

NAN YA PLASTICS CORPORATION

SPECIFICATION OF
LCD MODULE
PRODUCT NO.: LCBH7Z221M4CS_

SPEC. NO: LM221-4A-2

CUSTOMER
APPROVED BY
DATE:

LCD DEPARTMENT
ELECTRONIC MATERIALS DIVISION
NAN YA PLASTICS CORPORATION
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EDITED ON :JULY. 05, 2007

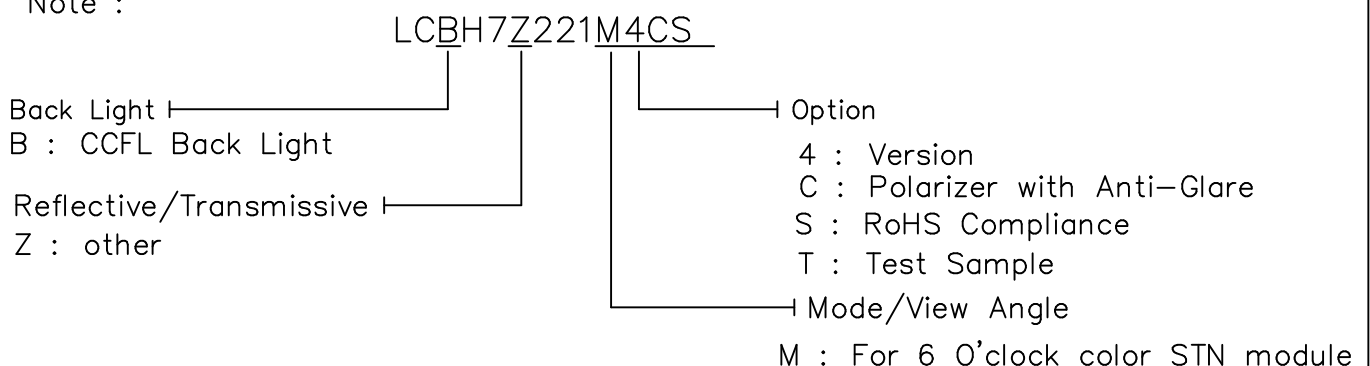
Q.C. DEPT.	DESIGN MANAGER	DESIGN CHECK	DESIGNER
			J.P Weng

[illegible]

1.MECHANICAL DATA

NO	ITEM	CONTENTS	UNIT
1	Product No.	LCBH7Z221M4CS_	—
2	Module Size	173 (W) x 73 (H) x 7.0 (D)	mm
3	Dot Size	0.065 (W) x 0.225 (H)	mm
4	Dot Pitch	0.08 (W) x 0.24 (H)	mm
5	Number of Dots	640xRGB (W) x 240 (H)	Dot
6	Duty	1/244	—
7	LCD Display Mode	Color STN / Normally Black	—
8	Rear Polarizer	Transmissive Type	—
9	Viewing Direction	6	O'clock
10	Backlight	CCFL	—
11	Controller IC	Excluded	—
12	DC/DC Converter	Included	
13	Weight	120 (Approx.)	g
14	CCFL Inverter	Recommended TAD-250(TDK)	—
15	Sodering	Lead Freee	—

Note :



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.

NAN YA PLASTICS CORP. ELEC. MATERIALS DIV. LCD DEPARTMENT	SPECIFICATION	SPEC. NO. : LM221-4A DATE : JUNE.15, 2006 SHEET NO. : 3/24
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3.ELECTRICAL CHARACTERISTICS

3-1.ELECTRICAL CHARACTERISTICS OF LCM

ITEM		SYMBOL		CONDITION		MIN.	TYP.	MAX.	UNIT
Logic Circuit Power Supply		VDD－VSS		Ta=25℃		3.0	3.3	3.6	V
Input Voltage		VIH		H level		0.8VDD	－	VDD	V
		VIL		L level		0	－	0.2VDD	V
Contrast Adjust Voltage		Vcon－VSS		Duty=1/244 VDD=3.3V	Ta=0℃	0.4	－	－	V
					Ta=25℃	0.7	1.1	1.5	
					Ta=50℃	－	－	2.8	
Supply Current for Logic		IDD		VDD－VSS=3.3V Ta=25℃ PATTERN : ■ □ ■ □ ■ □ ■ □ □ ■ □ ■ □ ■ □ ■		－	80	120	mA
LCM	Surface Luminance	L	Z221M4C	Ta=25℃ Inverter : TAD-250 Vin=12V Vcrt=4.5V	PATTERN: (Dots All On of White Color)	70	85	－	cd/m²
			Z221M4C	I _L =1.0mA _{rms}	PATTERN: (Dots All Off)	－	3.5	－	

REV/DATE	R0/ 06.15.06'	R1/ 11.24.06'				BY J.P. Weng
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4.OPTICAL CHARACTERISTICS

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

AT Vop

ITEM MODE		Cr(Contrast Ratio)						θ (Viewing Angle)		ϕ (Viewing Angle)	
		0℃		25℃		50℃		25℃		25℃	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
Z	M	30	35	35	40	10	13	—	F: >60 R: 38	—	±50
note		NOTE 6						NOTE 5			

note:

Z: SPECIAL POLARIZER

M: FOR 6 O'CLOCK COLOR STN MODULE

AT $\phi=0^\circ$ $\theta=0^\circ$

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	0℃	350	650	950	ms	NOTE 2
		25℃	130	250	370		
		50℃	55	80	120		
Response Time (fall)	Tf	0℃	130	250	370	ms	NOTE 2
		25℃	55	80	120		
		50℃	30	60	90		

4-2.Color of CIE Coordinate

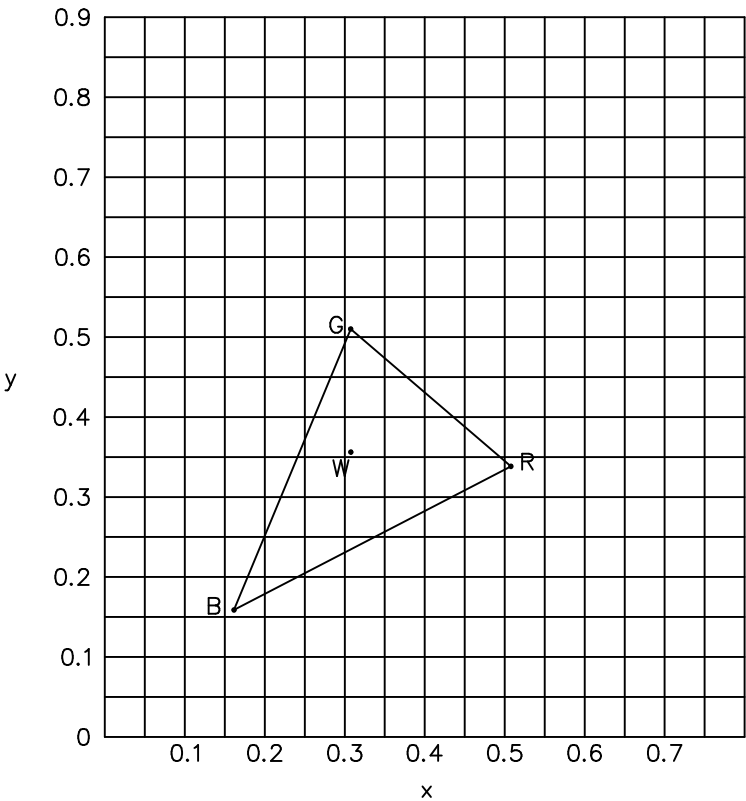
Ta = 25℃

ITEM		SYMBOL	CONDITION	VALUE	NOTE
Color of CIE Coordinate	Red	X	$\phi=0^{\circ}$, $\theta=0^{\circ}$	0.51	Note※
		y		0.33	
	Green	X	$\phi=0^{\circ}$, $\theta=0^{\circ}$	0.31	
		y		0.52	
	Blue	X	$\phi=0^{\circ}$, $\theta=0^{\circ}$	0.17	
		y		0.17	
	White	X	$\phi=0^{\circ}$, $\theta=0^{\circ}$	0.28	
		y		0.35	

