



LITEMAX

ULF/ULH1855-M

Sunlight Readable 18.5" 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/30/2025	all		Initial release	

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1 General Description

The **ULF/ULH1855-M** is a 18.5 inch industrial grade sunlight readable LCD, with high brightness 1000 nits, it produce sharp images, crisp text and lifelike colors. The Ubipixel 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
- Resolution: 1920 x 1080
- Low Power Consumption
- BL MTBF: 20,000 hours

1.2 General Specifications

Model Name	ULF/ULH1855-M
Description	18.5" TFT LCD, 1000 nits LED Backlight, 1920x1080
Screen Size	18.5"
Display Area (mm)	408.96(H) x 230.04(V)
Brightness	1000 cd/m ²
Resolution	1920x1080
Aspect Ratio	16 : 9
Contrast Ratio	900 : 1
Pixel Pitch (mm)	0.213(H) x 0.213(V)
Pixel Per Inch (PPI)	119
Viewing Angle	178°(H),178°(V)
Color Saturation (NTSC)	83%
Display Colors	16.7M
Response Time (Typical)	14ms
Panel Interface	LVDS
Input Interface	VGA, DVI-D, HDMI
Input Power	DC12V
Power Consumption	24W (27W With AD Board)
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position...etc
Dimensions (mm)	430.37 x 254.60 x 11.50 mm
Bezel Size(U/B/L/R)	12.28/12.28/10.71/10.71 mm
Weight (Net)	1.5Kg
Operating Temperature	-10 °C ~ 60 °C
Storage Temperature	-20 °C ~ 60 °C

ULF= Panel + LED Driving Board

ULH= Panel + LED Driving Board + AD Control Board

1.3 Absolute Maximum Ratings

Permanent damage may occur if exceeding the following maximum rating.

GND=0V, Ta = 25°C

Item	Symbol	Condition	Min.	Max.	Unit
Power Supply for Voltage	V _{DD}	-	V _{SS} -0.3	6.5	V
Operating Temperature	TOP	-	-10	60	°C
Storage Temperature	TST	-	-20	60	°C
Humidity	-	TA ≤ 40°C	--	90%	RH

2 Electrical Specifications

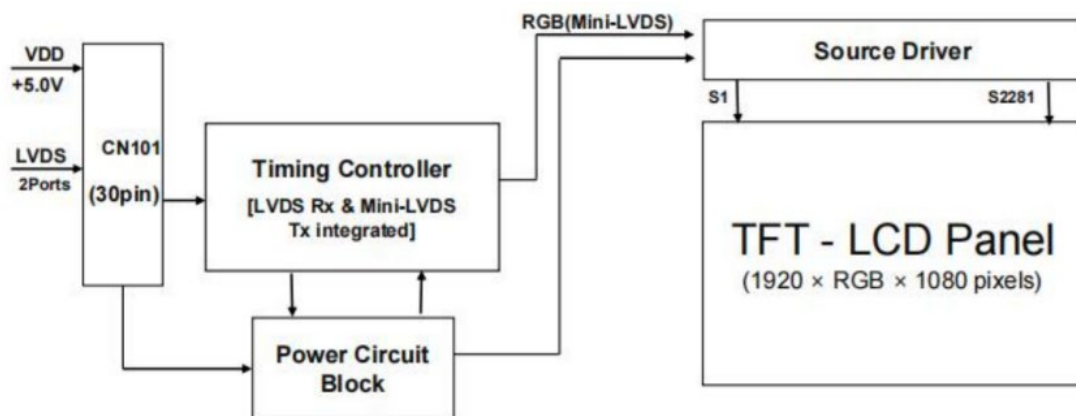
2.1 DC Electrical Characteristics

Parameter		Symbol	Condition Ratings			Unit
			Min	Typ	Max	
Power supply voltage		V _{DD}	4.5	5.0	5.5	V
Power Supply Current		I _{DD}		480	930	mA
In-Rush Current		I _{RUSH}		-	3.0	A
LVDS Interface	Differential Input High Threshold Voltage	V _{LVTH}	-	-	+100	mV
	Differential Input Low Threshold Voltage	V _{LVTL}	-100	-	-	mV
	Common Input Voltage	V _{LVC}	1.0	1.2	1.4	V
CMOS Interface	Input High Threshold Voltage	I _H	2.7	-	3.3	V
	Input Low Threshold Voltage	V _{IL}	0	-	0.6	V
Power Consumption		P _{DD}		2.4	4.65	W

2.2 Interface Pin Description

TFT Interface connector: IS100-L300-C23(UJU), MSBKT2407P30HC(STM)

Pin No.	Symbol	Function
1	RxO0-	Negative LVDS differential data input (Odd data)
2	RxO0+	Positive LVDS differential data input (Odd data)
3	RxO1-	Negative LVDS differential data input (Odd data)
4	RxO1+	Positive LVDS differential data input (Odd data)
5	RxO2-	Negative LVDS differential data input (Odd data)
6	RxO2+	Positive LVDS differential data input (Odd data)
7	GND	Ground
8	RxOCLK-	Negative LVDS differential clock input (Odd clock)
9	RxOCLK+	Positive LVDS differential clock input (Odd clock)
10	RxO3-	Negative LVDS differential data input (Odd data)
11	RxO3+	Positive LVDS differential data input (Odd data)
12	RxE0-	Negative LVDS differential data input (Even data)
13	RxE0+	Positive LVDS differential data input (Even data)
14	GND	Ground
15	RxE1-	Negative LVDS differential data input (Even data)
16	RxE1+	Positive LVDS differential data input (Even data)
17	GND	Ground
18	RxE2-	Negative LVDS differential data input (Even data)
19	RxE2+	Positive LVDS differential data input (Even data)
20	RxECLK-	Negative LVDS differential clock input (Even clock)
21	RxECLK+	Negative LVDS differential clock input (Even clock)
22	RxE3-	Negative LVDS differential data input (Even data)
23	RxE3+	Positive LVDS differential data input (Even data)
24	GND	Ground.
25~27	NC	No connection
28~30	VDD	Power Supply Input Voltage +5V



