

LITEMAX

SSF/SSH5856-Y

Sunlight Readable

58.5" LED B/L Ultra-Wide LCD

User Manual

Approved by	Checked by	Prepared by

LITEMAX Electronics Inc.

8F, No.137, Lane 235, Bau-chiau Rd.,
Shin-dian Dist., New Taipei City, Taiwan
R.O.C.

Tel : 886-2-8919-1858

Fax: 886-2-8919-1300

Homepage: <http://www.litemax.com>

Record of Revision

Date	Page	Old Description	New Description	Remark
Oct /29 /2025	all		Initial release	

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1 General Description

The [SSF/SSH5856-Y](#) is a 58.5 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 [1200](#) nits with power efficiency LED backlight. It is a low power consumption DC 24V input and build in high performance AD board provides [DVI-D](#)、[HDMI](#)、[DP](#) input port.

1.1 Key Features

- Ultra Wide Screen 16:4.5
- High Brightness 1200 nits
- Sunlight Readable
- LED Backlight
- Low Power Consumption
- BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	SSF/SSH5856-Y
Description	58.5" TFT LCD, 1200nits LED Backlight, 3840x1080
Screen Size	58.5"
Display Area (mm)	1428.48(H) x 401.76(V)
Brightness	1200 cd/m ²
Resolution	3840x1080
Aspect Ratio	16:4.5
Contrast Ratio	1400 : 1
Pixel Pitch (mm)	0.372(H) x 0.372 (V)
Pixel Pre Inch (PPI)	68
Viewing Angle	178°(H),178°(V)
Color Saturation (NTSC)	84%
Display Colors	1.07G
Response Time (Typical)	8ms
Panel Interface	V-by-One
Input Interface	DVI-D , HDMI , DP
Input Power	DC24V
Power Consumption	103W(106W with AD Board)
OSD Key	5 Keys (Power Switch, Menu, +, -,Exit)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position...etc
Dimensions (mm)	1462.3x 432.9x 23.7
Bezel Size(U/B/L/R)	15.57/15.57/16.91/16.91 mm
Weight (Net)	11.81Kg
Operating Temperature	0 °C ~ 50 °C
Storage Temperature	-20 °C ~ 60 °C

[SSF](#)= Panel + LED Driving Board

[SSH](#)= Panel + LED Driving Board + AD Control Board

Specifications are subject to change without notice.

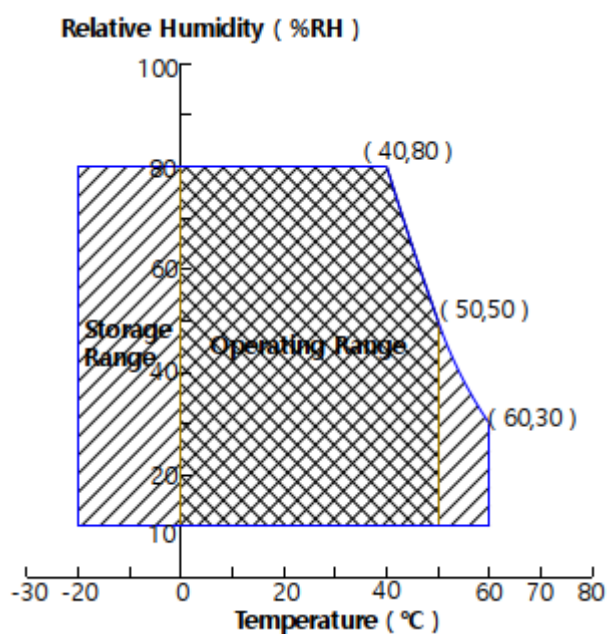
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1.3 Absolute Maximum Ratings

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

Parameter	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage	VDD	10.8	13.2	V	Ta = 25 °C
Operating Temperature	T _{OP}	0	+50	°C	Note 1
Storage Temperature	T _{ST}	-20	+60	°C	
Operating Ambient Humidity	Hop	10	80	%RH	
Storage Humidity	Hst	10	80	%RH	

Note 1 : Temperature and relative humidity range are shown in the figure below.



2 Electrical Specifications

2.1 Input power

[Ta =25±2 °C]

Parameter		Symbol	Values			Unit	Remark
			Min	Typ	Max		
Power Supply Input Voltage		VDD	10.8	12	13.2	Vdc	
Power Supply Ripple Voltage		VRP			300	mV	
Power Supply Current		IDD	-	458	830	mA	Note 1
Power Consumption		PDD	-	5.5	9	Watt	
Rush current		IRUSH	-	-	4.0	A	Note 2
V by One Interface	Differential Input High Threshold Voltage	VLVTH	-	-	+50	mV	
	Differential Input Low Threshold Voltage	VLVTL	-50	-	-	mV	
	Common Input Voltage	VLVC	-	0	-	V	
	Terminating Resistor	Rt	80	100	120	ohm	

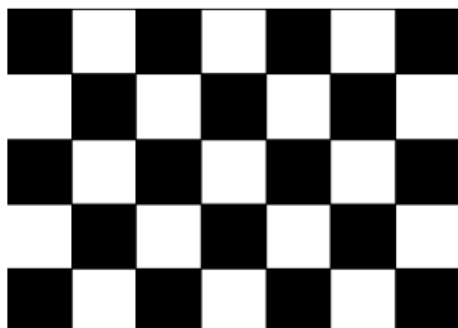
Note 1 : The supply voltage is measured and specified at the interface connector of OC.

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

Frame rate fv=60Hz and Clock frequency = 37.13MHz.

Test Pattern of power supply current

a) Typ : Chess 7*5



b) Max : Horizontal 1 Line (L0/L255)



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

2.2 Interface Connector

Interface Input Signal & Power

- V by one Connector : PM.LVS.S040505101 (UJC) /9006C51-0000RQ-M3-R(Qinghong) .

