Product Specification

Product Name: KTM024EM01

Product Code: MT8030

Customer
Approved by Customer
Approved Date:

Designed By	Checked by	Approved By	
		R&D	QA

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CONTENT

REVISION RECORD

REV.	REVISION DESCRIPTION	REV. DATE	REMARK
Y01	Initial Release	2010-08-23	

1 Overview

The specifications is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT LCD panel, driver ICs, FPC, and a backlight unit. The following table described the features of KTM024EM01.

2 Features

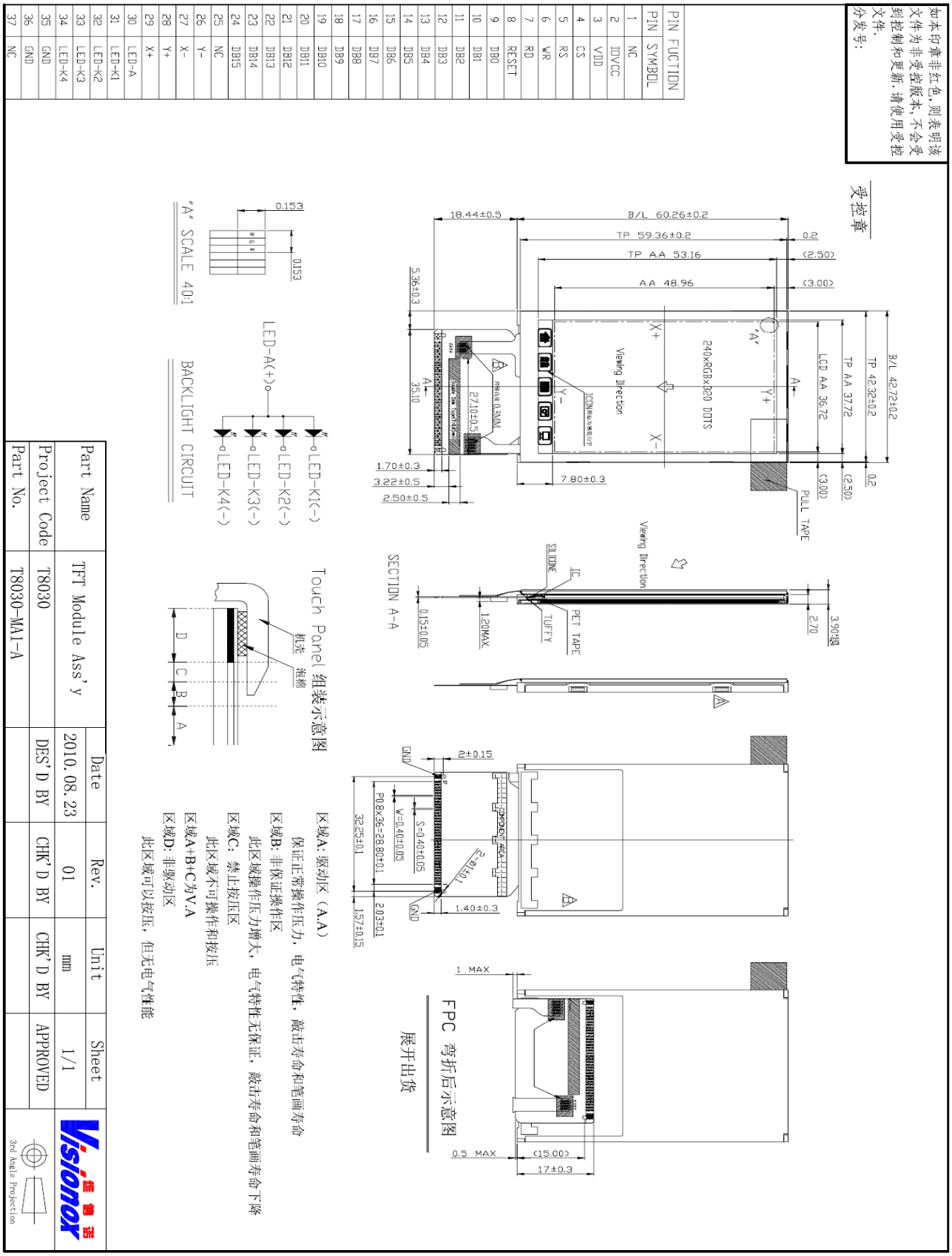
- Panel Size: 2.4 inch
- Number of Pixels /Resolution: 240×320
- Driver IC: SPFD5408B
- Interface: 16bit 80 system parallel interface
- Color :262K
- Display Mode: Normally White
- Viewing Direction: 12 o'clock

