SPECIFICATION

OF

LIQUID CRYSTAL DISPLAY MODULE

Jan-07-2025

CUSTOMER : URT-STD

Model No. : UMOH-9855JD-T

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**

Joe Wu	Ashin Chiu	Jenny Wang	Jan-07-2025
APPROVED	CHECKED	PREPARED	Date

COMPANY : No. 2,Fu-hsing Road,Taichung Tanzi Technology Industrial Park,Tantzu,Taichung,Taiwan,R.O.C.
TEL: 886-4-25314277   FAX: 886-4-25313067

This document has been signed by Digital Signature Approval System

Document Revision	Model No. Version No.	Description	Revision by
0	UMOH-9855JD-T Version No. 0	15.6" TFT.	C.K.T Chen Andy Lai 07-Jan-2025

CONTENTS:

1. BASIC SPECIFICATION

1.1 Mechanical specifications

Items	Nominal Dimension	Unit
Active screen size	15.6" Diagonal	-
Number of Pixel	1920 x RGB x 1080	Pixels
Module Size (W x H x T)	360.0 x 212.3 x 5.7	mm.
Active Area (W x H)	344.16 x 193.59	mm.
Pixel Size (W x H)	0.17925 x 0.17925	mm.
Color depth	16.7M	color
Interface	eDP/2Lane	-
Module weight	TBD±10％	g

1.2 Display specification

Display	Descriptions	Note
LCD Type	TFT	-
LCD Mode	Normally black	-
Polarizer Mode	Transflective	-
Surface treatment	Anti-glare , Hard-Coating (3H)	-
Pixel arrangement	RGB Vertical stripe	-
Backlight Type	Single LED(Dual-Light type)	-
Viewing Direction	70/70/70/70	degree

1.3 Outline dimension

NOTE:
1. DISPLAY: 15.6"TFT TRANSFLECTIVE
2. VIEW DIRECTION: ALL
3. DRIVER IC:
4. BL LED: 01JB.ZF4014W65P00
5. OPERATION TEMP.:
6. STORAGE TEMP.:
7. UNSPECIFIED TOLERANCES IS ±0.2mm
8. ALL MATERIAL AND PROCESSING SHOULD BE LEAD FREE

212.3±0.3(OUTLINE)
197.49(BEZ Opening)
196.7(UP POL)
193.59(A.A)
106.13
7.77
9.33
6.71
5.41

1920*1080

178.79

360±0.3(OUTLINE)
347.56(BEZ Opening)
346.76(UP POL)
344.16(A.A)

330±5
black
white

8.5 Max

5.7±0.3

Backlight LED Circuit

A○

○K

U.R.T.

1.4 Block diagram:
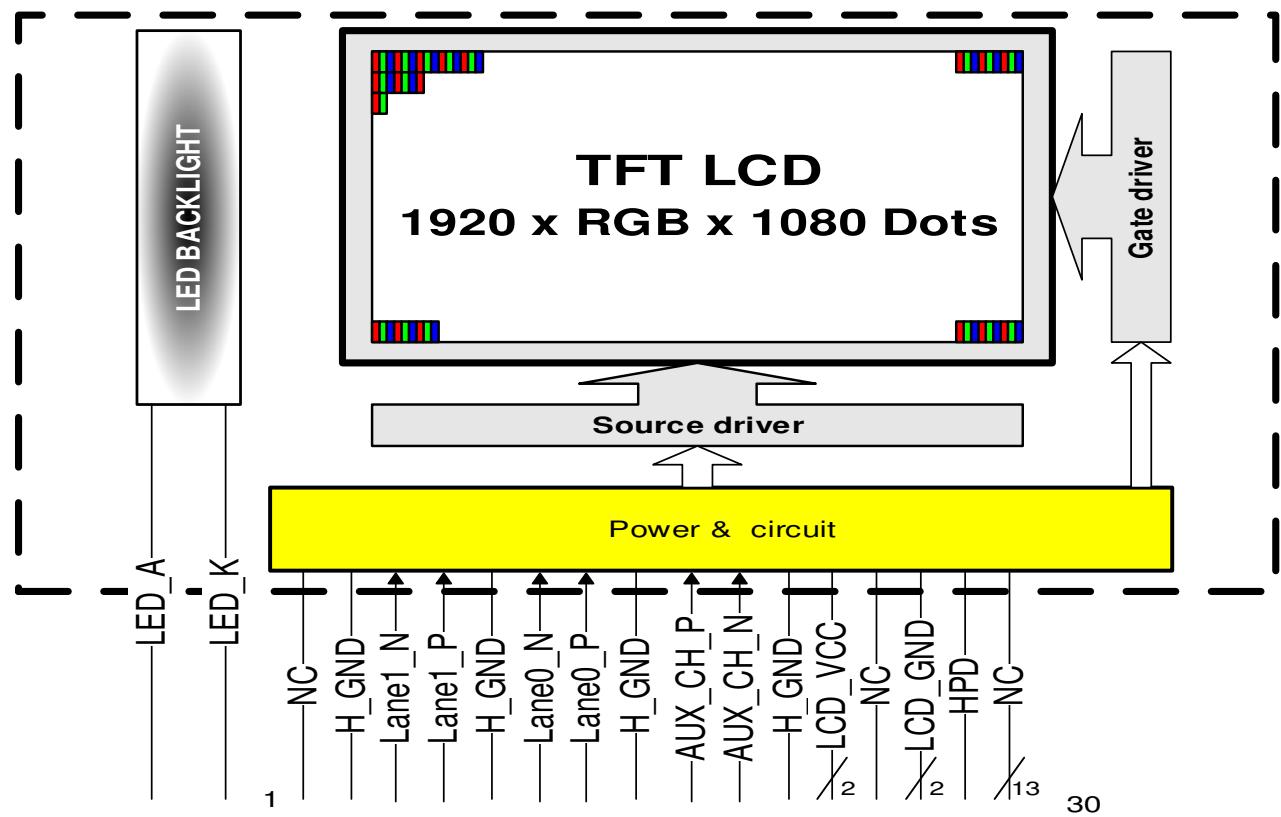
Pixel Format
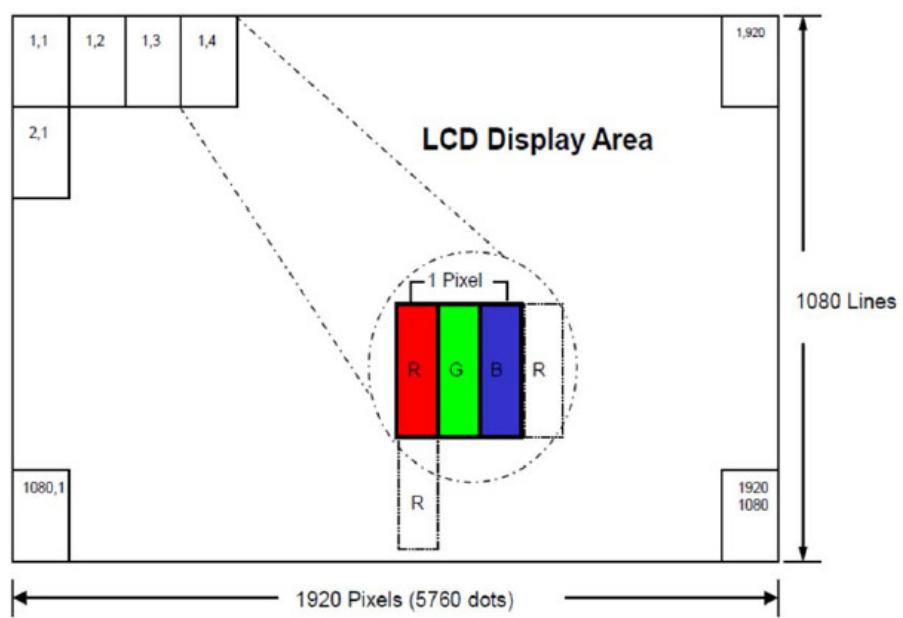
1.5 Interface Pin Connection:

LCM Input Connector: 20455-030E-76(I-PEX) (EDP Signal ,3.3V DC Supply)
The recommended connector is: 20453-030T-03 (I-PEX) or other Equivalent

Pin No.	Pin Symbol	I/O	Description	Note
1	NC	-	No connected.	2
2	H_GND	P	High speed Ground.	1
3	Lane1_N	I	complement signal Link Lane 1.	-
4	Lane1_P	I	True signal Link Lane 1.	-
5	H_GND	P	High speed Ground.	1
6	Lane0_N	I	complement signal Link Lane 0.	-
7	Lane0_P	I	True signal Link Lane 0.	-
8	H_GND	P	High speed Ground.	1
9	AUX_CH_P	I	True signal Auxiliary channel.	-
10	AUX_CH_N	I	complement signal Auxiliary channel.	-
11	H_GND	P	High speed Ground.	1
12~13	LCD_VCC	P	LCD logic and driver power(3.3V)	-
14	NC	-	No connected.	2
15~16	LCD_GND	P	LCD logic and driver ground.	-
17	HPD	O	HPD Signal.	-
18~30	NC	-	No connected.	2

Note1：

*1 P:Power   I:Input   O:Output

The shielding case is connected with signal GND

· Connector used：20455-030E-76 (I-PEX)

· Corresponding connector：20453-030T (I-PEX)

(URT is not responsible to its product quality, if the user applies a connector not corresponding to the Above model.)

All terminals except NC terminal must be connected to input signal described as above or supply voltage or GND each.

Note2：

Do not input any signals or any powers into a NC pin. Keep the NC pin open.

Back-light Interface：

CN LED Power Source (BHSR-02VS-1) or equivalent

Mating connector:(SBHT-002T-P0.5) or equivalent

Pin No.	Pin Symbol	I/O	Description	Note
1	LED_A	P	LED+	
2	LED_K	P	LED-	

2. Electrical Characteristics

2.1 Absolute Maximum Ratings

GND=0V, Ta= 25°C

Items	Symbol	Min.	Max.	Unit
Power supply voltage	LCD_VCC	-0.3	4.0	V
	VOP	-	4.2	V
Input voltage (eDP)	V1	-0.3	1.5	V
Operate temperature range	TOP	-30	80	°C
Storage temperature range	TST	-40	90	°C

2.2 DC Characteristics:

GND=0V, T_a= 25°C

Items	Symbol	Min.	Typ.	Max.	Unit	Condition
Supply voltage	LCD_VCC	3.0	3.3	3.6	V	-
	VGL	-	-10	-	V	-
	VGH	-	23.0	-	V	-
	VCOM	3.7	-	5.7	V	-
Current consumption	I_{LCD_VCC}	-	180	270	mA	Note1

Note 1: AGND=0, Test Pattern: White Pattern.

2.3 Back-light only Specification :

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition	Note
LED B/L Forward Current	IF	-	300	-	mA	Ta=25℃	3
LED B/L Forward Voltage	VF	-	29	32	V	Ta=25℃	-
Half-Life Time	Lf	50000	-	-	hrs	Ta=25℃	2、3

[Note 1]

Test Condition: LED current 300 mA

[Note 2]

LED life time(Hr) can be defind as the time in which it continues to operate under the condition：
Ta=25±3℃, typical IF value indicated in the above table until the brightness becomes less than 50%.

[Note 3]

The "LED life time" is defined as the module brightness decrease to 50% original brightness at
Ta=25℃ and IF=450mA. The LED lifetime could be decreased if operating IF is larger than 450mA.
The constant current driving method is suggested.

Backlight LED Circuit
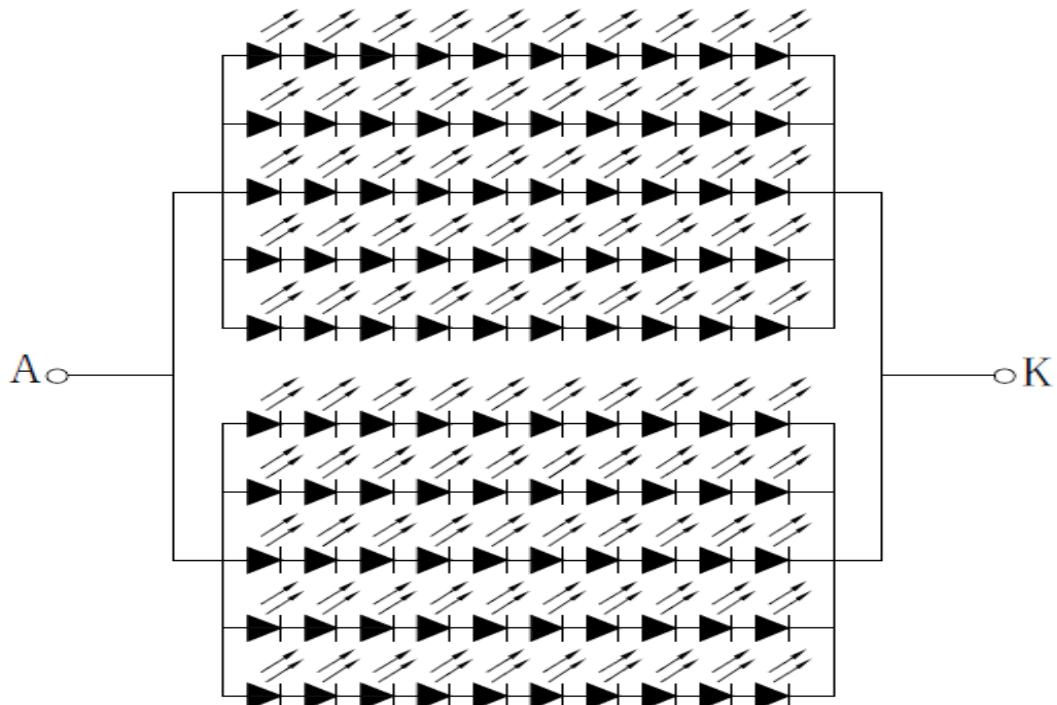
2.4 Timing characteristics of input signals

