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DLD0845-A

Sunlight Readable 8.4” LED B/L LCD

User Manual

Approved by	Checked by	Prepared by

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Record of Revision

Version and Date	Page	Old Description	New Description	Remark
Oct/22/2025	all		Initial release	

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1 General Description

The DLD0845-A is a 8.4 inch industrial grade sunlight readable LCD, with high brightness 1000 nits, it produces 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 1000 nits
- Sunlight Readable
- Wide Viewing Angle of 178°(H), 178°(V)
- Wide Temperature (-30~85˚C)
- Low Power Consumption
- BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	DLD0845-A
Description	8.4” TFT LCD, 1000 nits LED Backlight, 800x600
Screen Size	8.4”
Display Area (mm)	170.4(H) x 127.8(V)
Brightness	1000 cd/m^2
Resolution	800x600
Aspect Ratio	4:3
Contrast Ratio	1800:1
Pixel Pitch (mm)	0.213(H) x 0.213(V)
Pixel Pre Inch (PPI)	119
Viewing Angle	178°(H),178°(V)
Color Saturation (NTSC)	44%
Display Colors	16.7M
Response Time (Typical)	25ms
Panel Interface	LVDS
Input Interface	VGA, DVI-D, HDMI
Input Power	DC12V
Power Consumption	5W
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Tuning, H/V Position…etc
Dimensions (mm)	221.6(W) x 149.68(H) x 45(D)
Bezel Size(U/B/L/R)	10.94/10.94/25.6/25.6 mm
Mounting	75x75 mm
Weight (Net)	1.2kg
Operating Temperature	-30 ˚C ~ 85 ˚C
Storage Temperature	-30 ˚C ~ 85 ˚C

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

2 Absolute Maximum Ratings

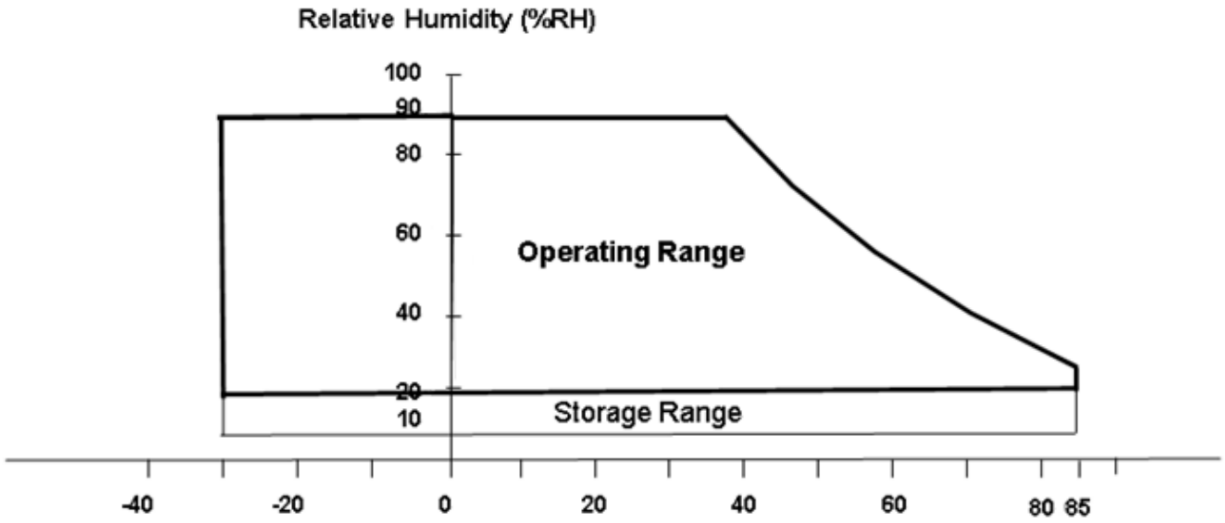
2.1 Absolute Ratings of TFT LCD Module

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	VDD	-0.3	+3.6	[Volt]	

2.2 Absolute Ratings of Environment

Item	Symbol	Min	Max	Unit
Operating Temperature	TOP	-30	+85	[°C]
Operation Humidity	HOP	5	90	[%RH]
Storage Temperature	TST	-30	+85	[°C]
Storage Humidity	HST	5	90	[%RH]

Note: Maximum Wet-Bulb should be 390C and no condensation.



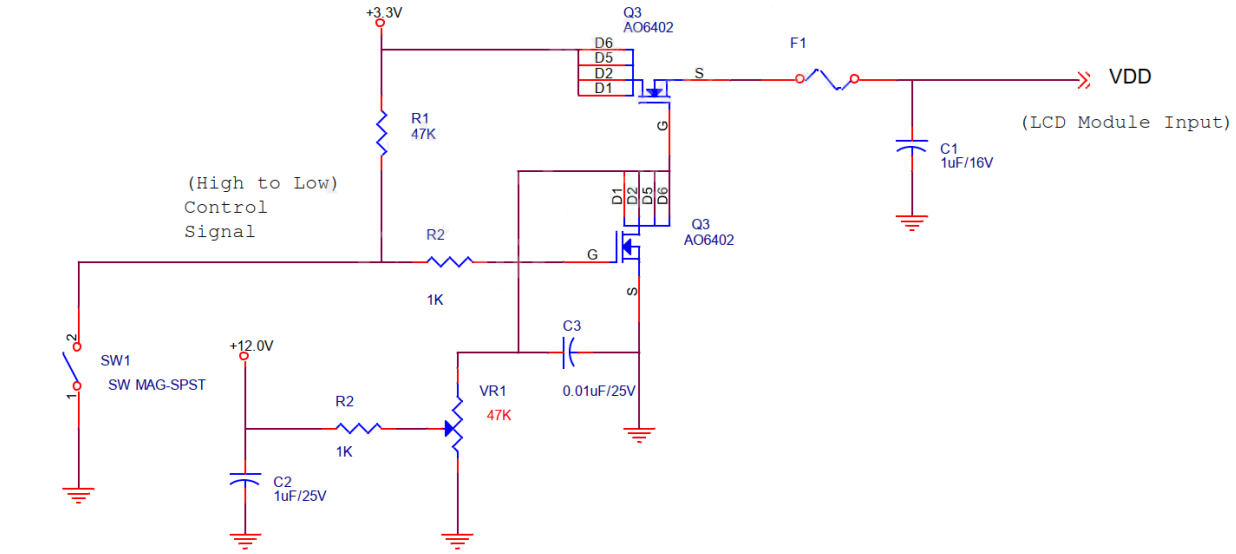
3 Electrical Characteristics

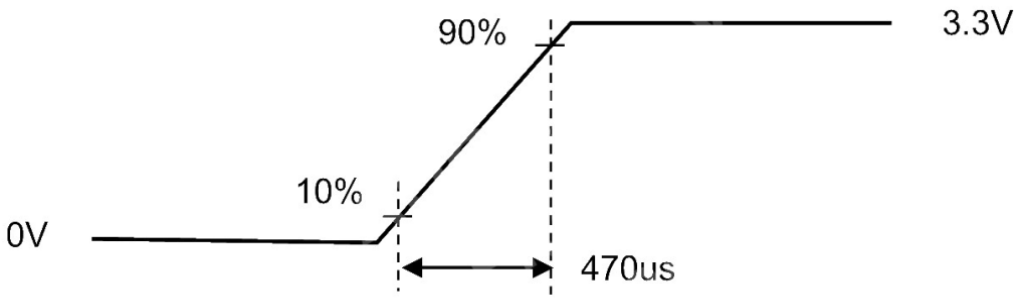
3.1 TFT LCD Module

Power Specification

Symbol	Parameter	Min	Typ	Max	Units	Remark
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	[Volt]	±10%
I_{VDD}	VDD Current	-	100	120	[mA]	64 Gray Bar Pattern (VDD=3.3V, at 60Hz)
P_{VDD}	VDD Power	-	0.3	0.4	[Watt]	64 Gray Bar Pattern (VDD=3.3V, at 60Hz)

Note 1: Measurement condition:





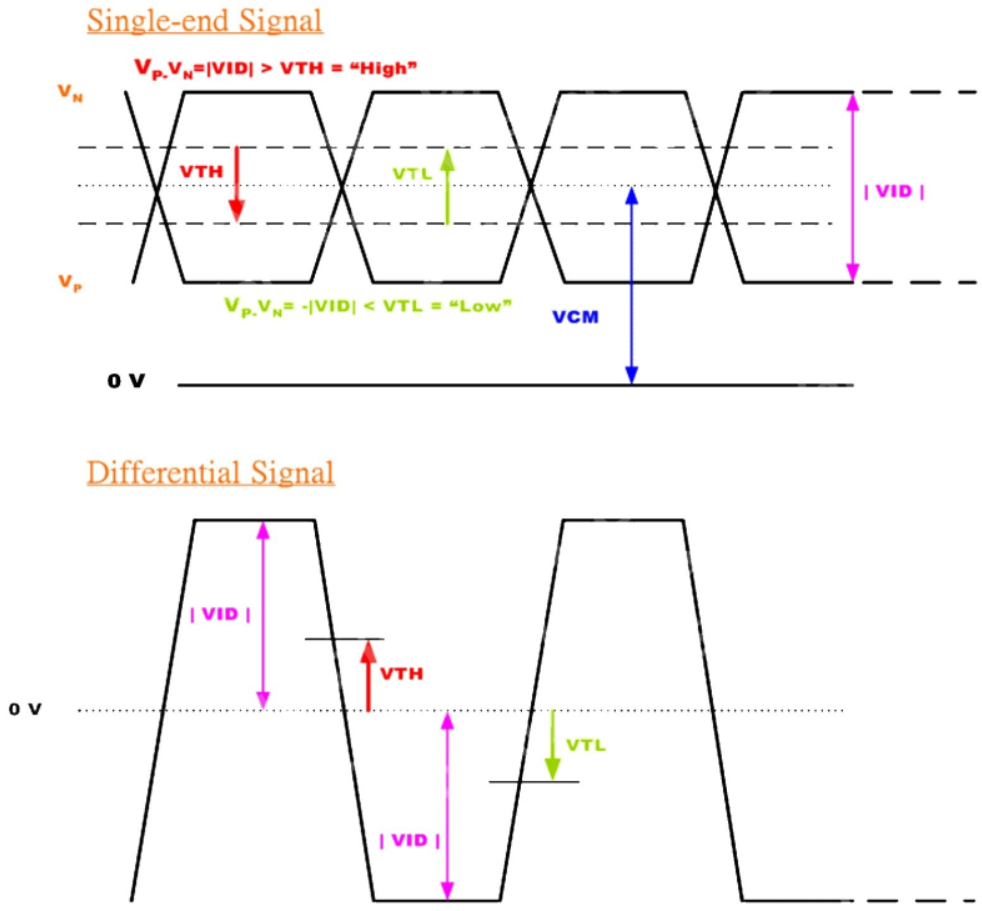
VDD rising time

3.2 Signal Electrical Characteristics

Input signals shall be low or Hi-Z state when VDD is off.

Symbol	Item	Min.	Typ.	Max.	Unit	Remark
VTH	Differential Input High Threshold	-	-	100	[mV]	VICM=1.2V
VTL	Differential Input Low Threshold	-100	-	-	[mV]	VICM=1.2V
| VID |	Input Differential Voltage	200	400	600	[mV]	
VICM	Differential Input Common Mode Voltage	1.1		1.6	[V]	VTH/VTL=±100mV

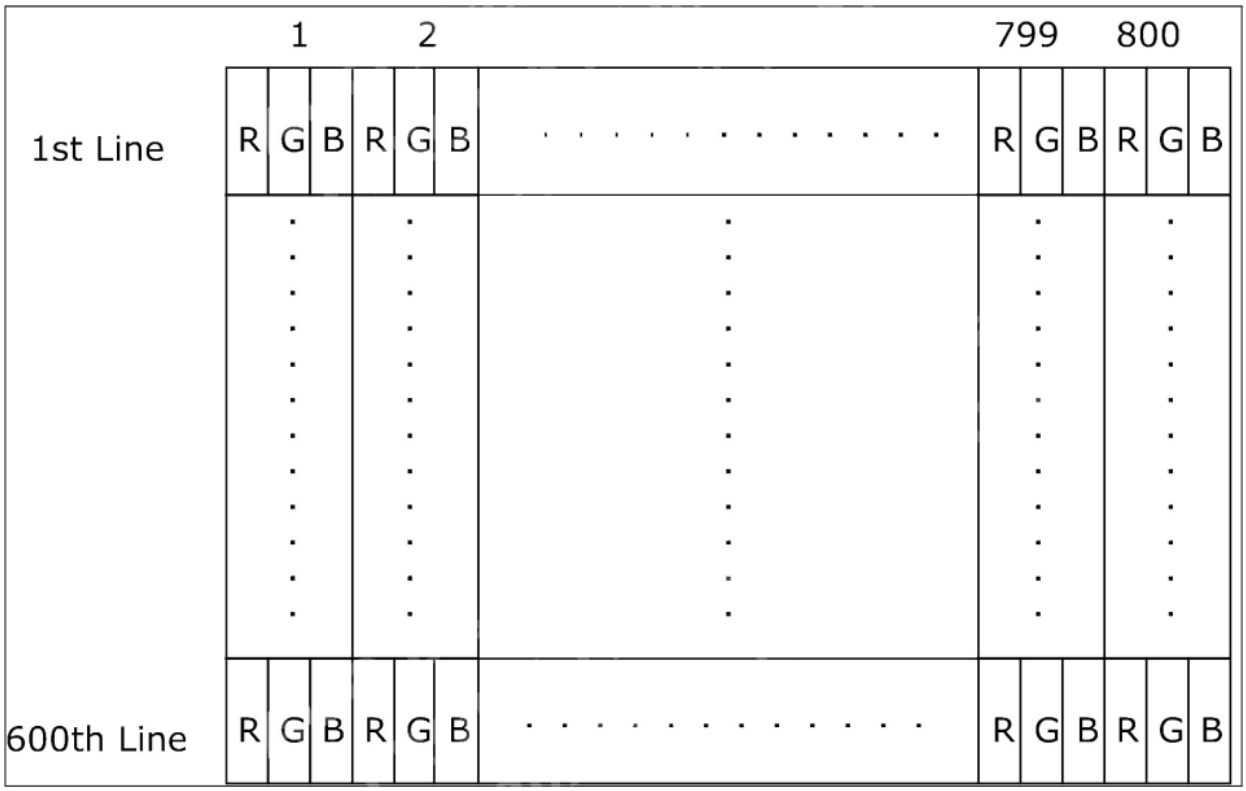
Note: LVDS Signal Waveform.



4 Signal Characteristic

Pixel Format Image

Following figure shows the relationship between input signal and LCD pixel format.



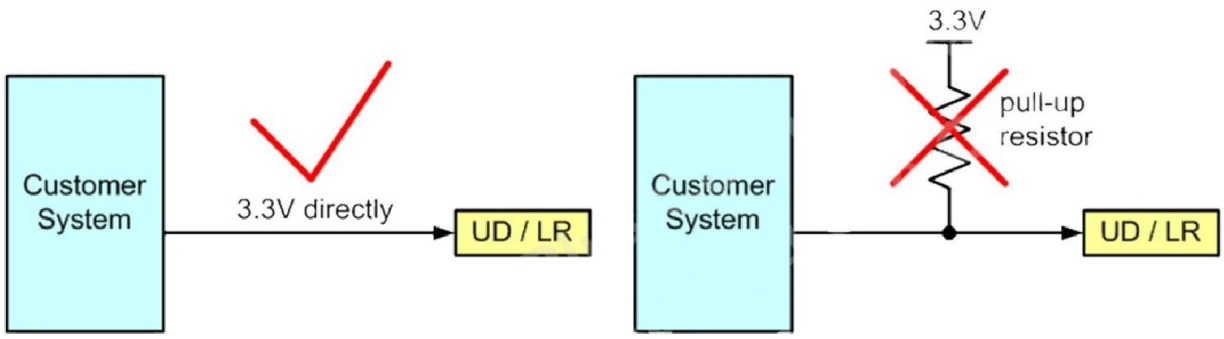
4.1 Signal Description

LVDS is a differential signal technology for LCD interface and high speed data transfer device. The connector pin definition is as below.

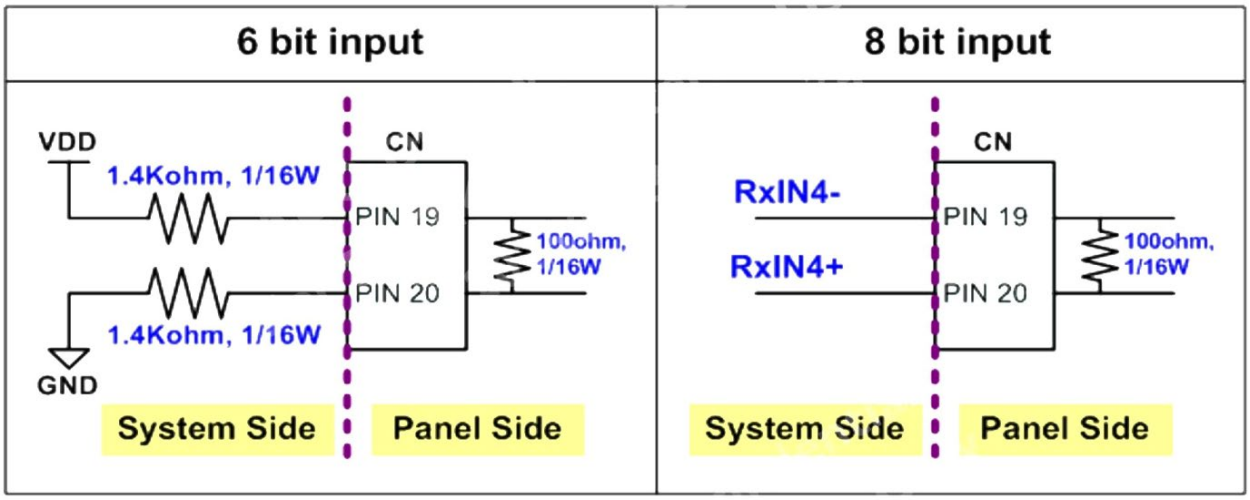
Pin No.	Symbol	Description
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	UD	Vertical Reverse Scan Control, When UD=Low or NC → Normal Mode. When UD=High → Vertical Reverse Scan. Note 1,2
4	LR	Horizontal Reverse Scan Control, When LR=Low or NC → Normal Mode. When LR=High → Horizontal Reverse Scan. Note 1,2
5	RxIN1-	LVDS differential data input Pair 0
6	RxIN1+	
7	GND	Ground
8	RxIN2-	LVDS differential data input Pair 1
9	RxIN2+	
10	GND	Ground
11	RxIN3-	LVDS differential data input Pair 2
12	RxIN3+	
13	GND	Ground
14	RxCLKIN-	LVDS differential Clock input Pair
15	RxCLKIN+	
16	GND	Ground
17	SEL 68	LVDS 6/8 bit select function control, Low or NC → 6 Bit Input Mode. High → 8 Bit Input Mode. Note
18	NC	NC
19	RxIN4-	LVDS differential data input Pair 3.
20	RxIN4+	Pin19:VDD & Pin20:GND for 6 Bit Input Mode NOTE 3

Note 1: "Low" stands for 0V. "High" stands for 3.3V. "NC" stands for "No Connected."