2.3 Timing Characteristics

LVDS Receiver : Timing Controller (LVDS Rx merged) / LVDS Data : Pixel Data

<Table 1. Open Cell Input Connector Pin Configuration >

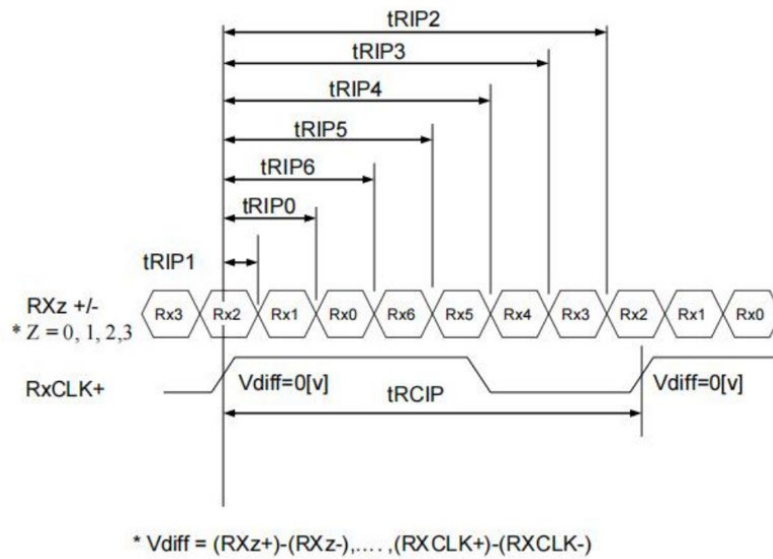
Channel No.	Data No.	8-bit LVDS Type
		NS
0	Bit-0	R0
	Bit-1	R1
	Bit-2	R2
	Bit-3	R3
	Bit-4	R4
	Bit-5	R5
	Bit-6	G0
1	Bit-0	G1
	Bit-1	G2
	Bit-2	G3
	Bit-3	G4
	Bit-4	G5
	Bit-5	B0
	Bit-6	B1
2	Bit-0	B2
	Bit-1	B3
	Bit-2	B4
	Bit-3	B5
	Bit-4	HS
	Bit-5	VS
	Bit-6	DE
3	Bit-0	R6
	Bit-1	R7
	Bit-2	G6
	Bit-3	G7
	Bit-4	B6
	Bit-5	B7
	Bit-6	-

LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter.

<Table 2 . LVDS Rx Interface Timing Specification>

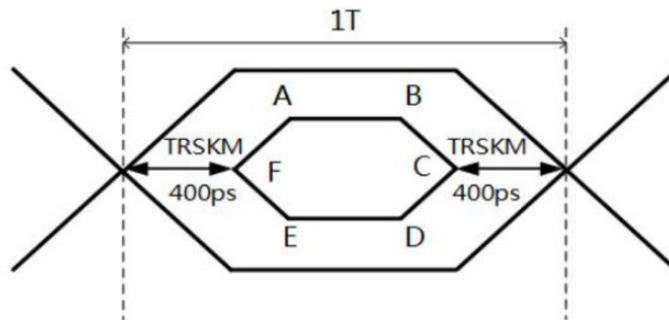
Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCIP	12.83	13.47	16.66	nsec	
Input Data 0	tRIP1	-0.42	0.0	+0.42	nsec	
Input Data 1	tRIP0	tRCIP/7-0.42	tRCIP/7	tRCIP/7+0.42	nsec	
Input Data 2	tRIP6	2 × tRCIP/7-0.42	2 × tRCIP/7	2 × tRCIP/7+0.42	nsec	
Input Data 3	tRIP5	3 × tRCIP/7-0.42	3 × tRCIP/7	3 × tRCIP/7+0.42	nsec	
Input Data 4	tRIP4	4 × tRCIP/7-0.42	4 × tRCIP/7	4 × tRCIP/7+0.42	nsec	
Input Data 5	tRIP3	5 × tRCIP/7-0.42	5 × tRCIP/7	5 × tRCIP/7+0.42	nsec	
Input Data 6	tRIP2	6 × tRCIP/7-0.42	6 × tRCIP/7	6 × tRCIP/7+0.42	nsec	



LVDS Rx Interface Eye Diagram

< Table 3. LVDS Rx Interface Eye Diagram>

Symbol	Min	Typ	Max	Unit	Note
A	-	150	-	mV	
B	-	150	-	mV	
C	-	0	-	mV	
D	-	-150	-	mV	
E	-	-150	-	mV	
F	-	0	-	mV	

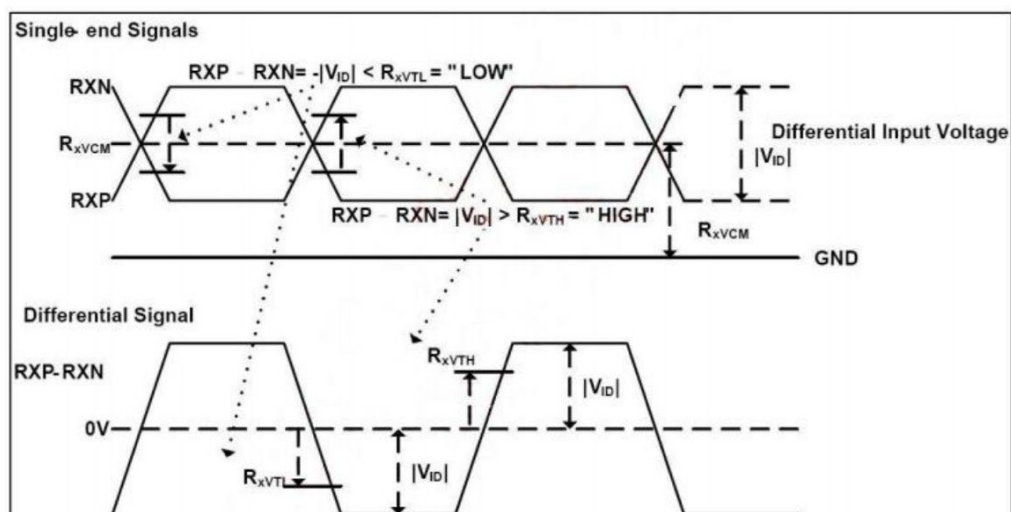


- Notes: 1. Time F to A, B to C, C to D, E to F is 150p second.
 2. LVDS clock=74.25Mhz.
 3. The time A to B= $1T-2*TRSKM-2*150ps$.

LVDS Receiver Differential Input

<Table 3-1. LVDS Receiver Differential Input>

Symbol	Parameter	Min	Typ	Max	Unit	Condition
R_{xVTH}	Differential input high threshold voltage	-		+0.1	V	$R_{xVCM} = 1.2V$
R_{xVTL}	Differential input low threshold voltage	-0.1		-	V	
R_{xVIN}	Input voltage range (singled-end)	0.4		1.9	V	
R_{xVCM}	Differential input common mode voltage	1.0		1.4	V	
$ V_{ID} $	Differential input voltage	± 0.1		± 0.6	V	



SIGNAL TIMING SPECIFICATION

Timing Parameters (DE only mode)

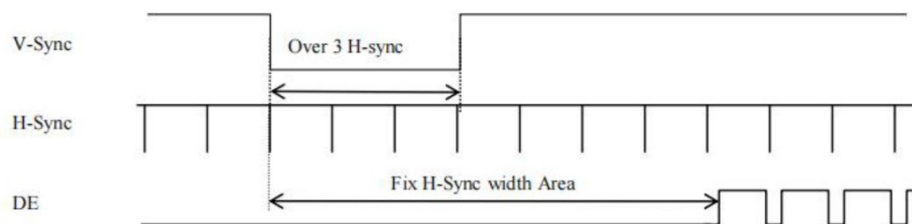
< Table 4. Timing Table >

Item		Symbols		Min	Typ	Max	Unit
Clock	Frequency	1/Tc		60	74.25	78	MHz
	High Time	Tch		-	4/7Tc	-	
	Low Time	Tcl		-	3/7Tc	-	
Frame Period		Tv		1100	1125	1149	lines
				48.5	60	63	Hz
Horizontal Active Display Term		Valid	t _{HV}	-	960	-	t _{CLK}
		Total	t _{HP}	1060	1100	1200	t _{CLK}
Vertical Active Display Term		Valid	t _{VV}	-	1080	-	t _{HP}
		Total	t _{VP}	1100	1125	1149	t _{HP}

