SPECIFICATION
FOR
LCD Module
RX101B-1000

MODULE:	**RX**101B-1000
CUSTOMER:	

REV	DESCRIPTION	DATE
A	FIRST ISSUE	2020.07.07

ROGIN	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

Revision History

Data	Rev. No.	Page	Summary
2020.07.07	A		FIRST ISSUE

ContentsGeneral Description

General Description

* Description

The specification 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 , a touch panel and a backlight unit.

General InformationItems	Specification	Unit	Note
	Main Panel		
Display area(AA)	216.96(H) * 135.6(V)	mm	-
Display colors	16.7M	colors	-
Number of pixels	1280(RGB) *800	dots	-
Pixel arrangement	Pixels RGB stripe arrangement	-	-
Pixel pitch	0.1695*0.1695	mm	
Viewing angle	ALL		-
Display mode	Normally Black	-	-
Operating temperature	-20～+70	℃	-
Storage temperature	-30～+80	℃	-

MechanicalInformation

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	229.46	-	mm	
	Vertical(V)	-	149.1	-	mm	
	Depth(D)	-	4.7	-	mm	-
Weight		-	TBD	-	g	-

1.OpticalCharacteristics

The following items are measured understableconditions.

The optical characteristicsshouldbe measured in a dark room or equivalentstate

Items		Symbol	Condition	Specifications			Unit	Note
				Min.	Typ.	Max.		
Contrast Ratio		CR	θ =□°	-	1000	-	-	
Response Time		T_{R+} T_F		-	35	40	ms	
	Red	X_R		-0.02	-	+0.02	-	
		Y_R			-		-	
	Green	X_G			-		-	
		Y_G			-		-	
	Blue	X_B			-		-	
		Y_B			-		-	
Viewing angle	Hor.	ϕ1(3 o'clock)	Center CR≥10	-	80	-	deg.	
		ϕ2(9 o'clock)		-	80	-		
	Ver.	θ2(12 o'clock)		-	80	-		
		θ1(6 o'clock)		-	80	-		
NTSC			CIE1931	45	50		%	
White Chromaticity		wx	θ =□°		-			
		wy			-			

