MULTI-INNO TECHNOLOGY CO., LTD.

www.multi-inno.com

LCD MODULE SPECIFICATION

Model : MI0700YT-5

This module uses ROHS material

For Customer's Acceptance:

Customer	
Approved	
Comment	

This specification may change without prior notice in order to improve performance or quality. Please contact Multi-Inno for updated specification and product status before design for this product or release of this order.	Revision	1.1
	Engineering	
	Date	2013-08-16
	Our Reference	

REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2013-05-22	First release	
1.1	2013-08-16	Update LED Forward Voltage; Modify Contrast Ratio; Update Surface Luminance; Modify CIE(x,y) Chromaticity; Modify Pin20 Interface AO to D/C; Update Block Diagram; Add Initial Code For Reference.	

CONTENTS

■ **GENERAL INFORMATION**

Item	Contents	Unit
LCD type	TFT/Transmissive/Negative/Normally white	/
Size	7.0	Inch
Viewing direction	12:00	O' Clock
Gray scale inversion direction	6:00	O'Clock
LCM (W × H × D)	165.00×104.80×7.90	mm^3
Active area (W×H)	152.40 ×91.44	mm^2
Dot pitch(W ×H)	0.0635×0.1905	mm^2
Number of dots	800 (RGB) × 480	/
Driver IC	SSD1963	/
Backlight type	24 LEDs	/
Interface type	16bit CPU	/
Color depth	262K	/
Input voltage	3.3	V
With/Without TSP	With TSP	/
Weight	TBD	g

Note 1:Viewing direction for best image quality is different from TFT definition, there is a 180 degree shift.
Note 2 : RoHS compliant;
Note 3: LCM weight tolerance: ± 5% .

■ EXTERNAL DIMENSIONS

Touch panel terminal table:

	SYMBOL	Description
1	YU	Top Film Terminal
2	XL	Bottom ITO Glass Terminal
3	YD	Top Film Terminal
4	XR	Bottom ITO Glass Terminal

Pin assignment:

PIN NO	SYMBOL	PIN NO	SYMBOL
1	VDD	17	DB14
2	VDD	18	DB15
3	NC	19	CS
4	DB0	20	D/C
5	DB1	21	RD
6	DB2	22	WR
7	DB3	23	NC
8	DB4	24	RST
9	DB5	25	NC
10	DB6	26	NC
11	DB7	27	NC
12	DB8	28	NC
13	DB9	29	NC
14	DB10	30	GND
15	DB11	31	GND
16	DB12	32	GND
	DB13		

3*8 24LED

SCALE100X

The non-specified tolerance of dimension is ±0.3mm.

Detail A Scale 2:1

MULTI-INNO TECHNOLOGY CO.,LTD.

CUSTOMER APVL		TITLE	MI0700YT-5
DRAWN			
DFTG CHK	SCALE		
ENGR CHK	UNIT	mm	MODEL
APPROVAL			DWG NO
	DATE		PAGE 1/1

■ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Operating temperature	T_{OP}	-20	70	°C
Storage temperature	T_{ST}	-30	80	°C
Humidity	RH	-	90%(Max60°C)	RH

■ELECTRICAL CHARACTERISTICS

DC CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage for logic	VDD	3.0	3.3	3.6	V
Input voltage ' H ' level	VIH	0.7VDD	-	VDD	V
Input voltage ' L ' level	VIL	0	-	0.3VDD	V

■ BACKLIGHT CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	Vf	8.4	-	11.0	V	Note 1
Forward current	I f	-	160	-	mA	
Power consumption	W_{BL}	-	1552	1680	mW	
Operating life time	-	-	50,000	-	Hrs	Note 2,3,4

Note 1 : There are 1 Groups LED

3×8 24LED
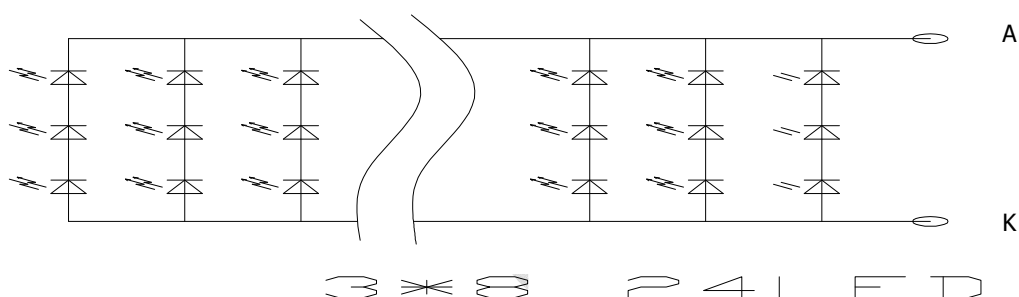
Note 2 : Ta = 25 ℃

Note 3 : Brightess to be decreased to 50% of the initial value

Note 4 : The single LED lamp case

■ELECTRO-OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark	Note
Response time	Tr +Tf	θ=0° $\varnothing$=0° Ta=25℃	-	16	26	ms	Fig.1	4
Contrastratio	Cr		250	400	-	—	FIG 2.	1
Luminance uniformity	δ WHITE		-	75	-	%	FIG 2.	3
Surface Luminance	Lv		270	360	-	cd/m^2	FIG 2.	2
Viewing angle range	θ	$\varnothing$ = 90°	55	60	-	deg	FIG 3.	6
		$\varnothing$ = 270°	55	60	-	deg	FIG 3.	
		$\varnothing$ = 0°	65	70	-	deg	FIG 3.	
		$\varnothing$ = 180°	65	70	-	deg	FIG 3.	
CIE (x, y) chromaticity	Red x	θ=0° $\varnothing$=0° Ta=25℃	-	-	-		FIG 2.	5
	Red y		-	-	-			
	Green x		-	-	-			
	Green y		-	-	-			
	Blue x		-	-	-			
	Blue y		-	-	-			
	White x		0.26	0.31	0.36			
	White y		0.28	0.33	0.38			