Pin No	Symbol	Description	Pin No	Symbol	Description
1	VDD	Power Supply +12.0V	27	GND	Ground
2	VDD	Power Supply +12.0V	28	Rx0n	V-by-One HS Data Lane 0
3	VDD	Power Supply +12.0V	29	Rx0p	V-by-One HS Data Lane 0
4	VDD	Power Supply +12.0V	30	GND	Ground
5	VDD	Power Supply +12.0V	31	Rx1n	V-by-One HS Data Lane 1
6	VDD	Power Supply +12.0V	32	Rx1p	V-by-One HS Data Lane 1
7	VDD	Power Supply +12.0V	33	GND	Ground
8	VDD	Power Supply +12.0V	34	Rx2n	V-by-One HS Data Lane 2
9	NC	No Connection	35	Rx2p	V-by-One HS Data Lane 2
10	GND	Ground	36	GND	Ground
11	GND	Ground	37	Rx3n	V-by-One HS Data Lane 3
12	GND	Ground	38	Rx3p	V-by-One HS Data Lane 3
13	GND	Ground	39	GND	Ground
14	GND	Ground	40	Rx4n	V-by-One HS Data Lane 4
15	NC	No Connection	41	Rx4p	V-by-One HS Data Lane 4
16	SSCG0	For EMI adjustment	42	GND	Ground
17	SSCG1	For EMI adjustment	43	Rx5n	V-by-One HS Data Lane 5
18	SDA	SDA(For I2C)	44	Rx5p	V-by-One HS Data Lane 5
19	SCL	SCL(For I2C)	45	GND	Ground
20	NC	No Connection	46	Rx6n	V-by-One HS Data Lane 6
21	NC	No Connection	47	Rx6p	V-by-One HS Data Lane 6
22	SEL_SECTION	H : 2 Section L : 1 Section (Default)	48	GND	Ground
23	POL28	H : POL 28s On L : POL 28s Off	49	Rx7n	V-by-One HS Data Lane 7
24	GND	Ground	50	Rx7p	V-by-One HS Data Lane 7
25	HTPDN	Hot Plug Detect	51	GND	Ground
26	LOCKN	Lock Detect			

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

2.3 Signal Timing Specifications

Item	Symbols		Min	Typ	Max	Unit	Note
DCLK	Period	tCLK	26.31	26.94	28.56	ns	
	Frequency	-	35	37.13	38	MHz	
Horizontal	Horizontal Period	tHP	530	550	570	tCLK	
	Horizontal Valid	tHV	480			tCLK	
	Horizontal Blank	tHB	50	70	90		
	Frequency	fH	61.4	67.5	71.7	KHz	
Vertical	Vertical Period	tVP	1100	1125	1250	tHP	
	Vertical Valid	tVV	1080			tHP	
	Vertical Blank	tVB	20	45	170	tHP	
	Frequency	fV	48	60	62	Hz	
VBO Receiver Clock	Intra-pair Skew		-0.3	-	0.3	UI	
VBO Rx Clock	Inter-pair Skew		-5	-	5	UI	

Note

1. Best operation clock frequency is 37.13 Mhz.

2. [Frequency] = [H Total] * [V Total] * [vertical Frame rate]

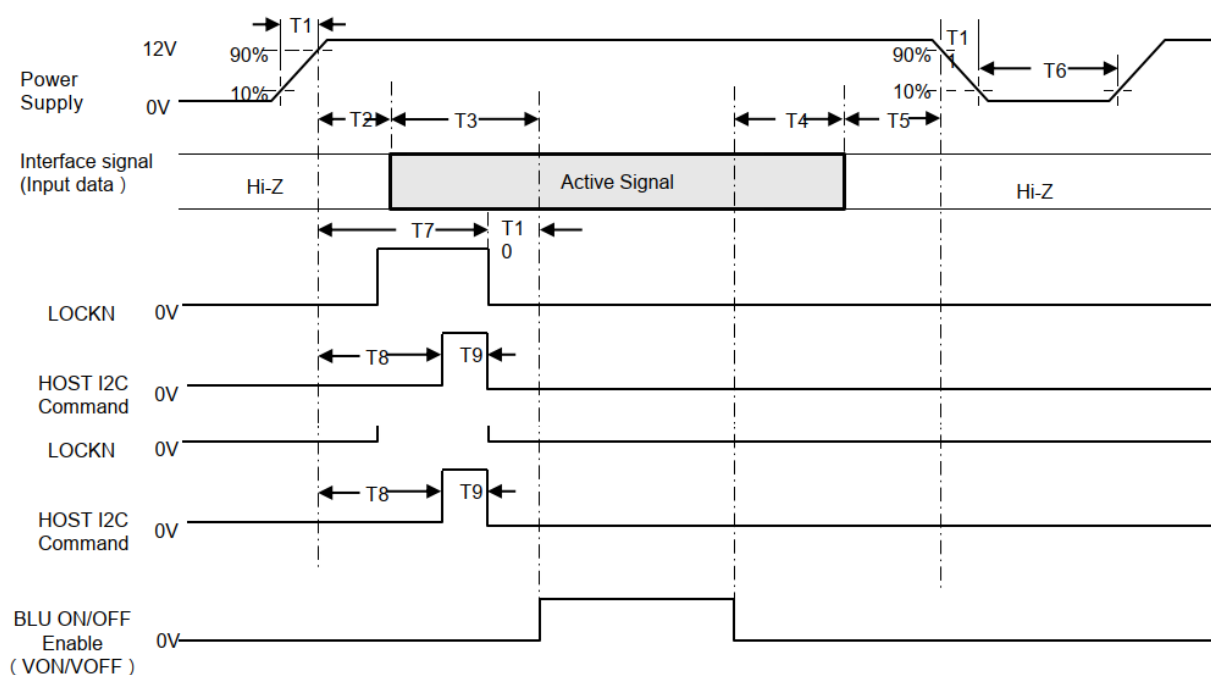
H Total, V Total and Frame rate should operate within the range between Frequency_Min and Max

