SPECIFICATION

OF

LIQUID CRYSTAL DISPLAY MODULE

CUSTOMER : URT-STD

Model No. : UMSH-8377MD-8T

Model version : 0

Document Revision : 0

CUSTOMER APPROVED SIGNATURE			

This specification need to be signed by purchaser or customer as a specification of products production and delivery from URT. Without signature of this specification , any purchase order for this model no. will be treated and considered that this specification is automatically acknowledged and accepted by purchaser or customer.

U.R.T. UNITED RADIANT TECHNOLOGY CORPORATION

Allen Wang	George Tseng	Angus Chiu	Sharon Tsai	Mar-08-2011
APPROVED	CHECKED	CHECKED	PREPARED	Date

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Revision record

Document Revision	Model No. Version No.	Description	Revision by
0	UMSH-8377MD-8T (UFNH-K080EY-FT) Version No. 0	1. Add T/P with Anti-Newton's ring 2. Modify module number from UMSH-8377MD-T toUMSH-8377MD-8T.	W.L.Tsai Nick Liu 08-Mar-2011

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1. BASIC SPECIFICATION

1.1 Mechanical specifications

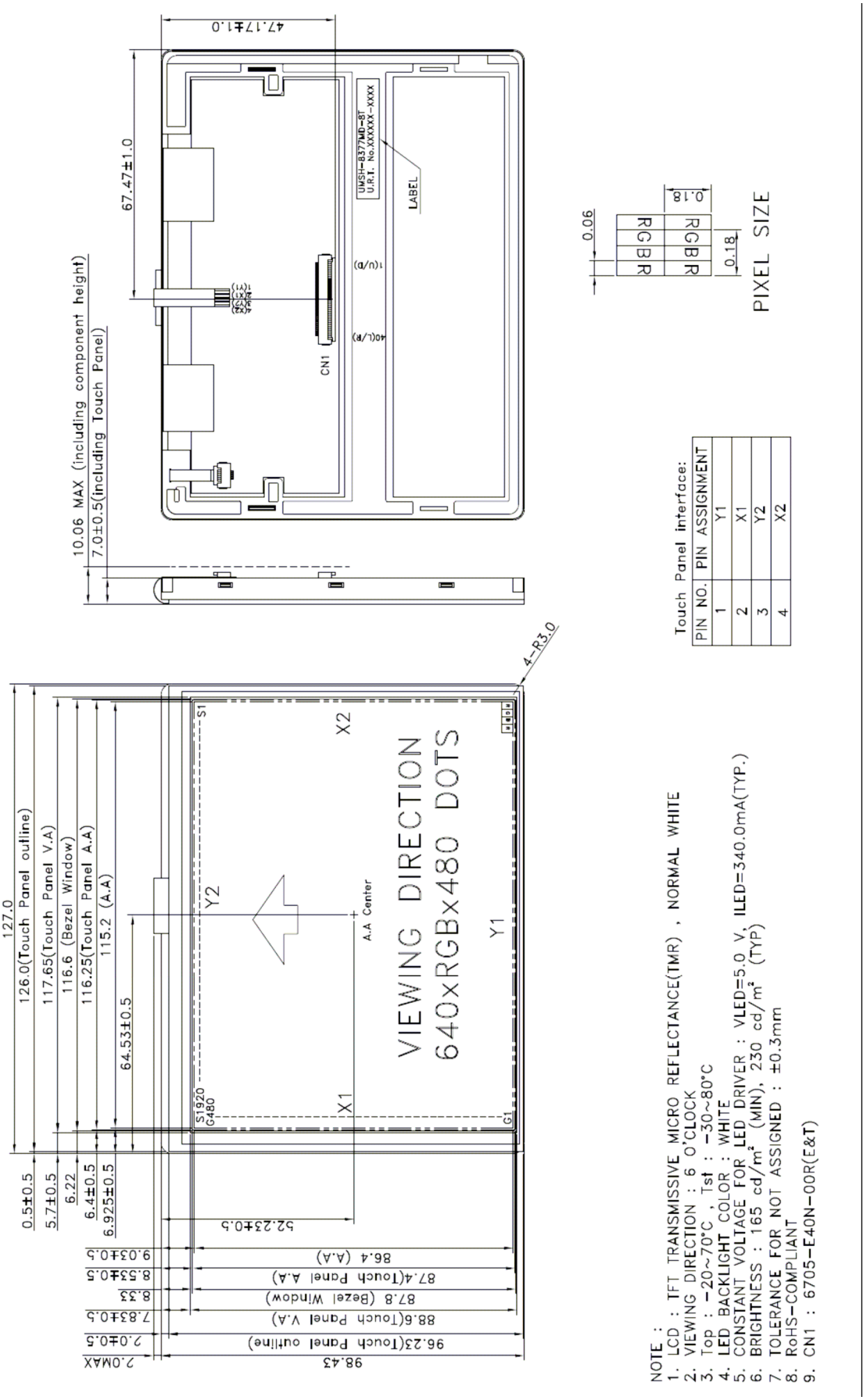
Items	Nominal Dimension	Unit
Active screen size	5.7” diagonal	-
Dot Matrix	640 x RGB x 480	Pixel
Module Size (W x H x T)	127.0 x 98.43 x 8.96	mm.
Active Area (W x H)	115.2 x 86.4	mm.
Pixel Size (W×H)	0.18x0.18	mm.
Color depth	262K	color
Interface	Parallel 18-bit RGB	-
Driving IC Package	COG	-
Module Weight	120	g

1.2 Display specification

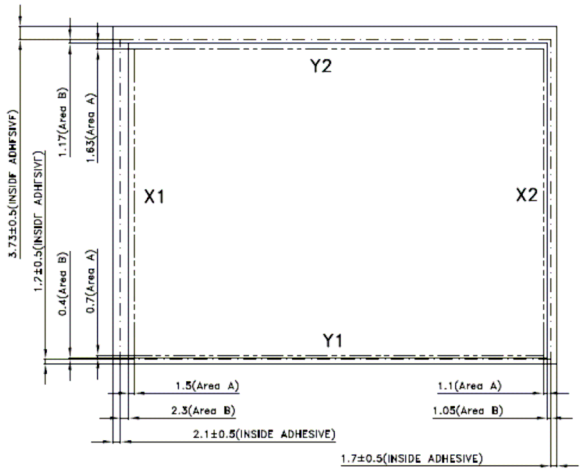
Display	Descriptions	Note
LCD Type	a-Si TFT	-
LCD Mode	TN/Normal white	-
Polarizer Mode	Transmissive	-
Polarizer Surface	Normal	-
Pixel arrangement	RGB-stripe	-
Backlight Type	LED	-
Viewing Direction(Gray inversion)	6 O'clock Direction	-

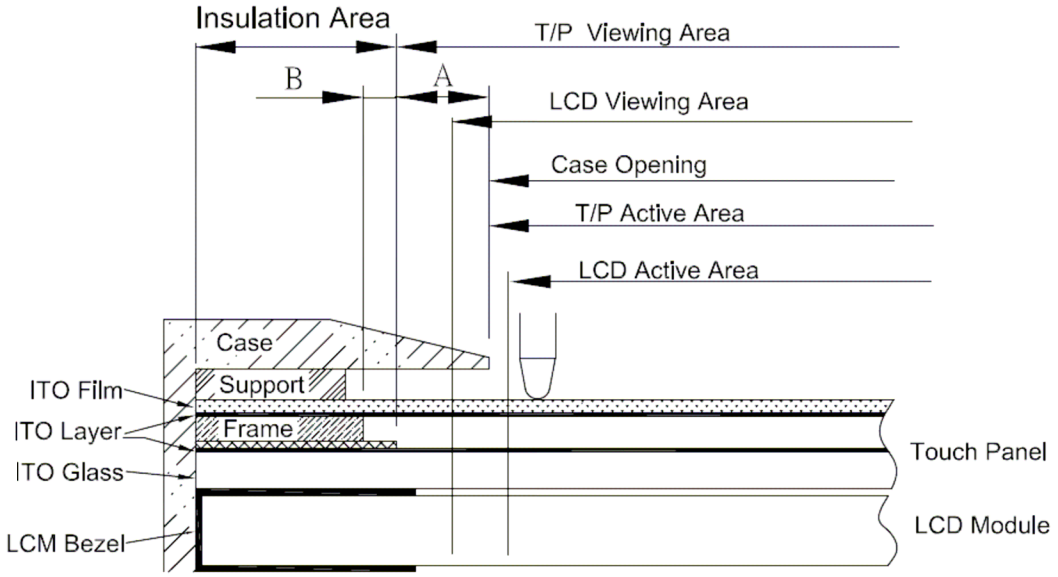
* Color tone is slightly changed by temperature and driving voltage.

