Suzhou BOE CHATANI Electronics Co., LTD.

LCM APPROVAL

Part Name ： LCM

MODEL NO ： BOEV320WX1

Part Name ： 2602802001

Effective Date ： 2012.05.09

Suzhou BOE CHATANI Electronics Co.,LTD		
APP	CKECK	APPV

Approved by：

APP/DATE	CHECK/DATE	APPV/DATE

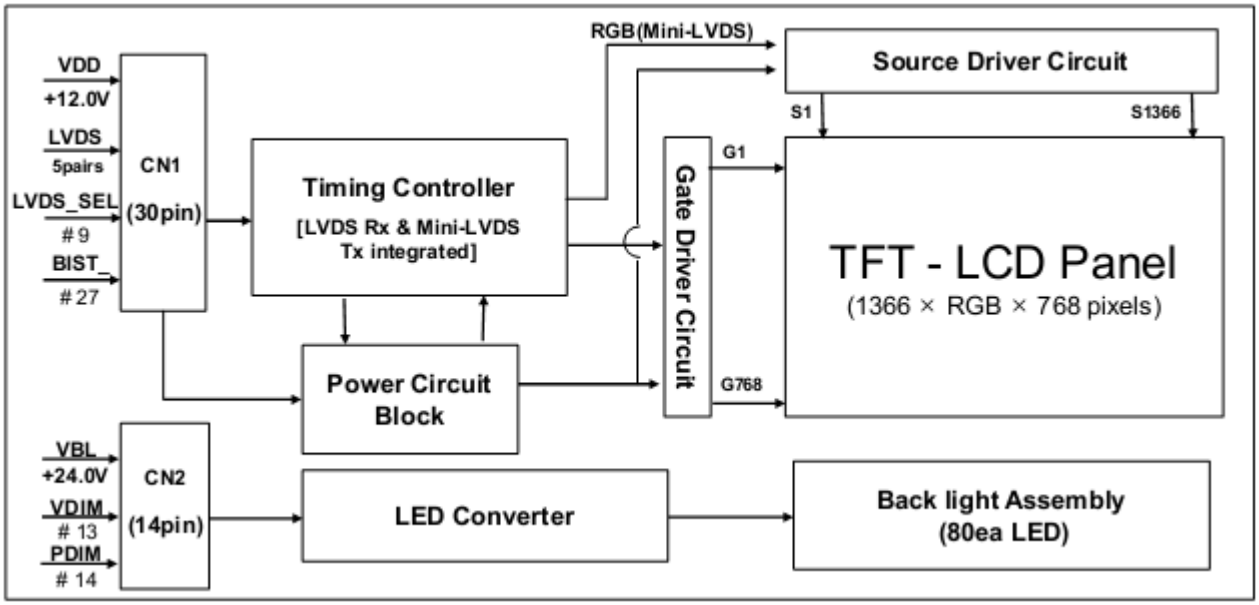
Revised record				
Ver	Date	Revision content	Page	Revised
1.0	2012-05-09	First release	all	Cheng xiaoqing

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

BOE320WX1 is a color active matrix TFT LCD module using amorphous silicon TFT's (Thin Film Transistors) as an active switching devices. This module has a 31.5 inch diagonally measured active area with WXGA resolutions (1366 horizontal by 768 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors. The TFT-LCD panel used for this module is adapted for a low reflection and higher color type.



1.2 Features

●LVDS Interface with 1 pixel / clock

●High-speed response

●Low color shift image quality

●8-bit color depth, display 16. 7M colors

●High luminance and contrast ratio, low reflection and wide viewing angle

●DE (Data Enable) only

●AFFS technology is applied for high display qualify

●RoHS/Halogen Free

1.3 Application

●Home Alone Multimedia TFT-LCD TV

•Display Terminals for Control System

•High Definition TV(HD TV)

•AV application Products

1.4 General Specification

The followings are general specifications at the model BOEV320WX1.

< Table 1,General Specifications >

Items	Specifications	Unit
Screen Diagonal	31.5	inch
Active Area	697.685(H) ×392.256(V)	mm
Pixels H x V	1366(H)×768(V)	pixels
Pixel Pitch	0.17025×RGB×0.51075	mm
Pixel Arrangement	Pixels R.G.B. Vertical Stripe	
White Luminance	350minimum，400typical	cd/m2 (LED@120mA Per Input Pin)
Display colors	16.7M（8bit-true）	colors
Display mode	Transmission mode，Normally Black	
Outline Dimension	741.4 (W) x 435.8(H) x 15.2 (T) typical	mm
Surface Treatment	Haze 10%, 3H	
Back-light	Lower edge side, 2-LED Lighting Bar type	Note 1
Power Consumption	PD : 7.1 (max)	
	PBL : 33.6W (max)	Note 2
	Ptotal : 40.7 (max)	

Notes : 1. LED Lighting Bar (2*input pins)

2. PLED=Input pins* VPIN×IPIN

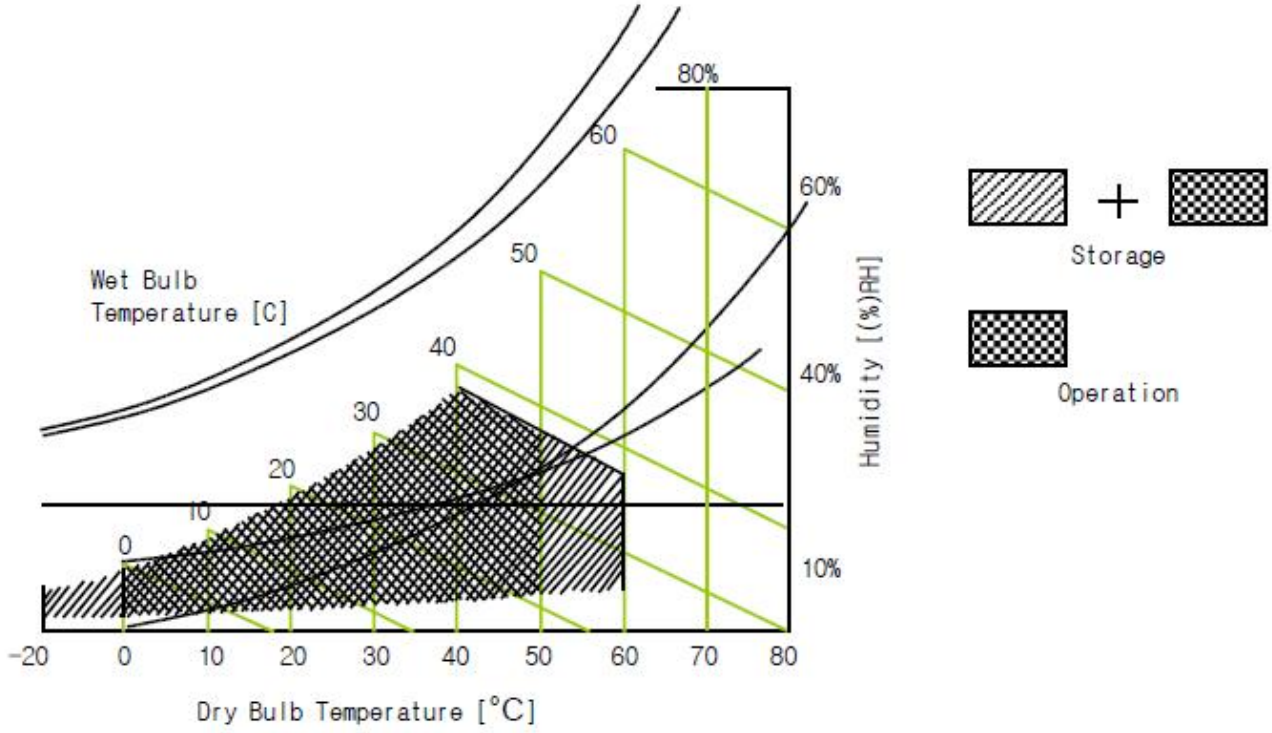
2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2. Absolute Maximum Ratings>

Item	Symbol	Min.	Max.	Unit	Conditions
Power Supply Voltage	VDD	VSS-0.3	13.2	V	Ta=25ºC
Operating Temperature	TOP	0	+50	ºC	
	TSUR	0	+60	ºC	Note 1）
Storage Temperature	TST	-20	+60	ºC	
Operating Ambient Humidity	Hop	10	80	%RH	
Storage Humidity	Hst	10	80	%RH	
Item	Symbol	Min.	Max.	Unit	Conditions
*LED Channel Current	IPIN	-	120	mA	
*LED Channel Voltage	VPIN	58	70	V	

Note : 1) Temperature and relative humidity range are shown in the figure below.Wet bulb temperature should be 39 ° C max. and no condensation of water.



