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LITEMAX

SSD6745-M

Sunlight Readable 67.4” LED B/L LCD

User Manual

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Record of Revision

Version and Date	Page	Old Description	New Description	Remark
Dec/15/2025	all		Initial release	

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1 General Description

The SSD6745-M is a 67.4 inch color TFT-LCD display with special aspect ratio 16:4.5 and wide resolution 3840 x 1080. It is Litemax's Spanpixel series product which designed for high brightness 1000 nits with power efficiency LED backlight. It provides LCD panel with specific aspect ratios and sunlight readable for digital signage, public transportation, exhibition hall, department store, and vending machine.

1.1 Key Features

- Resizing LCD
- Ultra-Wide Screen (16 : 4.5)
- High Brightness 1000 nits
- Sunlight Readable
- LED Backlight
- BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	SSD6745-M
Description	67.4" Resizing LCD, 1000 nits LED backlight, 3840x1080
Screen Size	67.4"
Display Area (mm)	1650.24(H) x 464.13(V)
Brightness	1000 cd/m^2
Resolution	3840x1080
Aspect Ratio	16 : 4.5
Contrast Ratio	5500 : 1
Pixel Pitch (mm)	0.42975(H) x 0.42975(V)
Pixel Per Inch (PPI)	59
Viewing Angle	178°(H),178°(V)
Color Saturation (NTSC)	84%
Display Colors	1.07G
Response Time (Typical)	6.5ms
Panel Interface	V-by-Ones
Input Interface	HDMI, DP
Input Power	DC24V
Power Consumption	111W
OSD Key	5 Keys (Power Switch, Menu, +, -, Exit)
OSD Control	Brightness, Color, Contrast, Auto Tuning, H/V Position…etc
Dimensions (mm)	1691(W) x 502.89(H) x 71.10(D)
Bezel Size(U/B/L/R)	19.38/19.38/20.38/20.38 mm
Weight (Net)	26Kg
Mounting	500x150mm, 900x150mm
Operating Temperature	0 ˚C ~ 50 ˚C
Storage Temperature	-20 ˚C ~ 60 ˚C

SSD= Panel + LED Driving Board + AD Control Board + Housing

1.3 Absolute Maximum Ratings

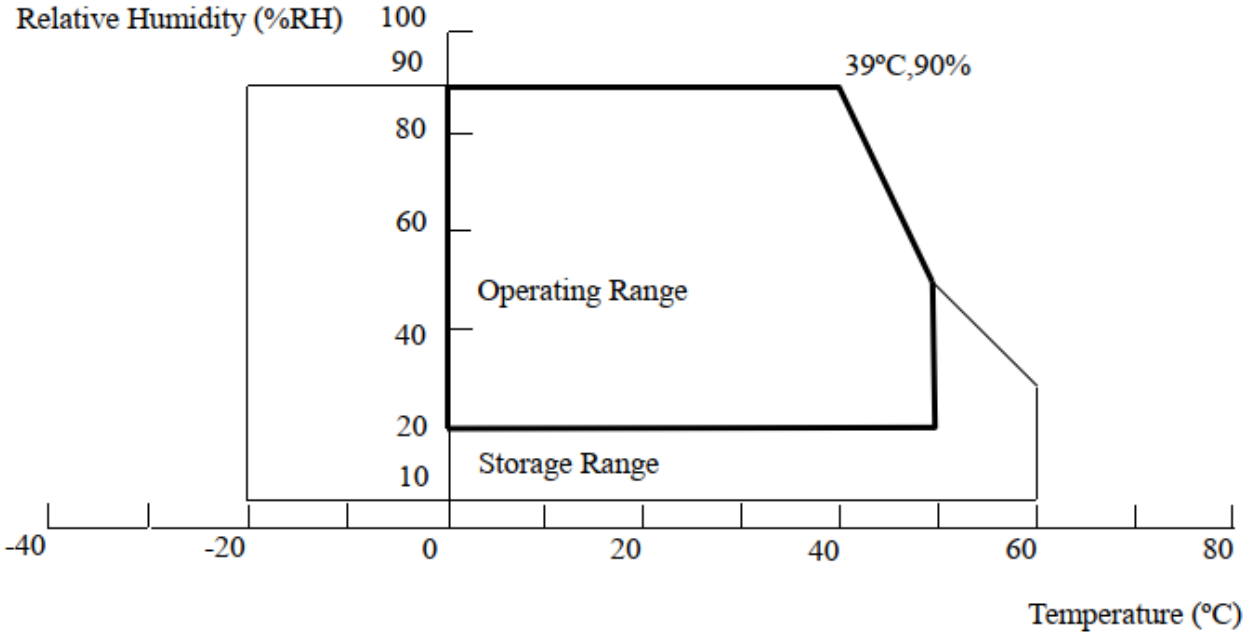
The followings are maximum values which, if exceeded, may cause damage to the unit.

[TA = 25 ± 2°C]

Item	Symbol	Value		Unit
		Min.	Max.	
Power Supply Voltage	V_{CC}	-0.3	13.8	V
Input Signal Voltage	V_{IN}	-0.3	3.6	V

Environment Requirement

(1) Temperature and relative humidity range are shown as below



a) 90% RH maximum (Ta ≤ 39ºC).

b) Wet-bulb temperature should be 39ºC maximum (Ta > 39ºC).

c) No condensation.

(2) The storage temperature is between -20ºC to 60ºC, and the operating ambient temperature is between 0 ºC to 50ºC. The maximum operating temperature is based on the test condition that the surface temperature of display area is less than or equal to 65ºC with LCD module in a temperature-controlled chamber alone. Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 65ºC. The range of operating temperature may degrade in case of improper thermal management in the end product design.

(3) The rating of environment is based on LCD module. Leave LCD cell alone, this environment condition can't be guaranteed. Except LCD cell, the customer has to consider the ability of other parts of LCD module and LCD module process.

2 Electrical Specifications

2.1 LCD Power Consumption

[TA = 25 ± 2°C]

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V_{CC}	10.8	12.0	13.2	V	(1)
Rush Current		I_{RUSH}	-	-	5	A	(2)
Power Supply Current	White Pattern	Icc	-	0.61	0.74	A	(3)
	Horizontal Stripe	Icc	-	1.96	2.36	A	
	Black Pattern	Icc	-	0.57	0.69	A	
	Horizontal Stripe	Pcc	-	23.52	28.23	W	

Note:
(1) The ripple voltage should be controlled less than 10% of Vcc
(2) Measurement condition: Vcc = 12V, Rising time = 470μs.

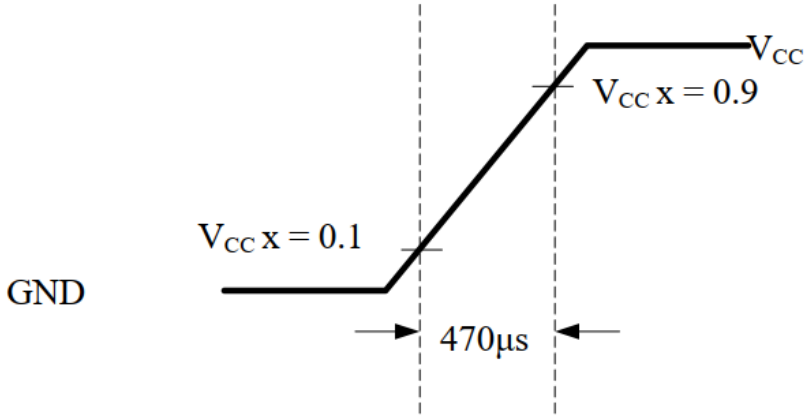
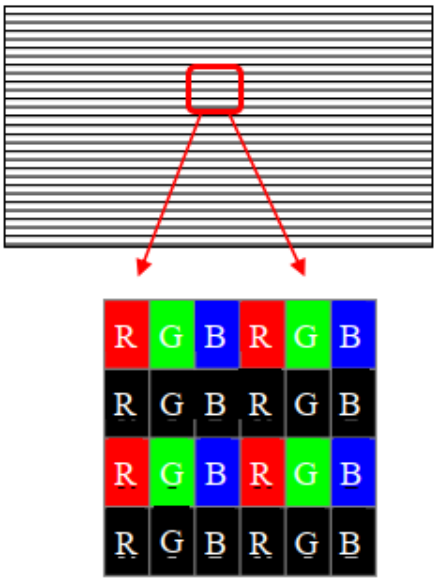


Fig. 3.1 V_{CC} rising time condition

(3) Measurement condition: Vcc = 12V, Ta = 25 ± 2ºC, F = 60 Hz. The test patterns are shown as below.

A. White Pattern

B. Horizontal Pattern



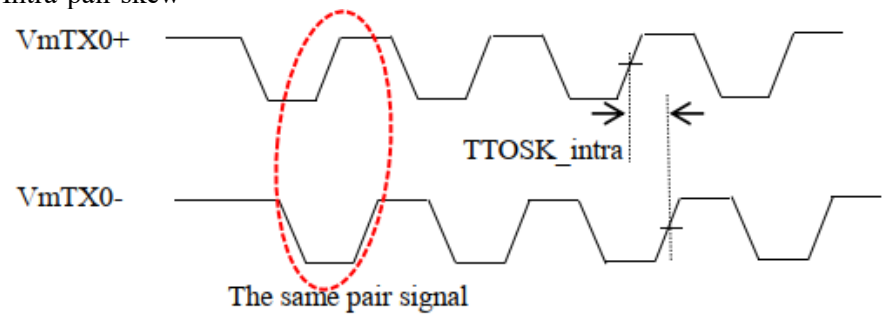
C. Black Pattern

2.2 V by One Characteristic

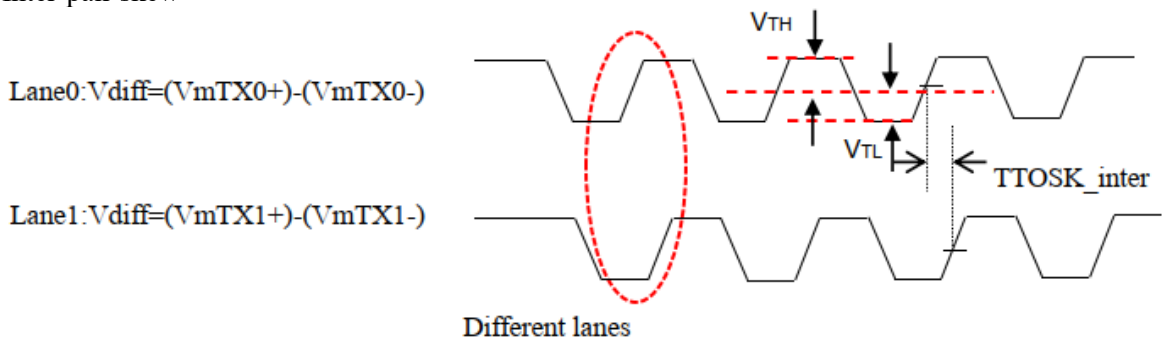
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
V by One Interface	Differential Input High Threshold Voltage	V_{TH}	-	-	+50	mV	
	Differential Input Low Threshold Voltage	V_{TL}	-50	-	-	mV	
	Intra-pair Skew	T_{TOSK_intra}	-0.3	-	0.3	UI	(1)
	Inter-pair Skew	T_{TOSK_inter}	-5	-	5	UI	(2)
	Spread Spectrum Modulation Range	F_{CLKIN_MOD}	-0.5	-	+0.5	%	(3)
	Spread Spectrum Modulation Frequency	F_{SSM}	-	30	-	KHz	(3)
CMOS Interface	Input High Threshold Voltage	V_{IH}	2.7	-	3.3	V	
	Input Low Threshold Voltage	V_{IL}	0	-	0.6	V	

