

**a-Si TFT LCD Single Chip Driver  
132RGBx162 Resolution and 262K color  
Specification**

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## 1. Introduction

ILI9163C is a 262,144-color one-chip SoC driver for a-TFT liquid crystal display with resolution of 132RGBx162 dots, comprising a 396-channel source driver, a 162-channel gate driver, 48,114bytes GRAM for graphic data of 132RGBx162 dots, and power supply circuit.

The ILI9163C supports 18-/16-/9-/8-bit data bus interface and serial peripheral interfaces (SPI). It also supplies 18-bit, 16-bit or 6-bit RGB interface for driving video signal directly from application controller. The moving picture area can be specified in internal GRAM by window address function. The specified window area can be updated selectively, so that moving picture can be displayed simultaneously independent of still picture area.

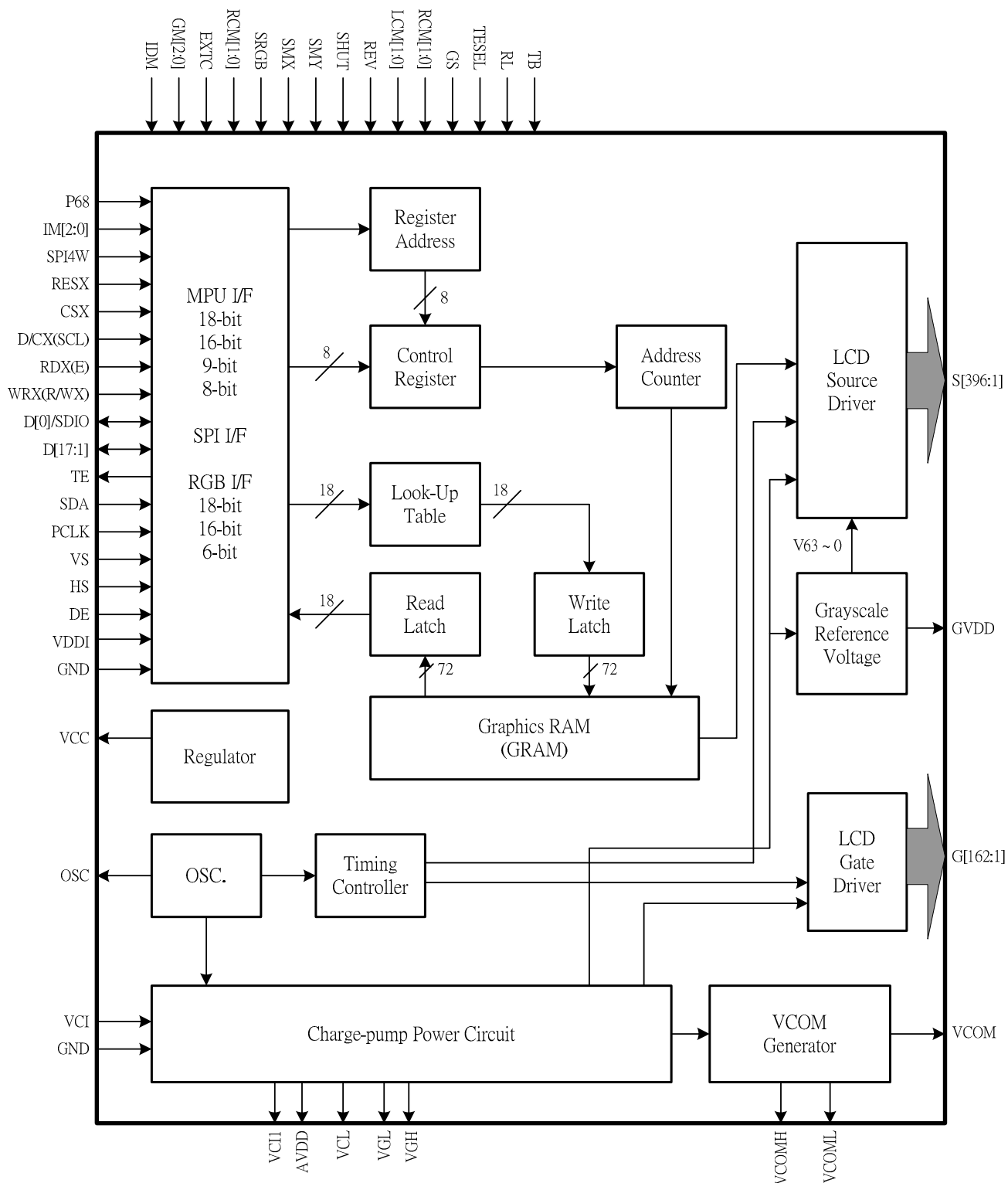
ILI9163C can operate with 1.65V I/O interface voltage, and an incorporated voltage follower circuit to generate voltage levels for driving an LCD. The ILI9163C also supports a function to display in 8 colors and a sleep mode, allowing for precise power control by software and these features make the ILI9163C an ideal LCD driver for medium or small size portable products such as digital cellular phones, smart phone, MP3 and PMP where long battery life is a major concern.

## 2. Features

- ◆ Display resolution: [132xRGB](H) x 162(V)
- ◆ Output:
  - 396 source outputs
  - 162 gate outputs
  - Common electrode output
- ◆ AM-LCD driver with on-chip full display RAM: 48,114 bytes
- ◆ System Interfaces
  - 8-bits, 9-bits, 16-bits, 18-bits interface with 8080-series MCU
  - 8-bits, 9-bits, 16-bits, 18-bits interface with 6800-series MCU
  - 6-bits, 16-bits, 18-bits RGB interface
  - 3-pin/4-pin serial interface
- ◆ Display mode:
  - Full color mode (idle mode off): 262K-colors
  - Reduced color mode (idle mode on): 8-colors (3-bits MSB bits mode)
- ◆ On chip functions:
  - VCOM generator and adjustment
  - Timing generator
  - Oscillator
  - DC/DC converter
  - 4 preset gamma curve selectable
  - Line/frame inversion
  - MTP to store initialization register setting
  - Factory default value(Contrast, Module ID, Module version, etc) are stored on the display module

- ◆ MTP:
  - 8-bits for ID2
  - 8-bits for ID3
  - 7-bits for VCOM adjustment
- ◆ Low –power consumption architecture
  - Low operating power supplies:
    - VDDI = 1.65V ~ 3.3 V (interface I/O)
    - VCI = 2.5V ~ 4.0 V (analog)
- ◆ LCD Voltage drive:
  - Source/VCOM power supply voltage
    - AVDD – GND = 4.5V ~ 6.0V
    - VCL – GND = -1.0V ~ -3.0V
    - VCI1 – VCL  $\leq$  6.0V
  - Gate driver output voltage
    - VGH – GND = 10V ~ 16V
    - VGL – GND = -6V ~ -12V
    - VGH – VGL  $\leq$  30V
  - VCOM driver output voltage
    - VCOMH = 2.5V ~5V
    - VCOML = -2.5V ~ 0V
    - VCOMH-VCOML  $\leq$  6.0V
- ◆ Operate temperature range: -40°C to 85°C

### 3. Block Diagram





## 4. Pin Descriptions

| Pin Name             | I/O | Descriptions                                                                                                                                                                                                                                                                                                                                                                                                |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
|----------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|--------------------|---|---|--------------------|---|---|---------------------|---|---|--------------------|---|---|---------------------|
| P68                  | I   | 8080/6800 MCU Interface mode selection.<br>P68='1': select 6800-MCU parallel interface<br>P68='0': select 8080-MCU parallel interface<br>If not used, please fix this pin at GND level.                                                                                                                                                                                                                     |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| IM2                  | I   | MCU Parallel interface bus and Serial interface select<br>- IM2='1'; Parallel Interface<br>- IM2='0'; Serial Interface                                                                                                                                                                                                                                                                                      |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| IM1, IM0             | I   | MCU parallel interface type selection <table border="1"> <thead> <tr> <th>IM1</th><th>IM0</th><th>Parallel interface</th></tr> </thead> <tbody> <tr> <td>0</td><td>0</td><td>MCU 8-bit Parallel</td></tr> <tr> <td>0</td><td>1</td><td>MCU 16-bit Parallel</td></tr> <tr> <td>1</td><td>0</td><td>MCU 9-bit Parallel</td></tr> <tr> <td>1</td><td>1</td><td>MCU 18-bit Parallel</td></tr> </tbody> </table> | IM1 | IM0 | Parallel interface | 0 | 0 | MCU 8-bit Parallel | 0 | 1 | MCU 16-bit Parallel | 1 | 0 | MCU 9-bit Parallel | 1 | 1 | MCU 18-bit Parallel |
| IM1                  | IM0 | Parallel interface                                                                                                                                                                                                                                                                                                                                                                                          |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| 0                    | 0   | MCU 8-bit Parallel                                                                                                                                                                                                                                                                                                                                                                                          |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| 0                    | 1   | MCU 16-bit Parallel                                                                                                                                                                                                                                                                                                                                                                                         |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| 1                    | 0   | MCU 9-bit Parallel                                                                                                                                                                                                                                                                                                                                                                                          |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| 1                    | 1   | MCU 18-bit Parallel                                                                                                                                                                                                                                                                                                                                                                                         |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| SPI4W                | I   | SPI interface selection pin<br>SPI4W='0': 3-wire SPI. (default)<br>SPI4W='1': 4-wire SPI.<br>This pin is internal pull low.                                                                                                                                                                                                                                                                                 |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| RESX                 | I   | Chip reset pin ("Low Active").<br>This signal low will reset the device and must be applied to properly initialize the chip.                                                                                                                                                                                                                                                                                |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| CSX                  | I   | Chip select input pin ("Low" enable).<br>This pin can be permanently fixed "Low" in MCU interface mode only.                                                                                                                                                                                                                                                                                                |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| D/CX<br>(SCL)        | I   | Display data / Command selection pin in parallel and SCL in 3-pin SPI interface.<br>D/CX='1': Display data.<br>D/CX='0': Command data.<br>If not used, please connect this pin to GND.                                                                                                                                                                                                                      |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| RDX<br>(E)           | I   | Read enable in 8080-parallel interface and Read/ Write operation enable pin in 6800-parallel interface.<br>In 8080-parallel interface, if not used, please connect this pin to VDDI.<br>In 6800-parallel interface, if not used, please connect this pin to VDDI or GND.                                                                                                                                    |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| WRX<br>(R/WX)(D/CX)  | I   | Write enable in parallel interface.<br>WRX: for 8080 MCU<br>R/WX: for 6800 MCU<br>D/CX: for 4-wire SPI<br>If not used, please connect this pin to VDDI or GND.                                                                                                                                                                                                                                              |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |
| D[17:1]<br>D[0]/SDIO | I/O | When RCM1='0' (MCU I/F), D[17:0] are used to MCU parallel interface data bus, and D0 is also the serial input/ output signal in SPI interface mode. In serial interface, D[17:1] are not used and should be connected to ground.<br>When RCM1='1' (RGB I/F), D[17:0] are used to RGB interface data bus.                                                                                                    |     |     |                    |   |   |                    |   |   |                     |   |   |                    |   |   |                     |

| Pin Name    | I/O                                                 | Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
|-------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------------|----------------------|-----------------------------------------------------|---|-----------------------------------------|---|------------------------------------------|------------------|---|---|------------------------------------------|---|---|---|------------------------------------------|---|---|---|------------------------------------------|---|---|---|------------------------------------------|---|---|---|------------------------------------------|
| TE          | O                                                   | Tearing effect output pin to synchronies MCU to frame writing, activated by S/W command. When this pin is not activated, this pin is low.<br>If not used, please open this pin.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| SDA         | I/O                                                 | When RCM1,RCM0='1X'(RGB I/F), serial input/output signal in serial I/F mode. The data is input on the rising edge of the SCL signal. The data is output on the falling edge of the SCL signal.<br>When RCM1,RCM0='0X'(MCU I/F), this pin is not used, and fix at VDDI or GND level.<br>If not used, please fix this pin at VDDI or GND level.                                                                                                                                                                                                                                                                                                                             |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| PCLK        | I                                                   | Pixel clock signal in RGB I/F mode.<br>-If it's not used, please fix this pin at GND level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| VS          | I                                                   | Vertical sync. Signal in RGB I/F mode.<br>-If it's not used, please fix this pin at GND level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| HS          | I                                                   | Horizontal sync. Signal in RGB I/F mode.<br>-If it's not used, please fix this pin at GND level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| DE          | I                                                   | Data enable signal in RGB I/F mode.<br>-If it's not used, please fix this pin at GND level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| OSC         | O                                                   | Oscillator output or test purpose.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| EXTC        | I                                                   | To use extended command set, please connect this pin to VDDI. During normal operation, please open this pin. (It has an internal pull low resistor.)<br>EXTC='1', all the command can be used.<br>EXTC='0', only Command (00h~3Ah, DAh~DCh) can be used                                                                                                                                                                                                                                                                                                                                                                                                                   |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| IDM         | I                                                   | Normal mode and Idle mode control pin(Only for RGB interface(2)) <table><tr><th>IDM</th><th>Idle mode H/W controller</th></tr><tr><td>0</td><td>Normal display (can be changed to Idle mode by S/W)</td></tr><tr><td>1</td><td>Idle mode</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                | IDM                                      | Idle mode H/W controller | 0                    | Normal display (can be changed to Idle mode by S/W) | 1 | Idle mode                               |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| IDM         | Idle mode H/W controller                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 0           | Normal display (can be changed to Idle mode by S/W) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 1           | Idle mode                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| GM2,GM1,GM0 | I                                                   | Panel Resolution selection pins <table><tr><th>GM2</th><th>GM1</th><th>GM0</th><th>Resolution selection</th></tr><tr><td>0</td><td>0</td><td>0</td><td>132RGB x 162(S1~396 and G1~ G162 output)</td></tr><tr><td>0</td><td>0</td><td>1</td><td>128RGB x 128(S7~390 and G2~ G129 output)</td></tr><tr><td>0</td><td>1</td><td>0</td><td>120RGB x 160(S7~366 and G2~ G161 output)</td></tr><tr><td>0</td><td>1</td><td>1</td><td>128RGB x 160(S7~390 and G2~ G161 output)</td></tr><tr><td>1</td><td>0</td><td>0</td><td>130RGB x 130(S7~396 and G2~ G131 output)</td></tr><tr><td>1</td><td>0</td><td>1</td><td>132RGB x 132(S1~396 and G2~ G133 output)</td></tr></table> | GM2                                      | GM1                      | GM0                  | Resolution selection                                | 0 | 0                                       | 0 | 132RGB x 162(S1~396 and G1~ G162 output) | 0                | 0 | 1 | 128RGB x 128(S7~390 and G2~ G129 output) | 0 | 1 | 0 | 120RGB x 160(S7~366 and G2~ G161 output) | 0 | 1 | 1 | 128RGB x 160(S7~390 and G2~ G161 output) | 1 | 0 | 0 | 130RGB x 130(S7~396 and G2~ G131 output) | 1 | 0 | 1 | 132RGB x 132(S1~396 and G2~ G133 output) |
| GM2         | GM1                                                 | GM0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Resolution selection                     |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 0           | 0                                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 132RGB x 162(S1~396 and G1~ G162 output) |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 0           | 0                                                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 128RGB x 128(S7~390 and G2~ G129 output) |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 0           | 1                                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 120RGB x 160(S7~366 and G2~ G161 output) |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 0           | 1                                                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 128RGB x 160(S7~390 and G2~ G161 output) |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 1           | 0                                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 130RGB x 130(S7~396 and G2~ G131 output) |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 1           | 0                                                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 132RGB x 132(S1~396 and G2~ G133 output) |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| RCM[1:0]    | I                                                   | RGB and MCU interface mode selection pin <table><tr><th>RCM1</th><th>RCM0</th><th>Resolution selection</th></tr><tr><td>0</td><td>X</td><td>MCU interface mode</td></tr><tr><td>1</td><td>0</td><td>RGB interface(1)</td></tr><tr><td>1</td><td>1</td><td>RGB interface(2)</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                              | RCM1                                     | RCM0                     | Resolution selection | 0                                                   | X | MCU interface mode                      | 1 | 0                                        | RGB interface(1) | 1 | 1 | RGB interface(2)                         |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| RCM1        | RCM0                                                | Resolution selection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 0           | X                                                   | MCU interface mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 1           | 0                                                   | RGB interface(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 1           | 1                                                   | RGB interface(2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| SRGB        | I                                                   | RGB direction select H/W pin for Color filter default setting. <table><tr><th>SRGB</th><th>Color mapping selection</th></tr><tr><td>0</td><td>S1, S2, S3 filter order = 'R', 'G', 'B'</td></tr><tr><td>1</td><td>S1, S2, S3 filter order = 'B', 'G', 'R'</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                | SRGB                                     | Color mapping selection  | 0                    | S1, S2, S3 filter order = 'R', 'G', 'B'             | 1 | S1, S2, S3 filter order = 'B', 'G', 'R' |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| SRGB        | Color mapping selection                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 0           | S1, S2, S3 filter order = 'R', 'G', 'B'             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |
| 1           | S1, S2, S3 filter order = 'B', 'G', 'R'             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                          |                      |                                                     |   |                                         |   |                                          |                  |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |   |   |   |                                          |

| Pin Name | I/O                             | Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|----------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------------------------|-------------------|------------------|---|----------------------------|----------|----------|----------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|          |                                 | <p>If the register is not changed, this H/W pin is always valid. If the register be changed, should be following registers setting.</p> <p>When Power On or H/W reset, this function follow H/W pins setting first.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| SMX      | I                               | <p>Source output direction H/W select pin</p> <table><tr><th rowspan="2">SMX</th><th colspan="6">Source Output Direction</th></tr><tr><th>GM='101'</th><th>GM='100'</th><th>GM='011'</th><th>GM='010'</th><th>GM='001'</th><th>GM='000'</th></tr><tr><td>0</td><td>S1 → S396</td><td>S7 → S396</td><td>S7 → S390</td><td>S7 → S366</td><td>S7 → S390</td><td>S1 → S396</td></tr><tr><td>1</td><td>S396 → S1</td><td>S396 → S7</td><td>S390 → S7</td><td>S366 → S7</td><td>S390 → S7</td><td>S396 → S1</td></tr></table> <p>If the register is not changed, this H/W pin is always valid. If the register be changed, should be following registers setting and H/W operation (XOR). When Power On or H/W reset, this function follow H/W pins setting first.</p> | SMX            | Source Output Direction         |                   |                  |   |                            |          | GM='101' | GM='100'       | GM='011' | GM='010' | GM='001' | GM='000'  | 0         | S1 → S396 | S7 → S396 | S7 → S390 | S7 → S366 | S7 → S390 | S1 → S396 | 1         | S396 → S1 | S396 → S7 | S390 → S7 | S366 → S7 | S390 → S7 | S396 → S1 |
| SMX      | Source Output Direction         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|          | GM='101'                        | GM='100'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | GM='011'       | GM='010'                        | GM='001'          | GM='000'         |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 0        | S1 → S396                       | S7 → S396                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | S7 → S390      | S7 → S366                       | S7 → S390         | S1 → S396        |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 1        | S396 → S1                       | S396 → S7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | S390 → S7      | S366 → S7                       | S390 → S7         | S396 → S1        |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| SMY      | I                               | <p>Gate output direction H/W select pin</p> <table><tr><th rowspan="2">SMY</th><th colspan="5">Gate Output Direction</th></tr><tr><th>GM='101'</th><th>GM='100'</th><th>GM='011','010'</th><th>GM='001'</th><th>GM='000'</th></tr><tr><td>0</td><td>G2 → G133</td><td>G2 → G131</td><td>G2 → G161</td><td>G2 → G129</td><td>G1 → G162</td></tr><tr><td>1</td><td>G133 → G2</td><td>G131 → G2</td><td>G161 → G2</td><td>G129 → G2</td><td>G162 → G1</td></tr></table> <p>If the register is not changed, this H/W pin is always valid. If the register be changed, should be following registers setting and H/W operation(XOR). When Power On or H/W reset, this function follow H/W pins setting first.</p>                                                     | SMY            | Gate Output Direction           |                   |                  |   |                            | GM='101' | GM='100' | GM='011','010' | GM='001' | GM='000' | 0        | G2 → G133 | G2 → G131 | G2 → G161 | G2 → G129 | G1 → G162 | 1         | G133 → G2 | G131 → G2 | G161 → G2 | G129 → G2 | G162 → G1 |           |           |           |           |
| SMY      | Gate Output Direction           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|          | GM='101'                        | GM='100'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | GM='011','010' | GM='001'                        | GM='000'          |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 0        | G2 → G133                       | G2 → G131                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | G2 → G161      | G2 → G129                       | G1 → G162         |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 1        | G133 → G2                       | G131 → G2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | G161 → G2      | G129 → G2                       | G162 → G1         |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| SHUT     | I                               | <p>Display On/ Off H/W control pin In RGB I/F(Only for RGB interface(2))</p> <table><tr><th>SHUT</th><th>Display On/Off in RGB interface</th></tr><tr><td>0</td><td>Display on</td></tr><tr><td>1</td><td>Display off</td></tr></table> <p>Please refer RGB I/F for detail using.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | SHUT           | Display On/Off in RGB interface | 0                 | Display on       | 1 | Display off                |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| SHUT     | Display On/Off in RGB interface |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 0        | Display on                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 1        | Display off                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| REV      | I                               | <p>Source output data polarity select H/W pin.</p> <table><tr><th>REV</th><th>Source output data polarity</th></tr><tr><td>0</td><td>Data not reverse</td></tr><tr><td>1</td><td>Data reverse</td></tr></table> <p>If the register is not changed, this H/W pin is always valid. If the register be changed, should be following registers setting.</p> <p>When Power On or H/W reset, this function follow H/W pins setting first.</p>                                                                                                                                                                                                                                                                                                                          | REV            | Source output data polarity     | 0                 | Data not reverse | 1 | Data reverse               |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| REV      | Source output data polarity     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 0        | Data not reverse                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 1        | Data reverse                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| LCM[1:0] | I                               | <p>Different Liquid Crystal type selection pins.</p> <p>There is a pull-low resistor only in LCM1 pin</p> <table><tr><th>LCM1</th><th>LCM0</th><th>LC Type Selection</th></tr><tr><td>0</td><td>0</td><td rowspan="4">TM (Transmission) LC Type2</td></tr><tr><td>0</td><td>1</td></tr><tr><td>1</td><td>0</td></tr><tr><td>1</td><td>1</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                        | LCM1           | LCM0                            | LC Type Selection | 0                | 0 | TM (Transmission) LC Type2 | 0        | 1        | 1              | 0        | 1        | 1        |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| LCM1     | LCM0                            | LC Type Selection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 0        | 0                               | TM (Transmission) LC Type2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 0        | 1                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 1        | 0                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 1        | 1                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| GS       | I                               | <p>Input pin to select the gamma curve order</p> <p>Connect to VDDI for GC0(2,2), GC1(1.8), GC2(2.5), GC3(1.0)</p> <p>Connect to GND for GC0(1,0), GC1(2.5), GC2(2.2), GC3(1.8)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                |                                 |                   |                  |   |                            |          |          |                |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |

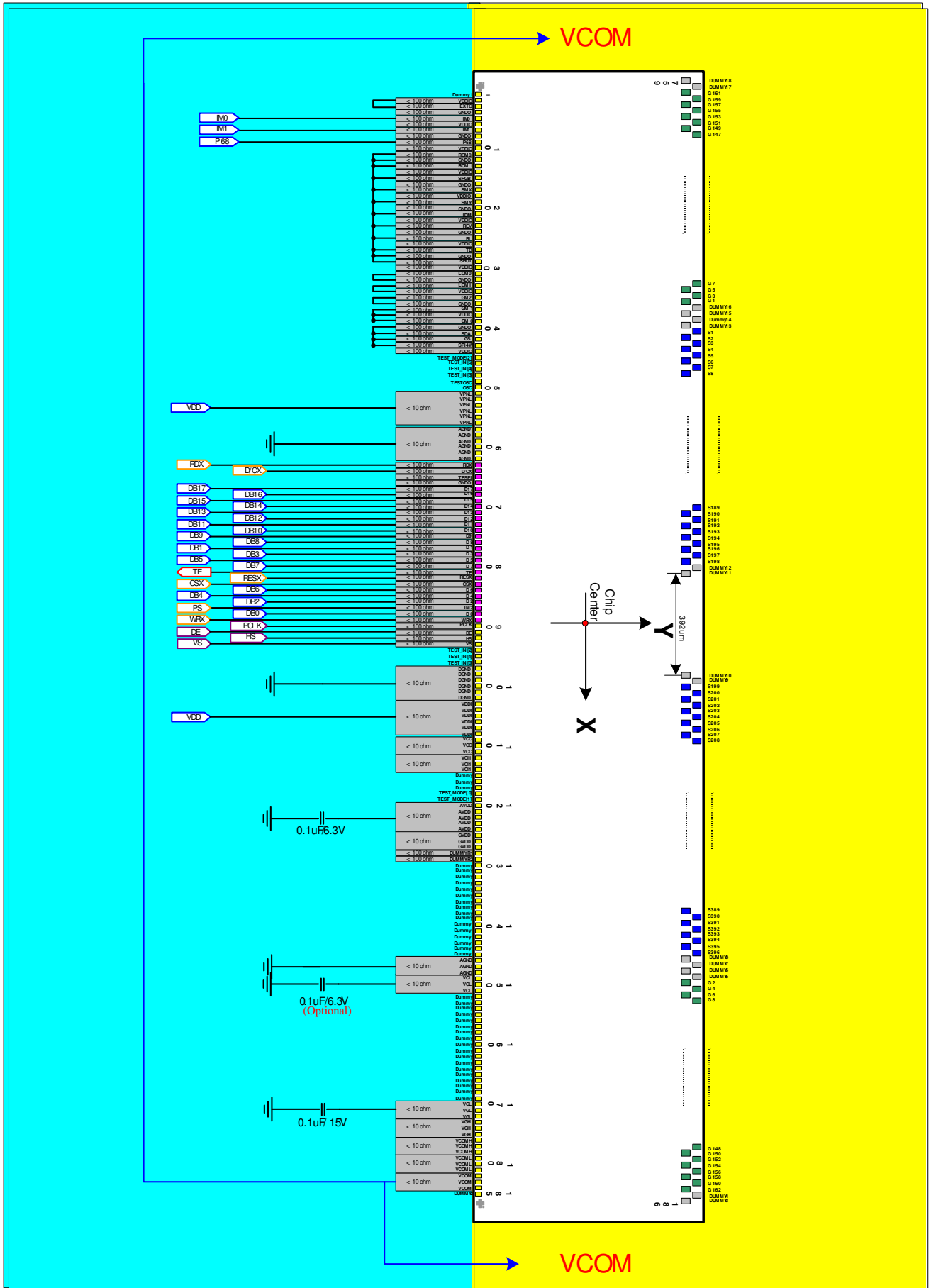
| Pin Name  | I/O                            | Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
|-----------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------|-----------|-----------|--|--|----------|----------|-------------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------------|-----------|-----------|----|--------------------------------|----------|----------|-------------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------|---|-----------|-----------|-----------|-----------|-----------|-----------|
| TESEL     | I                              | Default is internal pull high.<br>This pin is only for GM[2:0]='000' mode<br>Connect to VDDI (Disable scroll function)<br>Connect to GND (Enable scroll function)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| RL        | I                              | Source output direction H/W select pin in RGB interface(2)<br>When SMX=0 <table><tr><th rowspan="2">RL</th><th colspan="6">Module source output direction</th></tr><tr><th>GM='101'</th><th>GM='100'</th><th>GM='011'</th><th>GM='010'</th><th>GM='001'</th><th>GM='000'</th></tr><tr><td>0</td><td>S1 → S396</td><td>S7 → S396</td><td>S7 → S390</td><td>S7 → S366</td><td>S7 → S390</td><td>S1 → S396</td></tr><tr><td>1</td><td>S396 → S1</td><td>S396 → S7</td><td>S390 → S7</td><td>S366 → S7</td><td>S390 → S7</td><td>S396 → S1</td></tr></table><br>When SMX=1 <table><tr><th rowspan="2">RL</th><th colspan="6">Module source output direction</th></tr><tr><th>GM='101'</th><th>GM='100'</th><th>GM='011'</th><th>GM='010'</th><th>GM='001'</th><th>GM='000'</th></tr><tr><td>0</td><td>S396 → S1</td><td>S396 → S7</td><td>S390 → S7</td><td>S366 → S7</td><td>S390 → S7</td><td>S396 → S1</td></tr><tr><td>1</td><td>S1 → S396</td><td>S7 → S396</td><td>S7 → S390</td><td>S7 → S366</td><td>S7 → S390</td><td>S1 → S396</td></tr></table> | RL                | Module source output direction |           |           |  |  |          | GM='101' | GM='100'          | GM='011' | GM='010' | GM='001' | GM='000'  | 0         | S1 → S396 | S7 → S396 | S7 → S390 | S7 → S366 | S7 → S390 | S1 → S396 | 1         | S396 → S1 | S396 → S7 | S390 → S7 | S366 → S7                    | S390 → S7 | S396 → S1 | RL | Module source output direction |          |          |                   |          |          | GM='101' | GM='100'  | GM='011'  | GM='010'  | GM='001'  | GM='000'  | 0 | S396 → S1 | S396 → S7 | S390 → S7 | S366 → S7 | S390 → S7 | S396 → S1 | 1 | S1 → S396 | S7 → S396 | S7 → S390 | S7 → S366 | S7 → S390 | S1 → S396 |
| RL        | Module source output direction |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
|           | GM='101'                       | GM='100'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | GM='011'          | GM='010'                       | GM='001'  | GM='000'  |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| 0         | S1 → S396                      | S7 → S396                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | S7 → S390         | S7 → S366                      | S7 → S390 | S1 → S396 |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| 1         | S396 → S1                      | S396 → S7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | S390 → S7         | S366 → S7                      | S390 → S7 | S396 → S1 |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| RL        | Module source output direction |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
|           | GM='101'                       | GM='100'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | GM='011'          | GM='010'                       | GM='001'  | GM='000'  |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| 0         | S396 → S1                      | S396 → S7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | S390 → S7         | S366 → S7                      | S390 → S7 | S396 → S1 |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| 1         | S1 → S396                      | S7 → S396                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | S7 → S390         | S7 → S366                      | S7 → S390 | S1 → S396 |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| TB        | I                              | Gate output direction H/W select pin on RGB interface(2)<br>When SMY=0 <table><tr><th rowspan="2">TB</th><th colspan="5">Module gate output direction</th></tr><tr><th>GM='101'</th><th>GM='100'</th><th>GM='011',<br/>010'</th><th>GM='001'</th><th>GM='000'</th></tr><tr><td>0</td><td>G2 → G133</td><td>G2 → G131</td><td>G2 → G161</td><td>G2 → G129</td><td>G1 → G162</td></tr><tr><td>1</td><td>G133 → G2</td><td>G131 → G2</td><td>G161 → G2</td><td>G129 → G2</td><td>G162 → G1</td></tr></table><br>When SMY=1 <table><tr><th rowspan="2">TB</th><th colspan="5">Module gate output direction</th></tr><tr><th>GM='101'</th><th>GM='100'</th><th>GM='011',<br/>010'</th><th>GM='001'</th><th>GM='000'</th></tr><tr><td>0</td><td>G133 → G2</td><td>G131 → G2</td><td>G161 → G2</td><td>G129 → G2</td><td>G162 → G1</td></tr><tr><td>1</td><td>G2 → G133</td><td>G2 → G131</td><td>G2 → G161</td><td>G2 → G129</td><td>G1 → G162</td></tr></table>                                                                                             | TB                | Module gate output direction   |           |           |  |  | GM='101' | GM='100' | GM='011',<br>010' | GM='001' | GM='000' | 0        | G2 → G133 | G2 → G131 | G2 → G161 | G2 → G129 | G1 → G162 | 1         | G133 → G2 | G131 → G2 | G161 → G2 | G129 → G2 | G162 → G1 | TB        | Module gate output direction |           |           |    |                                | GM='101' | GM='100' | GM='011',<br>010' | GM='001' | GM='000' | 0        | G133 → G2 | G131 → G2 | G161 → G2 | G129 → G2 | G162 → G1 | 1 | G2 → G133 | G2 → G131 | G2 → G161 | G2 → G129 | G1 → G162 |           |   |           |           |           |           |           |           |
| TB        | Module gate output direction   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
|           | GM='101'                       | GM='100'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | GM='011',<br>010' | GM='001'                       | GM='000'  |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| 0         | G2 → G133                      | G2 → G131                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | G2 → G161         | G2 → G129                      | G1 → G162 |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| 1         | G133 → G2                      | G131 → G2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | G161 → G2         | G129 → G2                      | G162 → G1 |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| TB        | Module gate output direction   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
|           | GM='101'                       | GM='100'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | GM='011',<br>010' | GM='001'                       | GM='000'  |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| 0         | G133 → G2                      | G131 → G2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | G161 → G2         | G129 → G2                      | G162 → G1 |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| 1         | G2 → G133                      | G2 → G131                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | G2 → G161         | G2 → G129                      | G1 → G162 |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| S1 ~ S396 | O                              | Source driver output pins.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| G1 ~ G162 | O                              | Gate driver output pins.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| VCI       | P                              | Power supply for analog circuit.<br>Could connect to external power supply (VCI=2.5~4.8V).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| VDDI      | P                              | Power supply for interface logic circuits (1.65 ~ 3.3 V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| VCC       | P                              | Power supply for internal logic regulator.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| GND       | P                              | GND voltage output level for control pins.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| VDDIO     | P                              | VDDI voltage output level for control pins using.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| GNDO      | P                              | GND voltage output level for control pins using.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| VCI1      | P                              | A reference voltage in step-up circuit 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |
| AVDD      | P                              | A power output pin for source driver block that is generated from power block.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   |                                |           |           |  |  |          |          |                   |          |          |          |           |           |           |           |           |           |           |           |           |           |           |           |                              |           |           |    |                                |          |          |                   |          |          |          |           |           |           |           |           |   |           |           |           |           |           |           |   |           |           |           |           |           |           |

| Pin Name                      | I/O | Descriptions                                                                                                                                                            |
|-------------------------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               |     | Output of booster 1 circuit (output of 2-times output of VCI)<br>Connect a capacitor for stabilization.                                                                 |
| VCL                           | P   | A power supply pin for generating VCOML                                                                                                                                 |
| GVDD                          | P   | A standard level for grayscale voltage generator.                                                                                                                       |
| VGH                           | P   | Positive power supply for the gate driver.                                                                                                                              |
| VGL                           | P   | Negative power supply for the gate driver.<br>Connect a capacitor for stabilization                                                                                     |
| VCOM                          | O   | TFT display common electrode power supply. Alternates between voltage levels between VCOMH-VCOML.<br>Registers set the alternating cycle for operating or halting VCOM. |
| VCOMH                         | O   | The high level of VCOM AC voltage.                                                                                                                                      |
| VCOML                         | O   | The low level of VCOM AC voltage.                                                                                                                                       |
| TESTOSC                       | I   | These test pins for Driver vender test used.<br>Please open these pins or fix to GND.                                                                                   |
| TESTDA[5:0]<br>TEST_MODE[2:0] | O   | These test pins for Driver vendor test used.<br>Please open these pins.                                                                                                 |
| DUMMYR1-DUMMYR2               | -   | DUMMYR1 and DUMMYR2 are short-circuited within the chip for COG contact resistance measurement. Please leave them open when not used.                                   |
| DUMMY1-DUMMY18<br>DUMMY       | -   | Dummy pins. During normal operation, leave these pads open.                                                                                                             |

**Liquid crystal power supply specifications Table 1**

| No. | Item                              | Description                                        |
|-----|-----------------------------------|----------------------------------------------------|
| 1   | TFT Source Driver                 | 396 pins (132 x RGB)                               |
| 2   | TFT Gate Driver                   | 162 pins                                           |
| 3   | TFT Display's Capacitor Structure | Cst structure only (Common VCOM)                   |
| 4   | Liquid Crystal Drive Output       | S1 ~ S396 V0 ~ V63 grayscales                      |
|     |                                   | G1 ~ G162 VGH – VGL                                |
|     |                                   | VCOM VCOMH – VCOML: Amplitude = electronic volumes |
| 5   | Input Voltage                     | VDDI 1.65 ~ 3.30V                                  |
|     |                                   | VCI 2.50 ~ 4.00V                                   |
| 6   | Liquid Crystal Drive Voltages     | AVDD 4.5V ~ 6.0V                                   |
|     |                                   | VGH 10V ~ 16V                                      |
|     |                                   | VGL -6V ~ -12V                                     |
|     |                                   | VCL -1.0V ~ -3.0V                                  |
|     |                                   | VGH – VGL Max. 30V                                 |
|     |                                   | VCI – VCL Max. 6.0V                                |
|     | Internal Step-up Circuits         | AVDD VCI x2                                        |
|     |                                   | VGH AVDD x2.5, x3                                  |
|     |                                   | VGL AVDD -x2.5, -x3                                |
|     |                                   | VCL VCI1 x-1                                       |





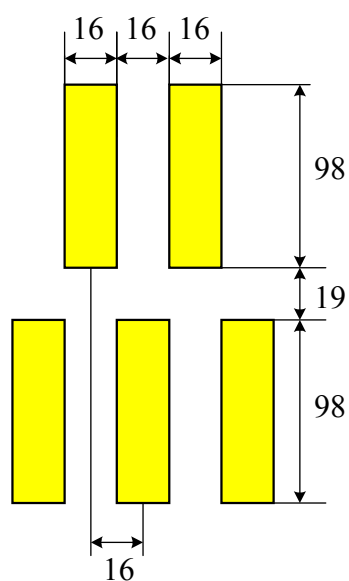
| No. | Name        | X     | Y      | No. | Name         | X     | Y      | No. | Name    | X    | Y      | No. | Name   | X    | Y      | No. | Name   | X    | Y   |
|-----|-------------|-------|--------|-----|--------------|-------|--------|-----|---------|------|--------|-----|--------|------|--------|-----|--------|------|-----|
| 1   | Dummy1      | -4750 | -238.5 | 61  | AGND         | -1750 | -238.5 | 121 | AVDD    | 1550 | -238.5 | 181 | VCOML  | 4550 | -238.5 | 241 | G56    | 3892 | 227 |
| 2   | VDDIO       | -4700 | -238.5 | 62  | AGND         | -1700 | -238.5 | 122 | AVDD    | 1600 | -238.5 | 182 | VCOM   | 4600 | -238.5 | 242 | G54    | 3876 | 110 |
| 3   | EXTC        | -4650 | -238.5 | 63  | RDX          | -1630 | -238.5 | 123 | AVDD    | 1650 | -238.5 | 183 | VCOM   | 4650 | -238.5 | 243 | G52    | 3860 | 227 |
| 4   | GNDO        | -4600 | -238.5 | 64  | D/CX         | -1570 | -238.5 | 124 | AVDD    | 1700 | -238.5 | 184 | VCOM   | 4700 | -238.5 | 244 | G50    | 3844 | 110 |
| 5   | IM0         | -4550 | -238.5 | 65  | TESEL        | -1510 | -238.5 | 125 | GVDD    | 1750 | -238.5 | 185 | DUMMY2 | 4750 | -238.5 | 245 | G48    | 3828 | 227 |
| 6   | VDDIO       | -4500 | -238.5 | 66  | GNDO         | -1450 | -238.5 | 126 | GVDD    | 1800 | -238.5 | 186 | DUMMY3 | 4772 | 110    | 246 | G46    | 3812 | 110 |
| 7   | IM1         | -4450 | -238.5 | 67  | D17          | -1390 | -238.5 | 127 | GVDD    | 1850 | -238.5 | 187 | DUMMY4 | 4756 | 227    | 247 | G44    | 3796 | 227 |
| 8   | GNDO        | -4400 | -238.5 | 68  | D16          | -1330 | -238.5 | 128 | DUMMYR1 | 1900 | -238.5 | 188 | G162   | 4740 | 110    | 248 | G42    | 3780 | 110 |
| 9   | P68         | -4350 | -238.5 | 69  | D15          | -1270 | -238.5 | 129 | DUMMYR2 | 1950 | -238.5 | 189 | G160   | 4724 | 227    | 249 | G40    | 3764 | 227 |
| 10  | VDDIO       | -4300 | -238.5 | 70  | D14          | -1210 | -238.5 | 130 | Dummy   | 2000 | -238.5 | 190 | G158   | 4708 | 110    | 250 | G38    | 3748 | 110 |
| 11  | RCM0        | -4250 | -238.5 | 71  | D13          | -1150 | -238.5 | 131 | Dummy   | 2050 | -238.5 | 191 | G156   | 4692 | 227    | 251 | G36    | 3732 | 227 |
| 12  | GNDO        | -4200 | -238.5 | 72  | D12          | -1090 | -238.5 | 132 | Dummy   | 2100 | -238.5 | 192 | G154   | 4676 | 110    | 252 | G34    | 3716 | 110 |
| 13  | RCM1        | -4150 | -238.5 | 73  | D11          | -1030 | -238.5 | 133 | Dummy   | 2150 | -238.5 | 193 | G152   | 4660 | 227    | 253 | G32    | 3700 | 227 |
| 14  | VDDIO       | -4100 | -238.5 | 74  | D10          | -970  | -238.5 | 134 | Dummy   | 2200 | -238.5 | 194 | G150   | 4644 | 110    | 254 | G30    | 3684 | 110 |
| 15  | SRGB        | -4050 | -238.5 | 75  | D9           | -910  | -238.5 | 135 | Dummy   | 2250 | -238.5 | 195 | G148   | 4628 | 227    | 255 | G28    | 3668 | 227 |
| 16  | GNDO        | -4000 | -238.5 | 76  | D8           | -850  | -238.5 | 136 | Dummy   | 2300 | -238.5 | 196 | G146   | 4612 | 110    | 256 | G26    | 3652 | 110 |
| 17  | SMX         | -3950 | -238.5 | 77  | D1           | -790  | -238.5 | 137 | Dummy   | 2350 | -238.5 | 197 | G144   | 4596 | 227    | 257 | G24    | 3636 | 227 |
| 18  | VDDIO       | -3900 | -238.5 | 78  | D3           | -730  | -238.5 | 138 | Dummy   | 2400 | -238.5 | 198 | G142   | 4580 | 110    | 258 | G22    | 3620 | 110 |
| 19  | SMY         | -3850 | -238.5 | 79  | D5           | -670  | -238.5 | 139 | Dummy   | 2450 | -238.5 | 199 | G140   | 4564 | 227    | 259 | G20    | 3604 | 227 |
| 20  | GNDO        | -3800 | -238.5 | 80  | D7           | -610  | -238.5 | 140 | Dummy   | 2500 | -238.5 | 200 | G138   | 4548 | 110    | 260 | G18    | 3588 | 110 |
| 21  | IDM         | -3750 | -238.5 | 81  | TE           | -550  | -238.5 | 141 | Dummy   | 2550 | -238.5 | 201 | G136   | 4532 | 227    | 261 | G16    | 3572 | 227 |
| 22  | VDDIO       | -3700 | -238.5 | 82  | RESX         | -490  | -238.5 | 142 | Dummy   | 2600 | -238.5 | 202 | G134   | 4516 | 110    | 262 | G14    | 3556 | 110 |
| 23  | REV         | -3650 | -238.5 | 83  | CSX          | -430  | -238.5 | 143 | Dummy   | 2650 | -238.5 | 203 | G132   | 4500 | 227    | 263 | G12    | 3540 | 227 |
| 24  | GNDO        | -3600 | -238.5 | 84  | D6           | -370  | -238.5 | 144 | Dummy   | 2700 | -238.5 | 204 | G130   | 4484 | 110    | 264 | G10    | 3524 | 110 |
| 25  | RL          | -3550 | -238.5 | 85  | D4           | -310  | -238.5 | 145 | Dummy   | 2750 | -238.5 | 205 | G128   | 4468 | 227    | 265 | G8     | 3508 | 227 |
| 26  | VDDIO       | -3500 | -238.5 | 86  | D2           | -250  | -238.5 | 146 | AGND    | 2800 | -238.5 | 206 | G126   | 4452 | 110    | 266 | G6     | 3492 | 110 |
| 27  | TB          | -3450 | -238.5 | 87  | IM2          | -190  | -238.5 | 147 | AGND    | 2850 | -238.5 | 207 | G124   | 4436 | 227    | 267 | G4     | 3476 | 227 |
| 28  | GNDO        | -3400 | -238.5 | 88  | D0           | -130  | -238.5 | 148 | AGND    | 2900 | -238.5 | 208 | G122   | 4420 | 110    | 268 | G2     | 3460 | 110 |
| 29  | SHUT        | -3350 | -238.5 | 89  | WRX          | -70   | -238.5 | 149 | VCL     | 2950 | -238.5 | 209 | G120   | 4404 | 227    | 269 | DUMMY5 | 3444 | 227 |
| 30  | VDDIO       | -3300 | -238.5 | 90  | PCLK         | 0     | -238.5 | 150 | VCL     | 3000 | -238.5 | 210 | G118   | 4388 | 110    | 270 | DUMMY6 | 3428 | 110 |
| 31  | LCM0        | -3250 | -238.5 | 91  | DE           | 50    | -238.5 | 151 | VCL     | 3050 | -238.5 | 211 | G116   | 4372 | 227    | 271 | DUMMY7 | 3412 | 227 |
| 32  | GNDO        | -3200 | -238.5 | 92  | HS           | 100   | -238.5 | 152 | Dummy   | 3100 | -238.5 | 212 | G114   | 4356 | 110    | 272 | DUMMY8 | 3396 | 110 |
| 33  | LCM1        | -3150 | -238.5 | 93  | VS           | 150   | -238.5 | 153 | Dummy   | 3150 | -238.5 | 213 | G112   | 4340 | 227    | 273 | S396   | 3380 | 227 |
| 34  | VDDIO       | -3100 | -238.5 | 94  | TESTDA[2]    | 200   | -238.5 | 154 | Dummy   | 3200 | -238.5 | 214 | G110   | 4324 | 110    | 274 | S395   | 3364 | 110 |
| 35  | GM2         | -3050 | -238.5 | 95  | TESTDA[1]    | 250   | -238.5 | 155 | Dummy   | 3250 | -238.5 | 215 | G108   | 4308 | 227    | 275 | S394   | 3348 | 227 |
| 36  | GNDO        | -3000 | -238.5 | 96  | TESTDA[0]    | 300   | -238.5 | 156 | Dummy   | 3300 | -238.5 | 216 | G106   | 4292 | 110    | 276 | S393   | 3332 | 110 |
| 37  | GM1         | -2950 | -238.5 | 97  | DGND         | 350   | -238.5 | 157 | Dummy   | 3350 | -238.5 | 217 | G104   | 4276 | 227    | 277 | S392   | 3316 | 227 |
| 38  | VDDIO       | -2900 | -238.5 | 98  | DGND         | 400   | -238.5 | 158 | Dummy   | 3400 | -238.5 | 218 | G102   | 4260 | 110    | 278 | S391   | 3300 | 110 |
| 39  | GM0         | -2850 | -238.5 | 99  | DGND         | 450   | -238.5 | 159 | Dummy   | 3450 | -238.5 | 219 | G100   | 4244 | 227    | 279 | S390   | 3284 | 227 |
| 40  | GNDO        | -2800 | -238.5 | 100 | DGND         | 500   | -238.5 | 160 | Dummy   | 3500 | -238.5 | 220 | G98    | 4228 | 110    | 280 | S389   | 3268 | 110 |
| 41  | SDA         | -2750 | -238.5 | 101 | DGND         | 550   | -238.5 | 161 | Dummy   | 3550 | -238.5 | 221 | G96    | 4212 | 227    | 281 | S388   | 3252 | 227 |
| 42  | GS          | -2700 | -238.5 | 102 | DGND         | 600   | -238.5 | 162 | Dummy   | 3600 | -238.5 | 222 | G94    | 4196 | 110    | 282 | S387   | 3236 | 110 |
| 43  | SPI4W       | -2650 | -238.5 | 103 | VDDI         | 650   | -238.5 | 163 | Dummy   | 3650 | -238.5 | 223 | G92    | 4180 | 227    | 283 | S386   | 3220 | 227 |
| 44  | VDDIO       | -2600 | -238.5 | 104 | VDDI         | 700   | -238.5 | 164 | Dummy   | 3700 | -238.5 | 224 | G90    | 4164 | 110    | 284 | S385   | 3204 | 110 |
| 45  | TESTMODE[2] | -2550 | -238.5 | 105 | VDDI         | 750   | -238.5 | 165 | Dummy   | 3750 | -238.5 | 225 | G88    | 4148 | 227    | 285 | S384   | 3188 | 227 |
| 46  | TESTDA[5]   | -2500 | -238.5 | 106 | VDDI         | 800   | -238.5 | 166 | Dummy   | 3800 | -238.5 | 226 | G86    | 4132 | 110    | 286 | S383   | 3172 | 110 |
| 47  | TESTDA[4]   | -2450 | -238.5 | 107 | VDDI         | 850   | -238.5 | 167 | Dummy   | 3850 | -238.5 | 227 | G84    | 4116 | 227    | 287 | S382   | 3156 | 227 |
| 48  | TESTDA[3]   | -2400 | -238.5 | 108 | VDDI         | 900   | -238.5 | 168 | Dummy   | 3900 | -238.5 | 228 | G82    | 4100 | 110    | 288 | S381   | 3140 | 110 |
| 49  | TESTOSC     | -2350 | -238.5 | 109 | VCC          | 950   | -238.5 | 169 | Dummy   | 3950 | -238.5 | 229 | G80    | 4084 | 227    | 289 | S380   | 3124 | 227 |
| 50  | OSC         | -2300 | -238.5 | 110 | VCC          | 1000  | -238.5 | 170 | VGL     | 4000 | -238.5 | 230 | G78    | 4068 | 110    | 290 | S379   | 3108 | 110 |
| 51  | VCI         | -2250 | -238.5 | 111 | VCC          | 1050  | -238.5 | 171 | VGL     | 4050 | -238.5 | 231 | G76    | 4052 | 227    | 291 | S378   | 3092 | 227 |
| 52  | VCI         | -2200 | -238.5 | 112 | VCI1         | 1100  | -238.5 | 172 | VGL     | 4100 | -238.5 | 232 | G74    | 4036 | 110    | 292 | S377   | 3076 | 110 |
| 53  | VCI         | -2150 | -238.5 | 113 | VCI1         | 1150  | -238.5 | 173 | VGH     | 4150 | -238.5 | 233 | G72    | 4020 | 227    | 293 | S376   | 3060 | 227 |
| 54  | VCI         | -2100 | -238.5 | 114 | VCI1         | 1200  | -238.5 | 174 | VGH     | 4200 | -238.5 | 234 | G70    | 4004 | 110    | 294 | S375   | 3044 | 110 |
| 55  | VCI         | -2050 | -238.5 | 115 | Dummy        | 1250  | -238.5 | 175 | VGH     | 4250 | -238.5 | 235 | G68    | 3988 | 227    | 295 | S374   | 3028 | 227 |
| 56  | VCI         | -2000 | -238.5 | 116 | Dummy        | 1300  | -238.5 | 176 | VCOMH   | 4300 | -238.5 | 236 | G66    | 3972 | 110    | 296 | S373   | 3012 | 110 |
| 57  | AGND        | -1950 | -238.5 | 117 | Dummy        | 1350  | -238.5 | 177 | VCOMH   | 4350 | -238.5 | 237 | G64    | 3956 | 227    | 297 | S372   | 2996 | 227 |
| 58  | AGND        | -1900 | -238.5 | 118 | TEST_MODE[0] | 1400  | -238.5 | 178 | VCOMH   | 4400 | -238.5 | 238 | G62    | 3940 | 110    | 298 | S371   | 2980 | 110 |
| 59  | AGND        | -1850 | -238.5 | 119 | TEST_MODE[1] | 1450  | -238.5 | 179 | VCOML   | 4450 | -238.5 | 239 | G60    | 3924 | 227    | 299 | S370   | 2964 | 227 |
| 60  | AGND        | -1800 | -238.5 | 120 | AVDD         | 1500  | -238.5 | 180 | VCOML   | 4500 | -238.5 | 240 | G58    | 3908 | 110    | 300 | S369   | 2948 | 110 |



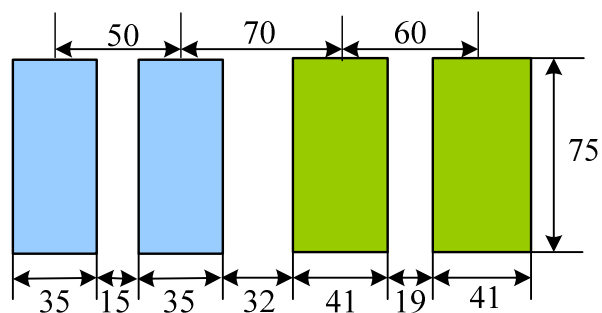
| No. | Name | X    | Y   | No. | Name | X    | Y   | No. | Name    | X    | Y   | No. | Name | X     | Y   | No. | Name | X     | Y   |
|-----|------|------|-----|-----|------|------|-----|-----|---------|------|-----|-----|------|-------|-----|-----|------|-------|-----|
| 301 | S368 | 2932 | 227 | 361 | S308 | 1972 | 227 | 421 | S248    | 1012 | 227 | 481 | S192 | -324  | 110 | 541 | S132 | -1284 | 110 |
| 302 | S367 | 2916 | 110 | 362 | S307 | 1956 | 110 | 422 | S247    | 996  | 110 | 482 | S191 | -340  | 227 | 542 | S131 | -1300 | 227 |
| 303 | S366 | 2900 | 227 | 363 | S306 | 1940 | 227 | 423 | S246    | 980  | 227 | 483 | S190 | -356  | 110 | 543 | S130 | -1316 | 110 |
| 304 | S365 | 2884 | 110 | 364 | S305 | 1924 | 110 | 424 | S245    | 964  | 110 | 484 | S189 | -372  | 227 | 544 | S129 | -1332 | 227 |
| 305 | S364 | 2868 | 227 | 365 | S304 | 1908 | 227 | 425 | S244    | 948  | 227 | 485 | S188 | -388  | 110 | 545 | S128 | -1348 | 110 |
| 306 | S363 | 2852 | 110 | 366 | S303 | 1892 | 110 | 426 | S243    | 932  | 110 | 486 | S187 | -404  | 227 | 546 | S127 | -1364 | 227 |
| 307 | S362 | 2836 | 227 | 367 | S302 | 1876 | 227 | 427 | S242    | 916  | 227 | 487 | S186 | -420  | 110 | 547 | S126 | -1380 | 110 |
| 308 | S361 | 2820 | 110 | 368 | S301 | 1860 | 110 | 428 | S241    | 900  | 110 | 488 | S185 | -436  | 227 | 548 | S125 | -1396 | 227 |
| 309 | S360 | 2804 | 227 | 369 | S300 | 1844 | 227 | 429 | S240    | 884  | 227 | 489 | S184 | -452  | 110 | 549 | S124 | -1412 | 110 |
| 310 | S359 | 2788 | 110 | 370 | S299 | 1828 | 110 | 430 | S239    | 868  | 110 | 490 | S183 | -468  | 227 | 550 | S123 | -1428 | 227 |
| 311 | S358 | 2772 | 227 | 371 | S298 | 1812 | 227 | 431 | S238    | 852  | 227 | 491 | S182 | -484  | 110 | 551 | S122 | -1444 | 110 |
| 312 | S357 | 2756 | 110 | 372 | S297 | 1796 | 110 | 432 | S237    | 836  | 110 | 492 | S181 | -500  | 227 | 552 | S121 | -1460 | 227 |
| 313 | S356 | 2740 | 227 | 373 | S296 | 1780 | 227 | 433 | S236    | 820  | 227 | 493 | S180 | -516  | 110 | 553 | S120 | -1476 | 110 |
| 314 | S355 | 2724 | 110 | 374 | S295 | 1764 | 110 | 434 | S235    | 804  | 110 | 494 | S179 | -532  | 227 | 554 | S119 | -1492 | 227 |
| 315 | S354 | 2708 | 227 | 375 | S294 | 1748 | 227 | 435 | S234    | 788  | 227 | 495 | S178 | -548  | 110 | 555 | S118 | -1508 | 110 |
| 316 | S353 | 2692 | 110 | 376 | S293 | 1732 | 110 | 436 | S233    | 772  | 110 | 496 | S177 | -564  | 227 | 556 | S117 | -1524 | 227 |
| 317 | S352 | 2676 | 227 | 377 | S292 | 1716 | 227 | 437 | S232    | 756  | 227 | 497 | S176 | -580  | 110 | 557 | S116 | -1540 | 110 |
| 318 | S351 | 2660 | 110 | 378 | S291 | 1700 | 110 | 438 | S231    | 740  | 110 | 498 | S175 | -596  | 227 | 558 | S115 | -1556 | 227 |
| 319 | S350 | 2644 | 227 | 379 | S290 | 1684 | 227 | 439 | S230    | 724  | 227 | 499 | S174 | -612  | 110 | 559 | S114 | -1572 | 110 |
| 320 | S349 | 2628 | 110 | 380 | S289 | 1668 | 110 | 440 | S229    | 708  | 110 | 500 | S173 | -628  | 227 | 560 | S113 | -1588 | 227 |
| 321 | S348 | 2612 | 227 | 381 | S288 | 1652 | 227 | 441 | S228    | 692  | 227 | 501 | S172 | -644  | 110 | 561 | S112 | -1604 | 110 |
| 322 | S347 | 2596 | 110 | 382 | S287 | 1636 | 110 | 442 | S227    | 676  | 110 | 502 | S171 | -660  | 227 | 562 | S111 | -1620 | 227 |
| 323 | S346 | 2580 | 227 | 383 | S286 | 1620 | 227 | 443 | S226    | 660  | 227 | 503 | S170 | -676  | 110 | 563 | S110 | -1636 | 110 |
| 324 | S345 | 2564 | 110 | 384 | S285 | 1604 | 110 | 444 | S225    | 644  | 110 | 504 | S169 | -692  | 227 | 564 | S109 | -1652 | 227 |
| 325 | S344 | 2548 | 227 | 385 | S284 | 1588 | 227 | 445 | S224    | 628  | 227 | 505 | S168 | -708  | 110 | 565 | S108 | -1668 | 110 |
| 326 | S343 | 2532 | 110 | 386 | S283 | 1572 | 110 | 446 | S223    | 612  | 110 | 506 | S167 | -724  | 227 | 566 | S107 | -1684 | 227 |
| 327 | S342 | 2516 | 227 | 387 | S282 | 1556 | 227 | 447 | S222    | 596  | 227 | 507 | S166 | -740  | 110 | 567 | S106 | -1700 | 110 |
| 328 | S341 | 2500 | 110 | 388 | S281 | 1540 | 110 | 448 | S221    | 580  | 110 | 508 | S165 | -756  | 227 | 568 | S105 | -1716 | 227 |
| 329 | S340 | 2484 | 227 | 389 | S280 | 1524 | 227 | 449 | S220    | 564  | 227 | 509 | S164 | -772  | 110 | 569 | S104 | -1732 | 110 |
| 330 | S339 | 2468 | 110 | 390 | S279 | 1508 | 110 | 450 | S219    | 548  | 110 | 510 | S163 | -788  | 227 | 570 | S103 | -1748 | 227 |
| 331 | S338 | 2452 | 227 | 391 | S278 | 1492 | 227 | 451 | S218    | 532  | 227 | 511 | S162 | -804  | 110 | 571 | S102 | -1764 | 110 |
| 332 | S337 | 2436 | 110 | 392 | S277 | 1476 | 110 | 452 | S217    | 516  | 110 | 512 | S161 | -820  | 227 | 572 | S101 | -1780 | 227 |
| 333 | S336 | 2420 | 227 | 393 | S276 | 1460 | 227 | 453 | S216    | 500  | 227 | 513 | S160 | -836  | 110 | 573 | S100 | -1796 | 110 |
| 334 | S335 | 2404 | 110 | 394 | S275 | 1444 | 110 | 454 | S215    | 484  | 110 | 514 | S159 | -852  | 227 | 574 | S99  | -1812 | 227 |
| 335 | S334 | 2388 | 227 | 395 | S274 | 1428 | 227 | 455 | S214    | 468  | 227 | 515 | S158 | -868  | 110 | 575 | S98  | -1828 | 110 |
| 336 | S333 | 2372 | 110 | 396 | S273 | 1412 | 110 | 456 | S213    | 452  | 110 | 516 | S157 | -884  | 227 | 576 | S97  | -1844 | 227 |
| 337 | S332 | 2356 | 227 | 397 | S272 | 1396 | 227 | 457 | S212    | 436  | 227 | 517 | S156 | -900  | 110 | 577 | S96  | -1860 | 110 |
| 338 | S331 | 2340 | 110 | 398 | S271 | 1380 | 110 | 458 | S211    | 420  | 110 | 518 | S155 | -916  | 227 | 578 | S95  | -1876 | 227 |
| 339 | S330 | 2324 | 227 | 399 | S270 | 1364 | 227 | 459 | S210    | 404  | 227 | 519 | S154 | -932  | 110 | 579 | S94  | -1892 | 110 |
| 340 | S329 | 2308 | 110 | 400 | S269 | 1348 | 110 | 460 | S209    | 388  | 110 | 520 | S153 | -948  | 227 | 580 | S93  | -1908 | 227 |
| 341 | S328 | 2292 | 227 | 401 | S268 | 1332 | 227 | 461 | S208    | 372  | 227 | 521 | S152 | -964  | 110 | 581 | S92  | -1924 | 110 |
| 342 | S327 | 2276 | 110 | 402 | S267 | 1316 | 110 | 462 | S207    | 356  | 110 | 522 | S151 | -980  | 227 | 582 | S91  | -1940 | 227 |
| 343 | S326 | 2260 | 227 | 403 | S266 | 1300 | 227 | 463 | S206    | 340  | 227 | 523 | S150 | -996  | 110 | 583 | S90  | -1956 | 110 |
| 344 | S325 | 2244 | 110 | 404 | S265 | 1284 | 110 | 464 | S205    | 324  | 110 | 524 | S149 | -1012 | 227 | 584 | S89  | -1972 | 227 |
| 345 | S324 | 2228 | 227 | 405 | S264 | 1268 | 227 | 465 | S204    | 308  | 227 | 525 | S148 | -1028 | 110 | 585 | S88  | -1988 | 110 |
| 346 | S323 | 2212 | 110 | 406 | S263 | 1252 | 110 | 466 | S203    | 292  | 110 | 526 | S147 | -1044 | 227 | 586 | S87  | -2004 | 227 |
| 347 | S322 | 2196 | 227 | 407 | S262 | 1236 | 227 | 467 | S202    | 276  | 227 | 527 | S146 | -1060 | 110 | 587 | S86  | -2020 | 110 |
| 348 | S321 | 2180 | 110 | 408 | S261 | 1220 | 110 | 468 | S201    | 260  | 110 | 528 | S145 | -1076 | 227 | 588 | S85  | -2036 | 227 |
| 349 | S320 | 2164 | 227 | 409 | S260 | 1204 | 227 | 469 | S200    | 244  | 227 | 529 | S144 | -1092 | 110 | 589 | S84  | -2052 | 110 |
| 350 | S319 | 2148 | 110 | 410 | S259 | 1188 | 110 | 470 | S199    | 228  | 110 | 530 | S143 | -1108 | 227 | 590 | S83  | -2068 | 227 |
| 351 | S318 | 2132 | 227 | 411 | S258 | 1172 | 227 | 471 | Dummy9  | 212  | 227 | 531 | S142 | -1124 | 110 | 591 | S82  | -2084 | 110 |
| 352 | S317 | 2116 | 110 | 412 | S257 | 1156 | 110 | 472 | Dummy10 | 196  | 110 | 532 | S141 | -1140 | 227 | 592 | S81  | -2100 | 227 |
| 353 | S316 | 2100 | 227 | 413 | S256 | 1140 | 227 | 473 | Dummy11 | -196 | 110 | 533 | S140 | -1156 | 110 | 593 | S80  | -2116 | 110 |
| 354 | S315 | 2084 | 110 | 414 | S255 | 1124 | 110 | 474 | Dummy12 | -212 | 227 | 534 | S139 | -1172 | 227 | 594 | S79  | -2132 | 227 |
| 355 | S314 | 2068 | 227 | 415 | S254 | 1108 | 227 | 475 | S198    | -228 | 110 | 535 | S138 | -1188 | 110 | 595 | S78  | -2148 | 110 |
| 356 | S313 | 2052 | 110 | 416 | S253 | 1092 | 110 | 476 | S197    | -244 | 227 | 536 | S137 | -1204 | 227 | 596 | S77  | -2164 | 227 |
| 357 | S312 | 2036 | 227 | 417 | S252 | 1076 | 227 | 477 | S196    | -260 | 110 | 537 | S136 | -1220 | 110 | 597 | S76  | -2180 | 110 |
| 358 | S311 | 2020 | 110 | 418 | S251 | 1060 | 110 | 478 | S195    | -276 | 227 | 538 | S135 | -1236 | 227 | 598 | S75  | -2196 | 227 |
| 359 | S310 | 2004 | 227 | 419 | S250 | 1044 | 227 | 479 | S194    | -292 | 110 | 539 | S134 | -1252 | 110 | 599 | S74  | -2212 | 110 |
| 360 | S309 | 1988 | 110 | 420 | S249 | 1028 | 110 | 480 | S193    | -308 | 227 | 540 | S133 | -1268 | 227 | 600 | S73  | -2228 | 227 |

| No. | Name | X     | Y   | No. | Name    | X     | Y   | No. | Name    | X     | Y    |
|-----|------|-------|-----|-----|---------|-------|-----|-----|---------|-------|------|
| 601 | S72  | -2244 | 110 | 661 | S12     | -3204 | 110 | 721 | G89     | -4164 | 110  |
| 602 | S71  | -2260 | 227 | 662 | S11     | -3220 | 227 | 722 | G91     | -4180 | 227  |
| 603 | S70  | -2276 | 110 | 663 | S10     | -3236 | 110 | 723 | G93     | -4196 | 110  |
| 604 | S69  | -2292 | 227 | 664 | S9      | -3252 | 227 | 724 | G95     | -4212 | 227  |
| 605 | S68  | -2308 | 110 | 665 | S8      | -3268 | 110 | 725 | G97     | -4228 | 110  |
| 606 | S67  | -2324 | 227 | 666 | S7      | -3284 | 227 | 726 | G99     | -4244 | 227  |
| 607 | S66  | -2340 | 110 | 667 | S6      | -3300 | 110 | 727 | G101    | -4260 | 110  |
| 608 | S65  | -2356 | 227 | 668 | S5      | -3316 | 227 | 728 | G103    | -4276 | 227  |
| 609 | S64  | -2372 | 110 | 669 | S4      | -3332 | 110 | 729 | G105    | -4292 | 110  |
| 610 | S63  | -2388 | 227 | 670 | S3      | -3348 | 227 | 730 | G107    | -4308 | 227  |
| 611 | S62  | -2404 | 110 | 671 | S2      | -3364 | 110 | 731 | G109    | -4324 | 110  |
| 612 | S61  | -2420 | 227 | 672 | S1      | -3380 | 227 | 732 | G111    | -4340 | 227  |
| 613 | S60  | -2436 | 110 | 673 | Dummy13 | -3396 | 110 | 733 | G113    | -4356 | 110  |
| 614 | S59  | -2452 | 227 | 674 | Dummy14 | -3412 | 227 | 734 | G115    | -4372 | 227  |
| 615 | S58  | -2468 | 110 | 675 | Dummy15 | -3428 | 110 | 735 | G117    | -4388 | 110  |
| 616 | S57  | -2484 | 227 | 676 | Dummy16 | -3444 | 227 | 736 | G119    | -4404 | 227  |
| 617 | S56  | -2500 | 110 | 677 | G1      | -3460 | 110 | 737 | G121    | -4420 | 110  |
| 618 | S55  | -2516 | 227 | 678 | G3      | -3476 | 227 | 738 | G123    | -4436 | 227  |
| 619 | S54  | -2532 | 110 | 679 | G5      | -3492 | 110 | 739 | G125    | -4452 | 110  |
| 620 | S53  | -2548 | 227 | 680 | G7      | -3508 | 227 | 740 | G127    | -4468 | 227  |
| 621 | S52  | -2564 | 110 | 681 | G9      | -3524 | 110 | 741 | G129    | -4484 | 110  |
| 622 | S51  | -2580 | 227 | 682 | G11     | -3540 | 227 | 742 | G131    | -4500 | 227  |
| 623 | S50  | -2596 | 110 | 683 | G13     | -3556 | 110 | 743 | G133    | -4516 | 110  |
| 624 | S49  | -2612 | 227 | 684 | G15     | -3572 | 227 | 744 | G135    | -4532 | 227  |
| 625 | S48  | -2628 | 110 | 685 | G17     | -3588 | 110 | 745 | G137    | -4548 | 110  |
| 626 | S47  | -2644 | 227 | 686 | G19     | -3604 | 227 | 746 | G139    | -4564 | 227  |
| 627 | S46  | -2660 | 110 | 687 | G21     | -3620 | 110 | 747 | G141    | -4580 | 110  |
| 628 | S45  | -2676 | 227 | 688 | G23     | -3636 | 227 | 748 | G143    | -4596 | 227  |
| 629 | S44  | -2692 | 110 | 689 | G25     | -3652 | 110 | 749 | G145    | -4612 | 110  |
| 630 | S43  | -2708 | 227 | 690 | G27     | -3668 | 227 | 750 | G147    | -4628 | 227  |
| 631 | S42  | -2724 | 110 | 691 | G29     | -3684 | 110 | 751 | G149    | -4644 | 110  |
| 632 | S41  | -2740 | 227 | 692 | G31     | -3700 | 227 | 752 | G151    | -4660 | 227  |
| 633 | S40  | -2756 | 110 | 693 | G33     | -3716 | 110 | 753 | G153    | -4676 | 110  |
| 634 | S39  | -2772 | 227 | 694 | G35     | -3732 | 227 | 754 | G155    | -4692 | 227  |
| 635 | S38  | -2788 | 110 | 695 | G37     | -3748 | 110 | 755 | G157    | -4708 | 110  |
| 636 | S37  | -2804 | 227 | 696 | G39     | -3764 | 227 | 756 | G159    | -4724 | 227  |
| 637 | S36  | -2820 | 110 | 697 | G41     | -3780 | 110 | 757 | G161    | -4740 | 110  |
| 638 | S35  | -2836 | 227 | 698 | G43     | -3796 | 227 | 758 | Dummy17 | -4756 | 227  |
| 639 | S34  | -2852 | 110 | 699 | G45     | -3812 | 110 | 759 | Dummy18 | -4772 | 110  |
| 640 | S33  | -2868 | 227 | 700 | G47     | -3828 | 227 |     |         |       |      |
| 641 | S32  | -2884 | 110 | 701 | G49     | -3844 | 110 |     | ALK-R   | 4841  | -220 |
| 642 | S31  | -2900 | 227 | 702 | G51     | -3860 | 227 |     | ALK-L   | -4841 | -220 |
| 643 | S30  | -2916 | 110 | 703 | G53     | -3876 | 110 |     |         |       |      |
| 644 | S29  | -2932 | 227 | 704 | G55     | -3892 | 227 |     |         |       |      |
| 645 | S28  | -2948 | 110 | 705 | G57     | -3908 | 110 |     |         |       |      |
| 646 | S27  | -2964 | 227 | 706 | G59     | -3924 | 227 |     |         |       |      |
| 647 | S26  | -2980 | 110 | 707 | G61     | -3940 | 110 |     |         |       |      |
| 648 | S25  | -2996 | 227 | 708 | G63     | -3956 | 227 |     |         |       |      |
| 649 | S24  | -3012 | 110 | 709 | G65     | -3972 | 110 |     |         |       |      |
| 650 | S23  | -3028 | 227 | 710 | G67     | -3988 | 227 |     |         |       |      |
| 651 | S22  | -3044 | 110 | 711 | G69     | -4004 | 110 |     |         |       |      |
| 652 | S21  | -3060 | 227 | 712 | G71     | -4020 | 227 |     |         |       |      |
| 653 | S20  | -3076 | 110 | 713 | G73     | -4036 | 110 |     |         |       |      |
| 654 | S19  | -3092 | 227 | 714 | G75     | -4052 | 227 |     |         |       |      |
| 655 | S18  | -3108 | 110 | 715 | G77     | -4068 | 110 |     |         |       |      |
| 656 | S17  | -3124 | 227 | 716 | G79     | -4084 | 227 |     |         |       |      |
| 657 | S16  | -3140 | 110 | 717 | G81     | -4100 | 110 |     |         |       |      |
| 658 | S15  | -3156 | 227 | 718 | G83     | -4116 | 227 |     |         |       |      |
| 659 | S14  | -3172 | 110 | 719 | G85     | -4132 | 110 |     |         |       |      |
| 660 | S13  | -3188 | 227 | 720 | G87     | -4148 | 227 |     |         |       |      |

S1 ~ S396  
G1 ~ G162



Input Pad



## 6. Function Description

### 6.1 MCU Interface Type Selection

The selection of a given interfaces are done by setting P68, IM2, IM1, and IM0 pins as show in below tables.

**Table 6.1.1 MCU Interface Type Selection**

| P68 | IM2 | IM1 | IM0 | Interface                | Read back selection                                                |
|-----|-----|-----|-----|--------------------------|--------------------------------------------------------------------|
| -   | 0   | -   | -   | Serial interface         | Via the read instruction (8-bit, 24-bit and 32-bit read parameter) |
| 0   | 1   | 0   | 0   | 8080 MCU 8-bit Parallel  | RDX strobe(8-bit read data and 8-bit read parameter)               |
| 0   | 1   | 0   | 1   | 8080 MCU 16-bit Parallel | RDX strobe(16-bit read data and 8-bit read parameter)              |
| 0   | 1   | 1   | 0   | 8080 MCU 9-bit Parallel  | RDX strobe(9-bit read data and 8-bit read parameter)               |
| 0   | 1   | 1   | 1   | 8080 MCU 18-bit Parallel | RDX strobe(18-bit read data and 8-bit read parameter)              |
| 1   | 1   | 0   | 0   | 6800 MCU 8-bit Parallel  | E strobe(8-bit read data and 8-bit read parameter)                 |
| 1   | 1   | 0   | 1   | 6800 MCU 16-bit Parallel | E strobe(9-bit read data and 8-bit read parameter)                 |
| 1   | 1   | 1   | 0   | 6800 MCU 9-bit Parallel  | E strobe(16-bit read data and 8-bit read parameter)                |
| 1   | 1   | 1   | 1   | 6800 MCU 18-bit Parallel | E strobe(18-bit read data and 8-bit read parameter)                |

## 6.2 Serial Interface

The Module uses a 3-wire 9-bit serial interface or 4-pins/8-bit bi-directional interface for communication between the micro controller and the LCD driver chip. The 3-pins serial use: CSX (chip enable), SCL(serial clock) and SDA(serial data input/output) and the 4-pins serial use: CSX(chip enable), D/CX(data/ command select), SCL(serial clock), and SDA(serial data input/output).

**Table 6.2.1 Serial Interface Type Selection**

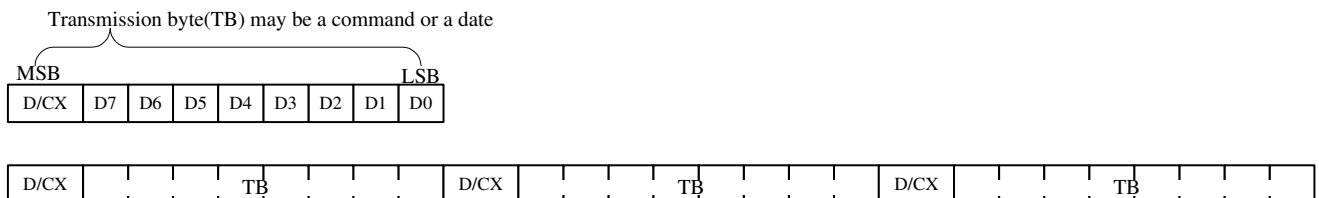
| IM2 | 4WSPI | Interface               | Read back selection                                               |
|-----|-------|-------------------------|-------------------------------------------------------------------|
| 0   | 0     | 3-Pins Serial Interface | Via the read instruction(8-bit, 24-bit and 32-bit read parameter) |
| 0   | 1     | 4-Pins Serial Interface | Via the read instruction(8-bit, 24-bit and 32-bit read parameter) |

### 6.2.1 Command Write

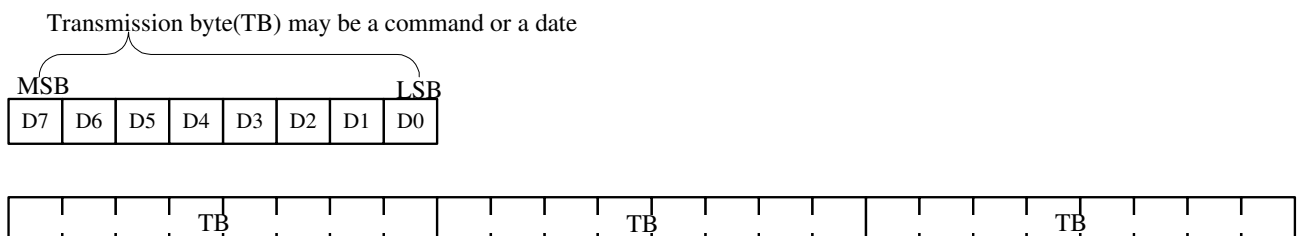
The write mode of the interface means the micro controller writes commands and data to the LCD driver. 3-pins serial data packet contains a control bit D/CX and a transmission byte and in 4-pins serial case, data packet contains just transmission byte and control bit D/CX is transferred by the D/CX pin. If D/CX is “low”, the transmission byte is interpreted as a command byte. If D/CX is “high”, the transmission byte is stored in the display data RAM (Memory write command), or command register as parameter.

Any instruction can be sent in any orders to the Driver. The MSB is transmitted first. The serial interface is initialized when CSX is high status. In this state, SCL clock pulse or SDA data have no effect. A falling edge on CSX enables the serial interface and indicated the start of data transmission.

**Figure1: 3-pins Serial Data Stream Format**

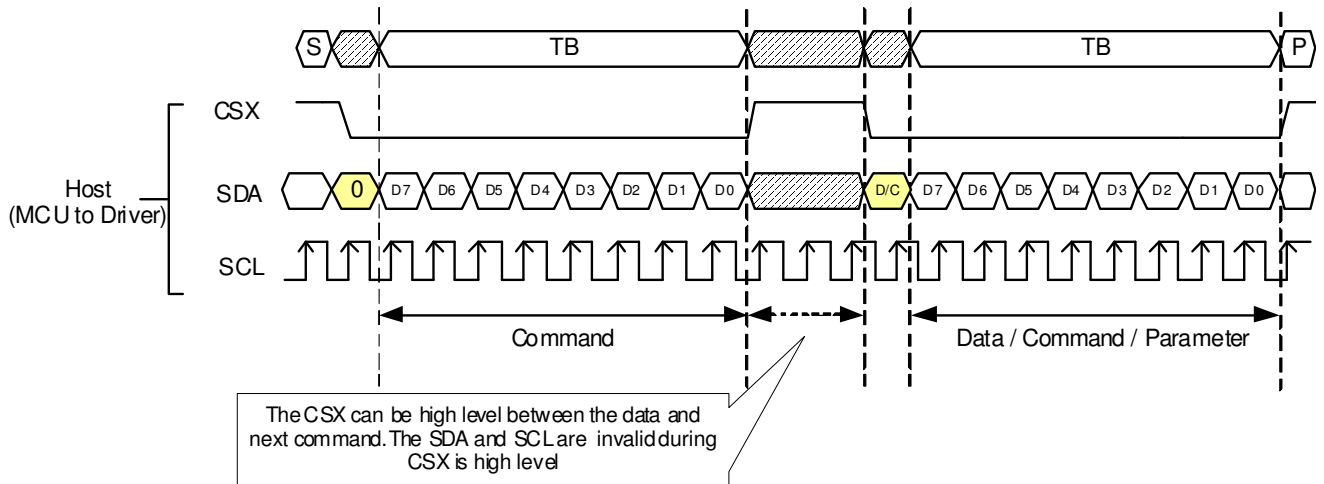


**Figure2: 4-pins Serial Data Stream Format**

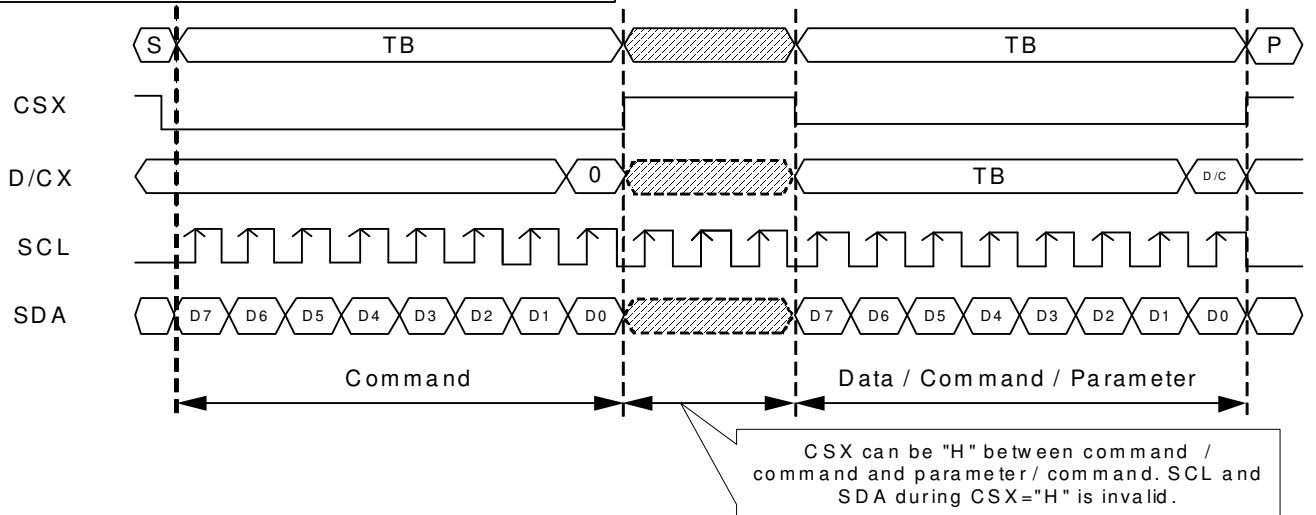


When CSX is “high”, SCL clock is ignored. At the falling edge of CSX, SCL can be high or low. SDA is sampled at the rising edge of CSX. D/CX indicates, whether the byte is command code (D/CX=’0’) or parameter/RAM data (D/CX=’1’). If CSX stays low after the last bit of command/data byte, the serial interface expects the D/CX bit (3-pin serial interface) or D7(4-pins serial interface) of the next byte at the next rising edge of SCL.

### 3-line Serial Interface Protocol



### 4-line Serial Interface Protocol



## 6.2.2 Read Function

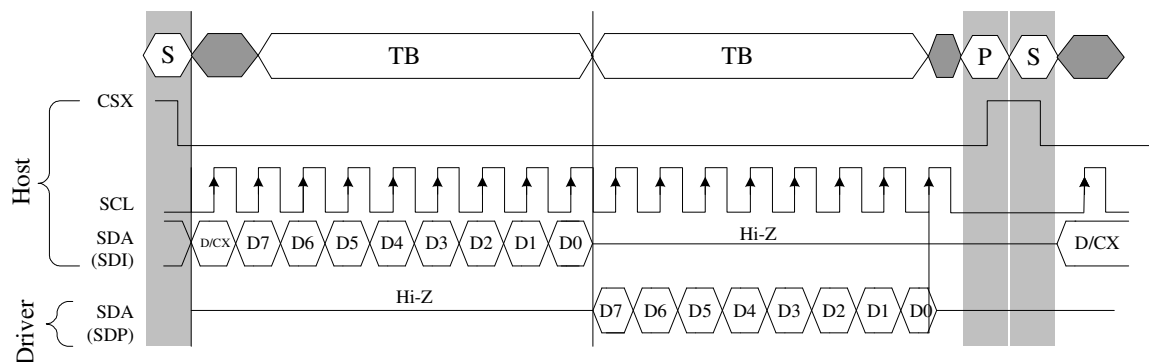
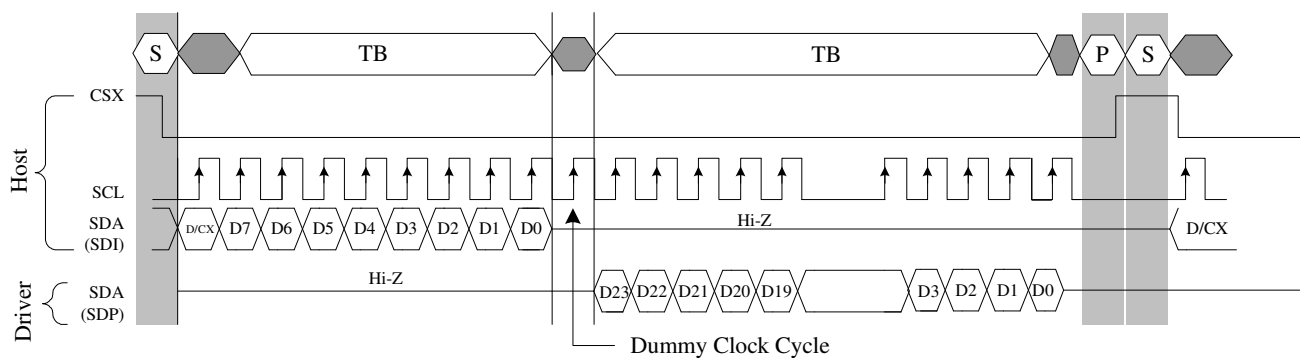
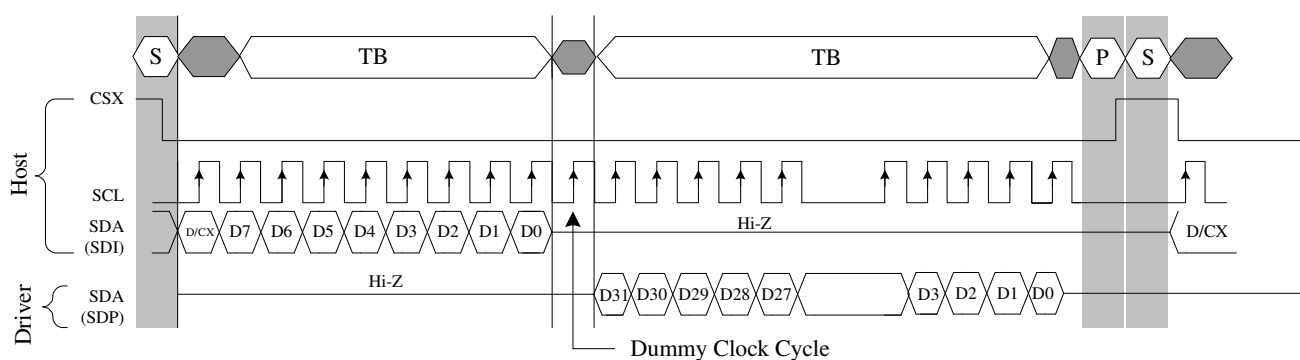


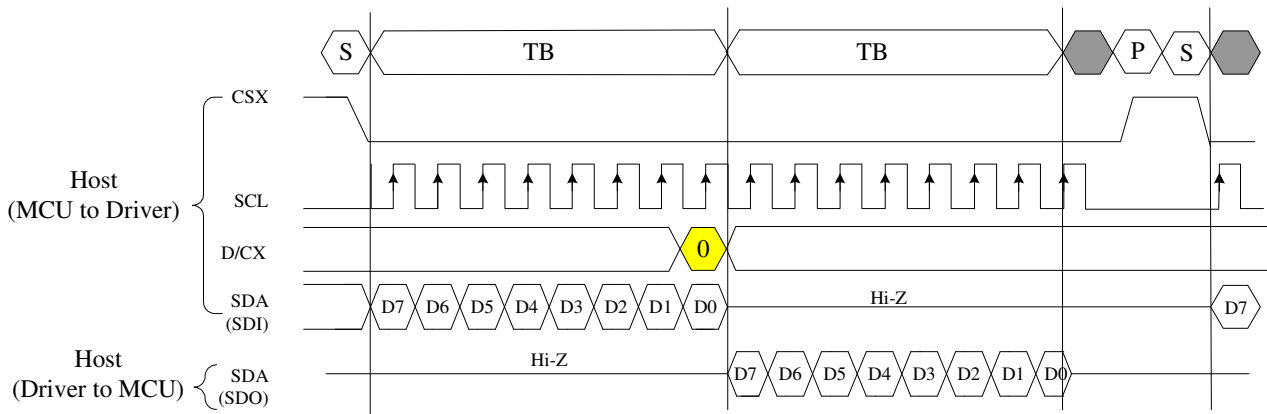
Figure3: 3-Pins Serial Protocol (for DAH/DBH/DCH/0Ah/0Bh/0Ch/0Dh/0Eh/0Fh command: 8-bit read)



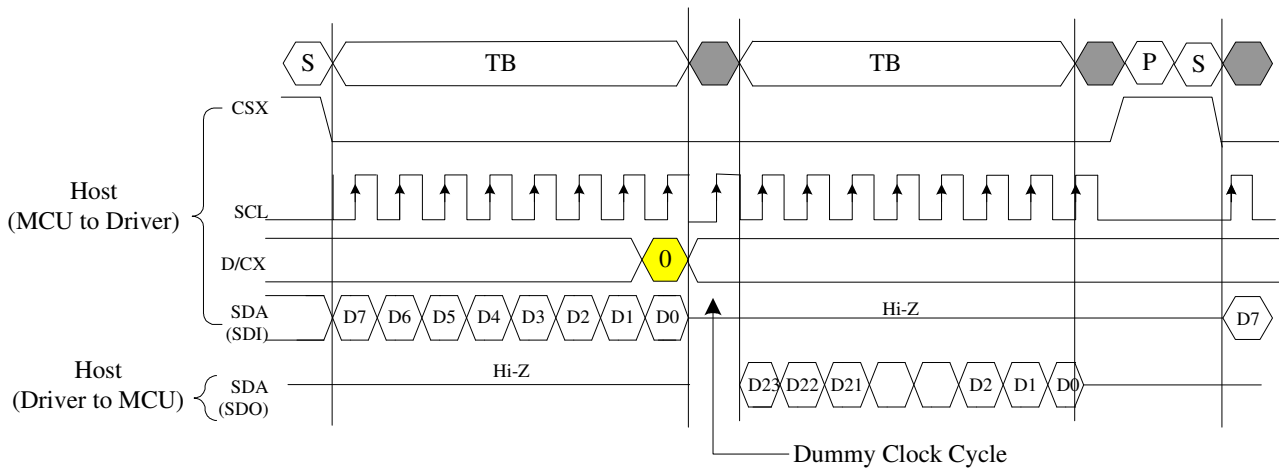
**Figure4: 3-Pins Serial Protocol (for 04H command: 24-bit read)**



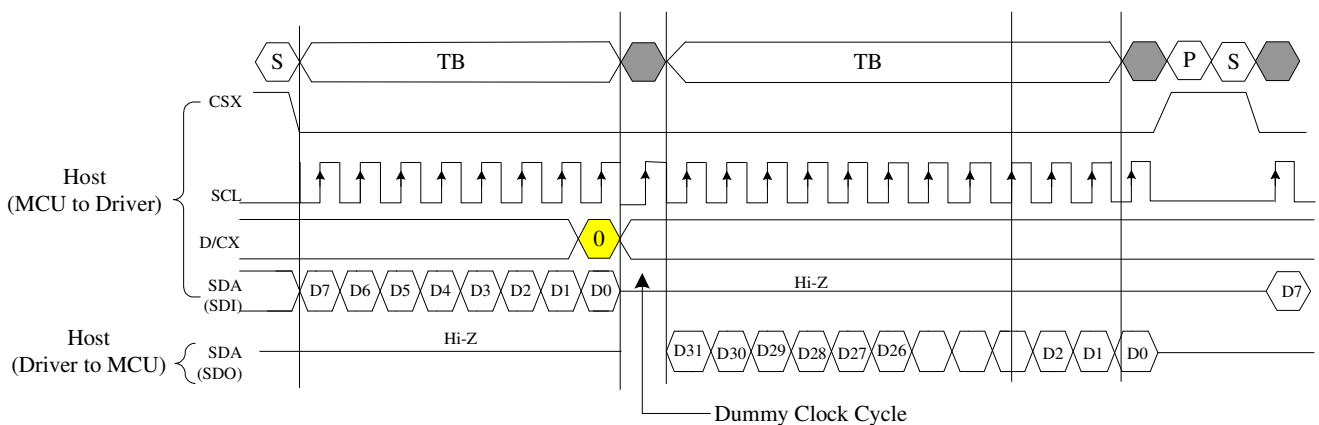
**Figure5: 3-Pins Serial Protocol (for 09H command: 32-bit read)**



**Figure6: 4-pins Serial Protocol (for DAH/DBH/DCH/0AH/0BH/0CH/0DH/0EH/0FH command: 8-bit read)**



**Figure7: 4-pins Serial Protocol (for 04H command: 24-bit read)**



**Figure8: 4-pins Serial Protocol (for 09H command: 32-bit read)**



### 6.3 8080-Series Parallel Interface (P68='0')

The MCU uses a 11-wires 8-data parallel interface or 12-wires 9-data parallel interface or 19-wires 16-data parallel interface or 21-wires 18-data parallel interface. The chip-select CSX (active low) enables and disables the parallel interface. RESX (active low) is an external reset signal. WRX is the parallel data write, RDX is the parallel data read and D[17:0] is parallel data.

