SPECIFICATION

OF

LIQUID CRYSTAL DISPLAY MODULE

CUSTOMER : **URT-STD**

Model No. : **UMSH-8837MD-1T(REV2)**

Model version : **0**

Document Revision : **7**

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

Joe Wu	Ashin Chiu	Jenny Wang	Apr-22-2020
APPROVED	CHECKED	PREPARED	Date

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This document has been signed by Digital Signature Approval System

		Revision record		
Document Revision	Model No. Version No.	Description	Revision by
0	UMSH-8837MD-T Version No. 0	5 inch TFT LCD.	Ken Liao Ken Lin 14-Aug-2013
1	UMSH-8837MD-T Version No. 1	1. Decrease the length of AK wire. 2. Modify the bezel outline. 3. Add the tape on the FPC.	H.F. Kuo Ken Liao 09-Oct-2013
2	UMSH-8837MD-1T Version No. 0	1. Change the TFT module. 2. Modify the module number from UMSH-8837MD-T to UMSH-8837MD-1T.	H.F. Kuo Ken Liao 18-Oct-2013
3	UMSH-8837MD-1T Version No. 1	1. Modify the outline dimension of FPC. 2. Change the backlight Specification.	H.F. Kuo Ken Liao 29-Oct-2013
4	UMSH-8837MD-1T Version No. 2	Modify the peeling tape size.	H.F. Kuo Ken Liao 06-Dec-2013
5	UMSH-8837MD-1T Version No. 3	1. Add the backlight circuit of outline dimension. 2. Modify the package.	William Don Naoki Tsai 20-Nov-2014
6	UMSH-8837MD-1T (REV1) Version No. 0	1. Improve the glass. 2. Modify the Module number from UMSH-8837MD-1T to UMSH-8837MD-1T(REV1)	William Don Naoki Tsai 25-Mar-2015
7	UMSH-8837MD-1T (REV2) Version No. 0	1. Change TFT panel. 2. Modify the module number from UMSH-8837MD-1T(REV1) to UMSH-8837MD-1T(REV2).	William Don George Pan 22-Apr-2020

CONTENTS:

1. BASIC SPECIFICATION

1.1 Mechanical specifications

Items	Nominal Dimension	Unit
Active screen size	5.0" diagonal	-
Dot Matrix	800 x RGB x 480	Pixel
Module Size (W x H x T)	118.4 x 80.0 x 4.1	mm.
Active Area (W x H)	108.0 x 64.8	mm.
Pixel Size (W×H)	0.135 x 0.045	mm.
Color depth	16.7M	color
Interface	Parallel 24-bit RGB	-
Driving IC Package	COG	-
Module Weight	70±10%	g

1.2 Display specification

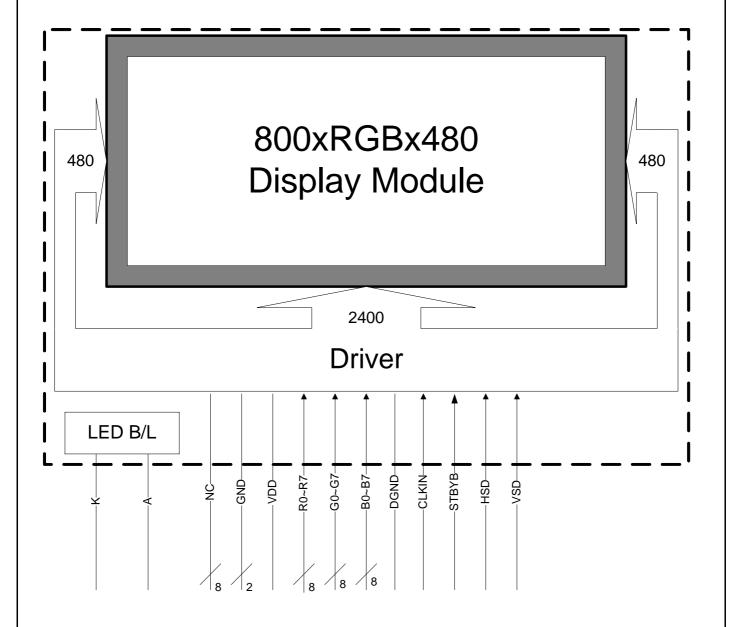| Display	Descriptions	Note
LCD Type	a-Si TFT	-
LCD Mode	TN/Normal white	-
Polarizer Mode	Transmissive	-
Polarizer Surface	Normal	-
Pixel arrangement	RGB-stripe	-
Backlight Type	LED	-
Viewing Direction (Gray scale inversion)	6 O'clock Direction	1