1.3 Outline dimension



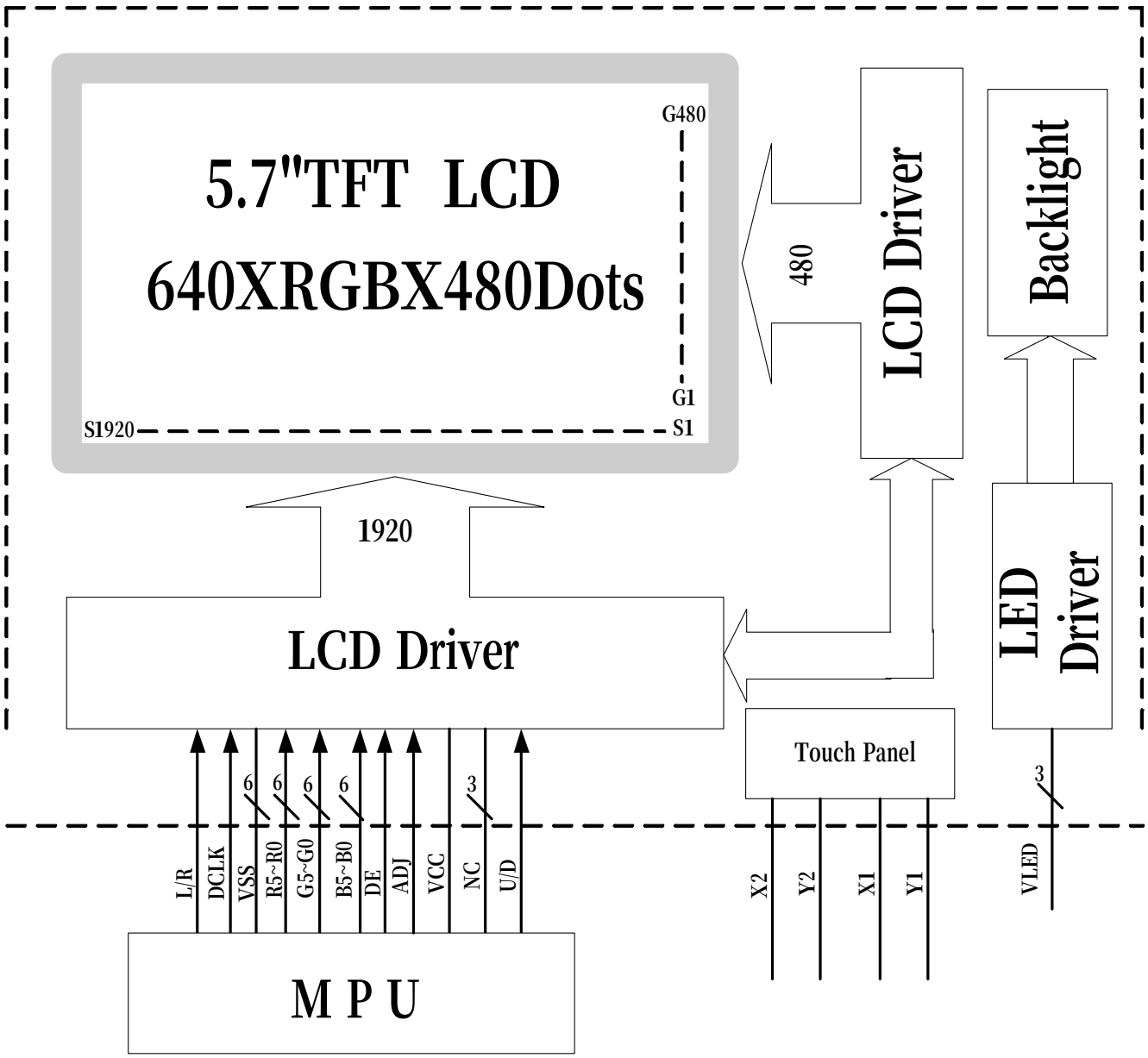
Attention for Assembly and Operation





(1) T/P Active Area : Means T/P guaranteed active area , where the feature and function of the T/P can be assured.
(2) Area A : Where the T/P can be operated but the feature and function are not guaranteed.
(3) Area B : This area is prohibited to contact , it is easy to hurt the ITO film and lose function once be touched .
(4) a. Customer should design the "Support " in between the case and T/P ,with sufficient thickness to ensure once the case was deformed or pressed unintendedly , the T/P can still work normally .
b. Support need to be designed within the frame size.
c. We suggest to the support thickness as 0.5mm , but customer should adapt suitable thickness according to the case deformation.
(5) The best design of customer's case opening is suggest ed to cover the LCD Viewing area and aligned with the T/P Active Area ,or in between the dimension of LCD Viewing area and T/P Active Area . But once if the LCD Viewing area was smaller than T/P Active Area ,then the case opening should be aligned with LCD Viewing area .
(6) Never use double sided tape or glue in between the support the ITO film , it will cause harm to ITO film or seperate the T/P with the ITO film.

1.4 Block diagram



1.5 Interface pin

Pin No.	Pin Symbol	I/O	Description
1	U/D	I	Up or Down Display Control
2~3	NC	-	Customer non-connect.
4~6	VLED	P	Power supply for digital circuit LED.(+5.0V)
7	VCC	P	Power supply for digital circuit LCD. (+3.3V)
8	NC	-	Customer non-connect.
9	DE	I	Data enable
10	X2	-	Touch Screen
11	Y1	-	Touch Screen
12	ADJ	I	Adjust for LED brightness.(PWM),High active
13	B5	I	Blue data input (MSB)
14、15	B4、B3	I	Blue data input
16	VSS	P	Power ground
17、18	B2、B1	I	Blue data input
19	B0	I	Blue data input (LSB)
20	VSS	P	Power ground
21	G5	I	Green data input (MSB)
22、23	G4、G3	I	Green data input
24	VSS	P	Power ground
25、26	G2、G1	I	Green data input
27	G0	I	Green data input (LSB)
28	VSS	P	Power ground

Pin No.	Pin Symbol	I/O	Description
29	R5	I	Red data input (MSB)
30、31	R4、R3	I	Red data input
32	VSS	P	Power ground
33、34	R2、R1	I	Red data input
35	R0	I	Red data input (LSB)
36	X1	-	Touch Screen
37	Y2	-	Touch Screen
38	DCLK	I	Clock signals.
39	VSS	P	Power ground
40	L/R	I	Left or Right Display Control

2. ELECTRICAL CHARACTERISTICS

2.1 Absolute Maximum Ratings

Items	Symbol	Min.	Max.	Unit
Power supply voltage	VCC	-0.3	7.0	V
Input voltage	Vin	-0.3	VCC+0.3	V
Operate temperature range	TOP	-20	70	℃
Storage temperature range	TST	-30	80	℃

2.2 DC Characteristics

T_a= 25℃

Items	Symbol	Min.	Typ.	Max.	Unit	Condition
Supply voltage	V_{CC}	-	3.3	-	V	-
Input Voltage	V_{IL}	0	-	$0.3V_{CC}$	V	L level
	V_{IH}	$0.7V_{CC}$	-	V_{CC}	V	H level
Current consumption	I_{CC}	-	70	135	mA	Note 1

*Note1 :

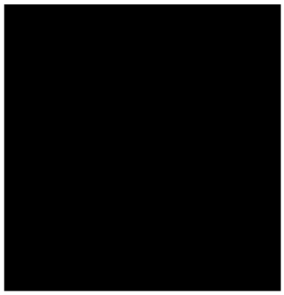
Measuring Condition:

Standard Value MAX.