The graphics controller chip reads the data at the rising edge of WRX signal. The D/CX is the data/command flag. When D/CX='1', D[17,0] bits are display RAM data or command parameters. When D/C='0', D[17,0] bits are commands.

The 8080-series bi-direction interface can be used for communication between the micro controller and LCD driver chip. The selection of this interface is done when P68 pin is low state (GND). Interface bus width can be selected with IM2, IM1 and IM0. The interface function of 8080-series parallel interface are given in Table 6.3.1.

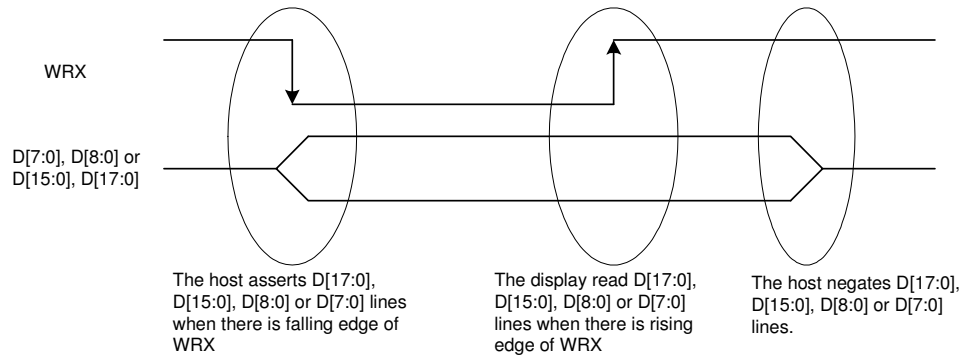
**Table 6.3.1 The function of 8080-series parallel interface**

| P68 | IM2 | IM1 | IM0 | Interface       | D/CX | RDX | WRX | Function                                                |
|-----|-----|-----|-----|-----------------|------|-----|-----|---------------------------------------------------------|
| 0   | 1   | 0   | 0   | 8-bit Parallel  | 0    | 1   | ↑   | Write 8-bit command(D7 to D0)                           |
|     |     |     |     |                 | 1    | 1   | ↑   | Write 8-bit display data or 8-bit parameter(D7 to D0)   |
|     |     |     |     |                 | 1    | ↑   | 1   | Read 8-bit display data(D7 to D0)                       |
|     |     |     |     |                 | 1    | ↑   | 1   | Read 8-bit parameter or status(D7 to D0)                |
| 0   | 1   | 0   | 1   | 16-bit Parallel | 0    | 1   | ↑   | Write 8-bit command(D7 to D0)                           |
|     |     |     |     |                 | 1    | 1   | ↑   | Write 16-bit display data or 8-bit parameter(D15 to D0) |
|     |     |     |     |                 | 1    | ↑   | 1   | Read 16-bit display data(D15 to D0)                     |
|     |     |     |     |                 | 1    | ↑   | 1   | Read 8-bit parameter or status(D7 to D0)                |
| 0   | 1   | 1   | 0   | 9-bit Parallel  | 0    | 1   | ↑   | Write 8-bit command(D7 to D0)                           |
|     |     |     |     |                 | 1    | 1   | ↑   | Write 9-bit display data or 8-bit parameter(D8 to D0)   |
|     |     |     |     |                 | 1    | ↑   | 1   | Read 9-bit display data (D8 to D0)                      |
|     |     |     |     |                 | 1    | ↑   | 1   | Read 8-bit parameter or status(D7 to D0)                |
| 0   | 1   | 1   | 1   | 18-bit Parallel | 0    | 1   | ↑   | Write 8-bit command(D7 to D0)                           |
|     |     |     |     |                 | 1    | 1   | ↑   | Write 18-bit display data or 8-bit parameter(D17 to D0) |
|     |     |     |     |                 | 1    | ↑   | 1   | Read 18-bit display data(D17 to D0)                     |
|     |     |     |     |                 | 1    | ↑   | 1   | Read 8-bit parameter or status(D7 to D0)                |

Note: Reading operation applied for command code: DAh, DBh, DCh, 04h, 09h, 0Ah, 0Bh, 0Ch, 0Dh, 0Eh, 0Fh

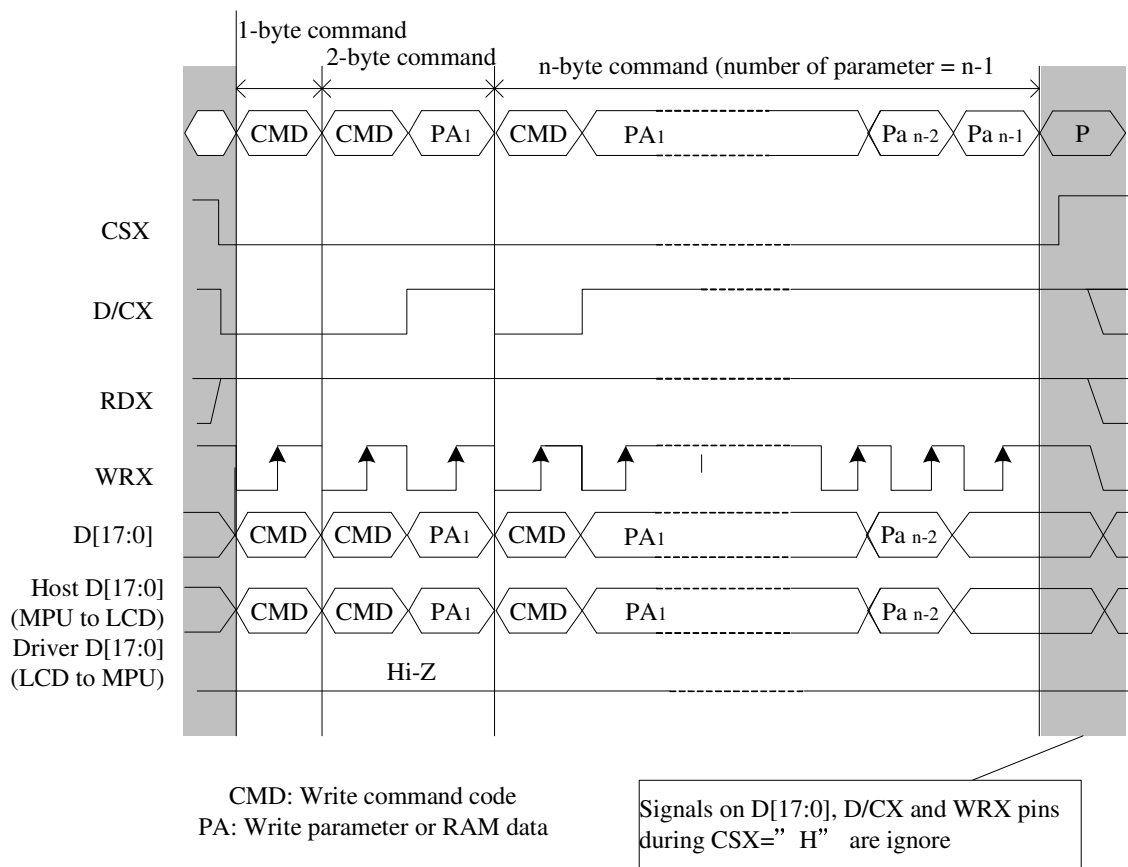
#### 6.3.1 Write Cycle/Sequence

The write cycle means that the host writes information (command or/and data) to the display via the interface. Each write cycle (WRX high-low-high sequence) consists of 3 control (D/CX, RDX, WRX) and data signals (D[17...0]). D/CX bit is a control signal, which tells if the data is a command or a data. The data signals are a command if the control signal is low (= '0') and vice versa it is data (= '1'). The write cycle is described in the following figure.



Note: WRX is an unsynchronized signal (it can be stopped)

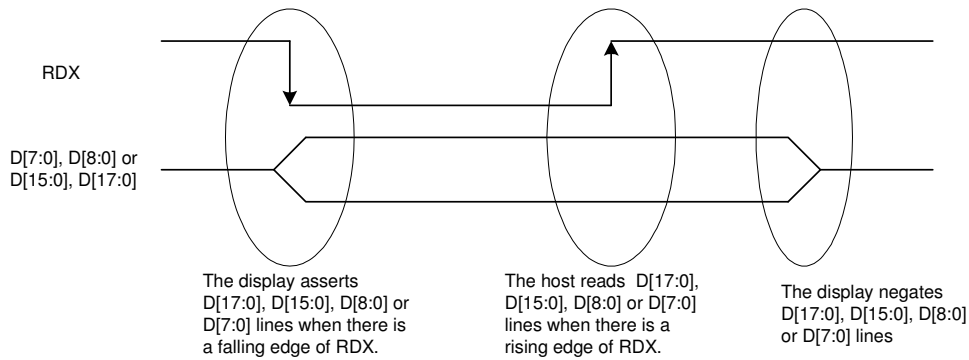
**Figure9: 8080-Series WRX Protocol**



**Figure10: 8080-Series Parallel bus protocol (write to register or display RAM)**

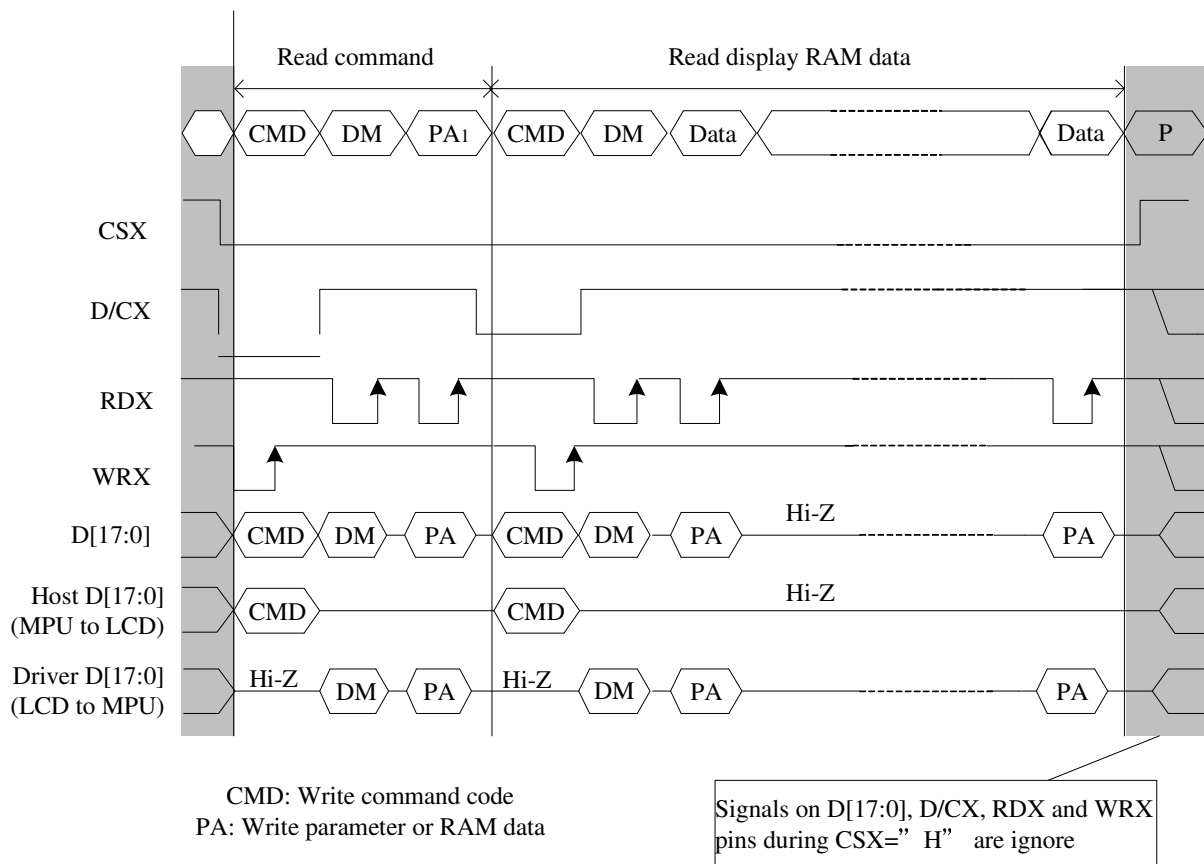
### 6.3.2 Read Cycle/Sequence

The read cycle (RDX high-low-high sequence) means that the host reads information from the display via interface. The display sends data (D[17...0]) to the host when there is a falling edge of RDX and the host reads data when there is a rising edge of RDX.



Note: RDX is an unsynchronized signal (It can be stopped).

**Figure11: 8080-Series RDX Protocol**



**Figure12: 8080-Series parallel bus protocol (Read from register or display RAM)**

## 6.4 6800-Series Parallel Interface (P68='1')

The MCU uses a 11-wires 8-data parallel interface or 12-wires 9-data parallel interface or 19-wires 16-data parallel interface or 21-wires 18-data parallel interface. The chip-select CSX(active low) enables and disables the parallel interface. RESX(active low) is an external reset signal. WRX is the parallel data write, RDX is the parallel data read and D[17:0] is parallel data.

The Graphics Controller Chip reads the data at the falling edge of E signal when R/WX='1' and writes the data at the falling of the E signal when R/WX='0'. The D/CX is the data/command flag. When D/CX='1', D[17,0] bits are display RAM data or command parameters. When D/C='0', D[17,0] bits are commands.

The 6800-series bi-direction interface can be used for communication between the micro controller and LCD driver chip. The selection of this interface is done when P68 pin is high state (VDDI). Interface bus width can be selected with IM2, IM1 and IM0. The interface function of 6800-series parallel interface are given in Table 6.4.1.

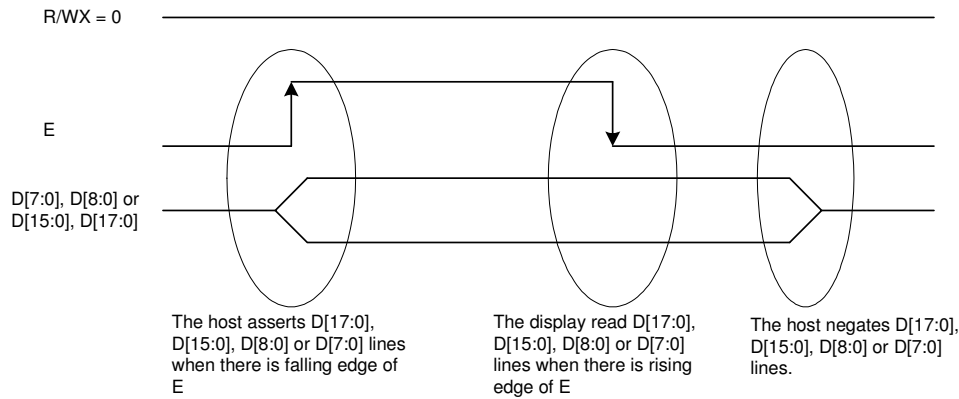
**Table 6.4.1 The function of 6800-series parallel interface**

| P68 | IM2 | IM1 | IM0 | Interface       | D/CX | RDX | E | Function                                                |
|-----|-----|-----|-----|-----------------|------|-----|---|---------------------------------------------------------|
| 1   | 1   | 0   | 0   | 8-bit Parallel  | 0    | 1   | ↓ | Write 8-bit command(D7 to D0)                           |
|     |     |     |     |                 | 1    | 1   | ↓ | Write 8-bit display data or 8-bit parameter(D7 to D0)   |
|     |     |     |     |                 | 1    | ↓   | 1 | Read 8-bit display data(D7 to D0)                       |
|     |     |     |     |                 | 1    | ↓   | 1 | Read 8-bit parameter or status(D7 to D0)                |
| 1   | 1   | 0   | 1   | 16-bit Parallel | 0    | 1   | ↓ | Write 8-bit command(D7 to D0)                           |
|     |     |     |     |                 | 1    | 1   | ↓ | Write 16-bit display data or 8-bit parameter(D15 to D0) |
|     |     |     |     |                 | 1    | ↓   | 1 | Read 16-bit display data(D15 to D0)                     |
|     |     |     |     |                 | 1    | ↓   | 1 | Read 8-bit parameter or status(D7 to D0)                |
| 1   | 1   | 1   | 0   | 9-bit Parallel  | 0    | 1   | ↓ | Write 8-bit command(D7 to D0)                           |
|     |     |     |     |                 | 1    | 1   | ↓ | Write 9-bit display data or 8-bit parameter(D8 to D0)   |
|     |     |     |     |                 | 1    | ↓   | 1 | Read 9-bit display data (D8 to D0)                      |
|     |     |     |     |                 | 1    | ↓   | 1 | Read 8-bit parameter or status(D7 to D0)                |
| 1   | 1   | 1   | 1   | 18-bit Parallel | 0    | 1   | ↓ | Write 8-bit command(D7 to D0)                           |
|     |     |     |     |                 | 1    | 1   | ↓ | Write 18-bit display data or 8-bit parameter(D17 to D0) |
|     |     |     |     |                 | 1    | ↓   | 1 | Read 18-bit display data(D17 to D0)                     |
|     |     |     |     |                 | 1    | ↓   | 1 | Read 8-bit parameter or status(D7 to D0)                |

Note : Reading operation applied for command code : DAh, DBh, DCh, 04h, 09h, 0Ah, 0Bh, 0Ch, 0Dh, 0Eh, 0Fh

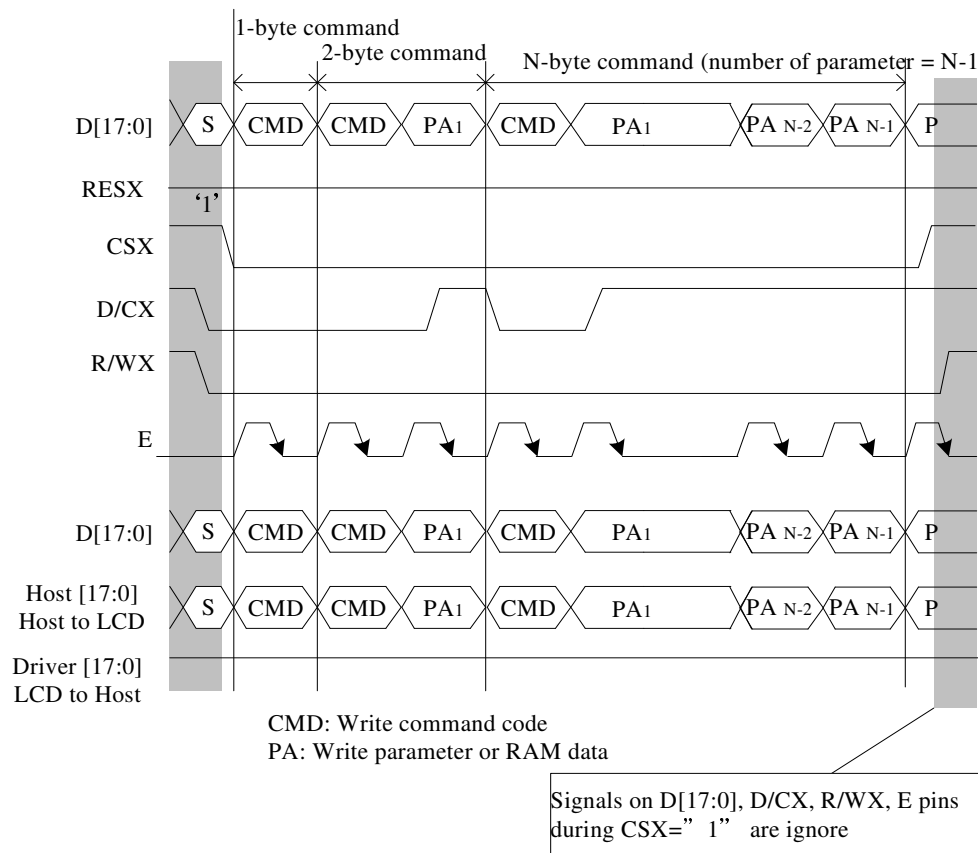
### 6.4.1 Write Cycle/Sequence

The write cycle means that the host writes information (command or/and data) to the display via the interface. Each write cycle (E low-high-low sequence) consists of 3 control (D/CX, E, R/WX) and data signals (D[17...0]). D/CX bit is a control signal, which tells if the data is a command or a data. The data signals are a command if the control signal is low (= '0') and vice versa it is data (= '1'). The write cycle is described in the following figure.



Note: E is unsynchronized signal (it can be stopped)

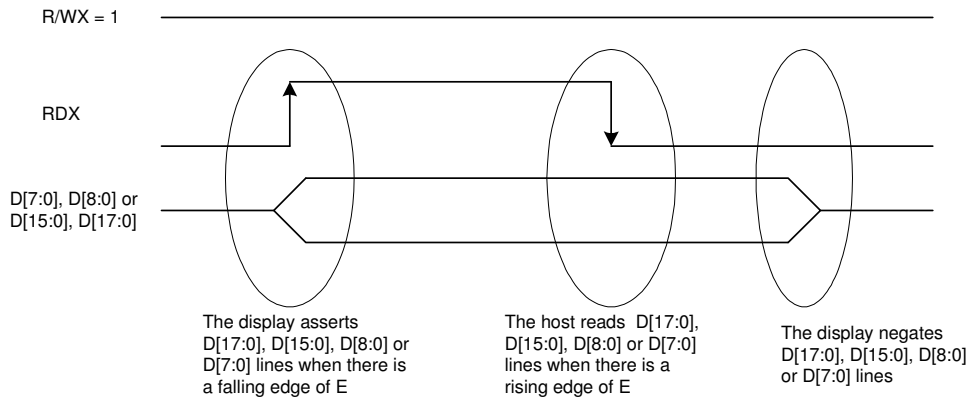
**Figure13: 6800-Series Write Protocol**



**Figure14: 6800-Series parallel bus protocol (write to register or display RAM)**

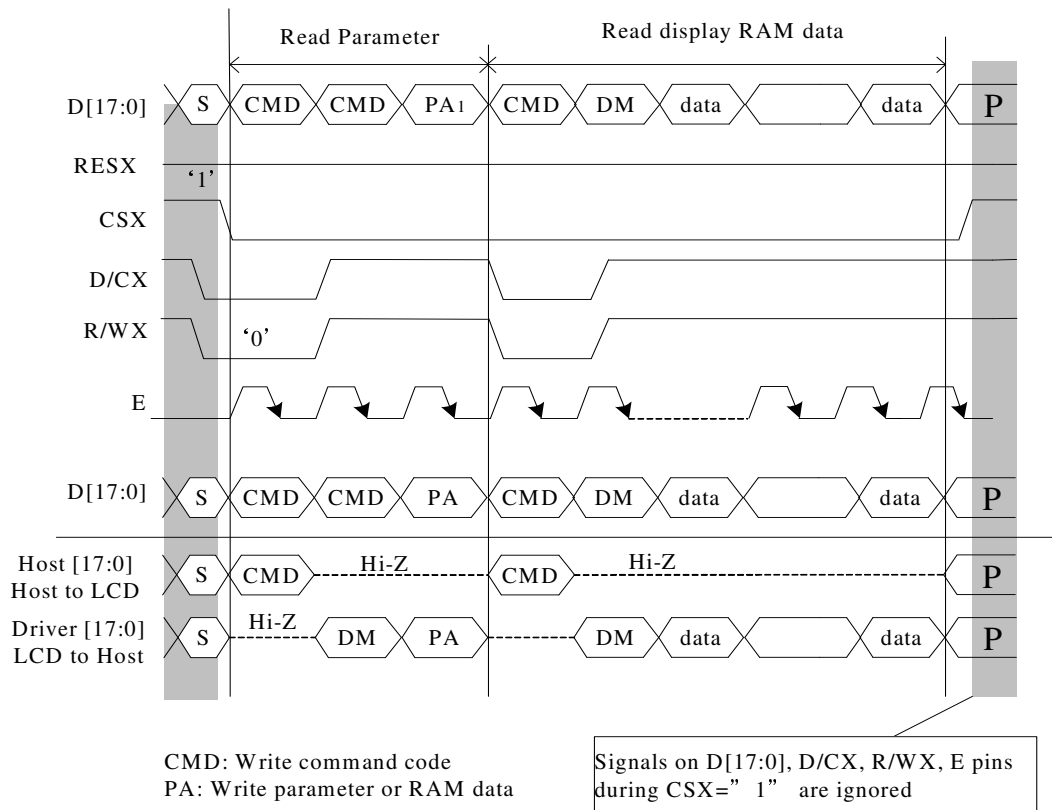
### 6.4.2 Read Cycle/Sequence

The read cycle means that the host reads information (command or/and data) to the display via the interface. Each read cycle (E low-high-low sequence) consists of 3 control (D/CX, E, R/WX) and data (D[17...0]). D/CX bit is control signal, which tells if the data is a command or a data. The data signals are the command if the control signal is low (= '0') and vice versa it is data (= '1')



Note: E is an unsynchronized signal (It can be stopped).

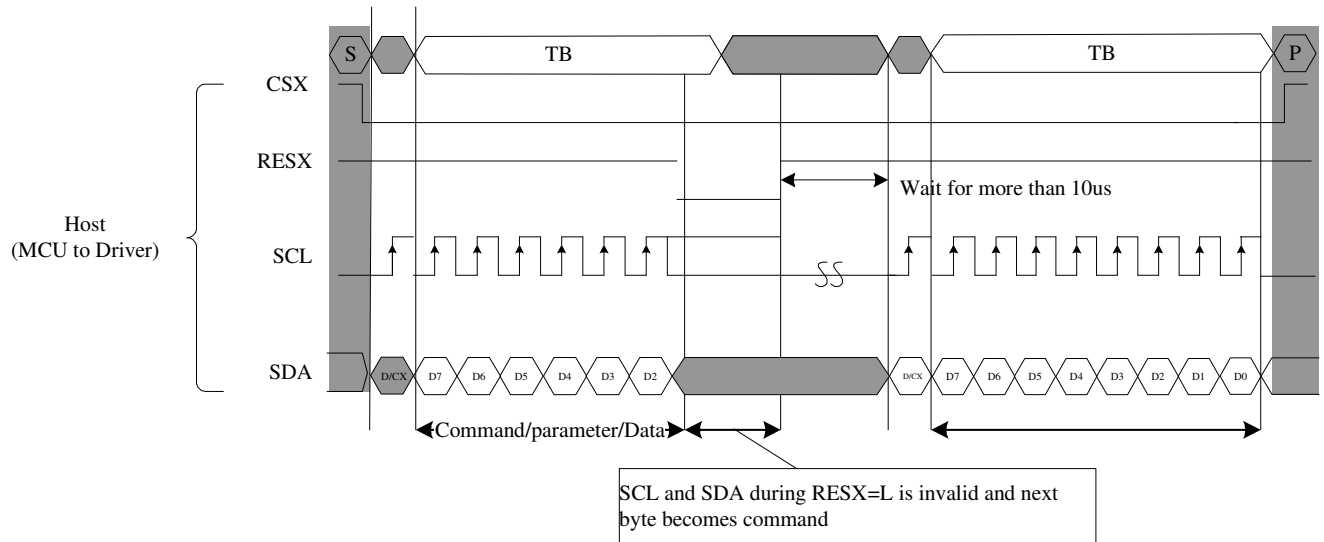
**Figure15: 6800-Series Read Protocol**



**Figure16: 6800-Series Parallel bus protocol (Read from register or display RAM)**

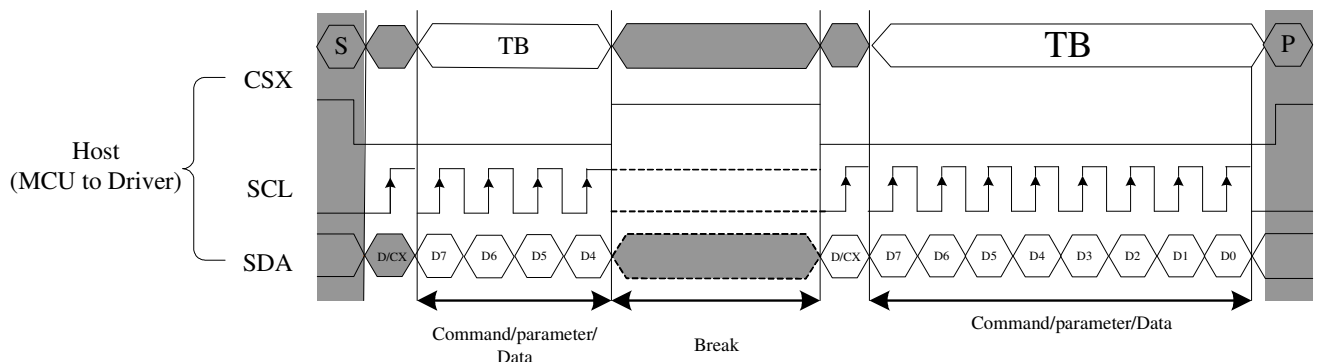
## 6.5 Display Data Transfer Recovery

If there is a break in data transmission by RESX pulse, while transferring a Command or Frame Memory Data or Multiple Parameter command Data, before Bit D0 of the byte has been completed, then DRIVER will reject the previous its and have reset the interface such that it will be ready to receive command data again when the chip select line (CSX) is next activated after RESX have been High state. See the following example.



**Figure17: Serial bus protocol, write mode – interrupted by RESX**

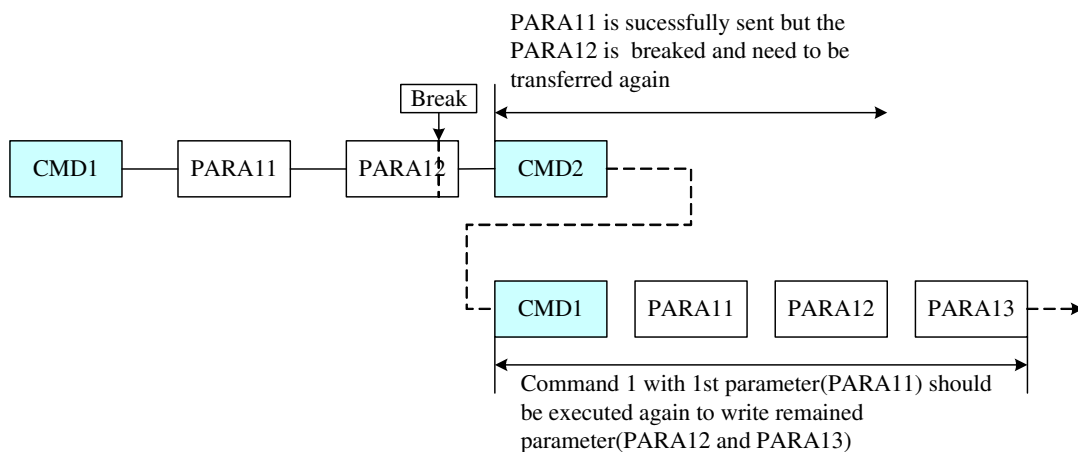
If there is a break in data transmission by CSX pulse, while transferring a Command or Frame Memory Data or Multiple Parameter command data, before Bit D0 of the byte has been completed. Then the DRIVER will reject the previous bits and have reset the interface such that it will be ready to receive the same byte re-transmitted when the chip select line(CSX) is next activated. See the following example.



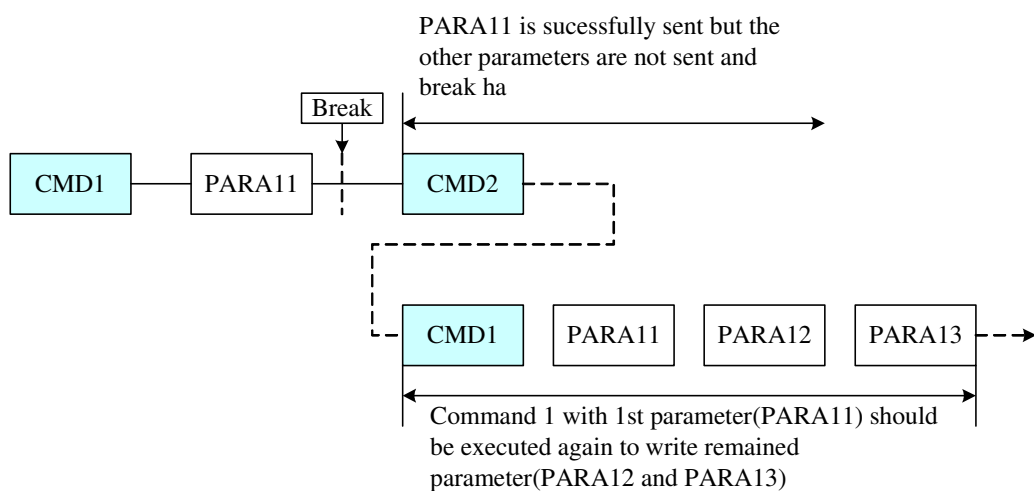
**Figure18: Serial bus protocol, write mode – interrupted by CSX**

If 1, 2 or more parameter command is being sent and a break occurs while sending any parameter before the last one and if the host then sends a new command rather than re-transmitting the parameter that was interrupted, then the parameters that were successfully sent are stored and the parameter where the break occurred is rejected. The inter face is ready to receive next byte as show below.

Note: Break can be e.g. another command or noise pulse.



**Figure19: Write interrupts recovery (serial interface)**

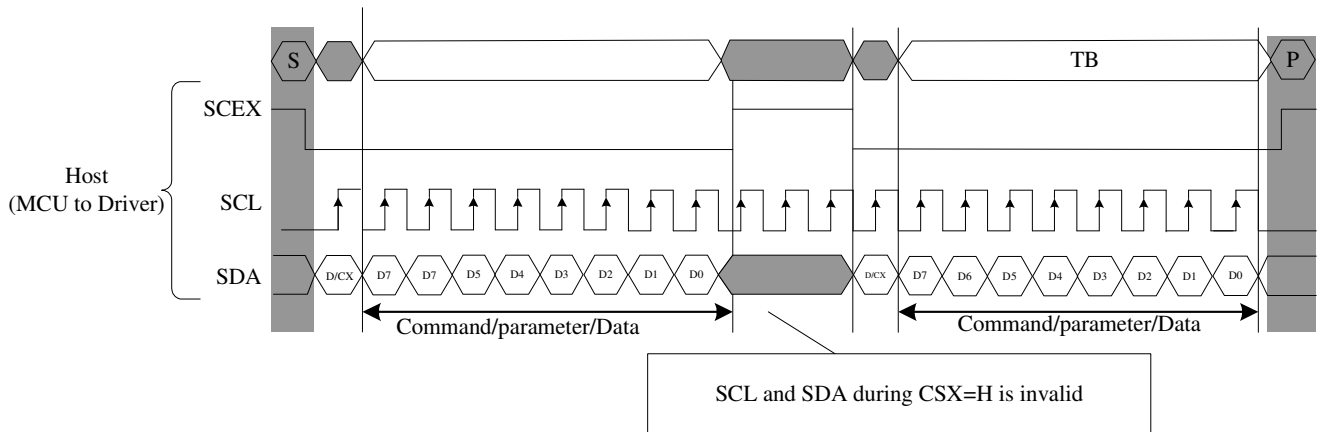


**Figure20: Write interrupts recovery (both serial and parallel interface)**

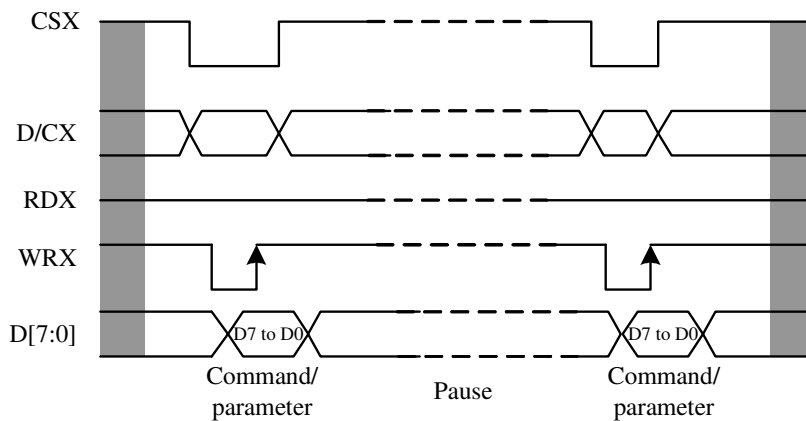


## 6.6 Display Data Transfer Pause

It will be possible when transferring a Command, Frame Memory Data or Multiple Parameter Data to invoke a pause in the data transmission. If the Chip Select Line is released after a whole byte of a Frame Memory Data or Multiple Parameter Data has been completed, then the Display Module will wait and continue the Frame Memory Data or Parameter Data Transmission from the point where it was paused. If the Chip Select Line is released after a whole byte of a command has been completed, then the Display Module will receive either the command's parameters (if appropriate) or a new command when the Chip Select Line is next enabled as shown below:



**Figure21: Serial interface Pause Protocol (pause by CSX)**



**Figure22: Parallel bus Pause Protocol (paused by CSX)**

*This applies to the following 4 conditions:*

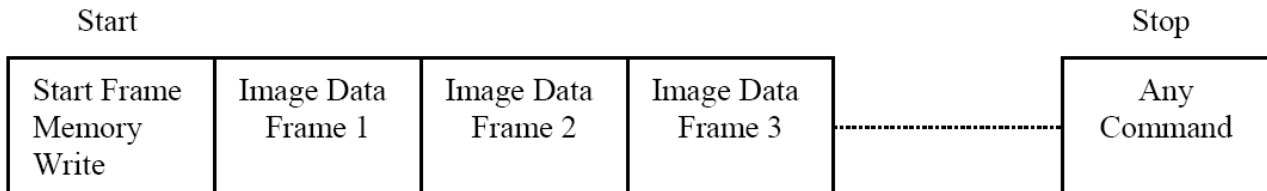
1. Command-Pause-Command
2. Command-Pause-Parameter
3. Parameter-Pause-Command
4. Parameter-Pause-Parameter

## 6.7 Display Data Transfer Mode

The data format is described for each interface. Data can be downloaded to the Frame Memory by 2 methods.

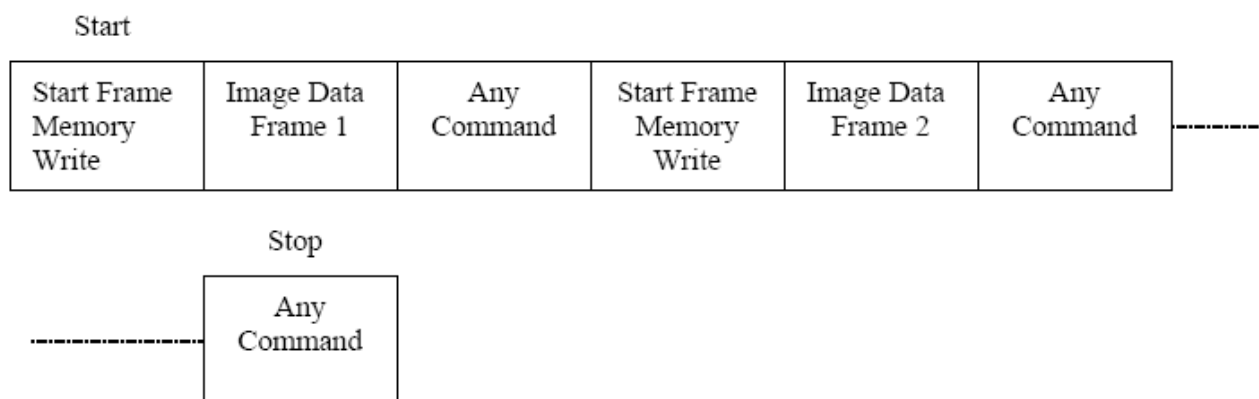
### Method 1:

The Image data is sent to the Frame Memory in successive Frame writes, each time the Frame Memory is filled, the Frame Memory pointer is reset to the start point and the next Frame is written.



### Method 2:

Image Data is sent and at the end of each Frame Memory download, a command is sent to stop Frame Memory Write. Then Start Memory Write command is sent, and a new Frame is downloaded.



Note:

1. These apply to this Data Transfer Color mode on both Serial and Parallel interfaces.
2. The Frame Memory can contain both odd and even number of pixels for both Methods. Only complete pixel data will be stored in the Frame Memory.

## 6.8 RGB Interface

### 6.8.1 RGB Interface Selection

The RGB interface mode is available for ILI9163C and the interface is selected by setting the VIPF[3:0] bits as following table.

| VIPF[3:0] |   |   |   | RGB Interface        | Data Bus          |
|-----------|---|---|---|----------------------|-------------------|
| 0         | 1 | 1 | 0 | 18-bit RGB interface | D[17:0]           |
| 0         | 1 | 0 | 1 | 16-bit RGB interface | D[17:13], D[11:1] |
| 1         | 1 | 1 | 0 | 6-bit RGB interface  | D[7:2]            |
| Others    |   |   |   | Setting prohibited   |                   |

The display operation via RGB interface is synchronized with the VS, HS and PCLK signals. The RGB interface transfers the updated data to GRAM and the update area is defined by the window address function. The back porch and back porch are used to set the RGB interface timing.

### Parallel RGB Interface Set Table

18-bit data bus interface (D[17:0] is used) , VIPF[3:0] = 0110

|                          | D17  | D16  | D15  | D14  | D13  | D12  | D11  | D10  | D9   | D8   | D7   | D6   | D5   | D4   | D3   | D2   | D1   | D0   |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 18bpp Frame Memory Write | R[5] | R[4] | R[3] | R[2] | R[1] | R[0] | G[5] | G[4] | G[3] | G[2] | G[1] | G[0] | B[5] | B[4] | B[3] | B[2] | B[1] | B[0] |

16-bit data bus interface (D[17:13] and D[11:1] are used) , VIPF[3:0] = 0101

|                          | D17  | D16  | D15  | D14  | D13  | D11  | D10  | D9   | D8   | D7   | D6   | D5   | D4   | D3   | D2   | D1   |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 16bpp Frame Memory Write | R[4] | R[3] | R[2] | R[1] | R[0] | G[5] | G[4] | G[3] | G[2] | G[1] | G[0] | B[4] | B[3] | B[2] | B[1] | B[0] |

6-bit data bus interface (D[7:2] is used) , VIPF[3] = 1110

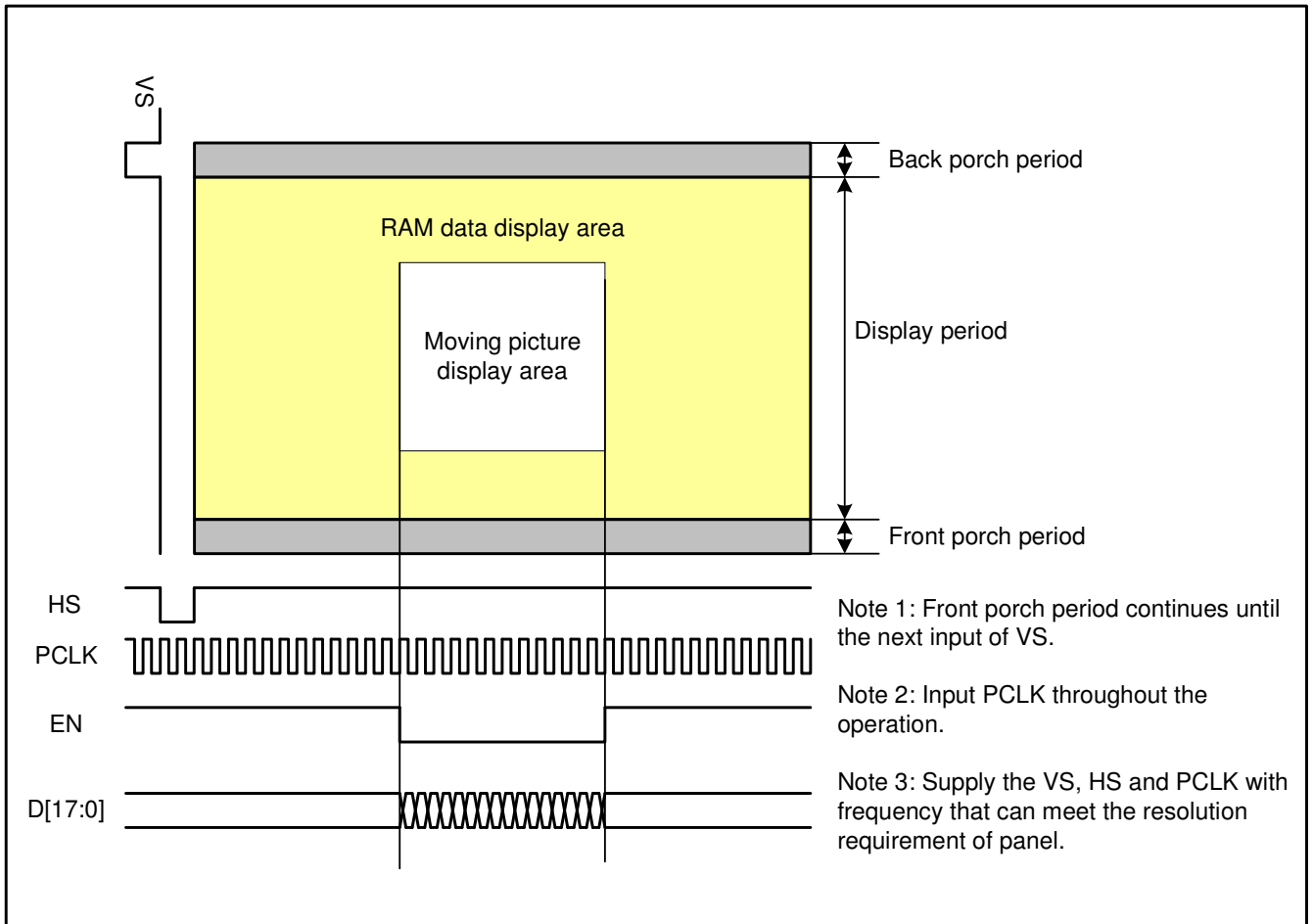
|                          | First Transfer |      |      |      |      |      | Second Transfer |      |      |      |      |      | Third Transfer |      |      |      |      |      |
|--------------------------|----------------|------|------|------|------|------|-----------------|------|------|------|------|------|----------------|------|------|------|------|------|
|                          | D7             | D6   | D5   | D4   | D3   | D2   | D7              | D6   | D5   | D4   | D3   | D2   | D7             | D6   | D5   | D4   | D3   | D2   |
| 18bpp Frame Memory Write | R[5]           | R[4] | R[3] | R[2] | R[1] | R[0] | G[5]            | G[4] | G[3] | G[2] | G[1] | G[0] | B[5]           | B[4] | B[3] | B[2] | B[1] | B[0] |

Pixel clock (PCLK) is running all the time without stopping and it is used to entering VS, HS, EN and D[17:0] states when there is a rising edge of the PCLK. The PCLK can not be used as continues internal clock for other functions of the display module.

Vertical synchronization (VS) is used to tell when there is received a new frame of the display. This is high enable and its state is read to the display module by a rising edge of the PCLK signal.

Horizontal synchronization (HS) is used to tell when there is received a new line of the frame. This is low enable and its state is read to the display module by a rising edge of the PCLK signal.

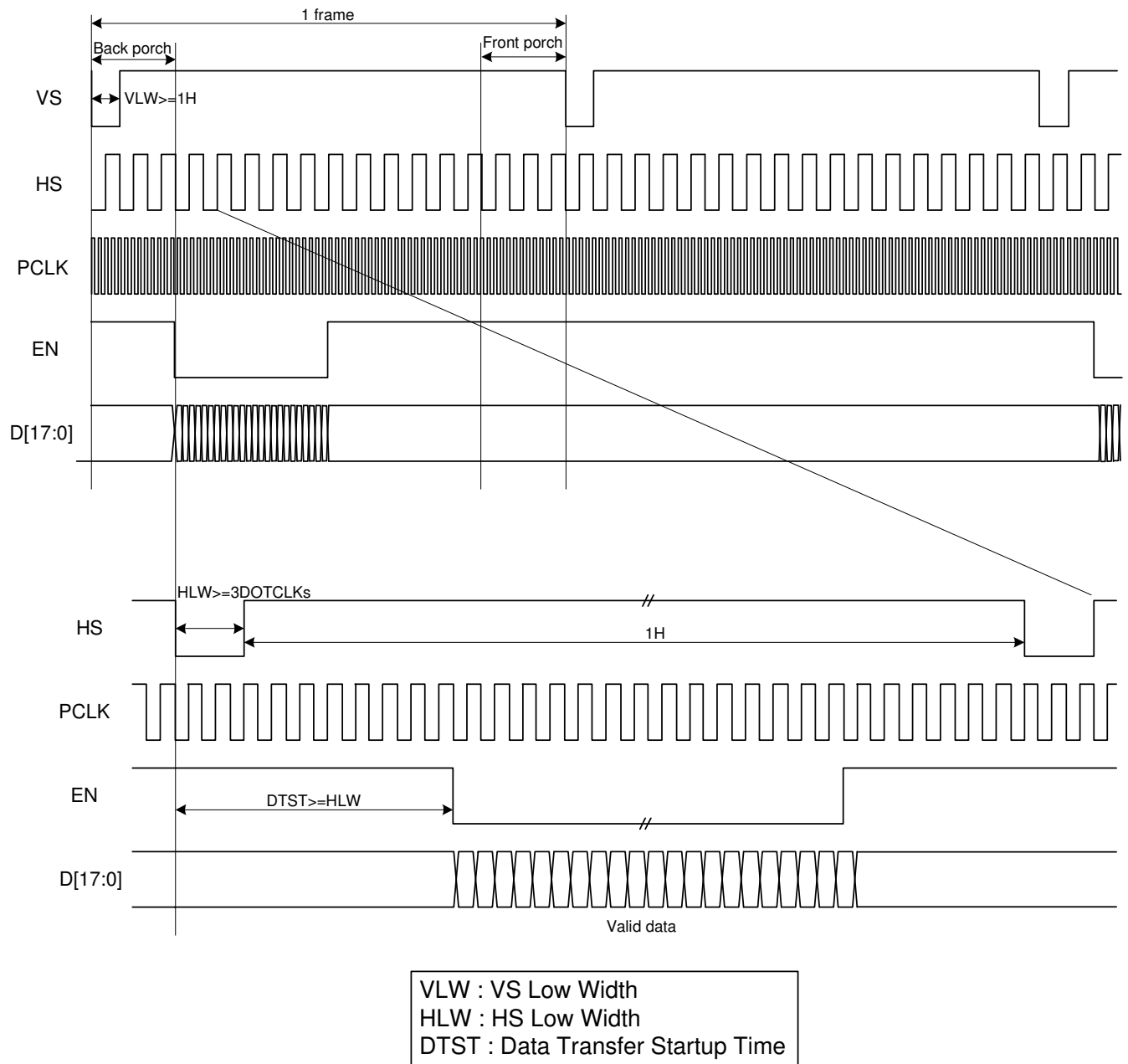
Data Enable (EN) is used to tell when there is received RGB information that should be transferred on the display. This is a high enable and its state is read to the display module by a rising edge of the PCLK signal. D[17:0] are used to tell what is the information of the image that is transferred on the display (When EN= '1' and there is a rising edge of PCLK). D[17:0] can be '0' (low) or '1' (high). These lines are read by a rising edge of the PCLK signal.



**Figure23: GRAM Access Area by RGB Interface**

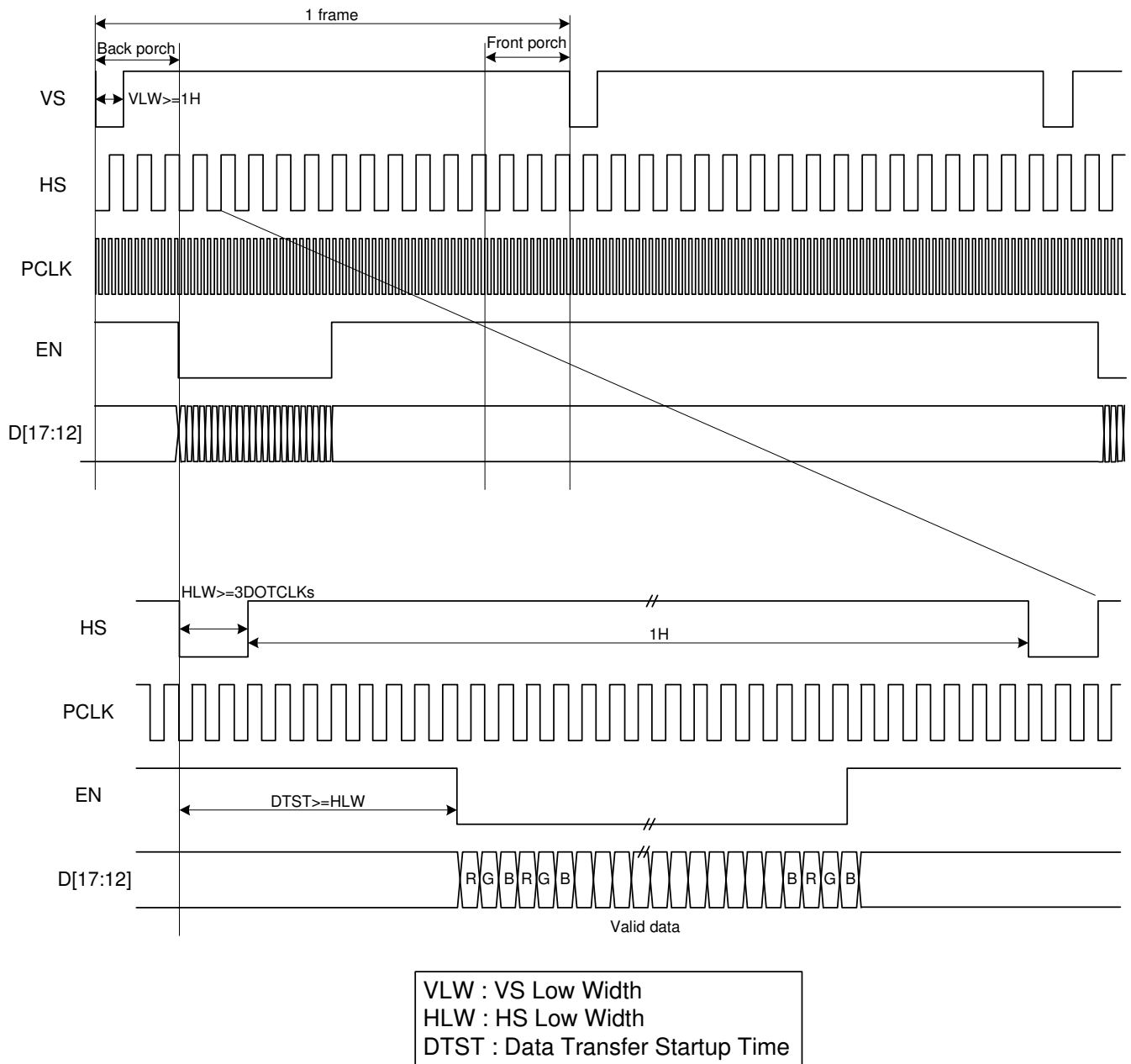
## 6.8.2 RGB Interface Timing

The timing chart of 18-/16-bit RGB interface mode is shown as below.



**Figure24: Timing Chart of Signals in 18-/16-bit RGB Interface Mode**

The timing chart of 6-bit RGB interface mode is shown as below:



*Note 1: In 6-bit RGB interface mode, each dot of one pixel (R, G and B) is transferred in synchronization with PCLK.*

*Note 2: In 6-bit RGB interface mode, set the cycles of VS, HS and EN to 3 multiples of PCLK.*

**Figure25: Timing Chart of Signals in 6-bit RGB Interface Mode**

### 6.8.3 RGB Interface Mode Set

ILI9163C supplies a RGB interface with DE mode and can be controlled by external RCM[1:0] pins.

| RCM1 | RCM0 | Resolution selection |
|------|------|----------------------|
| 0    | X    | MCU interface mode   |
| 1    | 0    | RGB interface(1)     |
| 1    | 1    | RGB interface(2)     |

There are 2-kinds of RGB mode which is selected by RCM1 & RCM0 hardware pins.

**In RGB interface 1 :** (RCM1, RCM0 = “10”), writing data to frame memory is done by PCLK and Video Data Bus , when DE is high state. The external synchronization signals (PCLK, VS and HS) are used for internal display signals. So, controller (host) must always transfer PCLK, VS, HS and DE signals to driver.

**In RGB interface 2 :** (RCM1, RCM0 = “11”), blanking porch setting of VS and HS signals are defined by RGBBPCTR (B5h)command. DE pin is used for data making. When DE pin is high, valid data is directly stored to frame

memory. In the contrast, if DE pin is low, valid data will becomes “00” and stored to frame memory.

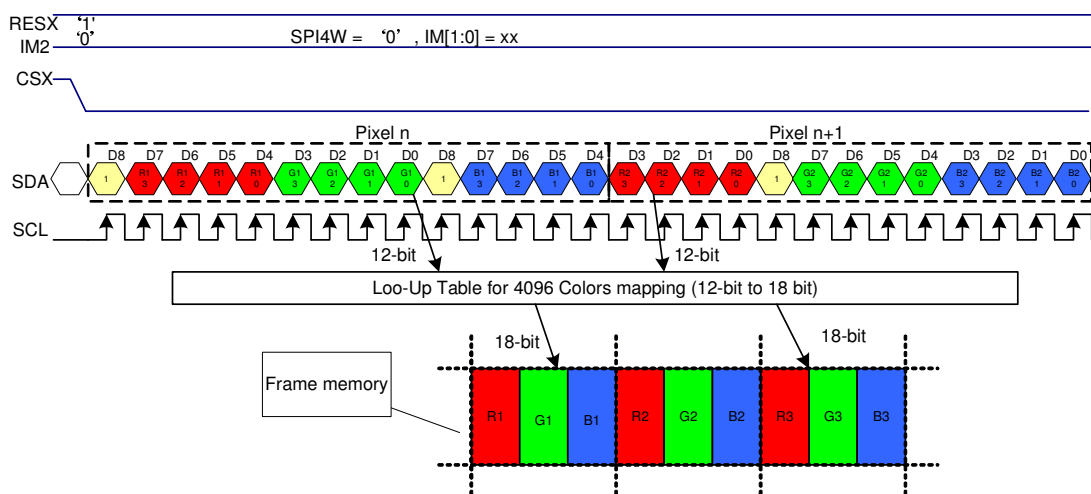
## 6.9 Display Data Color Coding

### 6.9.1 Serial Interface

Different display data formats are available for three colors depth supported by the LCM listed below.

- ✧ 4k colors, RGB 4-4-4-bits input
- ✧ 65K colors, RGB 5-6-5-bits input
- ✧ 262K colors, RGB 6-6-6-bits input

3-pin 9-bit data protocol



Note 1: pixel data with the 12-bits color depth information.

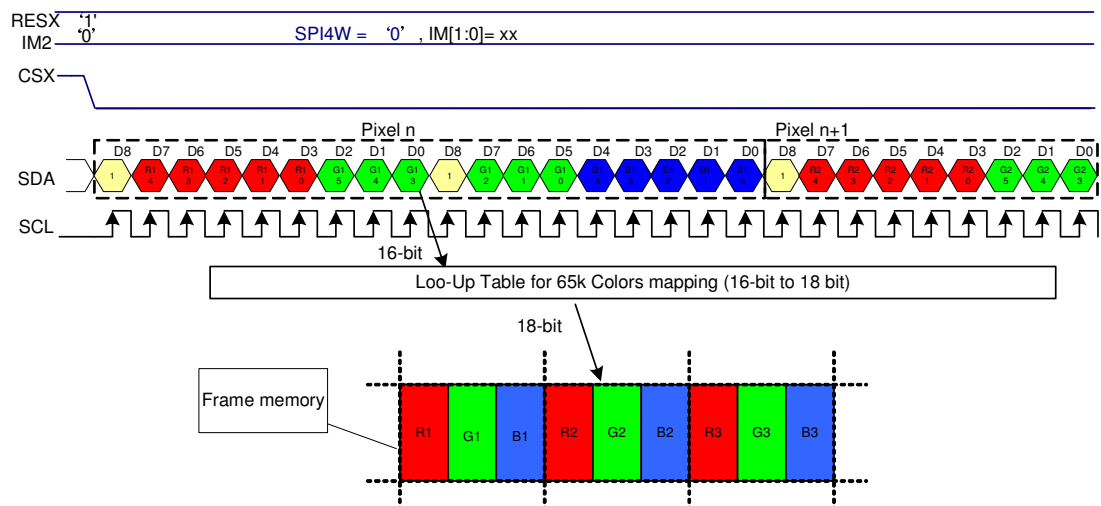
Note 2: The most significant bits are: Rx<sup>3</sup>, Gx<sup>3</sup> and Bx<sup>3</sup>

Note 3: The least significant bits are: Rx<sup>0</sup>, Gx<sup>0</sup> and Bx<sup>0</sup>

Note 4: X = don't care – Can be set to '0' or '1'

**Figure26: Write data for RGB4-4-4 bits input**

4-pin 8-bit Series data protocol





Note 1: pixel data with the 16-bits color depth information.

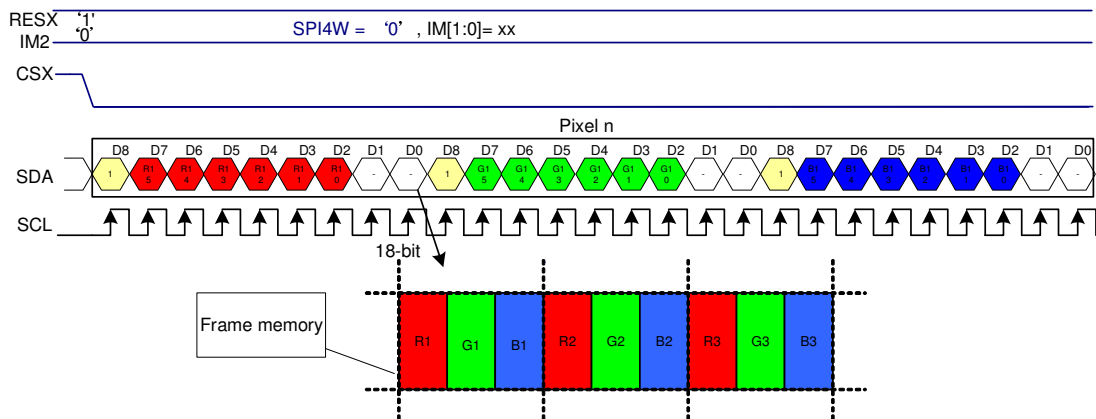
Note 2: The most significant bits are: Rx4, Gx5 and Bx4

Note 3: The least significant bits are: Rx0, Gx0 and Bx0

Note 4: X = Don't care – Can be set to '0' or '1'

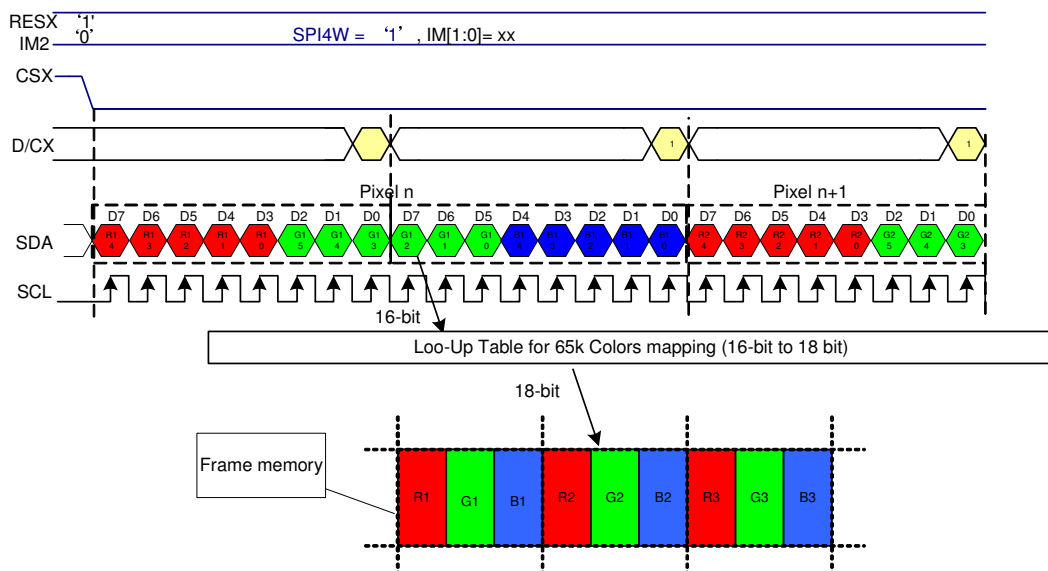
**Figure27: Write data for RGB 5-6-5-bits input**

### 3-pin 9-bit Series data protocol



**Figure28: Write data for RGB 6-6-6 bits input**

### 4-pin 8-bit Series data protocol



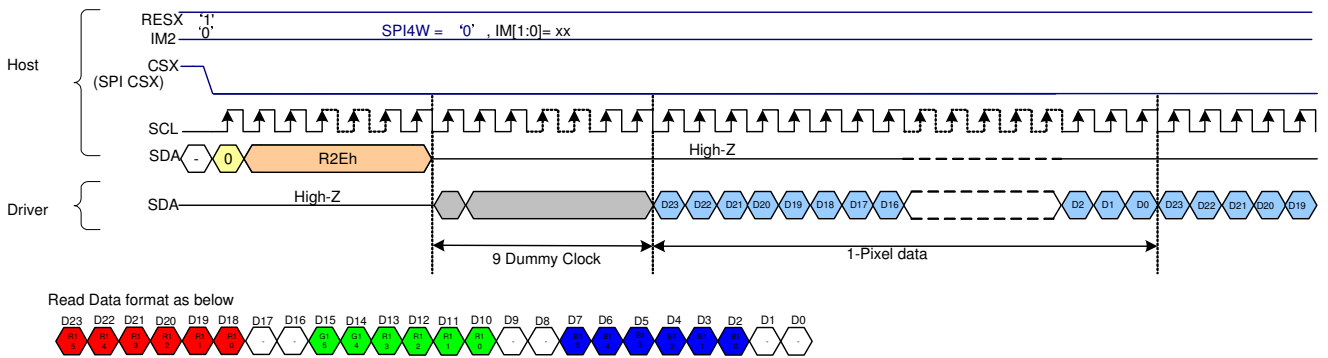
Note 1: pixel data with the 18-bits color depth information.

Note 2: The most significant bits are: Rx<sup>5</sup>, Gx<sup>5</sup> and Bx<sup>5</sup>

Note 3: The least significant bits are: Rx<sup>0</sup>, Gx<sup>0</sup> and Bx<sup>0</sup>

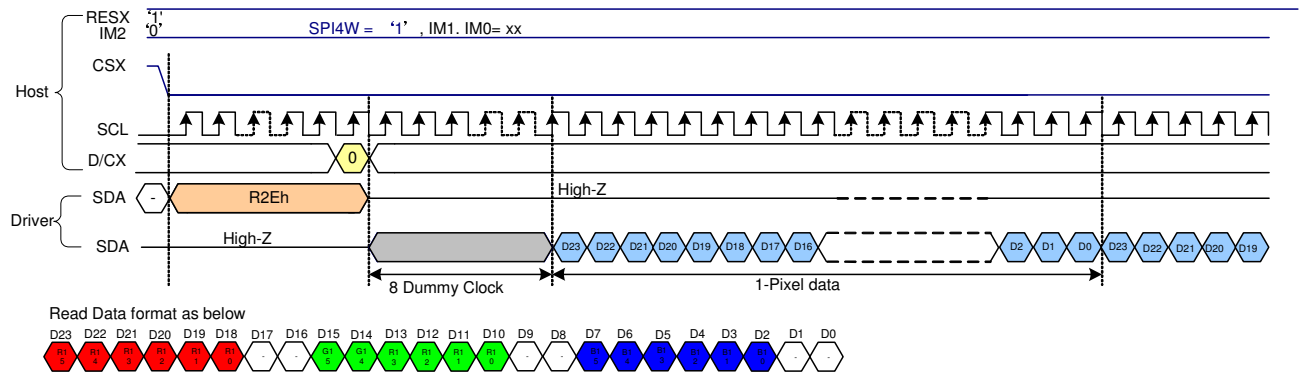
Note 4: X = Don't care – Can be set to '0' or '1'

### Read data for 3-W SPI RGB



Note: X = Don't care – Can be set to '0' or '1'

### Read data for 4-W SPI RGB



Note: X = Don't care – Can be set to '0' or '1'

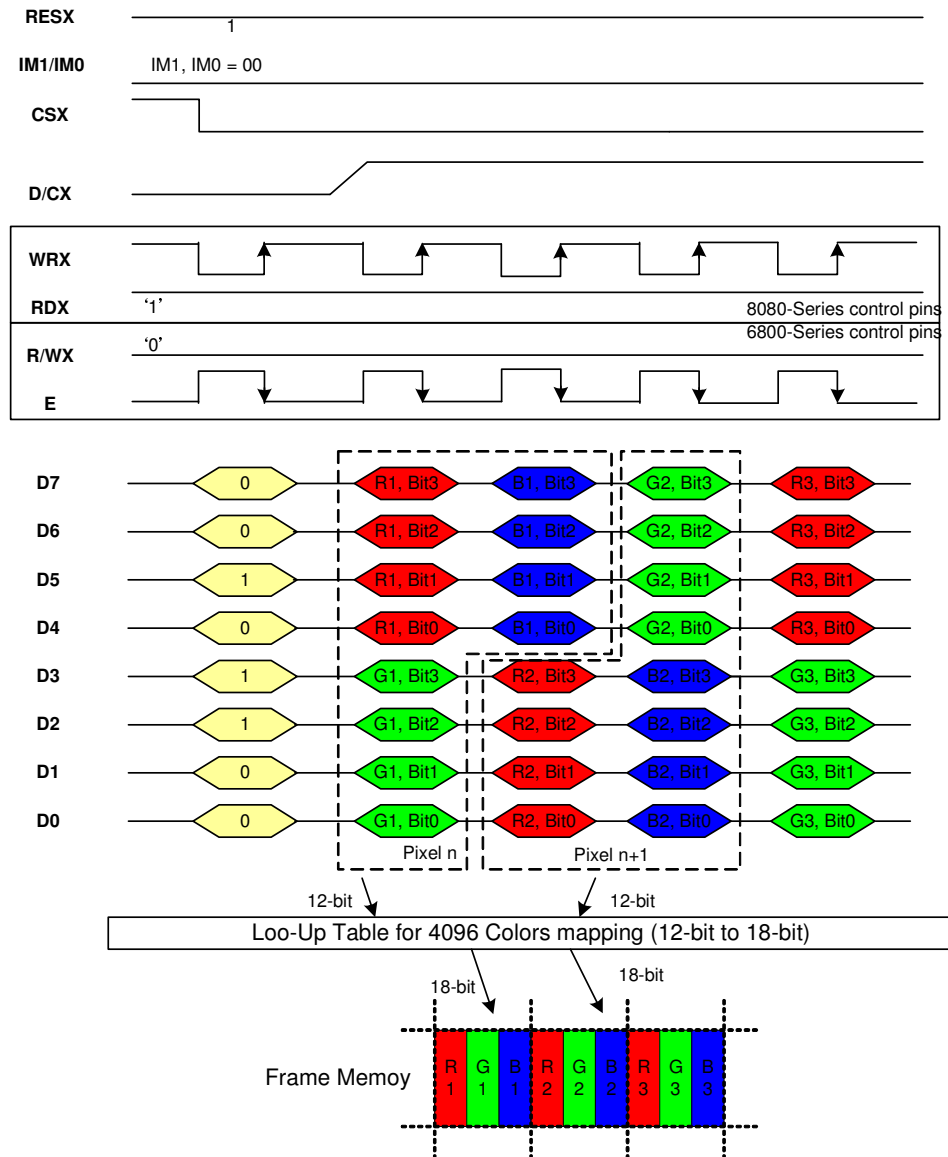
**Figure29: Read data for SPI RGB 6-6-6-bits**

### 6.9.2 8-bit Parallel Interface (IM2='1', IM[1:0] = "00")

Different display data formats are available for three colors depth supported by listed below

- ✧ 4k colors, RGB4-4-4-bits input
- ✧ 65K colors, RGB5-6-5-bits input
- ✧ 262K colors, RGB6-6-6-bits input

2 pixels (6 sub-pixels) per 3 transfer



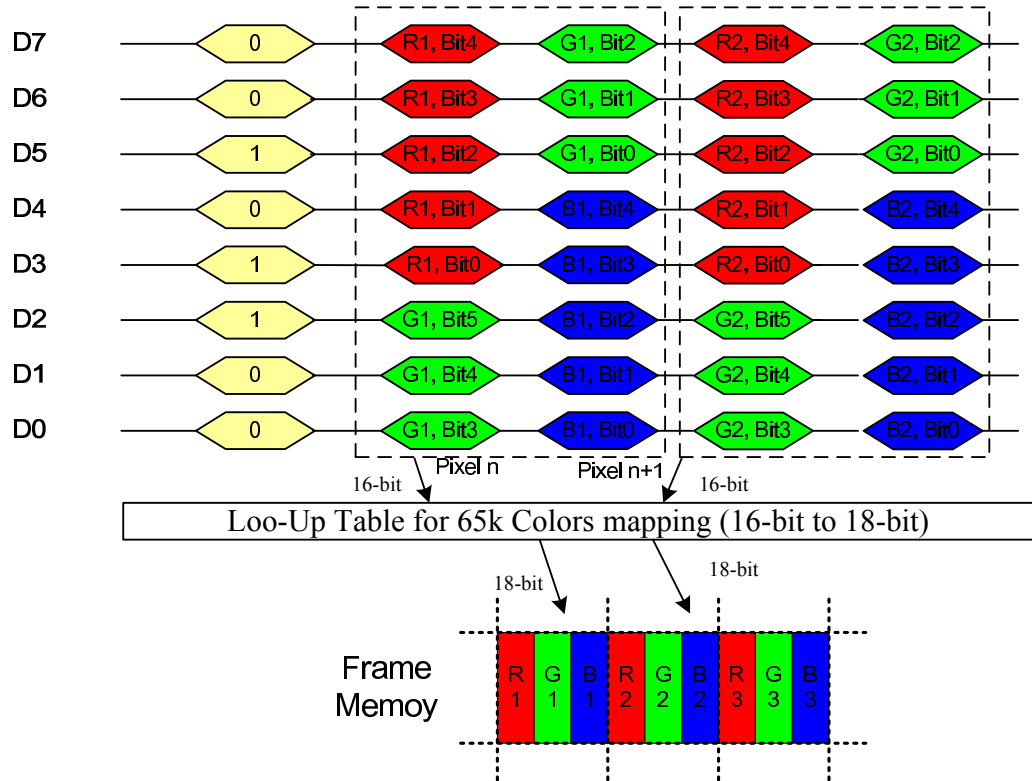
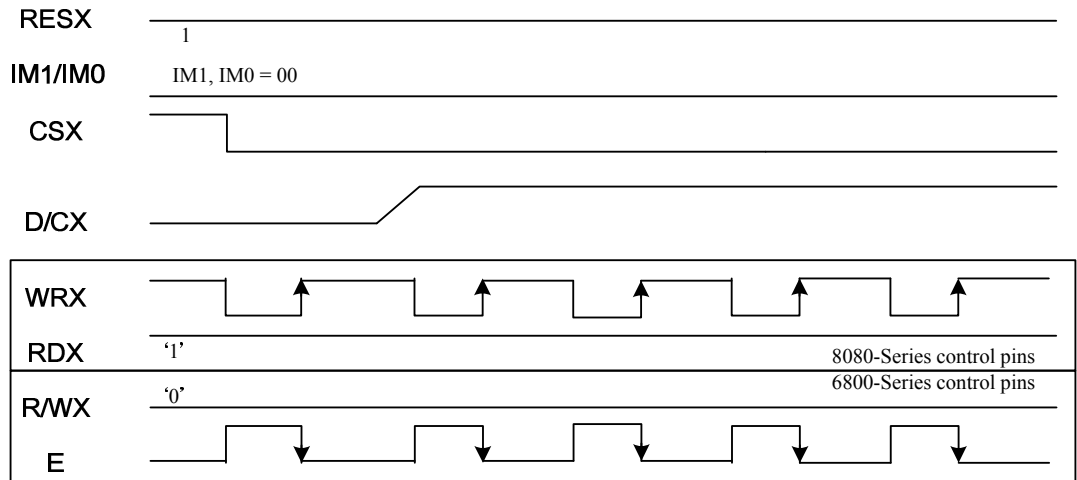
Note 1: The data order is as follows, MSB=D7, LSB=D0 and picture data is MSB=Bit3, LSB=Bit 0 for Red, Green and Blue data.

Note 2: 3-times transfer is used to transmit 2 pixels data with the 12-bits color depth information.

Note 3: '-' = Don't care – Can be set to '0' or '1'

**Figure30: Write 8-bit data for RGB 4-4-4-bits input**

There is 1 pixel (3 sub-pixels) per 2 transfer



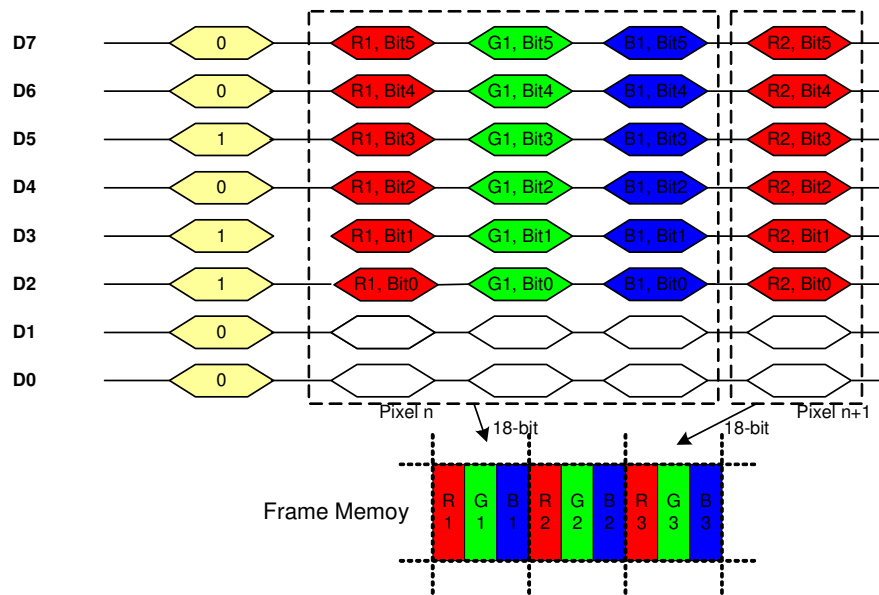
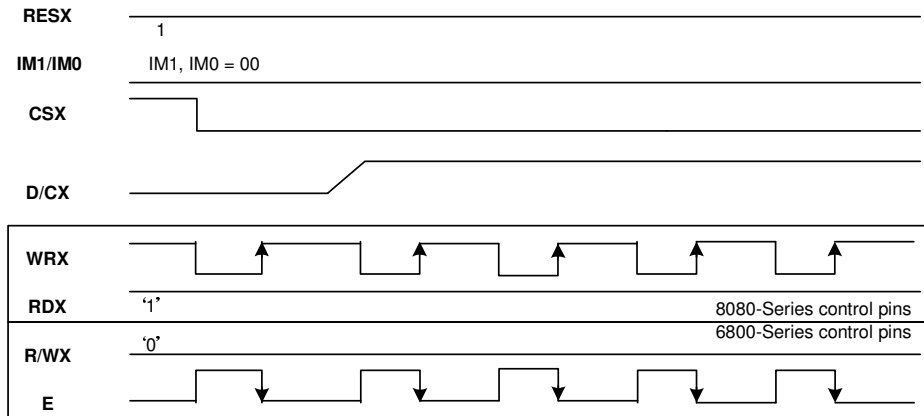
Note 1: The data order is as follows, MSB=D7, LSB=D0 and picture data is MSB=Bit5, LSB=Bit 0 for Green and MSB=Bit4, LSB=Bit0 for Red and Blue data.

Note 2: 2-times transfer is used to transmit 1 pixel data with the 16-bits color depth information.

Note 3: '-' = Don't care – Can be set to '0' or '1'

**Figure31: Write 8-bits data for RGB 5-6-5-bits input**

**1 pixel (3 sub-pixels) per 3 transfer**



Note 1: The data order is as follows, MSB=D7, LSB=D0 and picture data is MSB=Bit5, LSB=Bit 0 for Red, Green and Blue data.

Note 2: 3-times transfer is used to transmit 1 pixel data with the 18-bits color depth information.