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

Note 1 : The viewing direction defined in this specification is according to the rubbing direction of its TFT surface treatment by the TFT glass manufacturer. The grayscale inversion is at this direction as well. However, the optimal viewing direction for human view is normally where the color does not change to grayscale inversion, and this would be the opposite site of the specified viewing direction in this specification. In any case we advise customers to judge by themselves, and be aware of this phenomenon.

1.3 Outline dimension

VIEWING DIRECTION
800×RGB×480 DOTS

UMSH-8837MD-1T(REV2)
U.R.T. No.XXXXX-XXXX

5.2±0.5(BENDING AREA)
(1.0)
60.0±5.0
20.5
R0.3
1.0MIN
(UNBENDING AREA)
4.0±0.5
STIFFENER(PI) T=0.2mm

DETAIL A
0.3±0.1
1.5
0.35±0.05
0.23±0.05
0.1±0.1

4.1

2_WHITE
1_RED
CN1: BHSR-02VS-1(JST)
STIFFENER
0.3±0.05
CONDUCTOR

OK
OA

118.4
110.6(BEZEL OPEN)
108.0(LCD A.A.)
60.45±0.5
AA Center

5.15
6.45
3.85
2.55
36.25±0.5
64.8(LCD A.A.)
67.4(BEZEL OPEN)
80.0

TAPE
COMPONENT AREA
(HEIGHT 2.0MAX)
COMPONENT AREA
TAPE
3.0±0.5
0.5±0.1
4(NC)
70±0.5
1(NC) 2(NC) 3(GND)
27.44±0.5
58.42±1.0
3.61±0.5
8.89±0.5
19.5±0.05(P0.5×39)

NOTE:
1. LCD : TFT TRANSMISSIVE TYPE , NORMAL WHITE
2. VIEWING DIRECTION : 6 O'CLOCK (GRAY INVERSION)
3. Top : -20~70°C , Tst : -30~80°C
4. LED COLOR : WHITE , LED*10pcs
5. CONSTANT CURRENT IF=120.0mA , VLED : 15.0V(TYP)
6. RoHS-COMPLIANT
7. TOLERANCE FOR NOT ASSIGNED : ±0.3mm
8. THE BENDING RADIUS OF FPC SHOULD BE LARGE THAN 0.6R
9. LUMINANCE : 500.0 cd/m²(MIN) , 700.0 cd/m²(TYP)
10. UNIFORMITY : 70%(MIN)
11. FPC MATCH CONNECTOR : HIROSE FH19SC-40S-0.5SH OR EQUIVALENT
12. BACKLIGHT MATCH CONNECTOR : SM02B-BHSS-1-TB OR EQUIVALENT

1.4 Block diagram:

1.5 Interface pin :

Pin No.	Pin Symbol	I/O	Description
1	NC	P	No connect.
2	NC	P	No connect.
3	GND	P	Ground for logic. (0V)
4	VDD	P	Power supply. (+3.3V)
5 ~ 12	R0 ~ R7	I	Red data signal.
13 ~ 20	G0 ~ G7	I	Green data signal.
21 ~ 28	B0 ~ B7	I	Blue data signal.
29	DGND	P	Ground for logic. (0V)
30	CLKIN	I	Clock signal for data latching and internal counter of the timing controller.
31	STBYB	I	Standby mode control. When STBYB=L, TCON and source driver are off. When STBYB=H, all the functions are on. (Default pull high).
32	HSD	I	Horizontal sync input in digital parallel RGB.
33	VSD	I	Vertical sync input in digital parallel RGB.
34	NC	I	No connect.
35	NC	-	No connect.
36	GND	P	Ground for analog. (0V)
37~40	NC	-	No connect.

