

TO : _____

TECHNICAL SPECIFICATION**10.1 Inch EM Touch Display****MODEL NO.: LCM-E-101W01-AUO**

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Please contact HANVON or its agent for further information.

 Customer's Confirmation

By _____

Date _____

 HANVON's Confirmation

APPROVED	CHECKED	CHECKED	DESIGNED
马梁	高洋		姜海力

Revision History

Rev.	Issued Date	Revised
1.0	2012-06-06	Preliminary.
1.0	2012-09-13	Page 5 ERT Sensor Board: Material:FR4 ERT Control Board: Material:FR4+FPC; Physical Interface: 5 Pins Connectors (usb)+8 pins key connectors
1.0	2012-09-28	Page15 Add Appearance pictures

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1. Scope

This specification is applicable to HANVON LCD Module designed for 10.1 inch.
This specification applies to HANVON LCM-E-101W01-AUO only.

2. Features

- Without affecting the screen display
- High screen resolution
- High pressure levels
- High position accuracy
- Low power consumption
- Commercial temperature range
- Support battery-free, cordless and pressure sensitive pens

This single-display module is suitable for use in Net Book products. The LCD adopts one backlight with High brightness 21-lamps white LED. Construction: 10.1" a-Si color TFT-LCD ,White LED backlight, FPC and T-CON.

3. Technology Specifications

3.1 General Specifications

No.	Item	Specification
1	LCD size	10.1 inch
2	Resolution	1024 (RGB)X600
3	Display mode	Normally white, Transmissive
4	Pixel pitch	0.2175(W)X0.2088(H) mm
5	Active area	222.72 (W)X125.28 (H) mm
6	Module size	235.0(W)X143.0(H)X5.1(D) mm
7	Pixel arrangement	RGB-stripe
8	Interface	Digital (6bit LVDS)
9	Backlight power consumption	200 cd/m ²
10	Panel power consumption	0.264W(Typ.)
11	Weight	220g

Parameter		Specifications	Unit	Note
ERT Sensor Board	External Dimension	229.72(L)×133.28(W) ×0.4(H)	mm	±0.2mm(L, W) ±0.05mm(H)
	Effective Diagonal Size	10.1	inch	16:9
	Active Area	222.72(L) × 125.28(W)	mm	±0.2 mm
	Material	FR4	-	
	Resolution	10206*7422	-	
	Coordinate Accuracy	0.03	mm	
	Detectable Height	>3	mm	
ERT Control Board	External Dimension	55.0(L) ×50(W) ×1.9(H)	mm	±0.2mm
	Material	FPC + FR4	-	
	Physical Interface	5 Pins Connectors (usb)+8 pins key connectors	-	
	Pen Accuracy	±1.0/2.0	mm	Center /Edge
	Detectable Angle	±50°	-	
	Data Sending Rate	>130	dots/s	7Bytes/dot
	Response Time	<200	ms	
	Tracking speed	>1	m/s	

Note:

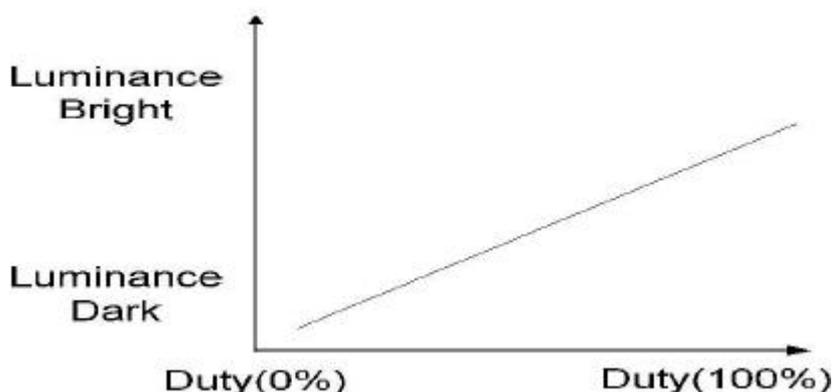
This specification is for standard module. For better performance, it needs to be customized by customer's system.

3.2 Interface Pin Connection

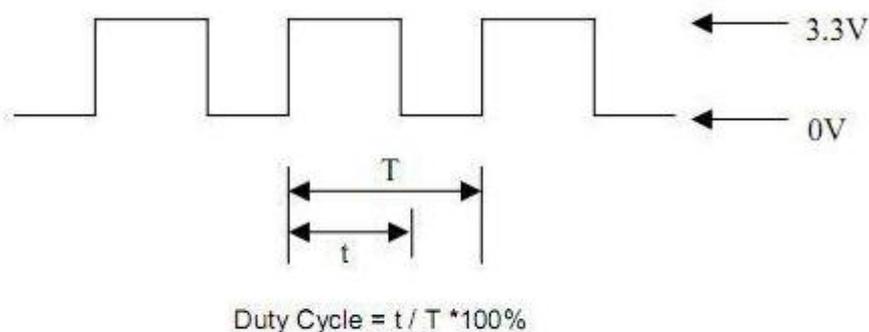
Connector CN1 is used for electronics interface. The recommended model is IPEX-20455-040E-12 manufactured by IPEX.