Note 2: For reverse scan mode, please connect to 3.3V directly. A pull-up resistor on the input side will cause abnormal reverse scan.



Note3:



4.2 Scanning Direction

The following figures show the image seen from the front view. The arrow indicates the direction of scan.

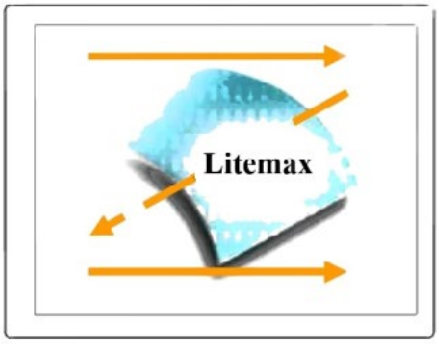


Fig. 1

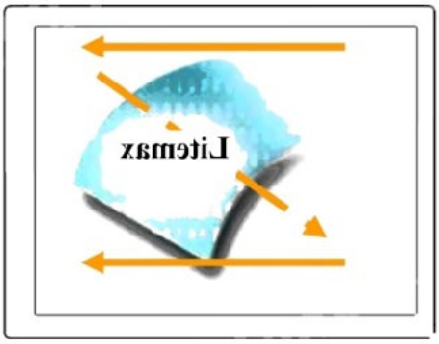


Fig. 2

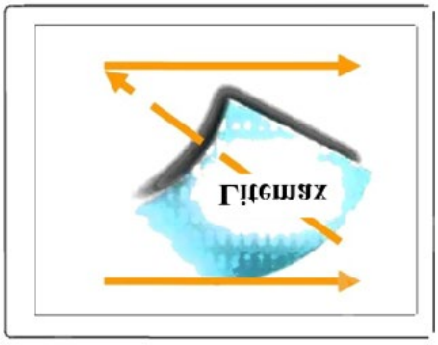


Fig. 3

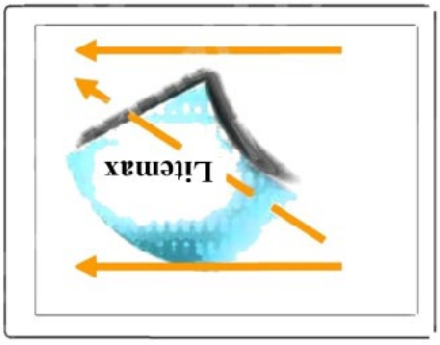


Fig. 4

Fig. 1 Normal scan (Pin3, UD = Low or NC ; Pin4, RL = Low or NC)

Fig. 2 Reverse scan (Pin3, UD = Low or NC ; Pin4, RL = High)

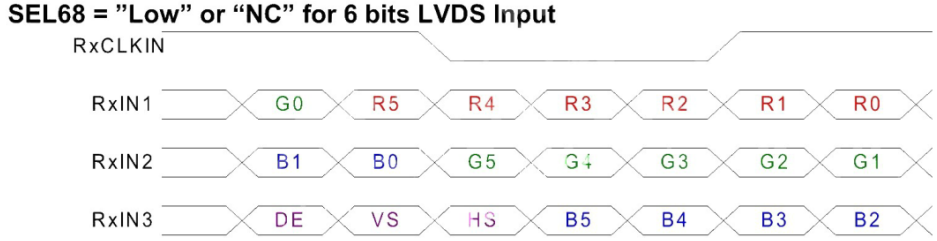
Fig. 3 Reverse scan (Pin3, UD = High ; Pin4, RL = Low or NC)

Fig. 4 Reverse scan (Pin3, UD = High ; Pin4, RL = High)

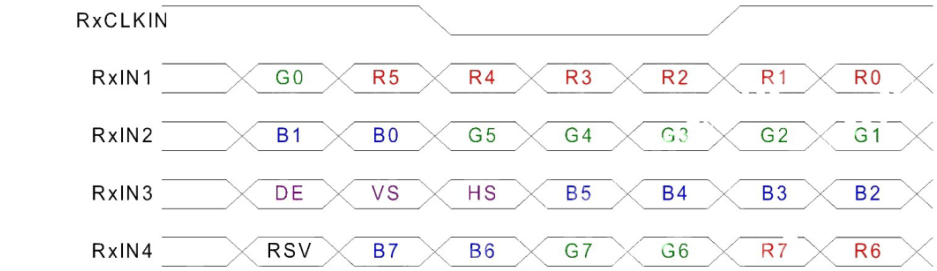
4.3 The Input Data Format

SEL 6/8 Bits

SEL68 = "Low" or "NC" for 6 bits LVDS Input



SEL68 = "High" for 8 bits LVDS Input



Note1: Please follow PSWG.
Note2: R/G/B data 7: MSB, R/G/B data 0: LSB

Signal Name	Description	Remark
R7 R6 R5 R4 R3 R2 R1 R0	Red Data 7 (MSB) Red Data 6 Red Data 5 Red Data 4 Red Data 3 Red Data 2 Red Data 1 Red Data 0 (LSB)	Red-pixel Data Each red pixel's brightness data consists of these 8 bits pixel data.
G7 G6 G5 G4 G3 G2 G1 G0	Green Data 7 (MSB) GreenData 6 GreenData 5 GreenData 4 GreenData 3 GreenData 2 GreenData 1 GreenData 0 (LSB)	Green-pixel Data Each green pixel's brightness data consists of these 8 bits pixel data.
B7 B6 B5 B4 B3 B2 B1 B0	Blue Data 7 (MSB) Blue Data 6 Blue Data 5 Blue Data 4 Blue Data 3 Blue Data 2 Blue Data 1 Blue Data 0 (LSB)	Blue-pixel Data Each blue pixel's brightness data consists of these 8 bits pixel data.
RxCLKIN+ RxCLKIN-	LVDS Clock Input	
DE	Display Enable	
VS	Vertical Sync	
HS	Horizontal Sync	

Note: Output signals from any system shall be low or Hi-Z state when VDD is off.

5 Interface Timing

5.1 Timing Characteristics

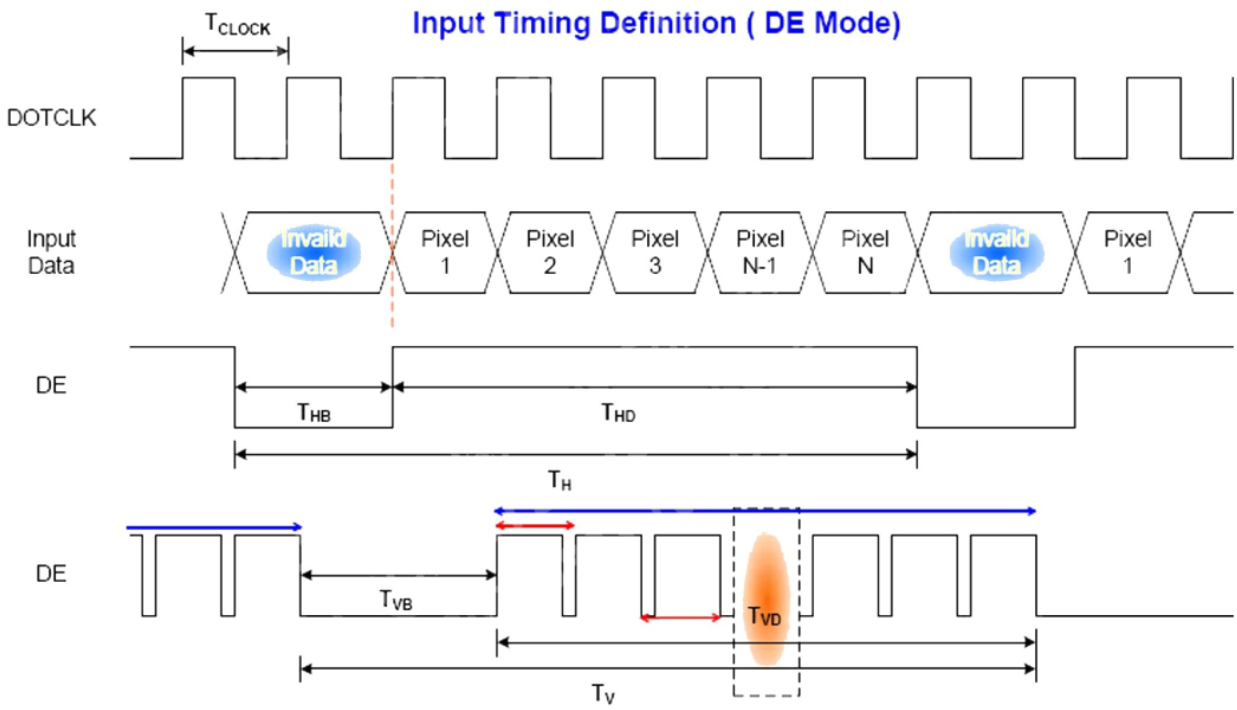
DE mode only

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency		1/ T_{Clock}	33.6	39.8	48.3	MHz	
Vertical Section	Period	T_V	608	628	650	T_H	
	Active	T_{VD}	600	600	600		
	Blanking	T_{VB}	8	28	50		
Horizontal Section	Period	T_H	920	1056	1240	T_{Clock}	
	Active	T_{HD}	800	800	800		
	Blanking	T_{HB}	120	256	440		

Note: Frame rate is 60Hz.