BACKLIGHT INTERFACE PIN:

Pin No.	Pin Symbol	I/O	Description
1	A	P	Power for LED backlight anode.
2	K	P	Power for LED backlight cathode.

2. ELECTRICAL CHARACTERISTICS

2.1 Absolute Maximum Ratings

Items	Symbol	Min.	Max.	Unit
Power supply voltage	VDD	-0.5	+5.0	V
Input voltage	Vin	-0.3	VDD+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_{DD}	3.0	3.3	3.6	V	-
Input Voltage	V_{IL}	0	-	$0.3V_{DD}$	V	L level
	V_{IH}	$0.7V_{DD}$	-	V_{DD}	V	H level
Current consumption	I_{DD}	-	140	-	mA	Note 1

*Note1 :

Measuring Condition:

Standard Value MAX.

Ta = 25℃

VDD -GND = 3.3V

Display Pattern = Check pattern

0 gray black pattern

2.2.1 Back-light Specification :

PARAMETER	SYMBOL	MIN	TYP	MAX	Unit	Test Condition	NOTE
Supply Current	I_A	-	-	120	mA	Ta=25℃	-
Supply Voltage	V_A	-	15	-	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.
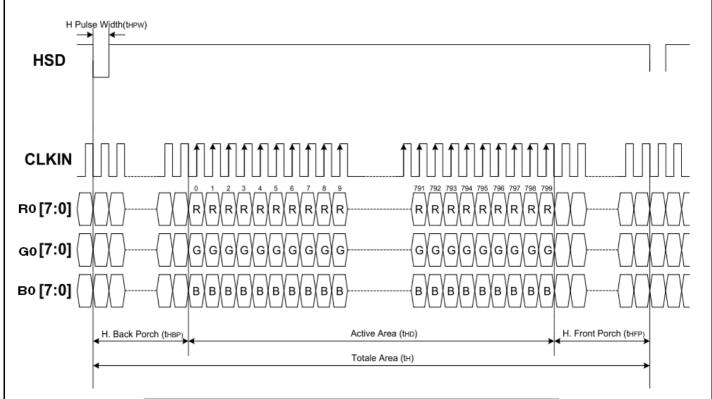
Note 2 : I_A is 120mA Constant current.

2.3 AC Characteristics:
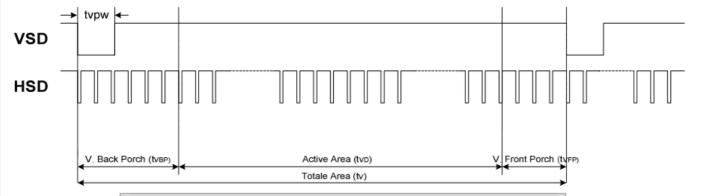
2.3.1 AC Electrical Characteristics：

Parameter	Symbol	Spec Min.	Spec Typ.	Spec Max.	Unit	Conditions
VDD Power ON slew rate	t_{POR}	--	--	20	ms	0V ~ 0.9VDD
CLKIN cycle time	t_{CPH}	20	--	--	ns	
CLKIN pulse duty	t_{CWH}	40	50	60	%	
VSD setup time	t_{VST}	8	--	--	ns	
VSD hold time	t_{VHD}	8	--	--	ns	
HSD setup time	t_{HST}	8	--	--	ns	
HSD hold time	t_{HHD}	8	--	--	ns	
Data setup time	t_{DST}	8	--	--	ns	R[7:0],G[7:0],B[7:0] to CLKIN
Data hold time	t_{DHD}	8	--	--	ns	R[7:0],G[7:0],B[7:0] to CLKIN
CLKIN frequency	f_{CLK}	--	40	50	MHz	VDD=3.0 ~ 3.6V
CLKIN cycle time	t_{CLK}	20	25	--	ns	
CLKIN pulse duty	t_{CWH}	40	50	60	%	T_{CLK}

