FOCUS LCDs
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ISO 9001
QUALITY MANAGEMENT

MEDICAL | INDUSTRIAL | DEFENSE | AGRICULTURE | FOOD SERVICE

G128128B1-FTW-D363

Product Description

- 128x128 Graphic LCD
- FSTN Positive
- 38.00x43.00mm Module
- 4-Line SPI Interface
- White LED Backlight

- Transflective (Anti-glare)
- Ultra-3 Temp Range
- 3.0V
- LCD IC: ST7571
- RoHS Compliant

LCD@FocusLCDs.com | 480-503-4295

Revision History

Date	Rev. No	Page	Summary
11/03/2025	1.0	All	First issue

Graphic LCD Features

Resolution: 128x128 Dots
Interface(s): 4-Line SPI
RoHS Compliant.

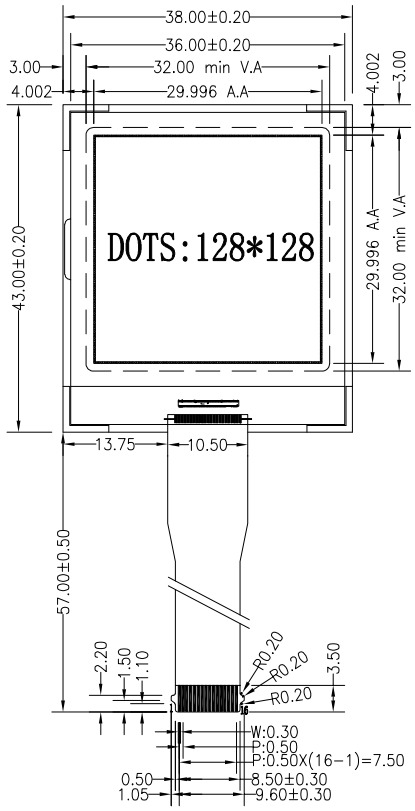
General Information Items	Specification	Unit	Note
	Main Panel		
Viewing Area (VA)	32.0 (H) x 32.0 (V)	mm	--
LCD Type	FSTN Positive	--	--
Viewing Angle	6:00	O'Clock	--
Polarizer	Transflective	--	--
Backlight Type	LED	--	--
Backlight Color	White	--	--
LCD IC	ST7571	--	--
Drive Mode	1/128 Duty, 1/12 Bias	--	--
Operating Temperature	-30 to +70	°C	--
Storage Temperature	-30 to +80	°C	--

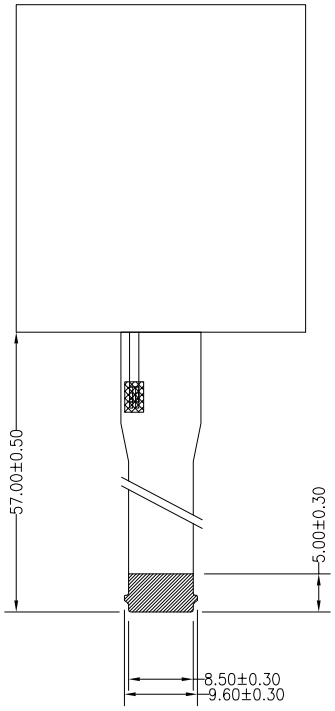
Mechanical Information

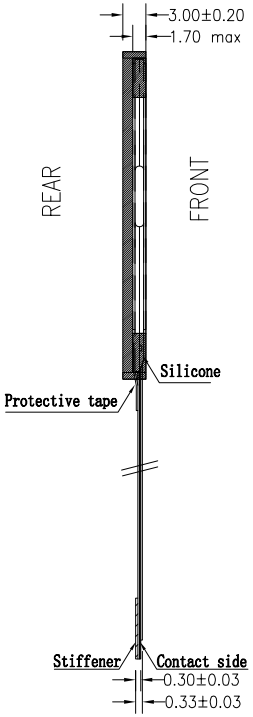
Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	--	38.00	--	mm	--
	Vertical (V)	--	43.00	--	mm	--
	Depth (D)	--	3.00	--	mm	--
Weight		--	7	--	g	Approximate

