LITEMAX
Sunlight Readable LCD!

ENRICH YOUR VISUAL WORLD...

SPANPIXEL
Stretched LCD

LITEMAX

SSF/SSH3325-Y
Sunlight Readable 33.2” LED B/L 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

Version and Date	Page	Old Description	New Description	Remark
July/17/2019	all		Initial release	

Contents

Record of Revision **2**
Contents **3**
1 General Description **4**
1.1 Features 4
1.2 General Specifications 4
1.3 Absolute Maximum Ratings 5
2 Electrical Specifications **6**
2.1 TFT LCD Electrical Characteristics 6
2.2 Electrical Interface Connection 7
2.3 SIGNAL TIMING SPECIFICATION 9
2.4 LVDS Rx Interface Timing Parameter 10
2.5 SIGNAL TIMING WAVEFORMS OF INTERFACE SIGNAL 11
2.6 Input Signals, Basic Display Colors and Gray Scale of Colors 12
2.7 Power Sequence 13
3 Optical Specification **14**
4 LED Driving Board Specifications **16**
4.1 Operating Characteristics 16
4.2 Connector Socket 17
4.3 Mechanical Characteristics 18
5 Mechanical Drawing **19**
6 AD9131GDHPR Board & OSD Functions **20**
6.1 General Description 20
6.2 Outline Dimensions 21
6.3 AD9131GDHPR Board Pin Define 22
6.4 OSD Function 29
6.5 OSD Menu 31
7 Precautions **40**
7.1 Handling and Mounting Precautions 40
7.2 Storage Precautions 40
7.3 Operation Precautions 41
8 Disclaimer **41**

1 General Description

The SSF/SSH3325-Y is a 33.2 inch color TFT-LCD display with special aspect ratio 1:1 and wide resolution 1920 x 1920. It is Litemax's Spanpixel series product which designed for high brightness with power efficiency LED backlight. It provides LCD panel with specific aspect ratios and sunlight readable for digital signage, public transportation, exhibition hall, department store, and vending machine.

1.1 Features

- High Brightness 1000nits
- Sunlight Readable
- Aspect ratio 1:1
- LED Backlight
- Low Power Consumption
- Slim Bezel
- BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	SSF/SSH3325-Y
Description	33.2" TFT LCD, 1000nits LED Backlight, 1920x1920
Screen Size	33.2"
Display Area (mm)	596.16(H) x 596.16(V)
Brightness	1000 cd/m^2
Resolution	1920x1920
Aspect Ratio	1 : 1
Contrast Ratio	600 : 1
Pixel Pitch (mm)	0.3105(H) x 0.3105(V)
Pixel Pre Inch (PPI)	82
Viewing Angle	178°(H),178°(V)
Color Saturation (NTSC)	77%
Display Colors	16.7M
Response Time (Typical)	8ms
Panel Interface	LVDS
AD Board Input Interface	Dual-DVI, HDMI, DP
Input Power	AC 100~240V
Power Consumption	56W (60W with AD board)
OSD Key	5 Keys (Power Switch, Menu, +, Exit, -)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position…etc
Dimensions (mm)	612.96x612.96x12.5
Bezel Size(U/B/L/R)	5.5/5.5/5.5/5.5 mm
Weight (Net)	5.5kg
Operating Temperature	0 ˚C ~ 50 ˚C
Storage Temperature	-20 ˚C ~ 60 ˚C

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

1.3 Absolute Maximum Ratings

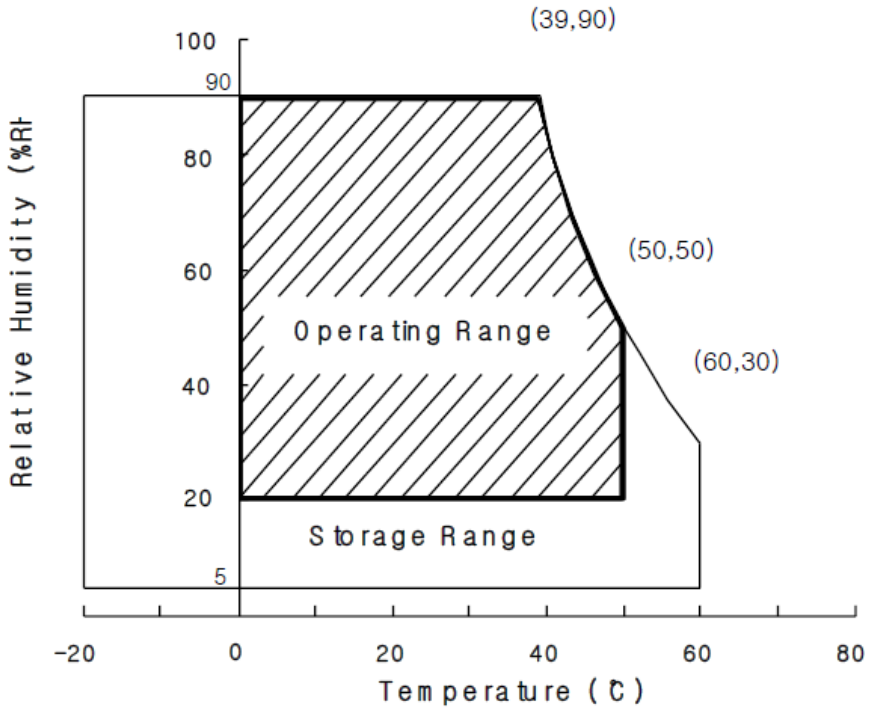
The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed below Table.

[VSS=GND=0V]

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	3.5	5.5	V	Ta = 25 ℃
Logic Supply Voltage	V_{IN}	VSS-0.3	V_{DD}+0.3	V	
Operating Temperature	T_{OP}	0	+50	℃	1)
Storage Temperature	T_{ST}	-20	+60	℃	1)
LCM Surface Temperature (Operation)	$T_{surface}$	0	+65	℃	2)

Notes :

1. Temperature and relative humidity range are shown in the figure below.
   Wet bulb temperature should be 39 ℃max. and no condensation of water.
2. LCM Surface Temperature should be Min. 0℃ and Max. 65℃ under the VLCD=5.0V, fV=60Hz, 25℃ ambient Temp. No humidity control and LED string current is typical Value.



2 Electrical Specifications

2.1 TFT LCD Electrical Characteristics

[Ta =25± 2 ℃]

Parameter		Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	4.5	5.0	5.5	V	Note1
Power Supply Current	I_{DD}	-	1400	1600	mA	
In-Rush Current	I_{RUSH}	-	3.0	4.0	A	Note 2
Permissible Input Ripple Voltage	V_{RF}	-	-	300	mV	V_{DD} = 5.0V
High Level Differential Input Threshold Voltage	V_{TH}	-	-	+100	mV	V_{IC}=1.2V
Low Level Differential Input Threshold Voltage	V_{TL}	-100	-	-	mV	
Differential input voltage	$\|V_{ID}\|$	100	-	600	mV	
Differential input common mode voltage	Vcm	0.7	-	1.6	V	

Notes :

1. The supply voltage is measured and specified at the interface connector of LCM.

   The current draw and power consumption specified is for VDD=5.0V, Frame rate=60Hz. Test Pattern of power supply current

   a) Typ : Color Bar pattern

   b) Max : Gray level 255 pattern

2. Duration of rush current is about 2 ms and rising time of VDD is 520 μs ± 20 %

2.2 Electrical Interface Connection

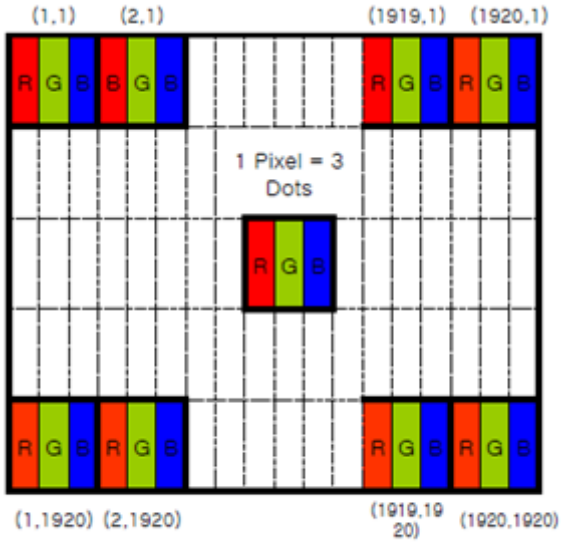
CN1 Module Side Connector : IS050-C51B-C39-Sor Equivalent

No	Symbol	Function		No	Symbol	Function
1	GND	Power Ground		27	NC	
2	NC			28	CH4_0-	FOURTH_ Negative LVDS differential data input
3	NC			29	CH4_0+	FOURTH_ Positive LVDS differential data in put
4	NC			30	CH4_1-	FOURTH_ Negative LVDS differential data input
5	NC			31	CH4_1+	FOURTH_ Positive LVDS differential data input
6	NC			32	CH4_2-	FOURTH_ Negative LVDS differential data input
7	NC			33	CH4_2+	FOURTH_ Positive LVDS differential data input
8	NC			34	GND	Power Ground
9	NC			35	CH4_CLK-	FOURTH_ Negative LVDS differential clock input
10	NC			36	CH4_CLK+	FOURTH_ Positive LVDS differential clock input
11	NC			37	GND	Power Ground
12	CH3_0-	THIRD_ Negative LVDS differential data input		38	CH4_3-	FOURTH_ Negative LVDS differential data input
13	CH3_0+	THIRD_ Positive LVDS differential data input		39	CH4_3+	FOURTH_ Positive LVDS differential data input
14	CH3_1-	THIRD_ Negative LVDS differential data input		40	NC	
15	CH3_1+	THIRD_ Positive LVDS differential data input		41	NC	
16	CH3_2-	THIRD_ Negative LVDS differential data input		42	NC	
17	CH3_2+	THIRD_ Positive LVDS differential data input		43	NC	
18	GND	Power Ground		44	GND	Power Ground
19	CH3_CLK-	THIRD_ Negative LVDS differential clock input		45	GND	Power Ground
20	CH3_CLK+	THIRD_ Positive LVDS differential clock input		46	GND	Power Ground
21	GND	Power Ground		47	NC	
22	CH3_3-	THIRD_ Negative LVDS differential data input		48	VIN	Power +5V
23	CH3_3+	THIRD_ Positive LVDS differential data input		49	VIN	Power +5V
24	NC			50	VIN	Power +5V
25	NC			51	VIN	Power +5V
26	GND	Power Ground				

CN2 Module Side Connector : IS050-C41B-C39-Sor Equivalent

No	Symbol	Function		No	Symbol	Function
1	NC			22	NC	
2	NC			23	NC	
3	NC			24	GND	Power Ground
4	NC			25	GND	Power Ground
5	NC			26	CH2_0-	SECOND_ Negative LVDS differential data input
6	NC			27	CH2_0+	SECOND_ Positive LVDS differential data input
7	NC			28	CH2_1-	SECOND_ Negative LVDS differential data input
8	NC			29	CH2_1+	SECOND_ Positive LVDS differential data input
9	GND	Power Ground		30	CH2_2-	SECOND_ Negative LVDS differential data input
10	CH1_0-	FIRST_ Negative LVDS differential data input		31	CH2_2+	SECOND_ Positive LVDS differential data input
11	CH1_0+	FIRST_ Positive LVDS differential data input		32	GND	Power Ground
12	CH1_1-	FIRST_ Negative LVDS differential data input		33	CH2_CLK-	SECOND_ Negative LVDS differential clock input
13	CH1_1+	FIRST_ Positive LVDS differential data input		34	CH2_CLK+	SECOND_ Positive LVDS differential clock input
14	CH1_2-	FIRST_ Negative LVDS differential data input		35	GND	Power Ground
15	CH1_2+	FIRST_ Positive LVDS differential data input		36	CH2_3-	SECOND_ Negative LVDS differential data input
16	GND	Power Ground		37	CH2_3+	SECOND_ Positive LVDS differential data input
17	CH1_CLK-	FIRST_ Negative LVDS differential clock input		38	NC	
18	CH1_CLK+	FIRST_ Positive LVDS differential clock input		39	NC	
19	GND	Power Ground		40	GND	Power Ground
20	CH1_3-	FIRST_ Negative LVDS differential data input		41	GND	Power Ground
21	CH1_3+	FIRST_PositiveLVDS differential data input				

