SPECIFICATION

OF

ORGANIC LIGHT EMITTING DIODES MODULE

UNITED RADIANT TECHNOLOGY CORP. 光聯科技 Apr-30-2009 品管部 QC DEPT.

CUSTOMER : URT-STD

Model No. : UMOH-8257N-1O

Model version : 0

Document Revision : 3

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

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APPROVED	CHECKED	CHECKED	PREPARED	Date

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Revision record

Document Revision	Model No. Version No.	Description	Revision by
0	UMOH-8257N-O Version No. 0		Jeffry Chen Ken Lin
1	UMOH-8257N-O Version No. 1	1.Modify the interface pin description.	Jeffry Chen Ken Lin 22-Sep-2008
2	UMOH-8257N-O Version No. 2	1. Add Command Sequence. 2. Add Recommended circuit. 3. Modify the Absolute Maximum Ratings. 4. Modify the interface pin description.	Jeffry Chen Ken Lin 20-Feb-2009
3	UMOH-8257N-1O Version No. 0	1.Add touch panel on LCM.	Jeffry Chen Ken Lin 30-Apr-2009

CONTENTS:

1. BASIC SPECIFICATION

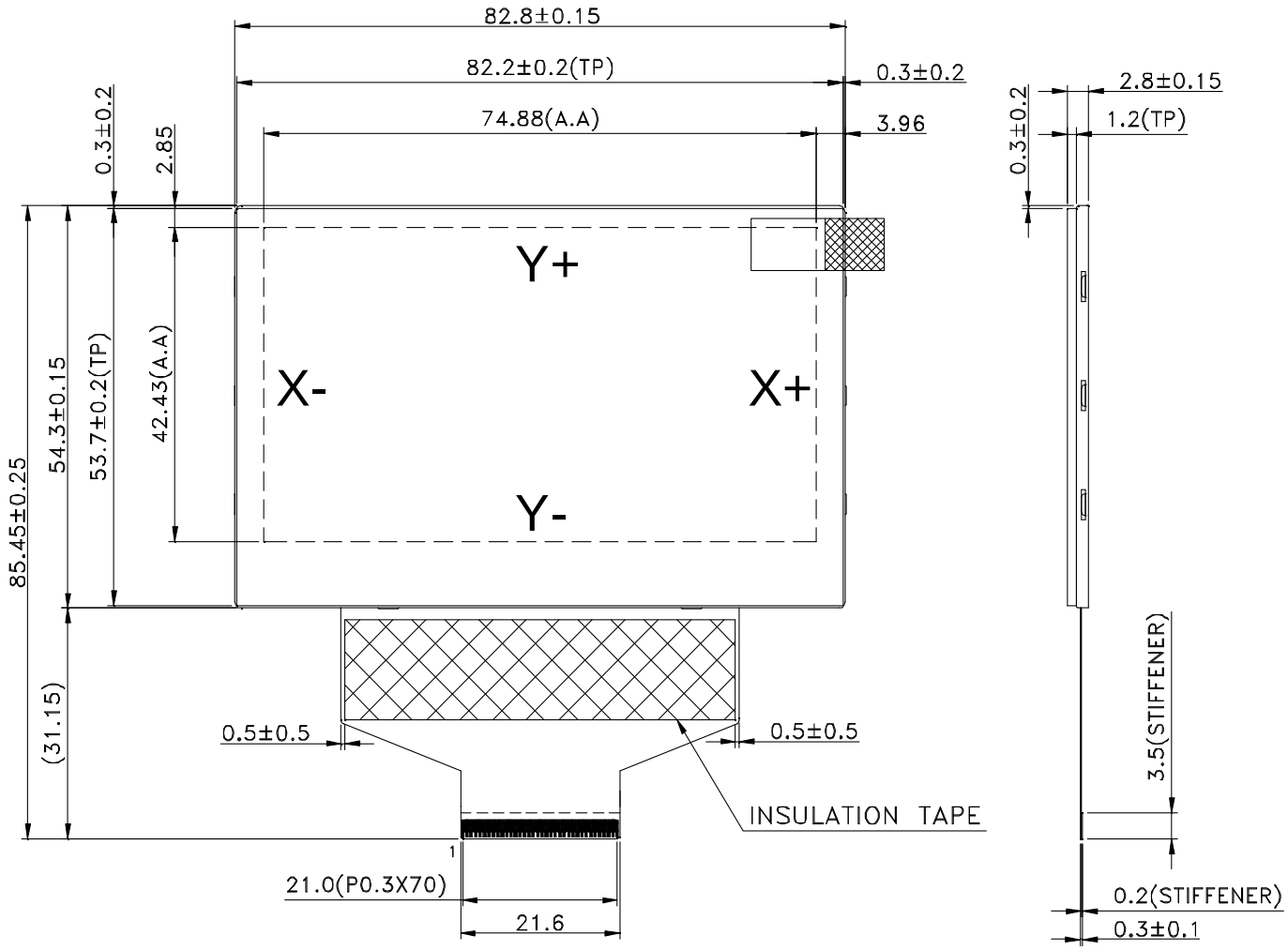
1.1 Mechanical specifications

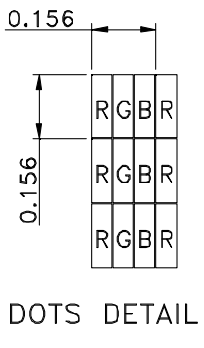
Items	Nominal Dimension	Unit
Dot Matrix	480*RGB*272	dots
Module Size (W x H x T)	82.8 x 85.45 x 2.8	mm.
Active Area (W x H)	74.88 x 42.43	mm.
Dot Pitch (W x H)	0.156 x 0.156	mm.
Driver IC	HX5116	-
Color depth	16M	color
Interface	8 bit serial RGB and 24bit parallel RGB	-
Driving IC Package	COG	-
Weight	TBD	g