Note:

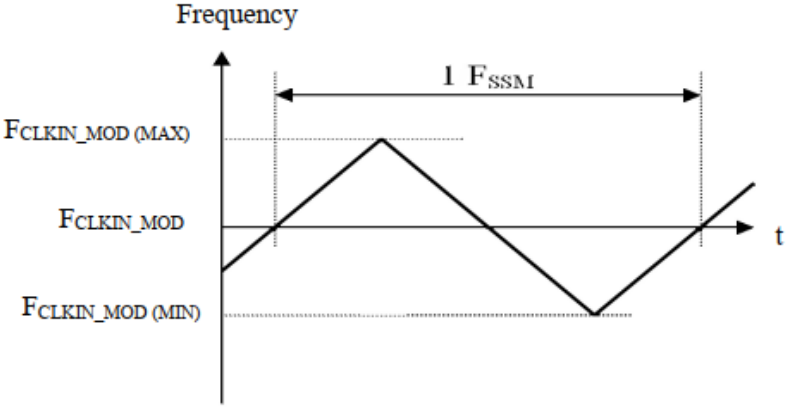
(1) Intra-pair skew



(2) Inter-pair skew



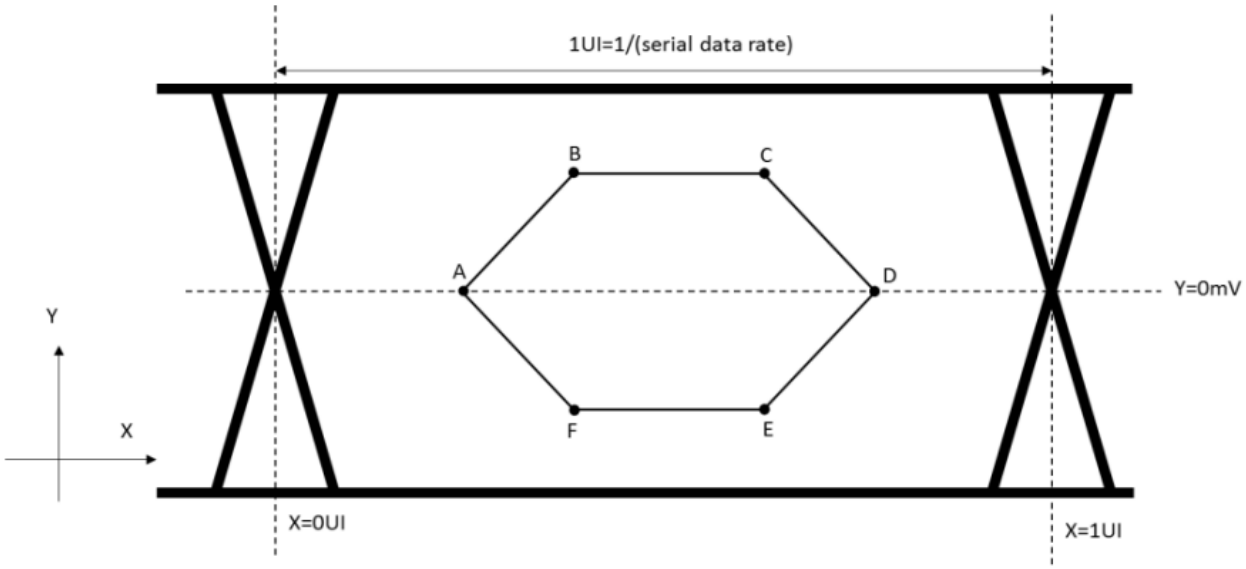
(3) The V by one SSCG's suggestion is off by default, SOC board must test all validations if SOC board enable the V by one SSCG. The SSCG (Spread Spectrum Clock Generator)) is defined as below figures.



2.3 V by One Input Signal Timing

The eye diagram is measured by oscilloscope and receiver CDR characteristics must be emulated.
CDR bandwidth：4 MHz.

Item	X(UI)	Y(mV)
A	0.25	0
B	0.3	+50
C	0.7	+50
D	0.75	0
E	0.7	-50
F	0.3	-50



2.4 Input Terminal Pin Assignment

Interface Pin Assignment

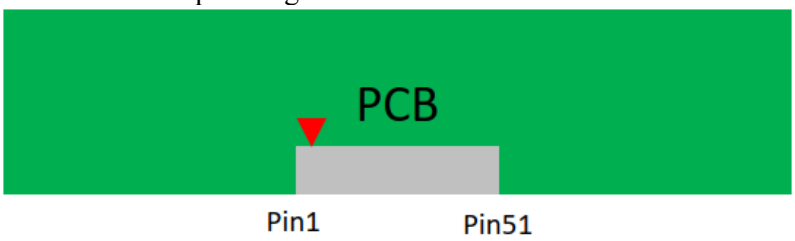
CN 101: F05035-51P-K (CT) or equivalent

Pin No.	Symbol	Description	Note
1	VCC	Power 12V in	
2	VCC	Power 12V in	
3	VCC	Power 12V in	
4	VCC	Power 12V in	
5	VCC	Power 12V in	
6	VCC	Power 12V in	
7	VCC	Power 12V in	
8	VCC	Power 12V in	
9	NC	No Connection	(3)
10	GND	Ground	
11	GND	Ground	
12	GND	Ground	
13	GND	Ground	
14	GND	Ground	
15	NC	No Connection	(3)
16	NC	No Connection	(3)
17	NC	No Connection	(3)
18	SDA	I2C Serial Data	(5)
19	SCL	I2C Serial Clock	(5)
20	WP	Write Protect (High: Write or Read Enable, Low or Open: Write or Read Disable)	(5) (6)
21	NC	No Connection	(3)
22	NC	No Connection	(3)
23	NC	No Connection	(3)
24	GND	Ground	
25	HTPDN	Hot Plug Detect	(2)
26	LOCKN	Lock Detect	(2)
27	GND	Ground	
28	Rx0N	Vx1 Lane0-	(4)
29	Rx0P	Vx1 Lane0+	(4)
30	GND	Ground	
31	Rx1N	Vx1 Lane1-	(4)

32	Rx1P	Vx1 Lane1+	(4)
33	GND	Ground	
34	Rx2N	Vx1 Lane2-	(4)
35	Rx2P	Vx1 Lane2+	(4)
36	GND	Ground	
37	Rx3N	Vx1 Lane3-	(4)
38	Rx3P	Vx1 Lane3+	(4)
39	GND	Ground	
40	Rx4N	Vx1 Lane4-	(4)
41	Rx4P	Vx1 Lane4+	(4)
42	GND	Ground	
43	Rx5N	Vx1 Lane5-	(4)
44	Rx5P	Vx1 Lane5+	(4)
45	GND	Ground	
46	Rx6N	Vx1 Lane6-	(4)
47	Rx6P	Vx1 Lane6+	(4)
48	GND	Ground	
49	Rx7N	Vx1 Lane7-	(4)
50	Rx7P	Vx1 Lane7+	(4)
51	GND	Ground	

Note:

(1) The direction of pin assignment is shown as below:

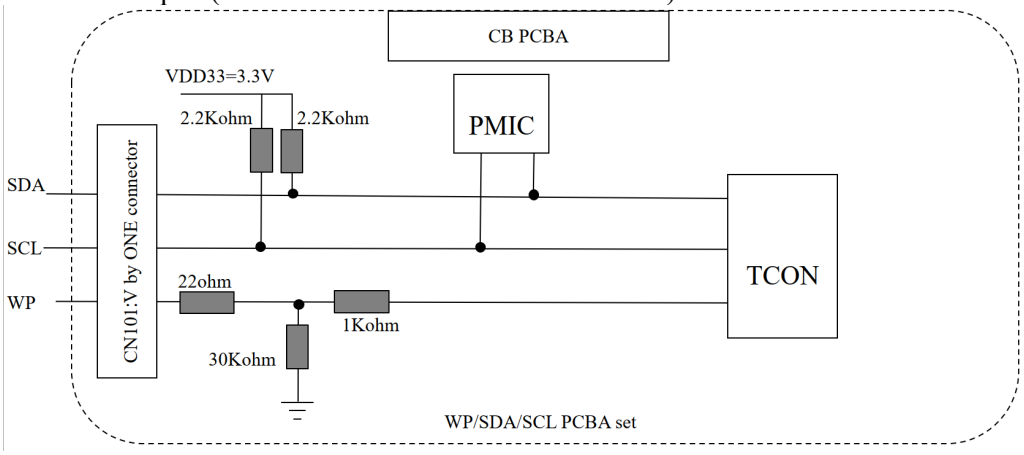


(2) For pin 25&26 need pull High(3.3V) with 10KΩ resistance On Soc board.

(3) This pin is for CSOT use only, please let it open.