Refresh rate 60Hz

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK	Frequency	1/Tc	151.6	152.84	154.04	MHz	-
DE	Vertical Total Time	TV	1128	1132	1136	TH	-
	Vertical Active Display Period	TVD	1080	1080	1080	TH	-
	Vertical Active Blanking Period	TVB	TV-TVD	52	TV-TVD	TH	-
	Horizontal Total Time	TH	2240	2250	2260	Tc	-
	Horizontal Active Display Period	THD	1920	1920	1920	Tc	-
	Horizontal Active Blanking Period	THB	TH-THD	330	TH-THD	Tc	-

Refresh rate 50Hz (Power Saving Mode)

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK	Frequency	1/Tc	126.35	127.35	128.35	MHz	-
DE	Vertical Total Time	TV	1128	1132	1136	TH	-
	Vertical Active Display Period	TVD	1080	1080	1080	TH	-
	Vertical Active Blanking Period	TVB	TV-TVD	52	TV-TVD	TH	-
	Horizontal Total Time	TH	2240	2250	2260	Tc	-
	Horizontal Active Display Period	THD	1920	1920	1920	Tc	-
	Horizontal Active Blanking Period	THB	TH-THD	330	TH-THD	Tc	-

Refresh rate 50Hz (Power Saving Mode)

| Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK	Frequency	1/Tc	121.3	122.26	123.22	MHz	-
DE	Vertical Total Time	TV	1128	1132	1136	TH	-
	Vertical Active Display Period	TVD	1080	1080	1080	TH	-
	Vertical Active Blanking Period	TVB	TV-TVD	52	TV-TVD	TH	-
	Horizontal Total Time	TH	2240	2250	2260	Tc	-
	Horizontal Active Display Period	THD	1920	1920	1920	Tc	-
	Horizontal Active Blanking Period	THB	TH-THD	330	TH-THD	Tc	-

Note (1) The panel can operate at 60Hz normal mode and power saving mode, respectively. All reliability tests are based on specific timing of 60Hz refresh rate. We can only assure the panel's electrical function at power saving mode.

INPUT SIGNAL TIMING DIAGRAM

U.R.T.
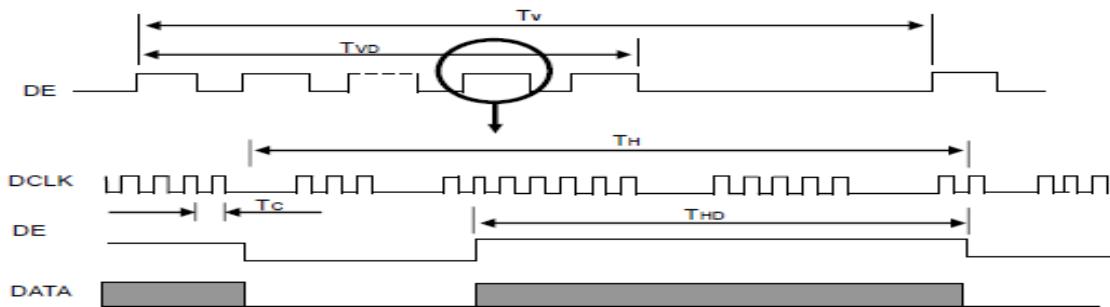
2.4.1 eDP interface timing specifications

| Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Differential Signal Common Mode Voltage(MainLink and AUX)	VCM	0		2	V	(1)(4)
AUX AC Coupling Capacitor	C_AUX_Source	75		200	nF	(2)
Main Link AC Coupling Capacitor	C_ML_source	75		200	nF	(3)

Note (1) Display port interface related AC coupled signals should follow VESA DisplayPort Standard Version1. Revision 1a and VESA Embedded DisplayPort^{TM} Standard Version 1.2. There are many optional items described in eDP1.2. If some optional item is requested, please contact us.