Pin No.	Symbol	Function
1	NC	No Connection(Reserve)
2	VDD	Power Supply,3.3V(typical)
3	VDD	Power Supply,3.3V(typical)
4	NC	EDID 3.3V power
5	NC	No Connection(Reserve)
6	NC	EDID Clock
7	NC	EDID Data
8	Rin0-	- LVDS differential data input(R0-R5,G0)
9	Rin0+	+ LVDS differential data input(R0-R5,G0)
10	GND	Ground
11	Rin1-	- LVDS differential data input(G1-G5,B0-B1)
12	Rin1+	+LVDS differential data input(G1-G5,B0-B1)
13	GND	Ground
14	Rin2-	- LVDS differential data input(B2-B5,HS,VS,DE)
15	Rin2+	+LVDS differential data input(B2-B5,HS,VS,DE)
16	GND	Ground
17	ClkIN-	-LVDS differential clock input
18	ClkIN+	+LVDS differential clock input
19	GND	Ground
20	NC	No Connection(Reserve)
21	NC	No Connection(Reserve)
22	GND	Ground
23	NC	No Connection(Reserve)
24	NC	No Connection(Reserve)
25	GND	Ground
26	NC	No Connection(Reserve)
27	NC	No Connection(Reserve)
28	GND	Ground
29	NC	No Connection(Reserve)
30	NC	No Connection(Reserve)
31	GND	Ground
32	GND	Ground
33	GND	Ground
34	NC	No Connection(Reserve)
35	PWM	LED BLU Brightness Control(Note 1,2)
36	NC	NC
37	NC	No Connection(Reserve)
38	VLED	LED Converter Input Power(5V~21V)
39	VLED	LED Converter Input Power(5V~21V)
40	VLED	LED Converter Input Power(5V~21V)

Note1: ADJ is used to adjust the B/L brightness.



Note 2: ADJ signal=0~3.3V, Operation Frequency:100 Hz~20KHz,



$$T = 1 / F$$

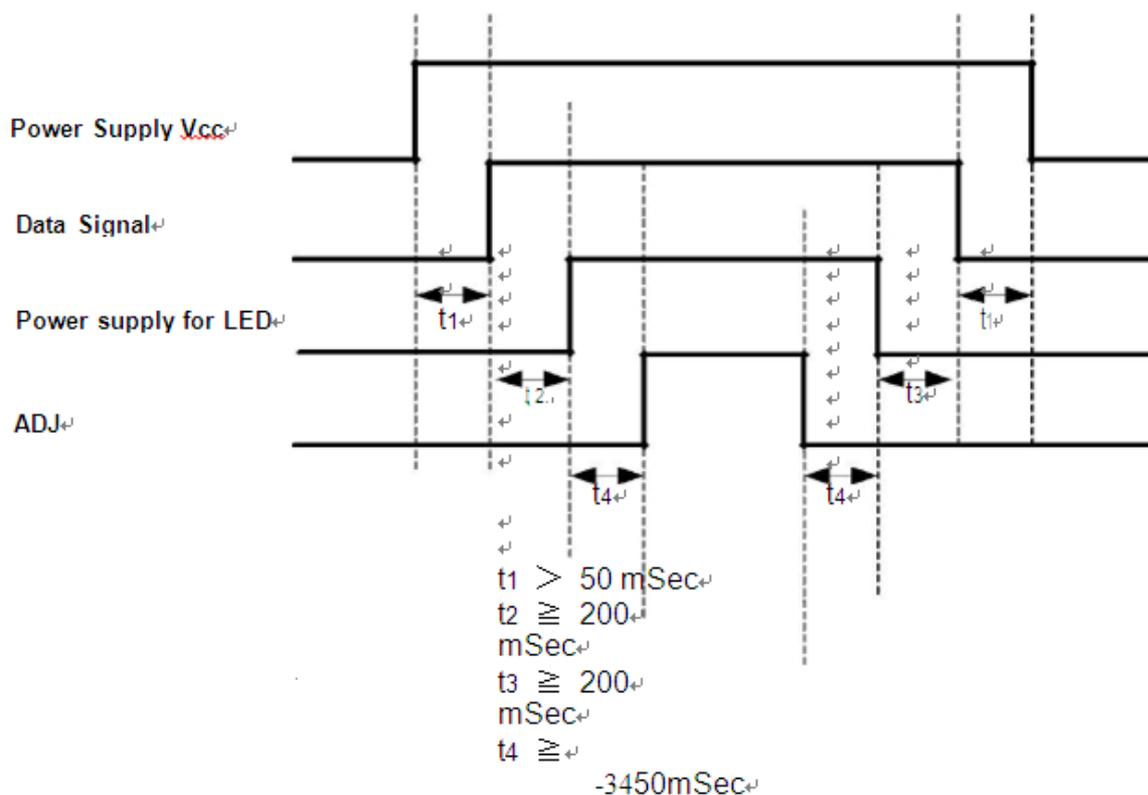
3.3 Absolute Max. Rating

Item	Symbol	Values		Unit
		Min.	Max.	
Power Voltage	V _{CC}	-0.3	4.0	V
	V _{LED}	5	21	V
Input Signal Voltage	V _I	-0.3	V _{CC}	V
Operation Temperature	T _{OP}	0	50	°C
Storage Temperature	T _{ST}	-20	60	°C

3.4 Typical Operation Conditions

Item	Symbol	Min.	Values	Max.	Unit
			Typ.		
Power Voltage	V _{CC}	3.0	3.3	3.6	V
	V _{LED}	5	-	21	V
Current Consumption	I _{CC}	-	80	-	mA
	I _{LED}	-	400	-	mA

3.5 Power Sequence



Note: Data Signal includes Rin0- ~ Rin2-, Rin0+ ~ Rin2+, CLKIN-, CLKIN+.