Ta = 25℃

VCC -GND = 3.3V

Display Pattern = Check pattern



0 gray black pattern

2.3 Back-light Specification

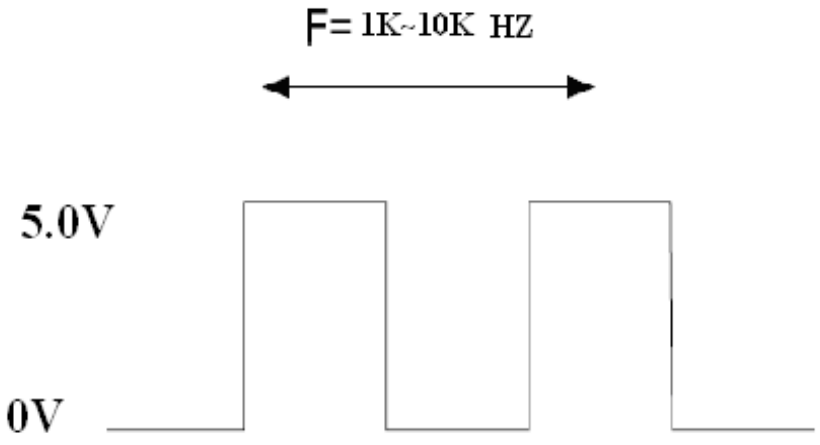
PARAMETER	SYMBOL	MIN	TYP	MAX	Unit	Test Condition	NOTE
Supply Current	I_{LED}	-	340	680	mA	Ta=25℃	-
Supply Voltage	V_{LED}	-	5	-	V	Ta=25℃	-
Half-Life Time	Lf	-	50000	-	hrs	Ta=25℃ 60 RH%	1

Note 1 : The " Half-Life Time "is defined as the module brightness decrease to 50% original brightness.

For interface pin12 (ADJ)

Items	Symbol	Min.	Typ.	Max.	Unit	Condition
Supply voltage	V_H	4.5	5.0	5.5	V	-
Input Voltage	V_{IL}	0	-	$0.3V_{DD}$	V	L level
	V_{IH}	$0.7V_{DD}$	-	V_{DD}	V	H level

ADJ signal=0~5V,operating frequency=1k~10k HZ



2.4 AC Characteristics

2.4.1 AC Electrical Characteristics

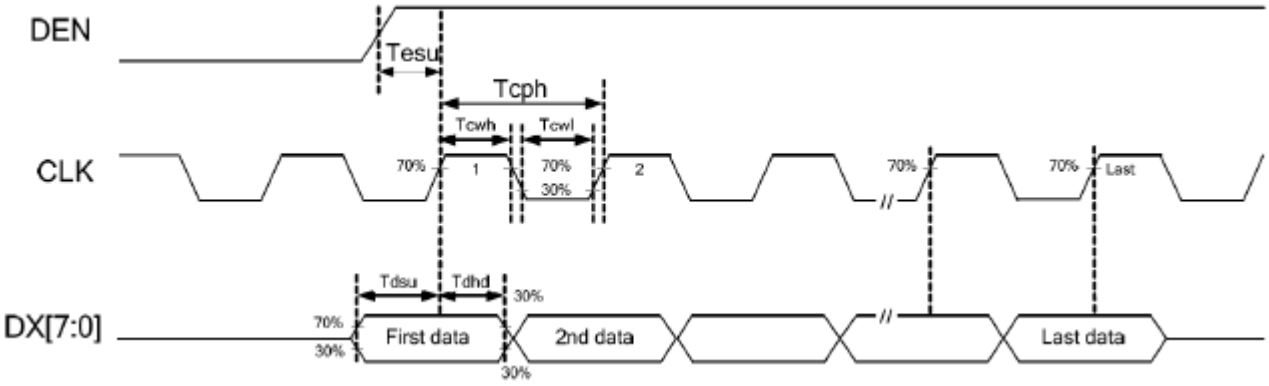
PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	T_{hst}	10	-	-	ns
HS hold time	T_{hhd}	10	-	-	ns
VS setup time	T_{vst}	10	-	-	ns
VS hold time	T_{vhd}	10	-	-	ns
Data setup time	T_{dsu}	10	-	-	ns
Data hold time	T_{dhd}	10	-	-	ns
DEN setup time	T_{esu}	10	-	-	ns
VS falling to HS falling time on odd field @ RGB mode	T_{HV_O}	-4	0	+4	T_{CPH}
VS falling to HS falling time on even field @ RGB mode	T_{HV_E}	0.4	0.5	0.6	T_H
Source output settling time	T_{ST}	-	12	20	µs
Source output loading R	R_{SL}	-	2	-	K ohm
Source output loading C	C_{SL}	-	60	-	pF
POL output delay time	T_{DP}	-	-	40	ns

2.4.2 Digital Parallel RGB interface (1920x480 resolution)

PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
CLK frequency	F_{CPH}	-	25.175	-	MHz
CLK period	T_{CPH}	-	39.7	-	ns
CLK pulse duty	T_{CWH}	40	50	60	%
HS period	T_H	-	800	-	T_{CPH}
HS pulse width	T_{WH}	5	30	-	T_{CPH}
HS-first horizontal data time	T_{HS}	112	144	175	T_{CPH}
DEN pulse width	T_{EP}	-	640	-	T_{CPH}
VS pulse width	T_{WV}	1	3	5	T_H
VS-DEN time	T_{STV}	-	35	-	T_H
VS period	T_V	-	525	-	T_H

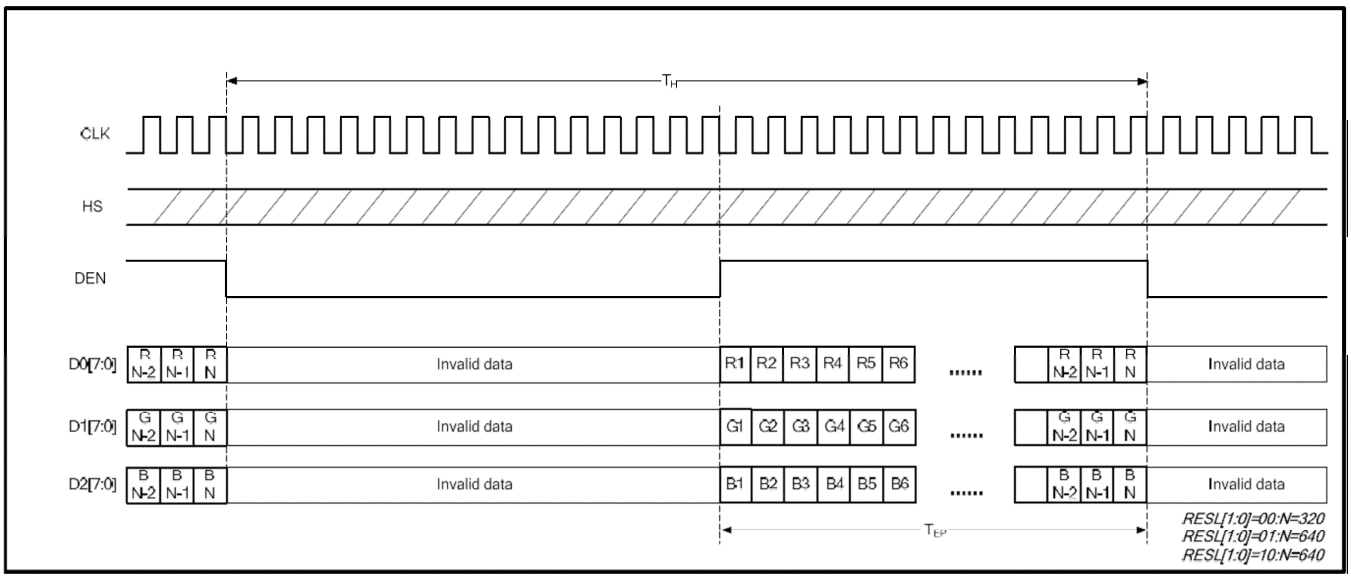
Note: When SYNC mode is used, 1st data start from 144th CLK after HS falling (when STHD[5:0]=00000)