2.3.2 Horizontal Timing Characteristic :
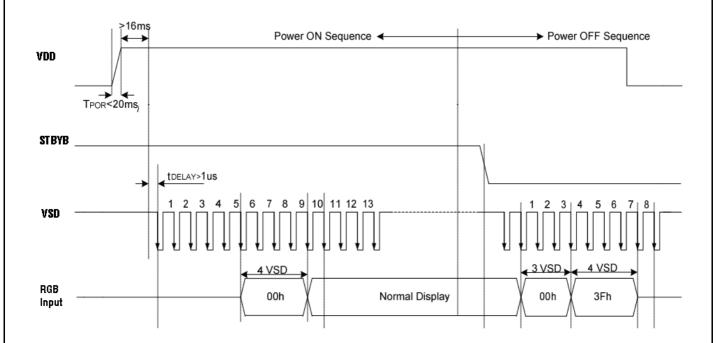
Horizontal Input Timing						
Parameter		Symbol	Value			Unit
			Min.	Typ.	Max.	
Horizontal display area		t_{HD}	--	800	--	CLKIN
CLKIN frequency		f_{CLK}	26.4	33.3	50	MHz
1 Horizontal line period		t_H	862	1056	1200	CLKIN
HSD pulse width	Min.	t_{HPW}	--	1	--	CLKIN
	Typ.		--	--	--	CLKIN
	Max.		--	40	--	CLKIN
HSD back porch	SYNC	t_{HBP}	46	46	46	CLKIN
HSD front porch	SYNC	t_{HFP}	16	210	354	CLKIN

2.3.3 Vertical Timing Characteristic :
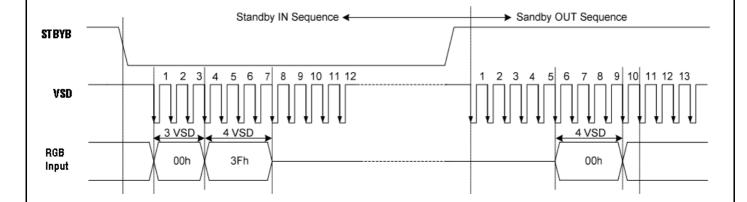
Vertical Input Timing

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	t_{VD}	--	480	--	HSD
VSD period time	t_V	510	525	650	HSD
VSD pulse width	t_{VPW}	1	--	20	HSD
VSD back porch	t_{VBP}	23	23	23	HSD
VSD front porch	t_{VFP}	7	22	147	HSD

