DISPLAYTRONIC

XIAMEN ZETTLER ELECTRONICS CO., LTD

SPECIFICATIONS FOR
LIQUID CRYSTAL DISPLAY

CUSTOMER APPROVAL

※ **PART NO. :** _____ATM0700B6A-T_____

APPROVAL		COMPANY CHOP	
CUSTOMER COMMENTS			

DISPLAYTRONIC ENGINEERING APPROVAL		
DESIGN BY	**CHECKED BY**	**APPROVED BY**

ATM0700B6A-T TFT MODULE V1.2

REVISION RECORD

REVISION	REVISION DATE	PAGE	CONTENTS
VER1.0	**27/10-2011**		**FIRST ISSUE**
VER1.1	**01/12-2011**	**3, 9**	**MODIFY MECHANICAL DIAGRAM AND 7.0 PIN ASSIGNMENT**
VER1.2	**19/12-2011**	**9**	**MODIFY THE WORK TIMING**

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1.0 MECHANICAL DIAGRAM

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3	XR
4	YU
5	VDD
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8	CS#
9	DC#
10	E(RD#)
11	R/W#(WR#)
12	TE
13	VSS
14	DB0
15	DB1
16	DB2
17	DB3
18	DB4
19	DB5
20	DB6
21	DB7
22	VSS
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24	DB9
25	DB10
26	DB11
27	DB12
28	DB13
29	DB14
30	DB15
31	VSS
32	ADJ
33	NC
34	VBL+

TP LAYOUT

Label

60.0

110.0

13.3MAX

Adhesive

PCB

5.7±0.3

1.4±0.2

164.9±0.3(OUTLINE)
163.3(TP. OUTLINE)
156.68±0.2(BEZEL OPEN)
156.14(TP. A.A.)
154.08(A.A.)

80.96

DISPLAY CENTER

Y1

Y2

X1

X2

47.74

(2.62)
(2.66)
(3.92)
(4.78)
(3.7)
(3.48)
(1.1)

85.92(A.A.)
89.2(TP. A.A.)
89.09±0.2(BEZEL OPEN)
97.8(TP. OUTLINE)
100.0±0.3(OUTLINE)

(50.0)
Ø2.00
(2.75)

Note:Dimensions marked with "()" are for reference.
General tolerance: ±0.3
"NC"means Connector not soldered

2.0 MECHANICAL SPECS

1.	Display Format	800RGB x 480 DOTS
2.	Power Supply	LCD 3.3V/ BACKLIGHT 3.3~5.0V
3.	Overall Module Size(L*W*T)	164.9mm x 100.0mm x MAX13.3mm
4.	Active Area(W*H)	154.08mm x 85.92mm
5.	Dot Pitch (W*H)	0.0642mm x 0.179mm
6.	Viewing Aera(W*H)	156.7mm x 89.1mm
7.	Color Configuration	RGB stripe
8.	Color Depth	65K colors
9.	Viewing Direction	12 O'clock
10.	Display mode	Normally White, Transmissive
11.	Backlight Options	LED-SIDE(White)
12.	DRIVING IC	SSD1963
13.	Operating temperature	-20ºC ~ 70ºC
14.	Storage temperature	-30ºC ~ 80ºC
15.	Weight	T.B.D.
16.	ROHS	ROHS compliant

3.0 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Typ	Max	Unit
Operating temperature	Top	-20	-	70	ºC
Storage temperature	Tst	-30	-	80	ºC
Input voltage	Vin	Vss-0.3	-	Vdd+0.3	V
Supply voltage for logic	Vdd- Vss	-0.3	-	3.6	V

4.0 ELECTRICAL CHARACTERISTICS

4.1 Electrical Characteristics Of LCM

Item	Symbol	Condition	Min	Typ	Max	Unit
Power Supply Voltage	VDD	Ta=25ºC	3.0	3.3	3.6	V
BL power consumption	P_{BL}	V_{BL_IN}=5V	--	370	--	mA
Power Consumption	P_{TFT}	Vdd=3.3V	-	0.23	--	W
Input voltage (high)	Vih	H level	0.8Vdd	-	Vdd	V
Input voltage (low)	Vil	L level	Vss	-	0.2Vdd	V

4.2 The Characteristics Of   Backlight

Item	Symbol	Condition	Min	Typ	Max	Unit
Power consumption	P_{LED}	IL=120mA	--	1.188	--	W
LED life time	--	--	20000	--	--	H

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and
IL =120mA.
Note 2: The "LED life time" is defined as the module brightness decrease to 50% original
brightness at Ta=25℃ and IL =120mA. The LED lifetime could be decreased if
operating IL is lager than 120 mA.