Note※ CIE chromaticity diagram shown on Fig.1

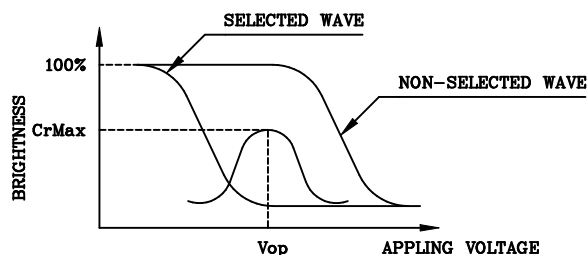
Tolerance : ±0.05

Fig.1

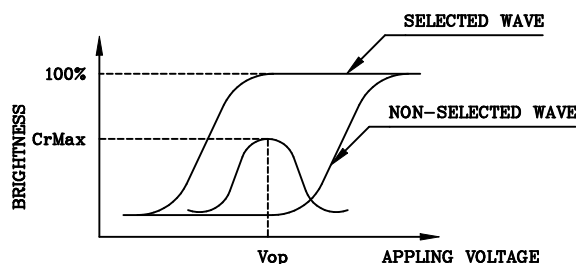


(NOTE 1)

Definition of Operation Voltage(Vop)



(positive type)



(negative type)

*Conditions

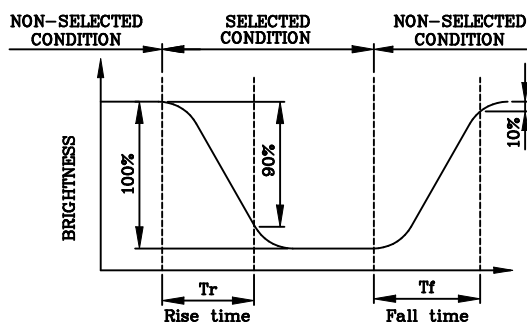
Viewing Angle : 0

Frame Frequency : 120Hz

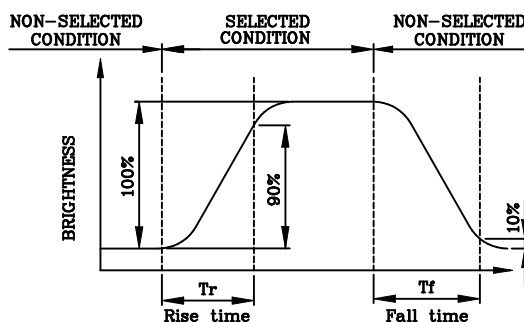
Applying Waveform : 1/N duty 1/a bias

(NOTE 2)

Definition of Response Time(Tr,Tf)



(positive type)



(negative type)

*Conditions

Operating Voltage : V_{op}

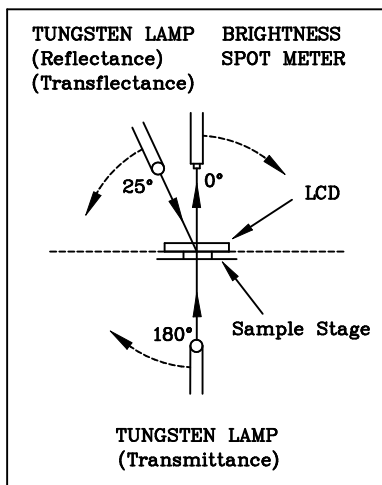
Viewing Angle (θ, ϕ) : (0,0)

Frame Frequency : 120Hz

Applying Waveform : 1/N duty 1/a bias

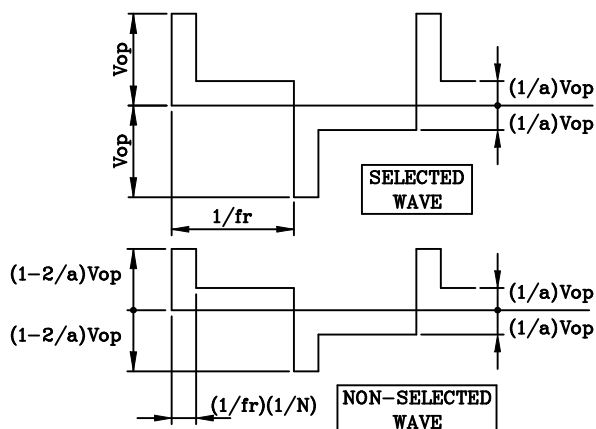
(NOTE 3)

Description of Measuring Equipment and Driving Waveforms



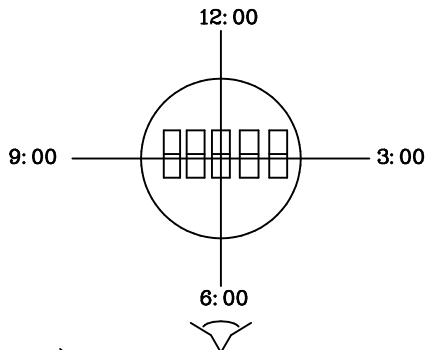
CONST.
TEMP.
CHAMBER

Multiplex Driving (1/N duty 1/a bias)



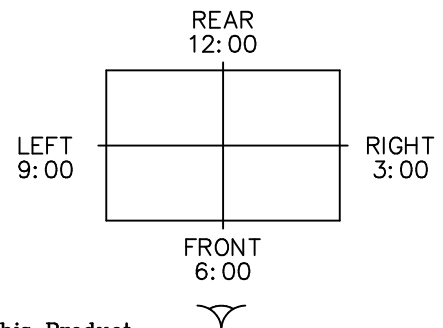
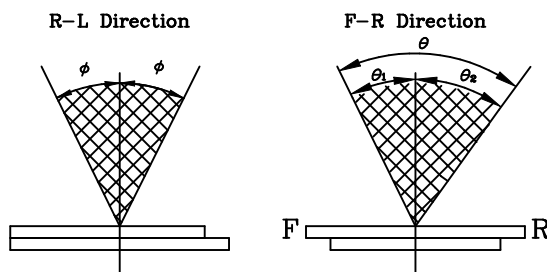
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle



*For This Product
The Viewing Direction Is 6 O'clock
So $\theta_1 > \theta_2$

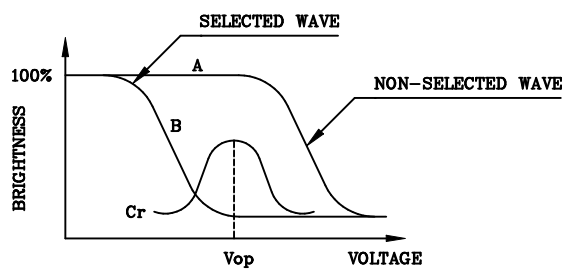
$$\theta = \theta_1 + \theta_2$$

*Conditions

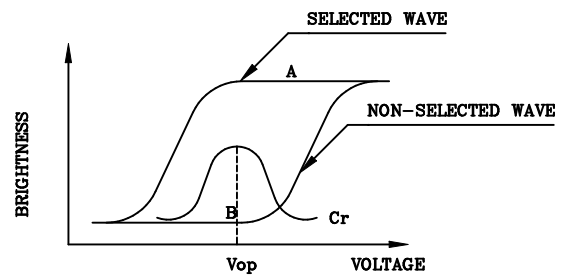
Operating Voltage : V_{op}
Frame Frequency : 120Hz
Applying Waveform : 1/N duty 1/a bias
Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)



