NAN YA PLASTICS CORPORATION

SPECIFICATION OF
LCD MODULE
PRODUCT NO.: LCBLDT163M2S

SPEC. NO: LM163-2A-△0

CUSTOMER
APPROVED BY
DATE:

LCD DEPARTMENT
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EDITED ON : May. 02. 2006

Q.C. DEPT.	DESIGN MANAGER	DESIGN CHECK	DESIGNER
			W.R.HSU

RECORDS OF REVISION

SPEC. NO.: LM163-2A

DATE	REVISED NO.	REF. PAGE	SUMMARY	DESIGN	CHECK
05.02.06'	0	1~27/27	First Issue	W.R.HSU	

1. MECHANICAL DATA

NO	ITEM	CONTENTS	UNIT
1	Product No.	LCBLDT163M2S	–
2	Module Size	205.5 (W) x 141.0 (H) x Max 9.0 (D)	mm
3	Dot Size	0.053 (W) x 0.210 (H)	mm
4	Dot Pitch	0.078 (W) x 0.235 (H)	mm
5	Number of Dots	640 x RGB (W) x 480 (H)	Dot
6	Duty	1/240	–
7	LCD Display Mode	FSTN, Color STN Module	–
8	Rear Polarizer	Color Transmissive Type	–
9	Viewing Direction	6	O'clock
10	Backlight	CCFL	–
11	Controller	Excluded	–
12	DC/DC Converter	Excluded	–
13	Touch Panel	Included	–
14	Weight	350 (Approx.)	g

Note :

LCBLDT163M2S

Backlight
B : CCFL Backlight

Reflective/Transmissive
T : Transmissive

Option
2 : Module Version Number
S : RoHS Compliance

Mode/View Angle
M : Color STN Module, 6 O'clock

RoHS Compliance.

Nan Ya guarantees that this project doesn't include any materials (6 materials) or includes less than specified quantities which are regulated by RoHS Compliance.

2. ABSOLUTE MAXIMUM RATINGS

(1) ELECTRICAL ABSOLUTE RATINGS

VSS=0V

	SYMBOL	MIN.	MAX.	UNIT	COMMENT
Power Supply for Logic	VDD−VSS	−0.3	5.5	V	
Input Voltage	VI	−0.3	VDD	V	
Static Electricity	−	−	−	−	Note 1

Note 1 LCM should be grounded during handling LCM.

(2) ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	NORMAL TEMP.			
	OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	0	50	−20	70
Humidity (Without Condensation)	Note 2,4		Note 3,4	

Note 2 Ta ≦ 50°C : 80%RH max

Note 3 Please refer to item of reliability test

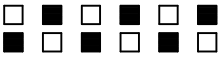
Note 4 Background color will change slightly depending on ambient temperature. That phenomenon is reversible.

Note 5

Frequency	5 Hz~13.95 Hz	13.95 Hz~33 Hz	33 Hz~51 Hz	51 Hz~500 Hz
Vibration Level	−	2X9.8 m/s²	−	5x9.8 m/s²
Vibration Width	0.2 inch	−	0.036 inch	−
Vibration Direction	X/Y/Z			
Vibration Time	20 min/cycle X 3 directions			

3. ELECTRICAL CHARACTERISTICS

3-1. ELECTRICAL CHARACTERISTICS OF LCM

ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
Power Supply for Logic	VDD-VSS	-		4.5	5.0	5.5	V
Input Voltage	VIH	H level		0.8VDD	-	VDD	V
	VIL	L level		0	-	0.2VDD	
Recommended LC Driving Voltage	VEE-VSS (Vop)	Duty= 1/240	0°C	23.0	23.4	23.8	V
			25°C	22.6	23.0	23.4	
			50°C	22.4	22.8	23.2	
Power Supply Current	IDD	VDD-VSS=5.0V VEE-VSS=23.0V Ta=25°C Pattern: 		-	30	45	mA
	IEE			-	11	16	
Surface Luminance of LCM	L	IL=5 mArms Pattern: Dots All ON(White)		50	70	-	cd/m²
		IL=5 mArms Pattern: Dots All OFF(Black)		-	5	10	
Recommended Frame Frequency for Optimum Contrast	FLM	-		115	120	125	Hz

3-2.ELECTRICAL CHARACTERISTICS OF BACKLIGHT

Used Lamp Rating

Temp.=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Lamp Voltage	V_L	–	350	–	Vrms	–
Lamp current	I_L	–	5	–	mArms	–
Lamp power consumption	P_L	–	1.75	–	W	(*1)
Starting voltage	Vs	–	–	820	Vrms	Ta=25°C
		–	–	1070	Vrms	Ta=0°C
Lamp life time	L_L	20000	–	–	hrs	at I_L = 5 mArms Ta=25°C (*2)

(*1) Power consumption excluded inverter loss .

(*2) Lamp life time is defined as follows : The final brightness is at 50% of original brightness.

3-3.ELECTRICAL CHARACTERISTICS OF RECOMMENDED INVERTER TDK TAD250

3-3-1 GENERAL SPECIFICATIONS

OPERATION TEMPERATURE : 00°C~50°C
STORAGE TEMPERATURE : -20°C~80°C
DIMENSION : 95.0(L)mm x 19.5(W)mm x MAX 8.8(H)mm

3-3-2 PIN ASSIGNMENTS

INPUT (CP1) CONNECTOR :
MOLEX 53261-0590

NO.	FUNCTION
1	VIN
2	GND
3	Vrmt ON/OFF CONTROL
4	Vctrl
5	N.C

OUTPUT (CP2) CONNECTOR :
MITSUMI M60-04-30-134P

NO.	FUNCTION
1	RTN
2	N.C
3	N.C
4	HV

3-3-3 RELATIONSHIP BETWEEN VIN & TUBE CURRENT

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Input Voltage	VIN	10	12	15	V	
Control Terminal Input Voltage	Vrmt	3.5	5	10	V	ON State
		-0.5	0	0.4		OFF State
Tube Current Control Voltage	Vctrl	-	1.1	-	V	
Tube Current	IL	-	5	-	mA	

3-4.CHARACTERISTICS OF TOUCH PANEL

Used Touch Panel Rating Temp.=25°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Applied Rating Voltage	V_R	–	–	–	7.0	V
Operating Temperature	T_{OPR}	20%~85% R.H. Max. Avoid Dew Condensation at Any Time	−10	–	60	°C
Storage Temperature	T_{STO}		−40	–	80	
Resistance of Terminal Electrodes	R_{ETD}	X Electrode	450	–	1000	Ω
		Y Electrode	300	–	700	
Linearity	L	–	–	–	1.5	%
Insulation Resistance	R_{OFF}	V_{DC}=25V	20	–	–	MΩ
Transparency	T	According to JIS-K7015	78	79	80	%
Surface Hardness	S_H	According to JIS-K5400	3	–	–	H

Test condition : Touch panel is placed horizonally in a vessel and no power is supplied to T/P.
Normal state is temperature : 25±10°C, relative humidity : 60±25%

4.OPTICAL CHARACTERISTICS

4-1.Optical Char. of Normal Temp. Mode

AT V_{OP}

ITEM / MODE		Cr(Contrast Ratio)						θ(Viewing Angle)		φ(Viewing Angle)	
		0°C		25°C		50°C		25°C		25°C	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
T	M	15	20	15	20	5	10	–	F: 45 R: 40	–	L: 40 R: 40
NOTE		NOTE 6						NOTE 5			

NOTE :

T : Transmissive

M : Color STN Module, 6 O'clock

AT $\phi=0°$ $\theta=0°$

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	0℃	500	650	900	ms	NOTE 2
		25℃	200	250	380		
		50℃	100	120	180		
Response Time (fall)	Tf	0℃	320	390	600	ms	NOTE 2
		25℃	90	110	170		
		50℃	40	50	60		

4-2.Color of CIE Coordinate

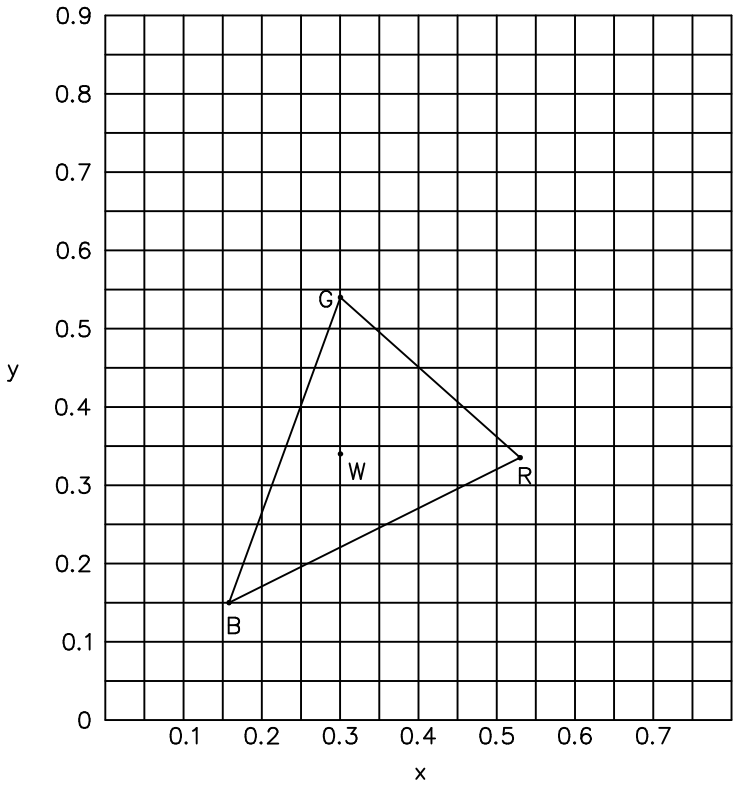
Ta = 25°C

ITEM		SYMBOL	CONDITION	VALUE	NOTE
Color of CIE Coordinate	Red	X	$\phi=0°$, $\theta=0°$	0.53	Note※
		y		0.33	
	Green	X	$\phi=0°$, $\theta=0°$	0.30	
		y		0.54	
	Blue	X	$\phi=0°$, $\theta=0°$	0.16	
		y		0.15	
	White	X	$\phi=0°$, $\theta=0°$	0.30	
		y		0.34	