3. Except Best operation clock frequency, FOS(Flicker & Brightness & Crosstalk, Etc.) are not guaranteed.

4. Main frequency Max is 38Mhz MHz without spread spectrum

Symbol	Parameter	Condition	Min	Typ	Max	Unit
F _{LVMOD}	Modulating frequency of input clock during SSC	F=37MHz	-	30	-	KHz
F _{LVDEV}	Maximum deviation of input clock frequency during SSC		-0.5	-	+0.5	%

2.4 Power Sequence



Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	10	ms
T2	0	-	-	ms
T3	200	-	-	ms
T4	100	-	-	ms
T5	0	-	-	ms
T6	1	-	-	s
T7	-	-	200	ms
T8	1200	-	-	ms
T9	Depends on I2C command			
T10	-	One Frame time*2~5	-	ms
T11	-	-	-	

Note 1: Even though T1 is over the specified value, there is no problem if the rush current is within Spec.

Note 2: When the power supply VDD is 0V, keep the level of input signals on the low or high impedance;

※ Please avoid floating state of interface signal at invalid period.

※ When the power supply for LCD (VDD) is off, be sure to pull down the valid and invalid data to 0V.

Note 3: The T3 / T4 is recommended value, the case when failed to meet a minimum specification, abnormal display would be shown. There is no reliability problem.

Note 4: T5 should be measured after the Module has been fully discharged between power off and on period

Note 5: Even though T7&T10 is over the specified value, please extend the time of Back Light on to ensure invalid data will not be seen.

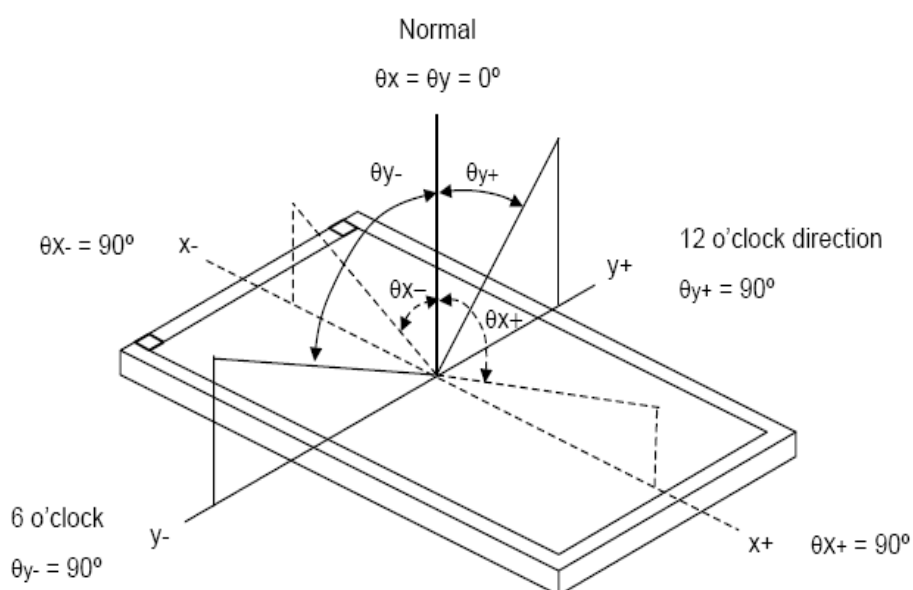
Note 6: T11: Voltage of VDD must decay smoothly after power-off, there should be none re-bouncing voltage. (customer system decide this value)

3 Optical Specification

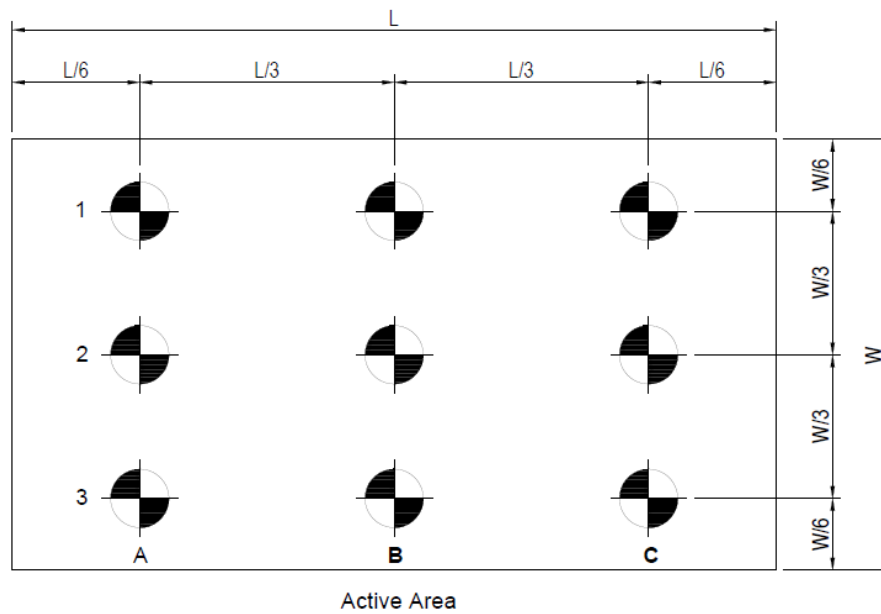
Item		Symbol	Condition	Min.	Typ.	Max .	Unit	Note
Color Chromaticity	Red	R _x	$\theta_x=0$ $\theta_y=0$ CA-410	0.617	0.647	0.677	-	Test Mode: (2) (3)
		R _y		0.305	0.335	0.365	-	
	Green	G _x		0.275	0.305	0.335	-	
		G _y		0.591	0.621	0.651	-	
	Blue	B _x		0.123	0.153	0.183	-	
		B _y		0.033	0.063	0.093	-	
	White	W _x		0.267	0.297	0.327	-	
		W _y		0.294	0.324	0.354	-	
Center Luminance of White		L _c	$\theta_x=0$	1080	1200	1560	cd/m ²	
Uniform		L _u	$\theta_y=0$ CA-410		86		%	
Contrast Ratio		CR	$\theta_x=0$	1260:1	1400:1		-	Test Mode: (4)
Color Saturation		NTSC	$\theta_y=0$ Klein K-10		84		%	
Viewing Angle	Horizontal	θ_{x+}	$CR \geq 10$		89		Deg	Test Mode: (1)
		θ_{x-}			89			
	Vertical	θ_{y+}			89			
		θ_{y-}			89			