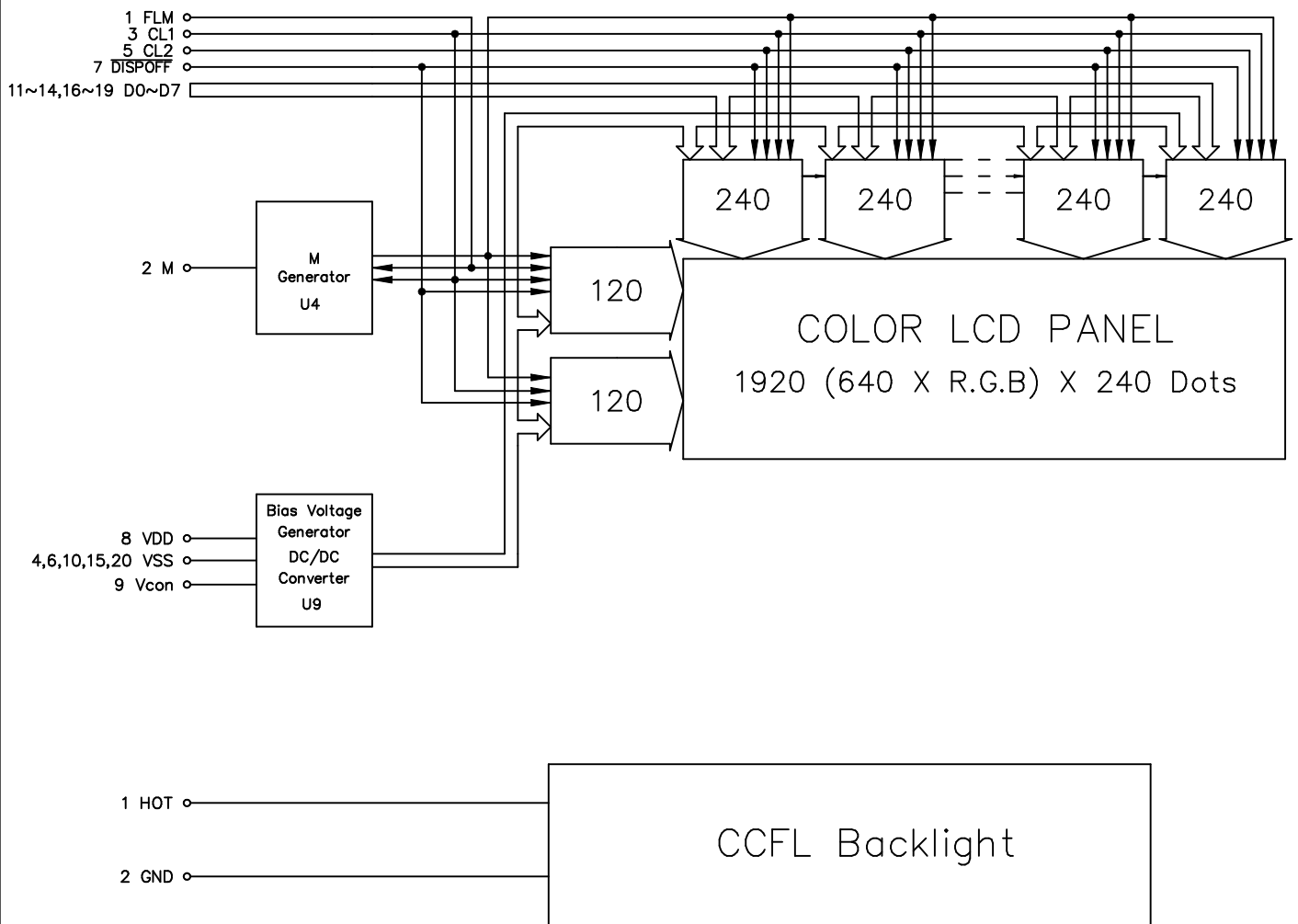
(negative type)

$$\text{Contrast Ratio : } Cr = A/B$$

*Conditions

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

5. BLOCK DIAGRAM



6.INTERFACE PIN CONNECTION

LCD

Pin No.	Symbol	Level	Function
1	FLM	"H"	Scan start-up signal
2	M	—	Control signal for AC driving
3	CL1	"H" → "L"	Input data latch signal
4	VSS	—	GND
5	CL2	"H" → "L"	Shift clock for input data
6	VSS	—	GND
7	DISP	H(ON),L(OFF)	Display control signal
8	VDD	—	Power Supply for logic (+3.3V)
9	Vcon	—	Contrast adjustment voltage
10	VSS	—	GND
11	D0	H(ON),L(OFF)	Display Data signal
12	D1	H(ON),L(OFF)	Display Data signal
13	D2	H(ON),L(OFF)	Display Data signal
14	D3	H(ON),L(OFF)	Display Data signal
15	VSS	—	GND
16	D4	H(ON),L(OFF)	Display Data signal
17	D5	H(ON),L(OFF)	Display Data signal
18	D6	H(ON),L(OFF)	Display Data signal
19	D7	H(ON),L(OFF)	Display Data signal
20	VSS	—	GND

CN1 : FH12-20S-0.5SH(55)(HIROSE)

MATING CABLE : FFC or FPC,N20,PITCH 0.5mm, WIDTH 10.5mm,THICKNESS 0.3mm

CCFL

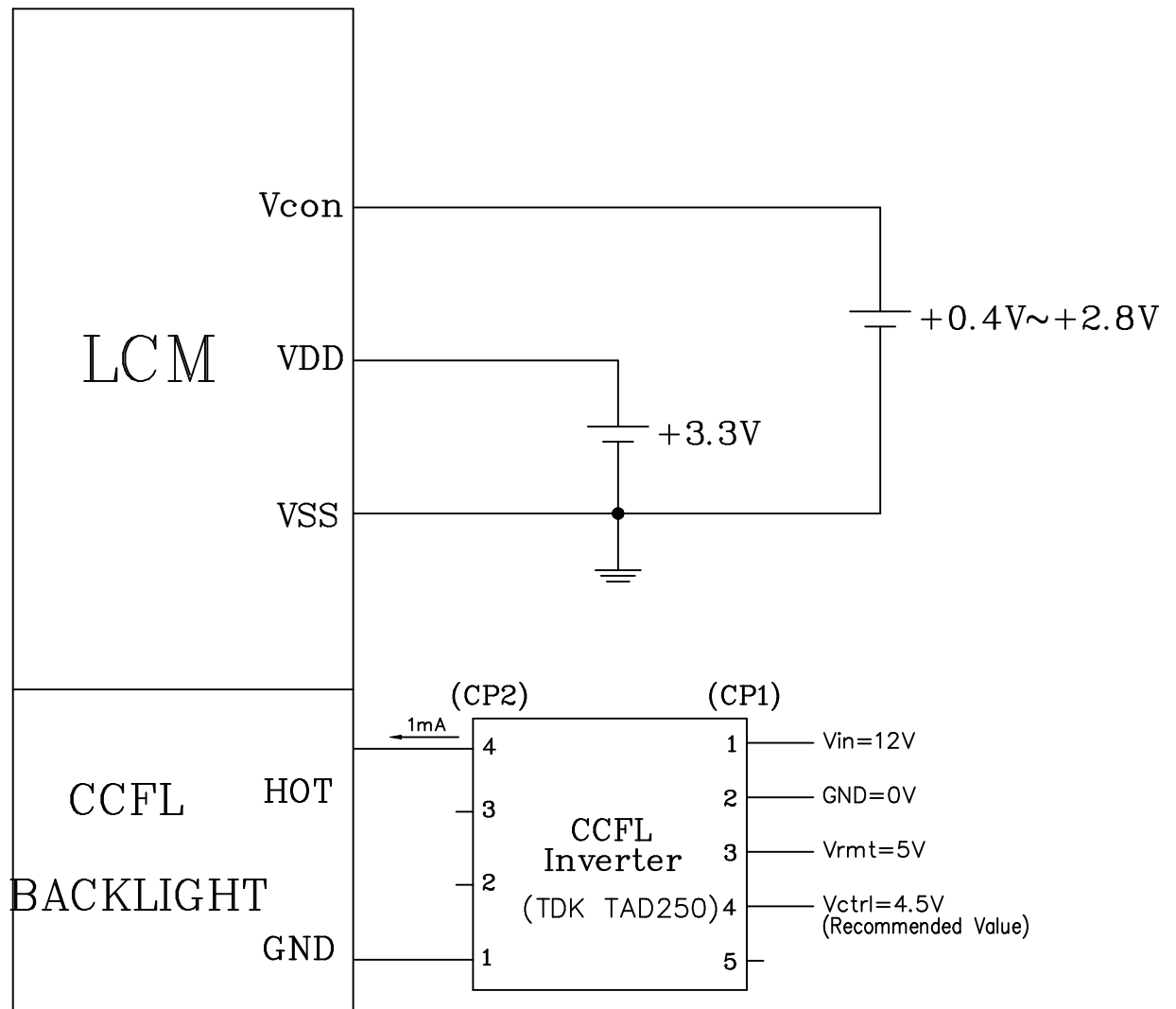
PIN NO.	SYMBOL	LEVEL	FUNCTION
1	HV	—	High Voltage Line
2	GND	—	Ground Line

FLCN : BHSR-02VS-1 (JST)

MATING CONNECTOR :