2.3.4 Power On/Off sequence :

2.3.5 Standby On/Off Control :

3. OPTICAL CHARACTERISTICS

3.1 Characteristics
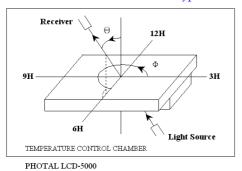
Electrical and Optical Characteristics

No.	Item			symbol / temp.		Min.	Typ.	Max.	Unit	Note
1	Response Time			Tr	25	-	15	30	ms	2
				Tf		-	35	50		
2	Viewing Angle	Hor.	Cr 10	2+	Φ = 0°	60	80	-	degree	3
				2-	Φ = 180°	60	80	-		
		Ver.		1+	Φ = 270°	60	80	-		
				1-	Φ = 90°	45	60	-		
3	Contrast Ratio			Cr	25	400	500	-	-	4
4	Red x-code			Rx	25	0.53	0.58	0.63	-	5
	Red y-code			Ry		0.27	0.32	0.37		
	Green x-code			Gx		0.30	0.35	0.40		
	Green y-code			Gy		0.54	0.59	0.64		
	Blue x-code			Bx		0.09	0.14	0.19		
	Blue y-code			By		0.05	0.10	0.15		
	White x-code			Wx		0.26	0.31	0.36		
	White y-code			Wy		0.28	0.33	0.38		
	Brightness			Y		500	700	-	cd/m^2	
5	Brightness Uniformity				25	80	-	-	%	6
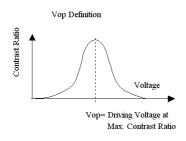
3.2 Definition of optical characteristics

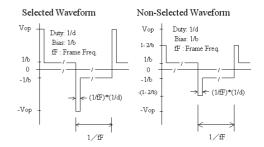**Measurement condition :**
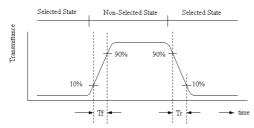
Transmissive and Transflective type

PHOTAL LCD-5000

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

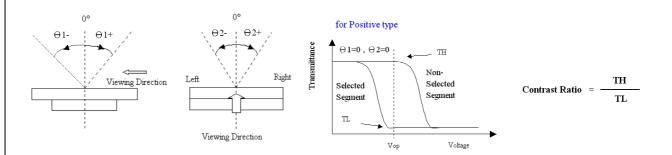**[Note 2] Definition of Response Time**
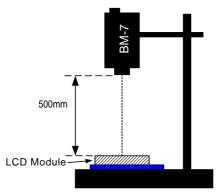
[Note 3] Definition of Viewing Angle :   **[Note 4] Definition of Contrast Ratio :**
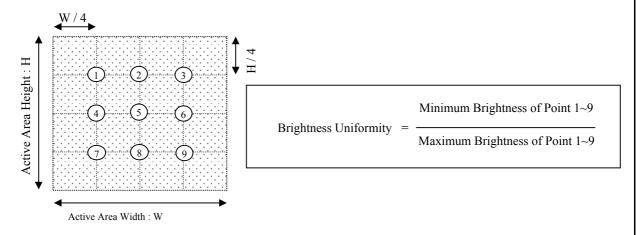
$$\text{Contrast Ratio} = \frac{TH}{TL}$$
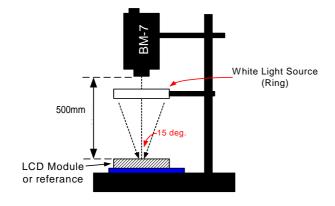
[Note 5] Definition of measurement of Color Chromaticity and Brightness

BM-7

500mm

LCD Module

[Note 6] Definition of Brightness Uniformity

W / 4

Active Area Height : H

H / 4

① ② ③
④ ⑤ ⑥
⑦ ⑧ ⑨

Active Area Width : W

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

[Note 7] Definition of Measurement of Reflectance

BM-7

White Light Source
(Ring)

500mm

15 deg.

LCD Module
or referance

4. RELIABILITY :

Item No	Items	Condition	Note
1	High temperature operating	70 , 200 hours	1
2	Low temperature operating	-20 , 200 hours	1
3	High temperature storage	80 , 200 hours	1
4	Low temperature storage	-30 , 200 hours	1
5	High temperature & humidity storage	60 , 90%RH, 100 hours	2
6	Thermal Shock storage	-30 , 30min.<=> 80 , 30min. 10 Cycles	1
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	

Note 1   The product move into the room temperature for at least 2 hours with no condensation.

Note 2   The product move into the room temperature for at least 24 hours with no condensation.

Note 3 : Please change the display picture (autorun) during operating mode. Avoid displaying static images to avoid image sticking , and the image sticking is accelerated by temperature.