Single Ended
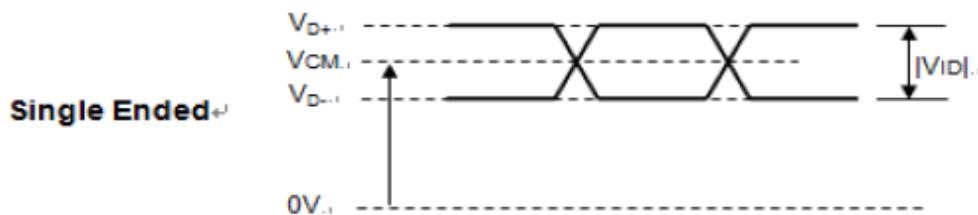
(2) Recommended eDP AUX Channel topology is as below and the AUX AC Coupling Capacitor (C_Aux_Source) should be placed on the source device..
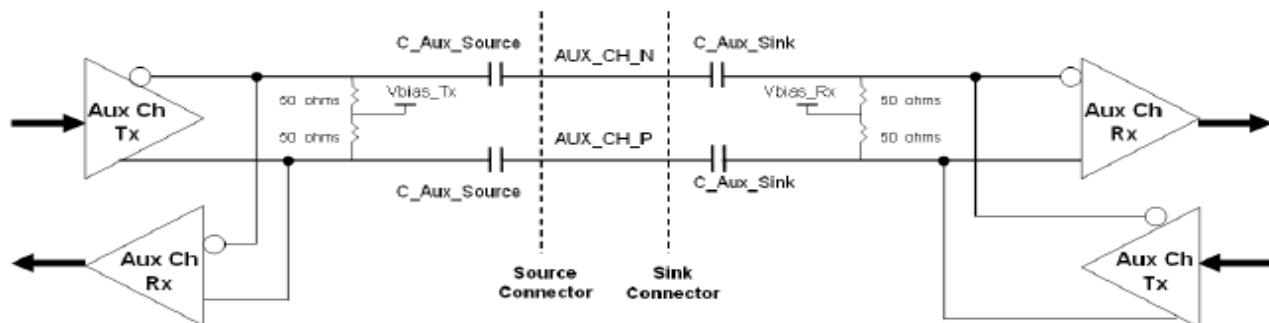
(3) Recommended Main Link Channel topology is as below and the Main Link AC Coupling Capacitor (C_ML_Source) should be placed on the source device.
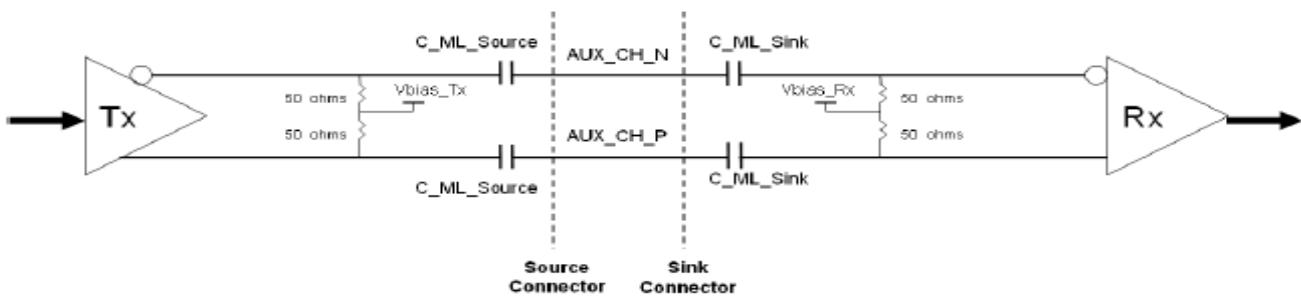
(4) The source device should pass the test criteria described in DisplayPort Compliance Test Specification(CTS) 1.1

2.5 Color Data Input Assignment

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input the brighter the color. The table below provides the assignment of color versus data input.

Color		Data Signal																							
		Red								Green								Blue							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale Of Red	Red(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale Of Green	Green(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
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	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale Of Blue	Blue(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
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	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Note (1) 0: Low Level Voltage, 1: High Level Voltage

2.6 Power ON/OFF Sequence :
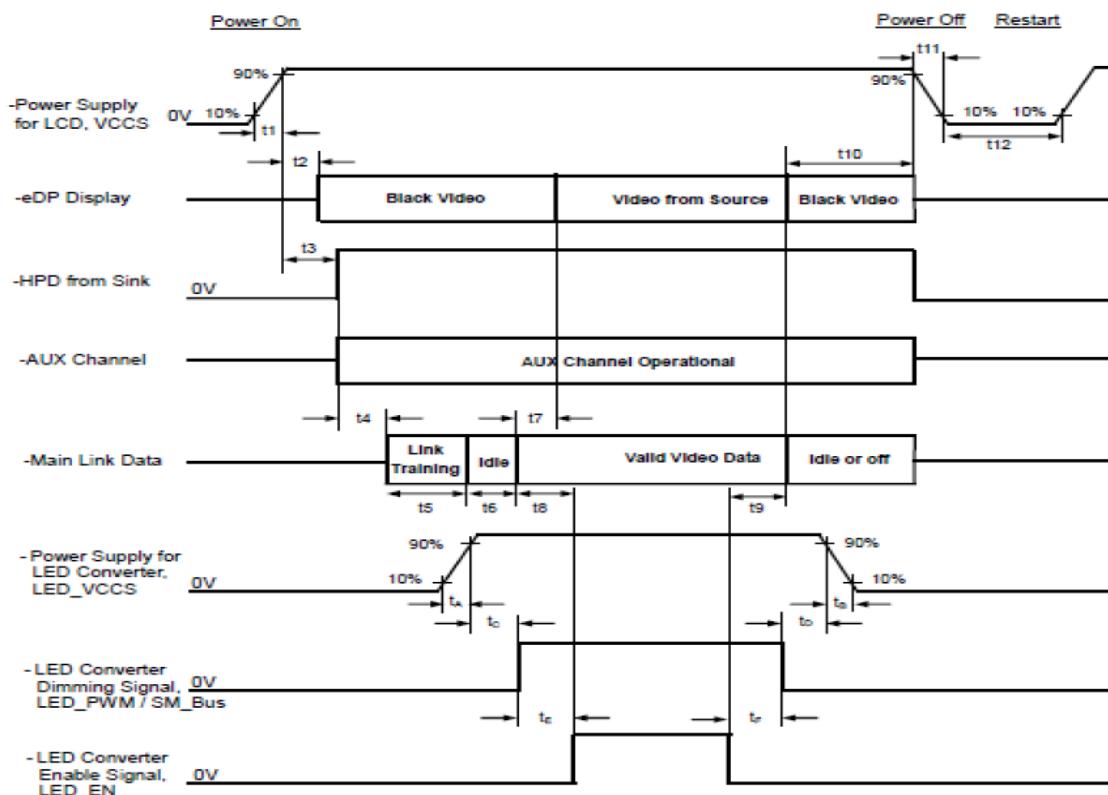
Parameter	Description	Reqd. By	Value Min	Value Max	Unit	Notes
t1	Power rail rise time, 10% to 90%	Source	0.5	10	ms	-
t2	Delay from LCD,VCCS to black video generation	Sink	0	200	ms	Automatic Black Video generation prevents display noise until valid video data is received from the Source (see Notes:2 and 3 below)
t3	Delay from LCD,VCCS to HPD high	Sink	0	200	ms	Sink AUX Channel must be operational upon HPD high (see Note:4 below)
t4	Delay from HPD high to link training initialization	Source	0	500	ms	Allows for Source to read Link capability and initialize
t5	Link training duration	Source	0	500	ms	Dependant on Source link training protocol
t6	Link idle	Source	0	500	ms	Min accounts for required BS-Idle pattern. Max allows for Source frame synchronization
t7	Delay from valid video data from Source to video on display	Sink	0	50	ms	Max value allows for Sink to validate video data and timing. At the end of T7, Sink will indicate the detection of valid video data by setting the SINK_STATUS bit to logic 1 (DPCD 00205h, bit 0), and Sink will no longer generate automatic Black Video
t8	Delay from valid video data from Source to backlight on	Source	80	500	ms	Source must assure display video is stable *: Recommended by INX. To avoid garbage image.