SM02B-BHSS-1-TB(JST) or COMPATIBLE

7. POWER SUPPLY



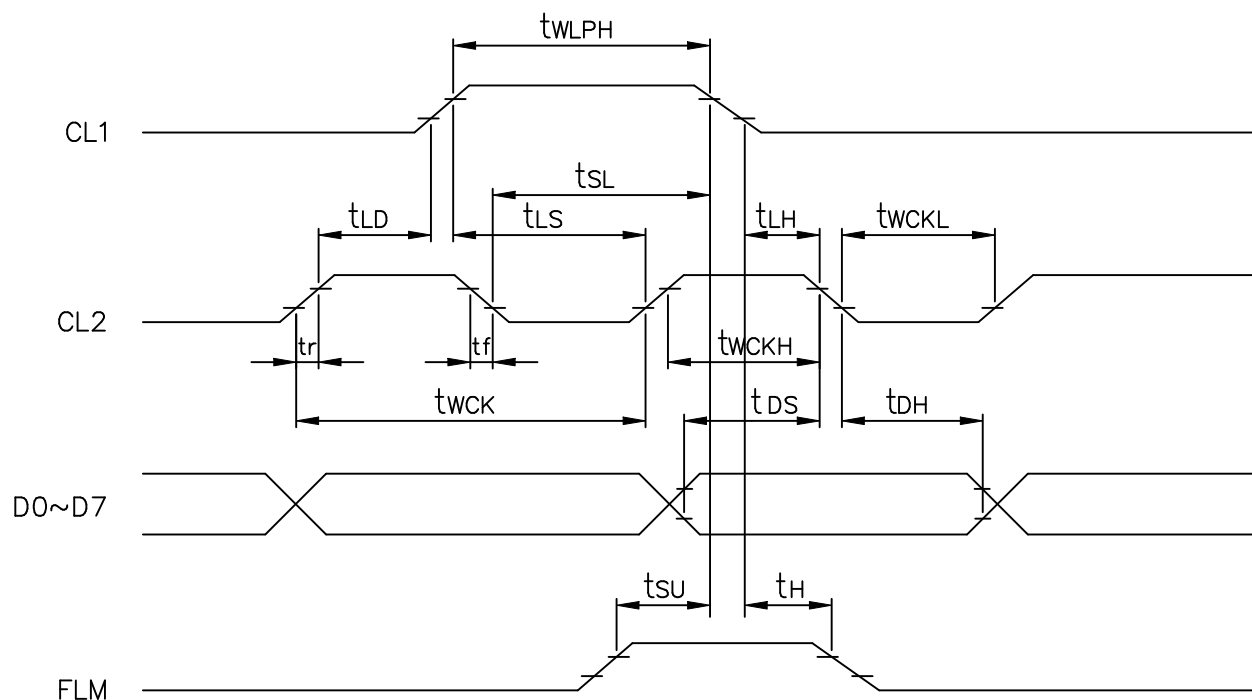
RECOMMEND CCFL INVERTER : TAD-250 (TDK)

8. TIMING CHARACTERISTICS

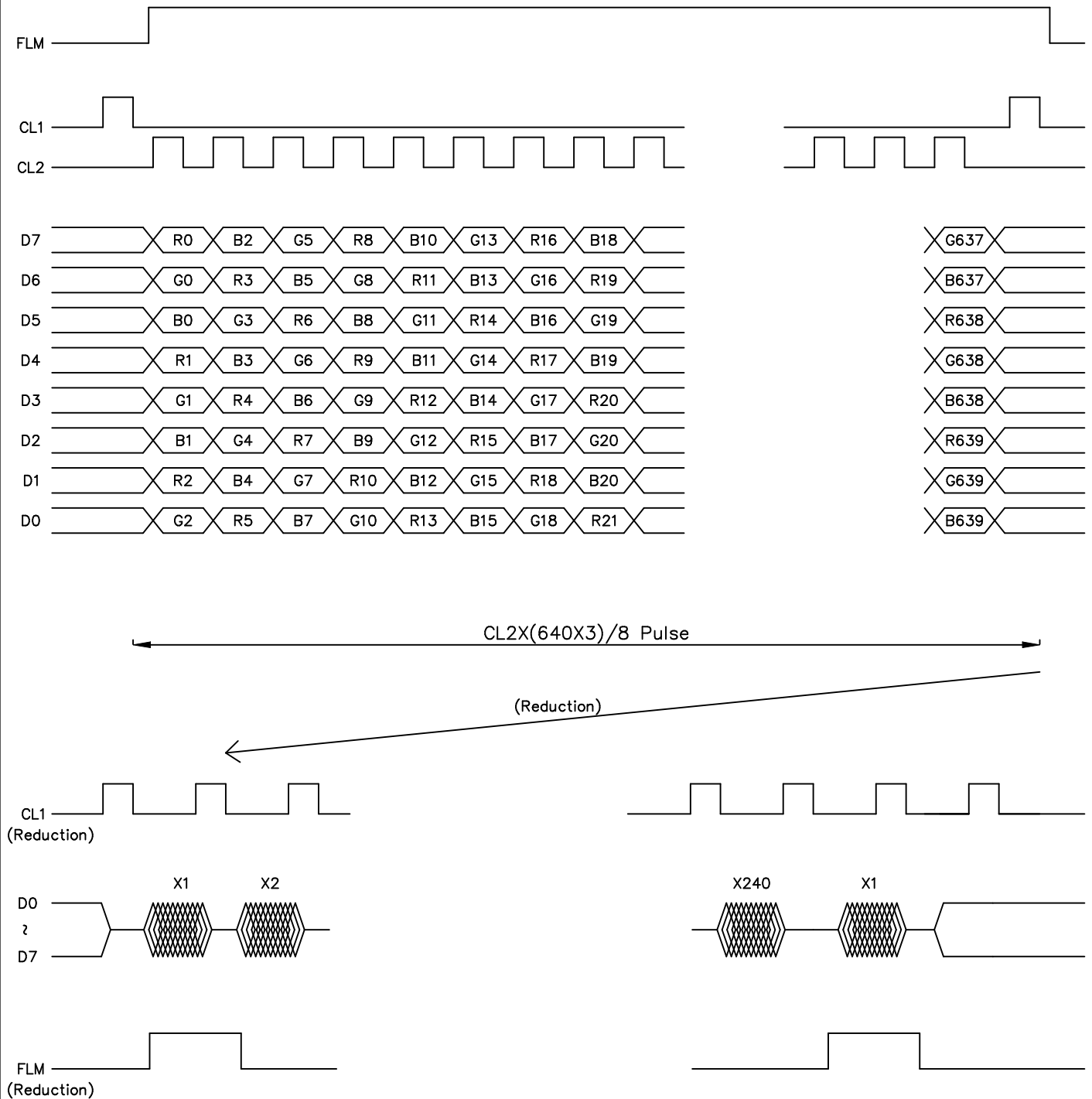
8-1. INTERFACE TIMING

VDD=5.0V $\pm$ 10%

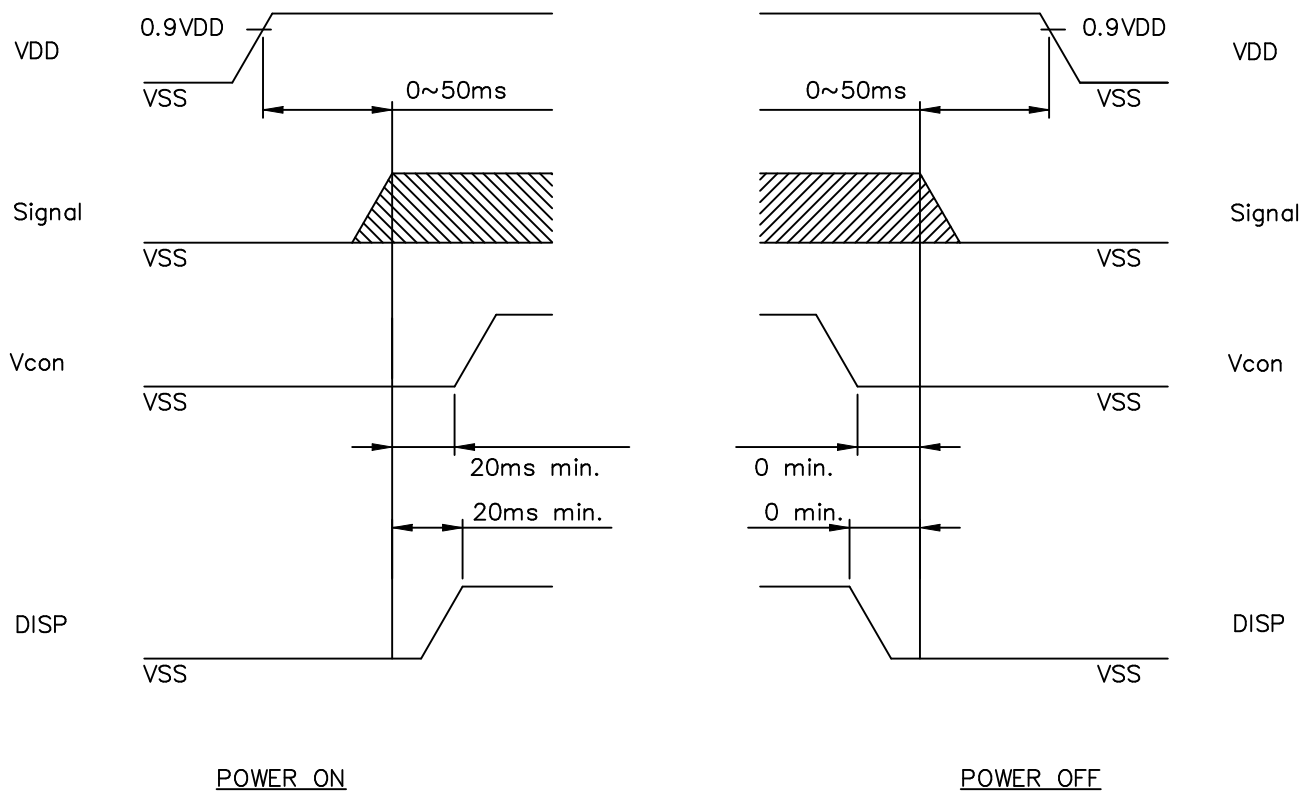
Parameter	SYMBOL	MIN.	MAX.	UNIT
CLOCK PULSE CYCLE TIME	t_{wck}	50	—	ns
CLOCK PULSE HIGH LEVEL WIDTH	t_{wckH}	15	—	ns
CLOCK PULSE LOW LEVEL WIDTH	t_{wckL}	15	—	ns
LATCH PULSE HIGH LEVEL WIDTH	t_{wLPH}	20	—	ns
CL2→CL1 RISE TIME	t_{LD}	0	—	ns
CL2→CL1 FALL TIME	t_{SL}	25	—	ns
CL1→CL2 RISE TIME	t_{LS}	25	—	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