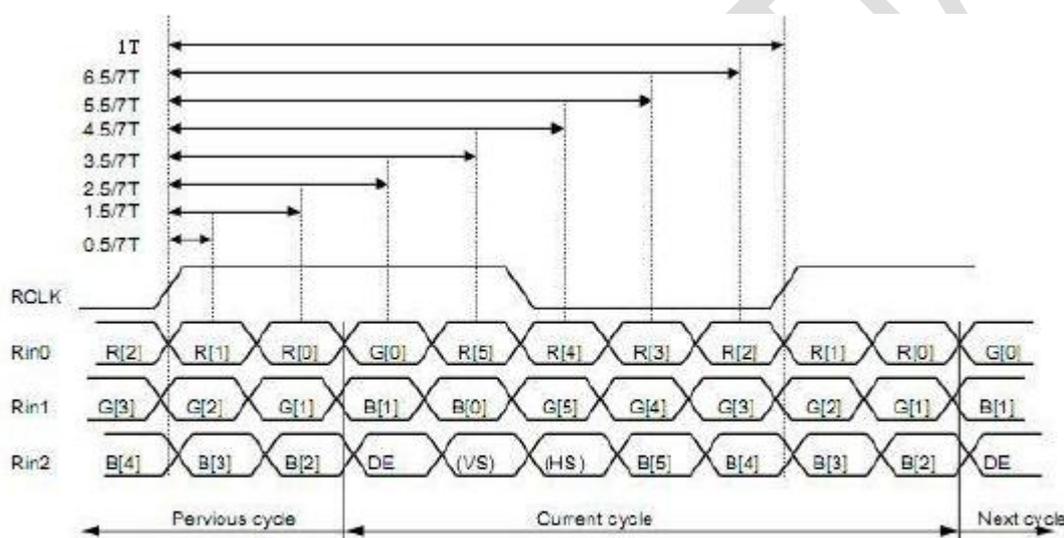
3.6 Timing Conditions

Switching Characteristics Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
RxCLKIN Period	t_{RCP}	11.76	T	50	ns	Note 1
RxCLKIN High Time	t_{RCH}	-	T/2	-	ns	
RxCLKIN Low Time	t_{RCL}	-	T/2	-	ns	
PAD0/1 to RxCLKIN Delay	t_{RCD}	-	3T/7	-	ns	
Data Setup to RxCLKIN	t_{RS}	1.9	-	-	ns	
Data Hold from RxCLKIN	t_{RH}	3.0	-	-	ns	
Input Data Position 0(T=11.76ns)	TRIP0.	-0.4	0	0.4	ns	Note 2
Input Data Position 1(T=11.76ns)	TRIP1.	T/7-0.4	T/7	T/7+0.4	ns	Note 2
Input Data Position 2(T=11.76ns)	TRIP2.	2T/7-0.4	2T/7	2T/7+0.4	ns	Note 2
Input Data Position 3(T=11.76ns)	TRIP3.	3T/7-0.4	3T/7	3T/7+0.4	ns	Note 2
Input Data Position 4(T=11.76ns)	TRIP4.	4T/7-0.4	4T/7	4T/7+0.4	ns	Note 2
Input Data Position 5(T=11.76ns)	TRIP5.	5T/7-0.4	5T/7	5T/7+0.4	ns	Note 2
Input Data Position 6(T=11.76ns)	TRIP6.	6T/7-0.4	6T/7	6T/7+0.4	ns	Note 2

Input Timing(only for DE Mode)

Parameter	Min	Typ	Max	Unit
H-Total	1185	1344	1800	CLK
H-Active	1024	1024	1024	CLK
H-Blanking	161	320	776	CLK
V-Total	628	635	650	LINE
V-Active	600	600	600	LINE
V-Blanking	28	35	50	LINE

Timing Diagram



LVDS Receiver Input Timing Definition
for 6bits LVDS input

3.7 Optical specifications

Item	Symbol	Condition	Values			Unit	Remark
			Min	Typ	Max		
Viewing angle (CR≥ 10)	θ_L	$\phi=180^\circ$ (3 o'clock)	-	60	-	degree	Note 1
	θ_R	$\phi=0^\circ$ (3 o'clock)	-	60	-		
	θ_T	$\phi=90^\circ$ (12 o'clock)	-	30	-		
	θ_B	$\phi=270^\circ$ (6 o'clock)	-	50	-		
Response time Rise+Fall	T_{RT}	Normal $\theta=\phi=0^\circ$	-	16	25	msec	Note 3
Contrast ratio	CR		400	500	-	-	Note 4
Color chromaticity	W_x		0.28	0.31	0.35	-	Note 2
	W_y		0.29	0.33	0.36	-	Note 5 Note 6
Luminance	L		-	160	-	-	Note 6
Luminance uniformity	Y_u		70	75	-	%	Note 6

