

Wuhan China Star Optoelectronics Technology Co.,Ltd

Product Specification Sheet

Customer: Lenovo

Model Name: MNG007DA1-C

Date: 2022/4/19

Version: V01

Customer's Approval		CSOT	
Signature	Date	Approved By	Date
		Reviewed By	Date
		Prepared By:	Date

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Version	Revise Date	Page	Content
V01	2022/04/19	All	Final Specification

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1. General Description

1.1 Overview

MNG007DA1-C is a 16" TFT Liquid Crystal Display Low blue light module with LED Backlight unit and 40 pins eDP 1.4 interface. This module supports 2560 x 1600 mode and can display 16.7M colors.

1.2 Specifications Summary

No.	Item	Specification	Unit	Note
1	LCD size	16.0	inch	
2	Resolution	2560 x RGB x 1600		
3	Pixel Arrangement	RGB		
4	Model Type	LCM		
5	TFT Technology	LTPS		
6	Display mode	FFS, Normally Black		
7	Active Area	344.6784 (H) × 213.424 (V)	mm	
8	pixel pitch	134.64(H) × 134.64(V)	um	
9	Display Colors	16.7M		@ 8bit
10	Contrast Ratio	1200:1(Typ)		
11	Color Gamut	SRGB 100% (typ) / 95% (min)	CIE1976	SRGB
12	LCM Outline Dimension		mm	Typical
13	Luminance	400(Typ)	nits	5 Points Average
14	Low blue light ratio	50	%	Max
15	Surface treatment(UP)	Anti-Glare	--	Pol.
16	Interface	eDP 1.4		
17	PSR2 function	Support		
18	Method of Inversion	Column Inversion		
19	Power consumption of Panel	0.75	W	3.3V@Mosaic 60Hz
	349.68×224.42×2.45	4.5	W	Max (1)@12V
20	Weight	330	g	Max

Note (1) The specified power consumption (with converter efficiency) is under the conditions at VCCS =3.3 V, LED_VCCS =12V (Typ), fPWM = 200 Hz, Duty=100% and Ta = 25 ± 2 °C, whereas mosaic pattern is displayed.

Power consumption of Backlight

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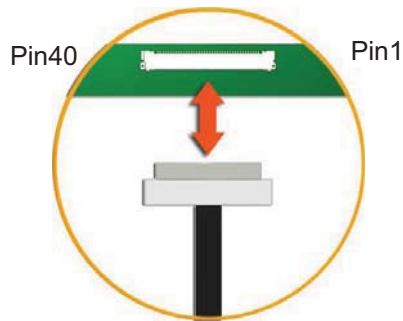
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2. Mechanical Specifications

Parameter		Min.	Typ.	Max.	Unit	Note
Unit outline dimensions	Width	349.38	349.68	349.98	mm	
	Height	224.12	224.42	224.72	mm	w/o pcb
	Height	-	-	225.02	mm	w/ pcb
	Depth	2.3	2.45	2.6	mm	w/o pcb
	Depth	-	-	4.6	mm	w/ pcb
Weight		-	-	330	g	

2.1 Interface Connection



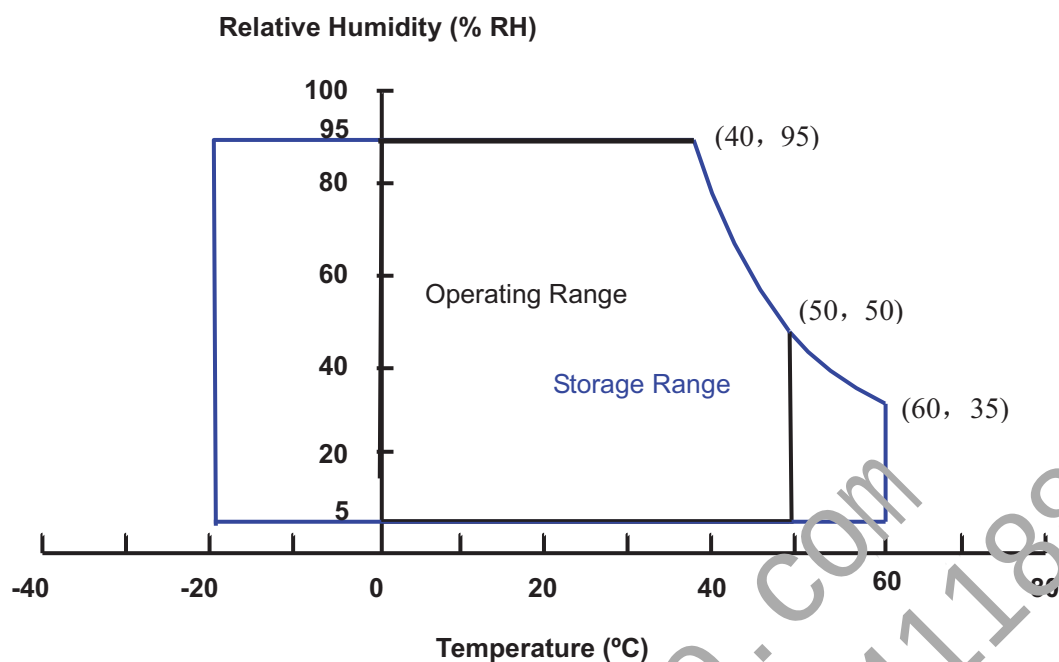
Please refer Appendix Outline Drawing for detail design.

Connector Part No.: IPEX-20455-040E

3. Absolute Maximum Ratings

3.1 Absolute Ratings of Environment

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T _{ST}	-20	+60	°C	(1)
Operating Ambient Temperature	T _{OP}	0	+50	°C	(1), (2)



Note (1)

(a) 95% RH Max. ($T_a \leq 40^\circ\text{C}$).

(b) Wet-bulb temperature should be 39°C Max. ($T_{wb} \leq 40^\circ\text{C}$).

(c) No condensation.

Note (2) The temperature of panel surface should be 0°C min. and 60°C max.

3.2 Electrical Absolute Ratings

3.2.1 TFT-LCD Module

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	VCCS	-0.3	+4	V	(1)
Logic Input Voltage	V_{IN}	-0.3	+3.6	V	
Converter Input Voltage	LED_VCCS	-0.3	26	V	(1)
Converter Control Signal Voltage	LED_PWM,	-0.3	+3.6	V	(1)
Converter Control Signal Voltage	LED_EN	-0.3	+3.6	V	(1)

Note (1) Stresses beyond those listed in above "ELECTRICAL ABSOLUTE RATINGS" may cause permanent damage to the device. Normal operation should be restricted to the conditions described in "ELECTRICAL CHARACTERISTICS".

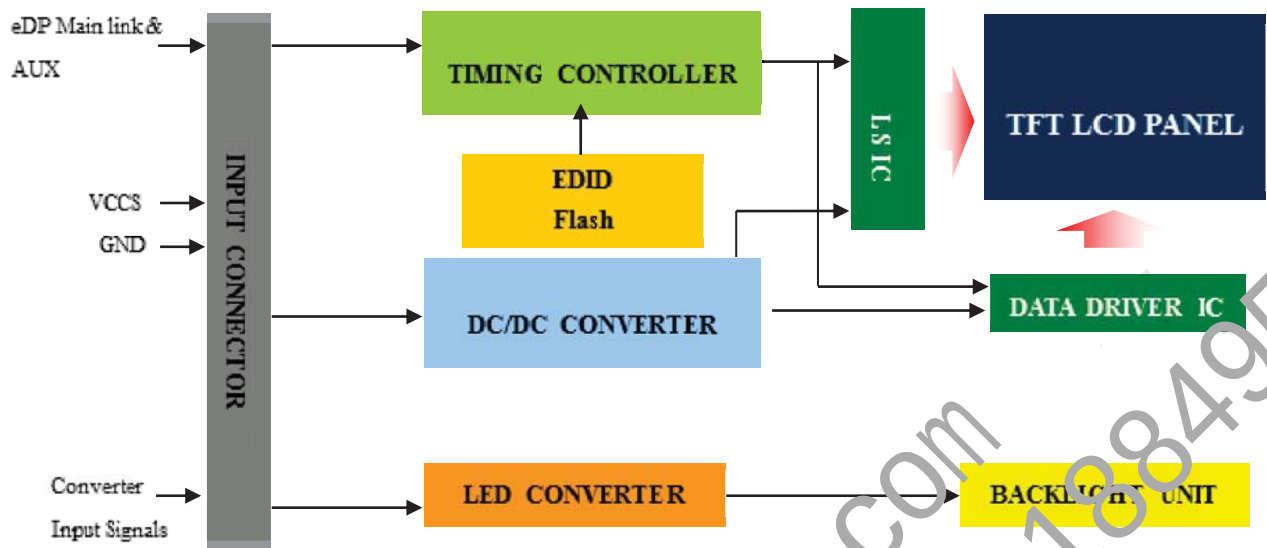
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4. Electrical Specifications