Data Input Format



Display Position of Input Data (V-H)

2.3 SIGNAL TIMING SPECIFICATION

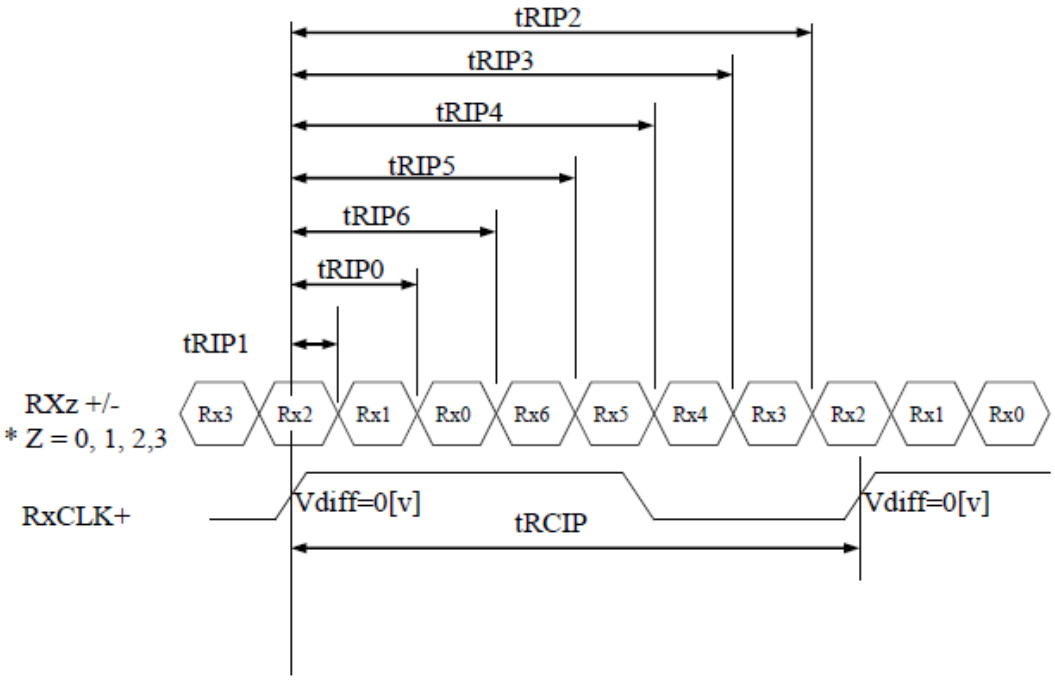
The LCM is operated by the DE only

Item	Symbols		Min	Typ	Max	Unit	Note
DCLK	Period	tCLK	14.08	14.78	15.56	ns	
	Frequency	-	64.3	67.6	71	MHz	
Hsync	Period	tHP	550	550	550	tCLK	
	Horizontal Valid	tHV	480	480	480	tCLK	
	Horizontal Blank	tHB	70	70	70		
	Frequency	fH	121.1	123	124.7	KHz	
Vsync	Period	tVP	2049	2050	2051	tHP	
	Vertical Valid	tVV	1920	1920	1920	tHP	
	Vertical Blank	tVB	129	130	131	tHP	
	Frequency	fV	57	60	63	Hz	
LVDS Receiver clock	Input spread spectrum ratio	SSr	-	-	-	%	

2.4 LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown below Table

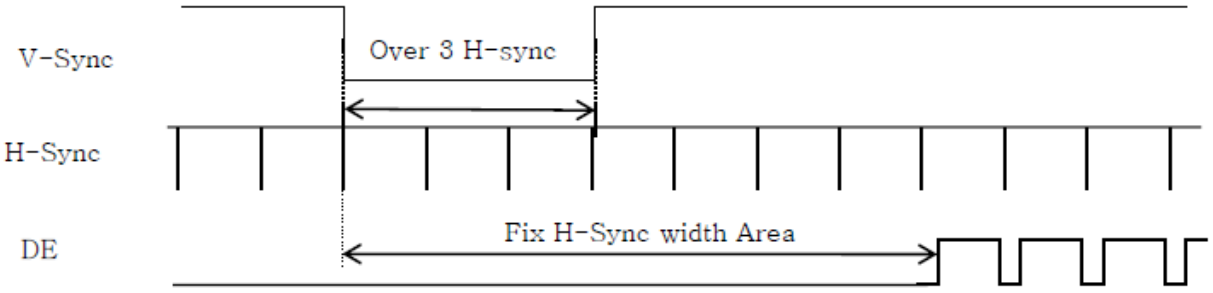
Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCIP	14.08	14.78	15.56	nsec	
Input Data 0	tRIP1	-0.4	0.0	+0.4	nsec	
Input Data 1	tRIP0	tRCIP/7-0.4	tRCIP/7	tRCIP/7+0.4	nsec	
Input Data 2	tRIP6	2 ×tRCIP/7-0.4	2 ×tRCIP/7	2 ×tRCIP/7+0.4	nsec	
Input Data 3	tRIP5	3 ×tRCIP/7-0.4	3 ×tRCIP/7	3 ×tRCIP/7+0.4	nsec	
Input Data 4	tRIP4	4 ×tRCIP/7-0.4	4 ×tRCIP/7	4 ×tRCIP/7+0.4	nsec	
Input Data 5	tRIP3	5 ×tRCIP/7-0.4	5 ×tRCIP/7	5 ×tRCIP/7+0.4	nsec	
Input Data 6	tRIP2	6 ×tRCIP/7-0.4	6 ×tRCIP/7	6 ×tRCIP/7+0.4	nsec	



* Vdiff = (RXz+)-(RXz-),…. ,(RXCLK+)-(RXCLK-)

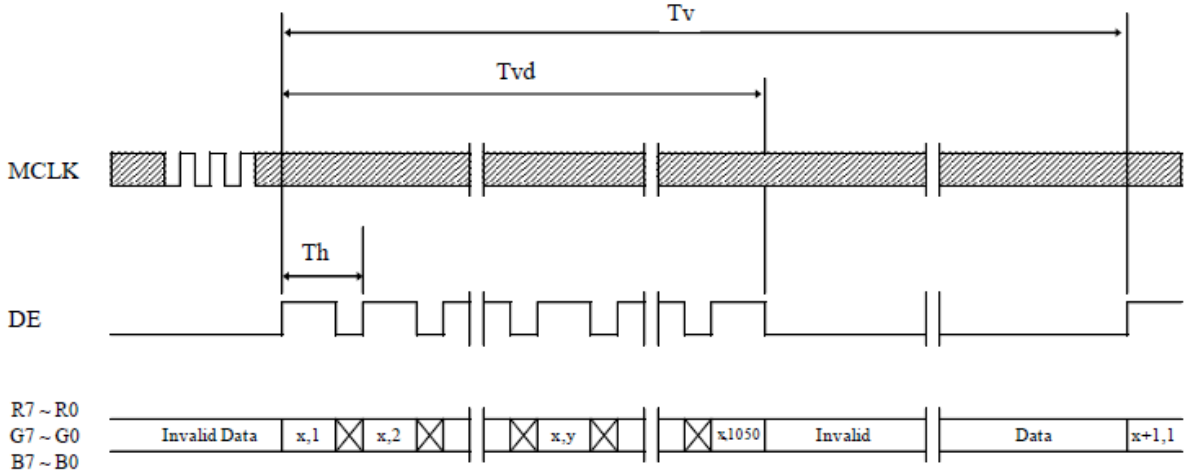
2.5 SIGNAL TIMING WAVEFORMS OF INTERFACE SIGNAL

Sync Timing Waveforms

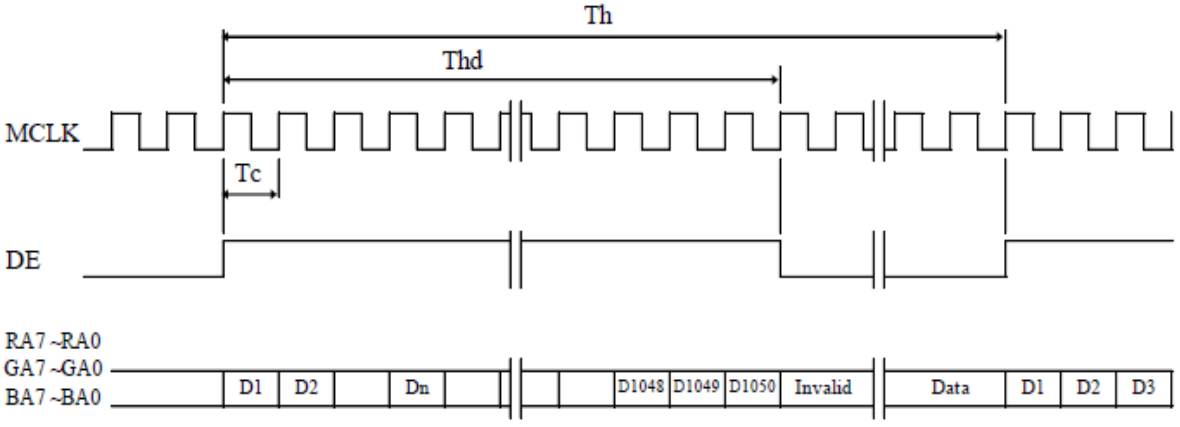


1) Need over 3 H-sync during V-Sync Low
2) Fix H-Sync width from V-Sync falling edge to first rising edge

Vertical Timing Waveforms



Horizontal Timing Waveforms

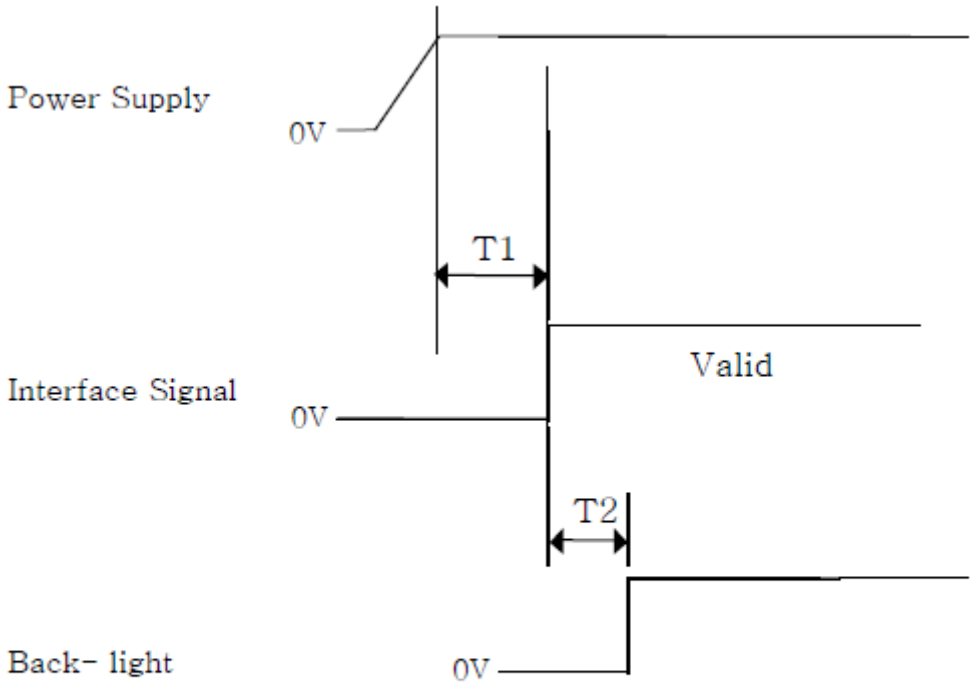


2.6 Input Signals, Basic Display Colors and Gray Scale of Colors

Color & Gray Scale		RED DATA								GREEN DATA								BLUE DATA							
		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
	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
	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
	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
	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
	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	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△																								
	▽																								
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	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	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	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	△																								
	▽																								
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	▽	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	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	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	△																								
	▽																								
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of WHITE	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
	△																								
	▽																								
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	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