Note 1: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

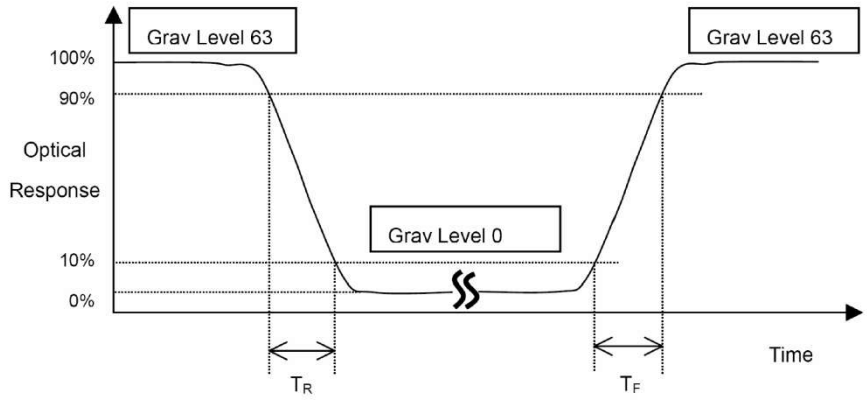
L63: Luminance of gray level 63

L0: Luminance of gray level 0

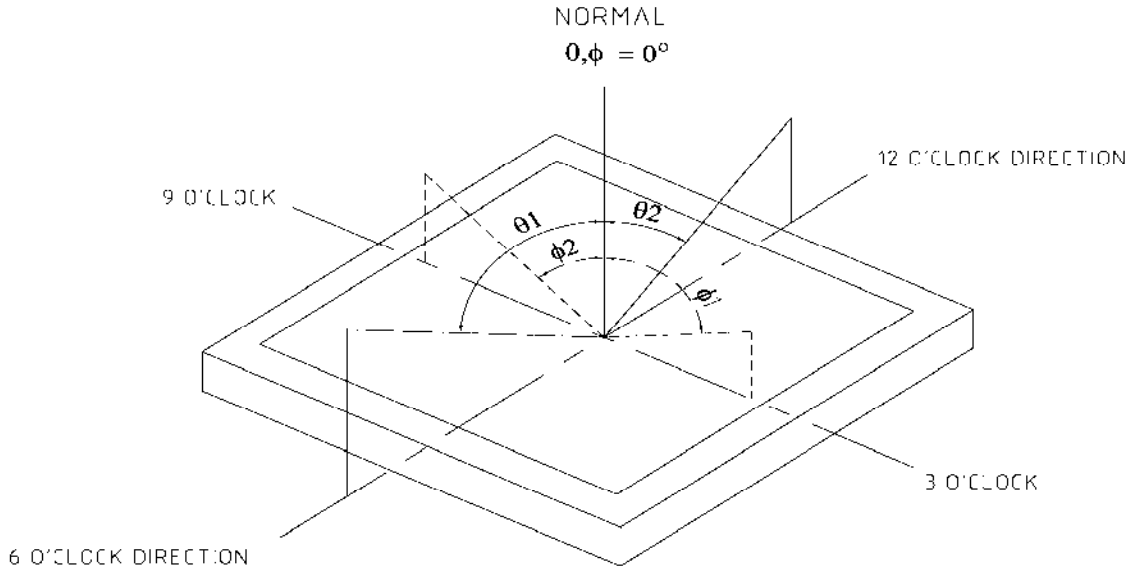
CR = CR (10)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5.

Note 2: Definition of Response Time (TR, TF):



Note 3: Viewing Angle



The above "Viewing Angle" is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is 6 O'clock. Module maker can increase the "Viewing Angle" by applying Wide View Film.

Note 4: Measurement Set-Up:

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 in a windless room.

2.ElectricalCharacteristics

AbsoluteMaximumRating (Ta=25 C VSS=0V)
DC Electrical Characteristics (Ta=25 C VSS=0V)

Characteristics		Symbol	Min.	Typ.	Max.	Unit	Note
Power supply voltage		VDD		3.3		V	
Logic Low input Voltage		VIL	0		0.5	V	
Logic Hight input Voltage		VIH	2.7		3.3	V	
Logic Low output Voltage		VOL	0		0.5	V	
Logic Hight output Voltage		VOH	2.7		3.3	V	
Curren consumption ALL Black	logic	ICC+IIN	-	-	-	mA	
	Analog						

Note: (1) All of the voltages listed above are with respective to GND=0V.
(2) Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above.
(3)Background color changes slightly depending on ambient temperature.
This pheno menon is reversible. Ta70℃: 75%RH max
Ta>70℃: absolute humidity must be lower than the humidity of 75%RH at 70℃
(4) Ta at -30℃will be <48hrs, at 80℃ will be <120hrs
(5) *VDDI=1.65 to 3.6V, VCI= 2.5 to 4.8V, VDDAM=1.65 to 3.6 V, AVDD=4.5 to 6.0V, AVEE=-6.0 to -4.5V, AVSS=VSS=0V,*
Ta=-30 to 75 (to +85 no damage)

Backlight Characteristics

Item	Symbol	MIN	TYP	MAX	UNIT	TestCondition
Supply Voltage	Vf	2.8V*6	3.2V*6	3.5V*6	V	If=6*45mA
Luminous Intensity for LCM	-	900	1000	-	Cd/m^2	If=273.2*30mA
Backlight Power Consumption	WBL	-	5184	-	mW	
Uniformity for LCM	-	80	-	-	%	
Color Coordinate for LCM	Wx	-	-	-		
	Wy	-	-	-		
LED	020					
Backlight Color	White					

