HTDISPLAY

SPECIFICATIONS

Version: V0
This module uses ROHS material

PRODUCT: TFT LCD MODULE

MODEL NO: HT0177AT01B

SUPPLIER: HTDisplay

ISSUED DATE: 2019-12-23

■ **Preliminary Specification**
☐ **Final Product Specification**

HTDisplay		Customer
Prepared by	Hongfei lan	Approved By
Reviewed by	Max zhang	
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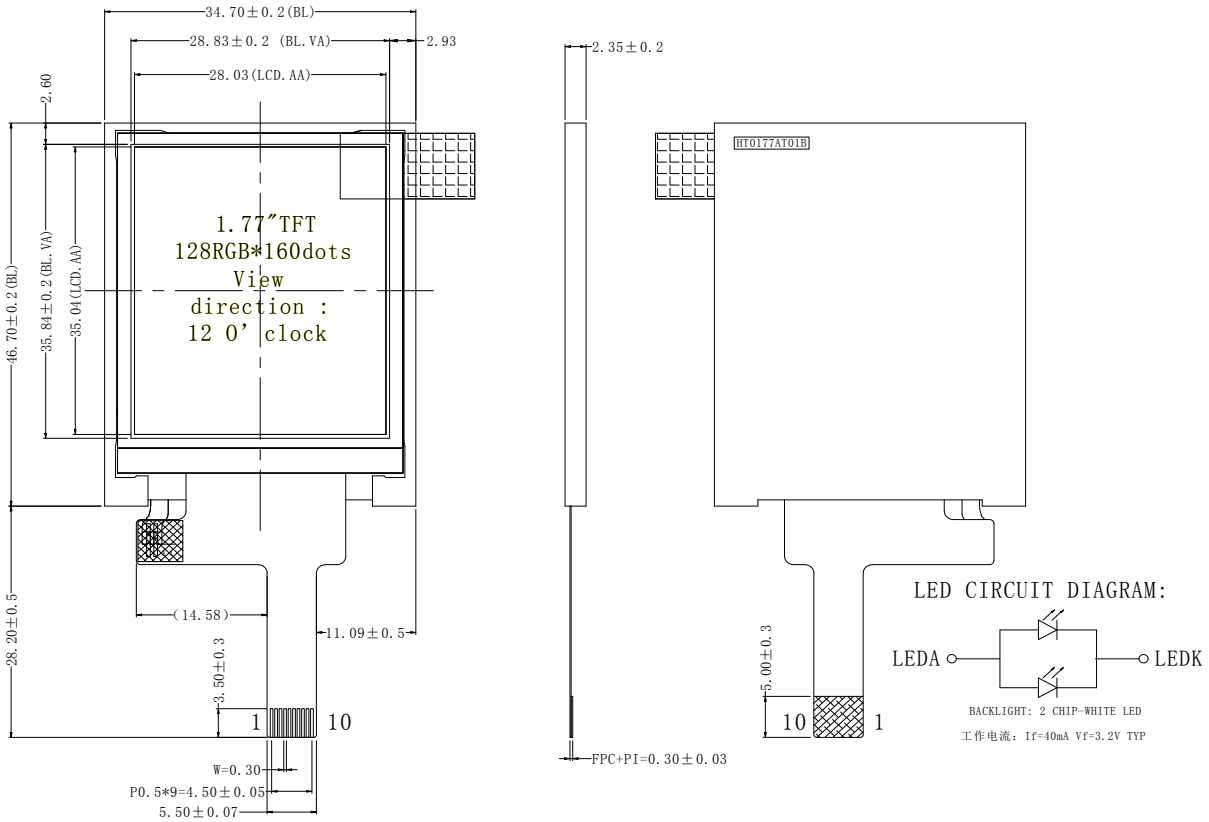
Revision Record

REV No.	REV Date	Contents	Editor	Remarks
V0	2019-12-23	First release	Hongfei lan	Preliminary

1. General information

Feature	Spec	Unit
LCD size	1.77	inch
Resolution	128RGB x 160Dots	---
Pixel pitch (WxH)	0.219 x0.219	mm
Active area	28.03(W) x 35.04(H)	mm
Viewing area	28.83 x 35.84	mm
Display Mode	TN,NW	---
LCM Outline(with TP) (WxHxT)	34.7× 46.7 × 2.35	mm
With/Without TP	Without	---
Weight (g)	TBD	g
TFT Driver IC	ST7735S-G4	---
TFT Interface	4-Line SPI	---
TFT Input voltage	2.8	V
TFT Power consumption	TBD	mW
Backlight Power consumption	TBD	mW
LCM brightness	MIN300	Cd/m^2