2.7 Power Sequence

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



- 0 ≤ T1 ≤ 70 ms
- 200 ms ≤ T2

Notes:

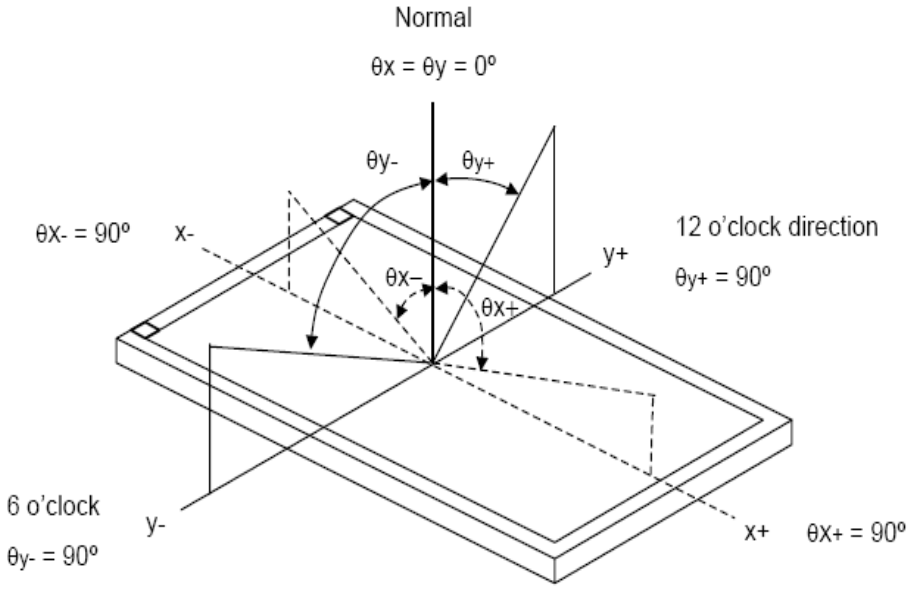
1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on.
3. Back Light must be turn on after power for logic and interface signal are valid.
4. The above power sequence should be satisfied at these case
   -.AC/DC power On/Off
   -.Mode Change (Resolution, frequency, timing, sleep mode, color depth change etc.)
   If not to follow power sequence, there is a risk of abnormal display.

3 Optical Specification

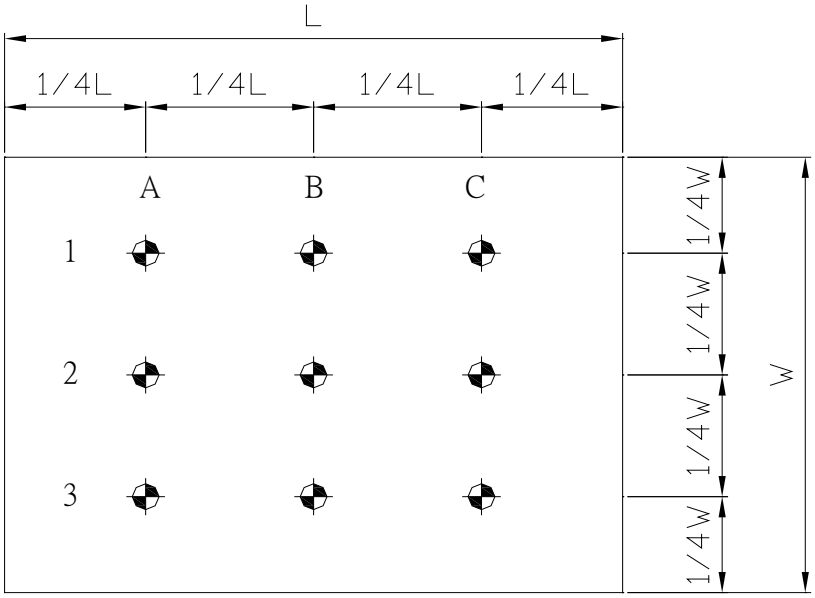
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	θx=0 θy=0 Klein K-10	0.601	0.631	0.661	-	Test Mode: (1) (2) (3)
		Ry		0.316	0.346	0.376	-	
	Green	Gx		0.278	0.308	0.338	-	
		Gy		0.615	0.645	0.675	-	
	Blue	Bx		0.117	0.147	0.177	-	
		By		0.046	0.076	0.106	-	
	White	Wx		0.272	0.302	0.332	-	
		Wy		0.314	0.344	0.374	-	
Center Luminance of White		Lc	θx=0 θy=0 BM-7		1000		cd/m^2	
Uniformity		Lu			83		%	
Contrast Ratio		CR	θx=0 θy=0 Klein K-10		600		-	Test Mode: (1) (4)
Color Saturation		NTSC			77		%	
Viewing Angle	Horizontal	θx+	CR ≥ 10		89		Deg	Test Mode: (1) (3)
		θx-			89			
	Vertical	θy+			89			
		θy-			89			

Test Mode：

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

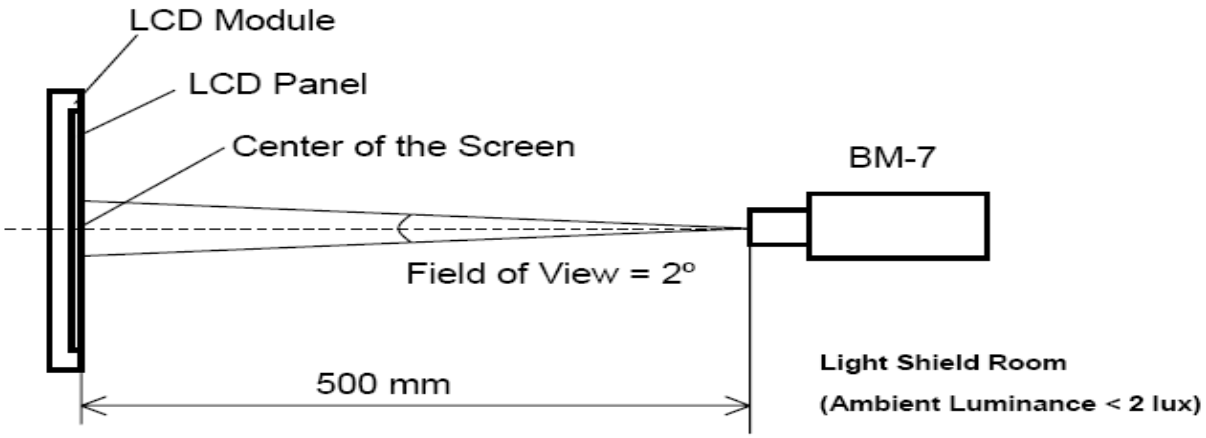


(2) Definition of Test Point:

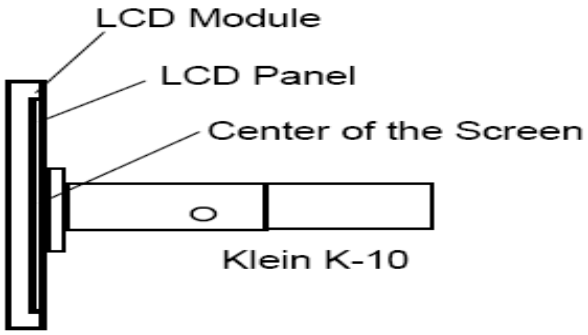


Active Area

(3) BM-7 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	Conditions	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	Vin		22	24	26	V	
Input Current (Low Brightness)	IinL	PWM=0%	0.0	-----	-----	mA	
Input Current (High Brightness)	IinH	PWM=100%	2.21	2.11	2.04	A	
LED Current (Low Brightness)	IoutL	PWM=0%	0.0	-----	-----	Arms	
LED Current (High Brightness)	IoutH	PWM=100%	0.77	0.8	0.83	A	J1~J4
			0.77	0.8	0.83	A	J5~J8
Working Frequency	Freq	PWM=100%	450	473	500	KHZ	
Brightness Control	PWM	Duty cycle	0	--	100	%	Max ratio:100:1
		Freq.	--	200	260	Hz	
ON/OFF Control	Von	Normal Operation	2	--	5	V	
	Voff	Normal Operation	0	--	0.8	V	
Output Voltage	Vout	PWM=100%	28.2	28.7	29.2	V	J1~J4
			28.2	28.7	29.2	V	J5~J8
Efficiency	η	PWM=100%	89.4	90.7	91.3	%	

-

4.2 Connector Socket

Input Connector:

CN1(JSTB10B-PH-K-SorCompatible)

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

CN2(JST B3B-PH-K-S or Compatible)

PIN No	Symbol	Description
1	Control	ON/OFF Control
2	Brightness	Brightness Control
3	GND	Ground

Output Connector:

J1,J2,J3,J4.J5.J6,J7,J8 (JST B2B-EH-TS or Compatible)

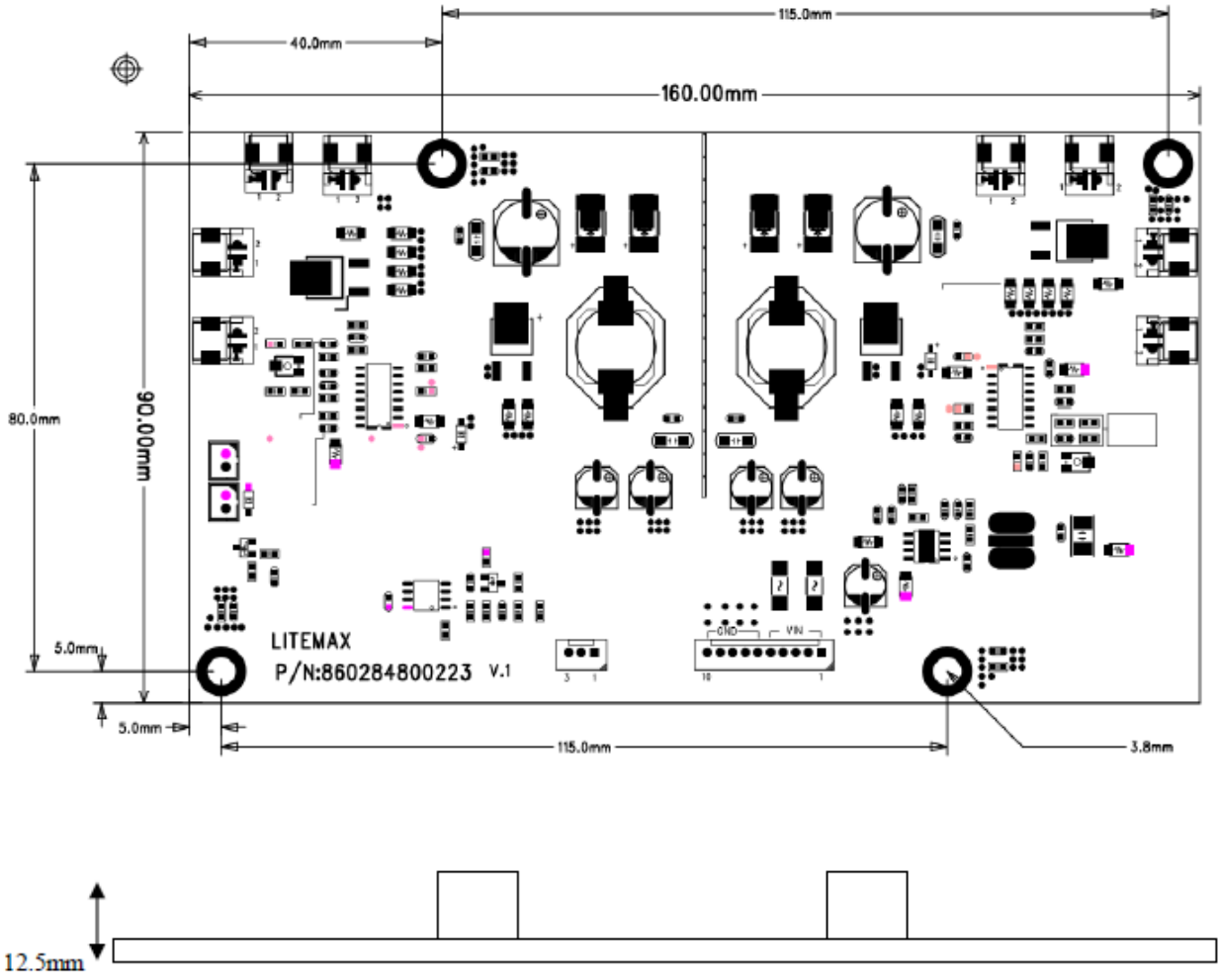
PIN NO	Symbol	Description
1	Output	LED High Voltage(+)
2	Output	LED Low Voltage (-)