Note : Requirements on Environmental Protection: RoHS

3 Mechanical Data

NO.	Item	Specification	Unit
1	Number of Pixels	240(H) × RGB × 320(V)	pixels
2	Active Area	36.72(H) × 48.96(V)	mm
3	Pixel Pitch	0.153(H) × 0.153(V)	mm
4	Outline Dimension	42.72(H) × 60.26(V) × 3.90(D)	mm
5	TP A.A	37.72 (H) × 53.16(V)	mm
6	TP Area	42.32 (H) × 59.36(V)	mm
7	Backlight unit	LEDx4/Parallel	
8	With /Without TP	With TP	
9	Weight	TBD	g

4 Mechanical Drawing



5 Module Interface

No.	Symbol	I/O	Description	Remark
1	NC	-	Dummy	
2	IOVCC	P	I/O interface supply voltage	
3	VDD	P	Analog power supply voltage	
4	/CS	I	Chip select input pin	
5	RS	I	Data/Command write select pin	
6	WR	I	Write execution control pin	
7	RD	I	Read execution control pin	
8	/LCD_RESET	I	reset	
9	DB0	I/O	Data bus bit 0	
10	DB1	I/O	Data bus bit 1	
11	DB2	I/O	Data bus bit 2	
12	DB3	I/O	Data bus bit 3	
13	DB4	I/O	Data bus bit 4	
14	DB5	I/O	Data bus bit 5	
15	DB6	I/O	Data bus bit 6	
16	DB7	I/O	Data bus bit 7	
17	DB8	I/O	Data bus bit 8	
18	DB9	I/O	Data bus bit 9	
19	DB10	I/O	Data bus bit 10	
20	DB11	I/O	Data bus bit 11	
21	DB12	I/O	Data bus bit 12	
22	DB13	I/O	Data bus bit 13	
23	DB14	I/O	Data bus bit 14	
24	DB15	I/O	Data bus bit 15	
25	NC	-	Dummy	
26	Y-	I	Touch panel pin	
27	X-	I	Touch panel pin	
28	Y+	I	Touch panel pin	
29	X+	I	Touch panel pin	
30	LED-A	P	LED Power supply(+)	
31	LED-K1	P	LED Power supply (-)	
32	LED-K2	P	LED Power supply (-)	
33	LED-K3	P	LED Power supply (-)	
34	LED-K4	P	LED Power supply (-)	
35	GND	P	Power Ground	
36	GND	P	Power Ground	
37	NC	-	Dummy	

Note2-1: I/O definition I----Input O----Output P----Power

*Unused pin must be fixed to GND level

6 Absolute Maximum Rating

Typical Operating Conditions (Ta=25℃)

Item	Symbol	Min	Max	Unit	Remark
Logic Supply Voltage	VDD	-0.24	3.6	V	
Input Signal Voltage	V_{IN}	-0.24	IOVCC	V	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	
Humidity	RH	-	90%	RH	Max 60℃

Note (1): All of the voltages are on the basis of “GND = 0V”.

Note (2): Permanent breakage of module may occur if the module is used beyond the maximum rating. The module can be normal operated under the conditions according to Section 7 “Electrical Characteristics”. Malfunctioning of the module may occur and the reliability of the module may deteriorate if the module is used beyond the conditions.

7 Electrical Characteristics

7.1 LCD DC Electrical Characteristics

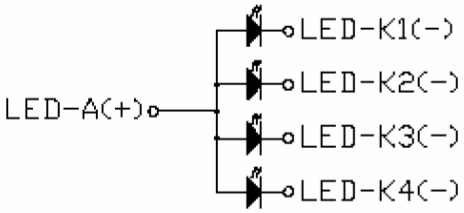
Typical Operating Conditions (Ta=25℃)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max		
Operating voltage	VDD	2.7	2.8	2.9	V	
Input high voltage	V_{IH}	0.8×IOVCC	-	IOVCC	V	
Input low voltage	V_{IL}	-0.24	-	0.2×IOVCC	V	
Current Consumption	I_{VDD}	-	4.1	-	mA	VDD=2.8V
Power Consumption	P_{LCD}	-	11.5	-	mW	

7.2 Backlight Unit

Item	Symbol	Min.	Typical	Max.	Unit
Current (One LED)	I_f	---	18	25	mA/Pcs
Number of LED ★1	---		4		Piece
Connection mode	P		Parallel		---
LCM Surface Luminance ★2(I_f = 18 mA)	L_S	210	220	----	Cd/㎡
LCM Surface brightness uniform★3	L_D	80	----	----	%