1. Outline Dimensions

Rev.	Description	Date
1.0	First	11/03/2025

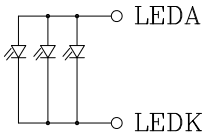


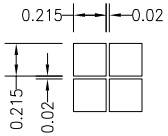




Interface:

NO	PIN
1	NC
2	NC
3	VG
4	VD1
5	XV0
6	V0
7	VM
8	VSS
9	VDD
10	SDA
11	SCL
12	RS
13	RST
14	CS
15	BLA
16	BLK





NOTES:
1. DISPLAY TYPE: 128x128 FSTN GRAPHIC LCD
2. POLARIZER: TRANSFLECTIVE, POSITIVE MODE
3. VIEWING ANGLE: 6:00
4. OPERATING TEMPERATURE: -30°C TO +70°C
   STORAGE TEMPERATURE: -30°C TO +80°C
5. DRIVE METHOD: 1/128 DUTY,1/12 BIAS,
   VDD 3.0V, VLCD 14.5V
6. LCD IC: ST7571
7. BACKLIGHT: WHITE LED, 3 LEDS, 45mA, 3.0V
8. ROHS COMPLIANT.

DISCLAIMER

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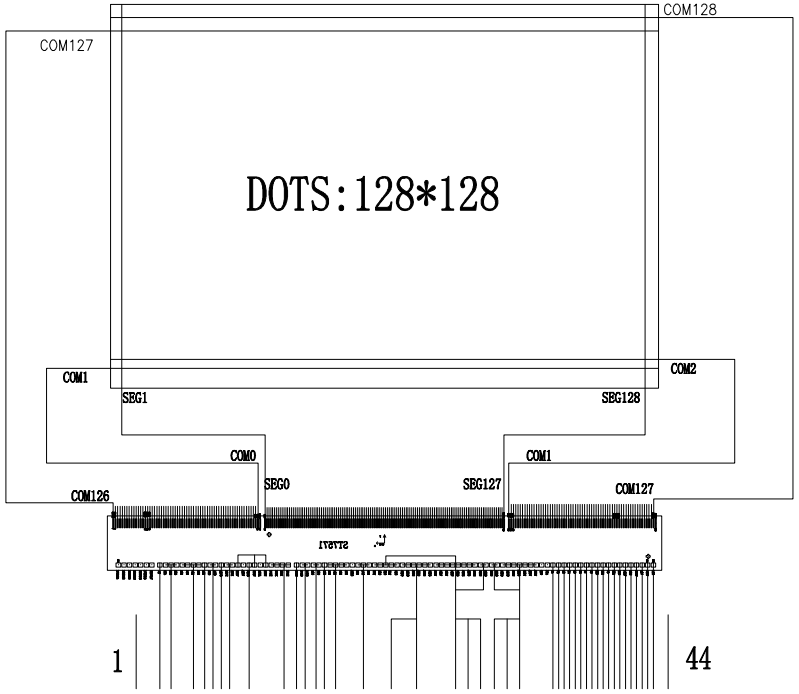
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Model Name: G128128B1-FTW-D363		FOCUS LCDs LCDs MADE SIMPLE®
General Tol: ±0.3		
Approvals	Date	Drawing No.: / Scale:
DWN:		
CHK:		Size: / Unit: mm / Page: 1/1
APP:		

2. Pin & Logic Diagram

Rev.	Description	Date
1.0	First	11/03/2025



Logic table:

NO.	1	2	3	4	5	6	7	8	9	10
SYMBOL	NC	VE	VPP	VGI	VGS	VG0	VD10	VD1I	DCPS	XVOI
NO.	11	12	13	14	15	16	17	18	19	20
SYMBOL	XVOS	XV00	V00	VOS	VOI	VM0	VDD	VDD	VSS	VSS
NO.	21	22	23	24	25	26	27	28	29	30
SYMBOL	VSS	VDD	VDD	VDD	D7	D6	D5	D4	D3	D2
NO.	31	32	33	34	35	36	37	38	39	40
SYMBOL	D1	D0	/RD	/WR	A0	RST	CSB	VSS1	PS2	VDD1
NO.	41	42	43	44						
SYMBOL	PS1	VSS1	PS0	NC						

