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DLD3200-I

Sunlight Readable 32” LED B/L LCD

User Manual

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Record of Revision

Version and Date	Page	Old Description	New Description	Remark
Oct/30/2025	all		Initial release	

Contents

1 General Description

The DLD3200-I is a 32inch industrial grade sunlight readable LCD, with high brightness 2000 nits, it produce sharp images, crisp text and lifelike colors. The Durapixel LED backlight technology ensures high reliability and low power consumption, suitable for outdoor application, kiosk, factory automation, military, transportation and gaming application.

1.1 Features

- High Brightness 2000 nits
- Sunlight Readable
- Wide Operation Temperature (-30 ˚C ~ 70 ˚C)
- LCD Blackening Defect Free (H-Tni 110 ˚C)
- Surface Treatment (Haze 28%)
- Low Power Consumption
- BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	DLD3200-I
Description	32” TFT LCD, 2000nits LED Backlight, 1920x1080
Screen Size	32”
Display Area (mm)	698.40(H) x 392.85(V)
Brightness	2000 cd/m^2
Resolution	1920x1080
Aspect Ratio	16 : 9
Contrast Ratio	6500 : 1
Pixel Pitch (mm)	0.36375(H) x 0.36375(V)
Pixel Per Inch (PPI)	69
Viewing Angle	178°(H),178°(V)
Color Saturation (NTSC)	82%
Display Colors	16.7M
Response Time (Typical)	9.5ms
Panel Interface	LVDS
Input Interface	DVI-I, HDMI, DP
Input Power	AC100~240V
Power Consumption	86W
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position…etc
Dimensions (mm)	735.4 x 429.8 x 58.1
Bezel Size(U/B/L/R)	18.45/18.45/18.50/18.50 mm
Mounting	100x100mm, 200x200mm
Weight (Net)	11 kg
Operating Temperature	-30 ˚C ~ 70 ˚C
Storage Temperature	-30 ˚C ~ 70 ˚C

DLD= Panel + LED Driving Board + AD Control Board + Chassis

1.3 Absolute Maximum Ratings

Permanent damage may occur if exceeding the following maximum rating.

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T_{ST}	-30	+70	ºC	(1), (3), (4)
Operating Ambient Temperature	T_{OP}	-30	+70	ºC	(1), (2) , (3), (4)
Panel Surface Temperature	P_{ST}		+80	ºC	(2)

Note (1) Temperature and relative humidity range is shown in the figure below:

(a) 90 %RH Max. (Ta <=40℃)

(b) Wet-bulb temperature should be 39 ºC Max. (Ta > 40℃)

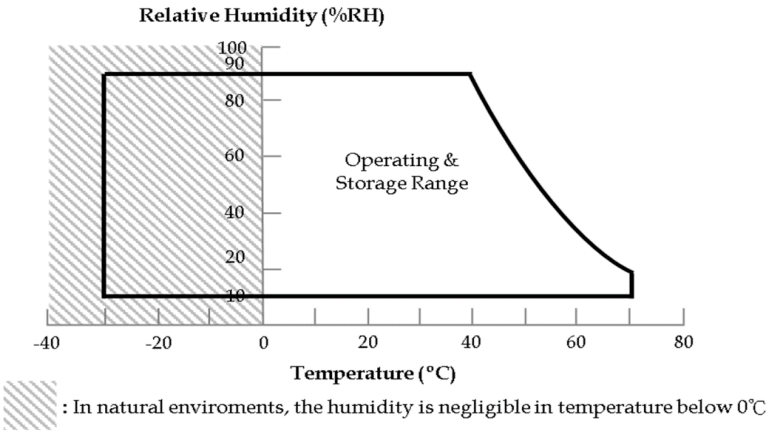
(c) No condensation.

Note (2) (a)Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 80 ºC. The range of operating temperature may degrade in case of improper thermal management in final product design.

(b) Surface temperature is measured at 70°C Dry condition.

Note (3) The rating of environment is base 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.

Note (4) Low temperature start can only be performed when the ambient temperature is greater than -20°C. Response time depends on the temperature. (In lower temperature, it becomes longer.)



2 Electrical Absolute Ratings

2.1 TFT LCD Module

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	VCC	-0.3	13.5	V	(1)
Logic Input Voltage	VIN	-0.3	3.6	V	
Component on PCB Temperature	-	-	100	℃	(2)
Source Driver Temperauure	-	-	125	℃	(3)

Note

(1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

(2) The surface temperature of component on PCB should be controlled under 100℃, operating over thermal spec can cause the damage or decrease of lifetime.

(3) The surface temperature of Source Driver should be controlled under 125℃, operating over thermal spec can cause the damage or decrease of lifetime.

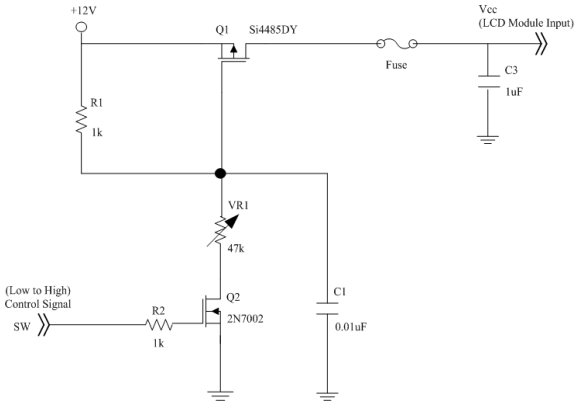
2.2 Electrical Characteristics

(Ta = 25 ± 2 ºC)

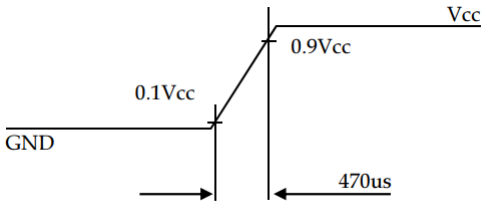
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V_{CC}	10.8	12	13.2	V	(1)
Rush Current		I_{RUSH}	—	—	1.56	A	(2)
Power Consumption	White Pattern	P_T	—	7.06	7.76	W	(3)
	Black Pattern	P_T	—	4.30	4.73	W	
	Horizontal Stripe	P_T	—	6.88	7.57	W	
Power Supply Current	White Pattern	—	—	0.60	0.73	A	
	Black Pattern	—	—	0.37	0.45	A	
	Horizontal Stripe	—	—	0.60	0.72	A	
LVDS interface	Differential Input High Threshold Voltage	V_{TH}	—	—	+100	mV	(4)
	Differential Input Low Threshold Voltage	V_{TL}	-100	—	—	mV	
	Common Input Voltage	V_{CM}	1.0	1.2	1.4	V	
	Differential input voltage (single-end)	$\|V_{ID}\|$	100	—	600	mV	
	Terminating Resistor	R_T	—	100	—	ohm	
CMIS interface	Input High Threshold Voltage	V_{IH}	2.7	—	3.3	V	
	Input Low Threshold Voltage	V_{IL}	0	—	0.7	V	

Note (1)The module should be always operated within above ranges. The ripple voltage should be controlled under 10% of Vcc (Typ.)

Note (2)Measurement Conditions:



Vcc rising time is 470us



Note (3) The specified max power supply current is under the conditions at V_{DD} = 12 V, Ta = 25 ± 2 ºC, DC Current and Fv =60Hz, whereas a power dissipation check pattern below is displayed.

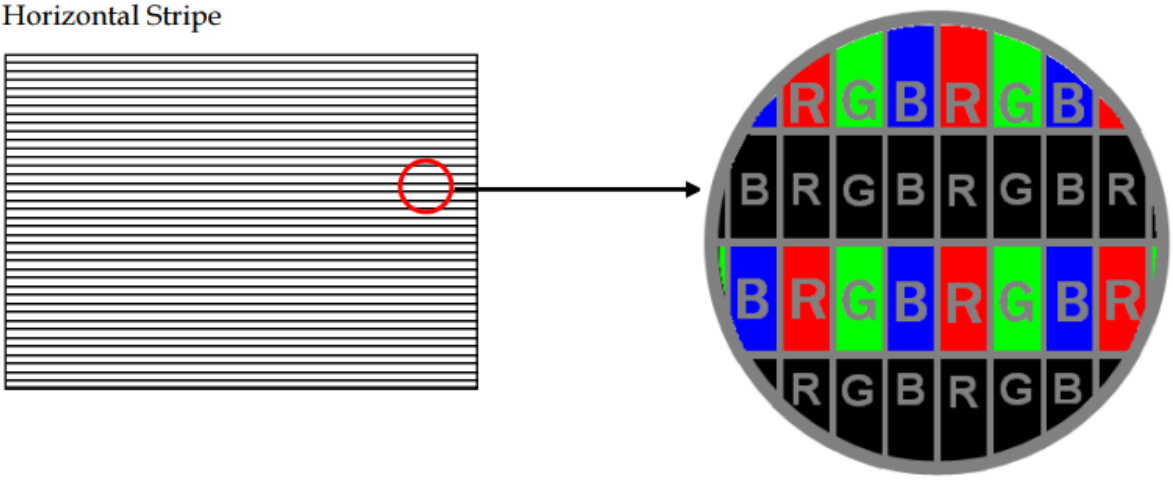
a. White Pattern

Active Area

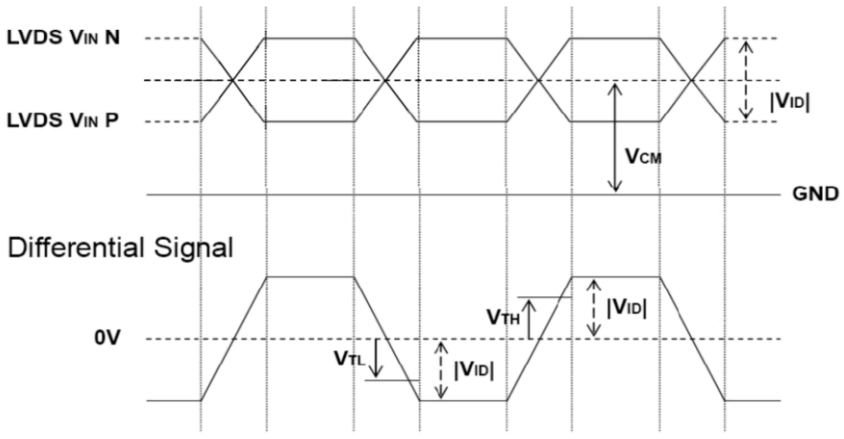
b. Black Pattern

Active Area

Horizontal Stripe



Note (4)The LVDS input characteristics is shown as below. The position of measurement is TCON LVDS input pin. The differential voltage must be higher than VTH and lower than VTL to ensure that the receiver indicates a valid logic state at its output.