Tolerance : ±0.05

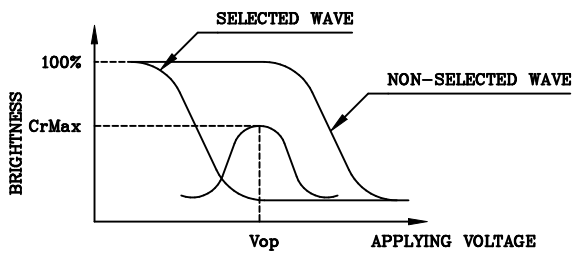
Note※ Measuring at position 3 on Fig.1
CIE chromaticity diagram

Fig.1

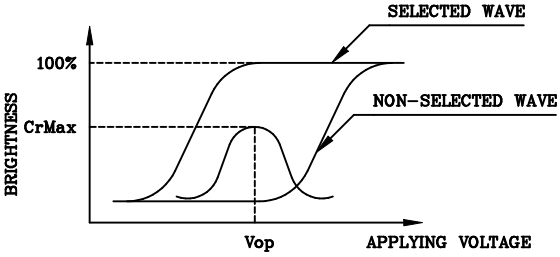


(NOTE 1)

Definition of Operation Voltage(Vop)



(positive type)



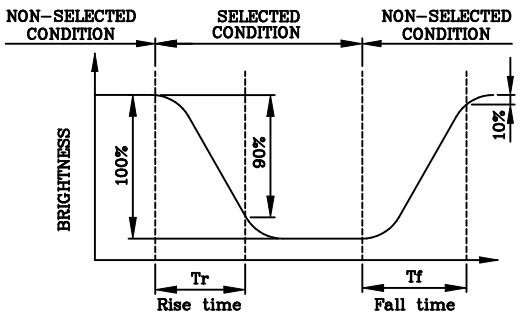
(negative type)

*Conditions

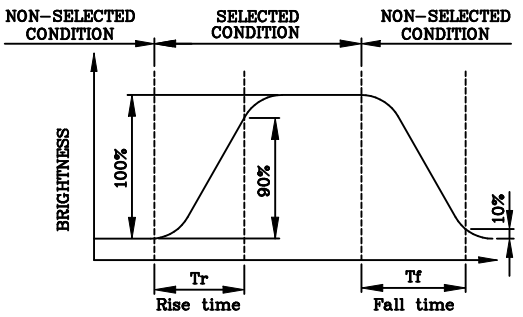
Viewing Angle : 0
Frame Frequency : 120Hz
Applying Waveform : 1/N duty 1/a bias

(NOTE 2)

Definition of Response Time(Tr,Tf)



(positive type)



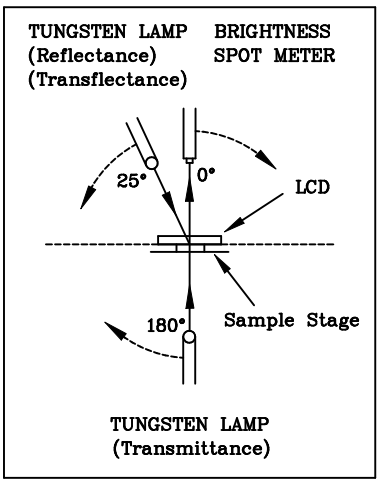
(negative type)

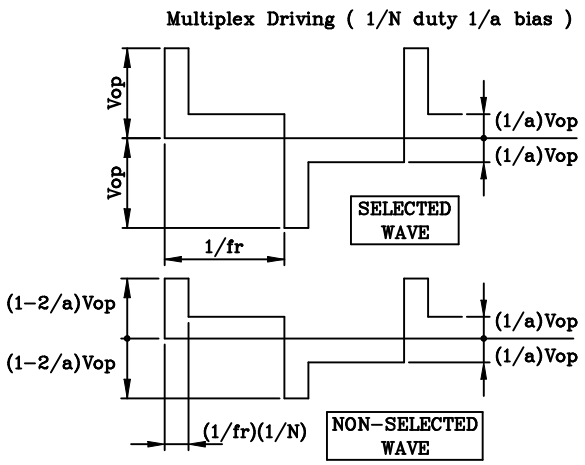
*Conditions

Operating Voltage : Vop
Viewing Angle (θ,ϕ) : (0,0)
Frame Frequency : 120Hz
Applying Waveform : 1/N duty 1/a bias

(NOTE 3)

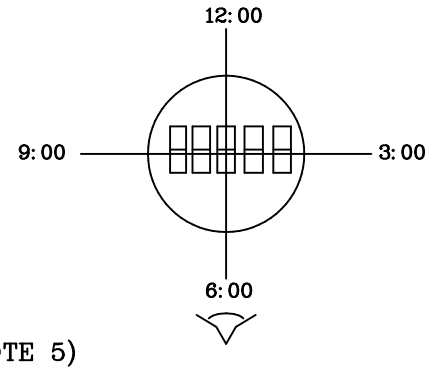
Description of Measuring Equipment and Driving Waveforms





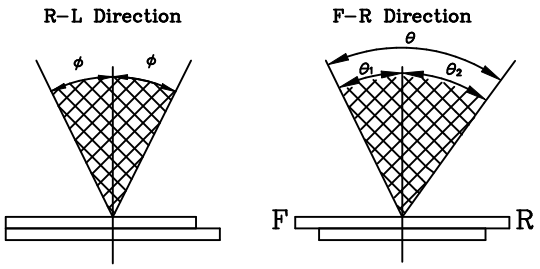
(NOTE 4)

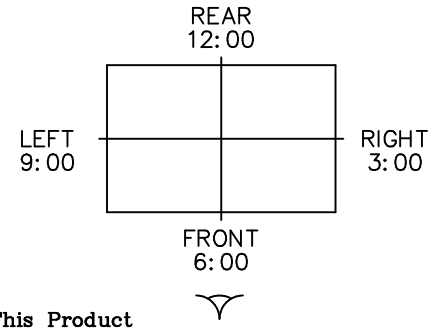
Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle





*For This Product

The Viewing Direction Is 6 O'clock

So $\theta_1 > \theta_2$

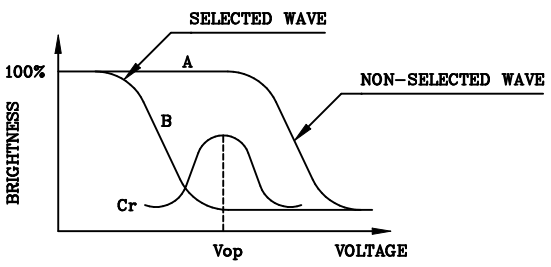
$\theta = \theta_1 + \theta_2$

*Conditions

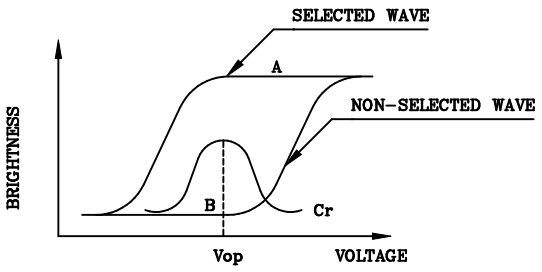
Operating Voltage : Vop
Frame Frequency : 120Hz
Applying Waveform : 1/N duty 1/a bias
Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)