2. Mechanical drawing



3. Absolute maximum ratings

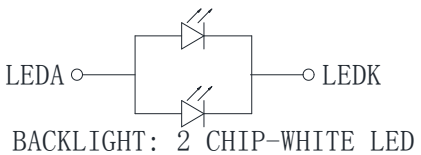
Item	Symbol	Min.	Max.	Unit
Supply voltage for logic	VDD	-0.3	4.8	V
Input voltage	VIN	-0.3	VDD+0.3	V
Operating temperature	TOP	-20	70	°C
Storage temperature	TST	-30	80	°C
Humidity	RH	--	90%(Max60 °C)	RH

4. Electrical characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply voltage for logic	VDD	2.5	2.8	4.8	V
Input Current	Idd	--	TBD	TBD	mA
Input voltage 'H' level	VIH	0.7VDD	--	VDD	V
Input voltage 'L' level	VIL	VSS	--	0.3VDD	V
Output voltage 'H' level	VOH	0.8VDD	--	VDD	V
Output voltage 'L' level	VOL	VSS		0.2VDD	V

5. Backlight characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Current	If	36	40	44	mA	
Forward Voltage	Vf	2.8	3.2	3.4	V	
LED Life Time	L_L	--	30000	--	Hrs	Ta=25°C



BACKLIGHT: 2 CHIP-WHITE LED
If=40mA Vf=3.2V TYP

Figure 2

Note1: Under LCM operating, the stable forward current should be inputted. And forward voltage is for reference only.

Note2: Optical performance should be evaluated at Ta=25℃. if LED is driven by high current, high ambient temperature & Humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

6. Electro-optical characteristics

Optical Specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Transmittance (without Polarizer)		T(%)		—	18.5	—	%	
Contrast Ratio		CR	Θ=0 Normal Viewing angle	400	500	—	—	(1)(2)
Response Time		TON+TOFF		—	8	16	msec	(1)(3)
Color Gamut		S(%)		—	60	—	%	
Color Chromaticity (CIE1931)	White	W_X		0.283	0.303	0.323	—	(1)(4) CF glass C-light
		W_Y		0.305	0.325	0.345		
	Red	R_X		0.606	0.626	0.646	—	
		R_Y		0.314	0.334	0.354		
	Green	G_X		0.257	0.277	0.297	—	
		G_Y		0.529	0.549	0.569		
	Blue	B_X		0.122	0.142	0.162	—	
		B_Y		0.102	0.122	0.142		
Viewing Angle	Hor.	Θ_L	CR>10	35	45	—	—	
		Θ_R		35	45	—		
	Ver.	Θ_U		35	45	—		
		Θ_D		10	20	—		
Optimal View Direction		12 O' CLOCK						(5)

Measuring Condition

- Measuring surrounding : dark room
- Ambient temperature:25°C±2°C
- 15min.warm-up time