3.Touch Screen Panel Specifications

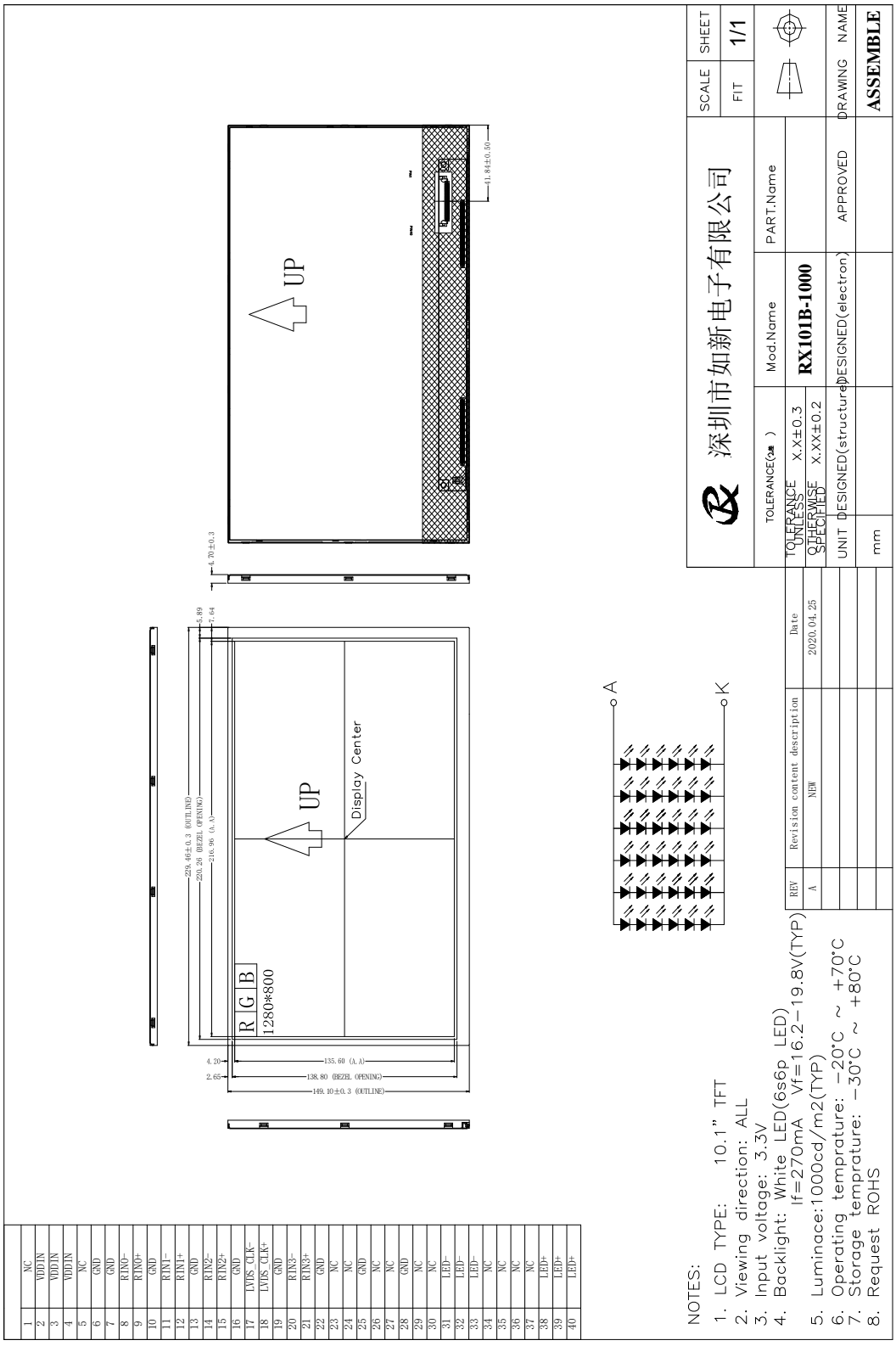
3.1 Electrical Characteristics

TBD

3.2 Mechanical & Reliability Characteristics

TBD

4.Outlinedimension



5:Input Terminal PinAssignment

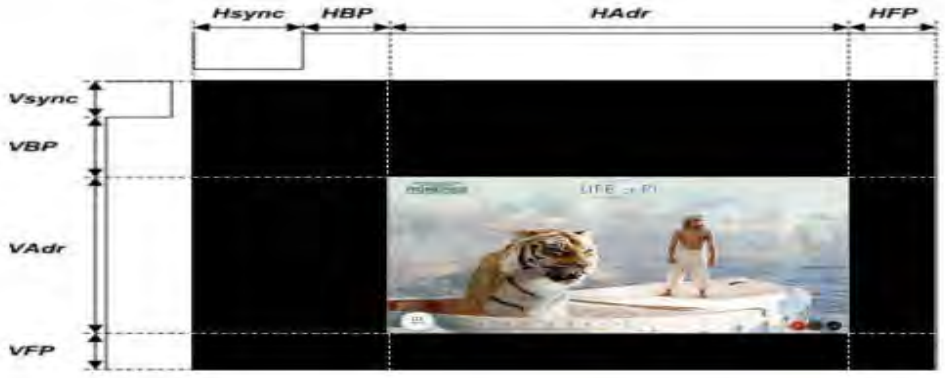
Pin NO.	Symbol	Function
1	NC	Non Connection
2	VDDIN	Power supply VDDIN=3.3V (Typ.)
3	VDDIN	Power supply VDDIN=3.3V (Typ.)
4	VDDIN	Power supply VDDIN=3.3V (Typ.)
5	NC	Non Connection
6	GND	GROUND
7	GND	GROUND
8	RIN0-	LVDS Positive data signal (−)
9	RIN0+	LVDS Positive data signal (+)
10	GND	GROUND
11	RIN1-	LVDS Positive data signal (−)
12	RIN1+	LVDS Positive data signal (+)
13	GND	GROUND
14	RIN2-	LVDS Positive data signal (−)
15	RIN2+	LVDS Positive data signal (+)
16	GND	GROUND
17	LVDS_CLK-	LVDS Positive CLK signal (−)
18	LVDS_CLK+	LVDS Positive CLK signal (+)
19	GND	GROUND
20	RIN3-	LVDS Positive data signal (−)
21	RIN3+	LVDS Positive data signal (+)
22	GND	GROUND
23	NC	Non Connection
24	NC	Non Connection
25	GND	GROUND
26	NC	Non Connection
27	NC	Non Connection
28	GND	GROUND
29	NC	Non Connection
30	NC	Non Connection
31	LED-	LED Cathode
32	LED-	LED Cathode
33	LED-	LED Cathode
34	NC	Non Connection
35	NC	Non Connection
36	NC	Non Connection
37	NC	Non Connection
38	LED+	LED Anode