   * 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
      - Function : work normally

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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 : Lead(Pb)-free solder.

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

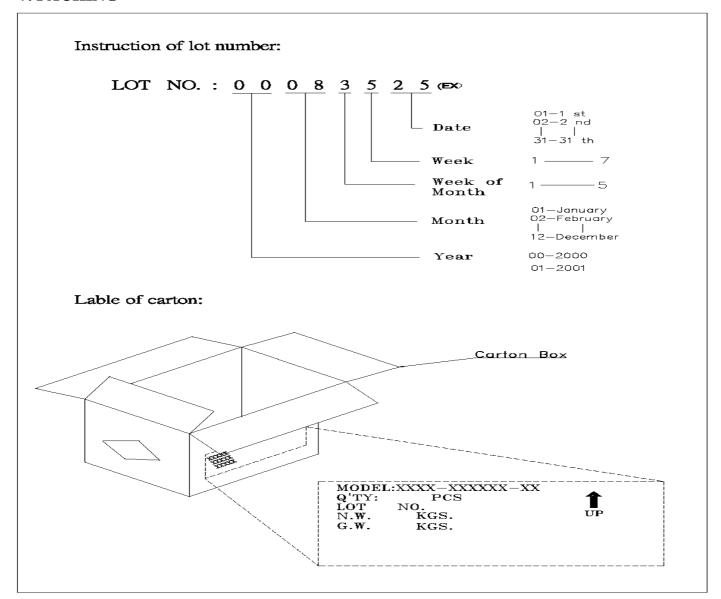Date code will be shown on each product :

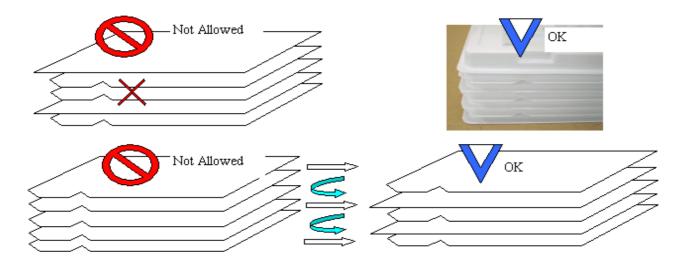<u>YY</u> <u>MM</u> <u>DD - XXXX</u>

Year Month Day - Serial no.

Example: 121108 - 0003 ==> Year 2012, November,8th , Serial no.0003

Note   The lot no. attached on the packing box will be used for tracking once the part is too small to print the date code.

7. PACKING

Instruction of lot number:

LOT NO. : 0 0 0 8 3 5 2 5 (EX)

Date — 01—1 st / 02—2 nd / | | / 31—31 th

Week — 1 ——— 7

Week of Month — 1 ——— 5

Month — 01—January / 02—February / | | / 12—December

Year — 00—2000 / 01—2001

Lable of carton:

Carton Box

```
MODEL:XXXX—XXXXXX—XX
Q'TY:        PCS
LOT    NO.
N.W.        KGS.
G.W.        KGS.
```
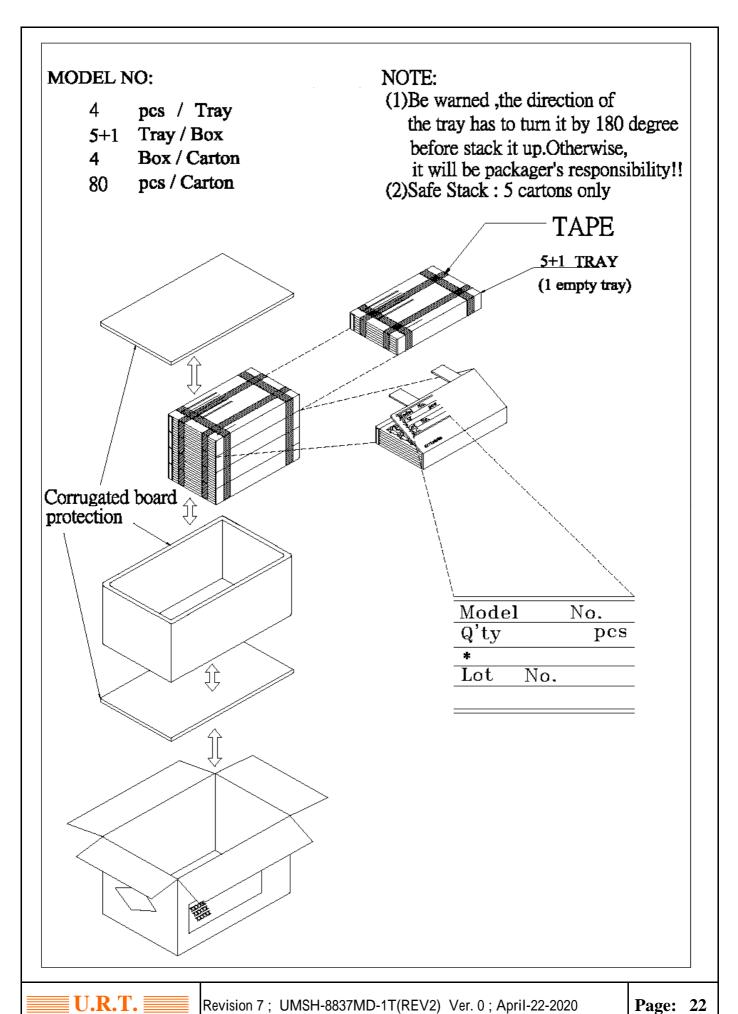UP ↑

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

Not Allowed ✕

OK

Not Allowed ✕

OK

MODEL NO:

4	pcs /	Tray
5+1	Tray /	Box
4	Box /	Carton
80	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

TAPE

5+1 TRAY

(1 empty tray)

Corrugated board
protection

Model	No.
Q'ty	pcs
*	
Lot	No.

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 (SAME AS MIL-STD-105E) , LEVEL   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 300±25 mm. 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

NO.	CLASS	ITEM	JUDGEMENT
8.4.1	MINOR	BLACK AND WHITE SPOT FOREIGN MATERIEL DUST IN THE CELL BLEMISH SCRATCH	(A) ROUND TYPE: unit : mm. 	DIAMETER (mm.)	ACCEPTABLE Q'TY
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0.1	DISREGARD
0.1 < 0.25	3 (Distance>5mm)
0.25 <	0 | NOTE: =(LENGTH+WIDTH)/2 (B) LINEAR TYPE: unit : mm. | LENGTH	WIDTH	ACCEPTABLE Q'TY
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------	W 0.03	DISREGARD
L 5.0	0.03 < W 0.07	3 (Distance>5mm)
------	0.07 < W	FOLLOW ROUND TYPE	
8.4.2	MINOR	BUBBLE IN POLARIZER DENT ON POLARIZER	unit : mm. 	DIAMETER	ACCEPTABLE Q'TY
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0.2	DISREGARD
0.2 < 0.5	2 (Distance>5mm)
0.5 <	0	
8.4.3	MINOR	Dot Defect		Items	ACC. Q'TY
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Bright dot	N 4 (Distance>5mm)
Dark dot	N 4 (Distance>5mm)	 Pixel Define : Note 1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot. Note 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern. Note 3: Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green ,blue pattern.

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. $a > L/3$, $A > 1.5$mm. REJ. 2. B : ACCORDING TO DIMENSION
8.4.8	MINOR	CHIPPING (ON THE TERMINAL AREA)		$= (x+y)/2 > 2.5$ mm REJ.
8.4.9	MINOR	CHIPPING (ON THE TERMINAL SURFACE)		$Y > (1/3) T$ REJ.
8.4.10	MINOR	CHIPPING		$Y > T$ REJ.