Test Mode :

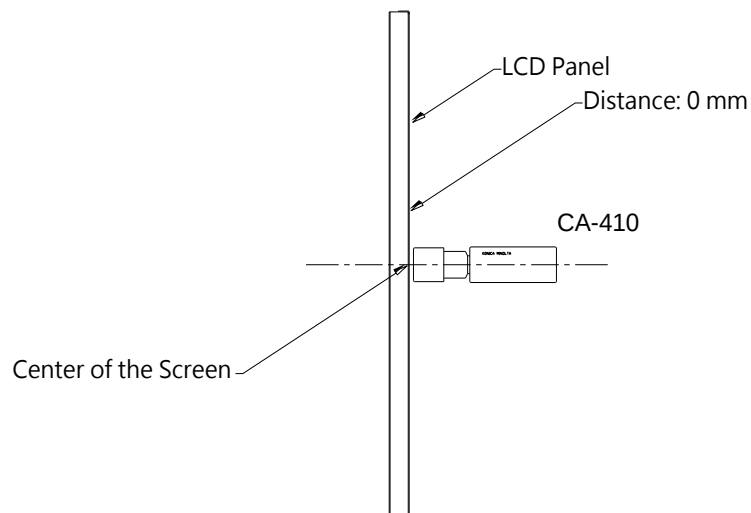
(1) Definition of Viewing Angle (θ_x , θ_y):



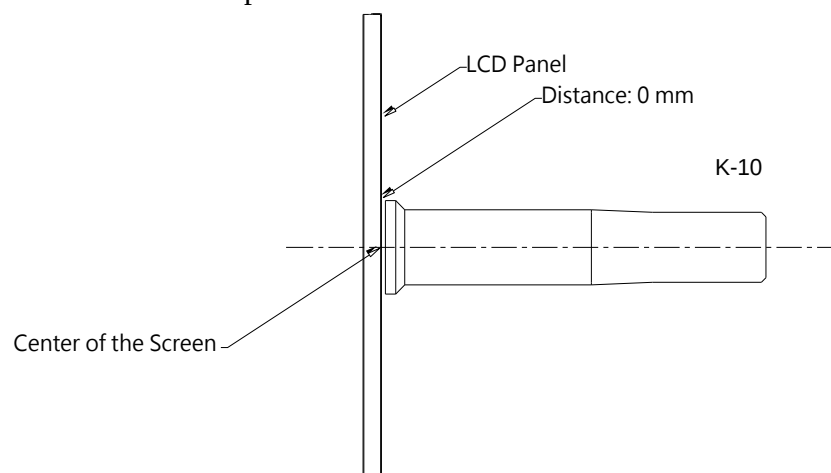
(2) Definition of Test Point:



(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 SSD5856 1200nits LED backlight.

4.1 Converter Characteristics

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	V _{in}		22.0	24.0	26.0	V	
Input Current (High Brightness)	I _{inH}	Brightness = 100%	4.33	3.96	3.66	A	(1)
Input Power Consumption	P _{in}	Brightness = 100%	-----	121.6	-----	W	
.1 LED Current .2 (High Brightness)	I _{outH}	Brightness = 100%	-----	1.08	-----	A	J3, J4
			-----	1.08	-----	A	J5, J6
Working Frequency	W_Freq	Brightness = 100%	-----	400	-----	KHZ	
Brightness Control	DC mode						
	V _{adj}	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	V _{on}	Normal Operation	2	-----	5	V	
	V _{off}		0	-----	0.8	V	
Output Voltage	V _{out}	Brightness = 100%	-----	39.44	33.49	V	J3, J4
			-----	39.44	33.49	V	J5, J6
Efficiency	η	Brightness = 100%	-----	90.2	-----	%	(5)

Remark:

- (1) This data is based on the testing result of practical input voltage, I_{in} is measured by related V_{in}.
(min, typ, max) If the voltage is increased, the current will decrease. If the voltage is decrease, the current will increase.
- (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) $\eta_{\max} = V_{\text{out}}(\max) \cdot I_{\text{outH}}(\max) / V_{\text{in}}(\max) \cdot I_{\text{inH}}(\min)$
 $\eta_{\min} = V_{\text{out}}(\min) \cdot I_{\text{outH}}(\min) / V_{\text{in}}(\min) \cdot I_{\text{inH}}(\max)$

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	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 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