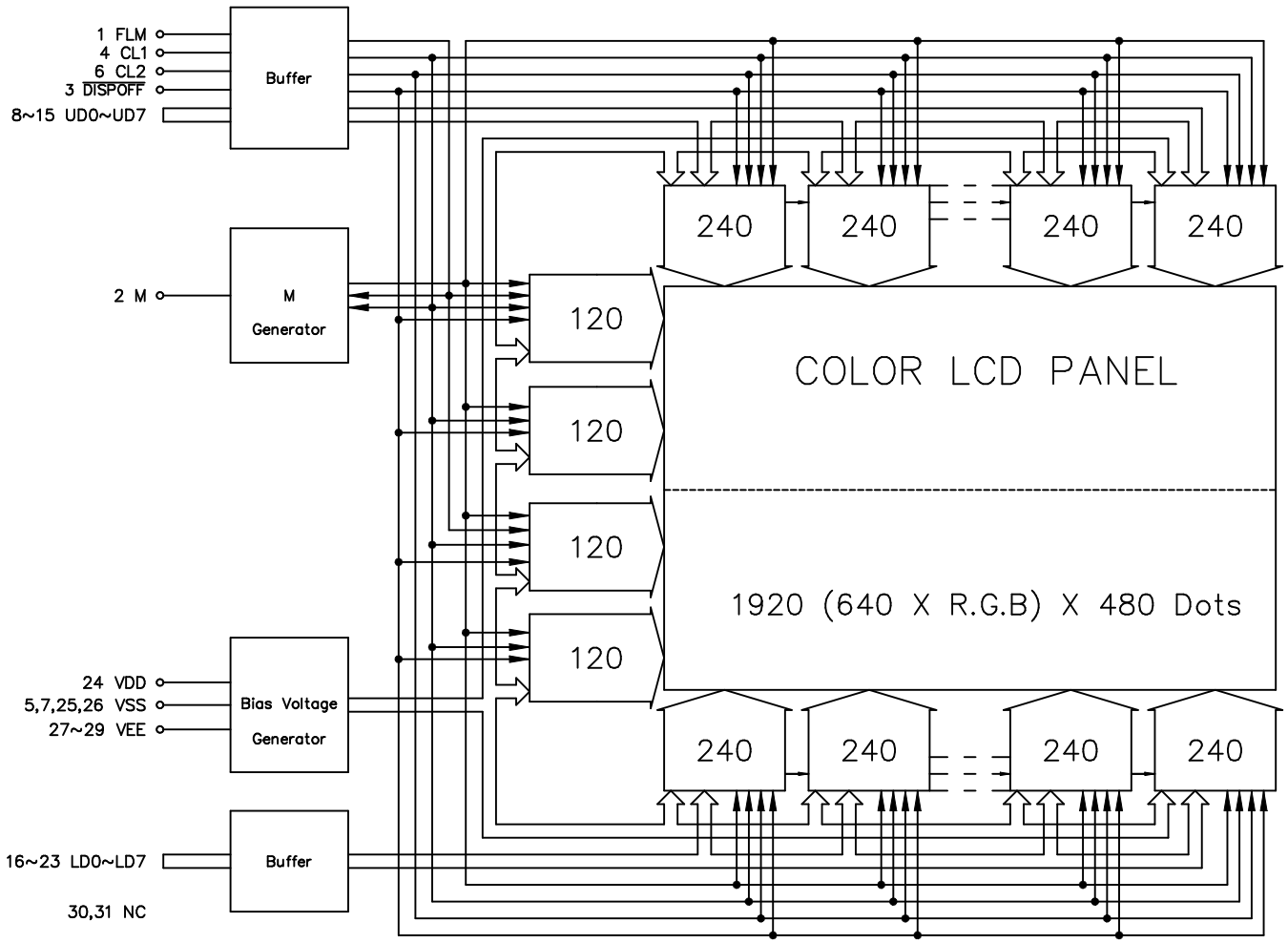
(negative type)

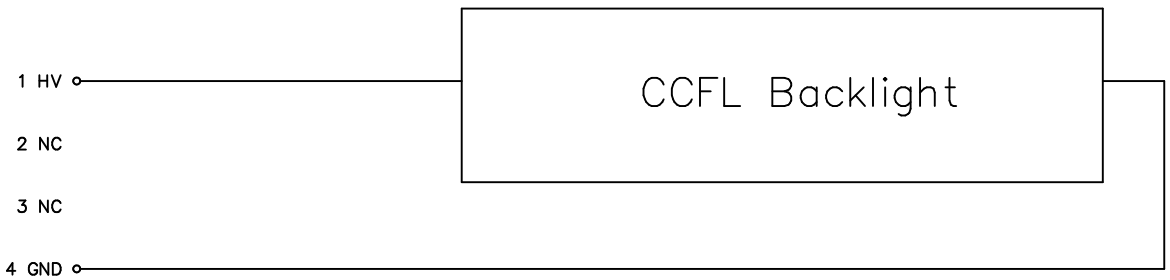
Contrast Ratio : Cr=A/B

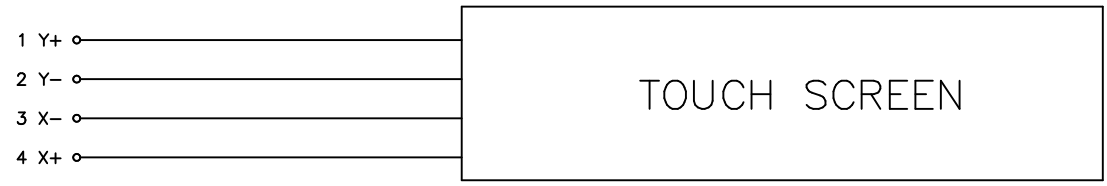
*Conditions

Viewing Angle : 0
Frame Frequency : 120Hz
Applying Waveform : 1/N duty 1/a bias

5. BLOCK DIAGRAM







6. INTERNAL PIN CONNECTION

USED LCD CONNECTOR :
CN1 : DF9-31P-1V (HIROSE)
CORRESPONDABLE LCD CONNECTOR : DF9-31S-1V (HIROSE)

INTERFACE		PIN NO.	SYMBOL	FUNCTION
LCM	CN1	1	FLM	First Line Marker
		2	M	Alternate Signal for LCD Drive
		3	$\overline{\text{DISPOFF}}$	Display Off ("H"=ON,"L"=OFF)
		4	CL1	Data Latch Pulse
		5	VSS	Signal Ground (GND)
		6	CL2	Data Shift Pulse
		7	VSS	Signal Ground (GND)
		8	UD0	Display Upper Data
		9	UD1	
		10	UD2	
		11	UD3	
		12	UD4	
		13	UD5	
		14	UD6	
		15	UD7	
		16	LD0	Display Lower Data
		17	LD1	
		18	LD2	
		19	LD3	
		20	LD4	
		21	LD5	
		22	LD6	
		23	LD7	
		24	VDD	Power Supply for Logic
		25	VSS	Signal Ground (GND)
		26	VSS	Signal Ground (GND)
		27	VEE	Power Supply for LCD (+V)
		28	VEE	Power Supply for LCD (+V)
		29	VEE	Power Supply for LCD (+V)
		30	NC	No Connection
		31	NC	No Connection

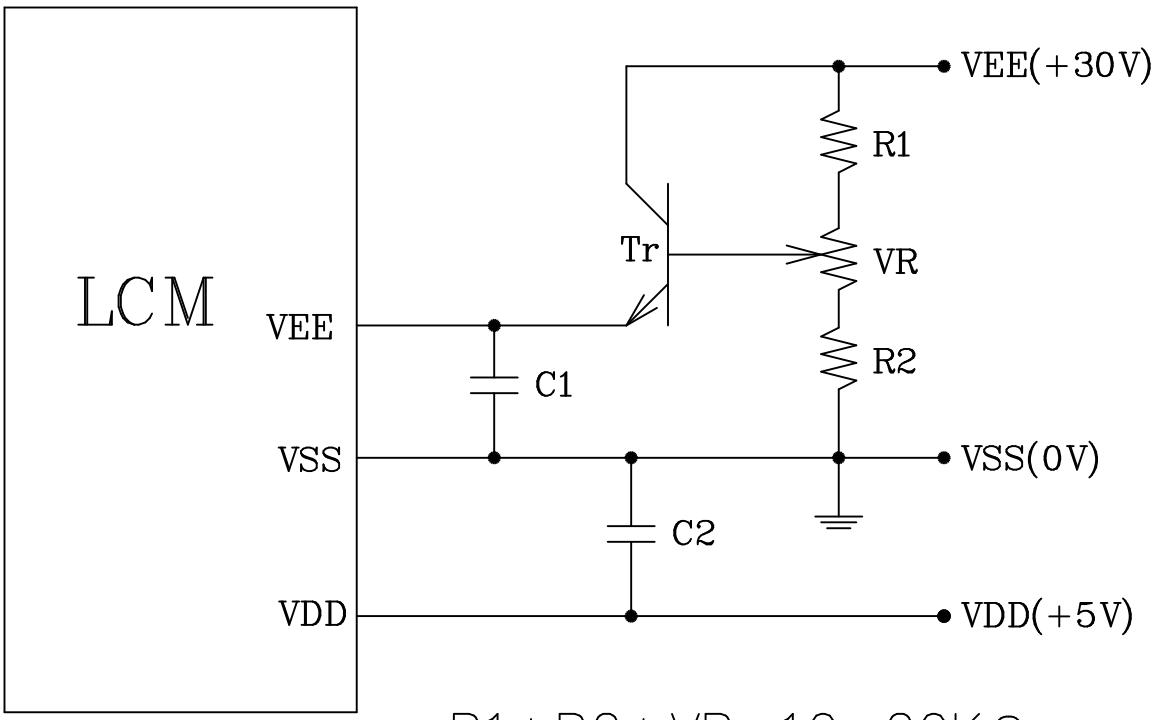
Used CCFT Connector : MITSUMI/M63M83-04
Correspondable CCFT Connector : MITSUMI/M60-04-30-134P or M60-04-30-114P
or M61M73-04

INTERFACE	PIN NO.	SYMBOL	FUNCTION
CCFT	1	HV	High Voltage Line (Inverter)
	2	N.C	No Connection
	3	N.C	No Connection
	4	GND	Ground Line (Inverter)