4.1 Function Block Diagram



4.2 Interface Connections

PIN Assignment

Pin	Symbol	Description	Note
1	#01	NC	
2	#02	H_GND	
3	#03	Lane3_N	
4	#04	Lane3_P	
5	#05	H_GND	
6	#06	Lane2_N	
7	#07	Lane2_P	
8	#08	H_GND	
9	#09	Lane1_N	
10	#10	Lane1_P	
11	#11	H_GND	
12	#12	Lane0_N	
13	#13	Lane0_P	
14	#14	H_GND	
15	#15	AUX_CH_P	
16	#16	AUX_CH_N	
17	#17	H_GND	
18	#18	LCD_VCC	3.0~3.6V@3.3V(Typ)
19	#19	LCD_VCC	
20	#20	LCD_VCC	
21	#21	LCD_VCC	

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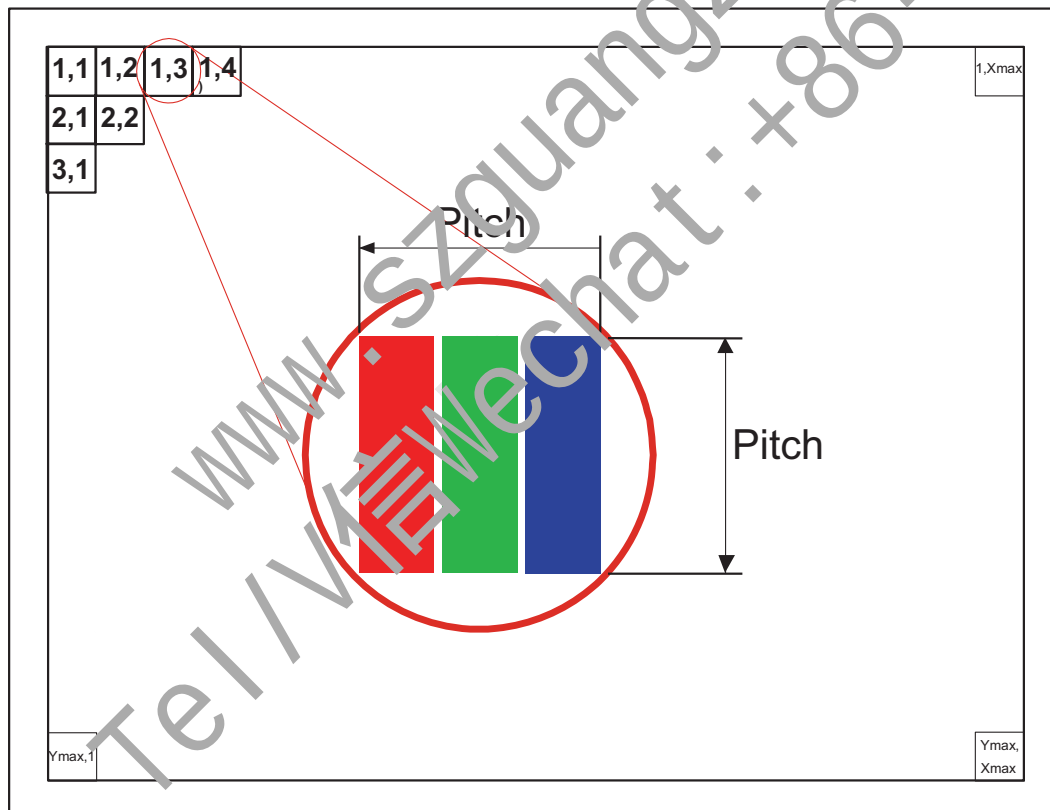
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22	#22	LCD Self-Test	
23	#23	LCD_GND	
24	#24	LCD_GND	
25	#25	LCD_GND	
26	#26	LCD_GND	
27	#27	HPD	
28	#28	BL_GND	
29	#29	BL_GND	
30	#30	BL_GND	
31	#31	BL_GND	
32	#32	BL_Enable	
33	#33	BL_PWM_DIM	
34	#34	NC	
35	#35	NC	
36	#36	BL_PWR	5V~12V@12V (Typ)
37	#37	BL_PWR	
38	#38	BL_PWR	
39	#39	BL_PWR	
40	#40	NC	

Note (1) The pixel is shown in the following figure.



4.3 Electrical Characteristics

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4.3.1 LCD Electronics Specification

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		VCCS	3.0	3.3	3.6	V	(1)
BIST Control Level		BIST on	2.2	3.3	3.6	V	(1)
		BIST off	0	-	0.5	V	(1)
Ripple Voltage		V _{RP}	-	-	100	mV	(1)
Inrush Current		I _{RUSH}	-	-	1.5	A	(1)(2)
Power Supply Current	Mosaic	I _{LCD}	-	212	227	mA	(1)
Power consumption	Mosaic	P _{LCD}	-	0.7	0.75	W	(3)

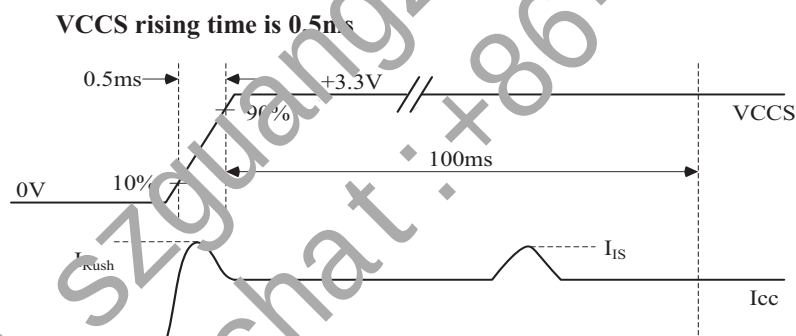
Note (1) The ambient temperature is $T_a = 25 \pm 2^\circ\text{C}$.

Note (2) I_{RUSH}: the maximum current when VCCS is rising

I_{IS}: the maximum current of the first 100ms after power-on

Measurement Conditions: Shown as the following figure.

Test pattern: Mosaic



Note (3) The specified power supply current is under the conditions at VCCS = 3.3 V, $T_a = 25 \pm 2^\circ\text{C}$, DC Current and $f_v = 60\text{ Hz}$, whereas a power dissipation check pattern below is displayed.

LED CONVERTER SPECIFICATION

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Converter Input power supply voltage		LED_Vccs	5.0	12.0	21.0	V	
Converter Inrush Current		I _{LED} RUSH	-	-	1.5	A	(1)
EN Control Level	Backlight On		1.5	-	3.6	V	

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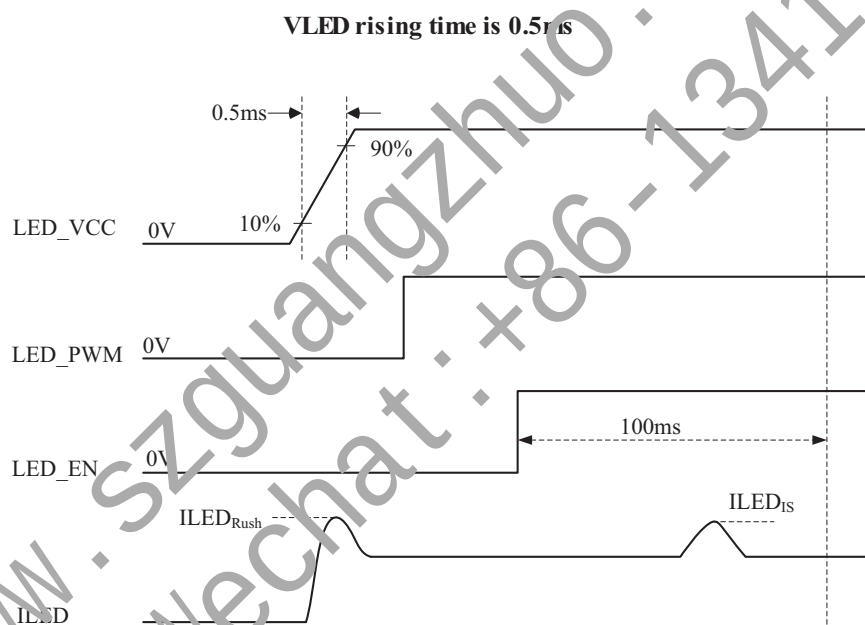
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	Backlight Off		0	-	0.5	V	
PWM Control Level	PWM High Level		1.5	-	3.6	V	
	PWM Low Level		0	-	0.5	V	
PWM Control Duty Ratio			1	-	100	%	
PWM Control Permissive Ripple Voltage		VPWM_pp	-	-	100	mV	
PWM Control Frequency		f _{PWM}	200	-	2000	Hz	
LED Power consumption		P _L	-	-	4.5	W	(2)
LED Power Current	LED_VCCS =Typ.	-	-	-	375	mA	(3)

Note (1) I_{LED_RUSH}: the maximum current when LED_VCCS is rising,

I_{LED_IS}: the maximum current of the first 100ms after power-on,

Measurement Conditions: Shown as the following figure. LED_VCCS = Typ., Ta = 25 ± 2 °C, f_{PWM} = 200 Hz, Duty=100%.