(4) All input levels of V-by-One signals are based on the V-by-One-HS standard Version 1.4.

(5) Please let it open (Do not line out from PCBA connector) if it do not used.



(6) WP default setting is low, only pull up WP to high when inline turning or debug. When WP pull high, we suggest to start I2C communication after 2.5ms.

2.5 V-by-One Each Lane Timing Spec

Timing Table (DE Only Mode)

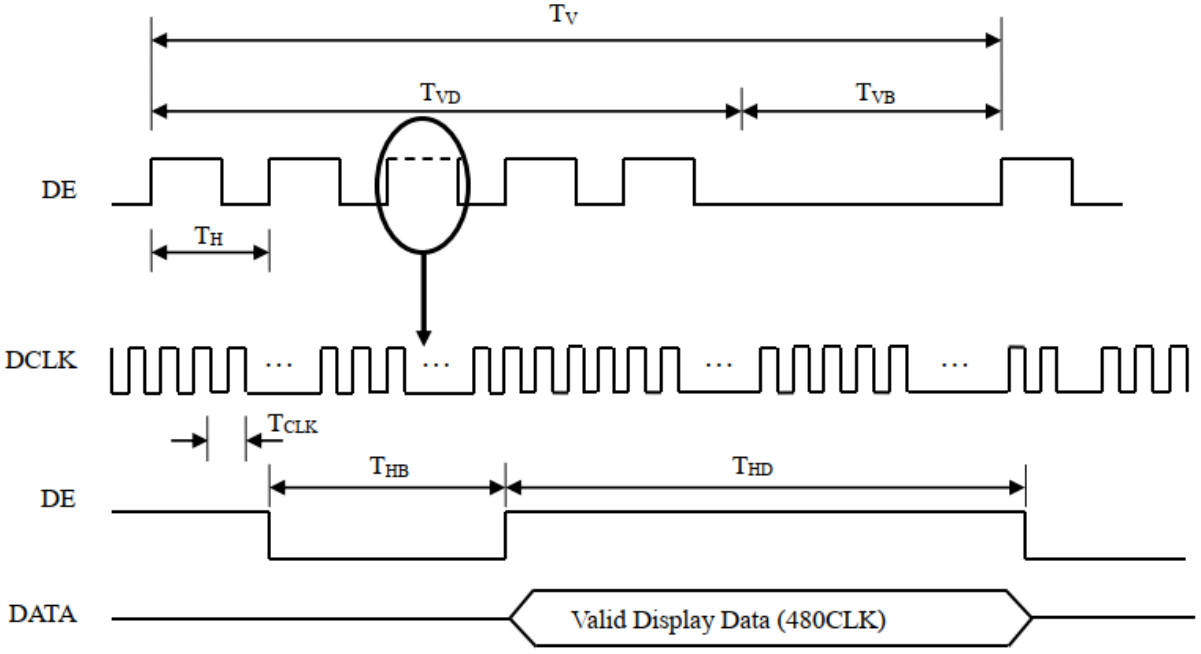
Frame Rate=60Hz

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
Frequency		F_{CLK} (= 1 / T_{CLK})	71.75	74.25	76.75	MHz	(1)
Frame Rate		F	58	60	62	Hz	
Vertical Term	Total	T_V	2200	2250	2350	T_H	TV = TVD + TVB
	Display	T_{VD}	2160				
	Blank	T_{VB}	40	90	190	T_H	
Horizontal Term	Total	T_H	540	550	600	T_{CLK}	TH = THD + THB
	Display	T_{HD}	480				
	Blank	T_{HB}	60	70	120	T_{CLK}	

Attention:
The module is operated in DE only mode, H sync and V sync input signal have no effect on normal operation.

Note:

Please make sure the range of pixel clock follows the following equations:
Fclkin(max) ≥Fmax × Tv× Th
Fmin × Tv × Th ≥ Fclkin(min)



2.6 Color Data Input Assignment

The brightness of each primary color is based on the 10 bit (8bit+2 bit FRC) gray scale data input for each color. The higher the binary input, the brighter the color. The table below provides the assignment of the color versus.

Data Input Color		Data Signal																													
		Red										Green										Blue									
		MSB									LSB	MSB									LSB	MSB									LSB
		R9	R8	R7	R6	R5	R4	R3	R2	R1	R0	G9	G8	G7	G6	G5	G4	G3	G2	G1	G0	B9	B8	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	0	0	0	0	0	0
	Red(1023)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	Blue(1023)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	0	0	1	1	1	1	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	1	1	0	0	0	0	0	0	0	0	0	0	1	1	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	1	1	1	1	0	0	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	1	1	1	1	1	1
GrayScale of Red	Red(000)	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
	Red(001)	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	0	0	0	0
	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :
	Red(1022)	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1023)	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GrayScale of Green	Green(000)	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
	Green(001)	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
	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :	: :
	Green(1022)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
	Green(1023)	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
GrayScale of Blue	Blue(000)	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
	Blue(001)	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
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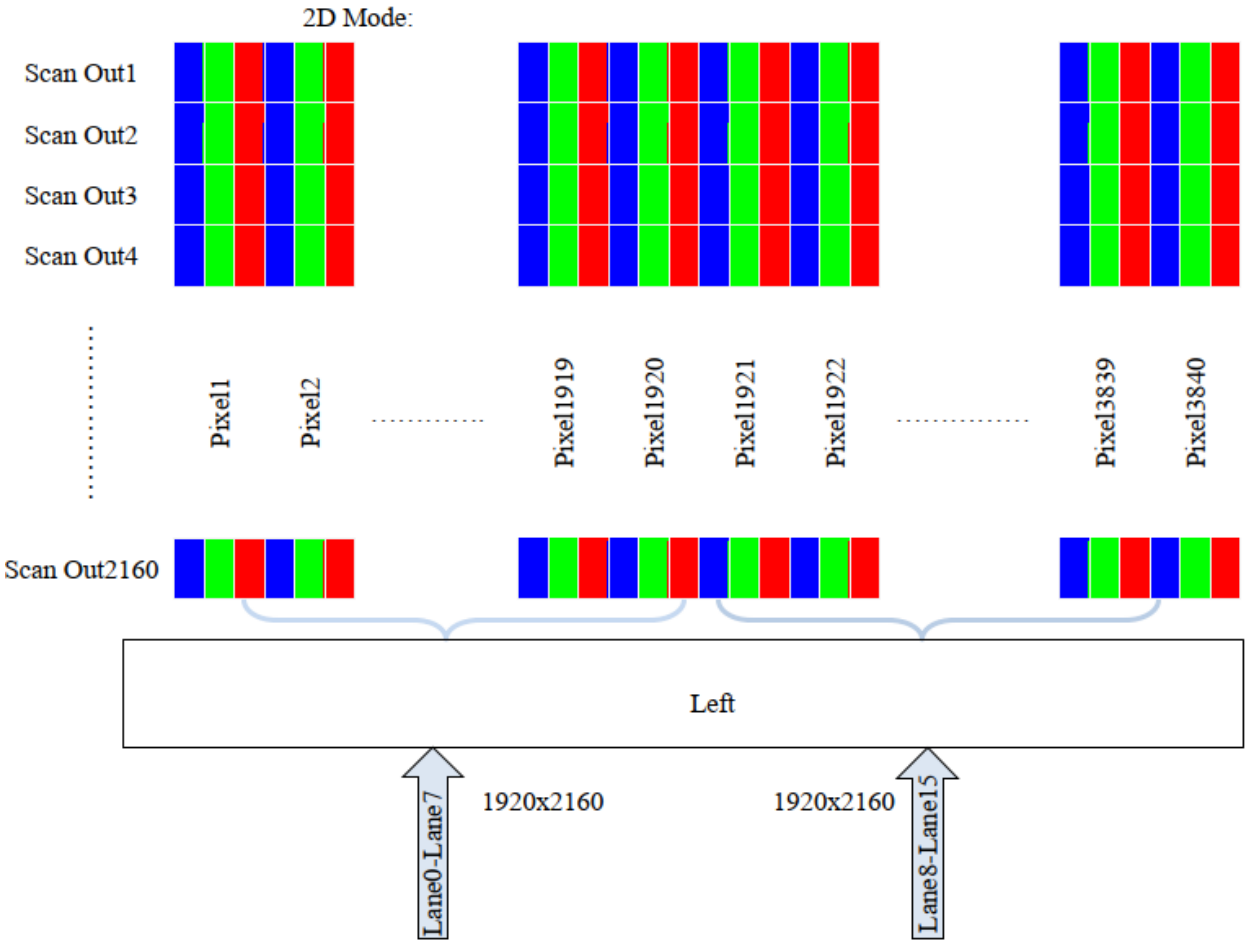
	Blue(1022)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
	Blue(1023)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1

Attention:
0: Low level voltage; 1: High level voltage.

