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Sunlight Readable LCD!

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Stretched LCD

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SSF/SSH3588-I V2

Sunlight Readable 35.8” 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
Sept./30/2025	all		Initial release	

Contents

1 General Description

The SSF/SSH3588-I is a 35.8 inch color TFT-LCD display with special aspect ratio 16:4.4 and wide resolution 1920 x 534. It is Litemax's Spanpixel series product which designed for high brightness 1600 nits 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

- Resizing LCD
- Ultra-Wide Screen (16:4.4)
- High Brightness 1600 nits
- Sunlight Readable
- LED Backlight
- Slim Bezel
- BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	SSF/SSH3588-I V2
Description	35.8" Resizing LCD, 1600 nits LED backlight, 1920x534
Screen Size	35.8"
Display Area (mm)	878.11(H) x 239.98(V)
Brightness	1600 cd/m^2
Resolution	1920x534
Aspect Ratio	16:4.4
Contrast Ratio	5400:1
Pixel Pitch (mm)	0.4494(H) x 0.4494(V)
Pixel Pre Inch (PPI)	56
Viewing Angle	178°(H),178°(V)
Color Saturation (NTSC)	83%
Display Colors	16.7M
Response Time (Typical)	9.5ms
Panel Interface	LVDS
Input Interface	VGA, DVI-D, HDMI, DP
Input Power	DC24V
Power Consumption	50W (with AD Board 53W)
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Tuning, H/V Position…etc
Dimensions (mm)	899.4(W) x 270.7(H) x 18.85(D)
Bezel Size(U/B/L/R)	14.025/16.695/10.644/10.644 mm
Weight (Net)	3.5kg
Operating Temperature	0 ˚C ~ 50 ˚C
Storage Temperature	-20 ˚C ~ 60 ˚C

SSF= Panel + LED Driving Board

SSH= Panel + LED Driving Board + AD Control Board

1.3 Absolute Maximum Ratings

Absolute Ratings of Environment

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	TST	-20	+60	ºC	(1), (3)
Operating Ambient Temperature	TOP	0	50	ºC	(1), (2), (3)

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

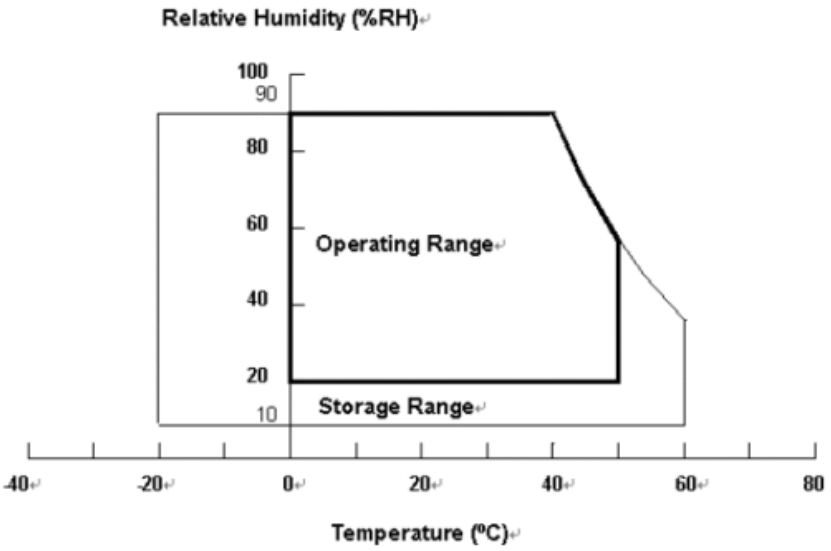
(a) 90 %RH Max. (Ta ≦ 40 ºC).

(b) Wet-bulb temperature should be 39 ºC Max.

(c) No condensation.

Note (2) Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 65ºC. The range of operating temperature may degrade in case of improper thermal management in final product design.

Note (3) The rating of environment is base on LCD module. Leave LCD cell alone, this environment condition can't be guaranteed. Except LCD cell, the customer has to consider the ability of other parts of LCD module and LCD module process.



1.4 Electrical Absolute Ratings

TFT LCD Module

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	VCC	-0.3	13.5	V	(1)
Logic Input Voltage	VIN	-0.3	3.6	V	
Component thermal	-	-	100	℃	(2)

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

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

2 Electrical Specification

2.1 Electrical Characteristics

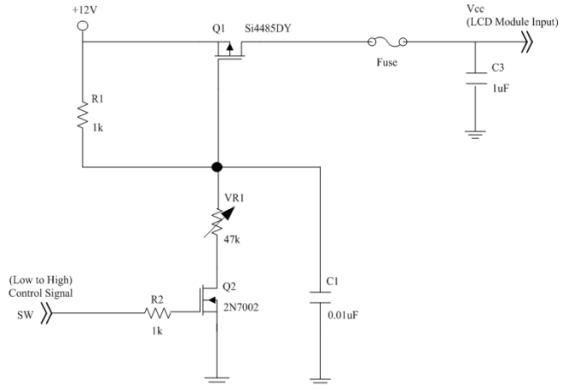
TFT LCD Open Cell
(Ta=25±2°C)

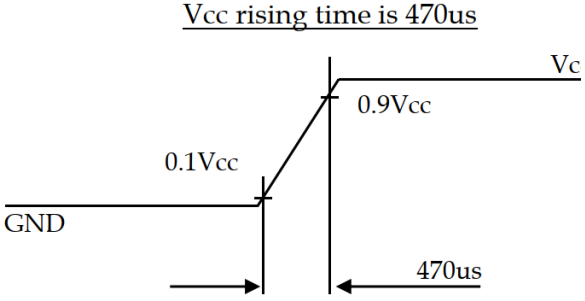
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V_{CC}	10.8	12	13.2	V	(1)
Rush Current		I_{RUSH}	—	—	2.58	A	(2)
Power Consumption	White Pattern	P_T	—	4.71	5.18	W	(3)
	Black Pattern	P_T	—	4.25	4.48	W	
	Horizontal Stripe	P_T	—	5.94	6.53	W	
Power Supply Current	White Pattern	—	—	0.40	0.48	A	
	Black Pattern	—	—	0.36	0.44	A	
	Horizontal Stripe	—	—	0.52	0.61	A	
LVDS interface	Differential Input High Threshold Voltage	V_{TH}	—	—	+100	mV	(4)
	Differential Input Low Threshold Voltage	V_{TL}	-100	—	—	mV	
	Common Input Voltage	V_{CM}	1.0	1.2	1.4	V	
	Differential input voltage (single-end)	$\|V_{ID}\|$	100	—	600	mV	
	Terminating Resistor	R_T	—	100	—	ohm	
CMOS interface	Input High Threshold Voltage	V_{IH}	2.7	—	3.3	V	
	Input Low Threshold Voltage	V_{IL}	0	—	0.7	V	

Note (1) The module should be always operated within the above ranges.

The ripple voltage should be controlled under 10% of Vcc (Typ.).