Used Touch Screen Connector : 487378-3 (AMP) or Compatible

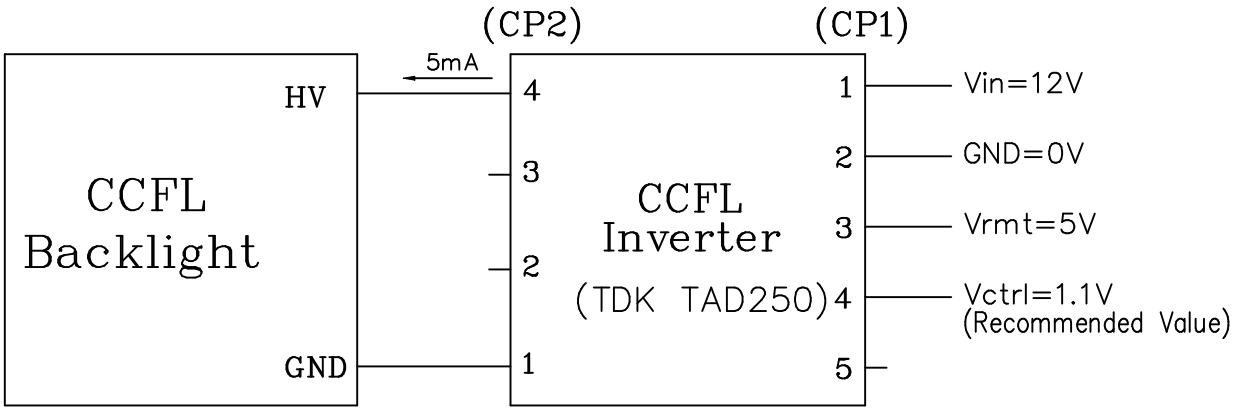
INTERFACE	PIN NO.	SYMBOL	FUNCTION
TOUCH SCREEN	1	Y+	Top Direction
	2	Y-	Bottom Direction
	3	X-	Left Direction
	4	X+	Right Direction

7. POWER SUPPLY



R1+R2+VR=10~20KΩ

C1,C2=10μF

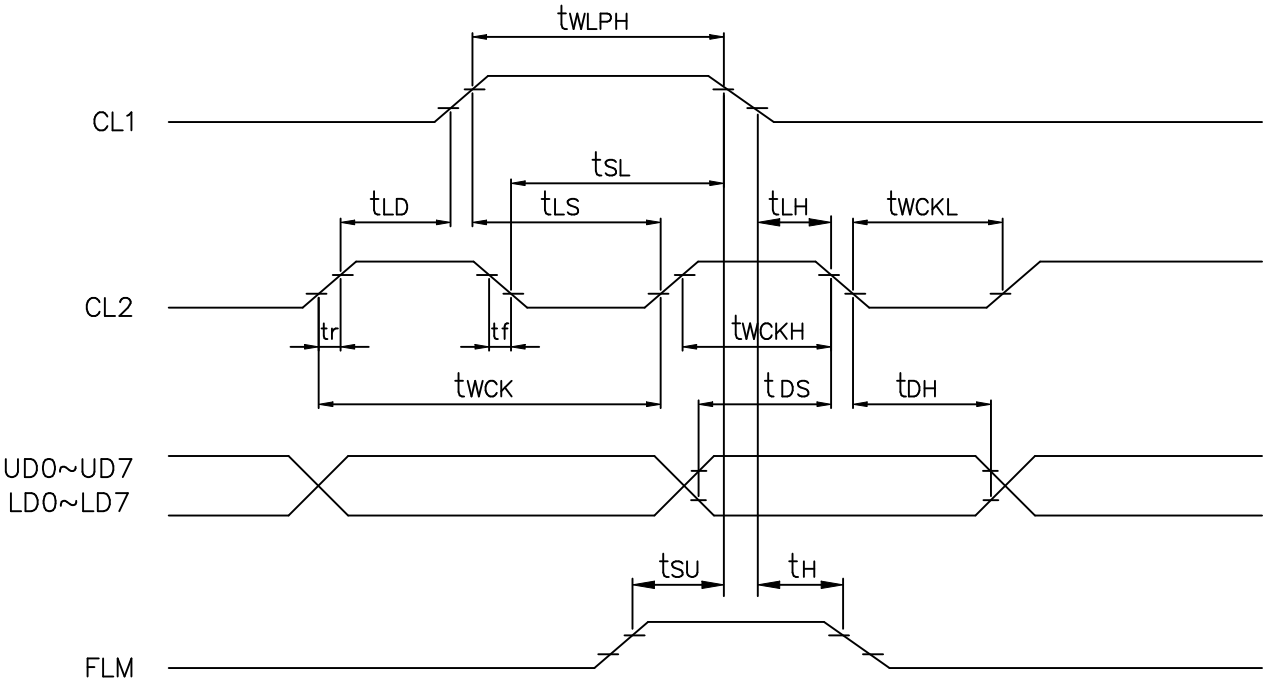


8. TIMING CHARACTERISTICS

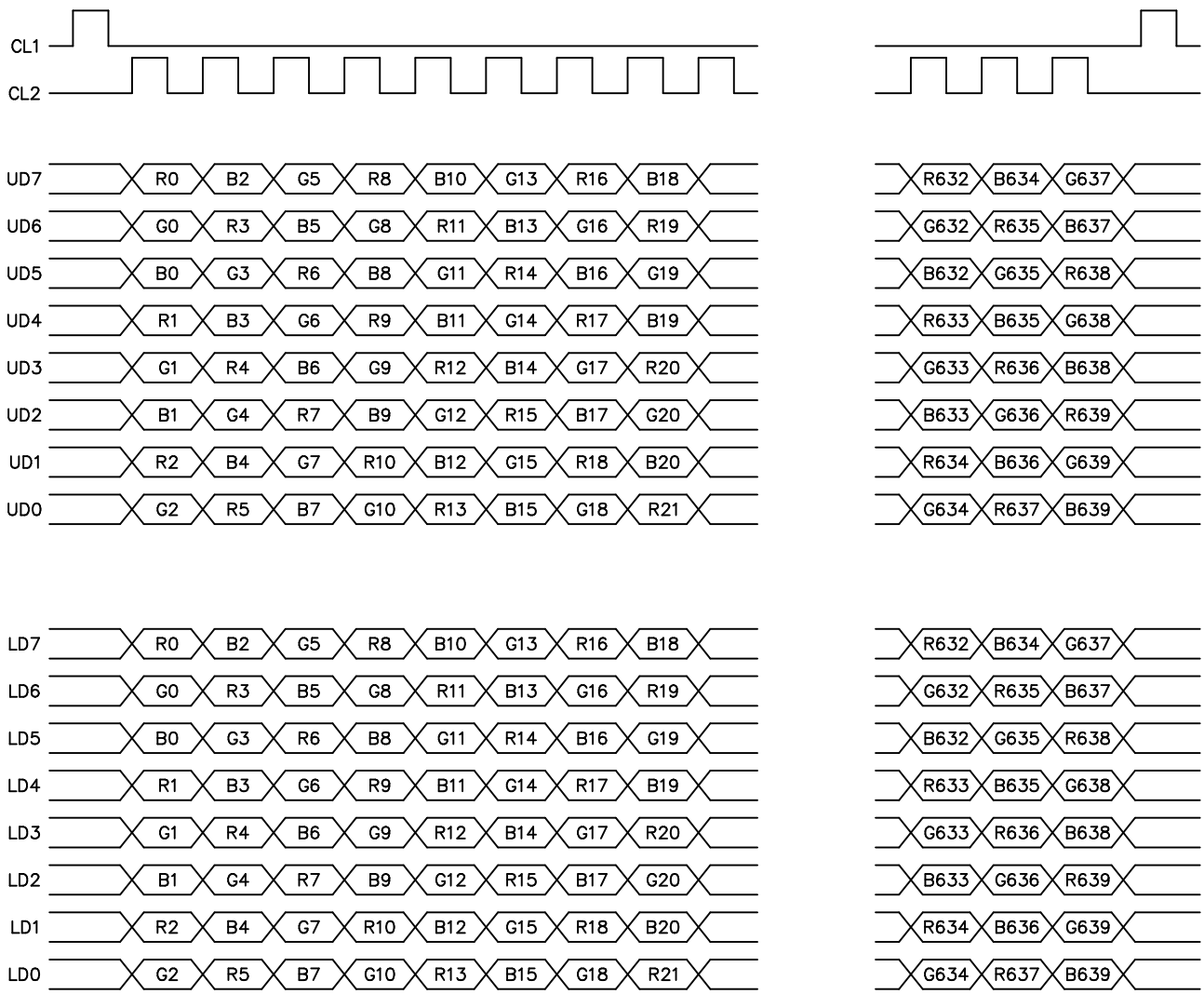
8-1. INTERFACE TIMING

VDD=5.0V ± 10%

Parameter	SYMBOL	MIN.	MAX.	UNIT
CLOCK PULSE CYCLE TIME	t_{WCK}	50	–	ns
CLOCK PULSE HIGH LEVEL WIDTH	t_{WCKH}	15	–	ns
CLOCK PULSE LOW LEVEL WIDTH	t_{WCKL}	15	–	ns
LATCH PULSE HIGH LEVEL WIDTH	t_{WLPH}	20	–	ns
CL2→CL1 RISE TIME	t_{LD}	0	–	ns
CL2→CL1 FALL TIME	t_{SL}	25	–	ns
CL1→CL2 RISE TIME	t_{LS}	25	–	ns
CL1→CL2 FALL TIME	t_{LH}	25	–	ns
CLOCK PULSE RISE/FALL TIME	t_r , t_f	–	30	ns
DATA SETUP TIME	t_{DS}	10	–	ns
DATA HOLD TIME	t_{DH}	10	–	ns
FLM SETUP TIME	t_{SU}	100	–	ns
FLM HOLD TIME	t_H	30	–	ns

