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TFT | OLED | CHARACTER | GRAPHIC | UWVD | SEGMENT | CUSTOM

TFT Display Module

Part Number

E101GB-RW750-R

Overview:

- 10.1-inch TFT (235x143mm)
- RGB Interface
- 1024x600 pixels
- 6:00 Viewing Angle
- White LED back-light
- Transmissive / Normally White
- Resistive Touch Panel
- 750 NITS
- Controller: HX8282A01
- RoHS Compliant

Description

This is a color active matrix TFT (Thin Film Transistor) LCD (Liquid Crystal Display) that uses amorphous silicon TFT as a switching device. This model is composed of a transmissive type TFT LCD Panel, driver circuit, resistive touch panel and an RGB board backlight unit. The resolution of a 10.1" TFT LCD contains 1024(RGB)x600 pixels and can display up to 16M colors.

TFT Features

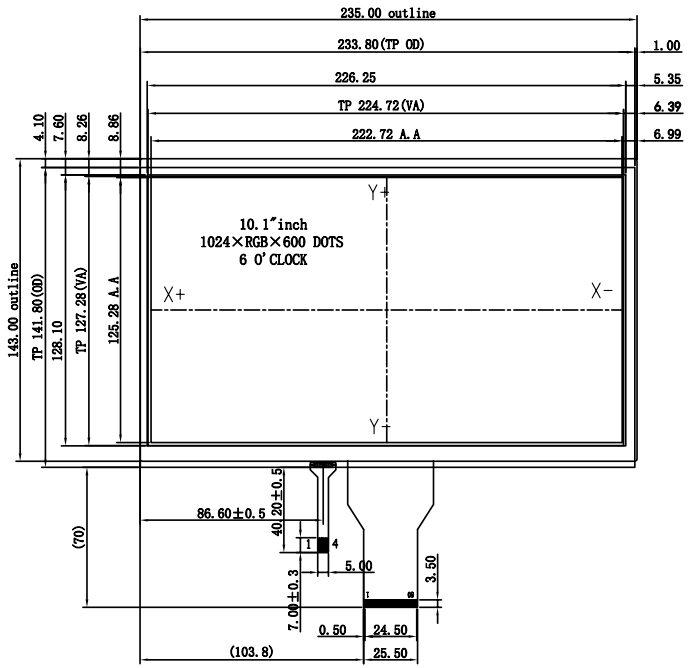
Input Voltage: 3.3V
Display Colors: 16M
TFT Interface: RGB

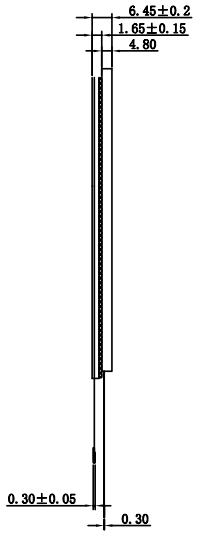
General Information Items	Specification Main Panel	Unit	Note
TFT Display area (AA)	222.72(W) ×125.28(H) (10.1 inch)	mm	-
Driver Element	a-Si TFT active matrix	-	-
Display Colors	16M	colors	-
Number of pixels	1024(RGB)x600	dots	-
TFT Pixel arrangement	RGB vertical stripe	-	-
Pixel Pitch	0.2175 (H) x 0.2088 (V) mm	mm	-
Viewing angle	6:00	-	-
Display mode	Transmissive, Normally White	-	-
TFT Controller	HX8282A01	-	-
Operating temperature	-20 - +70	℃	-
Storage temperature	-30 - +80	℃	-

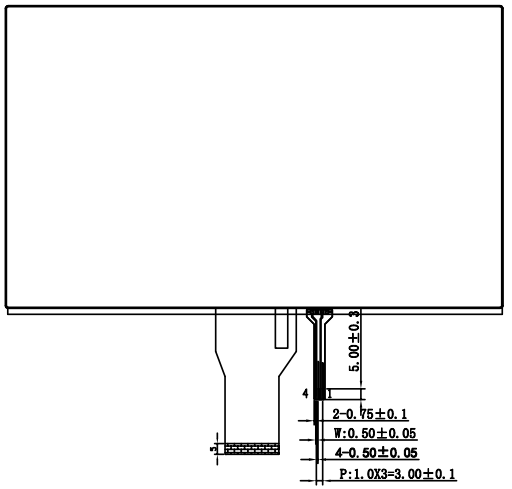
Mechanical Information

Item		Min	Typ.	Max	Unit	Note
Module Size	Horizontal (H)		235		mm	-
	Vertical (V)		143		mm	-
	Depth (D)		6.45		mm	-
	Weight		tbd		g	