Note (2) Measurement condition :



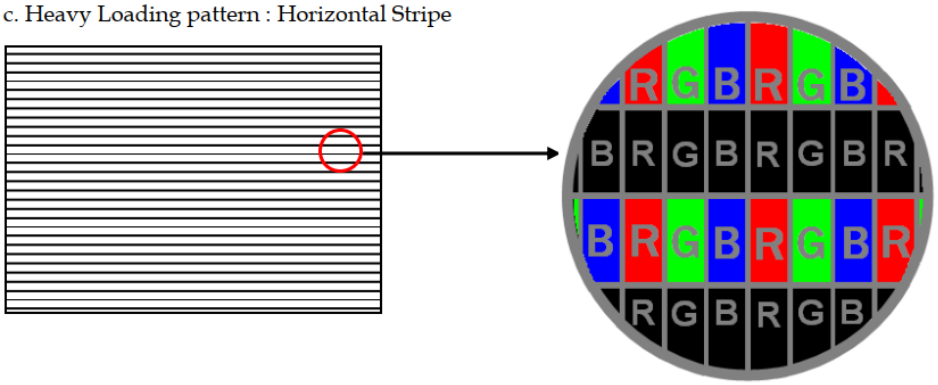


Note (3) The specified power supply current is under the conditions at Vcc = 12 V, Ta = 25 ± 2 °C, f_v = 60 Hz, whereas a power dissipation check pattern below is displayed.

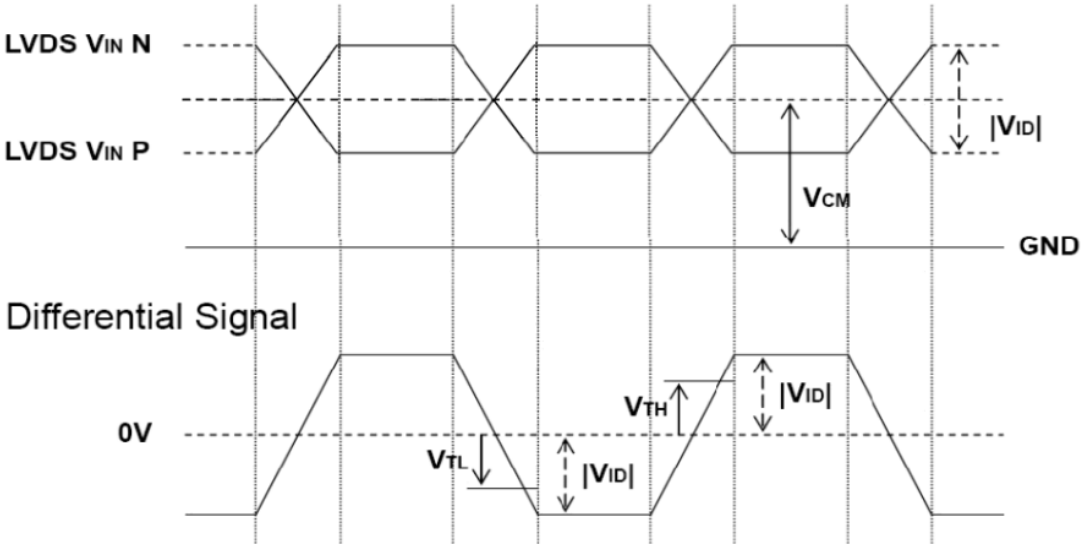
Active Area

Active Area

c. Heavy Loading pattern : Horizontal Stripe



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



2.2 Input Terminal PIN Assignment

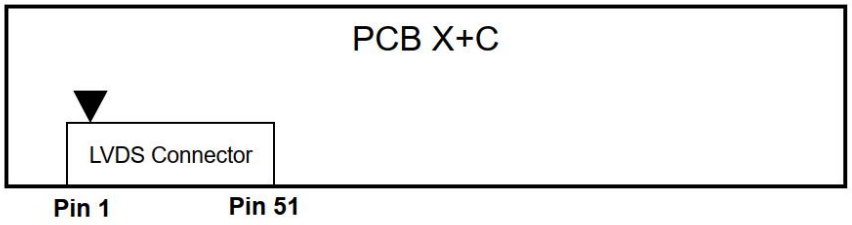
2.2.1 TFT Open Cell

CNF1 Connector Pin Assignment: [187059-51221(P-Two), WF23-402-5133(FCN)]
Matting connector: [FI-RE51HL (JAE)]

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

46	GND	Ground	
47	N.C.	No Connection	(2)
48	VCC	Power input (+12V)	
49	VCC	Power input (+12V)	
50	VCC	Power input (+12V)	
51	VCC	Power input (+12V)	

Note (1) LVDS connector pin orderdefined as below



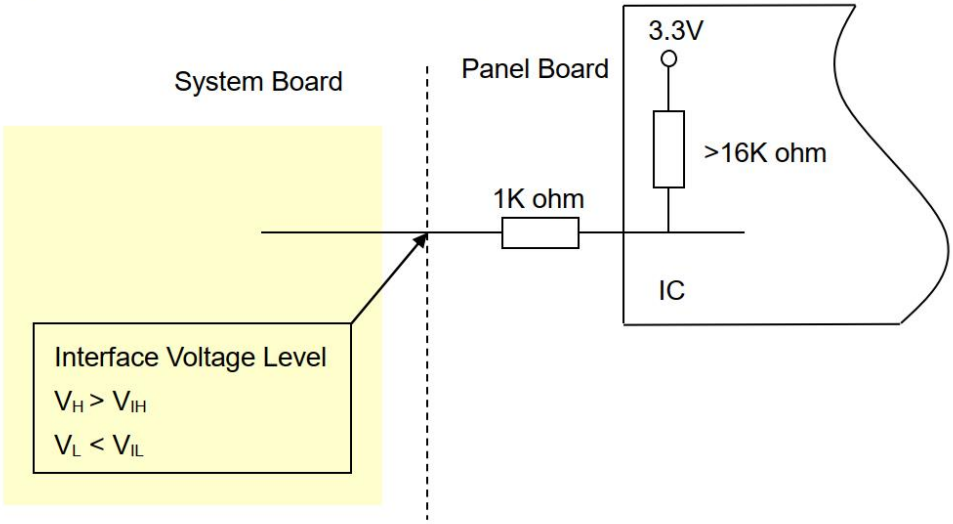
Note (2) Reserved for internal use. Please leave it open.

Note (3) Connect to Open or +3.3V: VESA Format, connect to GND: JEIDA Format.

SELLVDS	Mode
H(default)	VESA
L	JEIDA

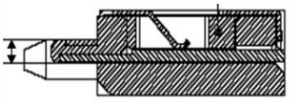
L : Connect to GND, H: Connect to +3.3V

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

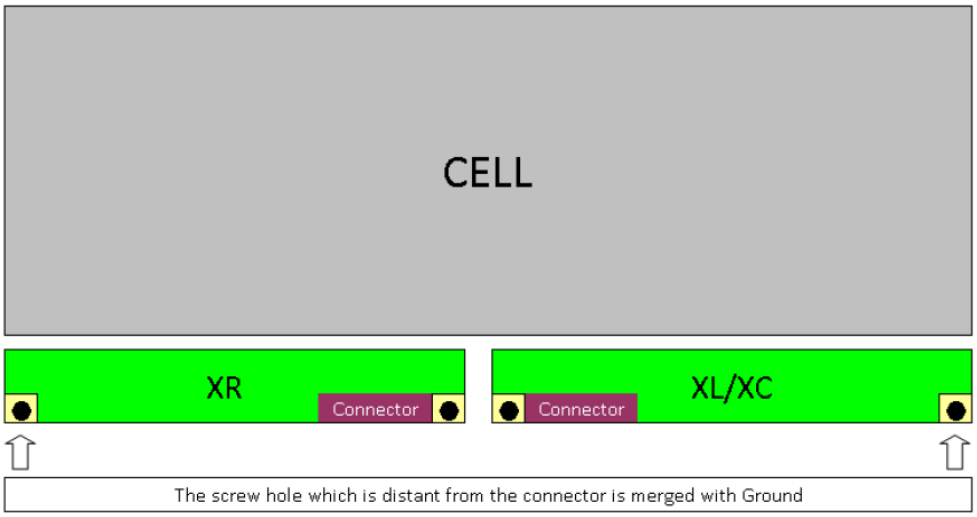


Note (5) Two pixel data send into the module for every clock cycle. The first pixel of the frame is odd pixel and the second pixel is even pixel.