1.2 Display specification

Display	Descriptions	Note
Display Type	3.4” OLED	-
Viewing Angle	170°	-

1.3 Outline dimension

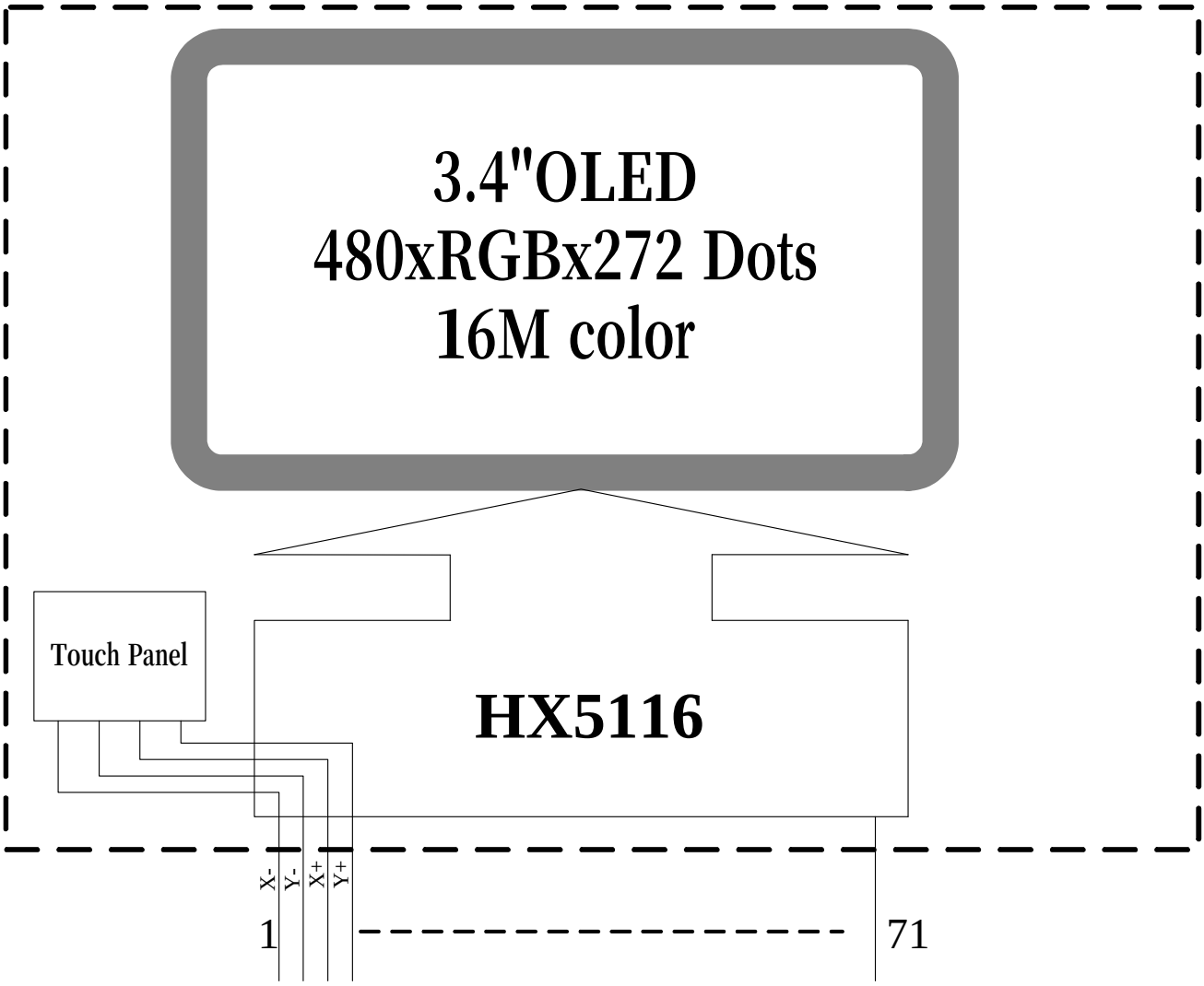




DOTS DETAIL

NOTE :
1. DOT MATRIX : 480 X 272
2. DOT PITCH : 0.156X0.156
3. Connector : HIROSE FH26-71S-0.3SHW

1.4 Block diagram:



1.5 Interface pin :

Pin No.	Pin Symbol	I/O	Description
1	X-	I	Touch panel LEFT.
2	Y-	I	Touch panel BOTTON.
3	X+	I	Touch panel RIGHT.
4	Y+	I	Touch panel TOP.
5~6	AR_VSS	P	Negative voltage for OLED.
7	TEST1_VS	-	Test pin, it must be open.
8~9	AR_VDD	P	Positive voltage for OLED.
10	TEST2_VD	-	Test pin, it must be open.
11	ARREF	P	Panel refers voltage of the regulator ARREF or external input voltage. (- 8V~+8V)
12	VGL	P	Low voltage output of regulator VGL or external input voltage. (- 3V~ - 8V)
13	VGH	P	High voltage output of regulator VGH or external input voltage. (+3V~ + 8V)
14	LVO	P	Negative output voltage of the booter2. (-8.5V)
15	C22N	I/O	Connect to the step-up circuit, capacitors according to the step-up factor. Leave this pin open if the internal step-up circuit is not used.
16	C22P		
17	HVO	P	Positive output voltage of the booter2. (+8.5V)
18	C21P	I/O	Connect to the step-up circuit, capacitors according to the step-up factor. Leave this pin open if the internal step-up circuit is not used.
19	C21N		
20	C11N	I/O	Connect to the step-up circuit, 4 capacitors according to the step-up factor. Leave this pin open if the internal step-up circuit is not used.
21	C11P		
22	C12N		
23	C12P		

1.5.1 Interface Pin : (cont)

<table>
<tr><th>Pin No.</th><th>Pin Symbol</th><th>I/O</th><th>Description</th></tr>
<tr><td>24</td><td>PVSS</td><td>P</td><td>Charge pump ground pin, it must connect to external ground.</td></tr>
<tr><td>25</td><td>DDVDH</td><td>P</td><td>Output voltage of the booster1. (5.1V/6.0V)</td></tr>
<tr><td>26~27</td><td>VSSA</td><td>P</td><td>Analog ground pin. It must connect to external ground.</td></tr>
<tr><td>28~29</td><td>VCI</td><td>P</td><td>A power supply for the Analog circuit. (3.0V~3.6V)</td></tr>
<tr><td>30</td><td>VGAM1OUT</td><td>P</td><td>Output voltage of the VGAM1OUT regulator and used positive power of source driver. (4.8V/5.8V)</td></tr>
<tr><td>31</td><td>VDDD</td><td>P</td><td>Internal logic voltage input or output pin.
VDC_ENB=0, VDDD is output, please connect to 1uF capacitor.
<table>
<tr><th>VDC0</th><th>VDDD</th><th>Status</th></tr>
<tr><td>0</td><td>1.8V</td><td>Normal display</td></tr>
<tr><td>1</td><td>2.5V</td><td>OTP program</td></tr>
</table>
VDC_ENB=1, VDDD is input. (Input range = 1.6V~2.75V)</td></tr>
<tr><td>32</td><td>VCC</td><td>P</td><td>A power supply for the digital circuit. (1.5V~3.6V)</td></tr>
<tr><td>33</td><td>VSSD</td><td>P</td><td>Digital ground pin. It must connect to external ground.</td></tr>
<tr><td>34</td><td>NRESET</td><td>I</td><td>Reset pin. Setting either pin low initializes the LSI. Must be reset after power is supplied. (Normal pull high)</td></tr>
<tr><td>35</td><td>NCS</td><td>I</td><td>Serial interface chip enable pin. (Normal pull high)</td></tr>
<tr><td>36</td><td>SCL</td><td>I</td><td>Serial interface clock input line. (Normal pull high)</td></tr>
<tr><td>37</td><td>SDA</td><td>I</td><td>Serial interface data line. (Normal pull high)</td></tr>
<tr><td>38</td><td>DE</td><td>I</td><td>Data enable: When VSYNC+HSYNC+DE mode, DE=H: Date enable, DE= L: Data disable (Black). (Normal pull high)</td></tr>
<tr><td>39</td><td>VSYNC</td><td>I</td><td>Frame synchronizing signal.
If VSPL= 0: Active low. If VBSPL= 1: Active high.</td></tr>
<tr><td>40</td><td>HSYNC</td><td>I</td><td>Line synchronizing signal.
If HSPL= 0: Active low. If HSPL= 1: Active high.</td></tr>
<tr><td>41</td><td>DCLK</td><td>I</td><td>Dot clock signal.
If DPL= 0: Data are input on the rising edge of DOTCLK.
If DPL= 1: Data are input on the falling edge of DOTCLK.</td></tr>
</table>

1.5.2 Interface Pin : (cont)

Pin No.	Pin Symbol	I/O	Description
42~49	D27~D20	I	Digital data input. DX0 is LSB and DX7 is MSB. (Normal pull low) 1. If parallel RGB input mode is used, D0X, D1X, D2X indicate R, G, and B data in turn. 2. If serial RGB or RGBD or CCIR601 or CCIR656 input mode is selected, only D07~D00 are used, and other short to GND. DX7~DX0 has 8-bit width, respectively to compose 16,77,216 color and 256 gray scale of 1 pixel.
50~57	D17~D10		
58~65	D07~D00		
66	TEST3_W	-	Test pin, it must be open.
67~68	AR_VDD	P	Positive voltage for OLED.
69~70	AR_VSS	P	Negative voltage for OLED.
71	TEST4_P	-	Test pin, it must be open.