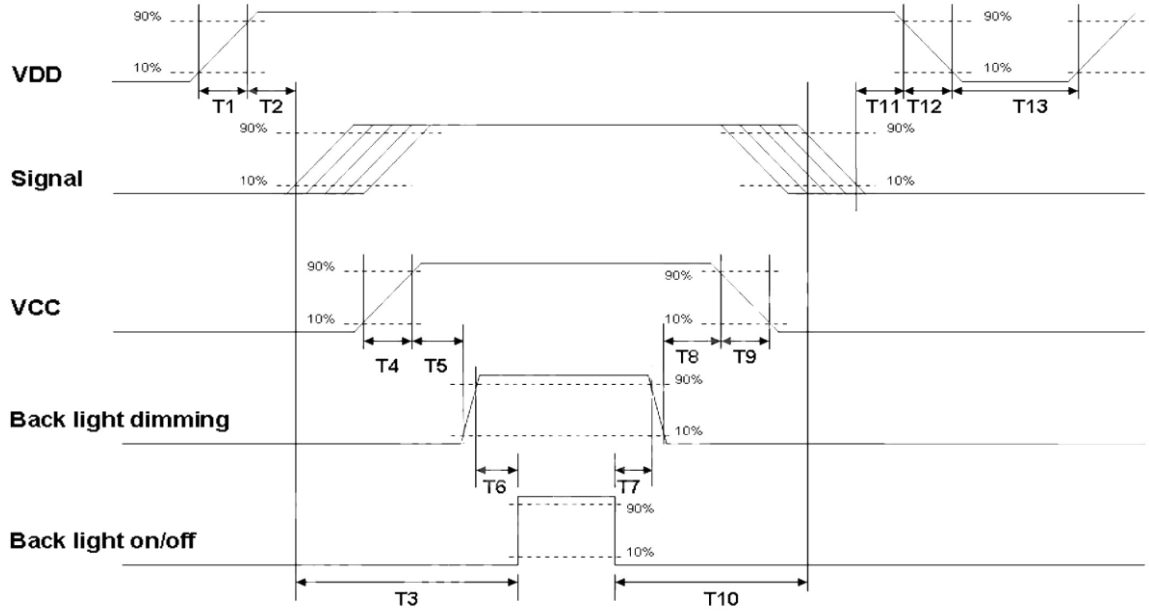
Note: DE mode.

5.2 Input Timing Diagram



5.3 Power ON/OFF Sequence

VDD power and Backlight on/off sequence is as below. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



Power ON/OFF sequence timing

Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0.5	--	10	[ms]
T2	30	40	50	[ms]
T3	200	--	--	[ms]
T4	0.5	--	10	[ms]
T5	10	--	--	[ms]
T6	10	--	--	[ms]
T7	0	--	--	[ms]
T8	10	--	--	[ms]
T9	--	--	10	[ms]
T10	110	--	--	[ms]
T11	0	16	50	[ms]
T12	--	--	10	[ms]
T13	1000	--	--	[ms]

The above on/off sequence should be applied to avoid abnormal function in the display.
Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

6 Connector & PIN Assignment

Physical interface is described as for the connector on module. These connectors are capable of accommodating the following signals and will be following components.

6.1 TFT LCD Signal

CN1: LVDS Connector

Connector Name / Designation	Signal Connector
Manufacturer	STM or compatible
Connector Model Number	STM -MSB24013P20HA or compatible
Mating Model Number	STM-P24013P20 or compatible

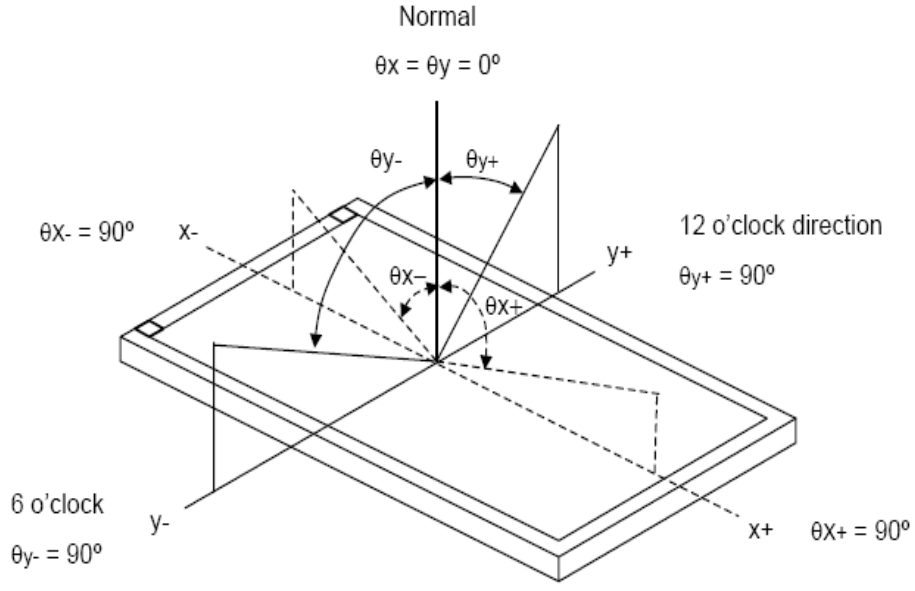
Pin No.	Signal Name	Pin No.	Signal Name
1	VDD	2	VDD
3	UD	4	LR
5	RxIN1-	6	RxIN1+
7	GND	8	RxIN2-
9	RxIN2+	10	GND
11	RxIN3-	12	RxIN3+
13	GND	14	RxCKIN-
15	RxCKIN+	16	GND
17	SEL 68	18	NC
19	RxIN4-	20	RxIN4+

7 Optical Specification

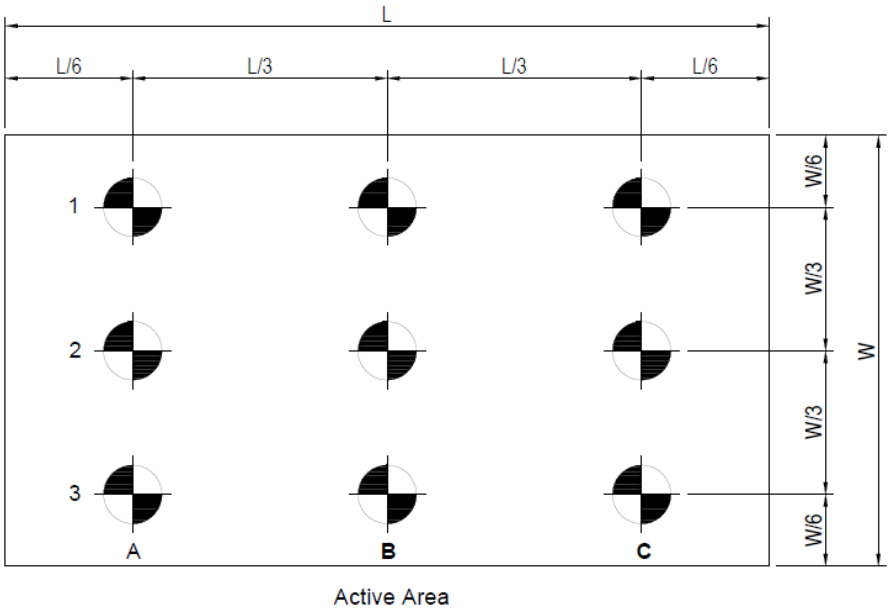
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	θx=0 θy=0 CA-410	0.554	0.584	0.614	-	Test Mode: (2) (3)
		Ry		0.316	0.346	0.376	-	
	Green	Gx		0.307	0.337	0.367	-	
		Gy		0.548	0.578	0.608	-	
	Blue	Bx		0.128	0.158	0.188	-	
		By		0.122	0.152	0.182	-	
	White	Wx		0.286	0.316	0.346	-	
		Wy		0.322	0.352	0.382	-	
Center Luminance of White		Lc	θx=0 θy=0 CA-410	900	1000	1300	cd/m^2	
Uniform		Lu			91		%	
Contrast Ratio		CR	θx=0 θy=0 Klein K-10	1620:1	1800:1		-	Test Mode: (4)
Color Saturation		NTSC			44		%	
Viewing Angle	Horizontal	θx+	CR ≥ 10		89		Deg	Test Mode: (1)
		θx-			89			
	Vertical	θy+			89			
		θy-			89			

Test Mode：

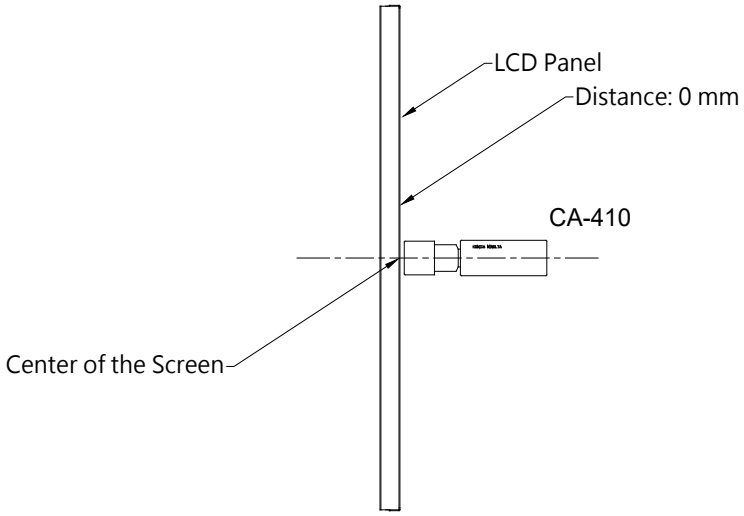
(1) Definition of Viewing Angle (θx , θy):