Note 1. Contrast Ratio(CR) is defined mathematically as For more information see FIG 2.:

$$\text{Contrast Ratio} = \frac{\text{Average Surface Luminance with all white pixels } (P_1,P_2,P_3,P_4,P_5)}{\text{Average Surface Luminance with all black pixels } (P_1, P_2, P_3,P_4, P_5)}$$

Note 2. Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see FIG 2.

$$Lv = \textbf{Average Surface Luminance with all white pixels} \quad (P_1, P_2, P_3,P_4, P_5)$$

Note 3. The uniformity in surface luminance , δ WHITE is determined by measuring luminance at each test position 1 through 5, and then dividing the maximum luminance of 5 points luminance by minimum luminance of 5 points luminance.   For more information see FIG 2.

$$\delta\,\text{WHITE} = \frac{\text{Minimum Surface Luminance with all white pixels } (P_1, P_2, P_3,P_4, P_5)}{\text{Maximum Surface Luminance with all white pixels } (P_1, P_2, P_3,P_4, P_5)}$$

Note 4. Response time is the time required for the display to transition from White to black(Rise Time, Tr)   and from black to white(Decay Time, Tf). For additional information see FIG 1. The test equipment is Autronic-Melchers's ConoScope. Series

Note 5. CIE (x, y) chromaticity,The x,y value is determined by measuring luminance at each test position 1 through 5,and then make average value

Note 6. Viewing angle is the angle at which the contrast ratio is greater than 2. For TFT module the conrast ratio is greater than 10. The angles are   determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.   For more information see FIG 3.

Note 7. For Viewing angle and response time testing, the testing data is base on Autronic-Melchers's ConoScope. Series Instruments. For contrast ratio, Surface Luminance, Luminance uniformity,CIE The test data is base on TOPCON's BM-5 photo detector.
Note 8.   For TFT module, Gray scale reverse occurs in the direction of panel viewing angle.
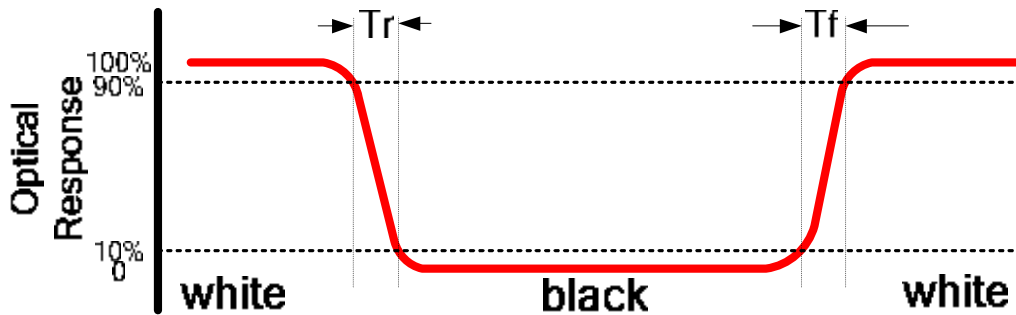
FIG.1.　The definition of Response Time

FIG.2.　Measuring method for Contrast ratio,surface luminance, Luminance uniformity ，　CIE (x, y) chromaticity

A : 5 mm
B : 5 mm
H,V : Active Area
Light spot size ∅=5mm, 500mm distance from the
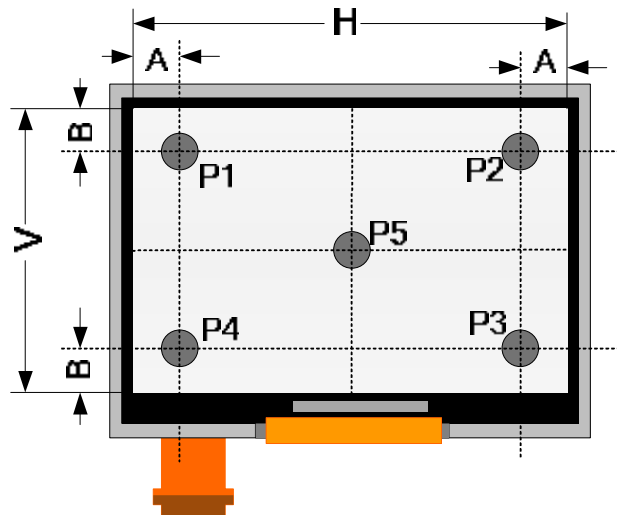LCD surface to detector lens
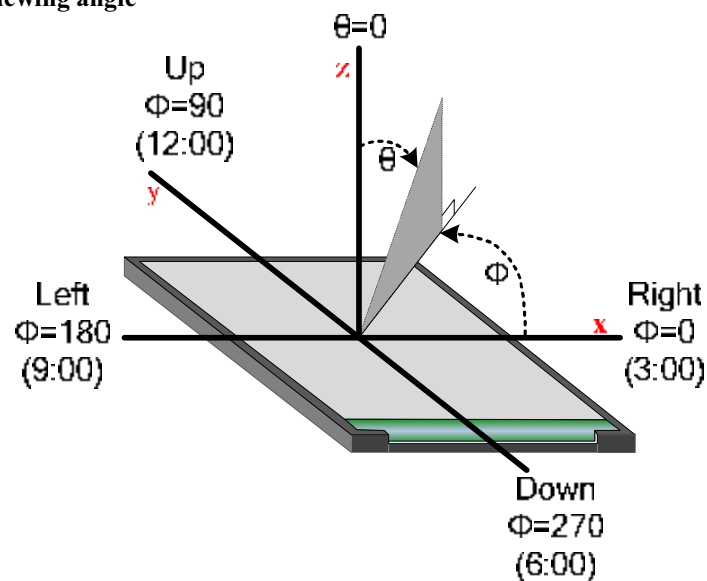measurement instrument is TOPCON's luminance
meter BM-5