<Table 9. LVDS Input SSCG>

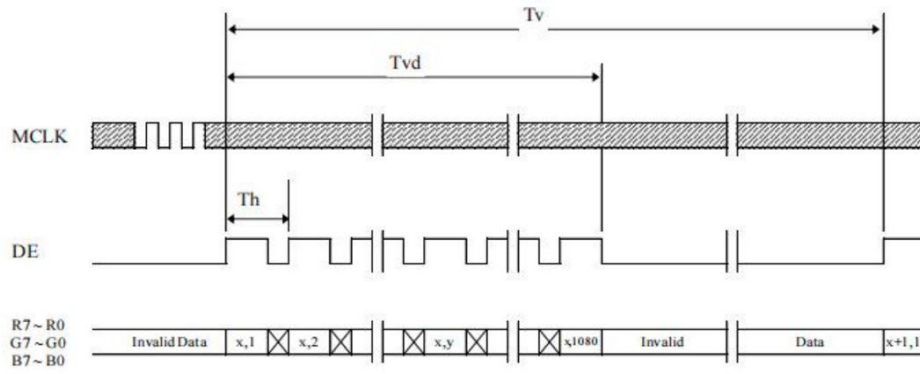
Symbol	Parameter	Condition	Min	Typ	Max	Unit
F	LVDS Input frequency	-	60	74.25	78	MHz
T _{LVSK}	LVDS channel to channel skew	F=100MHz V _{IC} =1.2V V _{ID} =±400mV	-380	-	+380	ps
F _{LVMOD}	Modulating frequency of input clock during SSC		60	-	85	KHz
F _{LVDEV}	Maximum deviation of input clock frequency during SSC		-3	-	+3	%
T _{CY-CY}	Cycle to Cycle jitter		-	-	100	ps

Sync Timing Waveforms

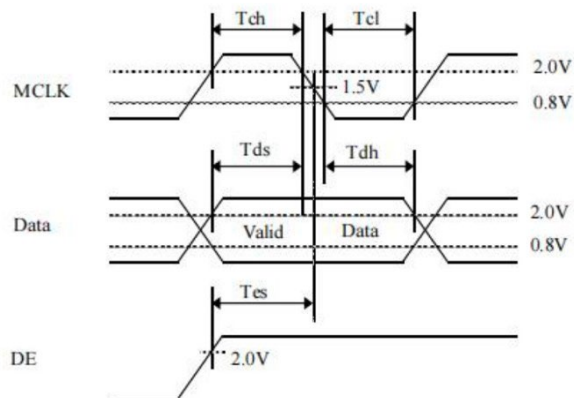
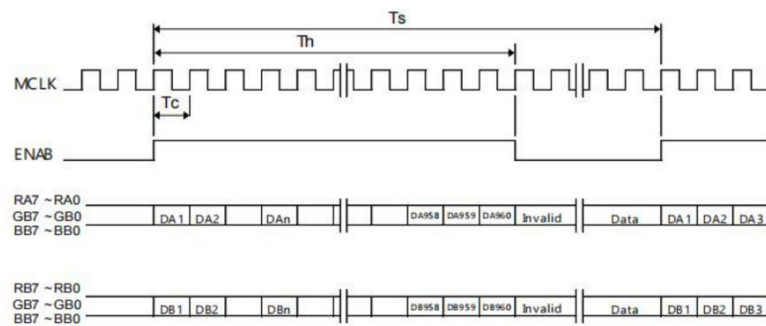


- 1) Need over 3 H-sync during V-Sync Low
- 2) Fix H-Sync width from V-Sync falling edge to first rising edge

Vertical Timing Waveforms

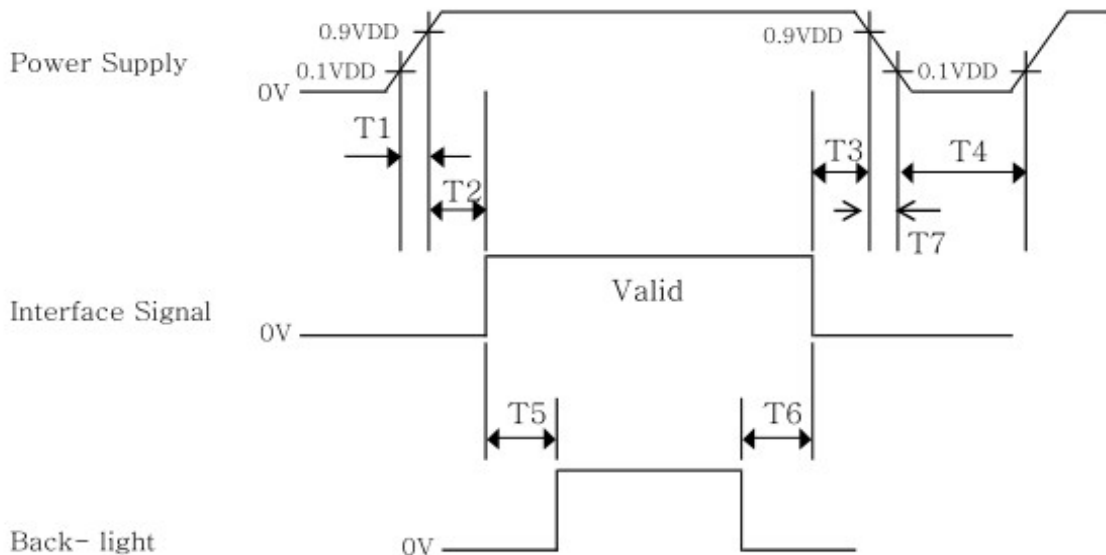


Horizontal Timing Waveforms



2.4 Power On/Off Sequence

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



- $0.5 \text{ ms} \leq T1 \leq 10 \text{ ms}$
- $0 \leq T2 \leq 50 \text{ ms}$
- $0 \leq T3 \leq 50 \text{ ms}$
- $1 \text{ sec} \leq T4$
- $200 \text{ ms} \leq T5$
- $200 \text{ ms} \leq T6$

Notes:

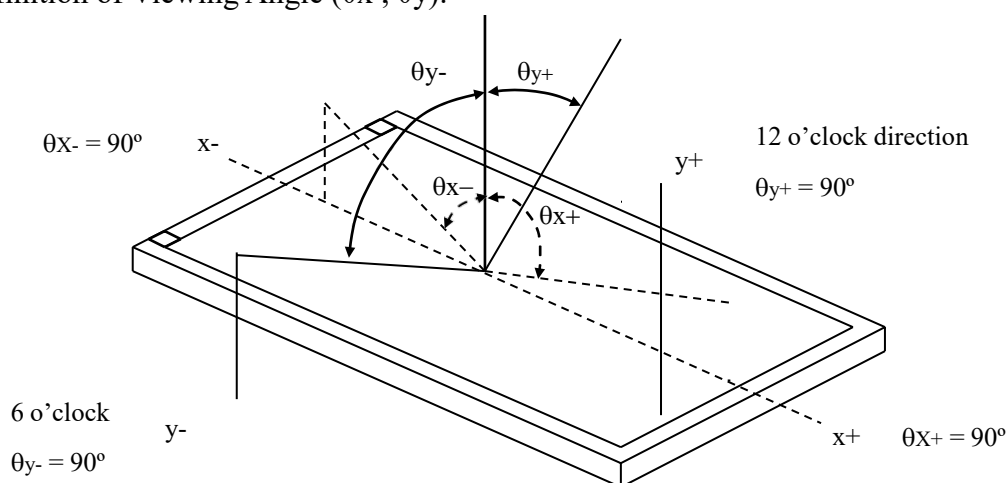
1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on.
3. Back Light must be turn on after power for logic and interface signal are valid.
4. T7 decreases smoothly, there is none re-bouncing voltage.