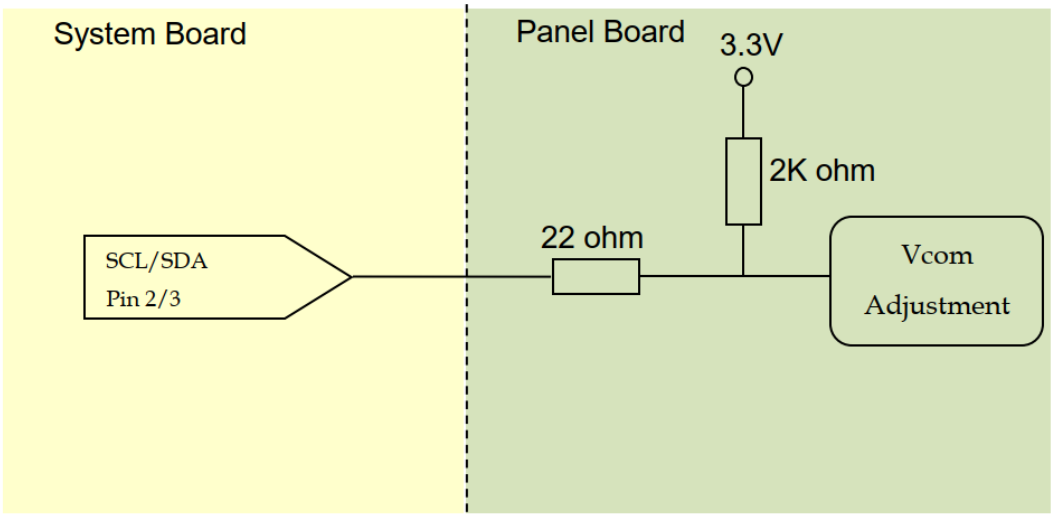
Note (6) LVDS connector mating dimension range request is 0.93mm~1.0mm as below.



Note (7) The screw hole which is distant from the connector is merged with Ground.



Note (8) I2C pin has internal scheme as following diagram. Customer should keep the interface voltage level requirement which including Panel board loading as below.

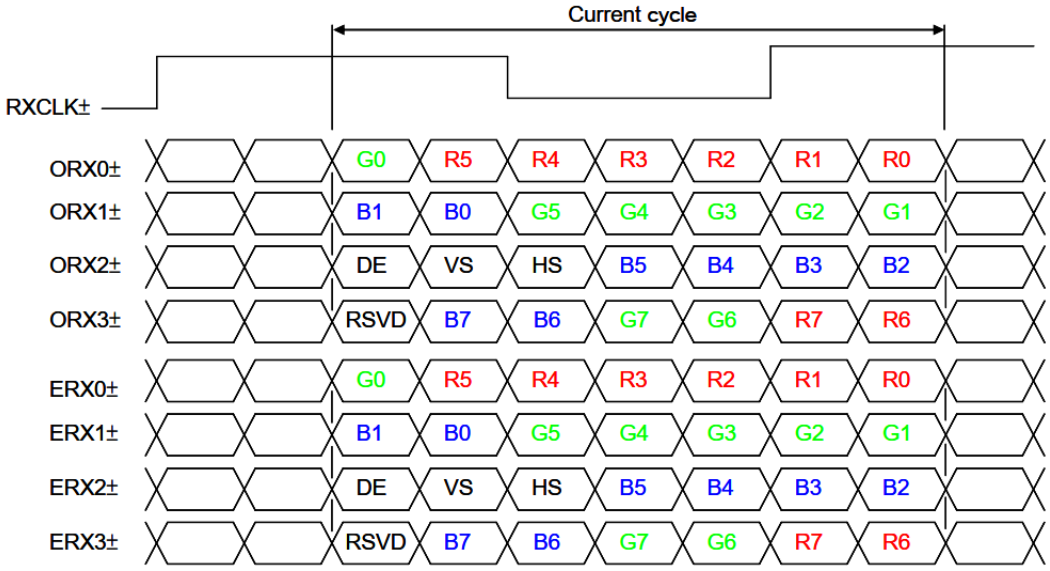


2.2.2 LVDS Interface

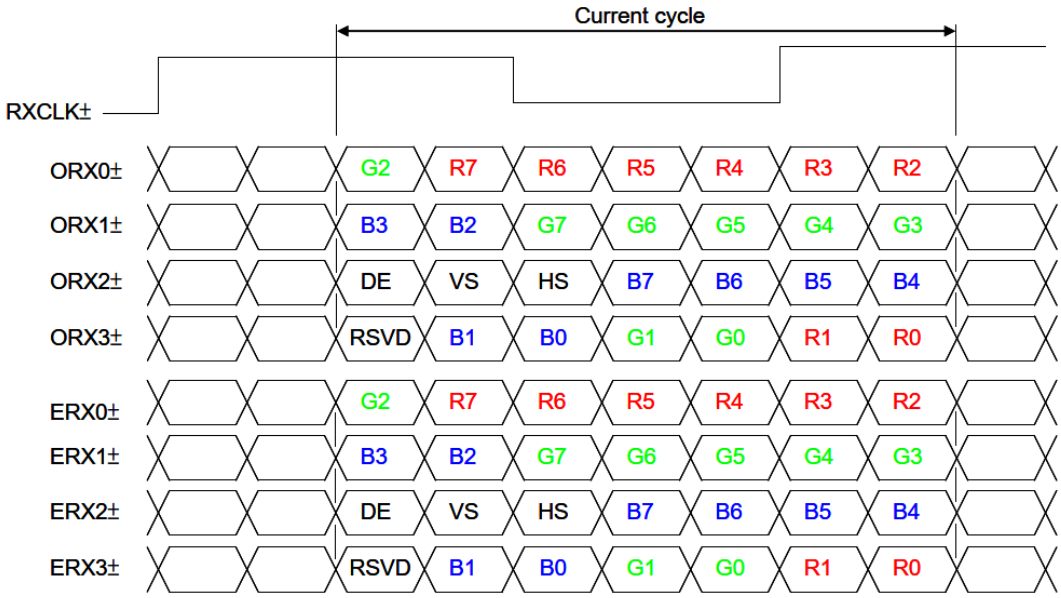
JEIDA Format : SELLVDS = L

VESA Format : SELLVDS = H or Open

VESA LVDS format



JEDIA LVDS format



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

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

2.3 Input Signal Timing Specifications

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

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Receiver Clock	Frequency	F_{clkin} (=1/TC)	60	74.25	80	MHz	
	Input cycle to cycle jitter	T_{rcl}	-	—	200	ps	(3)
	Spread spectrum modulation range	F_{clkin_mod}	F_{clkin}-2%	—	F_{clkin}+2%	MHz	(4)
	Spread spectrum modulation frequency	F_{SSM}	—	—	200	KHz	
LVDS Receiver Data	Receiver Skew Margin	T_{RSKM}	-400	—	400	ps	(5)
Vertical Active Display Term	Frame Rate	F_{r5}	47	50	53	Hz	(6)
		F_{r6}	57	60	63	Hz	
	Total	Tv	1110	1125	1480	Th	Tv=Tvd+Tvb
	Display	Tvd	1080	1080	1080	Th	—
	Blank	Tvb	20	45	400	Th	—
Horizontal Active Display Term	Total	Th	1030	1100	1325	Tc	Th=Thd+Thb
	Display	Thd	960	960	960	Tc	—
	Blank	Thb	70	140	365	Tc	—