Note 3: '-' = Don't care – Can be set to '0' or '1'

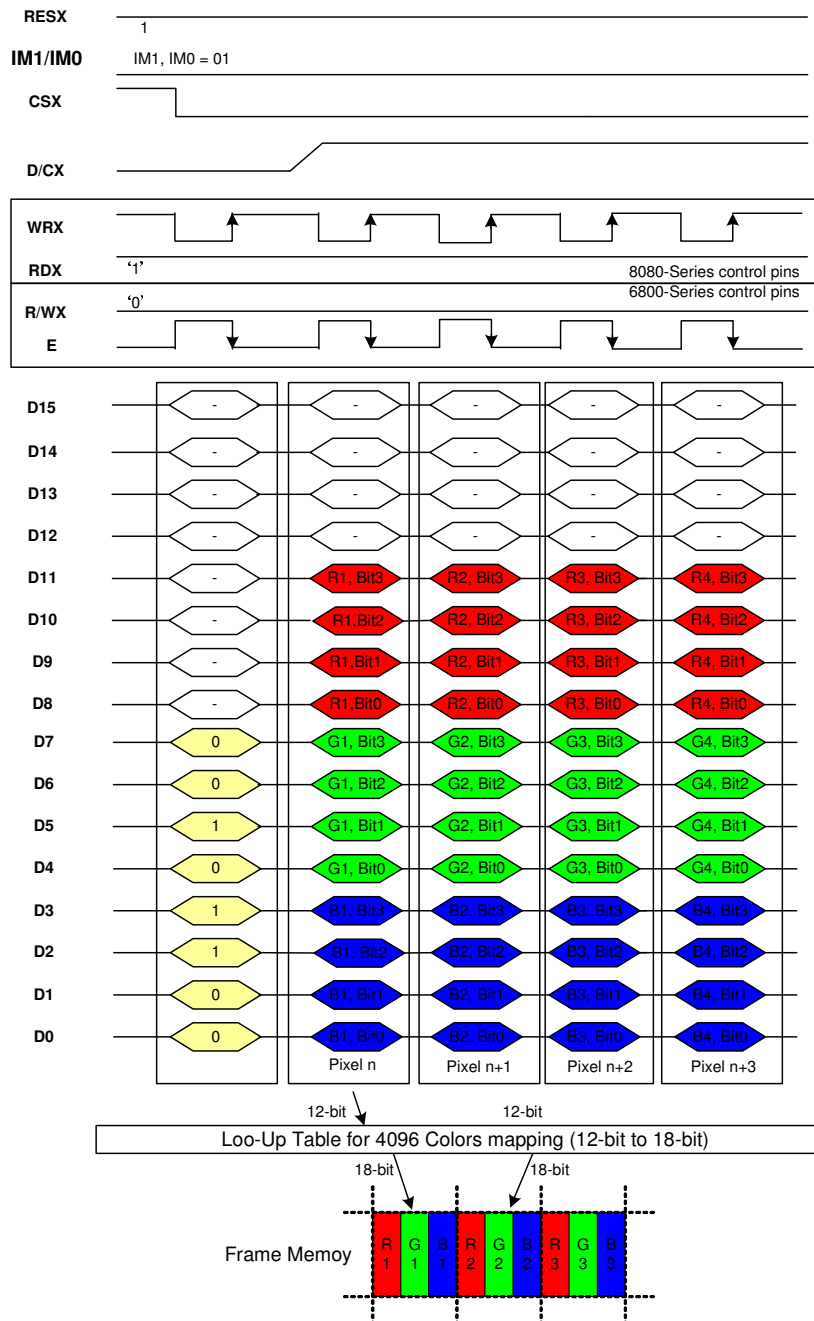
**Figure32: Write 8-bit data for RGB 6-6-6-bits input**

### 6.9.3 16-bit Parallel Interface (IM2='1', IM1, IM0='01')

Different display data formats are available for three colors depth supported by listed below

- ✧ 4k colors, RGB 4-4-4-bits input
- ✧ 65K colors, RGB 5-6-5-bits input
- ✧ 262K colors, RGB 6-6-6-bits input

1 pixels (3 sub-pixels) per 1 transfer, 12-bits/pixel

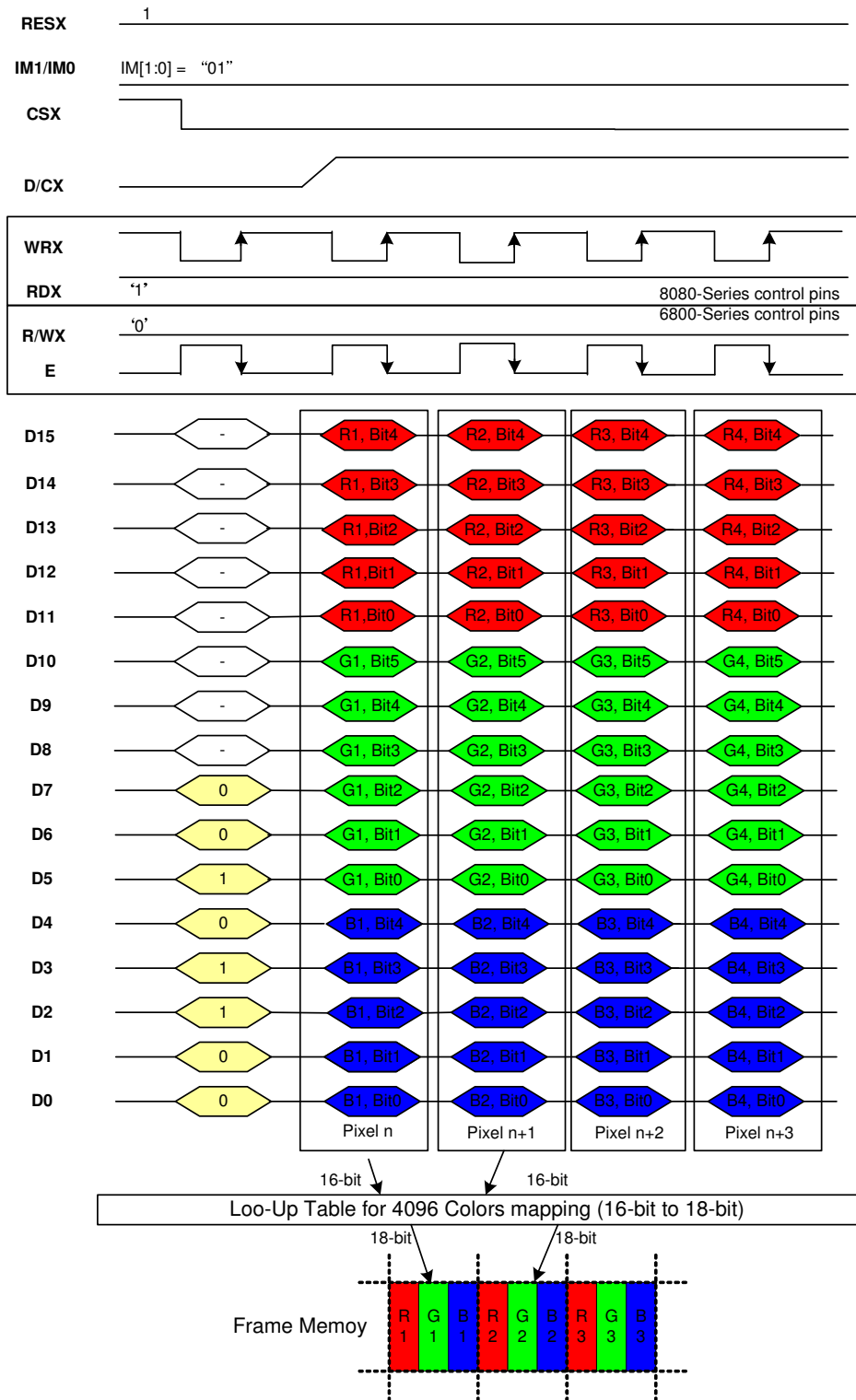


Note1: The data order is as follows, MSB = D15, LSB = D0 and picture data is MSB = Bit3, LSB = Bit0 for Red, Green and Blue data.

Note 2: '=' Don't care – Can be set to '0' or '1'

**Figure33: Write 16-bit data for RGB4-4-4-bits input (4k-color)**

**1 pixel (3 sub-pixels) per 1 transfer, 16-bits/pixel**

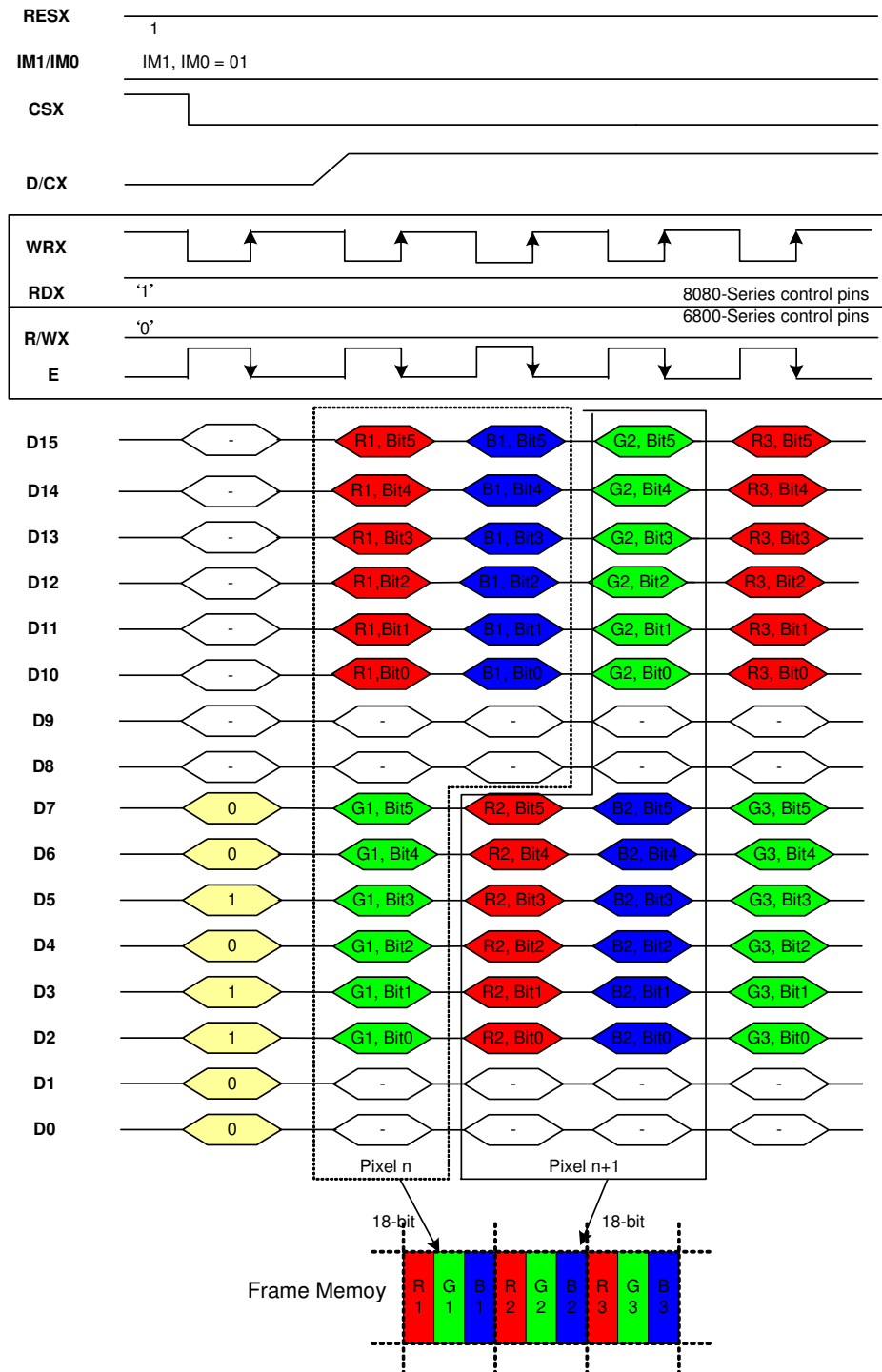


Note1: The data order is as follows, MSB = D15, LSB = D0 and picture data is MSB = Bit5, LSB = Bit0 for Red and Blue and MSB=Bit5, LSB=Bit 0 for Green data.

Note 2: '=' Don't care – Can be set to '0' or '1'

**Figure34: Write 16-bit data for RGB 5-6-5-bits input (65k colors)**

2 pixels (6 sub-pixels) per 2 transfer, 18-bits/pixel



Note1: The data order is as follows, MSB = D15, LSB = D0 and picture data is MSB = Bit5, LSB = Bit0 for Red and Green and Blue.

Note 2: '=' Don't care – Can be set to '0' or '1'

**Figure35: Write 16-bit data for RGB 6-6-6-bits input (262K colors)**

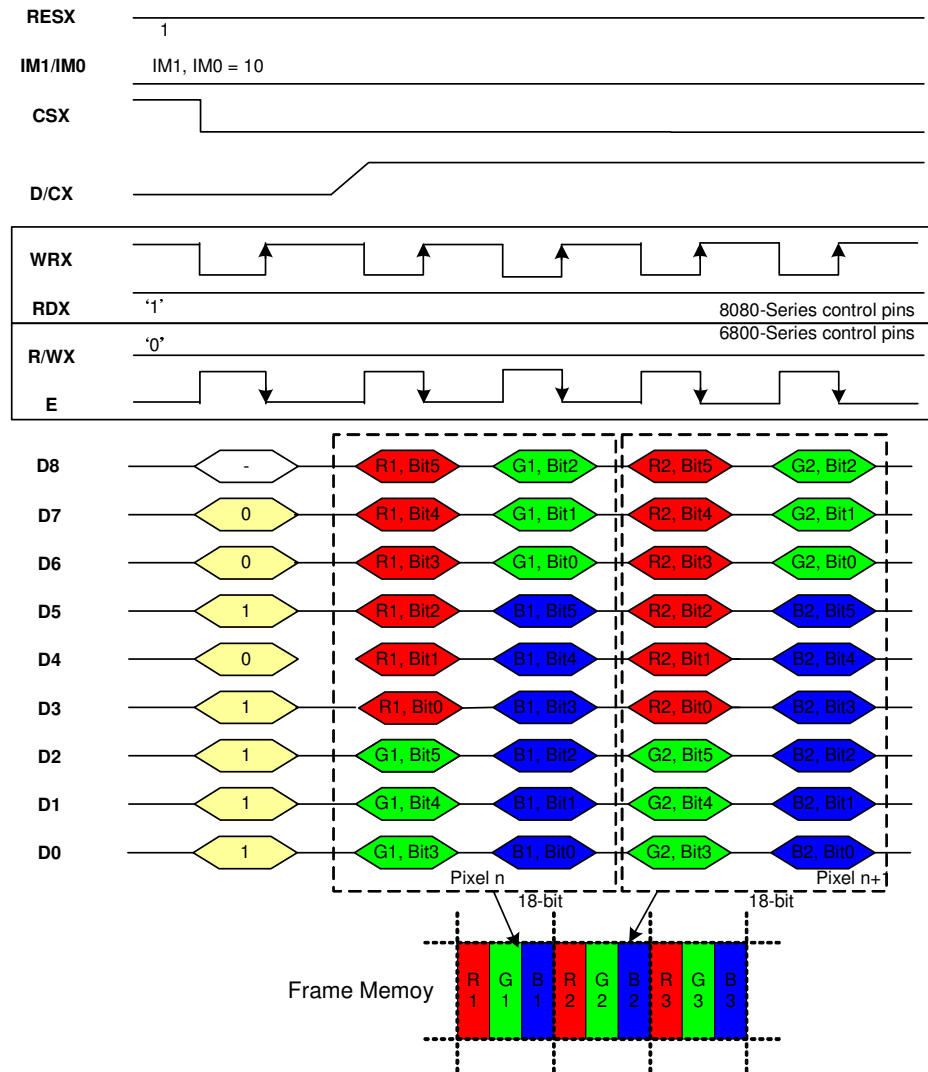


#### 6.9.4 9-bit Parallel Interface (IM2='2', IM1, IM0='10')

Different display data formats are available for three colors depth supported by listed below

✧ 262K colors, RGB6-6-6-bits input

2 pixels (6 sub-pixels) per 4 transfer, 18-bits/pixel



Note1: The data order is as follows, MSB = D8, LSB = D0 and picture data is MSB = Bit5, LSB = Bit0 for Red and Green and Blue data.

Note 2: '=' Don't care – Can be set to '0' or '1'

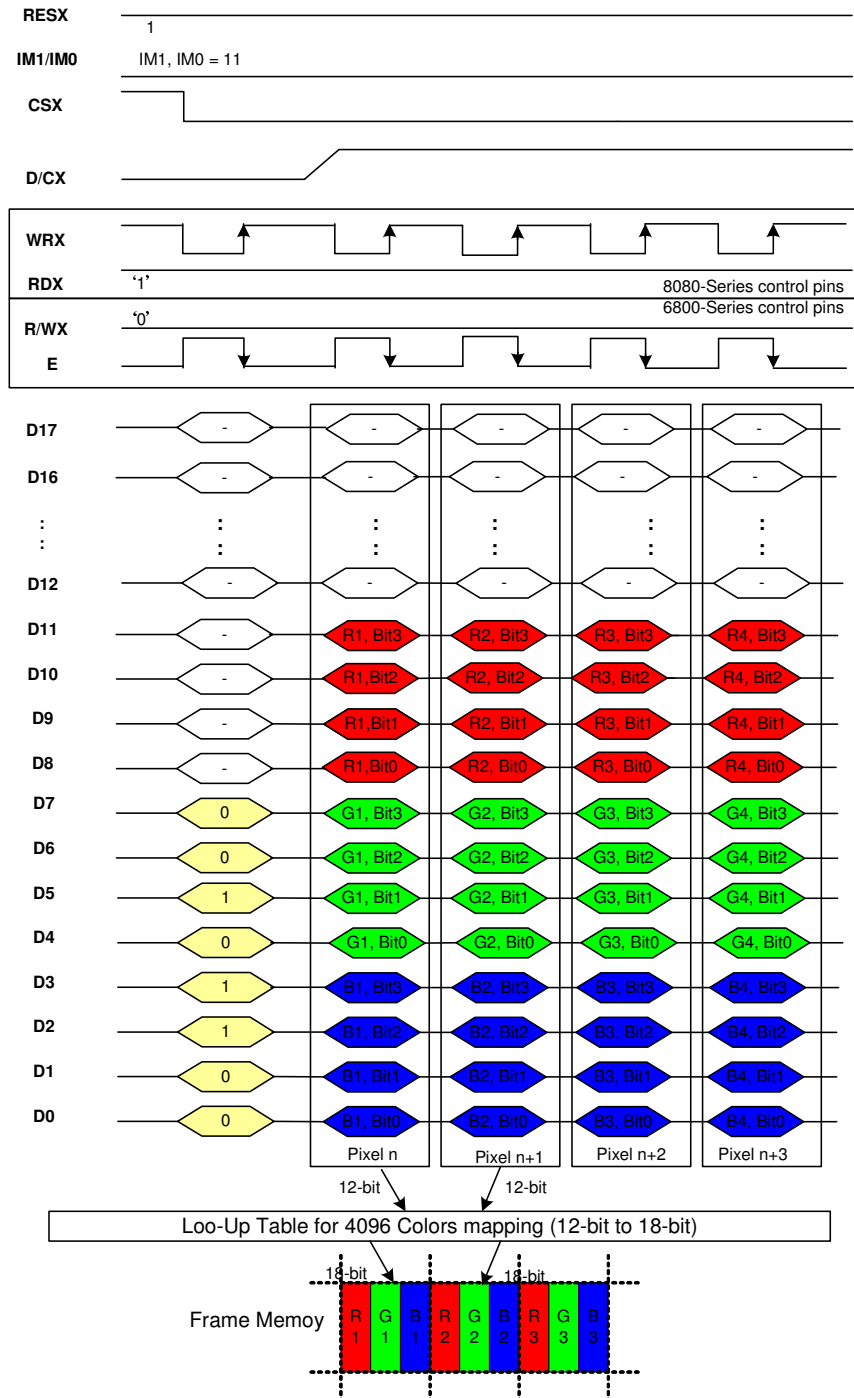
**Figure36: Write 9-bit data for RGB 6-6-6-bits input(262k-color)**

### 6.9.5 18-bit Parallel Interface (IM2='1', IM1, IM0="11")

Different display data formats are available for three colors depth supported by listed below

- ✧ 4k colors, RGB 4-4-4-bits input
- ✧ 65K colors, RGB 5-6-5-bits input
- ✧ 262K colors, RGB 6-6-6-bits input

**1 pixel (3 sub-pixels) per 1 transfer, 12-bits/pixel**

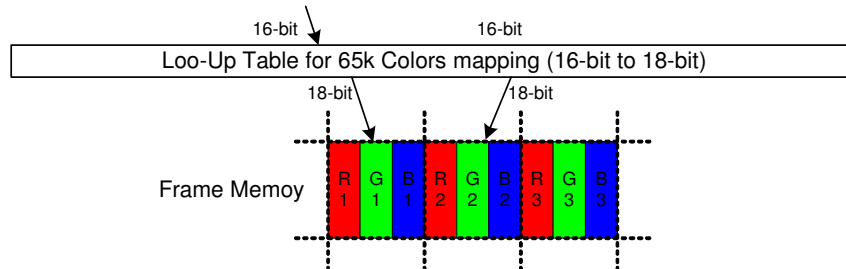
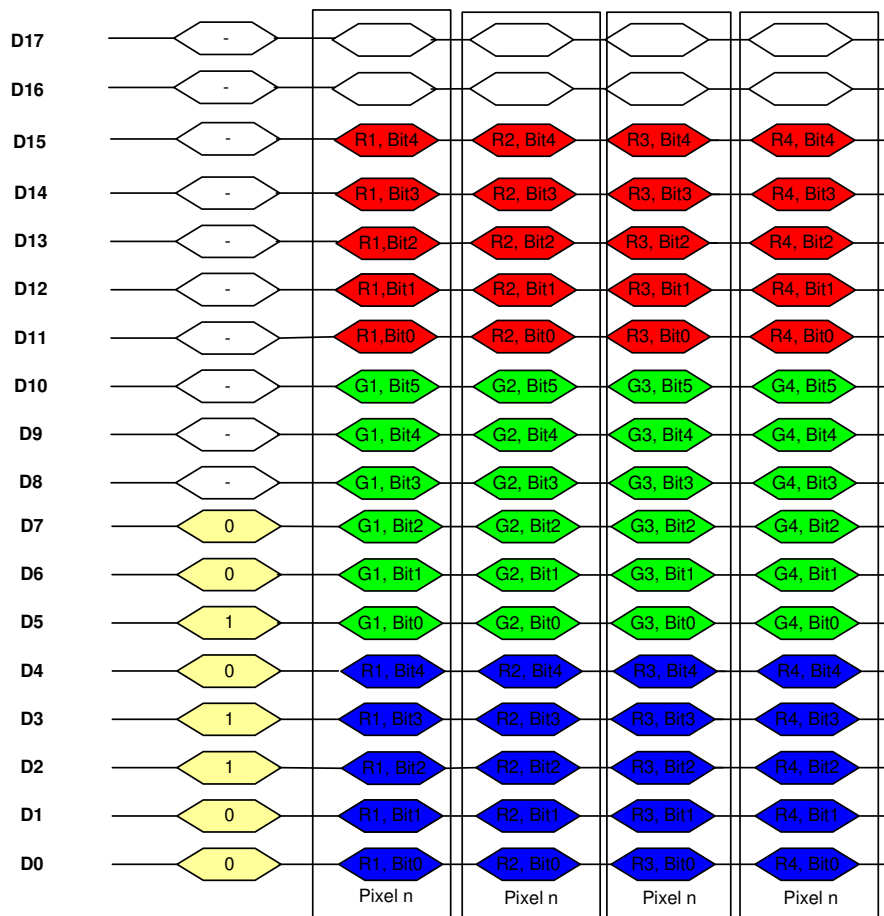
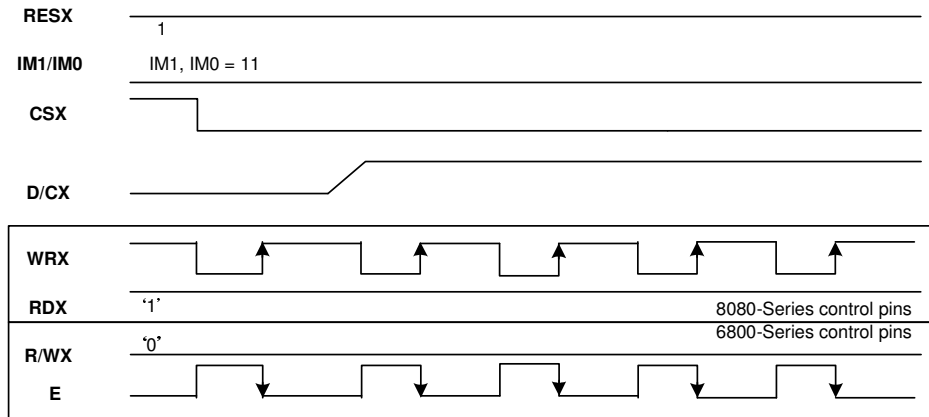


Note1: The data order is as follows, MSB = D11, LSB = D0 and picture data is MSB = Bit3, LSB = Bit0 for Red, Green and Blue data.

Note 2: '=' Don't care – Can be set to '0' or '1'

**Figure37: Write 18-bits data for RGB 4-4-4-bits input (4k colors)**

**1 pixel (3 sub-pixels) per 1 transfer, 16-bits/pixel**

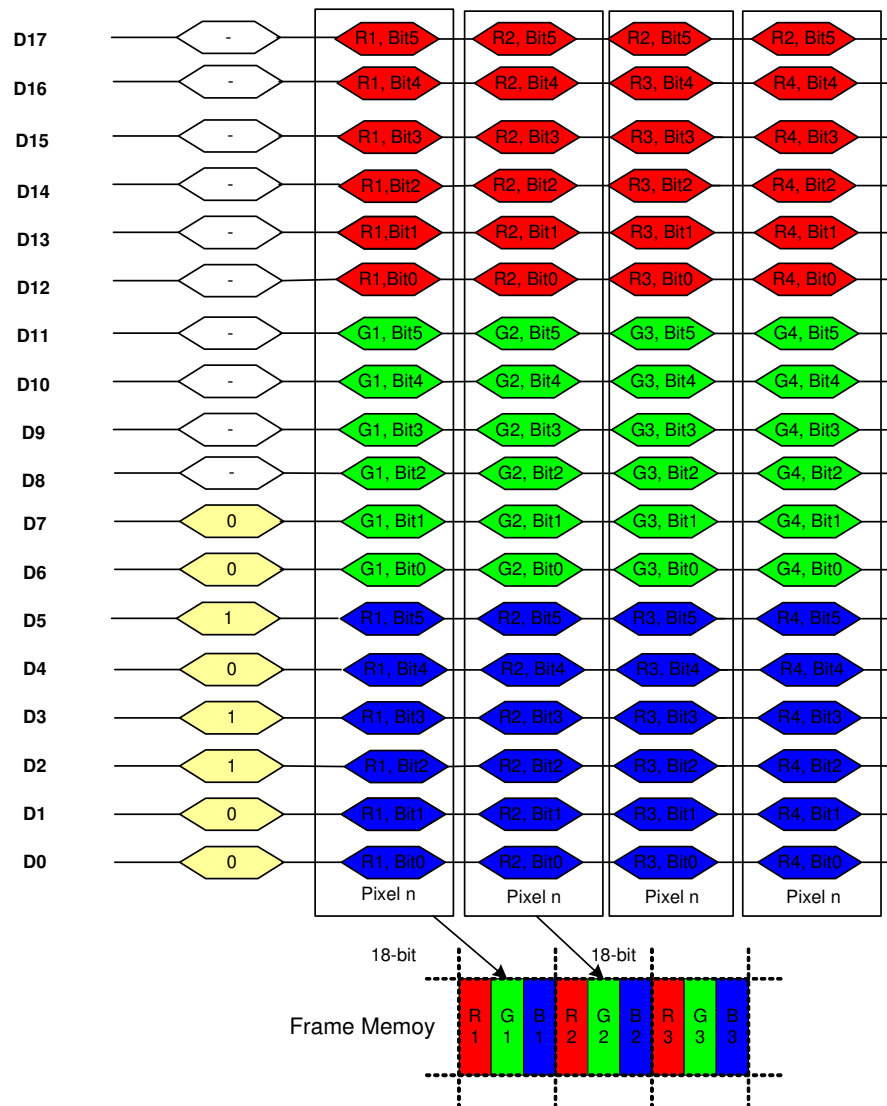
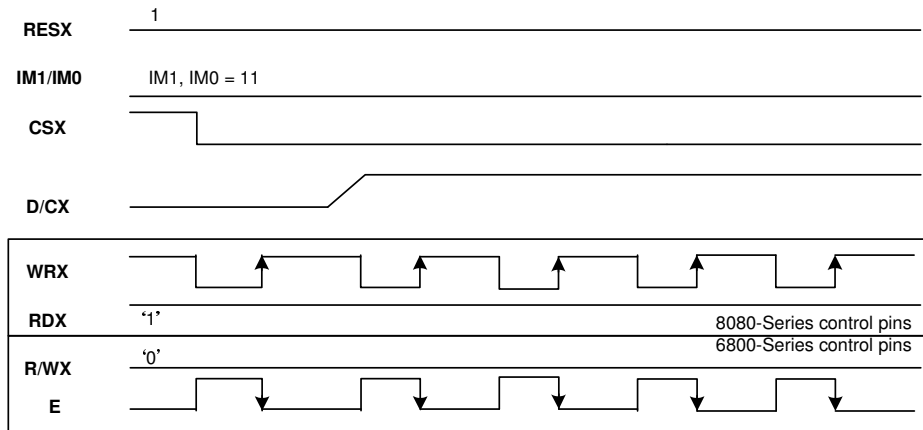


Note1: The data order is as follows, MSB = D15, LSB = D0 and picture data is MSB = Bit5, LSB = Bit0 for Green and MSB=Bit 4, LSB=Bit 0 for Blue data.

Note 2: '-' Don't care – Can be set to '0' or '1'

**Figure38: Write 18-bits data for RGB 5-6-5-bits input (65k-color)**

**1 pixel (3 sub-pixels) per 1 transfer, 18-bits/pixel**



Note1: The data order is as follows, MSB = D17, LSB = D0 and picture data is MSB = Bit5, LSB = Bit0 for Red, Green and Blue data.

Note 2: '=' Don't care – Can be set to '0' or '1'

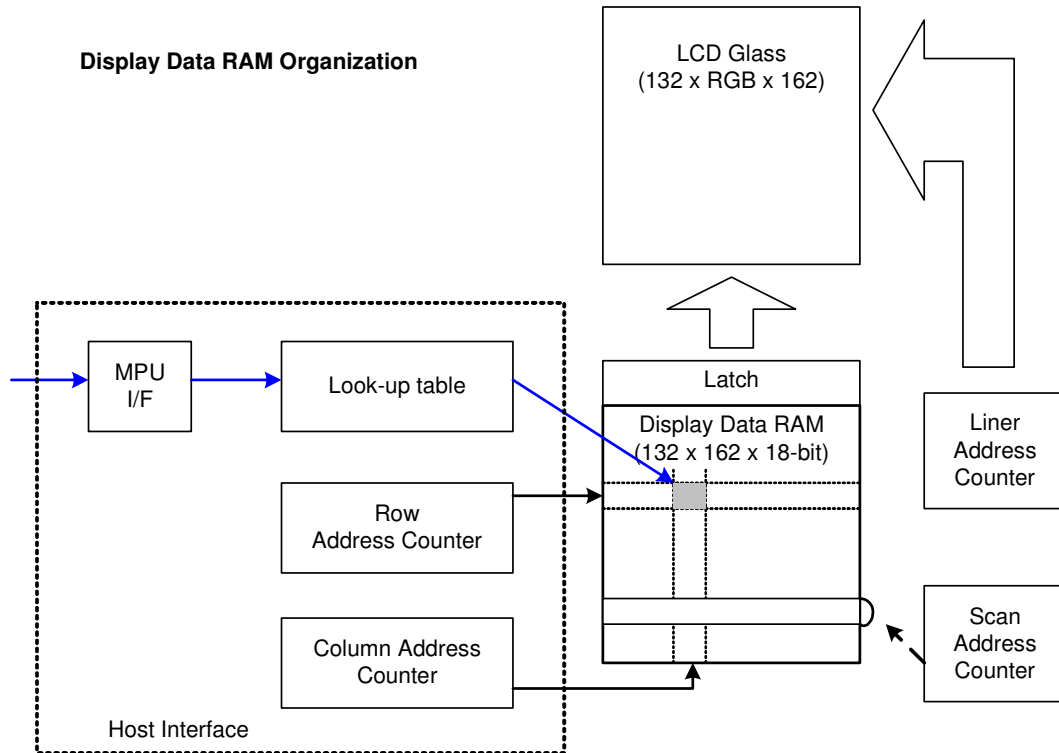
**Figure39: Write 18-bit data for RGB 6-6-6-bits input (262K colors)**

## 7. Display Data RAM

### 7.1 Configuration

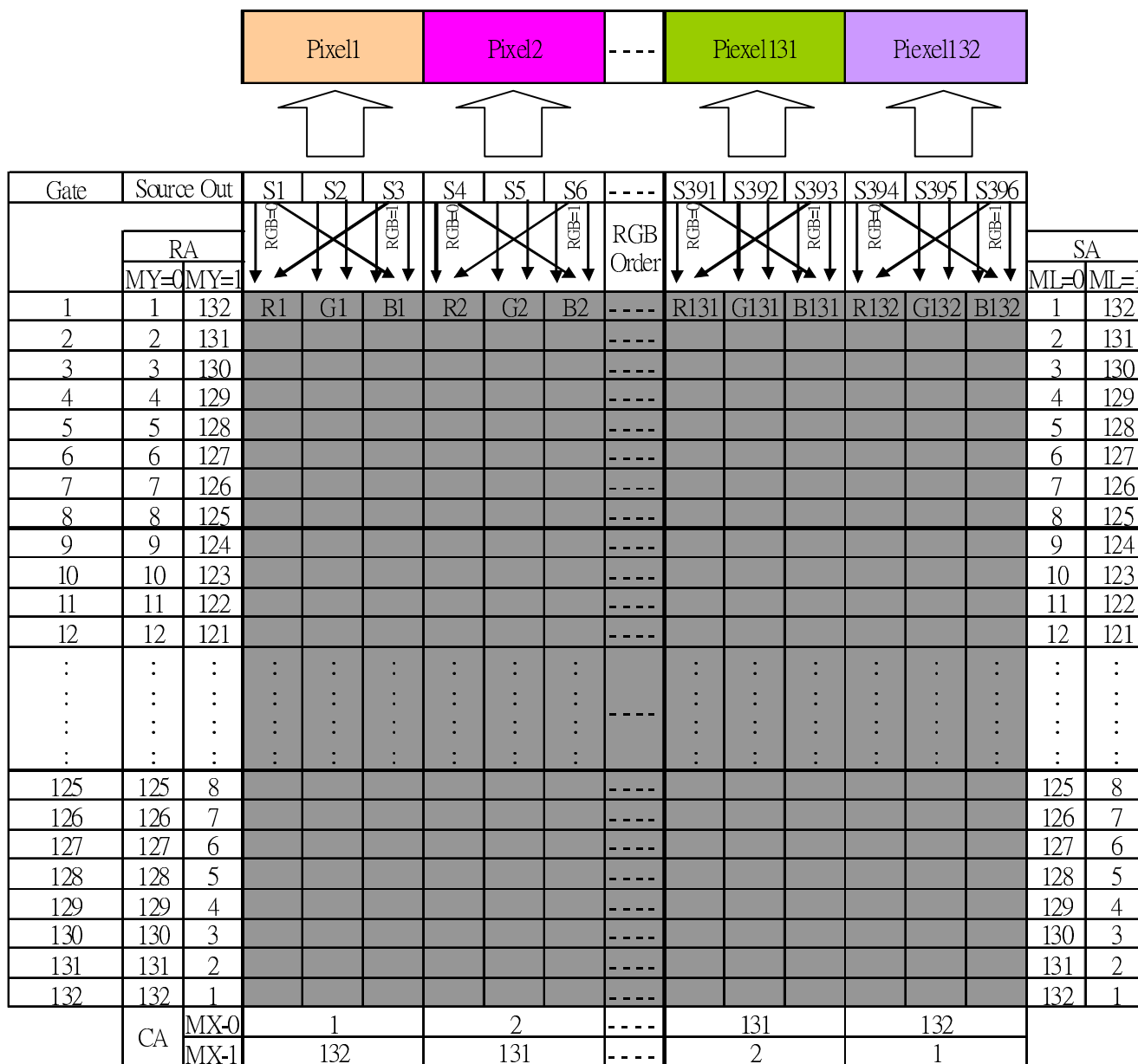
The display data RAM stores display dots and consists of 384,504 bits (132x18x162 bits). There is no restriction on access to the RAM even when the display data on the same address is loaded to DAC.

There will be no abnormal visible effect on the display when there is a simultaneous Panel Read and Interface Read or Write to the same location of the Frame Memory.

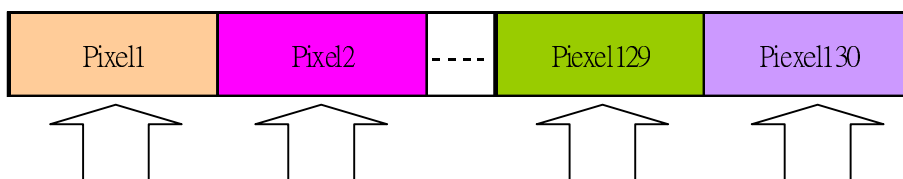


## 7.2 Memory to Display Address Mapping

### 7.2.1 132RGB x 132 resolution (GM[2:0] = "101", SMX=SMY=SRGB='0')

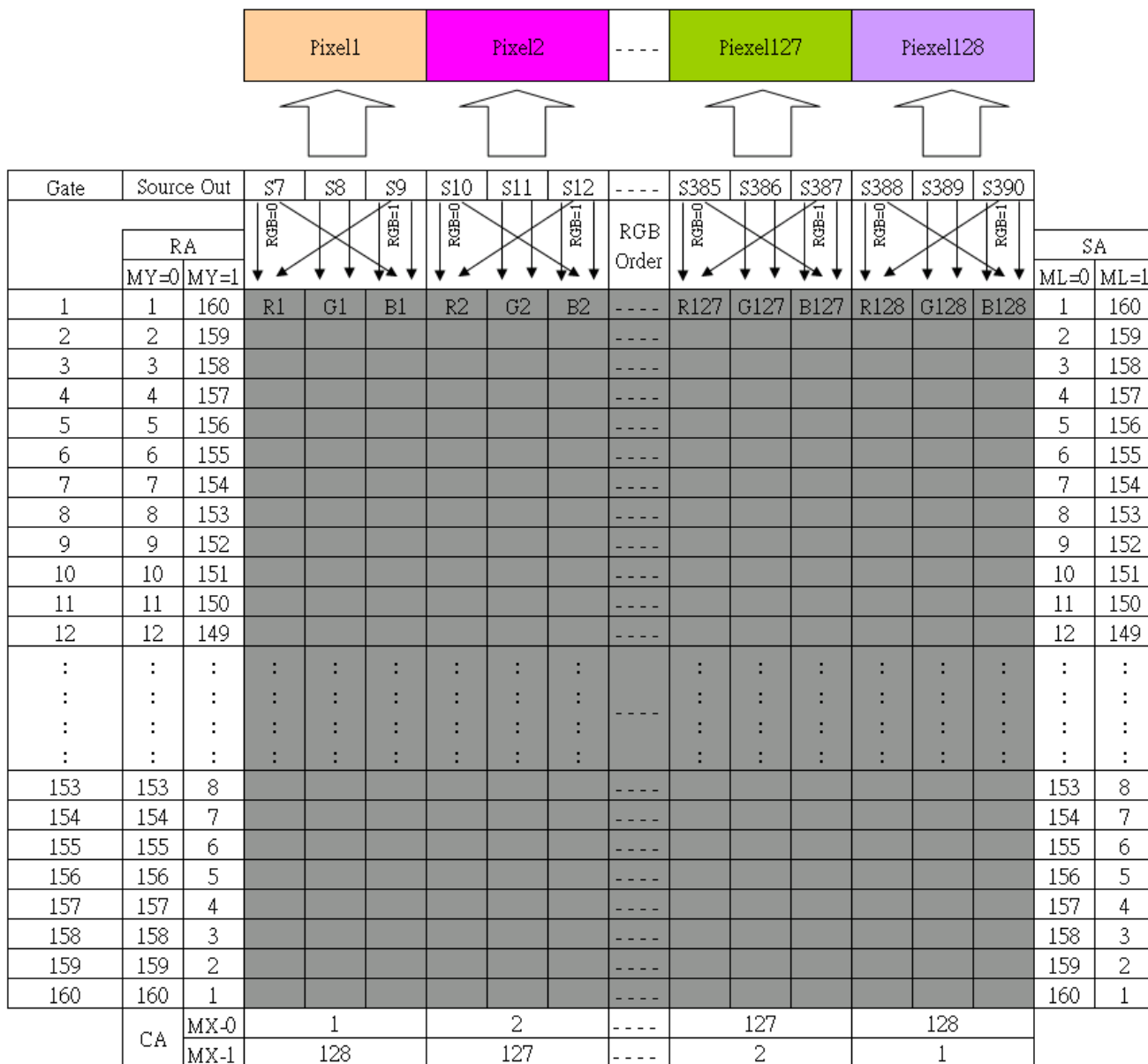


### 7.2.2 130RGB x 130 resolution(GM[2:0] = "100", SMX=SMY=SRGB='0')



| Gate | Source Out | S7    | S8  | S9 | S10   | S11 | S12 | ----      | S391  | S392 | S393 | S394  | S395 | S396 | SA        |
|------|------------|-------|-----|----|-------|-----|-----|-----------|-------|------|------|-------|------|------|-----------|
|      | RA         | RGB=0 |     |    | RGB=0 |     |     | RGB Order | RGB=0 |      |      | RGB=0 |      |      | ML=0 ML=1 |
|      | MY=0 MY=1  | R1    | G1  | B1 | R2    | G2  | B2  | ----      | R129  | G129 | B129 | R130  | G130 | B130 |           |
| 1    | 1          | 130   |     |    |       |     |     | ----      |       |      |      |       |      |      | 1 130     |
| 2    | 2          | 129   |     |    |       |     |     | ----      |       |      |      |       |      |      | 2 129     |
| 3    | 3          | 128   |     |    |       |     |     | ----      |       |      |      |       |      |      | 3 128     |
| 4    | 4          | 127   |     |    |       |     |     | ----      |       |      |      |       |      |      | 4 127     |
| 5    | 5          | 126   |     |    |       |     |     | ----      |       |      |      |       |      |      | 5 126     |
| 6    | 6          | 125   |     |    |       |     |     | ----      |       |      |      |       |      |      | 6 125     |
| 7    | 7          | 124   |     |    |       |     |     | ----      |       |      |      |       |      |      | 7 124     |
| 8    | 8          | 123   |     |    |       |     |     | ----      |       |      |      |       |      |      | 8 123     |
| 9    | 9          | 122   |     |    |       |     |     | ----      |       |      |      |       |      |      | 9 122     |
| 10   | 10         | 121   |     |    |       |     |     | ----      |       |      |      |       |      |      | 10 121    |
| 11   | 11         | 120   |     |    |       |     |     | ----      |       |      |      |       |      |      | 11 120    |
| 12   | 12         | 119   |     |    |       |     |     | ----      |       |      |      |       |      |      | 12 119    |
| :    | :          | :     | :   | :  | :     | :   | :   | :         | :     | :    | :    | :     | :    | :    | :         |
| :    | :          | :     | :   | :  | :     | :   | :   | ----      | :     | :    | :    | :     | :    | :    | :         |
| :    | :          | :     | :   | :  | :     | :   | :   | :         | :     | :    | :    | :     | :    | :    | :         |
| :    | :          | :     | :   | :  | :     | :   | :   | :         | :     | :    | :    | :     | :    | :    | :         |
| :    | :          | :     | :   | :  | :     | :   | :   | :         | :     | :    | :    | :     | :    | :    | :         |
| 123  | 123        | 8     |     |    |       |     |     | ----      |       |      |      |       |      |      | 123 8     |
| 124  | 124        | 7     |     |    |       |     |     | ----      |       |      |      |       |      |      | 124 7     |
| 125  | 125        | 6     |     |    |       |     |     | ----      |       |      |      |       |      |      | 125 6     |
| 126  | 126        | 5     |     |    |       |     |     | ----      |       |      |      |       |      |      | 126 5     |
| 127  | 127        | 4     |     |    |       |     |     | ----      |       |      |      |       |      |      | 127 4     |
| 128  | 128        | 3     |     |    |       |     |     | ----      |       |      |      |       |      |      | 128 3     |
| 129  | 129        | 2     |     |    |       |     |     | ----      |       |      |      |       |      |      | 129 2     |
| 130  | 130        | 1     |     |    |       |     |     | ----      |       |      |      |       |      |      | 130 1     |
| CA   |            | MX=0  | 1   |    |       | 2   |     |           | ----  | 129  |      |       | 130  |      |           |
|      |            | MX=1  | 130 |    |       | 129 |     |           | ----  | 2    |      |       | 1    |      |           |

### 7.2.3 128RGB x 160 resolution (GM[2:0] = "011", SMX=SMY=SRGB='0')



Note

RA = Row Address

CA = Column Address

SA = Scan Address

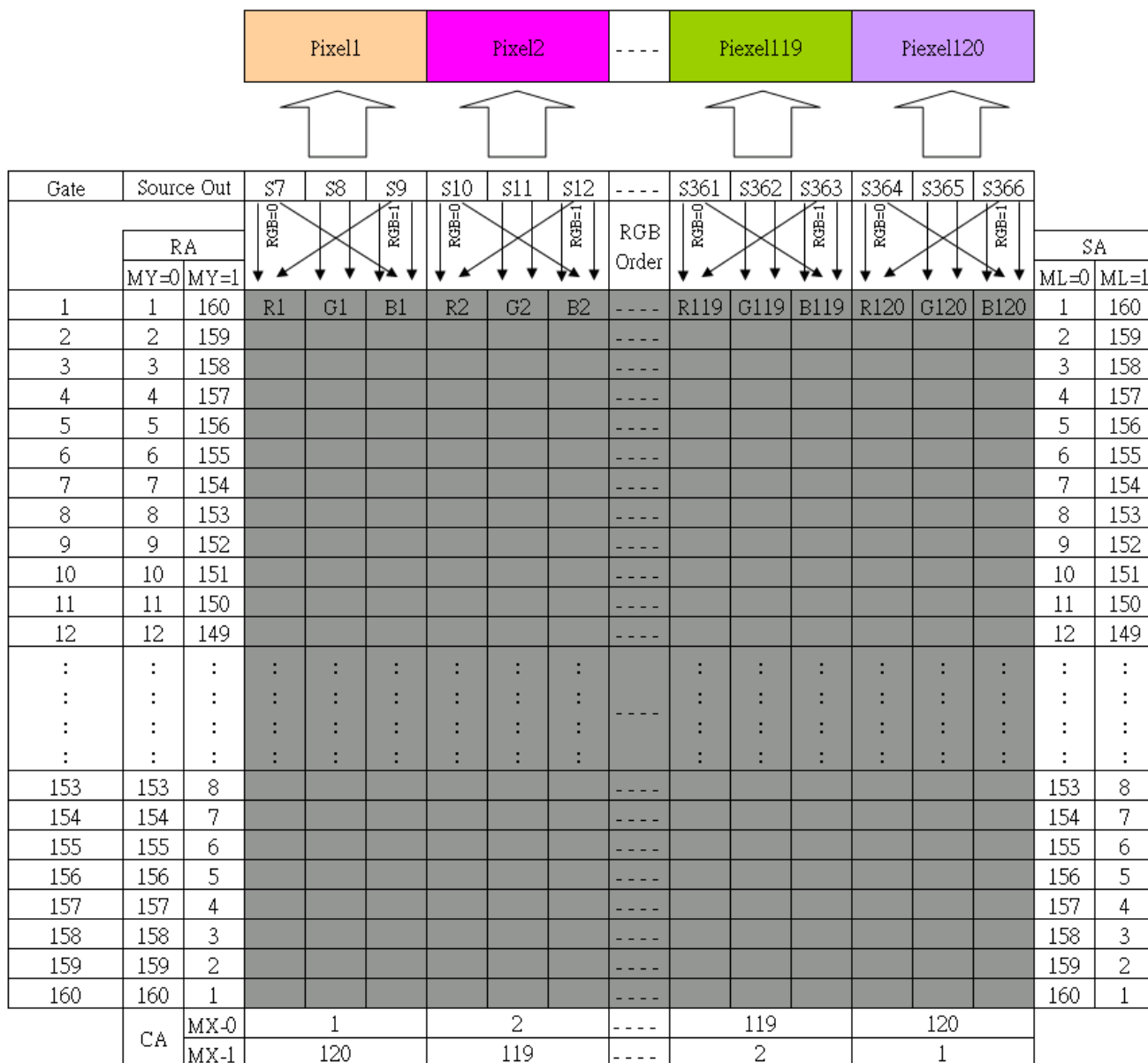
MX = Mirror X-axis (Column address direction parameter), D6 parameter of MADCTL command

ML = Scan direction parameter, D4 parameter of MADCTL command

RGB = Red, Green and Blue pixel position change, D3 parameter of MADCTL command



### 7.2.4 120RGB x 160 resolution (GM[2:0] = "010", SMX=SMY=SRGB='0')



**Note**

RA = Row Address

CA = Column Address

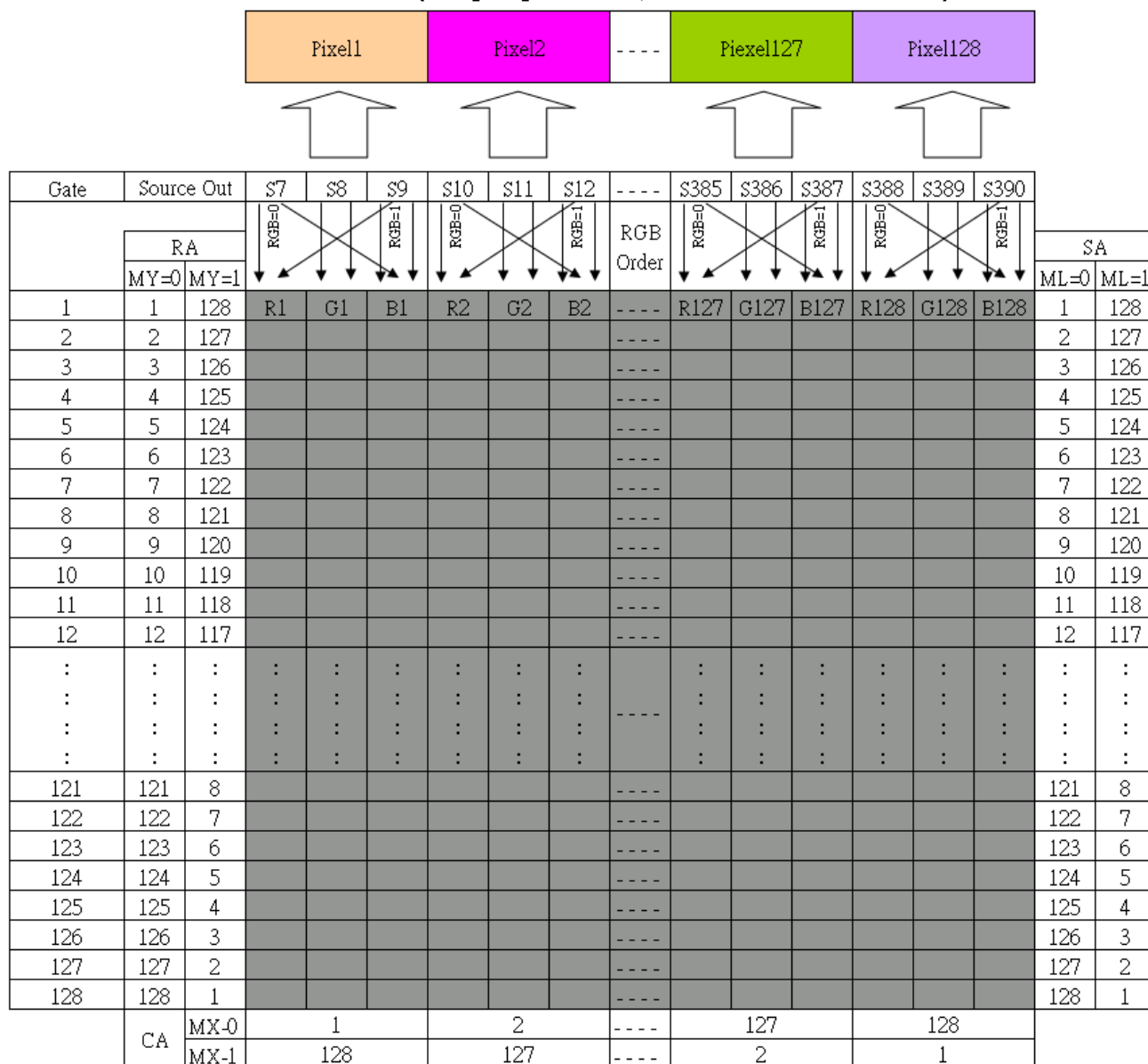
SA = Scan Address

MX = Mirror X-axis (Column address direction parameter), D6 parameter of MADCTL command

ML = Scan direction parameter, D4 parameter of MADCTL command

RGB = Red, Green and Blue pixel position change, D3 parameter of MADCTL command

### 7.2.5 128RGB x 128 resolution (GM[2:0] = "001", SMX=SMY=SRGB='0')



Note

RA = Row Address

CA = Column Address

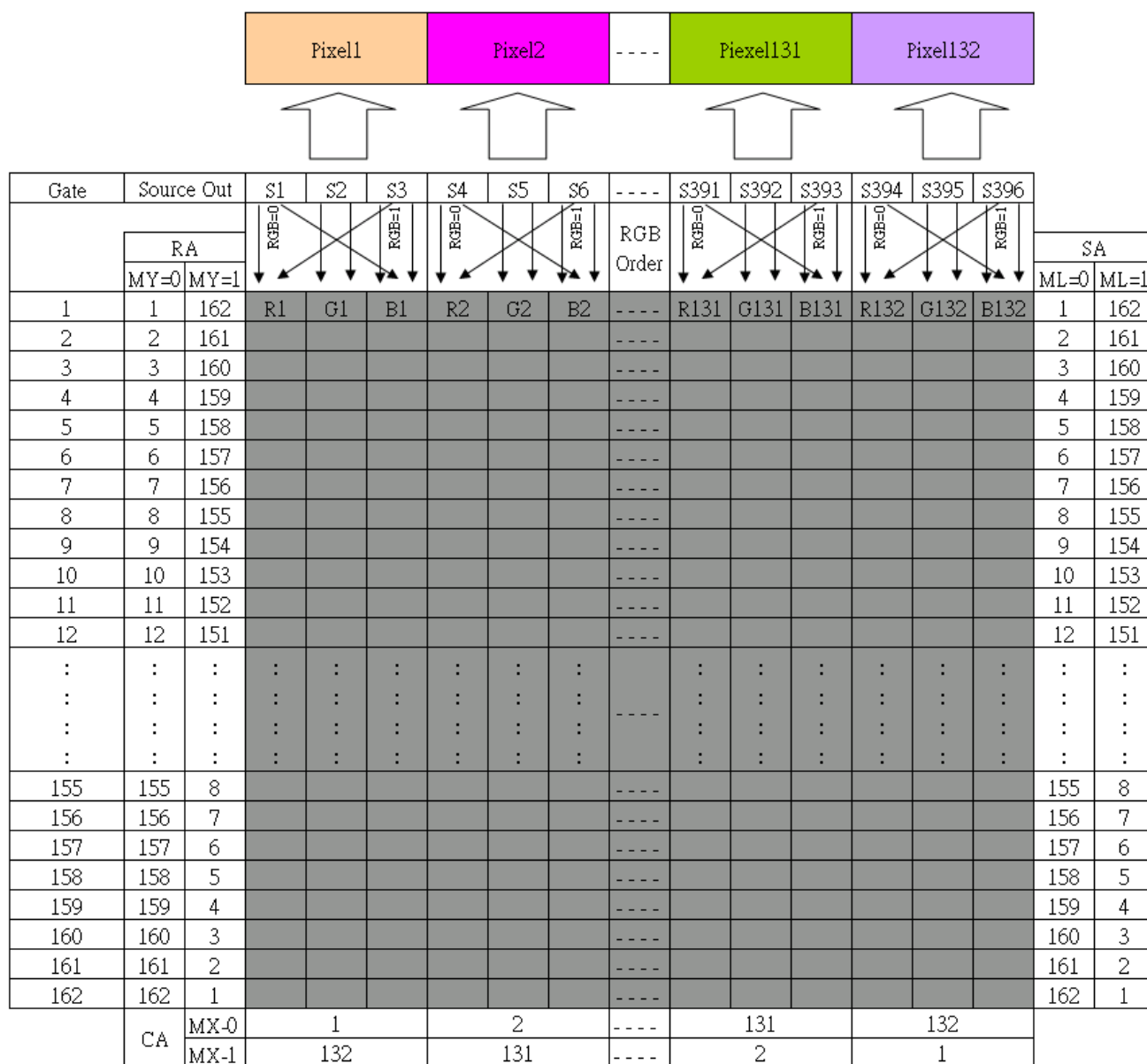
SA = Scan Address

MX = Mirror X-axis (Column address direction parameter), D6 parameter of MADCTL command

ML = Scan direction parameter, D4 parameter of MADCTL command

RGB = Red, Green and Blue pixel position change, D3 parameter of MADCTL command

## 7.2.6 132RGB x 162 resolution (GM[2:0] = "000", SMX=SMY=SRGB='0')



### Note

RA = Row Address

CA = Column Address

SA = Scan Address

MX = Mirror X-axis (Column address direction parameter), D6 parameter of MADCTL command

ML = Scan direction parameter, D4 parameter of MADCTL command

RGB = Red, Green and Blue pixel position change, D3 parameter of MADCTL command

### 7.3 MCU to memory write/read direction (Address Counter)

The address counter set the addresses of the display data RAM for writing and reading.

Data is written pixel-wise into the RAM matrix of DRIVER. The data for one pixel or two pixels is collected(RGB 6-6-6-bit), according to the data formats. As soon as this pixel-data information is complete the "Write access" is activated on the RAM. The locations of RAM are addressed by the address pointers. When GM=011, 132RGB x 162, the address ranges are X=0 to X=131 (83h) and Y=0 to Y=161 (A1h). Addresses outside these ranges are not allowed. Before writing to the RAM a window must be defined into which will be written. The window is programmable via the command register XS, YS designating the start address and XE, YE designating the end address.

For example the whole display contents will be written, the window is defined by the following values: XS=0(0h) YS=0(0h) and XE=131(83h), YE=161(A1h)

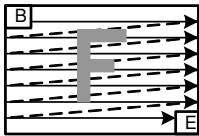
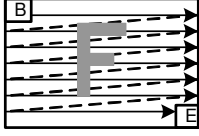
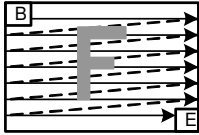
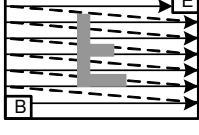
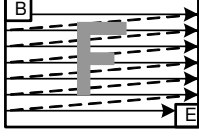
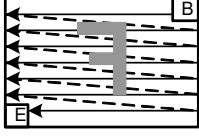
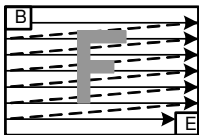
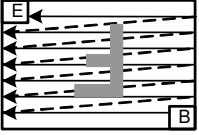
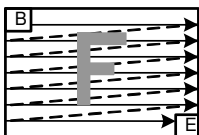
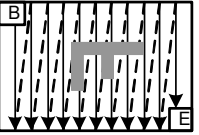
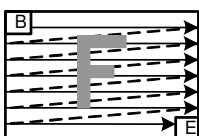
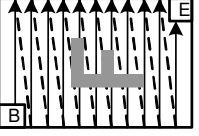
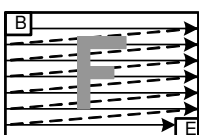
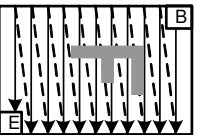
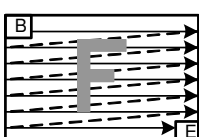
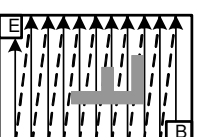
In vertical addressing mode (MV=1), the Y-address increments after each byte, after the last Y-address (Y=YE), Y wraps around to YS and X increments to address the next column. In horizontal addressing mode (V=0), the X-address increments after each byte, after the last X-address(X=XE), X wraps around to XS and Y increments to address the next row. After the every last address (X=XE and Y=YE) the address pointers wrap around to address (X=XS and Y=YS)

For flexibility in handling a wide variety of display architectures, the commands "CASET, RASET" and "MADCTR", define flags MX and MY, which allows mirroring of the X-address and Y-address. All combinations of flags are allowed. Below table shows the available combinations of writing to the display RAM. When MX, MY and MV will be changed the data must be rewritten to the display RAM.

For each image orientation, the controls for the column and page counters apply as below: -

| Condition                                                                                                        | Column Counter                | Row Counter                |
|------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------|
| When RAMWR/RAMRD command is accepted                                                                             | Return to "Start Column (XS)" | Return to "Start Row (YS)" |
| Complete Pixel Read/Write action                                                                                 | Increment by 1                | No change                  |
| The Column counter value is larger than "End Column(XE)"                                                         | Return to "Start Column (XS)" | Increment by 1             |
| The Column counter value is larger than "End Column (XE)" and the Row counter value is larger than "End Row(YE)" | Return to "Start Column (XS)" | Return to "Start Row (YS)" |

**Figure40: Frame Data Write Direction According to the MADCTR parameters (MV, MX and MY)**

| Display Data Direction      | MADCTR Parameter |    |    | Image in the Memory (MPU)                                                           | Image in the Driver (DDRAM)                                                                                                                                                  |
|-----------------------------|------------------|----|----|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | MV               | MX | MY |                                                                                     |                                                                                                                                                                              |
| Normal                      | 0                | 0  | 0  |    | <div>H/W position(0,0) → </div> <div>X-Y address (0,0)<br/>X: CASSET<br/>Y: RASET</div>   |
| Y-Mirror                    | 0                | 0  | 1  |    | <div>H/W position(0,0) → </div> <div>X-Y address (0,0)<br/>X: CASSET<br/>Y: RASET</div>   |
| X-Mirror                    | 0                | 1  | 0  |    | <div>H/W position(0,0) → </div> <div>X-Y address (0,0)<br/>X: CASSET<br/>Y: RASET</div>   |
| X-Mirror<br>Y-Mirror        | 0                | 1  | 1  |   | <div>H/W position(0,0) → </div> <div>X-Y address (0,0)<br/>X: CASSET<br/>Y: RASET</div>  |
| X-Y<br>Exchange             | 1                | 0  | 0  |  | <div>H/W position(0,0) → </div> <div>X-Y address (0,0)<br/>X: CASSET<br/>Y: RASET</div> |
| X-Y<br>Exchange<br>Y-Mirror | 1                | 0  | 1  |  | <div>H/W position(0,0) → </div> <div>X-Y address (0,0)<br/>X: CASSET<br/>Y: RASET</div> |
| XY<br>Exchange              | 1                | 1  | 0  |  | <div>H/W position(0,0) → </div> <div>X-Y address (0,0)<br/>X: CASSET<br/>Y: RASET</div> |
| XY<br>Exchange              | 1                | 1  | 1  |  | <div>H/W position(0,0) → </div> <div>X-Y address (0,0)<br/>X: CASSET<br/>Y: RASET</div> |

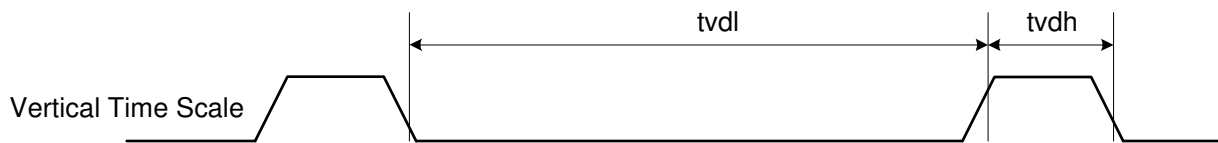
## 8. Tearing Effect Output Line

The Tearing Effect output line supplies to the MCU a Panel synchronization signal. This signal can be enabled or disabled by the Tearing Effect Line Off & On commands. The mode of the Tearing Effect Signal is defined by the Parameter of the Tearing Effect Line On command.

The signal can be used by the MCU to synchronize Frame Memory Writing when displaying video images.

### 8.1 Tearing Effect Line Modes

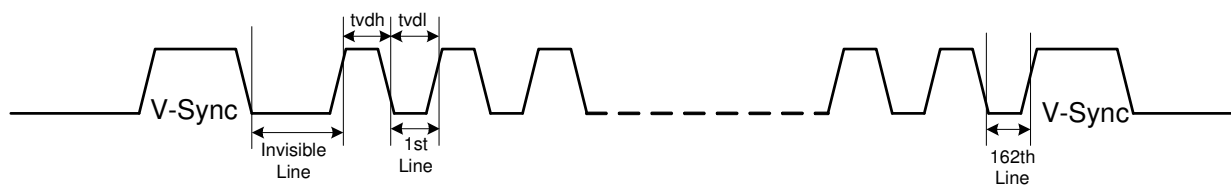
**Mode 1**, the Tearing Effect Output signal consists of V-Sync information only:



$t_{vdh}$  = The LCD display is not updated from the Frame Memory.

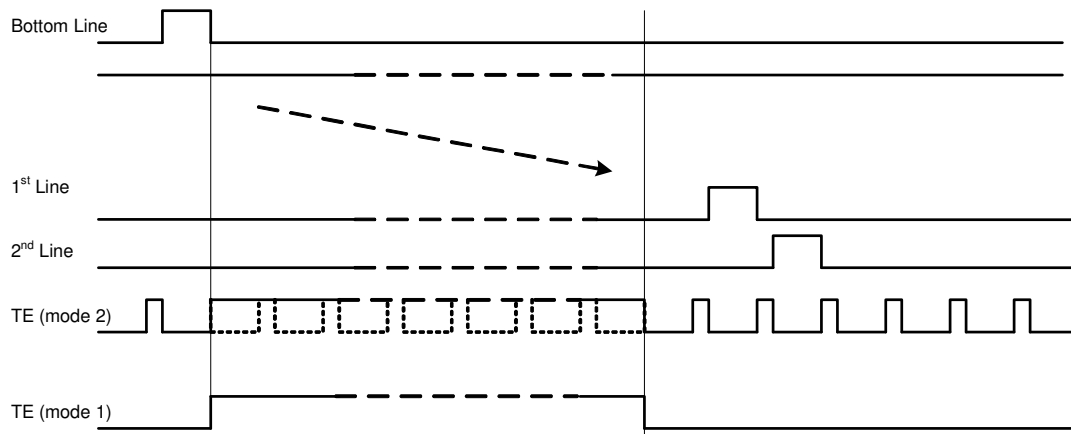
$t_{vdL}$  = The LCD display is updated from the Frame Memory (except Invisible Line – see below).

**Mode 2**, the Tearing Effect Output signal consists of V-Sync and H-Sync information, There is one V-sync and 162 H-sync pulses per field:



$t_{hdh}$  = The LCD display is not updated from the Frame Memory.

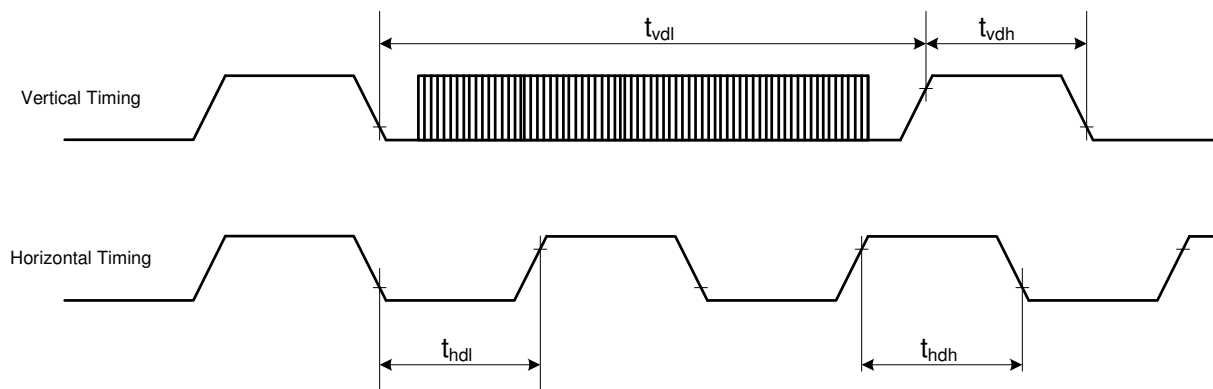
$T_{hdl}$  = The LCD display is updated from the Frame Memory (except Invisible Line – see above).



Note: During Sleep In Mode, the Tearing Effect Output Pin is active Low.

## 8.2 Tearing Effect Line Timing

The Tearing Effect signal is described below:



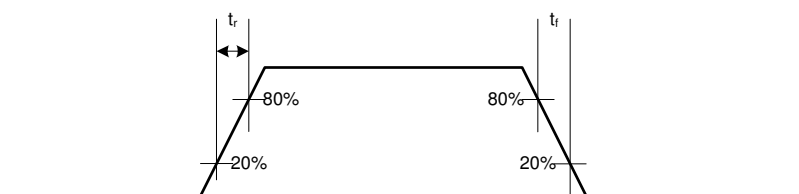
**Table 8.2.1 AC characteristics of Tearing Effect Signal Idle Mode Off/On (Frame Rate = 58.9Hz)**

| Symbol | Parameter                       | min  | max | unit    | description |
|--------|---------------------------------|------|-----|---------|-------------|
| tvdl   | Vertical Timing Low Duration    | 13   | -   | Ms      |             |
| tvdh   | Vertical Timing High Duration   | 1000 | -   | $\mu$ s |             |
| thdl   | Horizontal Timing Low Duration  | 33   | -   | $\mu$ s |             |
| thdh   | Horizontal Timing High Duration | 25   | 500 | $\mu$ s |             |

Notes:

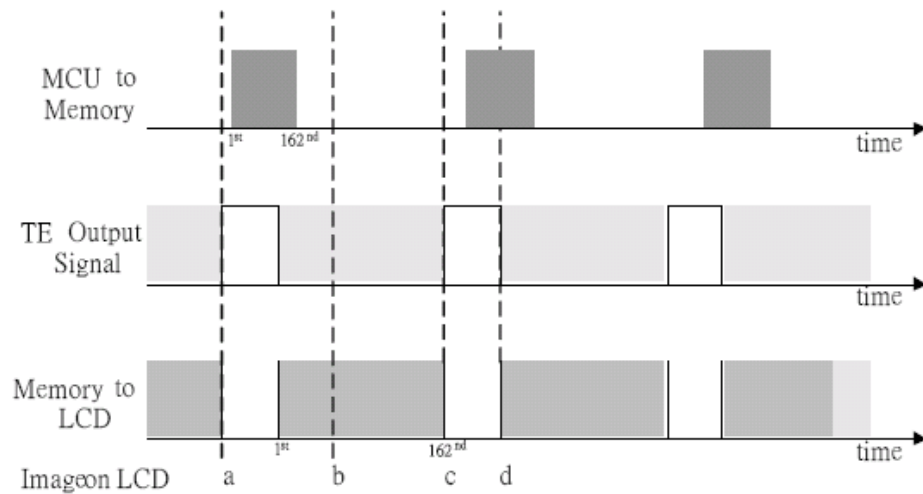
1. The timings in Table 8.2.1 apply when MADCTL B4=0 and B4=1
2. The signal's rise and fall times ( $t_f$ ,  $t_r$ ) are stipulated to be equal to or less than 15ns.

**Figure41: Rise and fall times**

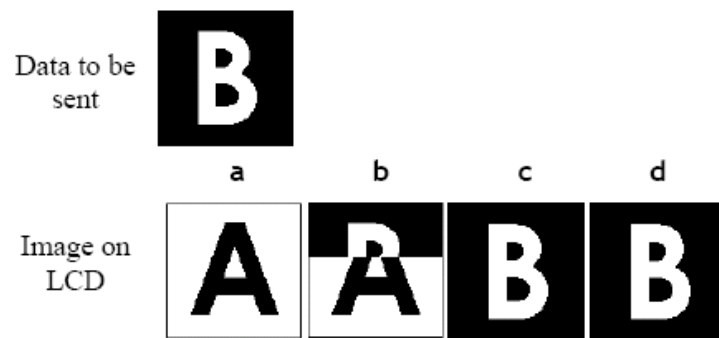


The Tearing Effect Output Line is fed back to the MCU and should be used as shown below to avoid Tearing Effect:

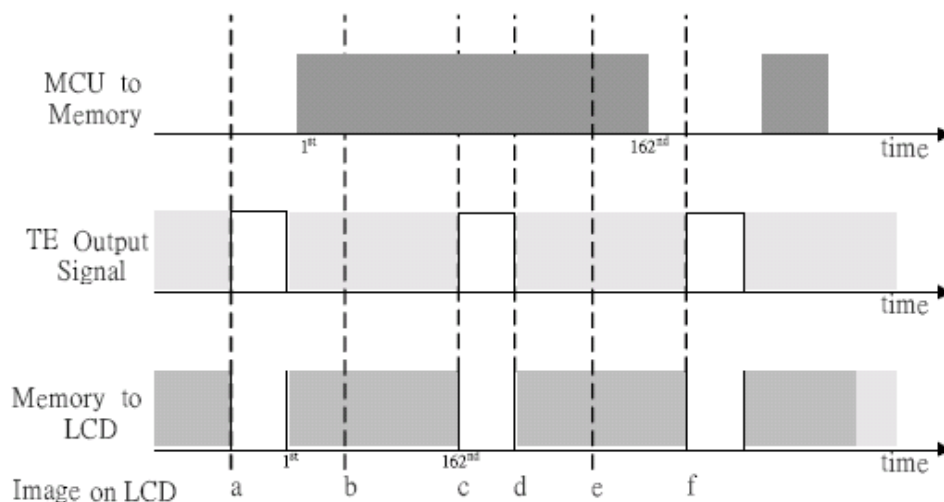
### 8.2.1 Example 1 MCU Write is Faster than Panel Read



Data write to Frame Memory is now synchronized to the Panel Scan. It should be written during the vertical sync pulse of the Tearing Effect Output Line. This ensures that data is always written ahead of the panel scan and each Panel Frame refresh has a complete new image:



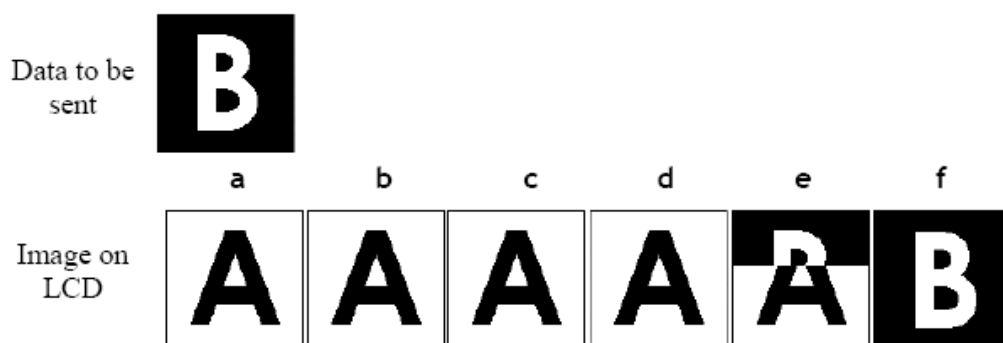
### 8.2.2 Example 2 MCU Write is slower than Panel Read



The MCU to Frame Memory write begins just after Panel Read has commenced i.e. after one horizontal sync



pulse of the Tearing Effect Output Line. This allows time for the image to download behind the Panel Read pointer and finishing download during the subsequent Frame before the Read Pointer “catches” the MCU to Frame memory write position.



## 9. Power ON/OFF Sequence

VDDI and VCI can be applied in any order.

VCI and VDDI can be powered down in any order.

During power off, if LCD is in the Sleep Out mode, VCI and VDDI must be powered down minimum 120msec after RESX has been released.

During power off, if LCD is in the Sleep In mode, VDDI or VCI can be powered down minimum 0msec after RESX has been released.

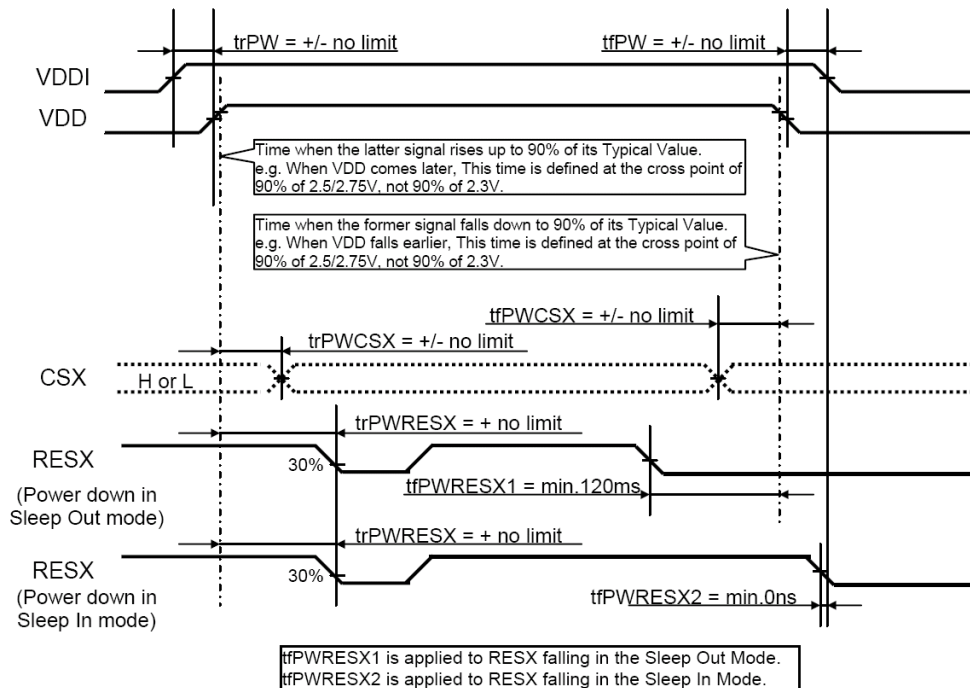
CSX can be applied at any timing or can be permanently grounded. RESX has priority over CSX.

Notes:

1. There will be no damage to the display module if the power sequences are not met.
2. There will be no abnormal visible effects on the display panel during the Power On/Off Sequences.
3. There will be no abnormal visible effects on the display between end of Power On Sequence and before receiving Sleep Out command. Also between receiving Sleep In command and Power Off Sequence.
4. If RESX line is not held stable by host during Power On Sequence as defined in Sections 9.1 and 9.2, then it will be necessary to apply a Hardware Reset (RESX) after Host Power On Sequence is complete to ensure correct operation. Otherwise function is not guaranteed.

### 9.1 Case 1 – RESX line is held high or Unstable by Host at Power –On

If RESX line is held high or unstable by the host during Power On, then a Hardware Reset must be applied after both VCI and VDDI have been applied – otherwise correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.

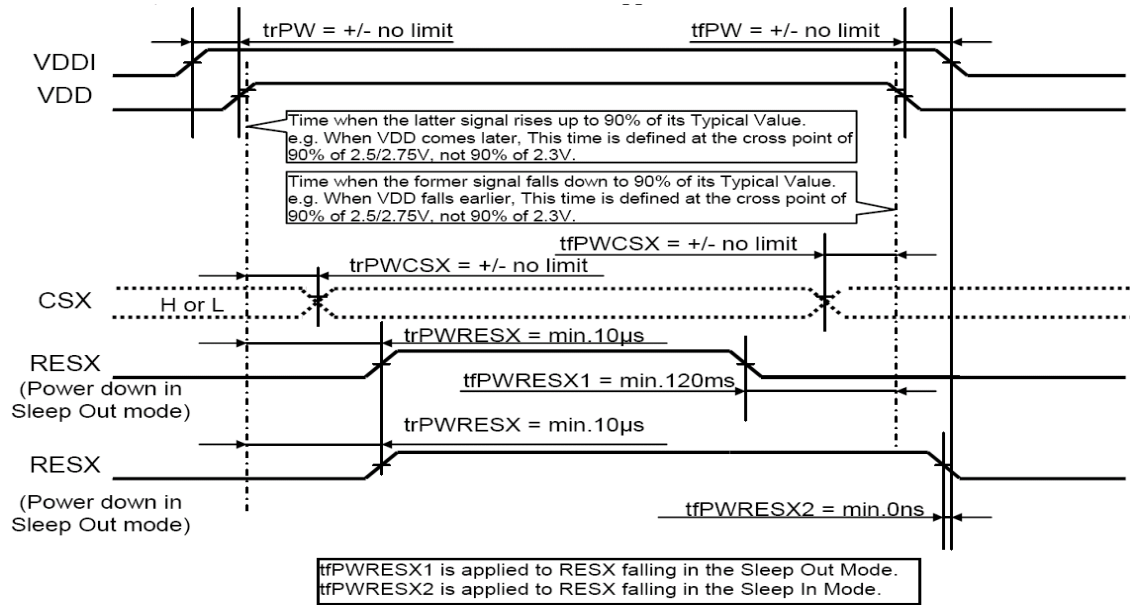


Note: Unless otherwise specified, timings herein show cross point at 50% of signal/power level.

### 9.2 Case 2 – RESX line is held Low by Host at Power On

If RESX line is held Low (and stable) by the host during Power On, then the RESX must be held low for minimum

10μsec after both VCI and VDDI have been applied.



Note: Unless otherwise specified, timings herein show cross point at 50% of signal/power level.

### 9.3 Uncontrolled Power Off

The uncontrolled power off means a situation when e.g. there is removed a battery without the controlled power off sequence. The display module must meet following requirements:

1. There cannot be any damages for the display module or the display module cannot cause any damages for the host or lines of the interface.
2. There cannot be any abnormal visible effects (= Display must be blank) within 1 second on the display and remains blank until "Power On Sequence" powers it up.

## 10. Power Level Definition

### 10.1 Power Levels

6 level modes are defined they are in order of Maximum Power consumption to Minimum Power Consumption:

1. Normal Mode On (full display), Idle Mode Off, Sleep Out.

In this mode, the display is able to show maximum 262,144 colors.

2. Partial Mode On, Idle Mode Off, Sleep Out.

In this mode part of the display is used with maximum 262,144 colors.

3. Normal Mode On (full display), Idle Mode On, Sleep Out.

In this mode, the full display area is used but with 8 colors.

4. Partial Mode On, Idle Mode On, Sleep Out.

In this mode, part of the display is used but with 8 colors.

5. Sleep In Mode.

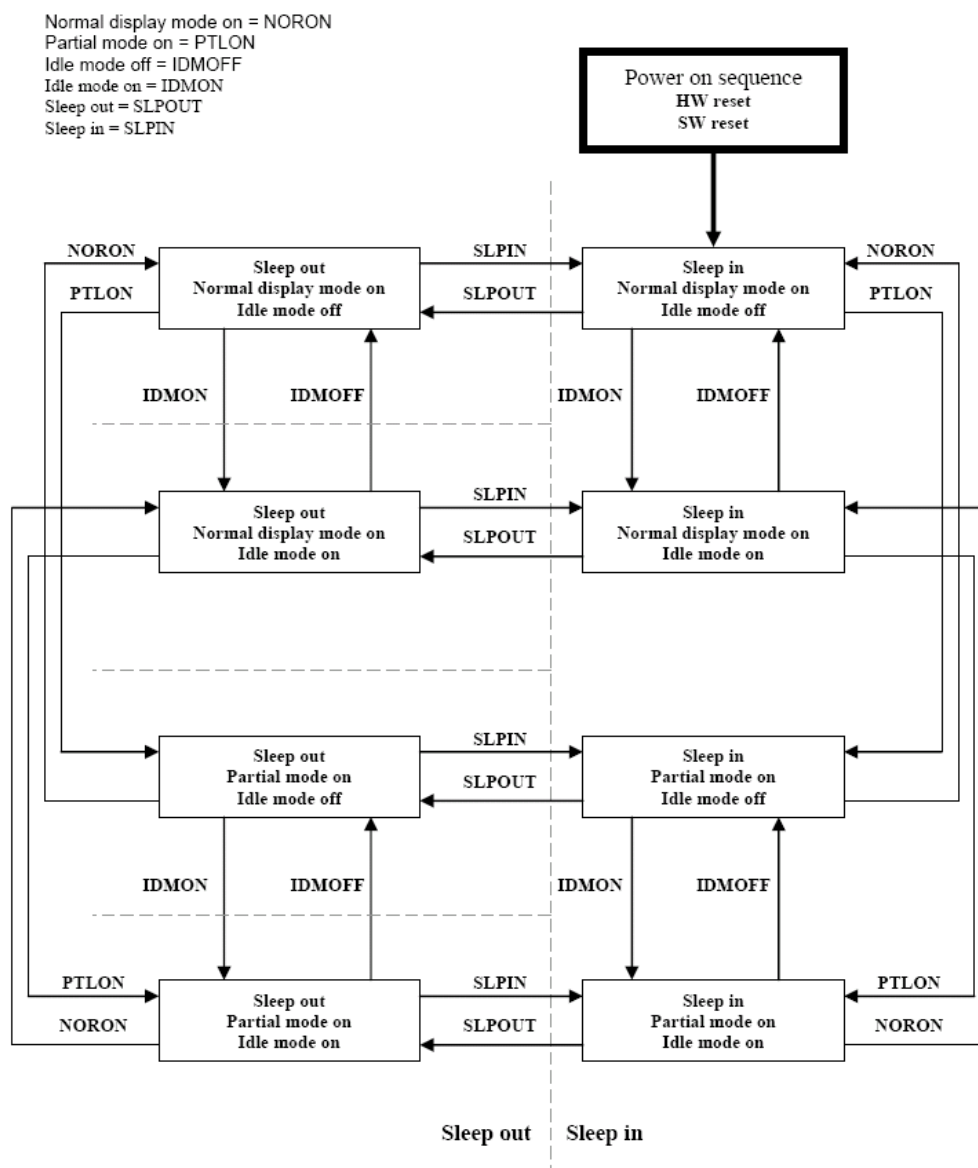
In this mode, the DC:DC converter, Internal oscillator and panel driver circuit are stopped. Only the MCU interface and memory works with VDDI power supply. Contents of the memory are safe.

6. Power Off Mode.

In this mode, both VCI and VDDI are removed.

Note: Transition between modes 1-5 is controllable by MCU commands. Mode 6 is entered only when both Power supplies are removed.

## 10.2 Power Flow Chart



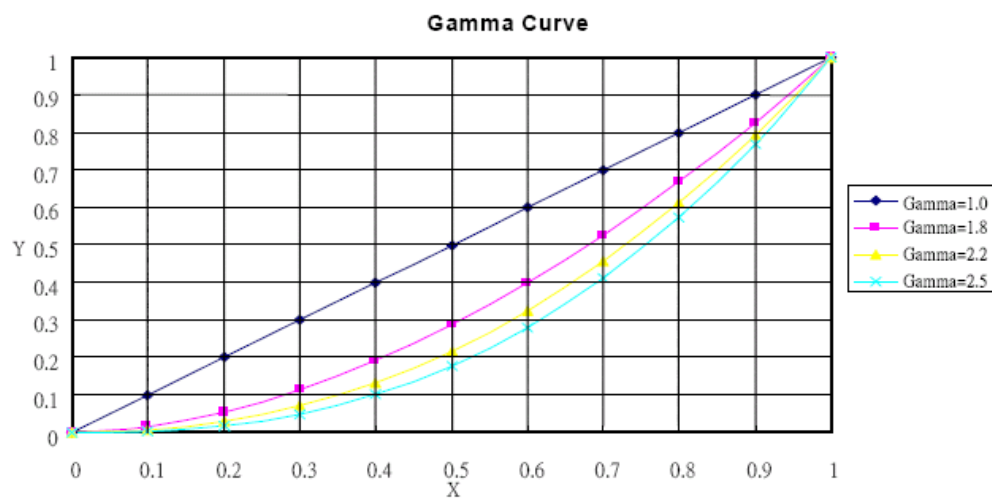
Note 1: There is not any abnormal visual effect when there is changing from one power mode to another power mode.

Note 2: There is not any limitation, which is not specified by Nokia, when there is changing from one power mode to another power mode.

Note 3: It is recommended that it should be enter Sleep in before power off.

## 11. Gamma Curves

### 11.1 Gamma curve according to the Gamma1.0/1.8/2.2/2.5





## Positive Gamma Correction

| Grayscale | Value "X" in Formula | Input Range | Formula                                        |
|-----------|----------------------|-------------|------------------------------------------------|
| VP0       | VP0[5:0]             | 0 - 63      | $((130R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$ |
| VP1       | VP1[5:0]             | 0 - 63      | $((130R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$ |
| VP2       | VP2[5:0]             | 0 - 63      | $((130R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$ |
| VP4       | VP4[5:0]             | 0 - 47      | $((47R-X \cdot R)/47R) \cdot (VP2-VP20)+VP20$  |
| VP6       | VP6[5:0]             | 0 - 47      | $((47R-X \cdot R)/47R) \cdot (VP2-VP20)+VP20$  |
| VP13      | VP13[4:0]            | 0 - 31      | $((32R-X \cdot R)/47R) \cdot (VP2-VP20)+VP20$  |
| VP20      | VP20[6:0]            | 0 - 127     | $((130R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$ |
| VP27      | VP27[3:0]            | 0 - 15      | $((36R-X \cdot R)/39R) \cdot (VP20-VP43)+VP43$ |
| VP36      | VP36[3:0]            | 0 - 15      | $((18R-X \cdot R)/39R) \cdot (VP20-VP43)+VP43$ |
| VP43      | VP43[6:0]            | 0 - 127     | $((130R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$ |
| VP50      | VP50[4:0]            | 0 - 31      | $((46R-X \cdot R)/47R) \cdot (VP43-VP61)+VP61$ |
| VP57      | VP57[5:0]            | 0 - 47      | $((47R-X \cdot R)/47R) \cdot (VP43-VP61)+VP61$ |
| VP59      | VP59[5:0]            | 0 - 47      | $((47R-X \cdot R)/47R) \cdot (VP43-VP61)+VP61$ |
| VP61      | VP61[5:0]            | 0 - 63      | $((66R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$  |
| VP62      | VP62[5:0]            | 0 - 63      | $((66R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$  |
| VP63      | VP63[5:0]            | 0 - 63      | $((66R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$  |

## Negative Gamma Correction

| Grayscale | Value "X" in Formula | Input Range | Formula                                        |
|-----------|----------------------|-------------|------------------------------------------------|
| VN63      | VN63[5:0]            | 0 - 63      | $((66R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$  |
| VN62      | VN62[5:0]            | 0 - 63      | $((66R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$  |
| VN61      | VN61[5:0]            | 0 - 63      | $((66R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$  |
| VN59      | VN59[5:0]            | 0 - 47      | $((47R-X \cdot R)/47R) \cdot (VN43-VN61)+VN61$ |
| VN57      | VN57[5:0]            | 0 - 47      | $((47R-X \cdot R)/47R) \cdot (VN43-VN61)+VN61$ |
| VN50      | VN50[4:0]            | 0 - 31      | $((46R-X \cdot R)/47R) \cdot (VN43-VN61)+VN61$ |
| VN43      | VN43[6:0]            | 0 - 127     | $((130R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$ |
| VN36      | VN36[3:0]            | 0 - 15      | $((18R-X \cdot R)/39R) \cdot (VN20-VN43)+VN43$ |
| VN27      | VN27[3:0]            | 0 - 15      | $((36R-X \cdot R)/39R) \cdot (VN20-VN43)+VN43$ |
| VN20      | VN20[6:0]            | 0 - 127     | $((130R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$ |
| VN13      | VN13[4:0]            | 0 - 31      | $((32R-X \cdot R)/47R) \cdot (VN2-VN20)+VN20$  |
| VN6       | VN6[5:0]             | 0 - 47      | $((47R-X \cdot R)/47R) \cdot (VN2-VN20)+VN20$  |
| VN4       | VN4[5:0]             | 0 - 47      | $((47R-X \cdot R)/47R) \cdot (VN2-VN20)+VN20$  |
| VN2       | VN2[5:0]             | 0 - 63      | $((130R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$ |
| VN1       | VN1[5:0]             | 0 - 63      | $((130R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$ |
| VN0       | VN0[5:0]             | 0 - 63      | $((130R-X \cdot R)/130R) \cdot (GVDD-VGS)+VGS$ |



## 12..Reset

### 12.1 Registers

The registers that are initialized are listed below.