2.6 Power ON/OFF Sequence :(Cont.)

			Min	Max	Unit	
t9	Delay from backlight off to end of valid video data	Source	50	500	ms	Source must assure backlight is no longer illuminated. At the end of T9, Sink will indicate the detection of no valid video data by setting the SINK_STATUS bit to logic 0 (DPCD 00205h, bit 0), and Sink will automatically display Black Video. (See Notes: 2 and 3 below) *: Recommended by INX. To avoid garbage image.
t10	Delay from end of valid video data from Source to power off	Source	0	500	ms	Black video will be displayed after receiving idle or off signals from Source
t11	VCCS power rail fall time, 90% to 10%	Source	0.5	10	ms	See Note 5 below

t12	VCCS Power off time	Source	500	-	ms	-
tA	LED power rail rise time, 10% to 90%	Source	0.5	10	ms	-
tB	LED power rail fall time, 90% to 10%	Source	0	10	ms	-
tC	Delay from LED power rising to LED dimming signal	Source	1	500	ms	-
tD	Delay from LED dimming signal to LED power falling	Source	1	500	ms	-
tE	Delay from LED dimming signal to LED enable signal	Source	1	500	ms	-
tF	Delay from LED enable signal to LED dimming signal	Source	1	500	ms	-

Note (1) Please don't plug or unplug the interface cable when system is turned on.

Note (2) The Sink must include the ability to automatically generate Black Video autonomously. The Sink must automatically enable Black Video under the following conditions:

- Upon LCD VCCS power-on (within T2 max)

- When the "NoVideoStream_Flag" (VB-ID Bit 3) is received from the Source (at the end of T9)

Note (3) The Sink may implement the ability to disable the automatic Black Video function, as described in Note (2), above, for system development and debugging purposes.

Note (4) The Sink must support AUX Channel polling by the Source immediately following LCD VCCS power-on without causing damage to the Sink device (the Source can re-try if the Sink is not ready). The Sink must be able to response to an AUX Channel transaction with the time specified within T3 max.

. Note (5) The VCCS power rail is recommended to rise and fall linearly. If not, please contact us to conduct risk assessment.

3. OPTICAL CHARACTERISTICS

3.1 Characteristics

Electrical and Optical Characteristics

No.	Item			symbol / temp.		Min.	Typ.	Max.	Unit	Note
1	Response Time (Reflectance mode)			Tr+Tf	$\theta=\Phi=0°$ (25℃)	-	5	-	ms	2
	Response Time (Transmittance mode)					-	15	-		
2	Viewing Angle	Hor.	CR≧2	θ_{2+}	$\Phi = 0°$	-	70	-	degree	3
				θ_{2-}	$\Phi = 180°$	-	70	-		
		Ver.		θ_{1+}	$\Phi = 270°$	-	70	-		
				θ_{1-}	$\Phi = 90°$	-	70	-		
3	Contrast Ratio			Cr	25 ℃	-	8	-	-	4
4	Red x-code			Rx	25 ℃	-	-	-	-	5
	Red y-code			Ry		-	-	-		
	Green x-code			Gx		-	-	-		
	Green y-code			Gy		-	-	-		
	Blue x-code			Bx		-	-	-		
	Blue y-code			By		-	-	-		
	White x-code			Wx		0.295	0.325	0.355		
	White y-code			Wy		0.333	0.363	0.393		
	Brightness			Y		70	100	-	cd/m^2	
5	Brightness Uniformity			Yu	25 ℃	-	75	-	%	6
6	White (Reflectance)			RW%	25 ℃	-	14	-	%	7
7	White (Transmittance)			TR%	25 ℃	-	1.5	-	%	7

3.2 Definition of optical characteristics

Measurement condition :
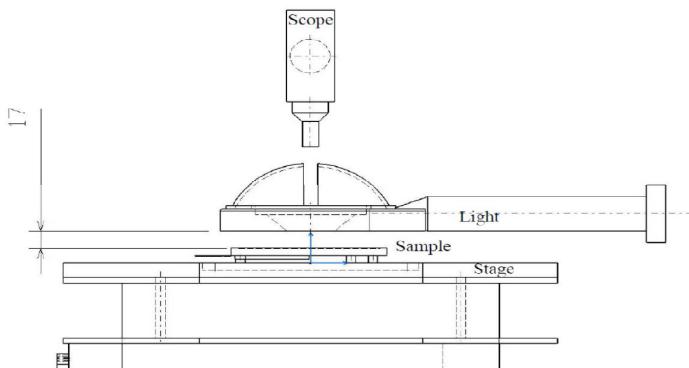
LCD Evaluation System : DMS-803
Light Source : Halogen Lamp.

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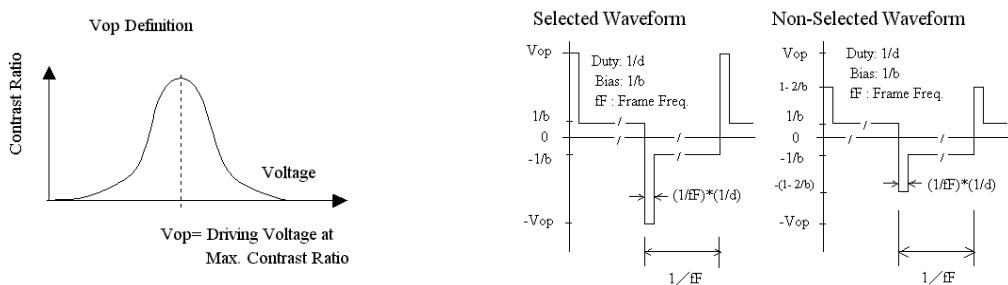