2. ELECTRICAL CHARACTERISTICS

2.1 Absolute Maximum Ratings

Items	Symbol	Min.	Max.	Unit
Logic Supply Voltage	VCC	-0.3	+3.6	V
Analog Supply Voltage	VCI	-0.3	+3.6	V
Operating temperature range	T_{OP}	-30	+70	℃
Storage temperature range	T_{ST}	-40	+85	℃

2.2 DC Characteristics

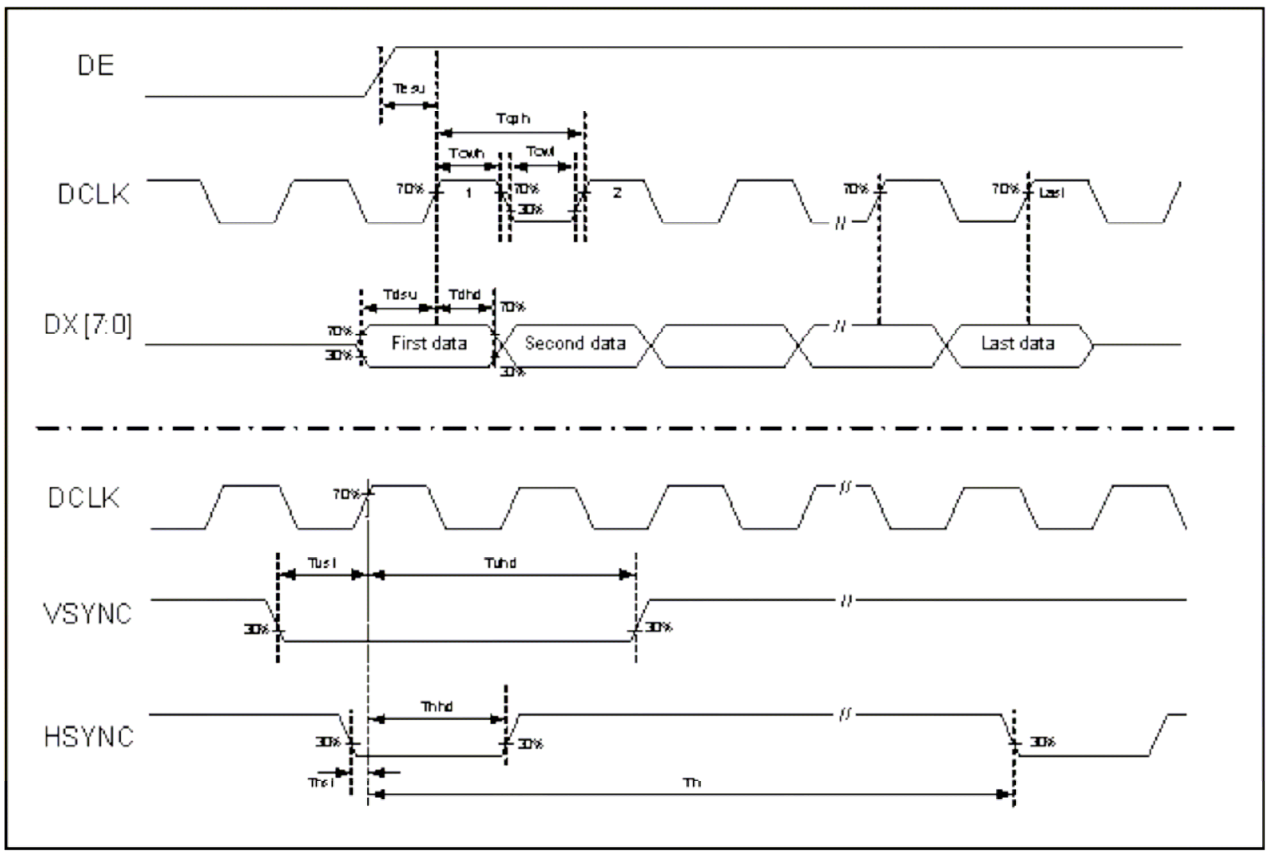
(Unless otherwise specified, Voltage Referenced to VSS = 0V, VCC = 1.5 to 3.6V, T_A = -20 to 70C)

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
System power supply pins of the logic block	VCC	-	1.5	-	3.6	V
Booster Reference Supply Voltage Range	VCI	-	3.0	-	3.6	V
DDVDH Output Voltage 1	DDVDH	Set CP1X=0	4.9	5.1	5.3	V
DDVDH Output Voltage 2	DDVDH	Set CP1X=1	5.8	6.0	6.2	V
VGAM1OUT Output Voltage 1	VGAM1OUT	Set CP1X=0	4.7	4.8	4.9	V
VGAM1OUT Output Voltage 2	VGAM1OUT	Set CP1X=1	5.7	5.8	5.9	V
Gate driver High Output Voltage	VGH	-	+3	-	+8	V
Gate driver Low Output Voltage	VGL	-	-8	-	-3	V
OLED Diode Refer Voltage	ARREF	-	-8	-	+8	V
Logic High Output Voltage	VOH	Iout=-400μA	0.8 * VCC	-	VCC	V
Logic Low Output Voltage	VOL	Iout=400μA	0	-	0.2 * VCC	V
Logic High Input voltage	VIH	-	0.8 * VCC	-	VCC	V
Logic Low Input voltage	VIL		0	-	0.2 * VCC	V
Logic Input Current	IIL/IIH	No pull up or pull low	-1	-	1	μA
Pull high resistance	RH	Pull up pins	600	900	1200	KΩ
Pull low resistance	RL	Pull low pins	600	900	1200	KΩ
High Output Current	IOH	S1~S107, Vo=4.9V vs. 4V	50	-	-	μA
Low Output Current	IOL	S1~S107, Vo=0.1V vs. 1V	-	-	-50	μA
Output leakage Current	IOZ	-	-1	-	1	μA
Output voltage offset	VOS	S1~S107, Vo=0.1V~DDVDH-0.1V		±10		mV
Output voltage deviation	VOD	S1~S107, Vo=0.1V~DDVDH-0.1V		±10		mV
Analog standby current	ISTB	VCI=3.0V, Stand by mode		-	10	uA
Analog operating current	IVCI	VCI=3.0V, S1~S160 no load		-	20	mA
Logic Pins Input Capacitance	CIN	-	-	5	7.5	pF