The missing pixels may occur when the LCM is driven beyond above power interface sequence.

8-4. DISPLAY PATTERN

COLUMN

	1	2	3	4	5	6	7	8
1	R0 D7	G0 D6	B0 D5	R1 D4	G1 D3	B1 D2	R2 D1	G2 D0
2	R0 D7	G0 D6	B0 D5	R1 D4	G1 D3	B1 D2	R2 D1	G2 D0

	1913	1914	1915	1916	1917	1918	1919	1920
	G637 D7	B637 D6	R638 D5	G638 D4	B638 D3	R639 D2	G639 D1	B639 D0
	G637 D7	B637 D6	R638 D5	G638 D4	B638 D3	R639 D2	G639 D1	B639 D0

ROW

239	R0 D7	G0 D6	B0 D5	R1 D4	G1 D3	B1 D2	R2 D1	G2 D0
240	R0 D7	G0 D6	B0 D5	R1 D4	G1 D3	B1 D2	R2 D1	G2 D0

	G637 D7	B637 D6	R638 D5	G638 D4	B638 D3	R639 D2	G639 D1	B639 D0
	G637 D7	B637 D6	R638 D5	G638 D4	B638 D3	R639 D2	G639 D1	B639 D0

9.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

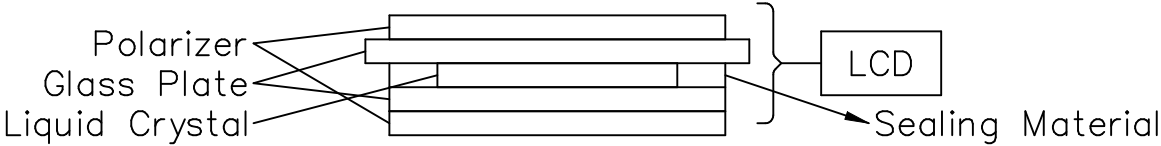
The NAN YA inspection provision provides outgoing inspection provision and its expected quality level based on our outgoing inspection of NAN YA LCD produces.

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		

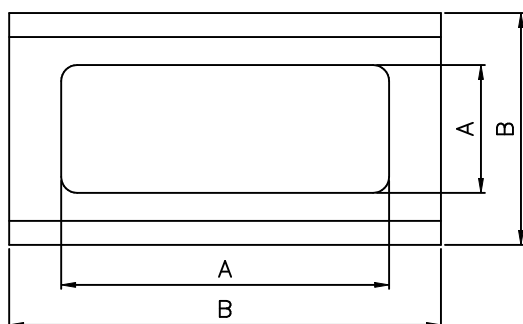
NAN YA PLASTICS CORP. ELEC. MATERIALS DIV. LCD DEPARTMENT	SPECIFICATION	SPEC. NO. : LM221-4A DATE : JUNE.15, 2006 SHEET NO. : 17/24
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	Dimensions	External from Dimensions	0.4	
Minor Defect	Inside the glass	Black spots	0.65	faults which appear to pose 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 Out Line

*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 a sample to be 30cm to 50cm.

REV/DATE	R0/ 06.15.06'					BY J.P. Weng
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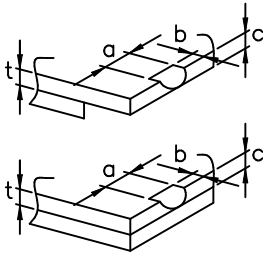
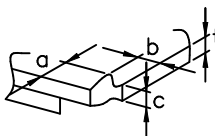
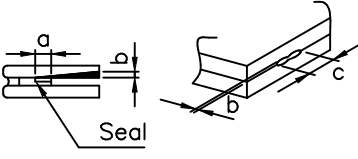
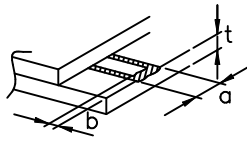
NAN YA PLASTICS CORP. ELEC. MATERIALS DIV. LCD DEPARTMENT		SPECIFICATION			SPEC. NO. : LM221-4A DATE : JUNE.15, 2006 SHEET NO. : 18/24																															
*Test and measurement are performed under the following conditions, unless otherwise specified. Otherwise specified. <table> <tr> <td>Temperature</td> <td>20± 15℃</td> </tr> <tr> <td>Humidity</td> <td>65± 20%R.H..</td> </tr> <tr> <td>Pressure</td> <td>860~1060hPa(mmbar)</td> </tr> </table> In case of doubtful judgment, it is performed under the following conditions. <table> <tr> <td>Temperature</td> <td>20± 15℃</td> </tr> <tr> <td>Humidity</td> <td>65± 20%R.H..</td> </tr> <tr> <td>Pressure</td> <td>860~1060hPa(mmbar)</td> </tr> </table> 5.Specification for quality check 5-1 Electrical characteristics <table border="1"> <thead> <tr> <th>NO.</th> <th>Item</th> <th>Criterion</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Non operational</td> <td>Fail</td> </tr> <tr> <td>2.</td> <td>Miss operating</td> <td>Fail</td> </tr> <tr> <td>3.</td> <td>Missing dot</td> <td>Fail</td> </tr> <tr> <td>4.</td> <td>Contrast irregular</td> <td>Fail</td> </tr> <tr> <td>5.</td> <td>Response time</td> <td>Within Specified value</td> </tr> </tbody> </table>							Temperature	20± 15℃	Humidity	65± 20%R.H..	Pressure	860~1060hPa(mmbar)	Temperature	20± 15℃	Humidity	65± 20%R.H..	Pressure	860~1060hPa(mmbar)	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
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REV/DATE	R0/ 06.15.06'					BY J.P. Weng																														

5-2 External Appearance Defect

NO.	Item	Criterion															
1.	Black spots, foreign matter, and white spots (Including light leakage due to pinholes of polarizing plates, etc.)	(1)–1–Spots															
		<table><tr><th>Average Diameter(mm):D</th><th>Number of pieces permitted</th><th>Minimum Space</th></tr><tr><td>$D \leq 0.2$</td><td>Ignore</td><td>—</td></tr><tr><td>$0.2 < D \leq 0.3$</td><td>7</td><td>10mm</td></tr><tr><td>$0.3 < D \leq 0.4$</td><td>3</td><td>30mm</td></tr><tr><td>$0.4 < D$</td><td>0</td><td></td></tr></table>	Average Diameter(mm):D	Number of pieces permitted	Minimum Space	$D \leq 0.2$	Ignore	—	$0.2 < D \leq 0.3$	7	10mm	$0.3 < D \leq 0.4$	3	30mm	$0.4 < D$	0	
		Average Diameter(mm):D	Number of pieces permitted	Minimum Space													
		$D \leq 0.2$	Ignore	—													
		$0.2 < D \leq 0.3$	7	10mm													
		$0.3 < D \leq 0.4$	3	30mm													
		$0.4 < D$	0														
		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															
		(1)–2–Blurred Spots(At lighting condition)															
<table><tr><th>Average Diameter(mm):D</th><th>Number of pieces permitted</th></tr><tr><td>$D \leq 0.3$</td><td>Ignore</td></tr><tr><td>$0.3 < D \leq 0.75$</td><td>5</td></tr><tr><td>$0.75 < D$</td><td>0</td></tr></table>	Average Diameter(mm):D	Number of pieces permitted	$D \leq 0.3$	Ignore	$0.3 < D \leq 0.75$	5	$0.75 < D$	0									
Average Diameter(mm):D	Number of pieces permitted																
$D \leq 0.3$	Ignore																
$0.3 < D \leq 0.75$	5																
$0.75 < D$	0																
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SPECIFICATION