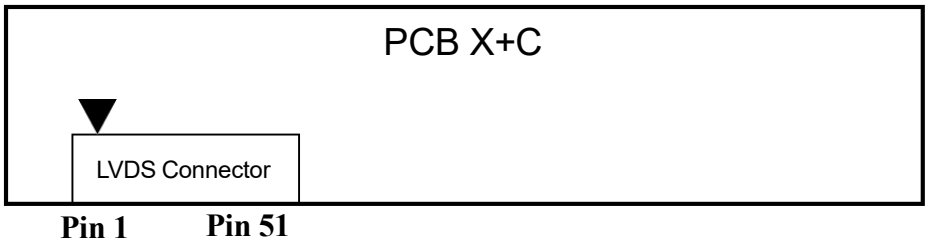


2.3 Input Terminal Pin Assignment

CNX11 Connector Pin Assignment: [187059-51221 (P-Two), WF23-402-5133(FCN)]

Pin	Name	Description	Note
1	NC	No connection	(2)
2	SCL	I2C clock (For Vcom tunning)	
3	SDA	I2C data (For Vcom tunning)	
4	NC	No connection	
5	NC	No connection	(2)
6	NC	No connection	
7	SELLVDS	LVDS data format Selection	(3)(4)
8	NC	No Connection	
9	NC	No Connection	(2)
10	NC	No connection	
11	GND	Ground	
12	ORX0-	Odd pixel Negative LVDS differential data input. Channel 0	
13	ORX0+	Odd pixel Positive LVDS differential data input. Channel 0	
14	ORX1-	Odd pixel Negative LVDS differential data input. Channel 1	(5)
15	ORX1+	Odd pixel Positive LVDS differential data input. Channel 1	
16	ORX2-	Odd pixel Negative LVDS differential data input. Channel 2	
17	ORX2+	Odd pixel Positive LVDS differential data input. Channel 2	
18	GND	Ground	
19	OCLK-	Odd pixel Negative LVDS differential clock input.	(5)
20	OCLK+	Odd pixel Positive LVDS differential clock input.	
21	GND	Ground	
22	ORX3-	Odd pixel Negative LVDS differential data input. Channel 3	(5)
23	ORX3+	Odd pixel Positive LVDS differential data input. Channel 3	
24	N.C.	No Connection	
25	N.C.	No Connection	(2)
26	N.C.	No Connection	
27	N.C.	No Connection	
28	ERX0-	Even pixel Negative LVDS differential data input. Channel 0	
29	ERX0+	Even pixel Positive LVDS differential data input. Channel 0	
30	ERX1-	Even pixel Negative LVDS differential data input. Channel 1	(5)
31	ERX1+	Even pixel Positive LVDS differential data input. Channel 1	
32	ERX2-	Even pixel Negative LVDS differential data input. Channel 2	
33	ERX2+	Even pixel Positive LVDS differential data input. Channel 2	
34	GND	Ground	
35	ECLK-	Even pixel Negative LVDS differential clock input	(5)
36	ECLK+	Even pixel Positive LVDS differential clock input	
37	GND	Ground	
38	ERX3-	Even pixel Negative LVDS differential data input. Channel 3	(5)
39	ERX3+	Even pixel Positive LVDS differential data input. Channel 3	
40	N.C.	No Connection	
41	N.C.	No Connection	(2)
42	N.C.	No Connection	
43	N.C.	No Connection	
44	GND	Ground	
45	GND	Ground	
46	GND	Ground	
47	N.C.	No Connection	(2)
48	VCC	Power input (+12V)	
49	VCC	Power input (+12V)	
50	VCC	Power input (+12V)	
51	VCC	Power input (+12V)	

Note (1) LVDS connector pin order defined as below

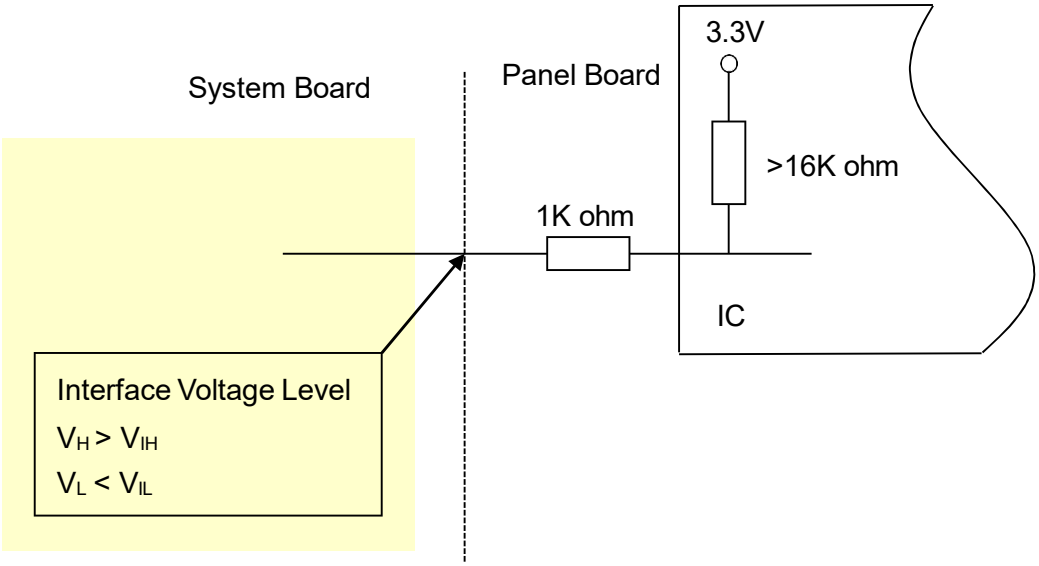


Note (2) Reserved for internal use. Please leave it open.
Note (3) Connect to Open or +3.3V: VESA Format, connect to GND: JEIDA Format.

SELLVDS	Mode
H(default)	VESA
L	JEIDA

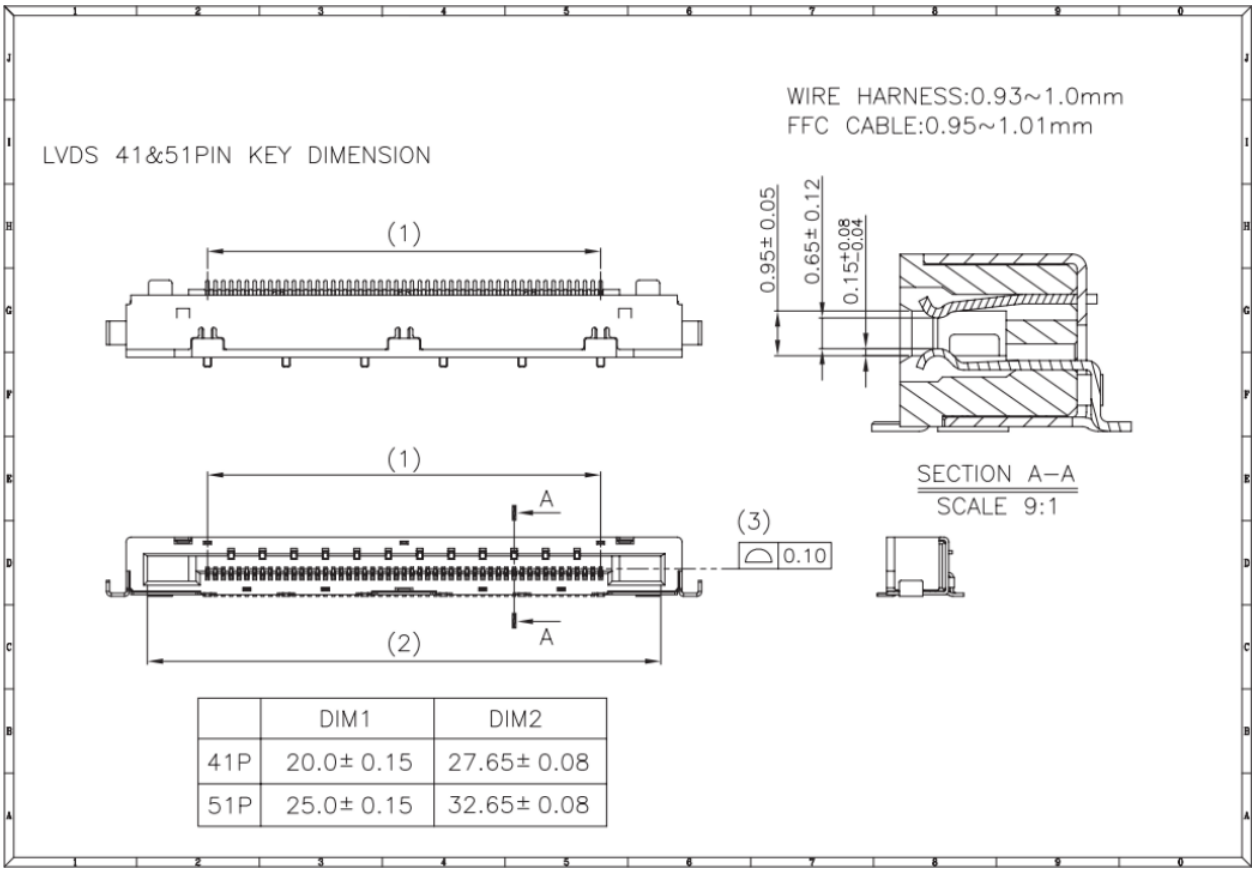
L : Connect to GND, H: Connect to +3.3V

Note (4) Interface optional pin has internal scheme as following diagram. Customer should keep the interface voltage level requirement which including Panel board loading as below.



Note (5) Two pixel data send into the module for every clock cycle. The first pixel of the frame is odd pixel and the second pixel is even pixel.

Note (6) LVDS connector mating dimension range request is 0.93mm~1.0mm as below. (Lock type) LVDS connector Recommend Mating FFC drawing as below (FFC type)

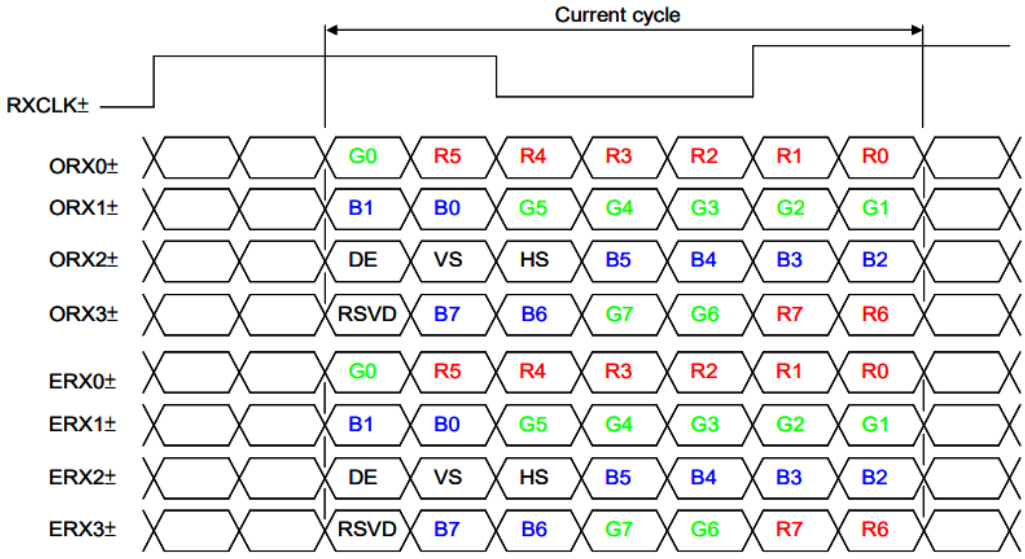


	DIM1	DIM2
41P	20.0± 0.15	27.65± 0.08
51P	25.0± 0.15	32.65± 0.08

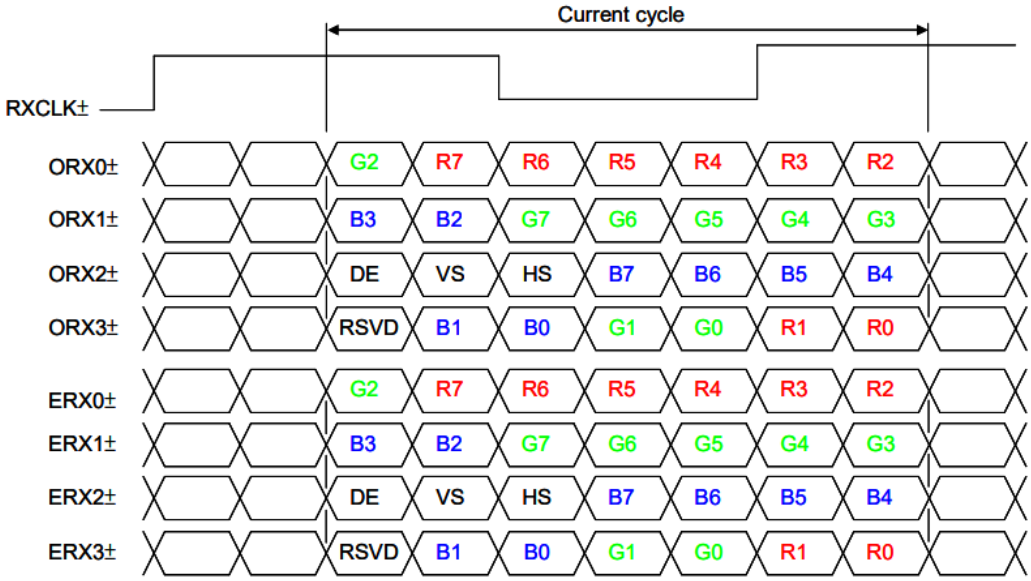
2.4 LVDS Interface

JEIDA Format : SELLVDS = L
VESA Format : SELLVDS = H or Open

VESA LVDS format



JEDIA LVDS format



R0~R7	Pixel R Data (7; MSB, 0; LSB)	DE	Data enable signal
G0~G7	Pixel G Data (7; MSB, 0; LSB)	DCLK	Data clock signal
B0~B7	Pixel B Data (7; MSB, 0; LSB)		

Note (1) RSVD (reserved) pins on the transmitter shall be “H” or “L”.