1. Outline Dimensions







Pin No	Pin Name
1	NC
2	NC
3	NC
4	NC
5	GND
6	VCOM
7	VDD
8	MODE
9	DE
10	VSYNC
11	HSYNC
12	B7
13	B6
14	B5
15	B4
16	B3
17	B2
18	B1
19	B0
20	G7
21	G6
22	G5
23	G4
24	G3
25	G2
26	G1
27	G0
28	R7
29	R6
30	R5
31	R4
32	R3
33	R2
34	R1
35	R0
36	GND
37	DCLK
38	GND
39	SHLR
40	UDDN
41	VGH
42	VGL
43	AVDD
44	RESET
45	NC
46	VCOM
47	DITHM
48	GND
49	NC
50	NC

Touch Panel Pin Assignment

Pin No	Pin Name
1	Y+
2	X+
3	Y-
4	X-

NOTES:
1.) DISPLAY: 10.1" TFT
2.) RESOLUTION: 1024X600 RGB
3.) VIEWING ANGLE: 6:00
4.) DISPLAY MODE: TRANSMISSIVE / NORMALLY WHITE
5.) BACKLIGHT: 42 WHITE LED CHIPS
6.) BRIGHTNESS: 280mA/18V (TYP.) 750cd/m2 (TYP.)
7.) OPERATING TEMP -20^{0}C TO 70^{0}C
STORAGE TEMP -30^{0}C TO 80^{0}C
8.) RoHS COMPLIANT

TOUCH PANEL NOTES:
1. PET+FILM+GLASS+TAIL
2. FILM 350-450 OHM (0.188mm)
3. GLASS 500 OHM
4. TAIL FPC (Pitch 1.1mm)
5. DC 5V 35mA

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Model Name: E101GB-RW750-R		FOCUS LCDs LCDs MADE SIMPLE®	
General Tol: ± 0.2			
Approvals	Date	Drawing No.:	Scale:
DWN:			
CHK:		Size:	Unit: mm / Page: 1/1
APP:			

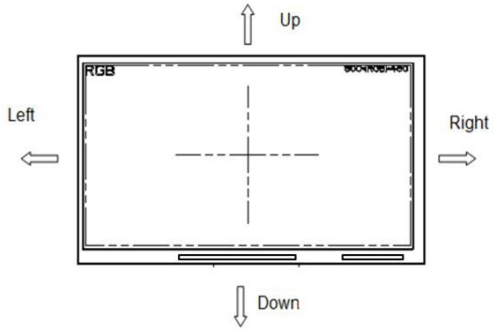
2. Input Terminal Pin Assignment

Pin	Name	I/O	Function	Notes
1-2	NC	-	No connection	
3-4	NC	-	No connection	
5	GND	P	Ground	
6	VCOM	p	Common Voltage	
7	VDD	P	Power for Digital Circuit	
8	MODE	I	DE/SYNC mode select	
9	DE	I	Data Input Enable	
10	VSYNC	I	Vertical Sync Input	
11	HSYNC	I	Horizontal Sync Input	
12-19	B7-B0	I	Blue data,B7 is MSB,B0 is LSB.	
20-27	G7-G0	I	Green data,G7 is MSB,G0 is LSB.	
28-35	R7-R0	I	Red data,R7 is MSB,R0 is LSB.	
36	GND	P	Power ground	
37	DCLK	I	Sample clock	
38	GND	P	Power ground	
39	SHLR	I	Left/right selection	
40	UPDN	I	Up/down selection	
41	VGH	P	Gate ON Voltage	
42	VGL	P	Gate OFF Voltage	
43	AVDD	P	Power for Analog Circuit	
44	RESET	I	Global reset pin.	
45	NC	-	No connect	
46	VCOM	p	Common Voltage	
47	DITHB	I	Dithering function enable control. Normally pull low In LVDS 6-bit mode, IC don't care DITHER and HFRC setting. DITHER = "1", Enable internal dithering function DITHER = "0", Disable internal dithering function.	
48	GND	P	Power ground	
49-50	NC	-	No connection	