3 Optical Specification

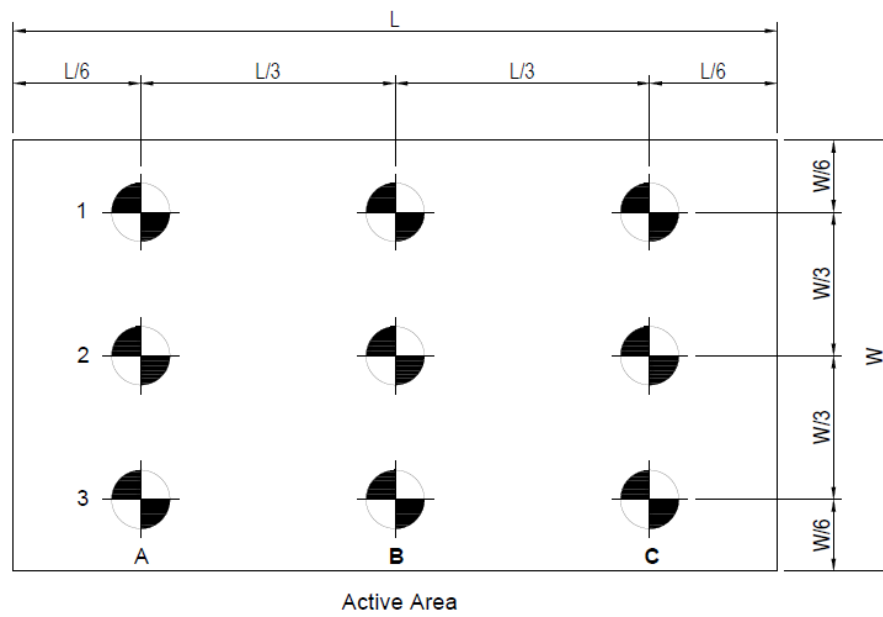
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	R _x	$\theta_x=0$ $\theta_y=0$ CA-410	0.617	0.647	0.677	-	Test Mode: (2) (3)
		R _y		0.308	0.338	0.368	-	
	Green	G _x		0.262	0.292	0.322	-	
		G _y		0.603	0.633	0.663	-	
	Blue	B _x		0.116	0.146	0.176	-	
		B _y		0.027	0.057	0.087	-	
	White	W _x		0.247	0.277	0.307	-	
		W _y		0.273	0.303	0.333	-	
Center Luminance of White		L _c	$\theta_x=0$ $\theta_y=0$	900	1000	1300	cd/m ²	
Uniform		L _u	CA-410		84		%	
Contrast Ratio		CR	$\theta_x=0$	810:1	900:1		-	Test Mode: (4)
Color Saturation		NTSC	$\theta_y=0$ Klein K-10		83		%	
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 :

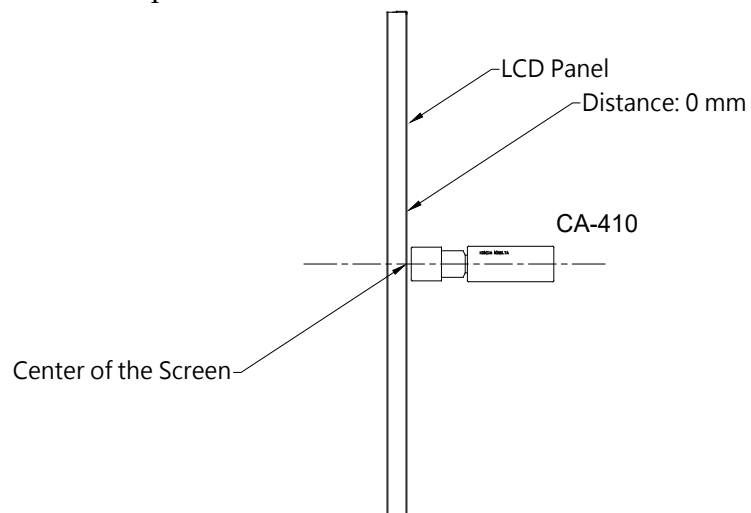
(1) Definition of Viewing Angle (θ_x , θ_y):



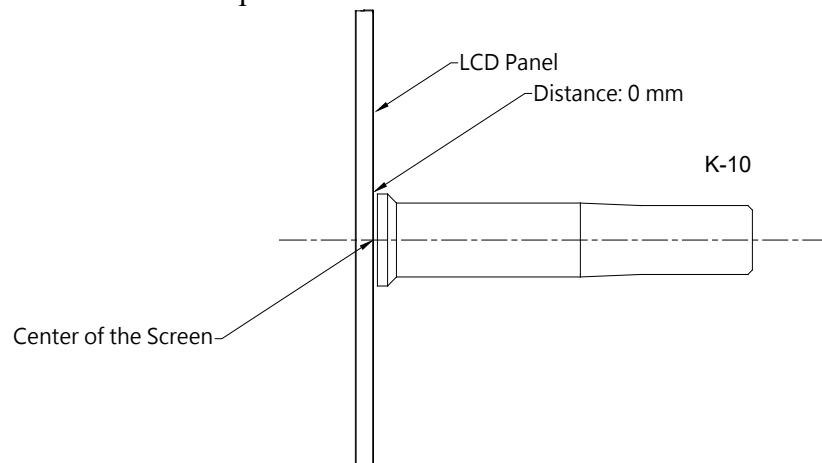
(2) Definition of Test Point:



(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 LED backlight.

4.1 Operating Characteristics

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	V _{in}		10.0	12.0	14.0	V	
Input Current (High Brightness)	I _{inH}	Brightness = 100%	2.30	1.92	1.64	A	(1)
Input Power Consumption	P _{in}	Brightness = 100%	-----	23.04	-----	W	
LED Current (High Brightness)	I _{outH}	Brightness = 100%	-----	0.52	-----	A	
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%	-----	39.98	40.03	V	
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: 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: J2,J3(JST S2B-EH or Compatible)