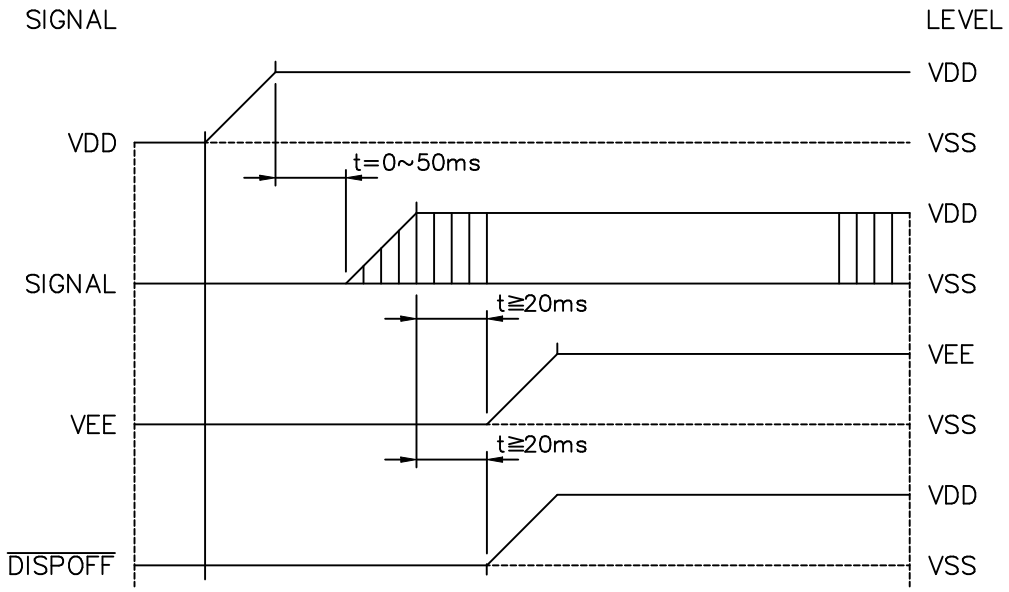


8-2. TIMING CHART

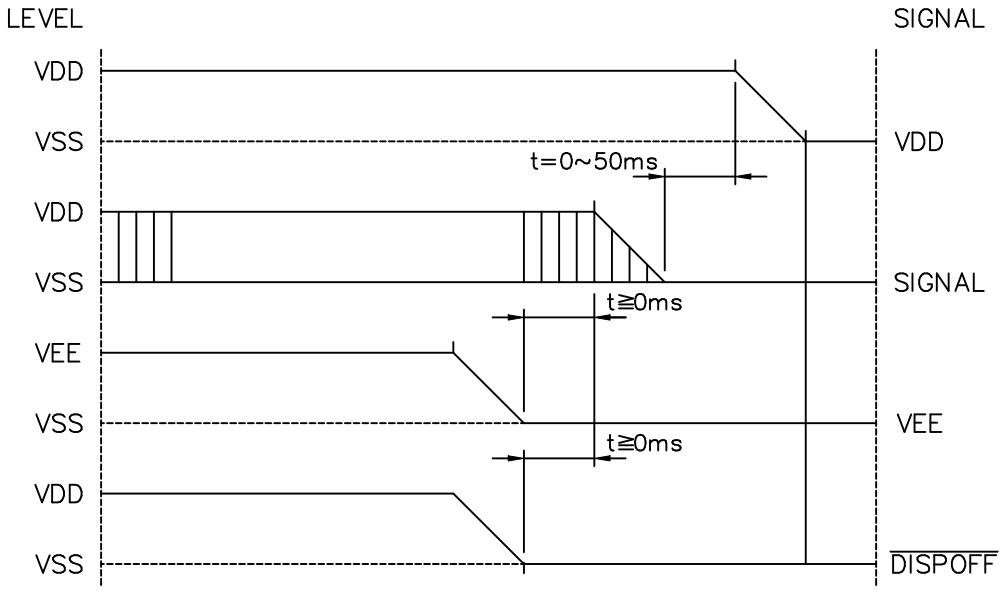


8-3.POWER ON/OFF TIMING

ON SEQUENCE



OFF SEQUENCE



Please maintain the above sequence when turning on and off the power supply of the module. If $\overline{\text{DISPOFF}}$ is supplied to the module while internal alternate signal for LCD driving(M) is unstable, DC component will be su-pplied to the LCD panel. This may cause damage the LCD module.

8-4.DISPLAY PATTERN

	1	2	3	4	5	6	7	8		1913	1914	1915	1916	1917	1918	1919	1920
1	R0 UD7	G0 UD6	B0 UD5	R1 UD4	G1 UD3	B1 UD2	R2 UD1	G2 UD0		G637 UD7	B637 UD6	R638 UD5	G638 UD4	B638 UD3	R639 UD2	G639 UD1	B639 UD0
2	R0 UD7	G0 UD6	B0 UD5	R1 UD4	G1 UD3	B1 UD2	R2 UD1	G2 UD0		G637 UD7	B637 UD6	R638 UD5	G638 UD4	B638 UD3	R639 UD2	G639 UD1	B639 UD0
239	R0 UD7	G0 UD6	B0 UD5	R1 UD4	G1 UD3	B1 UD2	R2 UD1	G2 UD0		G637 UD7	B637 UD6	R638 UD5	G638 UD4	B638 UD3	R639 UD2	G639 UD1	B639 UD0
240	R0 UD7	G0 UD6	B0 UD5	R1 UD4	G1 UD3	B1 UD2	R2 UD1	G2 UD0		G637 UD7	B637 UD6	R638 UD5	G638 UD4	B638 UD3	R639 UD2	G639 UD1	B639 UD0
241	R0 LD7	G0 LD6	B0 LD5	R1 LD4	G1 LD3	B1 LD2	R2 LD1	G2 LD0		G637 LD7	B637 LD6	R638 LD5	G638 LD4	B638 LD3	R639 LD2	G639 LD1	B639 LD0
242	R0 LD7	G0 LD6	B0 LD5	R1 LD4	G1 LD3	B1 LD2	R2 LD1	G2 LD0		G637 LD7	B637 LD6	R638 LD5	G638 LD4	B638 LD3	R639 LD2	G639 LD1	B639 LD0
479	R0 LD7	G0 LD6	B0 LD5	R1 LD4	G1 LD3	B1 LD2	R2 LD1	G2 LD0		G637 LD7	B637 LD6	R638 LD5	G638 LD4	B638 LD3	R639 LD2	G639 LD1	B639 LD0
480	R0 LD7	G0 LD6	B0 LD5	R1 LD4	G1 LD3	B1 LD2	R2 LD1	G2 LD0		G637 LD7	B637 LD6	R638 LD5	G638 LD4	B638 LD3	R639 LD2	G639 LD1	B639 LD0

9. RELIABILITY TEST

NORMAL TEMPERATURE RELIABILITY TEST

NO	ITEM	CONDITION			STANDARD	NOTE
1	High Temp. Storage	70°C	120Hrs		Appearance without defect	
2	Low Temp. Storage	−20°C	120Hrs		Appearance without defect	
3	High Temp. & High Humi. Storage	50°C 90%RH	120Hrs		Appearance without defect	
4	High Temp. Operating Display	50°C	120Hrs		Appearance without defect	
5	Low Temp. Operating Display	0°C	120Hrs		Appearance without defect	
6	Thermal Shock	−20°C,30min → 70°C,30min ↑ (1cycle)			Appearance without defect	10 cycles

Inspection Provision

1.Purpose

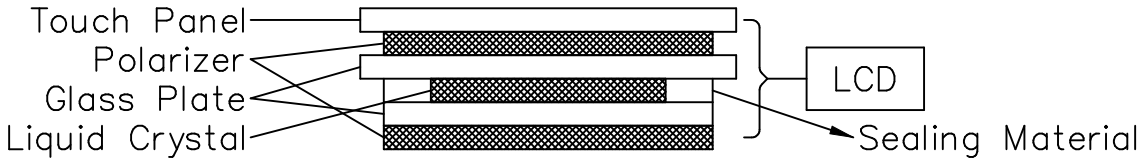
The NAN YA inspection provision provides outgoing inspection provision and its expected quality level based on our outgoing inspection of NAN YA LCD produces.

2.Applicable Scope

The NAN YA inspection provision is applicable to the arrangement in regard to outgoing inspection and quality assurance after outgoing.

3.Technical Terms

3-1 NAN YA Technical Terms



4.Outgoing Inspection

4-1 Inspection Method

MIL-STD-105E Level Ⅱ Regular inspection

4-2 Inspection Standard

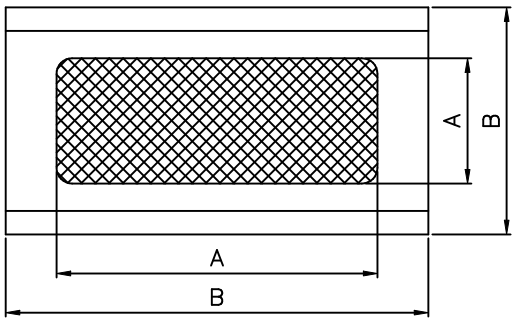
	Item		AQL(%)	Remarks
Major Defect	Dots	Opens Shorts Erroneous operation	0.4	faults which substantially lower the practicality and the initial purpose difficult to achieve.
	Solder appearance	Shorts Loose		
	Cracks	Display surface cracks		
	Touch Panel contact resistance			
	Touch Panel input load			

	Touch Panel linearity		0.4	
	Dimensions	External from Dimensions	0.4	
Minor Defect	Inside the glass	Black spots	0.65	faults which appear to pose almost no obstacle to the practicality, effective use, and operation.
	Polarizing plate	Scratches, foreign Matter, air bubbles, and peeling		
	Dots	Pinhole, deformation		
	Color tone	Color unevenness		
	Solder appearance	Cold solder Solder projections		

4-3 Inspection Provisions

*Viewing Area Definition

Fig. 1



A : Zone Viewing Area
B : Zone Glass Plate Outline

*Inspection place to be 500 to 1000 lux illuminance uniformly without glaring.
The distance between luminous source(daylight fluorescent lamp and cool white fluorescent lamp) and sample to be 30cm to 50cm.