2.2 Scanning Mode Selection

Setting of scan control input		Scanning direction
UPDN	SHLR	
GND	VDD	Up to down, left to right
VDD	GND	Down to up, right to left
GND	GND	Up to down, right to left
VDD	VDD	Down to up, left to right

Refer to the figure as below:



3. LCD Optical Characteristics

3.1 Optical Specifications

Item	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
Viewing angle (CR≥ 10)	θ_L	Φ=180°(9 o'clock)	-	65	-	degree
	θ_R	Φ=0°(3 o'clock)	-	65	-	
	θ_T	Φ=90°(12 o'clock)	-	45	-	
	θ_B	Φ=270°(6 o'clock)	-	55	-	
Response time	T_{ON}	Normal θ=Φ=0°	-	10	15	msec
	T_{OFF}		-	15	25	msec
Contrast ratio	CR		500	600	-	-
Color chromaticity	W_X		0.240	0.290	0.340	-
	W_Y		0.250	0.300	0.350	-
NTSC			-	50	-	%
Luminance	L			750	-	cd/mĮ
Luminance uniformity	Y_U		70	80	-	

4. TFT Electrical Characteristics

4.1 Typical Operation Specifications

Test Condition: GND=0V, T_A=25˚C

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	VDD	3.0	3.3	3.6	V	
	VGH	19	21	23	V	
	VGL	-9	-8	-7	V	
	AVDD	10.8	11	11.2	V	
	VCOM	3.3	3.8	4.3	V	
Input logic high voltage	VIH	0.8 VDD	-	VDD	V	
Input logic low voltage	VIL	0		0.2 VDD	V	

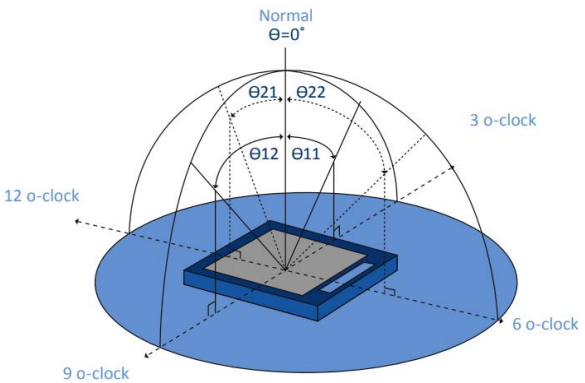
NOTE: If the absolute maximum rating of the above parameters is exceeded, even momentarily, the quality of the product may be degraded. Absolute maximum ratings specify the values which the product may be physically damaged if exceeded. Be sure to use the product within the range of the absolute maximum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