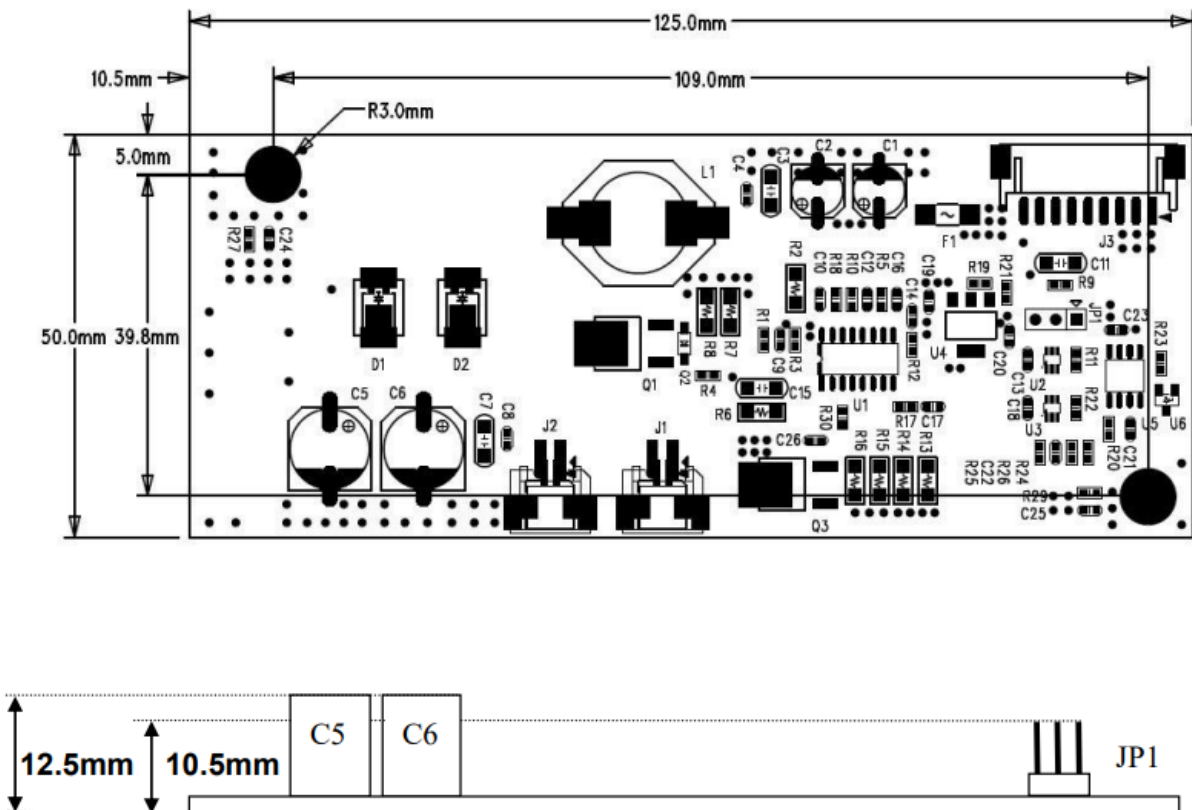
PIN NO	Symbol	Description
1	Output	LED High Voltage(+)
2	Output	LED Low Voltage (-)

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

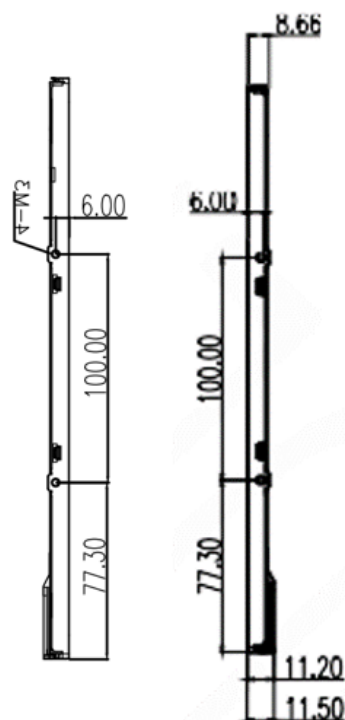
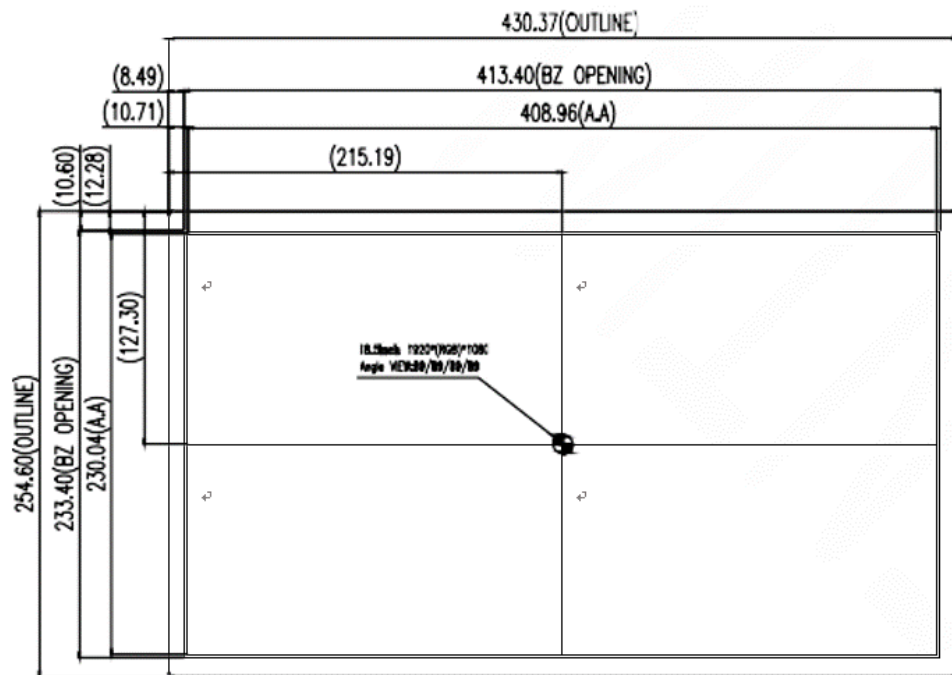
4.3 Mechanical Characteristics

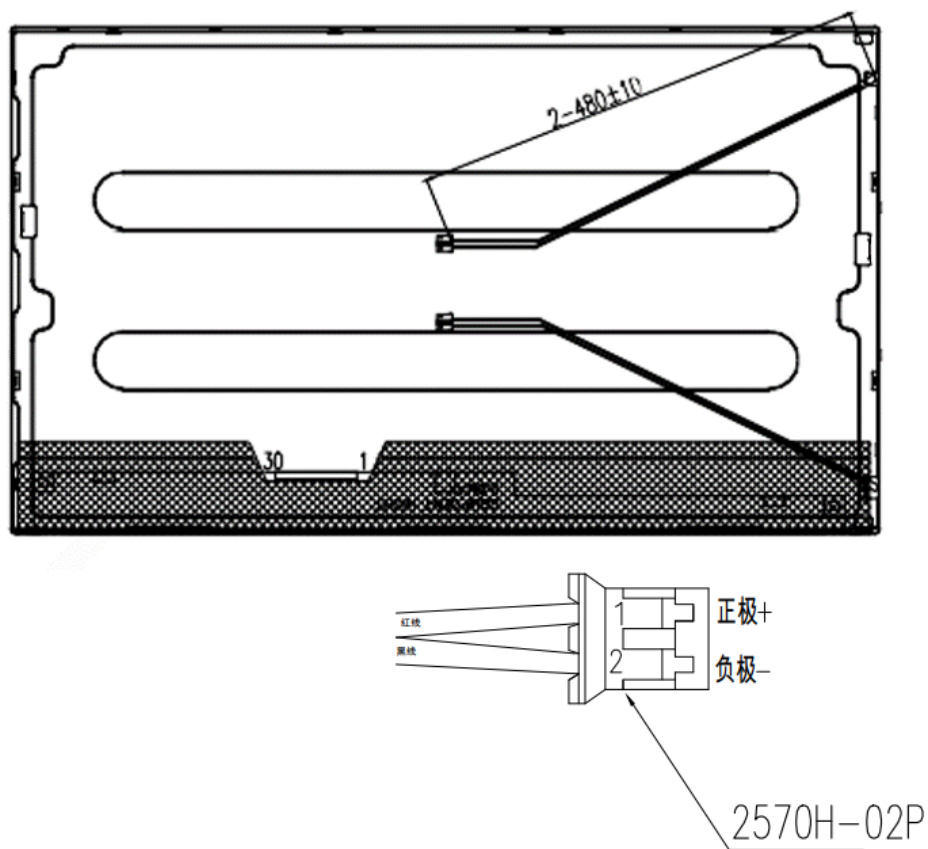
Dimension: 125 mm x 50 mm x 12.5mm



5 Mechanical Drawing

Unit: mm





Note :