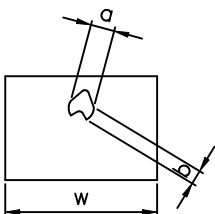
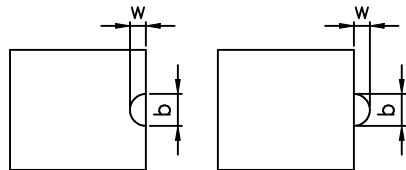
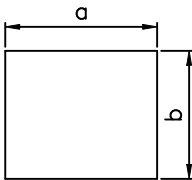
1.	Line	(1)-1-Lines <table> <tr> <th>Width(mm): W</th><th>Length(mm): L</th><th>Number of pieces permitted</th></tr> <tr> <td>$W \leq 0.03$</td><td>Ignore</td><td>Ignore</td></tr> <tr> <td>$0.03 < W \leq 0.08$</td><td>$L \leq 4$</td><td>2</td></tr> <tr> <td>$0.08 < W \leq 0.1$</td><td>$L \leq 1$</td><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>$W \leq 0.03$</td><td>Ignore</td><td>Ignore</td></tr> <tr> <td>$0.03 < W \leq 0.08$</td><td>$L \leq 3$</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.	Width(mm): W	Length(mm): L	Number of pieces permitted	$W \leq 0.03$	Ignore	Ignore	$0.03 < W \leq 0.08$	$L \leq 4$	2	$0.08 < W \leq 0.1$	$L \leq 1$	1	Width(mm): W	Length(mm): L	Number of pieces permitted	$W \leq 0.03$	Ignore	Ignore	$0.03 < W \leq 0.08$	$L \leq 3$	6	$0.08 < W$	$3 < L$	None
Width(mm): W	Length(mm): L	Number of pieces permitted																								
$W \leq 0.03$	Ignore	Ignore																								
$0.03 < W \leq 0.08$	$L \leq 4$	2																								
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Width(mm): W	Length(mm): L	Number of pieces permitted																								
$W \leq 0.03$	Ignore	Ignore																								
$0.03 < W \leq 0.08$	$L \leq 3$	6																								
$0.08 < W$	$3 < L$	None																								
2.	Scratches(Glass, reflection plates, and polarizing plates)	In accordance with black spots. (At non lighting condition)																								
3.	Color irregular	Not remarkable color irregular.																								

4.	Air bubbles polarizing plates, and reflection plates <table border="1" data-bbox="710 376 1228 667"> <tr> <th data-bbox="710 376 970 521">Average Diameter (mm): D</th><th data-bbox="970 376 1228 521">Number of pieces permitted</th></tr> <tr> <td data-bbox="710 521 970 667"> $D \leq 0.3$ $0.3 < D$ </td><td data-bbox="970 521 1228 667"> Ignore 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.	Average Diameter (mm): D	Number of pieces permitted	$D \leq 0.3$ $0.3 < D$	Ignore 0
Average Diameter (mm): D	Number of pieces permitted				
$D \leq 0.3$ $0.3 < D$	Ignore 0				
5.	(1) General crack  $a \leq 5$ $b \leq 2$ $c \leq t$ Where, a and b are ignored when less than or equal 0.5. The numbers of pieces are set at up to 5 pieces.				
	(2) Corner crack  $a \leq 2.5$ $b \leq 2.5$ $c \leq t$ $a + b \leq 4$				
	(3) Seal portion crack  $a \leq \text{The seal width} \times 1/3$ $b \leq t \times 2/3$ $c \leq 5$ The numbers of pieces are set at up to 5 pieces.				
	(4) ITO Pin crack  $a \leq 5$ $b \leq 1/3 \text{ pin length}$ $c \leq t$				
	(5) Progressive cracks All taken to be unacceptable.				

NAN YA PLASTICS CORP. ELEC. MATERIALS DIV. LCD DEPARTMENT	SPECIFICATION	SPEC. NO. : LM221-4A DATE : JUNE.15, 2006 SHEET NO. : 22/24
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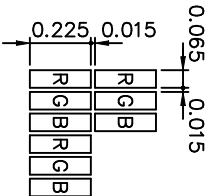
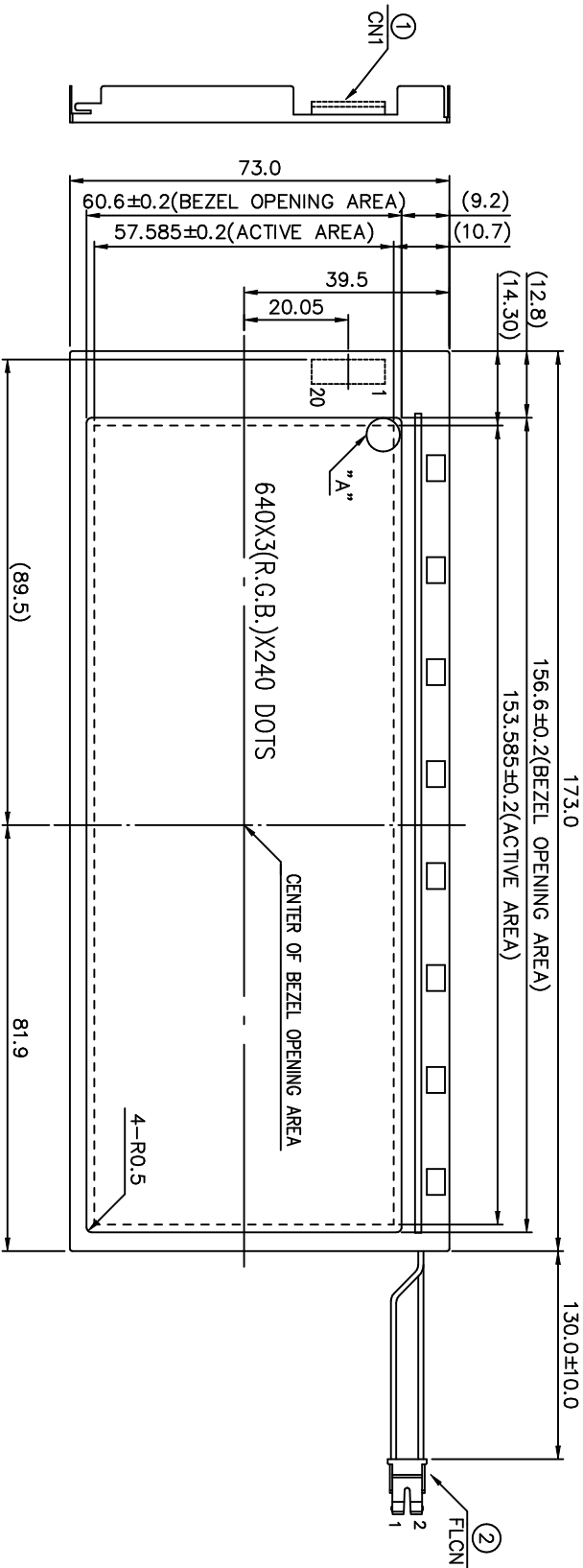
6.	Outer dimensions	Should be with in the tolerance.
7.	Newton ring(touch panel)	Orbicular of interference fringes is not allowed in the optimum contrast within the active area under viewing angle.
8.	Soldering	Should be no defective soldering such as shorting, loose terminal cold solder, peeling of printed circuit board pattern, improper mouting position, etc.

5-3 Dot Appearance Defect

NO.	Item	Criteria
1.	Pinhole	 Dot display a and b are each $\leq 0.2\text{mm}$ 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 $\leq 0.2\text{mm}$ The overall total is taken to be with in 10 units.
3.	Thick and thin display	 Taken to be within $\pm 1.5\%$ of display character width(a) and height(b).