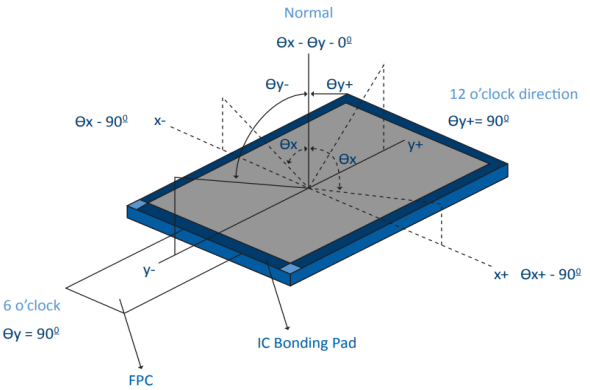
4.2 DC Electrical Characteristics

Parameter	Symbol	Spec			Unit	Condition
		Min.	Typ.	Max.		
Power Supply Voltage	VDD	2.3	-	3.6	V	-
Power Supply Voltage	AVDD	6.5	-	13.5	V	-
Power Supply Voltage	AVDDL	6.5	-	13.5	V	Full Range
		4	-	6.75	V	Half AVDD
Power Supply Voltage	AGNDH	0			V	Full Range
		4	-	6.75	V	Half AVDD
Low Level Input Voltage	VIL	0	-	0.3VDD	V	For Digital Circuit
High Level input Voltage	VIH	0.7VDD	-	VDD	V	For Digital Circuit
Output low voltage	VOL	-	-	GND+0.4	V	IOL=400uA
Output high voltage	VOH	VDD-.04	-	-	V	IOH=-400uA
Pull low/high resistance	RI	200	250	300	Kohm	For digital input pin at VDD=3.3V
Input Leakage Current	LI	-	-	+/-1	uA	For digital Circuit
Digital Operation Current	LDD	-	12	20	mA	FCLK=50MHz,LD=48KHz,VDD=3.3V, No Load
Digital Standby current	LST1	-	10	50	uA	Clock and all functions are stopped
Analog Operating Current	LDDA	-	8	10	mA	No Load, Fclk=50MHz, LD=48KHz@AVDD=10V, V1=8V,V14=0.4V
Analog Standby Current	LST2	-	10	50	uA	No Load, clock and all functions are stopped
Input level of v1-v7	VREF1	0.4AVDD	-	AVDD-0.1	V	Gamma correction voltage input
input level of v8-v14	VREF2	0.1	-	0.6AVDD	V	Gamma correction voltage input
Output Voltage Deviation	VOD1	-	+/-20	+/-35	mV	Vo=AGND+0.1V~AGND+0.5V & Vo=AVDD-0.5V~AVD-0.1v
Output Voltage Deviation	VOD2	-	+/-15	+/-20	mV	Vo=AGND+0.5V~AVDD-0.5V
Output Voltage Offset Between Chips	VOC	-	-	+/-20	mV	Vo=AGND+0.5V~AVDD-0.5V
Dynamic Range of Output	VDR	0.1	-	AVDD-0.1	V	SO1~SO1200
Sinking Current of Outputs	IOLY	80	-	-	uA	SO1~so1200; Vo=0.1V vs. 1.0V, AVDD=13.5V
Driving Current of Outputs	IOHY	80	-	-	uA	SO1~so1200; Vo=0.1V vs. 1.0V, AVDD=13.5V
Resistance of Gamma Table	RG	0.7Rn	1.0*Rn	1.3*Rn	Ohm	Rn: Internal Gamma Resistor

Optical Specification Reference Notes:

(1) Definition of Viewing Angle: The viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3,9 o'clock direction and the vertical or 6,12 o'clock direction with respect to the optical axis which is normal to the LCD surface.



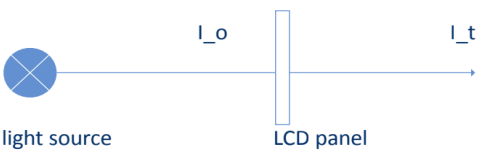


(2) Definition of Contrast Ratio (Cr): measured at the center point of panel. The contrast ratio (Cr) measured on a module, is the ratio between the luminance (Lw) in a full white area (R=G=B=1) and the luminance (Ld) in a dark area (R=G=B=0).

$$Cr = \frac{Lw}{Ld}$$

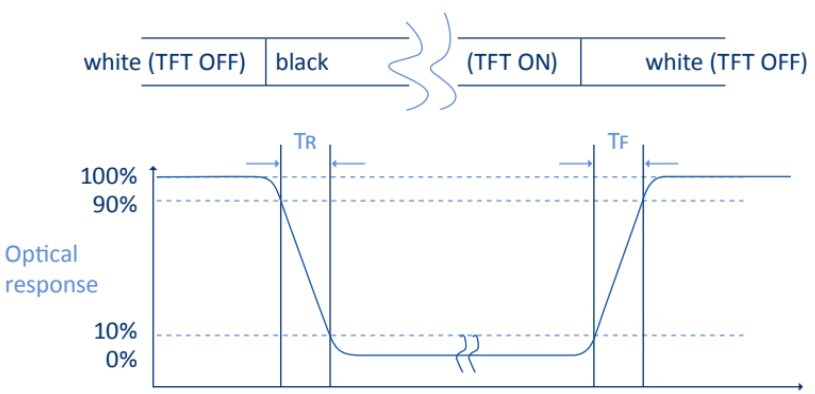
(3) Definition of transmittance (T%): The transmittance of the panel including the polarizers is measured with electrical driving. The equation for transmittance Tr is:

$$Tr = \frac{It}{Io} x\ 100\%$$



Io = the brightness of the light source.
It = the brightness after panel transmission