**Reset Table (Default Value, GM=000, 128RGB x 160)**

| Item                                            | After Power On      | After Hardware Reset | After Software Reset                               |
|-------------------------------------------------|---------------------|----------------------|----------------------------------------------------|
| Frame memory                                    | Random              | No Change            | No Change                                          |
| Sleep In/Out                                    | In                  | In                   | In                                                 |
| Display In/Out                                  | Off                 | Off                  | Off                                                |
| Display mode(normal/partial)                    | Normal              | Normal               | Normal                                             |
| Display Inversion On/Off                        | Off                 | Off                  | Off                                                |
| Display Idle Mode On/Off                        | Off                 | Off                  | Off                                                |
| Column: Start Address(XS)                       | 0000h               | 0000h                | 0000h                                              |
| Column: end Address(XE)                         | 007Fh               | 007Fh                | 007Fh(127d) (when MV=0)<br>009Fh(159d) (when MV=1) |
| Row: Start Address(YS)                          | 0000h               | 0000h                | 0000h                                              |
| Row: End Address(YE)                            | 009Fh               | 009Fh                | 009Fh(159d) (when MV=0)<br>007Fh(127d) (when MV=1) |
| Gamma Setting                                   | GC0                 | GC0                  | GC0                                                |
| Color Set                                       | TBD                 | TBD                  | No Change                                          |
| Partial: Start Address(PSL)                     | 0000h               | 0000h                | 0000h                                              |
| Partial: End Address(PEL)                       | 009Fh               | 009Fh                | 009Fh                                              |
| Scroll: Vertical scrolling                      | Off                 | Off                  | Off                                                |
| Scroll: Top Fixed Area(TFA)                     | 0000h               | 0000h                | 0000h                                              |
| Scroll: Scroll area(VSA)                        | 00A0h               | 00A0h                | 00A0h                                              |
| Scroll: Bottom Fixed Area (BFA)                 | 0000h               | 0000h                | 0000h                                              |
| Scroll Start Address(SSA)                       | 0000h               | 0000h                | 0000h                                              |
| Tearing: On/Off                                 | Off                 | Off                  | Off                                                |
| Tearing Effect Mode*3                           | 0(Mode1)            | 0(Mode1)             | 0(Mode1)                                           |
| Memory Data Access Control (MY/MX/MV/ML/MH/RGB) | 0/0/0/0/0/0         | 0/0/0/0/0/0          | No change                                          |
| Interface Pixel Color Format                    | 6<br>(18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                                          |
| RDDPM                                           | 08h                 | 08h                  | 08h                                                |
| RDDMADCTR                                       | 00h                 | 00h                  | No change                                          |
| RDDCOLMOD                                       | 6<br>(18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                                          |
| RDDIM                                           | 00h                 | 00h                  | 00h                                                |
| RDDSM                                           | 00h                 | 00h                  | 00h                                                |
| RDDSDR                                          | 00h                 | 00h                  | 00h                                                |
| ID1                                             | 54h                 | 54h                  | 54h                                                |
| ID2                                             | MTP Value           | MTP Value            | MTP Value                                          |
| ID3                                             | MTP Value           | MTP Value            | MTP Value                                          |

Notes:

1. There will be no abnormal visible effects on the display when S/W or H/W Reset are applied.
2. After Powered-On Reset finishes within 10μs after both VCI & VDDI are applied.
3. Mode 1 means Tearing Effect Output Line consists of V-Blanking Information only.

**Reset Table (Default Value, GM=010, 120RGB x 160)**

| Item                                            | After Power On   | After Hardware Reset | After Software Reset                               |
|-------------------------------------------------|------------------|----------------------|----------------------------------------------------|
| Frame memory                                    | Random           | No Change            | No Change                                          |
| Sleep In/Out                                    | In               | In                   | In                                                 |
| Display In/Out                                  | Off              | Off                  | Off                                                |
| Display mode(normal/partial)                    | Normal           | Normal               | Normal                                             |
| Display Inversion On/Off                        | Off              | Off                  | Off                                                |
| Display Idle Mode On/Off                        | Off              | Off                  | Off                                                |
| Column: Start Address(XS)                       | 0000h            | 0000h                | 0000h                                              |
| Column: end Address(XE)                         | 0077h            | 0077h                | 0077h(119d) (when MV=0)<br>0077h(159d) (when MV=1) |
| Row: Start Address(YS)                          | 0000h            | 0000h                | 0000h                                              |
| Row: End Address(YE)                            | 009Fh            | 009Fh                | 009Fh(159d) (when MV=0)<br>0077h(119d) (when MV=1) |
| Gamma Setting                                   | GC0              | GC0                  | GC0                                                |
| Color Set                                       | TBD              | TBD                  | No Change                                          |
| Partial: Start Address(PSL)                     | 0000h            | 0000h                | 0000h                                              |
| Partial: End Address(PEL)                       | 009Fh            | 009Fh                | 009Fh                                              |
| Scroll: Vertical scrolling                      | Off              | Off                  | Off                                                |
| Scroll: Top Fixed Area(TFA)                     | 0000h            | 0000h                | 0000h                                              |
| Scroll: Scroll area(VSA)                        | 00A0h            | 00A0h                | 00A0h                                              |
| Scroll: Bottom Fixed Area (BFA)                 | 0000h            | 0000h                | 0000h                                              |
| Scroll Start Address(SSA)                       | 0000h            | 0000h                | 0000h                                              |
| Tearing: On/Off                                 | Off              | Off                  | Off                                                |
| Tearing Effect Mode*3                           | 0(Mode1)         | 0(Mode1)             | 0(Mode1)                                           |
| Memory Data Access Control (MY/MX/MV/ML/MH/RGB) | 0/0/0/0/0/0      | 0/0/0/0/0/0          | No change                                          |
| Interface Pixel Color Format                    | 6 (18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                                          |
| RDDPM                                           | 08h              | 08h                  | 08h                                                |
| RDDMADCTR                                       | 00h              | 00h                  | No change                                          |
| RDDCOLMOD                                       | 6 (18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                                          |
| RDDIM                                           | 00h              | 00h                  | 00h                                                |
| RDDSM                                           | 00h              | 00h                  | 00h                                                |
| RDDSDR                                          | 00h              | 00h                  | 00h                                                |
| ID1                                             | 54h              | 54h                  | 54h                                                |
| ID2                                             | MTP Value        | MTP Value            | MTP Value                                          |
| ID3                                             | MTP Value        | MTP Value            | MTP Value                                          |

**Notes:**

1. There will be no abnormal visible effects on the display when S/W or H/W Reset are applied.
2. After Powered-On Reset finishes within 10 $\mu$ s after both VCI & VDDI are applied.
3. Mode 1 means Tearing Effect Output Line consists of V-Blanking Information only.

**Reset Table (Default Value, GM=010, 128RGB x 128)**

| Item                                            | After Power On   | After Hardware Reset | After Software Reset                               |
|-------------------------------------------------|------------------|----------------------|----------------------------------------------------|
| Frame memory                                    | Random           | No Change            | No Change                                          |
| Sleep In/Out                                    | In               | In                   | In                                                 |
| Display In/Out                                  | Off              | Off                  | Off                                                |
| Display mode(normal/partial)                    | Normal           | Normal               | Normal                                             |
| Display Inversion On/Off                        | Off              | Off                  | Off                                                |
| Display Idle Mode On/Off                        | Off              | Off                  | Off                                                |
| Column: Start Address(XS)                       | 0000h            | 0000h                | 0000h                                              |
| Column: end Address(XE)                         | 007Fh            | 007Fh                | 007Fh(127d) (when MV=0)<br>0077h(127d) (when MV=1) |
| Row: Start Address(YS)                          | 0000h            | 0000h                | 0000h                                              |
| Row: End Address(YE)                            | 007Fh            | 007Fh                | 007Fh(127d) (when MV=0)<br>007Fh(127d) (when MV=1) |
| Gamma Setting                                   | GC0              | GC0                  | GC0                                                |
| Color Set                                       | TBD              | TBD                  | No Change                                          |
| Partial: Start Address(PSL)                     | 0000h            | 0000h                | 0000h                                              |
| Partial: End Address(PEL)                       | 007Fh            | 007Fh                | 007Fh                                              |
| Scroll: Vertical scrolling                      | Off              | Off                  | Off                                                |
| Scroll: Top Fixed Area(TFA)                     | 0000h            | 0000h                | 0000h                                              |
| Scroll: Scroll area(VSA)                        | 0080h            | 0080h                | 0080h                                              |
| Scroll: Bottom Fixed Area (BFA)                 | 0000h            | 0000h                | 0000h                                              |
| Scroll Start Address(SSA)                       | 0000h            | 0000h                | 0000h                                              |
| Tearing: On/Off                                 | Off              | Off                  | Off                                                |
| Tearing Effect Mode*3                           | 0(Mode1)         | 0(Mode1)             | 0(Mode1)                                           |
| Memory Data Access Control (MY/MX/MV/ML/MH/RGB) | 0/0/0/0/0/0      | 0/0/0/0/0/0          | No change                                          |
| Interface Pixel Color Format                    | 6 (18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                                          |
| RDDPM                                           | 08h              | 08h                  | 08h                                                |
| RDDMADCTR                                       | 00h              | 00h                  | No change                                          |
| RDDCOLMOD                                       | 6 (18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                                          |
| RDDIM                                           | 00h              | 00h                  | 00h                                                |
| RDDSM                                           | 00h              | 00h                  | 00h                                                |
| RDDSDR                                          | 00h              | 00h                  | 00h                                                |
| ID1                                             | 54h              | 54h                  | 54h                                                |
| ID2                                             | MTP Value        | MTP Value            | MTP Value                                          |
| ID3                                             | MTP Value        | MTP Value            | MTP Value                                          |

Notes:

1. There will be no abnormal visible effects on the display when S/W or H/W Reset are applied.
2. After Powered-On Reset finishes within 10μs after both VCI & VDDI are applied.
3. Mode 1 means Tearing Effect Output Line consists of V-Blanking Information only.

**Reset Table (Default Value, GM=011, 132RGB x 162)**

| Item                                            | After Power On   | After Hardware Reset | After Software Reset                               |
|-------------------------------------------------|------------------|----------------------|----------------------------------------------------|
| Frame memory                                    | Random           | No Change            | No Change                                          |
| Sleep In/Out                                    | In               | In                   | In                                                 |
| Display In/Out                                  | Off              | Off                  | Off                                                |
| Display mode(normal/partial)                    | Normal           | Normal               | Normal                                             |
| Display Inversion On/Off                        | Off              | Off                  | Off                                                |
| Display Idle Mode On/Off                        | Off              | Off                  | Off                                                |
| Column: Start Address(XS)                       | 0000h            | 0000h                | 0000h                                              |
| Column: end Address(XE)                         | 0083h            | 0083h                | 0083h(131d) (when MV=0)<br>00A1h(161d) (when MV=1) |
| Row: Start Address(YS)                          | 0000h            | 0000h                | 0000h                                              |
| Row: End Address(YE)                            | 00A1h            | 00A1h                | 00A1h(161d) (when MV=0)<br>0083h(131d) (when MV=1) |
| Gamma Setting                                   | GC0              | GC0                  | GC0                                                |
| Color Set                                       | TBD              | TBD                  | No Change                                          |
| Partial: Start Address(PSL)                     | 0000h            | 0000h                | 0000h                                              |
| Partial: End Address(PEL)                       | 00A1h            | 00A1h                | 00A1h                                              |
| Scroll: Vertical scrolling                      | Off              | Off                  | Off                                                |
| Scroll: Top Fixed Area(TFA)                     | 0000h            | 0000h                | 0000h                                              |
| Scroll: Scroll area(VSA)                        | 00A2h            | 00A2h                | 00A2h                                              |
| Scroll: Bottom Fixed Area (BFA)                 | 0000h            | 0000h                | 0000h                                              |
| Scroll Start Address(SSA)                       | 0000h            | 0000h                | 0000h                                              |
| Tearing: On/Off                                 | Off              | Off                  | Off                                                |
| Tearing Effect Mode*3                           | 0(Mode1)         | 0(Mode1)             | 0(Mode1)                                           |
| Memory Data Access Control (MY/MX/MV/ML/MH/RGB) | 0/0/0/0/0/0      | 0/0/0/0/0/0          | No change                                          |
| Interface Pixel Color Format                    | 6 (18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                                          |
| RDDPM                                           | 08h              | 08h                  | 08h                                                |
| RDDMADCTR                                       | 00h              | 00h                  | No change                                          |
| RDDCOLMOD                                       | 6 (18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                                          |
| RDDIM                                           | 00h              | 00h                  | 00h                                                |
| RDDSM                                           | 00h              | 00h                  | 00h                                                |
| RDDSDR                                          | 00h              | 00h                  | 00h                                                |
| ID1                                             | 54h              | 54h                  | 54h                                                |
| ID2                                             | MTP Value        | MTP Value            | MTP Value                                          |
| ID3                                             | MTP Value        | MTP Value            | MTP Value                                          |

Notes:

1. There will be no abnormal visible effects on the display when S/W or H/W Reset are applied.
2. After Powered-On Reset finishes within 10μs after both VCI & VDDI are applied.
3. Mode 1 means Tearing Effect Output Line consists of V-Blanking Information only.

**Reset Table (Default Value, GM=100, 130RGB x 130)**

| Item                                               | After Power On   | After Hardware Reset | After Software Reset                 |
|----------------------------------------------------|------------------|----------------------|--------------------------------------|
| Frame memory                                       | Random           | No Change            | No Change                            |
| Sleep In/Out                                       | In               | In                   | In                                   |
| Display In/Out                                     | Off              | Off                  | Off                                  |
| Display mode(normal/partial)                       | Normal           | Normal               | Normal                               |
| Display Inversion On/Off                           | Off              | Off                  | Off                                  |
| Display Idle Mode On/Off                           | Off              | Off                  | Off                                  |
| Column: Start Address(XS)                          | 0000h            | 0000h                | 0000h                                |
| Column: end Address(XE)                            | 0081h            | 0081h                | 0081h(when MV=0)<br>0081h(when MV=1) |
| Row: Start Address(YS)                             | 0000h            | 0000h                | 0000h                                |
| Row: End Address(YE)                               | 0081h            | 0081h                | 0081h(when MV=0)<br>0081h(when MV=1) |
| Gamma Setting                                      | GC0              | GC0                  | GC0                                  |
| Color Set                                          | TBD              | TBD                  | No Change                            |
| Partial: Start Address(PSL)                        | 0000h            | 0000h                | 0000h                                |
| Partial: End Address(PEL)                          | 0081h            | 0081h                | 0081h                                |
| Scroll: Vertical scrolling                         | Off              | Off                  | Off                                  |
| Scroll: Top Fixed Area(TFA)                        | 0000h            | 0000h                | 0000h                                |
| Scroll: Scroll area(VSA)                           | 0082h            | 0082h                | 0082h                                |
| Scroll: Bottom Fixed Area (BFA)                    | 0000h            | 0000h                | 0000h                                |
| Scroll Start Address(SSA)                          | 0000h            | 0000h                | 0000h                                |
| Tearing: On/Off                                    | Off              | Off                  | Off                                  |
| Tearing Effect Mode*3                              | 0(Mode1)         | 0(Mode1)             | 0(Mode1)                             |
| Memory Data Access Control<br>(MY/MX/MV/ML/MH/RGB) | 0/0/0/0/0/0      | 0/0/0/0/0/0          | No change                            |
| Interface Pixel Color Format                       | 6 (18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                            |
| RDDPM                                              | 08h              | 08h                  | 08h                                  |
| RDDMADCTR                                          | 00h              | 00h                  | No change                            |
| RDDCOLMOD                                          | 6 (18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                            |
| RDDIM                                              | 00h              | 00h                  | 00h                                  |
| RDDSM                                              | 00h              | 00h                  | 00h                                  |
| RDDSDR                                             | 00h              | 00h                  | 00h                                  |
| ID1                                                | 54h              | 54h                  | 54h                                  |
| ID2                                                | MTP Value        | MTP Value            | MTP Value                            |
| ID3                                                | MTP Value        | MTP Value            | MTP Value                            |

Notes:

1. There will be no abnormal visible effects on the display when S/W or H/W Reset are applied.
2. After Powered-On Reset finishes within 10μs after both VCI & VDDI are applied.
3. Mode 1 means Tearing Effect Output Line consists of V-Blanking Information only.

**Reset Table (Default Value, GM=101, 132RGB x 132)**

| Item                                               | After Power On   | After Hardware Reset | After Software Reset                 |
|----------------------------------------------------|------------------|----------------------|--------------------------------------|
| Frame memory                                       | Random           | No Change            | No Change                            |
| Sleep In/Out                                       | In               | In                   | In                                   |
| Display In/Out                                     | Off              | Off                  | Off                                  |
| Display mode(normal/partial)                       | Normal           | Normal               | Normal                               |
| Display Inversion On/Off                           | Off              | Off                  | Off                                  |
| Display Idle Mode On/Off                           | Off              | Off                  | Off                                  |
| Column: Start Address(XS)                          | 0000h            | 0000h                | 0000h                                |
| Column: end Address(XE)                            | 0083h            | 0083h                | 0083h(when MV=0)<br>0083h(when MV=1) |
| Row: Start Address(YS)                             | 0000h            | 0000h                | 0000h                                |
| Row: End Address(YE)                               | 0083h            | 0083h                | 0083h(when MV=0)<br>0083h(when MV=1) |
| Gamma Setting                                      | GC0              | GC0                  | GC0                                  |
| Color Set                                          | TBD              | TBD                  | No Change                            |
| Partial: Start Address(PSL)                        | 0000h            | 0000h                | 0000h                                |
| Partial: End Address(PEL)                          | 0083h            | 0083h                | 0083h                                |
| Scroll: Vertical scrolling                         | Off              | Off                  | Off                                  |
| Scroll: Top Fixed Area(TFA)                        | 0000h            | 0000h                | 0000h                                |
| Scroll: Scroll area(VSA)                           | 0084h            | 0084h                | 0084h                                |
| Scroll: Bottom Fixed Area (BFA)                    | 0000h            | 0000h                | 0000h                                |
| Scroll Start Address(SSA)                          | 0000h            | 0000h                | 0000h                                |
| Tearing: On/Off                                    | Off              | Off                  | Off                                  |
| Tearing Effect Mode*3                              | 0(Mode1)         | 0(Mode1)             | 0(Mode1)                             |
| Memory Data Access Control<br>(MY/MX/MV/ML/MH/RGB) | 0/0/0/0/0/0      | 0/0/0/0/0/0          | No change                            |
| Interface Pixel Color Format                       | 6 (18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                            |
| RDDPM                                              | 08h              | 08h                  | 08h                                  |
| RDDMADCTR                                          | 00h              | 00h                  | No change                            |
| RDDCOLMOD                                          | 6 (18-Bit/Pixel) | 6 (18-Bit/Pixel)     | No change                            |
| RDDIM                                              | 00h              | 00h                  | 00h                                  |
| RDDSM                                              | 00h              | 00h                  | 00h                                  |
| RDDSDR                                             | 00h              | 00h                  | 00h                                  |
| ID1                                                | 54h              | 54h                  | 54h                                  |
| ID2                                                | MTP Value        | MTP Value            | MTP Value                            |
| ID3                                                | MTP Value        | MTP Value            | MTP Value                            |

Notes:

1. There will be no abnormal visible effects on the display when S/W or H/W Reset are applied.
2. After Powered-On Reset finishes within 10μs after both VCI & VDDI are applied.
3. Mode 1 means Tearing Effect Output Line consists of V-Blanking Information only.

## 12.2 Input/Output Pins

### 12.2.1 Output Pins, I/O Pins

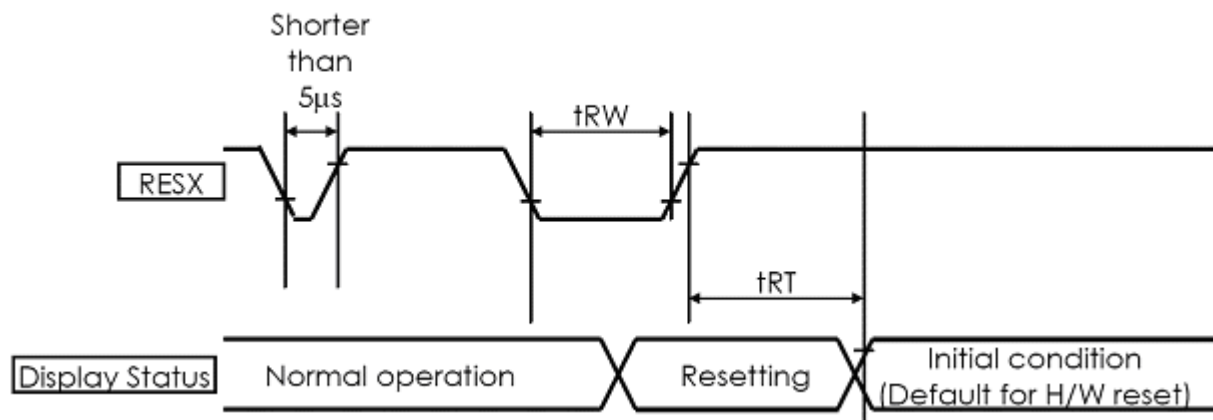
| Output or Bi-direction pins | After Power On   | After Hardware Reset | After Software Reset |
|-----------------------------|------------------|----------------------|----------------------|
| TE                          | Low              | Low                  | Low                  |
| D17to D0(Output driver)     | High-Z(Inactive) | High-Z(Inactive)     | High-Z(Inactive)     |

Note: There will be no output from D[7..0] and SDA during Power On/Off sequences, Hardware Reset and Software Reset.

### 12.2.2 Input Pins

| Input pins | During Power On Process | After Power On | After Hardware Reset | After Software Reset | During Power Off Process |
|------------|-------------------------|----------------|----------------------|----------------------|--------------------------|
| RESX       | TBD                     | Input invalid  | Input invalid        | Input invalid        | ?                        |
| CSX        | Input invalid           | Input invalid  | Input invalid        | Input invalid        | Input invalid            |
| D/CX       | Input invalid           | Input invalid  | Input invalid        | Input invalid        | Input invalid            |
| WRX        | Input invalid           | Input invalid  | Input invalid        | Input invalid        | Input invalid            |
| RDX        | Input invalid           | Input invalid  | Input invalid        | Input invalid        | Input invalid            |
| D17 to D0  | Input invalid           | Input invalid  | Input invalid        | Input invalid        | Input invalid            |
| SDA        | Input invalid           | Input invalid  | Input invalid        | Input invalid        | Input invalid            |

### 12.3 Reset Timing



(VSS=0V, VDDI=1.65V to 1.95V, VCI=2.6V to 2.9V, Ta = -30 to 70°C)

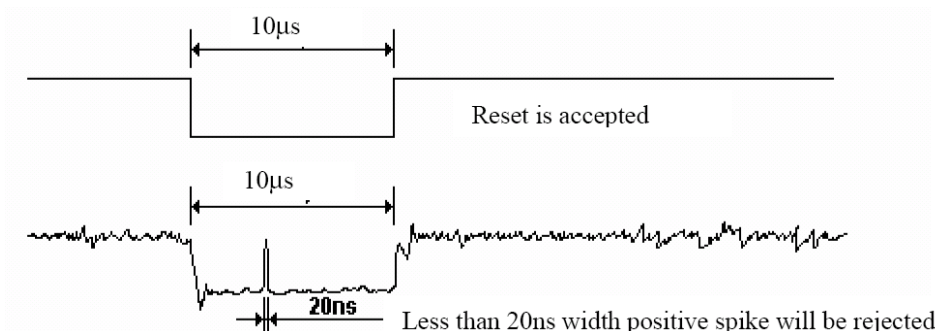
| Symbol | Parameter                 | Related Pins | MIN | TYP | MAX | Note                                     | Unit |
|--------|---------------------------|--------------|-----|-----|-----|------------------------------------------|------|
| tRESW  | *1) Reset low pulse width | RESX         | 10  | -   | -   | -                                        | µs   |
| tREST  | *2) Reset complete width  | -            | -   | -   | 5   | When reset applied during Sleep in mode  | ms   |
|        |                           | -            | -   | -   | 120 | When reset applied during Sleep out mode | ms   |

Note

1. Spike due to an electrostatic discharge on RESX line does not cause system reset according to the table below.

| RESX Pulse                       | Action                                                         |
|----------------------------------|----------------------------------------------------------------|
| Shorten than 5 $\mu$ s           | Reset Rejected                                                 |
| Longer than 10 $\mu$ s           | Reset                                                          |
| Between 5 $\mu$ s and 10 $\mu$ s | Reset starts (It depends on voltage and temperature condtion.) |

- During the resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode) and then return to Default condition for Hardware Reset.
- During Reset Complete Time, ID2 and VCOMOF value in OTP will be latched to internal register during this period. This loading is done every time when there is H/W reset complete time (tREST) within 5ms after a rising edge of RESX.
- Spike Rejection also applies during a valid reset pulse as shown below:



- It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.



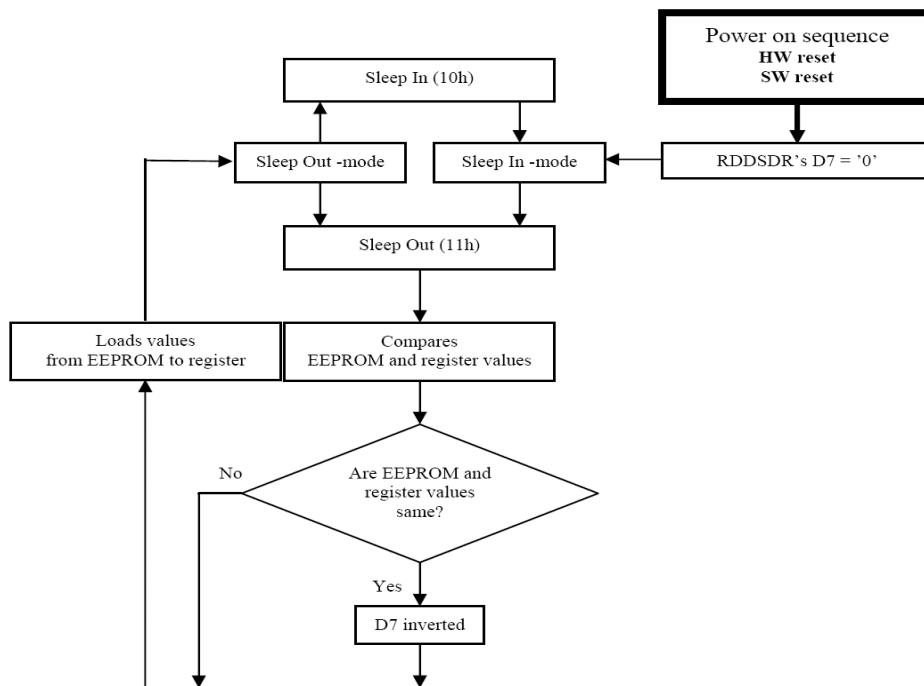
## 13. SleepOut – Command and Self-Diagnostic Functions of Display

### 13.1 Register loading Detection

Sleep Out-command (See section 16.1.2.12 Sleep Out (11h)) is a trigger for an internal function of the display module, which indicates, if the display module loading function of factory default values from EEPROM (or similar device) to registers of the display controller is working properly.

There are compared factory values of the EEPROM and register values of the display controller by the display controller. If those both values (EEPROM and register values) are same, there is inverted (= increased by 1) a bit, which is defined in command 16.1.2.10 “Read Display Self-Diagnostic Result (0Fh)” (=RDDSDR) (The used bit of this command is D7). If those both values are not same, the bit(D7) is not inverted (= increased by 1)

The flow chart for this internal function is following:



Note:

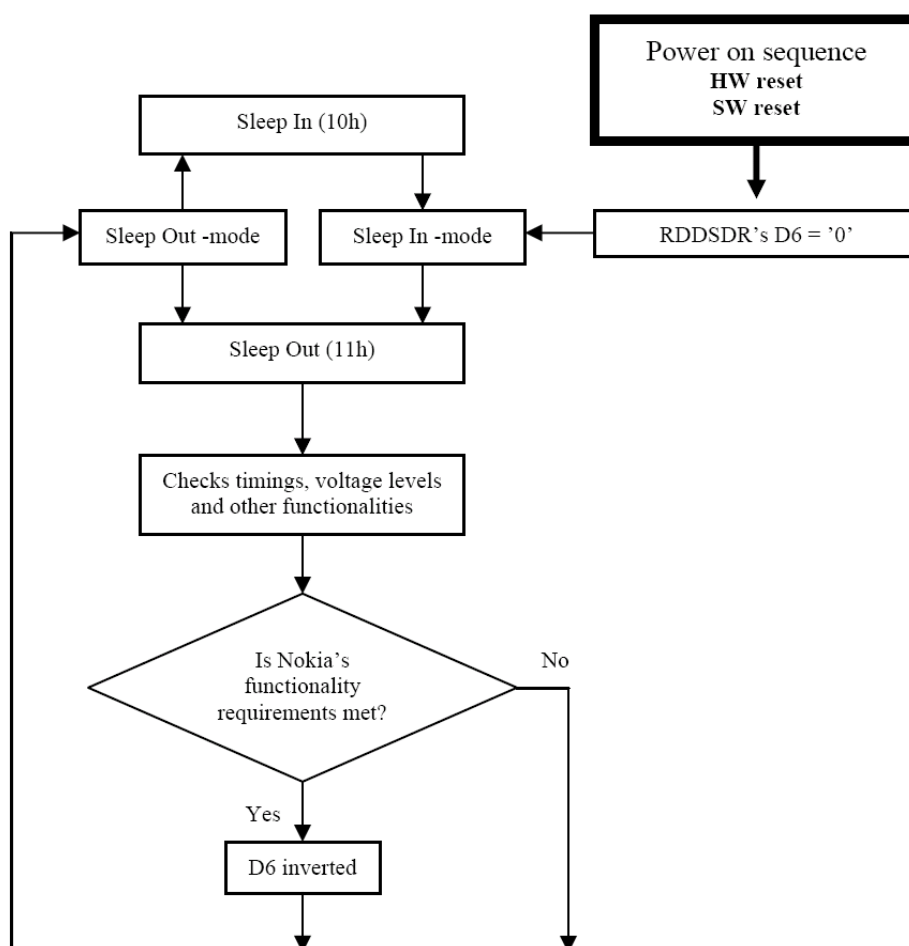
There is not compared and loaded register values, which can be changed by user (00h to AFh and DAh to DDh), by the display module.

## 13.2 Functionality Detection

Sleep Out-command (See section 16.1.2.12 Sleep Out (11h)) is a trigger for an internal function of the display module, which indicates, if the display module is still running and meets functionality requirements.

The internal function (= the display controller) is comparing, if the display module is still meeting functionality requirements (only Booster voltage level). If functionality requirement is met, there is inverted (= increased by 1) a bit, which defined in command 16.1.2.10 "Read Display Self-Diagnostic Result (0Fh)" (= RDDSDR) (The used bit of this command is D6). If functionality requirement is not same, this bit (D6) is not inverted (=increased by 1).

The flow chart for this internal function is following:



Note: There is needed 120msec after Sleep Out –command, when there is changing from Sleep In –mode to Sleep Out –mode, before there is possible to check if Nokia's functionality requirements are met and a value of RDDSDR's D6 is valid. Otherwise, there is 5msec delay for D6's value, when Sleep Out –command is sent in Sleep Out –mode.

## 14. Command

### 14.1 Command List

| Code | Command                                        | D17-8 | D7    | D6    | D5    | D4     | D3    | D2    | D1    | D0    | Hex | Ref.    |
|------|------------------------------------------------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-----|---------|
| 00H  | <b>NOP</b><br>(No Operation)                   | X     | 0     | 0     | 0     | 0      | 0     | 0     | 0     | 0     | 00h | 14.2.1  |
| 01H  | <b>Software Reset</b>                          | X     | 0     | 0     | 0     | 0      | 0     | 0     | 0     | 1     | 01h | 14.2.2  |
| 04H  | <b>Read Display Identification Information</b> | X     | 0     | 0     | 0     | 0      | 0     | 1     | 0     | 0     | 04h | 14.2.3  |
|      | 1 <sup>st</sup> Parameter                      | X     | X     | X     | X     | X      | X     | X     | X     | X     | X   |         |
|      | 2 <sup>nd</sup> Parameter                      | X     | ID17  | ID16  | ID15  | ID14   | ID13  | ID12  | ID11  | ID10  | 54h |         |
|      | 3 <sup>rd</sup> Parameter                      | X     | ID27  | ID26  | ID25  | ID24   | ID23  | ID22  | ID21  | ID20  | 80h |         |
|      | 4 <sup>th</sup> Parameter                      | X     | ID37  | ID36  | ID35  | ID34   | ID33  | ID32  | ID31  | ID30  | 66h |         |
| 09H  | <b>Read Display Status</b>                     | X     | 0     | 0     | 0     | 0      | 1     | 0     | 0     | 1     | 09h | 14.2.4  |
|      | 1 <sup>st</sup> Parameter                      | X     | X     | X     | X     | X      | X     | X     | X     | X     | X   |         |
|      | 2 <sup>nd</sup> Parameter                      | X     | BSTON | MY    | MX    | MV     | ML    | RGB   | MH    | ST24  | 00h |         |
|      | 3 <sup>rd</sup> Parameter                      | X     | ST23  | IFPF2 | IFPF1 | IFPF0  | IDMON | PTLON | SLOUT | NORON | 61h |         |
|      | 4 <sup>th</sup> Parameter                      | X     | VSSON | ST14  | INVON | ST12   | ST11  | DISON | TEON  | GCS2  | 00h |         |
|      | 5 <sup>th</sup> Parameter                      | X     | GCS1  | GCS0  | TELOM | HSOON  | VSON  | PCKON | DEON  | ST0   | 00h |         |
| 0AH  | <b>Read Display Power Mode</b>                 | X     | 0     | 0     | 0     | 0      | 1     | 0     | 1     | 0     | 0Ah | 12.4.5  |
|      | 1 <sup>st</sup> Parameter                      | X     | X     | X     | X     | X      | X     | X     | X     | X     | X   |         |
|      | 2 <sup>nd</sup> Parameter                      | X     | BSTON | IDMON | PLTON | SLPOUT | NORON | DISON | D1    | D0    | 08h |         |
| 0BH  | <b>Read Display MADCTL</b>                     | X     | 0     | 0     | 0     | 0      | 1     | 0     | 1     | 1     | 0Bh | 12.4.6  |
|      | 1 <sup>st</sup> Parameter                      | X     | X     | X     | X     | X      | X     | X     | X     | X     | X   |         |
|      | 2 <sup>nd</sup> Parameter                      | X     | MY    | MX    | MV    | ML     | RGB   | MH    | D1    | D0    | 00h |         |
| 0CH  | <b>Read Display Pixel Format</b>               | X     | 0     | 0     | 0     | 0      | 1     | 1     | 0     | 0     | 0Ch | 12.4.7  |
|      | 1 <sup>st</sup> Parameter                      | X     | X     | X     | X     | X      | X     | X     | X     | X     | X   |         |
|      | 2 <sup>nd</sup> Parameter                      | X     | VIPF3 | VIPF2 | VIPF1 | VIPF0  | D3    | IFPF2 | IFPF1 | IFPF0 | 06h |         |
| 0DH  | <b>Read Display Image Mode</b>                 | X     | 0     | 0     | 0     | 0      | 1     | 1     | 0     | 1     | 0Dh | 12.4.8  |
|      | 1 <sup>st</sup> Parameter                      | X     | X     | X     | X     | X      | X     | X     | X     | X     | X   |         |
|      | 2 <sup>nd</sup> Parameter                      | X     | VSSON | D6    | INVON | D4     | D3    | GCS2  | GCS1  | GCS0  | 00h |         |
| 0EH  | <b>Read Display Signal Mode</b>                | x     | 0     | 0     | 0     | 0      | 1     | 1     | 1     | 0     | 0Eh | 14.2.9  |
|      | 1 <sup>st</sup> Parameter                      | x     | x     | x     | x     | x      | x     | x     | x     | x     | x   |         |
|      | 2 <sup>nd</sup> Parameter                      | x     | D7    | D6    | HSOON | VSON   | PCKON | DEON  | D1    | D0    | 00h |         |
| 0FH  | <b>Read Display Signal Mode</b>                | x     | 0     | 0     | 0     | 0      | 1     | 1     | 1     | 1     | 0Fh | 14.2.10 |
|      | 1 <sup>st</sup> Parameter                      | x     | X     | x     | x     | x      | x     | x     | x     | x     | x   |         |
|      | 2 <sup>nd</sup> Parameter                      | x     | RELD  | FUND  | D5    | D4     | D3    | D2    | D1    | D0    | 00h |         |

|     |                                    |       |      |      |      |      |      |      |      |      |     |         |
|-----|------------------------------------|-------|------|------|------|------|------|------|------|------|-----|---------|
| 10H | Sleep In                           | x     | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 10h | 14.2.11 |
| 11H | Sleep Out                          | x     | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 1    | 11h | 14.2.12 |
| 12H | Partial Mode On                    | x     | 0    | 0    | 0    | 1    | 0    | 0    | 1    | 0    | 12h | 14.2.13 |
| 13H | Normal Display Mode On             | x     | 0    | 0    | 0    | 1    | 0    | 0    | 1    | 1    | 13h | 14.2.14 |
| 20H | Display Inversion Off              | x     | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 20h | 14.2.15 |
| 21H | Display Inversion On               | x     | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 1    | 21h | 14.2.16 |
| 26H | Gamma Set                          | x     | 0    | 0    | 1    | 0    | 0    | 1    | 1    | 0    | 26h | 14.2.17 |
|     | 1 <sup>st</sup> Parameter          | x     | GC7  | GC6  | GC5  | GC4  | GC3  | GC2  | GC1  | GC0  | 01h |         |
| 28H | Display Off                        | x     | 0    | 0    | 1    | 0    | 1    | 0    | 0    | 0    | 28h | 14.2.18 |
| 29H | Display On                         | x     | 0    | 0    | 1    | 0    | 1    | 0    | 0    | 1    | 29h | 14.2.19 |
| 2AH | Column Address Set                 | x     | 0    | 0    | 1    | 0    | 1    | 0    | 1    | 0    | 2Ah | 14.2.20 |
|     | 1 <sup>st</sup> Parameter          | x     | XS15 | XS14 | XS13 | XS12 | XS11 | XS10 | XS9  | XS8  | -   |         |
|     | 2 <sup>nd</sup> Parameter          | x     | XS7  | XS6  | XS5  | XS4  | XS3  | XS2  | XS1  | XS0  | -   |         |
|     | 3 <sup>rd</sup> Parameter          | x     | XE15 | XE14 | XE13 | XE12 | XE11 | XE10 | XE9  | XE8  | -   |         |
|     | 4 <sup>th</sup> Parameter          | x     | XE7  | XE6  | XE5  | XE4  | XE3  | XE2  | XE1  | XE0  | -   |         |
| 2BH | Page Address Set                   | x     | 0    | 0    | 1    | 0    | 1    | 0    | 1    | 1    | 2Bh | 14.2.21 |
|     | 1 <sup>st</sup> Parameter          | x     | YS15 | YS14 | YS13 | YS12 | YS11 | YS10 | YS9  | YS8  | -   |         |
|     | 2 <sup>nd</sup> Parameter          | x     | YS7  | YS6  | YS5  | YS4  | YS3  | YS2  | YS1  | YS0  | -   |         |
|     | 3 <sup>rd</sup> Parameter          | x     | YE15 | YE14 | YE13 | YE12 | YE11 | YE10 | YE9  | YE8  | -   |         |
|     | 4 <sup>th</sup> Parameter          | x     | YE7  | YE6  | YE5  | YE4  | YE3  | YE2  | YE1  | YE0  | -   |         |
| 2CH | Memory Write                       | x     | 0    | 0    | 1    | 0    | 1    | 1    | 0    | 0    | 2Ch | 14.2.22 |
|     | 1 <sup>st</sup> Parameter          | D17-8 | D7   | D6   | D5   | D4   | D3   | D2   | D1   | D0   | -   |         |
|     | :                                  | x     | :    | :    | :    | :    | :    | :    | :    | :    | :   |         |
|     | N <sup>th</sup> Parameter          | D17-8 | D7   | D6   | D5   | D4   | D3   | D2   | D1   | D0   | -   |         |
| 2DH | Color Setting for 4K, 65K and 262K | x     | 0    | 0    | 1    | 0    | 1    | 1    | 0    | 1    | 2Dh | 14.2.23 |
|     | 1 <sup>st</sup> Parameter          | x     | x    | x    | R005 | R004 | R003 | R002 | R001 | R000 | -   |         |
|     | :                                  | x     | x    | x    | Rnn5 | Rnn4 | Rnn3 | Rnn2 | Rnn1 | Rnn0 | -   |         |
|     | 32 <sup>nd</sup> parameter         | x     | x    | x    | R315 | R314 | R313 | R312 | R311 | R310 | -   |         |
|     | 33 <sup>rd</sup> Parameter         | x     | x    | x    | G005 | G004 | G003 | G002 | G001 | G000 | -   |         |
|     | :                                  | x     | x    | x    | Gnn5 | Gnn4 | Gnn3 | Gnn2 | Gnn1 | Gnn0 | -   |         |
|     | 96 <sup>th</sup> Parameter         | x     | x    | x    | G635 | G634 | G633 | G632 | G631 | G630 | -   |         |
|     | 97 <sup>th</sup> Parameter         | x     | x    | x    | B005 | B004 | B003 | B002 | B001 | B000 | -   |         |
|     | :                                  | x     | x    | x    | Bnn5 | Bnn4 | Bnn3 | Bnn2 | Bnn1 | Bnn0 | -   |         |
|     | 128 <sup>th</sup> Parameter        | x     | x    | x    | B315 | B314 | B313 | B312 | B311 | B310 | -   |         |

|            |                                         |   |        |        |        |        |        |        |       |       |     |         |
|------------|-----------------------------------------|---|--------|--------|--------|--------|--------|--------|-------|-------|-----|---------|
| <b>2EH</b> | <b>Memory Read</b>                      | x | 0      | 0      | 1      | 0      | 1      | 1      | 1     | 0     | 2Eh | 14.2.24 |
|            | 1 <sup>st</sup> Parameter               | x | x      | x      | x      | x      | x      | x      | x     | x     | -   |         |
|            | 2 <sup>nd</sup> Parameter               | x | D17    | D16    | D15    | D14    | D13    | D12    | D11   | D10   | -   |         |
|            | :                                       | x | :      | :      | :      | :      | :      | :      | :     | :     | -   |         |
|            | N <sup>th</sup> Parameter               | x | Dn7    | Dn6    | Dn5    | Dn4    | Dn3    | Dn2    | Dn1   | Dn0   | -   |         |
| <b>30H</b> | <b>Partial Area</b>                     | x | 0      | 0      | 1      | 1      | 0      | 0      | 0     | 0     | 30h | 14.2.25 |
|            | 1 <sup>st</sup> Parameter               | x | PSL15  | PSL14  | PSL13  | PSL12  | PSL11  | PSL10  | PSL9  | PSL8  | -   |         |
|            | 2 <sup>nd</sup> Parameter               | x | PSL7   | PSL6   | PSL5   | PSL4   | PSL3   | PSL2   | PSL1  | PSL0  | -   |         |
|            | 3 <sup>rd</sup> Parameter               | x | PEL15  | PEL14  | PEL13  | PEL12  | PEL11  | PEL10  | PEL9  | PEL8  | -   |         |
|            | 4 <sup>th</sup> Parameter               | x | PEL7   | PEL6   | PEL5   | PEL4   | PEL3   | PEL2   | PEL1  | PEL0  | -   |         |
| <b>33H</b> | <b>Vertical Scrolling Definition</b>    | x | 0      | 0      | 1      | 1      | 0      | 0      | 1     | 1     | 33h | 14.2.26 |
|            | 1 <sup>st</sup> Parameter               | x | TFA15  | TFA14  | TFA13  | TFA12  | TFA11  | TFA10  | TFA9  | TFA8  | -   |         |
|            | 2 <sup>nd</sup> Parameter               | x | TFA7   | TFA6   | TFA5   | TFA4   | TFA3   | TFA2   | TFA1  | TFA0  | -   |         |
|            | 3 <sup>rd</sup> Parameter               | x | VSA15  | VSA14  | VSA13  | VSA12  | VSA11  | VSA10  | VSA9  | VSA8  | -   |         |
|            | 4 <sup>th</sup> Parameter               | x | VSA7   | VSA6   | VSA5   | VSA4   | VSA3   | VSA2   | VSA1  | VSA0  | -   |         |
|            | 5 <sup>th</sup> Parameter               | x | BFA15  | BFA14  | BFA13  | BFA12  | BFA11  | BFA10  | BFA9  | BFA8  | -   |         |
|            | 6 <sup>th</sup> Parameter               | x | BFA7   | BFA6   | BFA5   | BFA4   | BFA3   | BFA2   | BFA1  | BFA0  | -   |         |
| <b>34H</b> | <b>Tearing Effect Line Off</b>          | x | 0      | 0      | 1      | 1      | 0      | 1      | 0     | 0     | 34h | 14.2.27 |
| <b>35H</b> | <b>Tearing Effect Line On</b>           | x | 0      | 0      | 1      | 1      | 0      | 1      | 0     | 1     | 35h | 14.2.28 |
|            | 1 <sup>st</sup> Parameter               | x | x      | x      | x      | x      | x      | x      | x     | M     | 00h |         |
| <b>36H</b> | <b>Memory Access Control</b>            | x | 0      | 0      | 1      | 1      | 0      | 1      | 1     | 0     | 36h | 14.2.29 |
|            | 1 <sup>st</sup> Parameter               | x | MY     | MX     | MV     | ML     | RGB    | MH     | x     | x     | 00h |         |
| <b>37H</b> | <b>Vertical Scrolling Start Address</b> | x | 0      | 0      | 1      | 1      | 0      | 1      | 1     | 1     | 37h | 14.2.30 |
|            | 1 <sup>st</sup> Parameter               | x | SSA 15 | SSA 14 | SSA 13 | SSA 12 | SSA 11 | SSA 10 | SSA 9 | SSA 8 | 00h |         |
|            | 2 <sup>nd</sup> Parameter               | x | SSA 7  | SSA 6  | SSA 5  | SSA 4  | SSA 3  | SSA 2  | SSA 1 | SSA 0 | 00h |         |
| <b>38H</b> | <b>Idle Mode Off</b>                    | x | 0      | 0      | 1      | 1      | 1      | 0      | 0     | 0     | 38h | 14.2.31 |
| <b>39H</b> | <b>Idle Mode On</b>                     | x | 0      | 0      | 1      | 1      | 1      | 0      | 0     | 1     | 39h | 14.2.32 |
| <b>3AH</b> | <b>Interface Pixel Format</b>           | x | 0      | 0      | 1      | 1      | 1      | 0      | 1     | 0     | 3Ah | 14.2.33 |
|            | 1 <sup>st</sup> Parameter               | x | VIPF3  | VIPF2  | VIPF1  | VIPF0  | D3     | IFPF2  | IFPF1 | IFPF0 | 66h |         |

|            |                                                        |   |      |      |      |       |       |       |       |       |     |         |
|------------|--------------------------------------------------------|---|------|------|------|-------|-------|-------|-------|-------|-----|---------|
| <b>B1H</b> | <b>Frame Rate Control (In normal mode/Full colors)</b> |   | 1    | 0    | 1    | 1     | 0     | 0     | 0     | 1     | B1h | 14.2.37 |
|            | 1 <sup>st</sup> Parameter                              |   | x    | x    | x    | DIVA4 | DIVA3 | DIVA2 | DIVA1 | DIVA0 | x   |         |
|            | 2 <sup>nd</sup> Parameter                              |   | x    | x    | VPA5 | VPA4  | VPA3  | VPA2  | VPA1  | VPA0  | x   |         |
| <b>B2H</b> | <b>Frame Rate Control(In Idle mode/8-colors)</b>       |   | 1    | 0    | 1    | 1     | 0     | 0     | 1     | 0     | B2h | 14.2.38 |
|            | 1 <sup>st</sup> Parameter                              |   | x    | x    | x    | DIVB4 | DIVB3 | DIVB2 | DIVB1 | DIVB0 | x   |         |
|            | 2 <sup>nd</sup> Parameter                              |   | x    | x    | VPB5 | VPB4  | VPB3  | VPB2  | VPB1  | VPB0  | x   |         |
| <b>B3H</b> | <b>Frame Rate Control(In Partial mode/full colors)</b> |   | 1    | 0    | 1    | 1     | 0     | 0     | 1     | 1     | B3h | 14.2.39 |
|            | 1 <sup>st</sup> Parameter                              |   | x    | x    | x    | DIVC4 | DIVC3 | DIVC2 | DIVC1 | DIVC0 | x   |         |
|            | 2 <sup>nd</sup> Parameter                              |   | x    | x    | VPC5 | VPC4  | VPC3  | VPC2  | VPC1  | VPC0  | x   |         |
| <b>B4H</b> | <b>Display Inversion Control</b>                       | x | 1    | 0    | 1    | 1     | 0     | 1     | 0     | 0     | B4h | 14.2.40 |
|            | 1 <sup>st</sup> Parameter                              | x | 0    | 0    | 0    | 0     | 0     | NLA   | NLB   | NLC   | 02H |         |
| <b>B5H</b> | <b>RGB Interface Blanking Porch setting</b>            | x | 1    | 0    | 1    | 1     | 0     | 1     | 0     | 1     | B5h | 14.2.41 |
|            | 1 <sup>st</sup> Parameter                              | x | x    | x    | HBP5 | HBP4  | HBP3  | HBP2  | HBP1  | HBP0  | 08h |         |
|            | 2 <sup>nd</sup> Parameter                              | x | VBP7 | VBP6 | VBP5 | VBP4  | VBP3  | VBP2  | VBP1  | VBP0  | 03h |         |
|            | 3 <sup>rd</sup> Parameter                              | x | x    | x    | x    | x     | x     | x     | VBP9  | VBP8  | 00h |         |
| <b>B6H</b> | <b>Display Function Set</b>                            | x | 1    | 0    | 1    | 1     | 0     | 1     | 1     | 0     | B6h | 14.2.41 |
|            | 1 <sup>st</sup> Parameter                              |   | x    | x    | NO1  | NO0   | SDT1  | SDT0  | EQ1   | EQ2   | 06h |         |
|            | 2 <sup>nd</sup> Parameter                              |   | x    | x    | x    | x     | x     | PTG0  | PT1   | PT0   | 02h |         |
| <b>B7H</b> | <b>Source Driver Direction Control</b>                 | x | 1    | 0    | 1    | 1     | 0     | 1     | 1     | 1     | B7h | 14.2.42 |
|            | 1 <sup>st</sup> Parameter                              | x | 0    | 0    | 0    | 0     | 0     | 0     | 0     | CRL   | 00h |         |
| <b>B8H</b> | <b>Gate Driver Direction Control</b>                   | x | 1    | 0    | 1    | 1     | 1     | 0     | 0     | 0     | B8h | 14.2.43 |
|            | 1 <sup>st</sup> Parameter                              | x | 0    | 0    | 0    | 0     | 0     | 0     | 0     | CTB   | 00h |         |
| <b>C0H</b> | <b>Power_Control1</b>                                  | x | 1    | 1    | 0    | 0     | 0     | 0     | 0     | 0     | C0h | 14.2.44 |
|            | 1 <sup>st</sup> Parameter                              | x | 0    | 0    | 0    | VRH4  | VRH3  | VRH2  | VRH1  | VRH0  | x   |         |
|            | 2 <sup>nd</sup> Parameter                              | x | 0    | 0    | 0    | 0     | 0     | VC2   | VC1   | VC0   | 02h |         |
| <b>C1H</b> | <b>Power_Control2</b>                                  | x | 1    | 1    | 0    | 0     | 0     | 0     | 0     | 1     | C1h | 14.2.45 |
|            | 1 <sup>st</sup> Parameter                              | x | 0    | 0    | 0    | 0     | 0     | BT2   | BT1   | BT0   | 07h |         |

|     |                                     |   |              |              |              |              |              |              |               |               |                 |         |
|-----|-------------------------------------|---|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|-----------------|---------|
| C2H | Power_Control3                      | x | 1            | 1            | 0            | 0            | 0            | 0            | 1             | 0             | C2h             | 14.2.46 |
|     | 1 <sup>st</sup> Parameter           | x | 0            | 0            | 0            | 0            | 0            | APA2         | APA1          | APA0          | 00h             |         |
| C3H | Power_Control4                      | x | 1            | 1            | 0            | 0            | 0            | 0            | 1             | 1             | C3h             | 14.2.47 |
|     | 1 <sup>st</sup> Parameter           | x | 0            | 0            | 0            | 0            | 0            | APB2         | APB1          | APB0          | 00h             |         |
| C4H | Power_Control 5                     | x | 1            | 1            | 0            | 0            | 0            | 1            | 0             | 0             | C4h             | 14.2.48 |
|     | 1 <sup>st</sup> Parameter           | x | 0            | 0            | 0            | 0            | 0            | APC2         | APC1          | APC1          | 01h             |         |
| C5H | VCOM_Control 1                      | x | 1            | 1            | 0            | 0            | 0            | 1            | 0             | 1             | C5h             | 14.2.49 |
|     | 1 <sup>st</sup> Parameter           | x | x            | VMH<br>6     | VMH<br>5     | VMH<br>4     | VMH<br>3     | VMH<br>2     | VMH<br>1      | VMH<br>0      | -               |         |
|     | 2 <sup>nd</sup> Parameter           | x | 0            | VML6         | VML<br>5     | VML<br>4     | VML<br>3     | VML<br>2     | VML<br>1      | VML<br>0      | -               |         |
| C6H | VCOM_Control 2                      | x | 1            | 1            | 0            | 0            | 0            | 1            | 1             | 0             | C6h             | 14.2.50 |
|     | 1 <sup>st</sup> Parameter           | x | 0            | 0            | VMA<br>5     | VMA<br>4     | VMA<br>3     | VMA<br>2     | VMA<br>1      | VMA<br>0      | 13h<br>/06<br>h |         |
| C7H | VCOM Offset Control                 | x | 1            | 1            | 0            | 0            | 0            | 1            | 1             | 1             | C7h             | 14.2.51 |
|     | 1 <sup>st</sup> Parameter           | 0 | nVM*         | VMF6         | VMF5         | VMF4         | VMF3         | VMF2         | VMF1          | VMF0          | 40h             |         |
| D3H | Write ID4 Value                     | x | 1            | 1            | 0            | 1            | 0            | 0            | 1             | 1             | D3h             | 14.2.52 |
|     | 1 <sup>st</sup> Parameter           | x | x            | x            | x            | x            | x            | x            | x             | x             | x               |         |
|     | 2 <sup>nd</sup> Parameter           | x | ID417        | ID416        | ID415        | ID414        | ID413        | ID412        | ID411         | ID410         | 91h             |         |
|     | 3 <sup>rd</sup> Parameter           | x | ID427        | ID426        | ID425        | ID424        | ID423        | ID422        | ID421         | ID420         | 63h             |         |
|     | 4 <sup>th</sup> Parameter           | x | x            | x            | x            | x            | ID433        | ID432        | ID431         | ID430         | 00h             |         |
|     | 5 <sup>th</sup> Parameter           | x | x            | x            | x            | x            | x            | x            | x             | x             | x               |         |
| D5H | NV Memory Function<br>Controller(1) | x | 1            | 1            | 0            | 1            | 1            | 0            | 1             | 0             | D5h             | 14.2.53 |
|     | 1 <sup>st</sup> Parameter           | x | ID33         | ID32         | ID31         | ID30         | ID23         | ID22         | ID21          | ID20          | 00h             |         |
|     | 2 <sup>nd</sup> Parameter           | x | OTP_<br>BS   | 0            | 0            | 0            | OTP_<br>VMF3 | OTP_<br>VMF2 | OTP_<br>VMF1  | OTP_<br>VMF0  | 00h             |         |
| D6H | NV Memory Function<br>Controller(2) | x | 1            | 1            | 0            | 1            | 1            | 0            | 1             | 0             | D6h             | 14.2.54 |
|     | 1 <sup>st</sup> Parameter           | x | OTP_<br>D[7] | OTP_<br>D[6] | OTP_<br>D[5] | OTP_<br>D[4] | OTP_<br>D[3] | OTP_<br>D[2] | OTP_<br>D[1]  | OTP_<br>D[0]  | 00h             |         |
|     | 2 <sup>nd</sup> Parameter           | x | 0            | 0            | 0            | 0            | 0            | 0            | OTP_<br>TP[1] | OTP_<br>TP[0] | 00h             |         |
| D7H | NV Memory Function<br>Controller(3) | x | 1            | 1            | 0            | 1            | 1            | 0            | 1             | 0             | D7h             | 14.2.55 |
|     | 1 <sup>st</sup> Parameter           | x | 0            | 1            | 0            | 1            | 0            | 1            | 0             | 1             | 55h             |         |
|     | 2 <sup>nd</sup> Parameter           | x | 1            | 0            | 1            | 0            | 1            | 0            | 1             | 0             | AAh             |         |

|     |                                   |   |           |           |           |           |           |      |      |      |      |         |
|-----|-----------------------------------|---|-----------|-----------|-----------|-----------|-----------|------|------|------|------|---------|
|     | 3 <sup>rd</sup> Parameter         | x | 0         | 1         | 1         | 0         | 0         | 1    | 1    | 0    | 66h  |         |
| DAH | Read ID1                          | x | 1         | 1         | 0         | 1         | 1         | 0    | 1    | 0    | DAh  | 14.2.34 |
|     | 1 <sup>st</sup> Parameter         | x | x         | x         | x         | x         | x         | x    | x    | x    | x    |         |
|     | 2 <sup>nd</sup> Parameter         | x | ID17      | ID16      | ID15      | ID14      | ID13      | ID12 | ID11 | ID10 | 54h  |         |
| DBH | Read ID2                          | x | 1         | 1         | 0         | 1         | 1         | 0    | 1    | 1    | DBh  | 14.2.35 |
|     | 1 <sup>st</sup> Parameter         | x | x         | x         | x         | x         | x         | x    | x    | x    | x    |         |
|     | 2 <sup>nd</sup> Parameter         | x | 1         | ID26      | ID25      | ID24      | ID23      | ID22 | ID21 | ID20 | 80h  |         |
| DCH | Read ID3                          | x | 1         | 1         | 0         | 1         | 1         | 1    | 0    | 0    | DC h | 14.2.36 |
|     | 1 <sup>st</sup> Parameter         | x | x         | x         | x         | x         | x         | x    | x    | x    | x    |         |
|     | 2 <sup>nd</sup> Parameter         | x | ID37      | ID36      | ID35      | ID34      | ID33      | ID32 | ID31 | ID30 | 66h  |         |
| E0H | Positive Gamma Correction Setting |   | 1         | 1         | 1         | 0         | 0         | 0    | 0    | 0    | E0h  | 14.2.57 |
|     | 1 <sup>st</sup> Parameter         |   | x         | x         | VP63[5:0] |           |           |      |      |      | -    |         |
|     | 2 <sup>nd</sup> Parameter         |   | x         | x         | VP62[5:0] |           |           |      |      |      | -    |         |
|     | 3 <sup>rd</sup> Parameter         |   | x         | x         | VP61[5:0] |           |           |      |      |      | -    |         |
|     | 4 <sup>th</sup> Parameter         |   | x         | x         | VP59[5:0] |           |           |      |      |      | -    |         |
|     | 5 <sup>th</sup> Parameter         |   | x         | x         | VP57[5:0] |           |           |      |      |      | -    |         |
|     | 6 <sup>th</sup> Parameter         |   | x         | x         | x         | VP50[4:0] |           |      |      |      | -    |         |
|     | 7 <sup>th</sup> Parameter         |   | x         | VP43[6:0] |           |           |           |      |      |      | -    |         |
|     | 8 <sup>th</sup> Parameter         |   | VP27[3:0] |           |           |           | VP36[3:0] |      |      |      | -    |         |
|     | 9 <sup>th</sup> Parameter         |   | x         | VP20[6:0] |           |           |           |      |      |      | -    |         |
|     | 10 <sup>th</sup> Parameter        |   | x         | x         | VP13[5:0] |           |           |      |      | -    |      |         |
|     | 11 <sup>st</sup> Parameter        |   | x         | x         | VP6[5:0]  |           |           |      |      | -    |      |         |
|     | 12 <sup>nd</sup> arameter         |   | x         | x         | VP4[5:0]  |           |           |      |      | -    |      |         |
|     | 13 <sup>rd</sup> Parameter        |   | x         | x         | VP2[5:0]  |           |           |      |      | -    |      |         |
|     | 14 <sup>th</sup> Parameter        |   | x         | x         | VP1[5:0]  |           |           |      |      | -    |      |         |
|     | 15 <sup>th</sup> Parameter        |   | x         | x         | VP0[5:0]  |           |           |      |      | -    |      |         |
| E1H | Negative Gamma Correction Setting |   | 1         | 1         | 1         | 0         | 0         | 0    | 0    | 1    | E1h  | 14.2.58 |
|     | 1 <sup>st</sup> Parameter         |   | x         | x         | VN0[5:0]  |           |           |      |      |      | -    |         |
|     | 2 <sup>nd</sup> Parameter         |   | x         | x         | VN1[5:0]  |           |           |      |      |      | -    |         |
|     | 3 <sup>rd</sup> Parameter         |   | x         | x         | VN2[5:0]  |           |           |      |      |      | -    |         |
|     | 4 <sup>th</sup> Parameter         |   | x         | x         | VN4[5:0]  |           |           |      |      |      | -    |         |
|     | 5 <sup>th</sup> Parameter         |   | x         | x         | VN6[5:0]  |           |           |      |      |      | -    |         |
|     | 6 <sup>th</sup> Parameter         |   | x         | x         | x         | VN13[4:0] |           |      |      |      | -    |         |



|     |                            |  |           |           |           |           |   |   |   |           |       |         |
|-----|----------------------------|--|-----------|-----------|-----------|-----------|---|---|---|-----------|-------|---------|
|     | 7 <sup>th</sup> Parameter  |  | x         | VN20[6:0] |           |           |   |   |   |           | -     |         |
|     | 8 <sup>th</sup> Parameter  |  | VN36[3:0] |           |           | VN27[3:0] |   |   |   | -         |       |         |
|     | 9 <sup>th</sup> Parameter  |  | x         | VN43[6:0] |           |           |   |   |   |           | -     |         |
|     | 10 <sup>th</sup> Parameter |  | x         | X         | VN50[5:0] |           |   |   |   | -         |       |         |
|     | 11 <sup>st</sup> Parameter |  | x         | x         | VN57[5:0] |           |   |   |   | -         |       |         |
|     | 12 <sup>nd</sup> Parameter |  | x         | x         | VN59[5:0] |           |   |   |   | -         |       |         |
|     | 13 <sup>rd</sup> Parameter |  | x         | x         | VN61[5:0] |           |   |   |   | -         |       |         |
|     | 14 <sup>th</sup> Parameter |  | x         | x         | VN62[5:0] |           |   |   |   | -         |       |         |
|     | 15 <sup>th</sup> Parameter |  | x         | x         | VN63[5:0] |           |   |   |   | -         |       |         |
| F2H | GAM_R_SEL                  |  | 1         | 1         | 1         | 1         | 0 | 0 | 1 | 0         | F2h   | 14.2.59 |
|     | 1 <sup>st</sup> Parameter  |  | x         | x         | x         | x         | x | x | x | GAM_R_SEL | Write |         |

## 14.2 Command Description

### 14.2.1 NOP (00h)

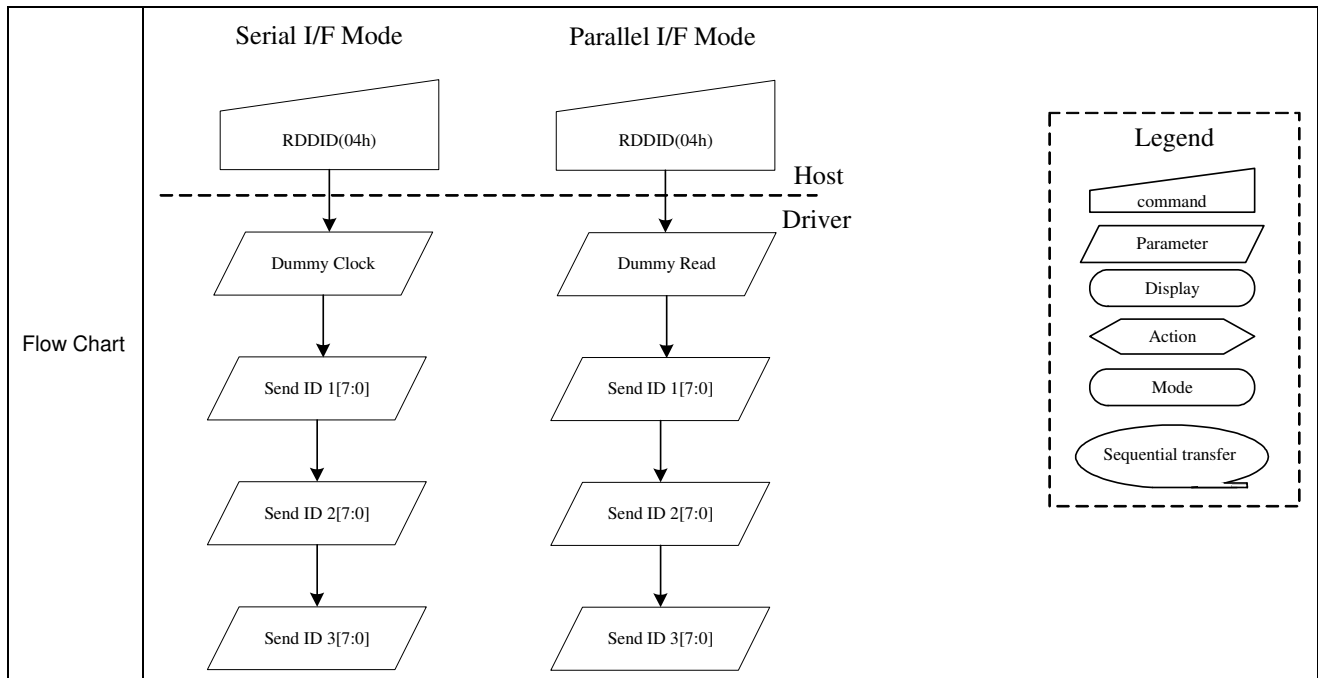
| 00H                                       | NOP (No Operation)                                                                                                                                                                                                                                                                                                                                                                         |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|--------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX | WRX | D17-D8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | X      | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 00  |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Parameter                                 | NO PARAMETER                                                                                                                                                                                                                                                                                                                                                                               |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Description                               | This command is an empty command; it does not have any effect on the display module. However it can be used to terminate Frame Memory Write or Read as described in RAMWR (Memory Write) and RAMRD (Memory Read) Commands.<br><br>X = Don't care.                                                                                                                                          |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Restriction                               | None                                                                                                                                                                                                                                                                                                                                                                                       |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |     |     |        |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>N/A</td></tr><tr><td>SW Reset</td><td>N/A</td></tr><tr><td>HW Reset</td><td>N/A</td></tr></table>                                                                                                                                                                                                   |     |     |        |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | N/A | SW Reset                                | N/A | HW Reset                                  | N/A |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Power On Sequence                         | N/A                                                                                                                                                                                                                                                                                                                                                                                        |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| SW Reset                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                        |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| HW Reset                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                        |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Flow Chart                                | None                                                                                                                                                                                                                                                                                                                                                                                       |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |

### 14.2.2 Software Reset (01h)

| 01H                                       | SWRESET (Software Reset)                                                                                                                                                                                                                                                                                                                                                                                                 |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|--------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                     | RDX | WRX | D17-D8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                        | 1   | ↑   | X      | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 01  |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Parameter                                 | NO PARAMETER                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Description                               | <p>When the Software Reset command is written, it causes software reset. It resets the commands and parameters to their S/W Reset default values. (See default tables in each command description.)</p> <p>Note: The Frame Memory contents are affected by this command.</p> <p>X = Don't care</p>                                                                                                                       |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability                     | <table><thead><tr><th>Status</th><th>Availability</th></tr></thead><tbody><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></tbody></table> |     |     |        |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Default                                   | <table><thead><tr><th>Status</th><th>Default Value</th></tr></thead><tbody><tr><td>Power On Sequence</td><td>N/A</td></tr><tr><td>SW Reset</td><td>N/A</td></tr><tr><td>HW Reset</td><td>N/A</td></tr></tbody></table>                                                                                                                                                                                                   |     |     |        |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | N/A | SW Reset                                | N/A | HW Reset                                  | N/A |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Power On Sequence                         | N/A                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| SW Reset                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| HW Reset                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Flow Chart                                | <div><div><div>SW RESET</div><div>↓</div><div>Display whole blank screen</div><div>↓</div><div>Set Commands to S/W Default Vaule</div><div>↓</div><div>Sleep in Mode</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                      |     |     |        |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |

### 14.2.3 Read Display Identification Information (04h)

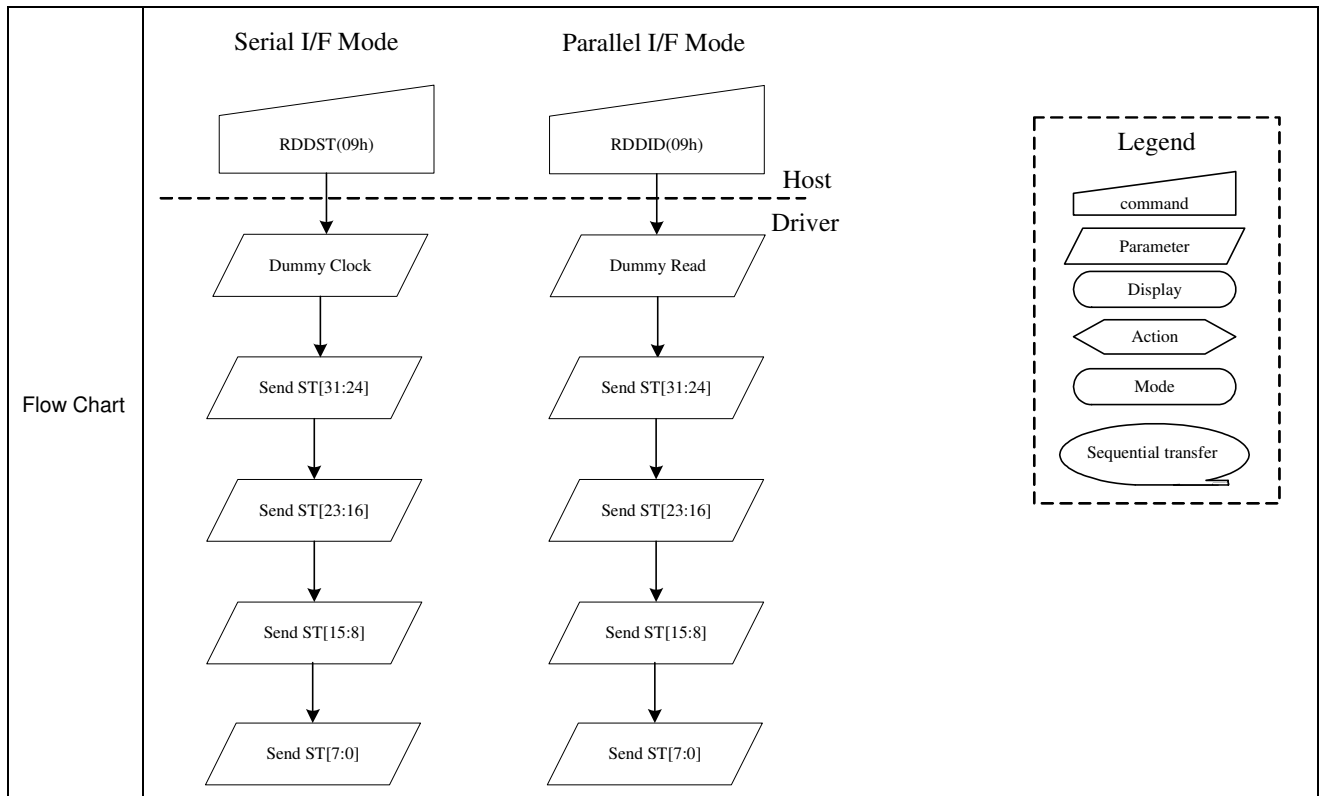
| 04H                                       | RDDIDIF (Read Display Identification Information)                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|------|------|------|------|------|------|------|------|-----|--------|---------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-------------------|------------------------------------------|-----|----------|----------|-----|-----|-----|----------|-----|-----|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RDX | WRX | D17-8 | D7   | D6   | D5   | D4   | D3   | D2   | D1   | D0   | HEX |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1   | ↑   | x     | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 04  |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ↑   | 1   | x     | x    | x    | x    | x    | x    | x    | x    | x    | x   |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ↑   | 1   | x     | ID17 | ID16 | ID15 | ID14 | ID13 | ID12 | ID11 | ID10 | 54h |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| 3 <sup>rd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ↑   | 1   | x     | ID27 | ID26 | ID25 | ID24 | ID23 | ID22 | ID21 | ID20 | 80h |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| 4 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ↑   | 1   | x     | ID37 | ID36 | ID35 | ID34 | ID33 | ID32 | ID31 | ID30 | 66h |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Description                               | <p>This read byte returns 24-bit display identification information.</p> <p>The 1<sup>st</sup> Parameter is dummy read.</p> <p>The 2<sup>nd</sup> Parameter (ID17 to ID10): LCD module's manufacture ID.</p> <p>The 3<sup>rd</sup> Parameter (ID27 to ID20): LCD module/driver version ID</p> <p>The 4<sup>th</sup> Parameter (ID37 to ID30): LCD module/driver version ID</p> <p>Note: Commands RDID1/2/3(DAh, DBh, DCh) read data correspond to the parameters 2,3,4 of command 04h, respectively</p> |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Restriction                               | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                              |     |     |       |      |      |      |      |      |      |      |      |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes               | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes      |     |     |     |          |     |     |     |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Default                                   | <div><div>Note: ID1 can be option</div><table><tr><th rowspan="2">Status</th><th colspan="3">Default Value</th></tr><tr><th>ID1</th><th>ID2</th><th>ID3</th></tr><tr><td>Power On Sequence</td><td>54h</td><td>80h</td><td>66h</td></tr><tr><td>SW Reset</td><td>54h</td><td>80h</td><td>66h</td></tr><tr><td>HW Reset</td><td>54h</td><td>80h</td><td>66h</td></tr></table><div>modified by metal</div></div>                                                                                          |     |     |       |      |      |      |      |      |      |      |      |     | Status | Default Value |                                          |     | ID1                                     | ID2 | ID3                                       | Power On Sequence | 54h                                      | 80h | 66h      | SW Reset | 54h | 80h | 66h | HW Reset | 54h | 80h | 66h |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
|                                           | ID1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ID2 | ID3 |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Power On Sequence                         | 54h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 80h | 66h |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| SW Reset                                  | 54h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 80h | 66h |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| HW Reset                                  | 54h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 80h | 66h |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |



### 14.2.4 Read Display Status (09h)

| 09H                       | RDDIDIF (Read Display Identification Information)                                         |                              |     |                                                                                                                                            |        |       |       |       |       |       |       |       |     |
|---------------------------|-------------------------------------------------------------------------------------------|------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-----|
|                           | D/CX                                                                                      | RDX                          | WRX | D17-8                                                                                                                                      | D7     | D6    | D5    | D4    | D3    | D2    | D1    | D0    | HEX |
| Command                   | 0                                                                                         | 1                            | ↑   | x                                                                                                                                          | 0      | 0     | 0     | 0     | 1     | 0     | 0     | 1     | 09h |
| 1 <sup>st</sup> Parameter | 1                                                                                         | ↑                            | 1   | x                                                                                                                                          | x      | x     | x     | x     | x     | x     | x     | x     | x   |
| 2 <sup>nd</sup> Parameter | 1                                                                                         | ↑                            | 1   | x                                                                                                                                          | BOTSON | MY    | MX    | MV    | ML    | RGB   | MH    | ST24  | x   |
| 3 <sup>rd</sup> Parameter | 1                                                                                         | ↑                            | 1   | x                                                                                                                                          | ST23   | IFPF2 | IFPF1 | IFPF0 | IDMON | PTLON | SLOUT | NORON | x   |
| 4 <sup>th</sup> Parameter | 1                                                                                         | ↑                            | 1   | x                                                                                                                                          | VSSON  | ST14  | INVON | ST12  | ST11  | DISON | TEON  | GCS2  | x   |
| 5 <sup>th</sup> Parameter | 1                                                                                         | ↑                            | 1   | x                                                                                                                                          | GCS1   | GCS0  | TELOM | HSOON | VSON  | PCKON | DEON  | ST0   | x   |
| Description               | This command indicates the current status of the display as described in the table below: |                              |     |                                                                                                                                            |        |       |       |       |       |       |       |       |     |
|                           | Bit                                                                                       | Description                  |     | Value                                                                                                                                      |        |       |       |       |       |       |       |       |     |
|                           | BSTON                                                                                     | Booster Voltage Status       |     | "1"=Booster on,"0"=Booster off                                                                                                             |        |       |       |       |       |       |       |       |     |
|                           | MY                                                                                        | Row Address Order(MY)        |     | "1"=Decrement, (Bottom to Top, when MADCTL(36h) D7='1')<br>"0"=Increment, (Top to Bottom, when MADCTL(36h) D7='0')                         |        |       |       |       |       |       |       |       |     |
|                           | MX                                                                                        | Column Address Order(MX)     |     | "1"=Decrement, (Right to Left, when MADCTL(36h) D6='1')<br>"0"=Increment, (Left to Right, when MADCTL(36h) D6='0')                         |        |       |       |       |       |       |       |       |     |
|                           | MV                                                                                        | Row/Column Exchange(MV)      |     | "1"=Row/column exchange, (when MADCTL (36h) D5='1')<br>"0"=Normal (MV=0), (when MADCTL(36h)D5='0')                                         |        |       |       |       |       |       |       |       |     |
|                           | ML                                                                                        | Vertical refresh Order(ML)   |     | "1"=Decrement, (LCD refresh Bottom to Top, when MADCTL(36h)D4='1')<br>"0"=Increment, (LCD refresh Top to Bottom, when MADCTL(36h)D4='0')   |        |       |       |       |       |       |       |       |     |
|                           | RGB                                                                                       | RGB/BGR Order(RGB)           |     | "1"=BGR,(When MADCTL(36h)D3='1')<br>"0"=RGB,(When MADCTL(36h)D3='0')                                                                       |        |       |       |       |       |       |       |       |     |
|                           | MH                                                                                        | Horizontal refresh Order(MH) |     | "1"=Decrement, (LCD refresh Right to Left, when MADCTL(36h) D2='1')<br>"0"=Increment, (LCD refresh Left to Right, when MADCTL(36h) D2='0') |        |       |       |       |       |       |       |       |     |
|                           | ST24                                                                                      | Not Used                     |     |                                                                                                                                            |        |       |       |       |       |       |       |       |     |
|                           | ST23                                                                                      | Not Used                     |     |                                                                                                                                            |        |       |       |       |       |       |       |       |     |
|                           | IFPF2                                                                                     | Interface Color Pixel Format |     | "011"=12-bit/pixel                                                                                                                         |        |       |       |       |       |       |       |       |     |
|                           | IFPF1                                                                                     | Definition                   |     | "101"=16-bit/pixel                                                                                                                         |        |       |       |       |       |       |       |       |     |
|                           | IFPF0                                                                                     |                              |     | "110"=18-bit/pixel                                                                                                                         |        |       |       |       |       |       |       |       |     |
|                           | IDMON                                                                                     | Idle Mode On/Off             |     | "1"=On,"0"=Off                                                                                                                             |        |       |       |       |       |       |       |       |     |

|                                                         | PTLON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Partial Mode On/Off        | “1”=On, “0”=Off                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------|-----------|--------|----------------------------|------------------------------------------|-----|-----------------------------------------|-----------|-------------------------------------------|----------|------------------------------------------|-------------------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|
|                                                         | SLOUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Sleep In/Out               | “1”=On, “0”=Off                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | NORON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Display Normal Mode On/Off | “1”=Normal Display, “0”=Normal Display Off                                       |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | VSSON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Vertical Scrolling Status  | “1”=Scroll on, “0”=Scroll off                                                    |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | ST14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Horizontal Scroll Status   | “0”                                                                              |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | INVON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Inversion Status           | “1”=On, “0”=Off                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | ST12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All Pixels On(Not Used)    | “0”                                                                              |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | ST11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All Pixels On(Not Used)    | “0”                                                                              |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | DISON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Display On/Off             | “1”=On, “0”=Off                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | TEON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Tearing effect line on/off | “1”=On, “0”=Off                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | GCS2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Gamma Curve Selection      | “000”=GC0<br>“001”=GC1<br>“010”=GC2<br>“011”=GC3<br>“100” to “111” = Not defined |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | GCS1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | GCS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | TELOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Tearing effect line mode   | “0”=mode1, “1”=mode2                                                             |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | STO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | For Future Use             | “0”                                                                              |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
| Note: For Bits ST30 to ST28, also refer to Section 8-11 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                            |                                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
| Register Availability                                   | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                      |                            |                                                                                  |           | Status | Availability               | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes       | Partial Mode On, Idle Mode Off, Sleep Out | Yes      | Partial Mode On, Idle Mode On, Sleep Out | Yes               | Sleep In  | Yes       |           |           |          |           |           |           |           |          |           |           |           |           |
| Status                                                  | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            |                                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
| Normal Mode On, Idle Mode Off, Sleep Out                | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
| Normal Mode On, Idle Mode On, Sleep Out                 | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
| Partial Mode On, Idle Mode Off, Sleep Out               | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
| Partial Mode On, Idle Mode On, Sleep Out                | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
| Sleep In                                                | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                            |                                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
| Default                                                 | <table><tr><th rowspan="2">Status</th><th colspan="4">Default Value(ST31 to ST0)</th></tr><tr><th>ST[31-24]</th><th>ST[23-16]</th><th>ST[15-8]</th><th>ST[7-0]</th></tr><tr><td>Power On Sequence</td><td>0000-0000</td><td>0110-0001</td><td>0000-0000</td><td>0000-0000</td></tr><tr><td>SW Reset</td><td>0xxx-xxx0</td><td>0xxx-0001</td><td>0000-0000</td><td>0000-0000</td></tr><tr><td>HW Reset</td><td>0000-0000</td><td>0110-0001</td><td>0000-0000</td><td>0000-0000</td></tr></table> |                            |                                                                                  |           | Status | Default Value(ST31 to ST0) |                                          |     |                                         | ST[31-24] | ST[23-16]                                 | ST[15-8] | ST[7-0]                                  | Power On Sequence | 0000-0000 | 0110-0001 | 0000-0000 | 0000-0000 | SW Reset | 0xxx-xxx0 | 0xxx-0001 | 0000-0000 | 0000-0000 | HW Reset | 0000-0000 | 0110-0001 | 0000-0000 | 0000-0000 |
| Status                                                  | Default Value(ST31 to ST0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |                                                                                  |           |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
|                                                         | ST[31-24]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ST[23-16]                  | ST[15-8]                                                                         | ST[7-0]   |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
| Power On Sequence                                       | 0000-0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0110-0001                  | 0000-0000                                                                        | 0000-0000 |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
| SW Reset                                                | 0xxx-xxx0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0xxx-0001                  | 0000-0000                                                                        | 0000-0000 |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |
| HW Reset                                                | 0000-0000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0110-0001                  | 0000-0000                                                                        | 0000-0000 |        |                            |                                          |     |                                         |           |                                           |          |                                          |                   |           |           |           |           |          |           |           |           |           |          |           |           |           |           |





### 14.2.5 Read Display Power Mode (0Ah)

| 0AH                          |                                                                                                                                                                                                                                                                                                                                                                                            | RDDPM (Read Display Power Mode) |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----|-------|----|------------|-------------------------------------------|----|----|----|----|----|-----|--------|-------------------------|------------------------------------------|----------------|-----------------------------------------|----------------|-------------------------------------------|----------------|------------------------------------------|-----|----------|-----|
| Inst / Para                  | D/C<br>X                                                                                                                                                                                                                                                                                                                                                                                   | RDX                             | WRX | D17-8 | D7 | D6         | D5                                        | D4 | D3 | D2 | D1 | D0 | HEX |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
| Command                      | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1                               | ↑   | x     | 0  | 0          | 0                                         | 0  | 1  | 0  | 1  | 0  | 0Ah |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
| 1 <sup>st</sup><br>Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                          | ↑                               | 1   | x     | x  | x          | x                                         | x  | x  | x  | x  | x  | X   |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
| 2 <sup>nd</sup><br>Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                          | ↑                               | 1   | x     | D7 | D6         | D5                                        | D4 | D3 | D2 | D1 | D0 | 08h |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
| Description                  | This command indicates the current status of the display as described in the table below:                                                                                                                                                                                                                                                                                                  |                                 |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | Bit                                                                                                                                                                                                                                                                                                                                                                                        | Description                     |     |       |    |            | Value                                     |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | D7                                                                                                                                                                                                                                                                                                                                                                                         | Booster Voltage Status          |     |       |    |            | “1”=Booster on, “0”=Booster off           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | D6                                                                                                                                                                                                                                                                                                                                                                                         | Idle Mode On/Off                |     |       |    |            | “1”=Idle Mode On, “0”=Idle Mode Off       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | D5                                                                                                                                                                                                                                                                                                                                                                                         | Partial Mode On/Off             |     |       |    |            | “1”=Partial Mode on, “0”=Partial Mode Off |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | D4                                                                                                                                                                                                                                                                                                                                                                                         | Sleep In/Out                    |     |       |    |            | “1”=Sleep Out, “0”=Sleep In               |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | D3                                                                                                                                                                                                                                                                                                                                                                                         | Display Normal Mode On/Off      |     |       |    |            | “1”=Normal Display, “0”=Partial Display   |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | D2                                                                                                                                                                                                                                                                                                                                                                                         | Display On/Off                  |     |       |    |            | “1”=Display On, “0”=Display Off           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | D1                                                                                                                                                                                                                                                                                                                                                                                         | Not Defined                     |     |       |    |            | Set to ‘0’                                |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
| D0                           | Not Defined                                                                                                                                                                                                                                                                                                                                                                                |                                 |     |       |    | Set to ‘0’ |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
| Register<br>Availability     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |                                 |     |       |    |            |                                           |    |    |    |    |    |     | Status | Availability            | Normal Mode On, Idle Mode Off, Sleep Out | Yes            | Normal Mode On, Idle Mode On, Sleep Out | Yes            | Partial Mode On, Idle Mode Off, Sleep Out | Yes            | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
|                              | Status                                                                                                                                                                                                                                                                                                                                                                                     | Availability                    |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | Normal Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes                             |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | Normal Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                    | Yes                             |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | Partial Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                  | Yes                             |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | Partial Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes                             |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
| Sleep In                     | Yes                                                                                                                                                                                                                                                                                                                                                                                        |                                 |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
| Default                      | <table><tr><th>Status</th><th>Default Value(D7 to D0)</th></tr><tr><td>Power On Sequence</td><td>0000_1000(08h)</td></tr><tr><td>SW Reset</td><td>0000_1000(08h)</td></tr><tr><td>HW Reset</td><td>0000_1000(08h)</td></tr></table>                                                                                                                                                        |                                 |     |       |    |            |                                           |    |    |    |    |    |     | Status | Default Value(D7 to D0) | Power On Sequence                        | 0000_1000(08h) | SW Reset                                | 0000_1000(08h) | HW Reset                                  | 0000_1000(08h) |                                          |     |          |     |
|                              | Status                                                                                                                                                                                                                                                                                                                                                                                     | Default Value(D7 to D0)         |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | Power On Sequence                                                                                                                                                                                                                                                                                                                                                                          | 0000_1000(08h)                  |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | SW Reset                                                                                                                                                                                                                                                                                                                                                                                   | 0000_1000(08h)                  |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
| HW Reset                     | 0000_1000(08h)                                                                                                                                                                                                                                                                                                                                                                             |                                 |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
| Flow Chart                   | <div><div><div>Serial I/F Mode</div><div><div>RDDPM(0Ah)</div><div>Send D[7:0]</div></div></div><div><div>Parallel I/F Mode</div><div><div>RDDPM(0Ah)</div><div>Dummy Read</div><div>Send D [7:0]</div></div></div><div><div>Host</div><div>Driver</div></div></div>                                                                                                                       |                                 |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |
|                              | <div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div>                                                                                                                                                                                                                              |                                 |     |       |    |            |                                           |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |                |                                          |     |          |     |