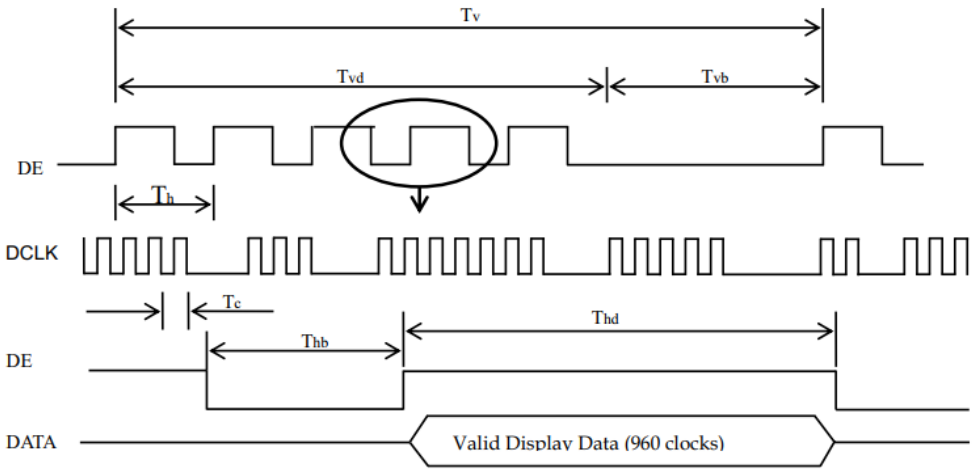
Notes:

(1)Please make sure the range of frame rate has follow the below equation：

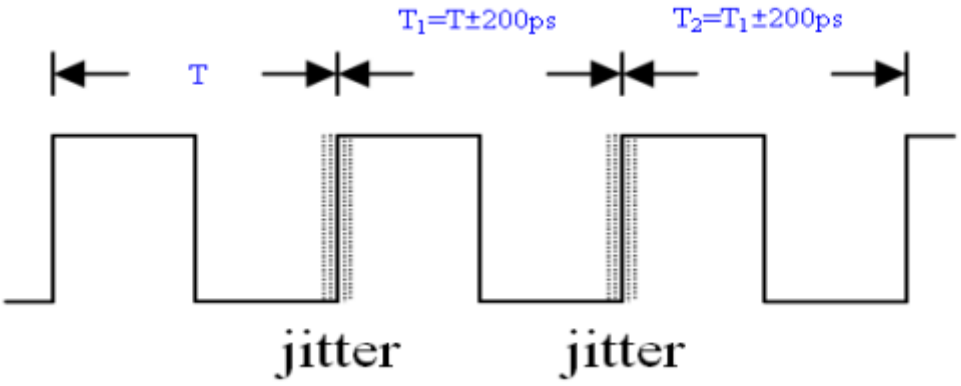
Fclkin(max) ≧ Fr6 ╳ Tv ╳ Th

Fr5 ╳ Tv ╳ Th ≧ Fclkin(min)

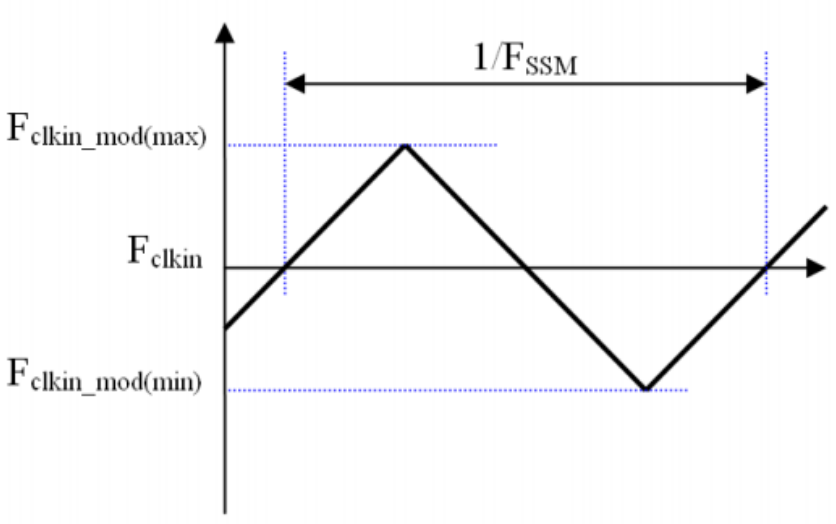
(2) This module is operated in DE only mode and please follow the input signal timing diagram as below:



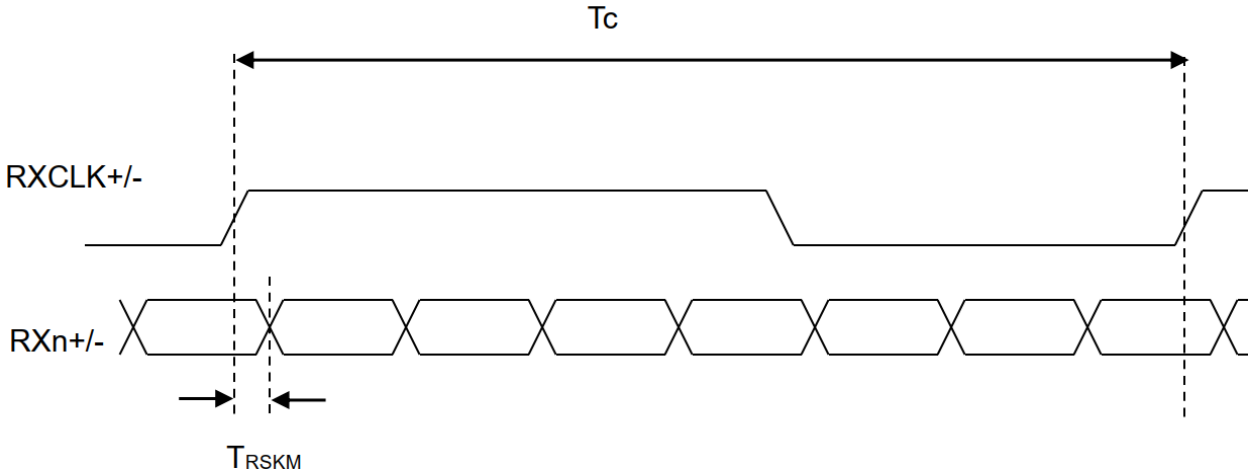
(3) The input clock cycle-to-cycle jitter is defined as below figures. Trcl =| T1 – T|