4K2K Data Format

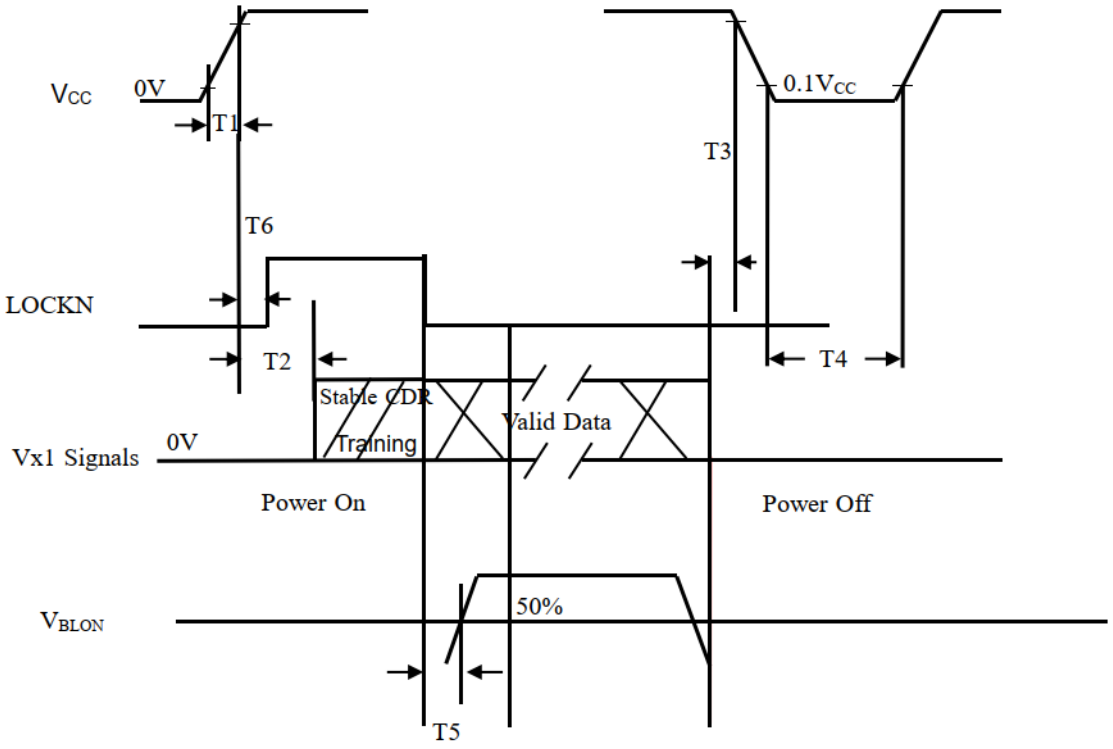
V by One Data Mapping

Area	Lane	Data Stream
Left	Lane 0	Pixel 1, 5, 9, ...,1913, 1917
	Lane 1	Pixel 2, 6, 10, ...,1914, 1918
	Lane 2	Pixel 3, 7, 11, ...,1915, 1919
	Lane 3	Pixel 4, 8, 12, ...,1916, 1920
Right	Lane 4	Pixel 1921, 1925, 1929, ...,3833, 3837
	Lane 5	Pixel 1922, 1926, 1930, ...,3834, 3838
	Lane 6	Pixel 1923, 1927, 1931, ...,3835, 3839
	Lane 7	Pixel 1924, 1928, 1932, ...,3836, 3840



2.7 Power On/Off Sequence

To prevent a latch-up or DC operation of LCD module, the power on/off change signal sequence should be as the diagram below



Parameter	Values			Unit
	Min.	Typ.	Max.	
T1	0.5	-	10	ms
T2	50	-	-	ms
T3	0	-	-	ms
T4	1000	-	-	ms
T5	500	-	-	ms
T6	0	-	-	ms

Note:

(1) Apply the light bar voltage within the LCD operation range. When the backlight turns on before the LCD operation or the LCD turns off before the backlight turns off, the display may momentarily become abnormal screen.

(2) In case that VCC is in off level, please keep the level of input signals on the low or high impedance. If T2 < 0, that may cause electrical overstress.

(3) T4 should be measured after the module has been fully discharged between power off and on period.

(4) Interface signal shall not be kept at high impedance when the power is on.

(5) The product should be always operated within above ranges.

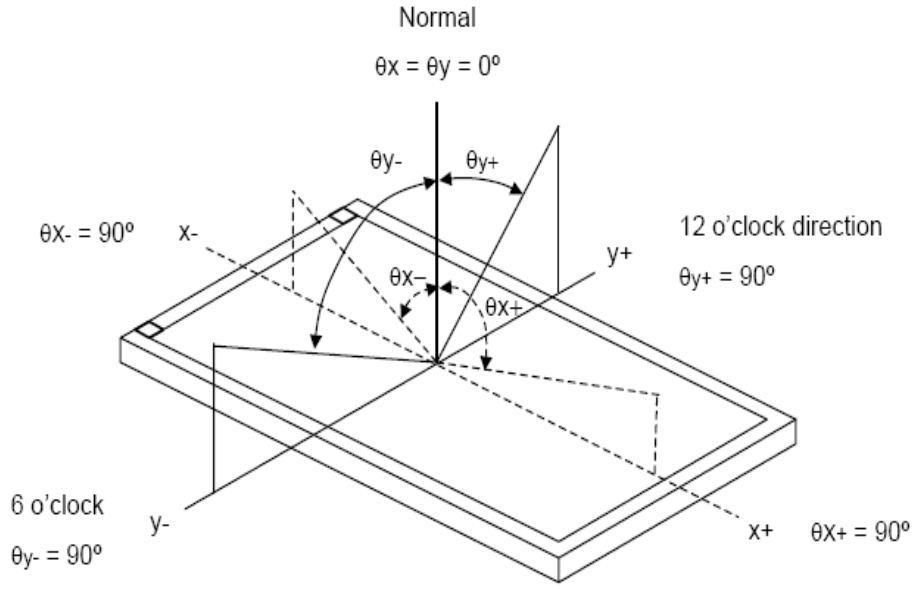
(6) During the first 2s after T5, the TCON's output is black pattern.

3 Optical Specification

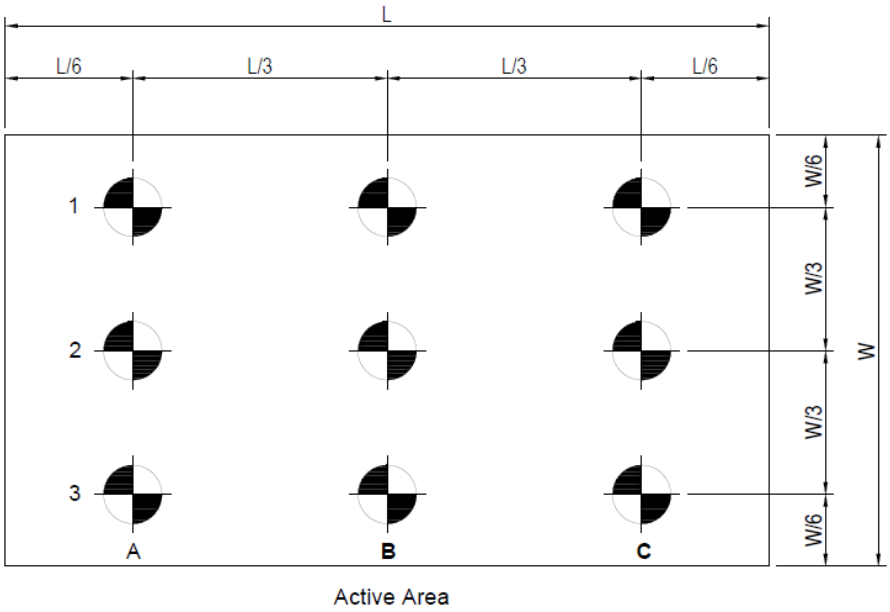
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	θx=0 θy=0 CA-410	0.613	0.643	0.673	-	Test Mode: (2) (3)
		Ry		0.307	0.337	0.367	-	
	Green	Gx		0.249	0.279	0.309	-	
		Gy		0.280	0.310	0.340	-	
	Blue	Bx		0.276	0.306	0.336	-	
		By		0.590	0.620	0.650	-	
	White	Wx		0.248	0.278	0.308	-	
		Wy		0.278	0.308	0.338	-	
Center Luminance of White		Lc	θx=0 θy=0 CA-410	900	1000	1300	cd/m^2	
Uniform		Lu			89		%	
Contrast Ratio		CR	θx=0 θy=0 Klein K-10	4950:1	5500:1		-	Test Mode: (4)
Color Saturation		NTSC			84		%	
Viewing Angle	Horizontal	θx+	CR ≥ 10		89		Deg	Test Mode: (1)
		θx-			89			
	Vertical	θy+			89			
		θy-			89			

Test Mode：

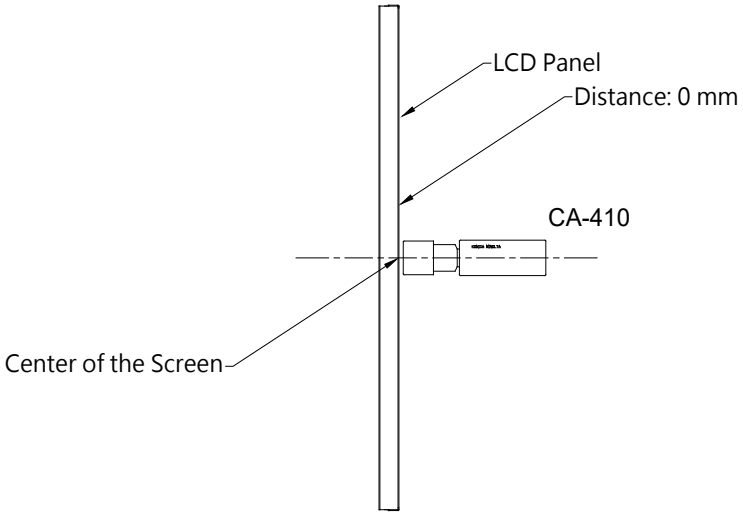
(1) Definition of Viewing Angle (θx , θy):



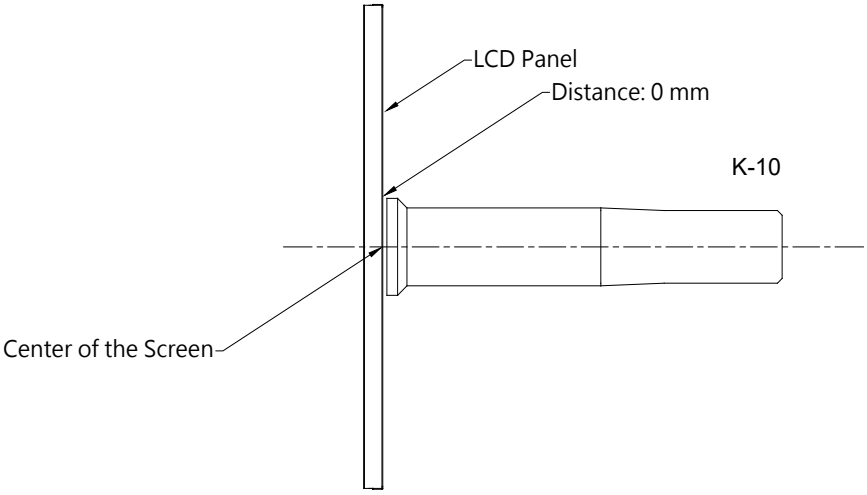
(2) Definition of Test Point:



(3) CA-410 Measurement Setup:



(4) Klein K-10 Measurement Setup:



4 LED Driving Board Specifications

4.1 Operating Characteristics

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	Vin		22.0	24.0	26.0	V	
Input Current (Low Brightness)	IinL	Brightness = 0%	0.0	-----	-----	mA	
Input Current (High Brightness)	IinH	Brightness = 100%	2.29	2.1	1.93	A	(1)
LED Current (Low Brightness)	IoutL	Brightness = 0%	0.0	-----	-----	Arms	
LED Current (High Brightness)	IoutH	Brightness = 100%	-----	1.65	-----	A	J2、J3、J4
			-----	1.65	-----	A	J5、J6、J7
Working Frequency	W_Freq	Brightness = 100%	-----	400	-----	KHZ	
Brightness Control	DC mode						
	Vadj	Connection of Voltage	0.2	-----	4.8	V	(2)
	PWM mode						
	PWM	Connect to PWM	0	-----	100	%	(3)
	Freq		-----	200	1000	Hz	(4)
ON/OFF Control	Von	Normal Operation	2	-----	5	V	
	Voff		0	-----	0.8	V	
Output Voltage	Vout	Brightness = 100%	-----	28.4	-----	V	J2、J3、J4
			-----	28.4	-----	V	J5、J6、J7
Efficiency	η	Brightness = 100%	-----	93	-----	%	(5)

Remark:

(1) This data is based on the testing result of practical input voltage, I_{in} is measured by related Vin. (min, typ, max).