H133,H134 (JST S2B-PH-K-S or Compatible)

PIN NO	Symbol	Description
1	Output	Fan (+)
2	Output	Fan (-)

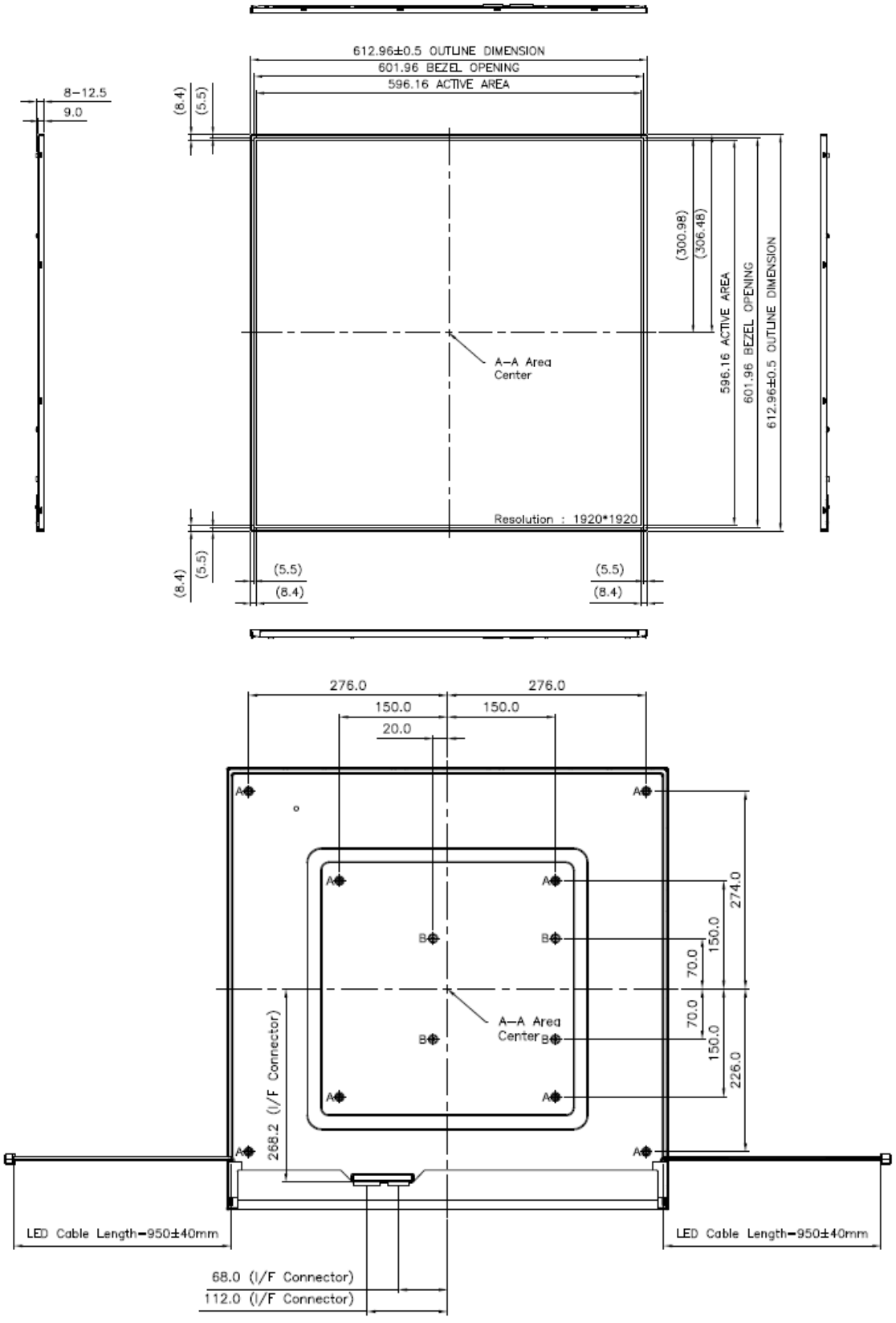
4.3 Mechanical Characteristics

Dimension: 160 x 90 x 12.5mm



5 Mechanical Drawing

Unit:mm



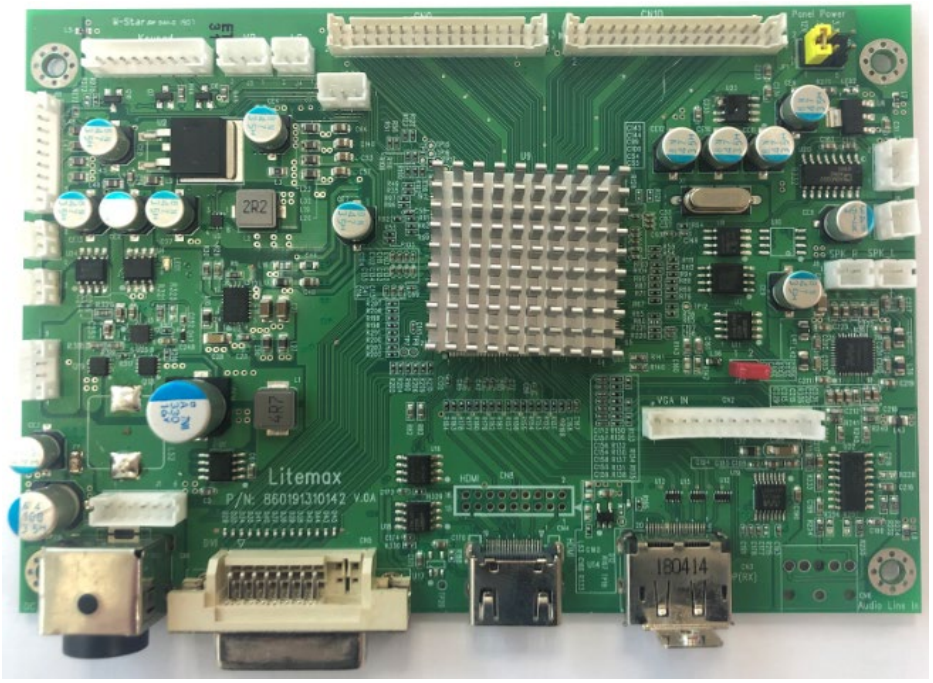
A	M3 MOUNTING HOLE (8X) DP=3.5mm MAX SCREW
B	M3 PCB FIX HOLE (4X) DP=3.5mm MAX SCREW

6 AD9131GDHPR Board & OSD Functions

AD9131GDHPR is a high integrated display controller solution for producing real time, top quality digital video and computer graphic images on LCD panel. The AD9131GDHPR provides an ideal interface between industry standard digital graphics controllers and a wide variety of LCD panel devices.

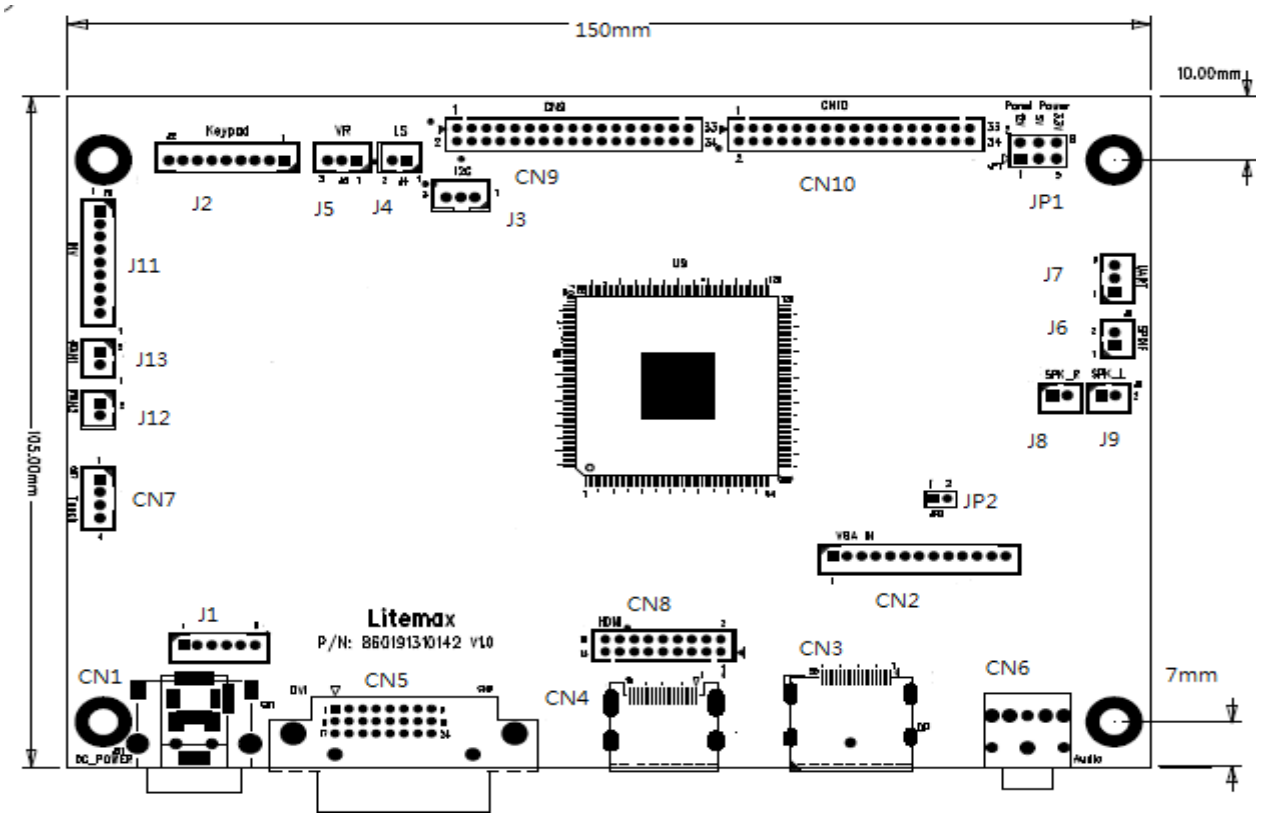
6.1 General Description

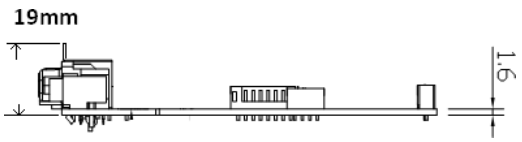
* Max Resolution Up To QHD(2560X1440)
* Support 4-CH LVDS
* Analog RGB Input up to 205MHz
* DVI operates up to165M Hz
* 1 ULTRA-RELIABLE Dual-link DVI INPUT(4K2K@30Hz)
* 1 VGA INPUT(Optional)
* 1 HDMI(HDMI 2.0) Input(4K2K@60Hz)
* 1 Display port Input (DP 1.2a) (4K2K@60Hz)
* LVDS interface
* Support Panel 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 24Vdc,or 12Vdc(24Vdc Power Input Is Optional)



6.2 Outline Dimensions

AD9131 150mm x 105mm





6.3 AD9131GDHPR Board Pin Define

CN9: 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 HI
14	GND	31	PANEL-VCC
15	RxE0-	32	PANEL-VCC
16	RxE0+	33	PANEL-VCC
17	RxE1-	34	PANEL-VCC

CN10: 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 HI
14	GND	31	PANEL-VCC

15	RxE0-	32	PANEL-VCC
16	RxE0+	33	PANEL-VCC
17	RxE1-	34	PANEL-VCC

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-

CN2: Analog RGB Input connector (13pin connector)

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

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		

CN8: HDMI Connector (18pin 2.0mm)

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

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	24Vdc or 12Vdc(Not 1)	2	24Vdc or 12Vdc (Not 1)
3	GND	4	GND

CN1: Power Jack (24V or 12V)

Pin No.	Function	Pin No.	Function
1	24Vdc or 12Vdc(Not 1)	2	GND
3	GND		

J1: Power input connector (6 pin 2.0mm)

Pin No.	Function	Pin No.	Function
1	24Vdc or 12Vdc(Not 1)	2	24Vdc or 12Vdc(Not 1)
3	24Vdc or 12Vdc(Not 1)	4	GND
5	GND	6	GND

Not 1:Power input has tow 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	5Vdc	2	GND
3	12Vdc	4	GND

J11: Inverter Connector (9PIN 2.0mm)

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

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	3,3VDC	2	VR OUT
3	GND		

J4: Ambient (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	3.3VDC/5VDC	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

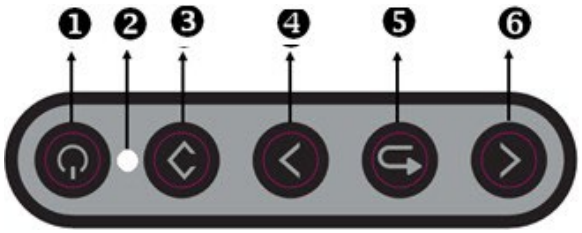
JP2: EDID (2PIN 2.0mm)

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



☐  **Key:** (Power) function key

Press the power switch will turn the monitor on.