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



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



2.4 Color Input Data Reference

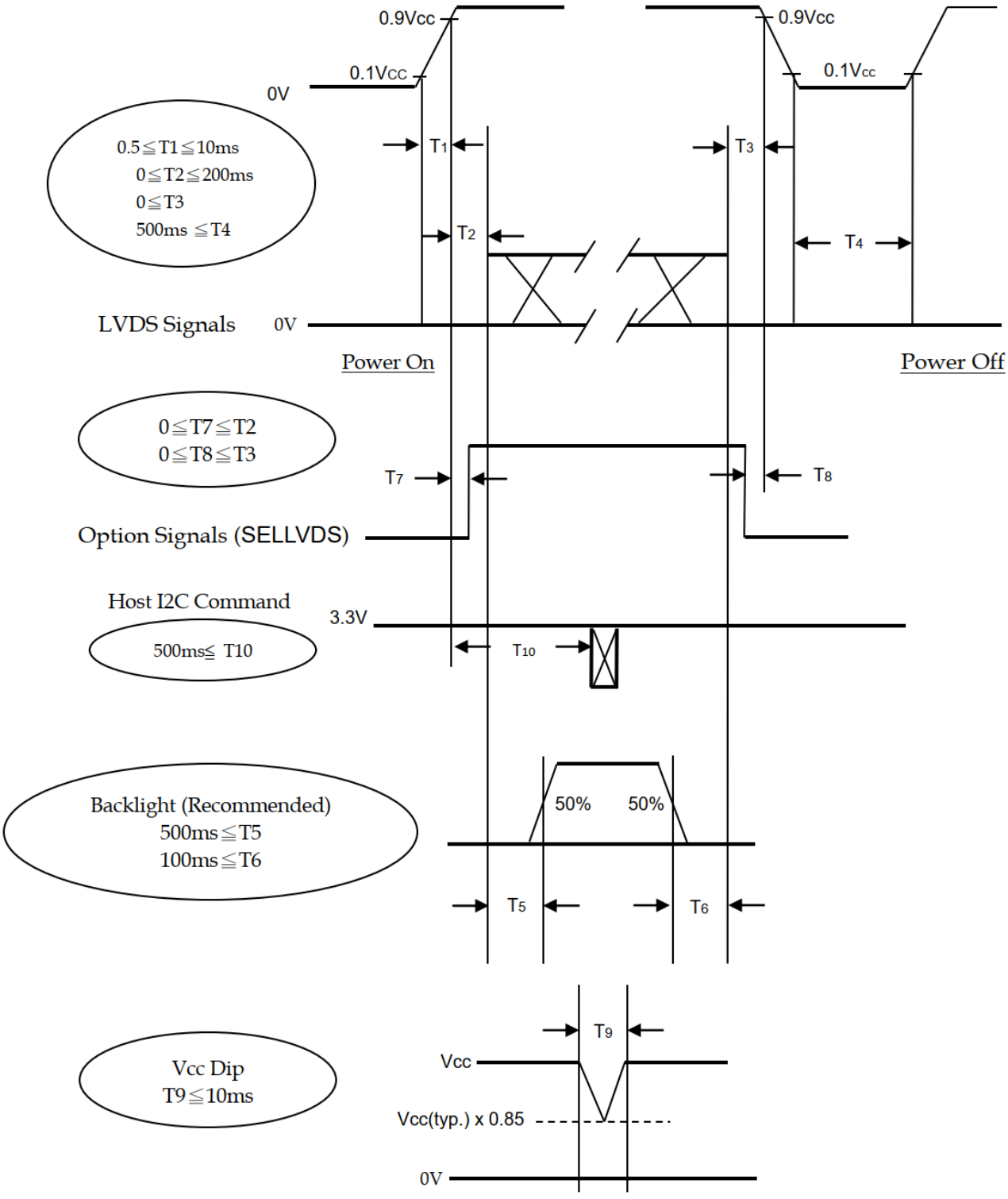
The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of the color versus data input

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

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

2.5 Power On/Off Sequence

(Ta = 25 ± 2 ºC)
To prevent a latch-up or DC operation of LCD module, the power on/off sequence should be as the diagram below.



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

Note (2) Apply the LED voltage within the LCD operation range. When the backlight turns on before the LCD operation or the LCD turns off before the backlight turns off, the display may momentarily become abnormal screen.

Note (3) In case of VCC is in off level, please keep the level of input signals on the low or high impedance.
If T2<0, that maybe cause electrical overstress failure.

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

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

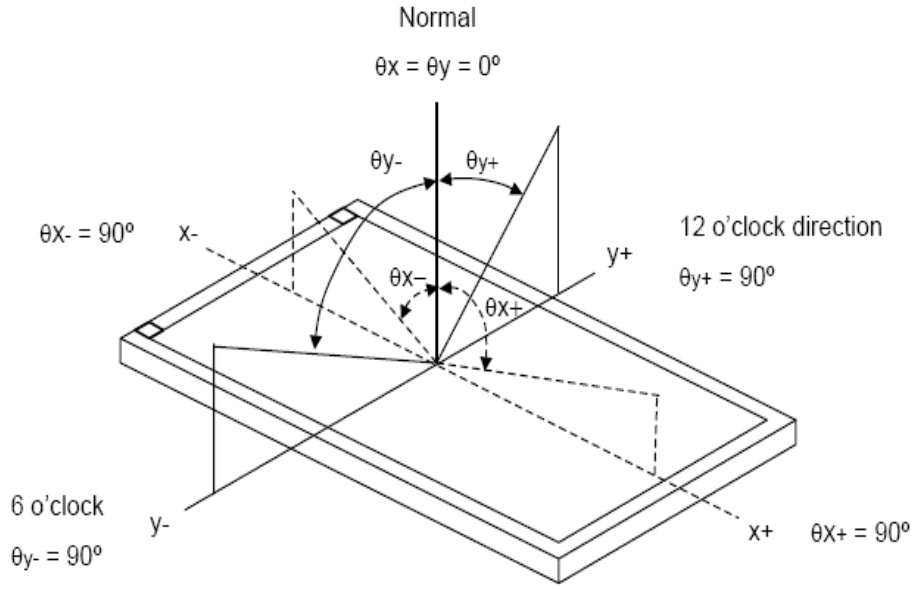
Note (6) Vcc must decay smoothly when power-off.