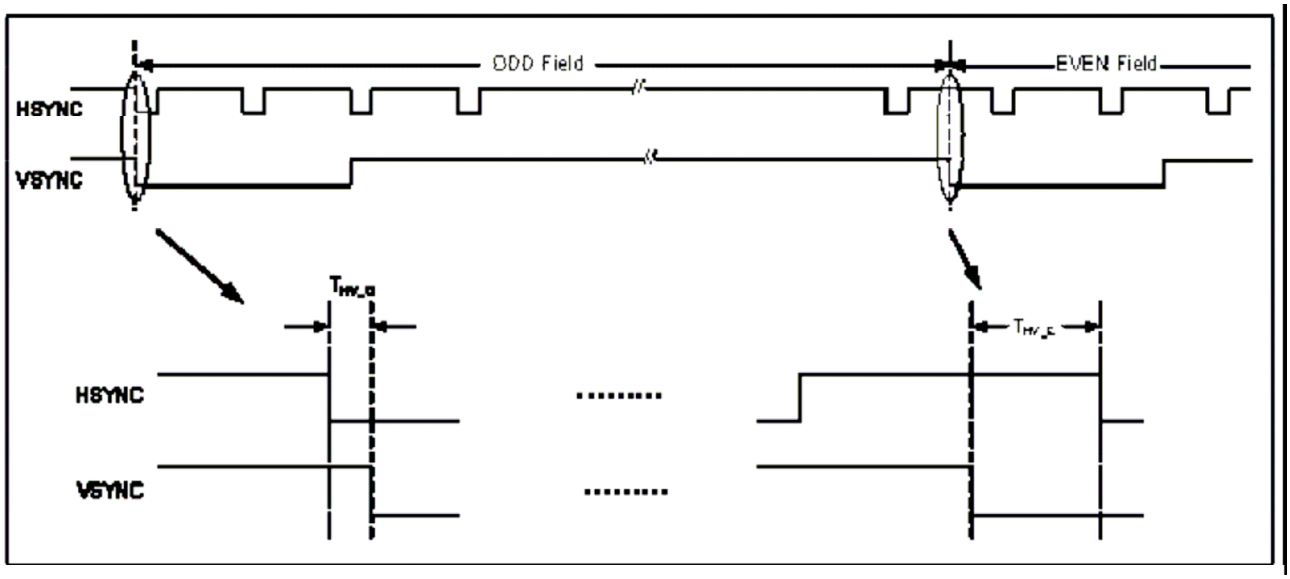
2.3 AC Characteristics

2-3.1 AC Electrical Characteristics:

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
HSYNC setup time	T_{hst}	10	-	-	ns
HSYNC hold time	T_{hhd}	10	-	-	ns
VSYNC setup time	T_{vst}	10	-	-	ns
VSYNC hold time	T_{vhd}	10	-	-	ns
Data setup time	T_{dsu}	10	-	-	ns
Data hold time	T_{dhd}	10	-	-	ns
DE setup time	T_{esu}	10	-	-	ns
VSYNC falling to HSYNC falling time on odd field @ RGB mode	T_{HV_O}	-4	0	+4	T_{CPH}
VSYNC falling to HSYNC falling time on even field @ RGB mode	T_{HV_E}	0.4	0.5	0.6	T_H
Source output settling time	T_{ST}	-	3	-	µs
Source output loading R	R_{SL}	-	25	-	K ohm
Source output loading C	C_{SL}	-	16	-	pF
Gate signals settling time (90%)	T_{GL}	-	0.5	-	µs
Gate signals loading R	R_{GL}	-	5.6	-	K ohm
Gate signals loading C	C_{GL}	-	30	-	pF
SW signals settling time (90%)	T_{SW}	-	0.6	-	µs
SW signals loading R	R_{SW}	-	1.4	-	K ohm
SW signals loading C	C_{SW}	-	85.5	-	pF



Clock and Data input waveforms

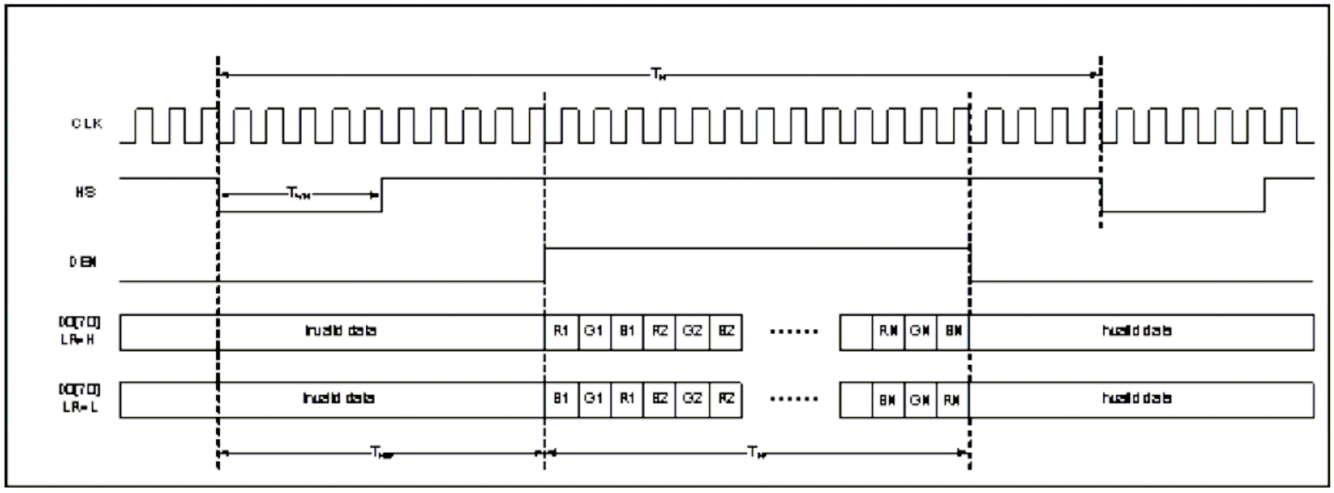


Define the HSYNC to VSYNC timing for RGB mode

2-3.2 480 x RGB x 272 serial RGB interface:

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
DCLK frequency	F_{CPH}	33.3	-	-	MHz
DCLK period	T_{CPH}	-	-	30	ns
DCLK pulse duty	T_{CWH}	40	50	60	%
HSYNC period	T_H	-	1836	-	T_{CPH}
HSYNC pulse width	T_{WH}	5	90	-	T_{CPH}
HSYNC-first horizontal data time	T_{HBP}	274	306	337	T_{CPH}
DE pulse width	T_{EP}	-	1440	-	T_{CPH}
VSYNC pulse width	T_{WV}	1	3	5	T_H
VSYNC-1st Data input (DE) time	T_{VBP}	4	20	35	T_H
VSYNC period	T_V	302	-	-	T_H