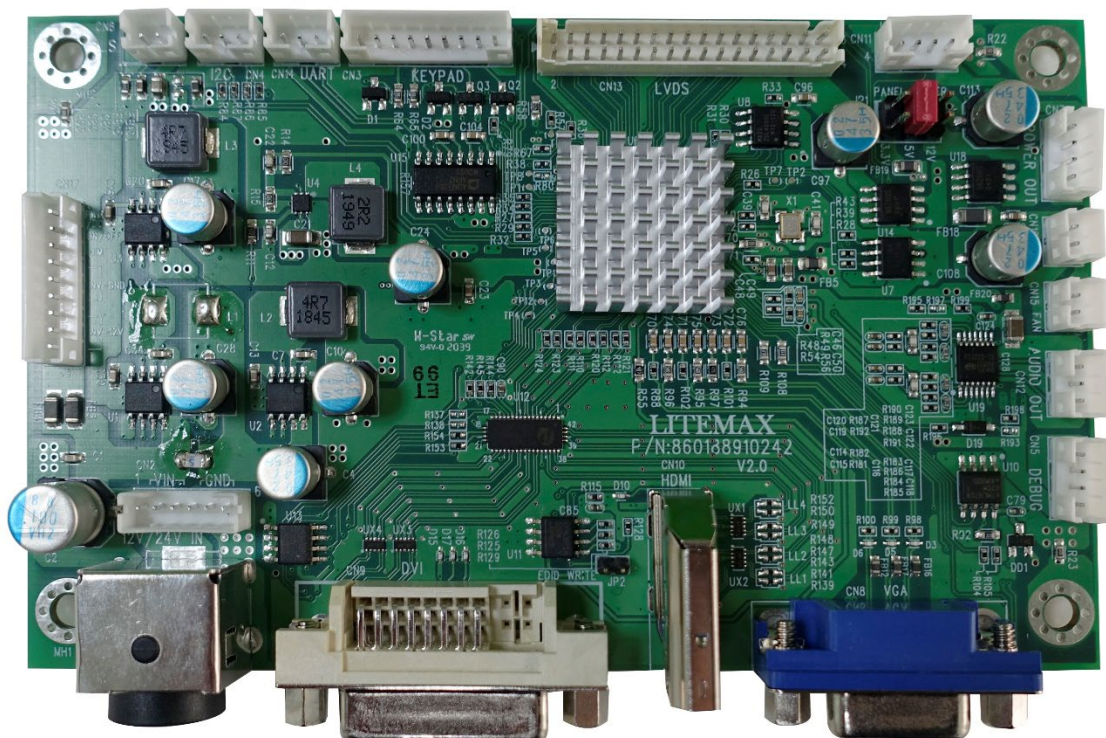
1. Resolution: 1920x1080
2. "()"marks the reference dimensions
3. Front Case is black paint

6 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. Rev.1 is European RoHS compliant.

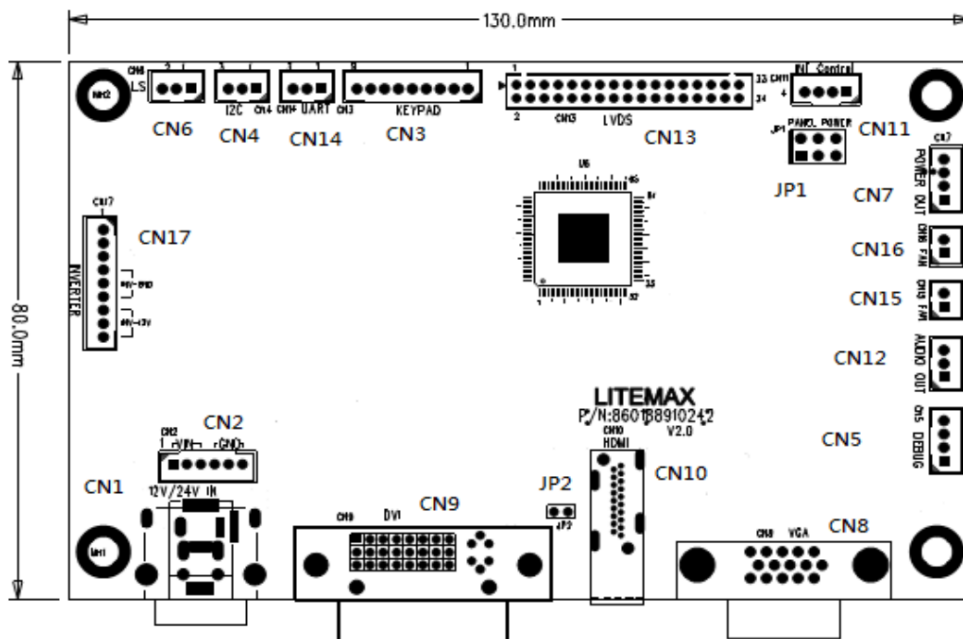
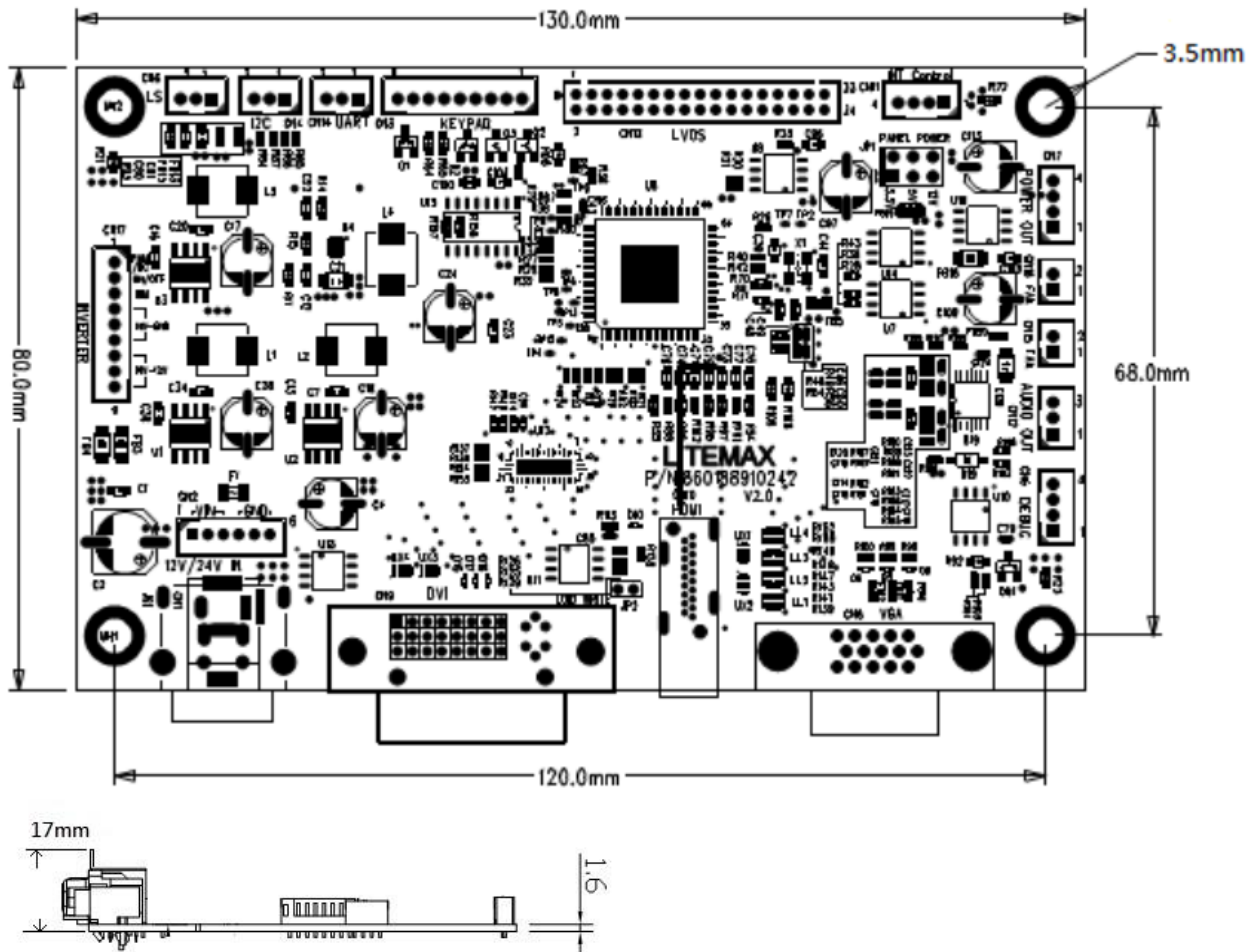
6.1 General Description