(2) Max brightness at V_{adj}=0.2V. Min brightness at V_{adj}=4.8V.

(3) Max dimming ratio = 1:100.

(4) Frequency can be adjusted in accordance with demand. (120Hz minimum, or lights will be flickering)

(5) $\eta_{max} = V_{out(max)} * I_{outH(max)} / V_{in(max)} * I_{inH(min)}$

$\eta_{min} = V_{out(min)} * I_{outH(min)} / V_{in(min)} * I_{inH(max)}$

4.2 Connector Socket

Input Connector: CN1(JST B10B-PH-K-S or Compatible)

PIN No	Symbol	Description
1	Vin	DC+
2	Vin	DC+
3	Vin	DC+
4	Vin	DC+
5	Vin	DC+
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	GND	Ground

DC or PWM Connector: CN2

PIN NO	Symbol	Description
1	DC	Clsoe pin 1,2 LED driver is DC dimming
2	GND	
3	PWM	Close pin 2,3 LED driver is PWM dimming

Note: If you use CN2 to set DC/PWM, please NC the pin1 of CN3.

Input Connector: CN3(JST B3B-PH-K-S or Compatible)

PIN No	Symbol	Description
1	CL	PWM or DC selection
2	Control	ON/OFF Control
3	Brightness	Brightness Control
4	GND	Ground

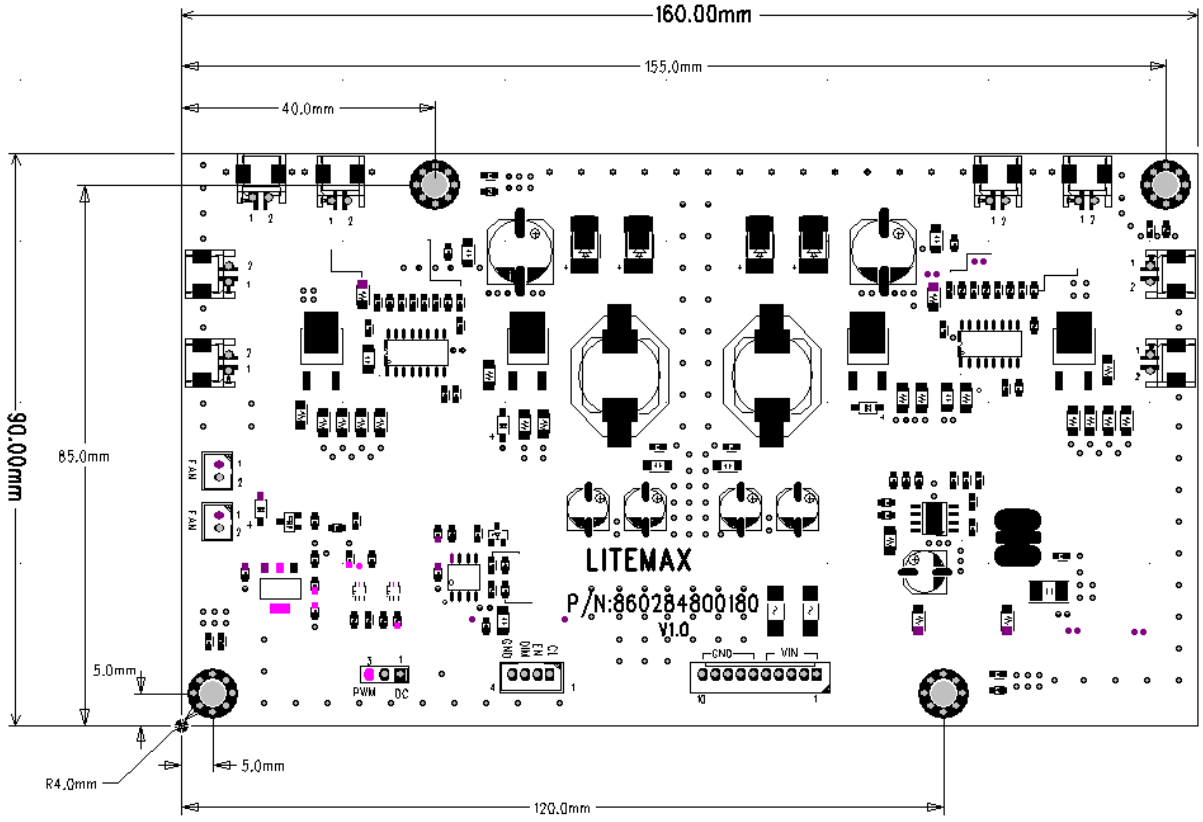
Note:
Pin1 is dimming method control pin, Low → DC dimming, High → PWM dimming.
If pin1 is be used, please NC CN2.

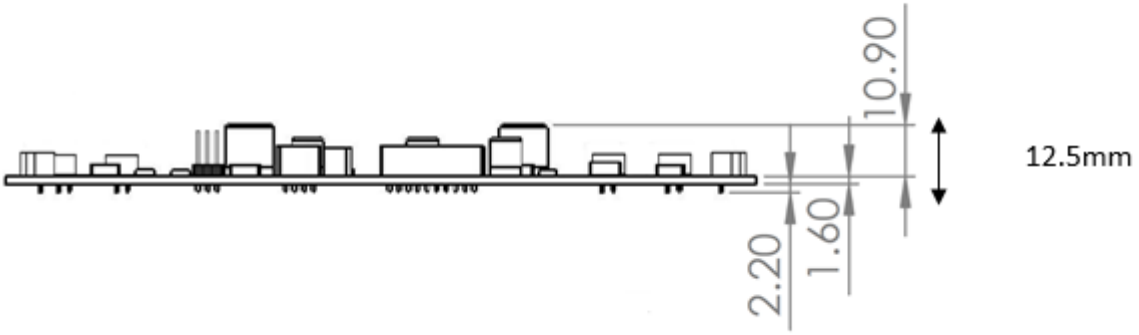
Output Connector: J3, J4, J5 (JST S2B-EH or Compatible)

PIN NO	Symbol	Description
1	Output	LED High Voltage(+)
2	Output	LED Low Voltage (-)