FIG.3.　The definition of viewing angle

■ INTERFACE DESCRIPTION

1. Interface Pin Function

Pin	Symbol	I/O	Function	Remark
1	VDD		Power Supply : +3.3V	
2	VDD		Power Supply : +3.3V	
3	DB0		Data bus	
4	DB1		Data bus	
5	DB2		Data bus	
6	DB3		Data bus	
7	DB4		Data bus	
8	DB5		Data bus	
9	DB6		Data bus	
10	DB7		Data bus	
11	DB8		Data bus	
12	DB9		Data bus	
13	DB10		Data bus	
14	DB11		Data bus	
15	DB12		Data bus	
16	DB13		Data bus	
17	DB14		Data bus	
18	DB15		Data bus	
19	CS		Chip select	
20	D/C		Display data/Command data	
21	RD		Read strobe signal	
22	WR		Write strobe signal	
23	NC		No connect	
24	RST		Hardware reset	
25	NC		No connect	
26	NC		No connect	
27	NC		No connect	
28	NC		No connect	
29	NC		No connect	
30	NC		No connect	
31	GND		Power Ground	
32	GND		Power Ground	

2. Block Diagram
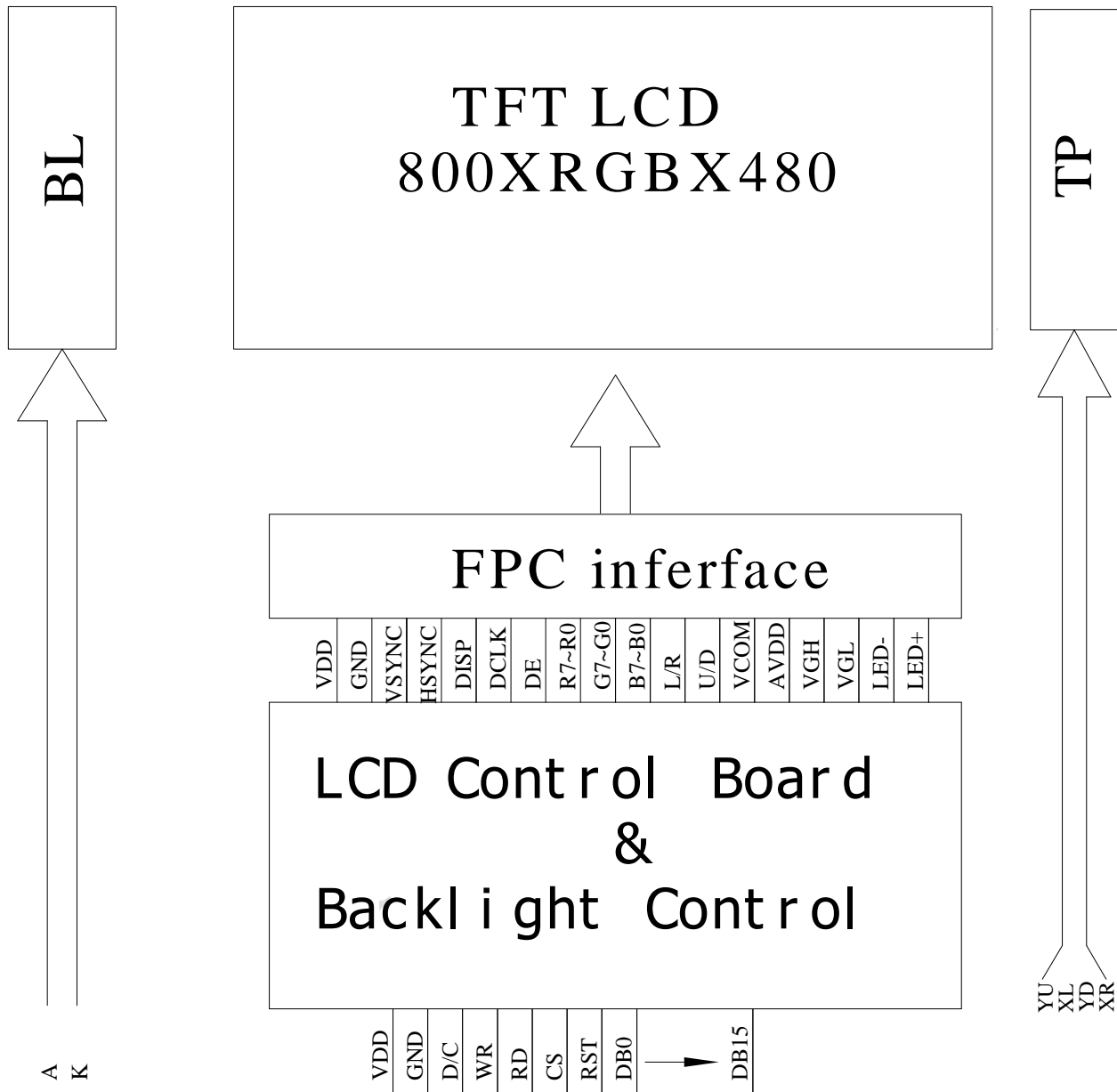
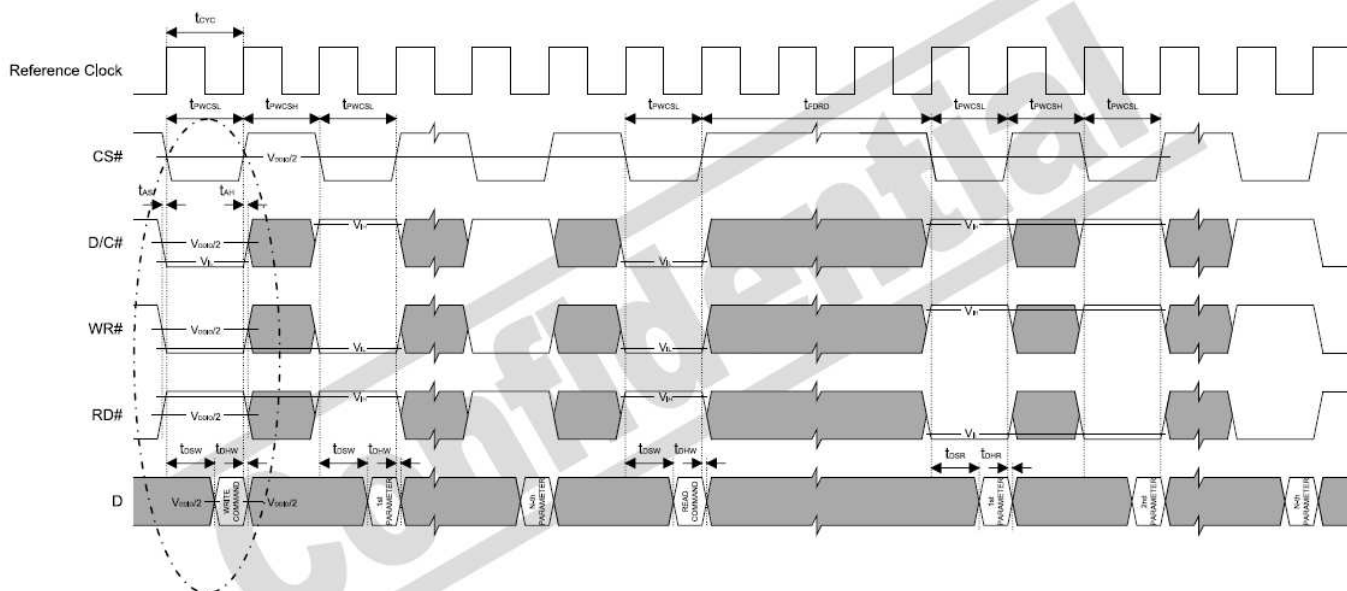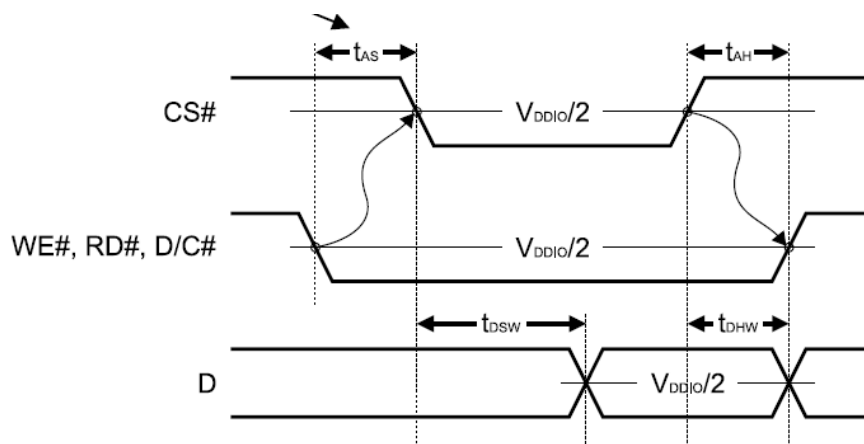# ■ TOUCH SCREEN PANEL SPECIFICATIONS
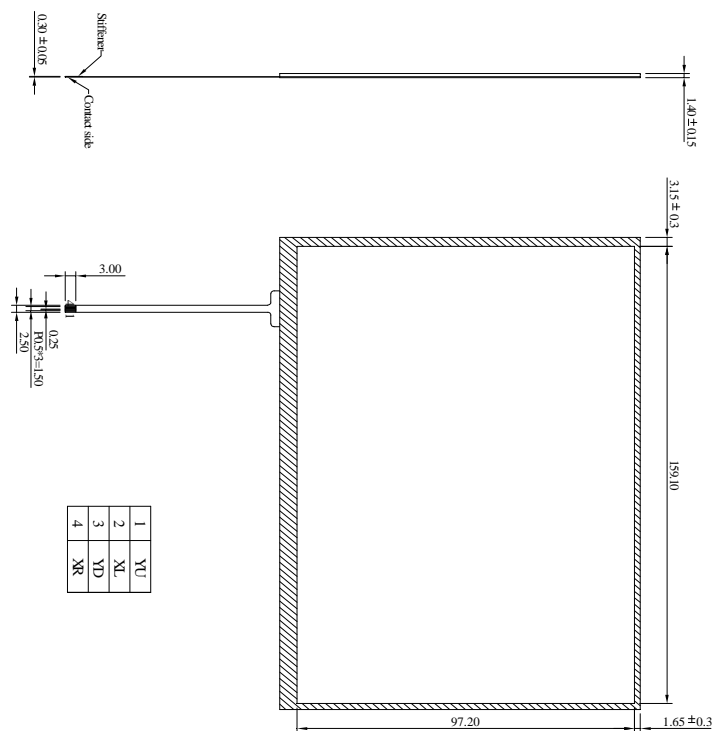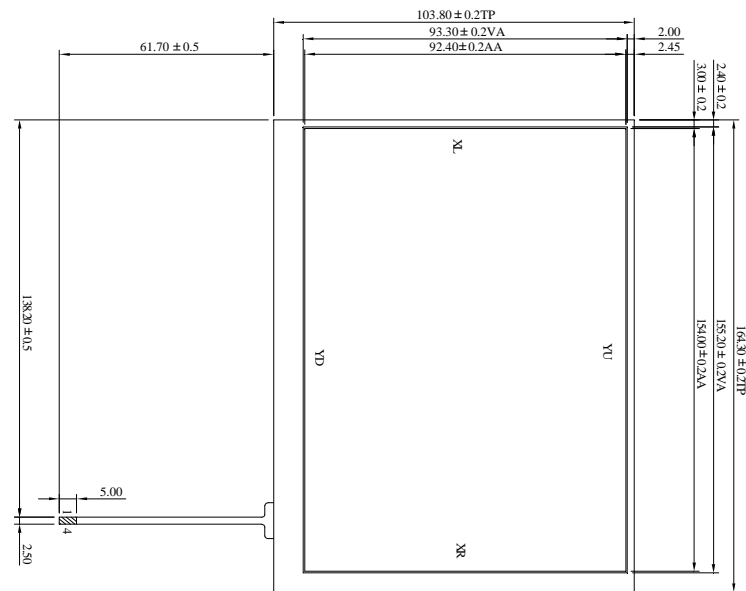
■ APPLICATION NOTES

1. 8080 Mode

The 8080 mode MCU interface consist of CS#, D/C#, RD#, WR#, D[23:0] and TE signals (Please refer to Table 6-1 for pin multiplexed with 6800 mode). This interface use WR# to define a write cycle and RD# for read cycle. If the WR# goes low when the CS# signal is low, the data or command will be latched into the system at the rising edge of WR#. Similarly, the read cycle will start when RD# goes low and end at the rising edge of RD#.