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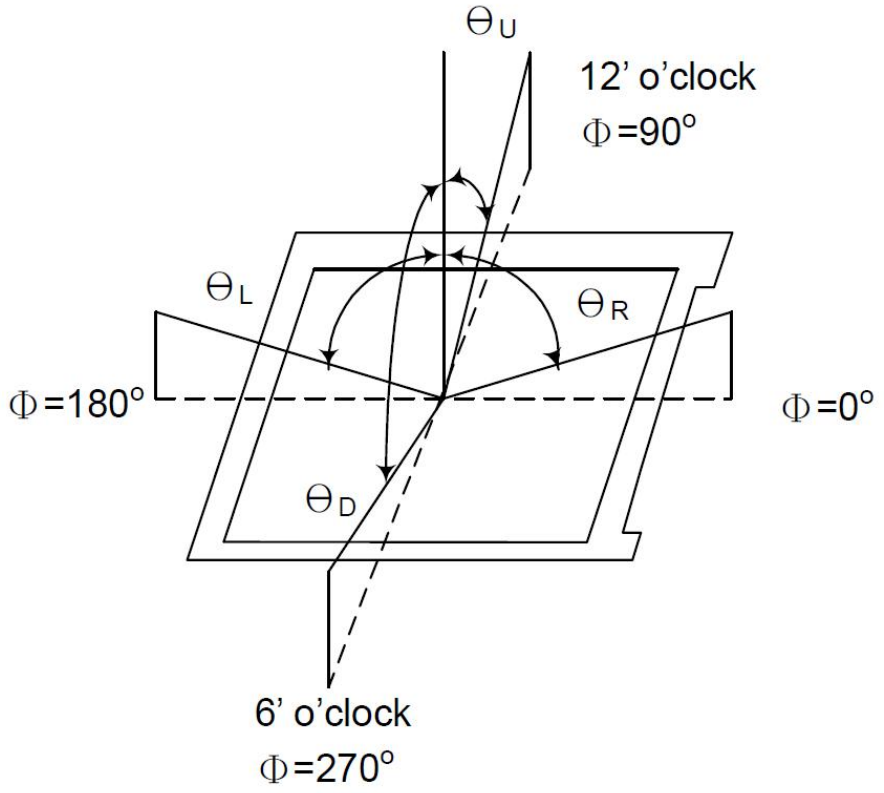
Measuring Equipment

- FPM520 of Waster Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

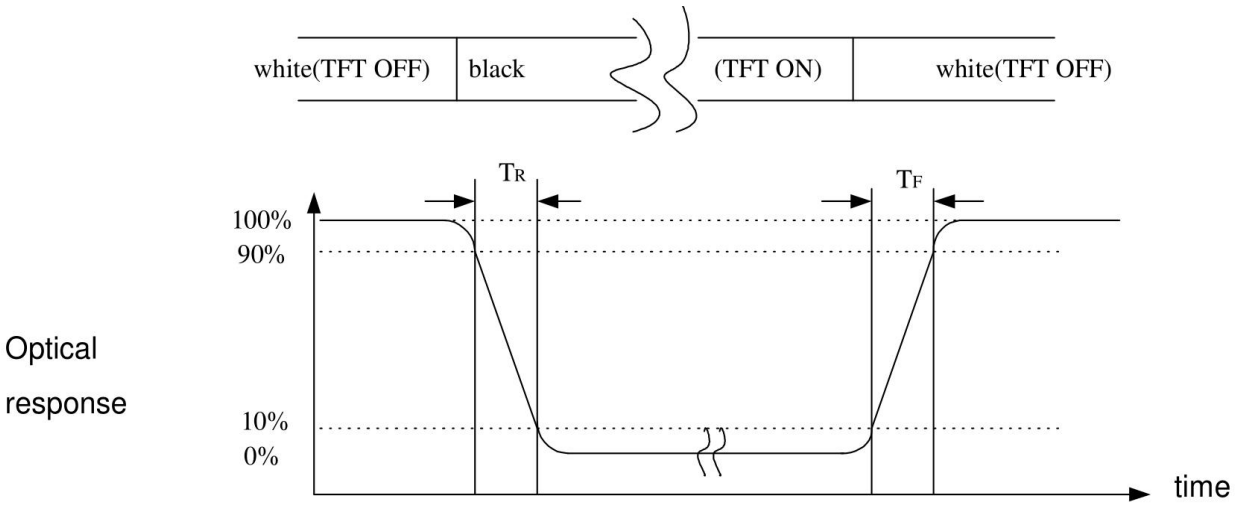
Note(1): Definition of Viewing Angle:



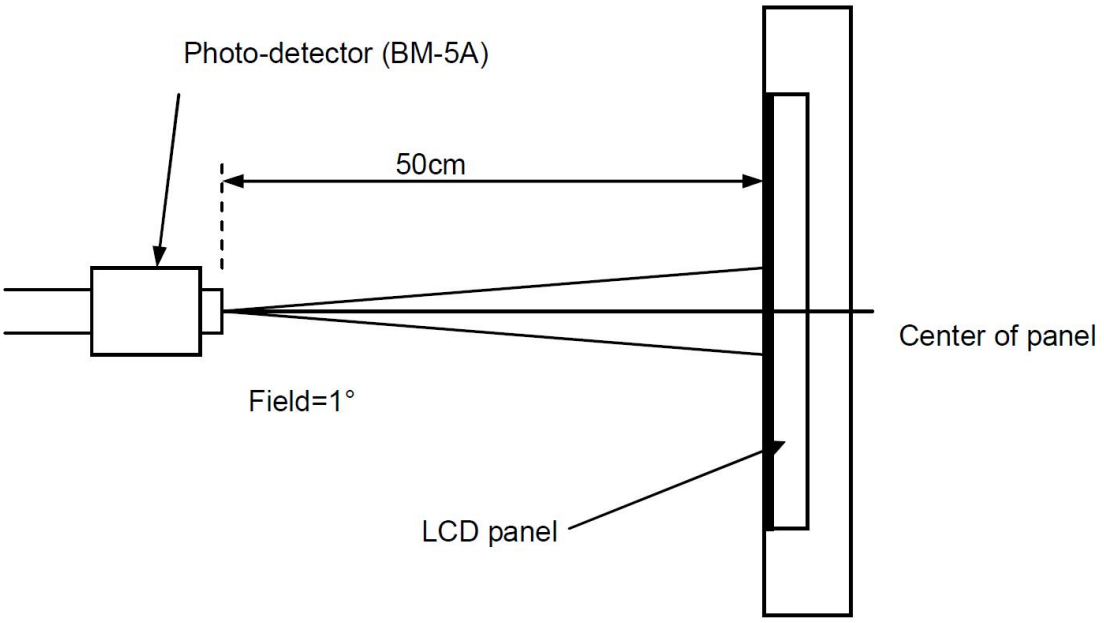
Note(2): Definition of Contrast Ratio (CR):
measured at the center point of panel

$$CR=\frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

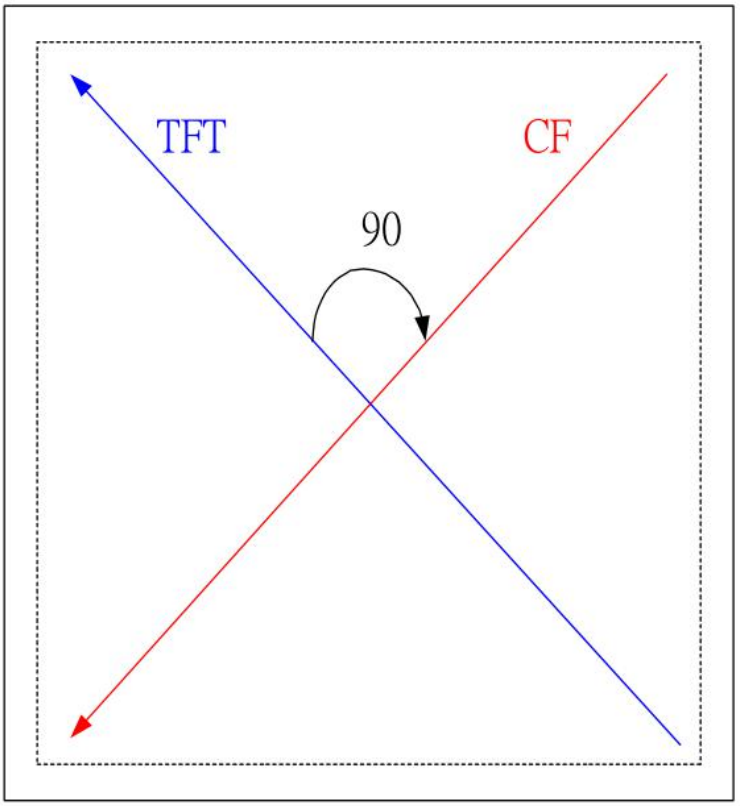
Note(3): Definition of Response Time : Sum of T_R and T_F