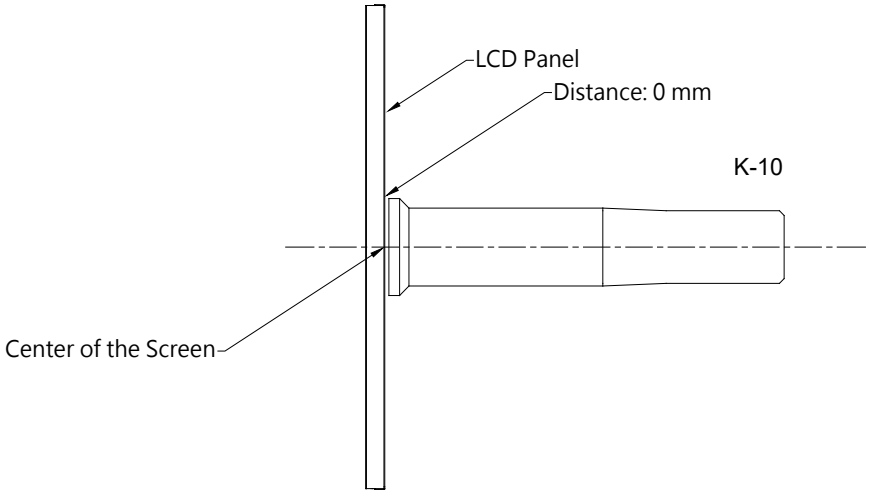
(2) Definition of Test Point:



(3) CA-410 Measurement Setup:



(4) Klein K-10 Measurement Setup:



8 LED Driving Board Specifications

This specification is applied to LED converter unit for LED backlight on LED Driving Board.

8.1 Operating Characteristics

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	Vin		10.0	12.0	14.0	V	
Input Current (High Brightness)	IinH	Brightness = 100%	0.34	0.3	0.25	A	(1)
Input Power Consumption	Pin	Brightness = 100%	-----	3.6	-----	W	
LED Current (High Brightness)	IoutH	Brightness = 100%	-----	0.114	-----	A	
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%	-----	27.4	-----	V	
Efficiency	η	Brightness = 100%	-----	87	-----	%	(5)

Remark:

(1) This data is based on the testing result of practical input voltage, Iin is measured by related Vin (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 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) $\eta_{max} = V_{out(max)} * I_{outH(max)} / V_{in(max)} * I_{inH(min)}$

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

8.2 Connector Socket

Input Connector: J3(JST S9B-PH-SM3-TB or Compatible)

PIN No	Symbol	Description
1	Vin	DC+
2	Vin	DC+
3	Vin	DC+
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	Brightness	Brightness Control
8	Control	ON/OFF Control
9	CL	PWM or DC selection (Low → DC , Hi → PWM)

Output Connector: J1(JST S 2B-ZR-SW4A-TF or Compatible)

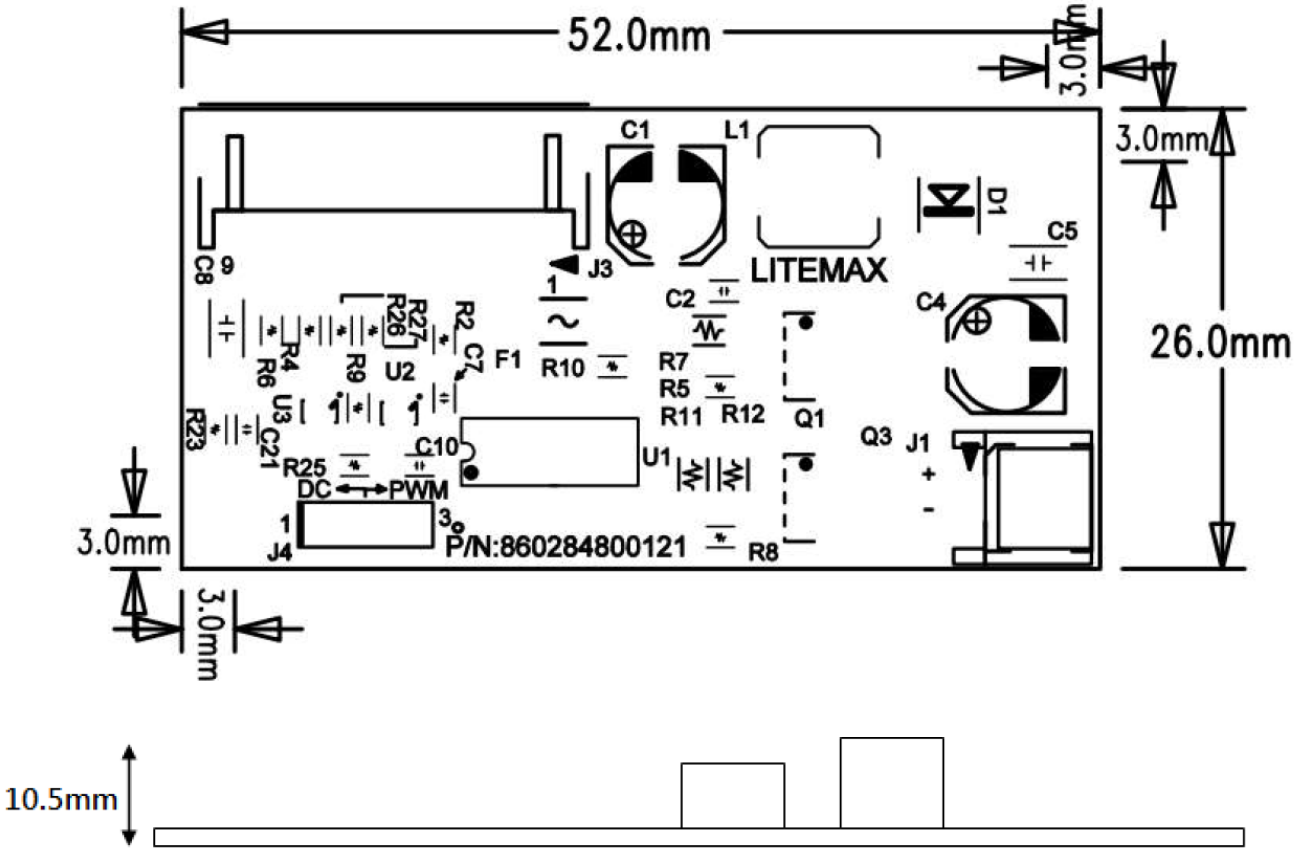
PIN NO	Symbol	Description
1	Output	LED High Voltage(+)
2	Output	LED Low Voltage (-)

DC or PWM Connector: J4

PIN NO	Symbol	Description
1	DC	JUMP pin 1,2 LED driver is DC input
2	GND	
3	PWM	JUMP pin 2,3 LED driver is PWM input