Note 1: Definition of viewing angle range

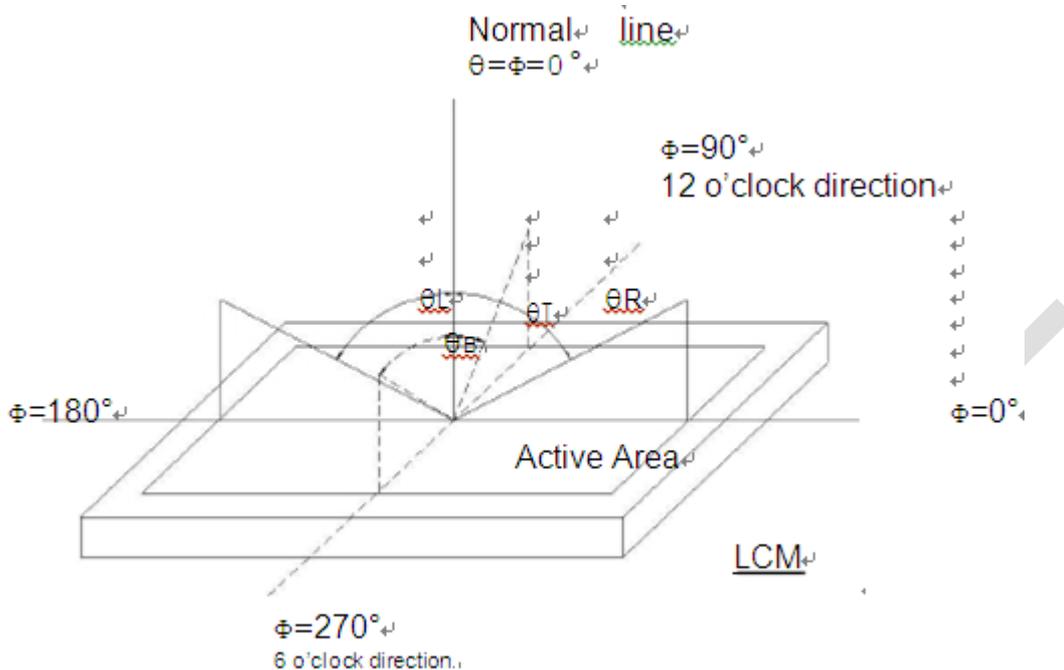


Fig. 3-1 Definition of viewing angle Note 2:

Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm ,Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1°/Height: 500mm.)

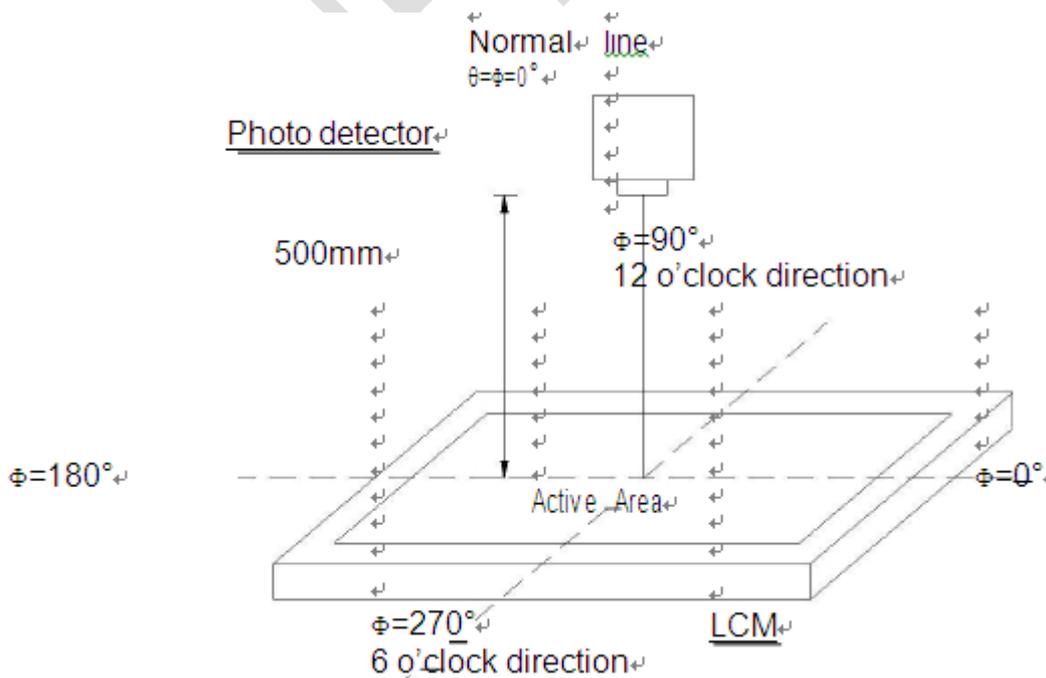


Fig. 3-2 Optical measurement system setup

Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

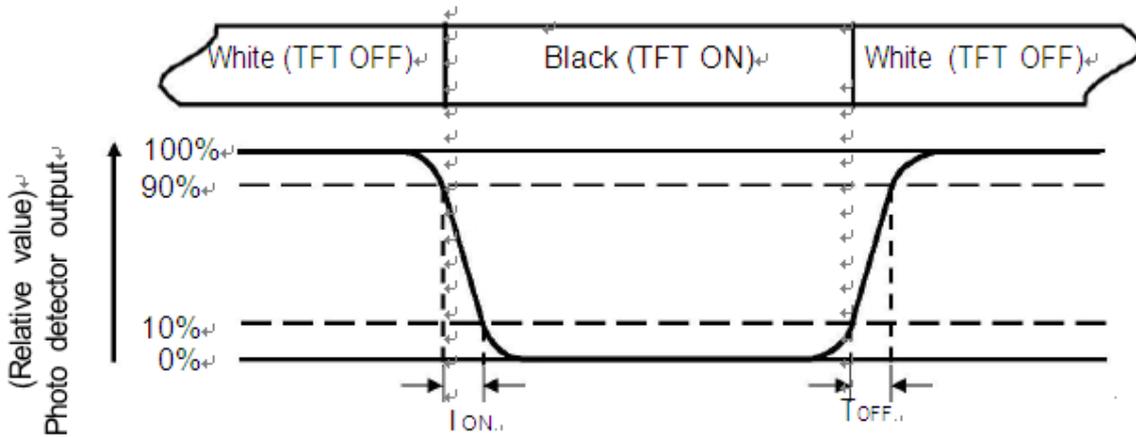


Fig. 3-3 Definition of response time

Note 4: Definition of contrast ratio

Contrast ratio (CR) = $\frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is VLED=5.0V.

Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 3-4).Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$

L-----Active area length

W----- Active area width

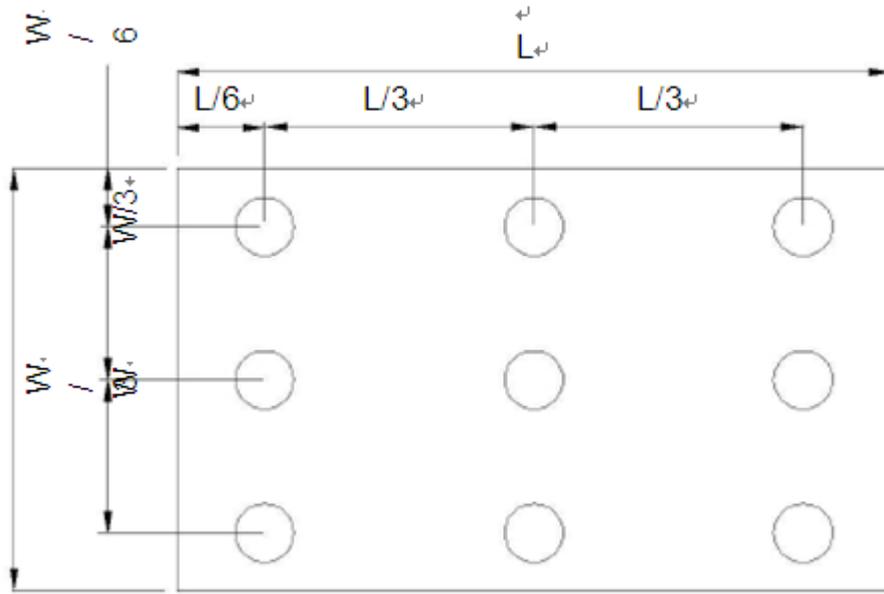


Fig. 3-4 Definition of measuring points

B_{max}: The measured maximum luminance of all measurement position.

B_{min}: The measured minimum luminance of all measurement position.

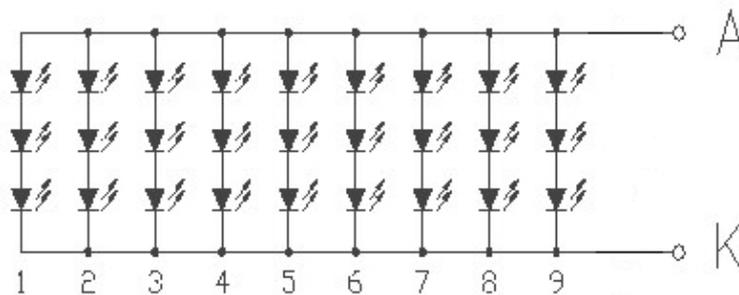
3.8 EM Signal Assignment

Pin#	Signal	In/out	Description
1	GND		Ground
2	VDD		Power Supply(5V)
3	USB+	I/O	USB Data Input/Output Signal
4	USB-	I/O	USB Data Input /Output Signal
5	No use		No Function
6	Key_Up	O	Page up
7	Key_Down	O	Page down
8	Key_Shrink	O	Zoom in
9	Key_Amp	O	Zoom out
10	Key_1		Default
11	Key_2		Default
12	No use		No Function
13	No use		No Function
14	GND		Ground

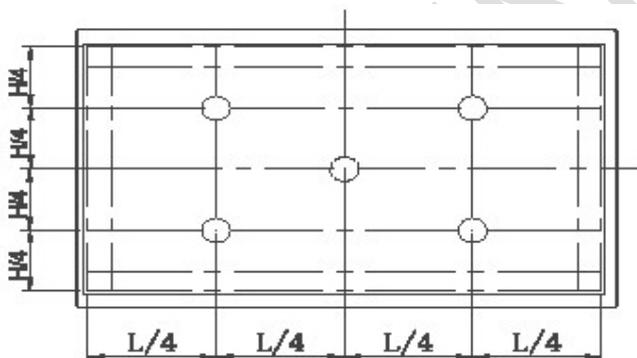
4. Test

4.1 Test Circuit Diagram:

Test Circuit Diagram:

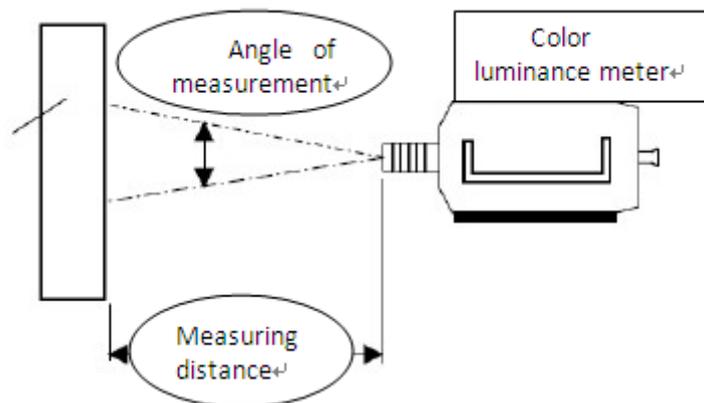


4.2 Test Point Space Diagram:



4.3 Test Condition as follow:

1. Ambient temperature: $25 \pm 2^\circ\text{C}$
2. Ambient humidity: $55\% \pm 10\%$.
3. Environmental illumination: Below Dark Room 10 LUX, Windless condition.
4. Test by current limiting power supply: $10 \times 20\text{mA}$ (single LED lamp 20mA)
5. Measuring instrument: BM-7 (TOPCON)
6. Ammeter: FLUKE 187
7. Color luminance meter: BM-7 (TOPCON)
8. Angle of measurement 1°
9. Measuring distance $L = 500\text{mm}$



10. Measuring method: (As shown in right)

5. Normative Reference

GB/T4619-1996 《Liquid Crystal Display Test Method》

GB/T2424 《Basic environmental Testing Procedures for Electric and Electronic Products.》

GB/T2423 《Basic Testing Procedures for Electric and Electronic Products》 IEC61747-1

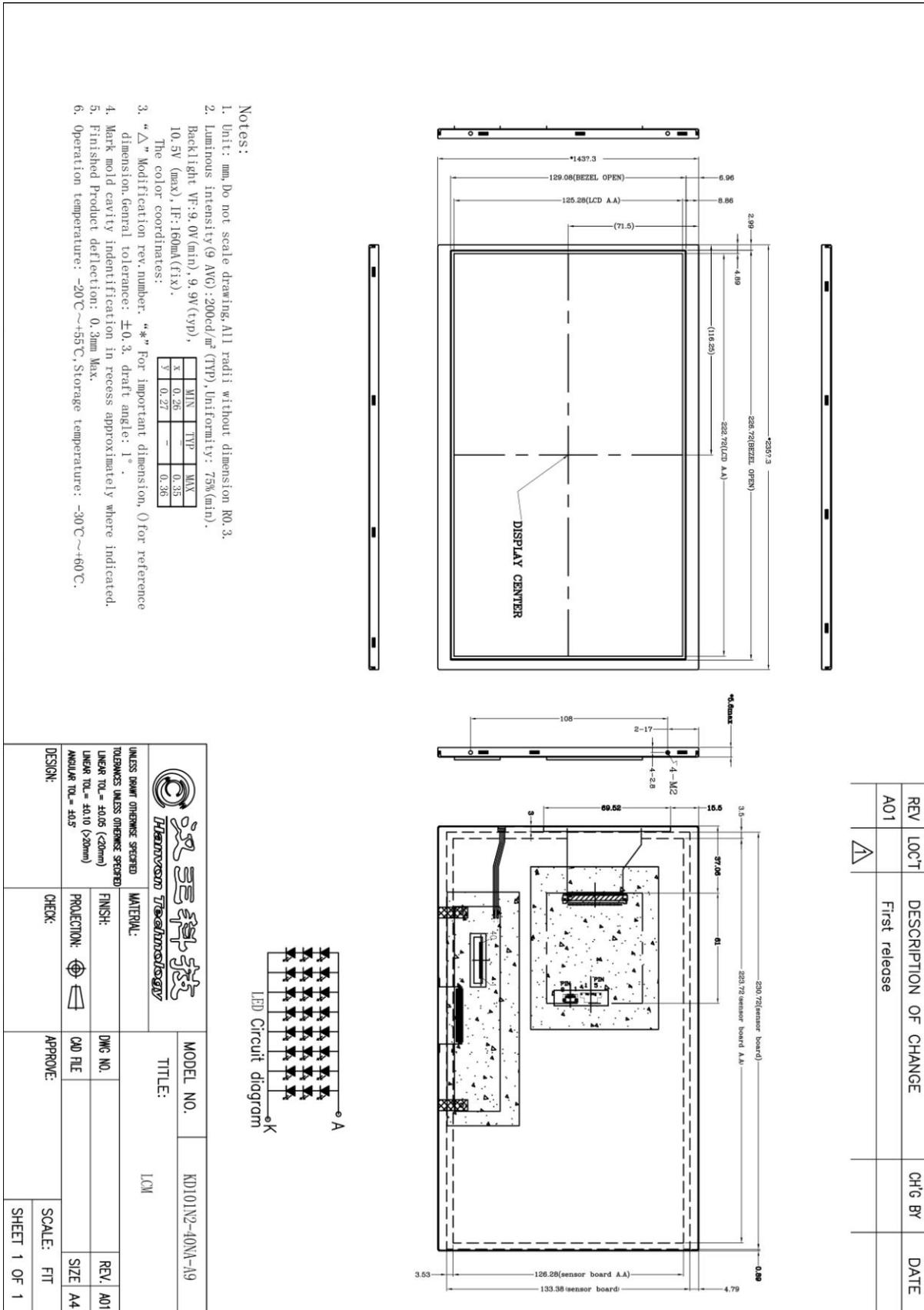
《SIXTH PART GB2828`2829-87 《National Standard of PRC》

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6. Appearance



7. Mechanical Drawing



8. Handling Precautions

8.1 Mounting method

The LCD panel of Daxian LCD module consists of two thin glass plates with polarizers which easily be damaged. And since the module is so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

8.2 Caution of LCD handling and cleaning

When cleaning the display surface, Use soft cloth with solvent [recommended below] and wipe lightly

- Isopropyl alcohol
- Ethyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:

- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns

Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux
- Chlorine (Cl) , Sulfur (S)

If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happens by miss-handling or using some materials such as Chlorine (Cl), Sulfur (S) from customer, Responsibility is on customer.