REV/DATE	R0/ 06.15.06'					BY J.P. Weng
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NAN YA PLASTICS CORP. ELEC. MATERIALS DIV. LCD DEPARTMENT	SPECIFICATION	SPEC. NO. : LM221-4A DATE : JUNE.15, 2006 SHEET NO. : 23/24
NOTE: - SAFETY - If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin. - If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water. - HANDLING - Avoid static electricity which can damage the CMOS LSI. - Do not remove the panel or frame from the module. - The polarizing plate of the display is very fragile. So, please handle it very carefully. - Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate. - Do not use ketonics solvent & Aromatic solvent, use a soft cloth soaked with a cleaning naphtha solvent. - STORAGE - Store the panel or module in a dark place where the temperature is 25°C±5°C and the humidity is below 65% RH. - Do not place the module near organics solvents or corrosive gases. - Do not crush, shake, or jolt the module. - TERMS OF WARRANT - Acceptance inspection period The period is within one month after the arrival of contracted commodity at the buyer's factory site. - Applicable warrant period The period is within twelve months since the date of shipping out under normal using and storage conditions.		
REV/DATE	R0/ 06.15.06'	BY J.P. Weng



VIEWING DIRECTION

A DETAIL

- ② CCFT CONNECTOR
FLCN : BHSR-02YS-1 (JST)

MATING CONNECTOR :

△ SM02B-BHSS-1-TB(JST) or COMPATIBLE

Pin No.	Symbol
1	HOT
2	GND

① INTERFACE CONNECTOR

CN1 : FH12-20S-0.5SH(55)(HIROSE) MATING CABLE : FFC or FPC,N20,PITCH 0.5mm,

WIDTH 10.5mm, THICKNESS 0.3mm

PIN NO	SYMBOL	LEVEL	FUNCTION	PIN NO	SYMBOL	LEVEL	FUNCTION
1	FLM	"H"	Scan start-up signal	11	DO	H(ON),L(OFF)	Display Data signal
2	M	-	Control signal for AC driving	12	D1	H(ON),L(OFF)	Display Data signal
3	CL1	"H" → "L"	Input data latch signal	13	D2	H(ON),L(OFF)	Display Data signal
4	VSS	-	GND	14	D3	H(ON),L(OFF)	Display Data signal
5	CL2	"H" → "L"	Shift clock for input data	15	VSS	-	GND
6	VSS	-	GND	16	D4	H(ON),L(OFF)	Display Data signal
7	DISP	H(ON),L(OFF)	Display control signal	17	D5	H(ON),L(OFF)	Display Data signal
8	VDD	-	Power Supply for logic (+3.3V)	18	D6	H(ON),L(OFF)	Display Data signal
9	Vcon	-	Contrast adjustment voltage	19	D7	H(ON),L(OFF)	Display Data signal
10	VSS	-	GND	20	VSS	-	GND

GENERAL TOLERANCE LIST

DIMENSION	TOLERANCE
L ≤ 6	±0.25 (mm)
6 < L ≤ 18	±0.3 (mm)
18 < L ≤ 50	±0.4 (mm)
50 < L ≤ 125	±0.5 (mm)
125 < L	±0.6 (mm)
ANGLE	±1° (DEG)

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

製品圖

△ LCBH7Z221M4CS

APPROVE TONY CHOU 95.03.21 THIRD ANGLE P.

CHECK Y. C. Liu 95.03.17

DESIGN Campos Chen 95.03.17 SCALE 1/1 UNIT mm

DRAWN Campos Chen 95.03.17

REV. NO.	DESCRIPTION	DATE	DESIGN	CHECK	APPROVE
△	Modified the B/L connector by customer	95.06.08	Campos Chen	Y. C. Liu	TONY CHOU
△	Modified the product no.	95.03.18	Campos Chen	Y. C. Liu	TONY CHOU

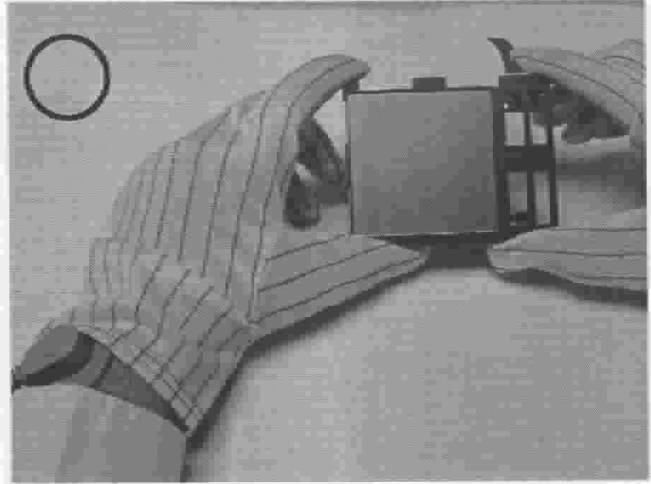
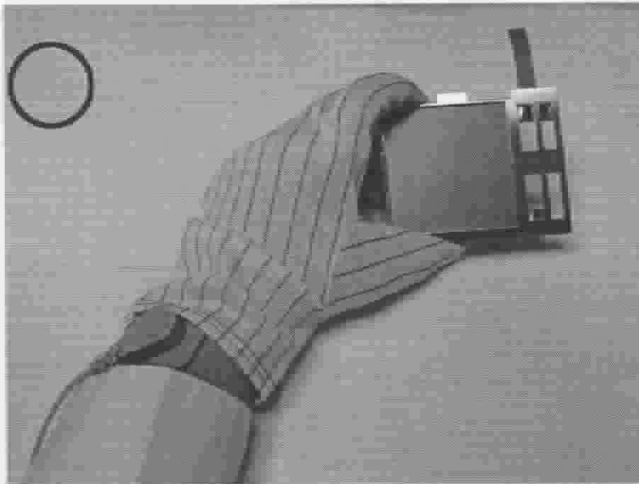
DWG NO.	M221AD4A
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THE NOTES OF LCM USING

LCM is easy to damage.

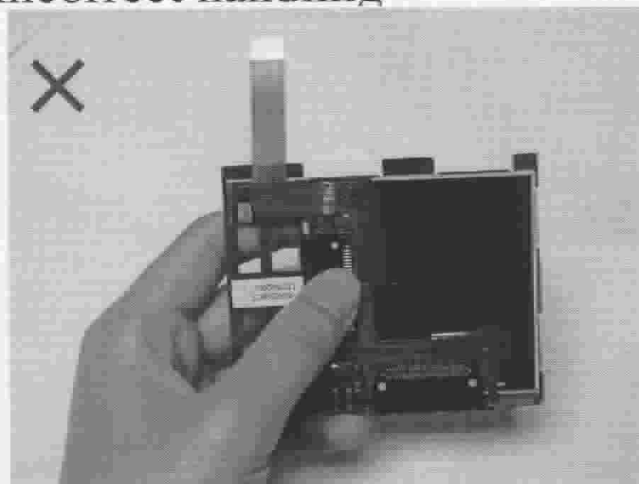
Please follow the notes as bellows, and be careful of handling!

Correct handling

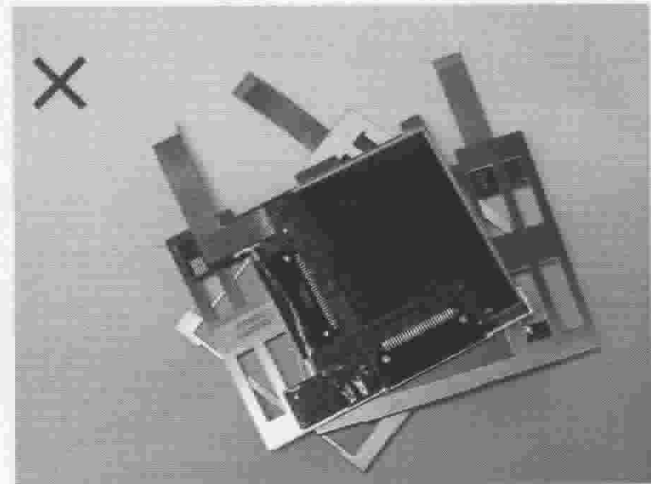


As above picture, please handle with glove by LCM edges and full EOS/ESD protection.