(4) Definition of Response Time (Tr, Tf): The rise time 'Tr' is defined as the time for luminance to change from 90%to 10% as a result of a change of the electrical condition. The fall time 'Tf' is defined as the time for luminance to change from 10% to 90% as a result of a change of the electrical condition.



(5) Definition of Color Gamut:
Measuring machine CFT-01. NTSC's Primaries: R(x,y,Y),G(x,y,Y), B(x,y,Y). FPM520 of Westar Display Technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.The color chromaticity shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

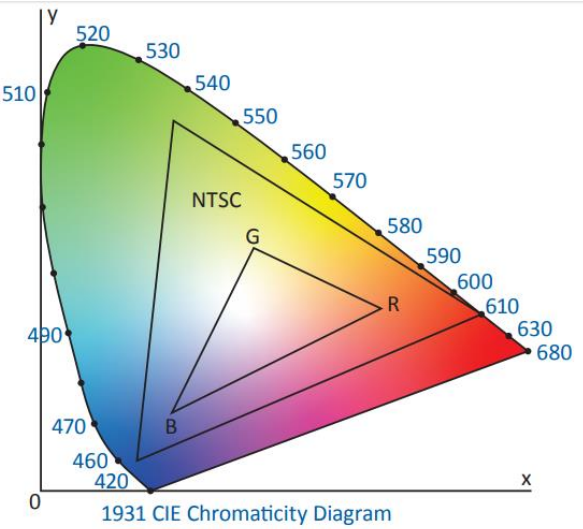
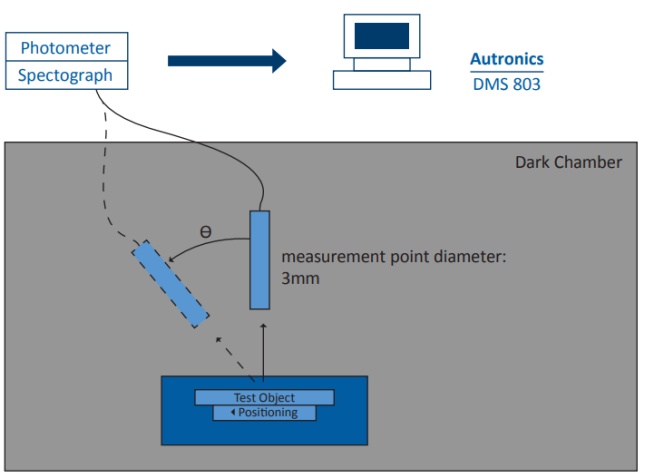