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Model Name: G128128B1-FTW-D363		FOCUS LCDs LCDs MADE SIMPLE®	
General Tol: ±0.3			
Approvals	Date	Drawing No.:	Scale:
DWN:			
CHK:		Size:	Unit: mm / Page: 1/1
APP:			

3. Input Terminal Pin Assignment

NO.	Symbol	Description	I/O
1	NC	No connection.	--
2	NC	No connection.	--
3	VG	VG is the LCD driving voltage for segment circuits.	P
4	VD1	VD1 is the power supply pin of the internal digital circuits.	O
5	XV0	XV0 is the LCD driving voltage for common circuits at positive frame.	P
6	V0	V0 is the LCD driving voltage for common circuits at negative frame.	P
7	VM	VM0 is the output of VM, which is the LCD driving voltage for common circuits.	P
8	VSS	Ground.	P
9	VDD	Power.	P
10	SDA	Serial input data.	I
11	SCL	Serial input clock.	I
12	RS	Register select input pin. -A0 = "H" : DB0 to DB7 are display data -A0 = "L" : DB0 to DB7 are control command	I
13	RST	Reset input pin. When RST is “L”, initialization is executed.	I
14	CS	Chip Select input pin.	I
15	BLA	Backlight power supply (anode).	P
16	BLK	Backlight power supply (cathode).	P

4. LCD Optical Characteristics

Item		Symbol	Condition	Min	Typ.	Max	Unit
Contrast Ratio		CR	--	--	5	--	--
Response Time	On	T_{on}	--	--	150	250	ms
	Off	T_{off}		--	180	300	ms
Viewing Angle $C_r \geq 2$, 25°C	Hor.	Θ_L	Φ=270°, 9H	--	55	--	degree
		Θ_R	Φ=90°, 3H	--	55	--	
	Ver.	Θ_T	Φ=180°, 12H	--	40	--	
		Θ_B	Φ=0°, 6H	--	70	--	

5. Electrical Characteristics

5.1 Absolute Maximum Rating

Characteristics	Symbol	Min	Max	Unit
Supply Voltage	VDD	-0.3	3.6	V
	Vout	0.3	15.0	V
Operating Temperature	T_{OP}	-30	+70	°C
Storage Temperature	T_{ST}	-30	+80	°C

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.

5.2 DC Electrical Characteristics

Characteristics		Symbol	Condition	Min	Typ.	Max	Unit
LCD Driving Voltage		VLCD	--	--	14.5	--	V
Supply Voltage		VDD	VDD-GND	--	3.0	--	V
Input Voltage	H Level	V_{IH}	--	0.7VDD	--	VDD	V
	L Level	V_{IL}	--	VSS	--	0.3VDD	V

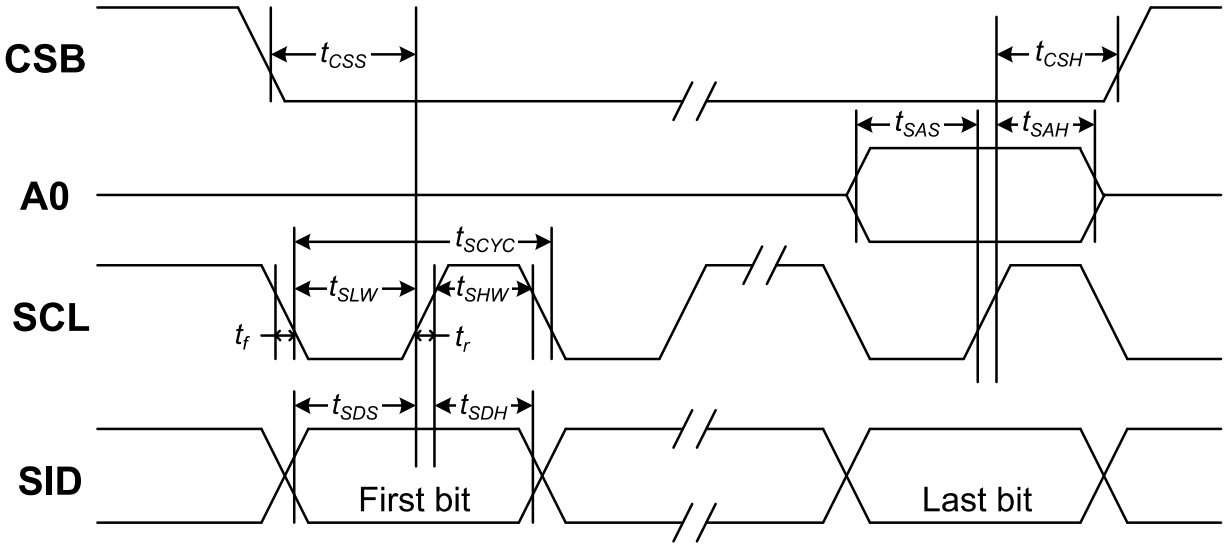
Condition:

1. VDD = 3.0V
2. 1/128 Duty, 1/12 Bias

6. Module Function

6.1 Timing Characteristics

System Bus Timing for 4-Line SPI Interface



(VDD1=1,8~3.3V, Ta=30~85°C)

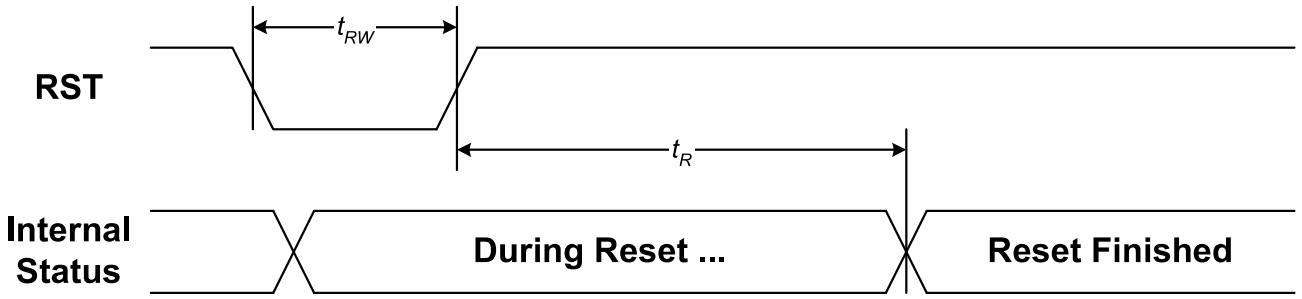
Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Serial clock period	SCL	t_{SCYC}		200	—	ns
SCLK “H” pulse width		t_{SHW}		80	—	
SCLK “L” pulse width		t_{SLW}		80	—	
Address setup time	A0	t_{SAS}		60	—	
Address hold time		t_{SAH}		30	—	
Data setup time	SID	t_{SDS}		60	—	
Data hold time		t_{SDH}		30	—	
CS-SCL time	CSB	t_{CSS}		40	—	
CS-SCL time		t_{CSH}		100	—	

Note:

*1. The input signal rise time and fall time (t_r, t_f) are specified as 15ns or less.

*2. All timing is specified using 20% and 80% of VDD1 as the standard.

6.2 Reset Timing



(VDD1=1,8~3.3V, Ta=30~85°C)

Item	Signal	Symbol	Condition	Rating			Units
				Min.	Typ.	Max.	
Reset time		t_R		120	--	--	ms
Reset “L” pulse width	RST	t_{RW}		2.0	--	--	μs

6.3 LCM Application

For application example, please see information on page 72 of the data sheet for LCD controller ST7571. The data sheet can be found here: *https://focuslcds.com/wp-content/uploads/Drivers/ST7571.pdf*