39	LED+	LED Anode
40	LED+	LED Anode

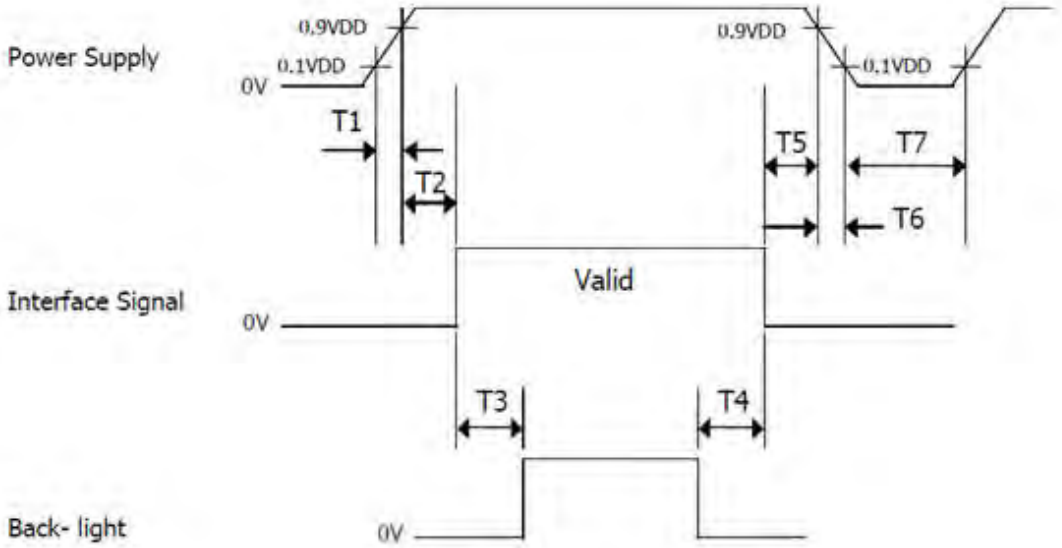
6:Operating Principle &Methods

< Table5. LVDS Timing Parameter >

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK Frequency	Fdclk	66.3	72.4	78.9	MHz
Horizontal display area	Thd		1280		pixel
HSYNC period time	Th	1380	1440	1500	pixel
HSYNC blanking	thbp+ thfp	100	160	220	pixel
Vertical display area	Tvd		800		H
Frequency	fV	55	60	65	Hz
VSYNC period time	Tv	824	838	872	H
VSYNC blanking	Tvbp+ Tvfp	24	38	72	H



3.4 Power Sequence



< Table6. Sequence Table >

Parameter	Values			Units
	Min	Typ	Max	
T1	0	-	10	ms
T2	0	-	50	ms
T3	200	-	-	ms
T4	500	-	-	ms
T5	0	-	50	ms
T6	0	-	10	ms
T7	500	-	-	ms

7:ReliabilityTestResult

Item	Condition	Sample Size	Test Result	Note
Low Temperature Operating Life test	-20℃, 96HR	3ea	pass	-
Thermal Humidity Operating Life test	40℃, 90%RH, 96HR	3ea	pass	-
Temperature CycleON/OFF test	-20℃ ↔ 70℃, ON/OFF, 20CYC	3ea	pass	(1)
High Temperature Storage test	80℃, 96HR	3ea	pass	-
Low Temperature Storage test	—30℃, 96HR	3ea	pass	-
Thermal Shock Resistance	The sample should be allowed to stand the following 5 cycles of operation: TSTL for 30minutes -> normal temperature for 5 minutes -> TSTH for 30 minutes -> normal temperature for 5 minutes, as one cycle, then taking it out and drying it at normal temperature, and allowing it stand for 24 hours	3ea	pass	
Box Drop Test	1 Corner 3 Edges 6 faces, 66cm(MEDIUM BOX)	1box	pass	-

Note (1) ON Time over 10 seconds, OFF Time under 10 seconds

8:Packing

TBD

9:Cautions and HandlingPrecautions

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 duringassemblywork.

(2) Protect the module from physical shock or any force. In addition to damage, this may cause improperoperationordamagetothemoduleandback-lightunit.

(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. Ifyouhavethedropletsforalongtime,staininganddiscolorationmayoccur.

(5) Ifthesurfaceofthepolarizerisdirty,cleanitusingsomeabsorbentcottonorsoftcloth.

(6) ThedesirablecleanersarewaterIPA(IsopropylAlcohol)orHexane.
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. Incaseofcontactwithhands,legs,orclothes,itmustbewashedawaythoroughlywithsoap.

(8) Protectthemodulefromstatic;itmaycausedamagetotheCMOSICs.

(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assemblyprocess.

(10) Do not disassemblethemodule.

(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that theelectrostaticchargecanbeminimized.

(12) PinsofI/Fconnectorshallnotbetoucheddirectlywithbarehands.

(13) Donotconnect,disconnectthemoduleinthe “PowerON” condition.

(14) Power supply should always be turned on/off by the item 6.1 Power On Sequence &6.2 Power OffSequence

Storage and Transportation.

(1) Donotleavethepanelinhightemperature,andhighhumidityforalongtime.
It is highly recommended to store the module with temperature from 0 to 35 ℃ and relative humidity of less than 70%

(2) DonotstoretheTFT-LCDmoduleindirectsunlight.

(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 fluorescentlight.