*Test and measurement are performed under the following conditions, unless otherwise specified.

Temperature	20± 15°C
Humidity	65± 20%R.H.
Pressure	860~1060hPa(mmbar)

In case of doubtful judgment, it is performed under the following conditions.

Temperature	20± 2°C
Humidity	65± 5%R.H.
Pressure	860~1060hPa(mmbar)

5. Specification for quality check

5-1 Electrical characteristics

NO.	Item	Criterion
1	Non operational	Fail
2	Miss operating	Fail
3	Missing dot	Fail
4	Contrast irregular	Fail
5	Response time	Within Specified value
6	Touch Panel contact resistance	Within Specified value
7	Touch Panel input load	Within Specified value
8	Touch Panel linearity	Within Specified value
9	Backlight turn on/off	Within Specified value

5-2 External Appearance Defect

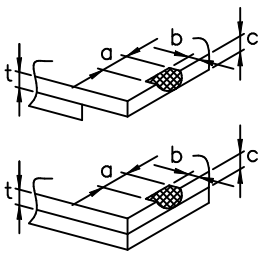
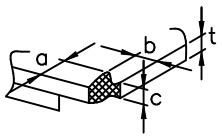
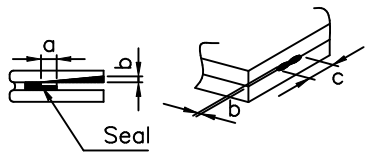
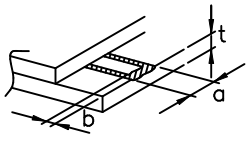
<table>
<tr><th>NO.</th><th>Item</th><th>Criterion</th></tr>
<tr><td>1</td><td>Black spots, foreign matter, and white spots (Including light leakage due to pinholes of polarizing plates, etc.)</td><td>
(1)-1-Spots
<table>
<tr><th>Average Diameter(mm): D</th><th>Number of pieces permitted</th><th>Minimum Space</th></tr>
<tr><td>D≦0.2</td><td>Ignore</td><td>-</td></tr>
<tr><td>0.2<D≦0.3</td><td>7</td><td>10mm</td></tr>
<tr><td>0.3<D≦0.4</td><td>3</td><td>30mm</td></tr>
<tr><td>0.4<D</td><td>0</td><td></td></tr>
</table>
Number of total pieces is set to within 7 pieces.

Note that when there are 2 pieces or more, they are not to be concentrated.
Set as: Average diameter = (Long diameter + Short diameter)/2

(1)-2-Blurred Spots(At lighting condition)
<table>
<tr><th>Average Diameter(mm): D</th><th>Number of pieces permitted</th></tr>
<tr><td>D≦0.3</td><td>Ignore</td></tr>
<tr><td>0.3<D≦0.75</td><td>5</td></tr>
<tr><td>0.75<D</td><td>0</td></tr>
</table>
Number of total pieces is set to within 5 pieces.

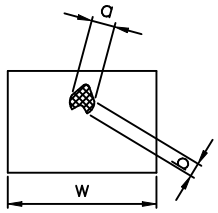
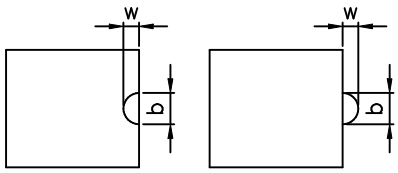
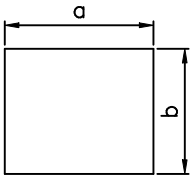
Note that when there are 2 pieces or more, they are not to be concentrated.
Set as: Average diameter = (Long diameter + Short diameter)/2
</td></tr>
</table>

<table>
<tr><td>1</td><td>Line</td><td>(1)-1-Lines
<table><tr><th>Width(mm): W</th><th>Length(mm): L</th><th>Number of pieces permitted</th></tr><tr><td>W≦0.03</td><td>Ignore</td><td>Ignore</td></tr><tr><td>0.03<W≦0.08</td><td>L≦4</td><td>2</td></tr><tr><td>0.08<W≦0.1</td><td>L≦1</td><td>1</td></tr></table>Object exceeding 0.1mm follow the standards of the spots form.
Note that when there are 2 pieces or more, they are not to be concentrated.
(1)-2-Blurred Lines(At lighting condition)
<table><tr><th>Width(mm): W</th><th>Length(mm): L</th><th>Number of pieces permitted</th></tr><tr><td>W≦0.03</td><td>Ignore</td><td>Ignore</td></tr><tr><td>0.03<W≦0.08</td><td>L≦3</td><td>6</td></tr><tr><td>0.08<W</td><td>3<L</td><td>None</td></tr></table>Object exceeding 0.1mm follow the standards of the spots form.
Note that when there are 2 pieces or more, they are not to be concentrated.</td></tr>
<tr><td>2</td><td>Scratches(Glass, reflection plates, and polarizing plates)</td><td>In accordance with black spots.
(At non lighting condition)</td></tr>
<tr><td>3</td><td>Color irregular</td><td>Not remarkable color irregular.</td></tr>
</table>

<table>
<tr><td>4</td><td>Air bubbles polarizing plates, and reflection plates</td><td colspan="2">
<table>
<tr><th>Average Diameter (mm): D</th><th>Number of pieces permitted</th></tr>
<tr><td>D≦0.3</td><td>Ignore</td></tr>
<tr><td>0.3<D</td><td>0</td></tr>
</table>
Average diameter = (Long diameter + Short diameter)/2
Note that when there are 4 pieces or more, they are not to be concentrated.
</td></tr>
<tr><td rowspan="5">5</td><td rowspan="5">Cracks</td><td>(1)General crack
 
</td><td>a≦5
b≦2
c≦t
Where, a and b are ignored when less than or equal to 0.5 The numbers of pieces are set at up to 5 pieces.</td></tr>
<tr><td>(2)Corner crack
 
</td><td>a≦2.5
b≦2.5
c≦t
a+b≦4</td></tr>
<tr><td>(3)Seal portion crack
 
</td><td>a≦The seal widthx1/3
b≦tx2/3
c≦5
The numbers of pieces are set at up to 5 pieces.</td></tr>
<tr><td>(4)ITO Pin crack
 
</td><td>a≦5
b≦1/3 pin length
c≦t</td></tr>
<tr><td>(5)Progressive cracks</td><td>All taken to be unacceptable.</td></tr>
</table>

6	Outer dimensions	Should be within the tolerance.
7	Newton ring(touch panel)	Orbicular of interference fringes is not allowed in the optimum contrast within the active area under viewing angle.
8	Soldering	Should be no defective soldering such as shorting, loose terminal cold solder, peeling of printed circuit board pattern, improper mounting position, etc.

5-3 Dot Appearance Defect

NO.	Item	Criteria
1	Pinhole	 Dot display a and b are each ≦0.2mm The overall total is taken be with in 10 units. Note that they are not to be concentrated.
2	Missing	 Dot display a and b are each ≦0.2mm The overall total is taken to be with in 10 units.
3	Thick and thin display	 Taken to be within ±1.5% of display character width(a) and height(b).

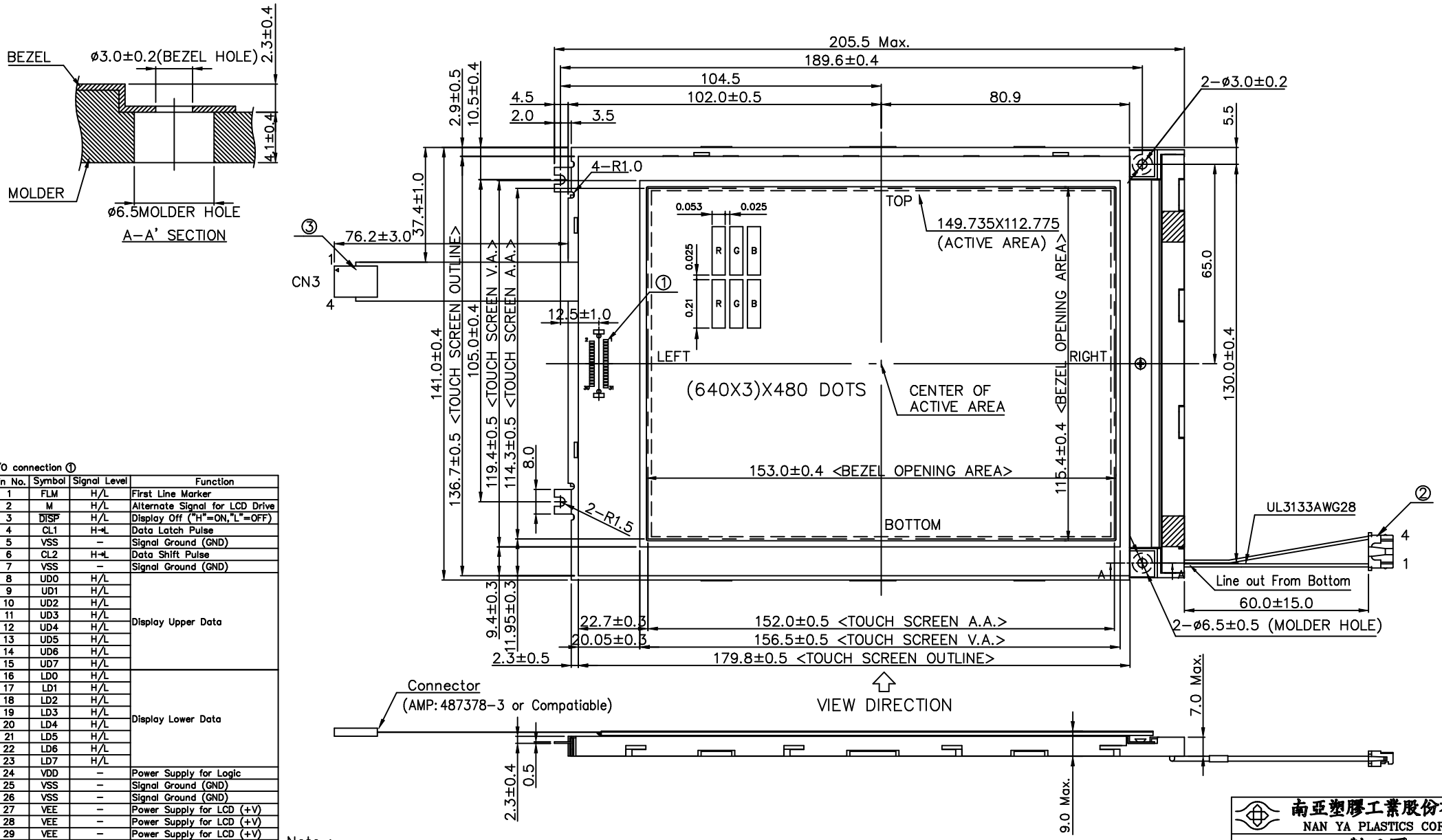
NOTICE:

- SAFETY
  1. If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.
  2. If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

- HANDLING
  1. Avoid static electricity which can damage the CMOS LSI.
  2. Do not remove the panel or frame from the module.
  3. The polarizing plate of the display is very fragile. So, please handle it very carefully.
  4. Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
  5. Do not use ketonics solvent & Aromatic solvent. Use a soft cloth soaked with a cleaning naphtha solvent.

- STORAGE
  1. Store the panel or module in a dark place where the temperature is 25°C±5°C and the humidity is below 65% RH.
  2. Do not place the module near organics solvents or corrosive gases.
  3. Do not crush, shake, or jolt the module.

- TERMS OF WARRANT
  1. Acceptance inspection period
     The period is within one month after the arrival of contracted commodity at the buyer's factory site.
  2. Applicable warrant period
     The period is within twelve months since the date of shipping out under normal using and storage conditions.



I/O connection ①

Pin No.	Symbol	Signal Level	Function
1	FLM	H/L	First Line Marker
2	M	H/L	Alternate Signal for LCD Drive
3	DISP	H/L	Display Off ("H"=ON,"L"=OFF)
4	CL1	H→L	Data Latch Pulse
5	VSS	–	Signal Ground (GND)
6	CL2	H→L	Data Shift Pulse
7	VSS	–	Signal Ground (GND)
8	UD0	H/L	Display Upper Data
9	UD1	H/L	
10	UD2	H/L	
11	UD3	H/L	
12	UD4	H/L	
13	UD5	H/L	
14	UD6	H/L	
15	UD7	H/L	
16	LD0	H/L	Display Lower Data
17	LD1	H/L	
18	LD2	H/L	
19	LD3	H/L	
20	LD4	H/L	
21	LD5	H/L	
22	LD6	H/L	
23	LD7	H/L	
24	VDD	–	Power Supply for Logic
25	VSS	–	Signal Ground (GND)
26	VSS	–	Signal Ground (GND)
27	VEE	–	Power Supply for LCD (+V)
28	VEE	–	Power Supply for LCD (+V)
29	VEE	–	Power Supply for LCD (+V)
30	NC	–	No Connection
31	NC	–	No Connection

CCFT ②

Pin No.	Symbol	Signal Level	Function
1	HV	–	High Voltage Line (Inverter)
2	NC	–	No Connection
3	NC	–	No Connection
4	GND	–	Ground Line (Inverter)

TOUCH SCREEN ③

Pin No.	Symbol	Signal Level	Function
1	Y+	–	Top Direction
2	Y–	–	Bottom Direction
3	X–	–	Left Direction
4	X+	–	Right Direction

Note :

① used LCD connector : DF9–31P–1V(HIROSE)
correspondable LCD connector : DF9–31S–1V(HIROSE)

② used CCFT connector : M63M83–04 (MITSUMI)
correspondable CCFT connector : M60–04–30–114P (MITSUMI)
M60–04–30–134P (MITSUMI)
M61M73–04 (MITSUMI)

③ used touch screen connector : 487378–3 (AMP) or Compatiable

* Tolerance no specified : ±0.5 mm

REV. NO.	DESCRIPTION	DATE	DESIGN	CHECK	APPROVE
5					
4					
3					
2					
1					

南亞塑膠工業股份有限公司
NAN YA PLASTICS CORPORATION

製品圖

LCBLDT163M2S

	NAME	DATE	THIRD ANGLE P.
APPROVE			
CHECK			
DESIGN	Campos Chen	95.04.03	SCALE / UNIT
DRAWN	Campos Chen	95.04.03	4/5 / mm

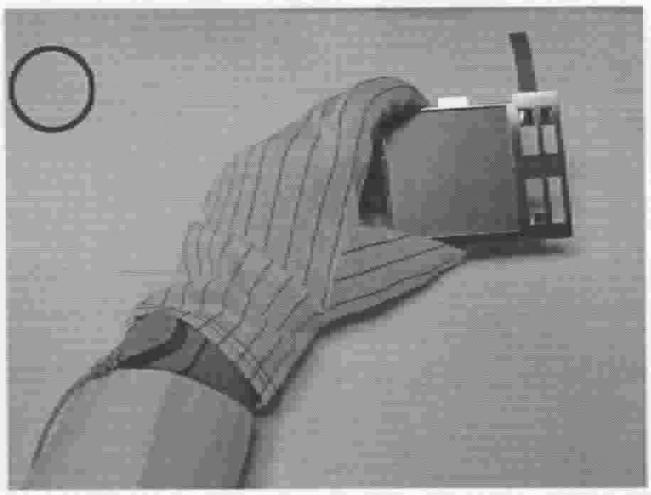
DWG NO. M163AD2A ①0

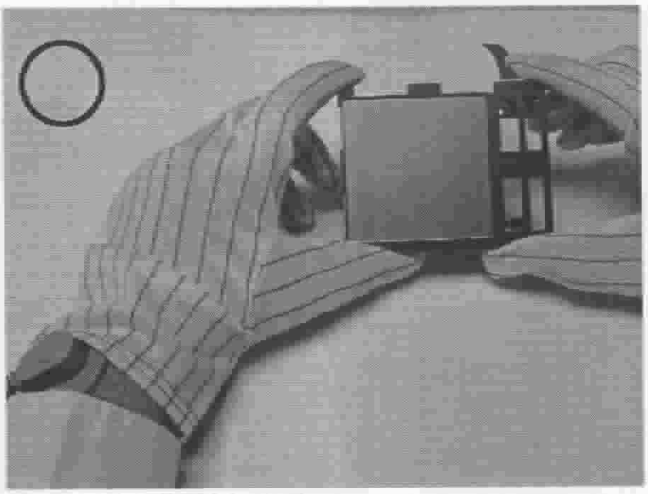
THE NOTES OF LCM USING

LCM is easy to damage.

Please follow the notes as bellows, and be careful of handling!

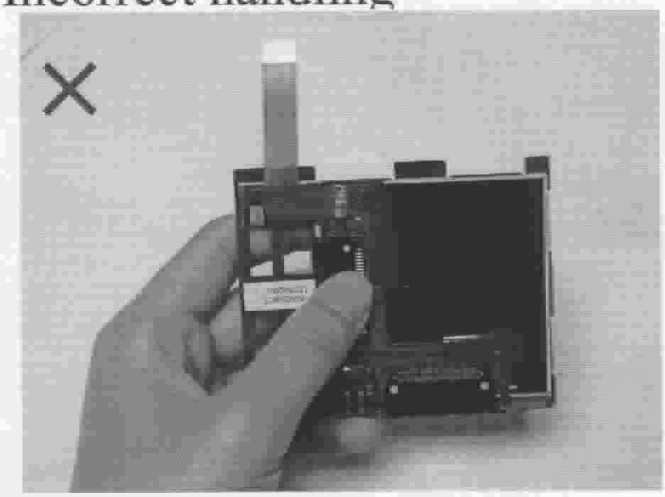
Correct handling



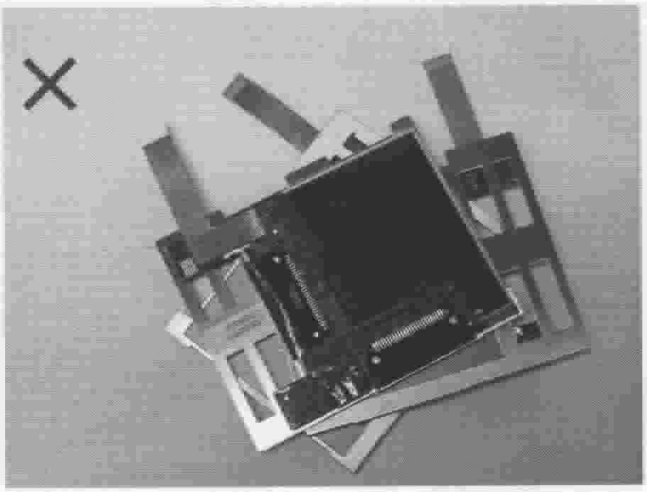


As above picture, please handle with glove by LCM edges and full EOS/ESD protection.