[Note 2] Definition of Response Time
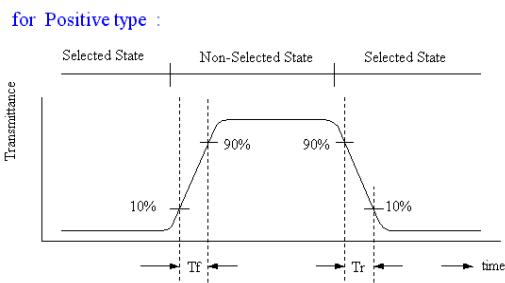
[Note 3] Definition of Viewing Angle :
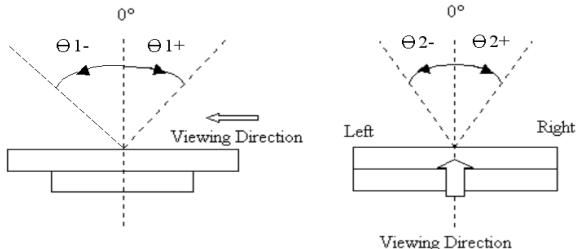
[Note 4] Definition of Contrast Ratio :
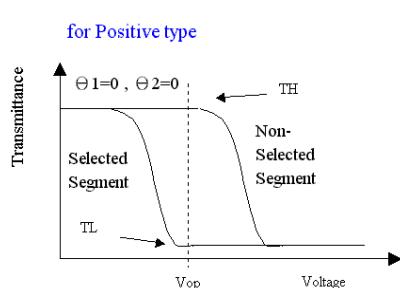
$$\text{Contrast Ratio} = \frac{TH}{TL}$$

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

BM-7

500mm

LCD Module
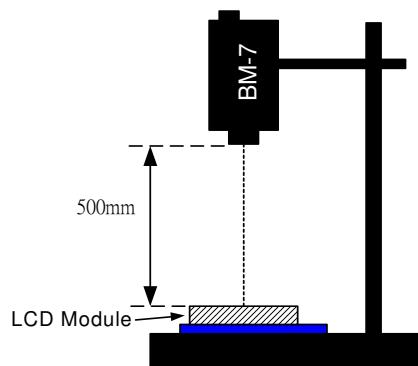
[Note 6] Definition of Brightness Uniformity

16.7%   50%   83.3%

Y_2 Y_3 Y_4 16.7%

Y_9 Y_1 Y_5 50%

Y_8 Y_7 Y_6 83.3%
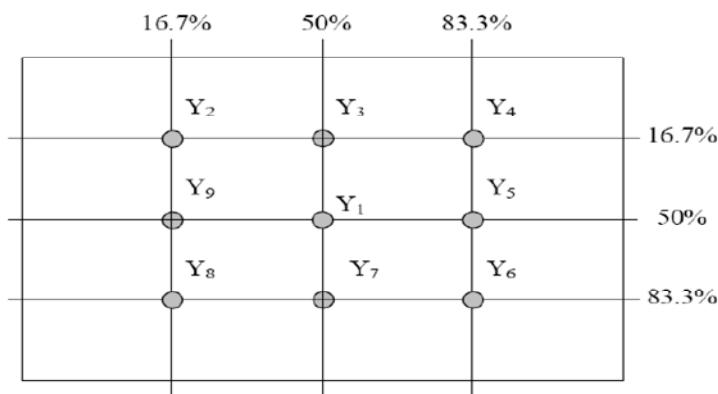
$$\text{Brightness Uniformity} = \frac{\text{Minimum Brightness of Point 1~9}}{\text{Maximum Brightness of Point 1~9}}$$

[Note 7] Definition of Transmissive VS Reflectance display characteristics :

穿透式面板
(Transmissive Display)

反射式面板
(Reflective Display)

Front Polarizer
CF Substrate
Color Resist
LC
Transparent electrode
TFT Substrate
Rear Polarizer
Backlight

Front Polarizer
CF Substrate
Color Resist
LC
Reflector electrode
TFT Substrate
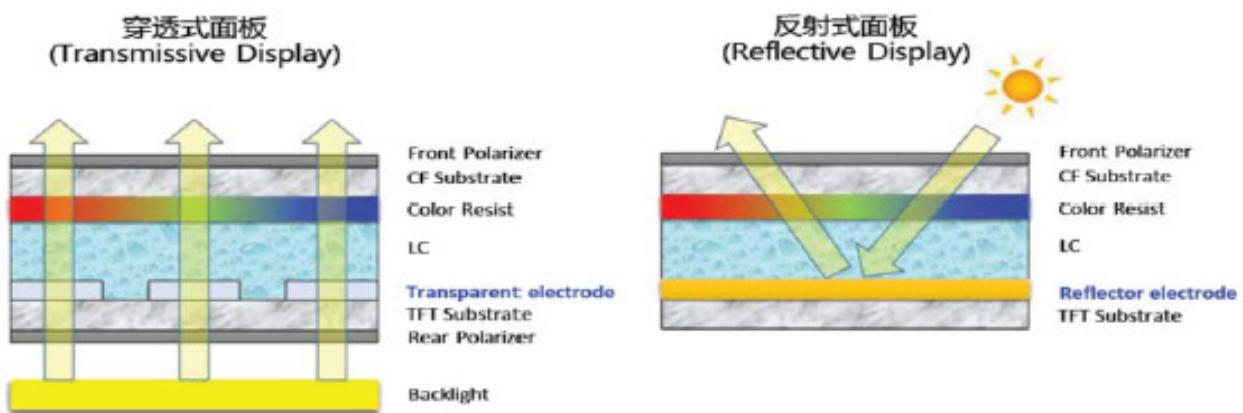
Transmissive vs. Reflective LCD Visibility
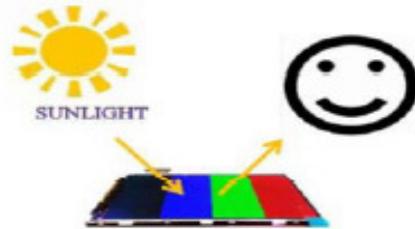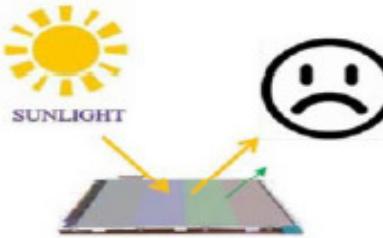
Reflective LCD under stronger light

100,000 nits (Sunny day) 300 nits (Indoor light)