(4) Itisrecommendedthatthemodulesshouldbestoredunderaconditionwherenocondensationis 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 bestressed

10.BHL&BMDT Customer QualityServiceProcess

12. **BHL&BMDT Customer Quality Service Process**

In order to provide better service to Customer, BHL&BMDT shall apply the after-sales product quality service process as below:

1. **According to the P/O from Customer, BHL&BMDT should deliver required product to the place appointed by Customer.**
2. **Customer will do IQC for the incoming procuct.**
3. **Inspection standard should be provided by BHL&BMDT, and it will be valid after confirmed by Customer.Inspection and Defects determination should be carried out according to the standard agreed by both Parties.**
4. **In order to guarantee in-time communication of product quality information and effective service, QA staff on Customer side should send Weekly Quality Report to the appointed CS staff in BHL&BMDT.**
5. **After BHL&BMDT get related information, both sides should arrange time and place to determin the defects found by Customer.**
6. **BHL&BMDT should cooperate with Customer for special quality requirement.**
7. **After confirmed by both side, BHL&BMDT should be responsible for the defect products which caused by its quality problem. BHL&BMDT should take back the confirmed defect product and return the good product to the place required by customer.**
8. **BHL&BMDT agree to provide related training of LCD product technology and usage.**
9. **Customer should use the LCD product according to the instruction. BHL&BMDT will not be responsible for the defect product caused by violation of Users' Instruction.**
10. **Both parties should deal with the quality problem with friendly cooperative policy. And both parties should negotiate to deal with the defect products of which the responsibility is not very clear.**

11:LCD Module OperationInstruction

13. LCD Module Operation Instruction

BHL&BMDT

Part I. How to use the LCD Module

1. Don't hit the LCD Panel in any way because the LCD is made of glass.
2. Don't clean the surface of LCD with hard things. Please clean LCD with Air-gun or very soft cloth when necessary. The protective film on the POL can be removed just before assembly, otherwise, dust, spit or other foreign matter may attached on the LCD under the protective film. After the protective film is removed, only air-gun can be used to remove any dust or foreign matter. Fingure or cloth MUST NOT be used in such cases.
3. No chemical liquid is allowed to clean the LCD, such as alcohol, acetone and IPA. All of these can damage the LCD. Water on the LCD must be cleaned as soon as possible, for it will cause POL color change or other defect.
4. Please move and assemble LCD very carefully during assembly, and don't push or twist it.
5. Don't damage the FPC of LCD module. It will cause permanent defect.
6. Don't disassemble LCD module. It will cause permanent defect.
7. Don't expose LCD module under sunshine, strong fluorescence or ultraviolet radiation.
8. Please make sure that operators wear static-protective bands effectively and working tables are effectively earthing during operation.
9. Please place LCD module on the tray provided by BHL&BMDT while moving it, in order to avoid mechanical damage. Hold the module's side frames to avoide damage during moving.
10. Don't twist, disassemble, squeeze or hit the PCB. It will damage the circuit or component on PCB and cause functional defect.
11. Please use the connector according to the instruction provided by BHL&BMDT.
12. Please place dual module with the sub-panel upward. Trays should be placed in contrary direction. An empty tray should be placed on the top.
13. Sealing operation on PCB must be very careful to avoid short or cut the original circuit on PCB. Otherwise, it will cause permenant damage to the LCD.
14. Don't add direct DC or high voltage to LCD panel. It will cause functional damage to the LCD or shorten the life of LCD product.
15. LCD may respond slowly or display abnormally in extrem temperature (lower than -20℃ or higher than 50℃). But this doesn't mean LCD functional defect. LCD will display normally in regular temperature. Therefore, don't use LCD product in extrem temperature.
16. Don't push the display area of LCD panel, it will cause abnormal display. This doesn't mean LCD functional defect, neither. LCD will display normally in regular temperature.
17. Electrical test of LCD product is made by using mobile phone provided by Customer. We can use special test equipment to do the test, also.
18. The black band on IC on LCD product is used to protect the IC from light. Please do NOT remove it.
19. Please take great care to use connector. Customer should be responsible for connector defect caused by operation on Customer side.

Part II Storage

1. Physical status of liquid crystal will change in extrem temperature, and it can not be resumed when the temperature returns to be normal. So LCD module should be stored in required temperature.
2. LCD module should be stored in required humidity. Low hymidity may add static, while high humidity may corrode the ITO circuit of LCD product. The suitable storage environment is: temperature: 22±5℃, humidity: 55%±10%.
3. Don't expose LCD module under sunshine, strong fluorescence or ultraviolet radiation for a long time. It should be stored in dark area.
4. LCD should be stored in static-protective polythene bag. Don't expose it in the air for a long time.