### 14.2.6 Read Display MADCTL (0Bh)

| 0BH                                       | RDDMADCTL (Read Display MADCTL)                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----|-------|----|----|----|----|----------------------------------------------------------------|----|----|----|-----|--------|-------------------------|------------------------------------------|----------------|-----------------------------------------|-----------|-------------------------------------------|-----|------------------------------------------|-----|----------|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RDX                                       | WRX | D17-0 | D7 | D6 | D5 | D4 | D3                                                             | D2 | D1 | D0 | HEX |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                                         | ↑   | x     | 0  | 0  | 0  | 0  | 1                                                              | 0  | 1  | 1  | 0Bh |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ↑                                         | 1   | x     | x  | x  | x  | x  | x                                                              | x  | x  | x  | x   |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ↑                                         | 1   | x     | D7 | D6 | D5 | D4 | D3                                                             | D2 | D1 | D0 | 00h |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| Description                               | This command indicates the current status of the display as described in the table below:                                                                                                                                                                                                                                                                                                                                                                                      |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
|                                           | Bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Description                               |     |       |    |    |    |    | Value                                                          |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
|                                           | D7                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Page Address Order                        |     |       |    |    |    |    | “1”=Decrement, “0”=Increment                                   |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
|                                           | D6                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Column Address Order                      |     |       |    |    |    |    | “1”=Decrement, “0”=Increment                                   |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
|                                           | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Page/Column Order                         |     |       |    |    |    |    | “1”=Row/column exchange(MV=1)<br>“0”=Normal(MV=0)              |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
|                                           | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Line Address Order                        |     |       |    |    |    |    | “1”=LCD Refresh Bottom to Top<br>“0”=LCD Refresh Top to Bottom |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
|                                           | D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | RGB/BGR Order                             |     |       |    |    |    |    | “1”=BGR, “0”=RGB                                               |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
|                                           | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Display Data Latch Order                  |     |       |    |    |    |    | “1”=LCD Refresh right to left<br>“0”=LCD Refresh left to right |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
|                                           | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Switching between Segment outputs and RAM |     |       |    |    |    |    | Set to ‘0’                                                     |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
|                                           | D0                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Switching between Common outputs and RAM  |     |       |    |    |    |    | Set to ‘0’                                                     |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| Register Availability                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
|                                           | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                     |                                           |     |       |    |    |    |    |                                                                |    |    |    |     | Status | Availability            | Normal Mode On, Idle Mode Off, Sleep Out | Yes            | Normal Mode On, Idle Mode On, Sleep Out | Yes       | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| Default                                   | <table><tr><th>Status</th><th>Default Value(D7 to D0)</th></tr><tr><td>Power On Sequence</td><td>0000_0000(00h)</td></tr><tr><td>SW Reset</td><td>No Change</td></tr></table>                                                                                                                                                                                                                                                                                                  |                                           |     |       |    |    |    |    |                                                                |    |    |    |     | Status | Default Value(D7 to D0) | Power On Sequence                        | 0000_0000(00h) | SW Reset                                | No Change |                                           |     |                                          |     |          |
| Status                                    | Default Value(D7 to D0)                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| Power On Sequence                         | 0000_0000(00h)                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| SW Reset                                  | No Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |
| Flow Chart                                | <div><div><div>Serial I/F Mode</div><div><div>RDDMADCTR(0Bh)</div><div>↓</div><div>Send D[7:0]</div></div></div><div><div>Parallel I/F Mode</div><div><div>RDDMADCTR(0Bh)</div><div>↓</div><div>Dummy Read</div><div>↓</div><div>Send D [7:0]</div></div></div><div><div>Host</div><div>Driver</div></div></div> <div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div> |                                           |     |       |    |    |    |    |                                                                |    |    |    |     |        |                         |                                          |                |                                         |           |                                           |     |                                          |     |          |

### 14.2.7 Read Display Pixel Format (0Ch)

| 0CH                          |                                                                                           | RDDCOLMOD (Read Display COLMOD) |                                |       |       |       |       |                                             |    |       |       |       |     |
|------------------------------|-------------------------------------------------------------------------------------------|---------------------------------|--------------------------------|-------|-------|-------|-------|---------------------------------------------|----|-------|-------|-------|-----|
|                              | D/C<br>X                                                                                  | RDX                             | WRX                            | D17-8 | D7    | D6    | D5    | D4                                          | D3 | D2    | D1    | D0    | HEX |
| Command                      | 0                                                                                         | 1                               | ↑                              | x     | 0     | 0     | 0     | 0                                           | 1  | 1     | 0     | 0     | 0Ch |
| 1 <sup>st</sup><br>Parameter | 1                                                                                         | ↑                               | 1                              | x     | x     | x     | x     | x                                           | x  | x     | x     | x     | x   |
| 2 <sup>nd</sup><br>Parameter | 1                                                                                         | ↑                               | 1                              | x     | VIPF3 | VIPF2 | VIPF1 | VIPF0                                       | D3 | IFPF2 | IFPF1 | IFPF0 | 66h |
| Description                  | This command indicates the current status of the display as described in the table below: |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              | Bit                                                                                       |                                 | Description                    |       |       |       |       | Value                                       |    |       |       |       |     |
|                              | D7                                                                                        | VIPF3                           | RGB Interface Color Format     |       |       |       |       | 0101 = 16 bit/pixel (1 time data transfer)  |    |       |       |       |     |
|                              | D6                                                                                        | VIPF2                           |                                |       |       |       |       | 0110 = 18 bit/pixel (1 time data transfer)  |    |       |       |       |     |
|                              | D5                                                                                        | VIPF1                           |                                |       |       |       |       | 1110 = 18 bit/pixel (3 times data transfer) |    |       |       |       |     |
|                              | D4                                                                                        | VIPF0                           |                                |       |       |       |       | The other = not defined                     |    |       |       |       |     |
|                              | D3                                                                                        | D3                              |                                |       |       |       |       | "0" (Not used)                              |    |       |       |       |     |
|                              | D2                                                                                        | IFPF2                           | Control Interface Color Format |       |       |       |       | "011"=12 bit/pixel                          |    |       |       |       |     |
|                              | D1                                                                                        | IFPF 1                          |                                |       |       |       |       | "101"=16 bit/pixel                          |    |       |       |       |     |
|                              | D0                                                                                        | IFPF 0                          |                                |       |       |       |       | "110"=18 bit/pixel                          |    |       |       |       |     |
|                              |                                                                                           | The others = not defined        |                                |       |       |       |       |                                             |    |       |       |       |     |
| Register<br>Availability     |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
| Default                      |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
| Flow Chart                   |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |
|                              |                                                                                           |                                 |                                |       |       |       |       |                                             |    |       |       |       |     |

| 0DH                       | RDDIM (Read Display Image Mode)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                             |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------|-------|----|----|----|----|----|----|----|----|-----|--------|-------------------------|------------------------------------------|----------------|-----------------------------------------|-------------------------------------------------------------|-------------------------------------------|-----------------------------|------------------------------------------|-----|------------------|-------------------------------------------|----|---------------|----------------|----|---------------|----------------|----|-----------------------|--------------------------------------------|----|------------------------------|----|
|                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | RDX                         | WRX                                                         | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
| Command                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1                           | ↑                                                           | x     | 0  | 0  | 0  | 0  | 1  | 1  | 0  | 1  | 0Dh |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
| 1 <sup>st</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ↑                           | 1                                                           | x     | x  | x  | x  | x  | x  | x  | x  | x  | x   |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
| 2 <sup>nd</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ↑                           | 1                                                           | x     | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | 00h |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
| Description               | <table border="1"> <thead> <tr> <th>Bit</th> <th>Description</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>D7</td> <td>Vertical Scrolling On/Off</td> <td>"1"=Vertical scrolling is On, "0"=Vertical scrolling is Off</td> </tr> <tr> <td>D6</td> <td>Horizontal Scrolling On/Off</td> <td>"0"(Not used)</td> </tr> <tr> <td>D5</td> <td>Inversion On/Off</td> <td>"1"=Inversion is On, "0"=Inversion is Off</td> </tr> <tr> <td>D4</td> <td>All Pixels On</td> <td>"0" (Not used)</td> </tr> <tr> <td>D3</td> <td>All Pixel Off</td> <td>"0" (Not used)</td> </tr> <tr> <td>D2</td> <td rowspan="3">Gamma Curve Selection</td> <td>"000"=GC0; "001"=GC1; "010"=GC2; "011"=GC3</td> </tr> <tr> <td>D1</td> <td rowspan="2">"100" to "111" = Not defined</td> </tr> <tr> <td>D0</td> </tr> </tbody> </table> |                             |                                                             |       |    |    |    |    |    |    |    |    |     | Bit    | Description             | Value                                    | D7             | Vertical Scrolling On/Off               | "1"=Vertical scrolling is On, "0"=Vertical scrolling is Off | D6                                        | Horizontal Scrolling On/Off | "0"(Not used)                            | D5  | Inversion On/Off | "1"=Inversion is On, "0"=Inversion is Off | D4 | All Pixels On | "0" (Not used) | D3 | All Pixel Off | "0" (Not used) | D2 | Gamma Curve Selection | "000"=GC0; "001"=GC1; "010"=GC2; "011"=GC3 | D1 | "100" to "111" = Not defined | D0 |
|                           | Bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Description                 | Value                                                       |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | D7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Vertical Scrolling On/Off   | "1"=Vertical scrolling is On, "0"=Vertical scrolling is Off |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | D6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Horizontal Scrolling On/Off | "0"(Not used)                                               |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Inversion On/Off            | "1"=Inversion is On, "0"=Inversion is Off                   |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All Pixels On               | "0" (Not used)                                              |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All Pixel Off               | "0" (Not used)                                              |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Gamma Curve Selection       | "000"=GC0; "001"=GC1; "010"=GC2; "011"=GC3                  |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                             | "100" to "111" = Not defined                                |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | D0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                             |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
| Register Availability     | <table border="1"> <thead> <tr> <th>Status</th> <th>Availability</th> </tr> </thead> <tbody> <tr> <td>Normal Mode On, Idle Mode Off, Sleep Out</td> <td>Yes</td> </tr> <tr> <td>Normal Mode On, Idle Mode On, Sleep Out</td> <td>Yes</td> </tr> <tr> <td>Partial Mode On, Idle Mode Off, Sleep Out</td> <td>Yes</td> </tr> <tr> <td>Partial Mode On, Idle Mode On, Sleep Out</td> <td>Yes</td> </tr> <tr> <td>Sleep In</td> <td>Yes</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                  |                             |                                                             |       |    |    |    |    |    |    |    |    |     | Status | Availability            | Normal Mode On, Idle Mode Off, Sleep Out | Yes            | Normal Mode On, Idle Mode On, Sleep Out | Yes                                                         | Partial Mode On, Idle Mode Off, Sleep Out | Yes                         | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In         | Yes                                       |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Availability                |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | Normal Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Yes                         |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | Normal Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Yes                         |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | Partial Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                         |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | Partial Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Yes                         |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
| Sleep In                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                             |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
| Default                   | <table border="1"> <thead> <tr> <th>Status</th> <th>Default Value(D7 to D0)</th> </tr> </thead> <tbody> <tr> <td>Power On Sequence</td> <td>0000_0000(00h)</td> </tr> <tr> <td>SW Reset</td> <td>0000_0000(00h)</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                             |                                                             |       |    |    |    |    |    |    |    |    |     | Status | Default Value(D7 to D0) | Power On Sequence                        | 0000_0000(00h) | SW Reset                                | 0000_0000(00h)                                              |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Default Value(D7 to D0)     |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
|                           | Power On Sequence                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0000_0000(00h)              |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
| SW Reset                  | 0000_0000(00h)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |
| Flow Chart                | <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Serial I/F Mode</p> </div> <div style="text-align: center;"> <p>Parallel I/F Mode</p> </div> </div> <div style="margin-top: 20px;"> <p style="text-align: center;">Host Driver</p> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |                                                             |       |    |    |    |    |    |    |    |    |     |        |                         |                                          |                |                                         |                                                             |                                           |                             |                                          |     |                  |                                           |    |               |                |    |               |                |    |                       |                                            |    |                              |    |

### 14.2.9 Read Display Signal Mode (0Eh)

| 0EH                       | RDDSM (Read Display Signal Mode)                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                      |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----|-------|----|----|----------------------|----|----|----|----|----|-----|--------|-------------------------|------------------------------------------|----------------|-----------------------------------------|----------------|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | RDX                                  | WRX | D17-8 | D7 | D6 | D5                   | D4 | D3 | D2 | D1 | D0 | HEX |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| Command                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1                                    | ↑   | x     | 0  | 0  | 0                    | 0  | 1  | 1  | 1  | 0  | 0Eh |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| 1 <sup>st</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ↑                                    | 1   | x     | x  | x  | x                    | x  | x  | x  | x  | x  | x   |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| 2 <sup>nd</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ↑                                    | 1   | x     | D7 | D6 | D5                   | D4 | D3 | D2 | D1 | D0 | 00h |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| Description               | This command indicates the current status of the display as described in the table below:                                                                                                                                                                                                                                                                                                                                                                              |                                      |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | Bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Description                          |     |       |    |    | Value                |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | D7                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Tearing Effect Line On/Off           |     |       |    |    | “1”=On, “0”=Off      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | D6                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Tearing Effect Line Mode             |     |       |    |    | “0”=mode1, “1”=mode2 |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | D5                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Horizontal Sync. (RGB I/F) On / Off  |     |       |    |    | “1”=On, “0”=Off      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | D4                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Vertical Sync. (RGB I/F) On / Off    |     |       |    |    | “1”=On, “0”=Off      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | D3                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Pixel Clock (PCLK, RGB I/F) On / Off |     |       |    |    | “1”=On, “0”=Off      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | D2                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Data Enable (DE , RGB I/F) On / Off  |     |       |    |    | “1”=On, “0”=Off      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | D1                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Not Used                             |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | D0                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Not Used                             |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| Register Availability     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                             |                                      |     |       |    |    |                      |    |    |    |    |    |     | Status | Availability            | Normal Mode On, Idle Mode Off, Sleep Out | Yes            | Normal Mode On, Idle Mode On, Sleep Out | Yes            | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
|                           | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Availability                         |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | Normal Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                                                                                               | Yes                                  |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | Normal Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                                                                                                | Yes                                  |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | Partial Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                                                                                              | Yes                                  |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | Partial Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                                                                                               | Yes                                  |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | Sleep In                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Yes                                  |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| Default                   | <table><tr><th>Status</th><th>Default Value(D7 to D0)</th></tr><tr><td>Power On Sequence</td><td>0000_0000(00h)</td></tr><tr><td>SW Reset</td><td>0000_0000(00h)</td></tr></table>                                                                                                                                                                                                                                                                                     |                                      |     |       |    |    |                      |    |    |    |    |    |     | Status | Default Value(D7 to D0) | Power On Sequence                        | 0000_0000(00h) | SW Reset                                | 0000_0000(00h) |                                           |     |                                          |     |          |     |
|                           | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Default Value(D7 to D0)              |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | Power On Sequence                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0000_0000(00h)                       |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                           | SW Reset                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0000_0000(00h)                       |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| Flow Chart                | <div><div><div>Serial I/F Mode</div><div><div>RDDID(0Eh)</div><div>↓</div><div>Send D[7:0]</div></div></div><div><div>Parallel I/F Mode</div><div><div>RDDPM(0Eh)</div><div>↓</div><div>Dummy Read</div><div>↓</div><div>Send D [7:0]</div></div></div><div><div>Host</div><div>Driver</div></div></div> <div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div> |                                      |     |       |    |    |                      |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |

### 14.2.10 Read Display Signal Mode (0Fh)

| 0EH                          |                                                                                                                                                                                                                                                                                                                                                                                            | RDDSM (Read Display Signal Mode) |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----|-------|----|----|-------|----|----|----|----|----|-----|--------|-------------------------|------------------------------------------|----------------|-----------------------------------------|----------------|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                              | D/C<br>X                                                                                                                                                                                                                                                                                                                                                                                   | RDX                              | WRX | D17-8 | D7 | D6 | D5    | D4 | D3 | D2 | D1 | D0 | HEX |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| Command                      | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1                                | ↑   | x     | 0  | 0  | 0     | 0  | 1  | 1  | 1  | 1  | 0Fh |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| 1 <sup>st</sup><br>Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                          | ↑                                | 1   | x     | x  | x  | x     | x  | x  | x  | x  | x  | x   |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| 2 <sup>nd</sup><br>Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                          | ↑                                | 1   | x     | D7 | D6 | D5    | D4 | D3 | D2 | D1 | D0 | 00h |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| Description                  | This command indicates the current status of the display as described in the table below:                                                                                                                                                                                                                                                                                                  |                                  |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | Bit                                                                                                                                                                                                                                                                                                                                                                                        | Description                      |     |       |    |    | Value |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | D7                                                                                                                                                                                                                                                                                                                                                                                         | Register Loading Detection       |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | D6                                                                                                                                                                                                                                                                                                                                                                                         | Functionality Detection          |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | D5                                                                                                                                                                                                                                                                                                                                                                                         | Not Used                         |     |       |    |    | "0"   |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | D4                                                                                                                                                                                                                                                                                                                                                                                         | Not Used                         |     |       |    |    | "0"   |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | D3                                                                                                                                                                                                                                                                                                                                                                                         | Not Used                         |     |       |    |    | "0"   |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | D2                                                                                                                                                                                                                                                                                                                                                                                         | Not Used                         |     |       |    |    | "0"   |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | D1                                                                                                                                                                                                                                                                                                                                                                                         | Not Used                         |     |       |    |    | "0"   |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | D0                                                                                                                                                                                                                                                                                                                                                                                         | Not Used                         |     |       |    |    | "0"   |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| Register<br>Availability     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |                                  |     |       |    |    |       |    |    |    |    |    |     | Status | Availability            | Normal Mode On, Idle Mode Off, Sleep Out | Yes            | Normal Mode On, Idle Mode On, Sleep Out | Yes            | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
|                              | Status                                                                                                                                                                                                                                                                                                                                                                                     | Availability                     |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | Normal Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes                              |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | Normal Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                    | Yes                              |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | Partial Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                  | Yes                              |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | Partial Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes                              |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| Sleep In                     | Yes                                                                                                                                                                                                                                                                                                                                                                                        |                                  |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| Default                      | <table><tr><th>Status</th><th>Default Value(D7 to D0)</th></tr><tr><td>Power On Sequence</td><td>0000_0000(00h)</td></tr><tr><td>SW Reset</td><td>0000_0000(00h)</td></tr></table>                                                                                                                                                                                                         |                                  |     |       |    |    |       |    |    |    |    |    |     | Status | Default Value(D7 to D0) | Power On Sequence                        | 0000_0000(00h) | SW Reset                                | 0000_0000(00h) |                                           |     |                                          |     |          |     |
|                              | Status                                                                                                                                                                                                                                                                                                                                                                                     | Default Value(D7 to D0)          |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | Power On Sequence                                                                                                                                                                                                                                                                                                                                                                          | 0000_0000(00h)                   |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| SW Reset                     | 0000_0000(00h)                                                                                                                                                                                                                                                                                                                                                                             |                                  |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
| Flow Chart                   | <div><div><div>Serial I/F Mode</div><div><div>RDDID(0Fh)</div><div>↓</div><div>Send 2nd<br/>Parameter</div></div></div><div><div>Parallel I/F Mode</div><div><div>RDDPM(0Fh)</div><div>↓</div><div>Dummy Read</div><div>↓</div><div>Send 2nd<br/>Parameter</div></div></div><div><div>Host</div><div>Driver</div></div></div>                                                              |                                  |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |
|                              | <div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div>                                                                                                                                                                                                                              |                                  |     |       |    |    |       |    |    |    |    |    |     |        |                         |                                          |                |                                         |                |                                           |     |                                          |     |          |     |

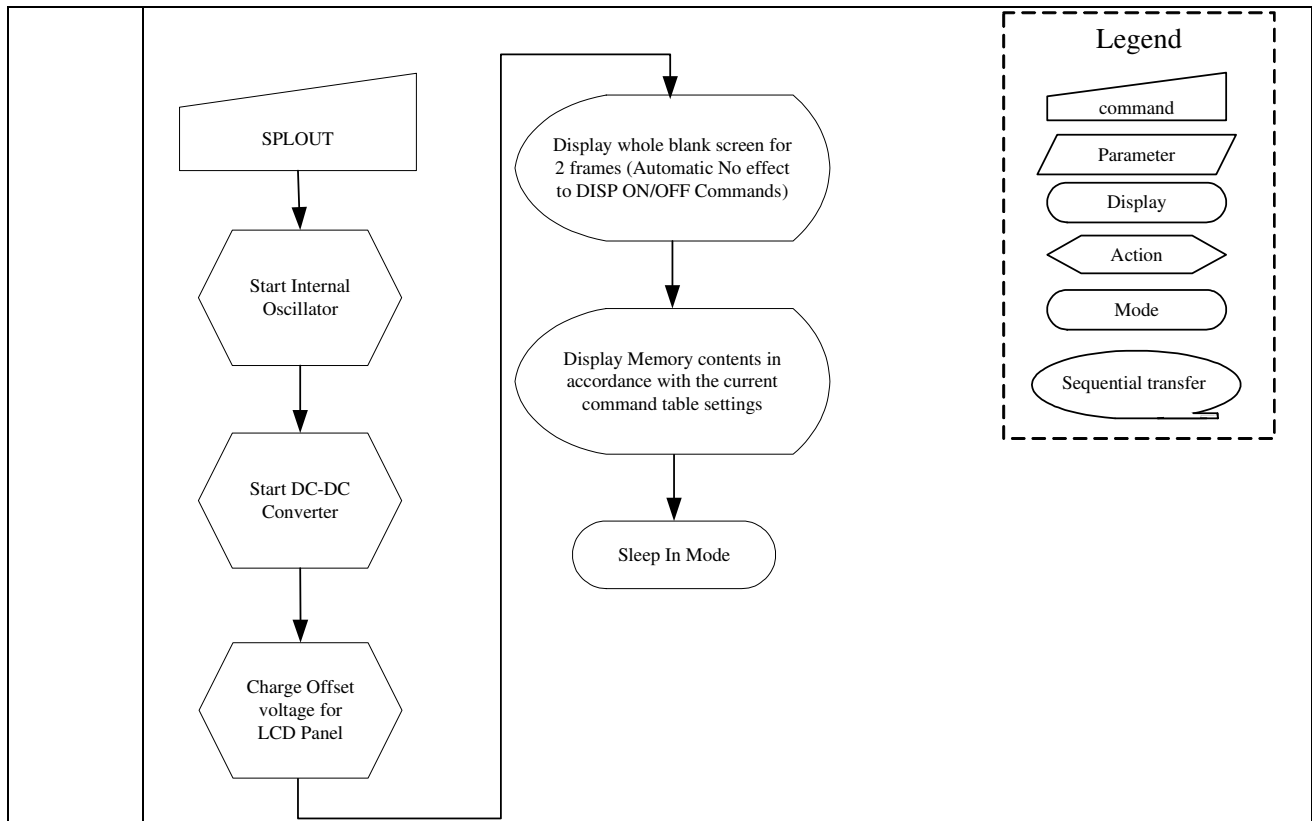
### 14.2.11 Sleep In (10h)

| 10H                                       | SLPIN (Sleep In)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|---------------|-----------------------------------------|---------------|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1   | ↑   | x     | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 10h |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Parameter                                 | No Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Description                               | <p>This command causes the LCD module to enter the minimum power consumption mode.</p> <p>In this mode e.g. the DC/DC converter is stopped, Internal oscillator is stopped, and panel scanning is stopped.</p> <p>MCU interface and memory are still working and the memory keeps its contents.</p>                                                                                                                                                                                                                 |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Restriction                               | <p>This command has no effect when module is already in sleep in mode. Sleep In Mode can only be left by the Sleep Out Command (11h). It will be necessary to wait 5msec before sending next command; this is to allow time for the supply voltages and clock circuits to stabilize. It will be necessary to wait 120msec after sending Sleep Out command (when in Sleep In Mode) before Sleep In command can be sent.</p>                                                                                          |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Register Availability                     | <table><thead><tr><th>Status</th><th>Availability</th></tr></thead><tbody><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></tbody></table>                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes           | Normal Mode On, Idle Mode On, Sleep Out | Yes           | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Default                                   | <table><thead><tr><th>Status</th><th>Default Value</th></tr></thead><tbody><tr><td>Power On Sequence</td><td>Sleep In Mode</td></tr><tr><td>SW Reset</td><td>Sleep In Mode</td></tr></tbody></table>                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | Sleep In Mode | SW Reset                                | Sleep In Mode |                                           |     |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Power On Sequence                         | Sleep In Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| SW Reset                                  | Sleep In Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |
| Flow Chart                                | <p>It takes 120msec to get into Sleep In mode after SLPIN command issued.</p> <div><div><div>SLPIN</div><div>Display whole blank screen<br/>(automatic No effect to DISP ON/OFF command)</div><div>Drain charge from LCD panel</div></div><div><div>Stop DC/DC Converter</div><div>Stop Internal Oscillator</div><div>Sleep In Mode</div></div></div> <div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div> |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |

### 14.2.12 Sleep Out (11h)

| 11H                                       | SLPOUT (Sleep Out)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|---------------|-----------------------------------------|---------------|-------------------------------------------|---------------|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1   | ↑   | x     | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 1  | 11h |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Parameter                                 | No Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Description                               | This command turns off sleep mode.<br>In this mode e.g. the DC/DC converter is enabled, Internal oscillator is started, and panel scanning is started.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Restriction                               | <p>This command has no effect when module is already in sleep out mode. Sleep Out Mode can only be left by the Sleep In Command (10h).</p> <p>It will be necessary to wait 5 msec before sending next command; this is to allow time for the clock circuits to stabilize.</p> <p>The display module loads all display supplier's factory default values to the registers during this 120 msec and there cannot be any abnormal visual effect on the display image if factory default and register values are same when this load is done and when the display module is already Sleep Out –mode.</p> <p>The display module is doing self-diagnostic functions during this 5msec. It will be necessary to wait 120msec after sending Sleep In command (when in Sleep Out mode) before Sleep Out command can be sent.</p> <p>This command has no effect when module is already in sleep out mode.</p> <p>Sleep Out Mode can only be left by HW Reset, Software Reset (01h), Sleep In (10h), or a NMI event trigger.</p> |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes           | Normal Mode On, Idle Mode On, Sleep Out | Yes           | Partial Mode On, Idle Mode Off, Sleep Out | Yes           | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>Sleep In Mode</td></tr><tr><td>SW Reset</td><td>Sleep In Mode</td></tr><tr><td>HW Reset</td><td>Sleep In Mode</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | Sleep In Mode | SW Reset                                | Sleep In Mode | HW Reset                                  | Sleep In Mode |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Power On Sequence                         | Sleep In Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| SW Reset                                  | Sleep In Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| HW Reset                                  | Sleep In Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Flow Chart                                | It takes 120msec to become Sleep Out mode after SLPOUT command issued.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |





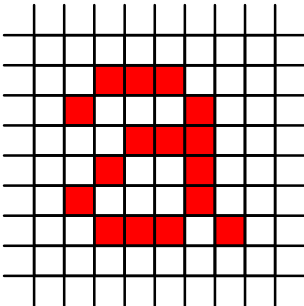
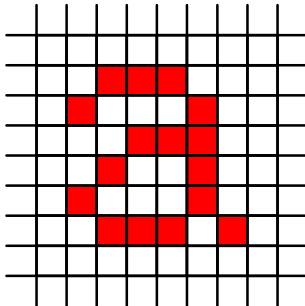
### 14.2.13 Partial Mode On (12h)

| 12H                                       | PTLON (Partial Mode On)                                                                                                                                                                                                                                                                                                                                                                    |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|------------------------|-----------------------------------------|------------------------|-------------------------------------------|------------------------|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | 0  | 0  | 0  | 1  | 0  | 0  | 1  | 0  | 12h |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Parameter                                 | No Parameter                                                                                                                                                                                                                                                                                                                                                                               |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Description                               | <p>This command turns on partial mode. The partial mode is described by the Partial Area command (30h).</p> <p>To leave Partial mode, the Normal Display On command (13h) should be written.</p> <p>X = Don't care</p> <p>Note: If a command is written in a frame cycle, the command becomes effective from the next frame.</p>                                                           |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Restriction                               | This command has no effect during Partial mode is active.                                                                                                                                                                                                                                                                                                                                  |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |     |     |       |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes                    | Normal Mode On, Idle Mode On, Sleep Out | Yes                    | Partial Mode On, Idle Mode Off, Sleep Out | Yes                    | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>Normal Display Mode On</td></tr><tr><td>SW Reset</td><td>Normal Display Mode On</td></tr><tr><td>HW Reset</td><td>Normal Display Mode On</td></tr></table>                                                                                                                                          |     |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | Normal Display Mode On | SW Reset                                | Normal Display Mode On | HW Reset                                  | Normal Display Mode On |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Power On Sequence                         | Normal Display Mode On                                                                                                                                                                                                                                                                                                                                                                     |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| SW Reset                                  | Normal Display Mode On                                                                                                                                                                                                                                                                                                                                                                     |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| HW Reset                                  | Normal Display Mode On                                                                                                                                                                                                                                                                                                                                                                     |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |
| Flow Chart                                | See Partial Area (30h)                                                                                                                                                                                                                                                                                                                                                                     |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                        |                                         |                        |                                           |                        |                                          |     |          |     |

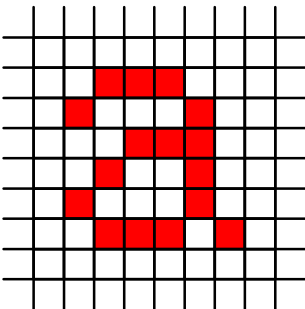
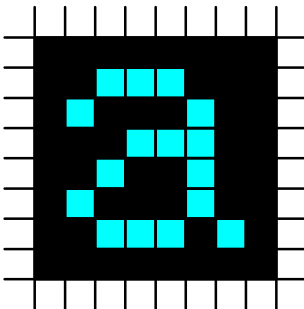
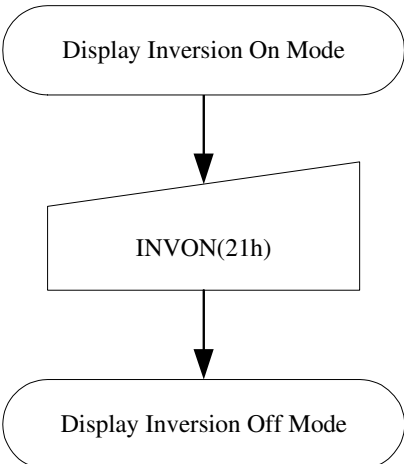
### 14.2.14 Normal Display Mode On (13h)

| 13H                   |                                                                                                          | PTLON (Partial Mode On) |     |       |    |    |    |    |    |    |    |    |     |
|-----------------------|----------------------------------------------------------------------------------------------------------|-------------------------|-----|-------|----|----|----|----|----|----|----|----|-----|
|                       | D/CX                                                                                                     | RDX                     | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |
| Command               | 0                                                                                                        | 1                       | ↑   | x     | 0  | 0  | 0  | 1  | 0  | 0  | 1  | 1  | 13h |
| Parameter             | No Parameter                                                                                             |                         |     |       |    |    |    |    |    |    |    |    |     |
| Description           | This command returns the display to normal mode.                                                         |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       | Normal display mode on means Partial mode off and Scroll mode Off.                                       |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       | Exit from NORON by the Partial mode On command(12h)                                                      |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       | X = Don't care                                                                                           |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       | Note: If a command is written in a frame cycle, the command becomes effective from the next frame.       |                         |     |       |    |    |    |    |    |    |    |    |     |
| Restriction           | This command has no effect when Normal Display mode is active.                                           |                         |     |       |    |    |    |    |    |    |    |    |     |
| Register Availability |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
| Default               |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
|                       |                                                                                                          |                         |     |       |    |    |    |    |    |    |    |    |     |
| Flow Chart            | See Partial Area and Vertical Scrolling Definition Descriptions for details of when to use this command. |                         |     |       |    |    |    |    |    |    |    |    |     |

### 14.2.15 Display Inversion Off (20h)

| 20H                                       | PTLON (Partial Mode On)                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|-------------------------|-----------------------------------------|-------------------------|-------------------------------------------|-------------------------|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1   | ↑   | x     | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 20h |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Parameter                                 | No Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Description                               | <div><div><p>This command is used to recover from display inversion mode.<br/>This command makes no change of contents of frame memory.<br/>This command does not change any other status.</p><div><div>Memory</div><div></div></div><div><div>Display Panel</div><div></div></div></div><p>X = don't care</p></div> |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Restriction                               | This command has no effect when module is already in inversion off mode.                                                                                                                                                                                                                                                                                                                                                                                                                 |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                               |     |     |       |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes                     | Normal Mode On, Idle Mode On, Sleep Out | Yes                     | Partial Mode On, Idle Mode Off, Sleep Out | Yes                     | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>Normal Display Mode Off</td></tr><tr><td>SW Reset</td><td>Normal Display Mode Off</td></tr><tr><td>HW Reset</td><td>Normal Display Mode Off</td></tr></table>                                                                                                                                                                                                                                     |     |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | Normal Display Mode Off | SW Reset                                | Normal Display Mode Off | HW Reset                                  | Normal Display Mode Off |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Power On Sequence                         | Normal Display Mode Off                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| SW Reset                                  | Normal Display Mode Off                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| HW Reset                                  | Normal Display Mode Off                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Flow Chart                                | <div><div><div>Display Inversion On Mode</div><div>↓</div><div>INVOFF(20h)</div><div>↓</div><div>Display Inversion Off Mode</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                                                                                               |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |

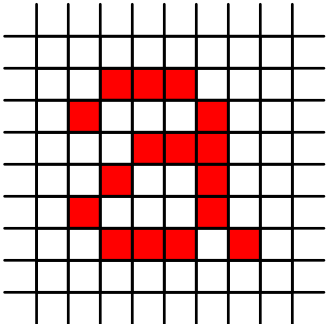
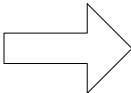
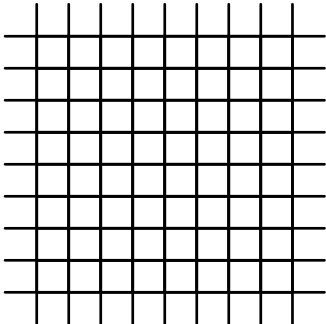
### 14.2.16 Display Inversion On (21h)

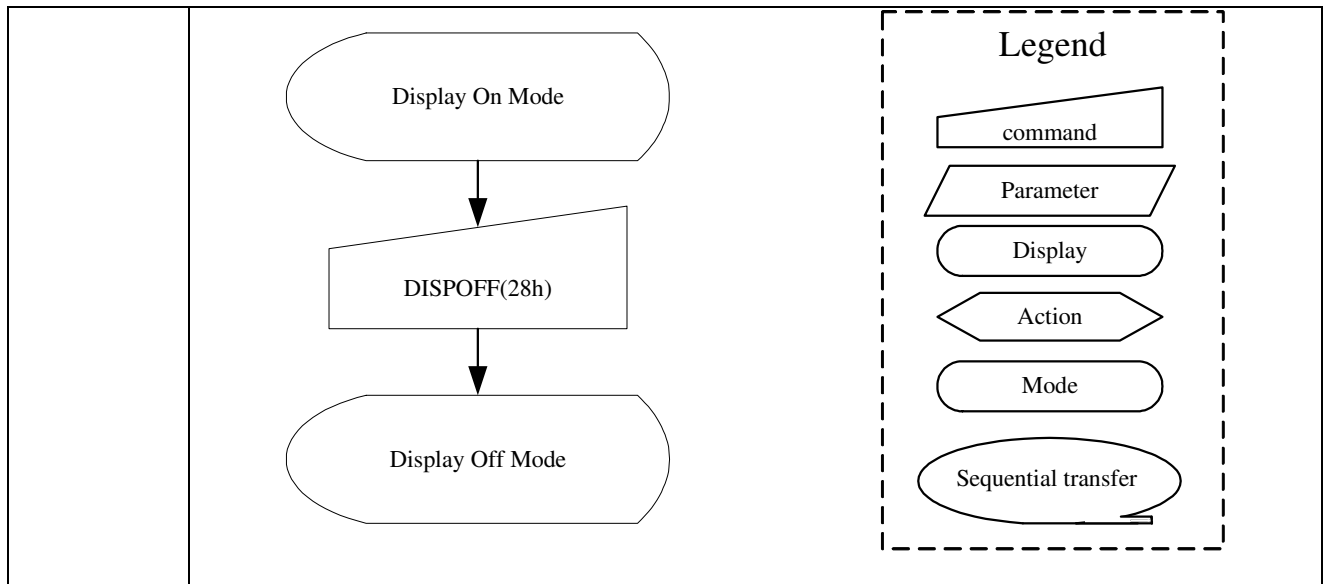
| 21H                                       | PTLON (Partial Mode On)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|-------------------------|-----------------------------------------|-------------------------|-------------------------------------------|-------------------------|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1   | ↑   | x     | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 1  | 21h |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Parameter                                 | No Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Description                               | <p>This command is used to enter into display inversion mode.</p> <p>This command makes no change of contents of frame memory. Every bit is inverted from the frame memory to the display.</p> <p>This command does not change any other status.</p> <p>To exit from Display inversion On, the Display Inversion Off command(20h) should be written.</p> <div style="display: flex; justify-content: space-around; align-items: center;"><div style="text-align: center;"><p>Memory</p></div><div style="font-size: 2em;">→</div><div style="text-align: center;"><p>Display Panel</p></div></div> <p>X = don't care</p>                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Restriction                               | This command has no effect when module is already in inversion on mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes                     | Normal Mode On, Idle Mode On, Sleep Out | Yes                     | Partial Mode On, Idle Mode Off, Sleep Out | Yes                     | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>Normal Display Mode Off</td></tr><tr><td>SW Reset</td><td>Normal Display Mode Off</td></tr><tr><td>HW Reset</td><td>Normal Display Mode Off</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | Normal Display Mode Off | SW Reset                                | Normal Display Mode Off | HW Reset                                  | Normal Display Mode Off |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Power On Sequence                         | Normal Display Mode Off                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| SW Reset                                  | Normal Display Mode Off                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| HW Reset                                  | Normal Display Mode Off                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |
| Flow Chart                                | <div style="display: flex; align-items: center; justify-content: center;"><div style="text-align: center; margin-right: 20px;"><p>Display Inversion On Mode</p><p>Display Inversion Off Mode</p></div><div style="border: 1px dashed black; padding: 10px; margin-left: 20px;"><p><b>Legend</b></p><div style="display: flex; flex-direction: column; align-items: center;"><div style="border: 1px solid black; width: 100px; height: 20px; margin-bottom: 5px;"></div>command</div><div style="border: 1px solid black; width: 100px; height: 20px; transform: rotate(-10deg); margin-bottom: 5px;"></div>Parameter</div><div style="border: 1px solid black; width: 100px; height: 20px; border-radius: 10px; margin-bottom: 5px;"></div>Display</div> <div style="border: 1px solid black; width: 100px; height: 20px; border-radius: 10px; margin-bottom: 5px;"></div> Action <div style="border: 1px solid black; width: 100px; height: 20px; border-radius: 10px; margin-bottom: 5px;"></div> Mode <div style="border: 1px solid black; width: 100px; height: 20px; border-radius: 10px; margin-bottom: 5px;"></div> Sequential transfer |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |                         |                                         |                         |                                           |                         |                                          |     |          |     |

### 14.2.17 Gamma Set (26h)

| 26H                                       | GAMSET (Gamma Set)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------|---------------|------------------------------------------|-----|-----------------------------------------|---------------|-------------------------------------------|-----|------------------------------------------|-----|----------|---------------|-----|-----|---------------|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | RDX            | WRX | D17-8 | D7  | D6  | D5  | D4  | D3  | D2  | D1  | D0  | HEX |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1              | ↑   | x     | 0   | 0   | 1   | 0   | 0   | 1   | 1   | 0   | 26h |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Parameter                                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1              | ↑   | x     | GC7 | GC6 | GC5 | GC4 | GC3 | GC2 | GC1 | GC0 | 01h |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Description                               | <p>This command is used to select the desired Gamma curve for the current display. A maximum of 4 fixed gamma curves can be selected. The curves are defined Gamma Curve Correction Power Supply Circuit. The curve is selected by setting the appropriate bit in the parameter as described in the table:</p> <table><tr><th>GC[7..0]</th><th>Parameter</th><th>Curve Selected</th></tr><tr><td>01h</td><td>GC0</td><td>Gamma Curve 1</td></tr><tr><td>02h</td><td>GC1</td><td>Gamma Curve 2</td></tr><tr><td>04h</td><td>GC2</td><td>Gamma Curve 3</td></tr><tr><td>08h</td><td>GC3</td><td>Gamma Curve 4</td></tr></table> <p>Note: All other values are undefined.<br/>X = don't care</p> |                |     |       |     |     |     |     |     |     |     |     |     | GC[7..0] | Parameter     | Curve Selected                           | 01h | GC0                                     | Gamma Curve 1 | 02h                                       | GC1 | Gamma Curve 2                            | 04h | GC2      | Gamma Curve 3 | 08h | GC3 | Gamma Curve 4 |
| GC[7..0]                                  | Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Curve Selected |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| 01h                                       | GC0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Gamma Curve 1  |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| 02h                                       | GC1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Gamma Curve 2  |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| 04h                                       | GC2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Gamma Curve 3  |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| 08h                                       | GC3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Gamma Curve 4  |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Restriction                               | Values of GC[7..0] not shown in table above are invalid and will not change the current selected Gamma curve until valid value is received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                    |                |     |       |     |     |     |     |     |     |     |     |     | Status   | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes           | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes           |     |     |               |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>01h</td></tr><tr><td>SW Reset</td><td>01h</td></tr><tr><td>HW Reset</td><td>01h</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |     |       |     |     |     |     |     |     |     |     |     | Status   | Default Value | Power On Sequence                        | 01h | SW Reset                                | 01h           | HW Reset                                  | 01h |                                          |     |          |               |     |     |               |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Power On Sequence                         | 01h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| SW Reset                                  | 01h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| HW Reset                                  | 01h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |
| Flow Chart                                | <div><div><p>Partial Mode</p><pre>graph TD; A[GAMSET (26h)] --&gt; B[/1st Parameter: GC[7:0]/]; B --&gt; C{{New Gamma Curve Loaded}};</pre></div><div><p>Legend</p><ul style="list-style-type: none"><li>command</li><li>Parameter</li><li>Display</li><li>Action</li><li>Mode</li><li>Sequential transfer</li></ul></div></div>                                                                                                                                                                                                                                                                                                                                                              |                |     |       |     |     |     |     |     |     |     |     |     |          |               |                                          |     |                                         |               |                                           |     |                                          |     |          |               |     |     |               |

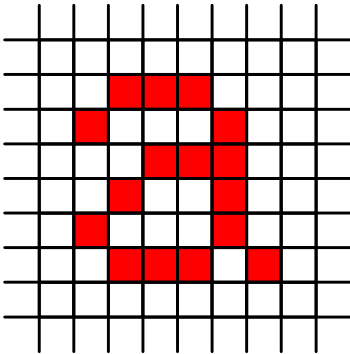
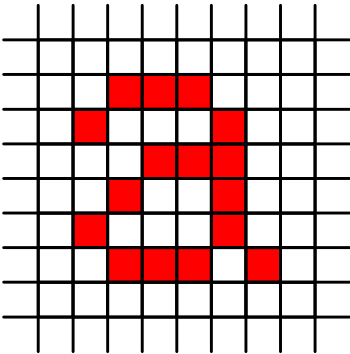
### 14.2.18 Display Off (28h)

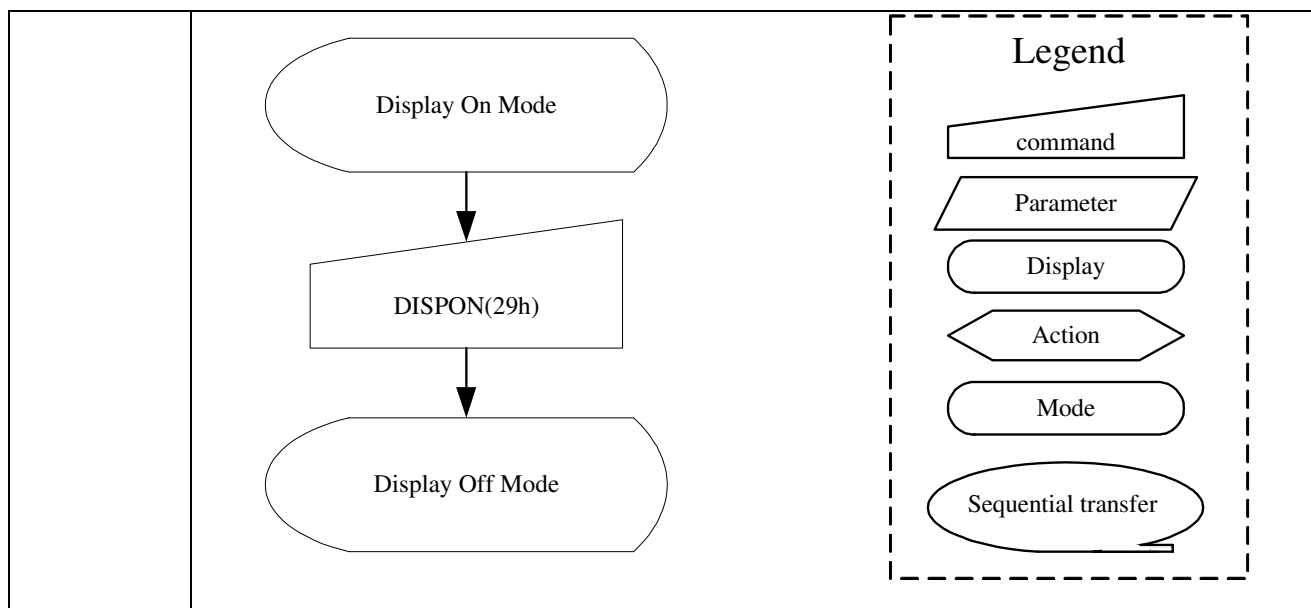
| 28H                                       | DISPOFF (Display Off)                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|-------------------|------------------------------------------|----------|-----------------------------------------|----------|-------------------------------------------|-----|------------------------------------------|-----|----------|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                | RDX                                                                                                                                                                                                                                                                                                                                                                                        | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                   | 1                                                                                                                                                                                                                                                                                                                                                                                          | ↑   | x     | 0  | 0  | 1  | 0  | 1  | 0  | 0  | 0  | 28h |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Parameter                                 | No Parameter                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Description                               | <p>This command is used to enter into DISPLAY OFF mode. In this mode, the output from Frame Memory is disabled and blank page inserted.</p> <p>This command makes no change of contents of frame memory.</p> <p>This command does not change any other status.</p> <p>There will be no abnormal visible effect on the display.</p> <p>Exit from this command by Display On(29h)</p> |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
|                                           | <div><div><div>Memory</div></div><div></div><div><div>Display Panel</div></div></div>                                         |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
|                                           | X = don't care                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
|                                           | Restriction                                                                                                                                                                                                                                                                                                                                                                         | This command has no effect when module is already in display off mode.                                                                                                                                                                                                                                                                                                                     |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
|                                           | Register Availability                                                                                                                                                                                                                                                                                                                                                               | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |     |       |    |    |    |    |    |    |    |    |     |        | Status        | Availability      | Normal Mode On, Idle Mode Off, Sleep Out | Yes      | Normal Mode On, Idle Mode On, Sleep Out | Yes      | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>Display Off</td></tr><tr><td>SW Reset</td><td>Display Off</td></tr><tr><td>HW Reset</td><td>Display Off</td></tr></table>                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence | Display Off                              | SW Reset | Display Off                             | HW Reset | Display Off                               |     |                                          |     |          |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Power On Sequence                         | Display Off                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| SW Reset                                  | Display Off                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| HW Reset                                  | Display Off                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Flow Chart                                |                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |



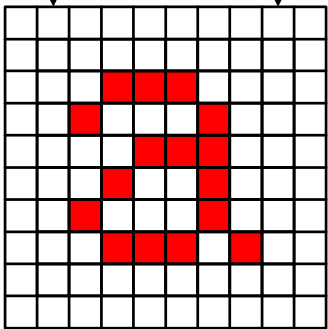


### 14.2.19 Display On (29h)

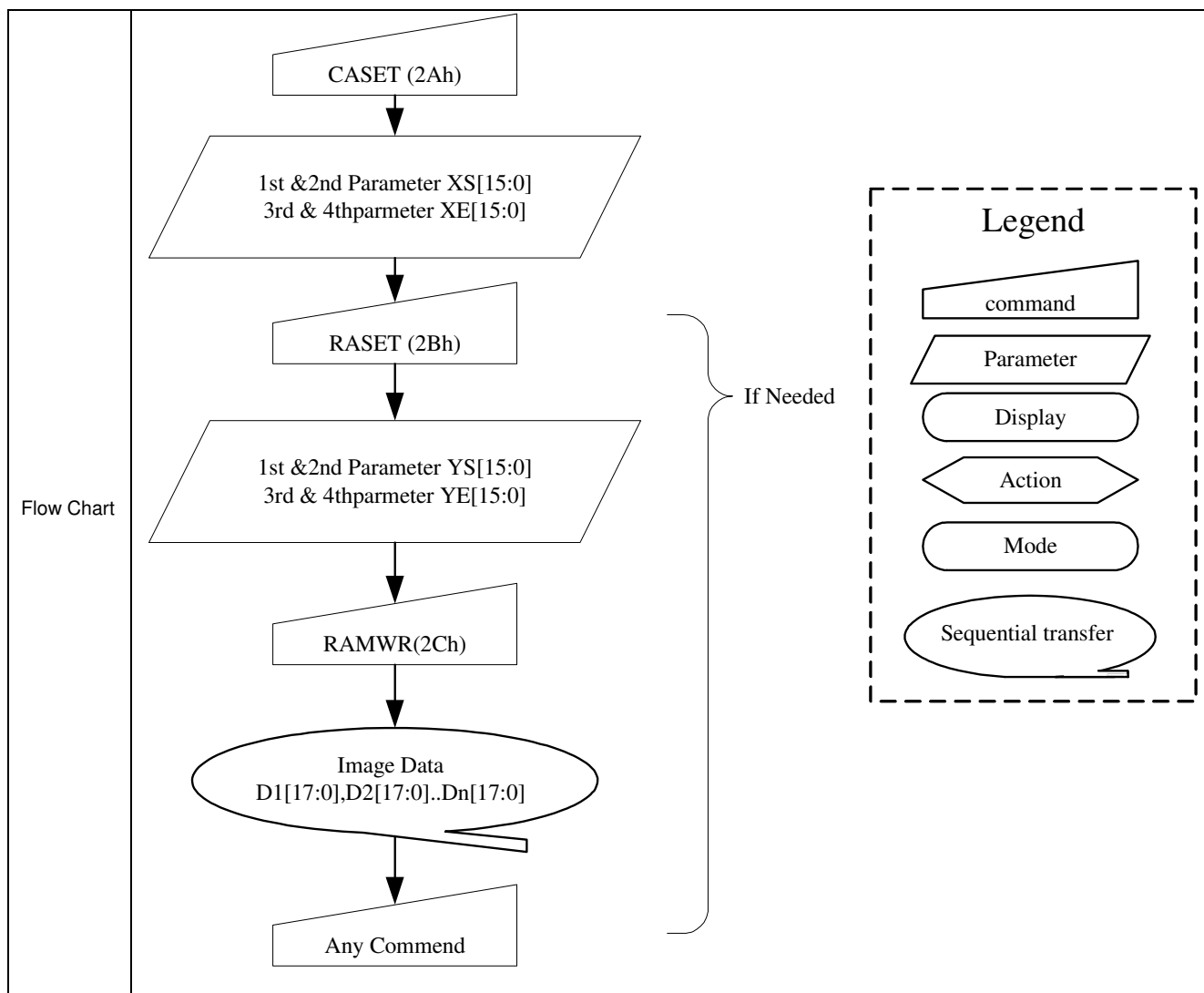
| 29H                                       | DISPON (Display On)                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|-------------|-----------------------------------------|-------------|-------------------------------------------|-------------|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | 0  | 0  | 1  | 0  | 1  | 0  | 0  | 1  | 29h |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Parameter                                 | No Parameter                                                                                                                                                                                                                                                                                                                                                                               |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Description                               | This command is used to recover from DISPLAY OFF mode. Output from the Frame Memory is enabled.                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
|                                           | This command makes no change of contents of frame memory.                                                                                                                                                                                                                                                                                                                                  |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
|                                           | This command does not change any other status.                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
|                                           | <div><div><div>Memory</div></div><div>→</div><div><div>Display Panel</div></div></div> <p>X = don't care</p>                                                                                                           |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Restriction                               | This command has no effect when module is already in display on mode.                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |     |     |       |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes         | Normal Mode On, Idle Mode On, Sleep Out | Yes         | Partial Mode On, Idle Mode Off, Sleep Out | Yes         | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>Display Off</td></tr><tr><td>SW Reset</td><td>Display Off</td></tr><tr><td>HW Reset</td><td>Display Off</td></tr></table>                                                                                                                                                                           |     |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | Display Off | SW Reset                                | Display Off | HW Reset                                  | Display Off |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Power On Sequence                         | Display Off                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| SW Reset                                  | Display Off                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| HW Reset                                  | Display Off                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |
| Flow Chart                                |                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |             |                                         |             |                                           |             |                                          |     |          |     |



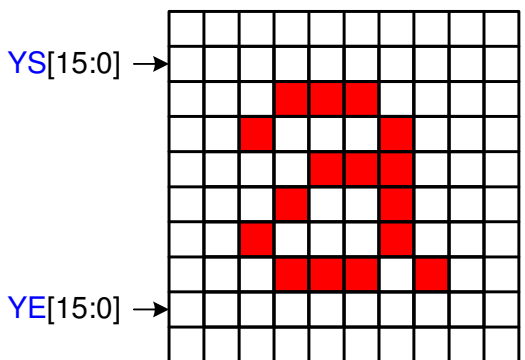
## 14.2.20 Column Address Set (2Ah)

| 2AH                       | CASET (Column Address Set)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |      |      |      |      |      |      |     |     |     |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|------|------|------|------|------|------|-----|-----|-----|
|                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | RDX | WRX | D17-8 | D7   | D6   | D5   | D4   | D3   | D2   | D1  | D0  | HEX |
| Command                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1   | ↑   | x     | 0    | 0    | 1    | 0    | 1    | 0    | 1   | 0   | 2Ah |
| 1 <sup>st</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1   | ↑   | x     | XS15 | XS14 | XS13 | XS12 | XS11 | XS10 | XS9 | XS8 | -   |
| 2 <sup>nd</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1   | ↑   | x     | XS7  | XS6  | XS5  | XS4  | XS3  | XS2  | XS1 | XS0 | -   |
| 3 <sup>rd</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1   | ↑   | x     | XE15 | XE14 | XE13 | XE12 | XE11 | XE10 | XE9 | XE8 | -   |
| 4 <sup>th</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1   | ↑   | x     | XE7  | XE6  | XE5  | XE4  | XE3  | XE2  | XE1 | XE0 | -   |
| Description               | <p>This command is used to define area of frame memory where MCU can access.<br/>This command makes no change on the other driver status.<br/>The values of XS[15:0] and XE[15:0] are referred when RAMWR command comes. Each value represents one column line in the Frame Memory.</p> <div style="text-align: center;">  </div> <p>X = don't care</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |      |      |      |      |      |      |     |     |     |
| Restriction               | <p>XS [15:0] always must be equal to or less than XE[15:0].<br/>When XS[15:0] or XE[15:0] is greater than maximum address like below, data of out of range will be ignored.</p> <ol style="list-style-type: none"> <li>132X132 memory base (GM='101')<br/>(Parameter range: <math>0 \leq XS[15:0] \leq XE[15:0] \leq 131(0083h)</math>:MV="0")<br/>(Parameter range: <math>0 \leq XS[15:0] \leq XE[15:0] \leq 131(0083h)</math>:MV="1")</li> <li>130X130 memory base (GM='100')<br/>(Parameter range: <math>0 \leq XS[15:0] \leq XE[15:0] \leq 129(0081h)</math>:MV="0")<br/>(Parameter range: <math>0 \leq XS[15:0] \leq XE[15:0] \leq 129(0081h)</math>:MV="1")</li> <li>128X160 memory base (GM='011')<br/>(Parameter range: <math>0 \leq XS[15:0] \leq XE[15:0] \leq 127(007Fh)</math>:MV="0")<br/>(Parameter range: <math>0 \leq XS[15:0] \leq XE[15:0] \leq 159(009Fh)</math>:MV="1")</li> <li>120X160 memory base (GM='010')<br/>(Parameter range: <math>0 \leq XS[15:0] \leq XE[15:0] \leq 119(0077h)</math>:MV="0")<br/>(Parameter range: <math>0 \leq XS[15:0] \leq XE[15:0] \leq 159(009Fh)</math>:MV="1")</li> <li>128X128 memory base (GM='001')<br/>(Parameter range: <math>0 \leq XS[15:0] \leq XE[15:0] \leq 127(007Fh)</math>:MV="0")<br/>(Parameter range: <math>0 \leq XS[15:0] \leq XE[15:0] \leq 127(007Fh)</math>:MV="1")</li> <li>132X162 memory base (GM='000')<br/>(Parameter range: <math>0 \leq XS[15:0] \leq XE[15:0] \leq 131(0083h)</math>:MV="0")</li> </ol> |     |     |       |      |      |      |      |      |      |     |     |     |

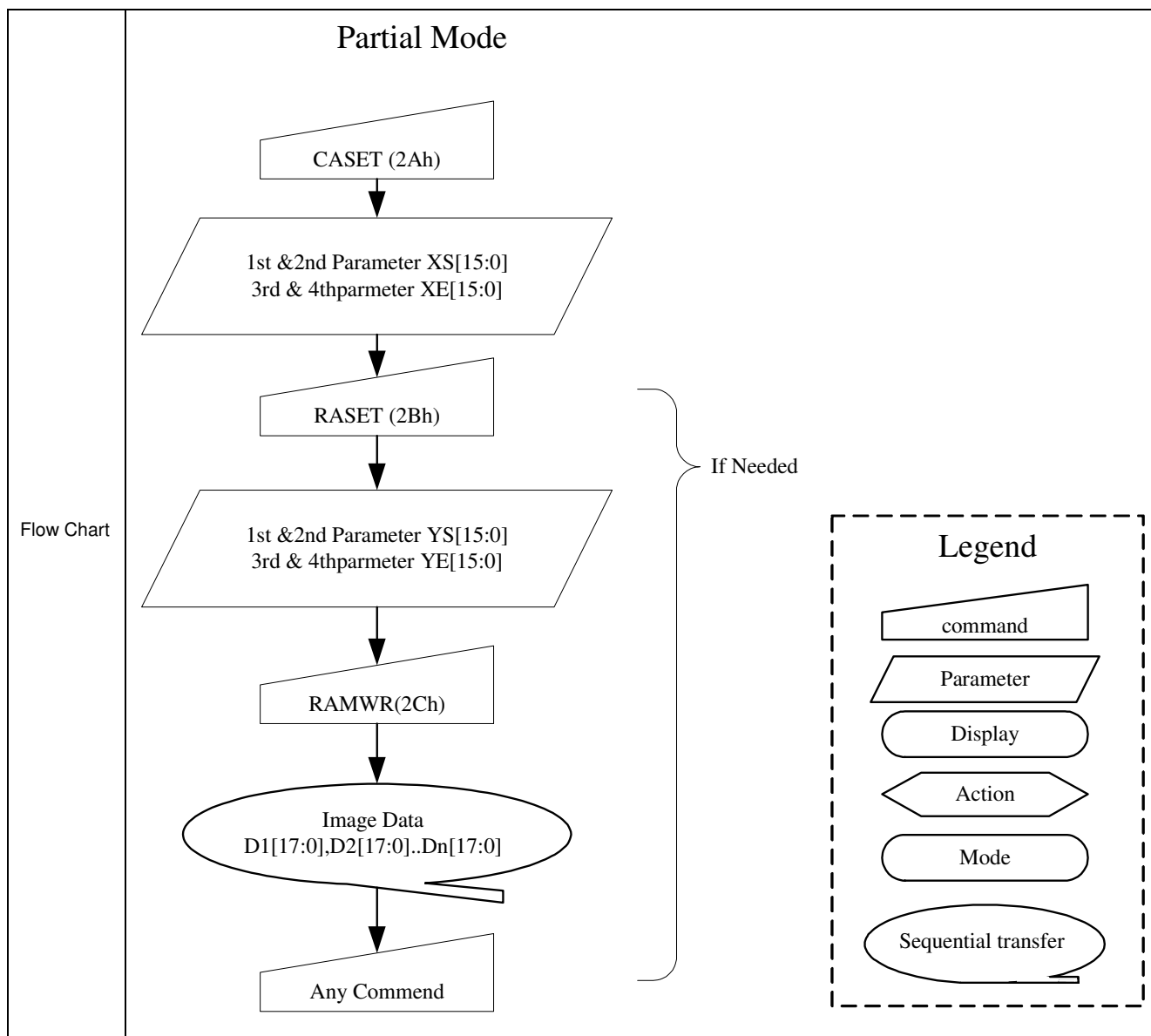
|                       | (Parameter range: 0≤XS[15:0] ≤XE[15:0] ≤127(00A1h):MV="1")                                                                                                                                                                                                                                                                                                                                 |                      |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------|--------|--------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                       | X = Don't care                                                                                                                                                                                                                                                                                                                                                                             |                      |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |                      |                             | Status | Availability | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
|                       | Status                                                                                                                                                                                                                                                                                                                                                                                     | Availability         |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | Normal Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes                  |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | Normal Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                    | Yes                  |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | Partial Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                  | Yes                  |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | Partial Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes                  |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In              | Yes                                                                                                                                                                                                                                                                                                                                                                                        |                      |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Default               | 1. 132 x 132 memory base(GM='101')                                                                                                                                                                                                                                                                                                                                                         |                      |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | <b>Status</b>                                                                                                                                                                                                                                                                                                                                                                              | <b>Default Value</b> |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | XS[15:0]             | XE[15:0] EX[15:0] (MV=1)    |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | Power On Sequence    | 0000h 0083h(131)            |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | S/W Reset            | 0000h 0083h(131) 0083h(131) |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | HW Reset                                                                                                                                                                                                                                                                                                                                                                                   | 0000h 0083h(131)     |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | <b>Status</b>                                                                                                                                                                                                                                                                                                                                                                              | <b>Default Value</b> |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | XS[15:0]             | XE[15:0] EX[15:0] (MV=1)    |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | Power On Sequence    | 0000h 0081h(129)            |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | S/W Reset            | 0000h 0081h(129) 0081h(129) |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | HW Reset                                                                                                                                                                                                                                                                                                                                                                                   | 0000h 0081h(129)     |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | <b>Status</b>                                                                                                                                                                                                                                                                                                                                                                              | <b>Default Value</b> |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | XS[15:0]             | XE[15:0] EX[15:0] (MV=1)    |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | Power On Sequence    | 0000h 007Fh(127)            |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | S/W Reset            | 0000h 007Fh(127) 009Fh(159) |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | HW Reset                                                                                                                                                                                                                                                                                                                                                                                   | 0000h 007Fh(127)     |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | <b>Status</b>                                                                                                                                                                                                                                                                                                                                                                              | <b>Default Value</b> |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | XS[15:0]             | XE[15:0] EX[15:0] (MV=1)    |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | Power On Sequence    | 0000h 0077h(119)            |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | S/W Reset            | 0000h 007Fh(119) 009Fh(159) |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | HW Reset                                                                                                                                                                                                                                                                                                                                                                                   | 0000h 0077h(119)     |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | <b>Status</b>                                                                                                                                                                                                                                                                                                                                                                              | <b>Default Value</b> |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | XS[15:0]             | XE[15:0] EX[15:0] (MV=1)    |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | Power On Sequence    | 0000h 007Fh(127)            |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | S/W Reset            | 0000h 007Fh(127) 009Fh(127) |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | HW Reset                                                                                                                                                                                                                                                                                                                                                                                   | 0000h 0077h(119)     |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | <b>Status</b>                                                                                                                                                                                                                                                                                                                                                                              | <b>Default Value</b> |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | XS[15:0]             | XE[15:0] EX[15:0] (MV=1)    |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | Power On Sequence    | 0000h 0083h(131)            |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       |                                                                                                                                                                                                                                                                                                                                                                                            | S/W Reset            | 0000h 0083h(131) 00A1h(161) |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | HW Reset                                                                                                                                                                                                                                                                                                                                                                                   | 0000h 0083h(131)     |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | 2. 130 x 130 memory base(GM='100')                                                                                                                                                                                                                                                                                                                                                         |                      |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | 3. 128 x 160 memory base(GM='011')                                                                                                                                                                                                                                                                                                                                                         |                      |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | 4. 120 x 160 memory base(GM='010')                                                                                                                                                                                                                                                                                                                                                         |                      |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | 5. 128 x 128 memory base(GM='001')                                                                                                                                                                                                                                                                                                                                                         |                      |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | 6. 132 x 162 memory base(GM='000')                                                                                                                                                                                                                                                                                                                                                         |                      |                             |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |



### 14.2.21 Page Address Set (2Bh)

| 2BH                       | PASET (Page Address Set)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |      |      |      |      |      |      |     |     |     |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|------|------|------|------|------|------|-----|-----|-----|
|                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RDX | WRX | D17-8 | D7   | D6   | D5   | D4   | D3   | D2   | D1  | D0  | HEX |
| Command                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1   | ↑   | x     | 0    | 0    | 1    | 0    | 1    | 0    | 1   | 1   | 2Bh |
| 1 <sup>st</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1   | ↑   | x     | YS15 | YS14 | YS13 | YS12 | YS11 | YS10 | YS9 | YS8 | -   |
| 2 <sup>nd</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1   | ↑   | x     | YS7  | YS6  | YS5  | YS4  | YS3  | YS2  | YS1 | YS0 | -   |
| 3 <sup>rd</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1   | ↑   | x     | YE15 | YE14 | YE13 | YE12 | YE11 | YE10 | YE9 | YE8 | -   |
| 4 <sup>th</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1   | ↑   | x     | YE7  | YE6  | YE5  | YE4  | YE3  | YE2  | YE1 | YE0 | -   |
| Description               | <p>This command is used to define area of frame memory where MCU can access.</p> <p>This command makes no change on the other driver status.</p> <p>The value of YS [15:0] and YE [15:0] are referred when RAMWR command comes.</p> <p>Each value represents one Page line in the Frame Memory.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |      |      |      |      |      |      |     |     |     |
|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |     |       |      |      |      |      |      |      |     |     |     |
| Restriction               | <p>YS [15:0] always must be equal to or less than EP [15:0].</p> <p>When YS[15:0] or YE[15:0] is greater than maximum row address like below, data of out of range will be ignored.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |      |      |      |      |      |      |     |     |     |
|                           | <ol style="list-style-type: none"> <li>132X132 memory base (GM='101')<br/>           (Parameter range: <math>0 \leq \text{YS}[15:0] \leq \text{YE}[15:0] \leq 131(0083\text{h})</math>):MV="0"<br/>           (Parameter range: <math>0 \leq \text{YS}[15:0] \leq \text{YE}[15:0] \leq 131(0083\text{h})</math>):MV="1"</li> <li>130X130 memory base (GM='100')<br/>           (Parameter range: <math>0 \leq \text{YS}[15:0] \leq \text{YE}[15:0] \leq 129(0081\text{h})</math>):MV="0"<br/>           (Parameter range: <math>0 \leq \text{YS}[15:0] \leq \text{YE}[15:0] \leq 129(0081\text{h})</math>):MV="1"</li> <li>128X160 memory base (GM='011')<br/>           (Parameter range: <math>0 \leq \text{YS}[15:0] \leq \text{YE}[15:0] \leq 159(009\text{Fh})</math>):MV="0"<br/>           (Parameter range: <math>0 \leq \text{YS}[15:0] \leq \text{YE}[15:0] \leq 127(007\text{Fh})</math>):MV="1"</li> <li>120X160 memory base (GM='010')<br/>           (Parameter range: <math>0 \leq \text{YS}[15:0] \leq \text{YE}[15:0] \leq 159(009\text{Fh})</math>):MV="0"<br/>           (Parameter range: <math>0 \leq \text{YS}[15:0] \leq \text{YE}[15:0] \leq 119(0077\text{h})</math>):MV="1"</li> <li>128X128 memory base (GM='001')<br/>           (Parameter range: <math>0 \leq \text{YS}[15:0] \leq \text{YE}[15:0] \leq 127(007\text{Fh})</math>):MV="0"<br/>           (Parameter range: <math>0 \leq \text{YS}[15:0] \leq \text{YE}[15:0] \leq 127(007\text{Fh})</math>):MV="1"</li> <li>132X162 memory base (GM='000')</li> </ol> |     |     |       |      |      |      |      |      |      |     |     |     |

|                                           | <div>(Parameter range: <math>0 \leq YS[15:0] \leq YE[15:0] \leq 161(00A1h)</math>):MV="0"</div> <div>(Parameter range: <math>0 \leq YS[15:0] \leq YE[15:0] \leq 131(0083h)</math>):MV="1"</div> <div>X = Don't care</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|--------|---------------|------------------------------------------|-----|-----------------------------------------|----------|-------------------------------------------|-------------------|------------------------------------------|------------|----------|-----------|-------|------------|------------|----------|-------|------------|--|--------|---------------|--|--|----------|----------|-----------------|-------------------|-------|------------|--|-----------|-------|------------|------------|----------|-------|------------|--|--------|---------------|--|--|----------|-----------------|-----------------|-------------------|-------|------------|--|----------|-------|------------|------------|----------|-------|------------|--|--------|---------------|--|--|----------|-----------------|-----------------|-------------------|-------|------------|--|----------|-------|------------|------------|----------|-------|------------|--|--------|---------------|--|--|----------|-----------------|-----------------|-------------------|-------|------------|--|----------|-------|------------|------------|----------|-------|------------|--|--------|---------------|--|--|----------|-----------------|-----------------|-------------------|-------|------------|--|----------|-------|------------|------------|
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                 | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes      | Partial Mode On, Idle Mode Off, Sleep Out | Yes               | Partial Mode On, Idle Mode On, Sleep Out | Yes        | Sleep In | Yes       |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Default                                   | <div><div><div>1. 132 x 132 memory base(GM='101')</div><table><tr><th rowspan="2">Status</th><th colspan="3">Default Value</th></tr><tr><th>YS[15:0]</th><th>YE[15:0]</th><th>YX[15:0] (MV=1)</th></tr><tr><td>Power On Sequence</td><td>0000h</td><td colspan="2">0083h(131)</td></tr><tr><td>S/W Reset</td><td>0000h</td><td>0083h(131)</td><td>0083h(131)</td></tr><tr><td>HW Reset</td><td>0000h</td><td colspan="2">0083h(131)</td></tr><tr><th rowspan="2">Status</th><th colspan="3">Default Value</th></tr><tr><th>YS[15:0]</th><th>YE[15:0]</th><th>YX[15:0] (MV=1)</th></tr><tr><td>Power On Sequence</td><td>0000h</td><td colspan="2">0081h(129)</td></tr><tr><td>S/W Reset</td><td>0000h</td><td>0081h(129)</td><td>0081h(129)</td></tr><tr><td>HW Reset</td><td>0000h</td><td colspan="2">0081h(129)</td></tr><tr><th rowspan="2">Status</th><th colspan="3">Default Value</th></tr><tr><th>YS[15:0]</th><th>YE[15:0] (MV=0)</th><th>YE[15:0] (MV=1)</th></tr><tr><td>Power On Sequence</td><td>0000h</td><td colspan="2">009Fh(159)</td></tr><tr><td>SW Reset</td><td>0000h</td><td>009Fh(159)</td><td>007Fh(127)</td></tr><tr><td>HW Reset</td><td>0000h</td><td colspan="2">009Fh(159)</td></tr><tr><th rowspan="2">Status</th><th colspan="3">Default Value</th></tr><tr><th>YS[15:0]</th><th>YE[15:0] (MV=0)</th><th>YE[15:0] (MV=1)</th></tr><tr><td>Power On Sequence</td><td>0000h</td><td colspan="2">009Fh(159)</td></tr><tr><td>SW Reset</td><td>0000h</td><td>009Fh(159)</td><td>0077h(119)</td></tr><tr><td>HW Reset</td><td>0000h</td><td colspan="2">009Fh(159)</td></tr><tr><th rowspan="2">Status</th><th colspan="3">Default Value</th></tr><tr><th>YS[15:0]</th><th>YE[15:0] (MV=0)</th><th>YE[15:0] (MV=1)</th></tr><tr><td>Power On Sequence</td><td>0000h</td><td colspan="2">007Fh(127)</td></tr><tr><td>SW Reset</td><td>0000h</td><td>007Fh(127)</td><td>007Fh(127)</td></tr><tr><td>HW Reset</td><td>0000h</td><td colspan="2">007Fh(127)</td></tr><tr><th rowspan="2">Status</th><th colspan="3">Default Value</th></tr><tr><th>YS[15:0]</th><th>YE[15:0] (MV=0)</th><th>YE[15:0] (MV=1)</th></tr><tr><td>Power On Sequence</td><td>0000h</td><td colspan="2">00A1h(161)</td></tr><tr><td>SW Reset</td><td>0000h</td><td>00A1h(161)</td><td>0083h(131)</td></tr></table></div><div><div>2. 130 x 130 memory base(GM='100')</div><div>3. 128X160 memory base(GM='011')</div><div>4. 120X160 memory base(GM='010')</div><div>5. 120X160 memory base(GM='001')</div><div>6. 132X162 memory base(GM='000')</div></div></div> |                 |                 | Status | Default Value |                                          |     | YS[15:0]                                | YE[15:0] | YX[15:0] (MV=1)                           | Power On Sequence | 0000h                                    | 0083h(131) |          | S/W Reset | 0000h | 0083h(131) | 0083h(131) | HW Reset | 0000h | 0083h(131) |  | Status | Default Value |  |  | YS[15:0] | YE[15:0] | YX[15:0] (MV=1) | Power On Sequence | 0000h | 0081h(129) |  | S/W Reset | 0000h | 0081h(129) | 0081h(129) | HW Reset | 0000h | 0081h(129) |  | Status | Default Value |  |  | YS[15:0] | YE[15:0] (MV=0) | YE[15:0] (MV=1) | Power On Sequence | 0000h | 009Fh(159) |  | SW Reset | 0000h | 009Fh(159) | 007Fh(127) | HW Reset | 0000h | 009Fh(159) |  | Status | Default Value |  |  | YS[15:0] | YE[15:0] (MV=0) | YE[15:0] (MV=1) | Power On Sequence | 0000h | 009Fh(159) |  | SW Reset | 0000h | 009Fh(159) | 0077h(119) | HW Reset | 0000h | 009Fh(159) |  | Status | Default Value |  |  | YS[15:0] | YE[15:0] (MV=0) | YE[15:0] (MV=1) | Power On Sequence | 0000h | 007Fh(127) |  | SW Reset | 0000h | 007Fh(127) | 007Fh(127) | HW Reset | 0000h | 007Fh(127) |  | Status | Default Value |  |  | YS[15:0] | YE[15:0] (MV=0) | YE[15:0] (MV=1) | Power On Sequence | 0000h | 00A1h(161) |  | SW Reset | 0000h | 00A1h(161) | 0083h(131) |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
|                                           | YS[15:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | YE[15:0]        | YX[15:0] (MV=1) |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Power On Sequence                         | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0083h(131)      |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| S/W Reset                                 | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0083h(131)      | 0083h(131)      |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| HW Reset                                  | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0083h(131)      |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
|                                           | YS[15:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | YE[15:0]        | YX[15:0] (MV=1) |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Power On Sequence                         | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0081h(129)      |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| S/W Reset                                 | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0081h(129)      | 0081h(129)      |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| HW Reset                                  | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0081h(129)      |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
|                                           | YS[15:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | YE[15:0] (MV=0) | YE[15:0] (MV=1) |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Power On Sequence                         | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 009Fh(159)      |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| SW Reset                                  | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 009Fh(159)      | 007Fh(127)      |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| HW Reset                                  | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 009Fh(159)      |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
|                                           | YS[15:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | YE[15:0] (MV=0) | YE[15:0] (MV=1) |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Power On Sequence                         | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 009Fh(159)      |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| SW Reset                                  | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 009Fh(159)      | 0077h(119)      |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| HW Reset                                  | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 009Fh(159)      |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
|                                           | YS[15:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | YE[15:0] (MV=0) | YE[15:0] (MV=1) |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Power On Sequence                         | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 007Fh(127)      |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| SW Reset                                  | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 007Fh(127)      | 007Fh(127)      |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| HW Reset                                  | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 007Fh(127)      |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
|                                           | YS[15:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | YE[15:0] (MV=0) | YE[15:0] (MV=1) |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| Power On Sequence                         | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 00A1h(161)      |                 |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |
| SW Reset                                  | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 00A1h(161)      | 0083h(131)      |        |               |                                          |     |                                         |          |                                           |                   |                                          |            |          |           |       |            |            |          |       |            |  |        |               |  |  |          |          |                 |                   |       |            |  |           |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |          |       |            |  |        |               |  |  |          |                 |                 |                   |       |            |  |          |       |            |            |





## 14.2.22 Memory Write (2Ch)

| 2CH                                       | RAMWR (Memory Write)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|----|----|----|----|----|----|----|----|-----|--------|--------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1   | ↑   | x     | 0  | 0  | 1  | 0  | 1  | 1  | 0  | 0  | 2Ch |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1   | ↑   | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | -   |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| ⋮                                         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1   | ↑   | x     | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮  | ⋮   |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| N <sup>TH</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1   | ↑   | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | -   |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Description                               | <p>This command is used to transfer data from MCU to frame memory.</p> <p>This command makes no change to the other driver status.</p> <p>When this command is accepted, the column register and the page register are reset to the Start Column/ Start Page positions.</p> <p>The Start Column / Start Page positions are different in accordance with MADCTL setting.</p> <p>Then D[17:0] is stored in frame memory and the column refister and the row register incremented.</p> <p>Sending any other command can stop frame Write.</p> <p>X=Don't care</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |    |    |    |    |    |    |    |    |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Restriction                               | <p>In all color modes, there is no restriction on length of parameters.</p> <p>1. 132X132 memory base (GM='101')</p> <p>132X132X18-bit memory can be written by this command.</p> <p>Memory range(0000h, 0000h) -&gt; (0083h,083h)</p> <p>2. 130X130 memory base (GM='100')</p> <p>130X130X18-bit memory can be written by this command.</p> <p>Memory range(0000h, 0000h) -&gt; (0081h,081h)</p> <p>3. 128X160 memory base (GM='011')</p> <p>128X160X18-bit memory can be written by this command.</p> <p>Memory range(0000h, 0000h) -&gt; (007Fh,09Fh)</p> <p>4. 120X160 memory base (GM='010')</p> <p>120X160X18-bit memory can be written by this command.</p> <p>Memory range(0000h, 0000h) -&gt; (0077h,09Fh)</p> <p>5. 128X128 memory base (GM='001')</p> <p>120X128X18-bit memory can be written by this command.</p> <p>Memory range(0000h, 0000h) -&gt; (007Fh,007Fh)</p> <p>6. 132X162 memory base (GM='000')</p> <p>132X162X18-bit memory can be written by this command.</p> <p>Memory range(0000h, 0000h) -&gt; (0083h,00A1h)</p> |     |     |       |    |    |    |    |    |    |    |    |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     | Status | Availability | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |     |       |    |    |    |    |    |    |    |    |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |

| Default           | <table border="1"> <thead> <tr> <th>Status</th><th>Default Value</th></tr> </thead> <tbody> <tr> <td>Power On Sequence</td><td>Contents of memory is set randomly</td></tr> <tr> <td>SW Reset</td><td>Contents of memory is not cleared</td></tr> <tr> <td>HW Reset</td><td>Contents of memory is not cleared</td></tr> </tbody> </table>                                                                                                                                            | Status | Default Value | Power On Sequence | Contents of memory is set randomly | SW Reset | Contents of memory is not cleared | HW Reset | Contents of memory is not cleared |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|-------------------|------------------------------------|----------|-----------------------------------|----------|-----------------------------------|
| Status            | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |               |                   |                                    |          |                                   |          |                                   |
| Power On Sequence | Contents of memory is set randomly                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |               |                   |                                    |          |                                   |          |                                   |
| SW Reset          | Contents of memory is not cleared                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |               |                   |                                    |          |                                   |          |                                   |
| HW Reset          | Contents of memory is not cleared                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |               |                   |                                    |          |                                   |          |                                   |
| Flow Chart        | <div> <pre> graph TD     CASET[CASET (2Ah)] --&gt; ImageData([Image Data<br/>D1[17:0],D2[17:0]..Dn[17:0]])     ImageData --&gt; AnyCommand[any Command]           </pre> </div> <div> <p><b>Legend</b></p> <ul style="list-style-type: none"> <li>command (trapezoid)</li> <li>Parameter (parallelogram)</li> <li>Display (rounded rectangle)</li> <li>Action (pointed rectangle)</li> <li>Mode (rounded rectangle)</li> <li>Sequential transfer (oval with arrow)</li> </ul> </div> |        |               |                   |                                    |          |                                   |          |                                   |
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |               |                   |                                    |          |                                   |          |                                   |

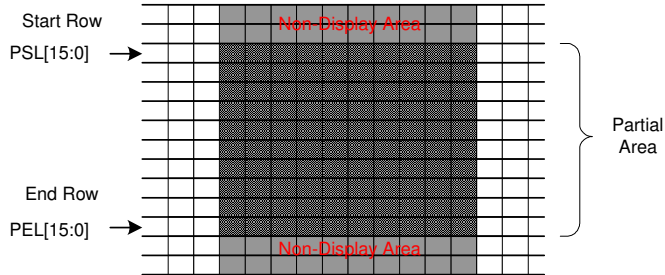
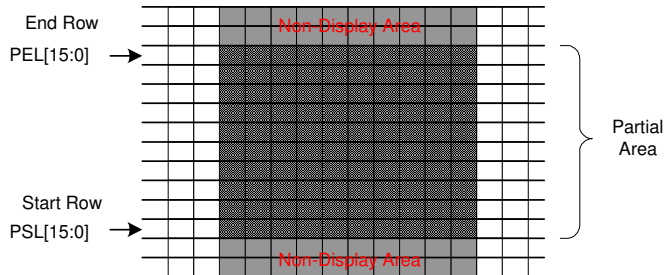
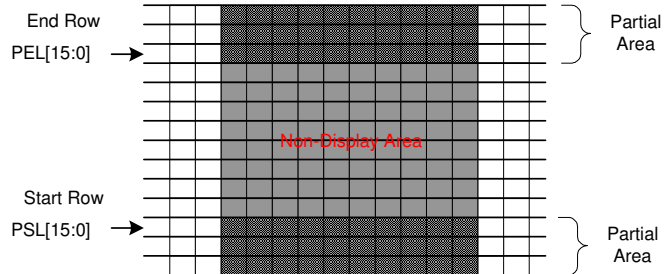
### 14.2.23 Color Setting fro 4K, 65K and 262K (2Dh)

| 2DH                                       | RAMWR (Memory Write)                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|----|----|------|------|------|------|------|------|-----|--------|---------------|------------------------------------------|------------------------------------|-----------------------------------------|-----------------------------------|-------------------------------------------|-----------------------------------|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | RDX | WRX | D17-8 | D7 | D6 | D5   | D4   | D3   | D2   | D1   | D0   | HEX |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | 0  | 0  | 1    | 0    | 1    | 1    | 0    | 1    | 2Dh |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | x  | x  | R005 | R004 | R003 | R002 | R001 | R000 | -   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| :                                         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | x  | x  | Rnn5 | Rnn4 | Rnn3 | Rnn2 | Rnn1 | Rnn0 | -   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| 32 <sup>nd</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | x  | x  | R315 | R314 | R313 | R312 | R311 | R310 | -   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| 33 <sup>rd</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | x  | x  | G005 | G004 | G003 | G002 | G001 | G000 | -   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| :                                         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | x  | x  | Gnn5 | Gnn4 | Gnn3 | Gnn2 | Gnn1 | Gnn0 | -   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| 96 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | x  | x  | G635 | G634 | G633 | G632 | G631 | G630 | -   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| 97 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | x  | x  | B005 | B004 | B003 | B002 | B001 | B000 |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| :                                         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | x  | x  | Bnn5 | Bnn4 | Bnn3 | Bnn2 | Bnn1 | Bnn0 | -   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| 128 <sup>th</sup> Parameter               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | x  | x  | B315 | B314 | B313 | B312 | B311 | B310 | -   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Description                               | <p>This command is used to define the LUT for 12bit-to-18-bit color depth conversations 128-Bytes must be written to the LUT regardless of the color mode.</p> <p>In this condition, 4K-color(4-4-4), and 65K-color(5-6-5) data input are transferred 6That-6(G)-6(B) through RGB LUT table.</p> <p>This command has no effect on other commands/parameters and Contents of frame memory.</p> <p>Visible change takes effect next time the Frame Memory is written to.</p> |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Restriction                               | Do not send any command before the last data is sent or LUT is not defined correctly.                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                 |     |     |       |    |    |      |      |      |      |      |      |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes                                | Normal Mode On, Idle Mode On, Sleep Out | Yes                               | Partial Mode On, Idle Mode Off, Sleep Out | Yes                               | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>Contents of memory is set randomly</td></tr><tr><td>SW Reset</td><td>Contents of memory is not cleared</td></tr><tr><td>HW Reset</td><td>Contents of memory is not cleared</td></tr></table>                                                                                                                                                                                        |     |     |       |    |    |      |      |      |      |      |      |     | Status | Default Value | Power On Sequence                        | Contents of memory is set randomly | SW Reset                                | Contents of memory is not cleared | HW Reset                                  | Contents of memory is not cleared |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                              |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Power On Sequence                         | Contents of memory is set randomly                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| SW Reset                                  | Contents of memory is not cleared                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| HW Reset                                  | Contents of memory is not cleared                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Flow Chart                                | <div><div>Partial Mode</div><div><div>RGBSET(2Dh)</div><div>↓</div><div><div>1st Parameter</div><div>⋮</div><div>64th Parameter</div><div>65th Parameter</div><div>⋮</div><div>128th Parameter</div></div></div></div> <div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div>                                                                                       |     |     |       |    |    |      |      |      |      |      |      |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |

## 14.2.24 Memory Read (2Eh)

| 2EH                                       | RAMRD (Memory Read)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------|---------------|------------------------------------------|------------------------------------|-----------------------------------------|-----------------------------------|-------------------------------------------|-----------------------------------|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | RDX | WRX | D17-8 | D7  | D6  | D5  | D4  | D3  | D2  | D1  | D0  | HEX |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1   | ↑   | x     | 0   | 0   | 1   | 0   | 1   | 1   | 1   | 0   | 2Eh |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ↑   | 1   | x     | x   | x   | x   | x   | x   | x   | x   | x   | x   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ↑   | 1   | x     | D17 | D16 | D15 | D14 | D13 | D12 | D11 | D10 | x   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| :                                         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ↑   | 1   | x     | :   | :   | :   | :   | :   | :   | :   | :   | x   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| N <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ↑   | 1   | x     | Dn7 | Dn6 | Dn5 | Dn4 | Dn3 | Dn2 | Dn1 | Dn0 | x   |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Description                               | <p>This command is used to transfer data from frame memory to MCU.</p> <p>This command makes no change to other driver status.</p> <p>When this command is accepted, the column register and then row register are reset to the Start Column/ Start Row positions.</p> <p>The Start Column / Start Row positions are different in accordance with MADCTL setting.</p> <p>Then D [17:0] is read back from the frame memory and the column register and the row register incremented.</p> <p>Frame Read can be stopped by sending any other command.</p> <p>“Display Data Format” for color coding(18 bit cases), when there is used 8,9,16 or 18 data lines for image data.</p> <p>X = Don't care</p> |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Restriction                               | <p>In all color modes, the Frame Read is always 24 bit so there is no restriction on length of parameters.</p> <p>Note: Memory Read is only possible via the Parallel Interface</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Register Availability                     | <table><thead><tr><th>Status</th><th>Availability</th></tr></thead><tbody><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></tbody></table>                                                                                                                                                                                                                                                                             |     |     |       |     |     |     |     |     |     |     |     |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes                                | Normal Mode On, Idle Mode On, Sleep Out | Yes                               | Partial Mode On, Idle Mode Off, Sleep Out | Yes                               | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Default                                   | <table><thead><tr><th>Status</th><th>Default Value</th></tr></thead><tbody><tr><td>Power On Sequence</td><td>Contents of memory is set randomly</td></tr><tr><td>SW Reset</td><td>Contents of memory is not cleared</td></tr><tr><td>HW Reset</td><td>Contents of memory is not cleared</td></tr></tbody></table>                                                                                                                                                                                                                                                                                                                                                                                    |     |     |       |     |     |     |     |     |     |     |     |     | Status | Default Value | Power On Sequence                        | Contents of memory is set randomly | SW Reset                                | Contents of memory is not cleared | HW Reset                                  | Contents of memory is not cleared |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Power On Sequence                         | Contents of memory is set randomly                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| SW Reset                                  | Contents of memory is not cleared                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| HW Reset                                  | Contents of memory is not cleared                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |
| Flow Chart                                | <div><div><div>CASSET (2Eh)</div><div>Dummy Read</div><div>Image Data<br/>D1[17:0],D2[17:0]..Dn[17:0]</div><div>Any Command</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |     |     |     |     |     |     |     |     |     |        |               |                                          |                                    |                                         |                                   |                                           |                                   |                                          |     |          |     |

### 14.2.25 Partial Area (30h)

| 30H                       | PLTAR (Partial Area)                                                                                                                                                                                                                                                               |     |     |       |       |       |       |       |       |       |      |      |     |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|-------|-------|-------|-------|-------|-------|------|------|-----|
|                           | D/CX                                                                                                                                                                                                                                                                               | RDX | WRX | D17-8 | D7    | D6    | D5    | D4    | D3    | D2    | D1   | D0   | HEX |
| Command                   | 0                                                                                                                                                                                                                                                                                  | 1   | ↑   | x     | 0     | 0     | 1     | 1     | 0     | 0     | 0    | 0    | 30h |
| 1 <sup>st</sup> Parameter | 1                                                                                                                                                                                                                                                                                  | 1   | ↑   | x     | PSL15 | PSL14 | PSL13 | PSL12 | PSL11 | PSL10 | PSL9 | PSL8 | -   |
| 2 <sup>nd</sup> Parameter | 1                                                                                                                                                                                                                                                                                  | 1   | ↑   | x     | PSL7  | PSL6  | PSL5  | PSL4  | PSL3  | PSL2  | PSL1 | PSL0 | -   |
| 3 <sup>rd</sup> Parameter | 1                                                                                                                                                                                                                                                                                  | 1   | ↑   | x     | PEL15 | PEL14 | PEL13 | PEL12 | PEL11 | PEL10 | PEL9 | PEL8 | -   |
| 4 <sup>th</sup> Parameter | 1                                                                                                                                                                                                                                                                                  | 1   | ↑   | x     | PEL7  | PEL6  | PEL5  | PEL4  | PEL3  | PEL2  | PEL1 | PEL0 | -   |
| Description               | <p>This command defines the partial mode's display area. There are 4 parameters associated with this command, the first defines the Start Row (PSL) and the second the End Row (PEL), as illustrated in the figures below. PSL and PEL refer to the Frame Memory Line Pointer.</p> |     |     |       |       |       |       |       |       |       |      |      |     |
|                           | <p>If End Row&gt;Start Row when MADCTL B4=0:</p>                                                                                                                                                |     |     |       |       |       |       |       |       |       |      |      |     |
|                           | <p>If End Row &gt; Start Row when MADCTL ML=1:</p>                                                                                                                                             |     |     |       |       |       |       |       |       |       |      |      |     |
|                           | <p>If End Row &lt; Start Row when MADCTL ML=0:</p>                                                                                                                                             |     |     |       |       |       |       |       |       |       |      |      |     |
|                           | <p>If End Row &lt; Start Row when MADCTL ML=1:</p>                                                                                                                                                                                                                                 |     |     |       |       |       |       |       |       |       |      |      |     |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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|  | <div><div><div><div><div><div>Start Row<br/>PSL[15:0] →</div><div>End Row<br/>PEL[15:0] →</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div>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### 14.2.26 Vertical Scrolling Definition (33h)

| 33H                       | VSCRDEF (Vertical Scrolling Definition) |     |     |       |           |           |           |           |           |           |          |          |     |
|---------------------------|-----------------------------------------|-----|-----|-------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|-----|
|                           | D/CX                                    | RDX | WRX | D17-8 | D7        | D6        | D5        | D4        | D3        | D2        | D1       | D0       | HEX |
| Command                   | 0                                       | 1   | ↑   | x     | 0         | 0         | 1         | 1         | 0         | 0         | 1        | 1        | 33h |
| 1 <sup>st</sup> Parameter | 1                                       | 1   | ↑   | x     | TFA<br>15 | TFA<br>14 | TFA<br>13 | TFA<br>12 | TFA<br>11 | TFA<br>10 | TFA<br>9 | TFA<br>8 | -   |
| 2 <sup>nd</sup> Parameter | 1                                       | 1   | ↑   | x     | TFA<br>7  | TFA<br>6  | TFA<br>5  | TFA<br>4  | TFA<br>3  | TFA<br>2  | TFA<br>1 | TFA<br>0 | -   |
| 3 <sup>rd</sup> Parameter | 1                                       | 1   | ↑   | x     | VSA<br>15 | VSA<br>14 | VSA<br>13 | VSA<br>12 | VSA<br>11 | VSA<br>10 | VSA<br>9 | VSA<br>8 | -   |
| 4 <sup>th</sup> Parameter | 1                                       | 1   | ↑   | x     | VSA<br>7  | VSA<br>6  | VSA<br>5  | VSA<br>4  | VSA<br>3  | VSA<br>2  | VSA<br>1 | VSA<br>0 | -   |
| 5 <sup>th</sup> Parameter | 1                                       | 1   | ↑   | x     | BFA<br>15 | BFA<br>14 | BFA<br>13 | BFA<br>12 | BFA<br>11 | BFA<br>10 | BFA<br>9 | BFA<br>8 | -   |
| 6 <sup>th</sup> Parameter | 1                                       | 1   | ↑   | x     | BFA<br>7  | BFA<br>6  | BFA<br>5  | BFA<br>4  | BFA<br>3  | BFA<br>2  | BFA<br>1 | BFA<br>0 | -   |

This command defines the Vertical Scrolling Area of the display.