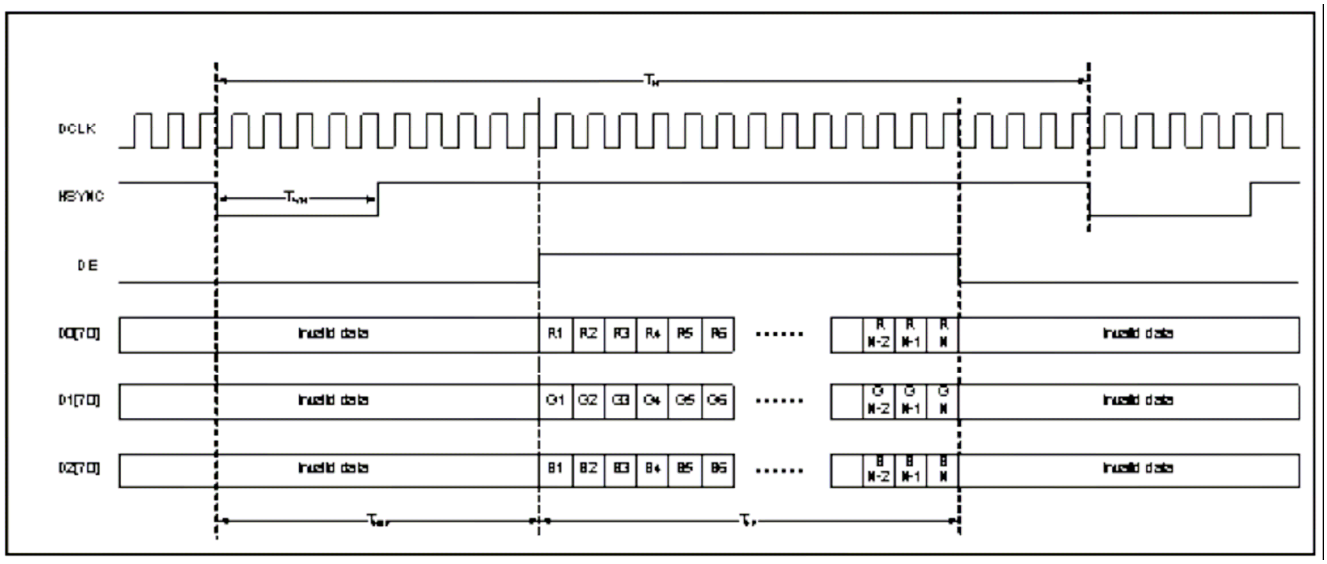
Serial RGB Horizontal Data Format:



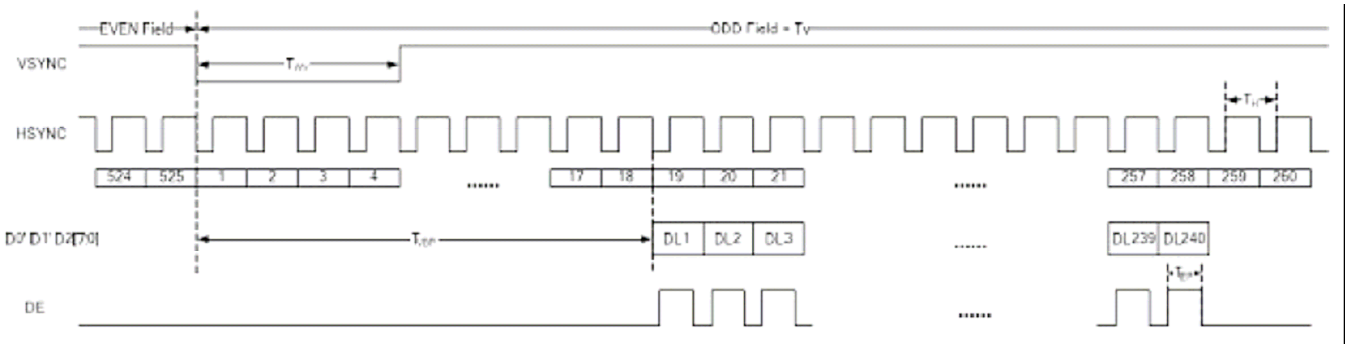
2-3.3 480 x RGB x 272 parallel RGB interface:

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
DCLK frequency	F_{CPH}	11.1	-	-	MHz
DCLK period	T_{CPH}	-	-	90	ns
DCLK pulse duty	T_{CWH}	40	50	60	%
HSYNC period	T_H	-	612	-	T_{CPH}
HSYNC pulse width	T_{WH}	5	30	-	T_{CPH}
HSYNC-first horizontal data time	T_{HBP}	70	102	133	T_{CPH}
DE pulse width	T_{EP}	-	480	-	T_{CPH}
VSYNC pulse width	T_{WV}	1	3	5	T_H
VSYNC-1st Data input (DE) time	T_{VBP}	4	20	35	T_H
VSYNC period	T_V	302	-	-	T_H