5.0 OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit	Remarks	Note
Reponse time	Tr	Ta = 25°C	---	10	20	ms	---	1
	Tf		---	15	30	ms	---	7
Luminance	L	Il=120mA	175	200	--	Cd/m2	---	6
Contrast	CR	Ta = 25°C	400	500	---	---	---	4
Viewing angle range	θ	Cr ≥ 10	60	70	---	deg	∅ = 90°	1,3
			40	50	---	deg	∅ = 270°	
			60	70	---	deg	∅ = 0°	
			60	70	---	deg	∅ = 180°	

Test Conditions:
1. DVDD=3.3V, IL=120mA (Backlight current), the ambient temperature is 25℃.
2. The test systems refer to Note 2.

Note 1: Definition of viewing angle range
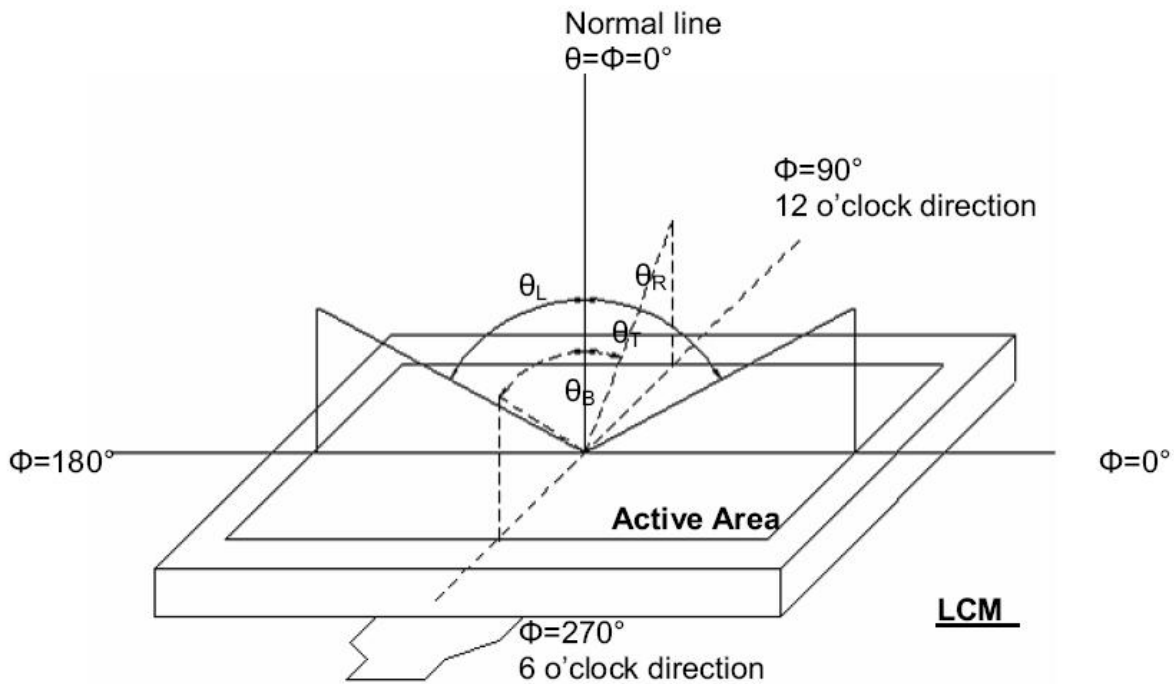
Note 2: Definition of optical measurement system.
The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)
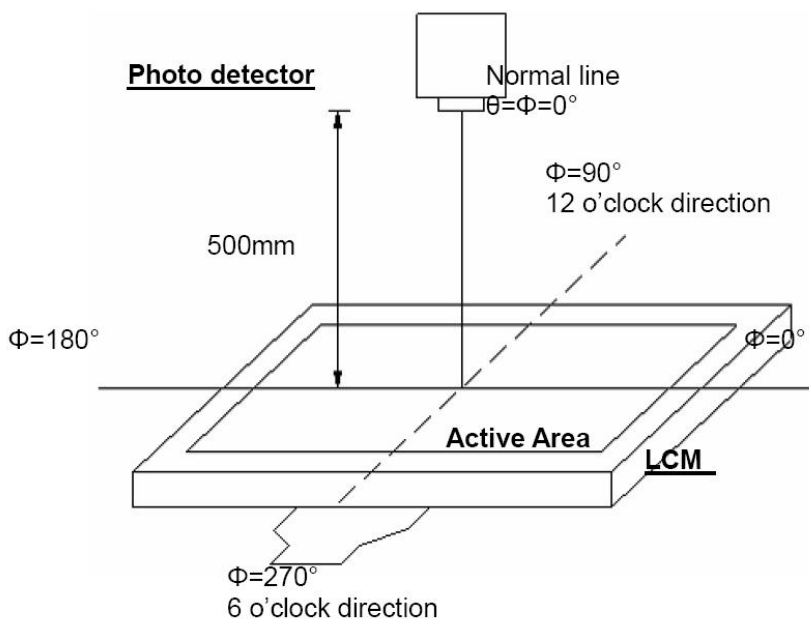
Note 3: Definition of Response time
The response time is defined as the LCD optical switching time interval between
"White" state and "Black" state. Rise time (TON) is the time between photo detector
output intensity changed from 90% to 10%. And fall time (TOFF) is the time
between photo detector output intensity changed from 10% to 90%.
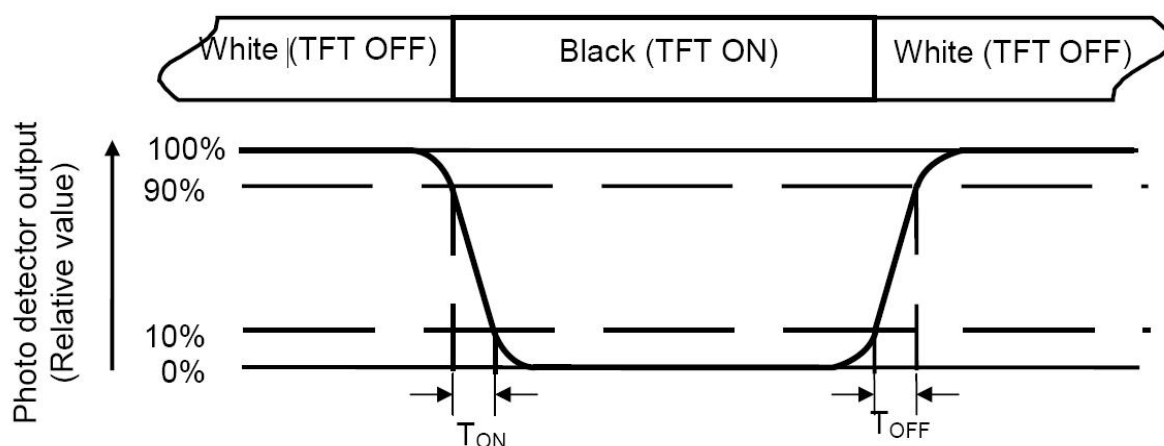
Note 4: Definition of contrast ratio
Luminance measured when LCD on the "Black" state
Luminance measured when LCD on the " White" state
Contrast ratio (CR) =

Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of
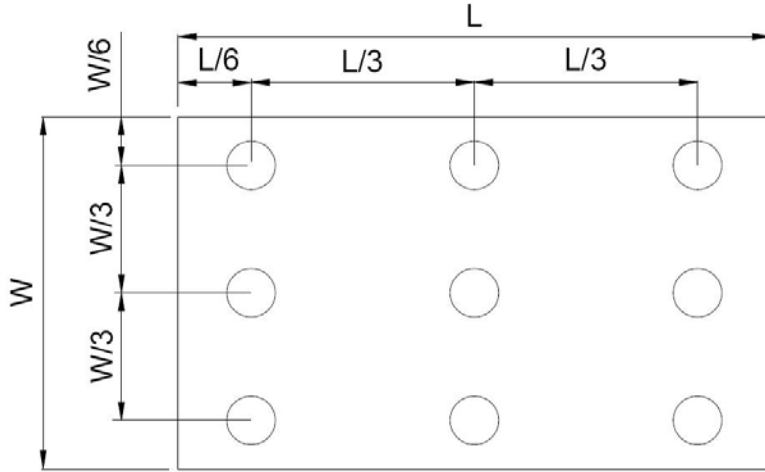the panel. The LED driving condition is IL=120mA .

Note 7: The values shall be measured without Touch Screen Panel.