2.5 Color Data Input Assignment

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

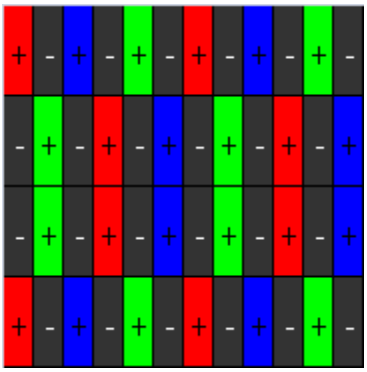
Color		Data Signal																							
		Red								Green								Blue							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1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

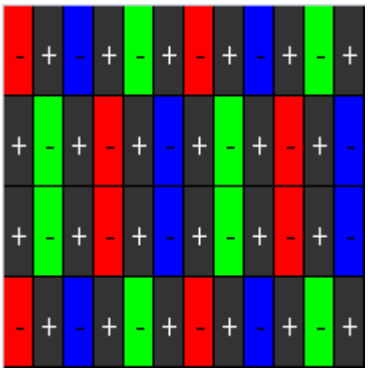
Note (1)0: Low Level Voltage, 1: High Level Voltage

2.6 Flicker (Vcom) Adjustment

(1) Adjustment Pattern :

The adjustment pattern is shown as below. If customer needs below pattern, please directly contact with account FAE.





(2) Adjustment method: (Digital V-com)

Programmable memory IC is used for Digital V-com adjustment in this model. LiteMax provide Auto Vcom tools to adjust Digital V-com.The detail connection and setting instruction, please directly contact with Account FAE or refer LiteMax Auto V-com adjustment OI. Below items is suggested to be ready before Digital V-com adjustment in customer LCM line.

a. USB Sensor Board.

b. Programmable software

2.7 Input Signal Timing Specifications

The input signal timing specifications are shown as the following table and timing diagram.

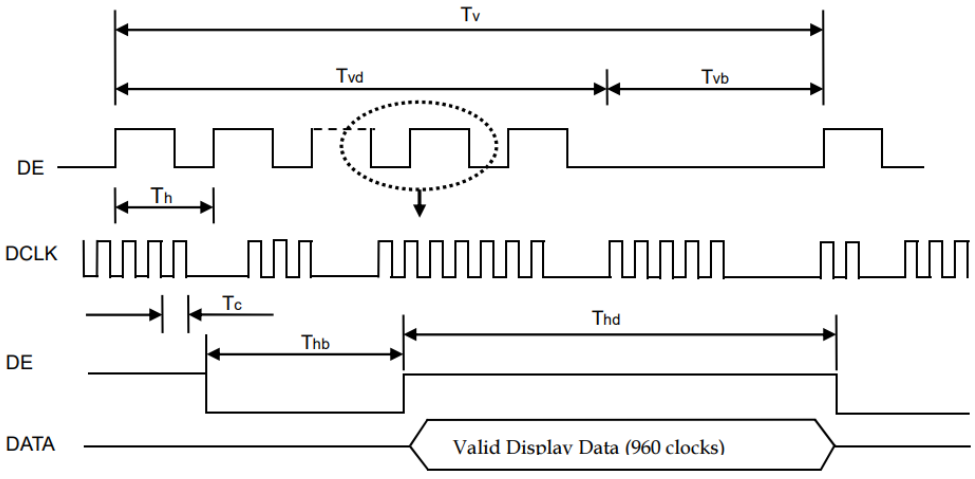
Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Receiver Clock	Frequency	F_{clkin} (=1/TC)	60	74.25	80	MHz	
	Input cycle to cycle jitter	T_{rcl}	-	—	200	ps	(3)
	Spread spectrum modulation range	F_{clkin_mod}	F_{clkin}-2%	—	F_{clkin}+2%	MHz	(4)
	Spread spectrum modulation frequency	F_{SSM}	—	—	200	KHz	
LVDS Receiver Data	Receiver Skew Margin	T_{RSKM}	-400	—	400	ps	(5)
Vertical Active Display Term	Frame Rate	F_{r5}	47	50	53	Hz	(6)
		F_{r6}	57	60	63	Hz	
	Total	Tv	1100	1125	1480	Th	Tv=Tvd+Tvb
	Display	Tvd	1080	1080	1080	Th	—
	Blank	Tvb	20	45	400	Th	—
Horizontal Active Display Term	Total	Th	1030	1100	1325	Tc	Th=Thd+Thb
	Display	Thd	960	960	960	Tc	—
	Blank	Thb	70	140	365	Tc	—

Note (1) Please make sure the range of pixel clock has follow the below equation :

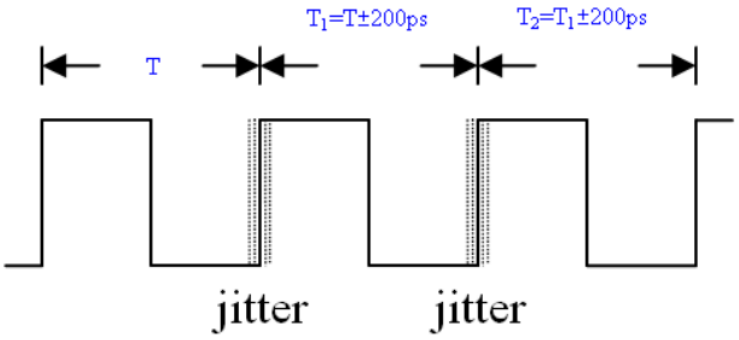
$$Fclkin(max) \geqq Fr6 \times Tv \times Th$$

$$Fr5 \times Tv \times Th \geqq Fclkin\ (min)$$

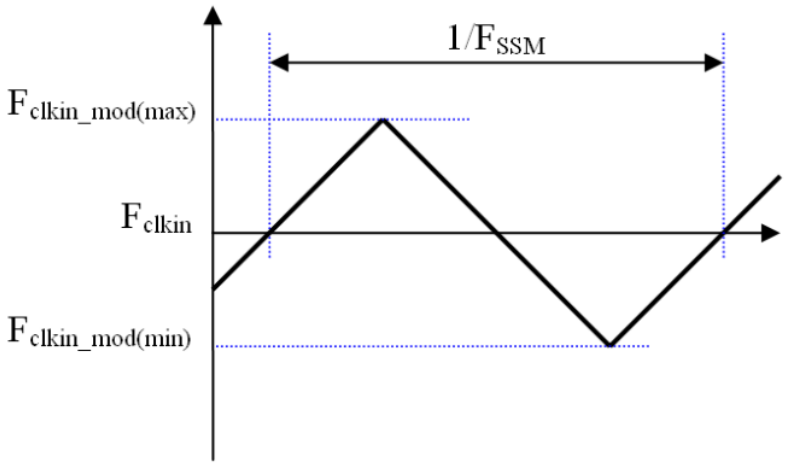
Note (2) This module is operated in DE only mode and please follow the input signal timing diagram below :



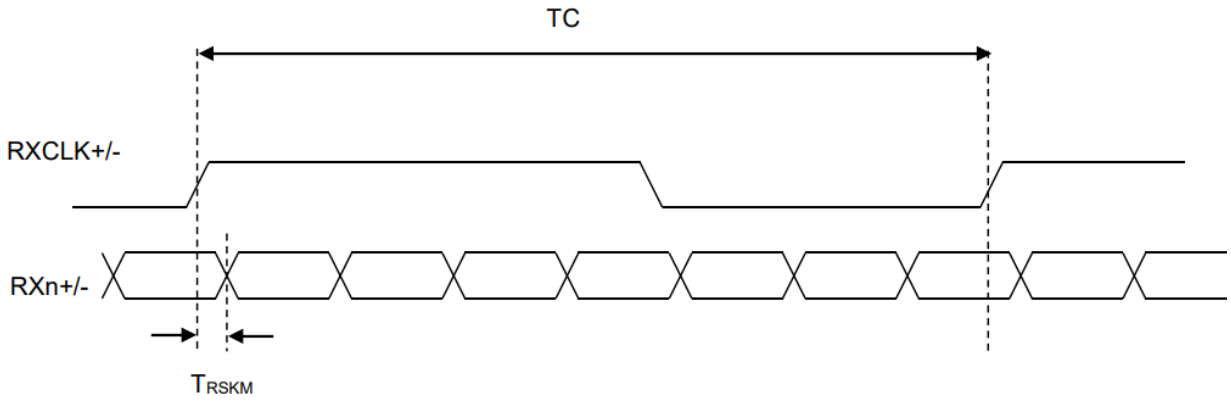
Note (3) The input clock cycle-to-cycle jitter is defined as below figures. Trcl = | T1 – T|



Note (4) The SSCG (Spread spectrum clock generator) is defined as below figures.