- Max Resolution Up To Full HD
- Analog RGB Input up to 205MHz
- Ultra-Reliable DVI-D Input
- HDMI Input (HDMI 1.3)
- Dual/single LVDS interface
- Inverter Analog or PWM Dimming Control
- Support Panel DC 5V or 12V,3.3V Output
- OSD Control
- External RS232 control (optional)
- Input Power 24V or 12V dc(optional)
- Audio Out(optional)
- *External Digital light sensor brightness control (optional)
- *External light sensor brightness control (optional)
- Support output voltage 12V(1A) and 5V(1A)



6.2 Outline Dimensions

AD8891GDH = 130mm X 80mm



6.3 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 High
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 No.	Symbol	Description	Pin No.	Symbol	Description
1	RED	Analog Red	9	+5V	+5VDCC
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	VSYN	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	24V/12V	2	24V/12V
3	GND	4	GND

CN1: Power Jack (12V)

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

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

Pin No.	Function	Pin No.	Function
1	24V/12V	2	24V/12V
3	24V/12V	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	NC
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: INT Control (4PIN 2.0mm)

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

Reserved for some control

CN6: Ambient (2PIN 2.0mm)/VR (3PIN 2.0mm)

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

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	Pull High	2	GND

When EDID want to update it must be short

C5: 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

CN17: Inverter Connector (9PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	PWM/DC SEL	6	GND
2	Backlight ON/OFF	7	24V/12V
3	Dimming Adjust	8	24V/12V
4	GND	9	24V/12V
5	GND		

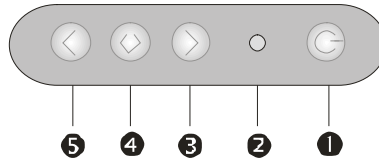
DC Characteristics

Power Consumption	10W	Note 1
Operation Temperature	-30~85	°C
Storage Temperature	-30~85	°C

Note: These values are for the A/D board body.

6.4 OSD Function

MEMBRANE CONTROL BUTTOM



- **POWER SWITCH:** Pushing the power switch will turn the monitor on. Pushing it again to turn the monitor off.
- **Power LED:** Power ON-Green / Power off-No.
- **Up Key >:** Increase item number or value of the selected item.
- **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.
- **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.

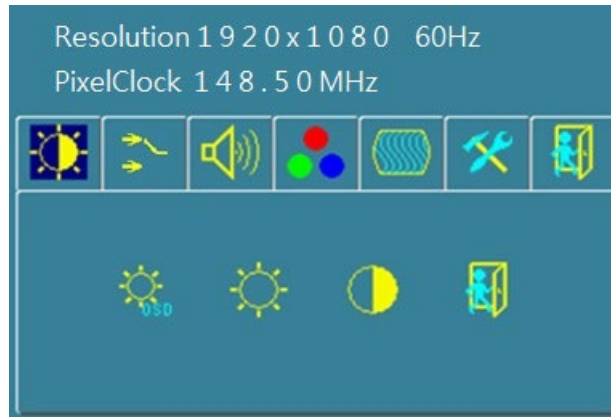
5. Return & Exit the main menu

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 :

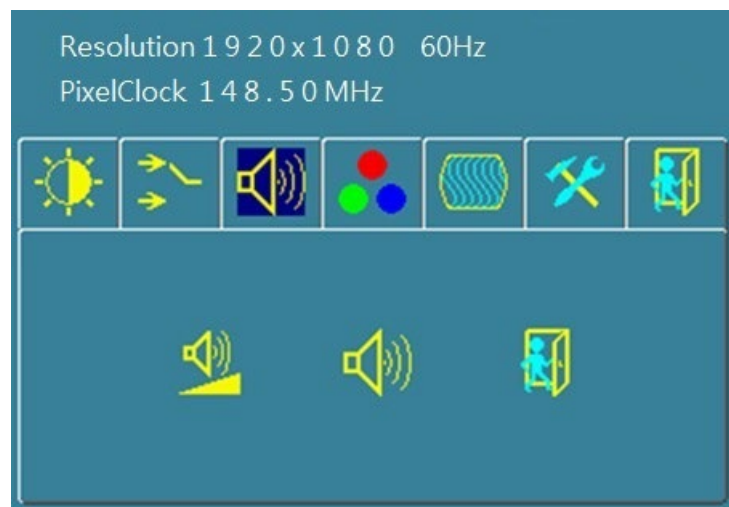
Press “Menu” once, you can adjust the contrast from “0” to “100” by pressing the “Left” and “Right”.