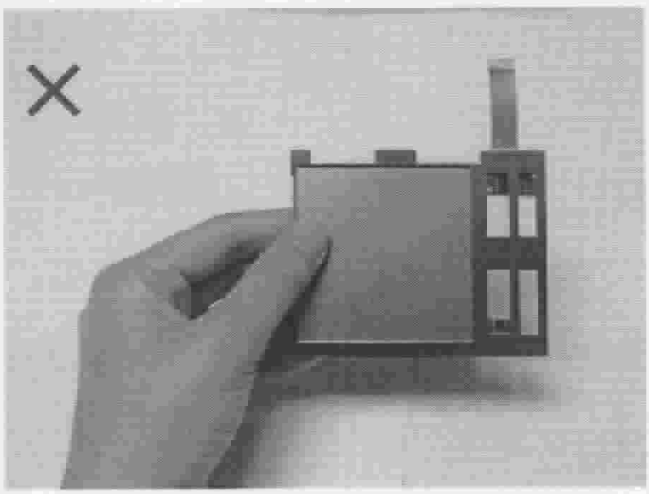
Incorrect handling



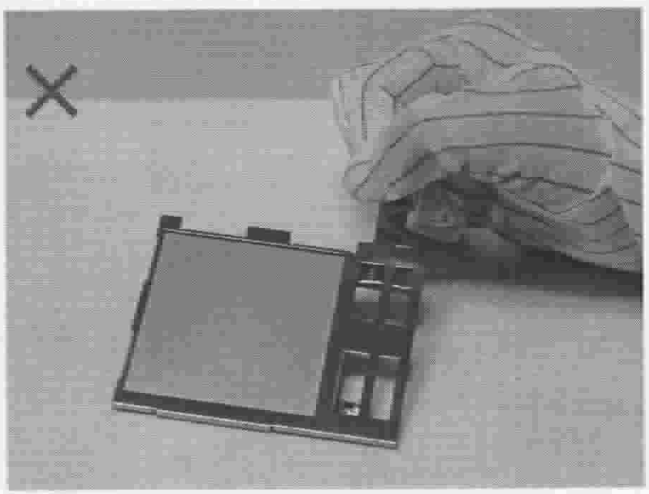
Please don't touch IC directly.



Please don't put one on another LCM.



Please don't hold the surface of LCM.

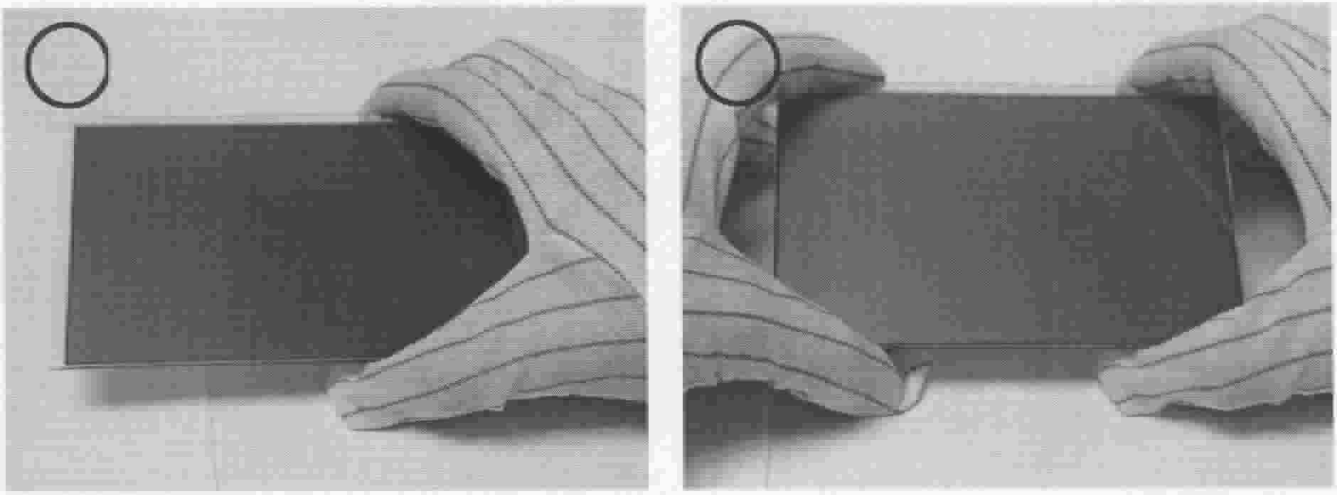


Please don't stretch interface of output.

THE NOTES OF LCD USING

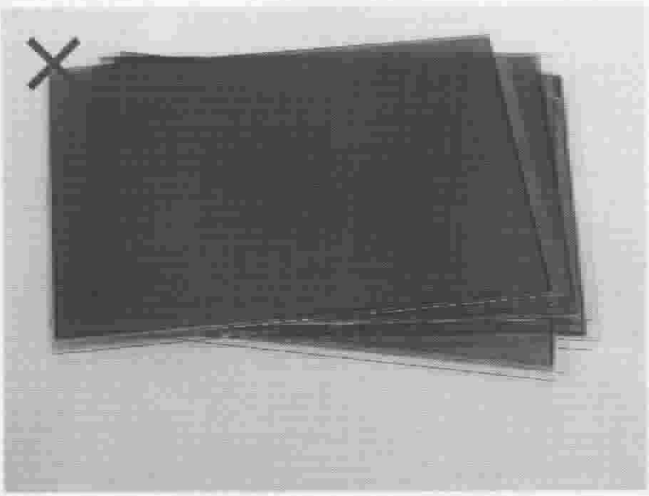
LCD is easy damage.
Please follow notes as bellows, and be careful of handling!

Correct handling

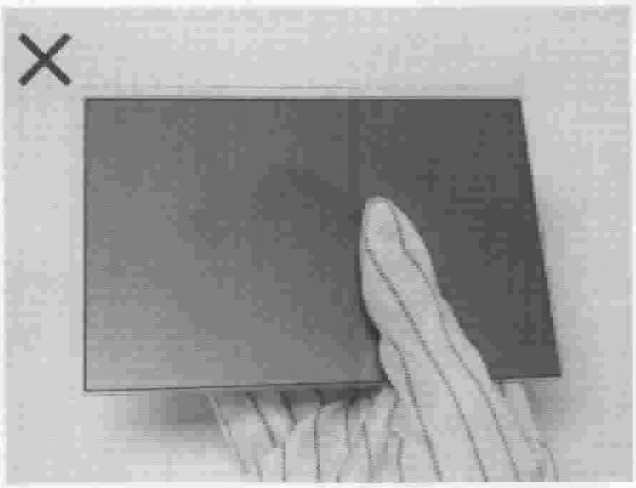


As above picture, please handle with glove by LCD edges and full EOS/ESD protection.

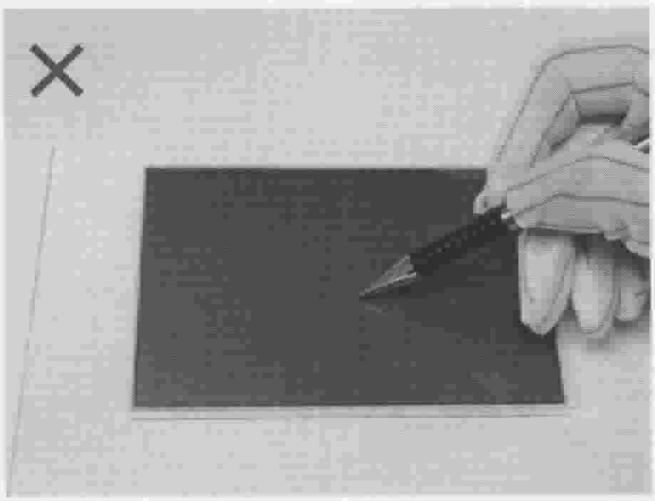
Incorrect handling



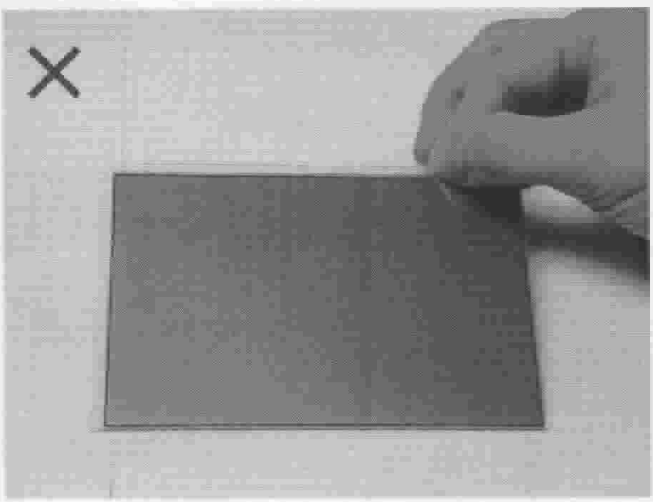
Please don't put one on another LCD.



Please don't hold the surface of LCD.



Please don't operate with sharp stick such as sharp pencil.



Please don't touch ITO glass without anti-static gloves.