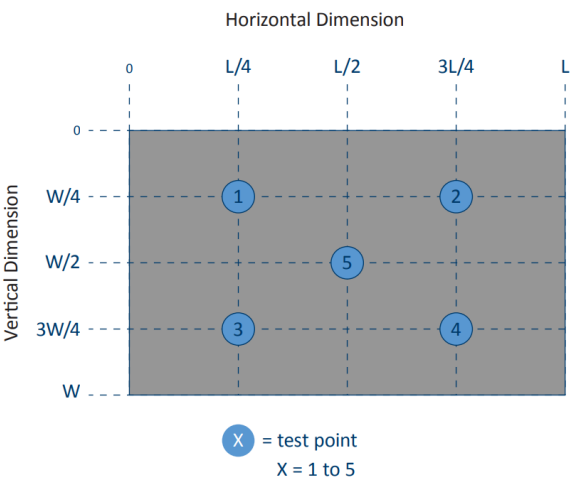
Fig. 1931 CIE chromacity diagram

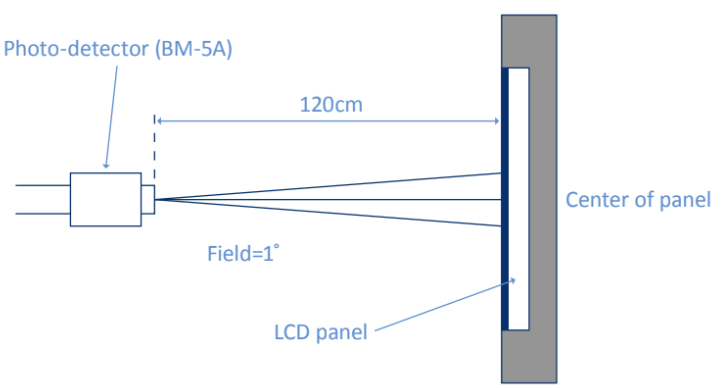
Color gamut: $S = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}} \times 100\%$

(6) Definition of Optical Measurement Setup:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 20 minutes.







4.3 LED Backlight Characteristics

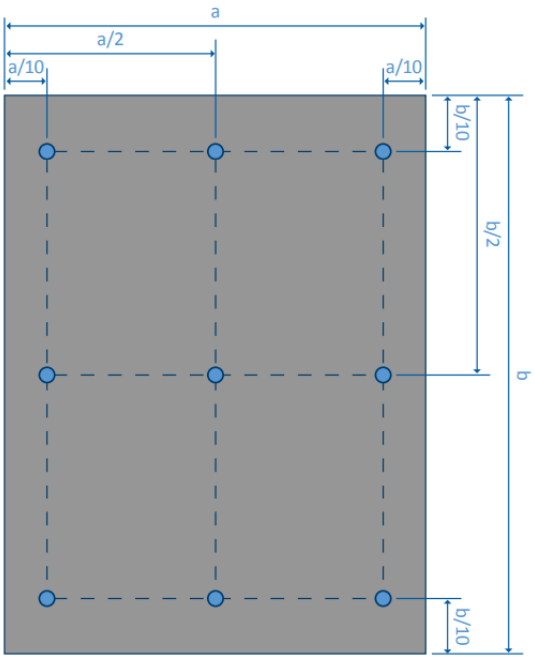
The backlight system is edge lighting type with 42 white LED chips.

Item	Symbol	Min	Typ.	Max	Unit	Note
LED Backlight Current	I_L	--	280	--	mA	
LED Backlight Voltage	V_L	16	18	20	V	
LCM Luminance	LV		750	--	cd/m2	Note 3
LED lifetime	Hr	40,000	--	--	hour	Note1 & 2
Uniformity	Avg	70	80	--	%	Note 3

Note 1: LED lifetime (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 ℃, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note 2: The "LED lifetime" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL = 280mA. The LED lifetime could be decreased if operating IL is larger than 280 mA. The constant current driving method is suggested.

Note 3: Luminance Uniformity of these 9 points is defined as below:



$$\text{Luminance} = \frac{\text{(Total Luminance of 9 points)}}{9}$$

$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points(1-9)}}{\text{maximum luminance in 9 points(1-9)}}$$

5.) Timing Characteristics

For more information on timing characteristics of this module, please see https://focuslcds.com/content/HX8282.pdf

6.) Quality Inspection Information

For more information on quality inspection of this module, please visit: https://focuslcds.com/content/LCD%20Quality%20Inspection%20Standards.pdf

7. Cautions and Handling Precautions

7.1 Handling and Operating the Module

1. When the module is assembled, it should be attached to the system firmly. Do not warp or twist the module during assembly work.
2. Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
3. Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.
4. Do not allow drops of water or chemicals to remain on the display surface. If you have the droplets for a long time, staining and discoloration may occur.
5. If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
6. The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
7. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.
8. Protect the module from static; it may cause damage to the CMOS ICs.
9. Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
10. Do not disassemble the module.
11. Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
12. Pins of I/F connector shall not be touched directly with bare hands.
13. Do not connect, disconnect the module in the “Power ON” condition.
14. Power supply should always be turned on/off by the item Power On Sequence & Power Off Sequence.

7.2 Storage and Transportation.

1. Do not leave the panel in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35 ℃ and relative humidity of less than 70%
2. Do not store the TFT-LCD module in direct sunlight.
3. The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.
4. It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module. In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.
5. This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.