Press it again to turn the monitor off.

☐  **LED Status:** Power ON-Green / Power off-No./ Power Saving-Orange

☐  **Key:** (Menu / Enter) function key

When OSD is on. Press this button to the OSD “Main Menu”,

When OSD is off. Press this button to “Enter/Select”.

☐  **Key:** Increase item number or value of the selected item.

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

☐  **Key:** (Exit/Return) function key

It also used for return to previous menu for sub-menu.

Or exit OSD when in Main Menu

☐  **Key:** Decrease item number or item value when OSD is on.

When OSD is off, it is Brightness hot key

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 **Up Key**  and **Down**  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 **Up Key**  and **Down Key**  buttons to change the setting values.

4. **Save**

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

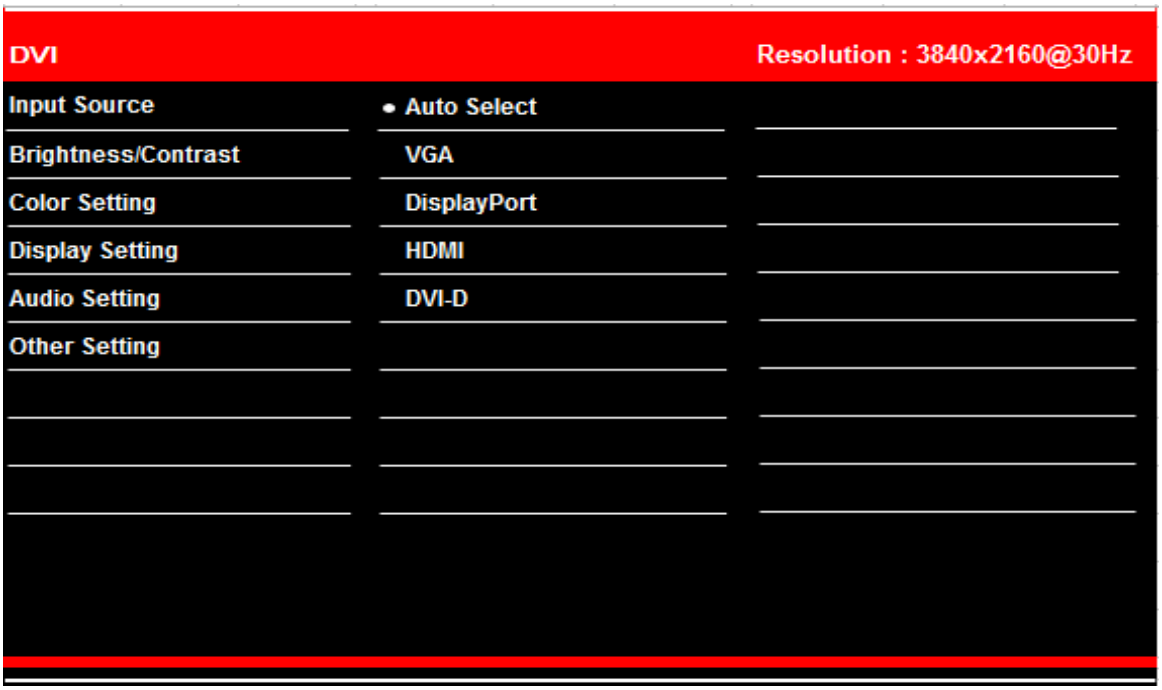
5. **Return & Exit the Main Menu**

   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.

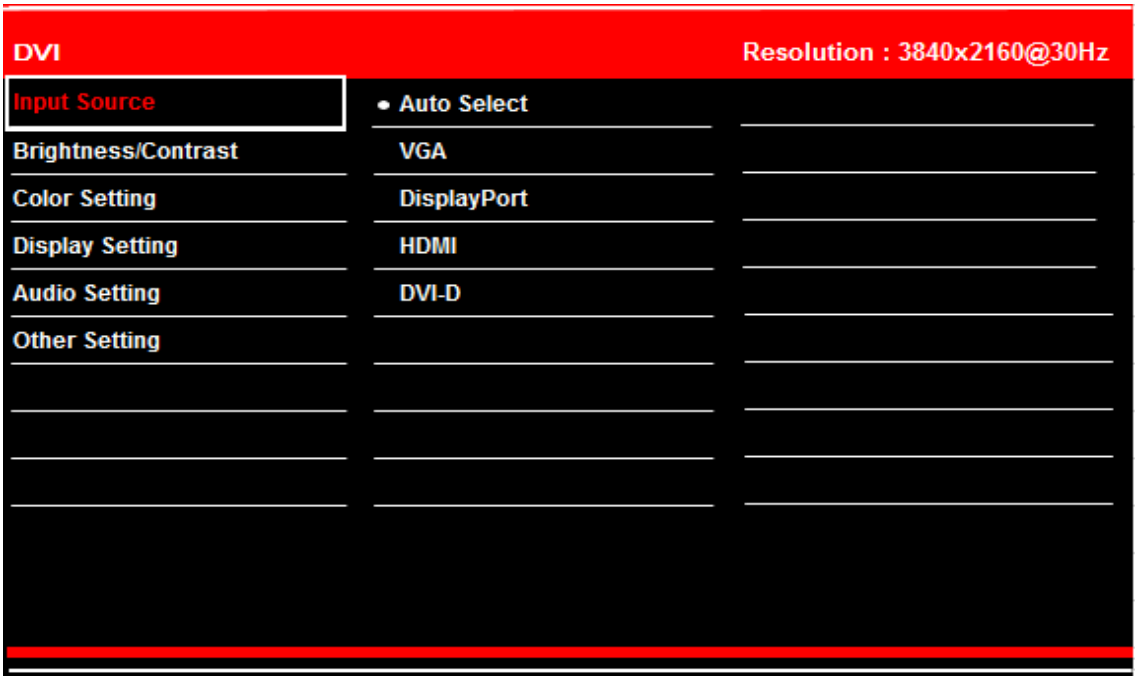
6.5 OSD Menu

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.

There are 6 subpages inside the OSD manual, Input Source, Brightness/Contrast, Color Setting, Display Setting, Audio Setting, and Other Setting.

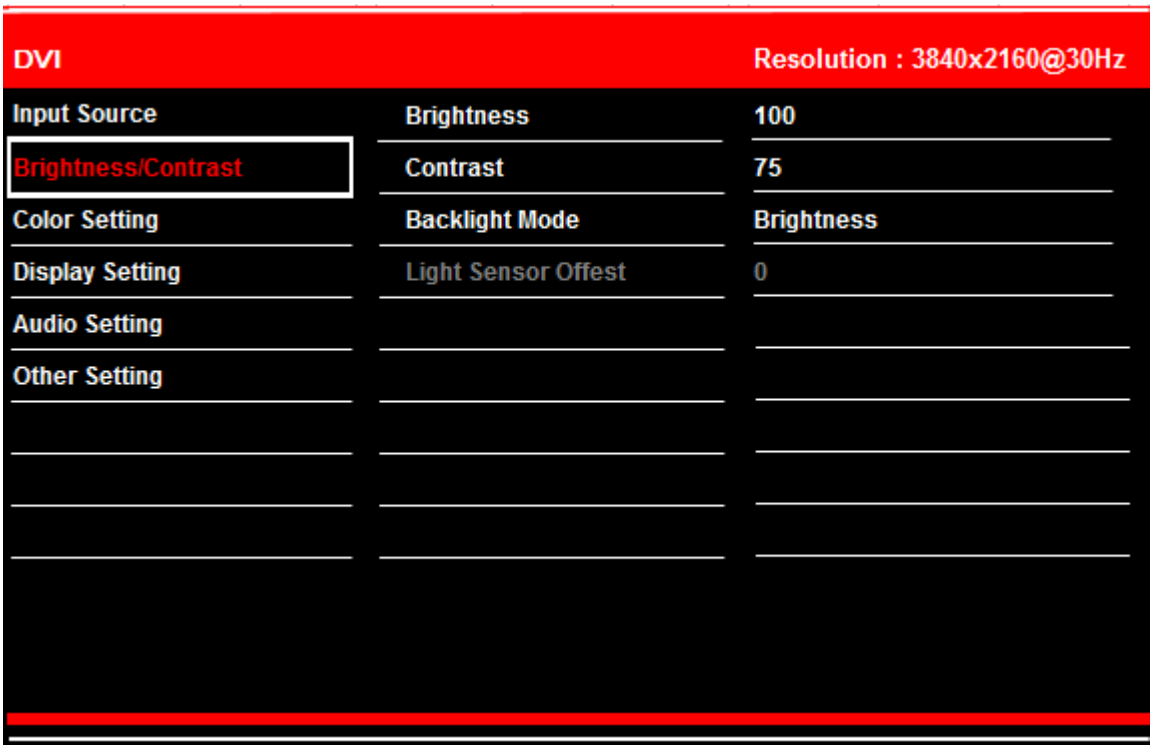


Input Source : press ”Menu” into subpage
There are have : Auto Select、VGA、DisplayPort、HDMI and DVI-D

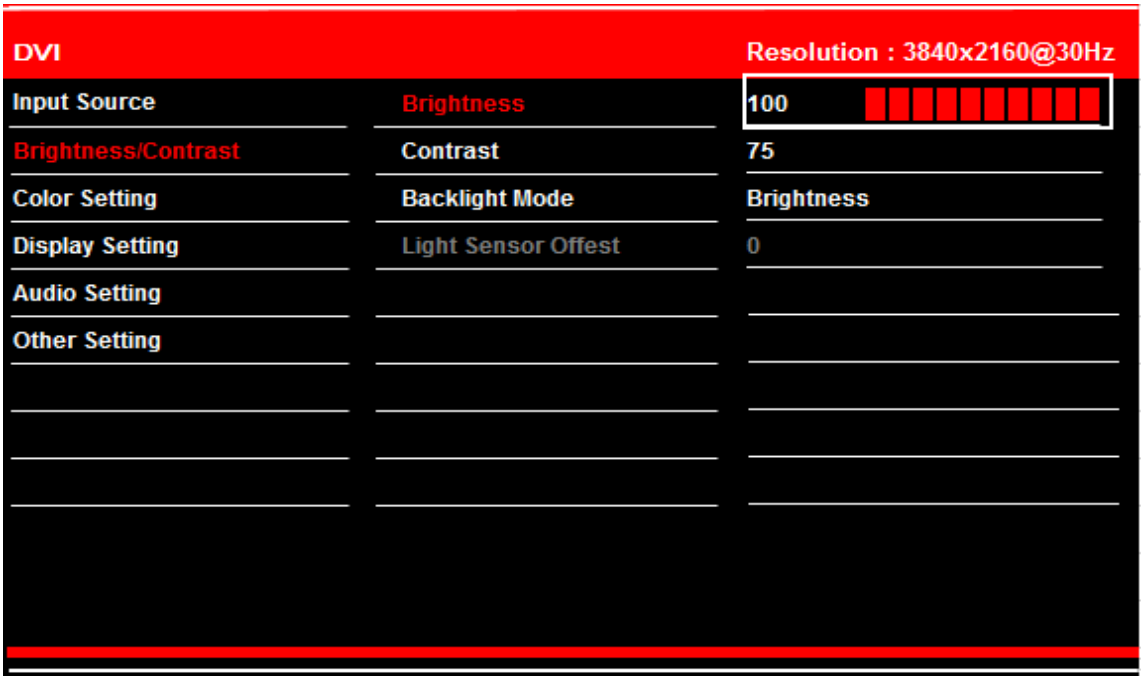


Brightness / Contrast Icon
There are 3 subpages inside the OSD manual, Brightness, Contrast and Backlight Mode.