4.3 Mechanical Characteristics

Dimension: 160 x 90 x 12.5mm

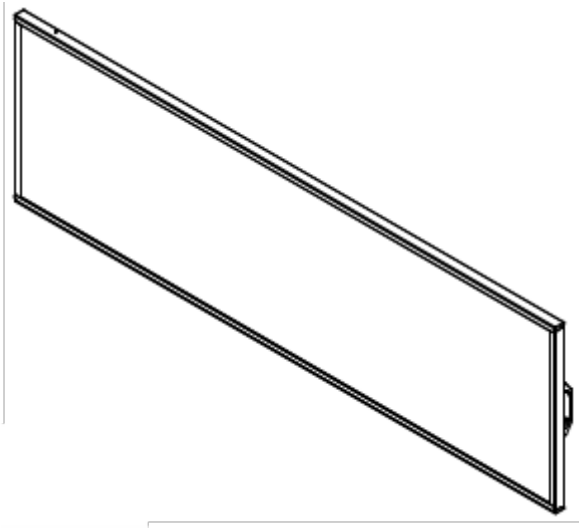


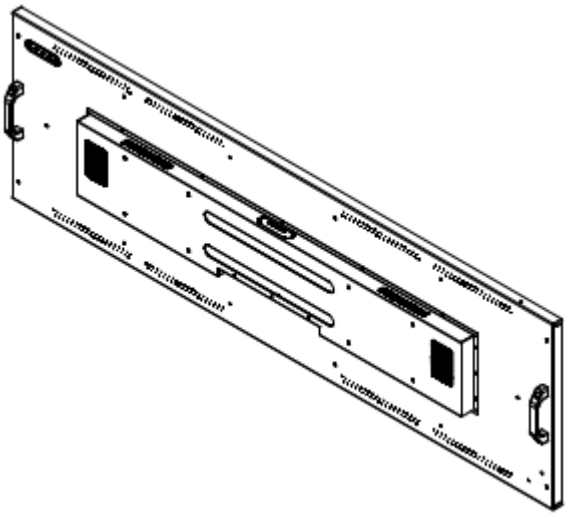


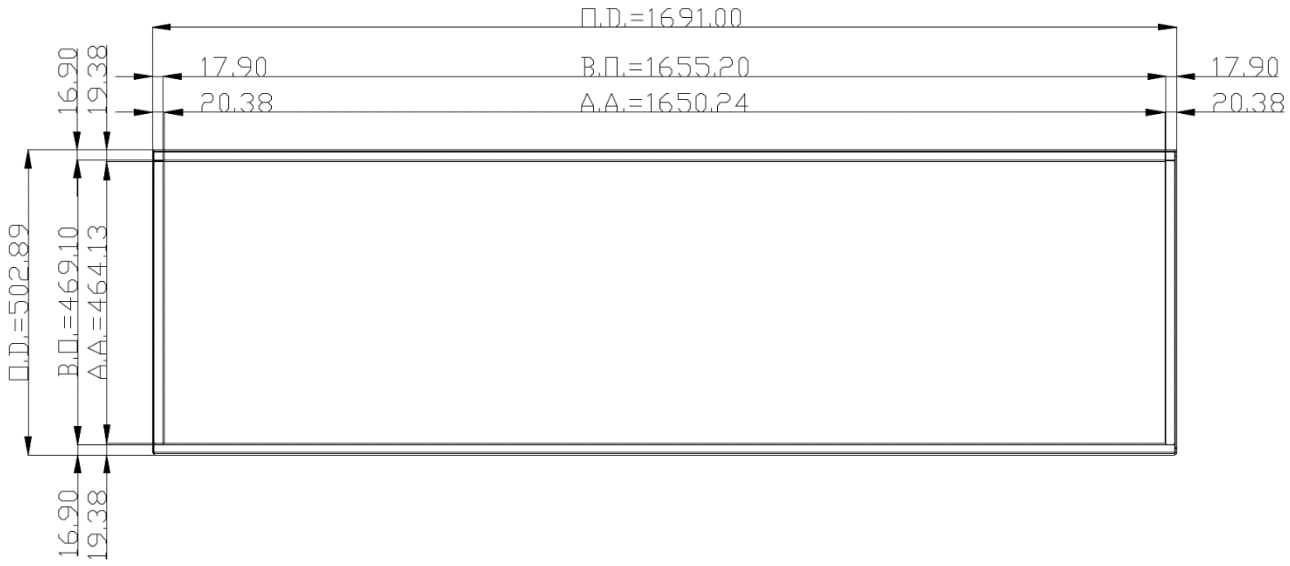
5 Mechanical Drawing

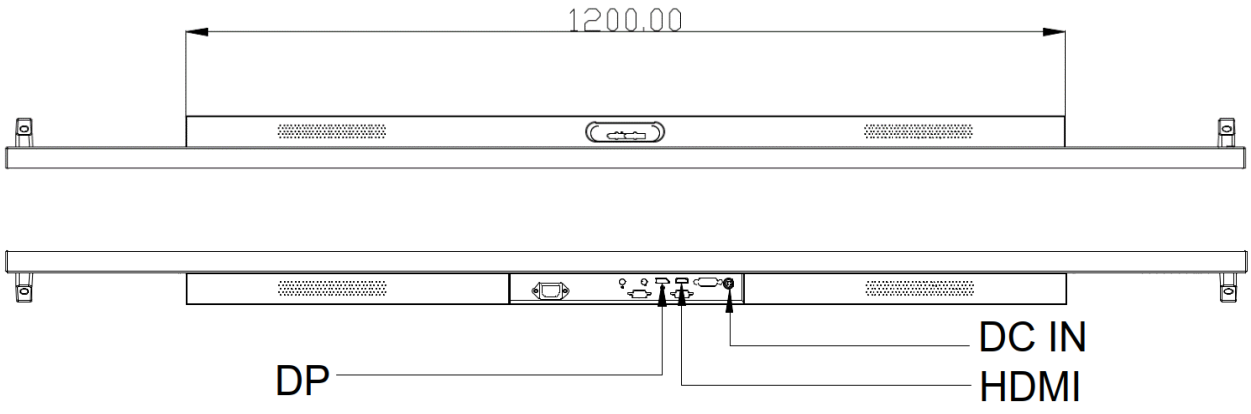
Outline Dimensions

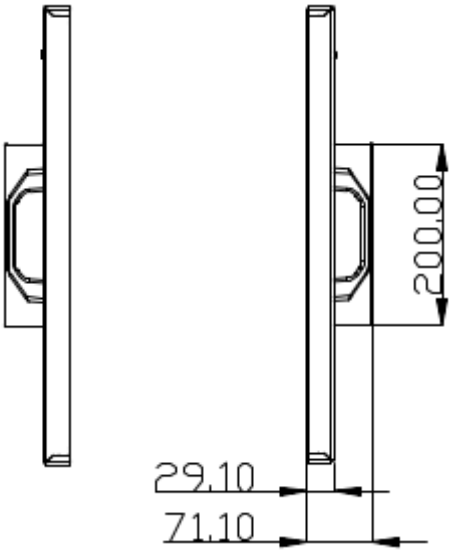
Unit: mm

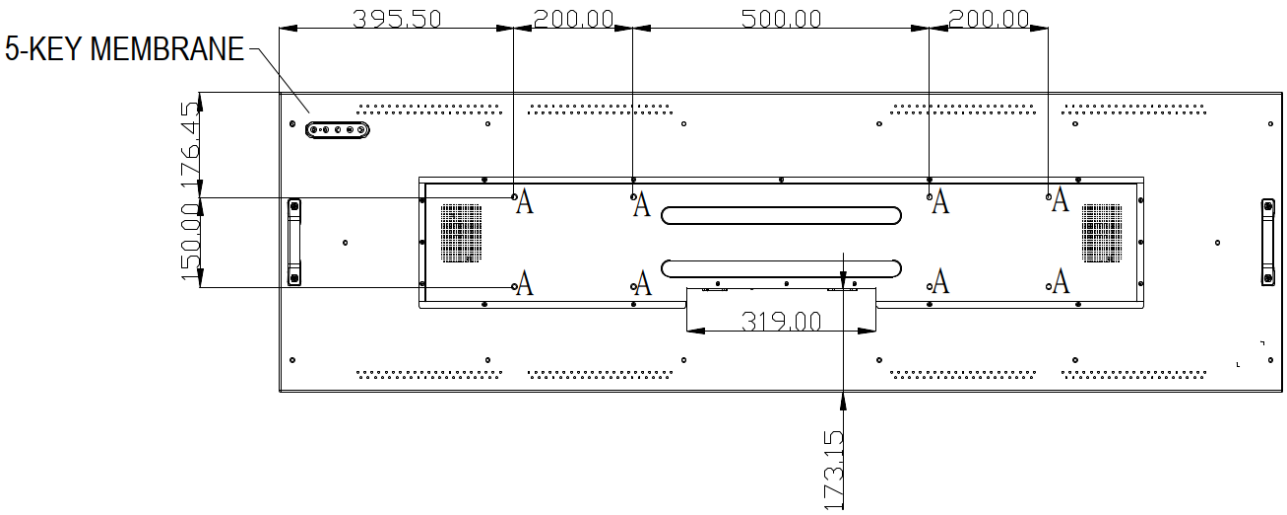












Note：

O.D.：OUTLINE DIMENSION
B.O.：BEZEL OPENING
A.A.：LCD ACTIVE AREA
A：8-M8_USER HOLE_MAX Depth=15mm

6 AD9800HP Board & OSD Functions

AD9800 is a good performance AD board for Litemax 4K resolution display product. Input interface supports HDMI, DP. Output supports V-by-1 and eDP panel. Max resolution up to 3840x2160.

For high level application, AD9800 supports screen rotation by embedded frame buffer.

General Description

- **Max resolution 3840x2160 60Hz**
- **One HDMI 2.1, supports 3840x2160 60Hz.**
- **One Display port 1.4, supports 3840x2160 60Hz.**
- **Support 90, 180, degree rotation.**
- **Embedded MCU with ADC port for VR, light sensor application.**
- **Support HDCP 2.3.**
- **Audio line in and speaker output.**
- **Embedded OSD.**
- **Support V-by-1, eDP panel.**
- **Support up to 64 zones LED local dimming control.**

Characteristics

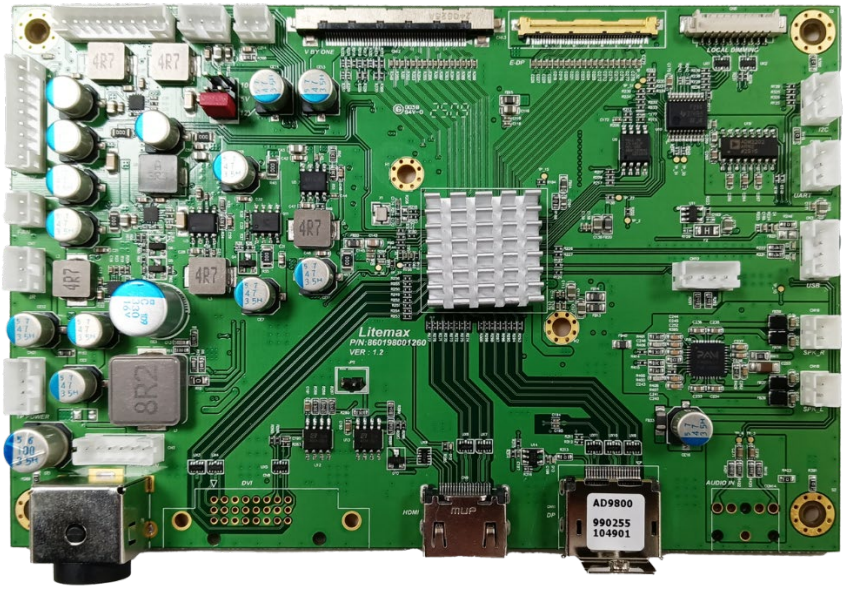
Power Input	12V/24V (Note1)
Power Consumption	15W Max. (Note2)
Input interface	HDMI 2.1, DP 1.4
Output interface	V-by-1 8 lanes, eDP 8 lanes.
Resolution	Max 3840x2160.
Support panel voltage	5 / 10 / 12 V
Speaker	5W speaker x 2(8Ω)
Backlight control	EN and PWM or DC dimming for backlight
Operation Temperature	-20 ~ 70 degree C