6.4 Command Table

Instruction	A0	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Description
Set Mode	0	0	0	0	1	1	1	0	0	0	2-byte instruction FR[3:0]: Set frame frequency BE[1:0]: Set booster efficiency
			FR3	FR2	FR1	FR0	BE1	BE0	--	0	
Write Display Data	1	0	Write data								Write data into DDRAM
Set Icon	0	0	1	0	1	0	0	0	1	ION	ION=0: Disable Icon function ION=1: Enable Icon function and set Page Address = 16
Set Page Address	0	0	1	0	1	1	P3	P2	P1	P0	Set Page Address
Set Column Address (MSB)	0	0	0	0	0	1	0	X7	X6	X5	Set MSB of Column Address
Set Column Address (LSB)	0	0	0	0	0	0	X4	X3	X2	X1	Set LSB of Column Address
Display ON/OFF	0	0	1	0	1	0	1	1	1	D	D=0: Display OFF D=1: Display ON
Set Display Start Line	0	0	0	1	0	0	0	0	--	--	2-byte instruction. Specify Line Address for the 1st display line of DDRAM (vertical scrolling).
	0	0	--	S6	S5	S4	S3	S2	S1	S0	
Set COM0	0	0	0	1	0	0	0	1	--	--	2-byte instruction. Specify a COM pin to be COM0 (moving partial display window).
	0	0	--	C6	C5	C4	C3	C2	C1	C0	
Set Display Duty	0	0	0	1	0	0	1	0	--	--	2-byte instruction. Set display duty
	0	0	L7	L6	L5	L4	L3	L2	L1	L0	
Set N-line Inversion	0	0	0	1	0	0	1	1	--	--	2-byte instruction. Set N-line inversion counter
	0	0	--	--	--	N4	N3	N2	N1	N0	
Release N-line Inversion	0	0	1	1	1	0	0	1	0	0	Exit N-line inversion mode
Reverse Display	0	0	1	0	1	0	0	1	1	REV	REV=0: Normal display REV=1: Reverse display
Entire Display ON	0	0	1	0	1	0	0	1	0	EON	EON=0: Normal display EON=1: Entire display ON
Power Control	0	0	0	0	1	0	1	VC	VR	VF	Set internal power ON/OFF
Select Regulator Register	0	0	0	0	1	0	0	R2	R1	R0	Select internal Regulator resistor
Set Contrast	0	0	1	0	0	0	0	0	0	1	2-byte instruction. Select EV for internal Regulator's reference
	0	0	--	--	EV5	EV4	EV3	EV2	EV1	EV0	
Select LCD bias	0	0	0	1	0	1	0	B2	B1	B0	Select LCD bias
Set COM Scan Direction	0	0	1	1	0	0	MY	--	--	--	Set COM scan direction: MY=0: Normal direction MY=1: Reverse direction
Set SEG Scan Direction	0	0	1	0	1	0	0	0	0	MX	Set SEG scan direction: MX=0: Normal direction MX=1: Reverse direction
Oscillator ON	0	0	1	0	1	0	1	0	1	1	Turn ON internal Oscillator