3.0 ELECTRICAL SPECIFICATIONS

3.1 Electrical Specifications

< Table 3. Electrical specifications > [Ta=25±2 ℃]

Parameter		Symbol	Values			Unit	Remark
			Min	Typ	Max		
Power Supply Input Voltage		VDD	10.8	12	13.2	Vdc	
Power Supply Ripple Voltage		VRP			300	mV	
Power Supply Current		IDD	-	333	592	mA	Note 1
Power Consumption		PDD		4.0	7.1	Watt	
Rush current		IRUSH	-	-	3.0	A	Note 2
LVDS Interface	Differential Input High Threshold Voltage	VLVTH	+100		+300	mV	
	Differential Input Low Threshold Voltage	VLVTL	-300		-100	mV	
	Common Input Voltage	VLVC	1.0	1.2	1.4	V	
CMOS Interface	Input High Threshold Voltage	VIH	2.7	-	3.3	V	
	Input Low Threshold Voltage	VIL	0	-	0.6	V	

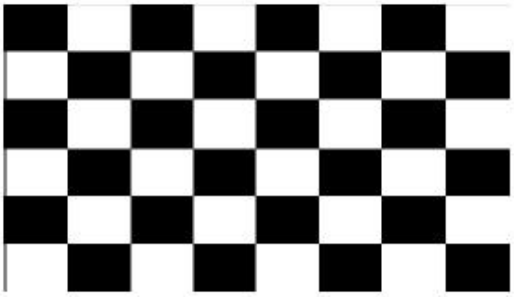
Note 1 : The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for VDD=12.0V,

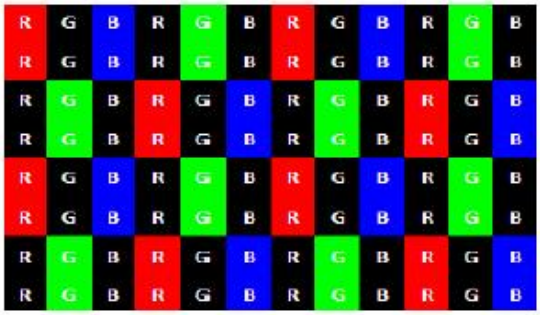
Frame rate fV=60Hz and Clock frequency = 75.4MHz.

Test Pattern of power supply current

a) Typ : Mosaic 8 x 6 Pattern(L0/L255)
Pattern(L0/L255)



b) Max : Skip 1H2V Sub Dot



Note 2 : The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)

3.2 Backlight Unit

< Table 4. Backlight Unit >

Symbol	Parameter	Min.	Typ.	Max.	Units	Condition
VPIN	LED Light Bar Input Voltage Per Input Pin	58	64	70	V	Duty 100%
IPIN	LED Light Bar Input Current Per Input Pin	-	120*4	-	mA	Note1，2
PBL	LED Power Consumption	-	30.72	-	W	Note3
-	the single lm rank	30	-	-	lm	
-	LED color Rank	1C、1D、1E、1F、1G、1H\ABE、ABF、ABG、ABH、ABI、ABK、ABL、ABM、ABN			-	
-	LED Life-Time	30,000	-	-	Hrs	Note4

Note1: There are one light bar ,and the specified current is input LED chip 100% duty current

Note2: The sense current of each input pin is 120mA

Note3: PBL=4 Input pins*VPIN ×IPIN

Note4: The lifetime is determined as the time at which luminance of LED become 50% of the initial brightness or not normal lighting at IPIN=120mA*4 on condition of continuous operating at 25 ±2 ℃

4.0 OPTICAL SPECIFICATION

4.1 Overview

The test of optical specifications shall be measured in a dark room (ambient luminance < 1 lux andtemperature=25±2℃) with the equipment of Luminance meter system (Goniometer system and PR730) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0 . We refer to θØ=0(=θ3) as the 3 o"clock direction (the "right"), θØ=90(= θ12) as the 12 o"clock direction ("upward"), θØ=180(= θ9) as the 9 o"clock direction ("left") and θØ=270(= θ6) as the 6 o"clock direction ("bottom"). While scanning θ and/or Ø, the center of the measuring spot on the Display surface shall stay fixed. The measurement shall be executed after 30 minutes warm-up period. VDD shall be 12.0V +/-10% at 25℃. Optimum viewing angle direction is 6 "clock.

4.2 LCM Optical Specifications

[VDD = 12.0V， Frame rate = 60Hz,, IBL = 120mA*4, Ta =25±2 ℃]

<Tabel 5.Optical Table>

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angel	Horizontal	θ_3	CR>10		89		Deg.	Note1
		θ_9			89		Deg.	
	Vertical	θ_{12}			89		Deg.	
		θ_6			89		Deg.	
Color Temperature				-	9,000		K	
Color Gamut				-	72		%	
Contrast ratio		CR	θ=0° (Center)Normal Viewing Angel	900:1	1200:1	-		Note2
Luminance of White		Y_w		350	400	-	cd/m^2	Note3
		△Y		70	75		%	Note4
Reproduction of color	White	W_x		TYP. -0.03	0.305	TYP. +0.03		Note5
		W_y			0.315			
	Red	R_x			0.630			
		R_y			0.340			
	Green	G_x			0.300			
		G_y			0.630			
	Blue	B_x			0.148			
		B_y			0.068			
Response Time	G to G	T_g		-	8	10	ms	Note6
Gamma Scale				2.0	2.2	2.4		Note7

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o"clock direction and the vertical or 6, 12 o"clock direction with respect to the optical axis which is normal to the LCD surface.

2. Contrast measurements shall be made at viewing angle of = 0 and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See Figure1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3.Center Luminance of white is defined as the LCD surface. Luminace shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in Figure 2 for a total of the measurement per display。