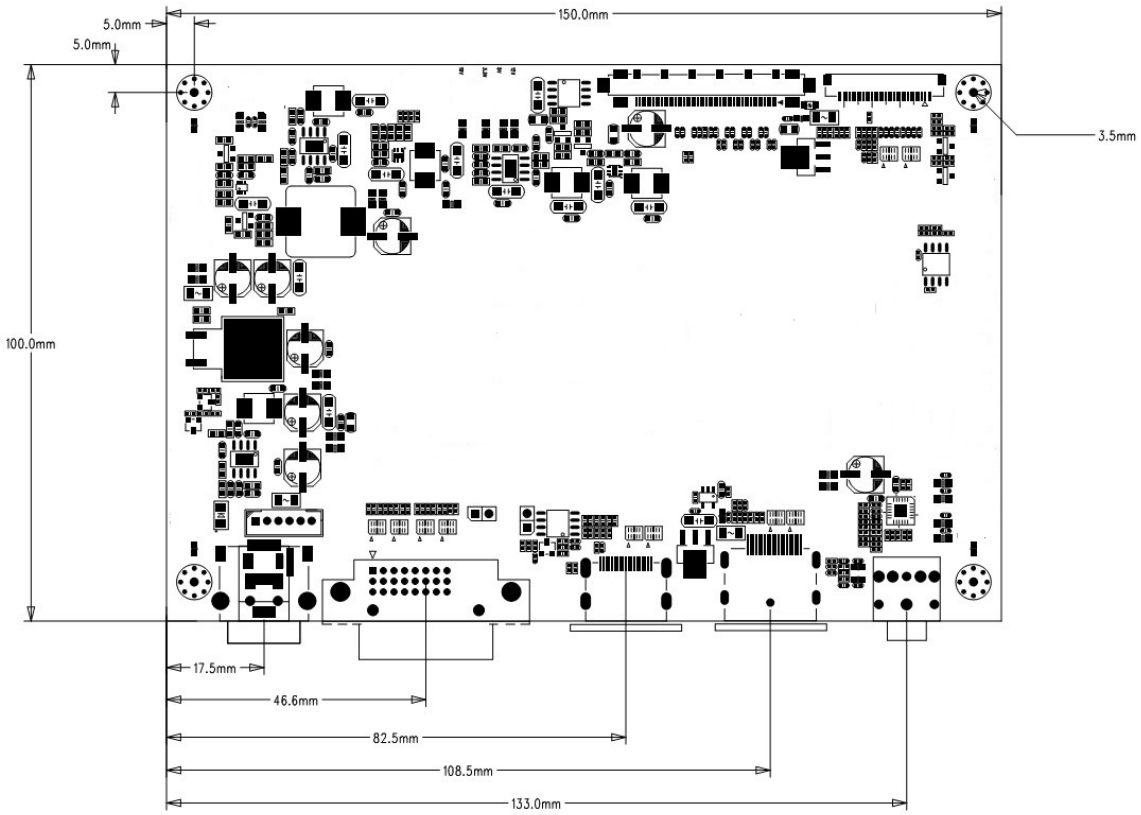
Note1: 12V or 24V are two different PCBA version, selection should be noted.

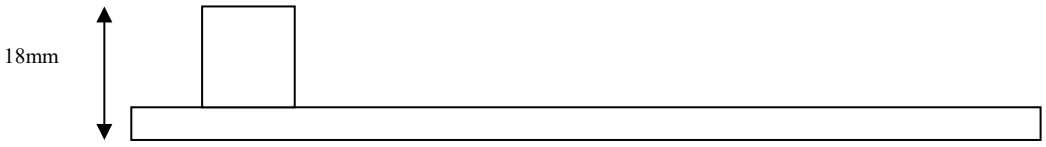
Note2: 15W means AD board own consumption, not include LCD and T-con.

Outline Dimensions

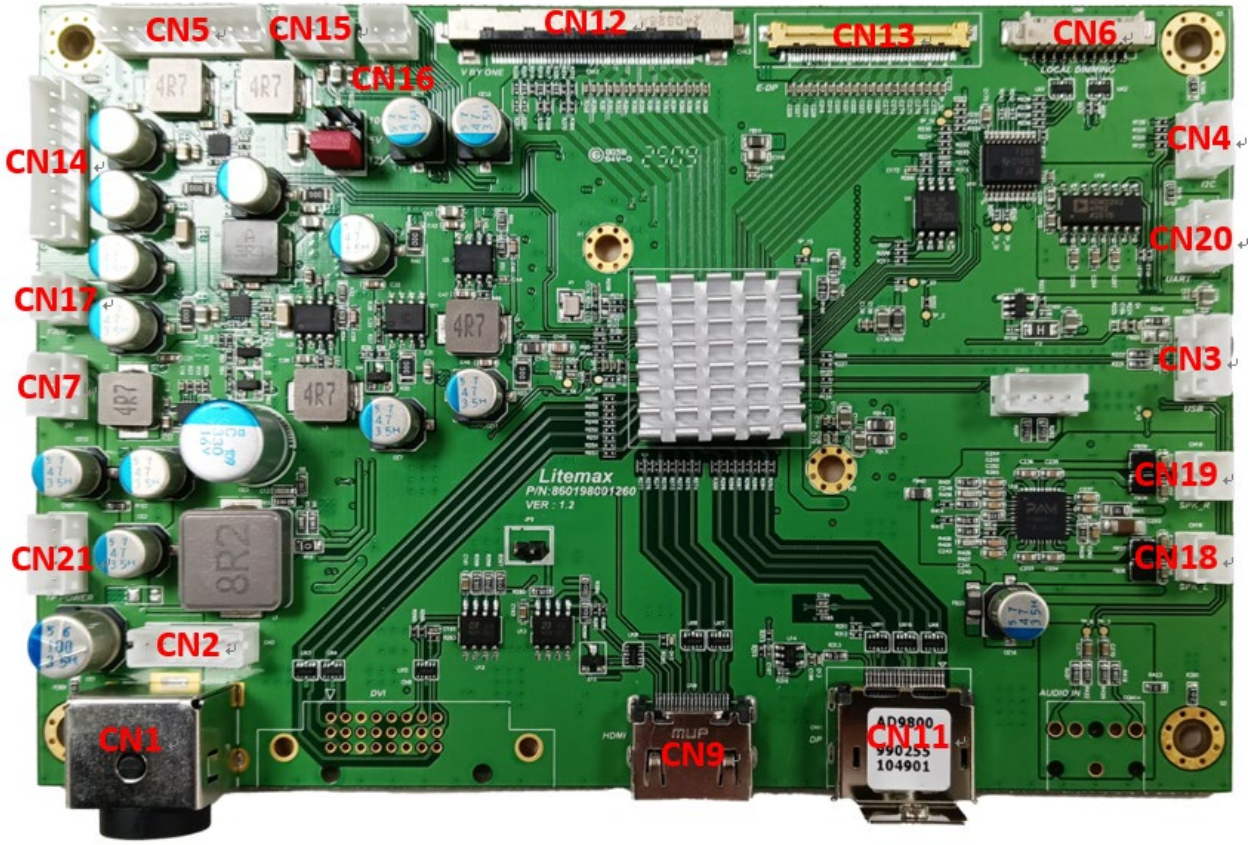
AD9800HP 150mm x 100mm







AD9800HP Board Pin Define



Connector pin define

➢ CN12: V-by-one output

Pin	Function	Pin	Function
1	GND	27	HPD
2	X7P	28	8b/10b SEL
3	X7N	29	NC
4	GND	30	LD_EN_U
5	X6P	31	NC
6	X6N	32	NC
7	GND	33	SCL
8	X5P	34	SDA
9	X5N	35	3D_EN_U
10	GND	36	NC
11	X4P	37	NC
12	X4N	38	GND
13	GND	39	GND
14	X3P	40	GND
15	X3N	41	GND
16	GND	42	GND

17	X2P	43	NC
18	X2N	44	Panel power
19	GND	45	Panel power
20	X1P	46	Panel power
21	X1N	47	Panel power
22	GND	48	Panel power
23	X0P	49	Panel power
24	X0N	50	Panel power
25	GND	51	Panel power
26	LOCKN		

- CN9: HDMI input

Pin	Function	Pin	Function	Pin	Function
1	TMDS Data2+	9	TMDS Data0-	17	GND
2	Shield	10	TMDS Clock+	18	HDMI +5V
3	TMDS Data2-	11	Shield	19	HPD
4	TMDS Data1+	12	TMDS Clock-		
5	Shield	13	CEC		
6	TMDS Data1-	14	NC		
7	TMDS Data0+	15	HDMI_SCL		
8	Shield	16	HDMI_SDA		

- CN11: DisplayPort input

Pin	Function	Pin	Function
1	LAN_C_D3N	11	GND
2	GND	12	ML_LANE0_P
3	LAN_C_D3P	13	GND
4	ML_LANE2_N	14	GND
5	GND	15	AUX _CH_P
6	ML_LANE2_P	16	GND
7	ML_LANE1_N	17	AUX _CH_N
8	GND	18	Hot plug detect
9	ML_LANE1_P	19	GND
10	ML_LANE0_N	20	DP +5V

➢ CN1: Power input (Power Din 4 pin)

Pin	Function	Pin	Function
1	Power Input	3	GND
2	Power Input	4	GND

➢ CN1: Power input (Power Jack 3 pin)

Pin	Function	Pin	Function
1	Power Input	3	GND
2	GND		

➢ CN2: Power input (Wafer 2.0mm pitch 6 pin)

Pin	Function	Pin	Function
1	Power Input	4	GND
2	Power Input	5	GND
3	Power Input	6	GND

➢ CN21: Reserved 12/5V (Wafer 2.0mm pitch 4 pin)

Pin	Function	Pin	Function
1	5V	3	12V
2	GND	4	GND

➢ CN14: Backlight Power and Control (Wafer 2.0mm pitch 9 pin)

Pin	Function	Pin	Function
1	DC/PWM SEL	6	GND
2	Enable	7	12V (Note3)
3	Dimming	8	12V (Note3)
4	GND	9	12V (Note3)
5	GND		

Note3: Pin 7,8,9 are for 12V version only. If you choose 24V version, these 3 pin are NC.