3 Optical Specification

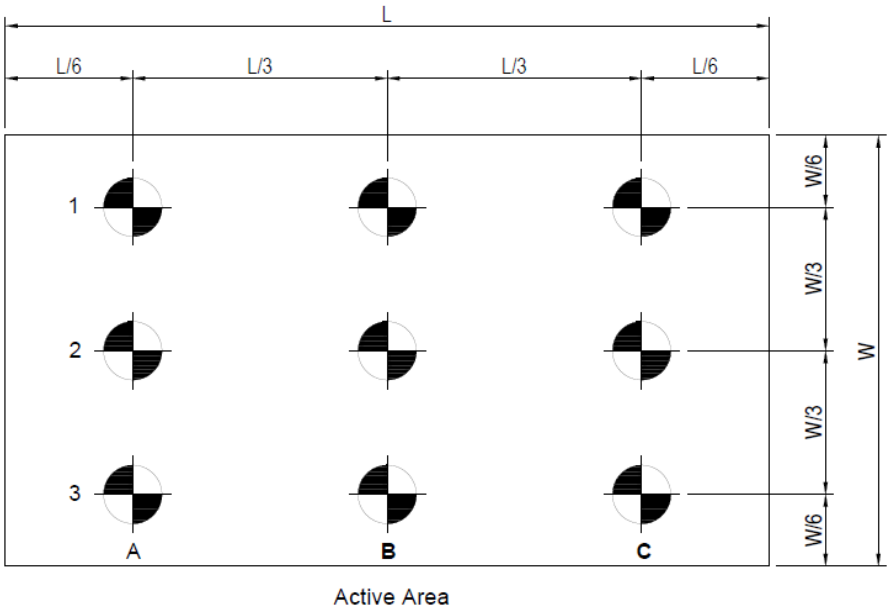
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	θx=0 θy=0 CA-410	0.613	0.643	0.673	-	Test Mode: (2) (3)
		Ry		0.304	0.334	0.364	-	
	Green	Gx		0.284	0.314	0.344	-	
		Gy		0.589	0.619	0.649	-	
	Blue	Bx		0.124	0.154	0.184	-	
		By		0.026	0.056	0.086	-	
	White	Wx		0.265	0.295	0.325	-	
		Wy		0.279	0.309	0.339	-	
Center Luminance of White		Lc	θx=0 θy=0 CA-410	1440	1600	2080	cd/m^2	
Uniform		Lu		-	85	-	%	
Contrast Ratio		CR	θx=0 θy=0 Klein K-10	4860:1	5400:1	-	-	Test Mode: (4)
Color Saturation		NTSC		-	83		-	
Viewing Angle	Horizontal	θx+	- - -	-	89	-	Deg	Test Mode: (1)
		θx-		-	89	-		
	Vertical	θy+		-	89	-		
		θy-		-	89	-		

Test Mode：

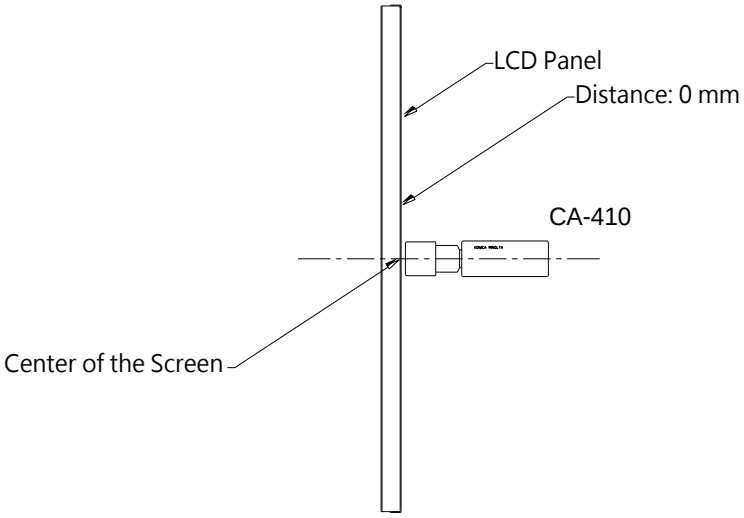
(1) Definition of Viewing Angle (θx , θy):



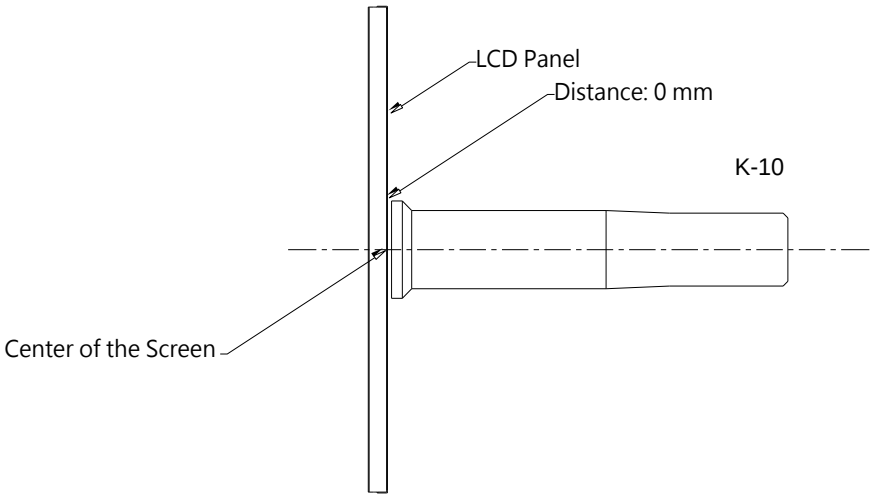
(2) Definition of Test Point:



(3) CA-410 Measurement Setup:



(4) Klein K-10 Measurement Setup:



4 LED Driving Board Specifications

This specification is applied to LED converter unit for IN3588_V2 White LED 1600nits 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	Vadj=5V	0.0	-----	-----	mA	
Input Current (High Brightness)	IinH	Vadj=0V	2.05	1.95	1.89	A	(1)
LED Current (Low Brightness)	IoutL	Vadj=5V	0.0	-----	-----	Arms	
LED Current (High Brightness)	IoutH	Vadj=0V	0.5	0.52	0.55	A	J1~J4
			0.5	0.52	0.55	A	J5~J8
Working Frequency	Freq	Vadj=0V	350	400	450	KHz	
Brightness Control	Vadj	Connection of Voltage	0.2	-----	4.8	V	Vadj±5%
ON/OFF Control	Von	Normal Operation	2	-----	5	V	
	Voff		0	-----	0.8	V	
Output Voltage	Vout	Vadj=0V	39.8	40.3	40.8	V	J1~J4
			39.8	40.3	40.8	V	J5~J8
Efficiency	η	Vadj=0V	88.1	89.6	90.9	%	(2)

Remark:

(1) This data is based on the testing result of practical input voltage, Iin is measured by related Vin. (min, typ, max).

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

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

4.2 Connector Socket

Input Connector: :CN1(JST B10B-PH-K-S or Compatible)

PIN No	Symbol	Description
1	Vin	DC+
2	Vin	DC+
3	Vin	DC+
4	Vin	DC+
5	Vin	DC+
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	GND	Ground