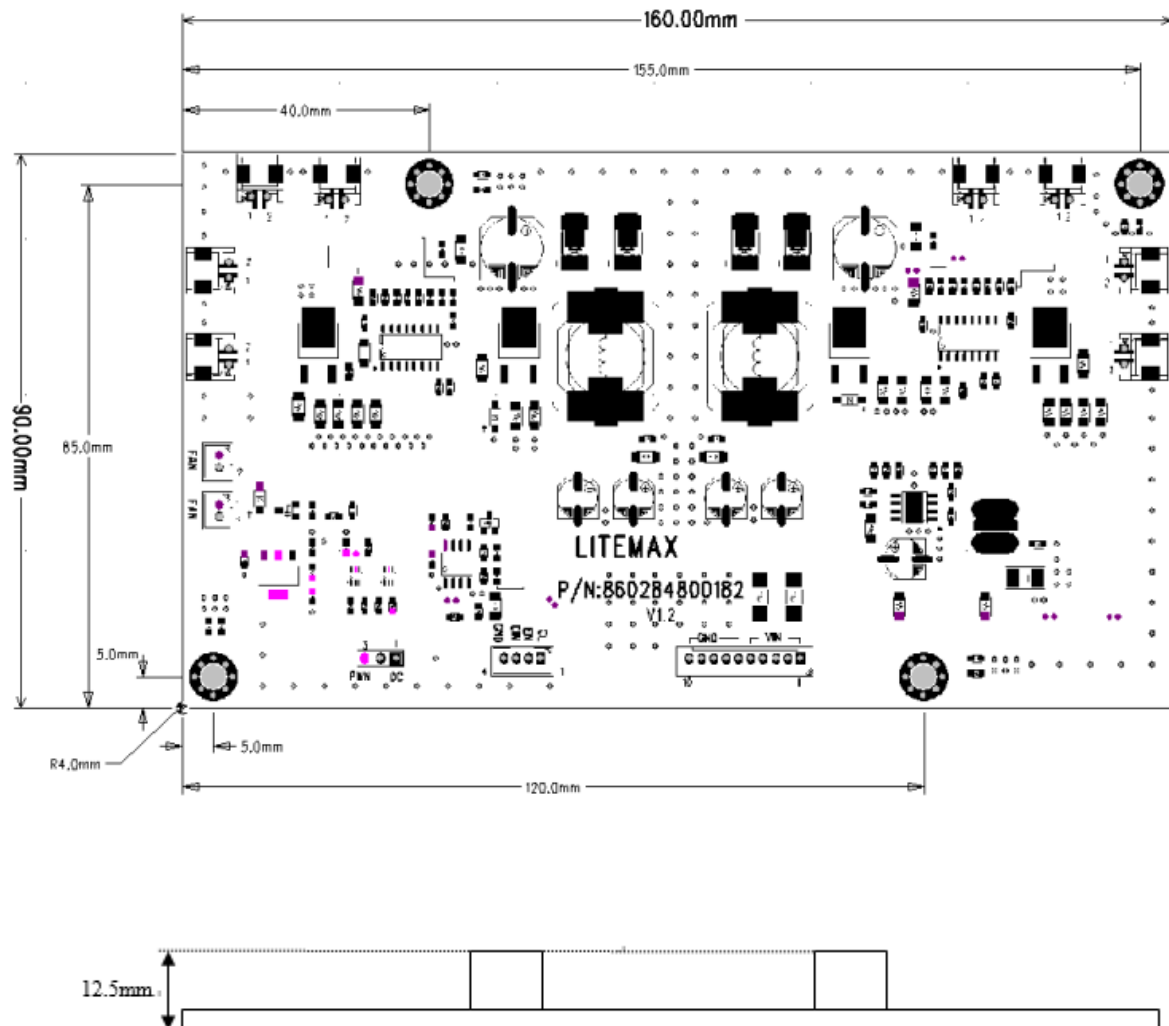
Note: Pin1 is dimming method control pin, Low → DC dimming, High → PWM dimming.
If pin1 is be used, please NC CN2.

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

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

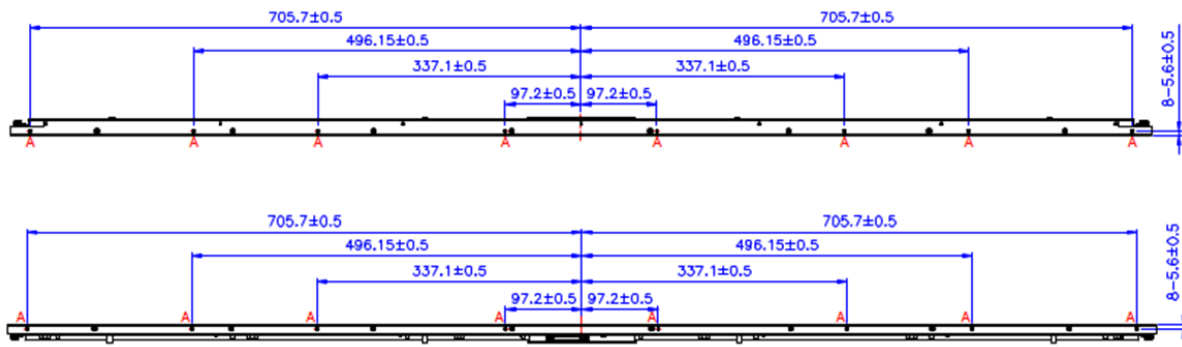
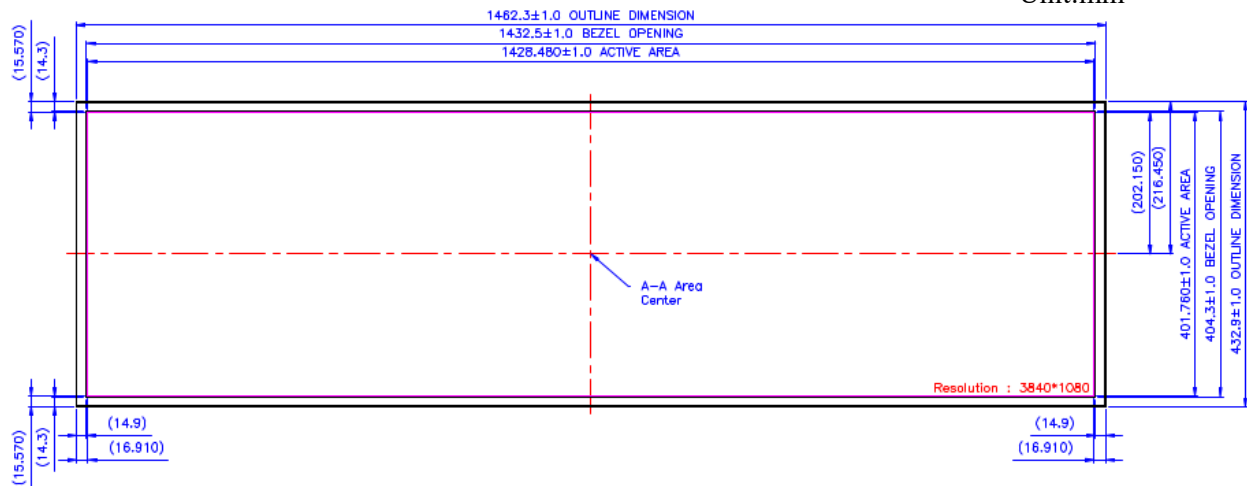
4.3 Mechanical Characteristics