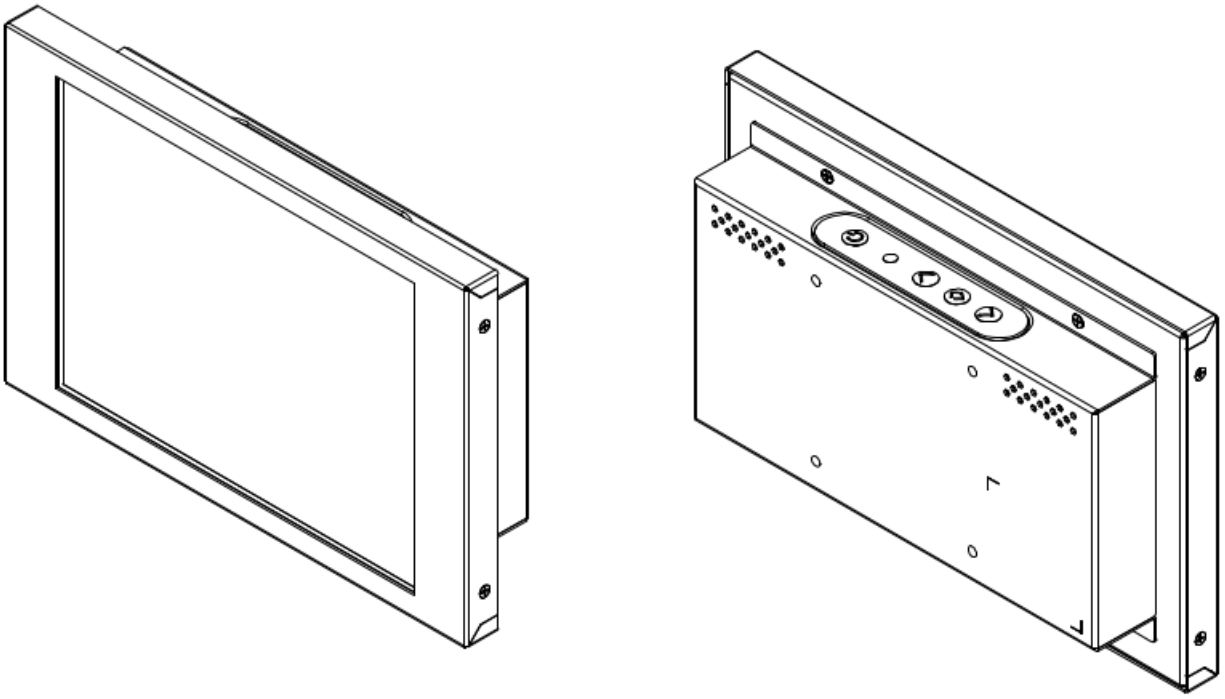
8.3 Mechanical Characteristics

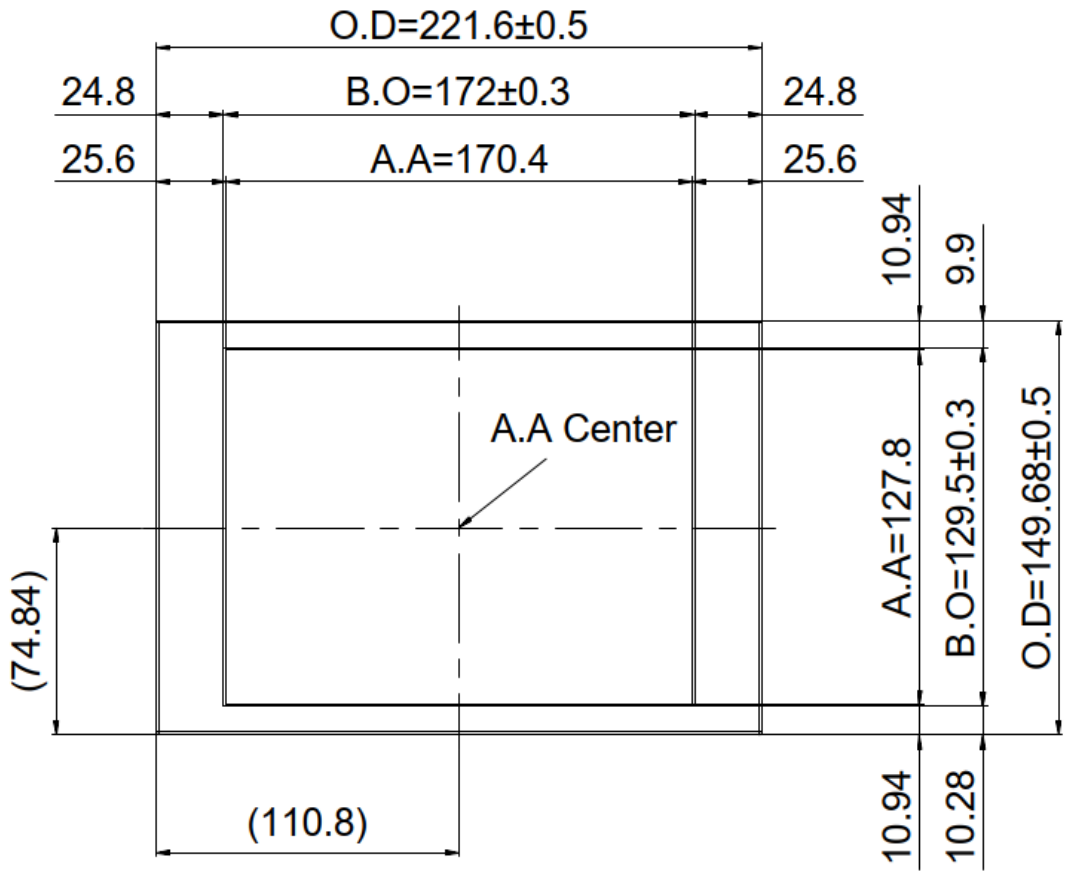
Dimension: 52 mm x 26 mm x 10.5mm

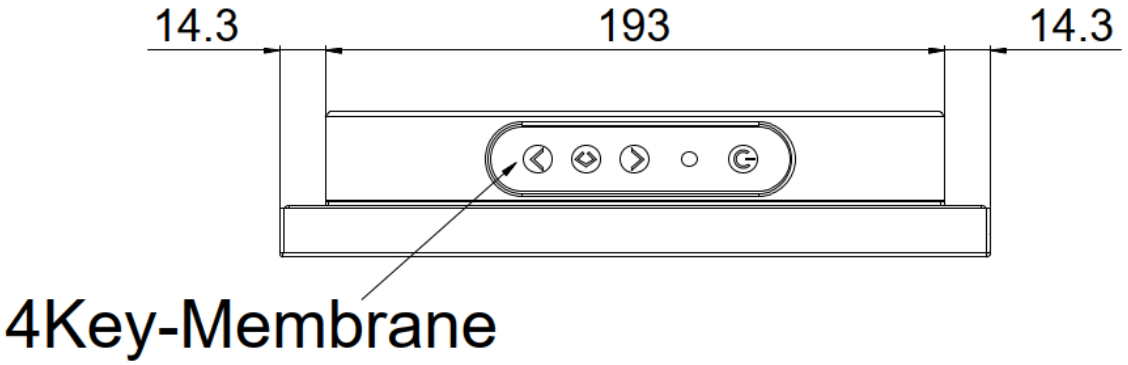


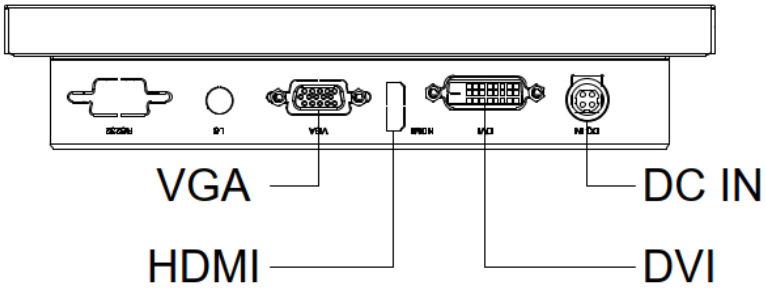
9 Mechanical Drawing

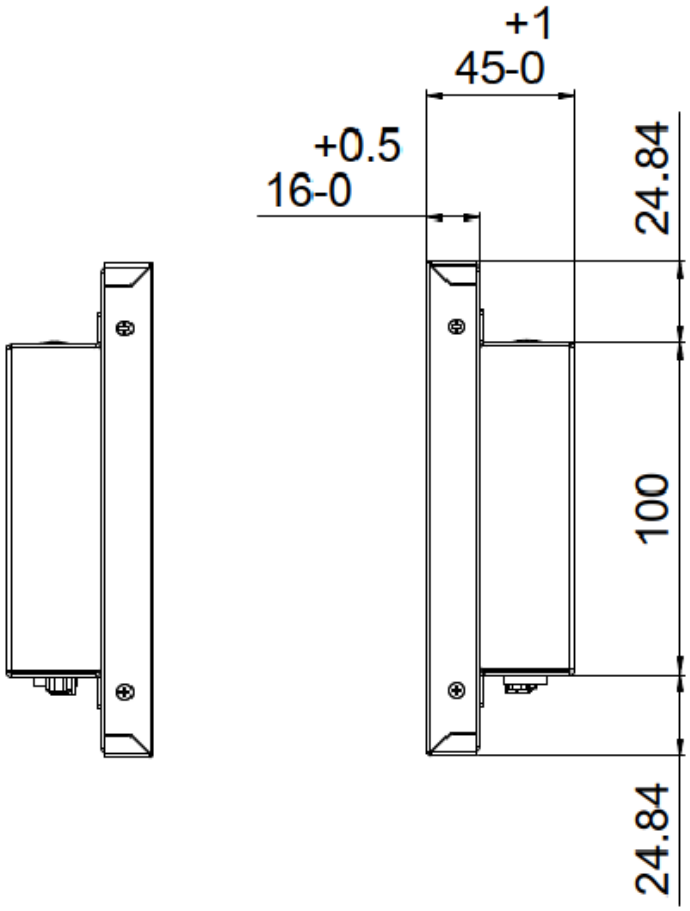
Unit:mm

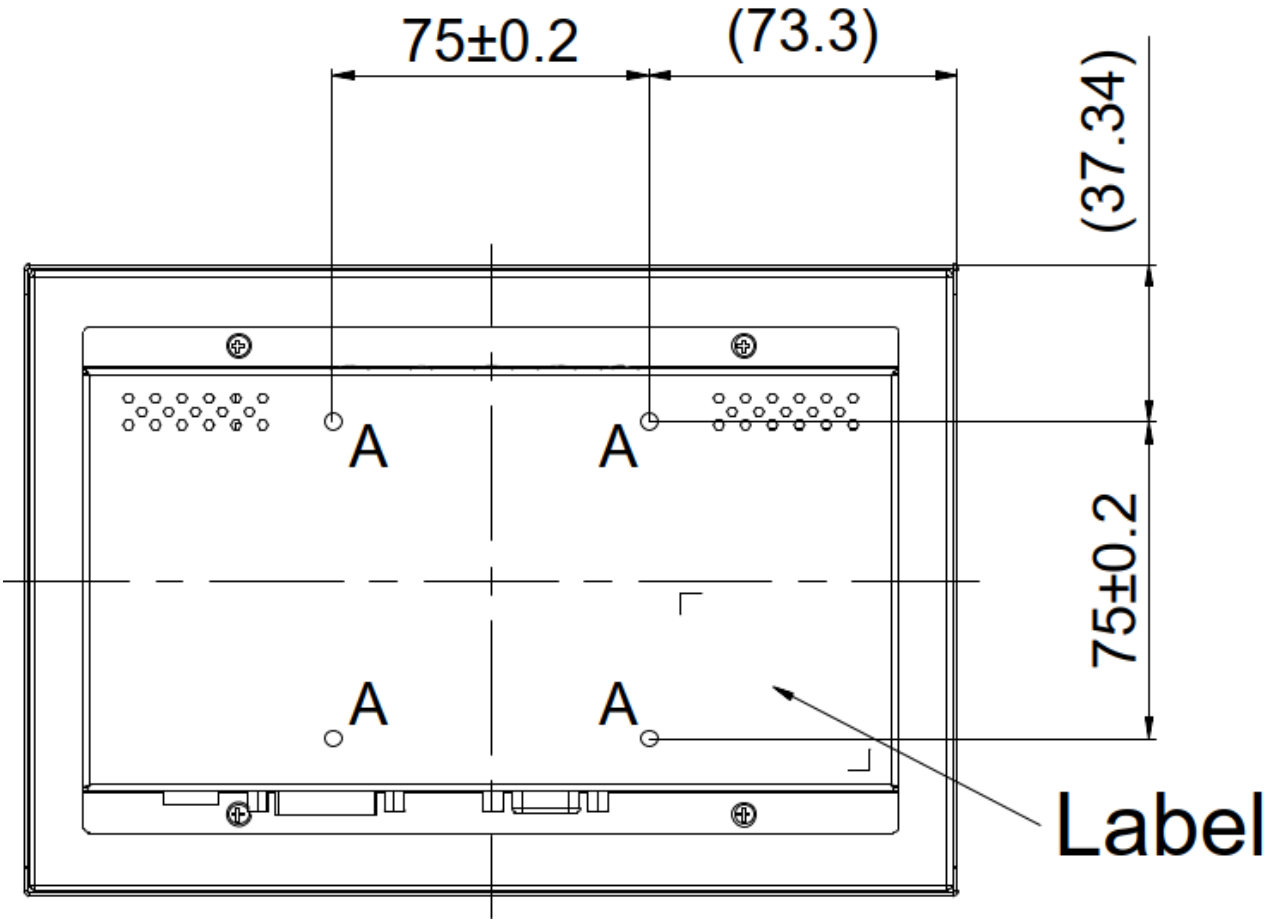





14.3
193
14.3
4Key-Membrane


VGA
DC IN
HDMI
DVI


+1
45-0
+0.5
16-0
24.84
100
24.84



Note:

O.D.：OUTLINE DIMENSION

V.A.：BEZEL OPENING

A.A.：ACTIVE AREA

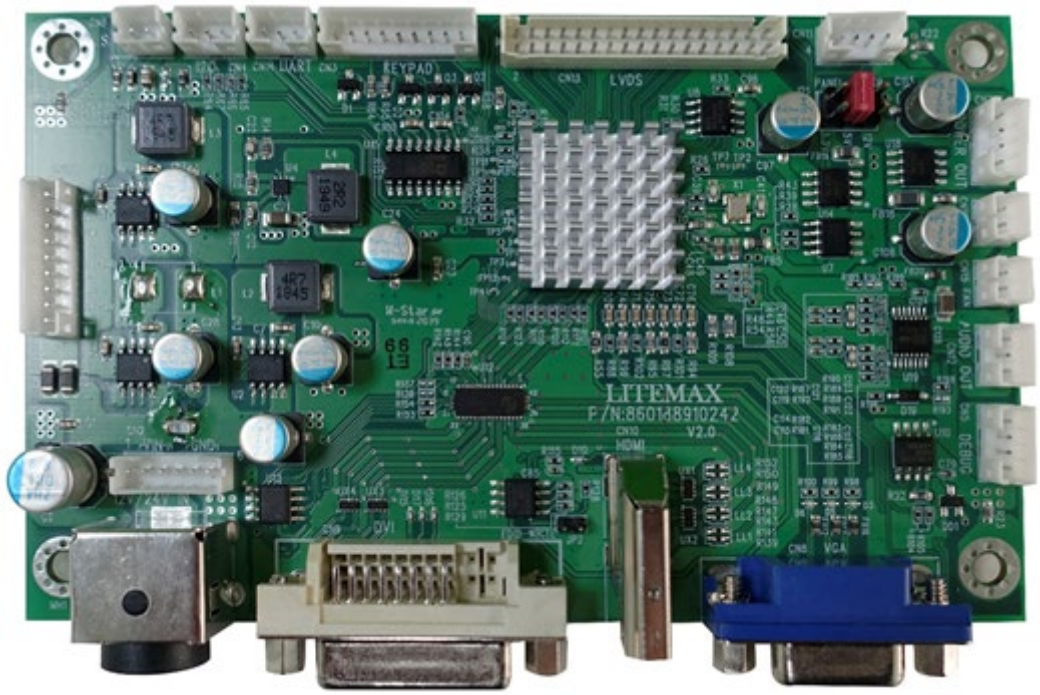
A：M4_USER HOLE_MAX Depth=3mm

10 AD8891GDH 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 VGA and DVI-D and HDMI input, an external luminance sensor and RS232 as an option, Rev.1 is European RoHS compliant.

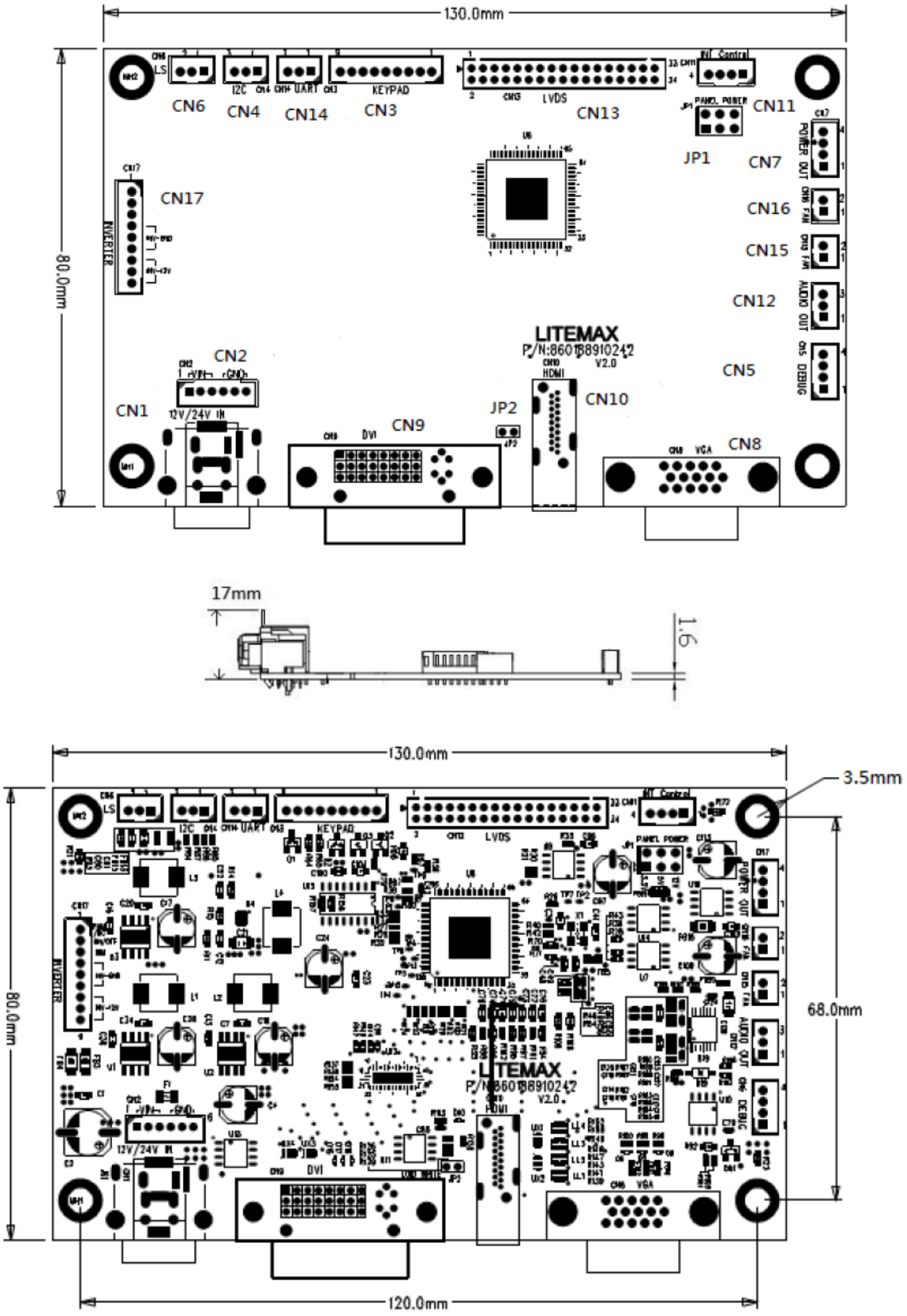
10.1 General Description

- Max Resolution Up To Full HD
- Analog RGB Input Up To 205MHz
- Ultra-Reliable DVI Input
- HDMI Input (HDMI 1.3)
- Dual/Single LVDS Interface
- Support Panel DC 5V or 12V, 3.3V Output
- OSD Control
- LID on Board
- External RS232 Control (Optional)
- Input Power 12V DC
- Audio Out (Optional)
- *External Digital Light Sensor Brightness Control (Optional)
- *External Light Sensor Brightness Control (Optional)
- Support Output Voltage 12V(1A) and 5V(1A)



10.2 Outline Dimensions

AD8891GDH 130mm x 80mm



AD8891GDH 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	NC
9	RxO3-	26	NC
10	RxO3+	27	GND
11	NC	28	GND
12	NC	29	Pull Height
13	GND	30	Pull Low
14	GND	31	VLCD
15	RxE0-	32	VLCD
16	RxE0+	33	VLCD
17	RXE1-	34	VLCD

CN9: DVI-D 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	DET_DVI	19	T.M.D.S. Data0/5 Shield
4	NC	12	NC	20	NC
5	NC	13	NC	21	NC
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	NC	16	Hot Plug Detect	24	T.M.D.S. Clock-