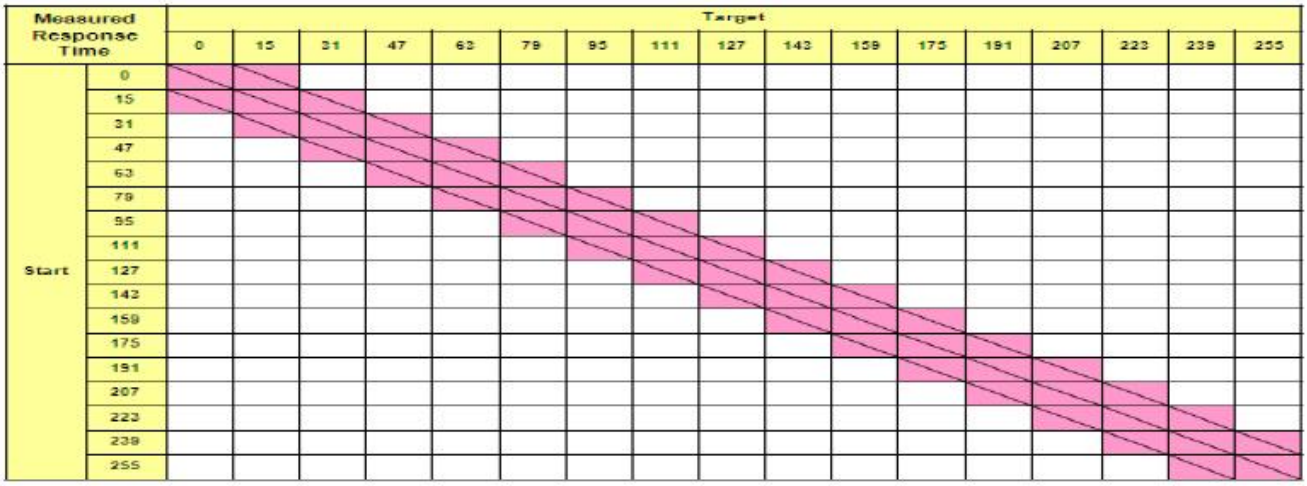
4. The White luminance uniformity on LCD surface is then expressed as :

ΔY = (Minimum Luminance of 5points / Maximum Luminance of 5points) * 100 (See Figure 2 shown in

Appendix).

5. The color chromaticity coordinates specified in Table 5.shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

6. Response time Tg is the average time required for display transition by switching the input signal as below table and is based on Frame rate fV =60Hz to optimize. Each time in below table is defined as Figure 2and shall be measured by switching the input signal for “any level of gray(bright)”and “any level of gray(dark)”.



7. Definition of Transmittance (T%) :

Module is with white(L255) signal input

$$\text{Transmittance} = \frac{\text{Luminance of LCD Module}}{\text{Luminance of BLU}} \times 100\ \%$$

5.0 INTERFACE CONNECTION.

5.1 Electrical Interface Connection

5.1.1 LED Light Bar

< Table 6. LED Light Bar>

Pin No	Symbol	Description
1	IRLED1	Channel Current Feedback
2	IRLED2	Channe2 Current Feedback
3	VLED	LED power supply
4	VLED	LED power supply
5	IRLED3	Channe3 Current Feedback
6	IRLED4	Channe4 Current Feedback
	CONNECTOR	CI0106S0000

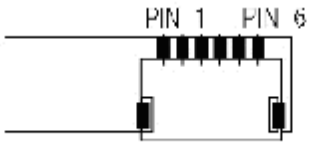
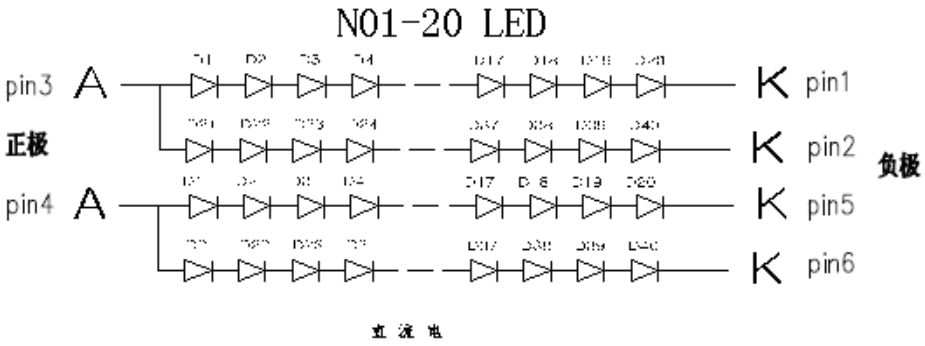


Figure1. Top View of LED Bar Connector



5.1.2 Module Input Signal & Power

-Connector : IS100-L30B-C23(Manufactured by UJU) or Equivalent.

< Table 7. Open Cell Input Connector Pin Configuration >

Pin No	Symbol	Description	Pin No	Symbol	Description
1	VDD	Power Supply +12.0V	16	RX1+	LVDS Receiver Signal(+)
2	VDD	Power Supply +12.0V	17	GND	Ground
3	VDD	Power Supply +12.0V	18	RX2-	LVDS Receiver Signal(-)
4	VDD	Power Supply +12.0V	19	RX2+	LVDS Receiver Signal(+)
5	GND	Ground	20	GND	Ground
6	GND	Ground	21	RCLK-	LVDS Receiver Clock Signal(-)
7	GND	Ground	22	RCLK+	LVDS Receiver Clock Signal(+)
8	GND	Ground	23	GND	Ground
9	LVDS_SEL	'L'=JEIDA , 'H'or NC= VESA	24	RX3-	LVDS Receiver Signal(-)
10	NC	No Connection	25	RX3+	LVDS Receiver Signal(+)
11	GND	Ground	26	GND	Ground
12	RX0-	LVDS Receiver Signal(-)	27	BIST	'L' or NC=Free run mode , 'H'= BIST mode
13	RX0+	LVDS Receiver Signal(+)	28	NC	No Connection
14	GND	Ground	29	NC	No Connection
15	RX1-	LVDS Receiver Signal(-)	30	GND	Ground

Notes : 1. NC(Not Connected) : This pins are only used for BOE internal operations.

2.Input Level of LVDS signal is based on the IEA 664 Standard.

3. LVDS_SEL: This pin is used for selecting LVDS signal data format.

If this Pin : High (3.3V) or Open (NC) Normal NS LVDS format

Otherwise : Low(GND) JEIDA LVDS format

4. BIST : This pin is used for selecting display pattern mode when input DE or input CLOCK quits toggling.

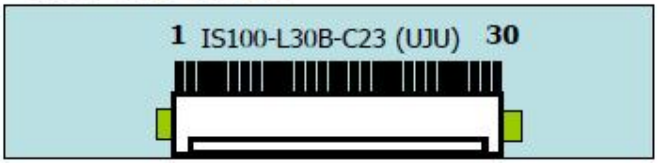
If this Pin : Low (GND) or Open (NC) Free run mode(Black Pattern)

Otherwise : High(3.3V) BIST mode(BIST Pattern)

Sequence : On = VDD ≥LVDS Option , BIST Option ≥Interface signal

Off = Interface signal ≥ LVDS Option , BIST Option ≥ VDD

Rear view of LCM



BIST Pattern

5.2 LVDS Interface

-LVDS Receiver : Timing Controller (LVDS Rx merged) / LVDS Data : Pixel Data

< Table 8. Open Cell Input Connector Pin Configuration >

	LVDS Pin	Vesa Data format	JEIDA Data format	Remark
TxOUT/RxIN0	TxIN/RxOUT0	Red0 [LSB]	R2	
	TxIN/RxOUT1	Red1	R3	
	TxIN/RxOUT2	Red2	R4	
	TxIN/RxOUT3	Red3	R5	
	TxIN/RxOUT4	Red4	R6	
	TxIN/RxOUT6	Red5	R7 [MSB]	
	TxIN/RxOUT7	Green0 [LSB]	G2	
TxOUT/RxIN1	TxIN/RxOUT8	Green1	G3	
	TxIN/RxOUT9	Green2	G4	
	TxIN/RxOUT12	Green3	G5	
	TxIN/RxOUT13	Green4	G6	
	TxIN/RxOUT14	Green5	G7 [MSB]	
	TxIN/RxOUT15	Blue0 [LSB]	B2	
	TxIN/RxOUT18	Blue1	B3	
TxOUT/RxIN2	TxIN/RxOUT19	Blue2	B4	
	TxIN/RxOUT20	Blue3	B5	
	TxIN/RxOUT21	Blue4	B6	
	TxIN/RxOUT22	Blue5	B7 [MSB]	
	TxIN/RxOUT24	HSYNC	HSYNC	
	TxIN/RxOUT25	VSYNC	VSYNC	
	TxIN/RxOUT26	DEN	DEN	
TxOUT/RxIN3	TxIN/RxOUT27	Red6	R0 [LSB]	
	TxIN/RxOUT5	Red7 [MSB]	R1	
	TxIN/RxOUT10	Green6	G0 [LSB]	
	TxIN/RxOUT11	Green7 [MSB]	G1	
	TxIN/RxOUT16	Blue6	B0 [LSB]	
	TxIN/RxOUT17	Blue7 [MSB]	B1	
	TxIN/RxOUT23	Reserved	Reserved	