Note 8: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas .Every measuring
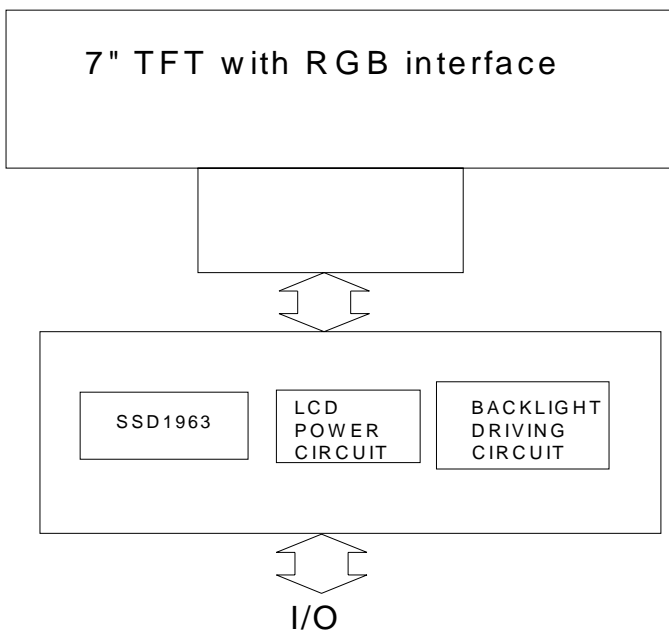point is placed at the center of each measuring area.

$$Luminance\ Uniformity\ (Yu) = \frac{B_{min}}{B_{max}}$$

L-------Active area length   W----- Active area width

Bmax: The measured maximum luminance of all measurement position.
Bmin: The measured minimum luminance of all measurement position.

6.0 BLOCK DIAGRAM

7" TFT with RGB interface
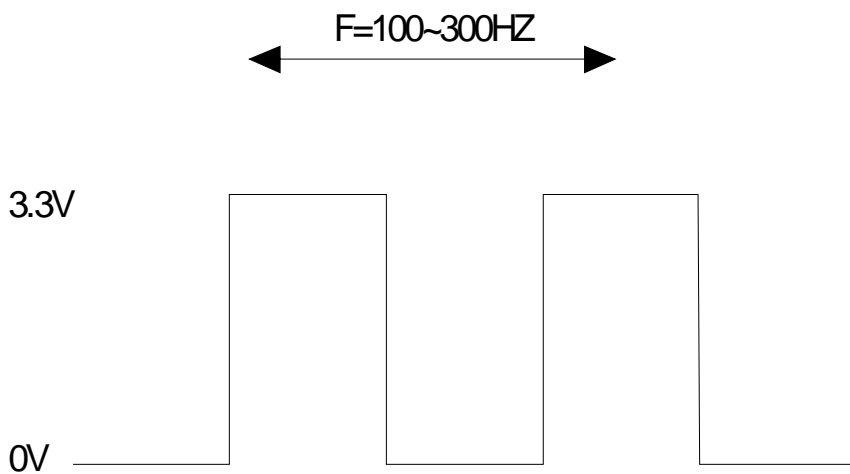
SSD1963

LCD POWER CIRCUIT

BACKLIGHT DRIVING CIRCUIT

I/O

7.0   PIN ASSIGNMENT(8/16 bit 6800 timing)

Pin No.	Symbol	Function
1	XL	TOUCH PANEL LEFT AXIS
2	YD	TOUCH PANEL DOWN AXIS
3	XR	TOUCH PANEL RIGHT AXIS
4	YU	TOUCH PANEL UP AXIS
5	VDD	Power Supply for LCM
6	VSS	POWER GND
7	RESET	Reset pin
8	CS#	Chip select pin
9	DC#	Data/Command select
10	E	Enable signal
11	R/W	Read or Write signal
12	TE	Tearing effect(Left open if not use)
13	VSS	POWER GND
14	DB0	Data bus
15	DB1	Data bus
16	DB2	Data bus
17	DB3	Data bus
18	DB4	Data bus
19	DB5	Data bus
20	DB6	Data bus
21	DB7	Data bus
22	VSS	POWER GND
23	DB8	Data bus(IF USE 8BIT INTERFACE,PLEASE LEAVE IT OPEN)
24	DB9	Data bus(IF USE 8BIT INTERFACE,PLEASE LEAVE IT OPEN)
25	DB10	Data bus(IF USE 8BIT INTERFACE,PLEASE LEAVE IT OPEN)
26	DB11	Data bus(IF USE 8BIT INTERFACE,PLEASE LEAVE IT OPEN)
27	DB12	Data bus(IF USE 8BIT INTERFACE,PLEASE LEAVE IT OPEN)
28	DB13	Data bus(IF USE 8BIT INTERFACE,PLEASE LEAVE IT OPEN)
29	DB14	Data bus(IF USE 8BIT INTERFACE,PLEASE LEAVE IT OPEN)
30	DB15	Data bus(IF USE 8BIT INTERFACE,PLEASE LEAVE IT OPEN)
31	VSS	POWER GND
32	ADJ	Adjust the led brightness with PWM Pulse / H: ON, L:OFF Note 1,2
33	NC	MUST LEFT OPEN
34	VBL+	POWER SUPPLY FOR BACKLIGHT(3.3~5.0V)