Note(2) $P_L = I_L \times V_L$ (With LED converter transfer efficiency);

Note (3) The specified LED power supply current is under the conditions at “LED_VCCS = 12V(Typ).”, Ta = 25 ± 2 °C, f_{PWM} = 200 Hz, Duty=100%.

4.3.2 Backlight Unit

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Parameter	Symbol	Value			Unit	Note
		Mn.	Typ	Max.		
LED Light Bar Power Supply Voltage	V _L	-	-	34.68	V	(1)(2) (Duty100%)
LED Light Bar Power Supply Current	I _L	-	114.6	-	mA	
Power Consumption	P _L	-	-	3.98	W	(3)
LED Life Time	L _{BL}	15000	-	-	Hrs	(4)

Note (4) The lifetime of LED is defined as the time when it continues to operate under the conditions at $T_a = 25 \pm 2^\circ\text{C}$ and $I_f = 20\text{ mA}$ (Per EA) until the brightness becomes $\leq 50\%$ of its original value.

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4.4.1 eDP AUX Channel Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Unit Interval for AUX channel	UI _{AUX}	0.4	-	0.6	μS	
Peak-to-peak voltage at TP1	V _{AUX-DIFF-pp}	0.18	0.2	0.8	V	
AUX DC Common mode Voltage	V _{AUX-DC-CM}	0	-	1.2	V	
AUX Short current limit	I _{AUX_SHORT}	-	-	20	mA	
AUX CH termination DC resistor	R _{AUX_TERM}	80	100	120	Ω	Differential input
AUX AC coupling capacitor	C _{AUX}	75	-	200	nF	
Number of pre-charge pulses	Pre-charge pulses	10	-	16		

4.4.2 eDP Main Link Receiver Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Link clock down spreading	Down_Spread_Amplitude	0		5	%	
Differential Peak-to-peak Input Voltage at Rx package pins	V _{RX-DIFFp-p}	100		1320	mV	
Differential termination resistance	R _{RX-TERM}	80	100	120	Ω	
RX short circuit Current Limit	I _{RX-SHORT}	-	-	20	mA	
Lane Intra-pair Skew at RX package pins	T _{RX-SKEW-INTRA-PAIR} at 10.0 Gb/s	-	-	50	ps	

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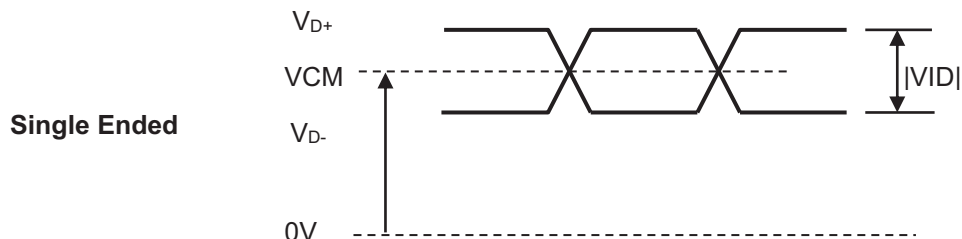
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4.4.3 eDP AUX Channel Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Hot plug Detect	VHPD	2.5	-	2.8	V	

Note (1) Display port interface related AC coupled signals are following VESA Display Port Standard V1.4.



4.4.4 Color Data Input Assignment

Differential
The brightness of each primary color (red, green and blue) 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

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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
	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
	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
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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
	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
	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
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
	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
	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
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	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(254)	0	0	0	0	0	0	0	0	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	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
	Blue(1)	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	1	0
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	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(253)	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	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	1	1	1	1	1	1	1	1

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

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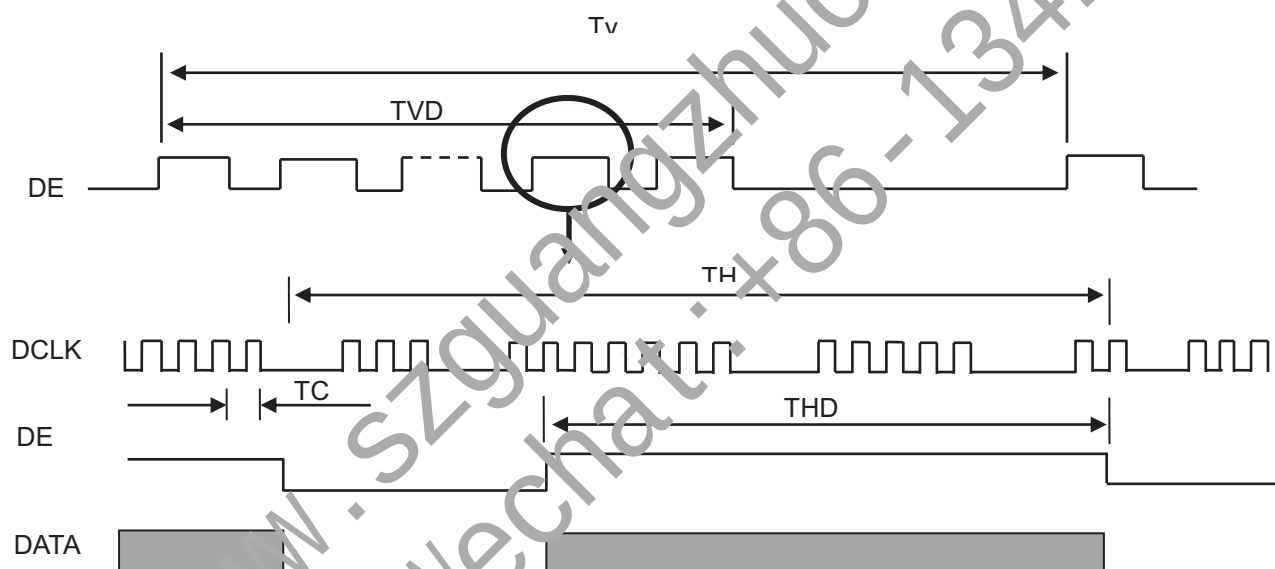
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4.5 Display Timing Specifications

The input signal timing specification is showed as the following table and timing diagram.

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK	Frequency	1/Tc	-	268.63	-	MHz	-
DE	Vertical Total Time	TV	-	1646	-	TH	-
	Vertical Active Display Period	TVD	--	1600	--	TH	-
	Vertical Active Blanking Period	TVB	-	46	-	TH	-
	Horizontal Total Time	TH	-	2720	-	Tc	-
	Horizontal Active Display Period	THD	--	2560	--	Tc	-
	Horizontal Active Blanking Period	THB	-	160	-	Tc	-

Note (1) Display timing signal should be contained and transferred by Display Port Main Link stream data packing described in VESA Display Port Standard V1.4