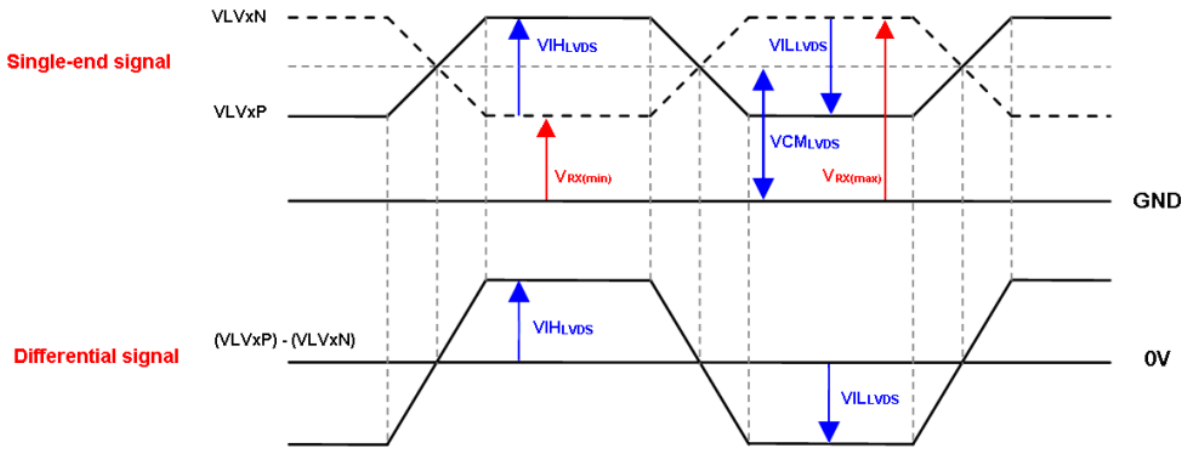


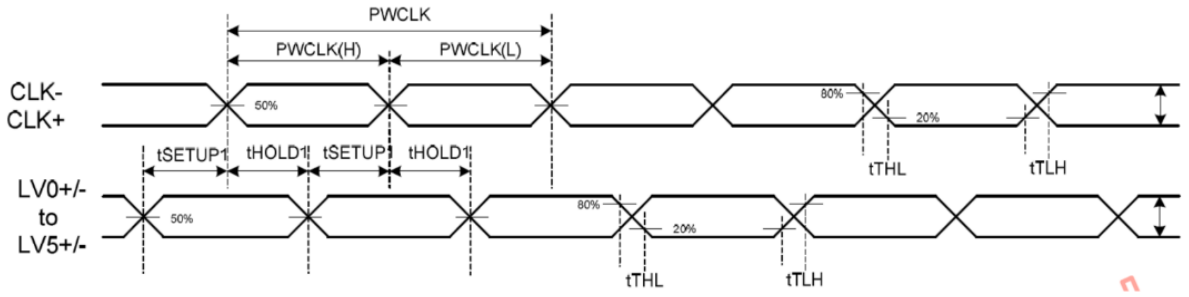
Note (5) The LVDS timing diagram and the receiver skew margin is defined and shown in following figure.



2.8 Mini-LVDS Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
mini-LVDS power Voltage	V_{DD}	2.3	3.3	3.6	V	
mini-LVDS high input voltage	$\lvert V_{IHLVDS} \rvert$	175	-	-	mV	Fmax ≦ 340MHz
mini-LVDS low input voltage	$\lvert V_{ILLVDS} \rvert$	175	-	-	mV	Fmax ≦ 340MHz
mini-LVDS input voltage range	V_{RX}	0	-	V_{DD}	V	
mini-LVDS common mode input voltage range	VCM_{LVDS}	0.5	1.2	V_{DD}-1.2	V	VCM_{LVDS} = (VCLKP + VCLKN) / 2 or VCM_{LVDS} = (VLVxP + VLVxN) / 2
Data setup time	tSETUP1	0.45	-	-	ns	
Data hold time	tHOLD1	0.45	-	-	ns	
CLK Rising Time	tTLH	-	-	0.7	Ns	From VIL_{LVDS} to VIH_{LVDS}
CLK Falling Time	tTHL	-	-	0.7	ns	From VIH_{LVDS} to VIL_{LVDS}



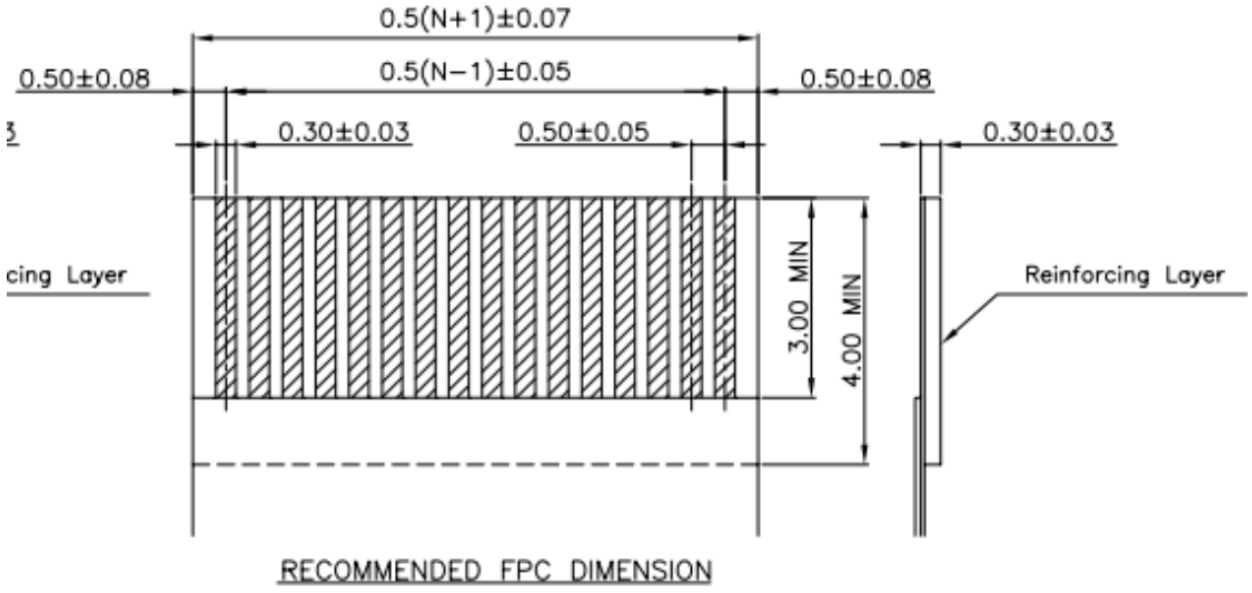


Notes:

(1). EYE diagram must meet above spec. Data receiver is not guaranteed. If EYE diagram is smaller than spec.

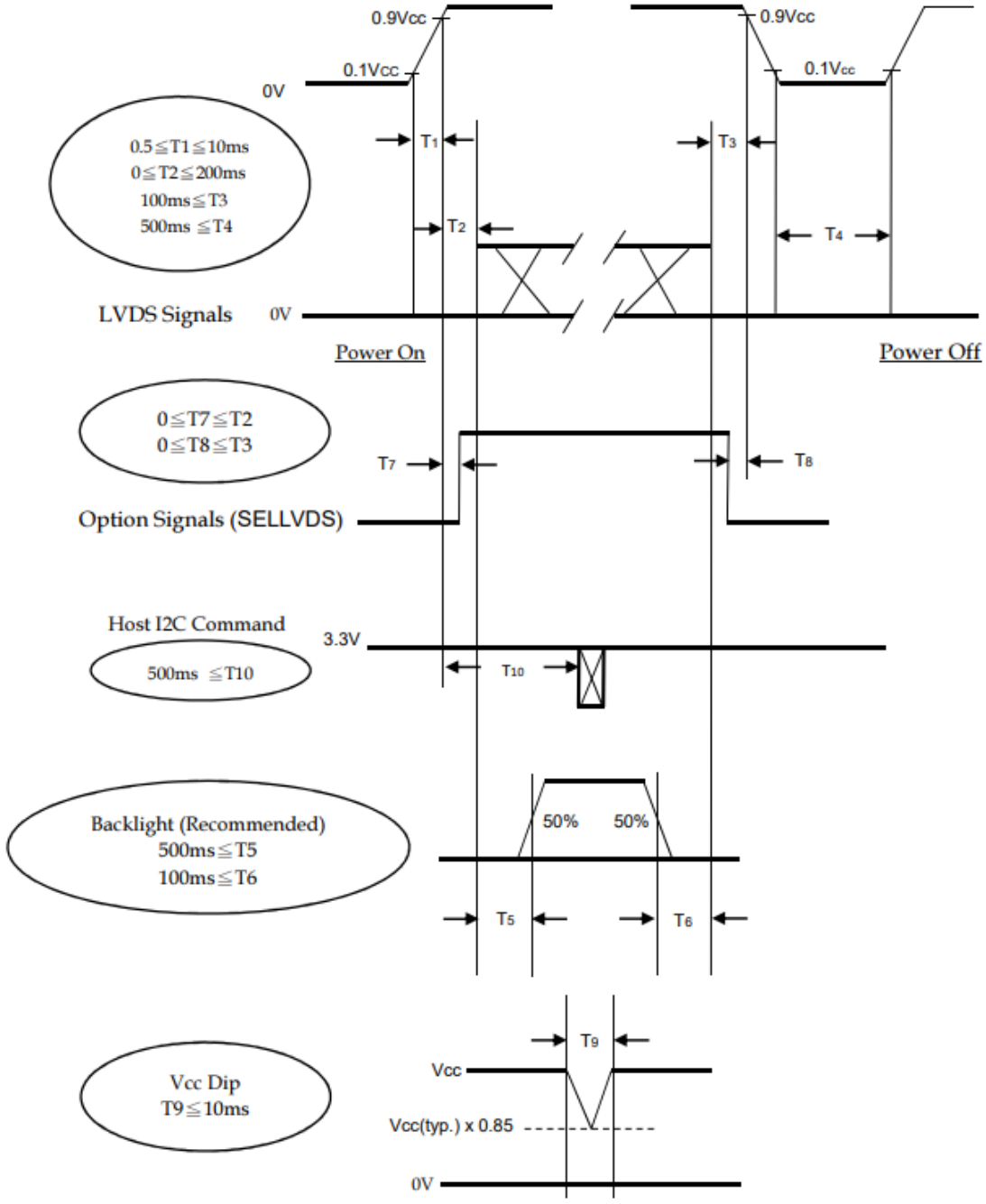
(2). Measure point: Pads of XC –board terminal resistances RX15, RX16, RX17, RX18; Pads of XR –board terminal resistances RX3, RX4, RX5, RX6

(3). FFC drawing is recommended as below:



2.9 Power On/Off Sequence

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



Note (1) The supply voltage of the external system for the module input should follow the definition of Vcc.

Note (2) Apply the lamp 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.

Note (3) In case of VCC is in off level, please keep the level of input signals on the low or high impedance. If T2

Note (4) T4 should be measured after the module has been fully discharged between power off and on period.

Note (5) Interface signal shall not be kept at high impedance when the power is on.

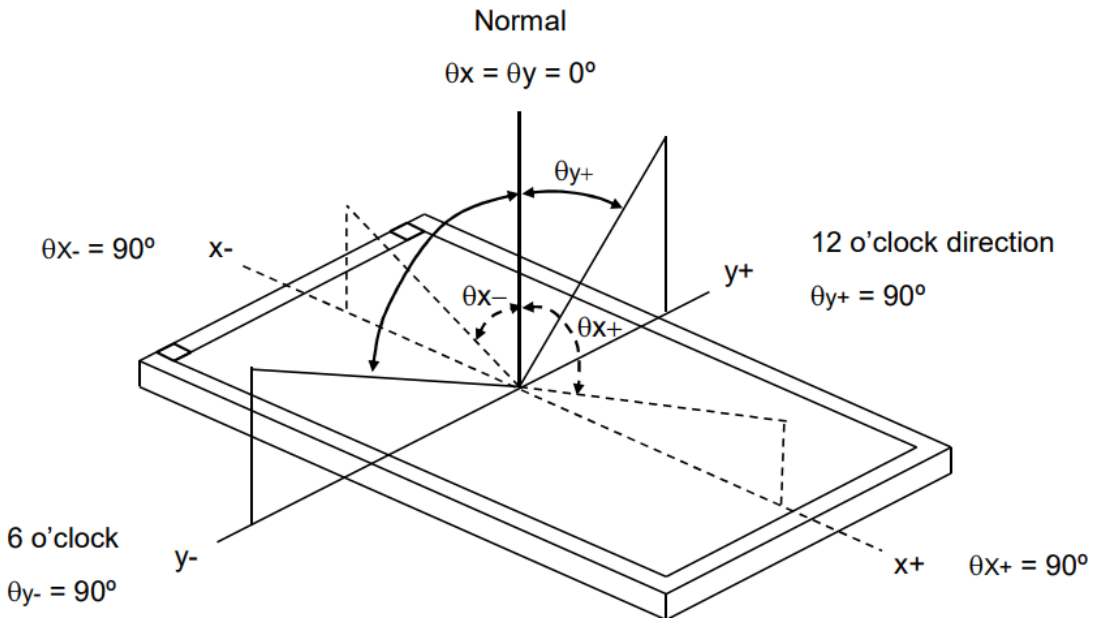
Note (6) Vcc must decay smoothly when power-off.