8.3 Caution against static charge

The LCD module uses C-MOS LSI drivers, so we recommend that you:

Connect any unused input terminal to V_{dd} or V_{ss}, do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity.

8.4 packing

- Module employs LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed directly to sunshine

or high temperature/humidity

8.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher
- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show 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.
- A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

8.6 Storage

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by anything else.

[It is recommended to store them as they have been contained in the inner container at the time of delivery from us

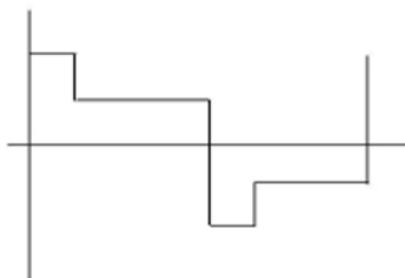
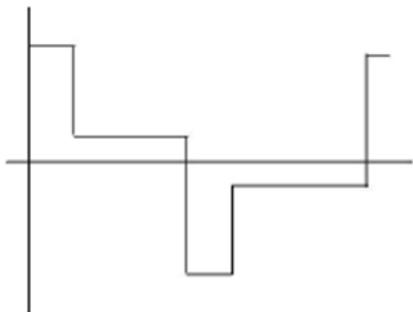
8.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water

9. Definitions

9.1 Definitions of Vop

The definitions of threshold voltage V_{th1} , V_{th2} the following typical waveforms are applied on liquid crystal by the method of equalized voltage for each duty and bias.



【 selected waveform 】

【 non-selected waveform 】

① V_{th1} : The voltage which the brightness of segment indicates 50% of saturated value on the conditions of selected waveform

($f_f=80\text{Hz}$, $\Phi=10^\circ$ $\theta=270^\circ$ at 25°C)

② V_{th2} : The voltage which the brightness of segment indicates 50% of saturated value on the conditions of non-selected waveform

($f_f=80\text{Hz}$, $\Phi=10^\circ$ $\theta=270^\circ$ at 25°C)

③ V_{op} : $(V_{th1}(50\%)+V_{th2}(50\%))/2$ ($f_f=80\text{Hz}$, $\Phi=10^\circ$ $\theta=270^\circ$ at 25°C)

9.2 Definition of Response Time T_r , T_d

① T_r : The time required which the brightness of segment becomes 10% from 100% when waveform is switched to selected one from non-selected one. ($f_f=80\text{Hz}$, $\phi=10^\circ$ $\theta=270^\circ$ at 25°C)

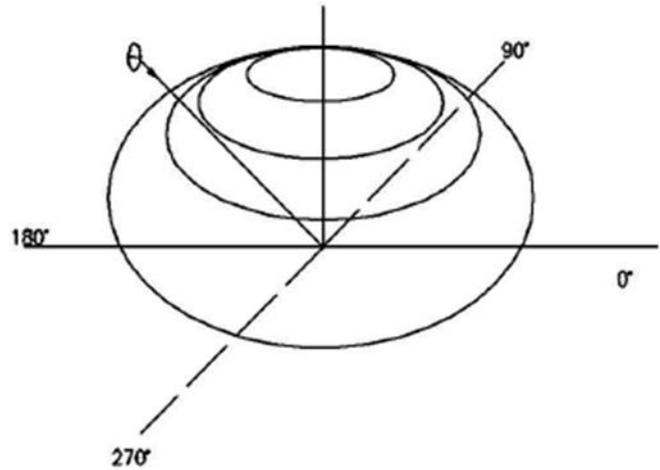
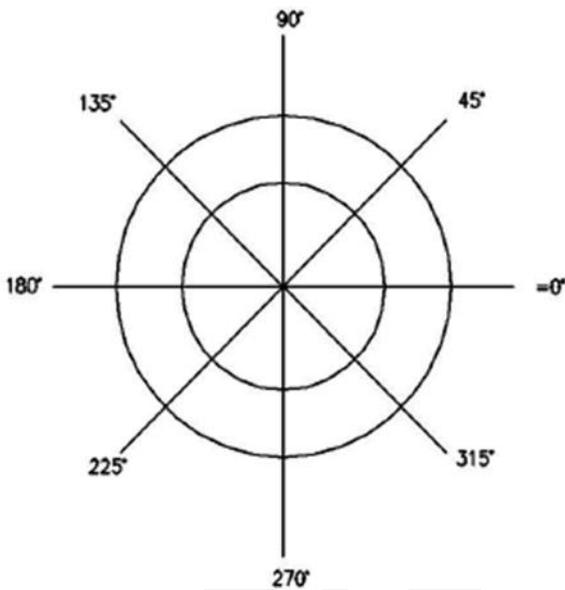
② T_d : The time required which the brightness of segment becomes 90% from 10% when waveform is switched to selected one from selected one. ($f_f=80\text{Hz}$, $\phi=10^\circ$ $\theta=270^\circ$ at 25°C)