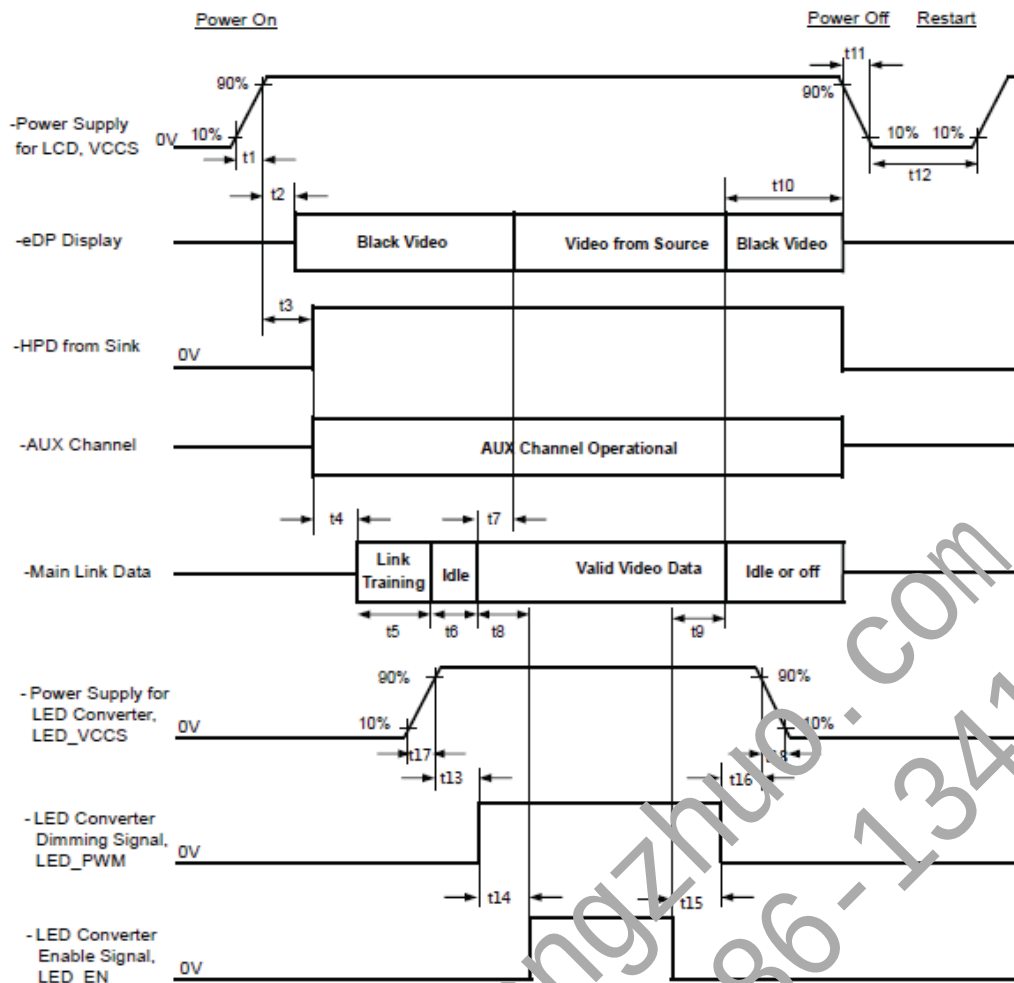
4.6 Power ON/OFF Sequence

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Symbol	Description	Min	Typ.	Max	Unit	Note
t1	Power rail rise time, 10% to 90%	0.5		10	ms	
t2	Delay from LCD, VCCS to eDP Display	0		200	ms	
t3	Delay from LCD, VCCS to HPD high	0		200	ms	
t4	Delay from Sink AUX to link training initialization	-		-	ms	
t5	Link training duration	-		-	ms	
t6	Link idle	-		-	ms	
t7	Delay from valid video data from Source to video on display	0		50	ms	
t8	Delay from valid video data from Source to backlight on	-		-	ms	
t9	Delay from backlight off to end of valid video data	-		-	ms	

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t10	Delay from end of valid video data from Source to power off	0		500	ms	
t11	VCCS power rail fall time, 90% to 10%	1		10	ms	(1)
t12	VCCS Power off time	500		-	ms	
t13	Delay from VCC to PWM	0		-	ms	
t14	Delay from PWM to LED ENABLE	0		-	ms	
t15	Delay from LED ENABLE to PWM Disable	0		-	ms	
t16	Delay from PWM Disable to VBL 90%	0		-	ms	
t17	Delay from VBL 10% to VBL 90%	0		-	ms	
t18	VBL power rail fall time, 90% to 10%	0		-	ms	

Note (1) Please follow the power on/off sequence described above. Otherwise, the LCD module might abnormal display or be damaged.

Note (2) Please avoid floating state of interface signal at invalid period. When the interface signal is invalid, be sure to pull down the power supply of LCD VCCS to 0 V.

Note (3) The backlight must be turned on after the power supply for the logic and the interface signal is valid.

The backlight must be turned off before the power supply for the logic and the interface signal is invalid.

Note (4) Please follow the LED backlight power sequence as above. If the customer could not follow, it might cause backlight flash issue during display ON/OFF or damage the LED backlight controller

5. Optical characteristics

Ta=25°C

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	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing angle range	Left/Right	CR> 10	85	89	-	Deg.	(1), (3), (4), (6)
	Upper/Low		85	89	-		
	Left/Right	CR> 100	70	80	-	Deg.	
	Upper/Low		70	80	-	Deg.	
Contrast ratio	CR	$\theta=0$ deg.	1000	1200	-	-	(2), (4), (6)
Response time	Tr + Tf		-	25	-	ms	(5)
Chromaticity of white	x		Typ. -0.025	0.313	Typ. +0.025	-	(2), (6) Normal operation
	y			0.329		-	
Chromaticity of red	x			0.642		-	
	y			0.331		-	
Chromaticity of green	x			0.298		-	
	y			0.602		-	
Chromaticity of blue	x			0.144		-	
	y			0.056		-	
Gamut	%		95%	100%		sRGB	
Luminance of White	Y_{LI}	-	340	400	460	cd/m ²	(7)
Half brightness viewing	--	-	-	20/20	-	[deg]	(3)
Half brightness viewing	-	-	-	20/20	-	[deg]	(3)
gamma	-	-	-	2.2	-	-	-
Surface hardness	[H]	-	-	3	-	H	-
White uniformity 5pt	δW	$\theta=0$ deg.	80	-	-	%	(8)
White uniformity 13pt	δW	$\theta=0$ deg.	60	-	-	%	(2), (8)
Low blue light ratio	%	(415nm~455nm)/ (400nm~500nm)	-	-	50	%	-
Reflection ratio	%	-	-	-	6.5	%	-

※The measurement shall be taken 5 minutes after lighting the LCM at the following rating.

※The optical characteristics shall be measured in a dark room or equivalent.

Note (1) Measurement of viewing angle range

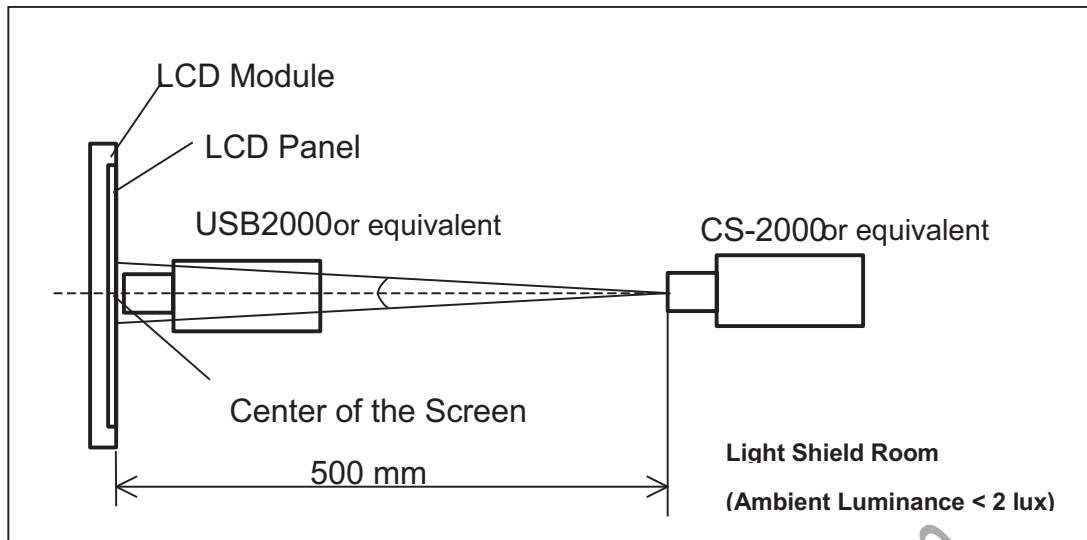
Note (2) Measurement of luminance and Chromaticity and Contrast.