3 Optical Specification

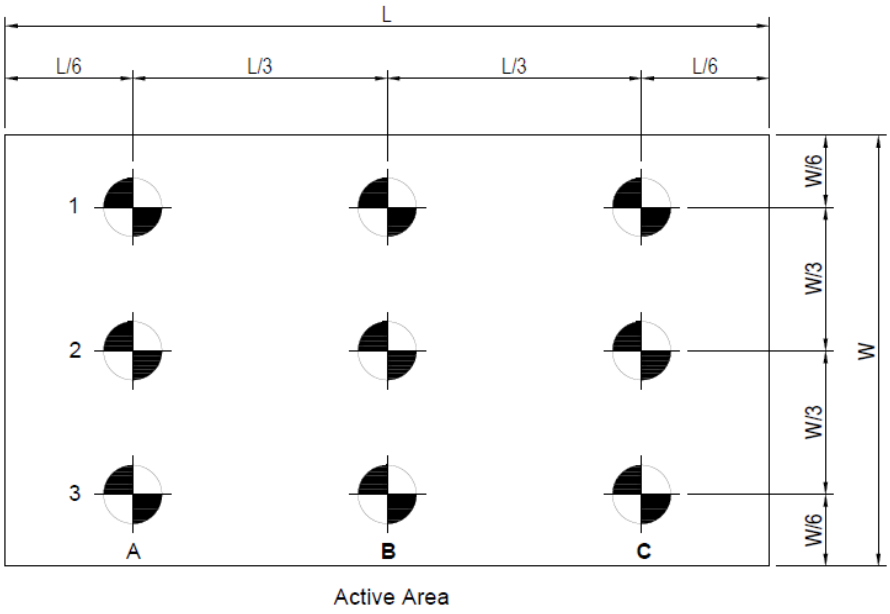
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	θx=0 θy=0 CA-410	0.616	0.646	0.676	-	Test Mode: (2) (3)
		Ry		0.305	0.335	0.365	-	
	Green	Gx		0.270	0.300	0.330	-	
		Gy		0.604	0.634	0.664	-	
	Blue	Bx		0.117	0.147	0.177	-	
		By		0.032	0.062	0.092	-	
	White	Wx		0.262	0.292	0.322	-	
		Wy		0.296	0.326	0.356	-	
Center Luminance of White		Lc	θx=0 θy=0 CA-410	1800	2000	2600	cd/m^2	
Uniformity		Lu			81		%	
Contrast Ratio		CR	θx=0 θy=0 Klein K-10	5850:1	6500:1		-	Test Mode: (4)
Color Saturation		NTSC			82		%	
Viewing Angle	Horizontal	θx+	CR ≥ 10		89		Deg	Test Mode: (1)
		θx-			89			
	Vertical	θy+			89			
		θy-			89			

Test Mode：

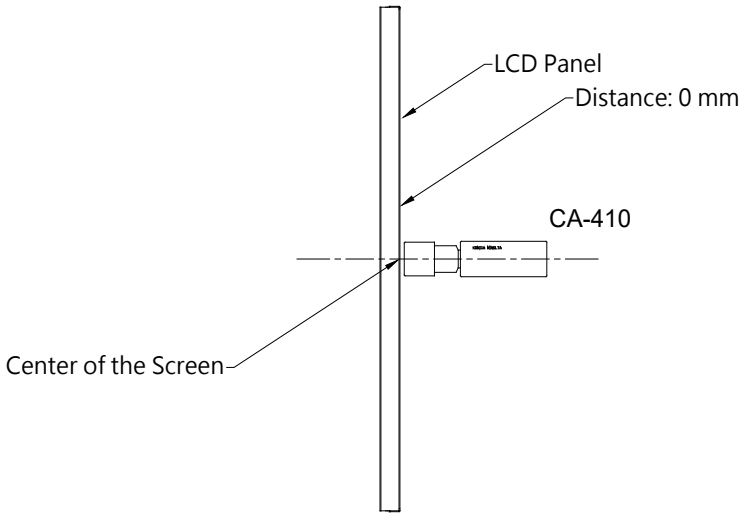
(1) Definition of Viewing Angle (θx , θy):



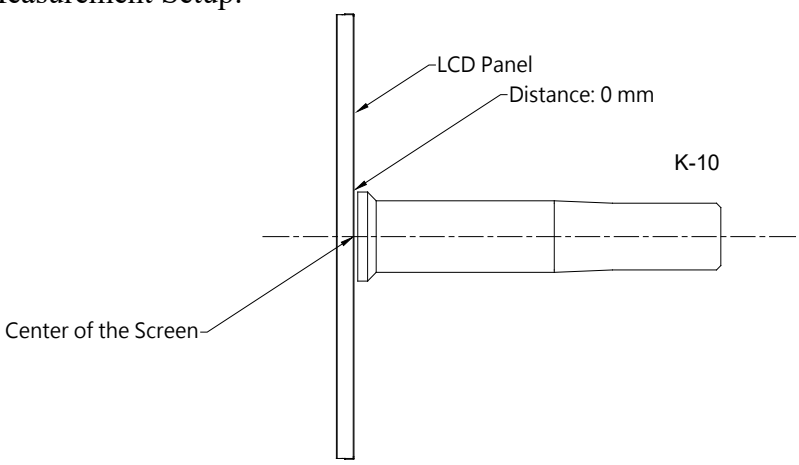
(2) Definition of Test Point:



(3) CA-410 Measurement Setup:



(4) Klein K-10 Measurement Setup:



4 LED Driving Board Specifications

This specification is applied to LED converter unit for LED backlight.

4.1 Operating Characteristics

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	Vin		22.0	24.0	26.0	V	
Input Current (High Brightness)	IinH	Brightness = 100%	3.40	3.09	2.87	A	(1)
Input Power Consumption	Pin	Brightness = 100%	-----	74.1	-----	W	
LED Current (High Brightness)	IoutH	Brightness = 100%	-----	1.16	-----	A	J3、J4
			-----	1.16	-----	A	J5、J6
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	-----	Hz	(4)
ON/OFF Control	Von	Normal Operation	2	-----	5	V	
	Voff		0	-----	0.8	V	
Output Voltage	Vout	Brightness = 100%	-----	28.84	28.89	V	J3、J4
			-----	28.84	28.89	V	J5、J6
Efficiency	η	Brightness = 100%	-----	90.2	-----	%	(5)

Remark:
(1) this data is based on the testing result of practical input voltage, Iin is measured by related Vin. (min, typ, max)
(2) Max brightness at Vadj=0.2V. Min brightness at Vadj=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) η max = Vout(max)*IoutH(max)/Vin(max)*IinH(min)
η min = Vout(min)*IoutH (min)/Vin(min)*IinH(max)

4.2 Connector Socket

Input Connector:
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	Close 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 B4B-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

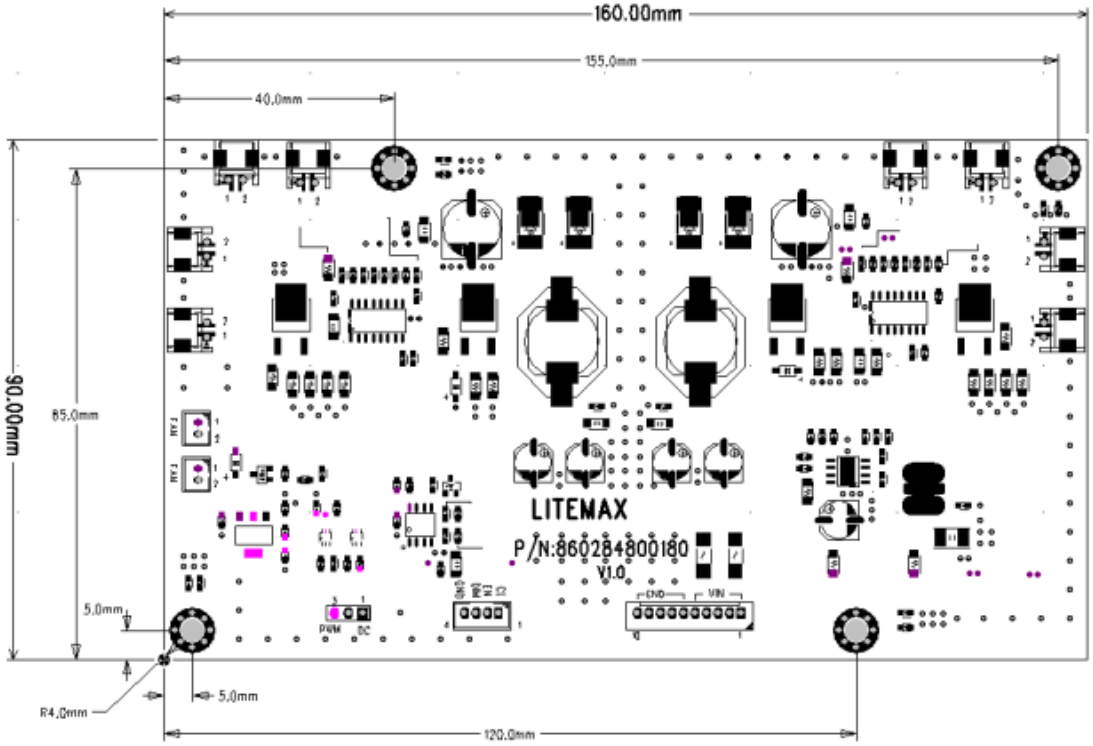
Note: Pin1 is dimming method control pin, Low → DC dimming, High → PWM dimming. If pin1 is be used, please NC CN2.