6.0 SIGNAL TIMING SPECIFICATION

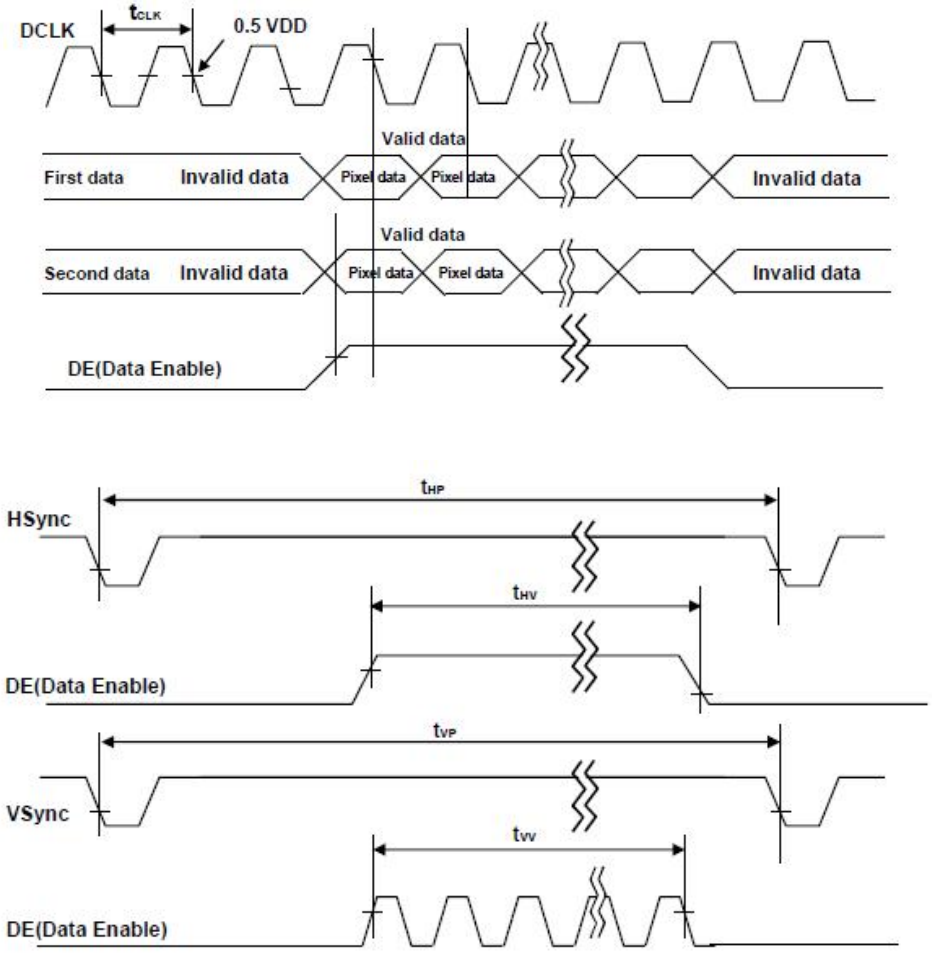
6.1 Timing Parameters (DE only mode)

< Table 9. Timing Table >

ITEM	Symbol		Min	Typ	Max	Unit	Note
CLK	Period	t_{CLK}	11.8	13.3	17.9	ns	
	Frequency	-	56	75.4	85.0	MHz	
Hsync	Period	t_{HP}	1450	1560	2000	t_{CLK}	
	Frequency	f_H	39.4	48.4	55	KHz	
Vsync	Period	t_{VP}	778	806	1200	t_{HP}	
	Frequency	f_V	47	60	65	Hz	
Horizontal Active Display Term	Valid	t_{HV}	-	1366	-	t_{CLK}	
	Total	t_{HP}	1450	1560	2000	t_{CLK}	
Vertical Active Display Term	Valid	t_{VV}	-	768	-	t_{HP}	
	Total	t_{VP}	778	806	1200	t_{HP}	

Notes: This product is DE only mode. The input of Hsync & Vsync signal does not have an effect on normal operation.

7.0 Signal Timing Waveform



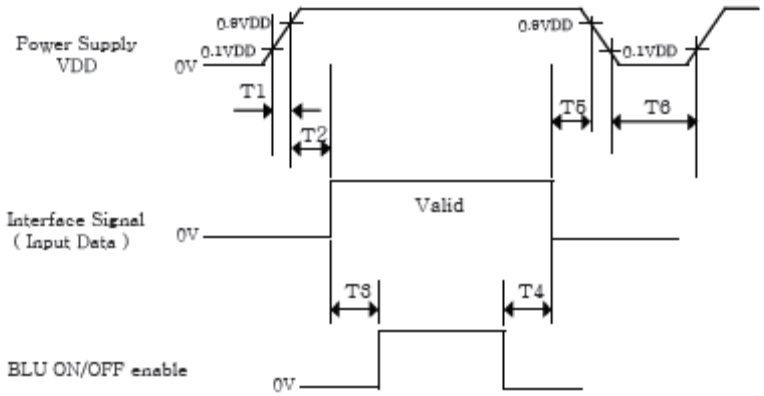
8.0 Input Signals, Basic Display Colors and Gray Scale of Colors

< Table 10. Input Signal and Display Color Table >

Color & Gray Scale		Input Data Signal																							
		Red Data								Green Data								Blue Data							
		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
	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
	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
	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
	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
	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	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
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	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	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	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
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	▽	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	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	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
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of White	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
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	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

9.0 POWER SEQUENCE

To prevent a latch-up or DC operation of the Open Cell, the power on/off sequence shall be as shown in below



< Table 11. Sequence Table >

Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	20	ms
T2	0	-	50	ms
T3	200	-	-	ms
T4	200	-	-	ms
T5	0	-	50	ms
T6	1	-	-	s

Notes: 1. Even though T1 is over the specified value, there is no problem if I2T spec of fuse is satisfied.
2. Back Light must be turn on after power for logic and interface signal are valid.