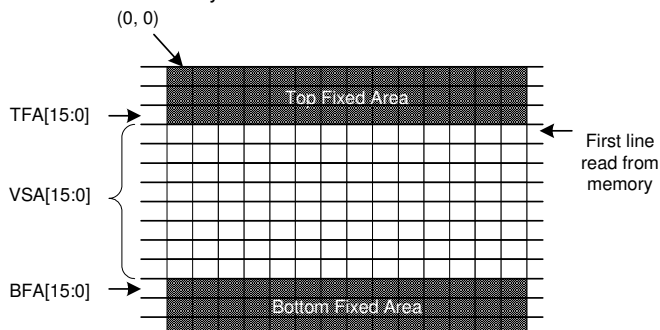
When MADCTL ML=0

Th<sup>e</sup> 1<sup>st</sup> & 2<sup>nd</sup> parameter TFA[15...0] describes the Top Fixed Area (in No. of lines from Top of the Frame Memory and Display).

Th<sup>e</sup> 3<sup>rd</sup> & 4<sup>th</sup> parameter VSA[15...0] describes the height of the Vertical Scrolling Area (in No. of lines of the Frame Memory [not the display] from the Vertical Scrolling Start Address). The first line read from Frame Memory appears immediately after the bottom most line of the Top Fixed Area.

Th<sup>e</sup> 5<sup>th</sup> & 6<sup>th</sup> parameter BFA[15...0] describes the Bottom Fixed Area (in No. of lines from Bottom of the Frame Memory and Display).

TFA, VSA and BFA refer to the Frame Memory Line Pointer.



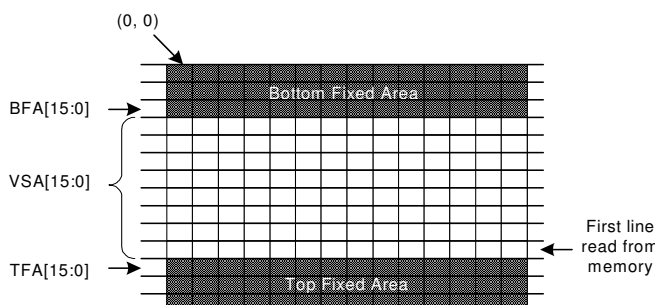
Description

When MADCTL ML=1

Th<sup>e</sup> 1<sup>st</sup> & 2<sup>nd</sup> parameter TFA[15...0] describes the Top Fixed Area (in No. of lines from Bottom of the Frame Memory and Display).

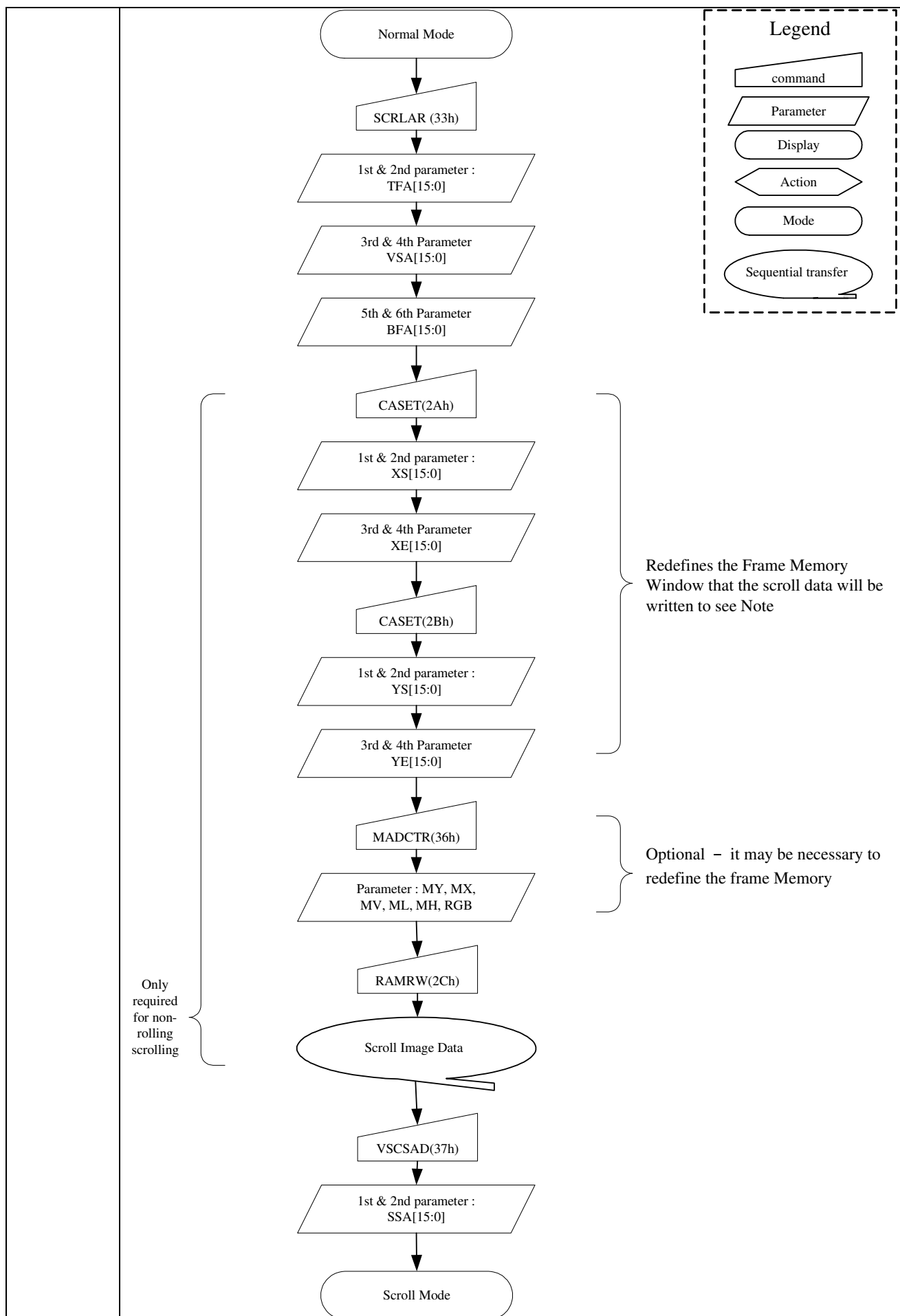
Th<sup>e</sup> 3<sup>rd</sup> & 4<sup>th</sup> parameter VSA[15...0] describes the height of the Vertical Scrolling Area (in No. of lines of the Frame Memory [not the display] from the Vertical Scrolling Start Address). The first line read from Frame Memory appears immediately after the top most line of the Top Fixed Area.

Th<sup>e</sup> 5<sup>th</sup> & 6<sup>th</sup> parameter BFA[15...0] describes the Bottom Fixed Area (in No. of lines from Top of the Frame Memory and Display).



| Restriction                               | <p>The condition is (TFA+VSA+BFA)=128 in 128RGBx128 (GM="001")</p> <p>The condition is (TFA+VSA+BFA)=130 in 130RGBx130 (GM="100")</p> <p>The condition is (TFA+VSA+BFA)=132 in 132RGBx132 (GM="101")</p> <p>The condition is (TFA+VSA+BFA)=160 in 128RGBx160 (GM="011") or 120RGBx160(GM="010")</p> <p>The condition is (TFA+VSA+BFA)=162 in 132RGBx162(GM="000")</p> <p>Otherwise Scrolling mode is undefined.</p> <p>In Vertical Scroll Mode, MADCTL parameter MV should be set to '0' – this affects the Frame memory Write.</p>                                                                                                                                                                                                                                                             |           |               |                                          |       |                                         |       |                                           |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------|------------------------------------------|-------|-----------------------------------------|-------|-------------------------------------------|-----|------------------------------------------|-----------|-----------|-----|--|--|--|--|-----------|----|------|-------|-------|-------|-------|-------|-------|------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|-------|-------|-------|-------|
| Register Availability                     | <table> <tr> <th>Status</th> <th>Availability</th> </tr> <tr> <td>Normal Mode On, Idle Mode Off, Sleep Out</td> <td>Yes</td> </tr> <tr> <td>Normal Mode On, Idle Mode On, Sleep Out</td> <td>Yes</td> </tr> <tr> <td>Partial Mode On, Idle Mode Off, Sleep Out</td> <td>Yes</td> </tr> <tr> <td>Partial Mode On, Idle Mode On, Sleep Out</td> <td>Yes</td> </tr> <tr> <td>Sleep In</td> <td>Yes</td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                             | Status    | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes   | Normal Mode On, Idle Mode On, Sleep Out | Yes   | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes       | Sleep In  | Yes |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |               |                                          |       |                                         |       |                                           |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |               |                                          |       |                                         |       |                                           |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |               |                                          |       |                                         |       |                                           |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |               |                                          |       |                                         |       |                                           |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |               |                                          |       |                                         |       |                                           |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |               |                                          |       |                                         |       |                                           |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| Default                                   | <table> <tr> <th rowspan="2">Status</th> <th colspan="8">Default Value</th> </tr> <tr> <th>TFA[15:0]</th> <th colspan="6">VSA[15:0]</th> <th>BFA[15:0]</th> </tr> <tr> <td>GM</td> <td>"xx"</td> <td>"101"</td> <td>"100"</td> <td>"011"</td> <td>"010"</td> <td>"001"</td> <td>"000"</td> <td>"xx"</td> </tr> <tr> <td>Power On Sequence</td> <td>0000h</td> <td>0083h</td> <td>0081h</td> <td>00A0h</td> <td>00A0h</td> <td>0080h</td> <td>00A2h</td> <td>0000h</td> </tr> <tr> <td>SW Reset</td> <td>0000h</td> <td>0083h</td> <td>0081h</td> <td>00A0h</td> <td>00A0h</td> <td>0080h</td> <td>00A2h</td> <td>0000h</td> </tr> <tr> <td>HW Reset</td> <td>0000h</td> <td>0083h</td> <td>0081h</td> <td>00A0h</td> <td>00A0h</td> <td>0080h</td> <td>00A2h</td> <td>0000h</td> </tr> </table> | Status    | Default Value |                                          |       |                                         |       |                                           |     |                                          | TFA[15:0] | VSA[15:0] |     |  |  |  |  | BFA[15:0] | GM | "xx" | "101" | "100" | "011" | "010" | "001" | "000" | "xx" | Power On Sequence | 0000h | 0083h | 0081h | 00A0h | 00A0h | 0080h | 00A2h | 0000h | SW Reset | 0000h | 0083h | 0081h | 00A0h | 00A0h | 0080h | 00A2h | 0000h | HW Reset | 0000h | 0083h | 0081h | 00A0h | 00A0h | 0080h | 00A2h | 0000h |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |               |                                          |       |                                         |       |                                           |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
|                                           | TFA[15:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | VSA[15:0] |               |                                          |       |                                         |       | BFA[15:0]                                 |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| GM                                        | "xx"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | "101"     | "100"         | "011"                                    | "010" | "001"                                   | "000" | "xx"                                      |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| Power On Sequence                         | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0083h     | 0081h         | 00A0h                                    | 00A0h | 0080h                                   | 00A2h | 0000h                                     |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| SW Reset                                  | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0083h     | 0081h         | 00A0h                                    | 00A0h | 0080h                                   | 00A2h | 0000h                                     |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| HW Reset                                  | 0000h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0083h     | 0081h         | 00A0h                                    | 00A0h | 0080h                                   | 00A2h | 0000h                                     |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |
| Flow Chart                                | <p>1. To enter Vertical Scroll Mode:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |               |                                          |       |                                         |       |                                           |     |                                          |           |           |     |  |  |  |  |           |    |      |       |       |       |       |       |       |      |                   |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |          |       |       |       |       |       |       |       |       |

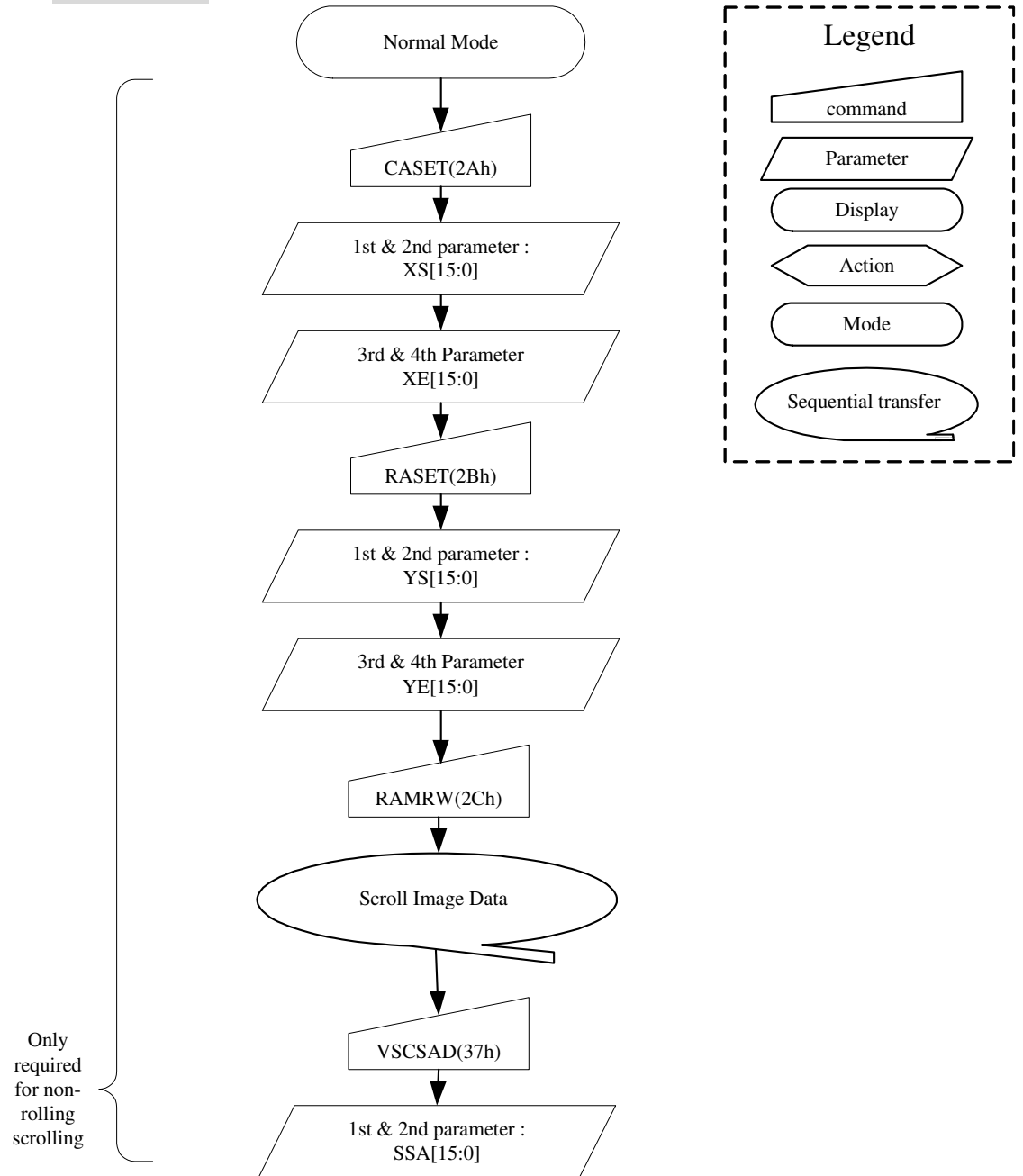




Note 1

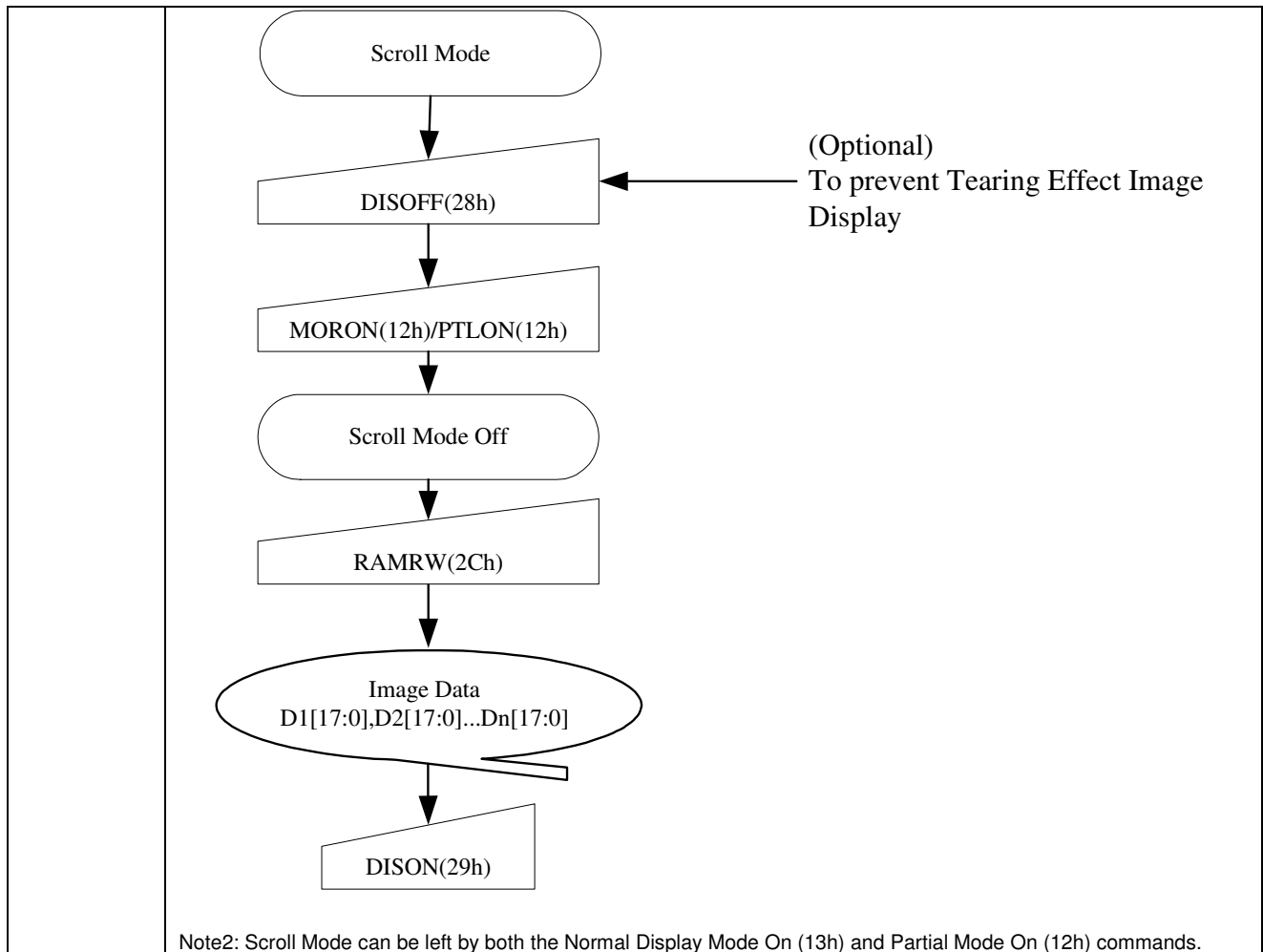
The Frame Memory Window size must be defined correctly otherwise undesirable image will be displayed.

2. **Continuous Scroll:**



V. .7

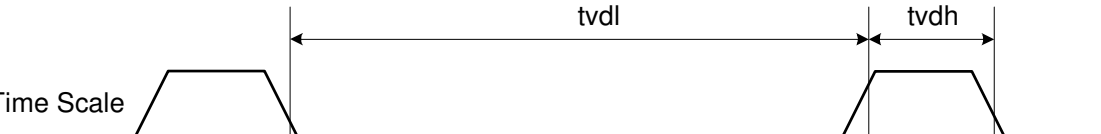
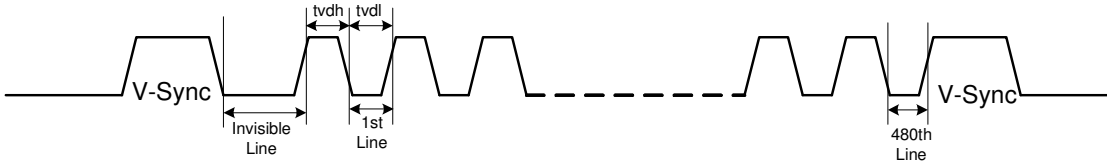
3. **To Leave Vertical Scroll Mode:**

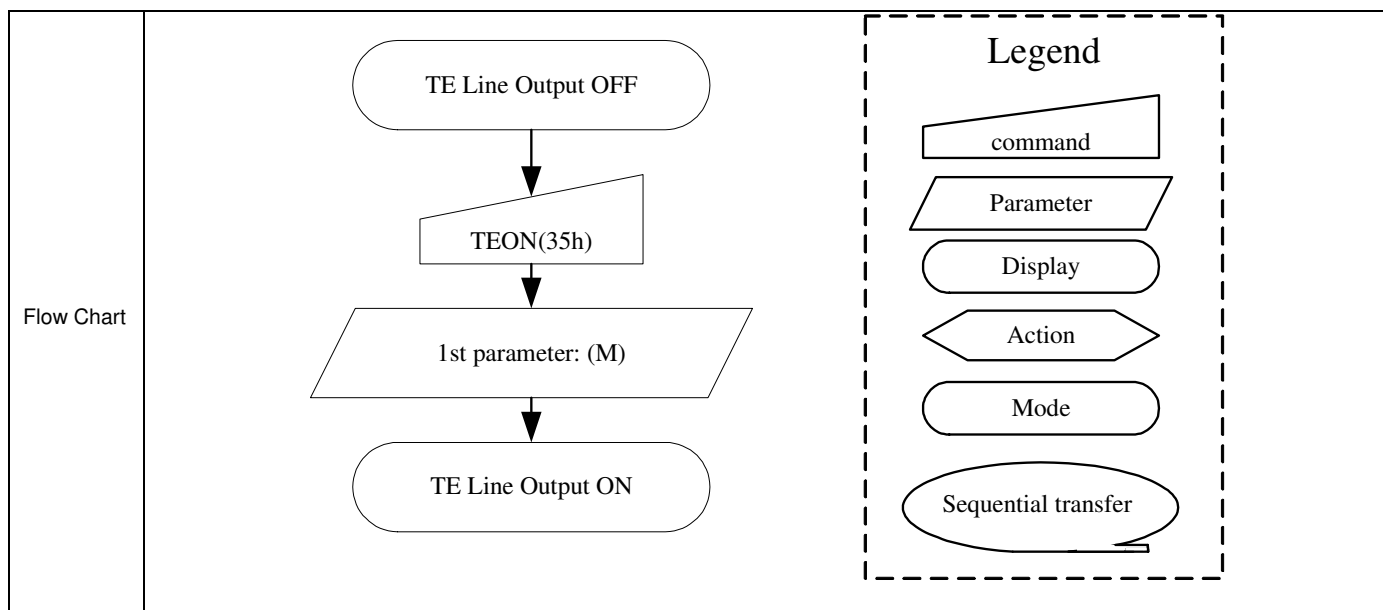


### 14.2.27 Tearing Effect Line Off (34h)

| 34H                   | TEOFF (Tearing Effect Line OFF)                                                                                                                                                                                                                                                                                                                                                            |               |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                       | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX           | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Command               | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1             | ↑   | x     | 0  | 0  | 1  | 1  | 0  | 1  | 0  | 0  | 34h |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Parameter             | NO PARAMETER                                                                                                                                                                                                                                                                                                                                                                               |               |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Description           | This command is used to turn OFF (Active Low) the Tearing Effect output signal from the TE signal line.                                                                                                                                                                                                                                                                                    |               |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Restriction           | This command has no effect when Tearing Effect output is already OFF.                                                                                                                                                                                                                                                                                                                      |               |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |               |     |       |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
|                       | Status                                                                                                                                                                                                                                                                                                                                                                                     | Availability  |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | Normal Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes           |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | Normal Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                    | Yes           |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | Partial Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                  | Yes           |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | Partial Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes           |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In              | Yes                                                                                                                                                                                                                                                                                                                                                                                        |               |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Default               | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>OFF</td></tr><tr><td>SW Reset</td><td>OFF</td></tr><tr><td>HW Reset</td><td>OFF</td></tr></table>                                                                                                                                                                                                   |               |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | OFF | SW Reset                                | OFF | HW Reset                                  | OFF |                                          |     |          |     |
|                       | Status                                                                                                                                                                                                                                                                                                                                                                                     | Default Value |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | Power On Sequence                                                                                                                                                                                                                                                                                                                                                                          | OFF           |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|                       | SW Reset                                                                                                                                                                                                                                                                                                                                                                                   | OFF           |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| HW Reset              | OFF                                                                                                                                                                                                                                                                                                                                                                                        |               |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Flow Chart            | <div><div><div>TE Line Output ON</div><div>↓</div><div>TEOFF(34h)</div><div>↓</div><div>TE Line Output OFF</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                  |               |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |

#### 14.2.28 Tearing Effect Line On (35h)

| 35H                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | TEON (Tearing Effect Line ON)                                                                                                                                                                                                                                                                                                                                                                                            |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|-------------------|------------------------------------------|----------|-----------------------------------------|----------|-------------------------------------------|-----|------------------------------------------|-----|----------|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RDX                                                                                                                                                                                                                                                                                                                                                                                                                      | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                                                                                                                                                                                                                                                                                                                                                                                                                        | ↑   | x     | 0  | 0  | 1  | 1  | 0  | 1  | 0  | 1  | 35h |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                                                                                                                                                                                                                                                                                                                                                                                                                        | ↑   | x     | x  | x  | x  | x  | x  | x  | x  | M  | 00h |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Description                               | <p>This command is used to turn ON the Tearing Effect output signal from the TE signal line. This output is not affected by changing MADCTL bit ML.</p> <p>The Tearing Effect Line On has one parameter which describes the mode of the Tearing Effect Output Line. (X=Don't Care).</p> <p>When M=0:</p> <p>The Tearing Effect Output line consists of V-Blanking information only.:</p> <div><p>Vertical Time Scale</p></div> <p>When M=1:</p> <p>The Tearing Effect Output Line consists of both V-Blanking and H-Blanking information:</p> <div></div> |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
|                                           | <p><b>Note: During Sleep In Mode with Tearing Effect Line On, Tearing Effect Output pin will be active Low.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
|                                           | Restriction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | This command has no effect when Tearing Effect output is already OFF.                                                                                                                                                                                                                                                                                                                                                    |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
|                                           | Register Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <table><thead><tr><th>Status</th><th>Availability</th></tr></thead><tbody><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></tbody></table> |     |       |    |    |    |    |    |    |    |    |     |        | Status        | Availability      | Normal Mode On, Idle Mode Off, Sleep Out | Yes      | Normal Mode On, Idle Mode On, Sleep Out | Yes      | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Default                                   | <table><thead><tr><th>Status</th><th>Default Value</th></tr></thead><tbody><tr><td>Power On Sequence</td><td>Tearing effect off &amp; M=0</td></tr><tr><td>SW Reset</td><td>Tearing effect off &amp; M=0</td></tr><tr><td>HW Reset</td><td>Tearing effect off &amp; M=0</td></tr></tbody></table>                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence | Tearing effect off & M=0                 | SW Reset | Tearing effect off & M=0                | HW Reset | Tearing effect off & M=0                  |     |                                          |     |          |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| Power On Sequence                         | Tearing effect off & M=0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| SW Reset                                  | Tearing effect off & M=0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |
| HW Reset                                  | Tearing effect off & M=0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                          |     |       |    |    |    |    |    |    |    |    |     |        |               |                   |                                          |          |                                         |          |                                           |     |                                          |     |          |



### 14.2.29 Memory Access Control (36h)

| 36H                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MADCTL (Memory Access Control)                                 |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------|-------|----|----|----|----|-----|----|----|----|-----|-----|-------------|-----------------------|----|-------------------|-----------------------------------------------------------|----|----------------------|----|-----------------------|----|----------------|----------------------------------------|-----|---------------|---------------------------------------------------------------------------------------|----|--------------------------|----------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                       | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RDX                                                            | WRX                                                                                   | D17-8 | D7 | D6 | D5 | D4 | D3  | D2 | D1 | D0 | HEX |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| Command                                                                                                                                                                                                                                                                                                               | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                                                              | ↑                                                                                     | x     | 0  | 0  | 1  | 1  | 0   | 1  | 1  | 0  | 36h |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| 1 <sup>st</sup> Parameter                                                                                                                                                                                                                                                                                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                                                              | ↑                                                                                     | x     | MY | MX | MV | ML | RGB | MH | x  | x  | 00h |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| Description                                                                                                                                                                                                                                                                                                           | This command defines read/write scanning direction of frame memory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
|                                                                                                                                                                                                                                                                                                                       | This command makes no change on the other driver status.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
|                                                                                                                                                                                                                                                                                                                       | Bit Assignment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
|                                                                                                                                                                                                                                                                                                                       | <table><thead><tr><th>Bit</th><th>Description</th><th>Comment</th></tr></thead><tbody><tr><td>MY</td><td>Row Address Order</td><td rowspan="3">These 3 bits controls MPU to memory write/read direction.</td></tr><tr><td>MX</td><td>Column Address Order</td></tr><tr><td>MV</td><td>Page/Column Selection</td></tr><tr><td>ML</td><td>Vertical Order</td><td>LCD Vertical refresh direction control</td></tr><tr><td>RGB</td><td>RGB/BGR Order</td><td>Color selector switch control<br/>0=RGB color filter panel<br/>1=BGR color filter panel</td></tr><tr><td>MH</td><td>Display data latch order</td><td>'1'=LCD Refresh right to left<br/>'0'=LCD Refresh left to right</td></tr></tbody></table> |                                                                |                                                                                       |       |    |    |    |    |     |    |    |    |     | Bit | Description | Comment               | MY | Row Address Order | These 3 bits controls MPU to memory write/read direction. | MX | Column Address Order | MV | Page/Column Selection | ML | Vertical Order | LCD Vertical refresh direction control | RGB | RGB/BGR Order | Color selector switch control<br>0=RGB color filter panel<br>1=BGR color filter panel | MH | Display data latch order | '1'=LCD Refresh right to left<br>'0'=LCD Refresh left to right |
|                                                                                                                                                                                                                                                                                                                       | Bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Description                                                    | Comment                                                                               |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
|                                                                                                                                                                                                                                                                                                                       | MY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Row Address Order                                              | These 3 bits controls MPU to memory write/read direction.                             |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
|                                                                                                                                                                                                                                                                                                                       | MX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Column Address Order                                           |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
|                                                                                                                                                                                                                                                                                                                       | MV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Page/Column Selection                                          |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
|                                                                                                                                                                                                                                                                                                                       | ML                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Vertical Order                                                 | LCD Vertical refresh direction control                                                |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
|                                                                                                                                                                                                                                                                                                                       | RGB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | RGB/BGR Order                                                  | Color selector switch control<br>0=RGB color filter panel<br>1=BGR color filter panel |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| MH                                                                                                                                                                                                                                                                                                                    | Display data latch order                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | '1'=LCD Refresh right to left<br>'0'=LCD Refresh left to right |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| <table><thead><tr><th>B5</th><th>B6</th><th>B7</th><th>Image in Frame Memory</th></tr></thead><tbody><tr><td>0</td><td>0</td><td>0</td><td></td></tr><tr><td>0</td><td>0</td><td>1</td><td></td></tr><tr><td>0</td><td>1</td><td>0</td><td></td></tr><tr><td>0</td><td>1</td><td>1</td><td></td></tr></tbody></table> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                |                                                                                       |       |    |    |    |    |     |    |    |    | B5  | B6  | B7          | Image in Frame Memory | 0  | 0                 | 0                                                         |    | 0                    | 0  | 1                     |    | 0              | 1                                      | 0   |               | 0                                                                                     | 1  | 1                        |                                                                |
| B5                                                                                                                                                                                                                                                                                                                    | B6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B7                                                             | Image in Frame Memory                                                                 |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| 0                                                                                                                                                                                                                                                                                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                                                              |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| 0                                                                                                                                                                                                                                                                                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                                                              |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| 0                                                                                                                                                                                                                                                                                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                                                              |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| 0                                                                                                                                                                                                                                                                                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                                                              |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| <table><thead><tr><th>B5</th><th>B6</th><th>B7</th><th>Image in Frame Memory</th></tr></thead><tbody><tr><td>1</td><td>0</td><td>0</td><td></td></tr><tr><td>1</td><td>0</td><td>1</td><td></td></tr><tr><td>1</td><td>1</td><td>0</td><td></td></tr><tr><td>1</td><td>1</td><td>1</td><td></td></tr></tbody></table> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                |                                                                                       |       |    |    |    |    |     |    |    |    | B5  | B6  | B7          | Image in Frame Memory | 1  | 0                 | 0                                                         |    | 1                    | 0  | 1                     |    | 1              | 1                                      | 0   |               | 1                                                                                     | 1  | 1                        |                                                                |
| B5                                                                                                                                                                                                                                                                                                                    | B6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | B7                                                             | Image in Frame Memory                                                                 |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| 1                                                                                                                                                                                                                                                                                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                                                              |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| 1                                                                                                                                                                                                                                                                                                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                                                              |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| 1                                                                                                                                                                                                                                                                                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0                                                              |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |
| 1                                                                                                                                                                                                                                                                                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                                                              |                                                                                       |       |    |    |    |    |     |    |    |    |     |     |             |                       |    |                   |                                                           |    |                      |    |                       |    |                |                                        |     |               |                                                                                       |    |                          |                                                                |

|                                           | <div style="text-align: center;"><p>B3 = 0</p><div style="display: flex; justify-content: space-around; align-items: center;"><div style="text-align: center;"><p>Memory</p><div style="display: flex; gap: 5px;"><div style="width: 20px; height: 20px; background-color: red; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">R</div><div style="width: 20px; height: 20px; background-color: green; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">G</div><div style="width: 20px; height: 20px; background-color: blue; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">B</div></div></div><div style="text-align: center; margin: 0 20px;"><p>Sent RGB</p><div style="font-size: 24px;">→</div></div><div style="text-align: center;"><p>Display Panel</p><div style="display: flex; gap: 5px;"><div style="width: 20px; height: 20px; background-color: red; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">R</div><div style="width: 20px; height: 20px; background-color: green; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">G</div><div style="width: 20px; height: 20px; background-color: blue; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">B</div></div></div></div><div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"><div style="text-align: center;"><p>Memory</p><div style="display: flex; gap: 5px;"><div style="width: 20px; height: 20px; background-color: red; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">R</div><div style="width: 20px; height: 20px; background-color: green; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">G</div><div style="width: 20px; height: 20px; background-color: blue; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">B</div></div></div><div style="text-align: center; margin: 0 20px;"><p>B3 = 1</p><p>Sent BGR</p><div style="font-size: 24px;">→</div></div><div style="text-align: center;"><p>Display Panel</p><div style="display: flex; gap: 5px;"><div style="width: 20px; height: 20px; background-color: blue; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">B</div><div style="width: 20px; height: 20px; background-color: green; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">G</div><div style="width: 20px; height: 20px; background-color: red; border: 1px solid black; display: flex; align-items: center; justify-content: center; color: white;">R</div></div></div></div></div> |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
| Restriction                               | -D1 and D0 of the 1 <sup>st</sup> parameter are set to “00” internally.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Status | Availability | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |



| Default           | <table border="1"> <thead> <tr> <th>Status</th><th>Default Value</th></tr> </thead> <tbody> <tr> <td>Power On Sequence</td><td>MY=0,MX=0,MV=0,ML=0,RGB=0,MH=0</td></tr> <tr> <td>SW Reset</td><td>No Change</td></tr> <tr> <td>HW Reset</td><td>MY=0,MX=0,MV=0,ML=0,RGB=0,MH=0</td></tr> </tbody> </table>                                                                                                                        | Status | Default Value | Power On Sequence | MY=0,MX=0,MV=0,ML=0,RGB=0,MH=0 | SW Reset | No Change | HW Reset | MY=0,MX=0,MV=0,ML=0,RGB=0,MH=0 |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------|-------------------|--------------------------------|----------|-----------|----------|--------------------------------|
| Status            | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                     |        |               |                   |                                |          |           |          |                                |
| Power On Sequence | MY=0,MX=0,MV=0,ML=0,RGB=0,MH=0                                                                                                                                                                                                                                                                                                                                                                                                    |        |               |                   |                                |          |           |          |                                |
| SW Reset          | No Change                                                                                                                                                                                                                                                                                                                                                                                                                         |        |               |                   |                                |          |           |          |                                |
| HW Reset          | MY=0,MX=0,MV=0,ML=0,RGB=0,MH=0                                                                                                                                                                                                                                                                                                                                                                                                    |        |               |                   |                                |          |           |          |                                |
| Flow Chart        | <div> <pre> graph TD     A[MADCTR(36h)] --&gt; B[1st parameter:<br/>(MY, MX, MV, ML,<br/>RGB, MH)]             </pre> </div> <div> <p><b>Legend</b></p> <ul style="list-style-type: none"> <li>command (trapezoid)</li> <li>Parameter (parallelogram)</li> <li>Display (rounded rectangle)</li> <li>Action (pointed rectangle)</li> <li>Mode (rounded rectangle)</li> <li>Sequential transfer (oval with arrow)</li> </ul> </div> |        |               |                   |                                |          |           |          |                                |

### 14.2.30 Vertical Scrolling Start Address (37h)

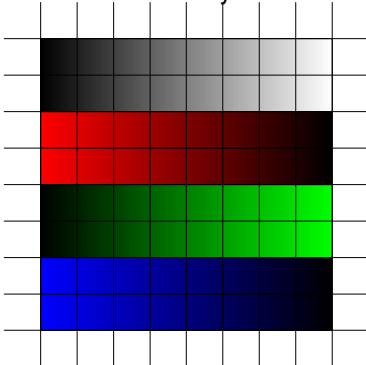
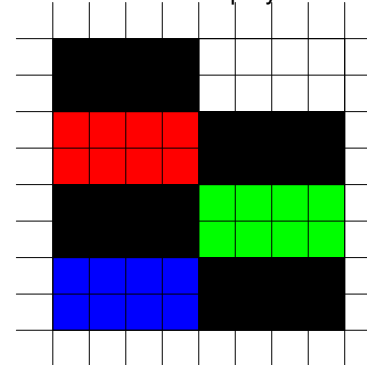
| 37H                                                                                                                                                                                                                                                                                                                                                                      | VSCRSADD (Vertical Scrolling Start Address)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|-----|---|---|---|---|---|----|----|-----|-----|-----|-----|-----|-----|----|----|---|---|---|---|---|
|                                                                                                                                                                                                                                                                                                                                                                          | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RDX | WRX | D17-8 | D7        | D6        | D5        | D4        | D3        | D2        | D1       | D0       | HEX |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| Command                                                                                                                                                                                                                                                                                                                                                                  | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1   | ↑   | x     | 0         | 0         | 1         | 1         | 0         | 1         | 1        | 1        | 37h |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 1 <sup>st</sup> Parameter                                                                                                                                                                                                                                                                                                                                                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1   | ↑   | x     | SSA<br>15 | SSA<br>14 | SSA<br>13 | SSA<br>12 | SSA<br>11 | SSA<br>10 | SSA<br>9 | SSA<br>8 | 00h |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 2 <sup>nd</sup> Parameter                                                                                                                                                                                                                                                                                                                                                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1   | ↑   | x     | SSA<br>7  | SSA<br>6  | SSA<br>5  | SSA<br>4  | SSA<br>3  | SSA<br>2  | SSA<br>1 | SSA<br>0 | 00h |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| Description                                                                                                                                                                                                                                                                                                                                                              | <p>This command is used together with Vertical Scrolling Definition (33h). These two commands describe the scrolling area and the scrolling mode.</p> <p>The Vertical Scrolling Start Address command has one parameter which describes the address of the line in the Frame Memory that will be written as the first line after the last line of the Top Fixed Area on the display as illustrated below:</p> <p>This command Start the scrolling.</p> <p>When MADCTL ML=0<br/>Example: GM=000, 132RGBx162<br/>When Top Fixed Area = Bottom Fixed Area = 00, Vertical Scrolling Area = 162 and Vertical Scrolling Pointer SSA='3'.</p> <div><div><p>Frame Memory</p><p>(0, 0) →</p><p>SSA[15:0] →</p><p>(0, 161) →</p></div><div><p>Pointer<br/>ML=0</p><table><tr><td>0</td></tr><tr><td>1</td></tr><tr><td>2</td></tr><tr style="background-color: #cccccc;"><td>3</td></tr><tr><td>4</td></tr><tr><td>..</td></tr><tr><td>..</td></tr><tr><td>159</td></tr><tr><td>160</td></tr><tr><td>161</td></tr></table></div><div><p>Display</p></div></div> <p>When MADCTL ML=1<br/>Example: GM=000, 132RGBx162<br/>When Top Fixed Area = Bottom Fixed Area = 00, Vertical Scrolling Area = 162 and SSA='3'.</p> <div><div><p>Frame Memory</p><p>(0, 161) →</p><p>SSA[15:0] →</p><p>(0, 0) →</p></div><div><p>Pointer<br/>ML=1</p><table><tr><td>161</td></tr><tr><td>160</td></tr><tr><td>159</td></tr><tr><td>..</td></tr><tr><td>..</td></tr><tr><td>4</td></tr><tr style="background-color: #cccccc;"><td>3</td></tr><tr><td>2</td></tr><tr><td>1</td></tr><tr><td>0</td></tr></table></div><div><p>Display</p></div></div> |     |     |       |           |           |           |           |           |           |          |          |     | 0 | 1 | 2 | 3 | 4 | .. | .. | 159 | 160 | 161 | 161 | 160 | 159 | .. | .. | 4 | 3 | 2 | 1 | 0 |
|                                                                                                                                                                                                                                                                                                                                                                          | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
|                                                                                                                                                                                                                                                                                                                                                                          | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
|                                                                                                                                                                                                                                                                                                                                                                          | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 3                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 4                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| ..                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
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| 159                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 160                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 161                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 161                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 160                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 159                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| ..                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| ..                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 4                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 3                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 2                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 1                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| 0                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| <p>Note:</p> <p>When new Pointer position and Picture Data are sent, the result on the display will happen at the next Panel Scan to avoid tearing effect. SSA refers to the Frame Memory scan address</p> <p>When new Pointer position and Picture Data, internal system works as 128x128 and maximum scan address becomes 127 internal of 161.</p> <p>X=Don't care</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |
| Restriction                                                                                                                                                                                                                                                                                                                                                              | <p>Since the value of the Vertical Scrolling Start Address is absolute (with reference to the Frame Memory), it must not enter the fixed area (defined by Vertical Scrolling Definition (33h)) – otherwise undesirable image will be displayed on the Panel.</p> <p>SSA[15:0] is based on 1-line unit.</p> <p>SSA[15:0]=0000h, 0001h, 0002h, 003h, ..., 00A1h</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |           |           |           |           |           |           |          |          |     |   |   |   |   |   |    |    |     |     |     |     |     |     |    |    |   |   |   |   |   |

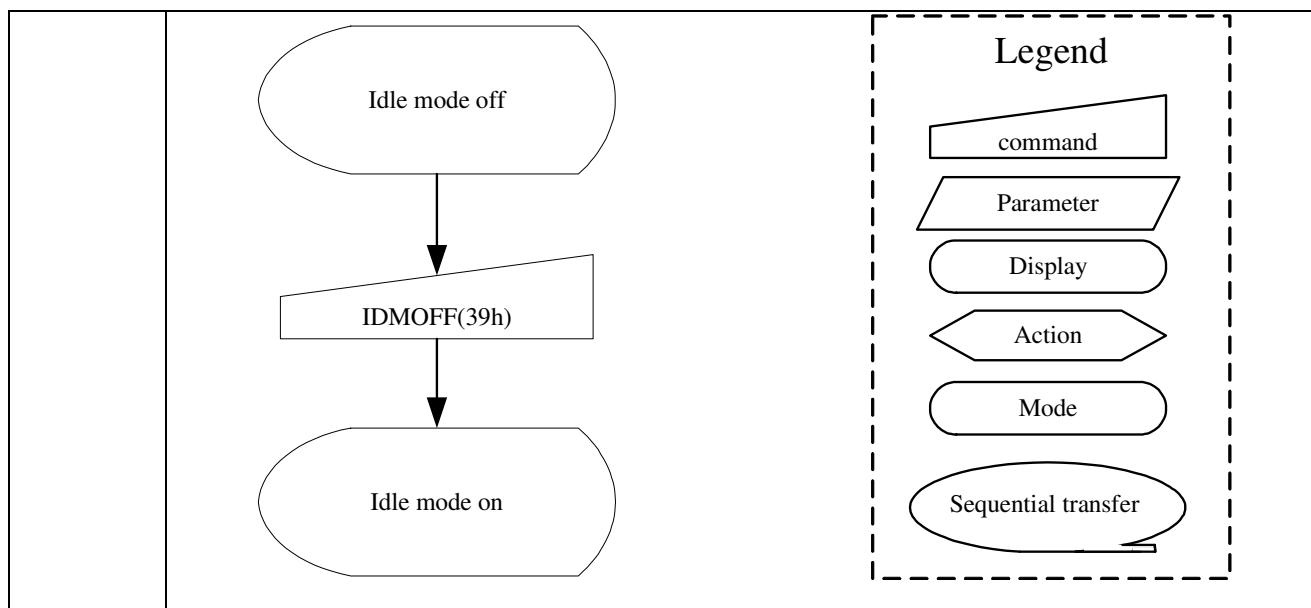
| Register Availability | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> | Status        | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes   | Normal Mode On, Idle Mode On, Sleep Out | Yes   | Partial Mode On, Idle Mode Off, Sleep Out | Yes   | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|------------------------------------------|-------|-----------------------------------------|-------|-------------------------------------------|-------|------------------------------------------|-----|----------|-----|
|                       | Status                                                                                                                                                                                                                                                                                                                                                                                     | Availability  |               |                                          |       |                                         |       |                                           |       |                                          |     |          |     |
|                       | Normal Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes           |               |                                          |       |                                         |       |                                           |       |                                          |     |          |     |
|                       | Normal Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                    | Yes           |               |                                          |       |                                         |       |                                           |       |                                          |     |          |     |
|                       | Partial Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                  | Yes           |               |                                          |       |                                         |       |                                           |       |                                          |     |          |     |
|                       | Partial Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes           |               |                                          |       |                                         |       |                                           |       |                                          |     |          |     |
| Sleep In              | Yes                                                                                                                                                                                                                                                                                                                                                                                        |               |               |                                          |       |                                         |       |                                           |       |                                          |     |          |     |
| Default               | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>0000h</td></tr><tr><td>SW Reset</td><td>0000h</td></tr><tr><td>HW Reset</td><td>0000h</td></tr></table>                                                                                                                                                                                             | Status        | Default Value | Power On Sequence                        | 0000h | SW Reset                                | 0000h | HW Reset                                  | 0000h |                                          |     |          |     |
|                       | Status                                                                                                                                                                                                                                                                                                                                                                                     | Default Value |               |                                          |       |                                         |       |                                           |       |                                          |     |          |     |
|                       | Power On Sequence                                                                                                                                                                                                                                                                                                                                                                          | 0000h         |               |                                          |       |                                         |       |                                           |       |                                          |     |          |     |
|                       | SW Reset                                                                                                                                                                                                                                                                                                                                                                                   | 0000h         |               |                                          |       |                                         |       |                                           |       |                                          |     |          |     |
| HW Reset              | 0000h                                                                                                                                                                                                                                                                                                                                                                                      |               |               |                                          |       |                                         |       |                                           |       |                                          |     |          |     |
| Flow Chart            | See Vertical Scrolling Definition (33h) description.                                                                                                                                                                                                                                                                                                                                       |               |               |                                          |       |                                         |       |                                           |       |                                          |     |          |     |

### 14.2.31 Idle Mode Off (38h)

| 38H                                       | IDMOFF (Idle Mode Off)                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|---------------|-----------------------------------------|---------------|-------------------------------------------|---------------|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                     | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                        | 1   | ↑   | x     | 0  | 0  | 1  | 1  | 1  | 0  | 0  | 0  | 38h |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Parameter                                 | NO PARAMETER                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Description                               | <p>This command is used to recover from Idle mode on.</p> <p>There will be no abnormal visible effect on the display mode change transition.</p> <p>In the Idle off mode</p> <ol style="list-style-type: none"><li>LCD can display maximum 4096, 65K, 262K colors.</li><li>Normal frame frequency is applied.</li></ol> <p>X = don't care</p>                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Restriction                               | This command has no effect when module is already in idle off mode.                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Register Availability                     | <table><thead><tr><th>Status</th><th>Availability</th></tr></thead><tbody><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></tbody></table> |     |     |       |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes           | Normal Mode On, Idle Mode On, Sleep Out | Yes           | Partial Mode On, Idle Mode Off, Sleep Out | Yes           | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Default                                   | <table><thead><tr><th>Status</th><th>Default Value</th></tr></thead><tbody><tr><td>Power On Sequence</td><td>Idle Mode Off</td></tr><tr><td>SW Reset</td><td>Idle Mode Off</td></tr><tr><td>HW Reset</td><td>Idle Mode Off</td></tr></tbody></table>                                                                                                                                                                     |     |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | Idle Mode Off | SW Reset                                | Idle Mode Off | HW Reset                                  | Idle Mode Off |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Power On Sequence                         | Idle Mode Off                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| SW Reset                                  | Idle Mode Off                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| HW Reset                                  | Idle Mode Off                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |
| Flow Chart                                | <div><div><div>Idle mode on</div><div>↓</div><div>IDMOFF(38h)</div><div>↓</div><div>Idle mode off</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                                                         |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |               |                                          |     |          |     |

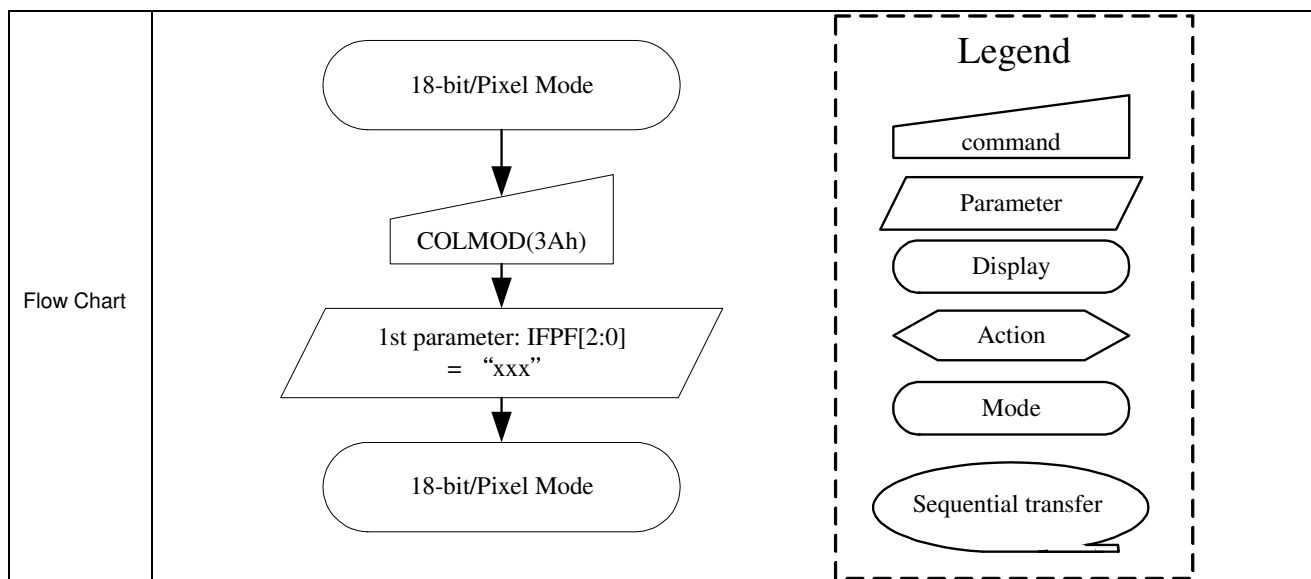
### 14.2.32 Idle Mode On (39h)

| 39H                                       | IDMON (Idle Mode On)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|---------------|-----------------------------------------|---------------|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|----|----|----|----|----|----|----|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1   | ↑   | x     | 0  | 0  | 1  | 1  | 1  | 0  | 0  | 1  | 39h |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Parameter                                 | NO PARAMETER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Description                               | <p>This command is used to enter into Idle mode on.</p> <p>There will be no abnormal visible effect on the display mode change transition.</p> <p>In the Idle mode,</p> <ol style="list-style-type: none"><li>Color expression is reduced. The primary and the secondary colors using MSB of each R,G and B in the Frame Memory, 8 color depth data is displayed.</li><li>8-Color mode frame frequency is applied.</li><li>Exit from IDMON by Idle Mode Off(38h) command.</li></ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                                           | <div><div><p>Memory</p></div><div>→</div><div><p>Panel Display</p></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                                           | <table><tr><td></td><td>R5</td><td>R4</td><td>R3</td><td>R2</td><td>R1</td><td>R0</td><td>G5</td><td>G4</td><td>G3</td><td>G2</td><td>G1</td><td>G0</td><td>B5</td><td>B4</td><td>B3</td><td>B2</td><td>B1</td><td>B0</td></tr><tr><td>Black</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>Blue</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>Red</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>Magenta</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>Green</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>Cyan</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>Yellow</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>0</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr><tr><td>White</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td><td>1</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr></table> |     |     |       |    |    |    |    |    |    |    |    |     |        | R5            | R4                                       | R3            | R2                                      | R1            | R0                                        | G5  | G4                                       | G3  | G2       | G1  | G0 | B5 | B4 | B3 | B2 | B1 | B0 | Black | 0 | X | X | X | X | X | 0 | X | X | X | X | X | 0 | X | X | X | X | X | Blue | 0 | X | X | X | X | X | 0 | X | X | X | X | X | 1 | X | X | X | X | X | Red | 1 | X | X | X | X | X | 0 | X | X | X | X | X | 0 | X | X | X | X | X | Magenta | 1 | X | X | X | X | X | 0 | X | X | X | X | X | 1 | X | X | X | X | X | Green | 0 | X | X | X | X | X | 1 | X | X | X | X | X | 0 | X | X | X | X | X | Cyan | 0 | X | X | X | X | X | 1 | X | X | X | X | X | 1 | X | X | X | X | X | Yellow | 1 | X | X | X | X | X | 1 | X | X | X | X | X | 0 | X | X | X | X | X | White | 1 | X | X | X | X | X | 1 | X | X | X | X | X | 1 | X | X | X | X | X |
|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | R5  | R4  | R3    | R2 | R1 | R0 | G5 | G4 | G3 | G2 | G1 | G0  | B5     | B4            | B3                                       | B2            | B1                                      | B0            |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                                           | Black                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0   | X   | X     | X  | X  | X  | 0  | X  | X  | X  | X  | X   | 0      | X             | X                                        | X             | X                                       | X             |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Blue                                      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | X   | X   | X     | X  | X  | 0  | X  | X  | X  | X  | X  | 1   | X      | X             | X                                        | X             | X                                       |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Red                                       | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | X   | X   | X     | X  | X  | 0  | X  | X  | X  | X  | X  | 0   | X      | X             | X                                        | X             | X                                       |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Magenta                                   | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | X   | X   | X     | X  | X  | 0  | X  | X  | X  | X  | X  | 1   | X      | X             | X                                        | X             | X                                       |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Green                                     | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | X   | X   | X     | X  | X  | 1  | X  | X  | X  | X  | X  | 0   | X      | X             | X                                        | X             | X                                       |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Cyan                                      | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | X   | X   | X     | X  | X  | 1  | X  | X  | X  | X  | X  | 1   | X      | X             | X                                        | X             | X                                       |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Yellow                                    | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | X   | X   | X     | X  | X  | 1  | X  | X  | X  | X  | X  | 0   | X      | X             | X                                        | X             | X                                       |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| White                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | X   | X   | X     | X  | X  | 1  | X  | X  | X  | X  | X  | 1   | X      | X             | X                                        | X             | X                                       |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Restriction                               | This command has no effect when module is already in idle on mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |     |       |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes           | Normal Mode On, Idle Mode On, Sleep Out | Yes           | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>Idle Mode Off</td></tr><tr><td>SW Reset</td><td>Idle Mode Off</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | Idle Mode Off | SW Reset                                | Idle Mode Off |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Power On Sequence                         | Idle Mode Off                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| SW Reset                                  | Idle Mode Off                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Flow Chart                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |               |                                         |               |                                           |     |                                          |     |          |     |    |    |    |    |    |    |    |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |



### 14.2.33 Interface Pixel Format (3Ah)

| 39H                                                                                                                                      | IDMON (Idle Mode On)                                                                                                                                 |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--------------------------------|-------|-------|-------|--------------------------|---------------------------------------------|----|-------|-------|-------|-----|
|                                                                                                                                          | D/CX                                                                                                                                                 | RDX | WRX                            | D17-8 | D7    | D6    | D5                       | D4                                          | D3 | D2    | D1    | D0    | HEX |
| Command                                                                                                                                  | 0                                                                                                                                                    | 1   | ↑                              | x     | 0     | 0     | 1                        | 1                                           | 1  | 0     | 1     | 0     | 3Ah |
| 1 <sup>st</sup> Parameter                                                                                                                | 1                                                                                                                                                    | 1   | ↑                              | x     | VIPF3 | VIPF2 | VIPF1                    | VIPF0                                       | D3 | IFPF2 | IFPF1 | IFPF0 | 66h |
| Description                                                                                                                              | This command is used to define the format of RGB picture data, which is to be transferred via the MCU interface. The formats are shown in the table: |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
|                                                                                                                                          | Bit                                                                                                                                                  |     | Description                    |       |       |       |                          | Value                                       |    |       |       |       |     |
|                                                                                                                                          | VIPF3                                                                                                                                                |     | RGB Interface Color Format     |       |       |       |                          | “0101”=16 bit/pixel (1 times data transfer) |    |       |       |       |     |
|                                                                                                                                          | VIPF2                                                                                                                                                |     |                                |       |       |       |                          | “0110”=18 bit/pixel (1 times data transfer) |    |       |       |       |     |
|                                                                                                                                          | VIPF1                                                                                                                                                |     |                                |       |       |       |                          | “1110”=18 bit/pixel (3 times data transfer) |    |       |       |       |     |
|                                                                                                                                          | VIPF0                                                                                                                                                |     |                                |       |       |       |                          | The others = not defined                    |    |       |       |       |     |
|                                                                                                                                          | D3                                                                                                                                                   |     |                                |       |       |       |                          | “0” (Not Used)                              |    |       |       |       |     |
|                                                                                                                                          | IFPF2                                                                                                                                                |     | Control Interface Color Format |       |       |       |                          | “011”=12 bit/pixel                          |    |       |       |       |     |
|                                                                                                                                          | IFPF1                                                                                                                                                |     |                                |       |       |       |                          | “101”=16 bit/pixel                          |    |       |       |       |     |
|                                                                                                                                          | IFPF0                                                                                                                                                |     |                                |       |       |       |                          | “110”=18 bit/pixel                          |    |       |       |       |     |
|                                                                                                                                          |                                                                                                                                                      |     |                                |       |       |       | The others = not defined |                                             |    |       |       |       |     |
| Note                                                                                                                                     |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
| 1.In 12-bits/Pixel, 16-bits/Pixel mode, the LUT is applied to transfer data into the Frame Memory.                                       |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
| 2. When VIPF[3:0]=1110, 6-bits data width of 3-times transfer is used to transmit 1 pixel data with the 18-bits color depth information. |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
| X = don't care                                                                                                                           |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
| Restriction                                                                                                                              | There is no visible effect until the Frame Memory is written to.                                                                                     |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
| Register Availability                                                                                                                    |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
|                                                                                                                                          |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
|                                                                                                                                          |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
|                                                                                                                                          |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
|                                                                                                                                          |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
|                                                                                                                                          |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
| Default                                                                                                                                  |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
|                                                                                                                                          |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |
|                                                                                                                                          |                                                                                                                                                      |     |                                |       |       |       |                          |                                             |    |       |       |       |     |





### 14.2.37 Frame Rate Control (In normal mode/Full colors) (B1h)

| B1h                                       | Frame Rate Control(In normal mode/Full colors)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|----|------|-------|-------|-------|-------|-------|-----|--------|--------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | RDX | WRX | D7 | D6 | D5   | D4    | D3    | D2    | D1    | D0    | HEX |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1   | ↑   | 1  | 0  | 1    | 1     | 0     | 0     | 0     | 1     | B1h |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1   | ↑   | x  | x  | x    | DIVA4 | DIVA3 | DIVA2 | DIVA1 | DIVA0 | x   |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1   | ↑   | x  | x  | VPA5 | VPA4  | VPA3  | VPA2  | VPA1  | VPA0  | x   |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Description                               | <p>Sets the division ratio for internal clocks of Normal mode at CPU interface mode.</p> <p>DIVA[4:0]: division ratio for internal clocks when Normal mode.</p> <p>VPA[5:0]: VS porch for internal clocks when Normal mode</p> $Frame\_rate = \frac{200kHz}{(Line + VPA[5 : 0])(DIVA[4 : 0] + 4)}$ <p>(1) When GM=101(132*132)</p> <p>In Normal mode, line=132, Default value DIVA[4:0]=17, VPA[5:0]=20, Frame rate=62.7Hz</p> <p>(2) When GM=100(130*130)</p> <p>In Normal mode, line=130, Default value DIVA[4:0]=17, VPA[5:0]=20, Frame rate=63.5Hz</p> <p>(3) When GM=011(128*160)</p> <p>In Normal mode, line=160, Default value DIVA[4:0]=14, VPA[5:0]=20, Frame rate=61.7Hz</p> <p>(4) When GM=010(120*160)</p> <p>In Normal mode, line=160, Default value DIVA[4:0]=14, VPA[5:0]=20, Frame rate=61.7Hz</p> <p>(5) When GM=001(128*128)</p> <p>In Normal mode, line=128, Default value DIVA[4:0]=17, VPA[5:0]=20, Frame rate=64.4Hz</p> <p>(6) When GM=000(132*162)</p> <p>In Normal mode, line=162, Default value DIVA[4:0]=14, VPA[5:0]=20, Frame rate=61Hz</p> |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Restriction                               | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |     |    |    |      |       |       |       |       |       |     | Status | Availability | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |

| Default           | <div>(1) When GM=000(132*162), GM=011(128*160) or GM=010(120*160)</div> <table><tr><th rowspan="2">Status</th><th colspan="2">Default Value</th></tr><tr><th>DIVA[4:0]</th><th>VPA[5:0]</th></tr><tr><td>Power On Sequence</td><td>0Eh/14d</td><td>14h/20d</td></tr><tr><td>S/W Reset</td><td>0Eh/14d</td><td>14h/20d</td></tr><tr><td>H/W Reset</td><td>0Eh/14d</td><td>14h/20d</td></tr></table> | Status   | Default Value |  | DIVA[4:0] | VPA[5:0] | Power On Sequence | 0Eh/14d | 14h/20d | S/W Reset | 0Eh/14d | 14h/20d | H/W Reset | 0Eh/14d | 14h/20d |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------|--|-----------|----------|-------------------|---------|---------|-----------|---------|---------|-----------|---------|---------|
|                   | Status                                                                                                                                                                                                                                                                                                                                                                                             |          | Default Value |  |           |          |                   |         |         |           |         |         |           |         |         |
| DIVA[4:0]         |                                                                                                                                                                                                                                                                                                                                                                                                    | VPA[5:0] |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| Power On Sequence | 0Eh/14d                                                                                                                                                                                                                                                                                                                                                                                            | 14h/20d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| S/W Reset         | 0Eh/14d                                                                                                                                                                                                                                                                                                                                                                                            | 14h/20d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| H/W Reset         | 0Eh/14d                                                                                                                                                                                                                                                                                                                                                                                            | 14h/20d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |
|                   | <div>(2) When GM=001(128*128), GM=100(130*130), GM=101(132*132)</div> <table><tr><th rowspan="2">Status</th><th colspan="2">Default Value</th></tr><tr><th>DIVA[4:0]</th><th>VPA[5:0]</th></tr><tr><td>Power On Sequence</td><td>11h/17d</td><td>11h/17d</td></tr><tr><td>S/W Reset</td><td>11h/17d</td><td>11h/17d</td></tr><tr><td>H/W Reset</td><td>11h/17d</td><td>11h/17d</td></tr></table>   | Status   | Default Value |  | DIVA[4:0] | VPA[5:0] | Power On Sequence | 11h/17d | 11h/17d | S/W Reset | 11h/17d | 11h/17d | H/W Reset | 11h/17d | 11h/17d |
| Status            | Default Value                                                                                                                                                                                                                                                                                                                                                                                      |          |               |  |           |          |                   |         |         |           |         |         |           |         |         |
|                   | DIVA[4:0]                                                                                                                                                                                                                                                                                                                                                                                          | VPA[5:0] |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| Power On Sequence | 11h/17d                                                                                                                                                                                                                                                                                                                                                                                            | 11h/17d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| S/W Reset         | 11h/17d                                                                                                                                                                                                                                                                                                                                                                                            | 11h/17d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| H/W Reset         | 11h/17d                                                                                                                                                                                                                                                                                                                                                                                            | 11h/17d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |

| Flow Chart | RGBCTR1(B1h)  ↓  1st parameter: DIVA[4:0] 2nd parameter: VPA[4:0]  Legend  command  Parameter  Display  Action  Mode  Sequential transfer |

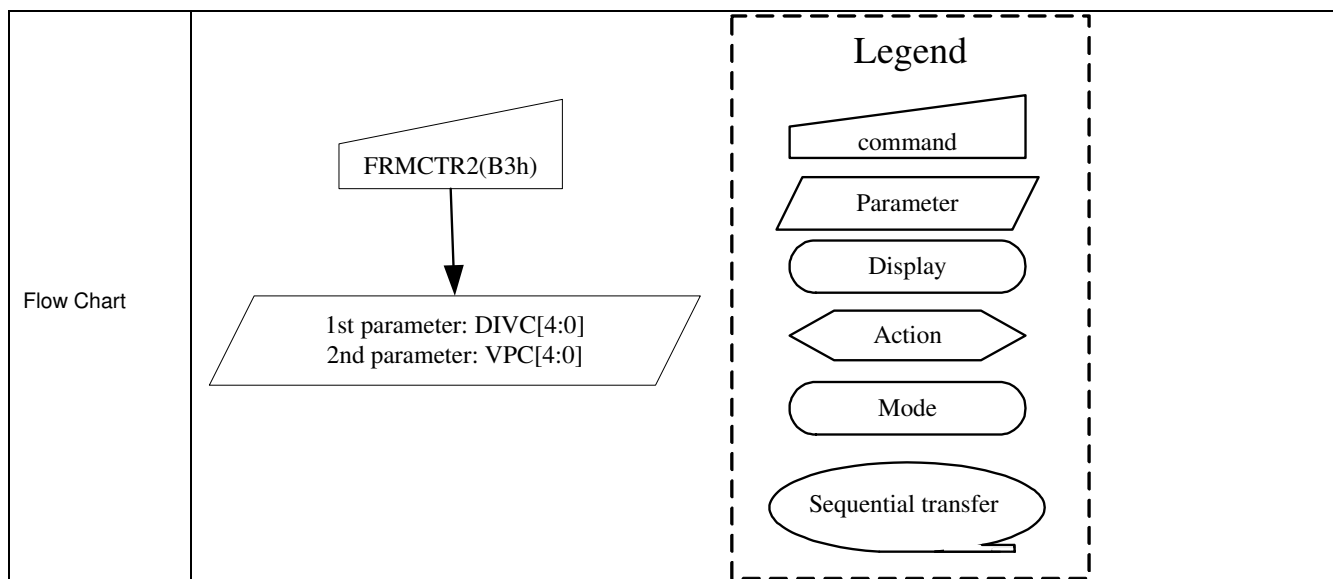
### 14.2.38 Frame Rate Control(In Idle mode/8-colors) (B2h)

| B2h                                       | Frame Rate Control(In Idle mode/Full colors)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|----|------|-------|-------|-------|-------|-------|-----|--------|--------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | RDX | WRX | D7 | D6 | D5   | D4    | D3    | D2    | D1    | D0    | HEX |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1   | ↑   | 1  | 0  | 1    | 1     | 0     | 0     | 1     | 0     | B2h |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1   | ↑   | x  | x  | x    | DIVB4 | DIVB3 | DIVB2 | DIVB1 | DIVB0 | x   |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1   | ↑   | x  | x  | VPB5 | VPB4  | VPB3  | VPB2  | VPB1  | VPB0  | x   |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Description                               | <p>Sets the division ratio for internal clocks of Idle mode at CPU interface mode.</p> <p>DIVB[4:0]: division ratio for internal clocks when Idle mode.</p> <p>VPB[5:0]: VS porch for internal clocks when Idle mode</p> $Frame\_rate = \frac{200kHz}{(Line + VPB[5 : 0])(DIVB[4 : 0] + 4)}$ <p>(1) When GM=101(132*132)</p> <p>In Normal mode, line=132, Default value DIVA[4:0]=17, VPA[5:0]=20, Frame rate=62.7Hz</p> <p>(2) When GM=100(130*130)</p> <p>In Normal mode, line=130, Default value DIVA[4:0]=17, VPA[5:0]=20, Frame rate=63.5Hz</p> <p>(3) When GM=011(128*160)</p> <p>In 8-color mode, line=160, Default value DIVB[4:0]=14, VPB[5:0]=20, Frame rate=61.7Hz</p> <p>(4) When GM=010(120*160)</p> <p>In 8-color I mode, line=160, Default value DIVB[4:0]=14, VPB[5:0]=20, Frame rate=61.7Hz</p> <p>(5) When GM=001(128*128)</p> <p>In 8-color mode, line=128, Default value DIVB[4:0]=17, VPB[5:0]=20, Frame rate=64.4Hz</p> <p>(6) When GM=000(132*162)</p> <p>In 8-color mode, line=162, Default value DIVB[4:0]=14, VPB[5:0]=20, Frame rate=61Hz</p> |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Restriction                               | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |     |    |    |      |       |       |       |       |       |     | Status | Availability | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |    |    |      |       |       |       |       |       |     |        |              |                                          |     |                                         |     |                                           |     |                                          |     |          |     |

| Default           | <div>(1) When GM=000(132*162), GM=011(128*160) or GM=010(120*160)</div> <table><tr><th rowspan="2">Status</th><th colspan="2">Default Value</th></tr><tr><th>DIVB[4:0]</th><th>VPB[5:0]</th></tr><tr><td>Power On Sequence</td><td>0Eh/14d</td><td>14h/20d</td></tr><tr><td>S/W Reset</td><td>0Eh/14d</td><td>14h/20d</td></tr><tr><td>H/W Reset</td><td>0Eh/14d</td><td>14h/20d</td></tr></table> <div>(2) When GM=001(128*128), GM=100(130*130), GM=101(132*132)</div> <table><tr><th rowspan="2">Status</th><th colspan="2">Default Value</th></tr><tr><th>DIVB[4:0]</th><th>VPB[5:0]</th></tr><tr><td>Power On Sequence</td><td>11h/17d</td><td>11h/17d</td></tr><tr><td>S/W Reset</td><td>11h/17d</td><td>11h/17d</td></tr><tr><td>H/W Reset</td><td>11h/17d</td><td>11h/17d</td></tr></table> | Status   | Default Value |  | DIVB[4:0] | VPB[5:0] | Power On Sequence | 0Eh/14d | 14h/20d | S/W Reset | 0Eh/14d | 14h/20d | H/W Reset | 0Eh/14d | 14h/20d | Status | Default Value |  | DIVB[4:0] | VPB[5:0] | Power On Sequence | 11h/17d | 11h/17d | S/W Reset | 11h/17d | 11h/17d | H/W Reset | 11h/17d | 11h/17d |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------|--|-----------|----------|-------------------|---------|---------|-----------|---------|---------|-----------|---------|---------|--------|---------------|--|-----------|----------|-------------------|---------|---------|-----------|---------|---------|-----------|---------|---------|
| Status            | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |               |  |           |          |                   |         |         |           |         |         |           |         |         |        |               |  |           |          |                   |         |         |           |         |         |           |         |         |
|                   | DIVB[4:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | VPB[5:0] |               |  |           |          |                   |         |         |           |         |         |           |         |         |        |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| Power On Sequence | 0Eh/14d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 14h/20d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |        |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| S/W Reset         | 0Eh/14d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 14h/20d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |        |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| H/W Reset         | 0Eh/14d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 14h/20d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |        |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| Status            | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |               |  |           |          |                   |         |         |           |         |         |           |         |         |        |               |  |           |          |                   |         |         |           |         |         |           |         |         |
|                   | DIVB[4:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | VPB[5:0] |               |  |           |          |                   |         |         |           |         |         |           |         |         |        |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| Power On Sequence | 11h/17d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 11h/17d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |        |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| S/W Reset         | 11h/17d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 11h/17d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |        |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| H/W Reset         | 11h/17d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 11h/17d  |               |  |           |          |                   |         |         |           |         |         |           |         |         |        |               |  |           |          |                   |         |         |           |         |         |           |         |         |
| Flow Chart        | <div><div><div>FRMCTR2(B2h)</div><div></div><div>1st parameter: DIVB[4:0]<br/>2nd parameter: VPB[4:0]</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |               |  |           |          |                   |         |         |           |         |         |           |         |         |        |               |  |           |          |                   |         |         |           |         |         |           |         |         |

### 14.2.39 Frame Rate Control(In Partial mode/full colors) (B3h)

| B3h                                                                                                                                                                                                                                                                                                                        | Frame Rate Control(In Partial mode/Full colors)                                       |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----|----|------|-------|-------|-------|-------|--------|---------------|--------|---------------|------------------------------------------|-------------------|-----------------------------------------|-------------------|-------------------------------------------|---------|------------------------------------------|-----------|----------|-----------|---------|
|                                                                                                                                                                                                                                                                                                                            | D/CX                                                                                  | RDX                                                                                                                                                                                                                                                                                                                                                                                        | WRX          | D7 | D6 | D5   | D4    | D3    | D2    | D1    | D0     | HEX           |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| Command                                                                                                                                                                                                                                                                                                                    | 0                                                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                          | ↑            | 1  | 0  | 1    | 1     | 0     | 0     | 1     | 1      | B3h           |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| 1 <sup>st</sup> Parameter                                                                                                                                                                                                                                                                                                  | 1                                                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                          | ↑            | x  | x  | x    | DIVC4 | DIVC3 | DIVC2 | DIVC1 | DIVC0  | x             |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| 2 <sup>nd</sup> Parameter                                                                                                                                                                                                                                                                                                  | 1                                                                                     | 1                                                                                                                                                                                                                                                                                                                                                                                          | ↑            | x  | x  | VPC5 | VPC4  | VPC3  | VPC2  | VPC1  | VPC0   | x             |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| Description                                                                                                                                                                                                                                                                                                                | Sets the division ratio for internal clocks of Partial mode at CPU interface mode.    |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | DIVB[4:0]: division ratio for internal clocks when Partial mode.                      |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | VPB[5:0]: VS porch for internal clocks when Partial mode                              |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | $Frame\_rate = \frac{200kHz}{(Line + VPC[5 : 0])(DIVC[4 : 0] + 4)}$                   |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | (1) When GM=101(132*132)                                                              |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | In Normal mode, line=132, Default value DIVA[4:0]=17, VPA[5:0]=20, Frame rate=62.7Hz  |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | (2) When GM=100(130*130)                                                              |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | In Normal mode, line=130, Default value DIVA[4:0]=17, VPA[5:0]=20, Frame rate=63.5Hz  |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | (3) When GM=011(128*160)                                                              |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | In Partial mode, line=160, Default value DIVC[4:0]=14, VPC[5:0]=20, Frame rate=61.7Hz |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| Restriction                                                                                                                                                                                                                                                                                                                | -                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | Register Availability                                                                 | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |              |    |    |      |       |       |       |       |        |               | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes               | Normal Mode On, Idle Mode On, Sleep Out | Yes               | Partial Mode On, Idle Mode Off, Sleep Out | Yes     | Partial Mode On, Idle Mode On, Sleep Out | Yes       | Sleep In | Yes       |         |
|                                                                                                                                                                                                                                                                                                                            |                                                                                       | Status                                                                                                                                                                                                                                                                                                                                                                                     | Availability |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            |                                                                                       | Normal Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes          |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            |                                                                                       | Normal Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                    | Yes          |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            |                                                                                       | Partial Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                  | Yes          |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            |                                                                                       | Partial Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes          |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            |                                                                                       | Sleep In                                                                                                                                                                                                                                                                                                                                                                                   | Yes          |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | Default                                                                               | (1) When GM=000(132*162), GM=011(128*160) or GM=010(120*160)                                                                                                                                                                                                                                                                                                                               |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            |                                                                                       | <table><tr><th rowspan="2">Status</th><th colspan="2">Default Value</th></tr><tr><th>DIVC4:0]</th><th>VPC[5:0]</th></tr><tr><td>Power On Sequence</td><td>0Eh/14d</td><td>14h/20d</td></tr><tr><td>S/W Reset</td><td>0Eh/14d</td><td>14h/20d</td></tr><tr><td>H/W Reset</td><td>0Eh/14d</td><td>14h/20d</td></tr></table>                                                                  |              |    |    |      |       |       |       |       |        |               | Status | Default Value |                                          | DIVC4:0]          | VPC[5:0]                                | Power On Sequence | 0Eh/14d                                   | 14h/20d | S/W Reset                                | 0Eh/14d   | 14h/20d  | H/W Reset | 0Eh/14d |
| Status                                                                                                                                                                                                                                                                                                                     |                                                                                       | Default Value                                                                                                                                                                                                                                                                                                                                                                              |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            |                                                                                       | DIVC4:0]                                                                                                                                                                                                                                                                                                                                                                                   | VPC[5:0]     |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| Power On Sequence                                                                                                                                                                                                                                                                                                          |                                                                                       | 0Eh/14d                                                                                                                                                                                                                                                                                                                                                                                    | 14h/20d      |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| S/W Reset                                                                                                                                                                                                                                                                                                                  |                                                                                       | 0Eh/14d                                                                                                                                                                                                                                                                                                                                                                                    | 14h/20d      |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| H/W Reset                                                                                                                                                                                                                                                                                                                  |                                                                                       | 0Eh/14d                                                                                                                                                                                                                                                                                                                                                                                    | 14h/20d      |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| (3) When GM=001(128*128), GM=100(130*130), GM=101(132*132)                                                                                                                                                                                                                                                                 |                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| <table><tr><th rowspan="2">Status</th><th colspan="2">Default Value</th></tr><tr><th>DIVB[4:0]</th><th>VPB[5:0]</th></tr><tr><td>Power On Sequence</td><td>11h/17d</td><td>11h/17d</td></tr><tr><td>S/W Reset</td><td>11h/17d</td><td>11h/17d</td></tr><tr><td>H/W Reset</td><td>11h/17d</td><td>11h/17d</td></tr></table> |                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                            |              |    |    |      |       |       |       |       | Status | Default Value |        | DIVB[4:0]     | VPB[5:0]                                 | Power On Sequence | 11h/17d                                 | 11h/17d           | S/W Reset                                 | 11h/17d | 11h/17d                                  | H/W Reset | 11h/17d  | 11h/17d   |         |
| Status                                                                                                                                                                                                                                                                                                                     |                                                                                       | Default Value                                                                                                                                                                                                                                                                                                                                                                              |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
|                                                                                                                                                                                                                                                                                                                            | DIVB[4:0]                                                                             | VPB[5:0]                                                                                                                                                                                                                                                                                                                                                                                   |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| Power On Sequence                                                                                                                                                                                                                                                                                                          | 11h/17d                                                                               | 11h/17d                                                                                                                                                                                                                                                                                                                                                                                    |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| S/W Reset                                                                                                                                                                                                                                                                                                                  | 11h/17d                                                                               | 11h/17d                                                                                                                                                                                                                                                                                                                                                                                    |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |
| H/W Reset                                                                                                                                                                                                                                                                                                                  | 11h/17d                                                                               | 11h/17d                                                                                                                                                                                                                                                                                                                                                                                    |              |    |    |      |       |       |       |       |        |               |        |               |                                          |                   |                                         |                   |                                           |         |                                          |           |          |           |         |



#### 14.2.40 Display Inversion Control (B4h)

| B4h                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Display Inversion Control                    |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----|-------|----|----|----|----|----|-----|-----|-----|-----|-----------------------------------------------|----------------------------------------------|----------------|------------------------------------------|-----------------|-----------------|-----------------------------------------|-----|-----|-------------------------------------------|-------------------|-----|------------------------------------------|----|-----|-----------|----|-----|----|-----|-----------|----|----|----|-----|
|                                                                                                                                                                                 | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RDX                                          | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2  | D1  | D0  | HEX |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Command                                                                                                                                                                         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                                            | ↑   | x     | 1  | 0  | 1  | 1  | 0  | 1   | 0   | 0   | B4h |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| 1 <sup>st</sup> Parameter                                                                                                                                                       | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                                            | ↑   | x     | 0  | 0  | 0  | 0  | 0  | NLA | NLB | NLC | 02H |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Description                                                                                                                                                                     | -Display Inversion mode control                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 | -NLA: Inversion setting in full colors normal mode(Normal mode on)                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 | <table><tr><td>NLA</td><td>Inversion setting in full colors normal mode</td></tr><tr><td>0</td><td>Line Inversion</td></tr><tr><td>1</td><td>Frame Inversion</td></tr></table>                                                                                                                                                                                                                                                                                     |                                              |     |       |    |    |    |    |    |     |     |     |     | NLA                                           | Inversion setting in full colors normal mode | 0              | Line Inversion                           | 1               | Frame Inversion |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 | NLA                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Inversion setting in full colors normal mode |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Line Inversion                               |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Frame Inversion                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 | -NLB: Inversion setting in Idle mode(Idle mode on)                                                                                                                                                                                                                                                                                                                                                                                                                 |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 | <table><tr><td>NLB</td><td>Inversion setting in Idle mode</td></tr><tr><td>0</td><td>Line Inversion</td></tr><tr><td>1</td><td>Frame Inversion</td></tr></table>                                                                                                                                                                                                                                                                                                   |                                              |     |       |    |    |    |    |    |     |     |     |     | NLB                                           | Inversion setting in Idle mode               | 0              | Line Inversion                           | 1               | Frame Inversion |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 | NLB                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Inversion setting in Idle mode               |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Line Inversion                               |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| 1                                                                                                                                                                               | Frame Inversion                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| -NLC: Inversion setting in full colors partial mode(Partial mode on/Idle mode off)                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| <table><tr><td>NLC</td><td>Inversion setting in full colors partial mode</td></tr><tr><td>0</td><td>Line Inversion</td></tr><tr><td>1</td><td>Frame Inversion</td></tr></table> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |     |       |    |    |    |    |    |     |     |     | NLC | Inversion setting in full colors partial mode | 0                                            | Line Inversion | 1                                        | Frame Inversion |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| NLC                                                                                                                                                                             | Inversion setting in full colors partial mode                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| 0                                                                                                                                                                               | Line Inversion                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| 1                                                                                                                                                                               | Frame Inversion                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Restriction                                                                                                                                                                     | If this register not using the register need be reserved.                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Register Availability                                                                                                                                                           | <table><tr><th colspan="2">Status</th><th>Availability</th></tr><tr><td colspan="2">Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td colspan="2">Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td colspan="2">Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td colspan="2">Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td colspan="2">Sleep In</td><td>Yes</td></tr></table> |                                              |     |       |    |    |    |    |    |     |     |     |     | Status                                        |                                              | Availability   | Normal Mode On, Idle Mode Off, Sleep Out |                 | Yes             | Normal Mode On, Idle Mode On, Sleep Out |     | Yes | Partial Mode On, Idle Mode Off, Sleep Out |                   | Yes | Partial Mode On, Idle Mode On, Sleep Out |    | Yes | Sleep In  |    | Yes |    |     |           |    |    |    |     |
| Status                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Availability                                 |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Normal Mode On, Idle Mode Off, Sleep Out                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Yes                                          |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Normal Mode On, Idle Mode On, Sleep Out                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Yes                                          |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Partial Mode On, Idle Mode Off, Sleep Out                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Yes                                          |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Partial Mode On, Idle Mode On, Sleep Out                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Yes                                          |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Sleep In                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Yes                                          |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Default                                                                                                                                                                         | <table><tr><th>Status</th><th colspan="4">Default Value</th></tr><tr><td></td><td>NLA</td><td>NLB</td><td>NLC</td><td>D7-0</td></tr><tr><td>Power On Sequence</td><td>0d</td><td>1d</td><td>0d</td><td>02h</td></tr><tr><td>S/W Reset</td><td>0d</td><td>1d</td><td>0d</td><td>02h</td></tr><tr><td>H/W Reset</td><td>0d</td><td>1d</td><td>0d</td><td>02h</td></tr></table>                                                                                       |                                              |     |       |    |    |    |    |    |     |     |     |     | Status                                        | Default Value                                |                |                                          |                 |                 | NLA                                     | NLB | NLC | D7-0                                      | Power On Sequence | 0d  | 1d                                       | 0d | 02h | S/W Reset | 0d | 1d  | 0d | 02h | H/W Reset | 0d | 1d | 0d | 02h |
| Status                                                                                                                                                                          | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
|                                                                                                                                                                                 | NLA                                                                                                                                                                                                                                                                                                                                                                                                                                                                | NLB                                          | NLC | D7-0  |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Power On Sequence                                                                                                                                                               | 0d                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1d                                           | 0d  | 02h   |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| S/W Reset                                                                                                                                                                       | 0d                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1d                                           | 0d  | 02h   |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| H/W Reset                                                                                                                                                                       | 0d                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1d                                           | 0d  | 02h   |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |
| Flow Chart                                                                                                                                                                      | <div><div><div>INVCTR(B4h)</div><div>↓</div><div>1st Parameter<br/>NLA, NLB, NLC</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                                                                                                                    |                                              |     |       |    |    |    |    |    |     |     |     |     |                                               |                                              |                |                                          |                 |                 |                                         |     |     |                                           |                   |     |                                          |    |     |           |    |     |    |     |           |    |    |    |     |