Dimension: 160 x 90 x 12.5mm

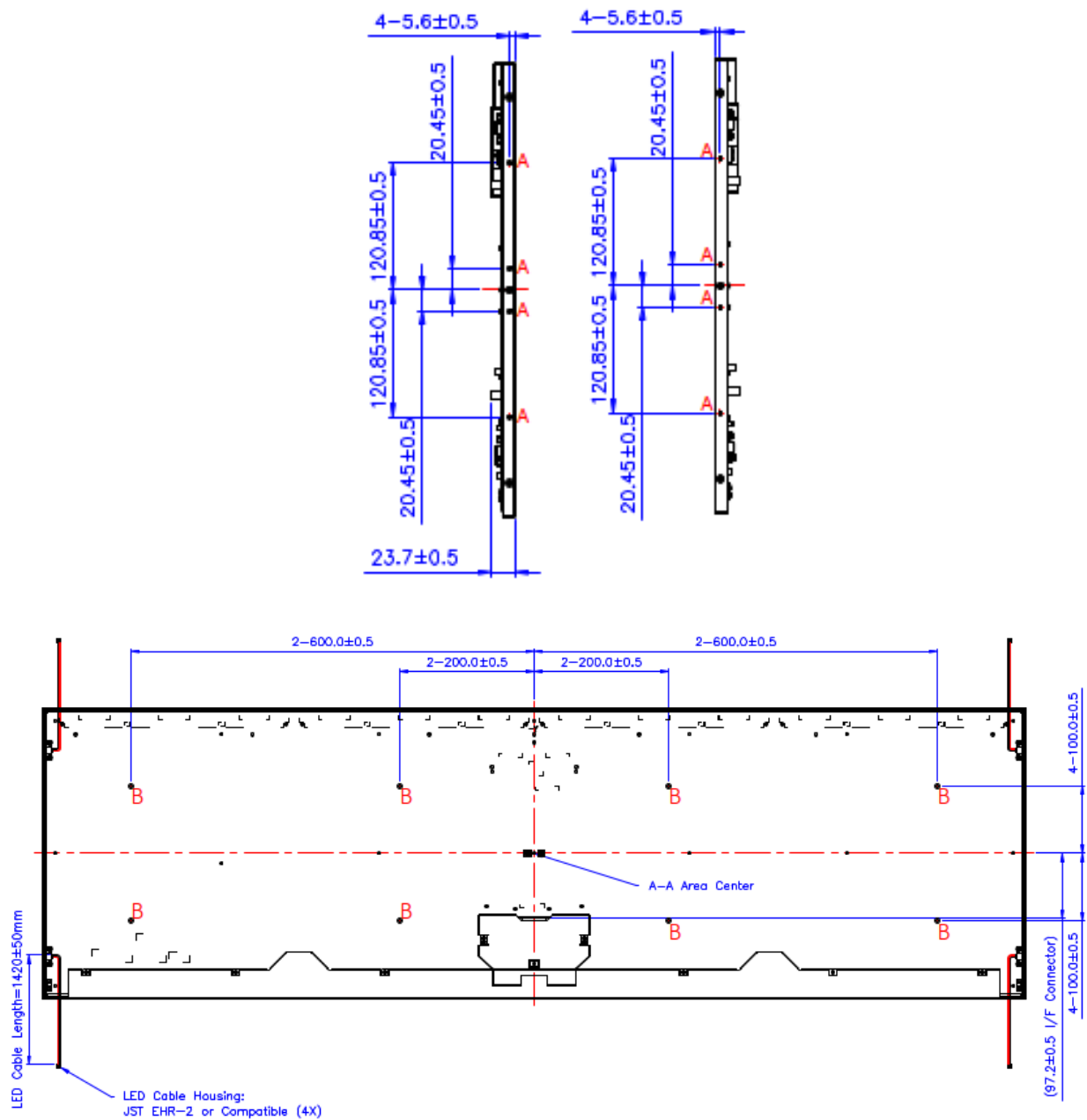


5 Mechanical Drawing

Unit:mm



A M3 MOUNTING HOLE (24X), DP=5.0mm MAX, TOUQUE=5.0kgf-cm MAX



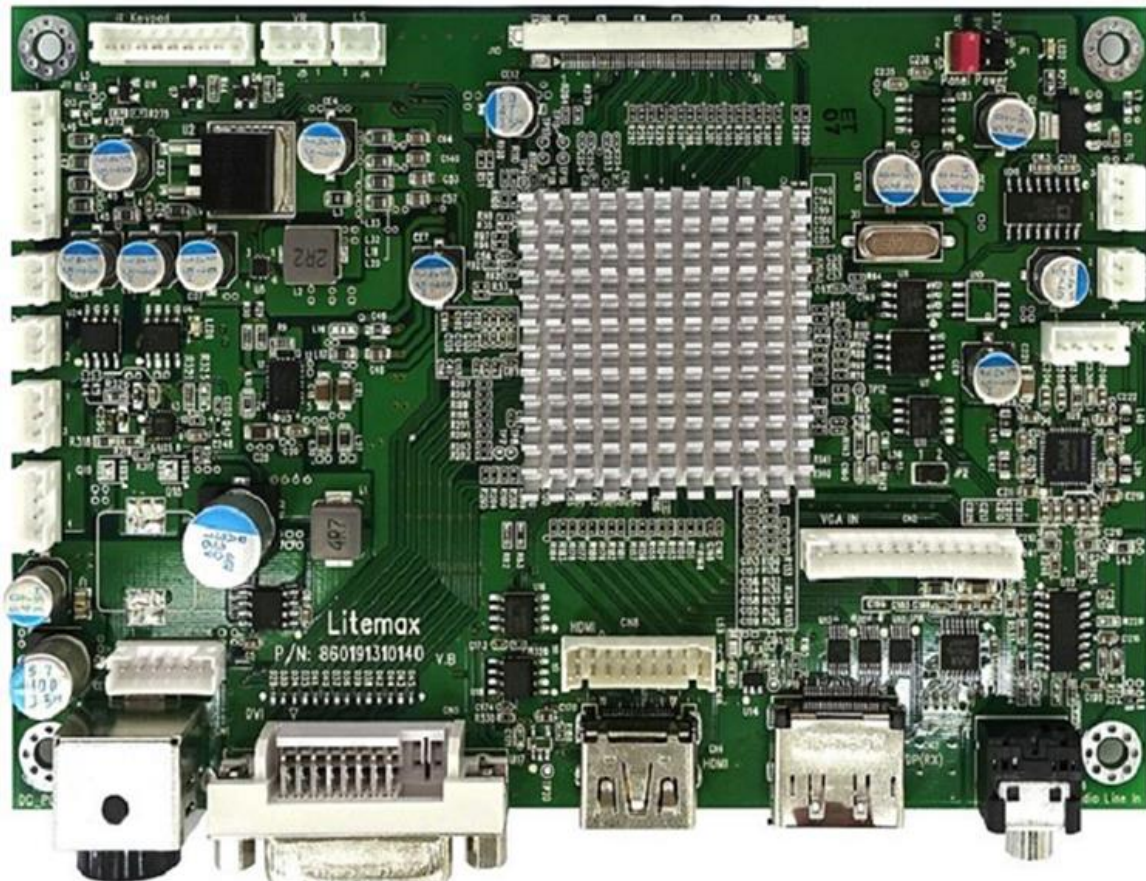
B	M4 MOUNTING HOLE (8X), DP=7.0mm MAX, TOUQUE=8.0kgf-cm MAX
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6 AD9131DHP Board & OSD Functions

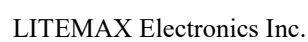
We developed this A/D board to support industrial high brightness and commercial applications. This A/D board has many functions. It has an external luminance sensor as an option, or optional VR button to control brightness, fan rotation and RS232. Rev.2 is European RoHS compliant.