Note(4): Definition of optical measurement setup

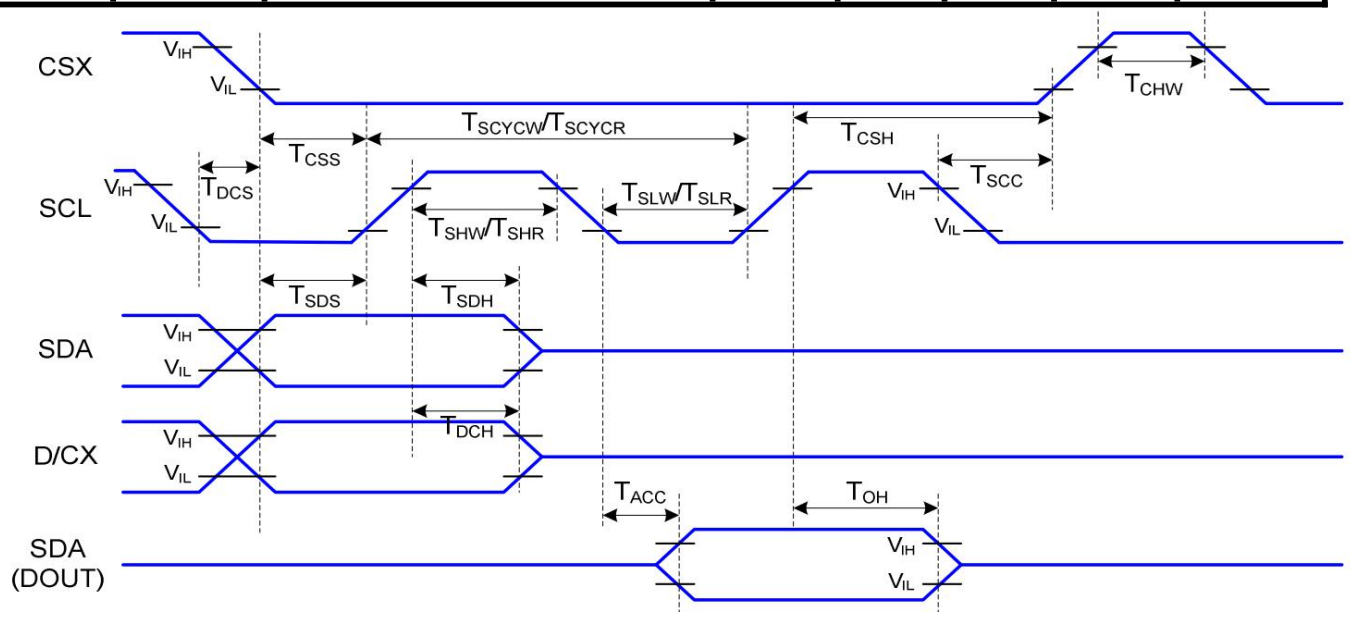


Note(5): Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.



7. Read/Write timing

Item	Symbol	Parameter	Min.	Typ.	Max.	Unit	Description
CSX	T_{CSS}	Chip select setup time(write)	45	--	--	ns	
	T_{CSH}	Chip select hold time(write)	45	--	--	ns	
	T_{CSS}	Chip select setup time(read)	60	--	--	ns	
	T_{SCC}	Chip select hold time(read)	65	--	--	ns	
	T_{CHW}	Chip select “H”pulse width	40	--	--	ns	
SCL	T_{SCYCW}	Serial clock cycle (write)	66	--	--	ns	
	T_{SHW}	SCL“H” pulse width(write)	15	--	--	ns	
	T_{SLW}	SCL“L” pulse width(write)	15	--	--	ns	
	T_{SCYCR}	Serial clock cycle (read)	150	--	--	ns	
	T_{SHR}	SCL“H” pulse width(read)	60	--	--	ns	
	T_{SLR}	SCL“L” pulse width(read)	60	--	--	ns	
D/CX	T_{DCS}	D/CX setup time	10	--	--	ns	
	T_{DCH}	D/CX setup time	10	--	--	ns	
SDA (DIN)	T_{SDS}	Date setup time	10	--	--	ns	
	T_{SDH}	Date hold time	10	--	--	ns	
DOUT	T_{ACC}	Access time	10	--	50	ns	
	T_{OH}	Output disable time	15	--	50	ns	



Note:This section is only for reference,Details please refer to the IC specification.

8. Interface description

TFT interface

No.	SYMBOL	Description
1	LEDA	LED power anode.
2	LEDK	LED power cathode.
3	GND	Ground for digital circuits.
4	CS	Chip selection pin.
5	A0	Display data/command selection pin in 4-line serial interface.
6	SCL	Serial communication clock input.
7	SDI	Serial communication data input.
8	RES	This signal will reset the device and must be applied to properly initialize the chip. Signal is active low.
9	TE	Tearing effect output pin to synchronize MCU to frame rate, activated by S/W command.
10	VDD	Power Supply for Logic.