### 14.2.41 RGB Interface Blanking Porch setting (B5h)

| B5h                                                                                   | RGB Interface Blanking Porch setting                                                 |                             |                                           |       |      |      |      |              |      |      |      |      |     |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------|-------|------|------|------|--------------|------|------|------|------|-----|
|                                                                                       | D/CX                                                                                 | RDX                         | WRX                                       | D17-8 | D7   | D6   | D5   | D4           | D3   | D2   | D1   | D0   | HEX |
| Command                                                                               | 0                                                                                    | 1                           | ↑                                         | x     | 1    | 0    | 1    | 1            | 0    | 1    | 0    | 1    | B5h |
| 1 <sup>st</sup> Parameter                                                             | 1                                                                                    | 1                           | ↑                                         | x     | x    | x    | HBP5 | HBP4         | HBP3 | HBP2 | HBP1 | HBP0 | 08h |
| 2 <sup>nd</sup> Parameter                                                             | 1                                                                                    | 1                           | ↑                                         | x     | VBP7 | VBP6 | VBP5 | VBP4         | VBP3 | VBP2 | VBP1 | VBP0 | 03h |
| 3 <sup>rd</sup> Parameter                                                             | 1                                                                                    | 1                           | ↑                                         | x     | x    | x    | x    | x            | x    | x    | VBP9 | VBP8 | 00h |
| Description                                                                           | Vertical and Horizontal back porch control when RGB I/F mode2(RCM[1:0]=11)           |                             |                                           |       |      |      |      |              |      |      |      |      |     |
|                                                                                       | HBP[5:0]: Set the delay period from falling edge of HSYNC signal to first vali data. |                             |                                           |       |      |      |      |              |      |      |      |      |     |
|                                                                                       | HBP[5:0]                                                                             |                             | No.of clock cycle of DOTCLK               |       |      |      |      |              |      |      |      |      |     |
|                                                                                       | 00d                                                                                  |                             | 2                                         |       |      |      |      |              |      |      |      |      |     |
|                                                                                       | 01d                                                                                  |                             | 3                                         |       |      |      |      |              |      |      |      |      |     |
|                                                                                       | 02d                                                                                  |                             | 4                                         |       |      |      |      |              |      |      |      |      |     |
|                                                                                       | 03d                                                                                  |                             | 5                                         |       |      |      |      |              |      |      |      |      |     |
|                                                                                       | :                                                                                    |                             | :                                         |       |      |      |      |              |      |      |      |      |     |
|                                                                                       | :                                                                                    |                             | (SETP1)                                   |       |      |      |      |              |      |      |      |      |     |
|                                                                                       | :                                                                                    |                             | :                                         |       |      |      |      |              |      |      |      |      |     |
|                                                                                       | 62d                                                                                  |                             | 64                                        |       |      |      |      |              |      |      |      |      |     |
|                                                                                       | 63d                                                                                  |                             | 65                                        |       |      |      |      |              |      |      |      |      |     |
| VBP[9:0]: Set the delay period from falling edge of VSYNC signal to first valid line. |                                                                                      |                             |                                           |       |      |      |      |              |      |      |      |      |     |
| VBP[9:0]                                                                              |                                                                                      | No. of clock cycle of HSYNC |                                           |       |      |      |      |              |      |      |      |      |     |
| 00d                                                                                   |                                                                                      | (invalid)                   |                                           |       |      |      |      |              |      |      |      |      |     |
| 01d                                                                                   |                                                                                      | 1                           |                                           |       |      |      |      |              |      |      |      |      |     |
| 02d                                                                                   |                                                                                      | 2                           |                                           |       |      |      |      |              |      |      |      |      |     |
| 03d                                                                                   |                                                                                      | 3                           |                                           |       |      |      |      |              |      |      |      |      |     |
| :                                                                                     |                                                                                      | :                           |                                           |       |      |      |      |              |      |      |      |      |     |
| :                                                                                     |                                                                                      | (STEP1):                    |                                           |       |      |      |      |              |      |      |      |      |     |
| :                                                                                     |                                                                                      | :                           |                                           |       |      |      |      |              |      |      |      |      |     |
| 1022d                                                                                 |                                                                                      | 1022                        |                                           |       |      |      |      |              |      |      |      |      |     |
| Restriction                                                                           | -                                                                                    |                             |                                           |       |      |      |      |              |      |      |      |      |     |
| Register Availability                                                                 |                                                                                      |                             | Status                                    |       |      |      |      | Availability |      |      |      |      |     |
|                                                                                       |                                                                                      |                             | Normal Mode On, Idle Mode Off, Sleep Out  |       |      |      |      | Yes          |      |      |      |      |     |
|                                                                                       |                                                                                      |                             | Normal Mode On, Idle Mode On, Sleep Out   |       |      |      |      | Yes          |      |      |      |      |     |
|                                                                                       |                                                                                      |                             | Partial Mode On, Idle Mode Off, Sleep Out |       |      |      |      | Yes          |      |      |      |      |     |
|                                                                                       |                                                                                      |                             | Partial Mode On, Idle Mode On, Sleep Out  |       |      |      |      | Yes          |      |      |      |      |     |
|                                                                                       |                                                                                      |                             | Sleep In                                  |       |      |      |      | Yes          |      |      |      |      |     |

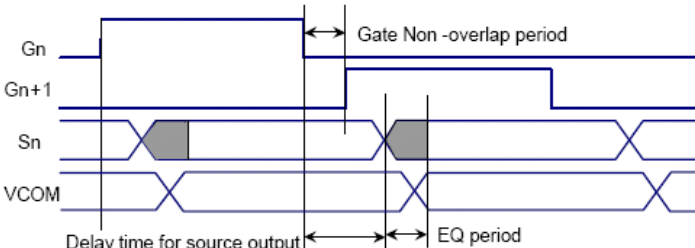


|         |  |                   |               |          |
|---------|--|-------------------|---------------|----------|
| Default |  | Status            | Default Value |          |
|         |  |                   | HBP[5:0]      | VBP[9:0] |
|         |  | Power On Sequence | 08h           | 03h      |
|         |  | S/W Reset         | 08h           | 03h      |
|         |  | H/W Reset         | 08h           | 03h      |

|            |  |  |                                                                                                                                                                                                                                                                                         |
|------------|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flow Chart |  |  | <p><b>Legend</b></p> <ul style="list-style-type: none"> <li>command (trapezoid)</li> <li>Parameter (parallelogram)</li> <li>Display (rounded rectangle)</li> <li>Action (pointed rectangle)</li> <li>Mode (rounded rectangle)</li> <li>Sequential transfer (oval with arrow)</li> </ul> |
|            |  |  |                                                                                                                                                                                                                                                                                         |

### 14.2.43 Display Fuction set 5 (B6h)

| B6h                           | RGB Interface Blanking Porch setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                   |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------|-------|----|----|-----|-----|------|------|-----|-----|-----|---------|--|------------------------------------------|-------------------------------|--|----|---|---------------|----|---|---------------|----|---|---------------|----|---|---------------|----------|--|--------------------------------------------|-------------------------------|--|----|---|---------------|----|---|---------------|----|---|-----------------|----|---|-----------------|---------|--|-----------|-------------------------------|--|----|---|-------|----|---|-----------------|----|---|---------------|----|---|-----------------|--------|--|-----------------------------------|---|---|-------------|---|---|------------|
|                               | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | RDX                               | WRX                                        | D17-8 | D7 | D6 | D5  | D4  | D3   | D2   | D1  | D0  | HEX |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| Command                       | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1                                 | ↑                                          | x     | 1  | 0  | 1   | 1   | 0    | 1    | 1   | 0   | B6h |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| 1 <sup>st</sup>               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1                                 | ↑                                          | x     | 0  | 0  | NO1 | NO0 | SDT1 | SDT0 | EQ1 | EQ2 | 07h |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| 2 <sup>nd</sup>               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1                                 | ↑                                          | x     | 0  | 0  | 0   | 0   | 0    | PTG0 | PT1 | PT0 | 02h |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| Description                   | <p>-1<sup>st</sup> parameter: Set output waveform relation.</p> <p>-NO[1:0]: Set the amount for non-overlap of the gate output</p> <table><tr><th colspan="2">NO[1:0]</th><th>Amount of non-overlap of the gate output</th></tr><tr><th colspan="2">Refer the Internal oscillator</th></tr><tr><td>00</td><td>0</td><td>4 clock cycle</td></tr><tr><td>01</td><td>1</td><td>5 clock cycle</td></tr><tr><td>10</td><td>2</td><td>6 clock cycle</td></tr><tr><td>11</td><td>3</td><td>7 clock cycle</td></tr></table> <p>-SDT[1:0]: Set delay amount from gate signal falling edge to the source output.</p> <table><tr><th colspan="2">SDT[1:0]</th><th>Amount of non-overlap of the source output</th></tr><tr><th colspan="2">Refer the Internal oscillator</th></tr><tr><td>00</td><td>0</td><td>4 clock cycle</td></tr><tr><td>01</td><td>1</td><td>4 clock cycle</td></tr><tr><td>10</td><td>2</td><td>4.5 clock cycle</td></tr><tr><td>11</td><td>3</td><td>5.5 clock cycle</td></tr></table> <p>-EQ[1:0]: Set the Equalizing period.</p> <table><tr><th colspan="2">EQ[1:0]</th><th>EQ period</th></tr><tr><th colspan="2">Refer the Internal oscillator</th></tr><tr><td>00</td><td>0</td><td>No EQ</td></tr><tr><td>01</td><td>1</td><td>0.5 clock cycle</td></tr><tr><td>10</td><td>2</td><td>1 clock cycle</td></tr><tr><td>11</td><td>3</td><td>1.5 clock cycle</td></tr></table> <div></div> <p>-2<sup>nd</sup> parameter: Set the output waveform in non-display area.</p> <p>-PTG[0]: Determine gate output in a non-display area in the partial mode.</p> <table><tr><th colspan="2">PTG[0]</th><th>Gate output in a non-display area</th></tr><tr><td>0</td><td>0</td><td>Normal scan</td></tr><tr><td>1</td><td>1</td><td>Fix on VGL</td></tr></table> |                                   |                                            |       |    |    |     |     |      |      |     |     |     | NO[1:0] |  | Amount of non-overlap of the gate output | Refer the Internal oscillator |  | 00 | 0 | 4 clock cycle | 01 | 1 | 5 clock cycle | 10 | 2 | 6 clock cycle | 11 | 3 | 7 clock cycle | SDT[1:0] |  | Amount of non-overlap of the source output | Refer the Internal oscillator |  | 00 | 0 | 4 clock cycle | 01 | 1 | 4 clock cycle | 10 | 2 | 4.5 clock cycle | 11 | 3 | 5.5 clock cycle | EQ[1:0] |  | EQ period | Refer the Internal oscillator |  | 00 | 0 | No EQ | 01 | 1 | 0.5 clock cycle | 10 | 2 | 1 clock cycle | 11 | 3 | 1.5 clock cycle | PTG[0] |  | Gate output in a non-display area | 0 | 0 | Normal scan | 1 | 1 | Fix on VGL |
|                               | NO[1:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                   | Amount of non-overlap of the gate output   |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
|                               | Refer the Internal oscillator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
|                               | 00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0                                 | 4 clock cycle                              |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
|                               | 01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1                                 | 5 clock cycle                              |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
|                               | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2                                 | 6 clock cycle                              |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
|                               | 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3                                 | 7 clock cycle                              |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
|                               | SDT[1:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                   | Amount of non-overlap of the source output |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
|                               | Refer the Internal oscillator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                   |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
|                               | 00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0                                 | 4 clock cycle                              |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| 01                            | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4 clock cycle                     |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| 10                            | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4.5 clock cycle                   |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| 11                            | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5.5 clock cycle                   |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| EQ[1:0]                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | EQ period                         |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| Refer the Internal oscillator |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                   |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| 00                            | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | No EQ                             |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| 01                            | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.5 clock cycle                   |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| 10                            | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1 clock cycle                     |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| 11                            | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.5 clock cycle                   |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| PTG[0]                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Gate output in a non-display area |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| 0                             | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Normal scan                       |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |
| 1                             | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Fix on VGL                        |                                            |       |    |    |     |     |      |      |     |     |     |         |  |                                          |                               |  |    |   |               |    |   |               |    |   |               |    |   |               |          |  |                                            |                               |  |    |   |               |    |   |               |    |   |                 |    |   |                 |         |  |           |                               |  |    |   |       |    |   |                 |    |   |               |    |   |                 |        |  |                                   |   |   |             |   |   |            |

|                                           | <div>-PT[1:0]: Determine Source/VCOM output in a non-display area in the partial mode</div> <table><tr><th colspan="2" rowspan="2">PT[1:0]</th><th colspan="2">Source output on non-display area</th><th colspan="2">VCOM output on non-display area</th></tr><tr><th>Positive</th><th>Negative</th><th>Positive</th><th>Negative</th></tr><tr><td>00</td><td>0</td><td>V63</td><td>V0</td><td>VCOMH</td><td>VCOML</td></tr><tr><td>01</td><td>1</td><td>V0</td><td>V63</td><td>VCOMH</td><td>VCOML</td></tr><tr><td>10</td><td>2</td><td>AGND</td><td>AGND</td><td>AGND</td><td>AGND</td></tr><tr><td>11</td><td>3</td><td>Hi-z</td><td>Hi-z</td><td>AGND</td><td>AGND</td></tr></table> | PT[1:0]  |               | Source output on non-display area        |          | VCOM output on non-display area         |     | Positive                                  | Negative | Positive                                 | Negative | 00       | 0                 | V63 | V0 | VCOMH | VCOML | 01 | 1         | V0 | V63 | VCOMH | VCOML | 10 | 2         | AGND | AGND | AGND | AGND | 11 | 3 | Hi-z | Hi-z | AGND | AGND |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------|------------------------------------------|----------|-----------------------------------------|-----|-------------------------------------------|----------|------------------------------------------|----------|----------|-------------------|-----|----|-------|-------|----|-----------|----|-----|-------|-------|----|-----------|------|------|------|------|----|---|------|------|------|------|
| PT[1:0]                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |               | Source output on non-display area        |          | VCOM output on non-display area         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Positive | Negative      | Positive                                 | Negative |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| 00                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | V63      | V0            | VCOMH                                    | VCOML    |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| 01                                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | V0       | V63           | VCOMH                                    | VCOML    |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| 10                                        | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | AGND     | AGND          | AGND                                     | AGND     |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| 11                                        | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Hi-z     | Hi-z          | AGND                                     | AGND     |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| Restriction                               | If this register not using the register need be reserved.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |               |                                          |          |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                | Status   | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes      | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes      | Partial Mode On, Idle Mode On, Sleep Out | Yes      | Sleep In | Yes               |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |               |                                          |          |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |               |                                          |          |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |               |                                          |          |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |               |                                          |          |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |               |                                          |          |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |               |                                          |          |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| Default                                   | <table><tr><th rowspan="2">Status</th><th colspan="5">Default Value</th></tr><tr><th>NO[1:0]</th><th>STD[1:0]</th><th>EQ[1:0]</th><th>PTG[1:0]</th><th>PT[1:0]</th></tr><tr><td>Power On Sequence</td><td>0d</td><td>1d</td><td>2d</td><td>0d</td><td>2d</td></tr><tr><td>S/W Reset</td><td>0d</td><td>1d</td><td>2d</td><td>0d</td><td>2d</td></tr><tr><td>H/W Reset</td><td>0d</td><td>1d</td><td>2d</td><td>0d</td><td>2d</td></tr></table>                                                                                                                                                                                                                                            | Status   | Default Value |                                          |          |                                         |     | NO[1:0]                                   | STD[1:0] | EQ[1:0]                                  | PTG[1:0] | PT[1:0]  | Power On Sequence | 0d  | 1d | 2d    | 0d    | 2d | S/W Reset | 0d | 1d  | 2d    | 0d    | 2d | H/W Reset | 0d   | 1d   | 2d   | 0d   | 2d |   |      |      |      |      |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |               |                                          |          |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
|                                           | NO[1:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | STD[1:0] | EQ[1:0]       | PTG[1:0]                                 | PT[1:0]  |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| Power On Sequence                         | 0d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1d       | 2d            | 0d                                       | 2d       |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| S/W Reset                                 | 0d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1d       | 2d            | 0d                                       | 2d       |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| H/W Reset                                 | 0d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1d       | 2d            | 0d                                       | 2d       |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |
| Flow Chart                                | <div><div><div>DISSET5 (B6h)</div><div>↓</div><div>1st parameter:<br/>NO[1:0], STD[1:0], EQ[1:0]<br/>2nd parameter:<br/>PTG[1:0], PT[1:0]</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                                                                                                                                                                                                                                                                                  |          |               |                                          |          |                                         |     |                                           |          |                                          |          |          |                   |     |    |       |       |    |           |    |     |       |       |    |           |      |      |      |      |    |   |      |      |      |      |

## 14.2.42 Source Driver Direction Control (B7h)

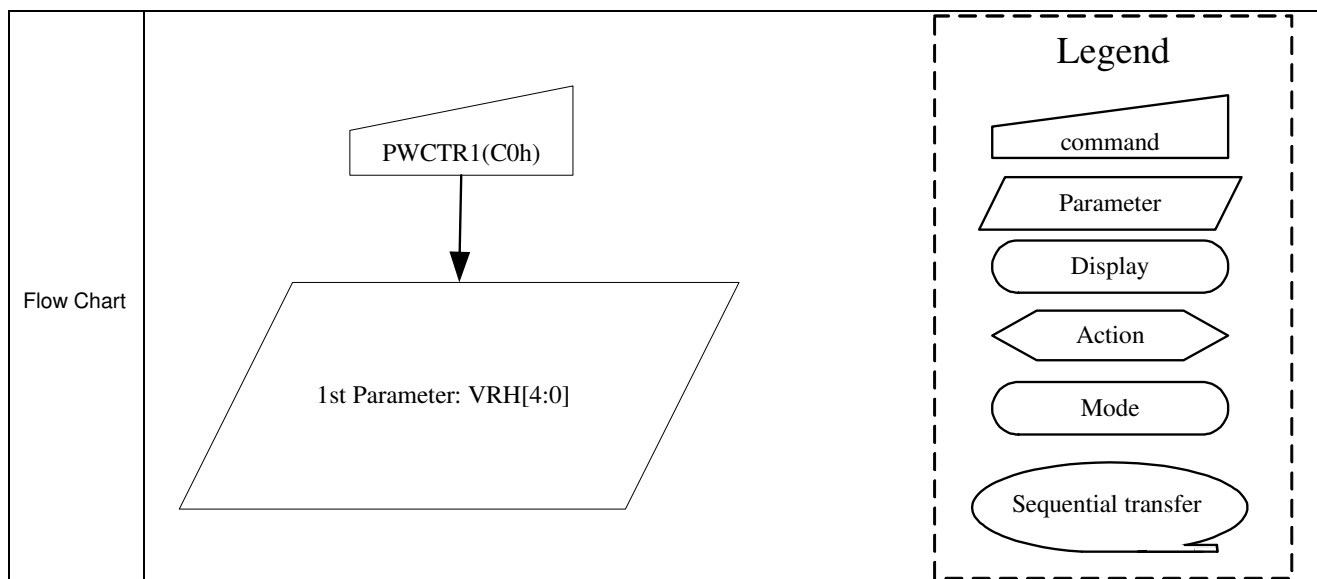
| B7h                                       |                                                                                                                                                                                                                                                                                                                                                                                            |               |                                | Display Inversion Control |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------|---------------------------|---------------|---------------|---------------|---------------|----|----|----|-----|-----|--------|---------------|------------------------------------------|-------------------|-----------------------------------------|-----------|-------------------------------------------|-----------|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX           | WRX                            | D17-8                     | D7            | D6            | D5            | D4            | D3 | D2 | D1 | D0  | HEX |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1             | ↑                              | x                         | 1             | 0             | 1             | 1             | 0  | 1  | 1  | 1   | B7h |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1             | ↑                              | x                         | 0             | 0             | 0             | 0             | 0  | 0  | 0  | CRL | 00h |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Description                               | -CRL: Source output direction select register                                                                                                                                                                                                                                                                                                                                              |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                                           | CRL                                                                                                                                                                                                                                                                                                                                                                                        |               | Module source output direction |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                                           |                                                                                                                                                                                                                                                                                                                                                                                            |               | GM='101'                       | GM='100'                  | GM='011'      | GM='010'      | GM='001'      | GM='000'      |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                                           | 0                                                                                                                                                                                                                                                                                                                                                                                          | S1 -><br>S396 | S7 -><br>S396                  | S7 -><br>S390             | S7 -><br>S366 | S7 -><br>S390 | S1 -><br>S396 |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                                           |                                                                                                                                                                                                                                                                                                                                                                                            | 1             | S1 -><br>S396                  | S396 -><br>S7             | S390 ->S7     | S366 -><br>S7 | S390 -><br>S7 | S396 -><br>S1 |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Restriction                               | If this register not using the register need be reserved.                                                                                                                                                                                                                                                                                                                                  |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |               |                                |                           |               |               |               |               |    |    |    |     |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes               | Normal Mode On, Idle Mode On, Sleep Out | Yes       | Partial Mode On, Idle Mode Off, Sleep Out | Yes       | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Default                                   | <table><tr><th rowspan="2">Status</th><th>Default Value</th></tr><tr><th>CRL</th></tr><tr><td>Power On Sequence</td><td>0d</td></tr><tr><td>S/W Reset</td><td>0d</td></tr><tr><td>H/W Reset</td><td>0d</td></tr></table>                                                                                                                                                                   |               |                                |                           |               |               |               |               |    |    |    |     |     | Status | Default Value | CRL                                      | Power On Sequence | 0d                                      | S/W Reset | 0d                                        | H/W Reset | 0d                                       |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                                           | CRL                                                                                                                                                                                                                                                                                                                                                                                        |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Power On Sequence                         | 0d                                                                                                                                                                                                                                                                                                                                                                                         |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| S/W Reset                                 | 0d                                                                                                                                                                                                                                                                                                                                                                                         |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| H/W Reset                                 | 0d                                                                                                                                                                                                                                                                                                                                                                                         |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Flow Chart                                | <div><div><div>SDOCTR(B7h)</div><div>↓</div><div>1st Parameter: CRL</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                                                         |               |                                |                           |               |               |               |               |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |

### 14.2.43 Gate Driver Direction Control (B8h)

| B8h                       | Display Inversion Control                                                                                                                                                                                                                                                                                                                                                                  |               |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------|------------|----------------|------------|----------|----|----|----|----|-----|-----|--------|---------------|------------------------------------------|-------------------|-----------------------------------------|-----------|-------------------------------------------|-----------|------------------------------------------|-----|----------|-----|
|                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX           | WRX                          | D17-8      | D7             | D6         | D5       | D4 | D3 | D2 | D1 | D0  | HEX |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Command                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1             | ↑                            | x          | 1              | 0          | 1        | 1  | 1  | 0  | 0  | 0   | B8h |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| 1 <sup>st</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1             | ↑                            | x          | 0              | 0          | 0        | 0  | 0  | 0  | 0  | CTB | 00h |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Description               | -CTB: Gate output direction select register                                                                                                                                                                                                                                                                                                                                                |               |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                           | CTB                                                                                                                                                                                                                                                                                                                                                                                        |               | Module gate output direction |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                           |                                                                                                                                                                                                                                                                                                                                                                                            |               | GM='101'                     | GM='100'   | GM='011','010' | GM='011'   | GM='000' |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                           | 0                                                                                                                                                                                                                                                                                                                                                                                          | G2 -> G133    | G2 -> G131                   | G2 -> G161 | G2 -> G129     | G1 -> G162 |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                           | 1                                                                                                                                                                                                                                                                                                                                                                                          | G133 -> G2    | G131 -> G2                   | G161 ->G2  | G129 -> G2     | G162 -> G1 |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Restriction               | If this register not using the register need be reserved.                                                                                                                                                                                                                                                                                                                                  |               |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Register Availability     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |               |                              |            |                |            |          |    |    |    |    |     |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes               | Normal Mode On, Idle Mode On, Sleep Out | Yes       | Partial Mode On, Idle Mode Off, Sleep Out | Yes       | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
|                           | Status                                                                                                                                                                                                                                                                                                                                                                                     | Availability  |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                           | Normal Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes           |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                           | Normal Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                    | Yes           |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                           | Partial Mode On, Idle Mode Off, Sleep Out                                                                                                                                                                                                                                                                                                                                                  | Yes           |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                           | Partial Mode On, Idle Mode On, Sleep Out                                                                                                                                                                                                                                                                                                                                                   | Yes           |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Sleep In                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |               |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Default                   | <table><tr><th rowspan="2">Status</th><th>Default Value</th></tr><tr><th>CRL</th></tr><tr><td>Power On Sequence</td><td>0d</td></tr><tr><td>S/W Reset</td><td>0d</td></tr><tr><td>H/W Reset</td><td>0d</td></tr></table>                                                                                                                                                                   |               |                              |            |                |            |          |    |    |    |    |     |     | Status | Default Value | CRL                                      | Power On Sequence | 0d                                      | S/W Reset | 0d                                        | H/W Reset | 0d                                       |     |          |     |
|                           | Status                                                                                                                                                                                                                                                                                                                                                                                     | Default Value |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                           |                                                                                                                                                                                                                                                                                                                                                                                            | CRL           |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                           | Power On Sequence                                                                                                                                                                                                                                                                                                                                                                          | 0d            |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
|                           | S/W Reset                                                                                                                                                                                                                                                                                                                                                                                  | 0d            |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| H/W Reset                 | 0d                                                                                                                                                                                                                                                                                                                                                                                         |               |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |
| Flow Chart                | <div><div><div>GDOCTR(D8h)</div><div>↓</div><div>1st Parameter: CTB</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                                                         |               |                              |            |                |            |          |    |    |    |    |     |     |        |               |                                          |                   |                                         |           |                                           |           |                                          |     |          |     |

**14.2.44 Power\_Control1 (C0h)**

| C0H                                       | Power_Control1                                                                                                                                                                                                                                                                                                                                                                             |         |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|-------|----|----|----|------|------|------|------|------|-----|--------|---------------|------------------------------------------|----------|-----------------------------------------|-------------------|-------------------------------------------|-----|------------------------------------------|-----|----------|----------|-----|----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX     | WRX  | D17-8 | D7 | D6 | D5 | D4   | D3   | D2   | D1   | D0   | HEX |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1       | ↑    | x     | 1  | 1  | 0  | 0    | 0    | 0    | 0    | 0    | C0h |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1       | ↑    | x     | 0  | 0  | 0  | VRH4 | VRH3 | VRH2 | VRH1 | VRH0 | x   |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1       | ↑    | x     | 0  | 0  | 0  | 0    | 0    | VC2  | VC1  | VC0  | 02h |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| Description                               | Set the GVDD and voltage                                                                                                                                                                                                                                                                                                                                                                   |         |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | VRH[4:0]                                                                                                                                                                                                                                                                                                                                                                                   |         |      | GVDD  |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 00000                                                                                                                                                                                                                                                                                                                                                                                      | 0       | 5.00 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 00001                                                                                                                                                                                                                                                                                                                                                                                      | 1       | 4.75 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 00010                                                                                                                                                                                                                                                                                                                                                                                      | 2       | 4.70 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 00011                                                                                                                                                                                                                                                                                                                                                                                      | 3       | 4.65 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 00100                                                                                                                                                                                                                                                                                                                                                                                      | 4       | 4.60 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 00101                                                                                                                                                                                                                                                                                                                                                                                      | 5       | 4.55 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 00110                                                                                                                                                                                                                                                                                                                                                                                      | 6       | 4.50 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 00111                                                                                                                                                                                                                                                                                                                                                                                      | 7       | 4.45 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 01000                                                                                                                                                                                                                                                                                                                                                                                      | 8       | 4.40 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 01001                                                                                                                                                                                                                                                                                                                                                                                      | 9       | 4.35 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 01010                                                                                                                                                                                                                                                                                                                                                                                      | 10      | 4.30 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 01011                                                                                                                                                                                                                                                                                                                                                                                      | 11      | 4.25 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 01100                                                                                                                                                                                                                                                                                                                                                                                      | 12      | 4.20 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 01101                                                                                                                                                                                                                                                                                                                                                                                      | 13      | 4.15 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 01110                                                                                                                                                                                                                                                                                                                                                                                      | 14      | 4.10 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 01111                                                                                                                                                                                                                                                                                                                                                                                      | 15      | 4.05 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 10000                                                                                                                                                                                                                                                                                                                                                                                      | 16      | 4.00 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 10001                                                                                                                                                                                                                                                                                                                                                                                      | 17      | 3.95 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 10010                                                                                                                                                                                                                                                                                                                                                                                      | 18      | 3.90 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 10011                                                                                                                                                                                                                                                                                                                                                                                      | 19      | 3.85 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 10100                                                                                                                                                                                                                                                                                                                                                                                      | 20      | 3.80 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 10101                                                                                                                                                                                                                                                                                                                                                                                      | 21      | 3.75 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 10110                                                                                                                                                                                                                                                                                                                                                                                      | 22      | 3.70 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 10111                                                                                                                                                                                                                                                                                                                                                                                      | 23      | 3.65 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 11000                                                                                                                                                                                                                                                                                                                                                                                      | 24      | 3.60 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 11001                                                                                                                                                                                                                                                                                                                                                                                      | 25      | 3.55 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 11010                                                                                                                                                                                                                                                                                                                                                                                      | 26      | 3.50 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 11011                                                                                                                                                                                                                                                                                                                                                                                      | 27      | 3.45 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 11100                                                                                                                                                                                                                                                                                                                                                                                      | 28      | 3.40 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 11101                                                                                                                                                                                                                                                                                                                                                                                      | 29      | 3.35 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 11110                                                                                                                                                                                                                                                                                                                                                                                      | 30      | 3.25 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 11111                                                                                                                                                                                                                                                                                                                                                                                      | 31      | 3.00 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | VC[2:0]                                                                                                                                                                                                                                                                                                                                                                                    |         |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | VC[2:0]                                                                                                                                                                                                                                                                                                                                                                                    |         | VC1  |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 000                                                                                                                                                                                                                                                                                                                                                                                        | 0       | 2.75 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 001                                                                                                                                                                                                                                                                                                                                                                                        | 1       | 2.70 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 010                                                                                                                                                                                                                                                                                                                                                                                        | 2       | 2.65 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 011                                                                                                                                                                                                                                                                                                                                                                                        | 3       | 2.60 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 100                                                                                                                                                                                                                                                                                                                                                                                        | 4       | 2.55 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 101                                                                                                                                                                                                                                                                                                                                                                                        | 5       | 2.50 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 110                                                                                                                                                                                                                                                                                                                                                                                        | 6       | 2.45 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | 111                                                                                                                                                                                                                                                                                                                                                                                        | 7       | 2.40 |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| Restriction                               |                                                                                                                                                                                                                                                                                                                                                                                            |         |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |         |      |       |    |    |    |      |      |      |      |      |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes      | Normal Mode On, Idle Mode On, Sleep Out | Yes               | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes      |     |    |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |         |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |         |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |         |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |         |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |         |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |         |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| Default                                   | <table><tr><th rowspan="2">Status</th><th colspan="2">Default Value</th></tr><tr><th>VRH[4:0]</th><th>VC[2:0]</th></tr><tr><td>Power On Sequence</td><td>10d</td><td>5d</td></tr><tr><td>SW Reset</td><td>10d</td><td>5d</td></tr><tr><td>HW Reset</td><td>10d</td><td>5d</td></tr></table>                                                                                                |         |      |       |    |    |    |      |      |      |      |      |     | Status | Default Value |                                          | VRH[4:0] | VC[2:0]                                 | Power On Sequence | 10d                                       | 5d  | SW Reset                                 | 10d | 5d       | HW Reset | 10d | 5d |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |         |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
|                                           | VRH[4:0]                                                                                                                                                                                                                                                                                                                                                                                   | VC[2:0] |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| Power On Sequence                         | 10d                                                                                                                                                                                                                                                                                                                                                                                        | 5d      |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| SW Reset                                  | 10d                                                                                                                                                                                                                                                                                                                                                                                        | 5d      |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |
| HW Reset                                  | 10d                                                                                                                                                                                                                                                                                                                                                                                        | 5d      |      |       |    |    |    |      |      |      |      |      |     |        |               |                                          |          |                                         |                   |                                           |     |                                          |     |          |          |     |    |



### 14.2.45 Power\_Control2 (C1h)

| C1H                                       | Power_Control 2                                                                                                                                                                                                                                                                                                                                                                            |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------|-------|------|----|-------|----|---------|-----|----------|-----|-----------|--------|---------------|------------------------------------------|-------------------|-----------------------------------------|----------|-------------------------------------------|----------|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX | WRX     | D17-8 | D7   | D6 | D5    | D4 | D3      | D2  | D1       | D0  | HEX       |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑       | x     | 1    | 1  | 0     | 0  | 0       | 0   | 0        | 1   | C1h       |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑       | x     | 0    | 0  | 0     | 0  | 0       | BT2 | BT1      | BT0 | 05h       |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Description                               | Set the AVDD, VCL, VGH and VGL supply power level.                                                                                                                                                                                                                                                                                                                                         |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           |                                                                                                                                                                                                                                                                                                                                                                                            |     | BT[2:0] |       | AVDD |    | VCL   |    | VGH     |     | VGL      |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           |                                                                                                                                                                                                                                                                                                                                                                                            |     | 010     |       | 2    |    | 2xVCI |    | -1xVCI1 |     | 2.5xAVDD |     | -2.5xAVDD |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           |                                                                                                                                                                                                                                                                                                                                                                                            |     | 011     |       | 3    |    | 2xVCI |    | -1xVCI1 |     | 3xAVDD   |     | -2.5xAVDD |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           |                                                                                                                                                                                                                                                                                                                                                                                            |     | 100     |       | 4    |    | 2xVCI |    | -1xVCI1 |     | 2.5xAVDD |     | -3xAVDD   |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           |                                                                                                                                                                                                                                                                                                                                                                                            |     | 101     |       | 5    |    | 2xVCI |    | -1xVCI1 |     | 3xAVDD   |     | -3xAVDD   |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Restriction                               | If this register not using the register need be reserved.<br>The deviation value of VGH/VGL between with Measurement and Specification<br>VGH-VGL <= 32V                                                                                                                                                                                                                                   |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |     |         |       |      |    |       |    |         |     |          |     |           | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes               | Normal Mode On, Idle Mode On, Sleep Out | Yes      | Partial Mode On, Idle Mode Off, Sleep Out | Yes      | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Default                                   | <table><tr><th rowspan="2">Status</th><th>Default Value</th></tr><tr><td>BT[2:0]</td></tr><tr><td>Power On Sequence</td><td>7d</td></tr><tr><td>SW Reset</td><td>7d</td></tr><tr><td>HW Reset</td><td>7d</td></tr></table>                                                                                                                                                                 |     |         |       |      |    |       |    |         |     |          |     |           | Status | Default Value | BT[2:0]                                  | Power On Sequence | 7d                                      | SW Reset | 7d                                        | HW Reset | 7d                                       |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           | BT[2:0]                                                                                                                                                                                                                                                                                                                                                                                    |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Power On Sequence                         | 7d                                                                                                                                                                                                                                                                                                                                                                                         |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| SW Reset                                  | 7d                                                                                                                                                                                                                                                                                                                                                                                         |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| HW Reset                                  | 7d                                                                                                                                                                                                                                                                                                                                                                                         |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Flow Chart                                | <div><div><div>PWCTR2(C1h)</div><div>↓</div><div>1st Parameter: BT[2:0]</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                                                     |     |         |       |      |    |       |    |         |     |          |     |           |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |



### 14.2.46 Power\_Control 3 (C2h)

| C2H                                       | Power_Control 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------|-------|----|----|----|----|----|------|------|------|-----|----------|---------------|--------------------------------------------|-------------------|-----------------------------------------|----------|-------------------------------------------|----------|------------------------------------------|-----|----------|------------|-----|---|--------|-----|---|-------------|-----|---|-------|-----|---|----------|-----|---|----------|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RDX      | WRX                                        | D17-8 | D7 | D6 | D5 | D4 | D3 | D2   | D1   | D0   | HEX |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1        | ↑                                          | x     | 1  | 1  | 0  | 0  | 0  | 0    | 1    | 0    | C2h |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1        | ↑                                          | x     | 0  | 0  | 0  | 0  | 0  | APA2 | APA1 | APA0 | 00h |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Description                               | Set the amount of current in Operation amplifier in normal mode/full colors.                                                                                                                                                                                                                                                                                                                                                                                                                       |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
|                                           | Adjust the amount of fixed current from the fixed current sources in the operational amplifier for the source driver.                                                                                                                                                                                                                                                                                                                                                                              |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
|                                           | <table><tr><th colspan="2">APA[2:0]</th><th>Amount of Current in Operational Amplifier</th></tr><tr><td>000</td><td>0</td><td>Least</td></tr><tr><td>001</td><td>1</td><td>Small</td></tr><tr><td>010</td><td>2</td><td>Medium Low</td></tr><tr><td>011</td><td>3</td><td>Medium</td></tr><tr><td>100</td><td>4</td><td>Medium High</td></tr><tr><td>101</td><td>5</td><td>Large</td></tr><tr><td>110</td><td>6</td><td>Reserved</td></tr><tr><td>111</td><td>7</td><td>Reserved</td></tr></table> |          |                                            |       |    |    |    |    |    |      |      |      |     | APA[2:0] |               | Amount of Current in Operational Amplifier | 000               | 0                                       | Least    | 001                                       | 1        | Small                                    | 010 | 2        | Medium Low | 011 | 3 | Medium | 100 | 4 | Medium High | 101 | 5 | Large | 110 | 6 | Reserved | 111 | 7 | Reserved |
|                                           | APA[2:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          | Amount of Current in Operational Amplifier |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
|                                           | 000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0        | Least                                      |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
|                                           | 001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1        | Small                                      |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
|                                           | 010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2        | Medium Low                                 |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
|                                           | 011                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3        | Medium                                     |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
|                                           | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4        | Medium High                                |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
|                                           | 101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5        | Large                                      |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| 110                                       | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Reserved |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| 111                                       | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Reserved |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Restriction                               | If some parameter of the register is not use the register need to be reserved.                                                                                                                                                                                                                                                                                                                                                                                                                     |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                         |          |                                            |       |    |    |    |    |    |      |      |      |     | Status   | Availability  | Normal Mode On, Idle Mode Off, Sleep Out   | Yes               | Normal Mode On, Idle Mode On, Sleep Out | Yes      | Partial Mode On, Idle Mode Off, Sleep Out | Yes      | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes        |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Default                                   | <table><tr><th rowspan="2">Status</th><th>Default Value</th></tr><tr><td>APA[2:0]</td></tr><tr><td>Power On Sequence</td><td>0d</td></tr><tr><td>SW Reset</td><td>0d</td></tr><tr><td>HW Reset</td><td>0d</td></tr></table>                                                                                                                                                                                                                                                                        |          |                                            |       |    |    |    |    |    |      |      |      |     | Status   | Default Value | APA[2:0]                                   | Power On Sequence | 0d                                      | SW Reset | 0d                                        | HW Reset | 0d                                       |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
|                                           | APA[2:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Power On Sequence                         | 0d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| SW Reset                                  | 0d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| HW Reset                                  | 0d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |
| Flow Chart                                | <div><div><div>PWCTR3(C2h)</div><div>↓</div><div>1st Parameter: APA[2:0]</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                                                                                                                                                            |          |                                            |       |    |    |    |    |    |      |      |      |     |          |               |                                            |                   |                                         |          |                                           |          |                                          |     |          |            |     |   |        |     |   |             |     |   |       |     |   |          |     |   |          |

### 14.2.47 Power\_Control 4 (C3h)

| C3H                       | Power_Control 4(in Idle mode / 8 colors)                                                                             |          |                                            |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|---------------------------|----------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------|-------|----|----|----|----|----|------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|                           | D/CX                                                                                                                 | RDX      | WRX                                        | D17-8 | D7 | D6 | D5 | D4 | D3 | D2   | D1   | D0                                                                                                                                                            | HEX |
| Command                   | 0                                                                                                                    | 1        | ↑                                          | x     | 1  | 1  | 0  | 0  | 0  | 0    | 1    | 1                                                                                                                                                             | C3h |
| 1 <sup>st</sup> Parameter | 1                                                                                                                    | 1        | ↑                                          | x     | 0  | 0  | 0  | 0  | 0  | APB2 | APB1 | APB0                                                                                                                                                          | 00h |
| Description               | Set the amount of current in Operational amplifier in Idle mode/8-colors                                             |          |                                            |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | Adjust the amount of fixed current from the fixed current source in the operational amplifier for the source driver. |          |                                            |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | APB[2:0]                                                                                                             |          | Amount of Current in Operational Amplifier |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | 000                                                                                                                  | 0        | Least                                      |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | 001                                                                                                                  | 1        | Small                                      |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | 010                                                                                                                  | 2        | Medium Low                                 |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | 011                                                                                                                  | 3        | Medium                                     |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | 100                                                                                                                  | 4        | Medium High                                |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | 101                                                                                                                  | 5        | Large                                      |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | 110                                                                                                                  | 6        | Reserved                                   |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
| 111                       | 7                                                                                                                    | Reserved |                                            |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
| Restriction               | If some parameter of the register not use the register need to be reserved.                                          |          |                                            |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
| Register Availability     |                                                                                                                      |          |                                            |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | Status                                                                                                               |          |                                            |       |    |    |    |    |    |      |      | Availability                                                                                                                                                  |     |
|                           | Normal Mode On, Idle Mode Off, Sleep Out                                                                             |          |                                            |       |    |    |    |    |    |      |      | Yes                                                                                                                                                           |     |
|                           | Normal Mode On, Idle Mode On, Sleep Out                                                                              |          |                                            |       |    |    |    |    |    |      |      | Yes                                                                                                                                                           |     |
|                           | Partial Mode On, Idle Mode Off, Sleep Out                                                                            |          |                                            |       |    |    |    |    |    |      |      | Yes                                                                                                                                                           |     |
|                           | Partial Mode On, Idle Mode On, Sleep Out                                                                             |          |                                            |       |    |    |    |    |    |      |      | Yes                                                                                                                                                           |     |
| Default                   |                                                                                                                      |          |                                            |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | Status                                                                                                               |          |                                            |       |    |    |    |    |    |      |      | Default Value                                                                                                                                                 |     |
|                           |                                                                                                                      |          |                                            |       |    |    |    |    |    |      |      | APB[2:0]                                                                                                                                                      |     |
|                           | Power On Sequence                                                                                                    |          |                                            |       |    |    |    |    |    |      |      | 0d                                                                                                                                                            |     |
|                           | SW Reset                                                                                                             |          |                                            |       |    |    |    |    |    |      |      | 0d                                                                                                                                                            |     |
| HW Reset                  |                                                                                                                      |          |                                            |       |    |    |    |    |    |      | 0d   |                                                                                                                                                               |     |
| Flow Chart                |                                                                                                                      |          |                                            |       |    |    |    |    |    |      |      |                                                                                                                                                               |     |
|                           | <div><div>PWCTR4(C3h)</div><div>↓</div><div>1st Parameter: APB[2:0]</div></div>                                      |          |                                            |       |    |    |    |    |    |      |      | <div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div> |     |

### 14.2.48 Power\_Control 5 (C4h)

| C4H                                       | Power Control_5(in Partial mode/full mode)                                                                                                                                                                                                                                                                                                                                                 |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------|-------|----|----|----|----|----|------|------|------|-----|--------|---------------|------------------------------------------|-------------------|-----------------------------------------|----------|-------------------------------------------|----------|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX      | WRX                                        | D17-8 | D7 | D6 | D5 | D4 | D3 | D2   | D1   | D0   | HEX |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1        | ↑                                          | x     | 1  | 1  | 0  | 0  | 0  | 1    | 0    | 0    | C4h |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1        | ↑                                          | x     | 0  | 0  | 0  | 0  | 0  | APC2 | APC1 | APC1 | 01h |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Description                               | Set the amount of current in Operational amplifier in Partial mode/full-colors                                                                                                                                                                                                                                                                                                             |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           | Adjust the amount of fixed current from the fixed current source in the operational amplifier for the source driver.                                                                                                                                                                                                                                                                       |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           | APC[2:0]                                                                                                                                                                                                                                                                                                                                                                                   |          | Amount of Current in Operational Amplifier |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           | 000                                                                                                                                                                                                                                                                                                                                                                                        | 0        | Least                                      |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           | 001                                                                                                                                                                                                                                                                                                                                                                                        | 1        | Small                                      |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           | 010                                                                                                                                                                                                                                                                                                                                                                                        | 2        | Medium Low                                 |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           | 011                                                                                                                                                                                                                                                                                                                                                                                        | 3        | Medium                                     |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           | 100                                                                                                                                                                                                                                                                                                                                                                                        | 4        | Medium High                                |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           | 101                                                                                                                                                                                                                                                                                                                                                                                        | 5        | Large                                      |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           | 110                                                                                                                                                                                                                                                                                                                                                                                        | 6        | Reserved                                   |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| 111                                       | 7                                                                                                                                                                                                                                                                                                                                                                                          | Reserved |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Restriction                               | If some parameter of the register not use the register need to be reserved.                                                                                                                                                                                                                                                                                                                |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |          |                                            |       |    |    |    |    |    |      |      |      |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes               | Normal Mode On, Idle Mode On, Sleep Out | Yes      | Partial Mode On, Idle Mode Off, Sleep Out | Yes      | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Default                                   | <table><tr><th rowspan="2">Status</th><th>Default Value</th></tr><tr><td>APC[2:0]</td></tr><tr><td>Power On Sequence</td><td>1d</td></tr><tr><td>SW Reset</td><td>1d</td></tr><tr><td>HW Reset</td><td>1d</td></tr></table>                                                                                                                                                                |          |                                            |       |    |    |    |    |    |      |      |      |     | Status | Default Value | APC[2:0]                                 | Power On Sequence | 1d                                      | SW Reset | 1d                                        | HW Reset | 1d                                       |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
|                                           | APC[2:0]                                                                                                                                                                                                                                                                                                                                                                                   |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Power On Sequence                         | 1d                                                                                                                                                                                                                                                                                                                                                                                         |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| SW Reset                                  | 1d                                                                                                                                                                                                                                                                                                                                                                                         |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| HW Reset                                  | 1d                                                                                                                                                                                                                                                                                                                                                                                         |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |
| Flow Chart                                | <div><div><div>PWCTR5(C4h)</div><div>↓</div><div>1st Parameter: APC[2:0]</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                                                    |          |                                            |       |    |    |    |    |    |      |      |      |     |        |               |                                          |                   |                                         |          |                                           |          |                                          |     |          |     |

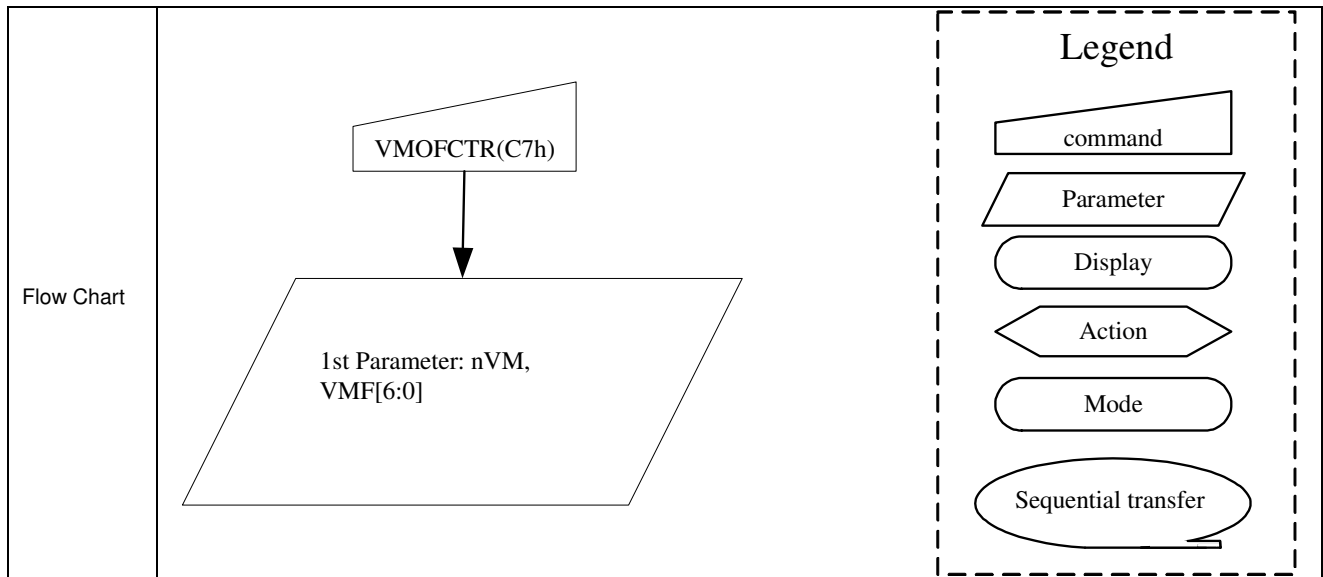
### 14.2.49 VCOM\_Control 1 (C5h)

| C5H                       | VCOM_Control1                                                                                                                                                                                                                                                                                 |       |          |         |          |        |          |       |          |         |          |        |               |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------|---------|----------|--------|----------|-------|----------|---------|----------|--------|---------------|
|                           | D/CX                                                                                                                                                                                                                                                                                          | RDX   | WRX      | D17-8   | D7       | D6     | D5       | D4    | D3       | D2      | D1       | D0     | HEX           |
| Command                   | 0                                                                                                                                                                                                                                                                                             | 1     | ↑        | x       | 1        | 1      | 0        | 0     | 0        | 1       | 0        | 1      | C5h           |
| 1 <sup>st</sup> Parameter | 1                                                                                                                                                                                                                                                                                             | 1     | ↑        | x       | x        | VMH6   | VMH5     | VMH4  | VMH3     | VMH2    | VMH1     | VMH0   | -             |
| 2 <sup>nd</sup> Parameter | 1                                                                                                                                                                                                                                                                                             | 1     | ↑        | x       | 0        | VML6   | VML5     | VML4  | VML3     | VML2    | VML1     | VML0   | -             |
| Description               | Set VCOMH Voltage                                                                                                                                                                                                                                                                             |       |          |         |          |        |          |       |          |         |          |        |               |
|                           | VMH[6:0]                                                                                                                                                                                                                                                                                      | VCOMH | VMH[6:0] | VCOMH   | VMH[6:0] | VCOMH  | VMH[6:0] | VCOMH | VMH[6:0] | VCOMH   | VMH[6:0] | VCOMH  |               |
|                           | 0000000                                                                                                                                                                                                                                                                                       | 0     | 2.500    | 0011011 | 27       | 3.175  | 0110110  | 54    | 3.850    | 1010001 | 81       | 4.525  |               |
|                           | 0000001                                                                                                                                                                                                                                                                                       | 1     | 2.525    | 0011100 | 28       | 3.200  | 0110111  | 55    | 3.875    | 1010010 | 82       | 4.550  |               |
|                           | 0000010                                                                                                                                                                                                                                                                                       | 2     | 2.550    | 0011101 | 29       | 3.225  | 0111000  | 56    | 3.900    | 1010011 | 83       | 4.575  |               |
|                           | 0000011                                                                                                                                                                                                                                                                                       | 3     | 2.575    | 0011110 | 30       | 3.250  | 0111001  | 57    | 3.925    | 1010100 | 84       | 4.600  |               |
|                           | 0000100                                                                                                                                                                                                                                                                                       | 4     | 2.600    | 0011111 | 31       | 3.275  | 0111010  | 58    | 3.950    | 1010101 | 85       | 4.625  |               |
|                           | 0000101                                                                                                                                                                                                                                                                                       | 5     | 2.625    | 0100000 | 32       | 3.300  | 0111011  | 59    | 3.975    | 1010110 | 86       | 4.650  |               |
|                           | 0000110                                                                                                                                                                                                                                                                                       | 6     | 2.650    | 0100001 | 33       | 3.325  | 0111100  | 60    | 4.000    | 1010111 | 87       | 4.675  |               |
|                           | 0000111                                                                                                                                                                                                                                                                                       | 7     | 2.675    | 0100010 | 34       | 3.350  | 0111101  | 61    | 4.025    | 1011000 | 88       | 4.700  |               |
|                           | 0001000                                                                                                                                                                                                                                                                                       | 8     | 2.700    | 0100011 | 35       | 3.375  | 0111110  | 62    | 4.050    | 1011001 | 89       | 4.725  |               |
|                           | 0001001                                                                                                                                                                                                                                                                                       | 9     | 2.725    | 0100100 | 36       | 3.400  | 0111111  | 63    | 4.075    | 1011010 | 90       | 4.750  |               |
|                           | 0001010                                                                                                                                                                                                                                                                                       | 10    | 2.750    | 0100101 | 37       | 3.425  | 1000000  | 64    | 4.100    | 1011011 | 91       | 4.775  |               |
|                           | 0001011                                                                                                                                                                                                                                                                                       | 11    | 2.775    | 0100110 | 38       | 3.450  | 1000001  | 65    | 4.125    | 1011100 | 92       | 4.800  |               |
|                           | 0001100                                                                                                                                                                                                                                                                                       | 12    | 2.800    | 0100111 | 39       | 3.475  | 1000010  | 66    | 4.150    | 1011101 | 93       | 4.825  |               |
|                           | 0001101                                                                                                                                                                                                                                                                                       | 13    | 2.825    | 0101000 | 40       | 3.500  | 1000011  | 67    | 4.175    | 1011110 | 94       | 4.850  |               |
|                           | 0001110                                                                                                                                                                                                                                                                                       | 14    | 2.850    | 0101001 | 41       | 3.525  | 1000100  | 68    | 4.200    | 1011111 | 95       | 4.875  |               |
|                           | 0001111                                                                                                                                                                                                                                                                                       | 15    | 2.875    | 0101010 | 42       | 3.550  | 1000101  | 69    | 4.225    | 1100000 | 96       | 4.900  |               |
|                           | 0010000                                                                                                                                                                                                                                                                                       | 16    | 2.900    | 0101011 | 43       | 3.575  | 1000110  | 70    | 4.250    | 1100001 | 97       | 4.925  |               |
|                           | 0010001                                                                                                                                                                                                                                                                                       | 17    | 2.925    | 0101100 | 44       | 3.600  | 1000111  | 71    | 4.275    | 1100010 | 98       | 4.950  |               |
|                           | 0010010                                                                                                                                                                                                                                                                                       | 18    | 2.950    | 0101101 | 45       | 3.625  | 1001000  | 72    | 4.300    | 1100011 | 99       | 4.975  |               |
|                           | 0010011                                                                                                                                                                                                                                                                                       | 19    | 2.975    | 0101110 | 46       | 3.650  | 1001001  | 73    | 4.325    | 1100100 | 100      | 5.000  |               |
|                           | 0010100                                                                                                                                                                                                                                                                                       | 20    | 3.000    | 0101111 | 47       | 3.675  | 1001010  | 74    | 4.350    | 1100101 | 101      |        |               |
|                           | 0010101                                                                                                                                                                                                                                                                                       | 21    | 3.025    | 0110000 | 48       | 3.700  | 1001011  | 75    | 4.375    |         |          |        | Not Permitted |
|                           | 0010110                                                                                                                                                                                                                                                                                       | 22    | 3.050    | 0110001 | 49       | 3.725  | 1001100  | 76    | 4.400    | 0111111 | 127      |        |               |
|                           | 0010111                                                                                                                                                                                                                                                                                       | 23    | 3.075    | 0110010 | 50       | 3.750  | 1001101  | 77    | 4.425    |         |          |        |               |
|                           | 0011000                                                                                                                                                                                                                                                                                       | 24    | 3.100    | 0110011 | 51       | 3.775  | 1001110  | 78    | 4.450    |         |          |        |               |
|                           | 0011001                                                                                                                                                                                                                                                                                       | 25    | 3.125    | 0110100 | 52       | 3.800  | 1001111  | 79    | 4.475    |         |          |        |               |
|                           | 0011010                                                                                                                                                                                                                                                                                       | 26    | 3.150    | 0110101 | 53       | 3.825  | 1010000  | 80    | 4.500    |         |          |        |               |
|                           | -Set VCOML Voltage                                                                                                                                                                                                                                                                            |       |          |         |          |        |          |       |          |         |          |        |               |
|                           | VML[6:0]                                                                                                                                                                                                                                                                                      | VCOML | VML[6:0] | VCOML   | VML[6:0] | VCOML  | VML[6:0] | VCOML | VML[6:0] | VCOML   | VML[6:0] | VCOML  |               |
|                           | 0000000                                                                                                                                                                                                                                                                                       | 0     | -2.500   | 0011011 | 27       | -1.825 | 0110110  | 54    | -1.150   | 1010001 | 81       | -0.475 |               |
|                           | 0000001                                                                                                                                                                                                                                                                                       | 1     | -2.475   | 0011100 | 28       | -1.800 | 0110111  | 55    | -1.125   | 1010010 | 82       | -0.450 |               |
|                           | 0000010                                                                                                                                                                                                                                                                                       | 2     | -2.450   | 0011101 | 29       | -1.775 | 0111000  | 56    | -1.100   | 1010011 | 83       | -0.425 |               |
|                           | 0000011                                                                                                                                                                                                                                                                                       | 3     | -2.425   | 0011110 | 30       | -1.750 | 0111001  | 57    | -1.075   | 1010100 | 84       | -0.400 |               |
|                           | 0000100                                                                                                                                                                                                                                                                                       | 4     | -2.400   | 0011111 | 31       | -1.725 | 0111010  | 58    | -1.050   | 1010101 | 85       | -0.375 |               |
|                           | 0000101                                                                                                                                                                                                                                                                                       | 5     | -2.375   | 0100000 | 32       | -1.700 | 0111011  | 59    | -1.025   | 1010110 | 86       | -0.350 |               |
|                           | 0000110                                                                                                                                                                                                                                                                                       | 6     | -2.350   | 0100001 | 33       | -1.675 | 0111100  | 60    | -1.000   | 1010111 | 87       | -0.325 |               |
|                           | 0000111                                                                                                                                                                                                                                                                                       | 7     | -2.325   | 0100010 | 34       | -1.650 | 0111101  | 61    | -0.975   | 1011000 | 88       | -0.300 |               |
|                           | 0001000                                                                                                                                                                                                                                                                                       | 8     | -2.300   | 0100011 | 35       | -1.625 | 0111110  | 62    | -0.950   | 1011001 | 89       | -0.275 |               |
|                           | 0001001                                                                                                                                                                                                                                                                                       | 9     | -2.275   | 0100100 | 36       | -1.600 | 0111111  | 63    | -0.925   | 1011010 | 90       | -0.250 |               |
|                           | 0001010                                                                                                                                                                                                                                                                                       | 10    | -2.250   | 0100101 | 37       | -1.575 | 1000000  | 64    | -0.900   | 1011011 | 91       | -0.225 |               |
|                           | 0001011                                                                                                                                                                                                                                                                                       | 11    | -2.225   | 0100110 | 38       | -1.550 | 1000001  | 65    | -0.875   | 1011100 | 92       | -0.200 |               |
|                           | 0001100                                                                                                                                                                                                                                                                                       | 12    | -2.200   | 0100111 | 39       | -1.525 | 1000010  | 66    | -0.850   | 1011101 | 93       | -0.175 |               |
|                           | 0001101                                                                                                                                                                                                                                                                                       | 13    | -2.175   | 0101000 | 40       | -1.500 | 1000011  | 67    | -0.825   | 1011110 | 94       | -0.150 |               |
|                           | 0001110                                                                                                                                                                                                                                                                                       | 14    | -2.150   | 0101001 | 41       | -1.475 | 1000100  | 68    | -0.800   | 1011111 | 95       | -0.125 |               |
|                           | 0001111                                                                                                                                                                                                                                                                                       | 15    | -2.125   | 0101010 | 42       | -1.450 | 1000101  | 69    | -0.775   | 1100000 | 96       | -0.100 |               |
|                           | 0010000                                                                                                                                                                                                                                                                                       | 16    | -2.100   | 0101011 | 43       | -1.425 | 1000110  | 70    | -0.750   | 1100001 | 97       | -0.075 |               |
|                           | 0010001                                                                                                                                                                                                                                                                                       | 17    | -2.075   | 0101100 | 44       | -1.400 | 1000111  | 71    | -0.725   | 1100010 | 98       | -0.050 |               |
|                           | 0010010                                                                                                                                                                                                                                                                                       | 18    | -2.050   | 0101101 | 45       | -1.375 | 1001000  | 72    | -0.700   | 1100011 | 99       | -0.025 |               |
|                           | 0010011                                                                                                                                                                                                                                                                                       | 19    | -2.025   | 0101110 | 46       | -1.350 | 1001001  | 73    | -0.675   | 1100100 | 100      | 0.000  |               |
|                           | 0010100                                                                                                                                                                                                                                                                                       | 20    | -2.000   | 0101111 | 47       | -1.325 | 1001010  | 74    | -0.650   | 1100101 | 101      |        |               |
|                           | 0010101                                                                                                                                                                                                                                                                                       | 21    | -1.975   | 0110000 | 48       | -1.300 | 1001011  | 75    | -0.625   |         |          |        | Not Permitted |
|                           | 0010110                                                                                                                                                                                                                                                                                       | 22    | -1.950   | 0110001 | 49       | -1.275 | 1001100  | 76    | -0.600   | 1111111 | 127      |        |               |
|                           | 0010111                                                                                                                                                                                                                                                                                       | 23    | -1.925   | 0110010 | 50       | -1.250 | 1001101  | 77    | -0.575   |         |          |        |               |
|                           | 0011000                                                                                                                                                                                                                                                                                       | 24    | -1.900   | 0110011 | 51       | -1.225 | 1001110  | 78    | -0.550   |         |          |        |               |
|                           | 0011001                                                                                                                                                                                                                                                                                       | 25    | -1.875   | 0110100 | 52       | -1.200 | 1001111  | 79    | -0.525   |         |          |        |               |
|                           | 0011010                                                                                                                                                                                                                                                                                       | 26    | -1.850   | 0110101 | 53       | -1.175 | 1010000  | 80    | -0.500   |         |          |        |               |
| Restriction               | -If this register not using the register need be reserved.<br>-The VCOM amplitude: VCOMH-VCOML <=5.5V<br>-The deviation value of VCOMH/VCOML between with Measurement and Specification: Max <=25mV<br>-The deviation value of VCOMAC between with Measurement and Specification: Max <= 50mV |       |          |         |          |        |          |       |          |         |          |        |               |

| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> | Status   | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes      | Partial Mode On, Idle Mode Off, Sleep Out | Yes               | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes      |    |     |     |          |    |     |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------|------------------------------------------|-----|-----------------------------------------|----------|-------------------------------------------|-------------------|------------------------------------------|-----|----------|----------|----|-----|-----|----------|----|-----|-----|
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |          |               |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |          |               |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |          |               |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |          |               |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |          |               |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |          |               |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |
| Default                                   | <table><tr><th rowspan="2">Status</th><th colspan="3">Default Value</th></tr><tr><th>nVM</th><th>VMH[6:0]</th><th>VML[6:0]</th></tr><tr><td>Power On Sequence</td><td>0d</td><td>67d</td><td>77d</td></tr><tr><td>SW Reset</td><td>0d</td><td>67d</td><td>77d</td></tr><tr><td>HW Reset</td><td>0d</td><td>67d</td><td>77d</td></tr></table>                                               | Status   | Default Value |                                          |     | nVM                                     | VMH[6:0] | VML[6:0]                                  | Power On Sequence | 0d                                       | 67d | 77d      | SW Reset | 0d | 67d | 77d | HW Reset | 0d | 67d | 77d |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |          |               |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |
|                                           | nVM                                                                                                                                                                                                                                                                                                                                                                                        | VMH[6:0] | VML[6:0]      |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |
| Power On Sequence                         | 0d                                                                                                                                                                                                                                                                                                                                                                                         | 67d      | 77d           |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |
| SW Reset                                  | 0d                                                                                                                                                                                                                                                                                                                                                                                         | 67d      | 77d           |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |
| HW Reset                                  | 0d                                                                                                                                                                                                                                                                                                                                                                                         | 67d      | 77d           |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |
| Flow Chart                                | <div><div><div>VMCTR(C5h)</div><div></div><div>1st Parameter: VMH[6:0]<br/>2nd Parameter: VML[6:0]</div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div>                                                                                                          |          |               |                                          |     |                                         |          |                                           |                   |                                          |     |          |          |    |     |     |          |    |     |     |

### 14.2.51 VCOM Offset Control (C7h)

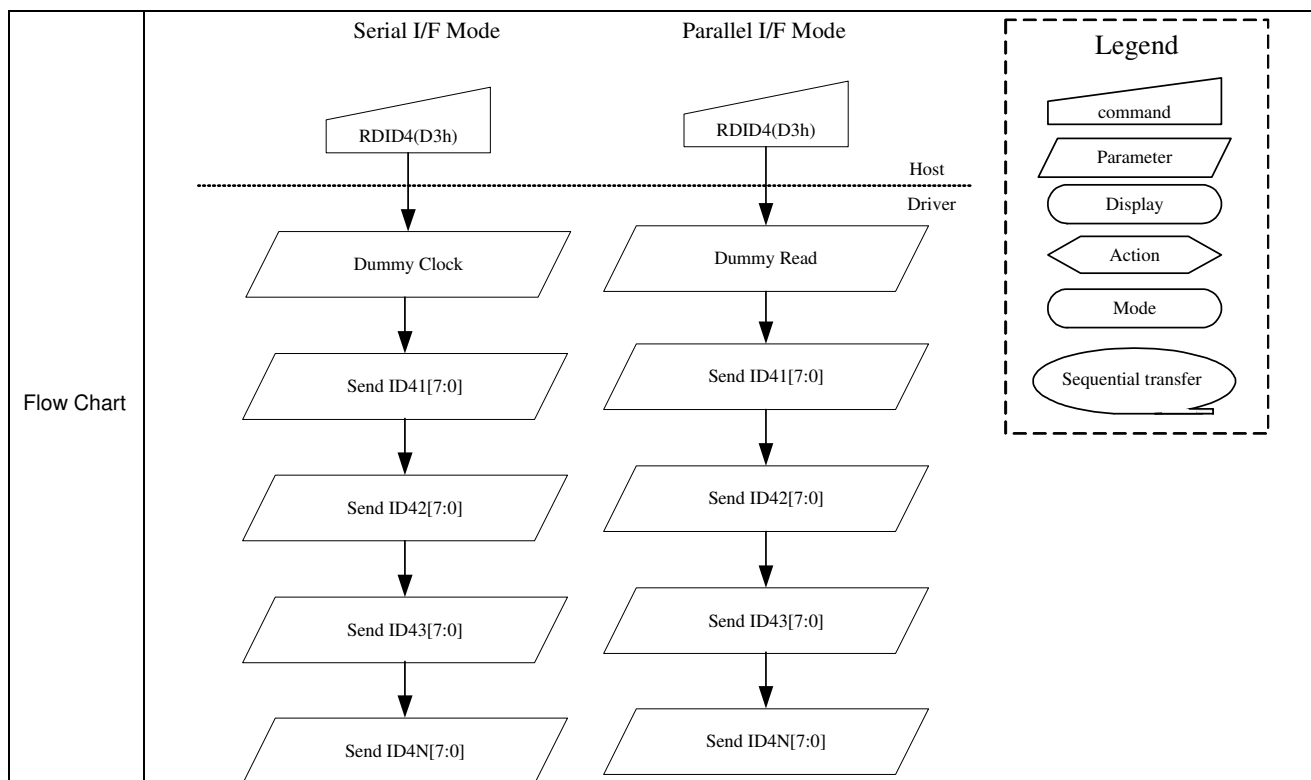
| C7H                                                                                                                                                                                            | VCOM Offset Control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------|-------|------|------|------|------|------|------|------|------|-----|----------------|------------------------|------------------------------------------|-----|---------------------------------------------|-------|-------------------------------------------|-----------|------------------------------------------|-----|-----------|-----------|---|---|---|----|----------|----------|----|----------|----------|----|-------|-------|----|----------|----------|----|----------|----------|---|---|---|-----|-----------|-----------|-----|-----------|-----------|
|                                                                                                                                                                                                | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | RDX          | WRX                | D17-8 | D7   | D6   | D5   | D4   | D3   | D2   | D1   | D0   | HEX |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Command                                                                                                                                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1            | ↑                  | x     | 1    | 1    | 0    | 0    | 0    | 1    | 1    | 1    | C7h |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| 1 <sup>st</sup> Parameter                                                                                                                                                                      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1            | ↑                  | 0     | nVM* | VMF6 | VMF5 | VMF4 | VMF3 | VMF2 | VMF1 | VMF0 | 40h |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Description                                                                                                                                                                                    | -Set VCOMH Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
|                                                                                                                                                                                                | <table><tr><th>VMF[6:0]</th><th>VCOMH Output</th><th>VCOML Output Level</th></tr><tr><td>0</td><td>“VMH”</td><td>“VML”</td></tr><tr><td>1</td><td>“VMH”-63d</td><td>“VML”-63d</td></tr><tr><td>2</td><td>“VMH”-62d</td><td>“VML”-62d</td></tr><tr><td>:</td><td>:</td><td>:</td></tr><tr><td>62</td><td>“VMH”-2d</td><td>“VML”-2d</td></tr><tr><td>63</td><td>“VMH”-1d</td><td>“VML”-1d</td></tr><tr><td>64</td><td>“VMH”</td><td>“VML”</td></tr><tr><td>65</td><td>“VMH”+1d</td><td>“VML”+1d</td></tr><tr><td>66</td><td>“VMH”+2d</td><td>“VML”+2d</td></tr><tr><td>:</td><td>:</td><td>:</td></tr><tr><td>126</td><td>“VMH”+62d</td><td>“VML”+62d</td></tr><tr><td>127</td><td>“VMH”+63d</td><td>“VML”+63d</td></tr></table> |              |                    |       |      |      |      |      |      |      |      |      |     | VMF[6:0]       | VCOMH Output           | VCOML Output Level                       | 0   | “VMH”                                       | “VML” | 1                                         | “VMH”-63d | “VML”-63d                                | 2   | “VMH”-62d | “VML”-62d | : | : | : | 62 | “VMH”-2d | “VML”-2d | 63 | “VMH”-1d | “VML”-1d | 64 | “VMH” | “VML” | 65 | “VMH”+1d | “VML”+1d | 66 | “VMH”+2d | “VML”+2d | : | : | : | 126 | “VMH”+62d | “VML”+62d | 127 | “VMH”+63d | “VML”+63d |
|                                                                                                                                                                                                | VMF[6:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | VCOMH Output | VCOML Output Level |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
|                                                                                                                                                                                                | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | “VMH”        | “VML”              |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
|                                                                                                                                                                                                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | “VMH”-63d    | “VML”-63d          |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
|                                                                                                                                                                                                | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | “VMH”-62d    | “VML”-62d          |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
|                                                                                                                                                                                                | :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | :            | :                  |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
|                                                                                                                                                                                                | 62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | “VMH”-2d     | “VML”-2d           |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
|                                                                                                                                                                                                | 63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | “VMH”-1d     | “VML”-1d           |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
|                                                                                                                                                                                                | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | “VMH”        | “VML”              |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| 65                                                                                                                                                                                             | “VMH”+1d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | “VML”+1d     |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| 66                                                                                                                                                                                             | “VMH”+2d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | “VML”+2d     |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| :                                                                                                                                                                                              | :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | :            |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| 126                                                                                                                                                                                            | “VMH”+62d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | “VML”+62d    |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| 127                                                                                                                                                                                            | “VMH”+63d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | “VML”+63d    |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| If “VMH”+xd or “VML”+xd is less than 0d, it becomes 0d                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| If “VMH”+xd or “VML”+xd is large than 100d, it becomes 100d                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| VMF[5:0] are stored in NV memory to contrast                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| -Select the VMF[6:0]value                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| <table><tr><td>nVM</td><td>VMF[6:0] value</td></tr><tr><td>0</td><td>VCOM offset value from NV memory</td></tr><tr><td>1</td><td>VCOM offset value in the VMF[6:0] registers</td></tr></table> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                    |       |      |      |      |      |      |      |      |      | nVM | VMF[6:0] value | 0                      | VCOM offset value from NV memory         | 1   | VCOM offset value in the VMF[6:0] registers |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| nVM                                                                                                                                                                                            | VMF[6:0] value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| 0                                                                                                                                                                                              | VCOM offset value from NV memory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| 1                                                                                                                                                                                              | VCOM offset value in the VMF[6:0] registers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Restriction                                                                                                                                                                                    | -If this register not use the register need be reserved.<br>-To control the VCOM output voltage with VMF[5::0] command, nVM parameter should be set ‘1’                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Register Availability                                                                                                                                                                          | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                                                     |              |                    |       |      |      |      |      |      |      |      |      |     | Status         | Availability           | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out     | Yes   | Partial Mode On, Idle Mode Off, Sleep Out | Yes       | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In  | Yes       |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Status                                                                                                                                                                                         | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Normal Mode On, Idle Mode Off, Sleep Out                                                                                                                                                       | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Normal Mode On, Idle Mode On, Sleep Out                                                                                                                                                        | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Partial Mode On, Idle Mode Off, Sleep Out                                                                                                                                                      | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Partial Mode On, Idle Mode On, Sleep Out                                                                                                                                                       | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Sleep In                                                                                                                                                                                       | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Default                                                                                                                                                                                        | <table><tr><th>Status</th><th>Default Value VMF[6:0]</th></tr><tr><td>Power On Sequence</td><td>40h</td></tr><tr><td>SW Reset</td><td>40h</td></tr><tr><td>HW Reset</td><td>40h</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |                    |       |      |      |      |      |      |      |      |      |     | Status         | Default Value VMF[6:0] | Power On Sequence                        | 40h | SW Reset                                    | 40h   | HW Reset                                  | 40h       |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Status                                                                                                                                                                                         | Default Value VMF[6:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| Power On Sequence                                                                                                                                                                              | 40h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| SW Reset                                                                                                                                                                                       | 40h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |
| HW Reset                                                                                                                                                                                       | 40h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |                    |       |      |      |      |      |      |      |      |      |     |                |                        |                                          |     |                                             |       |                                           |           |                                          |     |           |           |   |   |   |    |          |          |    |          |          |    |       |       |    |          |          |    |          |          |   |   |   |     |           |           |     |           |           |



### 14.2.52 Write ID4 Value (D3h)

| D3H                                       | Read the ID4 value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |           |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|--------|---------------|------------------------------------------|-----|-----------------------------------------|-----------|-------------------------------------------|-------------------|------------------------------------------|-----|----------|----------|-----|-----|-----|----------|-----|-----|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RDX       | WRX       | D17-8 | D7    | D6    | D5    | D4    | D3    | D2    | D1    | D0    | HEX |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1         | ↑         | x     | 1     | 1     | 0     | 1     | 0     | 0     | 1     | 1     | D3h |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ↑         | 1         | x     | x     | x     | x     | x     | x     | x     | x     | x     | x   |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ↑         | 1         | x     | ID417 | ID416 | ID415 | ID414 | ID413 | ID412 | ID411 | ID410 | 91h |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| 3 <sup>rd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ↑         | 1         | x     | ID427 | ID426 | ID425 | ID424 | ID423 | ID422 | ID421 | ID420 | 63h |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| 4 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ↑         | 1         | x     | x     | x     | x     | x     | ID433 | ID432 | ID431 | ID430 | 00h |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| 5 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ↑         | 1         | x     | x     | x     | x     | x     | x     | x     | x     | x     | x   |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Description                               | <div>-Read the Driver IC information from mask value.</div> <div>-Ignored the EXTC pin.</div> <div>-The 1<sup>st</sup> parameter is dummy data</div> <div>-The 2<sup>nd</sup> parameter ID41[7:0] is Driver IC ID code. (Default value=91h)</div> <div>-The value be defined later</div> <div>-Currently, “01h”, “02h”, “03h”, “05h” can’t be used.</div> <div>-The 3<sup>rd</sup> parameter ID42[7:0] is Driver IC Part number ID. (The code be define by Driver IC Vendor, and default value=63h)</div> <div>-The 4<sup>th</sup> parameter ID43[7:0] is Driver IC version ID</div> <div>-When the Driver maker modifies any function it should be modify the parameters at this ID code before sample out also.</div> <div>-If Driver Maker don't need 2 parameter if can't reduce to one parameter.</div> <div>-If the parameters are not enough Driver makers can add or reduce yourself</div> |           |           |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Restriction                               | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |           |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |           |       |       |       |       |       |       |       |       |       |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes       | Partial Mode On, Idle Mode Off, Sleep Out | Yes               | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes      |     |     |     |          |     |     |     |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |           |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |           |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |           |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |           |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |           |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |           |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Default                                   | <table><tr><th rowspan="2">Status</th><th colspan="3">Default Value</th></tr><tr><th>ID41[7:0]</th><th>ID42[7:0]</th><th>ID43[7:0]</th></tr><tr><td>Power On Sequence</td><td>01h</td><td>21h</td><td>TBD</td></tr><tr><td>SW Reset</td><td>01h</td><td>21h</td><td>TBD</td></tr><tr><td>HW Reset</td><td>01h</td><td>21h</td><td>TBD</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |           |       |       |       |       |       |       |       |       |       |     | Status | Default Value |                                          |     | ID41[7:0]                               | ID42[7:0] | ID43[7:0]                                 | Power On Sequence | 01h                                      | 21h | TBD      | SW Reset | 01h | 21h | TBD | HW Reset | 01h | 21h | TBD |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |           |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
|                                           | ID41[7:0]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ID42[7:0] | ID43[7:0] |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| Power On Sequence                         | 01h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 21h       | TBD       |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| SW Reset                                  | 01h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 21h       | TBD       |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |
| HW Reset                                  | 01h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 21h       | TBD       |       |       |       |       |       |       |       |       |       |     |        |               |                                          |     |                                         |           |                                           |                   |                                          |     |          |          |     |     |     |          |     |     |     |





**14.2.53 NV Memory Function Controller(1) (D5h)**

| D5H                       | NV Memory Function Controller1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |      |       |            |      |      |      |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------|-------|------------|------|------|------|--------------|--------------|--------------|--------------|-----|-------------|---------------------------|--|--|--|--|--|--|--|------|------|------|------|------|------|------|------|-----------------|---|---|---|---|---|---|---|---|-----------------|---|---|---|---|---|---|---|---|-----------------|---|---|---|---|---|---|---|---|-----------------|---|---|---|---|---|---|---|---|
|                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | RDX                       | WRX  | D17-8 | D7         | D6   | D5   | D4   | D3           | D2           | D1           | D0           | HEX |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| Command                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1                         | ↑    | x     | 1          | 1    | 0    | 1    | 1            | 0            | 1            | 0            | D5h |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| 1 <sup>st</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1                         | ↑    | x     | ID33       | ID32 | ID31 | ID30 | ID23         | ID22         | ID21         | ID20         | 00h |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| 2 <sup>nd</sup> Parameter | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1                         | ↑    | x     | OTP_<br>BS | 0    | 0    | 0    | OTP_<br>VMF3 | OTP_<br>VMF2 | OTP_<br>VMF1 | OTP_<br>VMF0 | 00h |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| Description               | -ID2,ID3,and VMF can be written four times.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |      |       |            |      |      |      |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
|                           | -Read status(written times) of the NV memory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                           |      |       |            |      |      |      |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
|                           | -Written times for ID2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                           |      |       |            |      |      |      |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
|                           | <table><tr><th rowspan="2">Times \ ID2</th><th colspan="8">1<sup>st</sup> Parameter</th></tr><tr><th>ID33</th><th>ID32</th><th>ID31</th><th>ID30</th><th>ID23</th><th>ID22</th><th>ID21</th><th>ID20</th></tr><tr><td>1<sup>st</sup></td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>2<sup>nd</sup></td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>3<sup>rd</sup></td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td></tr><tr><td>4<sup>th</sup></td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr></table> |                           |      |       |            |      |      |      |              |              |              |              |     | Times \ ID2 | 1 <sup>st</sup> Parameter |  |  |  |  |  |  |  | ID33 | ID32 | ID31 | ID30 | ID23 | ID22 | ID21 | ID20 | 1 <sup>st</sup> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 <sup>nd</sup> | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 <sup>rd</sup> | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 4 <sup>th</sup> | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
|                           | Times \ ID2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1 <sup>st</sup> Parameter |      |       |            |      |      |      |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| ID33                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ID32                      | ID31 | ID30  | ID23       | ID22 | ID21 | ID20 |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| 1 <sup>st</sup>           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0                         | 0    | 0     | 0          | 0    | 0    | 1    |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| 2 <sup>nd</sup>           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0                         | 0    | 0     | 0          | 0    | 1    | 1    |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| 3 <sup>rd</sup>           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0                         | 0    | 0     | 0          | 1    | 1    | 1    |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| 4 <sup>th</sup>           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0                         | 0    | 0     | 1          | 1    | 1    | 1    |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
|                           | -Written times for ID3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                           |      |       |            |      |      |      |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
|                           | <table><tr><th rowspan="2">Times \ ID3</th><th colspan="8">1<sup>st</sup> Parameter</th></tr><tr><th>ID33</th><th>ID32</th><th>ID31</th><th>ID30</th><th>ID23</th><th>ID22</th><th>ID21</th><th>ID20</th></tr><tr><td>1<sup>st</sup></td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>2<sup>nd</sup></td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>3<sup>rd</sup></td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>4<sup>th</sup></td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table> |                           |      |       |            |      |      |      |              |              |              |              |     | Times \ ID3 | 1 <sup>st</sup> Parameter |  |  |  |  |  |  |  | ID33 | ID32 | ID31 | ID30 | ID23 | ID22 | ID21 | ID20 | 1 <sup>st</sup> | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 <sup>nd</sup> | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 3 <sup>rd</sup> | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 4 <sup>th</sup> | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| Times \ ID3               | 1 <sup>st</sup> Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                           |      |       |            |      |      |      |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
|                           | ID33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ID32                      | ID31 | ID30  | ID23       | ID22 | ID21 | ID20 |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| 1 <sup>st</sup>           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0                         | 0    | 1     | 0          | 0    | 0    | 0    |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| 2 <sup>nd</sup>           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0                         | 1    | 1     | 0          | 0    | 0    | 0    |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| 3 <sup>rd</sup>           | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1                         | 1    | 1     | 0          | 0    | 0    | 0    |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
| 4 <sup>th</sup>           | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1                         | 1    | 1     | 0          | 0    | 0    | 0    |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |
|                           | -Written times for OTP_VMF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                           |      |       |            |      |      |      |              |              |              |              |     |             |                           |  |  |  |  |  |  |  |      |      |      |      |      |      |      |      |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |                 |   |   |   |   |   |   |   |   |

| OTP_VMF<br>Times | 2 <sup>nd</sup> Parameter |      |      |      |
|------------------|---------------------------|------|------|------|
|                  | VMF3                      | VMF2 | VMF1 | VMF0 |
| 1 <sup>st</sup>  | 0                         | 0    | 0    | 1    |
| 2 <sup>nd</sup>  | 0                         | 0    | 1    | 1    |
| 3 <sup>rd</sup>  | 0                         | 1    | 1    | 1    |
| 4 <sup>th</sup>  | 1                         | 1    | 1    | 1    |

-Parameter 1

bit[7:4] : ID3 Mark bit default by OTP

bit[3:0] : ID2 Mark bit default by OTP

-Parameter 2

bit[7] : OTP Busy status 1'b0

bit[6:4] : None 3'd0

bit[3:0] : VMF Mark bit default by OTP

MTP write EPWRITE command

Please see MTP Access sequence for program(Data write) for more detail

Register  
Availability

| Status                                    | Availability |
|-------------------------------------------|--------------|
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes          |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes          |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes          |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes          |
| Sleep In                                  | Yes          |

Default

| Status            | Default Value |
|-------------------|---------------|
| Power On Sequence | N/A           |
| SW Reset          | N/A           |
| HW Reset          | N/A           |

Flow Chart

**14.2.54 NV Memory Function Controller(2) (D6h)**

| D6H                       | NV Memory Function Controller1                                         |     |     |       |              |              |              |              |              |              |               |               |     |
|---------------------------|------------------------------------------------------------------------|-----|-----|-------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|-----|
|                           | D/CX                                                                   | RDX | WRX | D17-8 | D7           | D6           | D5           | D4           | D3           | D2           | D1            | D0            | HEX |
| Command                   | 0                                                                      | 1   | ↑   | x     | 1            | 1            | 0            | 1            | 1            | 0            | 1             | 0             | D6h |
| 1 <sup>st</sup> Parameter | 1                                                                      | 1   | ↑   | x     | OTP_<br>D[7] | OTP_<br>D[6] | OTP_<br>D[5] | OTP_<br>D[4] | OTP_<br>D[3] | OTP_<br>D[2] | OTP_<br>D[1]  | OTP_<br>D[0]  | 00h |
| 2 <sup>nd</sup> Parameter | 1                                                                      | 1   | ↑   | x     | 0            | 0            | 0            | 0            | 0            | 0            | OTP_<br>TP[1] | OTP_<br>TP[0] | 00h |
| Description               | -Parameter 1                                                           |     |     |       |              |              |              |              |              |              |               |               |     |
|                           | bit[7:0] :     OTP Write Data                   OTP_D[7:0]             |     |     |       |              |              |              |              |              |              |               |               |     |
|                           | ID2[7:0]                                                               |     |     |       |              |              |              |              |              |              |               |               |     |
|                           | ID3[7:0]                                                               |     |     |       |              |              |              |              |              |              |               |               |     |
|                           | {1'b0, VMF[6:0]}                                                       |     |     |       |              |              |              |              |              |              |               |               |     |
|                           | Ctrl[4:0] -> {3'd0, BG_AD[1:0], OSC_CT[2:0]}                           |     |     |       |              |              |              |              |              |              |               |               |     |
| Register Availability     | -Parameter 2     OTP type selection:                                   |     |     |       |              |              |              |              |              |              |               |               |     |
|                           | bit[1:0] :     OTP Address                   OTP[1:0]                  |     |     |       |              |              |              |              |              |              |               |               |     |
|                           | 00: ID2,     01:ID3,     10:VMF,     11:Ctrl                           |     |     |       |              |              |              |              |              |              |               |               |     |
|                           | MTP write EPWRITE command                                              |     |     |       |              |              |              |              |              |              |               |               |     |
|                           | Please see MTP Access sequence for program(Data write) for more detail |     |     |       |              |              |              |              |              |              |               |               |     |
| Default                   |                                                                        |     |     |       |              |              |              |              |              |              |               |               |     |
|                           |                                                                        |     |     |       |              |              |              |              |              |              |               |               |     |
|                           |                                                                        |     |     |       |              |              |              |              |              |              |               |               |     |
|                           |                                                                        |     |     |       |              |              |              |              |              |              |               |               |     |
|                           |                                                                        |     |     |       |              |              |              |              |              |              |               |               |     |
|                           |                                                                        |     |     |       |              |              |              |              |              |              |               |               |     |
| Flow Chart                |                                                                        |     |     |       |              |              |              |              |              |              |               |               |     |
|                           |                                                                        |     |     |       |              |              |              |              |              |              |               |               |     |
|                           |                                                                        |     |     |       |              |              |              |              |              |              |               |               |     |
|                           |                                                                        |     |     |       |              |              |              |              |              |              |               |               |     |