2. 8080 Mode Write Cycle

Symbol	Parameter	Min	Typ	Max	Unit
t_{cyc}	Reference Clock Cycle Time	9	-	-	ns
t_{PWCSL}	Pulse width CS# low	1	-	-	t_{CYC}
t_{PWCSH}	Pulse width CS# high	1	-	-	t_{CYC}
t_{FDRD}	First Read Data Delay	5	-	-	t_{CYC}
t_{AS}	Address Setup Time	1	-	-	ns
t_{AH}	Address Hold Time	1	-	-	ns
t_{DSW}	Data Setup Time	4	-	-	ns
t_{DHW}	Data Hold Time	1	-	-	ns
t_{DSR}	Data Access Time	-	-	5	ns
t_{DHR}	Output Hold time	1	-	-	ns

(Timing diagram: CS#, WE#/RD#/D/C#, and D signals with t_{AS}, t_{AH}, t_{DSW}, t_{DHW} timing parameters referenced to $V_{DDIO}/2$.)

3. Pixel Data Format

Interface	Cycle	D[23]	D[22]	D[21]	D[20]	D[19]	D[18]	D[17]	D[16]	D[15]	D[14]	D[13]	D[12]	D[11]	D[10]	D[9]	D[8]	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
24 bits	1st	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
18 bits	1st							R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
16 bits (565 format)	1st									R5	R4	R3	R2	R1	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1
16 bits	1st									R5	R4	R3	R2	R1	R0	X	X	G5	G4	G3	G2	G1	G0	X	X
16 bits	2nd									B5	B4	B3	B2	B1	B0	X	X	R5	R4	R3	R2	R1	R0	X	X
16 bits	3rd									G5	G4	G3	G2	G1	G0	X	X	B5	B4	B3	B2	B1	B0	X	X
9 bits	1st															R5	R4	R3	R2	R1	R0	G5	G4	G3
9 bits	2nd															G2	G1	G0	B5	B4	B3	B2	B1	B0
8 bits	1st																	R5	R4	R3	R2	R1	R0	X	X
8 bits	2nd																	G5	G4	G3	G2	G1	G0	X	X
8 bits	3rd																	B5	B4	B3	B2	B1	B0	X	X

X: Don't Care

■ **INITIAL CODE FOR REFERENCE**

```c
void Initial_code()
{
        Write_Command(0x01);
        Delay_ms(10);
        Write_Command(0xe0);
        Write_Parameter(0x01);
        Delay_ms(5);
        Write_Command(0xe0);
        Write_Parameter(0x03);
        Delay_ms(5);

        Write_Command(0xb0);
        Write_Parameter(0x08);
        Write_Parameter(0x80);
        Write_Parameter(0x03);
        Write_Parameter(0x1f);
        Write_Parameter(0x01);
        Write_Parameter(0xdf);
        Write_Parameter(0x00);

        Write_Command(0xf0);
        Write_Parameter(0x03);
        Write_Command(0x3a);
        Write_Parameter(0x50);

        Write_Command(0xe2);
        Write_Parameter(0x1d);
        Write_Parameter(0x02);
        Write_Parameter(0x54);

        Write_Command(0xe6);
        Write_Parameter(0x04);
        Write_Parameter(0x6f);
        Write_Parameter(0x47);

        Write_Command(0xb4);
        Write_Parameter(0x04);
        Write_Parameter(0x20);
```

```
        Write_Parameter(0x01);
        Write_Parameter(0x00);
        Write_Parameter(0x00);
        Write_Parameter(0x00);
        Write_Parameter(0x00);
        Write_Parameter(0x00);

        Write_Command(0xb6);
        Write_Parameter(0x02);
        Write_Parameter(0x0d);
        Write_Parameter(0x00);
        Write_Parameter(0x2d);
        Write_Parameter(0x00);
        Write_Parameter(0x00);
        Write_Parameter(0x00);

        Write_Command(0x2a);
        Write_Parameter(0x00);
        Write_Parameter(0x00);
        Write_Parameter(0x03);
        Write_Parameter(0x1f);

        Write_Command(0x2b);
        Write_Parameter(0x00);
        Write_Parameter(0x00);
        Write_Parameter(0x01);
        Write_Parameter(0xdf);

        Write_Command(0x29);
        Write_Command(0x2c);
}
```

■ RELIABILITY TEST
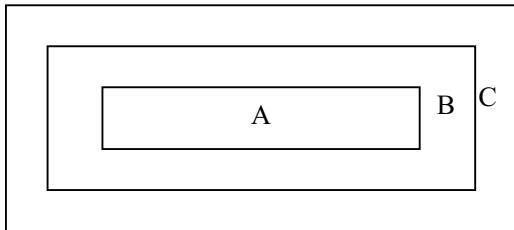
No.	Test Item	Test Condition	Inspection after test
1	High Temperature Storage	80±2℃/200 hours	2
2	Low Temperature Storage	-30±2℃/200 hours	1,2
3	High Temperature Operating	70±2℃/200 hours	
4	Low Temperature Operating	-20±2℃/200 hours	1
5	Temperature Cycle	-20 ± 2 ℃ ~25~70 ± 2 ℃ × 10cycles (30min.) (5min.) (30min.)	
6	Damp Proof Test	60℃±5℃×90%RH/96 hours	1,2
7	Vibration Test	Frequency：10Hz~55Hz Amplitude：15mm, One cycle 60 seconds to 3 directions of X,Y,Z for each 15 minutes	3
8	ESD	VS=800V,RS=1.5kΩ CS=100pF 1 time	