6.1 General Description

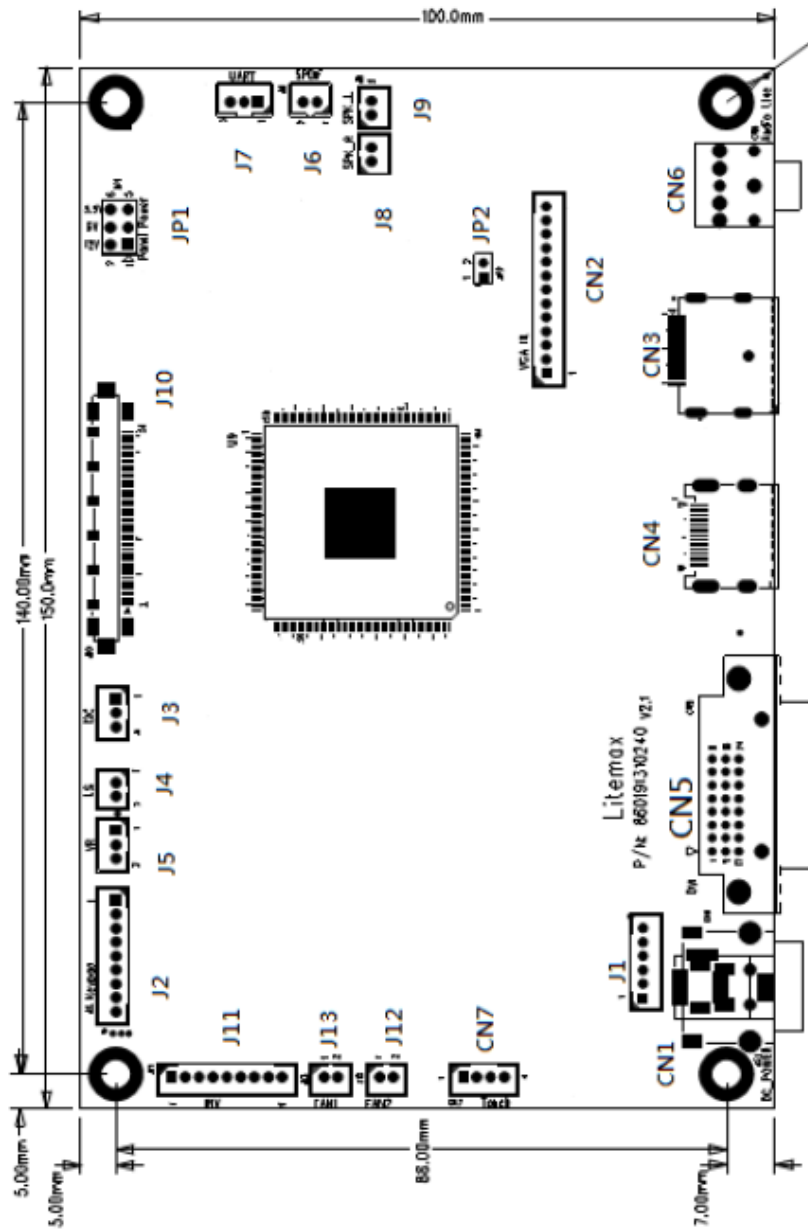
- Max resolution up to UHD (4096x2160)
- Support V-By-one or e-DP panel
- DVI operates up to 165MHz
- One ultra-reliable dual-link DVI input(4K2K@30Hz)
- One HDMI(HDMI 2.0) input(4K2K@60Hz)
- One display port input (DP 1.2a) (4K2K@60Hz)
- V-by-One or e-DP interface
- Support panel DC5V or 3.3V, 12V output
- External fan control by software
- OSD control
- Inverter analog or PWM dimming control
- External V.R. brightness control (Optional)
- External light sensor brightness control (Optional)
- External RS232 control (Optional)
- Input power DC 24V or DC 12V (DC 24V power input is optional)