Input Connector: CN2(JST B3B-PH-K-S or Compatible

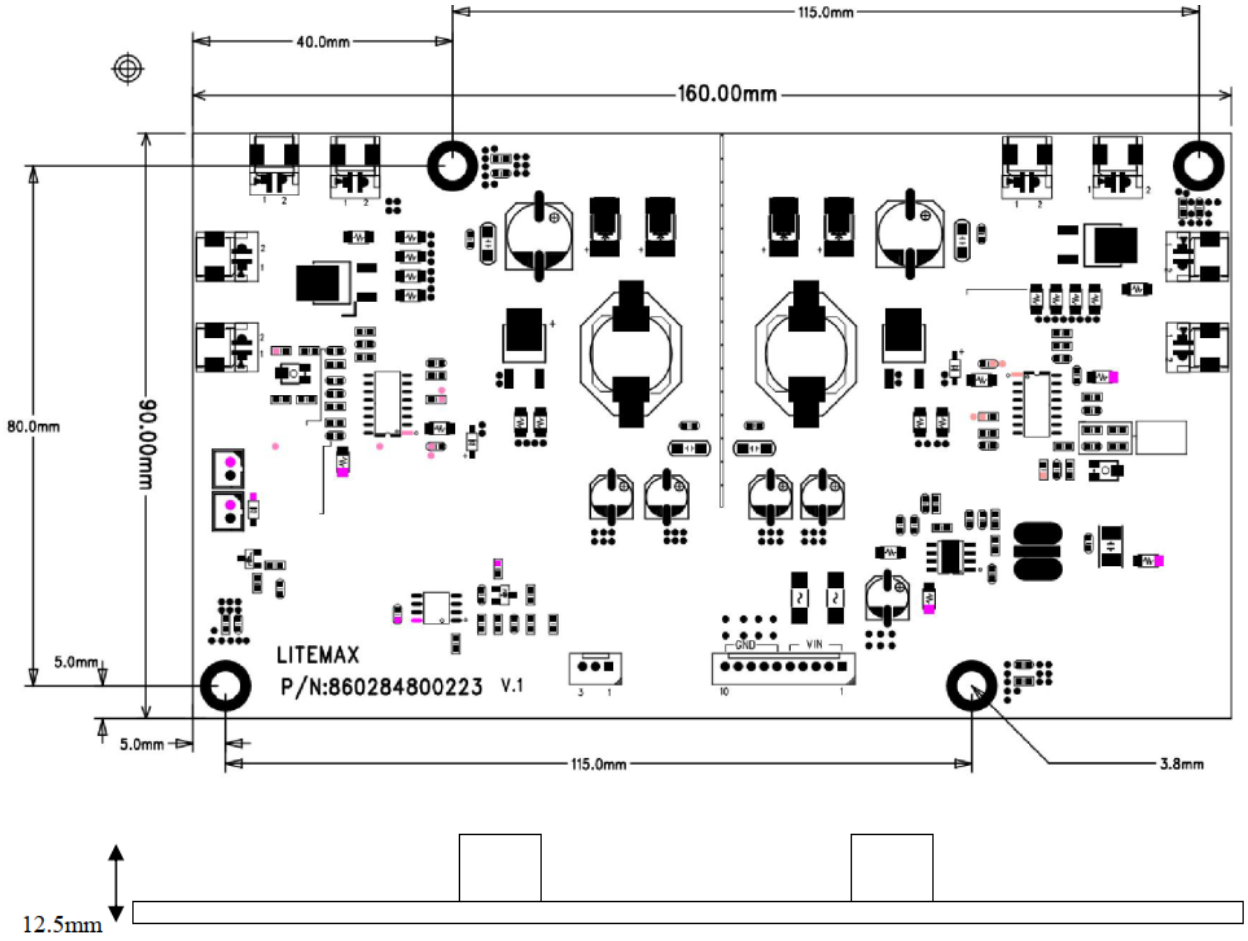
PIN No	Symbol	Description
1	Control	ON/OFF Control
2	Brightness	Brightness Control
3	GND	Ground

Output Connector: J1,J2,J5,J6(JST S2B-EH or Compatible)