2.4.3 Interface Timing Chart



2.4.4 Data input format for RGB Mode

Parallel RGB DE Mode Horizontal Data Format



2.5 Touch Panel Specifications

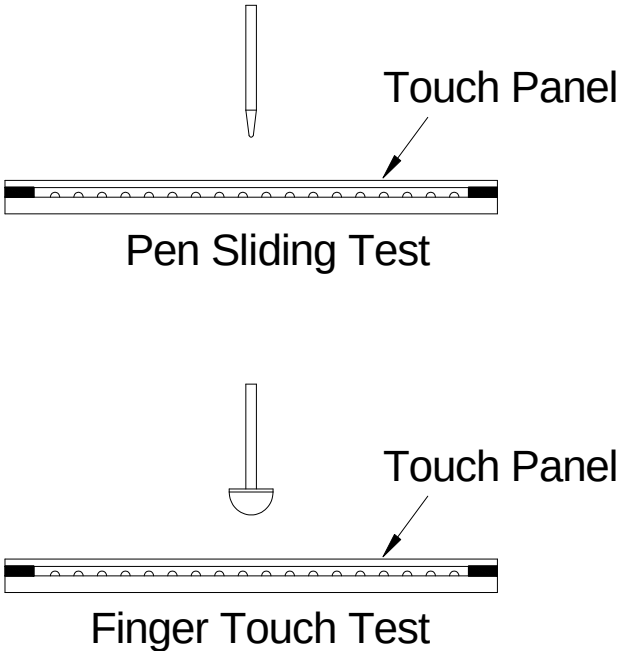
Display	Descriptions	Note
Type	4-wires Analog Resistive Touch Panel	-
Structure	ITO Film：T=0.188mm	-
	ITO Glass：T=0.7mm	-
Surface Hardness	≧ 3H	3H pencil, pressure 500g/45° (JIS-K5600)
Input mode	Stylus or Finger	-
Operating Force (Minimum Active Force)	≦ 100 gf	Stylus R0.8mm
Connector Type	FPC	-

2.5.1 Electric Characteristics

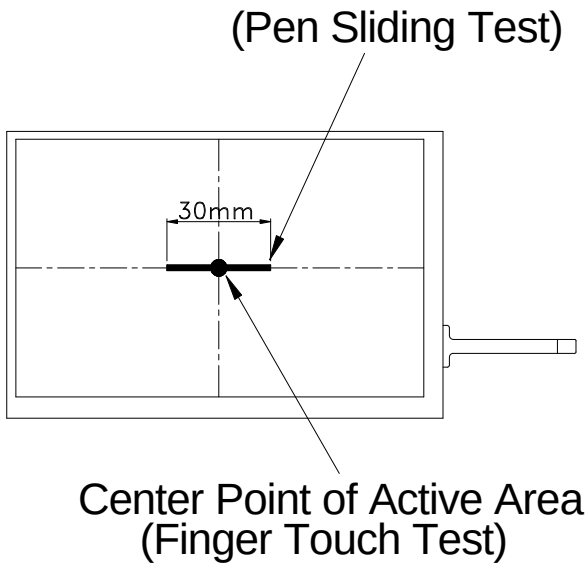
Items	Descriptions	Note
Linearity	X-axis≦1.5%	Active Area toward inner 2mm
	Y-axis≦1.5%	
Terminal Resistance	X-axis：350~950Ω	-
	Y-axis：100~700Ω	-

2-5-2. Durability Test

Items	Condition
Finger Touch Test	Repeating impact the surface of touch panel 1,000k times by R8.0 silicon rubber under 250g loading and 2 times/sec speed.
Pen Sliding Test	Drawing line in 30mm length at same location of touch panel surface 100k times by R0.8mm plastic stylus under 250g loading and 60mm/sec moving speed.

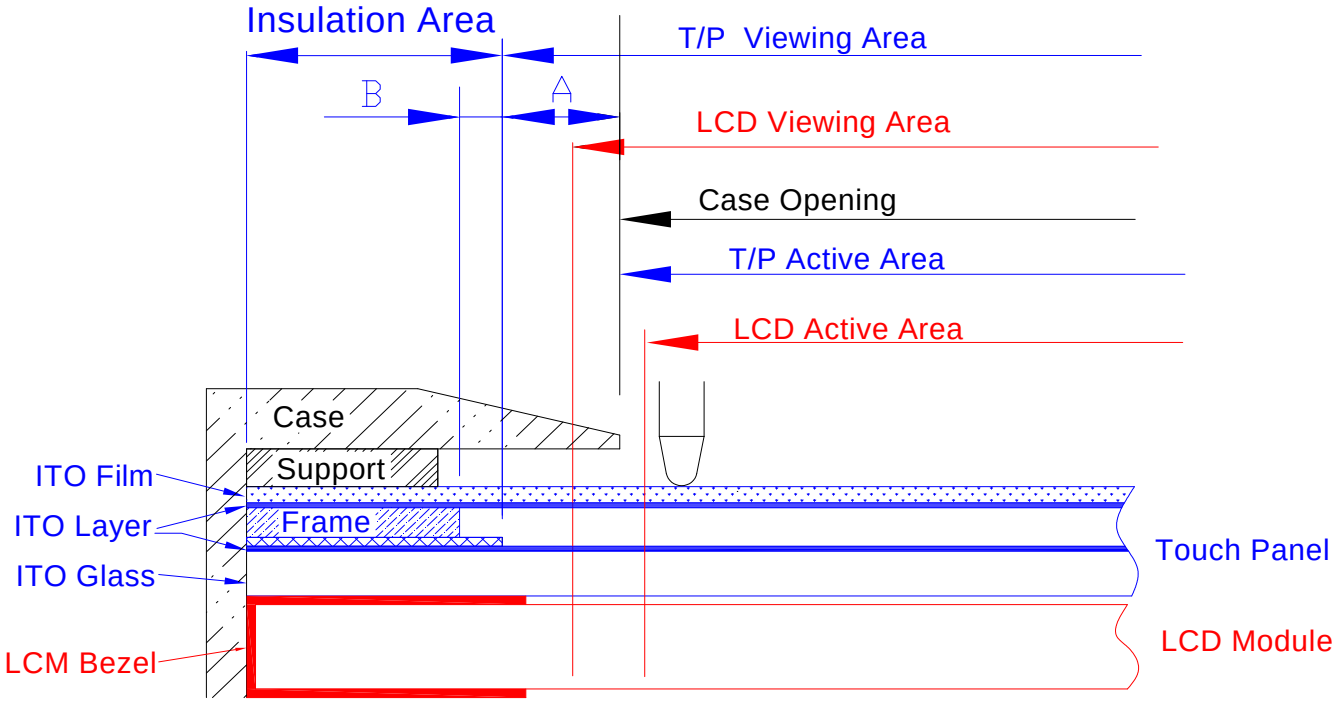


(Durability Test Position)



2.5.3. Attention for Assembly and Operation

Touch Panel as illustrated in the followings:



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(6) Never use double sided tape or glue in between the support and the ITO film , it will cause harm to ITO film or seperate the T/P with the ITO film.