AD9131DHP 100mm x 150mm



6.3 AD9131DHP Board Pin Define



J10: Panel (V-By-one or e-DP) connector

Pin No.	Function	Pin No.	Function
1	PANEL-VCC	27	GND
2	PANEL-VCC	28	RX0N
3	PANEL-VCC	29	RX0P
4	PANEL-VCC	30	GND
5	PANEL-VCC	31	RX1N
6	PANEL-VCC	32	RX1P
7	PANEL-VCC	33	GND
8	PANEL-VCC	34	RX2N
9	NC	35	RX2P
10	GND	36	GND
11	GND	37	RX3N
12	GND	38	RX3P
13	GND	39	GND
14	GND	40	RX4N
15	eDP_HPD1	41	RX4P
16	AUXTX_P1	42	GND
17	AUXTX_N1	43	RX5N
18	P_SDA	44	RX5P
19	P_SCL	45	GND
20	NC	46	RX6N
21	eDP_HPD0	47	RX6P
22	LD_EN	48	GND
23	AUXTX_P0	49	RX7N
24	AUXTX_N0	50	RX7P
25	HTPDN	51	GND
26	LOCKN		

CN5: DVI-D Input Connector (24pin)

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-

CN4: HDMI Connector (19pin HDMI)

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		

CN3: Display Port Connector (20pin DP)

Pin No.	Function	Pin No.	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

CN6: Audio Jack in

Pin No.	Function	Pin No.	Function
1	GND	2	LINE IN R
3	GND	4	GND
5	LINE IN L		

CN1: Power DIN(24V or 12V)

Pin No.	Function	Pin No.	Function
1	DC 24V or DC 12V(Note 1)	2	DC 24V or DC 12V (Note 1)
3	GND	4	GND

CN1: Power Jack (24V or 12V)

Pin No.	Function	Pin No.	Function
1	DC 24V or DC 12V(Note 1)	2	GND
3	GND		

J1: Power input connector (6 pin 2.0mm)

Pin No.	Function	Pin No.	Function
1	DC 24V or DC 12V(Note 1)	2	DC 24V or DC 12V(Note 1)
3	DC 24V or DC 12V(Note 1)	4	GND
5	GND	6	GND

Note 1: Power input has two different versions, 12V power input version and 24V input version don't mistake.

CN7: Power out connector (5V/12V)(4PIN 2.0mm)

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

J11: Inverter Connector (8PIN 2.0mm)

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

J13,J12: FAN (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	FAN(+)	2	GND

J2: 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		

J5: VR connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	DC 3.3V	2	VR OUT
3	GND		

J4: Ambient (2PIN 2.0mm)

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

JP1: PANEL VCC (3PIN 2.54mm)

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

J8& J9: Speaker Connector (2PIN 2.0mm)

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

J7 UART Connector (RS232 IN) (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	TXD	2	RXD
3	GND		

J3 I2C Connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	SDA	2	SCL
3	GND		

J6: SPDIF (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	SPDIF_OUT	2	GND

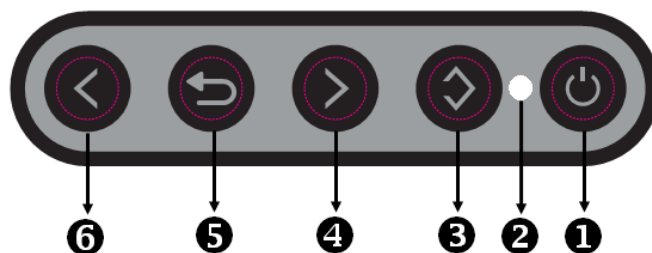
JP2: EDID (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	EEROM Write protect	2	GND

When need to rewrite EEROM EDID , short two pin .

6.4 OSD Function

MEMBRANE CONTROL BUTTOM



- ①**  **Key:** (Power) function key
Press the power switch will turn the monitor on.
Press it again to turn the monitor off.
- ②**  **LED Status:** Power ON-Green / Power off-No.
- ③**  **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”.
- ④**  **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”.
- ⑤**  **Key:** (Menu + Exit) function key
Enter to the OSD adjustment menu. It also used for go back to previous menu for sub-menu.
- ⑥**  **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.

6.5 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 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.