### 14.2.55 NV Memory Function Controller(3) (D7h)

| D7H                                       | NV Memory Function Controller1                                                                                                                                                                                                                                                                                                                                                             |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|----|----|----|----|----|----|----|----|-----|--------|---------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX | WRX | D17-8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | HEX |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | 1  | 1  | 0  | 1  | 1  | 0  | 1  | 0  | D7h |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | 0  | 1  | 0  | 1  | 0  | 1  | 0  | 1  | 55h |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | 1  | 0  | 1  | 0  | 1  | 0  | 1  | 0  | AAh |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 3 <sup>rd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x     | 0  | 1  | 1  | 0  | 0  | 1  | 1  | 0  | 66h |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Description                               | MTP write EPWRITE command<br>Please see MTP Access sequence for program(Data write) for more detail                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |     |     |       |    |    |    |    |    |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>N/A</td></tr><tr><td>SW Reset</td><td>N/A</td></tr><tr><td>HW Reset</td><td>N/A</td></tr></table>                                                                                                                                                                                                   |     |     |       |    |    |    |    |    |    |    |    |     | Status | Default Value | Power On Sequence                        | N/A | SW Reset                                | N/A | HW Reset                                  | N/A |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Power On Sequence                         | N/A                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| SW Reset                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| HW Reset                                  | N/A                                                                                                                                                                                                                                                                                                                                                                                        |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Flow Chart                                |                                                                                                                                                                                                                                                                                                                                                                                            |     |     |       |    |    |    |    |    |    |    |    |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |

### 14.2.34 Read ID1 (DAh)

| DAH                                       | RDID1 (Read ID1)                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|------|------|------|------|------|------|------|------|-----|--------|---------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RDX | WRX | D17-8 | D7   | D6   | D5   | D4   | D3   | D2   | D1   | D0   | HEX |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1   | ↑   | x     | 1    | 1    | 0    | 1    | 1    | 0    | 1    | 0    | DAh |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ↑   | 1   | x     | x    | x    | x    | x    | x    | x    | x    | x    | x   |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ↑   | 1   | x     | ID17 | ID16 | ID15 | ID14 | ID13 | ID12 | ID11 | ID10 | 54h |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Description                               | <p>This read byte return 8-bit LCD module's ID.</p> <p>The 1<sup>st</sup> parameter is dummy data</p> <p>The 2<sup>nd</sup> parameter (ID17to ID10): LCD module manufacturer ID</p> <p>X = Don't care</p>                                                                                                                                                                                                                                                 |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Restriction                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                |     |     |       |      |      |      |      |      |      |      |      |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                              |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>54h</td></tr><tr><td>SW Reset</td><td>54h</td></tr><tr><td>HW Reset</td><td>54h</td></tr></table> <p>Note : ID1 can be modified by metal option</p>                                                                                                                                                                                                                |     |     |       |      |      |      |      |      |      |      |      |     | Status | Default Value | Power On Sequence                        | 54h | SW Reset                                | 54h | HW Reset                                  | 54h |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Power On Sequence                         | 54h                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| SW Reset                                  | 54h                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| HW Reset                                  | 54h                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Flow Chart                                | <div><div><div>Serial I/F Mode</div><div><div>RDID1(DAh)</div><div>↓</div><div>Send 2nd parameter ID1[7:0]</div></div></div><div><div>Parallel I/F Mode</div><div><div>RDID1(DAh)</div><div>↓</div><div>Dummy Read</div><div>↓</div><div>Send 2nd parameter ID1[7:0]</div></div></div><div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div></div> |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |

### 14.2.35 Read ID2 (DBh)

| DBH                                       | RDID2 (Read ID2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|-------|----|------|------|------|------|------|------|------|-----|----------|---------------|------------------------------------------|-----------------|-----------------------------------------|-----------------|-------------------------------------------|-----------------|------------------------------------------|-----|----------|-----|-----|-----|-----|---|-----|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | RDX     | WRX | D17-8 | D7 | D6   | D5   | D4   | D3   | D2   | D1   | D0   | HEX |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1       | ↑   | x     | 1  | 1    | 0    | 1    | 1    | 0    | 1    | 1    | DBh |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ↑       | 1   | x     | x  | x    | x    | x    | x    | x    | x    | x    | x   |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ↑       | 1   | x     | 1  | ID26 | ID25 | ID24 | ID23 | ID22 | ID21 | ID20 | 80h |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Description                               | <p>This read byte returns 8-bit LCD module/driver version ID</p> <p>Th<sup>o</sup> 1st parameter is dummy data</p> <p>Th<sup>o</sup> 2nd parameter (ID26 to ID20): LCD module/driver version ID</p> <p>Parameter Range: ID=80h to FFh</p> <p>Note : See command RDDID(04h) 3rd parameter</p> <table><tr><th>D7 to D0</th><th>Version</th><th>Changes</th></tr><tr><td>80h</td><td>TBD</td><td>TBD</td></tr><tr><td>81h</td><td>TBD</td><td>TBD</td></tr><tr><td>82h</td><td>TBD</td><td>TBD</td></tr><tr><td>83h</td><td>TBD</td><td>TBD</td></tr><tr><td>-</td><td>TBD</td><td>TBD</td></tr></table> |         |     |       |    |      |      |      |      |      |      |      |     | D7 to D0 | Version       | Changes                                  | 80h             | TBD                                     | TBD             | 81h                                       | TBD             | TBD                                      | 82h | TBD      | TBD | 83h | TBD | TBD | - | TBD | TBD |
| D7 to D0                                  | Version                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Changes |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| 80h                                       | TBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | TBD     |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| 81h                                       | TBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | TBD     |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| 82h                                       | TBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | TBD     |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| 83h                                       | TBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | TBD     |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| -                                         | TBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | TBD     |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Restriction                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                                                                                                                            |         |     |       |    |      |      |      |      |      |      |      |     | Status   | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes             | Normal Mode On, Idle Mode On, Sleep Out | Yes             | Partial Mode On, Idle Mode Off, Sleep Out | Yes             | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |     |     |     |   |     |     |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>See Description</td></tr><tr><td>SW Reset</td><td>See Description</td></tr><tr><td>HW Reset</td><td>See Description</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                          |         |     |       |    |      |      |      |      |      |      |      |     | Status   | Default Value | Power On Sequence                        | See Description | SW Reset                                | See Description | HW Reset                                  | See Description |                                          |     |          |     |     |     |     |   |     |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Power On Sequence                         | See Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| SW Reset                                  | See Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| HW Reset                                  | See Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |
| Flow Chart                                | <div><div><div>Serial I/F Mode</div><div><div>RDID2(DBh)</div><div>↓</div><div>Send 2nd parameter ID2[7:0]</div></div></div><div><div>Parallel I/F Mode</div><div><div>RDID2(DBh)</div><div>↓</div><div>Dummy Read</div><div>↓</div><div>Send 2nd parameter ID2[7:0]</div></div></div><div><div>Host</div><div>Driver</div></div></div> <div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div>                                                                                                 |         |     |       |    |      |      |      |      |      |      |      |     |          |               |                                          |                 |                                         |                 |                                           |                 |                                          |     |          |     |     |     |     |   |     |     |

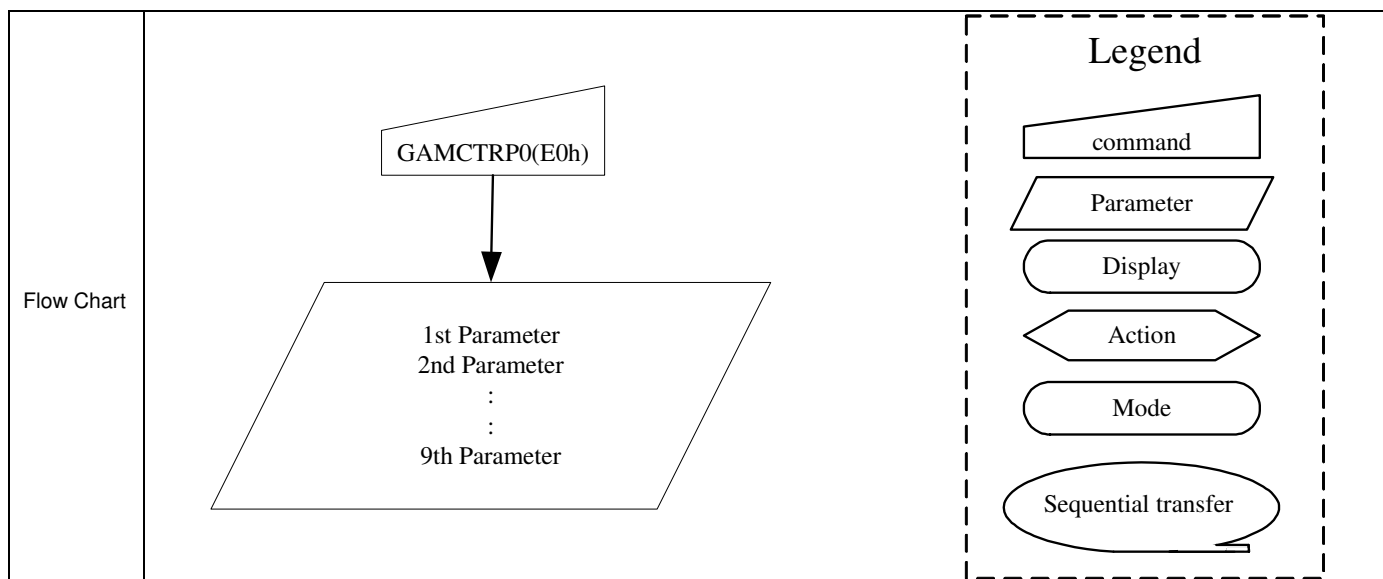
### 14.2.36 Read ID3 (DCh)

| DCH                                       | RDID3 (Read ID3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-------|------|------|------|------|------|------|------|------|-----|--------|---------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | RDX | WRX | D17-8 | D7   | D6   | D5   | D4   | D3   | D2   | D1   | D0   | HEX |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1   | ↑   | x     | 1    | 1    | 0    | 1    | 1    | 1    | 0    | 0    | DCh |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ↑   | 1   | x     | x    | x    | x    | x    | x    | x    | x    | x    | x   |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ↑   | 1   | x     | ID37 | ID36 | ID35 | ID34 | ID33 | ID32 | ID31 | ID30 | 66h |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Description                               | <div>-This read byte return 8-bit LCD module/driver ID</div> <div>-Th<sup>o</sup> 1st parameter is dummy data</div> <div>-Th<sup>o</sup> 2nd parameter (ID37 to ID30): LCD module/driver ID</div> <div>-Parameter range: ID=00h to FFh</div> <div>Note : See command RDDID(04h) 4th parameter</div>                                                                                                                                                                                                   |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Restriction                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table>                                                                                                            |     |     |       |      |      |      |      |      |      |      |      |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>66h</td></tr><tr><td>SW Reset</td><td>66h</td></tr><tr><td>HW Reset</td><td>66h</td></tr></table>                                                                                                                                                                                                                                                                                                              |     |     |       |      |      |      |      |      |      |      |      |     | Status | Default Value | Power On Sequence                        | 66h | SW Reset                                | 66h | HW Reset                                  | 66h |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Power On Sequence                         | 66h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| SW Reset                                  | 66h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| HW Reset                                  | 66h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Flow Chart                                | <div><div><div>Serial I/F Mode</div><div><div>RDID3(DCh)</div><div>↓</div><div>Send 2nd parameter ID3[7:0]</div></div></div><div><div>Parallel I/F Mode</div><div><div>RDID3(DBh)</div><div>↓</div><div>Dummy Read</div><div>↓</div><div>Send 2nd parameter ID3[7:0]</div></div></div><div><div>Host</div><div>Driver</div></div></div> <div><div>Legend</div><div><div>command</div><div>Parameter</div><div>Display</div><div>Action</div><div>Mode</div><div>Sequential transfer</div></div></div> |     |     |       |      |      |      |      |      |      |      |      |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |



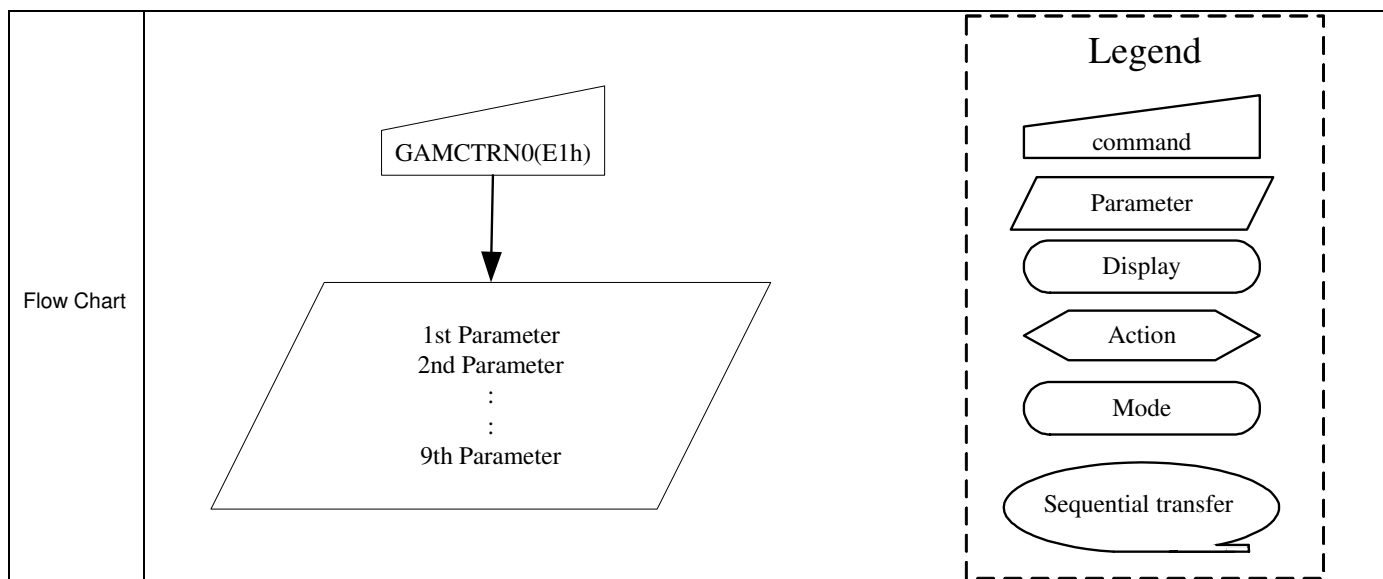
**14.2.56 Positive Gamma Correction Setting (E0h)**

| E1H                                       | Postive Gamma Correction Setting                                                                                                                                                                                                                                                                                                                                                           |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----------|-----------|-----------|-----------|-----------|----|----|----|-----|--------|---------------|------------------------------------------|---------------------------------------------|-----------------------------------------|----------|-------------------------------------------|----------|------------------------------------------|----------|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX | WRX | D7        | D6        | D5        | D4        | D3        | D2 | D1 | D0 | HEX |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | 1         | 1         | 1         | 0         | 0         | 0  | 0  | 1  | E0h |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VP63[5:0] |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VP62[5:0] |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 3 <sup>rd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VP61[5:0] |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 4 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VP59[5:0] |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 5 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VP57[5:0] |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 6 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | x         | VP50[4:0] |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 7 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | VP43[6:0] |           |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 8 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | VP27[3:0] |           |           |           | VP36[3:0] |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 9 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | VP20[6:0] |           |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 10 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | x         | VP13[4:0] |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 11 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VP6[5:0]  |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 12 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VP4[5:0]  |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 13 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VP2[5:0]  |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 14 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VP1[5:0]  |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 15 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VP0[5:0]  |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Description                               | Set the gray scale voltage to adjust the gamma characteristics of the TFT panel.<br>It apply to gamma curve selection for only activate when EXTC=1 and GAM_R_SEL=1<br>VP0 is the maximum gamma output voltage in positive polarity.<br>VP63 is the minimum gamma output voltage in positive polarity.                                                                                     |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Restriction                               | -                                                                                                                                                                                                                                                                                                                                                                                          |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |     |     |           |           |           |           |           |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes                                         | Normal Mode On, Idle Mode On, Sleep Out | Yes      | Partial Mode On, Idle Mode Off, Sleep Out | Yes      | Partial Mode On, Idle Mode On, Sleep Out | Yes      | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td></td><td>1<sup>st</sup> ~ 9<sup>th</sup> Parameter</td></tr><tr><td>Power On Sequence</td><td>All "00"</td></tr><tr><td>SW Reset</td><td>All "00"</td></tr><tr><td>HW Reset</td><td>All "00"</td></tr></table>                                                                                                                |     |     |           |           |           |           |           |    |    |    |     | Status | Default Value |                                          | 1 <sup>st</sup> ~ 9 <sup>th</sup> Parameter | Power On Sequence                       | All "00" | SW Reset                                  | All "00" | HW Reset                                 | All "00" |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
|                                           | 1 <sup>st</sup> ~ 9 <sup>th</sup> Parameter                                                                                                                                                                                                                                                                                                                                                |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Power On Sequence                         | All "00"                                                                                                                                                                                                                                                                                                                                                                                   |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| SW Reset                                  | All "00"                                                                                                                                                                                                                                                                                                                                                                                   |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| HW Reset                                  | All "00"                                                                                                                                                                                                                                                                                                                                                                                   |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |



### 14.2.57 Negative Gamma Correction Setting (E1h)

| E1H                                       | Negative Gamma Correction Setting                                                                                                                                                                                                                                                                                                                                                          |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----------|-----------|-----------|-----------|-----------|----|----|----|-----|--------|---------------|------------------------------------------|---------------------------------------------|-----------------------------------------|----------|-------------------------------------------|----------|------------------------------------------|----------|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX | WRX | D7        | D6        | D5        | D4        | D3        | D2 | D1 | D0 | HEX |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | 1         | 1         | 1         | 0         | 0         | 0  | 0  | 1  | E1h |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VN0[5:0]  |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 2 <sup>nd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VN1[5:0]  |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 3 <sup>rd</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VN2[5:0]  |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 4 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VN4[5:0]  |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 5 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VN6[5:0]  |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 6 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | x         | VN13[4:0] |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 7 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | VN20[6:0] |           |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 8 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | VN36[3:0] |           |           |           | VN27[3:0] |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 9 <sup>th</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | VN43[6:0] |           |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 10 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | x         | VN50[4:0] |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 11 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VN57[5:0] |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 12 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VN59[5:0] |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 13 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VN61[5:0] |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 14 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VN62[5:0] |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| 15 <sup>th</sup> Parameter                | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x         | x         | VN63[5:0] |           |           |    |    |    | x   |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Description                               | Set the gray scale voltage to adjust the gamma characteristics of the TFT panel.<br>It apply to gamma curve selection for only activate when EXTC=1 and GAM_R_SEL=1<br>VN0 is the minimum gamma output voltage in negative polarity.<br>VN63 is the maximum gamma output voltage in negative polarity.                                                                                     |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Restriction                               | -                                                                                                                                                                                                                                                                                                                                                                                          |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |     |     |           |           |           |           |           |    |    |    |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes                                         | Normal Mode On, Idle Mode On, Sleep Out | Yes      | Partial Mode On, Idle Mode Off, Sleep Out | Yes      | Partial Mode On, Idle Mode On, Sleep Out | Yes      | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td></td><td>1<sup>st</sup> ~ 9<sup>th</sup> Parameter</td></tr><tr><td>Power On Sequence</td><td>All "00"</td></tr><tr><td>SW Reset</td><td>All "00"</td></tr><tr><td>HW Reset</td><td>All "00"</td></tr></table>                                                                                                                |     |     |           |           |           |           |           |    |    |    |     | Status | Default Value |                                          | 1 <sup>st</sup> ~ 9 <sup>th</sup> Parameter | Power On Sequence                       | All "00" | SW Reset                                  | All "00" | HW Reset                                 | All "00" |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
|                                           | 1 <sup>st</sup> ~ 9 <sup>th</sup> Parameter                                                                                                                                                                                                                                                                                                                                                |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| Power On Sequence                         | All "00"                                                                                                                                                                                                                                                                                                                                                                                   |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| SW Reset                                  | All "00"                                                                                                                                                                                                                                                                                                                                                                                   |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |
| HW Reset                                  | All "00"                                                                                                                                                                                                                                                                                                                                                                                   |     |     |           |           |           |           |           |    |    |    |     |        |               |                                          |                                             |                                         |          |                                           |          |                                          |          |          |     |



### 14.2.58 GAM\_R\_SEL (F2h)

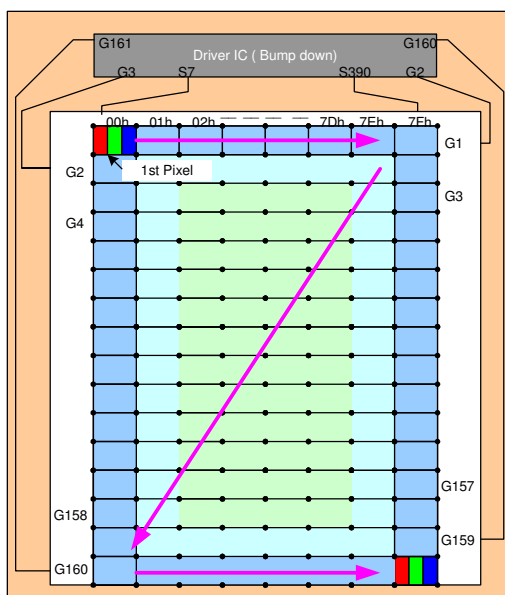
| F2h                                       | Gamma Setting (Green)                                                                                                                                                                                                                                                                                                                                                                      |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|----|----|----|----|----|----|-----------|-----|--------|---------------|------------------------------------------|-----|-----------------------------------------|-----|-------------------------------------------|-----|------------------------------------------|-----|----------|-----|
|                                           | D/CX                                                                                                                                                                                                                                                                                                                                                                                       | RDX | WRX | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0        | HEX |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Command                                   | 0                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | 1  | 1  | 1  | 1  | 0  | 0  | 1  | 0         | F2h |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| 1 <sup>st</sup> Parameter                 | 1                                                                                                                                                                                                                                                                                                                                                                                          | 1   | ↑   | x  | x  | x  | x  | x  | x  | x  | GAM_R_SEL | x   |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Description                               | GAM_R_SEL: Gamma adjustment E0h and E1h enable control<br>0: Disable (Default)<br>1: Enable                                                                                                                                                                                                                                                                                                |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Restriction                               | -                                                                                                                                                                                                                                                                                                                                                                                          |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Register Availability                     | <table><tr><th>Status</th><th>Availability</th></tr><tr><td>Normal Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Normal Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode Off, Sleep Out</td><td>Yes</td></tr><tr><td>Partial Mode On, Idle Mode On, Sleep Out</td><td>Yes</td></tr><tr><td>Sleep In</td><td>Yes</td></tr></table> |     |     |    |    |    |    |    |    |    |           |     | Status | Availability  | Normal Mode On, Idle Mode Off, Sleep Out | Yes | Normal Mode On, Idle Mode On, Sleep Out | Yes | Partial Mode On, Idle Mode Off, Sleep Out | Yes | Partial Mode On, Idle Mode On, Sleep Out | Yes | Sleep In | Yes |
| Status                                    | Availability                                                                                                                                                                                                                                                                                                                                                                               |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode Off, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Normal Mode On, Idle Mode On, Sleep Out   | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode Off, Sleep Out | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Partial Mode On, Idle Mode On, Sleep Out  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Sleep In                                  | Yes                                                                                                                                                                                                                                                                                                                                                                                        |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Default                                   | <table><tr><th>Status</th><th>Default Value</th></tr><tr><td>Power On Sequence</td><td>0h</td></tr><tr><td>SW Reset</td><td>0h</td></tr><tr><td>HW Reset</td><td>0h</td></tr></table>                                                                                                                                                                                                      |     |     |    |    |    |    |    |    |    |           |     | Status | Default Value | Power On Sequence                        | 0h  | SW Reset                                | 0h  | HW Reset                                  | 0h  |                                          |     |          |     |
| Status                                    | Default Value                                                                                                                                                                                                                                                                                                                                                                              |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| Power On Sequence                         | 0h                                                                                                                                                                                                                                                                                                                                                                                         |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| SW Reset                                  | 0h                                                                                                                                                                                                                                                                                                                                                                                         |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |
| HW Reset                                  | 0h                                                                                                                                                                                                                                                                                                                                                                                         |     |     |    |    |    |    |    |    |    |           |     |        |               |                                          |     |                                         |     |                                           |     |                                          |     |          |     |

## 15. Example Connection with Panel direction and Different Resolution

### 15.1 Application of connect with panel direction (when GM='011')

#### Case 1: (This is default case)

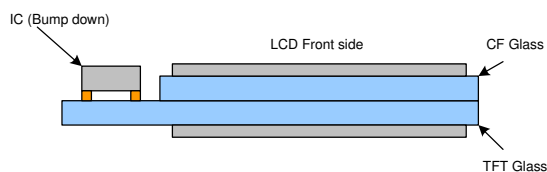
- 1<sup>st</sup> Pixel is at Left Top of the panle
- RGB filter order = RGB



- Direction default setting(H/W)  
SMX = 0  
SMY = 0  
SRGB = 0

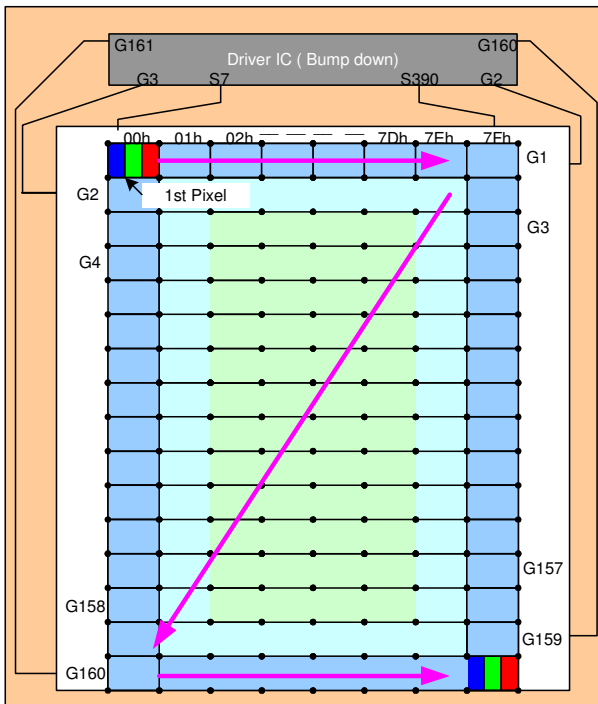
S1 = Filter R  
S2 = Filter G  
S3 = Filter B

- Display direction control (S/W)  
- X- Mirror control by MX  
- Y- Mirror control by MY  
-XY- Exchange control by MV



**Case 2:**

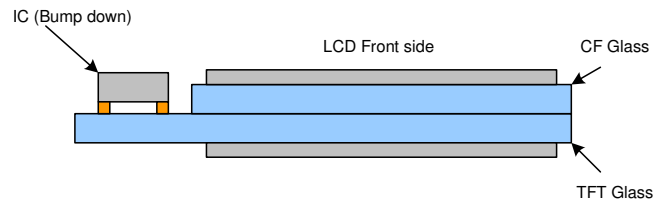
- 1<sup>st</sup> Pixel is at Left Top of the panel
- RGB filter order = BGR



- Direction default setting(H/W)
- SMX = 0
- SMY = 0
- SRGB = 1

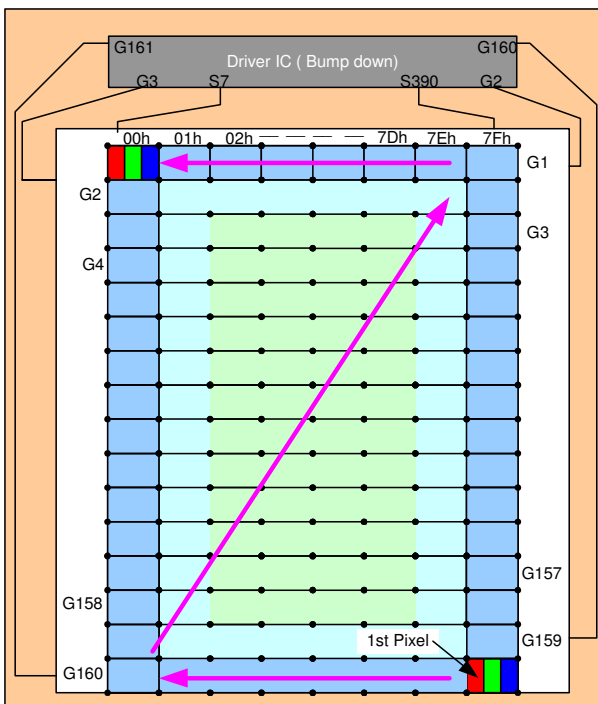
- S1 = Filter **B**
- S2 = Filter **G**
- S3 = Filter **R**

- Display direction control (S/W)
- X- Mirror control by MX
- Y- Mirror control by MY
- XY- Exchange control by MV



**Case3:**

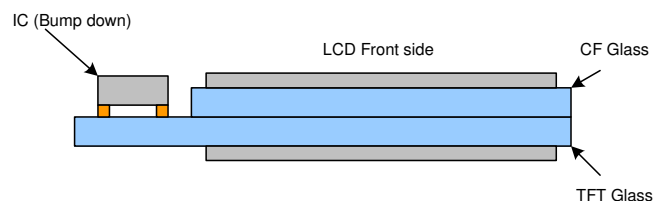
- 1<sup>st</sup> Pixel is at Right Bottom of the panel
- RGB filter order = "RGB"



- Direction default setting(H/W)
- SMX = 0
- SMY = 0
- SRGB = 0

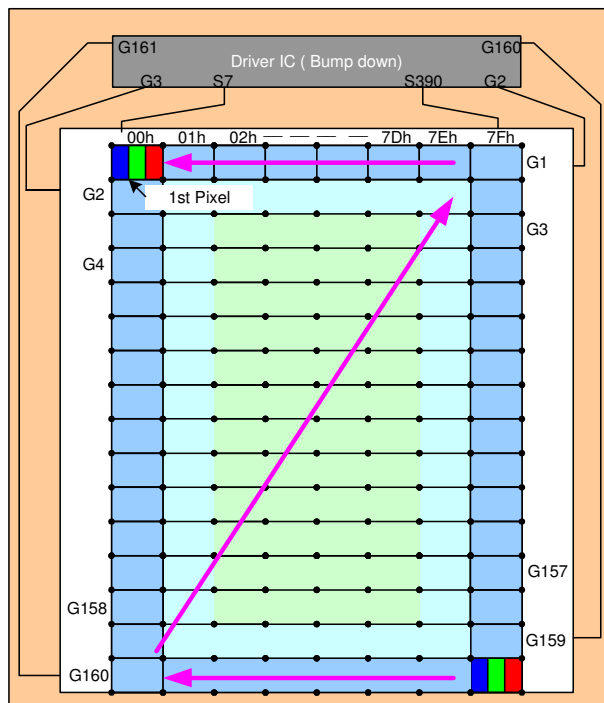
- S1 = Filter **R**
- S2 = Filter **G**
- S3 = Filter **B**

- Display direction control (S/W)
- X- Mirror control by MX
- Y- Mirror control by MY
- XY- Exchange control by MV



Case 4:

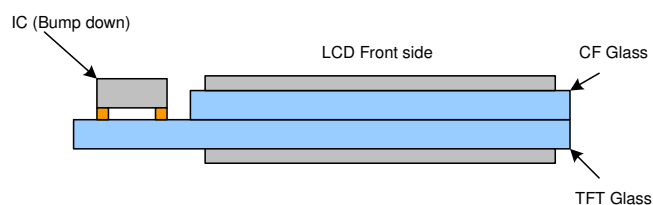
- 1<sup>st</sup> Pixel is at Right-Bottom of the panel
- RGB filter order = "BGR"



- Direction default setting(H/W)  
SMX = 0  
SMY = 0  
SRGB = 1

S1 = Filter B  
S2 = Filter G  
S3 = Filter R

- Display direction control (S/W)  
- X- Mirror control by MX  
- Y- Mirror control by MY  
-XY- Exchange control by MV



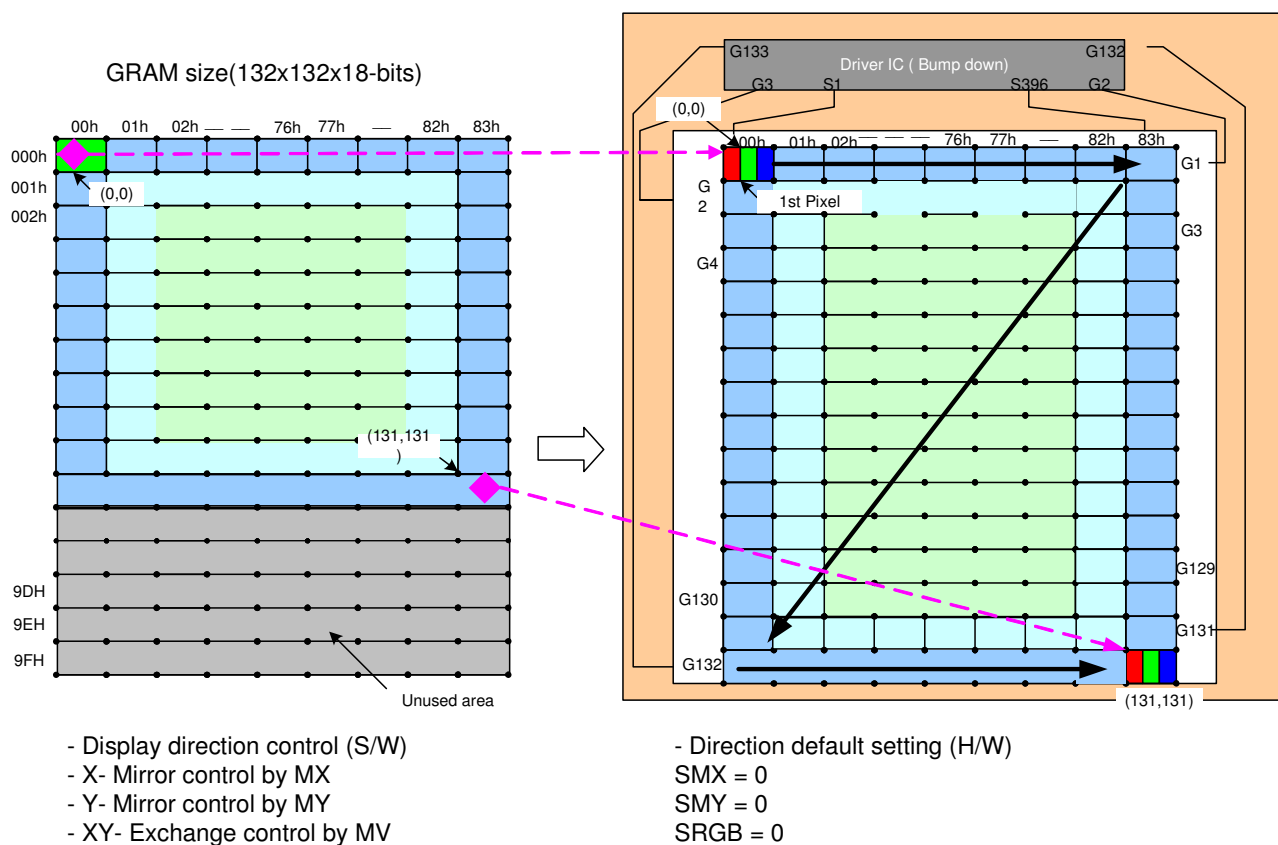


## 15.2 Application of connection with Different resolution

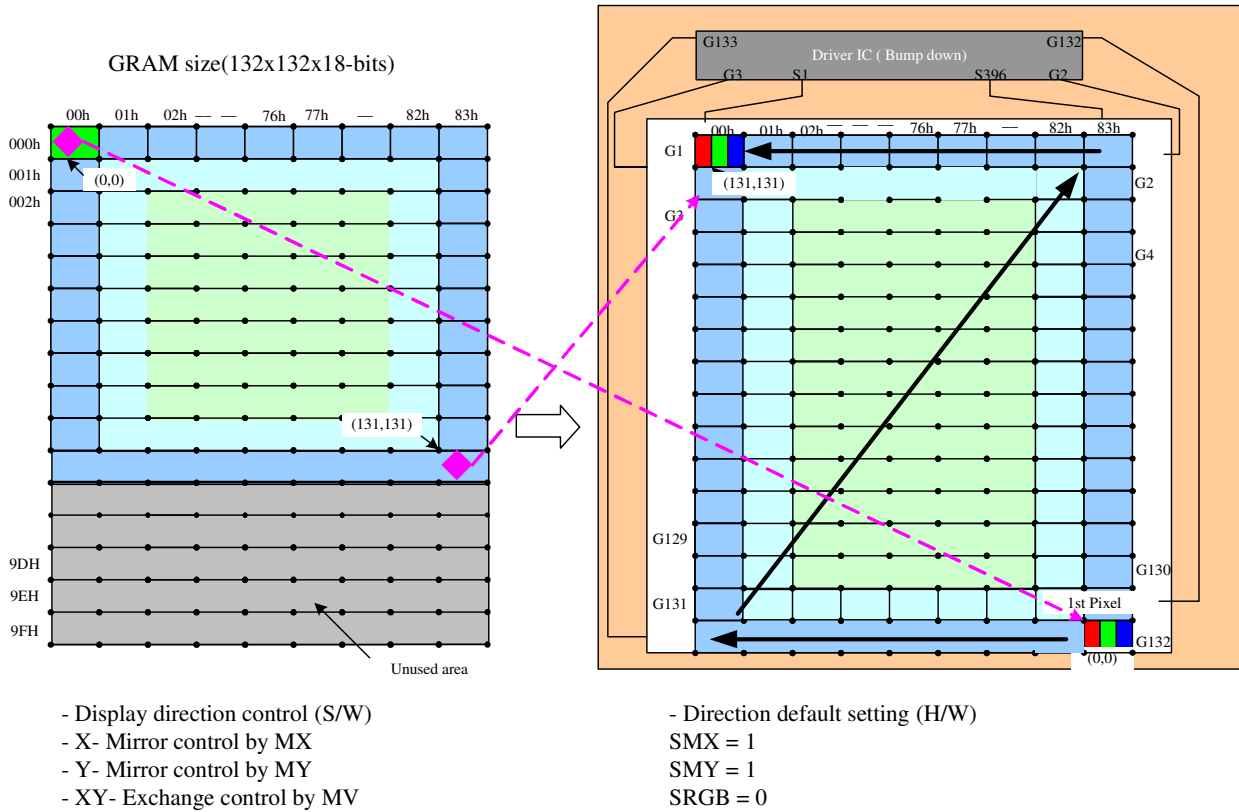
Case 1 of Resolution (132RGB x 132)(GM[2:0]="101") RAM size=132 x 132 x 18-bits(Used)

Display size = 132RGB x 132

1) Example for SMX=SMY='0'



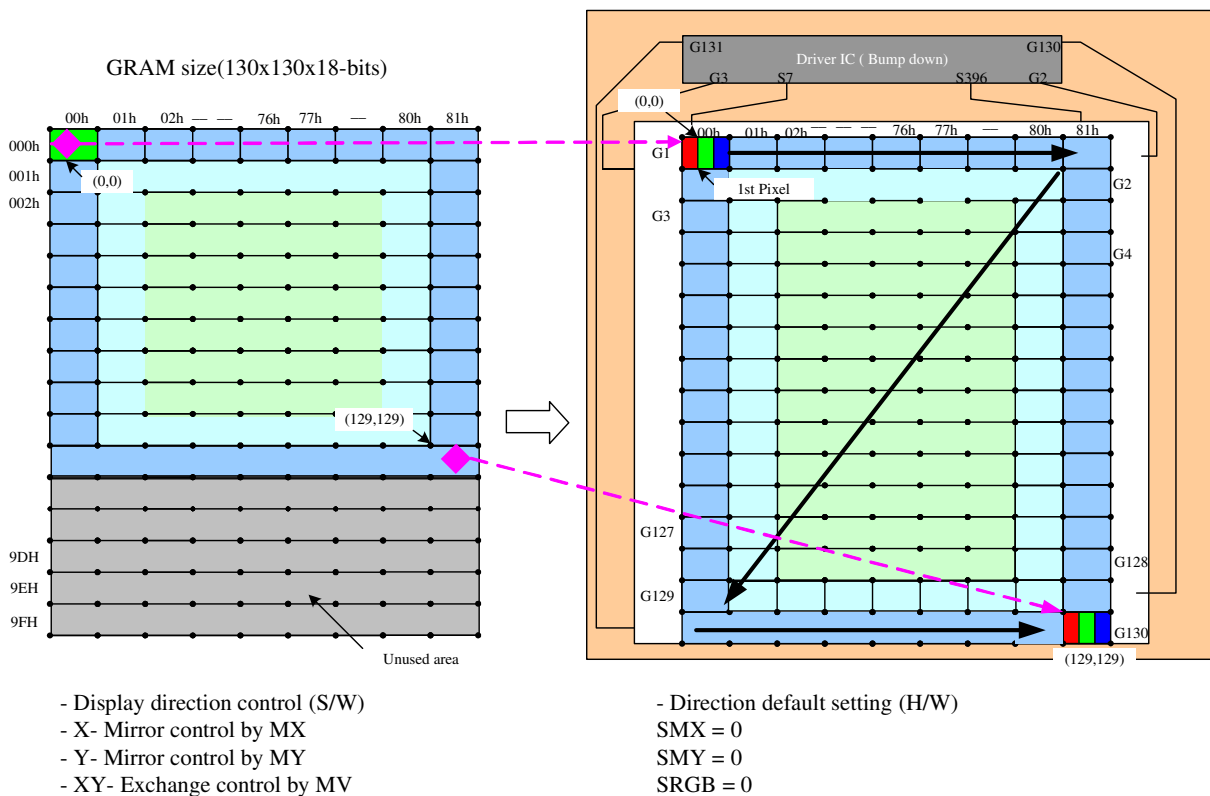
2) Example for SMX=SMY='1'



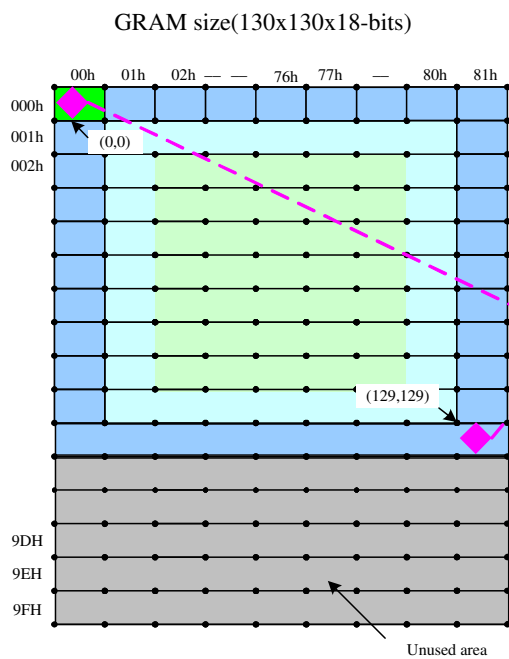
Case 2 of Resolution (130RGB x 130)(GM[2:0]="100") RAM size=130 x 130 x 18-bits(Used)

Display size = 130RGB x 130

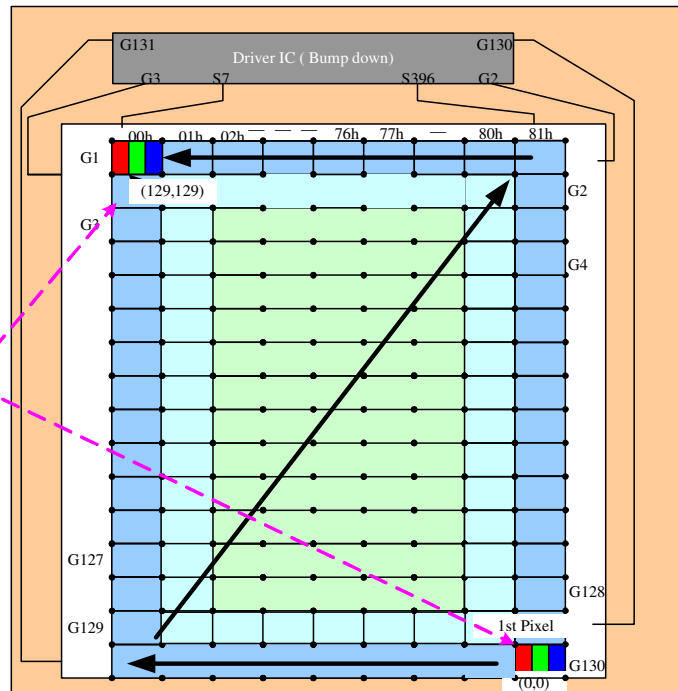
1) Example for SMX=SMY='0'



2) Example for SMX=SMY='1'



- Display direction control (S/W)
- X- Mirror control by MX
- Y- Mirror control by MY
- XY- Exchange control by MV



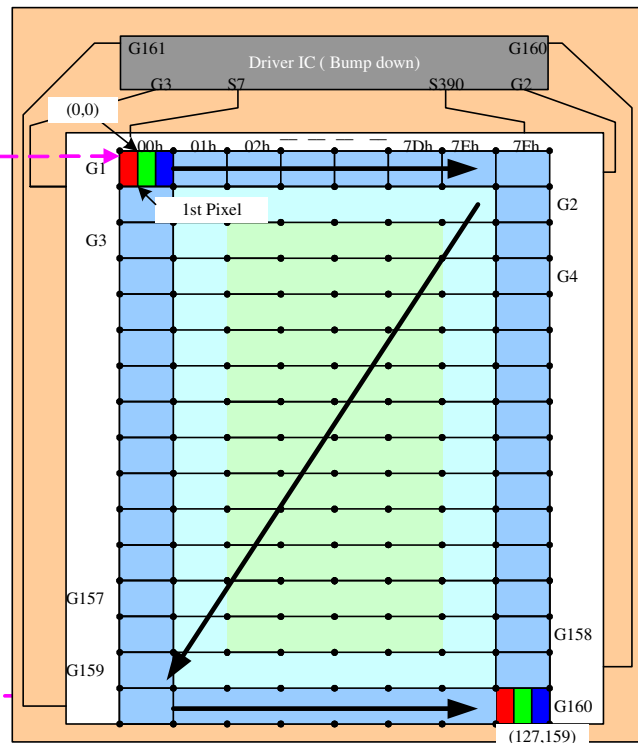
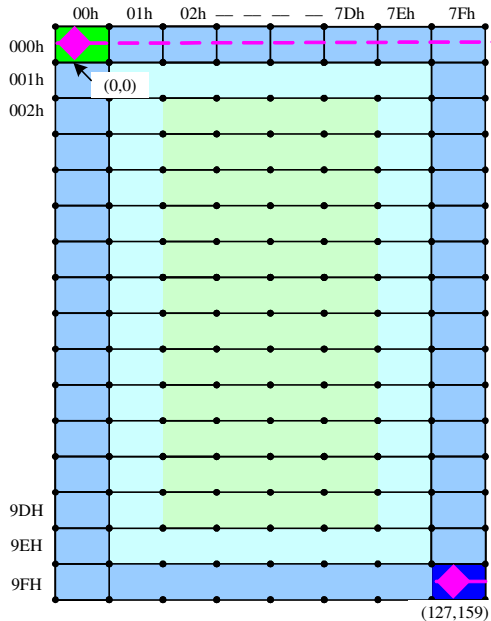
- Direction default setting (H/W)
- SMX = 1
- SMY = 1
- SRGB = 0

Case 3 of Resolution (128RGB x 160)(GM[2:0]="011") RAM size=128 x 160 x 18-bits(Used)

Display size = 128RGB x 160

1) Example for SMX=SMY='0'

GRAM size(128x160x18-bits)

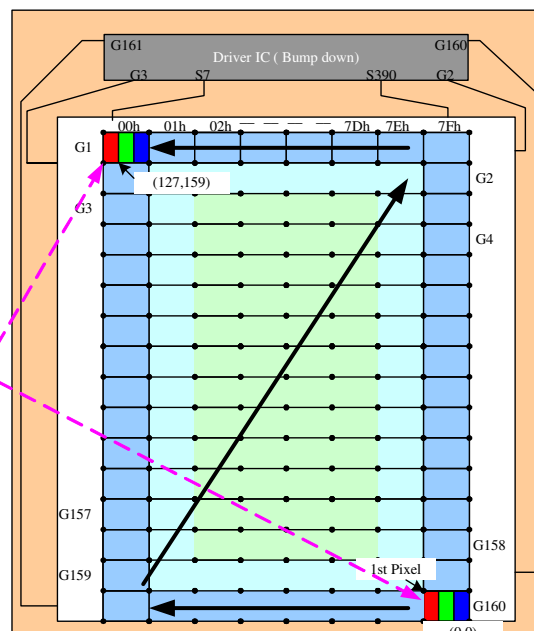
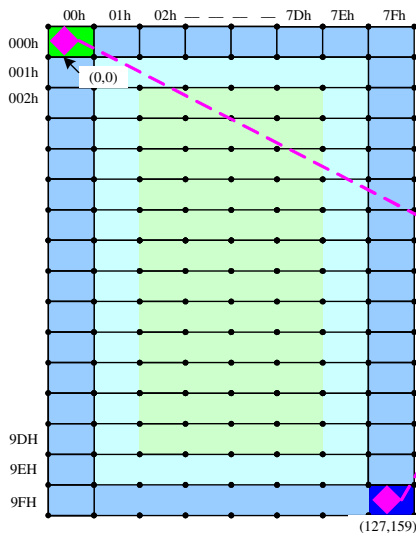


- Display direction control (S/W)
- X- Mirror control by MX
- Y- Mirror control by MY
- XY- Exchange control by MV

- Direction default setting (H/W)
- SMX = 0
- SMY = 0
- SRGB = 0

## 2) Example for SMX=SMY='1'

GRAM size(128x160x18-bits)



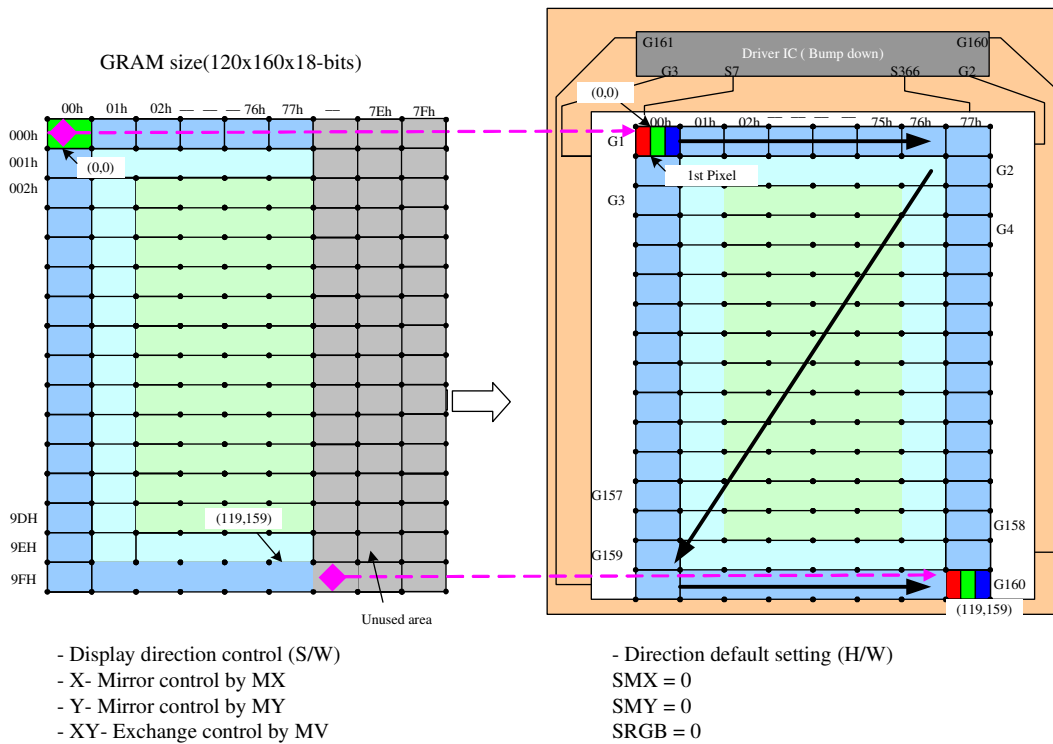
- Display direction control (S/W)
- X- Mirror control by MX
- Y- Mirror control by MY
- XY- Exchange control by MV

- Direction default setting (H/W)
- SMX = 1
- SMY = 1
- SRGB = 0

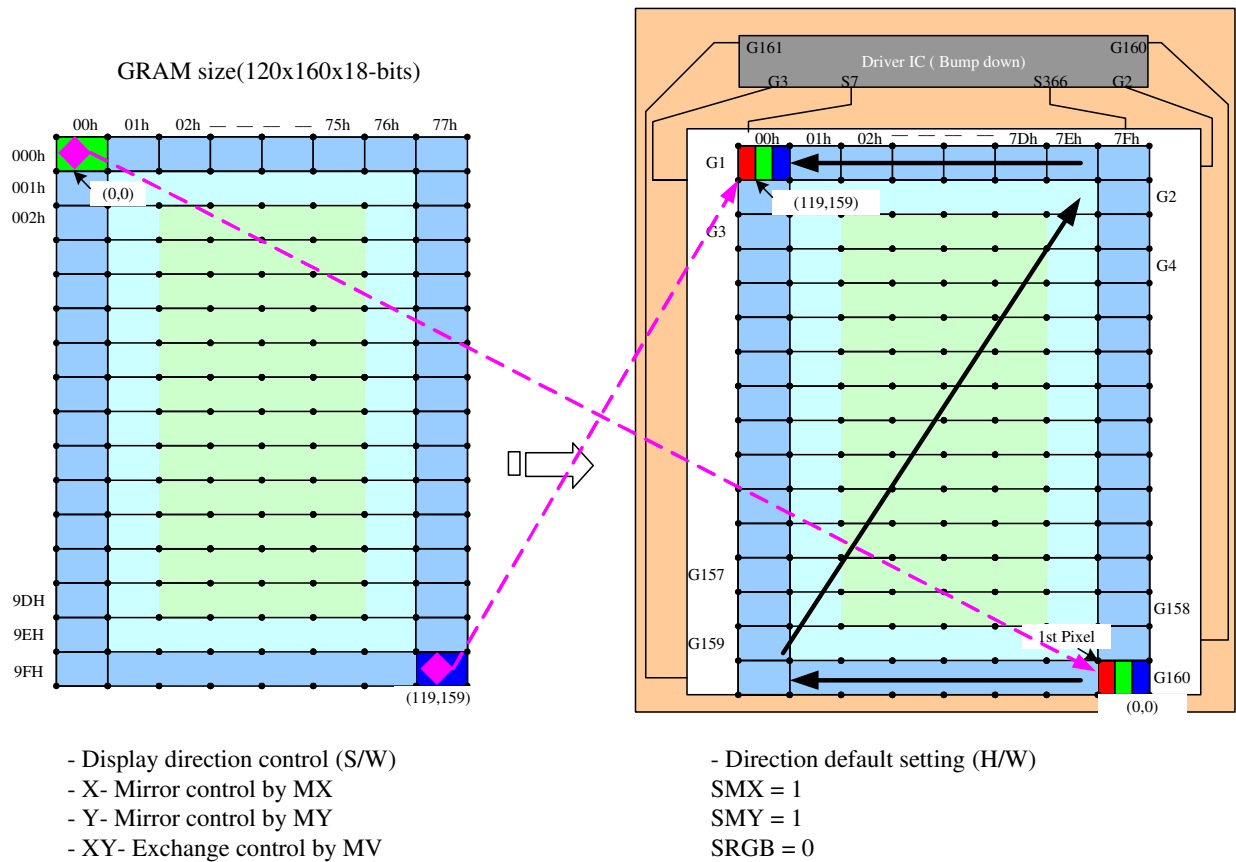
Case4 of Resolution (120RGB x 160)(GM[2:0]="010") RAM size=120 x 160 x 18-bits(Used)

Display size = 120RGB x 160

## 1) Example for SMX=SMY='0'

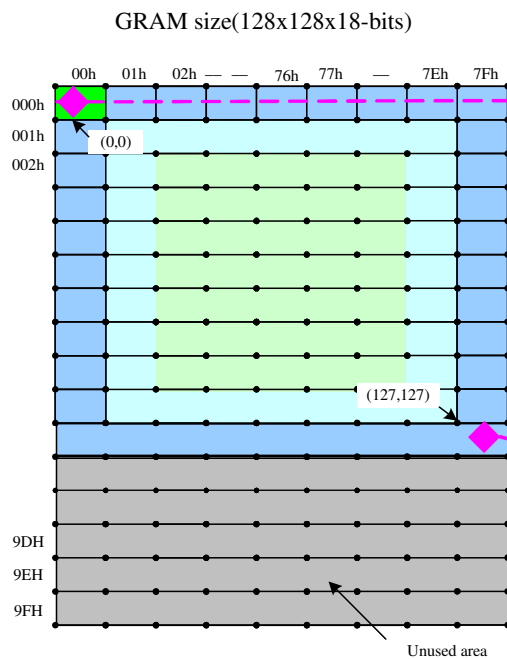


## 2) Example for SMX=SMY='1'

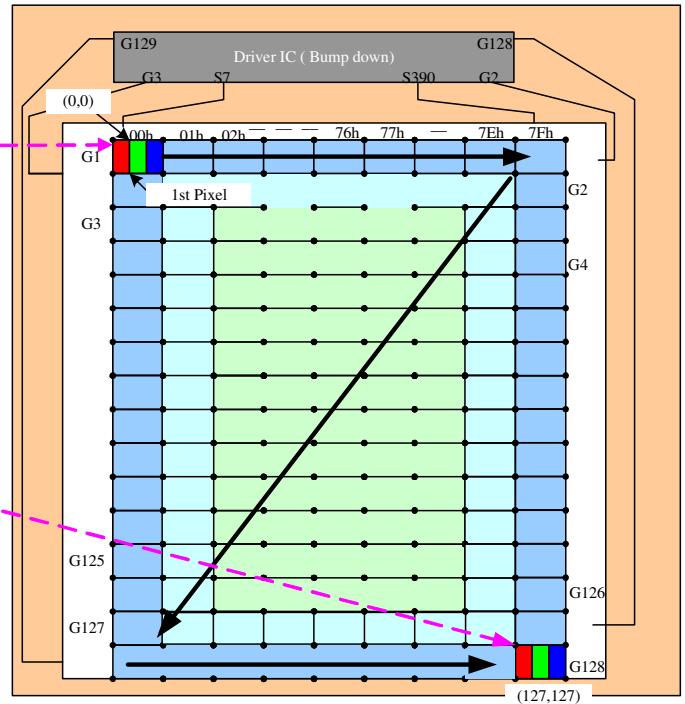


Case 5 of Resolution (128RGBx128)(GM[2:0]="001") RAM size=128 x 128 x 18-bits(Used)

## 1) Example for SMX=SMY='0'

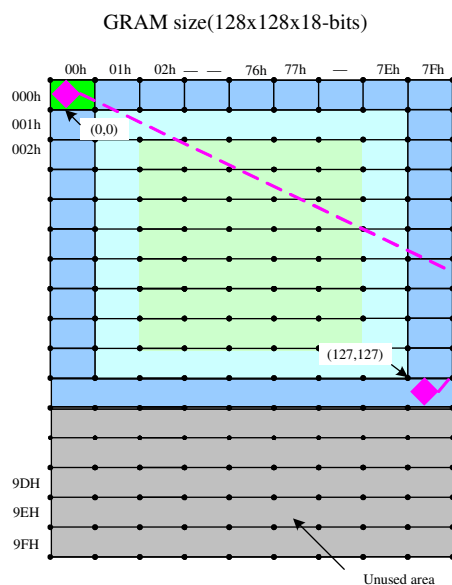


- Display direction control (S/W)
- X- Mirror control by MX
- Y- Mirror control by MY
- XY- Exchange control by MV

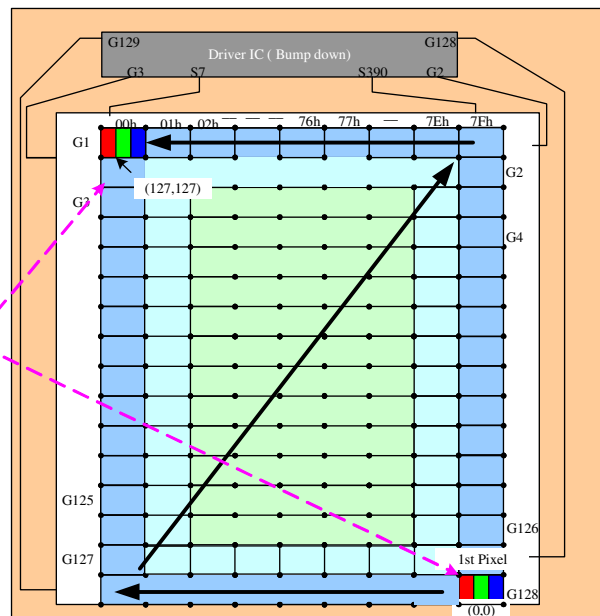


- Direction default setting (H/W)
- SMX = 0
- SMY = 0
- SRGB = 0

## 2) Example for SMX=SMY='1'



- Display direction control (S/W)
- X- Mirror control by MX
- Y- Mirror control by MY
- XY- Exchange control by MV

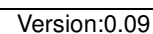
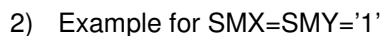


- Direction default setting (H/W)
- SMX = 1
- SMY = 1
- SRGB = 0

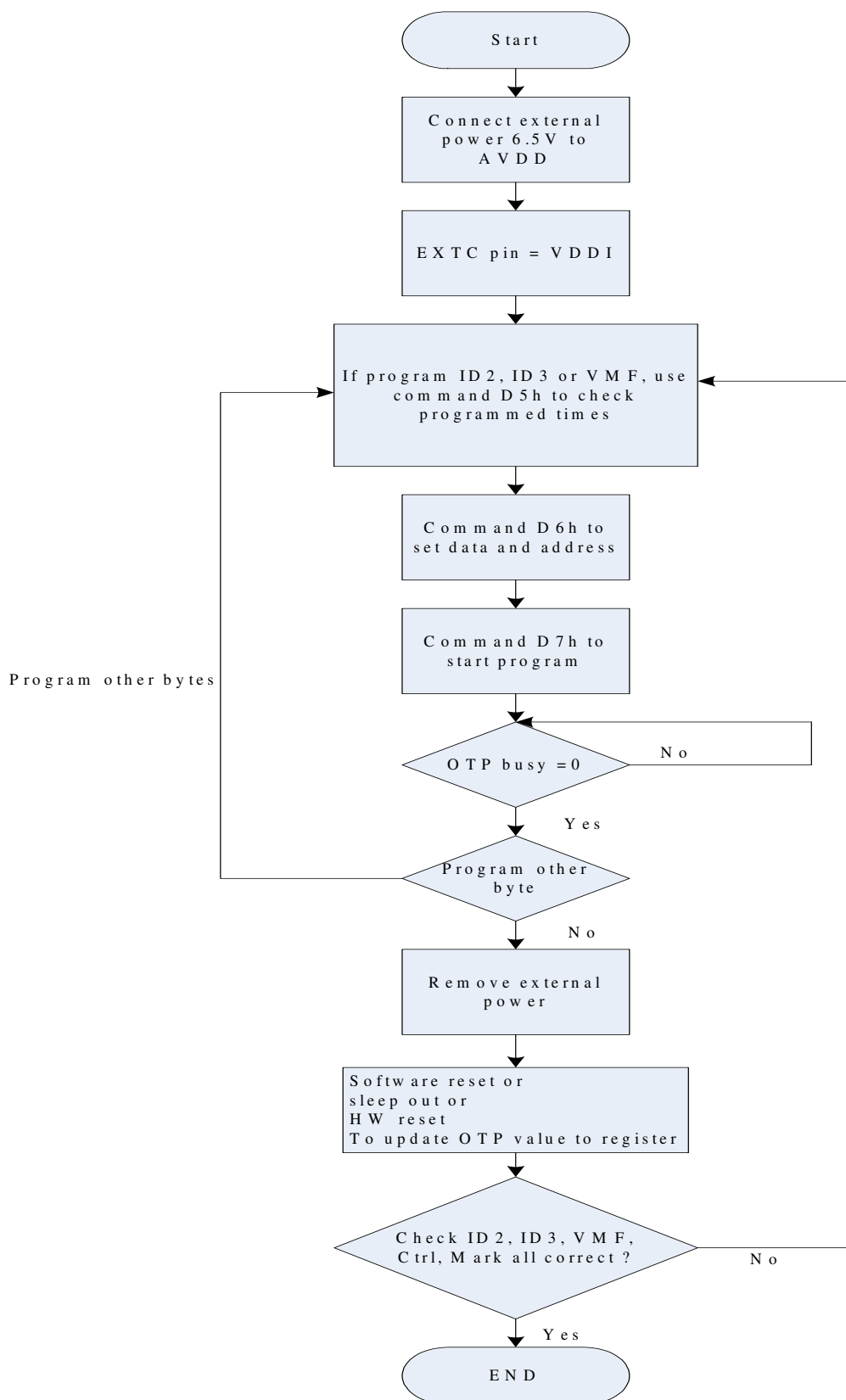
Case 6 of Resolution (132RGB x 162)(GM[2:0]="000") RAM size = 132 x 162 x 18-bits(Used)

Display size = 132RGB x 162

## 1) Example for SMX=SMY='0'



## 16. OTP Programming Flow



Note. Please remove external power 6.5V after programming.



## 17. Electrical Characteristics

### 17.1 Absolute Maximum Ratings

The absolute maximum rating is listed on following table. When ILI9163C is used out of the absolute maximum ratings, the ILI9163C may be permanently damaged. To use the ILI9163C within the following electrical characteristics limit is strongly recommended for normal operation. If these electrical characteristic conditions are exceeded during normal operation, the ILI9163C will malfunction and cause poor reliability.

| Item                       | Symbol  | Unit | Value<br>Note     |
|----------------------------|---------|------|-------------------|
| Supply voltage             | VCI     | V    | -0.3 ~ + 4.8      |
| Supply voltage (Logic)     | VDDI    | V    | -0.3 ~ + 4.6      |
| Supply voltage (Digital)   | VCC     | V    | -0.3 ~ + 2.4      |
| Driver supply voltage      | VGH-VGL | V    | -0.3 ~ + 33.0     |
| Logic input voltage range  | VIN     | V    | -0.3 ~ VDDI + 0.3 |
| Logic output voltage range | VO      | V    | -0.3 ~ VDDI + 0.3 |
| Operating temperature      | Topr    | °C   | -40 ~ + 85        |
| Storage temperature        | Tstg    | °C   | -55 ~ + 110       |

Notes: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

### 17.2 DC Characteristics

| Item                                 | Symbol | Unit | Condition                 | Min.    | Typ.     | Max.    | Note      |
|--------------------------------------|--------|------|---------------------------|---------|----------|---------|-----------|
| <b>Power &amp; Operation Voltage</b> |        |      |                           |         |          |         |           |
| Analog Operating voltage             | VCI    | V    | Operating voltage         | 2.5     | 2.78     | 4.8     | Note2     |
| Logic Operating voltage              | VDDI   | V    | I/O supply voltage        | 1.65    | 1.8/2.78 | 3.3     | Note2     |
| Digital Operating voltage            | VCC    | V    | Digital supply voltage    |         | 1.8      |         | Note2     |
| Gate Driver High voltage             | VGH    | V    |                           | 10.0    |          | 16.0    | Note3     |
| Gate Driver Low voltage              | VGL    | V    |                           | -16.0   |          | -7.5    | Note3     |
| Driver Supply voltage                |        | V    | VGH-VGL                   | 19      |          | 32      | Note3     |
| <b>Input/Output</b>                  |        |      |                           |         |          |         |           |
| Logic High level input voltage       | VIH    | V    |                           | 0.7VDDI |          | VDDI    | Note1,2,3 |
| Logic Low level input voltage        | VIL    | V    |                           | VSS     |          | 0.3VDDI | Note1,2,3 |
| Logic High level output voltage      | VOH    | V    | IOH = -1.0mA              | 0.8VDDI |          | VDDI    | Note1,2,3 |
| Logic High level output voltage      | VOL    | V    | IOL = 1.0mA               | VSS     |          | 0.2VDDI | Note1,2,3 |
| Logic input leakage current          | IIL    | μA   | VIN = VDDI or VSS         | -0.1    |          | +0.1    | Note1,2,3 |
| Sleep in current consumption         | ISLP   | μA   | VCI=VDDI=2.8V<br>Ta=25 °C |         |          | 70      | Note1,2,3 |
| <b>VCOM Operation</b>                |        |      |                           |         |          |         |           |

|                         |       |   |             |      |  |          |        |
|-------------------------|-------|---|-------------|------|--|----------|--------|
| VCOM High voltage       | VCOMH | V | Ccom=12nF   | 2.5  |  | 5.0      | Note 3 |
| VCOM Low voltage        | VCOML | V | Ccom=12nF   | -2.5 |  | 0.0      | Note 3 |
| VCOM Amplitude voltage  | VOMA  | V | VCOMH-VCOML | 4.0  |  | 5.5      | Note 3 |
| <b>Source Driver</b>    |       |   |             |      |  |          |        |
| Source output range     | Vsout | V |             | 0.1  |  | AVDD-0.1 | Note4  |
| Gamma reference voltage | GVDD  | V |             | 3.0  |  | 5.0      | Note3  |

Note 1: VDDI=1.65 to 3.3V, VCI=2.5 to 4.8V, AGND=GND=0V, Ta=-30 to 70°C (to +85°C no damage)

Note2: Please supply digital VDDI voltage equal or less than analog VCI voltage. ( $VDDI \leq VCI$ )

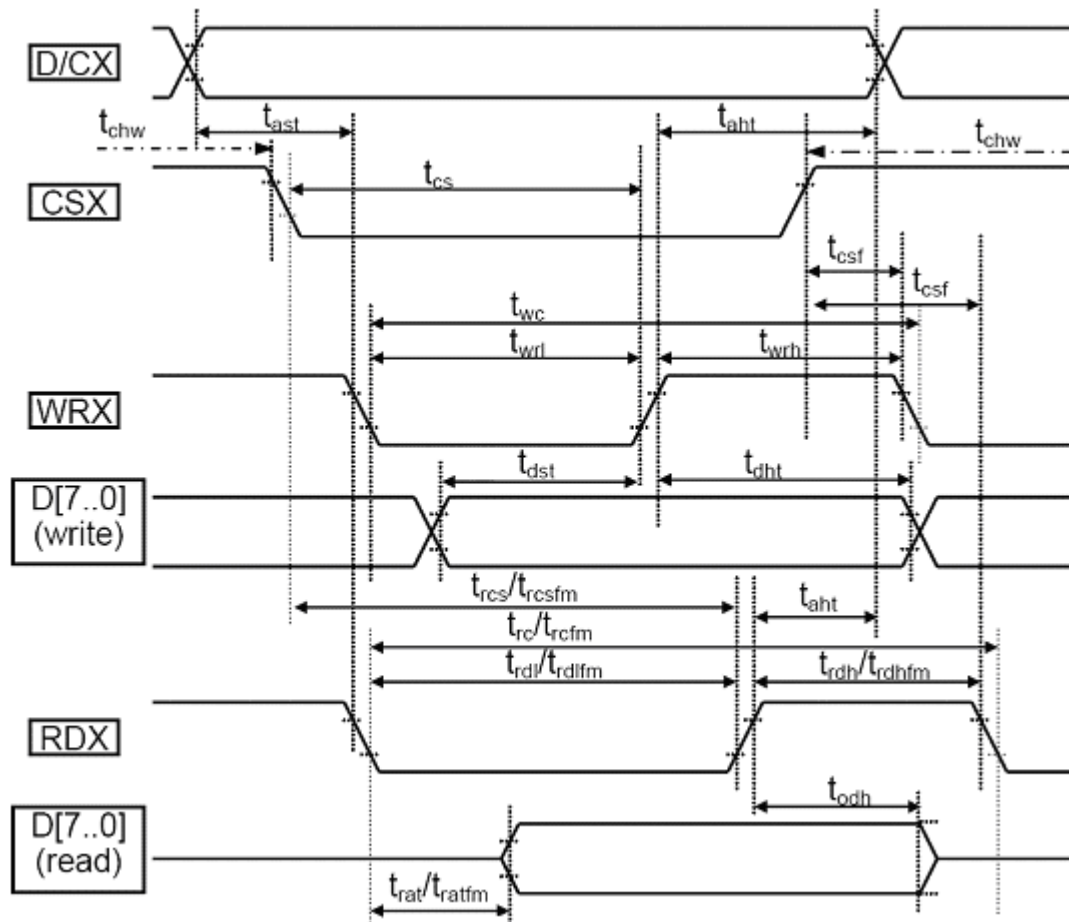
Note2,3,4: When the measurements are performed with LCD module. Measurement Points are like below.

Note3: CSX, RDX, WRX, D[23:0], D/CX, RESX, TE, PCLK, VS, HS, DE, SDA, SCL, GM2, GM1, GM0, RCM1, RCM0, P68, IM2, IM1, IM0, SRGB, REV, SMX, SMY, RL, TB, IDM, SHUT, PREG, GS and Test pins.

Note5: Source channel loading = 10pF/channel, Gate channel loading = 50pF/channel

## 17.3 AC Characteristics

### 17.3.1. Parallel CPU 18/16/9/8-bit Bus



Note: Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

**Table 17.3.1 AC characteristics of parallel CPU I/F in asynchronous mode**

| Signal | Symbol             | Parameter                         | min | max | unit | description  |
|--------|--------------------|-----------------------------------|-----|-----|------|--------------|
| D/CX   | t <sub>ast</sub>   | Address setup time                | 0   |     | ns   |              |
|        | t <sub>ahh</sub>   | Address hold time(Write/Read)     | 10  |     | ns   |              |
| CSX    | t <sub>chw</sub>   | "S""H" Pulse Width                | 0   |     | ns   |              |
|        | t <sub>cs</sub>    | Chip Select setup time (Write)    | 10  |     | ns   |              |
|        | t <sub>rcs</sub>   | Chip Select setup time (Read ID)  | 45  |     | ns   |              |
|        | t <sub>rcsfm</sub> | Chip Select setup time (Read FM)  | 355 |     | ns   |              |
|        | t <sub>csf</sub>   | Chip Select Wait time(Write/read) | 10  |     | ns   |              |
| WRX    | t <sub>wc</sub>    | Write cycle                       | 66  |     | ns   |              |
|        | t <sub>wrh</sub>   | Control pulse H duration          | 15  |     | ns   |              |
|        | t <sub>wrl</sub>   | Control pulse L duration          | 15  |     | ns   |              |
| RDX    | t <sub>rc</sub>    | Read cycle (ID)                   | 160 |     | ns   | When read ID |

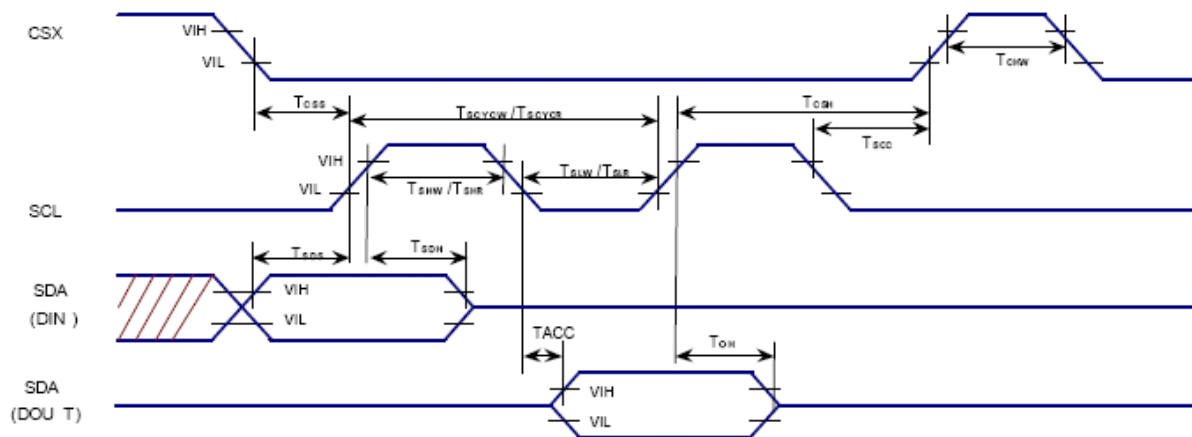
|          |        |                               |     |     |    |                                                     |
|----------|--------|-------------------------------|-----|-----|----|-----------------------------------------------------|
|          | trdh   | Control pulse H duration(ID)  | 90  |     | ns | data                                                |
|          | trdl   | Control pulse L duration(ID)  | 45  |     | ns |                                                     |
| RDX      | trcfm  | Read cycle (FM)               | 450 |     | ns | When read from frame memory                         |
|          | trdhfm | Control pulse H duration (FM) | 90  |     | ns |                                                     |
|          | trdlfm | Control pulse L duration (FM) | 355 |     | ns |                                                     |
| D[17..0] | tdst   | Data setup time               | 10  |     | ns | For maximum<br>CL = 30pF<br>For minimum<br>CL = 8pF |
|          | tdht   | Data hold time                | 10  |     | ns |                                                     |
|          | trat   | Read access time (ID)         |     | 40  | ns |                                                     |
|          | tratfm | Read access time (FM)         |     | 340 | ns |                                                     |
|          | todh   | Output disable time           | 20  | 80  | ns |                                                     |

Note 1: VDDI 1.65 to 3.3V, VCI=2.6 to 3.3V, AGND=GND=0V, Ta=-30 to 70 °C (to +85°C no damage)

Note 2: This input signal rise time and fall time (tr, tf) is specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of VDDI for input signals

## 17.3.2. Display Serial Interface (SPI)

### 17.3.2.1 3-pin Serial Interface



**Table 17.3.2.1: 3-pin Serial Interface Characteristics**

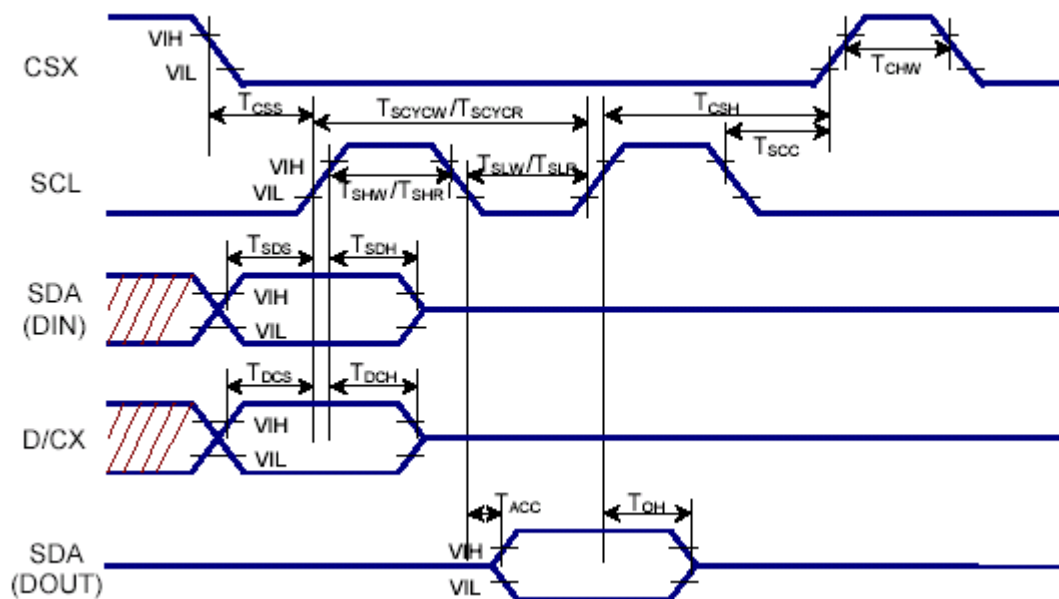
| Signal              | Symbol | Parameter                   | MIN | MAX | Unit | Description           |
|---------------------|--------|-----------------------------|-----|-----|------|-----------------------|
| CSX                 | Tcss   | Chip select setup time      | 10  |     | ns   |                       |
|                     | Tsch   | Chip select hold time       | 30  |     | ns   |                       |
|                     | Tchw   | Chip select "H" pulse width | 30  |     | ns   |                       |
| SCL                 | Tscycw | Serial clock cycle(Write)   | 66  |     | ns   |                       |
|                     | Tshw   | S"L""H" pulse width(Write)  | 15  |     | ns   |                       |
|                     | Tslw   | S"L""L" pulse width(Write)  | 15  |     | ns   |                       |
|                     | Tscycr | Serial clock cycle(Read)    | 150 |     | ns   |                       |
|                     | Tshr   | S"L""H" pulse width(Read)   | 60  |     | ns   |                       |
|                     | Tslr   | S"L""L" pulse width(Read)   | 60  |     | ns   |                       |
| SDA(DIN)<br>(DOU T) | Tds    | Data setup time             | 5   |     | ns   |                       |
|                     | Tdh    | Data hold time              | 5   |     | ns   |                       |
|                     | Tacc   | Access time                 | 5   | 50  | ns   | For maximum CL = 30pF |
|                     | Toh    | Output disable time         | 10  |     | ns   | For minimum CL = 8pF  |

Note 1: VDDI=1.65 to 3.3V, VCI=2.6 to 3.3V, AGND=GND=0V. Ta=-30 to 70°C (to +85°C no damage)

Note 2 : The input signal rise time and fall time(tr, tf) is specified at 15 ns or less.

Logic high and low levels are specified as 10% and 90% of VDDI for Input signals.

### 17.3.2.2 4-pin Serial Interface



**Table 17.3.2.2: 4 pin Serial Interface Characteristics**

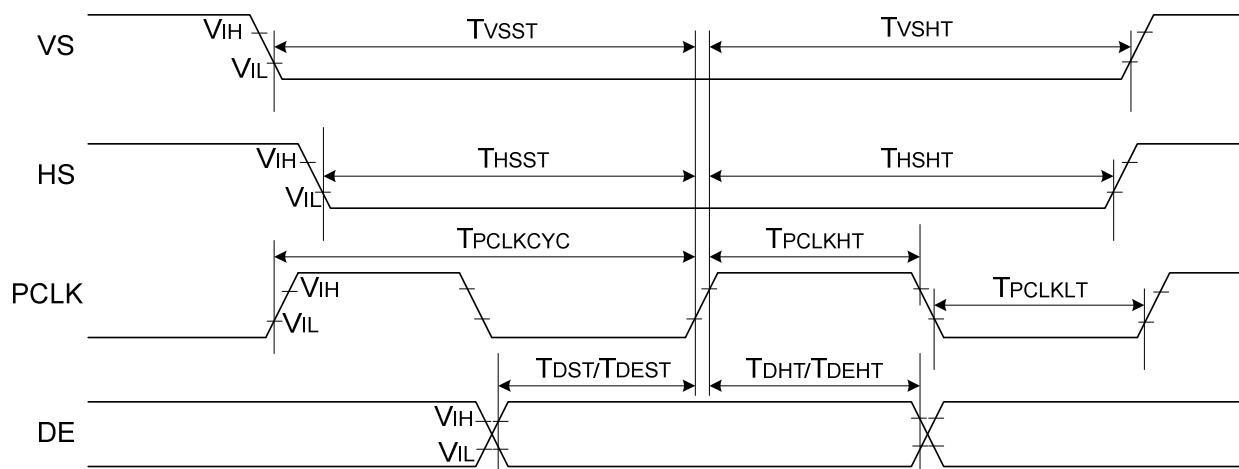
| Signal             | Symbol | Parameter                   | MIN | MAX | Unit | Description           |
|--------------------|--------|-----------------------------|-----|-----|------|-----------------------|
| CSX                | TCSS   | Chip select setup time      | 10  |     | ns   |                       |
|                    | TCSH   | Chip select hold time       | 30  |     | ns   |                       |
|                    | TCHW   | Chip select "H" pulse width | 30  |     | ns   |                       |
| SCL                | TSCYCW | Serial clock cycle(Write)   | 66  |     | ns   |                       |
|                    | TSHW   | S"L"H" pulse width(Write)   | 15  |     | ns   |                       |
|                    | TSLW   | S"L"L" pulse width(Write)   | 15  |     | ns   |                       |
|                    | TSCYCR | Serial clock cycle(Read)    | 150 |     | ns   |                       |
|                    | TSHR   | S"L"H" pulse width(Read)    | 60  |     | ns   |                       |
|                    | TSLR   | S"L"L" pulse width(Read)    | 60  |     | ns   |                       |
| D/CX               | TDCS   | D/CX setup time             | 5   |     | ns   |                       |
|                    | TDCH   | D/CX hold time              | 5   |     | ns   |                       |
| SDA(DIN)<br>(DOUT) | TSDS   | Data setup time             | 5   |     | ns   |                       |
|                    | TSDH   | Data hold time              | 5   |     | ns   |                       |
|                    | TACC   | Access time                 | 5   | 50  | ns   | For maximum CL = 30pF |
|                    | TOH    | Output disable time         | 10  |     | ns   | For minimum CL = 8pF  |

Note 1: VDDI=1.65 to 3.3V, VCI=2.6 to 3.3V, AGND=GND=0V. Ta=-30 to 70°C (to +85°C no damage)

Note 2 : The input signal rise time and fall time(tr, tf) is specified at 15 ns or less.

Logic high and low levels are specified as 10% and 90% of VDDI for Input signals.

### 17.3.3. Parallel RGB 18/16/6-bit Bus



| Signal  | Symbol   | Parameter                   | MIN | MAX | Unit | Description |
|---------|----------|-----------------------------|-----|-----|------|-------------|
| PCLK    | TPCLKCYC | TPCLK Cycle time            | 66  |     | ns   |             |
|         | TPCLKLT  | Pixel low pulse width       | 15  | -   | ns   |             |
|         | TPCLKHT  | Pixel high pulse width      | 15  | -   | ns   |             |
| VS      | TVSST    | Vertical Sync. setup time   | 15  | -   | ns   |             |
|         | TVSHT    | Vertical Sync. hold time    | 15  | -   | ns   |             |
| HS      | THSST    | Horizontal Sync. setup time | 15  | -   | ns   |             |
|         | THSHT    | Horizontal Sync. hold time  | 15  | -   | ns   |             |
| DE      | TDEST    | Data Enable setup time      | 15  | -   | ns   |             |
|         | TDEHT    | Data Enable hold time       | 15  | -   | ns   |             |
| D[17:0] | TDST     | Data setup time             | 15  | -   | ns   |             |
|         | TDHT     | Data hold time              | 15  | -   | ns   |             |

## 18. Revision History

| Version No. | Date       | Page           | Description                                                                      |
|-------------|------------|----------------|----------------------------------------------------------------------------------|
| V0.01       | 2009/12/28 |                | New Created                                                                      |
| V0.02       | 2010/2/2   | 130            | Tearing effect description                                                       |
| V0.03       | 2010/2/26  | 179            |                                                                                  |
| V0.04       | 2010/3/24  | 191~197        | AC/DC timing revise                                                              |
|             |            | 43             | modify type error in Figure 31                                                   |
| V0.05       | 2010/3/31  | 101            | Sleep out description                                                            |
|             |            | 10             | Modify SMX/SMY decription                                                        |
|             |            | 157            | Modify C1h default vaule                                                         |
|             |            | 14             | Modify Au bump hight and remove 400um chip thickness                             |
| V0.06       | 2010/5/10  | 10             | Modify SDA description                                                           |
| V0.07       | 2010/5/26  | 11             | LCM[0:1]                                                                         |
| V0.08       | 2010/7/30  | 12<br>69~71    | Modify TESEL description<br>Add Gamma structure                                  |
| V0.09       | 2010/9/01  | 13<br>14<br>22 | To modify VCL description<br>Add 300um chip thickness<br>SPI 3-wire/4-wire write |
| V0.10       | 2011/01/18 | 193            | Add sleep in current                                                             |