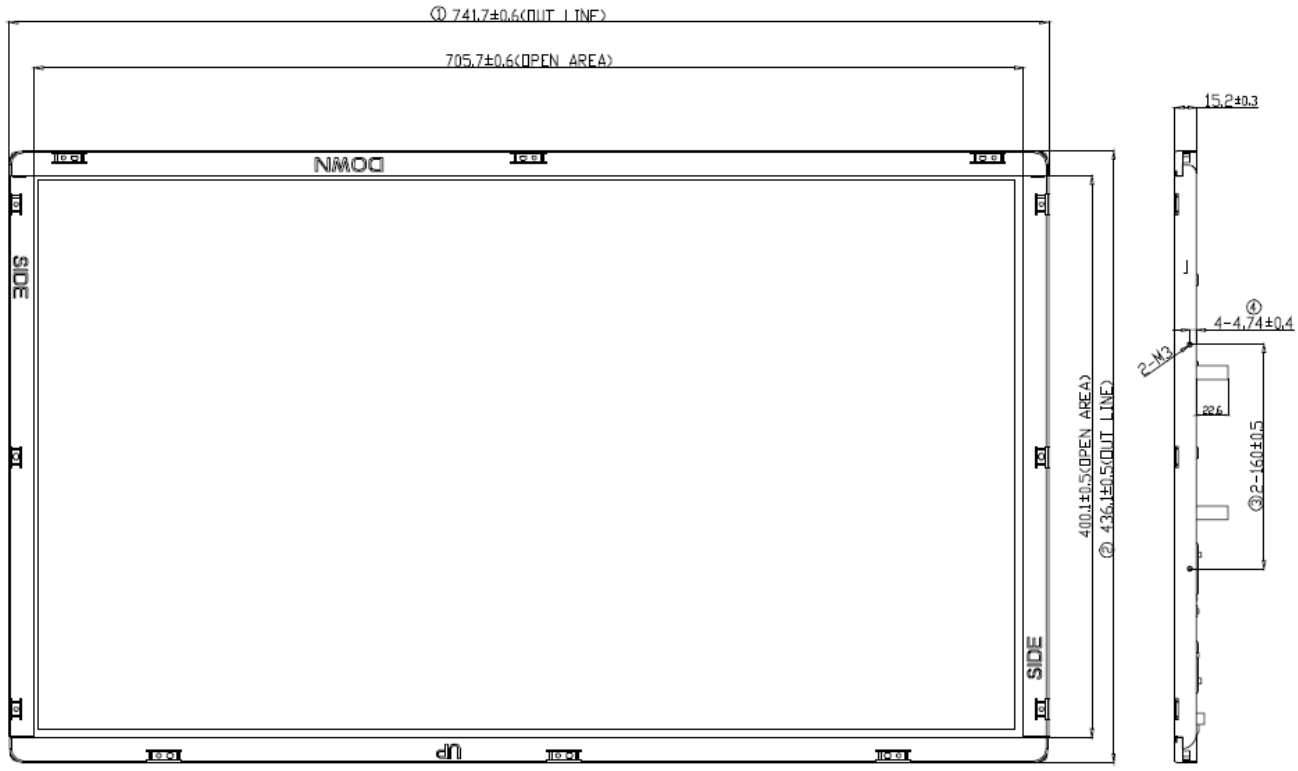
10.0 MECHANICAL CHARACTERISTICS

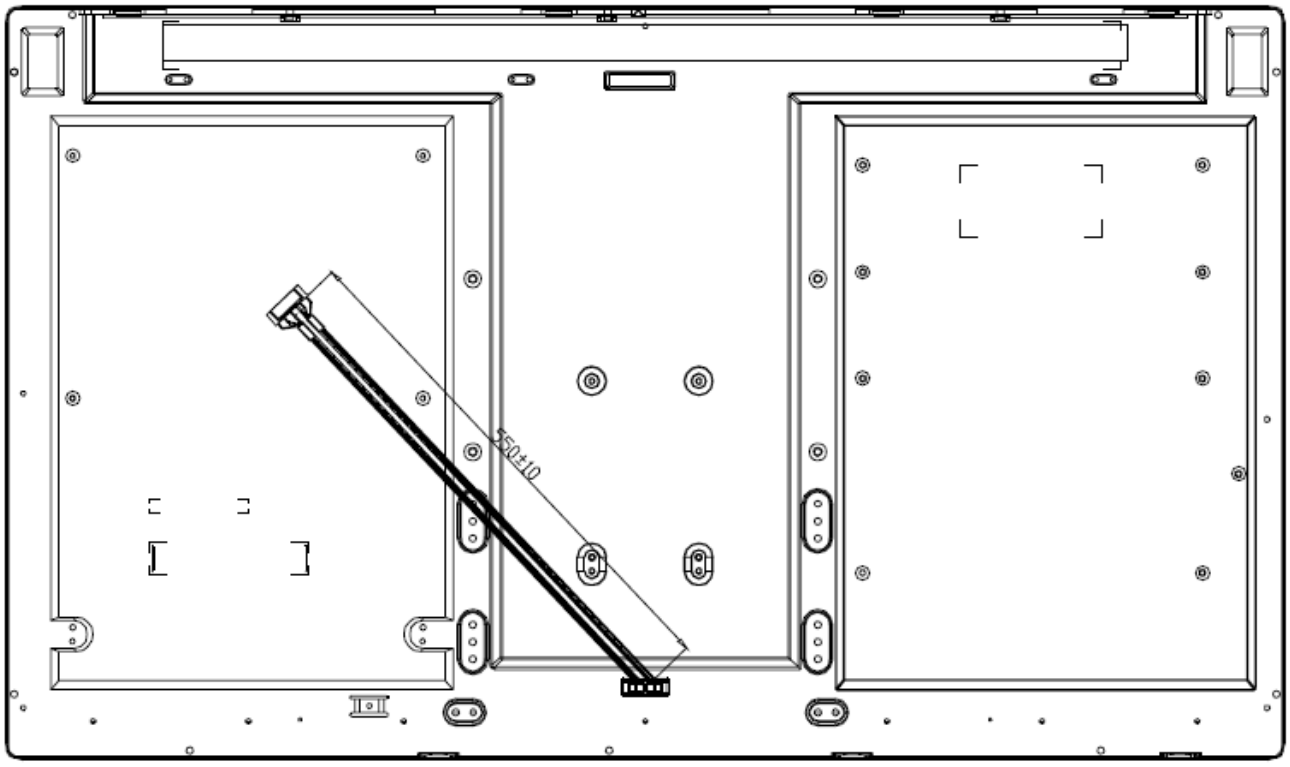
10.1 Dimensional Requirements

FIGURE 6 (located in Appendix) shows mechanical outlines for the opencell HV320WX2-201.Other parameters are shown in Table 12.

<Table 12. Dimensional Parameters>

Item		Min	Typ	Max	Unit	Note
Module Size	Horizontal	740.8	741.4	742.0	mm	
	Vertical	435.3	435.8	436.3	mm	
	Thickness	14.9	15.2	15.5	mm	
Bezel	Horizontal	-	705.4	-	mm	
	Vertical	-	399.8	-	mm	
Active Area	Horizontal	-	697.685	-	mm	
	Vertical	-	392.256	-	mm	
Weight			5700		g	
D/B Wire length		-	550	-	mm	





10.2 Mounting

See FIGURE 5. (shown in Appendix)

10.3 Anti-Glare and Polarizer Hardness.

The surface of the LCD has an anti-glare coating to minimize reflection and a coating to reduce scratching.

10.4 Light Leakage

There shall not be visible light from the back-lighting system around the edges of the screen as seen from a distance 50cm from the screen with an overhead light level of 300lux.

11.0 RELIABLITY TEST

The Reliability test items and its conditions are shown in below.

< Table 13. Reliability Test Condition >

Item	Test Condition
High-Temp/STG	Ta = 60 ℃, 240 hrs
Low-Temp/STG	Ta = -20 ℃, 240 hrs
High-Temp/HMD	Ta = 50 ℃, 80%RH, 240hrs
High-Temp/OP	Ta = 50 ℃, 240hrs
Low-Temp/OP	Ta = 0 ℃, 240hrs
TST	Ta = -20 ℃ ↔ 60 ℃ (0.5 hr), 100 cycle
Vibration	Frequency:10-300 Hz Gravity / AMP : 1.0 G rms Period : X, Y, Z 30 min
Shock	Gravity : 50G Pulse width : 11msec, Half Sine ±X, ±Y, ±Z Once for each direction
ESD	Air: ± 15kV,150pF/330Ω,100Point,1time/Point Contact: ± 8kV,150pF/330Ω,100Point, 1time/Point

This test condition is based on BOE module.

12.0 HANDLING & CAUTIONS

(1) Cautions when taking out the module

●Pick the pouch only, when taking out module from a shipping package.

(2) Cautions for handling the module

●As the electrostatic discharges may break the LCD module, handle the LCD module with care. Peel a protection sheet off from the LCD panel surface as slowly as possible.