3. OPTICAL CHARACTERISTICS

3.1 Characteristics

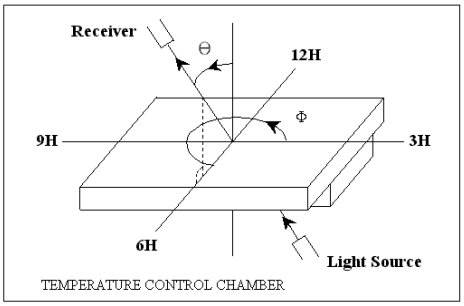
Electrical and Optical Characteristics

No.	Item			symbol	/ temp.	Min.	Typ.	Max.	Unit	Note
1	Response Time			Tr	25 ℃	-	15	-	ms	2
				Tf	25 ℃	-	35	-		
2	Viewing Angle	Hor.	Cr>=10	Θ_{2+}	0°	60	75	-	degree	3
				Θ_{2-}	180°	60	75	-		
		Ver.		Θ_{1+}	270°	45	60	-		
				Θ_{1-}	90°	60	75	-		
3	Contrast Ratio			Cr	25 ℃	400	600	-	-	4
4	Red x-code			Rx	25 ℃	0.57	0.62	0.67	-	5
	Red y-code			Ry		0.31	0.36	0.41		
	Green x-code			Gx		0.30	0.35	0.40		
	Green y-code			Gy		0.52	0.57	0.62		
	Blue x-code			Bx		0.09	0.14	0.19		
	Blue y-code			By		0.10	0.15	0.20		
	White x-code			Wx		0.30	0.35	0.40		
	White y-code			Wy		0.34	0.39	0.44		
	Brightness			Y		250	350	-	cd/m^2	
5	Brightness Uniformity				25 ℃	80	-	-	%	6

3.2 Definition of optical characteristics

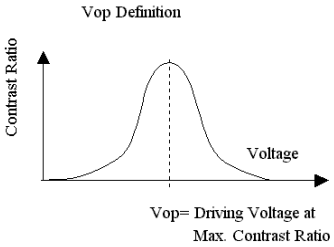
Measurement condition :

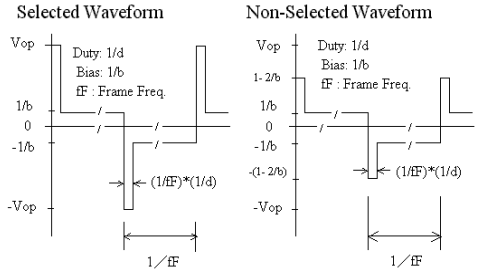
Transmissive and Transflective type



PHOTAL LCD-5000

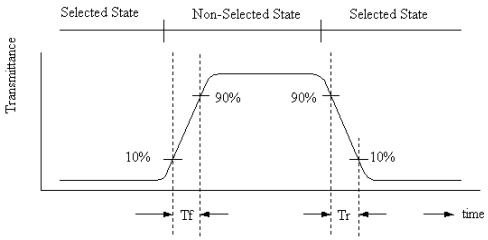
[Note 1] Definition of LCD Driving Vop and Waveform :



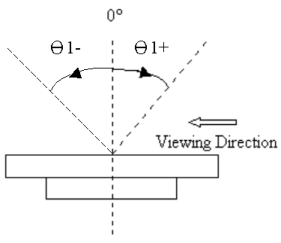


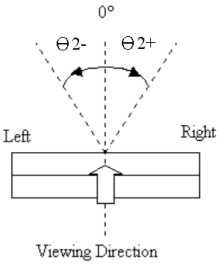
[Note 2] Definition of Response Time

for Positive type :

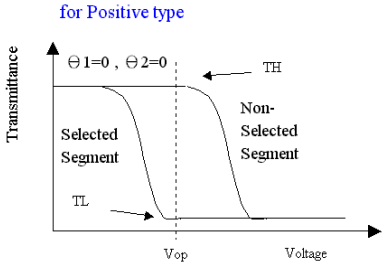


[Note 3] Definition of Viewing Angle :



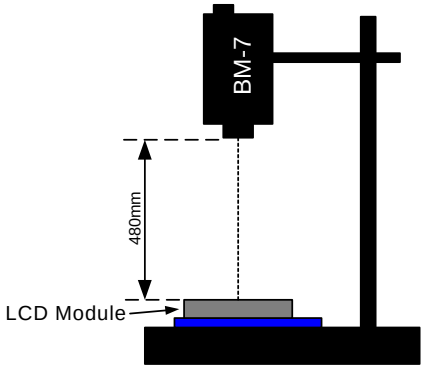


[Note 4] Definition of Contrast Ratio :

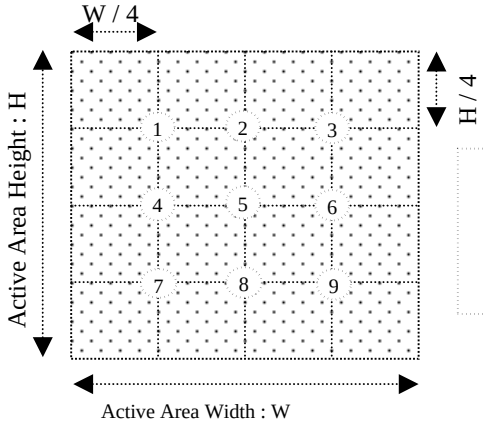


$$\text{Contrast Ratio} = \frac{TH}{TL}$$

[Note 5] Definition of measurement of Color Chromaticity and Brightness

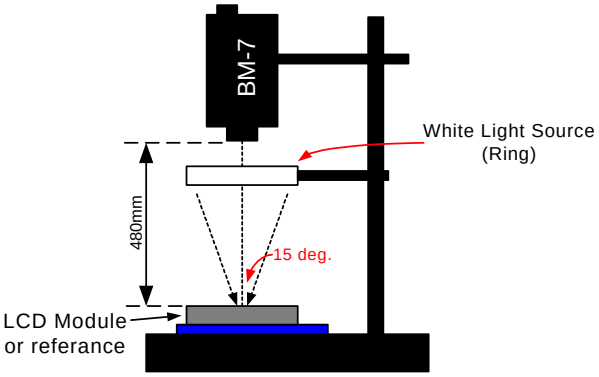


[Note 6] Definition of Brightness Uniformity



$$\text{Brightness Uniformity} = \frac{\text{Minimum Brightness of Point 1~9}}{\text{Maximum Brightness of Point 1~9}}$$

[Note 7] Definition of Measurement of Reflectance



4. RELIABILITY :

Item No	Items	Condition
1	High temperature operating	70 ℃ , 200 hours
2	Low temperature operating	-20 ℃ , 200 hours
3	High temperature storage	80 ℃ , 200 hours
4	Low temperature storage	-30 ℃ , 200 hours
5	High temperature & humidity storage	60℃, 90%RH, 100 hours
6	Thermal Shock storage	-30℃, 30min.<=> 80℃, 30min. 10 Cycles
7	Vibration test	10 => 55 =>10 => 55 => 10 Hz , within 1 minute Amplitude : 1.5mm. 15 minutes for each Direction (X,Y,Z)
8	Drop test	Packed, 100CM free fall, 6 sides, 1 corner, 3edges
9	Life time	50,000 hours 25℃ , 60%RH , specification condition driving

* One single product test for only one item.
* Judgment after test : keep in room temperature for more than 2 hours.
- Current consumption < 2 times of initial value
- Contrast > 1/2 initial value
- Function : work normally

5. PRODUCT HANDLING AND APPLICATION

☐ PRECAUTION FOR HANDLING LCM

- The LCD module contains a C-MOS LSI. People who operate the LCM should wear ESD protection eguipement to prevent ESD hurt on products.
- Do not input any signal before power is turned on.
- Do not take LCM from its packaging bag until it is assembled.
- Peel off the LCM protective film slowly since static electricity may be generated.
- Pay attention to the humidity of the work shop, 50~60%RH is satisfactory.
- Use a non-leak iron for soldering LCM.
- Do not touch the display surface or connection terminals area with bare hands.Smudges on the display surface reduce the insulation between terminals.
- Cautions for soldering to LCM:

  Condition for soldering I/O terminals:
  Temperature at iron tip :350℃±15℃.
  Soldering time : 3~4sec./ terminals.
  Type of solder : Eutectic solder(rosin flux filled).