Note1: No dew condensation to be observed.
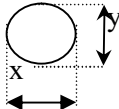
Note2: The function test shall be conducted after 4 hours storage at the normal
Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.
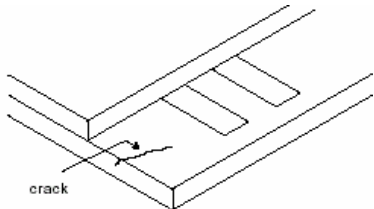
■ INSPECTION CRITERION
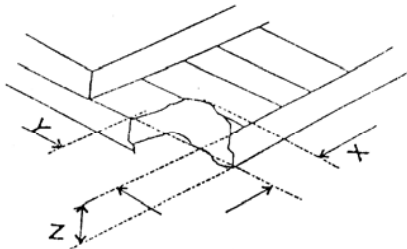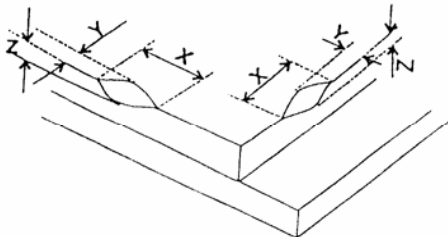
OUTGOING QUALITY STANDARD	PAGE　1　OF　7
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA	

This specification is made to be used as the standard acceptance/rejection criteria for Color mobile phone LCM with touch panel.

1 Sample plan

　Sampling plan according to GB/T2828.1-2003/ISO 2859-1：1999 and ANSI/ASQC Z1.4-1993, normal level 2 and based on:

　　　Major defect: AQL 0.65

　　　Minor defect: AQL 1.5

2. Inspection condition

　Viewing distance for cosmetic inspection is about 30cm with bare eyes, and under an environment of 20~40W light intensity, all directions for inspecting the sample should be within 45° against perpendicular line.

3. Definition of inspection zone in LCD.

　Zone A: character/Digit area

　Zone B: viewing area except Zone A (ZoneA+ZoneB=minimum Viewing area)

　Zone C: Outside viewing area (invisible area after assembly in customer's product)

　Fig.1 Inspection zones in an LCD.

　Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for
　　　quality and assembly of customer's product.

	OUTGOING QUALITY STANDARD	PAGE 2 OF 4
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA		MDS Product

4. Inspection standards

4.1 Major Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.1.1	All functional defects	1) No display 2) Display abnormally 3) Missing vertical，horizontal segment 4) Short circuit 5) Back-light no lighting, flickering and abnormal lighting.	Major
4.1.2	Missing	Missing component	
4.1.3	Outline dimension	Overall outline dimension beyond the drawing is not allowed.	

4.2 Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.2.1	Clear Spots Black and white Spot defect Pinhole, Foreign Particle, Dirt under polarizer	For dark/white spot, sizeΦis defined as $\Phi=\frac{(x+y)}{2}$ 1.	Minor

Zone / Size(mm) table 1:

Size(mm) \ Zone	A	B	C
Φ≤0.10	Ignore		Ignore
0.10＜Φ≤0.15	2		
0.15＜Φ≤0.20	1		
Φ＞0.20	0		

Dim Spots / Circle shaped and dim edged defects — table 2:

Size(mm) \ Zone	A	B	C
Φ≤0.2	Ignore		Ignore
0.20＜Φ≤0.40	3		
0.40＜Φ≤0.60	2		
0.60＜Φ≤0.80	1		
0.80＜Φ	0		

Classification: Minor

OUTGOING QUALITY STANDARD	PAGE　3　OF　4
TITLE: FUNCTIONAL TEST & INSPECTION CRITERIA	MDS Product

4.2. Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.2.2	Line defect Black line, White line, Foreign material under polarizer,	<table><tr><td colspan="2">Size(mm)</td><td colspan="3">Acceptable Qty</td></tr><tr><td rowspan="2">L(Length)</td><td rowspan="2">W(Width)</td><td colspan="3">Zone</td></tr><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>Ignore</td><td>W≤0.02</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>L≤3.0</td><td>0.02＜W≤0.03</td><td colspan="2">2</td></tr><tr><td>L≤2.0</td><td>0.03＜W≤0.05</td><td colspan="2">1</td></tr><tr><td></td><td>0.05＜W</td><td colspan="2">Define as spot defect</td></tr></table>	Minor
4.2.3	Polarizer scratch	If the Polarizer scratch can be seen after mobile phone cover assembling or in the operating condition, judge by the line defect of 4.2.2. If the Polarizer scratch can be seen only in non-operating condition or some special angle, judge by the following. <table><tr><td colspan="2">Size(mm)</td><td colspan="3">Acceptable Qty</td></tr><tr><td rowspan="2">L(Length)</td><td rowspan="2">W(Width)</td><td colspan="3">Zone</td></tr><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>Ignore</td><td>W≤0.03</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>5.0＜L≤10.0</td><td>0.03＜W≤0.05</td><td colspan="2">2</td></tr><tr><td>L≤5.0</td><td>0.05＜W≤0.08</td><td colspan="2">1</td></tr><tr><td></td><td>0.08＜W</td><td colspan="2">0</td></tr></table>	Minor
4.2.4	Polarize Air bubble	Air bubbles between glass & polarizer <table><tr><td>2. Zone Size(mm)</td><td colspan="3">Acceptable Qty</td></tr><tr><td></td><td>A</td><td>B</td><td>C</td></tr><tr><td>Φ≤0.2</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.20＜Φ≤0.30</td><td colspan="2">2</td></tr><tr><td>0.30＜Φ≤0.50</td><td colspan="2">1</td></tr><tr><td>0.50＜Φ</td><td colspan="2">0</td></tr></table>	Minor

OUTGOING QUALITY STANDARD	PAGE 4 OF 4
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA	MDS Product

4.3. Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.3.5	Glass defect	(i) Chips on corner <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤2.0</td><td>≤S</td><td>Disregard</td></tr></table> Notes: S=contact pad length Chips on the corner of terminal shall not be allowed to extend into the ITO pad or expose perimeter seal.	Minor
		(ii)Usual surface cracks <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0</td><td><Inner border line of the seal</td><td>Disregard</td></tr></table>	Minor
		(iii) Crack Cracks tend to break are not allowed. 	Major
4.3.6	Parts alignment	1) Not allow IC and FPC/heat-seal lead width is more than 50% beyond lead pattern. 2) Not allow chip or solder component is off center more than 50% of the pad outline.	Minor
4.3.7	SMT	According to the <Acceptability of electronic assemblies> IPC-A-610C class 2 standard. Component missing or function defect are Major defect, the others are Minor defect.	