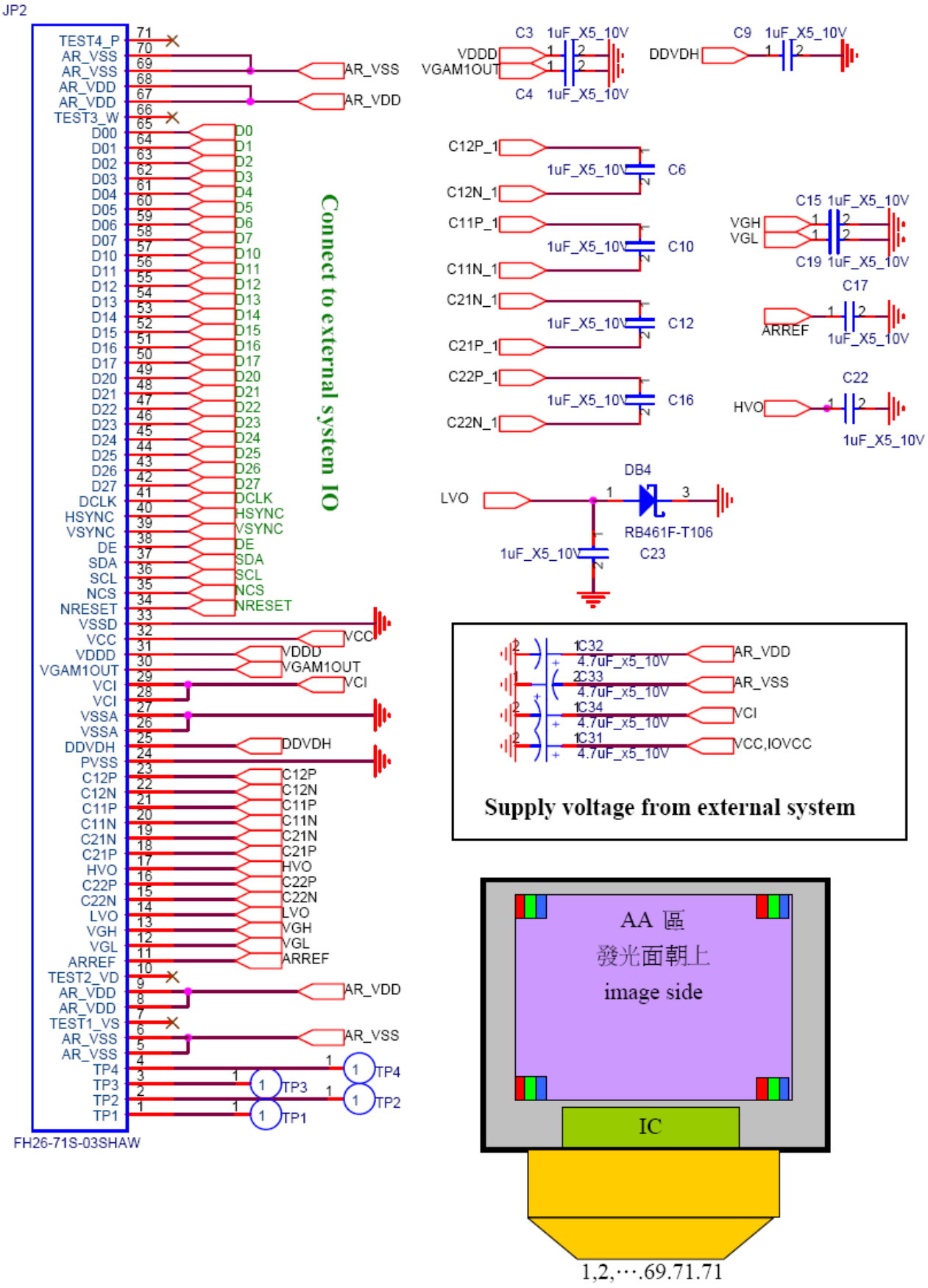
Parallel RGB Horizontal Data Format



Digital RGB Vertical Data Format



2.4 Recommended circuit



2.5 Command Sequence (Recommend by U.R.T.)

2.5-1 Display command of parallel RGB interface:

24-bit parallel RGB (DE)

```
Index_out(0x04); Parameter_out(0x23); //set display mode 24-bit parallel RGB (DE)
Index_out(0x05); Parameter_out(0x82); //set display mode
Index_out(0x07); Parameter_out(0x0F); //set driver capability
Index_out(0x34); Parameter_out(0x18); //set display timing
Index_out(0x35); Parameter_out(0x28); //set display timing
Index_out(0x36); Parameter_out(0x16); //set display timing
Index_out(0x37); Parameter_out(0x01); //set display timing
Index_out(0x02); Parameter_out(0x02); //OTP On
Index_out(0x0A); Parameter_out(0x3B); //VGHVGL=+5/-7V
Index_out(0x09); Parameter_out(0x17); //VGAM1OUT=4.59V
Index_out(0x10); Parameter_out(0x06); //set R slop
Index_out(0x11); Parameter_out(0x07); //set G slop
Index_out(0x12); Parameter_out(0x05); //set B slop
Index_out(0x13); Parameter_out(0x00); //set R_0
Index_out(0x14); Parameter_out(0x04); //set R_10
Index_out(0x15); Parameter_out(0x05); //set R_36
Index_out(0x16); Parameter_out(0x07); //set R_80
Index_out(0x17); Parameter_out(0x05); //set R_124
Index_out(0x18); Parameter_out(0x05); //set R_168
Index_out(0x19); Parameter_out(0x04); //set R_212
Index_out(0x1A); Parameter_out(0x07); //set R_255
Index_out(0x1B); Parameter_out(0x00); //set G_0
Index_out(0x1C); Parameter_out(0x05); //set G_10
Index_out(0x1D); Parameter_out(0x06); //set G_36
Index_out(0x1E); Parameter_out(0x07); //set G_80
Index_out(0x1F); Parameter_out(0x07); //set G_124
Index_out(0x20); Parameter_out(0x06); //set G_168
Index_out(0x21); Parameter_out(0x05); //set G_212
Index_out(0x22); Parameter_out(0x06); //set G_255
```

Index_out(0x23); Parameter_out(0x00); //set G_0
Index_out(0x24); Parameter_out(0x06); //set B_10
Index_out(0x25); Parameter_out(0x06); //set B_36
Index_out(0x26); Parameter_out(0x07); //set B_80
Index_out(0x27); Parameter_out(0x05); //set B_124
Index_out(0x28); Parameter_out(0x04); //set B_168
Index_out(0x29); Parameter_out(0x03); //set B_212
Index_out(0x2A); Parameter_out(0x00); //set B_255
Index_out(0x06); Parameter_out(0x03); //set display on
AR_VDD= +5.0V
AR_VSS= -5.0V

2.5-2 Display command of serial RGB interface:

8-bit serial RGB (DE)

Index_out(0x04); Parameter_out(0x21); //set display mode 8-bit serial RGB (DE)
Index_out(0x05); Parameter_out(0x82); //set display mode
Index_out(0x07); Parameter_out(0x0F); //set driver capability
Index_out(0x34); Parameter_out(0x48); //set display timing
Index_out(0x35); Parameter_out(0x78); //set display timing
Index_out(0x36); Parameter_out(0x42); //set display timing
Index_out(0x37); Parameter_out(0x01); //set display timing
Index_out(0x02); Parameter_out(0x02); //OTP On
Index_out(0x0A); Parameter_out(0x3B); //VGHVGL=+5/-7V
Index_out(0x09); Parameter_out(0x17); //VGAM1OUT=4.59V
Index_out(0x10); Parameter_out(0x06); //set R slop
Index_out(0x11); Parameter_out(0x07); //set G slop
Index_out(0x12); Parameter_out(0x05); //set B slop
Index_out(0x13); Parameter_out(0x00); //set R_0
Index_out(0x14); Parameter_out(0x04); //set R_10
Index_out(0x15); Parameter_out(0x05); //set R_36
Index_out(0x16); Parameter_out(0x07); //set R_80
Index_out(0x17); Parameter_out(0x05); //set R_124
Index_out(0x18); Parameter_out(0x05); //set R_168
Index_out(0x19); Parameter_out(0x04); //set R_212
Index_out(0x1A); Parameter_out(0x07); //set R_255

Index_out(0x1B); Parameter_out(0x00); //set G_0
Index_out(0x1C); Parameter_out(0x05); //set G_10
Index_out(0x1D); Parameter_out(0x06); //set G_36
Index_out(0x1E); Parameter_out(0x07); //set G_80
Index_out(0x1F); Parameter_out(0x07); //set G_124
Index_out(0x20); Parameter_out(0x06); //set G_168
Index_out(0x21); Parameter_out(0x05); //set G_212
Index_out(0x22); Parameter_out(0x06); //set G_255
Index_out(0x23); Parameter_out(0x00); //set G_0
Index_out(0x24); Parameter_out(0x06); //set B_10
Index_out(0x25); Parameter_out(0x06); //set B_36
Index_out(0x26); Parameter_out(0x07); //set B_80
Index_out(0x27); Parameter_out(0x05); //set B_124
Index_out(0x28); Parameter_out(0x04); //set B_168
Index_out(0x29); Parameter_out(0x03); //set B_212
Index_out(0x2A); Parameter_out(0x00); //set B_255
Index_out(0x06); Parameter_out(0x03); //set display on
AR_VDD= +5.0V
AR_VSS= -5.0V