★1 BACKLIGHT Block diagram：



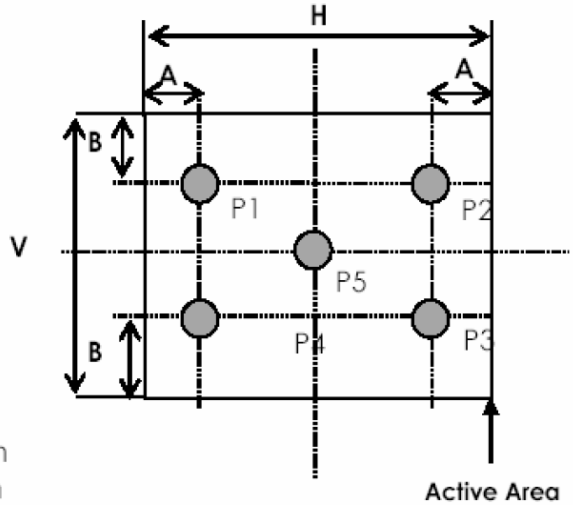
★2 Definition of Luminance:

From the LCD surface 50cm vertical suvery the center point，use BM-7 at field 1° when all pixels displaying white.

★3 Uniform measure condition：

(1)Measure 5 point. Measure location is show below：

(2)Uniform = (Min. brightness / Max. brightness)×100%



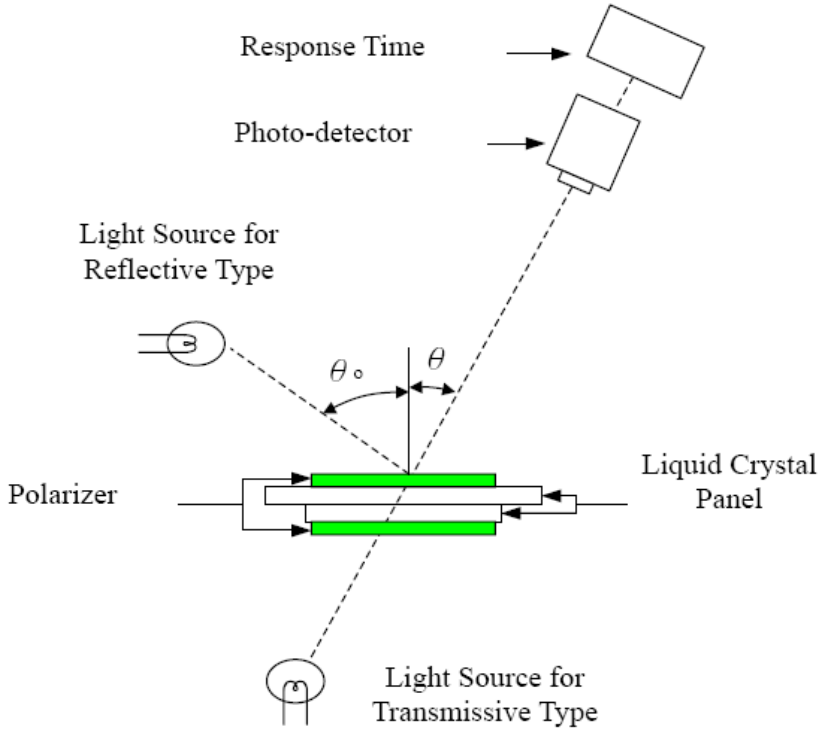
A : 5 mm
B : 5 mm
Light source spot size ∅=2mm
H,V : Active Area
measurement device is TOPCON luminance meter BM-7