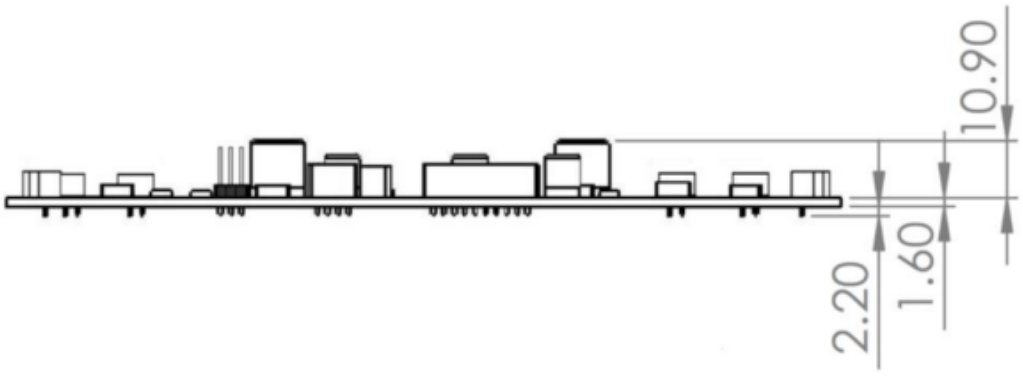
Output Connector :J3,J4, J5,J6(JST S2B-EH or Compatible)

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

4.3 Mechanical Characteristics

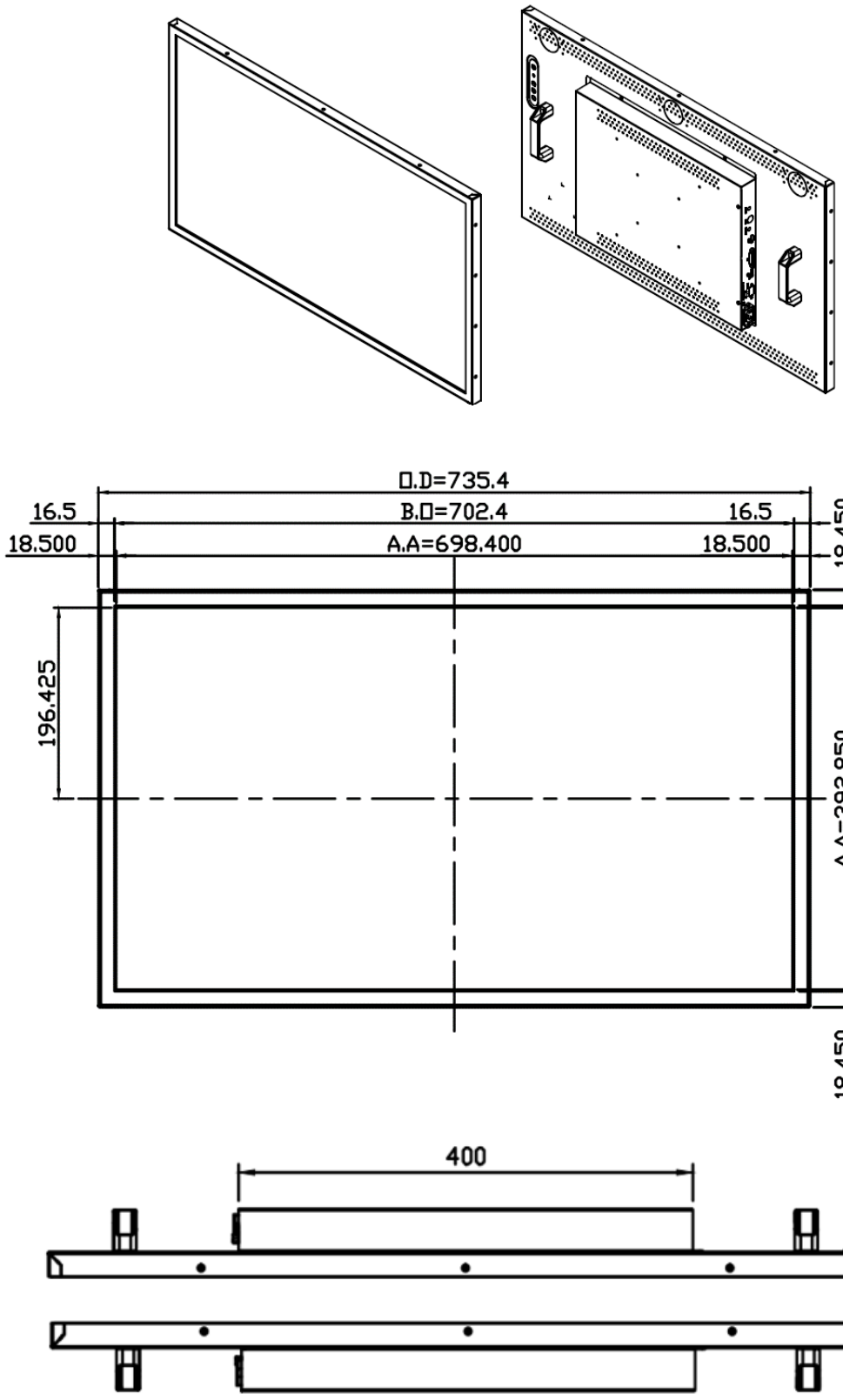
Dimension: 160 x 90 x 12.5mm

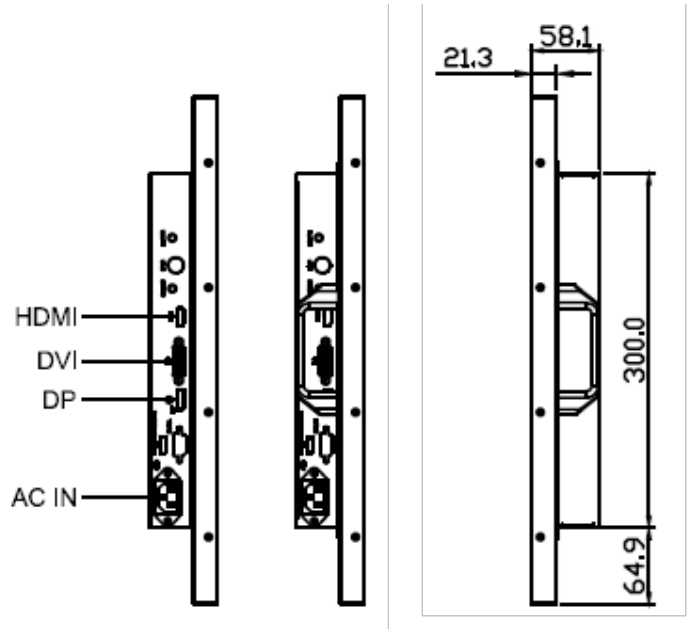


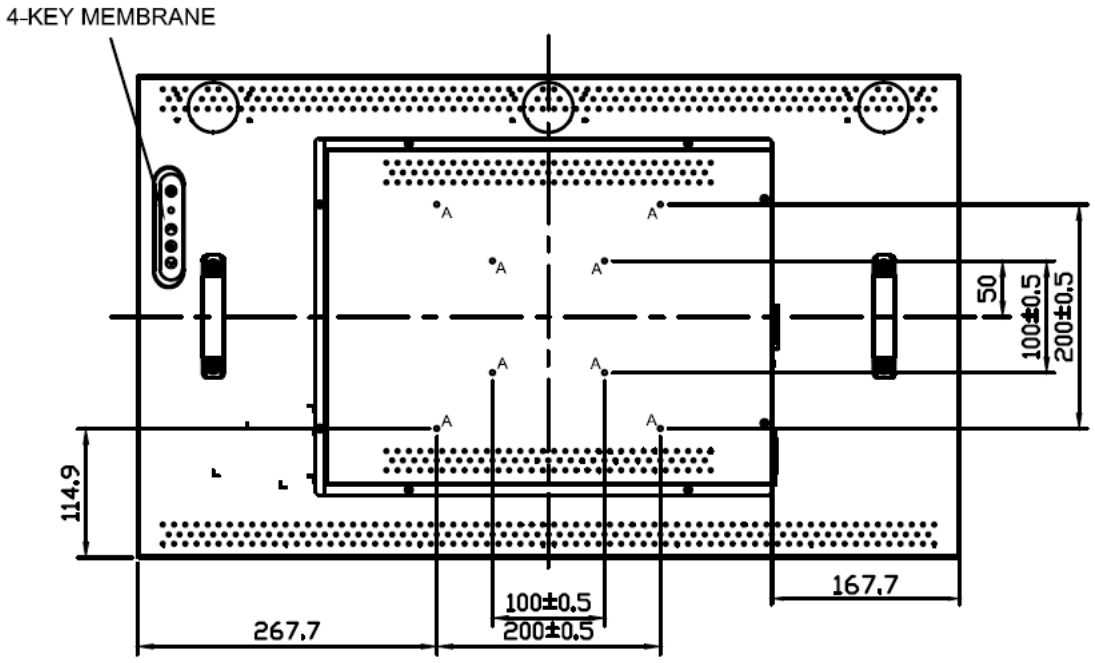


5 Mechanical Drawing

Unit:mm







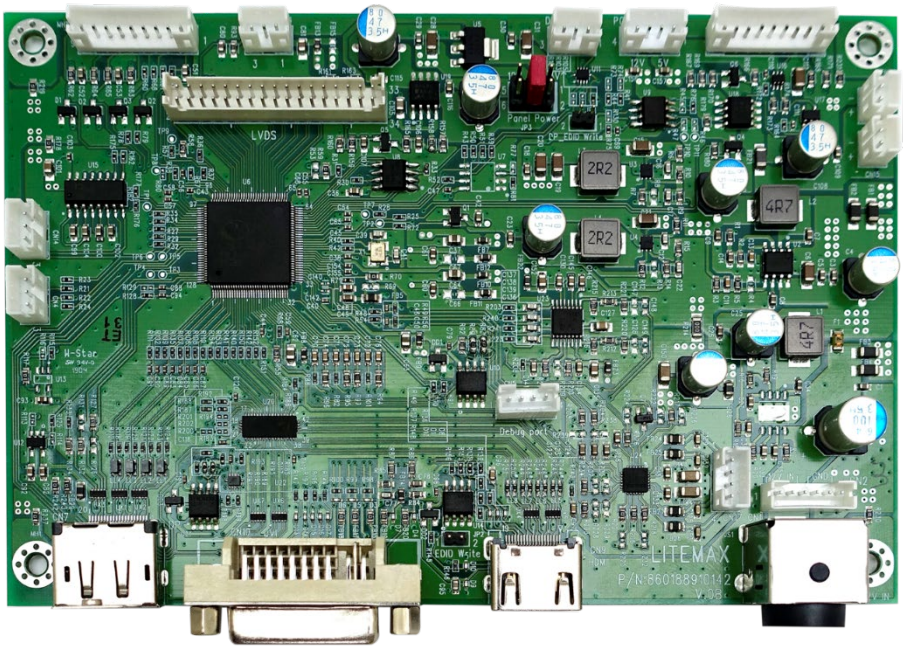
NOTE:
O.D : OUTLINE DIMENSION
B.O : BEZEL OPENING
A.A : LCD ACTIVE AREA
A: 8-M4_USER_HOLE_MAX. DEPTH=6mm

6 AD8891GDPH Board & OSD Functions

We developed this A/D board to support industrial high brightness and commercial applications. This A/D board has many functions. It has a display port and DVI-I and HDMI input. Rev.1 is European RoHS compliant.