☐ PRECAUTION IN USE OF LCM

- Do not contact or scratch the front surface and the contact pads of a LCM with hard materials such as metal or glass or with one' s nail.
- To clean the surface , wipe it gently with soft cloth dampened by alcohol.
- Do not attempt to wiped off the contact pads.
- Keep LCM panels away from direct sunlight , also avoid them in high-temperature & high humidity environment for a long period.
- Do not drive LCM by DC voltage.
- Do not expose LCM to organic solvent.
- Liquid in LCM is hazardous substance. In case a contact with liquid crystal material is occured, be sure to immediately wash such material away by soap and water.
- The polarizer is easily damaged and should be handle with special care. Don' t press or rub it with hard objects.

☐ PRECAUTION FOR STORING AND USE OF LCM

- To avoid degradation of the device , do not store the module under the conditions of direct sunlight , high temperature or high humidity . Keep the module in bags designed to prevent static electricity charging under low temperature / normal humidity conditions(avoid high temperature / high humidity and low temperature below 0℃)
- Never use the LCD , LCM under 45 Hz , the liquid crystal will decomposition and cause permently damage on display !!

☐ USING ON MEDICAL CARE , SAFETY OR HAZARDOUS APPLICATION OR SYSTEM

- For the application in medical care, safety and hazardous prodcuts or systems, an authorization from URT is required. URT will not responsible for any damage or loss which caused by the products without any authorization given by URT.
- This product is not allowed to be designed and used for military application and/or purpose.
- The delivery of this product to the countries and/or regions where the embargoes are imposed by U.N. is prohibited.
- The application and delivery of this product must comply with Startegic High-Tech Commodities (SHTC) export control and the sales to the embargoed and/or sanctioned countries or regions are strictly prohibited.

6. DATE CODE OF PRODUCTS

- Date code will be shown on each product :

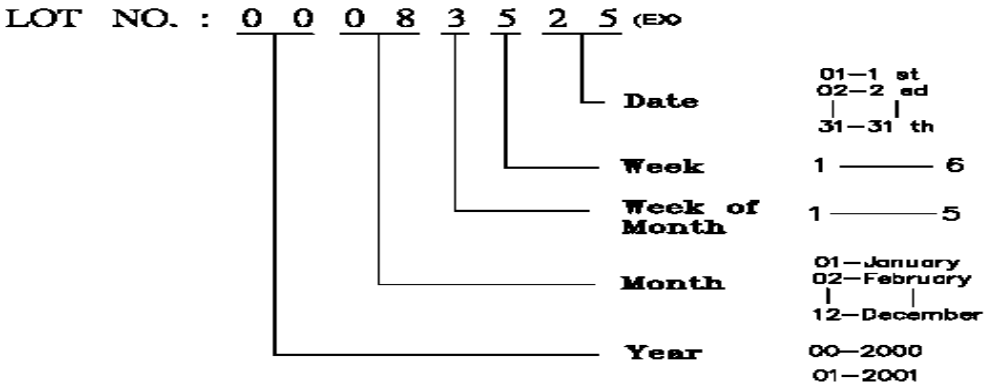
- **YY MM DD - XXXX**

  Year Month Day - Production lots

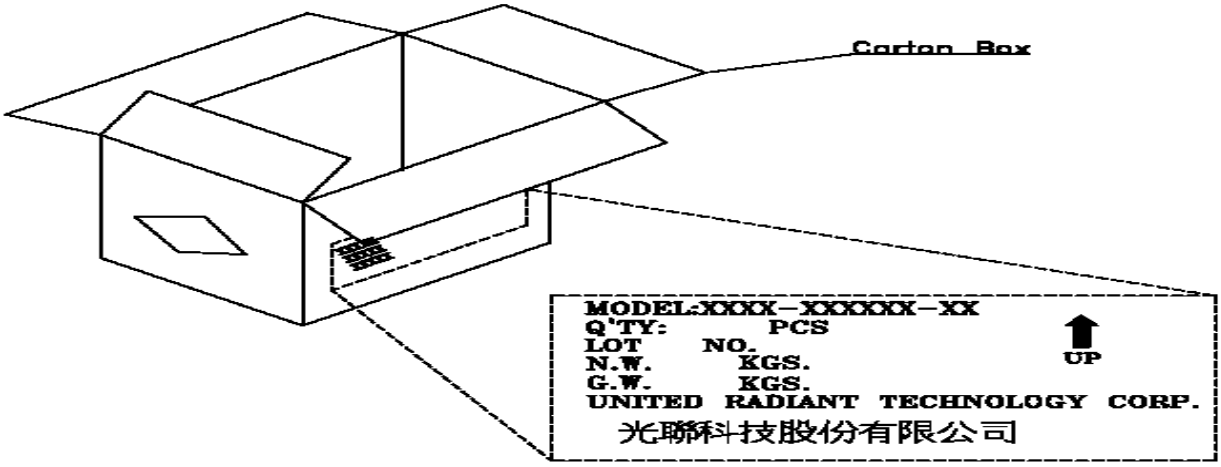
- Example: 090508 - 0 0 0 3 ==>Year 2009, May.,08rd , Batch no.03

7. PACKING

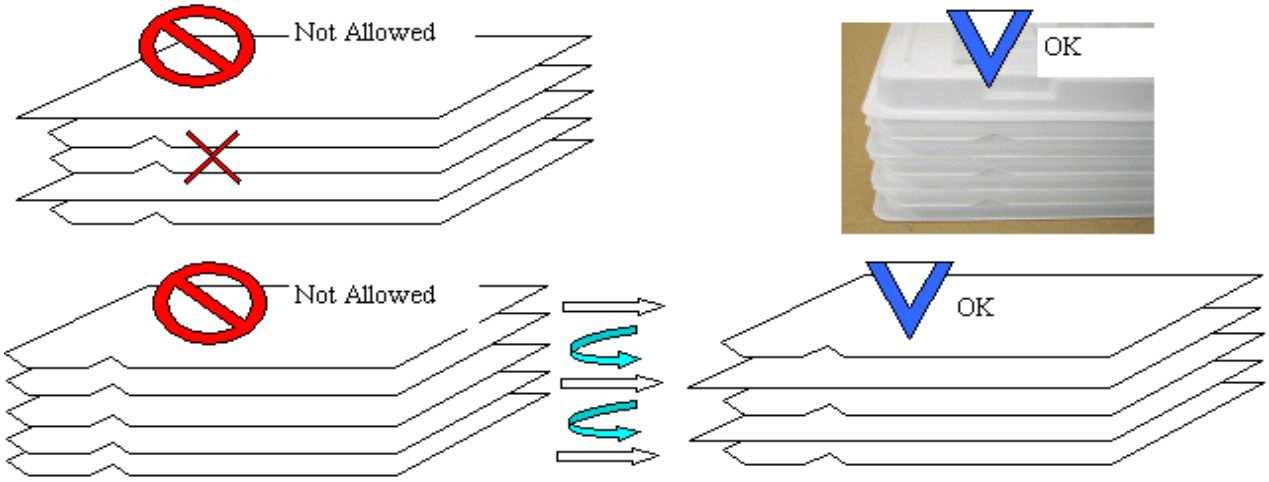
Instruction of lot number:



Lable of carton:



Packing tray must be stacked with alternated direction to each others.
To tacks packing trays in same direction will cause product damaged.