●As the LCD panel and back - light element are made from fragile glass material,impulse and pressure to the LCD module should be avoided.

●As the surface of the polarizer is very soft and easily scratched, use a soft dry cloth without chemicals for cleaning.

●Do not pull the interface connector in or out while the LCD module is operating.

●Put the module display side down on a flat horizontal plane.

●Handle connectors and cables with care.

(3) Cautions for the operation

●When the module is operating, do not lose CLK, ENAB signals. If any one of these signals is lost, the LCD panel would be damaged.

●Obey the supply voltage sequence. If wrong sequence is applied, the module would be damaged.

(4) Cautions for the atmosphere

●Dew drop atmosphere should be avoided.

●Do not store and/or operate the LCD module in a high temperature and/or humidity atmosphere. Storage in an electro-conductive polymer packing pouch and under relatively low temperature atmosphere is recommended.

(5) Cautions for the module characteristics

●Do not apply fixed pattern data signal to the LCD module at product aging.

●Applying fixed pattern for a long time may cause image sticking.

(6) Other cautions

●Do not disassemble and/or re-assemble LCD module.

●Do not re-adjust variable resistor or switch etc.

●When returning the module for repair or etc., Please pack the module not to be broken. We recommend to use the original shipping packages.

13.0 LCM Optical Characteristics

Item		Symbol	Min.	Typ.	Max.	Unit	Note
Luminance Of White (central)		Lc	350	400		nit	
Brightness Uniformity (9 pts)		Lu	70	75	-	%	Note 1
Central Chromaticity of White		x	0.275	0.305	0.335		CIE 1931(x, y) [Base On BM-7]
		y	0.285	0.315	0.345		
Test Conditions	Temperature	25±3℃					
	Humidity	65±20%					
	Environment	Under 10 Lux					
	Test distance	50±3 cm □others(____ cm)					
	Viewing cone	□0.2° ▩others(1°)					
	Electricity (Max. luminance)	□ Lamp Current ____mA_{rms} ▩ LED Driving Current Per Input Pin __120__mA ▩ Power consumption__30.7__Watt					
	Test equipment	▩ BM-7 ▩others(_BM-7_) Corrective value for Brightness and Color (x ; y) Should be added while using SR-3.					
	Measured Area	LCM Module open lighting area					
	Method	See attachment “ test detail-1, -2 “					
	Others	Measurement should be done after lighting for at least 30 mins					

Note :Brightness Uniformity = Lmin / Lmax × 100%

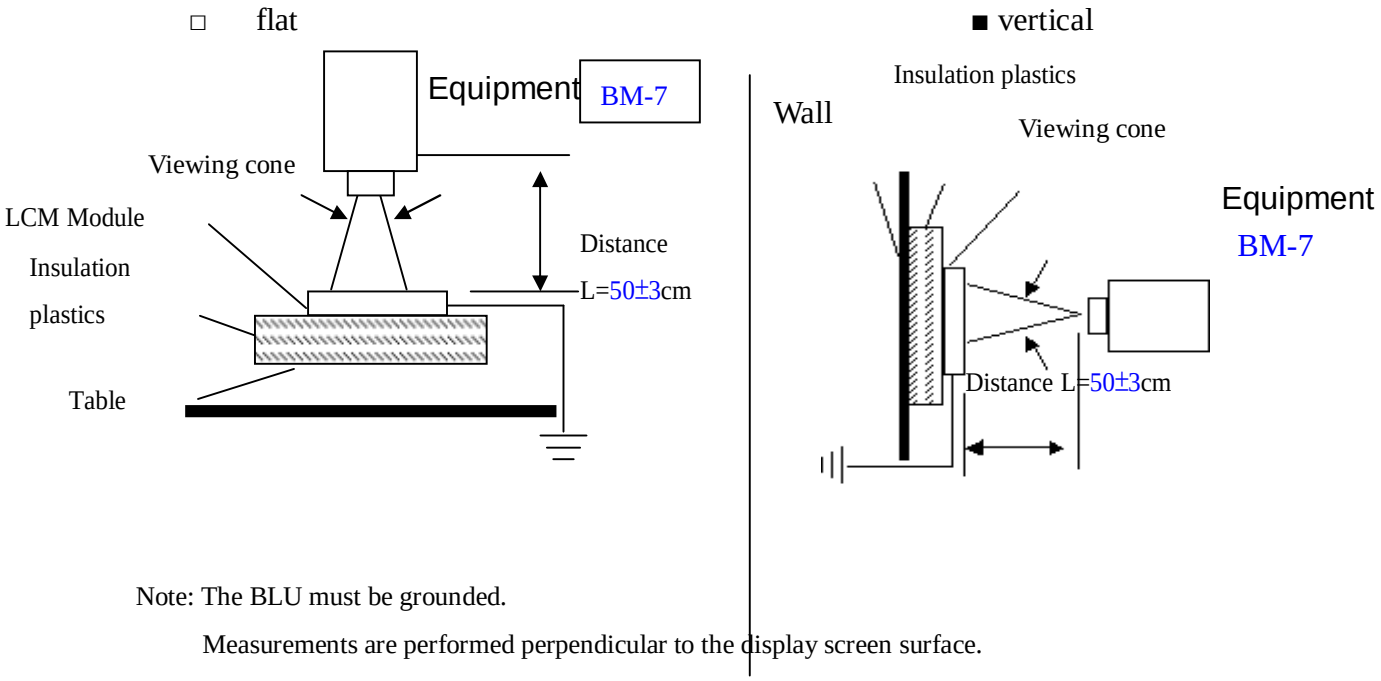
The centre point should be the maximal brightness of 9 measuring points.

Note:

(1)Measurement Setup

The LCD module should be stabilized at 25℃ for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 30 minutes in a windless room.

Figure 10 Measurement Setup

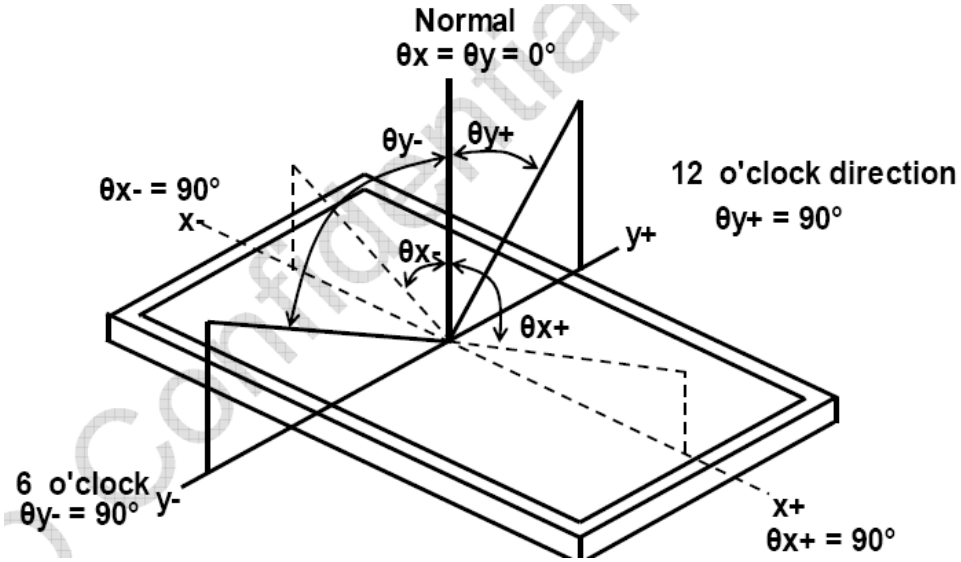


Note: The BLU must be grounded.