0.2%
4%

R%(white) = 17%
R%(black) = 0.56%

Front Polarizer
CF Substrate
Color Resist
LC
Reflector electrode
TFT Substrate
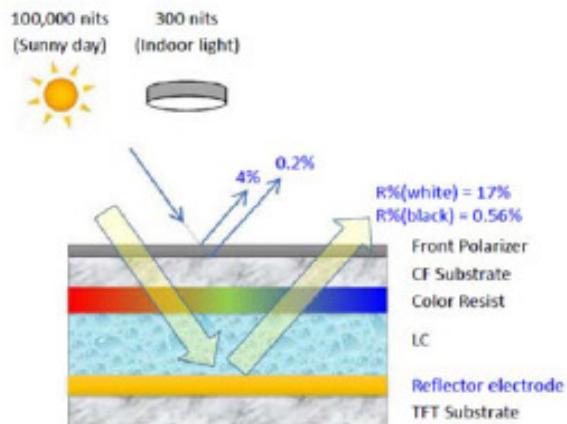
Display reflected light intensity > Surface reflectied light intensity

$$CR = \frac{(100,000 \text{ or } 300) \times 17\%}{(100,000 \text{ or } 300) \times 0.56\%} = \text{keep } 30.35$$

- Perfect readability under any ambient light conditions
- No need for backlight, with advantages of lightweight, energy-saving, power-saving, and eye protection
- Adequate ambient light sources are required to ensure readability

Transmissive LCD under stronger light

100,000 nits (Sunny day) 300 nits (Indoor light)

0.2%
4%

L(white) = 450 cd/m2
L(black) = 0.3 cd/m2

Front Polarizer
CF Substrate
Color Resist
LC
Transparent electrode
TFT Substrate
Rear Polarizer
Backlight
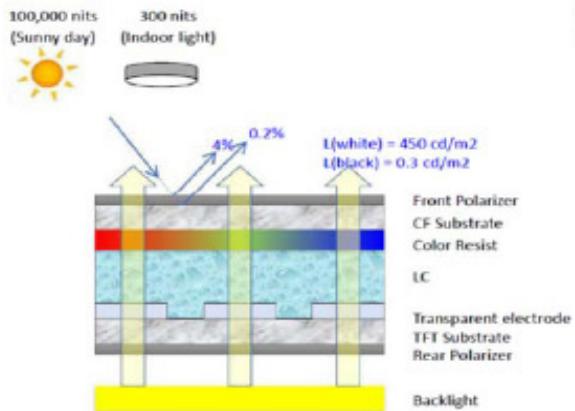
The intensity of light reflected on the surface is greater than the intensity of light transmitted through it

$$CR = \frac{(100,000 \text{ or } 300) \times 4.2\% + 450}{(100,000 \text{ or } 300) \times 4.2\% + 0.3} = 1.11 \text{ or } 35.86$$

- Penetrating displays are suitable for indoor use and can be viewed in sunlight Poor readability
- Improving surface brightness can enhance outdoor readability, but there are some limitations
- Disadvanages :
- Relative increase in backlight power consumption
- **The increase in backlight current is prone to overheating**
- Increased backlight thickness

4. RELIABILITY :

Item No	Items	Condition	Note
1	High temperature operating	80 ℃ , 240 hours	Inspection after2～4 hours storage at room temperature, the sample shall be free from defects 1. Air bubble in the LCD 2. Sealleak 3. non-display 4. missing segmnents 5. glass crack 6. current idd is twice higher than initial value.
2	Low temperature operating	-30 ℃ , 240 hours	
3	High temperature storage	90 ℃ , 240 hours	
4	Low temperature storage	-40 ℃ , 240 hours	
5	High temperature & humidity storage	60℃, 90%RH, 240 hours	
6	Thermal Shock storage	-30℃, 30min.<=> 80℃, 30min. 10 Cycles	
7	ESD Test	200V 200pf(0ohm) 1time/each terminal	
8	Vibration (with carton)	Random:0.015G∧2/HZ, 5～200HZ -6dB/octave,200～400HZ XYZ each dirction:1hr	
9	Drop Test (with carton)	Height：60 cm 1 corner, 3 edges, 6 surfaces	

REMARK:

1.There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

2.The test samples should be applied to only one test item.

3.For damp proof test, Pure water(resistance>10M ohm)should be used

4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part

5.Failure Judgment Criterion:Basic Specification, Electrical Characteristic, Mechanical Charateristic,Optical Characteristic

5. PRODUCT HANDLING AND APPLICATION

5.1 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.

● Hand Soldering : Soldering temperature less than 260℃,within 5 sec, at 5 mm. Away from pin connection.

● Do not touch the display surface or connection terminals area with bare hands.Smudges on the display surface reduce the insulation between terminals.

● Do not twist or bend the modules and also avoid any inappropriate external force on display surface during assembly.

● Do not expose LCM to organic solvent. IF 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 or fluorescent light, , also avoid them in high-temperature & high humidity environment for a long period.

● It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life.

● Do not drive LCM by DC voltage & avoid displaying at certain pattern for a long time otherwise it might cause image sticking.

● Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.

● If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.

● Never use the LCD , LCM under 45 Hz , the liquid crystal will decomposition and cause permently damage on display !!

● 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.

5.2 PRECAUTION FOR STORING

● Store the module in a dark room where must keep at 25±10℃ and 65%RH or less.

● Do not store the module in surroundings containing organic solvent or corrosive gas

● Store the module in an anti-electrostatic container or bag.

5.3 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</u> - <u>XXXX</u>

Year Month Day - Production control number

● Example: 241108 - 0003 ==> Year 2024, November,8th ,

　　　　　　　　　　　　　　Production control number 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. LOT NO