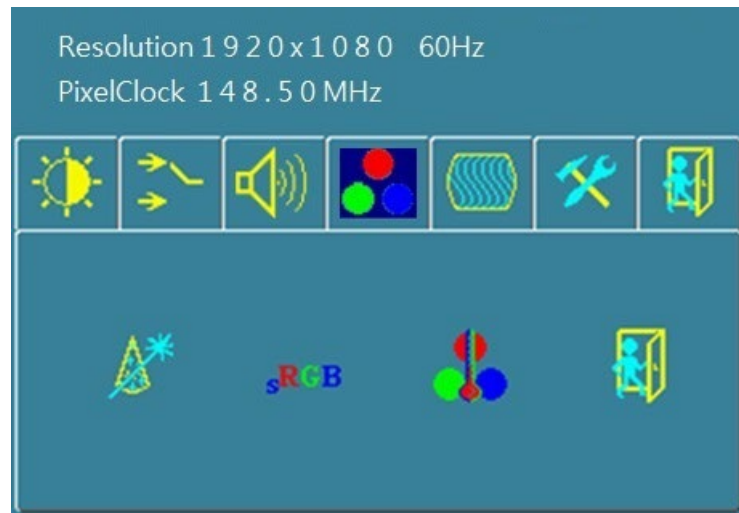
Exit: back to the beginning menu.



- VGA** Analog: RGB/VGA input
- DVI** Digital: DVI input
- HDMI** HDMI: HDMI input
- Exit** Exit: back to the beginning menu



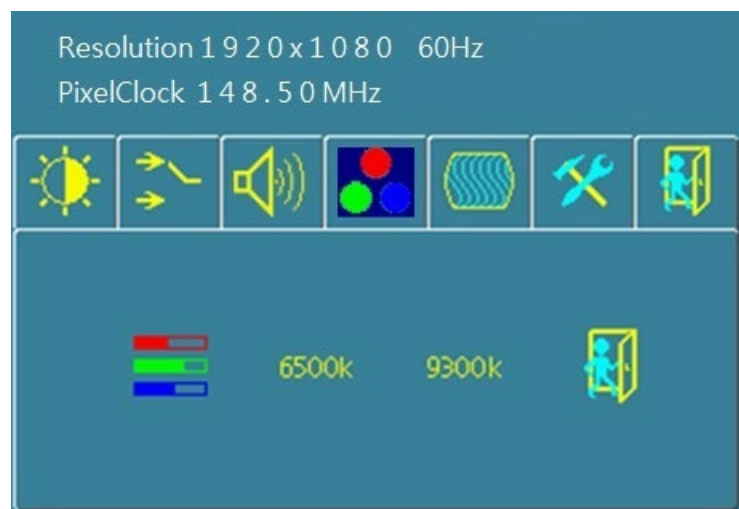
- Audio Volume:** Audio volume adjustment.
- UnMute/Mute:** You can mute the speaker by pressing this option.
- Exit:** back to the beginning menu.



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”.



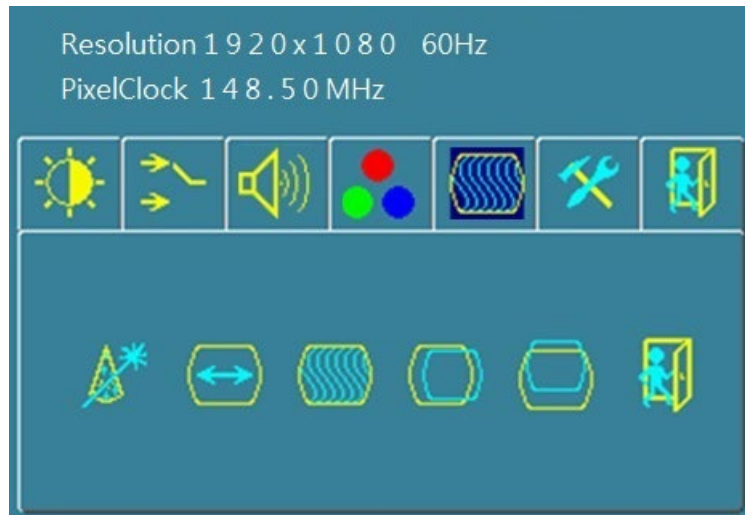
Color Tempture_6500K: Warm color scheme



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..



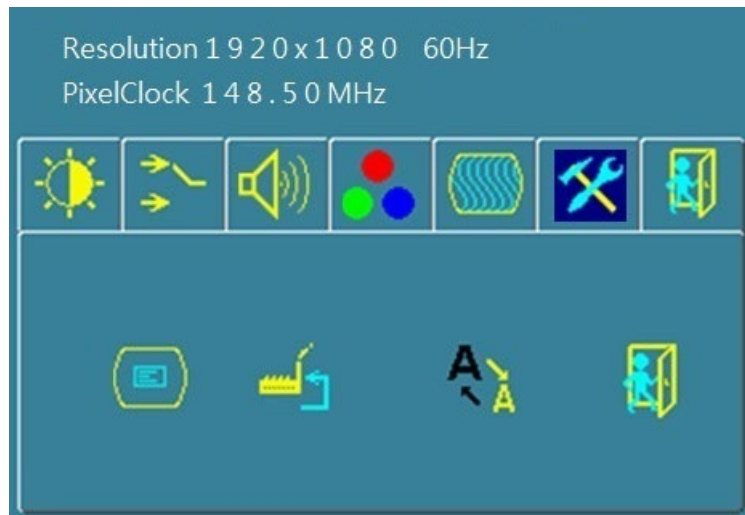
HPos: You can shift the screen horizontally using this function.



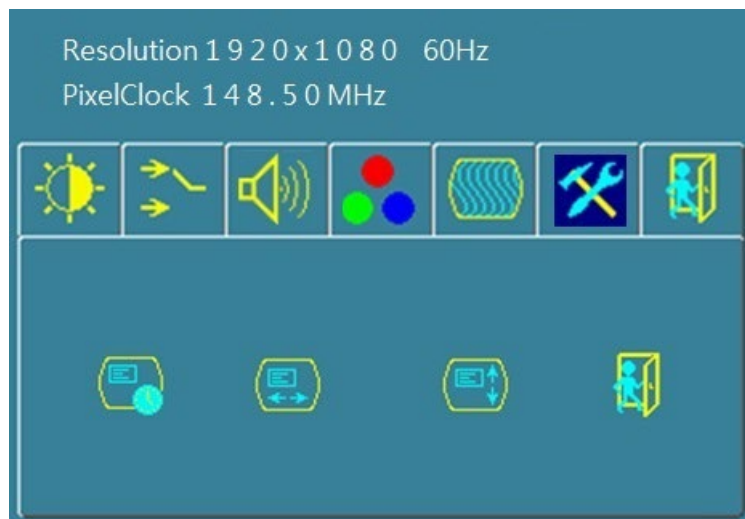
VPos: You can shift the screen vertically using this function.



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.



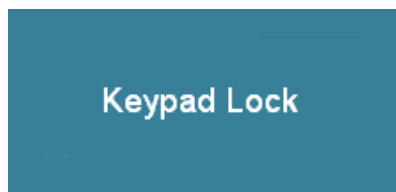
Sharpness: Sharpen characters.



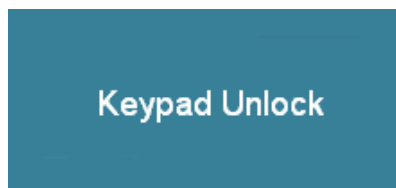
Exit: back to the normal screen

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.



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.