9.3 Definition of Contrast Ratio Cr

$Cr=A/B$

- ① A: Segments brightness in case of non-selected waveform
- ② B: Segments brightness in case of selected waveform

9.4 Definition of Angle and Viewing Rang

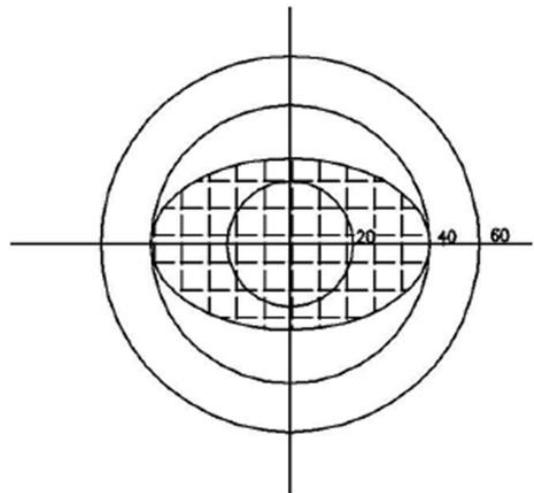


Angular Graph: Contrast Ratio

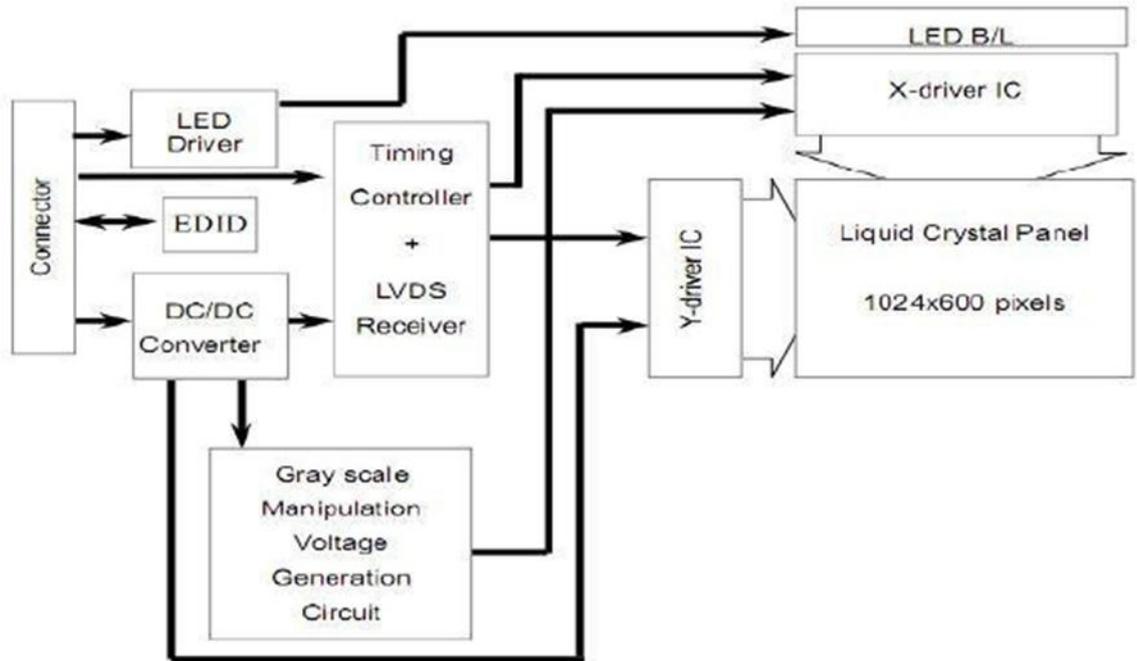
Such as:

Viewing Angle Range:

80($Cr>2$) Horizontal 70($Cr>2$) Vertical



10. Block Diagram



11. Reliability Test Conditions and Methods

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12. Precaution for use

12.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

12.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.

13. RoHS Report

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14. Labels

14.1 Green Label

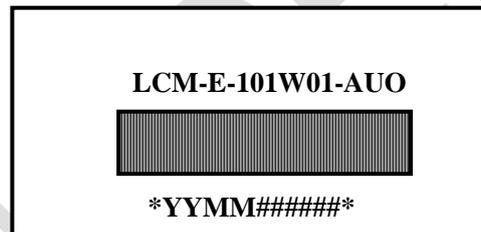


Label Material: White color

Label Ink: Green

Label Location: Paste on the middle of the board backside

14.2 Bar Code Label



Serial number: YY: Year produced

MM: Month produced

#####: Serial number in the month

Label Material: White color

Label Ink: Black

Label Location: Paste on the bottom of the board backside

14.3 Inner Box Label

CP No.	*****
Q'ty/Box (pcs):	
P No.	LCM-E-101W01-AUO
<u>Hanwang Technology CO., LTD.</u>	
<u>MADE IN CHINA</u>	

Label Material: White color

Label Ink: Black

Label Location: Paste on the upside of the inner carton

14.4 Shipping Mark Label

PRODUCT NAME: 10.1Inch EM Touch Display
CP NO.:
P NO.: LCM-E-101W01-AUO
QTY:
CARTON NO.:
DIMENSION:
GROSS WEIGHT:
NET WEIGHT:
Hanwang Technology Co., Ltd.
MADE IN CHINA
Handle with Care Keep Upright

Label Material: White color

Label Ink: Black

Label Location: Paste on the side face of the outer carton

15.Packing