8 Optical characteristics

8.1 Optical Specification

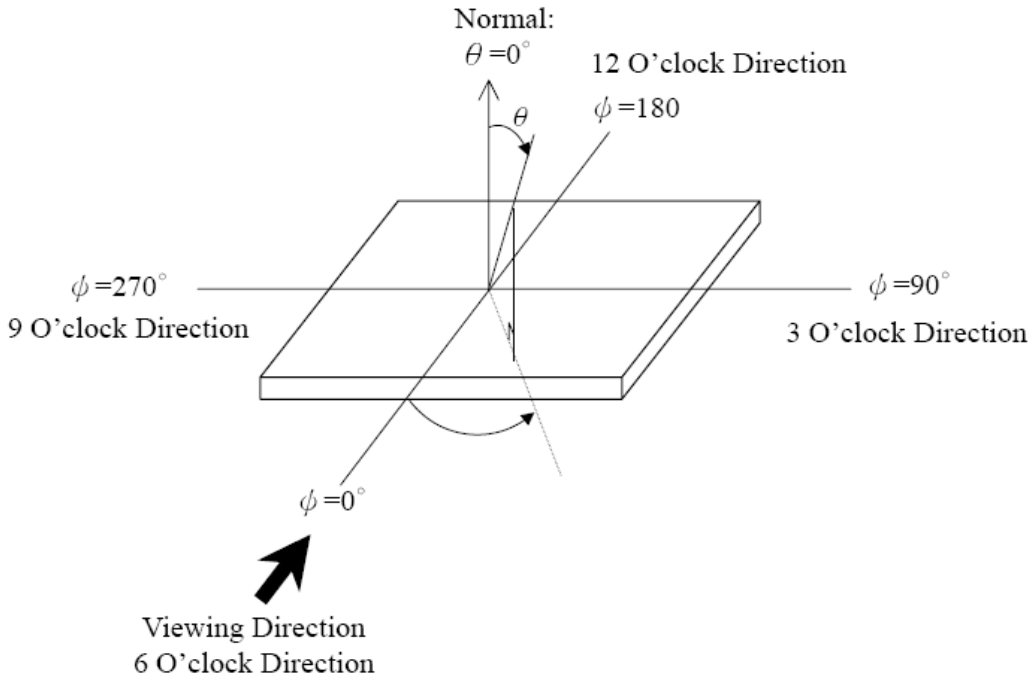
Electro-Optical Characteristics									
Item	Symbol		Condition	Temp.	Min.	Typ.	Max.	Units	Note
Viewing Angle Range	θ		ψ= 0° ψ= 90° ψ= 180° ψ= 270° (CR≧10)	25℃	---- ---- ---- ----	60 65 70 60	---- ---- ---- ----	degree	Note 2
Response Time	Rise Time (Tr)		θ=ψ= 0° θ_0 = 25°	25℃	----	10.4	----	msec	Note 1,4
	Fall Time (Tf)				----	20.4	----		
Module Chromaticity	White	x	θ=ψ= 0°	25℃	0.26	0.2923	0.32	---	Note 3
		y			0.30	0.3304	0.36		
	Red	x			----	TBD	----		
		y			----		----		
	Green	x			----		----		
		y			----		----		
	Blue	x			----		----		
		y			----		----		
Module Contrast Ratio	CR		θ=ψ= 0°	25℃	----	453	----	---	Note3, 5

Note 1: Electro-Optical Characteristics Test Method.



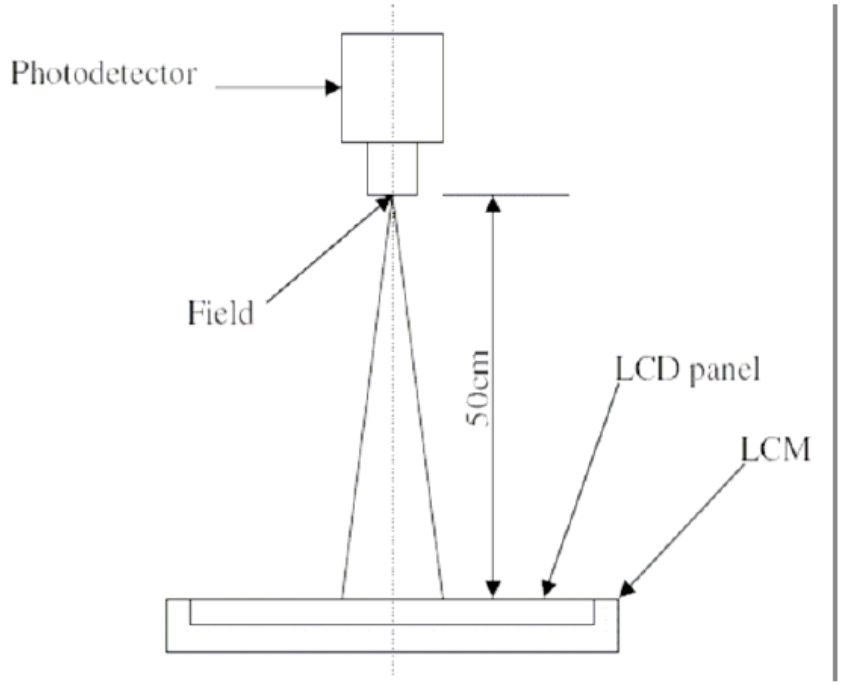
Note 2: Definition of Viewing Angel.