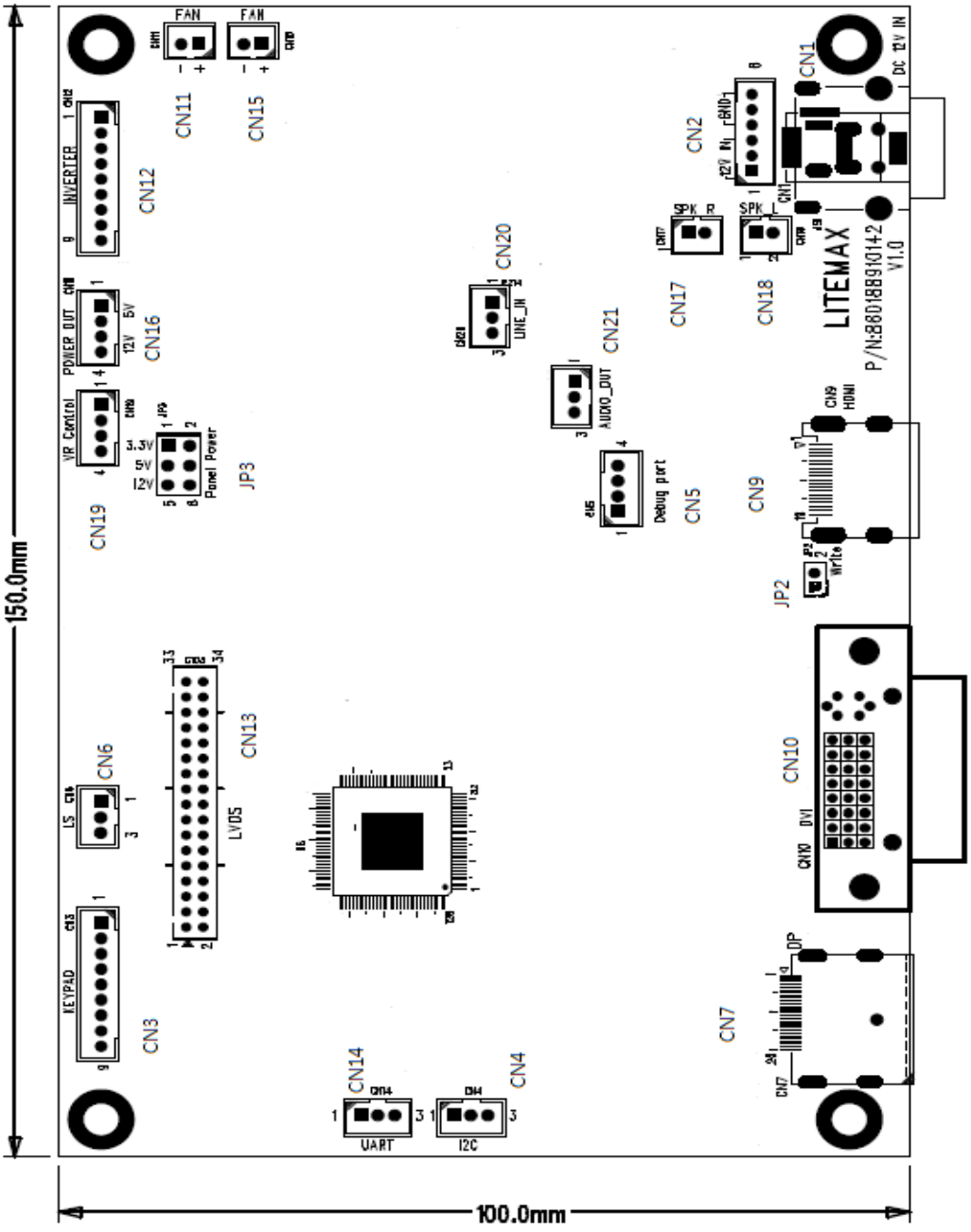
6.1 General Description

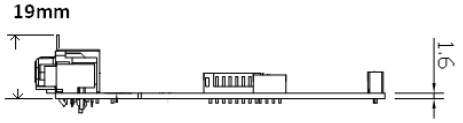
- **Max Resolution Up To Full HD**
- **Analog RGB Input up to 205MHz**
- **Ultra-Reliable DVI-I Input (CN12 Pin header)**
- **HDMI Input (HDMI 1.3) (CN11 Pin header) (CN10 Optional)**
- **Dual/single LVDS interface**
- **Inverter Analog or PWM Dimming Control.**
- **Support Panel DC 3.6V, 5V or 12V Output**
- **OSD Control**
- **External RS232 control (Optional)**
- **Input Power DC 12V**
- **Audio Speaker Out (MAX 3W 4Ω) (optional), Audio In (Optional)**
- ***External Digital light sensor brightness control (Optional)**
- ***External light sensor brightness control or VR (Optional)**
- **Support output voltage 12V(1A) and 5V(1A)**
- **External FAN control (Optional)**

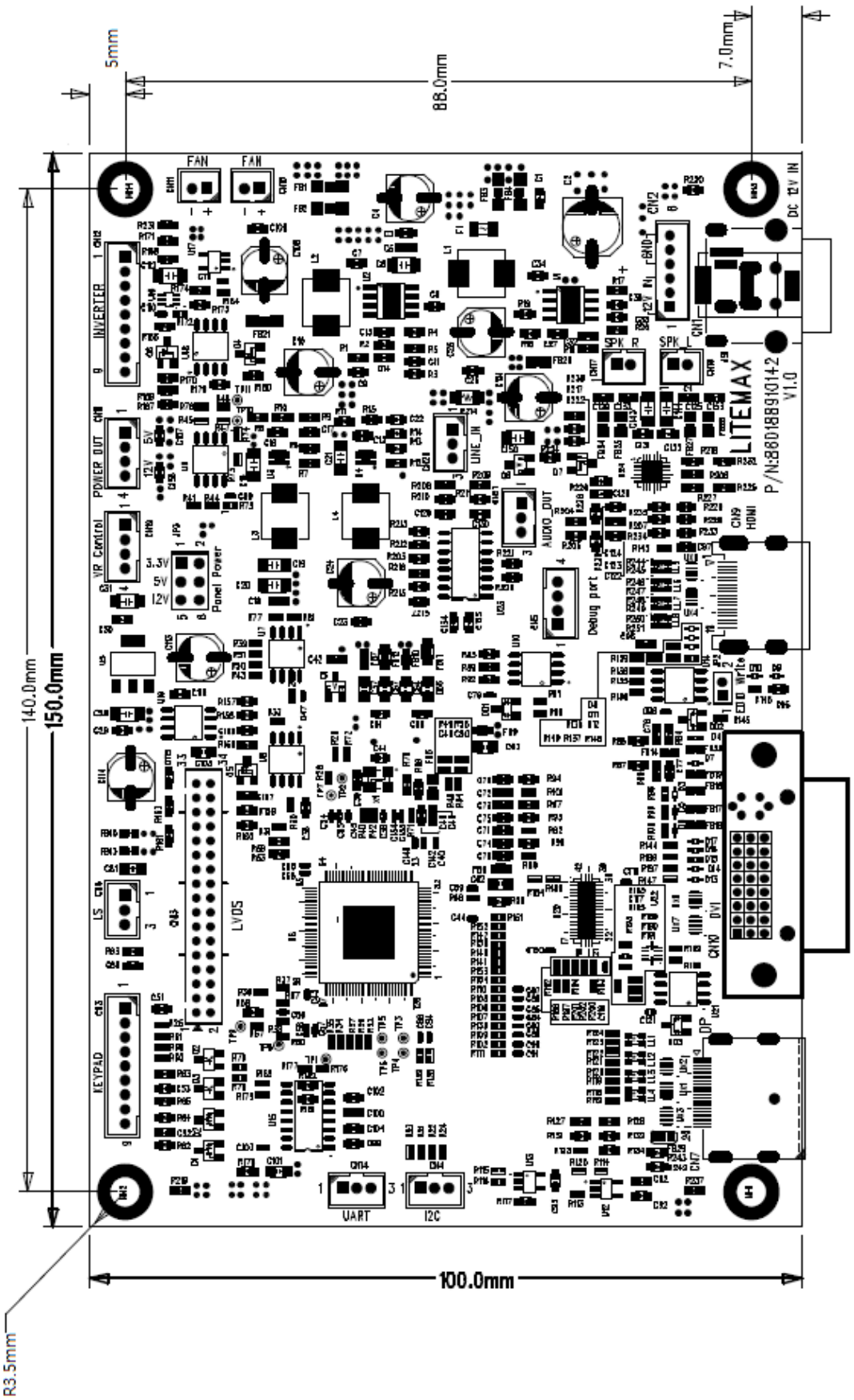


6.2 Outline Dimensions

AD8891GDPH = 150mm x 100m






5mm
88.0mm
7.0mm
140.0mm
150.0mm
100.0mm
R3.5mm
FAN
FAN
INVERTER
POWER OUT
VR Control
Panel Power
LVDS
KEYPAD
UART
I2C
LINE_IN
AUDIO OUT
Debug port
SPK_R
SPK_L
DC 12V IN
LITEMAX
P/N:8801888910142
V1.0
DVI
HDMI

6.3 AD8891GDPH Board Pin Define

CN13: Panel LVDS connector

Pin No.	Function	Pin No.	Function
1	RxO0-	18	RxE1+
2	RxO0+	19	RxE2-
3	RxO1-	20	RxE2+
4	RxO1+	21	RxEC-
5	RxO2-	22	RxEC+
6	RxO2+	23	RxE3-
7	RxOC-	24	RxE3+
8	RxOC+	25	RxE4-
9	RxO3-	26	RxE4+
10	RxO3+	27	GND
11	RxO4-	28	GND
12	RxO4+	29	Pull Low
13	GND	30	Pull Height
14	GND	31	VLCD
15	RxE0-	32	VLCD
16	RxE0+	33	VLCD
17	RXE1-	34	VLCD

CN10: DVI-I INPUT Connector

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2/4 Shield	11	T.M.D.S Data1/3 Shield	19	T.M.D.S. Data0/5 Shield
4	T.M.D.S. Data4-	12	T.M.D.S. Data3-	20	T.M.D.S. Data5-
5	T.M.D.S. Data4+	13	T.M.D.S. Data3+	21	T.M.D.S. Data5+
6	DDC Clock	14	+5V Power	22	T.M.D.S. Clock Shield
7	DDC Data	15	Ground (for +5V)	23	T.M.D.S. Clock+
8	Vertical SYNC.	16	Hot Plug Detect	24	T.M.D.S. Clock-
C1	Red input	C2	Green input	C3	Blue input
C4	Horizontal SYNC.	C5	Analog GND		

CN7: DISPLAY PORT

Pin No.	Function	Pin No.	Function
1	RX3-	11	GND
2	GND	12	RX0+
3	RX3+	13	GND
4	RX2-	14	GND
5	GND	15	AUX+
6	RX2+	16	GND
7	RX1-	17	AUX-
8	GND	18	Hot plug detect
9	RX1+	19	GND
10	RX0-	20	DP +3.3V

CN9: HDMI Input connector (HDMI 19Pin)

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	T.M.D.S. Data2+	9	T.M.D.S. Data0-	17	GND
2	Shield	10	T.M.D.S. Clock+	18	HDMI 5V
3	T.M.D.S. Data2-	11	Shield	19	Hot Plug Detect
4	T.M.D.S. Data1+	12	T.M.D.S. Clock-		-
5	Shield	13	CEC		
6	T.M.D.S. Data1-	14	NC		
7	T.M.D.S. Data0+	15	HDMI_SCL		
8	Shield	16	HDMI_SDA		

CN1: Power DIN (24V or 12V)

Pin No.	Function	Pin No.	Function
1	12V/24VDC	2	12V/24VDC
3	GND	4	GND

CN2: Power connector (12V) (6PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	12V/24VDC	2	12V/24VD
3	12V/24VD	4	GND
5	GND	6	GND

CN16: Touch Power connector

Pin No.	Function	Pin No.	Function
1	5V	2	GND
3	12V	4	GND

CN21: Inverter Connector(9PIN 2.0mm)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	DIM_SEL	PWM/DC SEL	6	GND	GND
2	ON/OFF	Backlight ON/OFF	7	12VDC	12INV
3	BRIGHT	Dimming adjust	8	12VDC	12INV
4	GND	GND	9	12VDC	12INV
5	GND	GND			

CN11, CN15: Fan control (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	12V	2	GND

CN3: Key Pad (9PIN 2.0mm)

Pin No.	Function	Pin No.	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		

JP3: Panel Power

Pin No.	Function	Pin No.	Function
1-2	3.3	5-6	12V
3-4	5V		

CN14: RS232 Connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	UART TX	2	UART RX
3	GND		

CN20:LINE IN (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	AUDIO-R	2	AUDIO-L
3	GND		

CN17: Speaker Connector (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	SPK_R+	2	SPK_R-

CN18: Speaker Connector (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	SPK_L+	2	SPK_L-

CN19: VR conTROL (4PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	5V	2	INT
3	GPIO	4	GND

Reserve for some control

CN6: Ambient (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	3.3V/5V	2	Sensor Out

CN21: Audio out connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	Audio R out	2	Audio L out
3	GND		

For audio connect to another Audio AMP

CN4: I2C Connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	I2C_SDA	2	I2C_SCL
3	GND		

For digital LS

JP2: EDID Jumper (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	3.3V	2	GND

When EDIE wan to update it must be short .