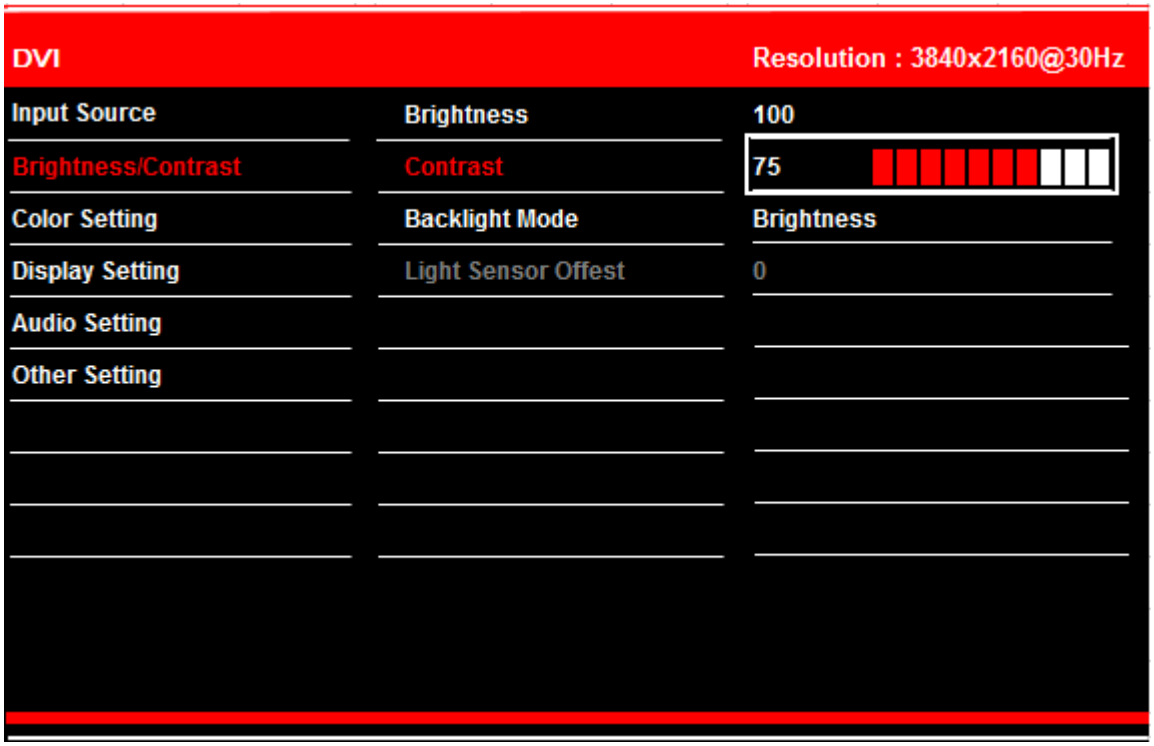
Brightness/Contrast : press ”Menu” into subpage
There are have : Brightness, Contrast and Backlight Mode



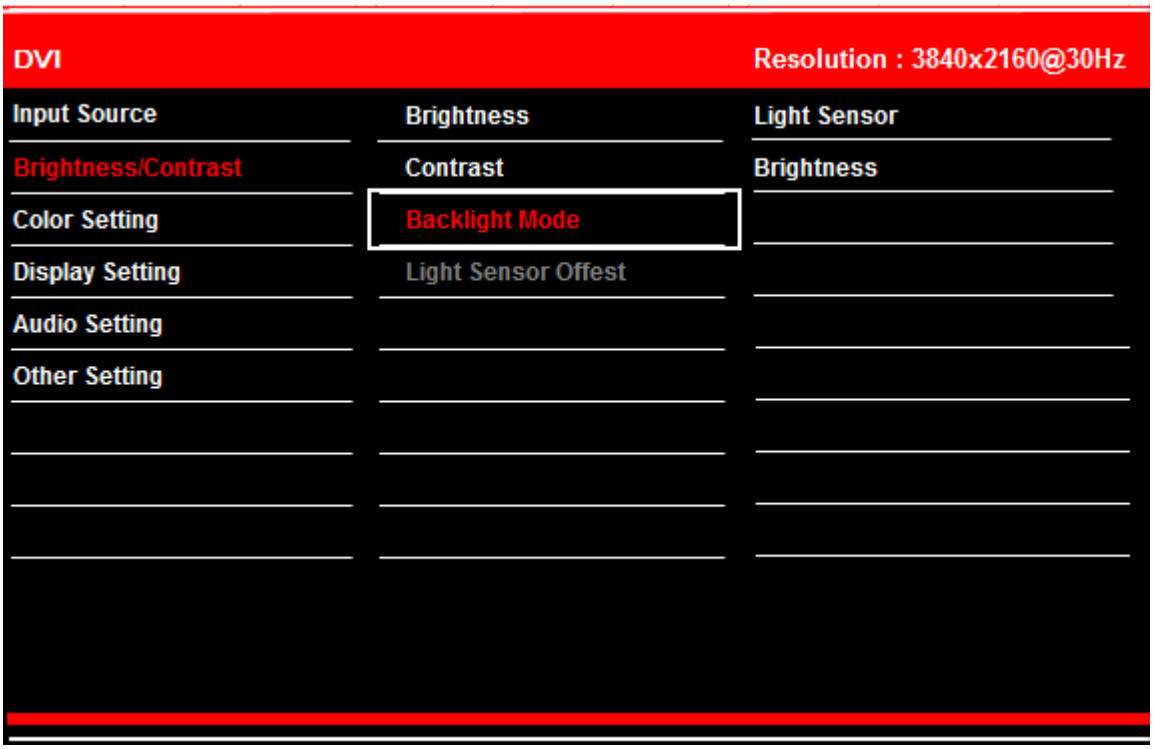
Brightness : press ”Menu” into subpage
If is Brightness Mode, you can go into adjust the brightness.
Press “left” you can dim down the brightness to “0”, while press “right” you can increase the brightness to “100”.



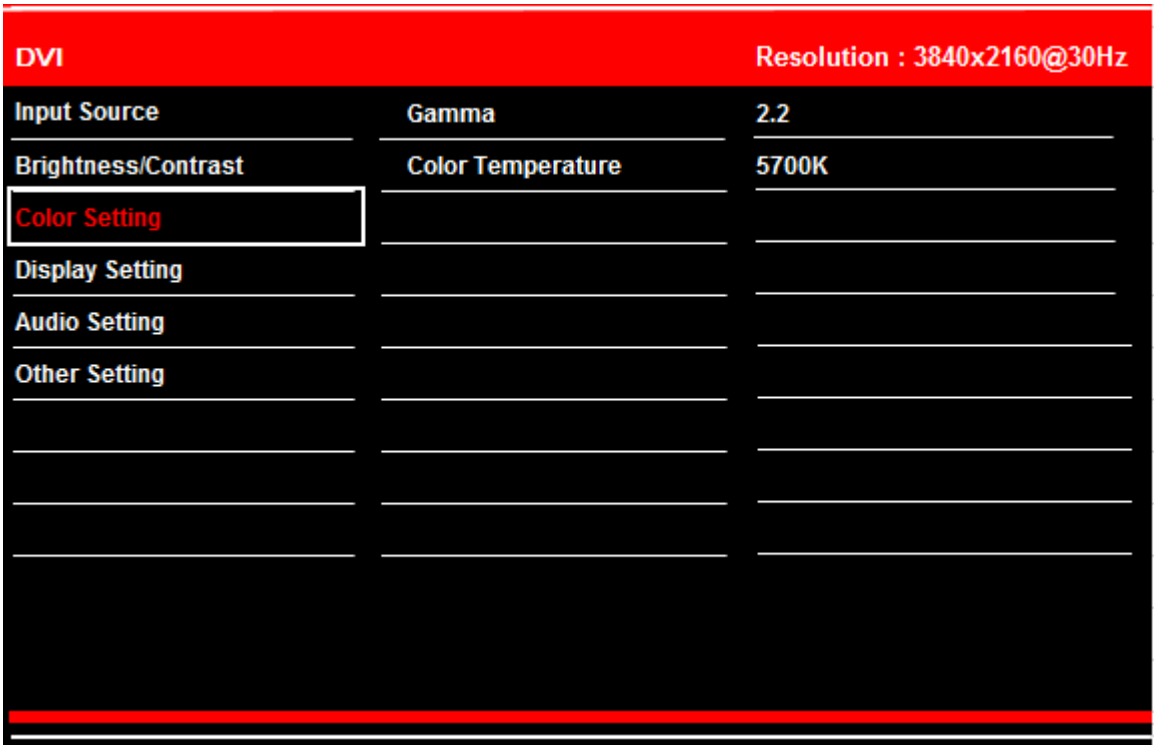
Contrast : press ”Menu” into subpage
Press “Menu” you can adjust the contrast from “0” to “100” by pressing the “left” and “right”.



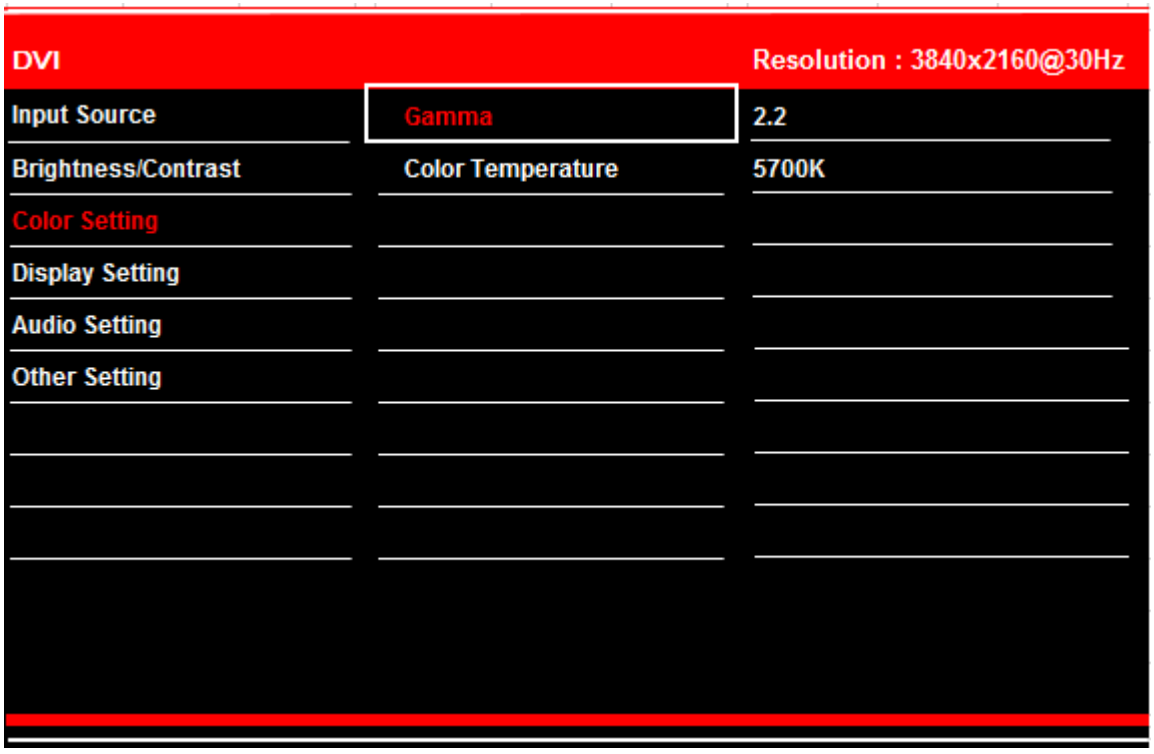
Backlight Mode : press ”Menu” into subpage
There are have: Light Sensor and Brightness can select.