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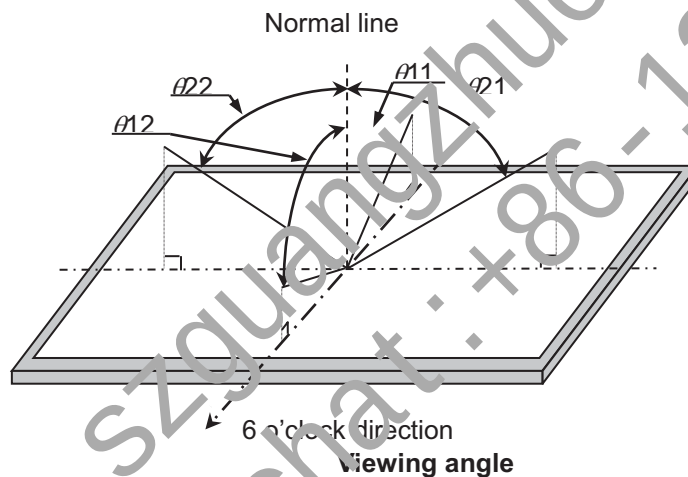
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Measurement of Contrast, Luminance, Chromaticity, White variation, Crosstalk and Color temperature variation

Note (3) Definitions of viewing angle range:



Note (4) Definition of contrast ratio:

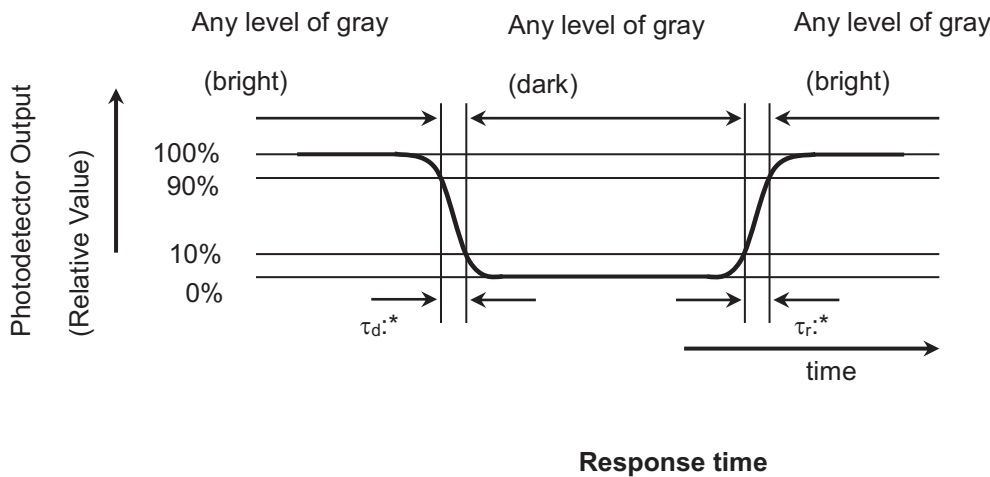
The contrast ratio is defined as the following.

$$\text{Contrast Ratio} = \frac{\text{Luminance(Brightness) with all pixels white}}{\text{Luminance(Brightness) with all pixels Black}}$$

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Note (5) Definition of response time:

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".

Note (6) This shall be measured at center of the screen.

Note (7) The Luminance of White is the average of 5 points measurements (4,5,7,9,10) showing in the Fig.9-5.

Note (8) Definition of white uniformity:

White uniformity of 5 points is defined as the following with 5 measurements(4,5,7,9,10).

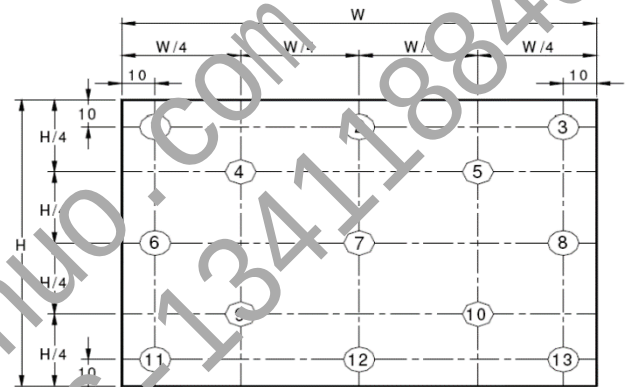


Fig.9-5

$$\delta_{W1} = \frac{\text{Maximum Luminance of 5 Points (Brightness)}}{\text{Minimum Luminance of 5 Points (Brightness)}}$$

White uniformity of 13 points is defined as the following with 13 measurements(1~13).

$$\delta_{W2} = \frac{\text{Maximum Luminance of 13 Points (Brightness)}}{\text{Minimum Luminance of 13 Points (Brightness)}}$$

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6. Reliability Test Items

No.	Test Item	Conditions
1	High temperature storage test	60°C , 240h
2	Low temperature storage test	-20°C , 240h
3	Low temperature operation test	0°C , 500h
4	High temperature & high humidity operation test	50°C , 80%RH , 1000hrs±48hrs
5	Thermal shock test	-20°C/30min、 60°C/30min 100cycles
6	TC	-20±2°C/18minutes±5%、 60±2°C/18minutes±5% 40cycles
7	Altitude test (Alt)	53.3±5% KPa (altitude 5000m) , 24±2 hours
8	ON/OFF Test (OnOff)	Room temperature (25±3°C), 500 hours (30sec. On / 30sec. Off, 30,000 cycles) ;
9	Life Test (Life)	Room temperature (25±3°C) , 2000hrs±72hrs ,
10	ESD	150pF[330Ω],Contact:: 5KV,Air:±17KV
11	IS	1 Condition: Room temp.(25±3°C) , Test pattern :Black window pattern (background L127/255 white) and Full-screen L127/255 white Room ambient 0 - 500 lux Viewing distance 30 - 50cm Viewing Angle: 0 Degree 2: Procedure: Turn off the panel at least 12Hrs before starting the test; 0 minutes、 2minutes、 every 5minutes up to 30minutes,2hrs 、 4hrs and 10hrs Checking IS by using 64Gray scale from Gray0~63 under 30s,
12	Vibration	1.5G , 10->200Hz , For x, , y , z axis , 30min for each axis
13	shock	(1) 50G 18msec. trapezoidal (2) 210G 3msec. half-sine 1 for each ± x, y, z direction, total 6 times for (1),(2) Power off

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7. Display Quality

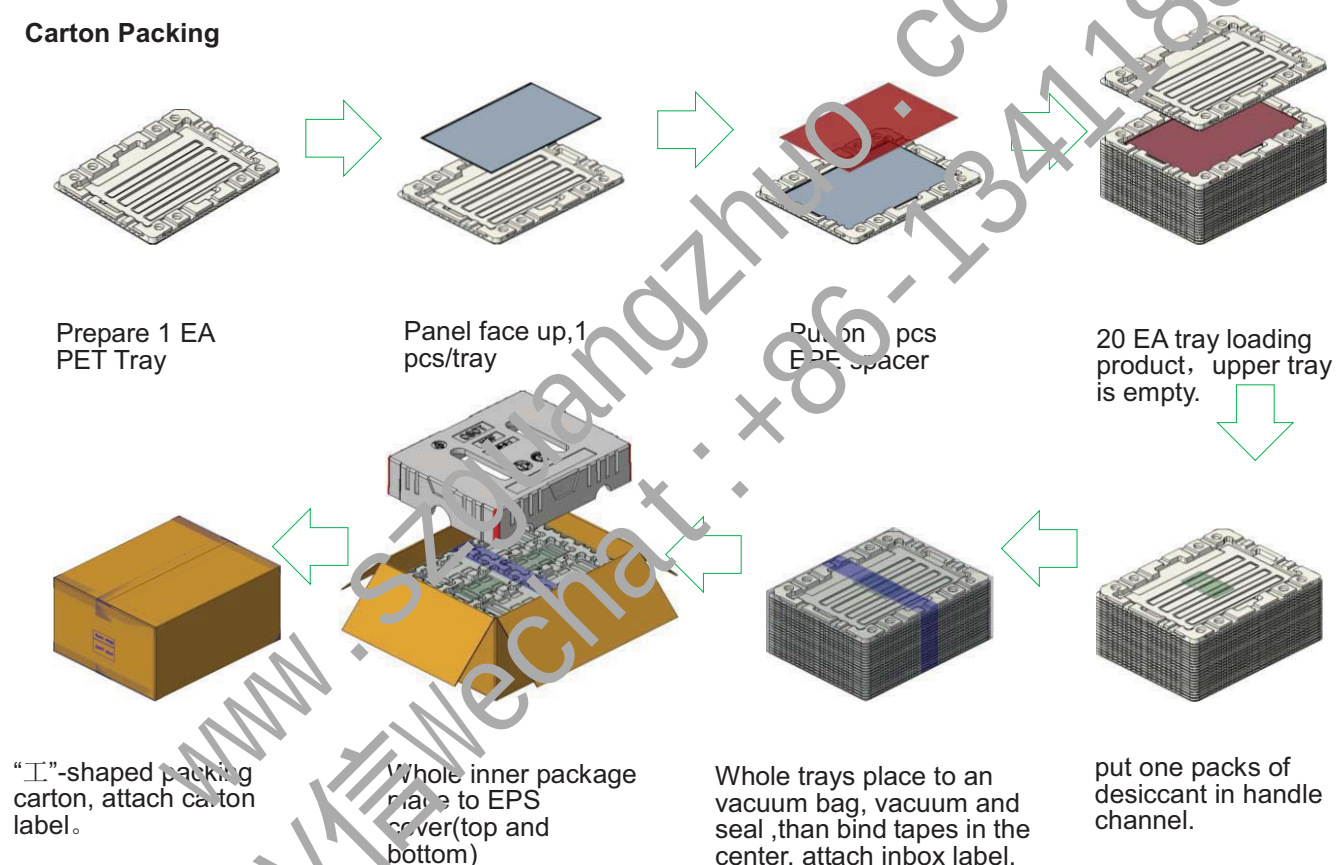
The display quality of the color TFT-LCD Module shall be in compliance with the Incoming Inspection Standard.