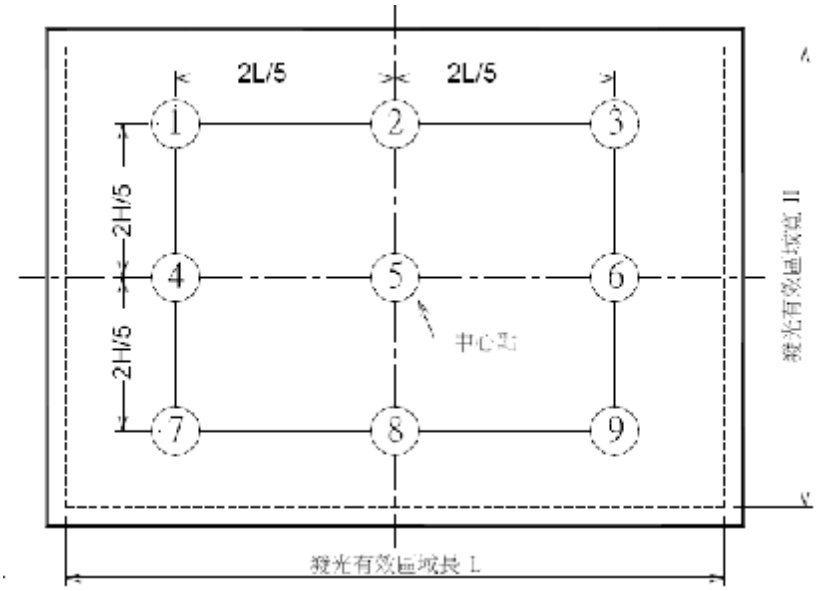
Measurements are performed perpendicular to the display screen surface.

(2)Definition of Viewing Angle

Figure 11 Definition of Viewing Angle

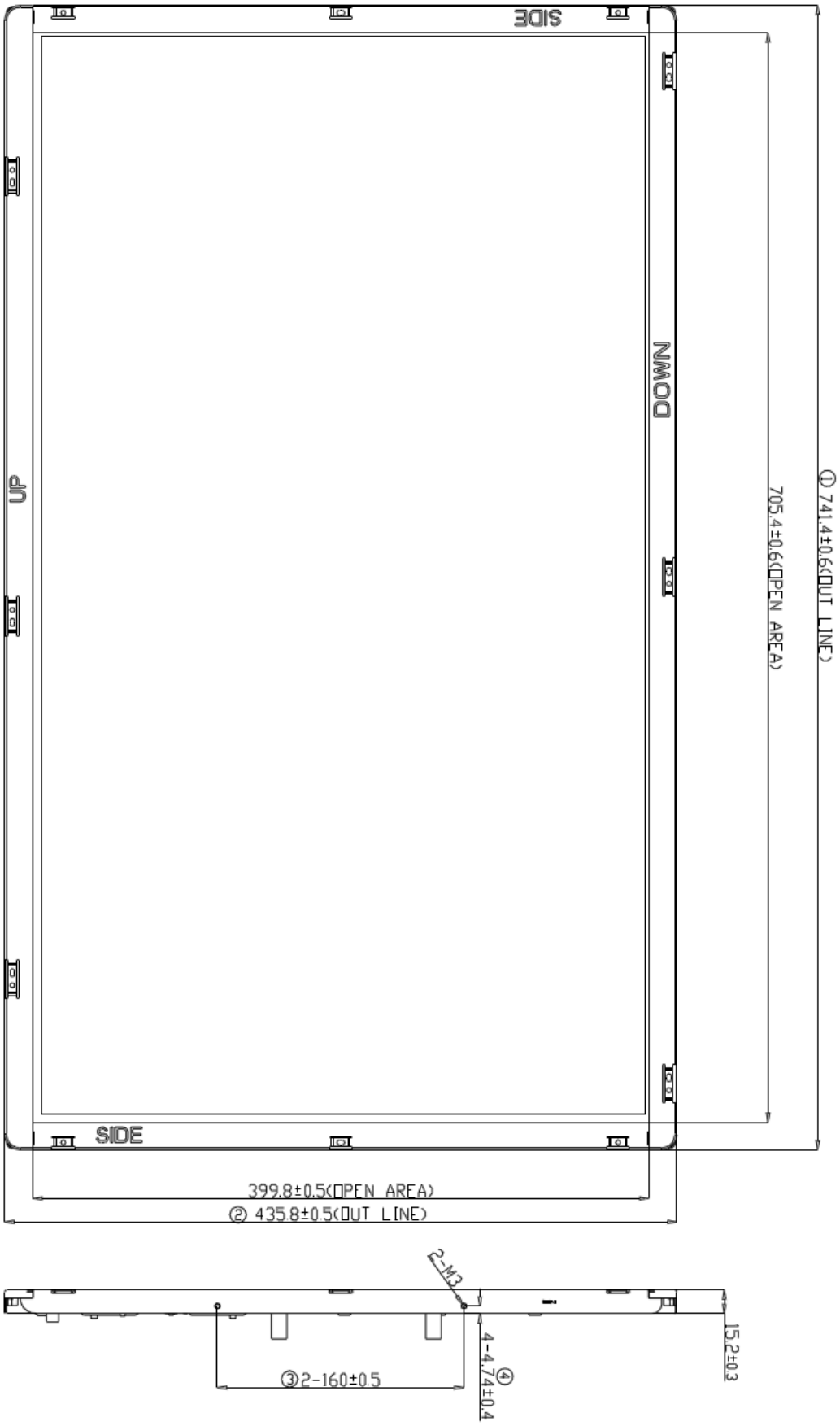


(3)The position of measured points



14.0 Mechanical Characteristics

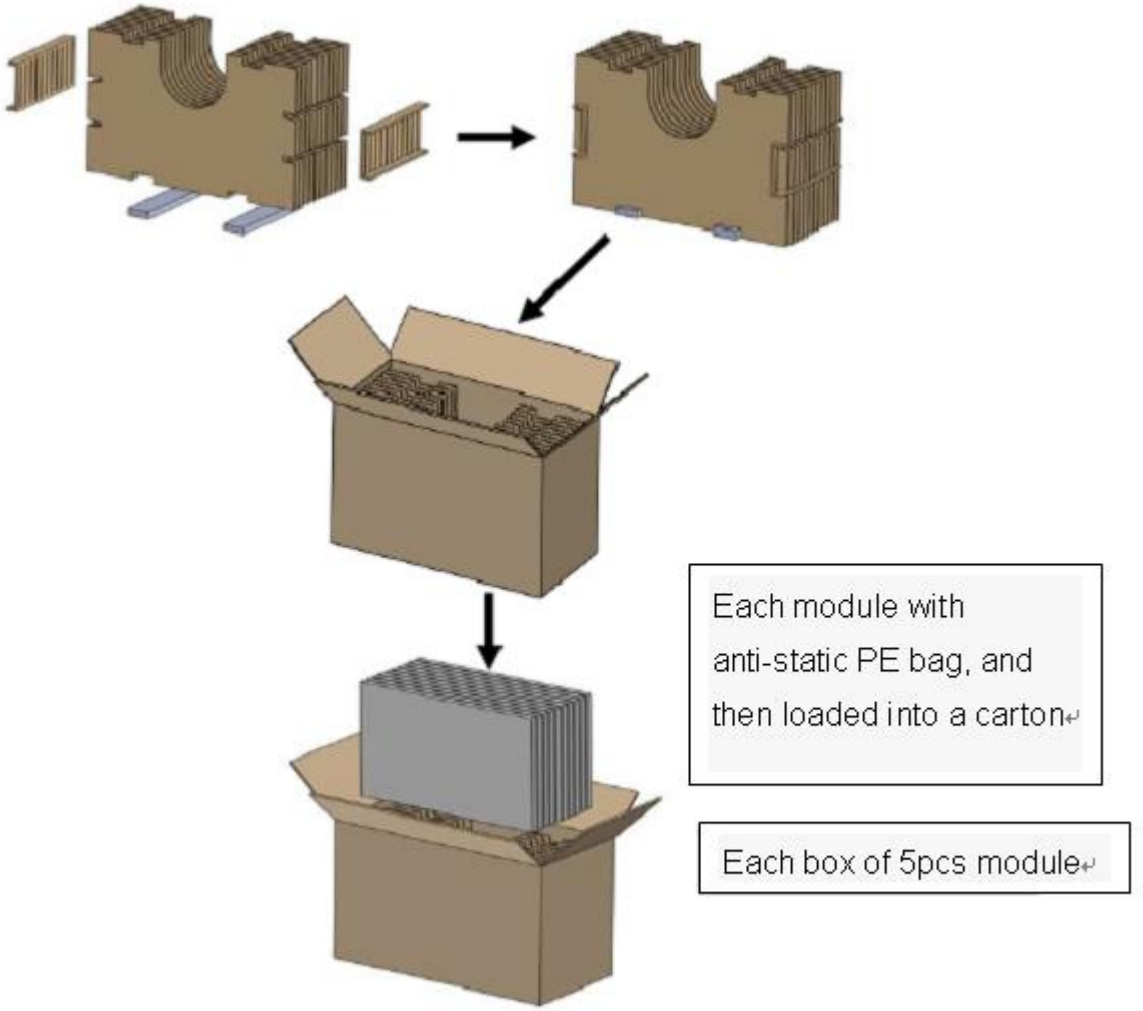
TFT-LCD Module Outline Dimensions (Front view)



Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

15.0 PACKING

15.1 CARTON

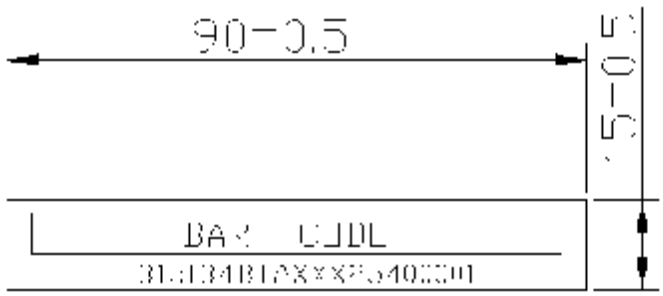


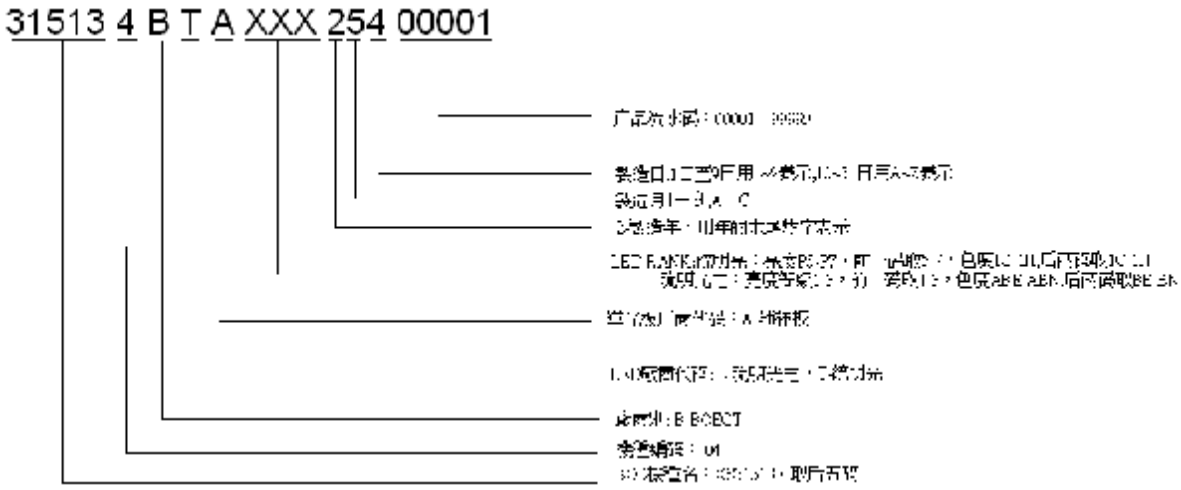
15.2 PALLET

Packed cartons will be placed on the pallet, each layer 4box, three horizontal and one vertical placed, each pallet placed 3 layer. Pallet first use of stretch film packaging layer 3 to 5, then use the sealing belted with #-shaped package.

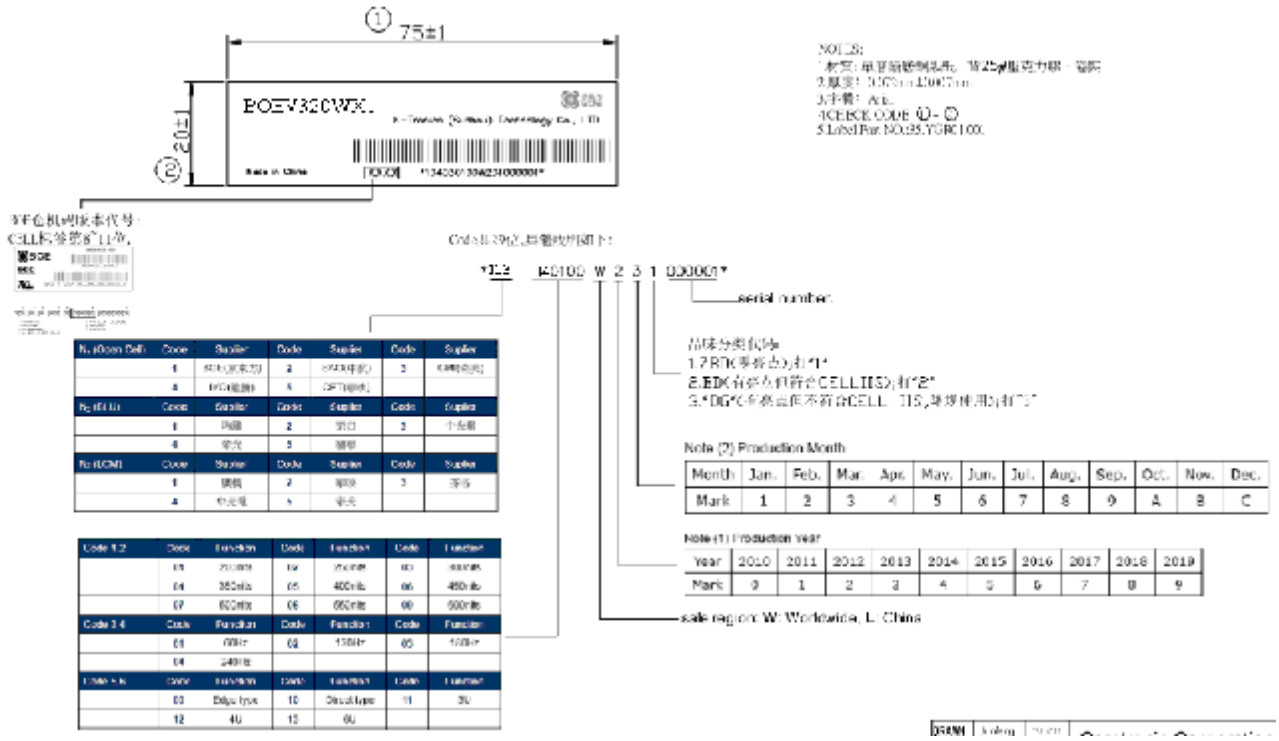
16.0 DEFINITION OF LABELS

16.1 LOT NO. LABEL





16.2 BOECT MODULE LABEL



16.3 CARTON LABEL