Viewing angle is the angle at which the contrast ratio is greater than 2,for TFT module thecontrast 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.



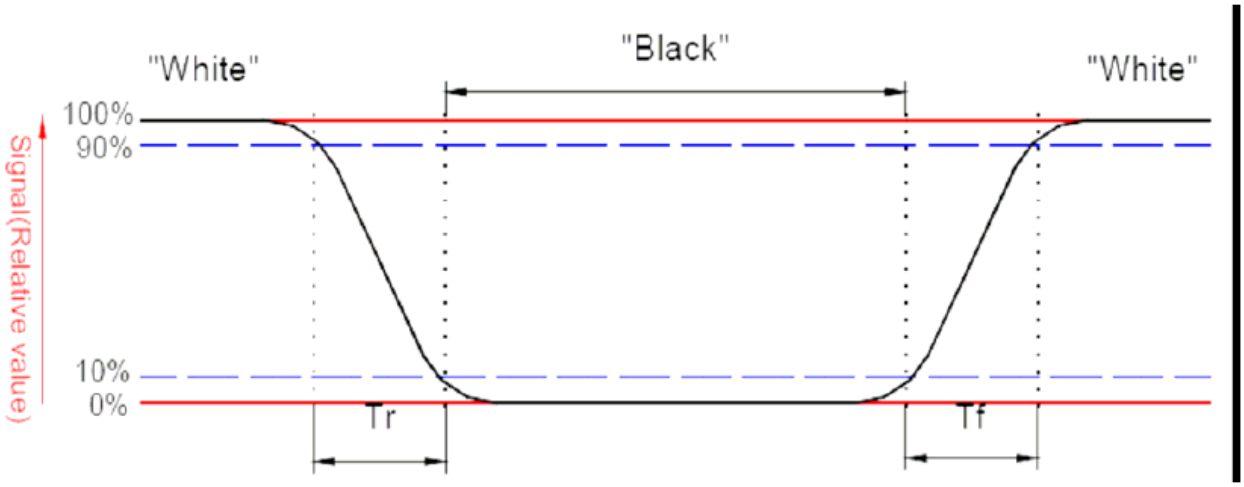
Note 3: **Optical measurement equipment setup**

-Measurement should be executed in a stable, windless, and dark room. After lighting thebacklight for 30mins.
-Environment condition : Common air conditioner cleanness Ta=25±5
Humidity=60±15%
-Distance : 50cm
-Photodetector : BM-7 (Field 1°)



Note 4: Definition of Optical Response Time

The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below:



Note 5: Definition of Contrast Ratio (CR).

Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

9 Package Specification

TBD

10 Reliability

TBD

11 Precautions for operation and Storage

11.1 Precautions for Operation

(1) Since the display panel is made of glass, do not apply any mechanical shock or impact or excessive force to it when installing the module. Any strong mechanical impact due to falling dropping etc. may cause damage (breakage or cracking).

(2) If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

(3) The polarizer on the display surface is made of soft material and is easily scratched. Please take most care when handing. When the display surface is contaminated, please wipe it off gently by using moisten soft cloth with isopropyl alcohol, do not use water, ketone or aromatics.If still not completely clear, moisten cloth with isopropyl alcohol or ethyl alcohol solvents.

(4) When handling the LCD module, please be sure that the body and the tools are properly grounded. And do not touch I/O pins with bare hands or contaminate I/O pins, it will cause disconnection or defective insulation of terminals.

(5) Do not attempt to disassemble or process the LCD module.

(6) The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

(7) Do not put one product on the other .Otherwise, it may cause the product to bescratched and/or change on cosmetic occur (ex. Newton ring).

11.2 Soldering

(1) Soldering should be performed only on the I/O terminals.

(2) Use soldering irons with proper grounding and no leakage.

(3) Iron: no higher than 300℃ and 3~4 sec during soldering.

11.3 Precautions for Storage

(1) Please store LCD module in a dark place. Avoid exposure to sunlight, the light of fluorescent lamp or any ultraviolet ray.

(2) Keep the environment temperature between 0℃ and 40℃ and the relative humidity less than 80%. Avoid high temperature and high humidity.

(3) Keep the LCD modules stored in the room without acid ,alkali and harmful gas.

11.4 Warranty period

Visionox Display Co., Ltd. warrants for a period of 12 months from the shipping date when stored or used under normal condition.