8. Packaging Condition

Item	Specification	Remark
Carton(Box) Packing	20 PCS/Carton(Box)	
Carton(Box) Packing Size	445mm(L)x375mm(W)x220mm(H)	Length x With x Height
Pallet Packing	36 Carton(Box)/Pallet	
Pallet Packing Size	1140mm(L) x 945mm(W) x 1450mm(H)	Length x With x Height

8.1 Packing Method

Carton Packing



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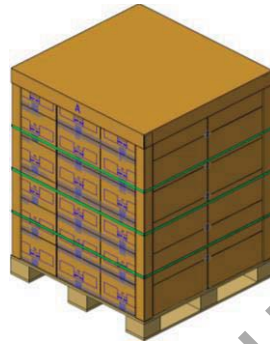
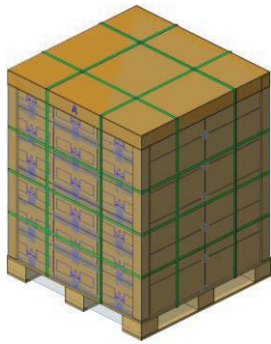
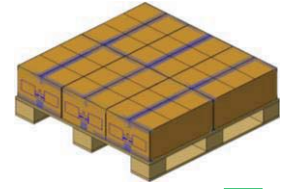
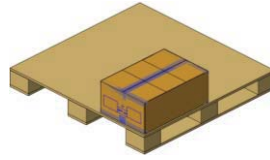
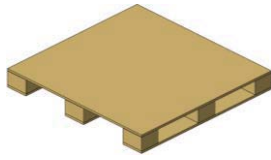
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Pallet Packing

1pcs plywood
pallet, “川”-shape,
carton label face out

1*paper cover&4*corner
paper, wrap the PE film
around.

6 carton/layer



“井”-shape bind PP belt ,attach
pallet label

6 layers/pallet

8.2 Label

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REV.	1	2	3	4	5	6	7	8	9	10	11	12	
Need confirm CSOT environmental protection agreement HSR		Degree of secrecy Normal								REV. Ver1.0	DESCRIPTION First Release	CHANGED BY: Niu Gu	DATE: 2021-07-14

CSOT inbox label

CSOT Carton label

CSOT Pallet label

QR Code

Font Height: 1.5mm

version	Provisional "1", if change, new product type informant FAE, MP type informant CLE.
year month day	year: last place in the current year, include "0" month: 1~12 (January to December), 1,2,3,4,5,6,7,8,9,10,11,12 day: 1~9 (exclusive "1", "0", "Q", "U")
serial no.	XX" where serial no. (exclusive "I", "O", "Q", "U", include "0")

Qty: the values for reference base on reality quantity
 WT: the values for reference base on reality weight
 Carton Qty: the values for reference base on reality carton quantity

NOTES:
 1. Font: reference (Arial), Height: 2mm, Space: 1mm;
 2. CSOT Barcode Style: Code 128;
 3. Attended position see the RD Packing manual;
 4. The printing information must be clearly.

STEP	TOOL	DATE	NAME	DESIGNING	CHK	DATE	NAME	DATE	NAME	DATE	NAME
1-30	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
30-100	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
100-150	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
150-200	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
200-250	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
250-300	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
300-350	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
350-400	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
400-450	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
450-500	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
500-550	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
550-600	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
600-650	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
650-700	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
700-750	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
750-800	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
800-850	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
850-900	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
900-950	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					
950-1000	AS	2021-07-14	SHO ANG	MODULE NAME	PART NO.	VER.					

9. RoHS Directive

This LCD Module is compliant with RoHS Directive.

10. Handling Precautions

- Be sure to turn off the power supply when inserting or disconnecting the cable .Please insert for too much stress not to join a connector in the case of insertion of a connector.
- Be sure to design the cabinet so that the Module can be installed without any extra stress such as warp or twist.
- Since the front polarizer is easily damaged, pay attention not to scratch it.
- Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
- When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
- Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface. Handle with care.
- Since CMOS LSI is used in this Module, take care of static electricity and injure the human earth when handling. Observe all other precautionary requirements in handling components.
- This Open-cell has its circuitry PCBs on the side and should be handled carefully in order not to be stressed.

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- i) Laminate film is attached to the Module surface to prevent it from being scratched. Peel the laminate film off slowly just before the use with strict attention to electrostatic charges. Ionized air shall be blown over during the action. Blow off the 'dust' on the polarizer by using an ionized nitrogen gun, etc. Working under the following environments is desirable.
 - All workers wear conductive shoes, conductive clothes, conductive fingerstalls and grounding belts without fail.
 - Use Ionized blower for electrostatic removal, and peel of the laminate film with a constant speed.
(Peeling of it at over 2 seconds)
- j) The polarizer surface on the panel is treated with Anti Glare . In case of attaching protective board over the LCD, be careful about the optical interface fringe etc. which degrades display quality.
- k) Do not expose the LCD Module to a direct sunlight, for a long period of time to protect the Module from the ultra violet ray.
- l) When handling LCD Modules and assembling them into cabinets, please be noted that long-term storage in the environment of oxidization or deoxidization gas and the use of such materials as reagent, solvent, adhesive, resin, etc. which generate these gasses, may cause corrosion and discoloration of the Modules.
- m) Liquid crystal contained in the panel may leak if the LCD is broken. Rinse it as soon as possible if it gets inside your eye or mouth by mistake.
- n) Disassembling the Module can cause permanent damage and should be strictly avoided. (Except for protection film of the panel.)
- o) Be careful when using it for long time with fixed pattern display as it may cause afterimage. (Please use a screen saver etc., in order to avoid an afterimage.)
- p) If a minute particle enters in the Module and adheres to an optical material, it may cause display non-uniformity issue, etc. Therefore, fine-pitch filters have to be installed to cooling and inhalation hole if you intend to install a fan.
- q) Epoxy resin (amine series curing agent), silicone adhesive material (dealcoholization series and oxime series), tray forming agent (azo compound) etc, in the cabinet or the packing materials may induce abnormal display with polarizer film deterioration regardless of contact or noncontact to polarizer film. Be sure to confirm the component of them.
- r) Do not use polychloroprene. If you use it, there is some possibility of generating Cl₂ gas that influences the reliability of the connection between LCD panel and driver IC.
- s) Do not put a laminate film on LCD Module, after peeling of the original one. If you put on it, it may cause discoloration or spots because of the occurrence of air gaps between the polarizer and the film.
- t) Ground module bezel to stabilize against EMI and external noise.

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Appendix. EDID Data Structure

EDID Table Format					
Address (DEC)	Address (HEX)	Field Name & Comments		Set Value (HEX)	Set Value (BIN) (DEC)
0	00	Header		00	00000000
1	01	Header		FF	11111111
2	02	Header		FF	11111111
3	03	Header		FF	11111111
4	04	Header		FF	11111111
5	05	Header		FF	11111111
6	06	Header		FF	00000000
7	07	Header		00	11111111
8	08	EISA Manuf. Code LSB		0E	00001110
9	09	Compressed ASCII		F	01101111
10	0A	Product Code		0E	00001110
11	0B	hex, LSB first		16	00010110
12	0C	32-bit ser #		00	00000000
13	0D	ID S/N - option		00	00000000
14	0E	ID S/N - option		00	00000000
15	0F	ID S/N - option		00	00000000
16	10	Week of manufacture		00	00000000
17	11	Year of manufacture		1F	00011111
18	12	EDID Structure Ver		01	00000001
19	13	EDID revision #		04	00000100
20	14	Video input def.		A5	10100101
21	15	Max H image size		22	00100010
22	16	Max V image size		16	00010110
23	17	Display Gamma		78	01111000
24	18	Feature support (no DPMS, Active off, RGB timing BLK 1)		03	00000011
25	19	Red/Green Low bits	Default value. These will Updated to actual performance after measured	74	01110100
26	1A	Blue/White Low bits		D5	11010101
27	1B	Red X Rx		A4	10100100
28	1C	Red Y Ry		54	01010100
29	1D	Green X Gx		4C	01001100
30	1E	Green Y Gy		9A	10011010
31	1F	Blue X Bx		24	00100100
32	20	Blue Y By		0E	00001110
33	21	White X Wx		50	01010000
34	22	White Y Wy		54	01010100