3. OPTICAL CHARACTERISTICS

3.1 Characteristics

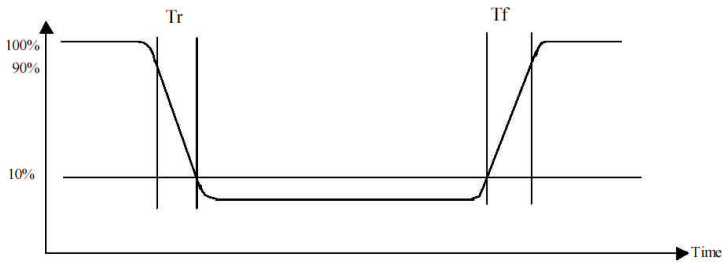
Electrical and Optical Characteristics

No.	Item	symbol / temp.	Min.	Typ.	Max.	Unit	Note
1	Response Time	Tres	-	-	50	us	2
2	Viewing Angle	VA	160	170	-	degree	3
3	Contrast	Cr	5000:1	10000:1	-	-	4
4	Operating Luminance	L	136	160	184	cd/m^2	-

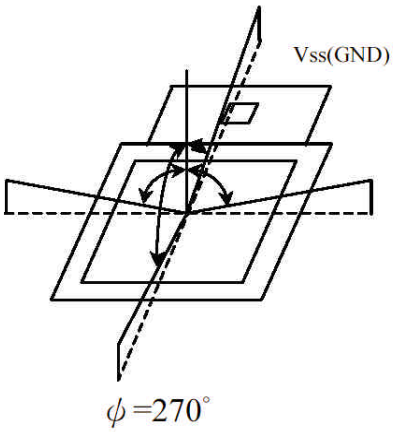
3.2 Definition of optical characteristics

Measurement condition :

[Note 2] Definition of Response Time



[Note 3] Definition of Viewing Angle :



[Note 4] Definition of Contrast Ratio :

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

4. RELIABILITY :

Item No	Items	Condition
1	High temperature operating	70 °C , 200 hours
2	Low temperature operating	-30 °C , 200 hours
3	High temperature storage	85 °C , 200 hours
4	Low temperature storage	-40 °C , 200 hours
5	High temperature & humidity storage	60°C, 90%RH, 100 hours
6	Thermal Shock storage	-40°C, 30min.<=> 85°C, 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°C , 70%RH below , 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 OLED MODULE

- The LCD module contains a C-MOS LSI. People who operate the OLED module should wear ESD protection eguipement to prevent ESD hurt on products.
- Do not input any signal before power is turned on.
- Do not take OLED module from its packaging bag until it is assembled.
- Peel off the OLED module 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 OLED module.
- 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 OLED module:

  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 FOR STORING OLED MODULE

- 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℃)

☐ 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 :

- **Y MM DD - XXX**

  Year Month Day - Production lots

- Example: 2 1 2 2 3 - 0 0 3 ==>Year 2002, Dec.,23rd , Batch no.03

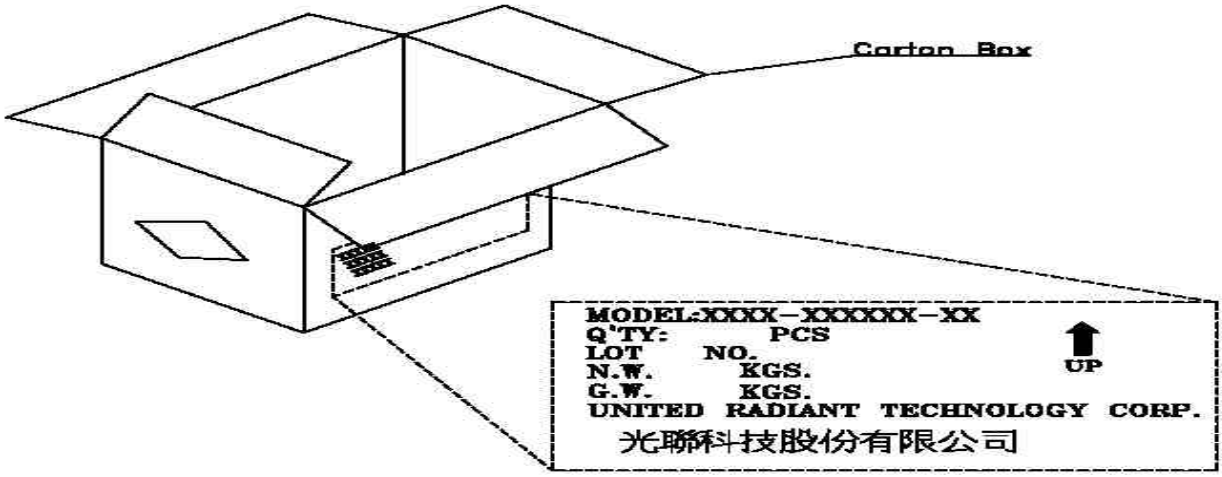
7. PACKING

Instruction of lot number:

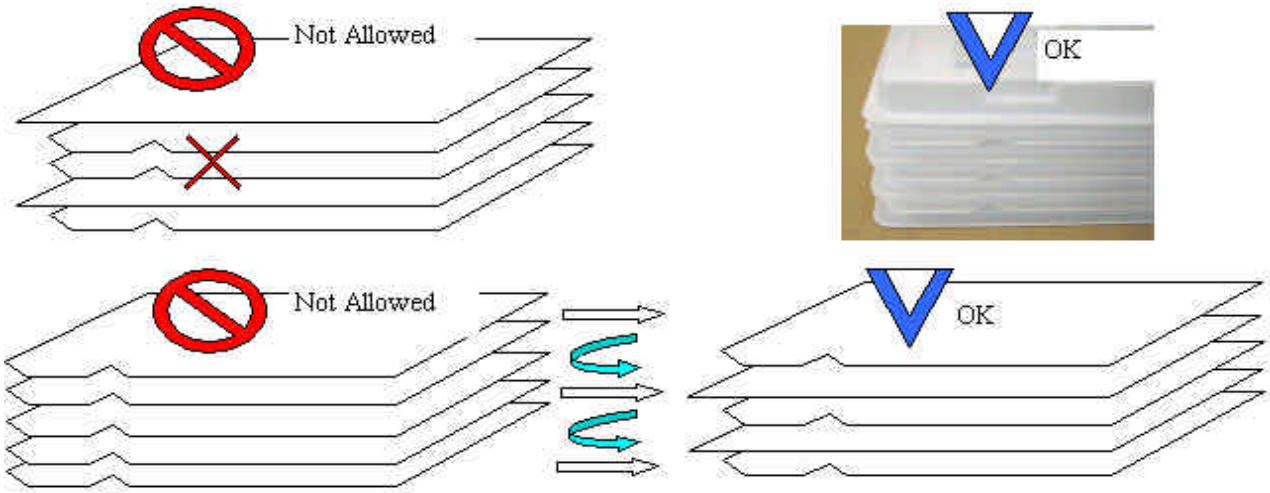
LOT NO. : 0 0 0 8 3 5 2 5 (EX)

- Date: 01—1 st, 02—2 ed, ... 31—31 th
- Week: 1 ——— 6
- Week of Month: 1 ——— 5
- Month: 01—January, 02—February, ... 12—December
- Year: 00—2000, 01—2001

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.