MODEL NO: UM*

T.B.D pcs / Tray

T.B.D Tray / Box

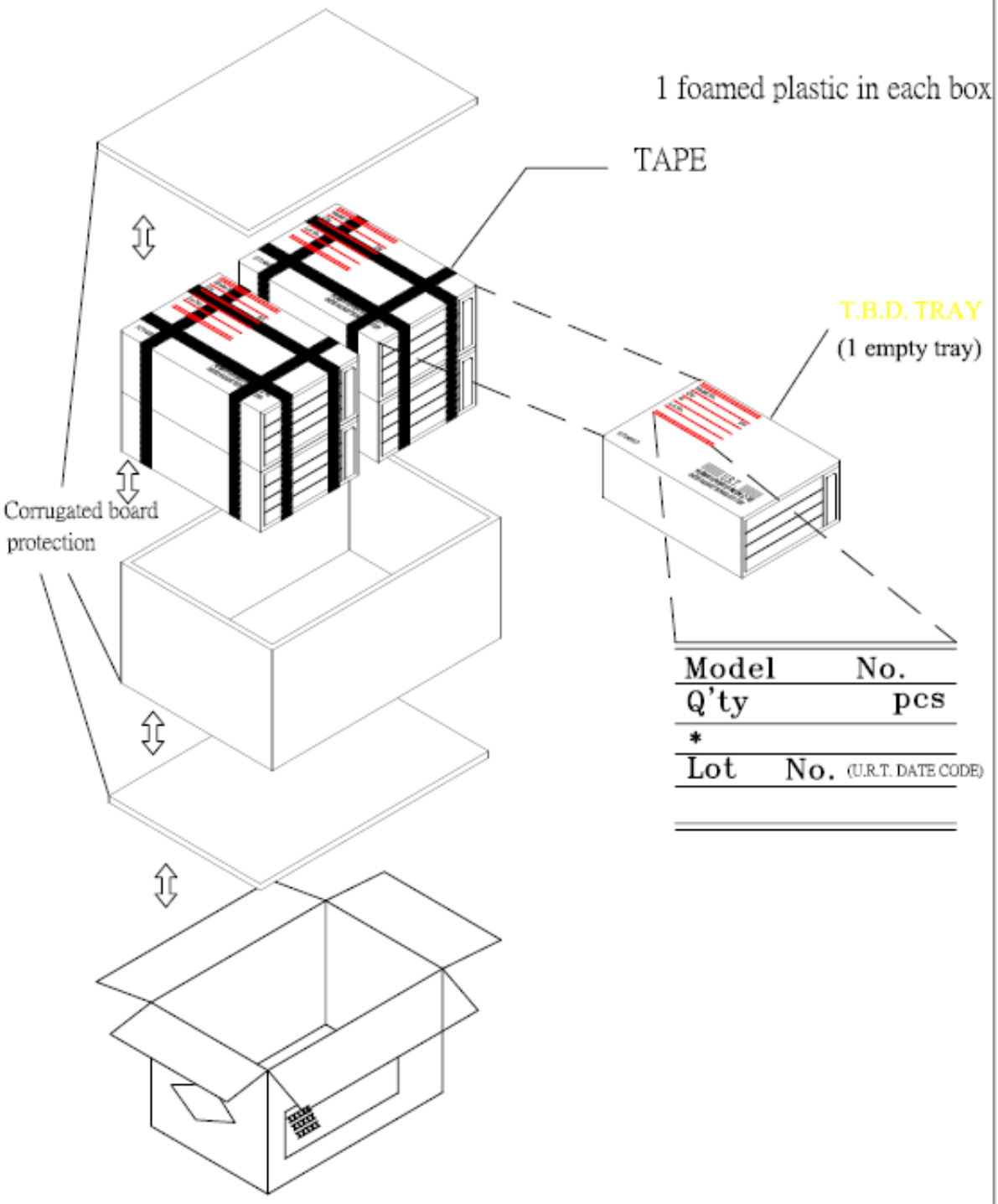
T.B.D Box / Carton

T.B.D pcs / Carton

NOTE:

(1)Be warned ,the direction of the tray has to turn it by 180 degree before stack it up.Otherwise, it will be packager's responsibility!!

(2)Safe Stack : 5 cartons only



8. INSPECTION STANDARD

8.1. QUALITY :

THE QUALITY OF GOODS SUPPLIED TO PURCHASER SHALL COME UP TO THE FOLLOWING STANDARD.

8.1.1. THE METHOD OF PRESERVING GOODS

AFTER DELIVERY OF GOODS FROM U.R.T. TO PURCHASER. PURCHASER SHALL CONTROL THE LCM AT -10 ℃ 40 ℃ ,AND IT MIGHT BE DESIRABLE TO KEEP AT THE NORMAL ROOM TEMPERATURE AND HUMIDITY UNTIL INCOMING INSPECTION OR THROWING INTO PROCESS LINE.

8.1.2. INCOMING INSPECTION

(A) THE METHOD OF INSPECTION

IF PURCHASER MAKE AN INCOMING INSPECTION , A SAMPLING PLAN SHALL BE APPLIED ON THE CONDITION THAT QUALITY OF ONE DELIVERY SHALL BE REGARDED AS ONE LOT.

(B) THE STANDARD OF QUALITY

ISO-2859-1 (or MIL-STD-105E) , LEVEL Ⅱ SINGLE PLAN.

CLASS	AQL(%)
CRITICAL	0.4 %
MAJOR	0.65 %
MINOR	1.5 %
TOTAL	1.5 %

EVERY ITEM SHALL BE INSPECTED ACCORDING TO THE CLASS.

(C) MEASURE

IF AS THE RESULT OF ABOVE RECEIVING INSPECTION , A LOT OUT IS DISCOVERED. PURCHASER SHALL BE INFORM SELLER OF IT WITHIN SEVEN DAYS. BUT FIRST SHIPMENT WITHIN FOURTEEN DAYS.

8.1.3. WARRANTY POLICY

U.R.T. WILL PROVIDE ONE-YEAR WARRANTY FOR THE PRODUCTS ONLY IF UNDER SPECIFICATION OPERATING CONDITIONS. U.R.T. WILL REPLACE NEW PRODUCTS FOR THESE DEFECT PRODUCTS WHICH UNDER WARRANTY PERIOD AND BELONG TO THE RESPONSIBILITY OF U.R.T.

8.2. CHECKING CONDITION

8.2.1. CHECKING DIRECTION SHALL BE IN THE 45 DEGREE AREA TO FACE THE SAMPLE.

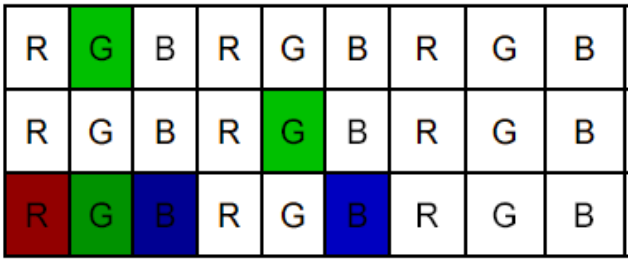
8.2.2. CHECKER SHALL SEE OVER 30 cm. WITH BARE EYES FAR FROM SAMPLE AND USING 2 PCS. OF 20W FLUORESCENT LAMP.