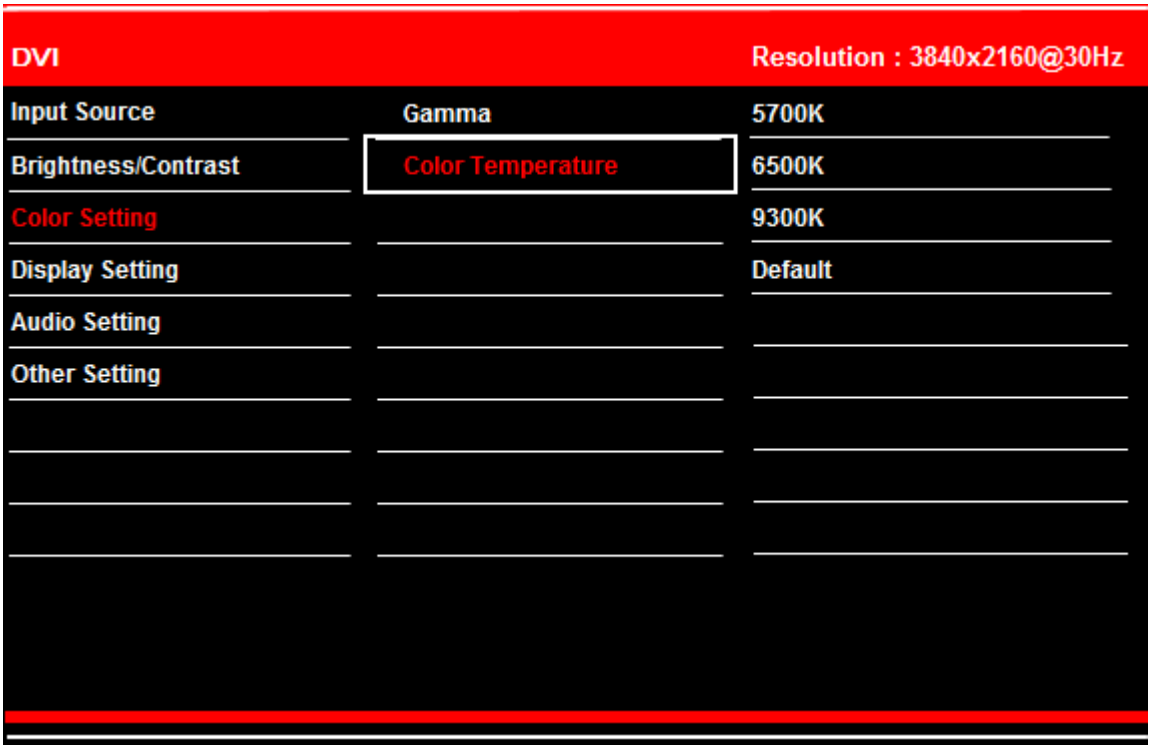
Color Setting Icon
There are 2 subpages inside the OSD manual, Gamma and Color Temperature.



Gamma : press ”Menu” into subpage, only select 2.2

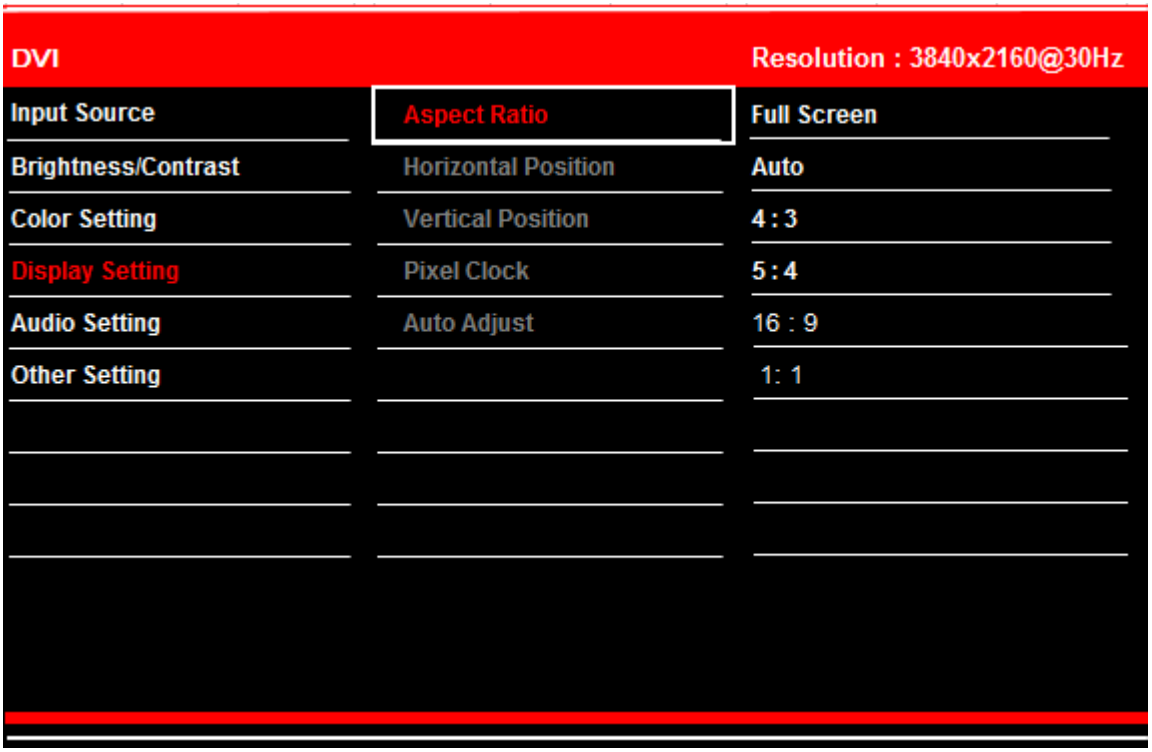


Color Temperature : press ”Menu” into subpage
You can have 4 options in this selection. 5700K, 6500K, 9300K and Default.

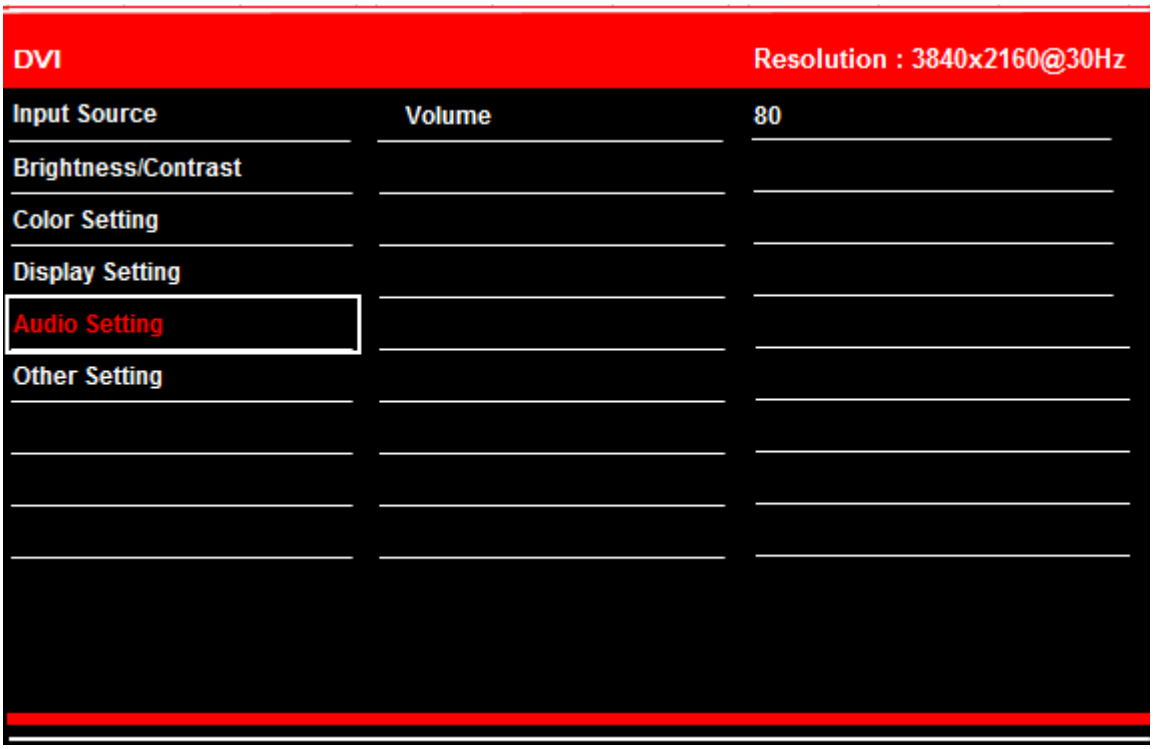


Display Setting Icon
There is 1 subpage inside the OSD manual, only select Aspect Ratio.

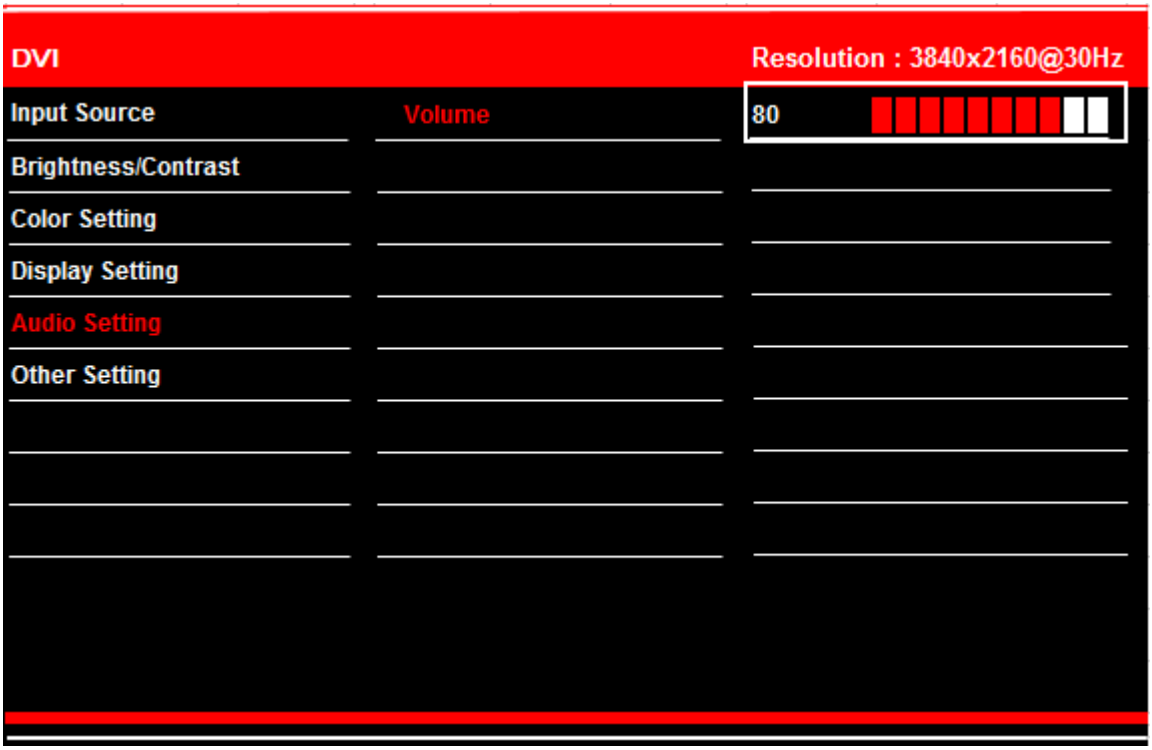
Aspect Ratio : press ”Menu” into subpage, You can have 6 options in this selection.
Full Screen, Auto, 4:3, 5:4, 16:9 and 1:1