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35	23	Established timings 1	00	00000000	0
36	24	Established timing 2	00	00000000	0
37	25	Established timing 3	00	00000000	0
38	26	Standard timing #1	01	00000001	1
39	27	Standard timing #1	01	00000001	1
40	28	Standard timing #2	01	00000001	1
41	29	Standard timing #2	01	00000001	1
42	2A	Standard timing #3	01	00000001	1
43	2B	Standard timing #3	01	00000001	1
44	2C	Standard timing #4	01	00000001	1
45	2D	Standard timing #4	01	00000001	1
46	2E	Standard timing #5	01	00000001	1
47	2F	Standard timing #5	01	00000001	1
48	30	Standard timing #6	01	00000000	1
49	31	Standard timing #6	01	00000001	1
50	32	Standard timing #7	01	00000001	1
51	33	Standard timing #7	01	00000001	1
52	34	Standard timing #8	01	00000001	1
53	35	Standard timing #8	01	00000001	1
54	36	Pixel Clock LSB	EF	11101111	239
55	37	Pixel Clock HSB	68	01101000	104
56	38	Horizontal Active (lower 8 bits)	00	00000000	0
57	39	Hor blanking (lower 8 bits)	A0	10100000	160
58	3A	Horizontal Active/Horizontal blanking	A0	10100000	160
59	3B	Vertical active(lower 8 bits)	40	01000000	64
60	3C	Vertical blanking(lower 8 bits)	2E	00101110	46
61	3D	Vertical Active : Vertical Blanking	60	01100000	96
62	3E	Horizontal Sync Offset	30	00110000	48
63	3F	Horizontal Sync Pulse Width	20	00100000	32
64	40	Vertical Sync Offset , Sync Width	36	00110110	54
65	41	Horizontal /Vertical Sync Offset/Width	00	00000000	0
66	42	Horizontal Image Size	58	01011000	88
67	43	Vertical image Size	D7	11010111	215
68	44	Horizontal Image Size / Vertical image size	10	00010000	16
69	45	Horizontal Border = (0 for Notebook LCD)	00	00000000	0
70	46	Vertical Border = (0 for Notebook LCD)	00	00000000	0
71	47	Signal (non-intr, norm, no stereo, sep sync, neg pol)	18	00011000	24
72	48	Pixel Clock LSB	00	00000000	0
73	49	Pixel Clock HSB	00	00000000	0
74	4A	Horizontal Active (lower 8 bits)	00	00000000	0

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75	4B	Hor blanking (lower 8 bits)	FD	11111101	253
76	4C	Horizontal Active/Horizontal blanking	00	00000000	0
77	4D	Vertical active(lower 8 bits)	28	00101000	40
78	4E	Vertical blanking(lower 8 bits)	3C	00111100	60
79	4F	Vertical Active : Vertical Blanking	63	01100011	99
80	50	Horizontal Sync Offset	63	01100011	99
81	51	Horizontal Sync Pulse Width	1B	00011011	27
82	52	Vertical Sync Offset , Sync Width	01	00000001	1
83	53	Horizontal Vertical Sync Offset/Width	0A	00001010	10
84	54	Horizontal Image Size	20	00100000	32
85	55	Vertical image Size	20	00100000	32
86	56	Horizontal Image Size / Vertical image size	20	00100000	32
87	57	Horizontal Border = (0 for Notebook LCD)	20	00100000	32
88	58	Vertical Border = (0 for Notebook LCD)	20	00100000	32
89	59	Signal (non-intr, norm, no stereo, sep sync, neg pol)	20	00100000	32
90	5A	descriptor#3	00	00000000	0
91	5B	Reserved for definition	00	00000000	0
92	5C	Reserved for definition	00	00000000	0
93	5D	ASCII String	FE	11111110	254
94	5E	Reserved for definition	00	00000000	0
95	5F	Manufacture	43	01000011	67
96	60	Manufacture	53	01010011	83
97	61	Manufacture	4F	01001111	79
98	62	Manufacture	54	01010100	84
99	63	Manufacture	20	00100000	32
100	64	Manufacture	54	01010100	84
101	65	Manufacture	33	00110011	51
102	66	Reserved for definition	0A	00001010	10
103	67	Reserved for definition	20	00100000	32
104	68	Reserved for definition	20	00100000	32
105	69	Reserved for definition	20	00100000	32
106	6A	Reserved for definition	20	00100000	32
107	6B	Reserved for definition	20	00100000	32
108	6C	descriptor #4	00	00000000	0
109	6D	Reserved for definition	00	00000000	0
110	6E	Reserved for definition	00	00000000	0
111	6F	Reserved for definition	FE	11111110	254
112	70	Reserved for definition	00	00000000	0
113	71	Manufacture P/N	4D	01001101	77
114	72	Manufacture P/N	4E	01001110	78

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115	73	Manufacture P/N	47	01000111	71
116	74	Manufacture P/N	30	00110000	48
117	75	Manufacture P/N	30	00110000	48
118	76	Manufacture P/N	37	00110111	55
119	77	Manufacture P/N	44	01000100	68
120	78	Manufacture P/N	41	01000001	65
121	79	Manufacture P/N	31	00110001	49
122	7A	Manufacture P/N	2D	00101101	45
123	7B	Manufacture P/N	43	01000011	67
124	7C	Reserved for definition	0A	00001010	10
125	7D	Reserved for definition	20	00100000	32
126	7E	Extension Flag	00	00000000	0
127	7F	Checksum Default Value. This will calculated based on color values	3E	00111110	62
128	80	Tag	0	00000000	0
129	81	Revision Number	00	00000000	0
130	82	Length of Info Frame	00	00000000	0
131	83	Global Declarations	00	00000000	0
132	84	Tag Code [7:5], Length of data [4:0]	00	00000000	0
133	85	Extended Tag Code	00	00000000	0
134	86	Colorimetry Support Flags	00	00000000	0
135	87	Colorimetry Metadata Support Flags	00	00000000	0
136	88	Tag Code [7:5], Length of data [4:0]	00	00000000	0
137	89	Extended Tag Code	00	00000000	0
138	8A	Supported Electro-Optical Transfer	00	00000000	0
139	8B	SM_0=1, Static Metadata Type 1	00	00000000	0
140	8C	Desired Content Max Luminance data	00	00000000	0
141	8D	Desired Content Max Frame-average	00	00000000	0
142	8E	Desired Content Min Luminance data	00	00000000	0
143	8F	Reserved for definition	00	00000000	0
144	90	Reserved for definition	00	00000000	0
145	91	Reserved for definition	00	00000000	0
146	92	Reserved for definition	00	00000000	0
147	93	Reserved for definition	00	00000000	0
148	94	Reserved for definition	00	00000000	0
149	95	Reserved for definition	00	00000000	0
150	96	Reserved for definition	00	00000000	0
151	97	Reserved for definition	00	00000000	0
152	98	Reserved for definition	00	00000000	0
153	99	Reserved for definition	00	00000000	0
154	9A	Reserved for definition	00	00000000	0

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155	9B	Reserved for definition	00	00000000	0
156	9C	Reserved for definition	00	00000000	0
157	9D	Reserved for definition	00	00000000	0
158	9E	Reserved for definition	00	00000000	0
159	9F	Reserved for definition	00	00000000	0
160	A0	Reserved for definition	00	00000000	0
161	A1	Reserved for definition	00	00000000	0
162	A2	Reserved for definition	00	00000000	0
163	A3	Reserved for definition	00	00000000	0
164	A4	Reserved for definition	00	00000000	0
165	A5	Reserved for definition	00	00000000	0
166	A6	Reserved for definition	00	00000000	0
167	A7	Reserved for definition	00	00000000	0
168	A8	Reserved for definition	00	00000000	0
169	A9	Reserved for definition	00	00000000	0
170	AA	Reserved for definition	00	00000000	0
171	AB	Reserved for definition	00	00000000	0
172	AC	Reserved for definition	00	00000000	0
173	AD	Reserved for definition	00	00000000	0
174	AE	Reserved for definition	00	00000000	0
175	AF	Reserved for definition	00	00000000	0
176	B0	Reserved for definition	00	00000000	0
177	B1	Reserved for definition	00	00000000	0
178	B2	Reserved for definition	00	00000000	0
179	B3	Reserved for definition	00	00000000	0
180	B4	Reserved for definition	00	00000000	0
181	B5	Reserved for definition	00	00000000	0
182	B6	Reserved for definition	00	00000000	0
183	B7	Reserved for definition	00	00000000	0
184	B8	Reserved for definition	00	00000000	0
185	B9	Reserved for definition	00	00000000	0
186	BA	Reserved for definition	00	00000000	0
187	BB	Reserved for definition	00	00000000	0
188	BC	Reserved for definition	00	00000000	0
189	BD	Reserved for definition	00	00000000	0
190	BE	Reserved for definition	00	00000000	0
191	BF	Reserved for definition	00	00000000	0
192	C0	Reserved for definition	00	00000000	0
193	C1	Reserved for definition	00	00000000	0
194	C2	Reserved for definition	00	00000000	0
195	C3	Reserved for definition	00	00000000	0