9. Reliability test conditions

No.	Test Item	Test condition	Remark
1	High Temperature Storage	80°C±2°C 96H	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Storage	-30°C±2°C 96H	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Operation	70°C±3°C 96H	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Operatin	-20°C±3°C 96H	IEC60068-2-1:2007 GB2423.1-2008
5	High Temperature /Humidity Storage	40°C±3°C 90%RH 96H	IEC60068-2-78:2007 GB2423.3-2006
6	Temperature Cycle	-30℃←→25℃←→80℃ 5min 30min ←→25℃ , 5min after 10cycle, Restore 4H at 25℃	IEC60068-2-14:1984 GB2423.22-2002
7	Vibration Testo	10Hz~150Hz, 100m/s2, 120min	IEC60068-2-6:1982 GB/T2423.10-1995
8	Mechanical shock	100G ±X,±Y,±Z 3times for each direction	IEC60068-2-27:1987 GB/T2423.5-1995
9	Packing vibration test	0.015G^2/Hz from 50~200Hz -6dB/Octave from 200~500Hz 2hours for each direction of X ,Y,Z	IEC60068-2-34 GB/T2423.11
10	Dropping test	Drop to the ground from 0.5m height, one time, every side of carton. (Packing condition)	IEC60068-2-32:1990 GB/T2423.8-1995
11	ESD test	Voltage:±10KV R: 330Ω C: 150pF Air discharge, 10time	IEC61000-4-2:2001 GB/T17626.2-2006

Note1:
The component placed on a vibrating platform as it is assembled in the machine, wires included, is subjected to sinusoidal vibration in all directions XYZ

Note2:
After completing the reliability test, leave the samples under the room temperature and f

or the following inspection items:

1. No clearly visible defects or deterioration of display quality allowed.
2. No function-related abnormalities.
3. Connected parts still connecting tightly.
4. Display characteristics fulfill initial value contrast ratio should be an least 30% of initial value.

10. Storage and use precautions

When storing and using the LCD modules, the following precaution are necessary：

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

10.2 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.

10.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

10.4 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).

10.5 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

10.6 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.

10.7 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 gained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

10.8 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

10.9 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.

10.10 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

10.11 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

10.12 If the display surface is contaminated, gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

— Isopropyl alcohol
— Ethyl alcohol

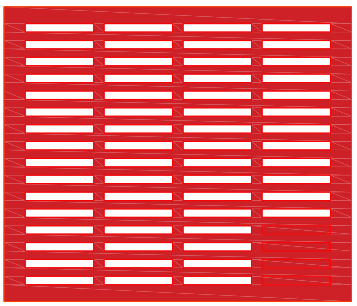
Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

— Water
— Ketone
— Aromatic solvents

10.13 Do not attempt to disassemble the LCD Module.

10.14 If the logic circuit power is off, do not apply the input signals.
10.15 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
--Be sure to ground the body when handling the LCD Modules.
–Tools required for assembly, such as soldering irons, must be properly ground.
–To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions
--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.
--Exposed area of the printed circuit board.
--Terminal electrode sections

11. Packing

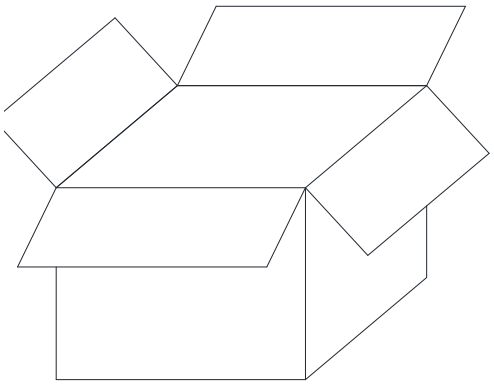


(1)

(1)Place the module into the pearl cotton tray.

(2)Place the pear cotton tray into the carton.

(3)Wrap the carton well.



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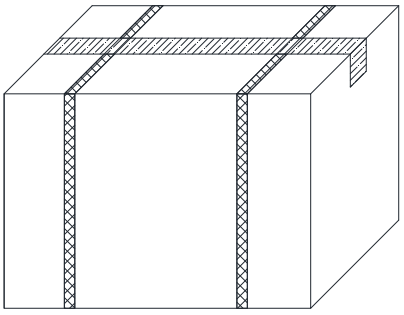

(3)