■ PRECAUTIONS FOR USING LCD MODULES

1　Handing Precautions

1.1　The display panel is made of glass and polarizer. As glass is fragile. It tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.

1.2　If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.

1.3　Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands. This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer).

1.4　The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on it. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming in to　contact with room temperature air.

1.5　If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents
- Isopropyl alcohol
- Ethyl alcohol

Do not scrub hard to avoid damaging the display surface.

1.6　Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.
- Water
- Ketone
- Aromatic solvents

Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contact with oil and fats.

1.7　Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.

1.8　Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

1.9　Do not attempt to disassemble or process the LCD module.

1.10　NC terminal should be open. Do not connect anything.

1.11　If the logic circuit power is off, do not apply the input signals.

1.12　Electro-Static Discharge Control，Since this module uses a CMOS LSI, the same careful attention should be paid to electrostatic discharge as for an ordinary CMOS IC. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

　　　- Before removing LCM from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential. Be sure to ground the body when handling the LCD modules.

　　　- Tools required for assembling, such as soldering irons, must be properly grounded. Make certain the AC power source for the soldering iron does not leak. When using an electric screwdriver to attach LCM, the screwdriver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.

　　　- To reduce the amount of static electricity generated, do not conduct assembling

and other work under dry conditions. To reduce the generation of static electricity be careful that the air in the work is not too dry. A relative humidity of 50%-60% is recommended. As far as possible make the electric potential of your work clothes and that of the work bench the ground potential.

- The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

1.13 Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.

- Do not alter, modify or change the shape of the tab on the metal frame.

- Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.

- Do not damage or modify the pattern writing on the printed circuit board.

- Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.

- Except for soldering the interface, do not make any alterations or modifications with a soldering iron.

- Do not drop, bend or twist the LCM.

2   Handling precaution for LCM
2.1   LCM is easy to be damaged. Please note below and be careful for handling.
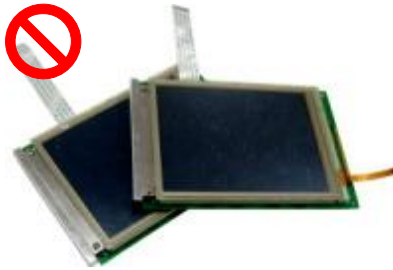### 2.2   Correct handling:

As above picture, please handle with anti-static gloves around LCM edges.

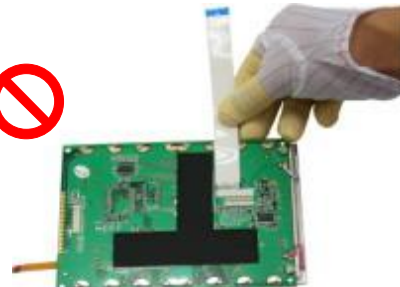### 2.3   Incorrect handling:

Please don't touch IC directly.
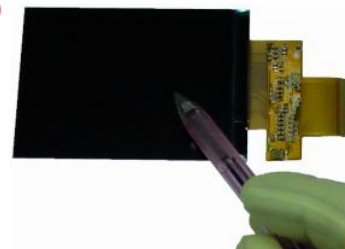

Please don't stack LCM.

Please don't hold the surface of panel.

Please don't stretch interface of output, such as FPC cable.

Please don't hold the surface of IC.

Please don't operate with sharp stick such as pens.

3　Storage Precautions

3.1　When storing the LCD modules, the following precaution are necessary.

3.1.1 Store them in a sealed polyethylene bag. If properly sealed, there is no need for the desiccant.

3.1.2 Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35°C, and keep the relative humidity between 40%RH and 60%RH.

3.1.3 The polarizer surface should not come in contact with any other objects (We advise you to store them in the anti-static electricity container in which they were shipped).

3.2　Others 其它

3.2.1 Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

3.2.2 If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

3.2.3 To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

3.2.3.1 - Exposed area of the printed circuit board.

3.2.3.2 -Terminal electrode sections.

4　USING LCD MODULES

4.1　Installing LCD Modules

The hole in the printed circuit board is used to fix LCM as shown in the picture below. Attend to the following items when installing the LCM.

4.1.1 Cover the surface with a transparent protective plate to protect the polarizer and LC cell.
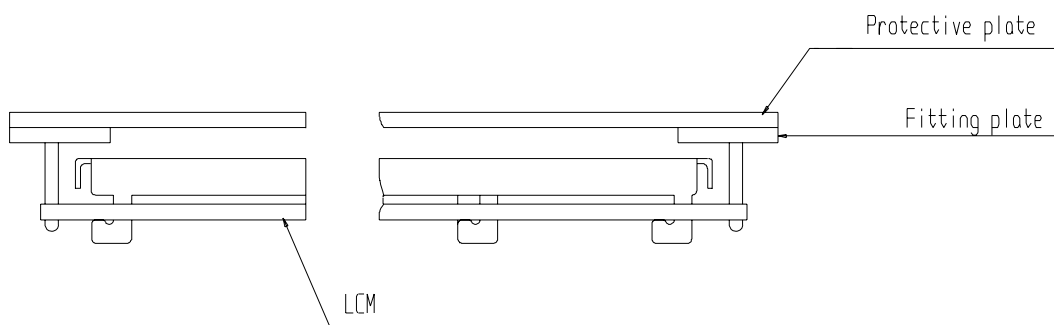
4.1.2 When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be ±0.1mm.