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196	C4	Reserved for definition	00	00000000	0
197	C5	Reserved for definition	00	00000000	0
198	C6	Reserved for definition	00	00000000	0
199	C7	Reserved for definition	00	00000000	0
200	C8	Reserved for definition	00	00000000	0
201	C9	Reserved for definition	00	00000000	0
202	CA	Reserved for definition	00	00000000	0
203	CB	Reserved for definition	00	00000000	0
204	CC	Reserved for definition	00	00000000	0
205	CD	Reserved for definition	00	00000000	0
206	CE	Reserved for definition	00	00000000	0
207	CF	Reserved for definition	00	00000000	0
208	D0	Reserved for definition	00	00000000	0
209	D1	Reserved for definition	00	00000000	0
210	D2	Reserved for definition	00	00000000	0
211	D3	Reserved for definition	00	00000000	0
212	D4	Reserved for definition	00	00000000	0
213	D5	Reserved for definition	00	00000000	0
214	D6	Reserved for definition	00	00000000	0
215	D7	Reserved for definition	00	00000000	0
216	D8	Reserved for definition	00	00000000	0
217	D9	Reserved for definition	00	00000000	0
218	DA	Reserved for definition	00	00000000	0
219	DB	Reserved for definition	00	00000000	0
220	DC	Reserved for definition	00	00000000	0
221	DD	Reserved for definition	00	00000000	0
222	DE	Reserved for definition	00	00000000	0
223	DF	Reserved for definition	00	00000000	0
224	E0	Reserved for definition	00	00000000	0
225	E1	Reserved for definition	00	00000000	0
226	E2	Reserved for definition	00	00000000	0
227	E3	Reserved for definition	00	00000000	0
228	E4	Reserved for definition	00	00000000	0
229	E5	Reserved for definition	00	00000000	0
230	E6	Reserved for definition	00	00000000	0
231	E7	Reserved for definition	00	00000000	0
232	E8	Reserved for definition	00	00000000	0
233	E9	Reserved for definition	00	00000000	0
234	EA	Reserved for definition	00	00000000	0
235	EB	Reserved for definition	00	00000000	0
236	EC	Reserved for definition	00	00000000	0

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237	ED	Reserved for definition	00	00000000	0
238	EE	Reserved for definition	00	00000000	0
239	EF	Reserved for definition	00	00000000	0
240	F0	Reserved for definition	00	00000000	0
241	F1	Reserved for definition	00	00000000	0
242	F2	Reserved for definition	00	00000000	0
243	F3	Reserved for definition	00	00000000	0
244	F4	Reserved for definition	00	00000000	0
245	F5	Reserved for definition	00	00000000	0
246	F6	Reserved for definition	00	00000000	0
247	F7	Reserved for definition	00	00000000	0
248	F8	Reserved for definition	00	00000000	0
249	F9	Reserved for definition	00	00000000	0
250	FA	Reserved for definition	00	00000000	0
251	FB	Reserved for definition	00	00000000	0
252	FC	Reserved for definition	00	00000000	0
253	FD	Reserved for definition	00	00000000	0
254	FE	Reserved for definition	00	00000000	0
255	FF	Checksum	00	00000000	0

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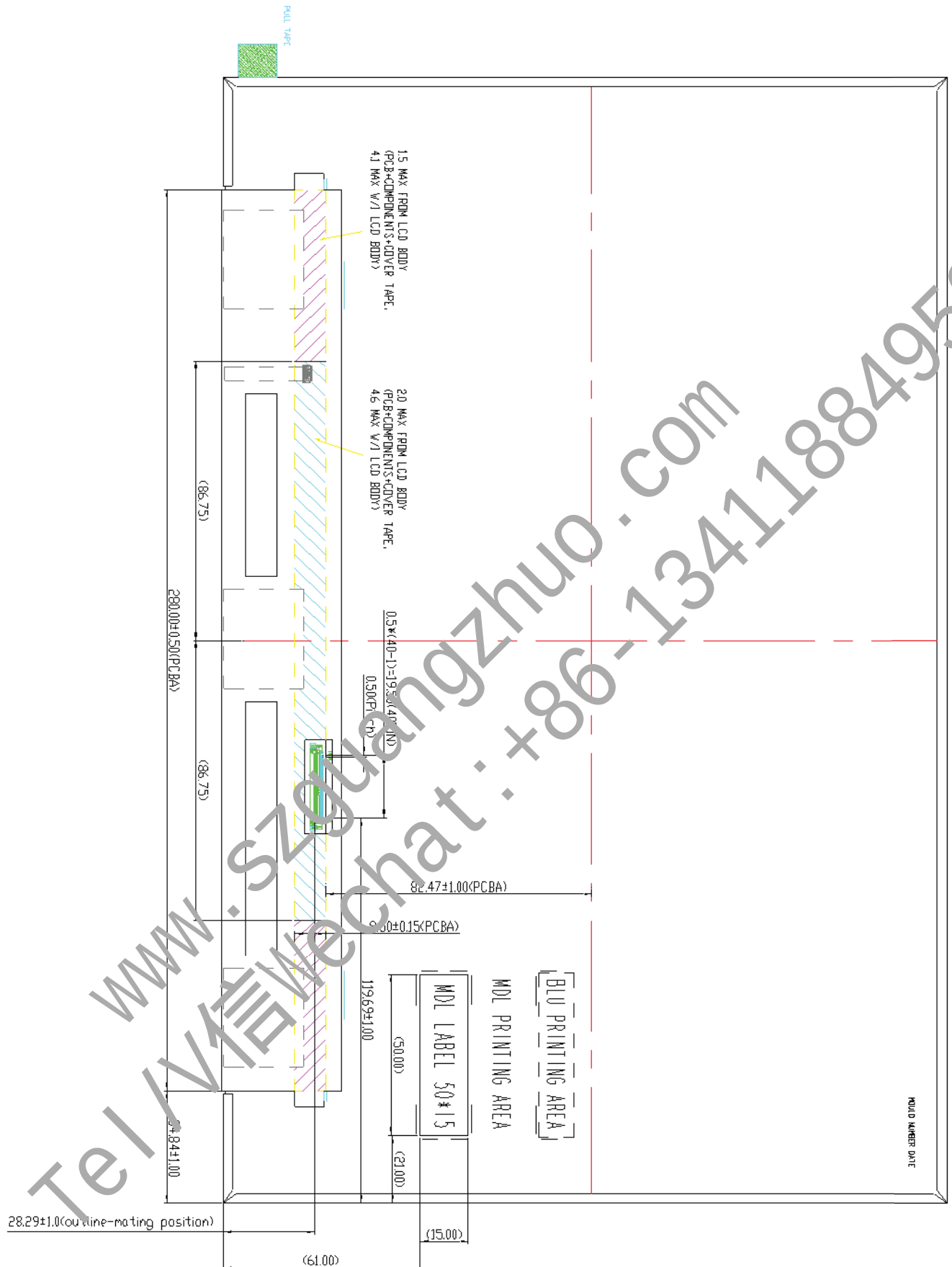
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Figure 1: PCB layout drawing of the main board. The drawing shows a rectangular PCB with various dimensions and labels. Key dimensions include: overall width 224.72±0.3 (Outline w/ FPC), overall height 224.42±0.3 (Outline w/ D FPC), and a central area of 217.82±0.3 (CF PDL). The layout includes a central 'AA Center' marked with a circle. Various component footprints are labeled with dimensions like 6.51±0.30 (AA-Outline), 120±0.30 (AA-CF PDL), and 120±0.30 (AA-CF PDL). The drawing also shows a '110.21 (Outline-AA Center)' dimension. A large watermark 'www.szguangzhuo.com' and 'Wechat: +86-1341188' is overlaid on the drawing.

www.szguangzhuo.com 广卓液晶屏 echodeng61@hotmail.com jimei@jimeihk.com +86-13411884959

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