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
UNITED RADIANT TECHNOLOGY CORP.
光聯科技股份有限公司
```

FRAGILE 落下嚴禁

MADE IN TAIWAN
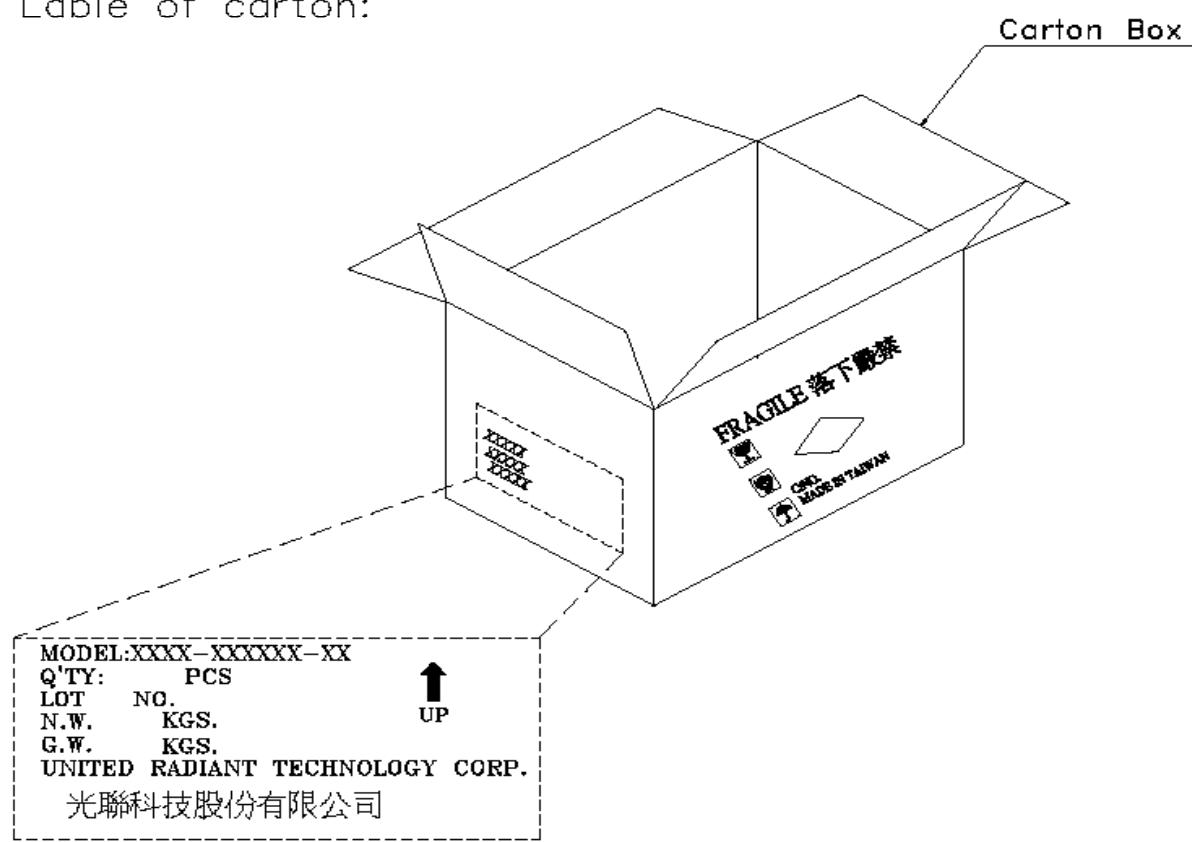
8. INSPECTION STANDARD

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 Ⅱ SINGLE PLAN.

    EVERY ITEM SHALL BE INSPECTED ACCORDING TO THE CLASS.

(C) MEASURE
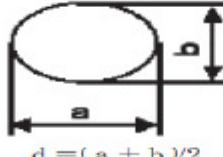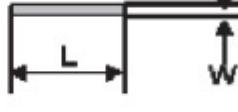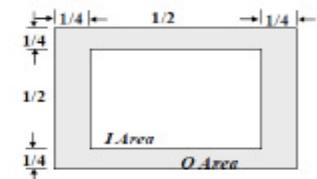
    IF AS THE RESULT OF ABOVE RECEIVING INSPECTION , A LOT OUT IS DISCOVERED.

    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 GOOD PRODUCTS FOR THESE DEFECT PRODUCTS

WHICH UNDER WARRANTY PERIOD AND BELONG TO THE RESPONSIBILITY OF U.R.T.

8.2 Visuals Specification:

General	1. Customer identified anomalies not defined within this inspection standard shall be reviewed by LowKey, and an additional standard shall be determined by mutual consent. 2. This inspection standard about the image quality shall be applied to any defect within the effective viewing area and shall not be applicable to outside of the area. 3. Inspection conditions Luminance : 500 Lux min. Inspection distance : 300 mm. Temperature : 25±5°C Direction : Directly above		
Definition of inspection item	Dot defect	Bright dot defect	The dot is constantly "on" when power applied to the LCD, even when all "Black" data sent to the screen. Inspection tool: 5% Transparency neutral density filter. Count dot: If the dot is visible through the filter. Don't count dot: If the dot is not visible through the filter.
		Black dot defect	The dot is constantly "off" when power applied to the LCD, even when all "White" data sent to the screen.
		Adjacent dot	Adjacent dot defect is defined as two or more bright dot defects or black dot defects.
	External inspection	Bubble ,scratch(foreign Particle polarizer, Cell, Backlight)	Visible operating (all pixels "Black" or "White") and non operating.
		Appearance inspection	Does not satisfy the value at the spec.
	Others	LED wires	Damaged to the LED wires, connector, pin, functional failure or appearance failure.
	Definition of Size	Definition of circle : definition of linear size definition Area I/O 		

Classification		Inspection item		Judgment Standard	
Defect (in LCD glass)	Dot defect	Area		I	O
		Bright dots(Note: Visible under:ND5%) 1:D≤0.15mm:No count); D>0.15mm acceptable: 2		N≤3	
		Dark dots (0.15mm<D≤0.3mm), D>0.3mm Not allowable		N≤4	
		Bright dot-2Adjacent		N≤0	
		Dark dot-2Adjacent		N≤4	
		Dark or bright dots-3 and more Adjacent(note6)		N≤0	
		Total bright and dark dots		N≤6	
		Minimum distance between bright dots		15mm	
		Minimum distance between dark dots		5mm	
		Minimum distance between bright and bright dots		5mm	
	Other	White dot ,dark dot (circle)	Size (mm)	Acceptable number	
			d≤0.2	Neglected	
			0.2mm<D≤0.3mm	N≤4	
			0.3mm<D≤0.4mm	N≤2	
			D>0.4mm	Not allowable	
Visual defect	Foreign partial	Circular foreign material: dark/bright sport		Visible under:ND5% 1:D≤0.2mm:No count 2:0.2mm<D≤0.5mm,N≤3 3:D>0.5mm:Not allowable	
		Linear foreign material: bright or dark line		Invisible under ND5% 0.1mm<W≤0.3mm, 0.3mm<L≤5mm,N≤3 Visible under ND5% 0.03mm≤w≤0.1mm, 0.3mm≤L≤3mm,N≤2	
	Polarizer	Linear scratch		1:BM:No Count 2:Pixel area 0.05mm≤w≤0.2mm, 1.0mm≤L≤5.0mm,N≤3	
		Bubble peeling		1:BM:No Count 2:Pixel area 0.2mm≤D<0.5mm,N≤4	
		Mura & leak		ND5%	