Instruction	A0	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Description
Set Power-Save Mode	0	0	1	0	1	0	1	0	0	P	P=0: Normal mode P=1: Enable Power-Save mode
Release Power-Save Mode	0	0	1	1	1	0	0	0	0	1	Exit Power-Save mode
RESET	0	0	1	1	1	0	0	0	1	0	Software reset
Set Display Data Length	--	--	1	1	1	0	1	0	0	0	2-byte instruction. Set the data counter in 3-Line SPI only
	--	--	DL7	DL6	DL5	DL4	DL3	DL2	DL1	DL0	
NOP	0	0	1	1	1	0	0	0	1	1	No operation
Reserved	0	0	1	1	1	0	0	0	0	0	Do NOT use
	0	0	1	1	1	0	1	1	1	0	Do NOT use
	0	0	1	1	1	1	--	--	--	--	Reserved for testing
Extension Command Set1	0	0	1	1	1	1	1	1	0	TE1	TE1=1: Enter extension Mode1
Extension Command Set2	0	0	1	1	0	1	0	0	0	TE2	TE2=1: Enter extension Mode2
Extension Command Set3	0	0	0	1	1	1	1	0	0	TE3	TE3=1: Enter extension Mode3
EXTENSION COMMAND SET 1											
Increase Vop offset	0	0	0	1	0	1	0	0	0	1	Increase vop offset by 1step
Decrease Vop offset	0	0	0	1	0	1	0	0	1	0	Decrease vop offset by 1 step
Return normal mode	0	0	0	0	0	0	0	0	0	0	Return normal mode
EXTENSION COMMAND SET 2											
Disable autoread	0	0	1	0	1	0	1	0	1	0	Disable autoread
Enter EEPROM mode	0	0	0	0	0	1	0	0	1	1	Enter EEPROM mode
Enable read mode	0	0	0	0	1	0	0	0	0	0	Enable read mode
Set read pulse	0	0	0	1	1	1	0	0	0	1	Set read pulse width
Exit EEPROM mode	0	0	1	0	0	0	0	0	1	1	Exit EEPROM mode
Enable erase mode	0	0	0	1	0	0	1	0	1	0	Enable erase mode
Set erase pulse	0	0	0	1	0	1	0	1	0	1	Set erase pulse width
Enable write mode	0	0	0	0	1	1	0	1	0	1	Enable write mode
Set write pulse	0	0	0	1	1	0	1	0	1	0	Set write pulse width
Return normal mode	0	0	0	0	0	0	0	0	0	0	Return normal mode
EXTENSION COMMAND SET 3											
Set Color Mode	0	0	0	0	0	1	0	0	0	B/G	Select Black/White or Gray mode B/G=1: Black/White mode; B/G=0: Gray mode (default)
Return normal mode	0	0	0	0	0	0	0	0	0	0	Return normal mode

6.5 Initialization Code

```
void init()
{
        RES=0;
        delay(2);
        RES=1;
        delay(2);
        write_com(0xaf);      //Display off
        write_com(0xa0);      //ADC=normal
        write_com(0xc8);      //SHL=reverse
        write_com(0x44);      //COM0
        write_com(0x00);      //Set initial com12 ;08
        write_com(0x40);      //SET INITIAL DISPLAY LINE REGISTER
        write_com(0x00);      //04
        write_com(0x38);      //set mode frequency
        write_com(0x04);      //
        write_com(0x2e);      //POWER CONTROL VC=1
        delay(5);
        write_com(0x27);      //Select the internal resistance ratio of the regulator resistor
        write_com(0x81);      //SELECT ELECTRONIC VOLUME REGISTER
        write_com(vop);       //
        write_com(0x57);      //BIAS 1/12
        write_com(0x48);      //duty
        write_com(0x80);      //60
        write_com(0x4c);      //SET N-LINE INVERSION 4c
        write_com(0x00);      //
        write_com(0x93);      ///* 4FRC */ /*PWM 15*/
        write_com(0x88);      //gray setting
        write_com(0x00);      //
        write_com(0x89);      //
        write_com(0x00);      //
        write_com(0x8a);      //
        write_com(0x99);      //
        write_com(0x8b);      //
        write_com(0x99);      //
        write_com(0x8c);      //
        write_com(0xdd);      //
        write_com(0x8d);      //
```

```
        write_com(0xdd);     //
        write_com(0x8e);     //
        write_com(0xff);     //
        write_com(0x8f);     //
        write_com(0xff);     //
        write_com(0x64);     //Booster 3 TIME
        delay(5);
        write_com(0x65);     //Booster 4 TIME
        delay(5);
        write_com(0x66);     //Booster 5 TIME
        delay(5);
        //write_com(0x2e);   //POWER CONTROL VC=1 VR=1
        //delay(5);
        write_com(0x2f);     //POWER CONTROL VC=1 VR=1 VF=1
        delay(10);
        write_com(0xe4);     //
        write_com(0xab);     //OSC ON
        write_com(0xa6);     //reverse display on/off
        write_com(0xa8);     //power save mode
        write_com(0xa2);     //disable icon row
        write_com(0xae);     //Display on
        write_com(0xa4);     //full off//entire display on/off
        delay(5);
}
```

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 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.