CN8: Analog RGB Input connector (D-SUB 15Pin)

Pin	Symbol	Description	Pin No.	Symbol	Description
1	RED	Analog Red	9	+5V	+5VDDC
2	GREEN	Analog Green	10	SGND	Sync GND
3	BLUE	Analog Blue	11	NCD	Reserved
4	GND	Reserved	12	SDA	DDC Serial Data
5	GND	DET_VGA	13	HSYNC	Horizontal Sync
6	RED_RTN	Red Return	14	VSYNC	Vertical Sync
7	GREEN_RTN	Green Return	15	SCL	DDC Data Clock
8	BLUE_RTN	Blue Return			

CN10: 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 (12V)

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

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

Pin No.	Function	Pin No.	Function
1	12V DC	2	12V DC
3	12V DC	4	GND
5	GND	6	GND

CN7: Touch Power connector

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

CN15, CN16: 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		

JP1: Panel Power

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

CN11: 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

CN12: 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 EDID want 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

J4: DC or PWM select connector

Pin No.	Function	Pin No.	Function
1	DC	2	GND
3	PWM		

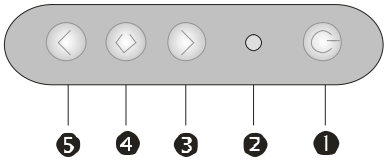
If DC is selected, pin 1 and pin 2 must short.
If PWM is selected, pin 3 and pin 2 must short.

J1, J2: EDID Jumper (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	LED height voltage	2	LED low voltage

10.3 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.

When OSD is off, it is hot key for input switch between VGA, DVI-D, and HDMI.

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 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.

10.4 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”.

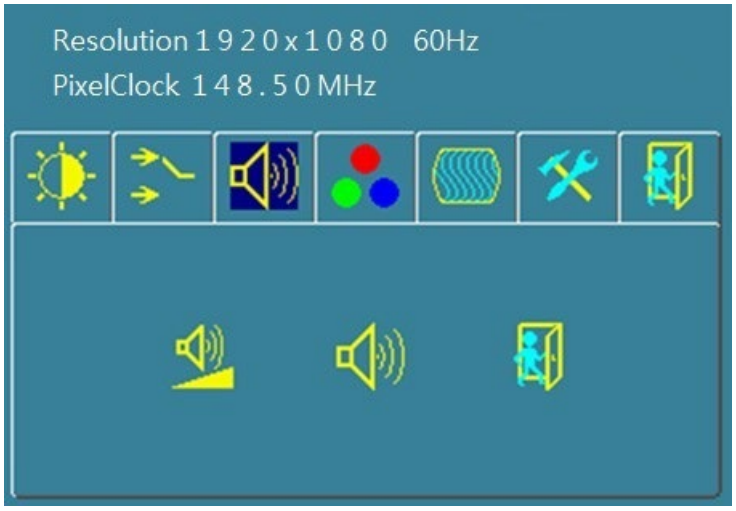
Exit: back to the beginning menu.

VGA **Analog:** RGB/VGA input

DVI **Digital:** DVI input

HDMI **HDMI:** HDMI input

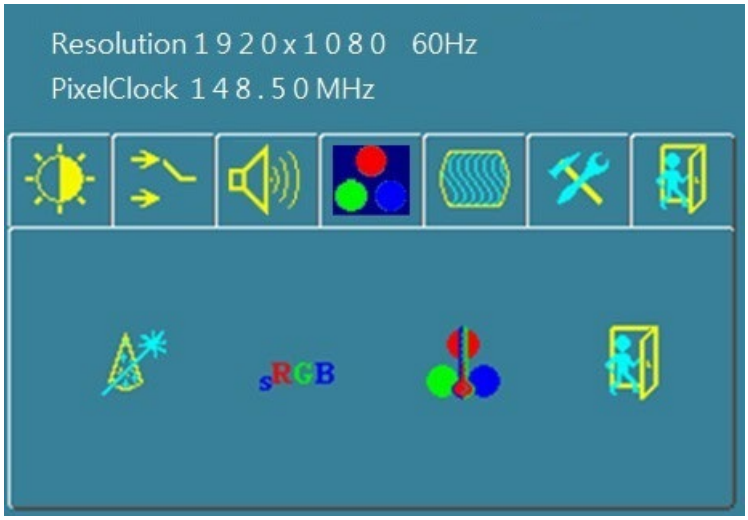
Exit **Exit:** back to the beginning menu.



Audio Volume: Audio volume adjustment.

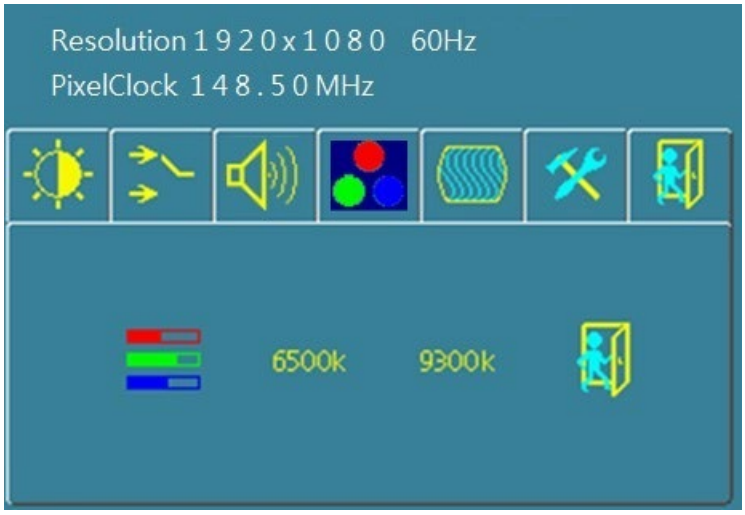
UnMute/Mute: You can mute the speaker by pressing this option.

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

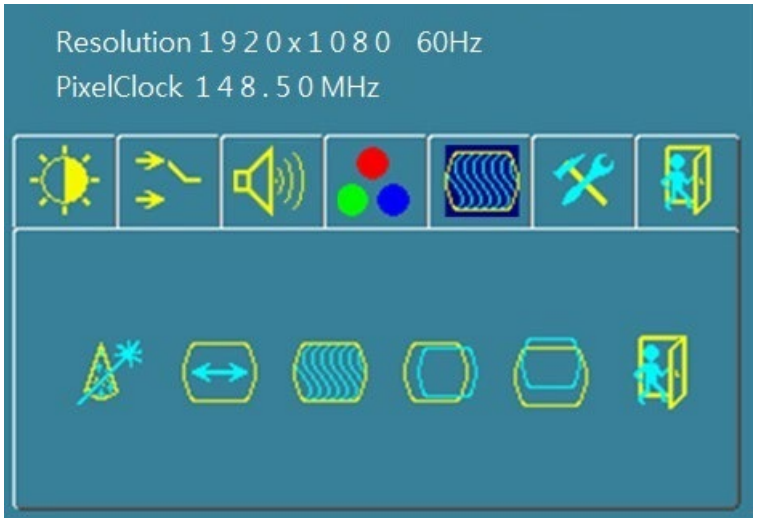
.

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.

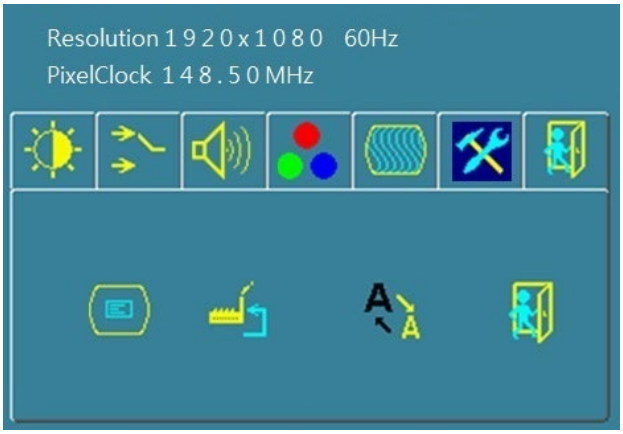
Clock: If you are not satisfied with the Auto tune result, you can adjust manually by pressing "Clock". Using this will make the image wider.

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

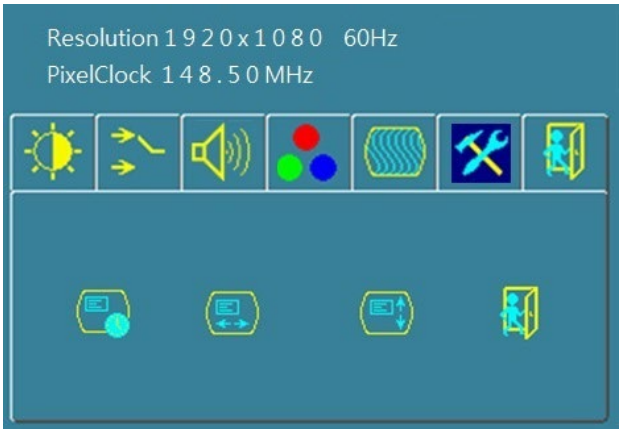
HPos: You can shift the screen horizontally using this function.

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

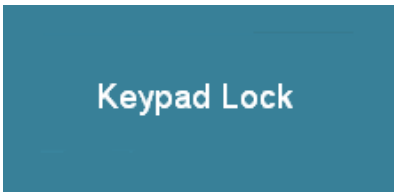
Factory Reset: By pressing this, the screen will revert to factory settings, and the previous settings will be deleted.

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.

11 Precautions

11.1 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.

11.2 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.

11.3 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.

12 Disclaimer

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