8.3. INSPECTION PLAN :

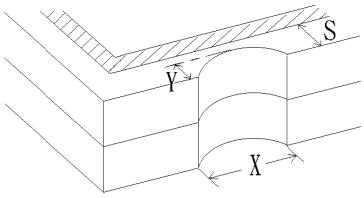
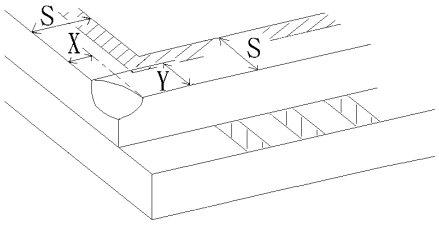
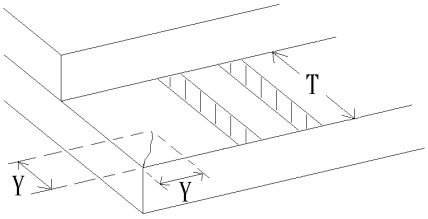
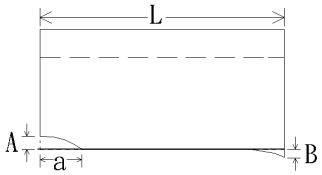
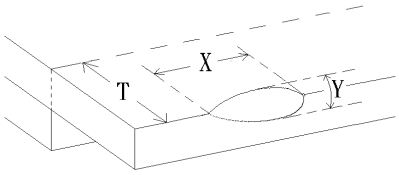
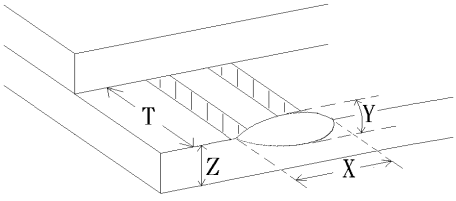
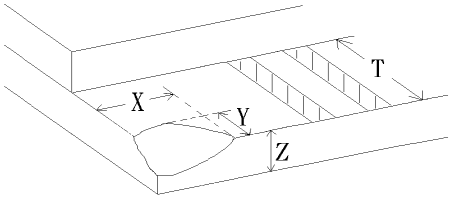
CLASS	ITEM	JUDGEMENT	CLASS
PACKING & INDICATE	1. OUTSIDE AND INSIDE PACKAGE	"MODEL NO." , "LOT NO." AND "QUANTITY" SHOULD INDICATE ON THE PACKAGE.	Minor
	2. MODEL MIXED AND QUANTITY	OTHER MODEL MIXED.....REJECTED QUANTITY SHORT OR OVER.....REJECTED	Critical
	3. PRODUCT INDICATION	"MODEL NO." SHOULD INDICATE ON THE PRODUCT	Major
ASSEMBLY	4. DIMENSION, LCD GLASS SCRATCH AND SCRIBE DEFECT.	ACCORDING TO SPECIFICATION OR DRAWING.	Major
APPEARANCE	5. VIEWING AREA	POLARIZER EDGE OR LCD'S SEALING LINE IS VISABLE IN THE VIEWING AREA ……..REJECTED	Minor
	6. BLEMISH、BLACK SPOT、 WHITE SPOT IN THE LCD AND LCD GLASS CRACKS	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	7. BLEMISH、BLACK SPOT WHITE SPOT AND SCRATCH ON THE POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	8. BUBBLE IN POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	9. LCD'S RAINBOW COLOR	STRONG DEVIATION COLOR (OR NEWTON RING) OF LCD.....REJECTED. OR ACCORDING TO LIMITED SAMPLE (IF NEEDED, AND INSIDE VIEWING AREA)	Minor
ELECTRICAL	10. ELECTRICAL AND OPTICAL CHARACTERISTICS (CONTRAST、VOP、 CHROMATICITY … ETC)	ACCORDING TO SPECIFICATION OR DRAWING . (INSIDE VIEWING AREA)	Critical
	11.MISSING LINE	MISSING DOT、LINE、CHARACTER ....REJECTED	Critical
	12.SHORT CIRCUIT、 WRONG PATTERN DISPLAY	NON DISPLAY、WRONG PATTERN DISPLAY、CURRENT CONSUMPTION OUT OF SPECIFICATION..... REJECTED	Critical
	13. PIN HOLE、PATTERN DEFORMITY	ACCORDING TO STANDARD OF VISUAL INSPECTION	Minor

8.4. STANDARD OF VISUAL INSPECTION

<table>
<tr><th>NO.</th><th>CLASS</th><th>ITEM</th><th>JUDGEMENT</th></tr>
<tr><td>8.4.1</td><td>MINOR</td><td>. BLEMISH、BLACK SPOT、WHITE SPOT IN THE LCD.

. BLEMISH、BLACK SPOT、WHITE SPOT AND SCRATCH ON THE POLARIZER</td><td>(A) ROUND TYPE: unit : mm.
<table>
<tr><th>DIAMETER (mm.)</th><th>ACCEPTABLE Q'TY</th></tr>
<tr><td>Φ ≦ 0.1</td><td>DISREGARD</td></tr>
<tr><td>0.1 < Φ ≦ 0.2</td><td>2</td></tr>
<tr><td>0.2 < Φ ≦ 0.25</td><td>1</td></tr>
<tr><td>0.25 < Φ</td><td>0</td></tr>
</table>
NOTE: Φ=(LENGTH+WIDTH)/2
(B) LINER TYPE: unit : mm.
<table>
<tr><th>LENGTH</th><th>WIDTH</th><th>ACCEPTABLE Q'TY</th></tr>
<tr><td>------</td><td>W ≦0.03</td><td>DISREGARD</td></tr>
<tr><td>L ≦ 5.0</td><td>0.03 < W ≦0.05</td><td>3</td></tr>
<tr><td>L ≦ 5.0</td><td>0.05 < W ≦0.07</td><td>1</td></tr>
<tr><td>------</td><td>0.07 < W</td><td>FOLLOW ROUND TYPE</td></tr>
</table></td></tr>
<tr><td>8.4.2</td><td>MINOR</td><td>BUBBLE IN POLARIZER</td><td>unit : mm.
<table>
<tr><th>DIAMETER</th><th>ACCEPTABLE Q'TY</th></tr>
<tr><td>Φ ≦0.15</td><td>DISREGARD</td></tr>
<tr><td>0.15 < Φ ≦ 0.5</td><td>2</td></tr>
<tr><td>0.5 < Φ</td><td>0</td></tr>
</table></td></tr>
<tr><td>8.4.3</td><td>MINOR</td><td>Dot Defect</td><td>
<table>
<tr><th>Items</th><th>ACC. Q'TY</th></tr>
<tr><td>Bright dot</td><td>N≦ 4</td></tr>
<tr><td>Dark dot</td><td>N≦ 4</td></tr>
</table>
Pixel Define


Not 1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot.
Not 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.
Not 3: Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green ,blue pattern.</td></tr>
</table>

NO.	CLASS	ITEM	JUDGEMENT
8.4.4	MINOR	CHIPPING	 Y > S REJ.
8.4.5	MINOR	CHIPPING	 X or Y > S REJ.
8.4.6	MAJOR	GLASS CRACK	 Y > (1/2) T REJ.
8.4.7	MAJOR	SCRIBE DEFECT	 1. a> L/3 , A>1.5mm. REJ. 2. B : ACCORDING TO DIMENSION
8.4.8	MINOR	CHIPPING (ON THE TERMINAL AREA)	 Φ= (x+y)/2 > 2.5 mm REJ.
8.4.9	MINOR	CHIPPING (ON THE TERMINAL SURFACE)	 Y > (1/3) T REJ.
8.4.10	MINOR	CHIPPING	 Y > T REJ.