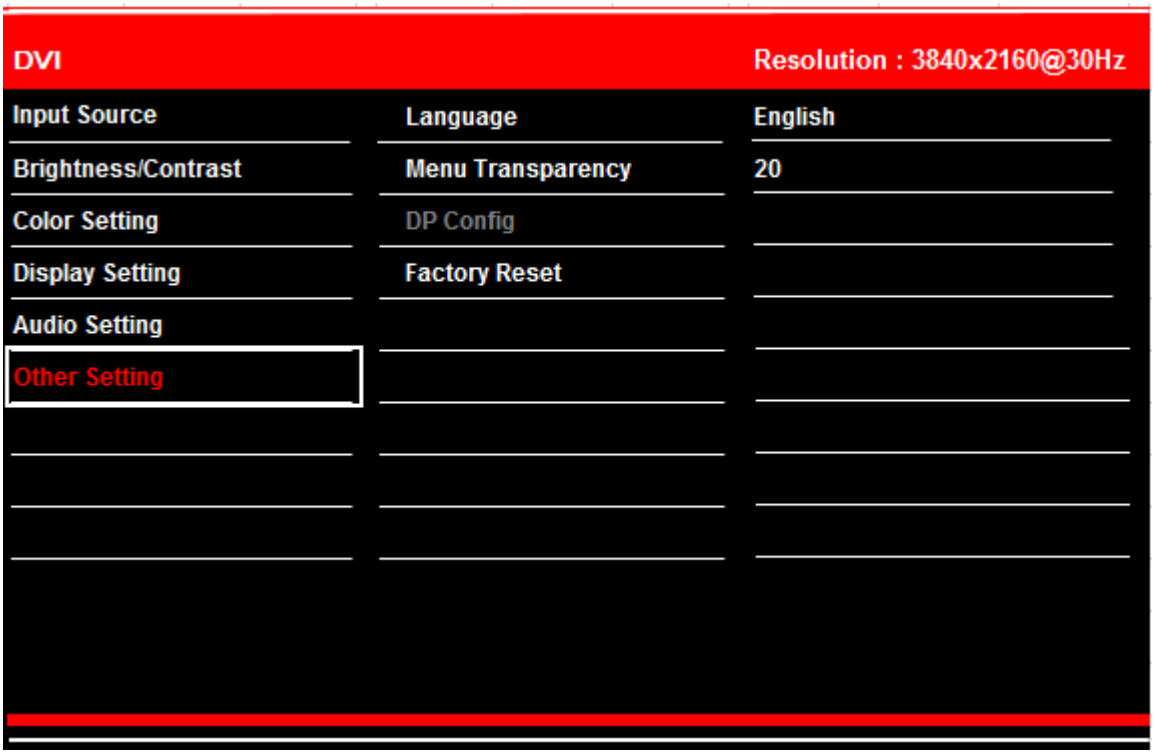
Audio Setting Icon
There is 1 subpage inside the OSD manual, Volume.



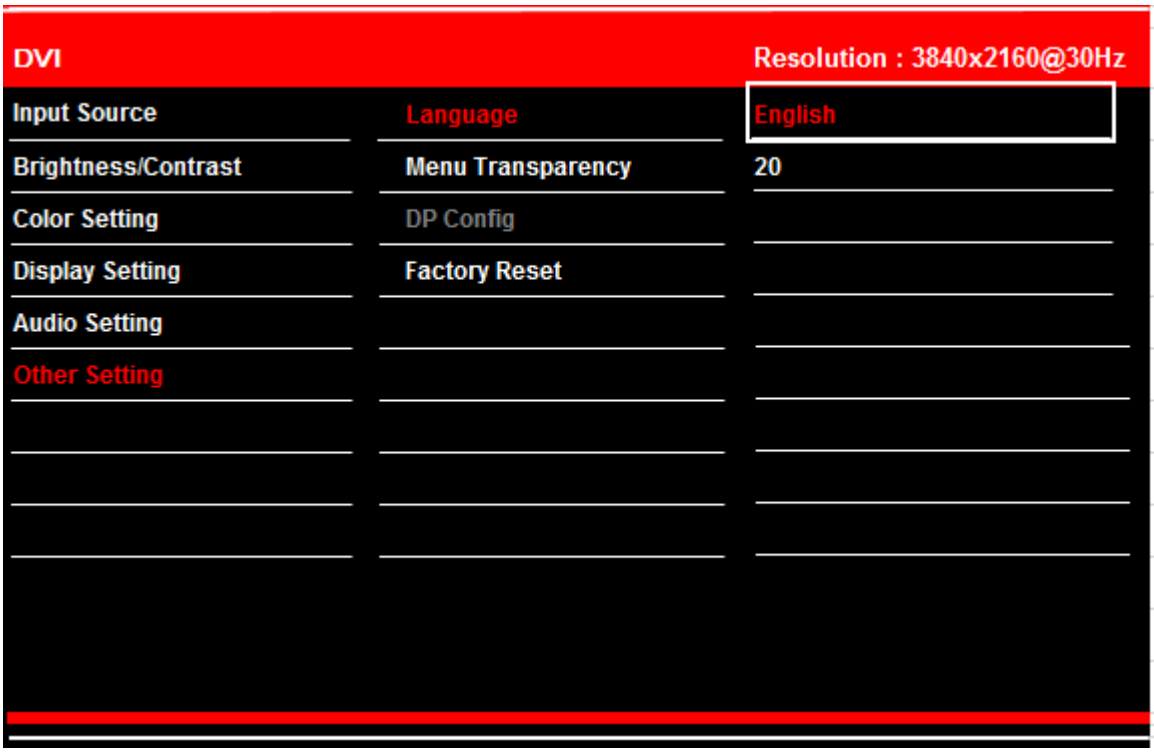
Volume : Press “Menu” you can adjust the Volume from “0” to “100” by pressing the “left” and “right”.



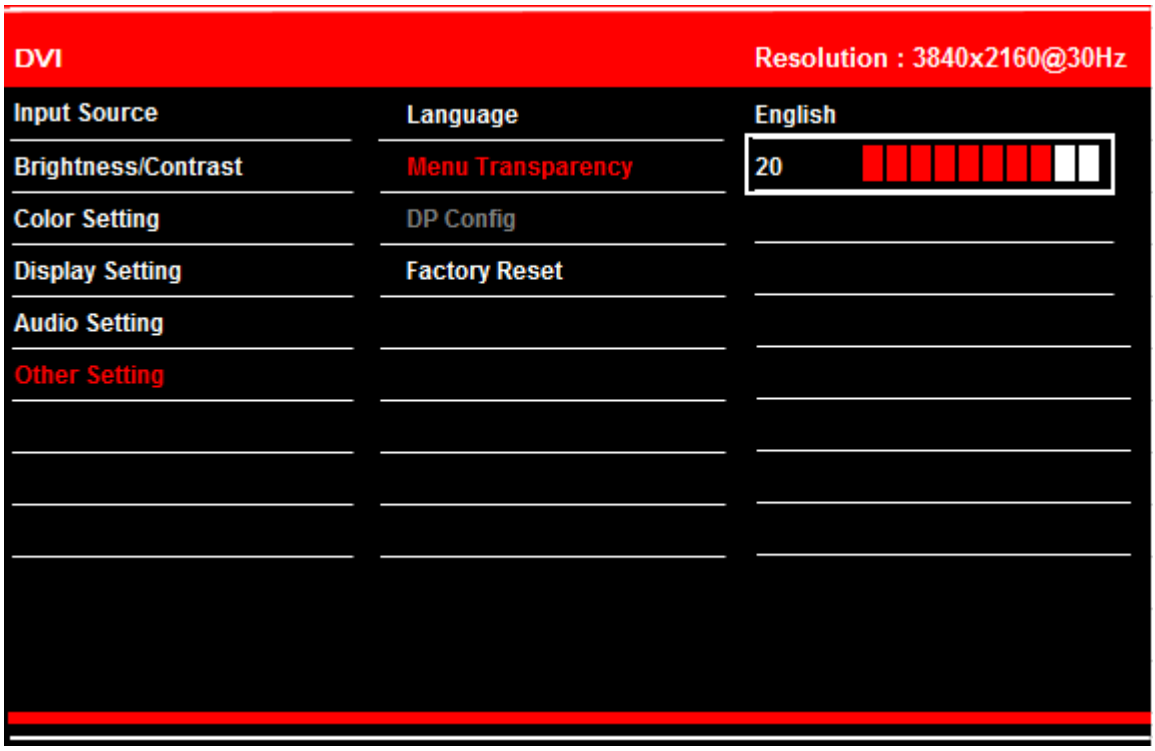
Other Setting Icon
There is 3 subpages inside the OSD manual, Language, Menu Transparency and Factory Reset.



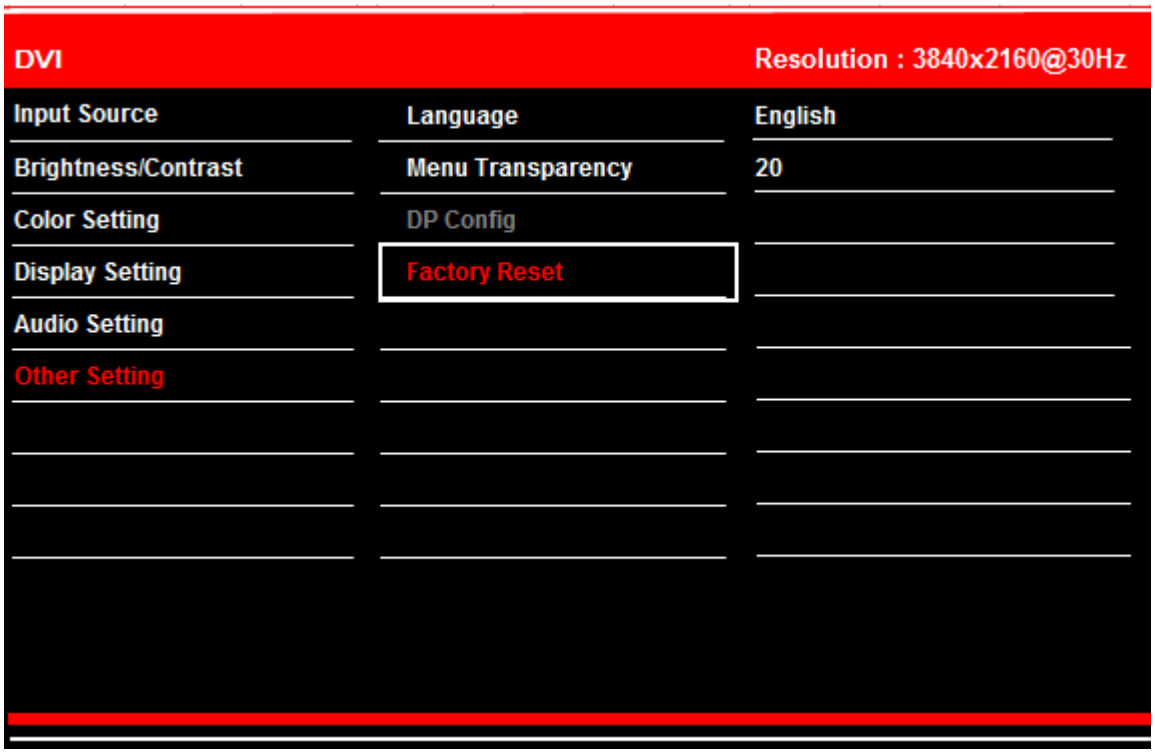
Language : press ”Menu” into subpage, only select English



Menu Transparency : Press “Menu” you can adjust the Menu Transparency from “0” to “100” by pressing the “left” and “right”.



Factory Reset: Press “Menu” into subpage, the screen will be back to the default settings.



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.