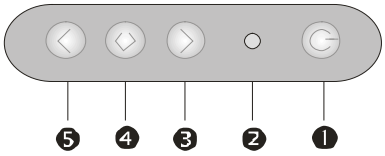
CN5: Debug Connector (4PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	3.3V	2	DDCA_SCL
3	DDCA_SDA	4	GND

For F/W debug

6.4 OSD Function

MEMBRANE CONTROL BUTTOM



❶**POWER SWITCH:** Pushing the power switch will turn the monitor on. Pushing it again to turn the monitor off.

❷**Power LED:** Power ON-Green / Power off-No.

❸**Up Key >:** Increase item number or value of the selected item.

❹**Menu Key:** Enter to the OSD adjustment menu. It also used for go back to previous menu for sub-menu, and the change data don't save to memory.

❺**Down Key <:** Decrease item number or item value when OSD is on.

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 SELECT 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 10 sec (default OSD timeout), it goes back to the stand-by mode and no more switching is accepted except MENU to restart the setting.

6.5 OSD Menu

Here are some instructions for you to use the OSD (On Screen Display). By pressing the “menu”, you will see the below picture.
Timing shows resolution and V-frequency of the panel. This 2 information is not changeable by user.

There are 7 sub menus within the OSD user interface:
Brightness, Signal Select, Sound, Color, Image, Tools, and Exit.

When you press the “menu” button, you enter the “Brightness” sub directory. In this directory, you will see 4 selections:

press “menu” once, you can go into the **Ambient light sensor**.

Ambient light sensor:
press this Icon,must to accompany with LiteMax ambient light sensor to auto dimming.**(OPTION)**

OSD Brightness：

Press the “menu” once, to adjust the brightness. Press “left” to dim down the brightness to “0”, press “right” to increase the brightness to “100”

Contrast：

Press “Menu” once, you can adjust the contrast from “0” to “100” by pressing the “Left” and “Right”.

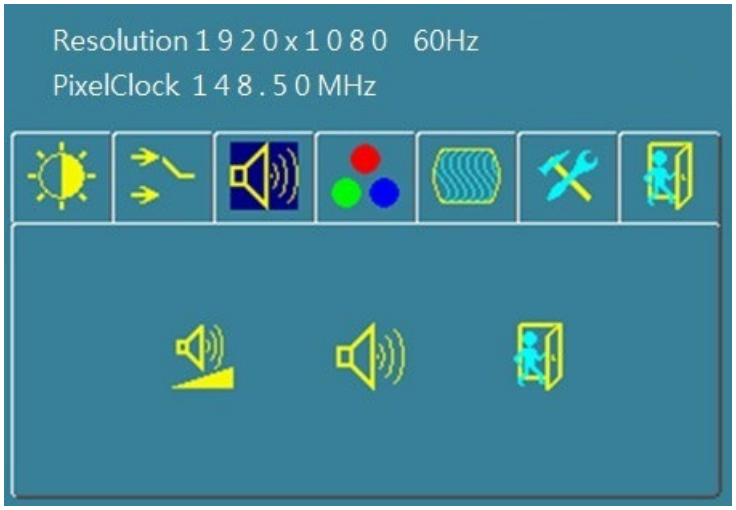
Exit: back to the beginning menu.

VGA Analog: RGB/VGA input

DVI Digital: DVI input

DP DP: DisplayPort input (Optional)

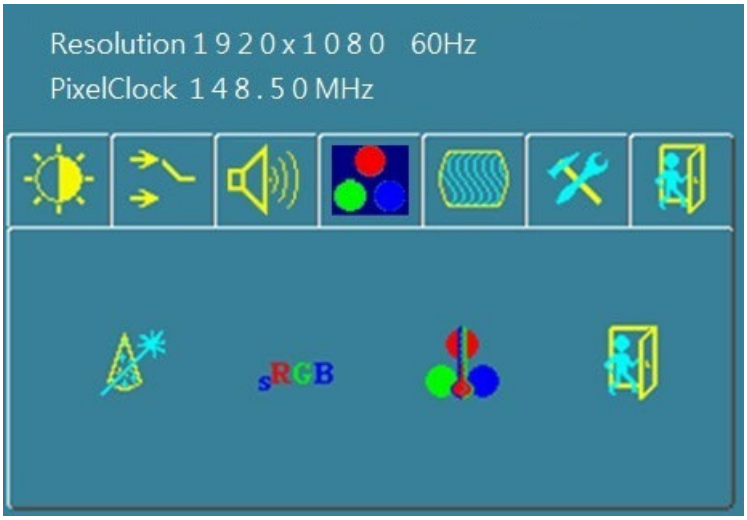
Exit Exit: back to the beginning menu.



Audio Volume: Audio volume adjustment.

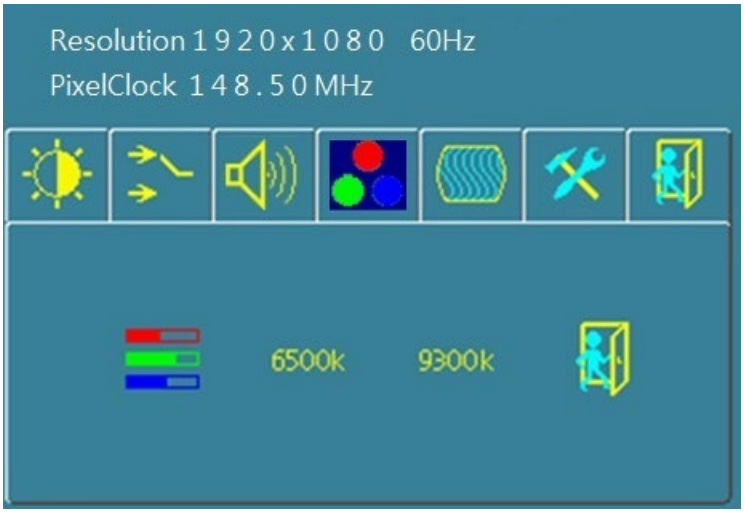
UnMute/Mute: You can mute the speaker by pressing this option.

Exit: back to the beginning menu.



Auto Color：By navigating over to the “Auto Color” option, optimal color performance is invoked.

SRGB: Windows standard color setting



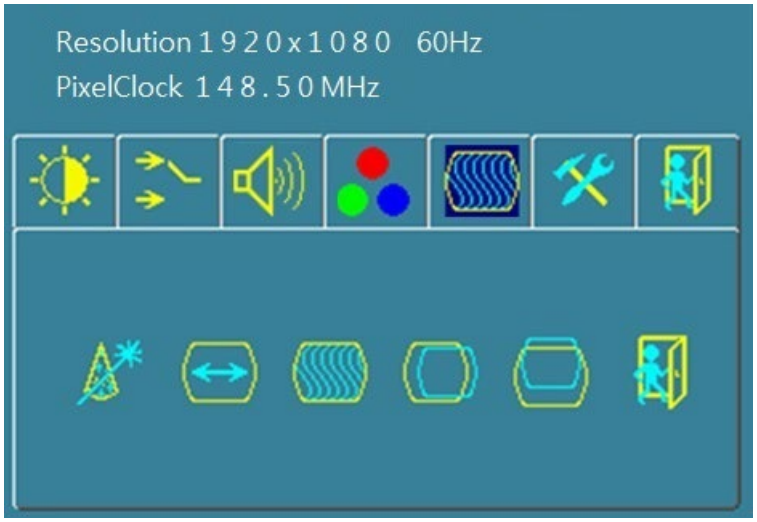
Color Temperature: You have 4 options in this selection
.

Color Temperature User Define: Default is 100 for “R”, “G”, and “B”.

Color Tempture_6500K: Warm color scheme

Color Tempture_9300K: Cold color scheme

Exit: back to the beginning menu.



Auto Adjust:
Choose this option and the AD8891 will adjust to the optimal horizontal and vertical frequency.

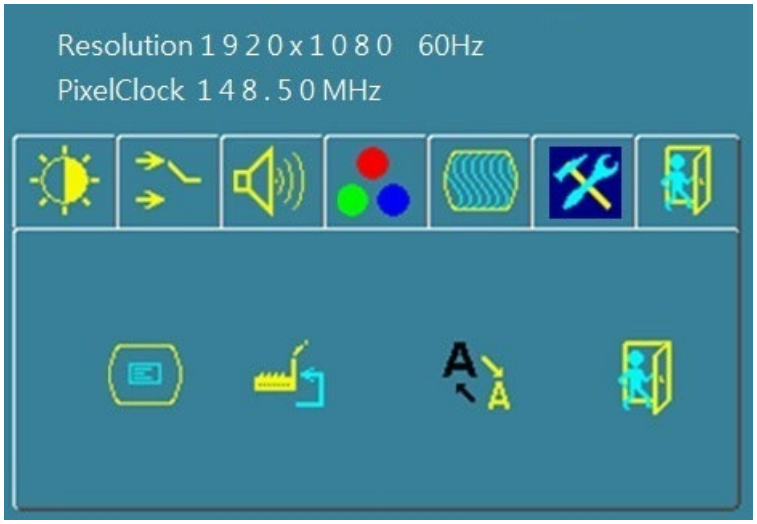
Clock: If you are not satisfied with the Auto tune result, you can adjust manually by pressing “Clock”. Using this will make the image wider.

Phase: If “double images” appear around the characters, choose “Phase” to remove them..

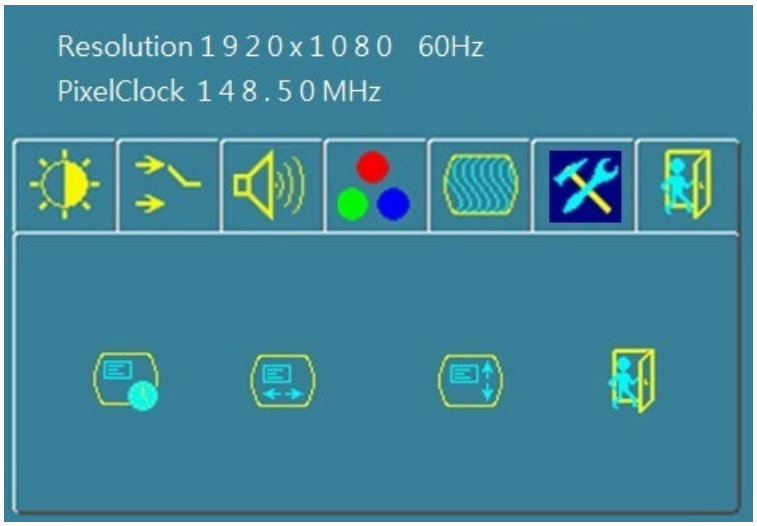
HPos: You can shift the screen horizontally using this function.

VPos: You can shift the screen vertically using this function.

Exit: back to the beginning menu.



OSD Control: Selecting this option, brings you to 4 more options:



Osd_time: Select time for the OSD user interface to stay on screen, for 2 sec. to 16 sec. Default is 10 sec.

Osd_HPos: Moves the OSD user interface horizontally on screen.

Osd_VPos: Moves the OSD user interface vertically on screen.

Exit: You can exit this sub menu back to the beginning

Factory_Reset: By pressing this, the screen will revert to factory settings, and the previous settings will be deleted.

Sharpness: Sharpen characters.

Exit: back to the normal screen

OSD Lock Function：

It is possible to lock all the OSD buttons to prevent unauthorized changes to occur by pressing "**right >**" and "Menu" buttons simultaneously. You will see the "lock" icon below on the center of the screen for 8 ~ 9 seconds. If any button is pushed after the lock function is initiated, the below icon will appear on the screen.'

To release the OSD lock, press and "**right >**" and "Menu". The below icon will appear on the center of the screen for 8 ~ 9 seconds. Now all OSD keys are active again.

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℃ and 35℃ 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.