4.2   Precaution for assemble the module with BTB connector:
       Please note the position of the male and female connector position, don't assemble or assemble like the method which the following picture shows

>15°

OK

NG

NG
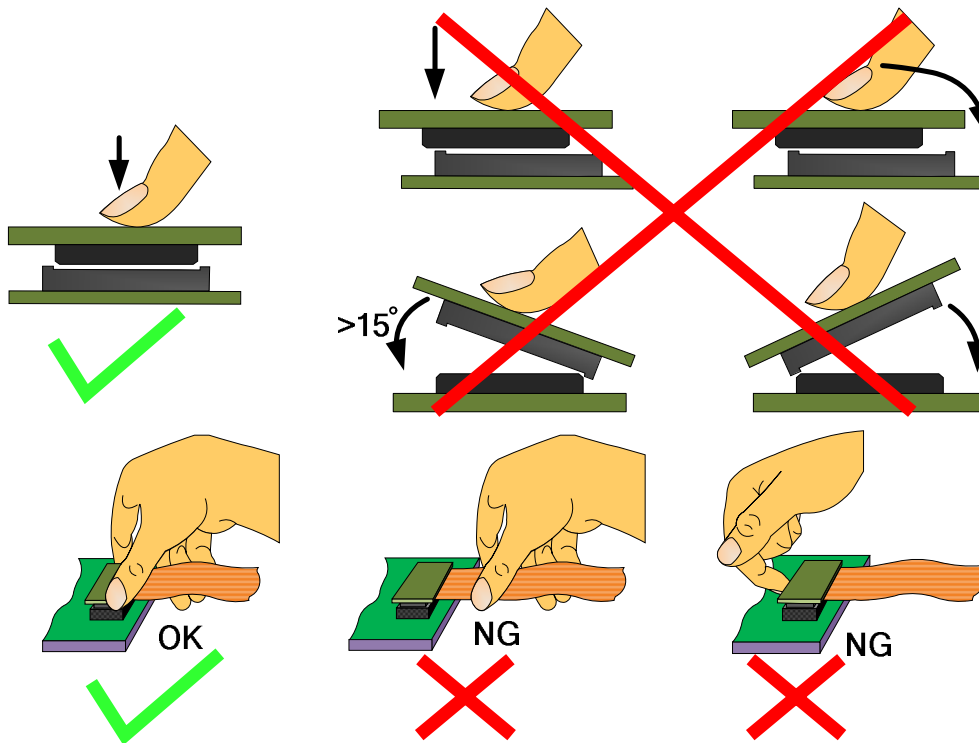
4.3 Precaution for soldering the LCM

	Manual soldering	Machine drag soldering	Machine press soldering
No RoHS Product	290°C ~350°C. Time : 3-5S.	330°C ~350°C. Speed : 15-17 mm/s.	300°C ~330°C. Time : 3-6S. Press: 0.8~1.2Mpa
RoHS Product	340°C ~370°C. Time : 3-5S.	350°C ~370°C. Speed : 15-17 mm/s.	330°C ~360°C. Time : 3-6S. Press: 0.8~1.2Mpa

4.3.1 If soldering flux is used, be sure to remove any remaining flux after finishing to soldering operation (This does not apply in the case of a non-halogen type of flux). It is recommended that you protect the LCD surface with a cover during soldering to prevent any damage due to flux spatters.

4.3.2 When soldering the electroluminescent panel and PC board, the panel and board should not be detached more than three times. This maximum number is determined by the temperature and time conditions mentioned above, though there may be some variance depending on the temperature of the soldering iron.

4.3.3 When remove the electroluminescent panel from the PC board, be sure the solder has completely melted, the soldered pad on the PC board could be damaged.

4.4 Precautions for Operation

4.4.1 Viewing angle varies with the change of liquid crystal driving voltage (VLCD). Adjust VLCD to show the best contrast.

4.4.2 It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life. An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.

4.4.3 Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operating temperature.

4.4.4 If the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if it is turned off and then back on.

4.4.5 A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit. Usage under the maximum operating temperature, 50%RH or less is required.

4.4.6 Input logic voltage before apply analog high voltage such as LCD driving voltage when power on. Remove analog high voltage before logic voltage when power off the module. Input each signal after the positive/negative voltage becomes stable.

4.4.7 Please keep the temperature within the specified range for use and storage. Polarization degradation, bubble generation or polarizer peel-off may occur with high temperature and high humidity.

4.5 Safety

4.5.1 It is recommended to crush damaged or unnecessary LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.

4.5.2 If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

4. 6   Limited Warranty

      Unless agreed between Multi-Inno and the customer, Multi-Inno will replace or repair any of its LCD modules which are found to be functionally defective when inspected in accordance with Multi-Inno LCD acceptance standards (copies available upon request) for a period of one year from date of production. Cosmetic/visual defects must be returned to Multi-Inno within 90 days of shipment. Confirmation of such date shall be based on data code on product. The warranty liability of Multi-Inno limited to repair and/or replace on the terms set forth above. Multi-Inno will not be responsible for any subsequent or consequential events.

4.7   Return LCM under warranty

    4.7.1 No warranty can be granted if the precautions stated above have been disregarded. The typical examples of violations are :

    4.7.1.1 - Broken LCD glass.

    4.7.1.2 - PCB eyelet is damaged or modified.

    4.7.1.3 -PCB conductors damaged.

    4.7.1.4 - Circuit modified in any way, including addition of components.

    4.7.1.5 - PCB tampered with by grinding, engraving or painting varnish.

    4.7.1.6 - Soldering to or modifying the bezel in any manner.

    4.7.2 Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB eyelet, conductors and terminals.

■ PACKING SPECIFICATION

Please consult our technical department for detail information.

■ PRIOR CONSULT MATTER

1   For Multi-Inno standard products, we keep the right to change material, process ... for improving the product property without prior notice to our customer.

2   For OEM products, if any changes are needed which may affect the product property, we will consult with our customer in advance.

3   If you have special requirement about reliability condition, please let us know before you start the test on our samples.