➢ CN17: 12V for Fan power (Wafer 2.0mm pitch 2 pin)

Pin	Function	Pin	Function
1	Fan+ (12V)	2	Fan-

➢ CN5: Keypad (Wafer 2.0mm pitch 9 pin)

Pin	Function	Pin	Function
1	POWER KEY	6	MENU KEY
2	GREEN LED	7	AUTO KEY
3	RED LED	8	GND
4	DOWN KEY	9	GND
5	UP KEY		

- CN15: VR (Wafer 2.0mm pitch 3 pin)

Pin	Function	Pin	Function
1	3.3V	3	GND
2	VR		

- CN16: Light sensor (Wafer 2.0mm pitch 2 pin)

Pin	Function	Pin	Function
1	5V/3.3V	2	Sensor Out

- JP1: Panel power selection (2.54mm pitch 2x3 jump)

Pin	Function	Pin	Function
1-2 close	12V	5-6 close	10V
3-4 close	5V		

- CN18,CN19: Speaker output (Wafer 2.0mm pitch 2 pin)

Pin	Function	Pin	Function
1	SPK+	2	SPK-

- CN20: UART (Wafer 2.0mm pitch 3 pin)

Pin	Function	Pin	Function
1	TX	3	GND
2	RX		

- CN4: I2C (Wafer 2.0mm pitch 3 pin)

Pin	Function	Pin	Function
1	SDA	3	GND
2	SCL		

- CN13: eDP output

Pin	Function	Pin	Function
1	GND	21	GND
2	NC	22	EDP-D1-
3	GND	23	EDP-D1+
4	EDP-D7-	24	GND
5	EDP-D7+	25	EDP-D0-
6	GND	26	EDP-D0+
7	EDP-D6-	27	GND
8	EDP-D6+	28	AUXTX_1P
9	GND	29	AUXTX_1N
10	EDP-D5-	30	GND
11	EDP-D5+	31	AUXTX_0P

12	GND	32	AUXTX_0N
13	EDP-D4-	33	GND
14	EDP-D4+	34	eHPD1
15	GND	35	eHPD0
16	EDP-D3-	36	NC
17	EDP-D3+	37	Panel power
18	GND	38	Panel power
19	EDP-D2-	39	Panel power
20	EDP-D2+	40	Panel power

➢ CN3: USB (Wafer 2.0mm pitch 4 pin)

Pin	Function	Pin	Function
1	USB_5V	3	D0+
2	D0-	4	GND

Note: CN3 only for update FW.

➢ CN6: Local Dimming (Wafer 1.25mm pitch 10 pin)

Pin	Function	Pin	Function
1	LDSPI0_SDI_OUT	6	LD_VSYNC_OUT
2	LDSPI0_SDO_OUT	7	LD_HSYNC_OUT
3	LDSPI0_SCL_OUT	8	GND
4	LDSPI0_CS_OUT	9	VBLCTRL
5	GND	10	NC

➢ JP2: EDID Write Protect (Wafer 2.0mm pitch 2 pin)

Pin	Function	Pin	Function
1	3.3V	2	GND

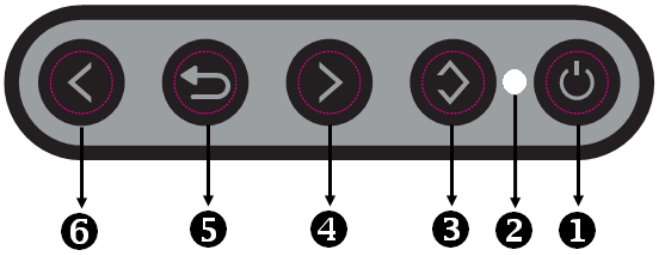
Note: When update EDID , this JP2 must be short.

➢ CON14: Phone Jack(Optional)

Pin	Function	Pin	Function
1	GND	4	GND
2	Audio IN_R	5	GND
3	Audio IN_L		

6.1 OSD Function

MEMBRANE CONTROL BUTTOM



❶ **Key:** (Power) function key

Press the power switch will turn the monitor on.

Press it again to turn the monitor off.

❷ **LED Status:** Power ON-Green / Power OFF-No.

❸ **Key:** (Menu + Selection Right + Enter) function key

Press this button to the OSD “main menu”. And then press this button go to the “Selection Right” function, and press again this button to “Enter”.

❹ **Key:** (Menu + Selection Up + Increase) function key

Press this button to the OSD “main menu”. And then press this button go to the “Selection Up” function, and press again this button to adjustment value “Increase”.

❺ **Key:** (Menu + Exit) function key

Enter to the OSD adjustment menu. It also used for go back to previous menu for sub-menu.

❻ **Key:** (Menu + Selection Down + Decrease) function key

Press this button to the OSD “main menu”. And then press this button go to the “Selection Down” function, and press again this button to adjustment value “Decrease”.

Screen Adjustment Operation Procedure

1. **Entering the screen adjustment**

   The setting switches are normally at stand-by. Push the **Menu Key** once to display the main menu of the screen adjustment. The adjustable items will be displayed in the main menu.

2. **Entering the settings**

   Use the **Down Key**  and **Up Key**  buttons to select the desired setting icon and push the SELECT button to enter sub-menu.

3. **Change the settings**

   After the sub-menu appears, use the **Down Key**  and **Up Key**  buttons to change the setting values.

4. **Save**

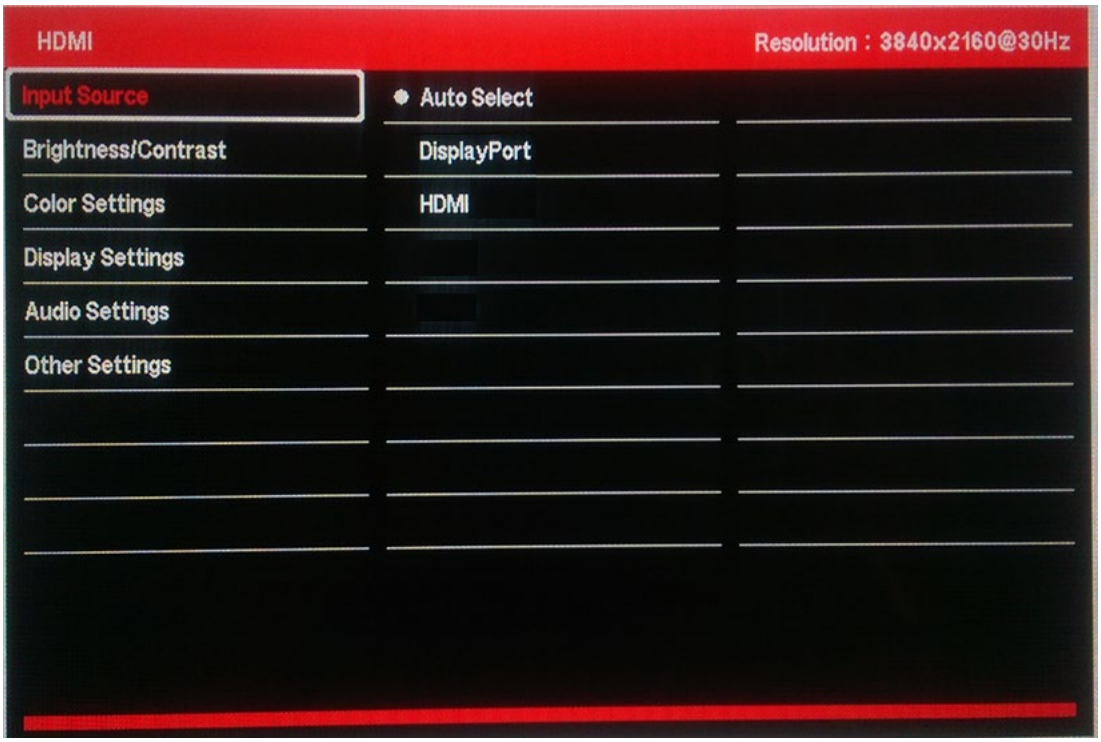
   After finishing the adjustment, push the  button to memorize the setting.

5. **Return & Exit the Main Menu**

   Exit the screen adjustment; push the “MENU” button. When no operation is done around 30 sec (default OSD timeout), it goes back to the stand-by mode and no more switching is accepted except MENU to restart the setting.

6.2 OSD Menu

By pressing the “menu” button, you will see the below picture. Across from timing you will see resolution, frequency, and V-frequency of the panel. These cannot be altered by the user.



7 Precautions

7.1 Handling and Mounting Precautions

(1) The module should be assembled into the system firmly by using every mounting hole. Do not apply rough force such as bending or twisting to the LCD during assembly.
(2) You should consider the mounting structure so that uneven force (ex. Twisted stress, Concentrated stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the LCD module.
(3) While assembling or installing LCD modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
(4) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
(5) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily be scratched.
(6) Please attach the surface transparent protection film to the surface in order to protect the polarizer. Transparent protection film should have sufficient strength in order to the resist external force.
(7) When the transparent protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
(8) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.
(9) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.
(10) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.
(11) Protect the LCD module from static electricity, it may cause damage to the C-MOS Gate Array IC.
(12) Do not disassemble the module.
(13) Do not pull or fold the lamp wire.
(14) Pins of I/F connector should not be touched directly with bare hands.

7.2 Storage Precautions

(1) High temperature or humidity may reduce the performance of LCD module. Please store LCD module within the specified storage conditions.
(2) If possible store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.
(3) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
(4) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

7.3 Operation Precautions

(1) Do not pull the I/F connector in or out while the LCD module is operating.
(2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.
(3) Response time depends on the temperature. (In lower temperature, it becomes longer.)
(4) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
(5) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods are very important to minimize the interference.
(7) Please do not give any mechanical and/or acoustical impact to module. Otherwise, module can't be operated its full characteristics perfectly.
(8) Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.
(9) Do not display the fixed pattern for a long time because it may cause image sticking.
(10) In order to prevent image sticking, periodical power-off or screen save is needed after fixed pattern long time display.
(11) Black image or moving image is strongly recommended as a screen save.
(12) Static information display recommended to use with moving image. Cycling display between 10 minutes' information (static) display and 10 seconds' moving image.
(13) Background and character (image) color change is recommended. Use different colors for background and character, respectively. And change colors themselves periodically.
(14) LCD system is required to place in well-ventilated environment. Adapting active cooling system is highly recommended.
(15) Product reliability and functions are only guaranteed when the product is used under right operation usages.
(16) If product will be used in extreme conditions, such as high temperature/ humidity, shock and vibration it is strongly recommended to contact Litemax for filed application engineering advice. Otherwise, its reliability and function may not be guaranteed. Extreme conditions are commonly found at airports, transit stations, taxi-top, in vehicle and controlling systems.

8 Disclaimer

All information in this document are subject to change, please constant LiteMax for any new design.