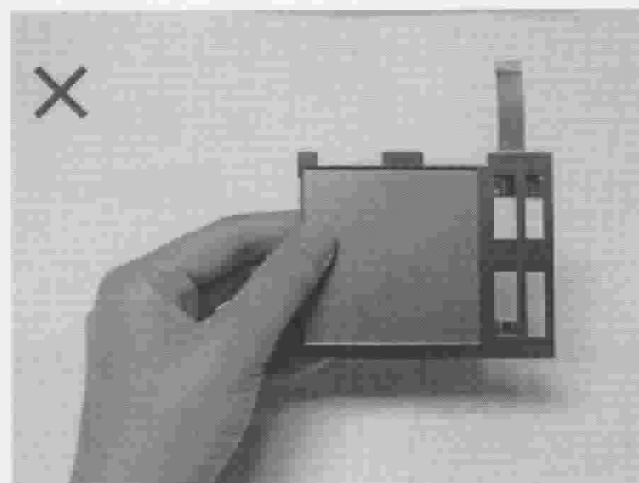
Incorrect handling



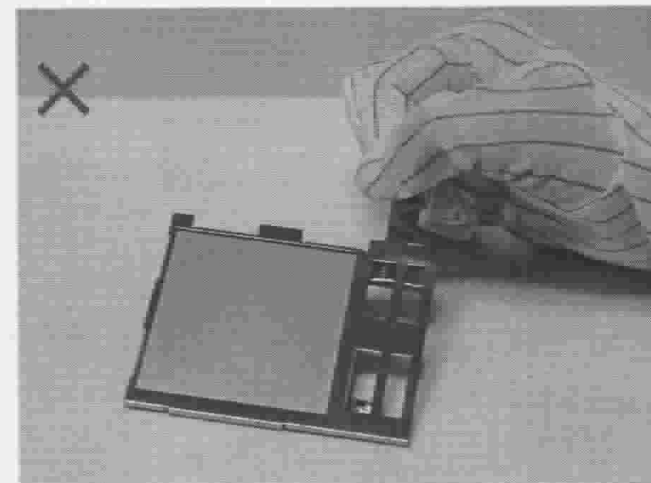
Please don't touch IC directly.



Please don't put one on another LCM.



Please don't hold the surface of LCM.



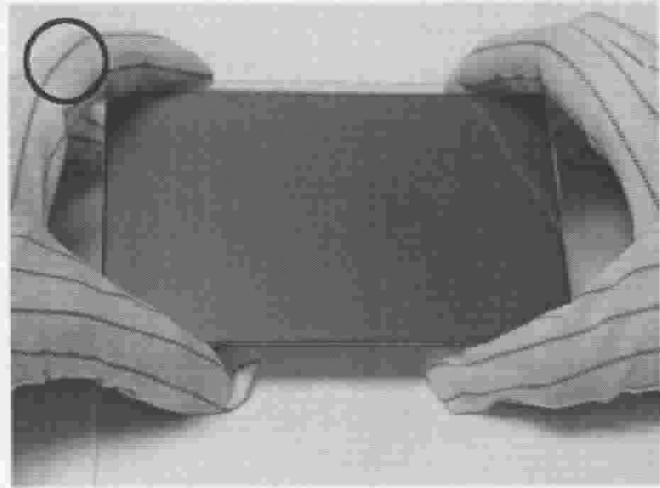
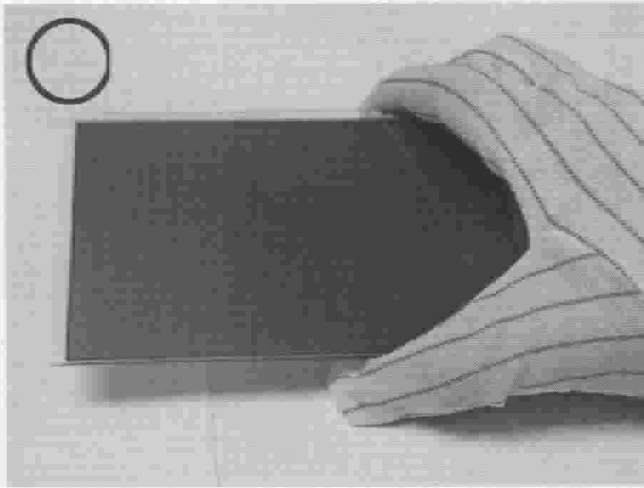
Please don't stretch interface of output.

THE NOTES OF LCD USING

LCD is easy damage.

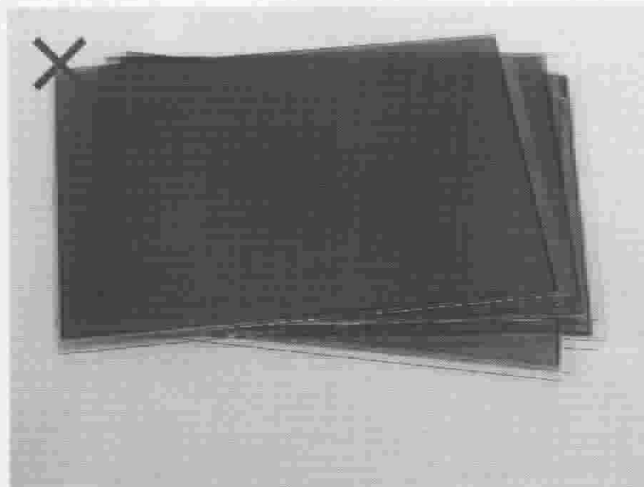
Please follow notes as bellows, and be careful of handling!

Correct handling

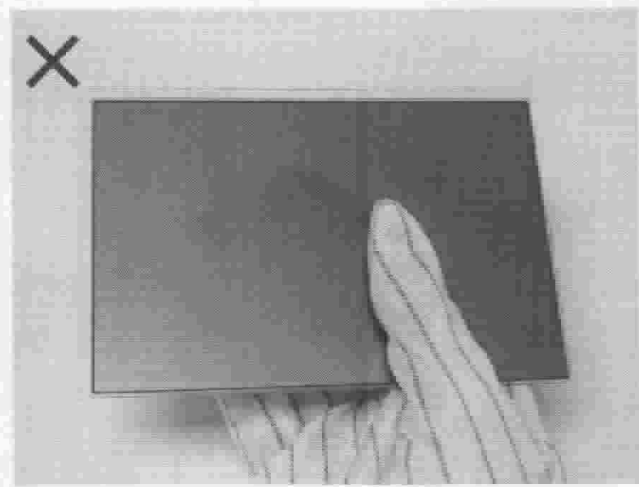


As above picture, please handle with glove by LCD edges and full EOS/ESD protection.

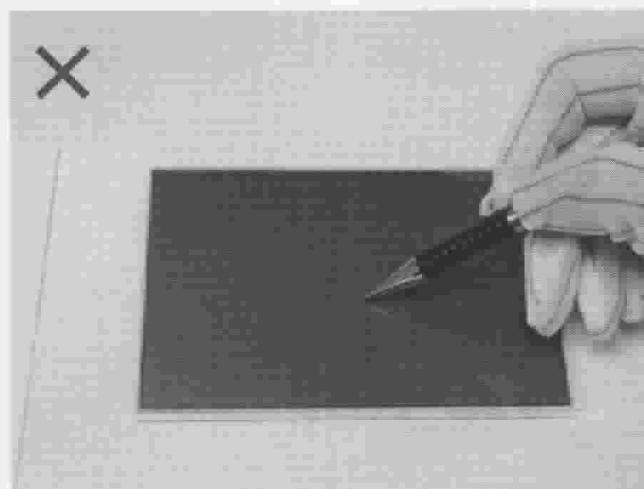
Incorrect handling



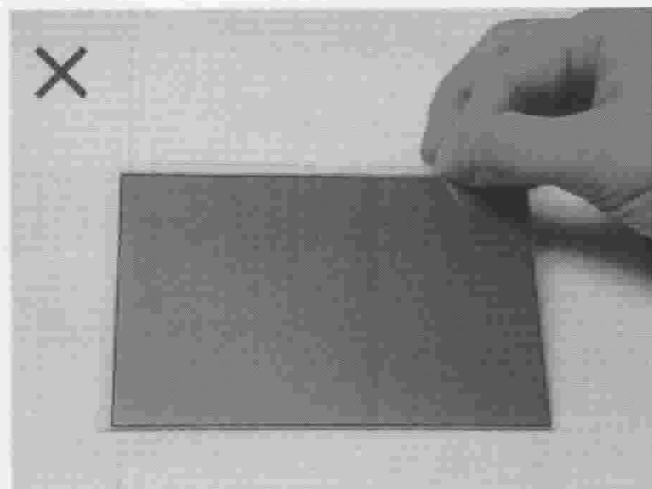
Please don't put one on another LCD.



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.