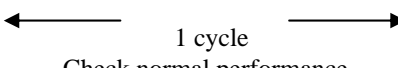**Note1:** Pin32. is used to adjust brightness.
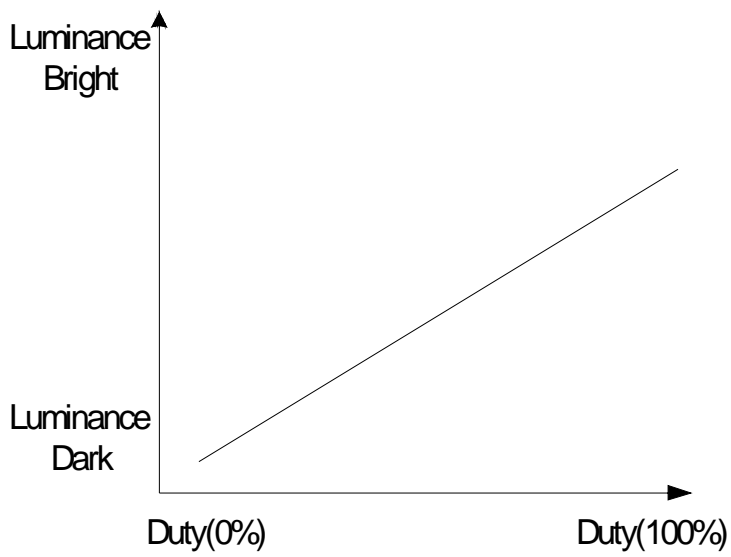
Note 2: ADJ signal=0 ~3.3V; Operating frequency:100~300Hz.

8.0 TIMING CHARACTERISTICS

PLEASE REFER TO SSD1963 DATASHEET

9.0 RELIABILITY TEST

NO	Test Item		Description	Test Condition	Remark
1	Environmental Test	High temperature storage	Applying the high storage temperature Under normal humidity for a long time Check normal performance	80 ºC 96hrs	
2		Low temperature storage	Applying the low storage temperature Under normal humidity for a long time Check normal performance	-30ºC 96hrs	
3		High temperature Operation	Apply the electric stress(Volatge and current) Under high temperature for a long time	70 ºC 96hrs	Note1
4		Low temperature Operation	Apply the electric stress Under low temperature for a long time	-20ºC 96hrs	Note1 Note2
5		High temperature/High Humidity Storage	Apply high temperature and high humidity storage for a long time	90% RH 40ºC 96hrs	Note2
6		Temperature Cycle	Apply the low and high temperature cycle -30ºC＜＞25ºC＜＞80ºC ＜＞25ºC 30min 10min 30min 10min ◄──────────── 1 cycle ────────────► Check normal performance	-30ºC/80ºC 10 cycle	
7	Mechanical Test	Vibration test(Package state)	Applying vibration to product check normal performance	Freq:10-55Hz Max Acceleration 5G 1cycle time:1min time X.Y.Z direction for 15 mines	
8		Shock test(package state)	Applying shock to product check normal performance	Drop them through 70cm height to strike horizontal plane	
9	Other				

Remark

Note1:Normal operations condition (25ºC±5ºC).

Note2:Pay attention to keep dewdrops from the module during this test.

10.0 PRECAUTION FOR USING LCM

1. When design the product with this LCD Module, make sure the viewing angle matches to its purpose of usage.

2. As LCD panel is made of glass substrate, Dropping the LCD module or banging it against hard objects may cause cracking or fragmentation. Especially at corners and edges.

3. Although the polarizer of this LCD Module has the anti-glare coating, always be careful not to scratch its surface. Use of a plastic cover is recommended to protect the surface of polarizer.