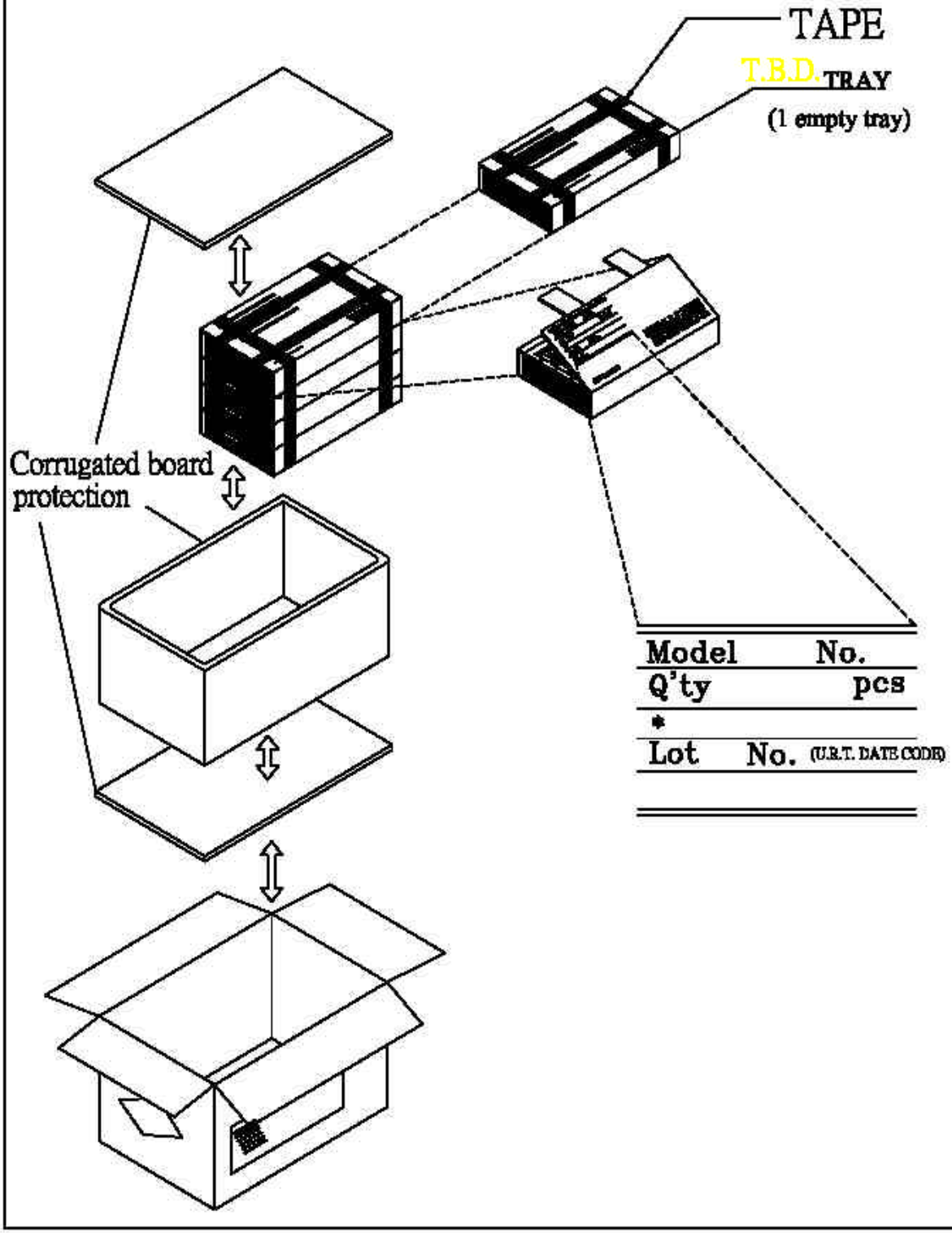
MODEL NO: UM*

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.

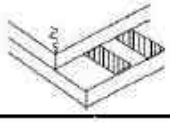
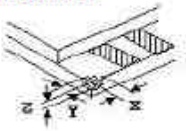
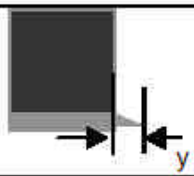
8.2.2. CHECKER SHALL SEE OVER 30 cm. WITH BARE EYES FAR FROM SAMPLE AND USING 2 PCS. OF 20W FLUORESCENT LAMP.

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

External appearance defect

<table>
<tr><th>Item</th><th>Description</th><th>Criterion</th></tr>
<tr><td rowspan="4">Panel</td><td>Glass scratch</td><td>0.05<W≦0.1mm, 0.3<L≦2.0mm , N≦3</td></tr>
<tr><td>Glass crack</td><td>Crack: Propagation crack is not acceptable
  </td></tr>
<tr><td rowspan="2">Glass chip</td><td>Chip on corner
 
<table>
<tr><td>x</td><td>≦1.5 mm</td></tr>
<tr><td>y</td><td>≦2. 0 mm</td></tr>
<tr><td>z</td><td>≦t</td></tr>
</table>
1.) t=Glass thickness
2.) Chip on the corner extending into the ITO contact is not acceptable
3.) Chip on the corner is not acceptable when it extends into the seal or makes the exposure</td></tr>
<tr><td> 
Lead & customer alignment mark can't be damaged.</td></tr>
<tr><td>Glass burr</td><td> 
y ≦ 0.5mm</td></tr>
<tr><td rowspan="3">Polarizer</td><td>Scratch</td><td>Line type in accordance with criteria of "Glass item"</td></tr>
<tr><td>Stains on surface</td><td>Stains which cannot be moved even when wiped lightly with a soft cloth or similar cleaning are not acceptable</td></tr>
<tr><td>Polarizer bubble</td><td>
<table>
<tr><th>Size</th><th>Number of pieces permitted</th></tr>
<tr><td>φ ≦0.3mm</td><td>Ignore</td></tr>
<tr><td>0.3mm< φ ≦0.5mm</td><td>2</td></tr>
<tr><td>φ >0.5mm</td><td>0</td></tr>
</table>
</td></tr>
<tr><td rowspan="2">Displaying</td><td>Power consumption</td><td>The module operating current consumption should not go beyond the standard indicated in product specification</td></tr>
<tr><td>Pixel size</td><td>The tolerance of display pixel dimension should be within ±25% of specification</td></tr>
</table>

8.4. STANDARD OF VISUAL INSPECTION

	Non-displaying	Not allowable	
	Line defect	Not allowable	
	Black line/White line/Particle/Scratch	0.05＜W≦0.1 mm, 0.3＜L≦2.0 mm, N≦3	
	Color	Refer to the spec	
	Luminance	Refer to the spec	
	Dimming spot, Lighting spot, Dust	 b a D=(a+b)/2	0.1 mm<D≦0.3mm, N≦3
	Dot defect	Bright dot	N≦0
		Dark dot	N≦5
	Mura	Serious mura not allowable	
FPC / COG	Dimension Out of spec.	FPC dimension out of spec.	
	Damage	Crack on the FPC/COG deep scratch on the FPC/COG, deep fold on the FPC, deep pressure mark on the FPC/COG or other damage are not acceptable	
	Foreign material	Conductive foreign material sticking to the leads, foreign material and pin-hole between the FPC/COG and the glass are not acceptable	
Metal Frame	Appearance	Any scratch or contamination outside the viewing can be ignored.	
Dimension	Dimension out of spec	Refer to the drawing of the spec	