4. If the LCD module is stored at below specified temperature, the LC material may freeze and be deteriorated. If it is stored at above specified temperature, the molecular orientation of the LC material may change to Liquid state and it may not revert to its original state. Excessive temperature and humidity could cause polarizer peel off or bubble. Therefore, the LCD module should always be stored within specified temperature range.

5. Saliva or water droplets must be wiped off immediately as those may leave stains or cause color changes if remained for a long time. Water vapor will cause corrosion of ITO electrodes.

6. If the surface of LCD panel needs to be cleaned, wipe it swiftly with cotton or other soft cloth. If it is not still clean enough, blow a breath on the surface and wipe again.

7. The module should be driven according to the specified ratings to avoid malfunction and permanent damage. Applying DC voltage cause a rapid deterioration of LC material. Make sure to apply alternating waveform by continuous application of the M signal. Especially the power ON/OFF sequence should be kept to avoid latchup of driver LSIs and DC charge up to LCD panel.

8. Mechanical Considerations

   a) LCM are assembled and adjusted with a high degree of precision. Avoid excessive shocks and do not make any alterations or modifications. The following should be noted.

   b) Do not tamper in any way with the tabs on the metal frame.

   c) Do not modify the PCB by drilling extra holes, changing its outline, moving its components or modifying its pattern.

   d) Do not touch the elastomer connector; especially insert a backlight panel (for example, EL).

   e) When mounting a LCM makes sure that the PCB is not under any stress such as bending or twisting. Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.

   f) Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels.

9. Static Electricity

   a) Operator

   Ware the electrostatics shielded clothes because human body may be statically charged if not ware shielded clothes. Never touch any of the conductive parts such as the LSI pads; the copper leads on the PCB and the interface terminals

   with any parts of the human body.

   b) Equipment

   There is a possibility that the static electricity is charged to the equipment, which has a function of peeling or friction

   action (ex: conveyer, soldering iron, working table). Earth the equipment through proper resistance (electrostatic

earth: 1x108 ohm).

Only properly grounded soldering irons should be used.

If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.

The normal static prevention measures should be observed for work clothes and working benches; for the latter

conductive (rubber) mat is recommended.

c) Floor

Floor is the important part to drain static electricity, which is generated by operators or equipment.

There is a possibility that charged static electricity is not properly drained in case of insulating floor. Set the

electrostatic earth (electrostatic earth: 1x108 ohm).

d) Humidity

Proper humidity helps in reducing the chance of generating electrostatic charges. Humidity should be kept over

50%RH.

e) Transportation/storage

The storage materials also need to be anti-static treated because there is a possibility that the human body or storage

materials such as containers may be statically charged by friction or peeling.

The modules should be kept in antistatic bags or other containers resistant to static for storage.

f) Soldering

Solder only to the I/O terminals.Use only soldering irons with proper grounding and no leakage.

Soldering temperature : 280° C ± 10° C

Soldering time: 3 to 4 sec.

Use eutectic solder with resin flux fill.

If flux is used, the LCD surface should be covered to avoid flux spatters. Flux residue should be removed afterwards.

g) Others

The laminator (protective film) is attached on the surface of LCD panel to prevent it from scratches or stains. It should

be peeled off slowly using static eliminator.

Static eliminator should also be installed to the workbench to prevent LCD module from static charge.

10. Operation

a) Driving voltage should be kept within specified range; excess voltage shortens display life.

b) Response time increases with decrease in temperature.

c) Display may turn black or dark blue at temperatures above its operational range; this is (however not pressing on the viewing area) may cause the segments to appear "fractured".

d) Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear "fractured".

11. If any fluid leaks out of a damaged glass cell, wash off any human part that comes into contact with soap and water. The toxicity is extremely low but caution should be exercised at all the time.

12. Disassembling the LCD module can cause permanent damage and it should be strictly avoided.

13. LCD retains the display pattern when it is applied for long time (Image retention). To prevent image retention, do not apply the fixed pattern for a long time. Image retention is not a deterioration of LCD. It will be removed after display pattern is changed.

14. Do not use any materials, which emit gas from epoxy resin (hardener for amine) and silicone adhesive agent (dealcohol or deoxym) to prevent discoloration of polarizer due to gas.

15. Avoid the exposure of the module to the direct sunlight or strong ultraviolet light for a long time.

16. The brightness of LCD module may be affected by the routing of CCFL cables due to leakage to the chassis through coupling effect. The inverter circuit needs to be designed taking the level of leakage current into consideration. Thorough evaluation is needed for LCD module and inverter built into its host equipment to ensure specified brightness.