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

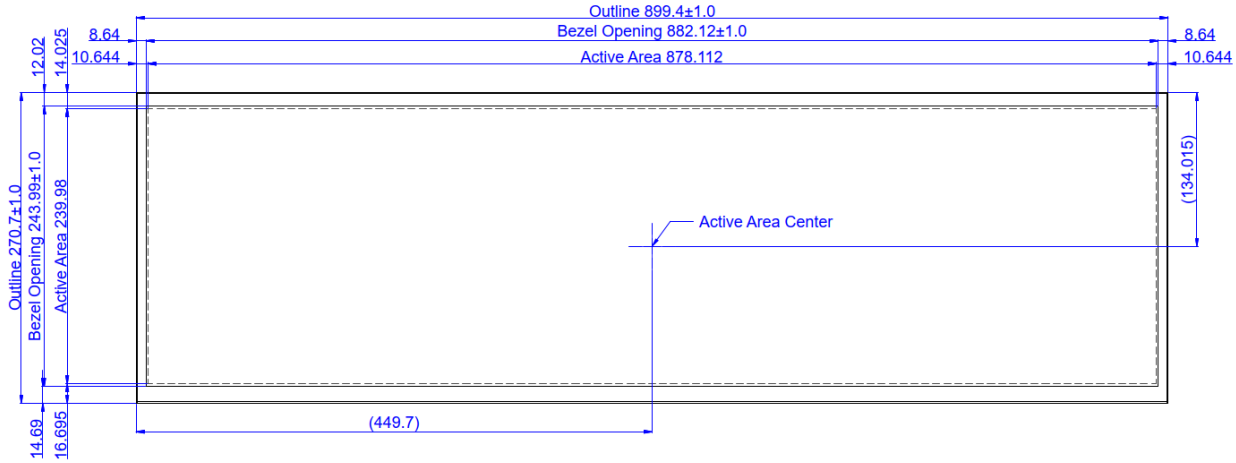
4.3 Mechanical Characteristics

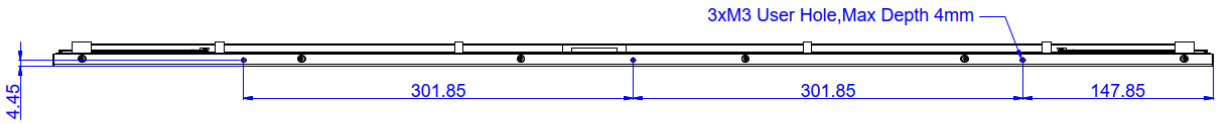
Dimension: 160 x 90 x 12.5mm

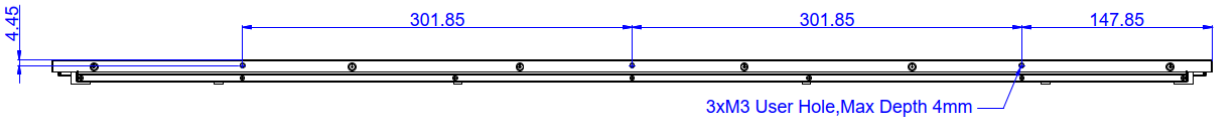


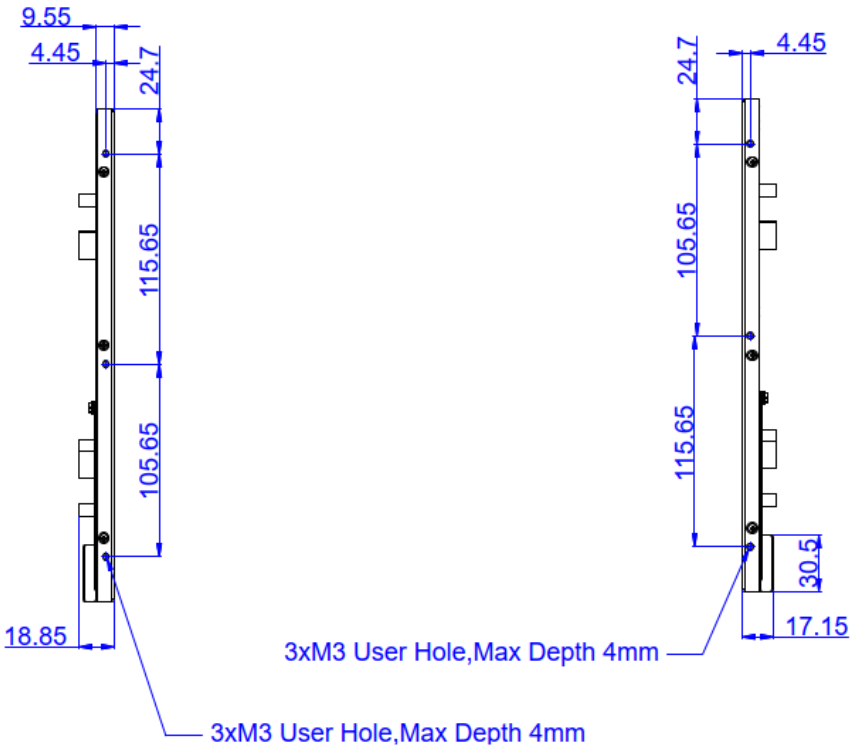
5 Mechanical Drawing

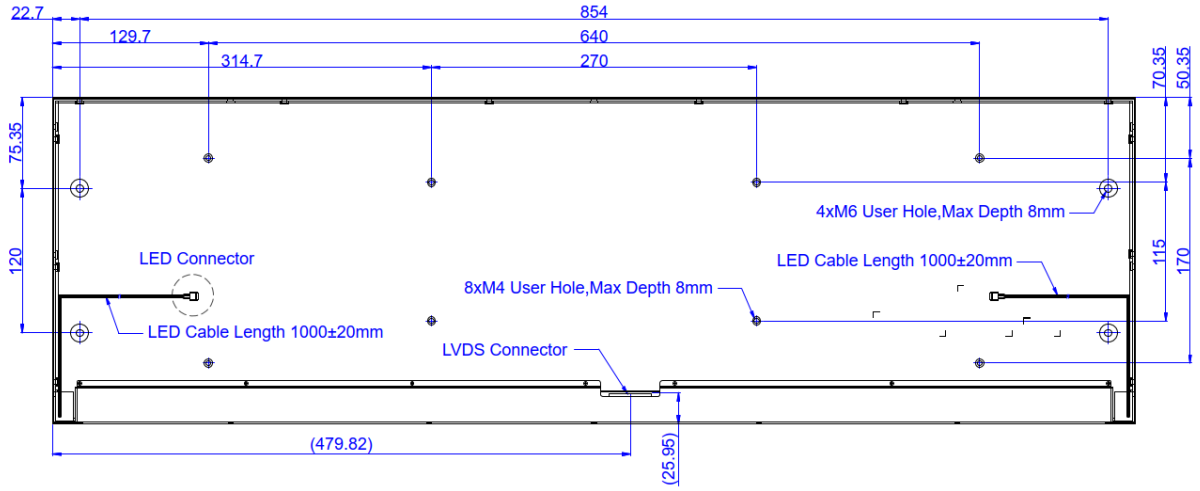
Unit:mm



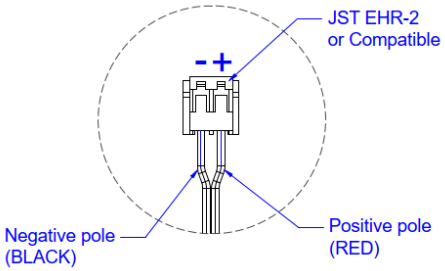








LED Connector



Note

1.Resolution : 1920 x 534

2."( )" marks the reference dimension

3.LVDS Connector : 187059-51221 (P-Two), WF23-402-5133(FCN)]

Matting connector : [FI-RE51HL(JAE)]

6 AD5827GDHPVAR & OSD Functions

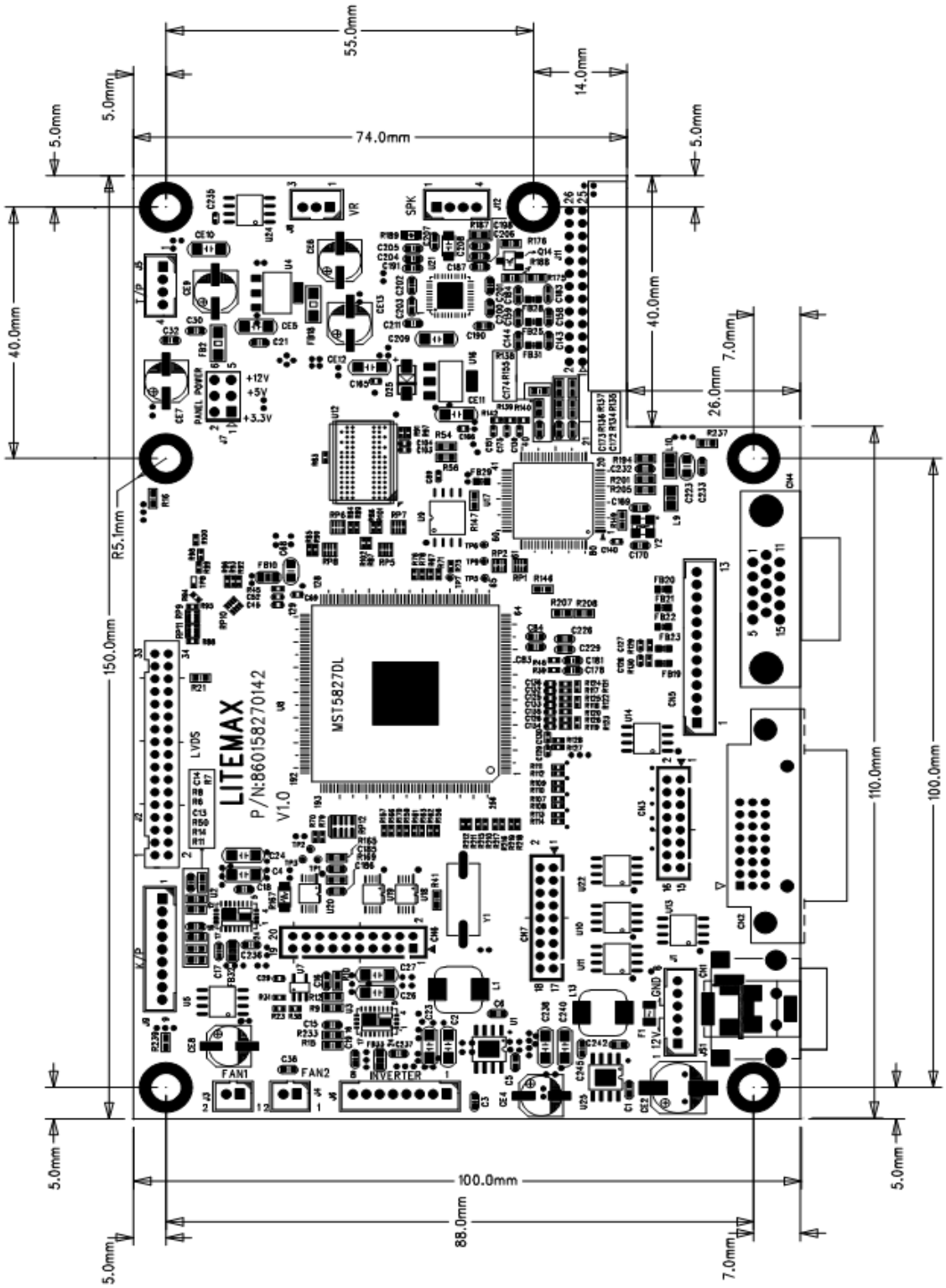
We developed this A/D board to support industrial high brightness and commercial applications. This A/D board has many functions. It has an external luminance sensor as an option, or optional VR button to control brightness, fan rotation and RS232. Rev.1 is European RoHS compliant.

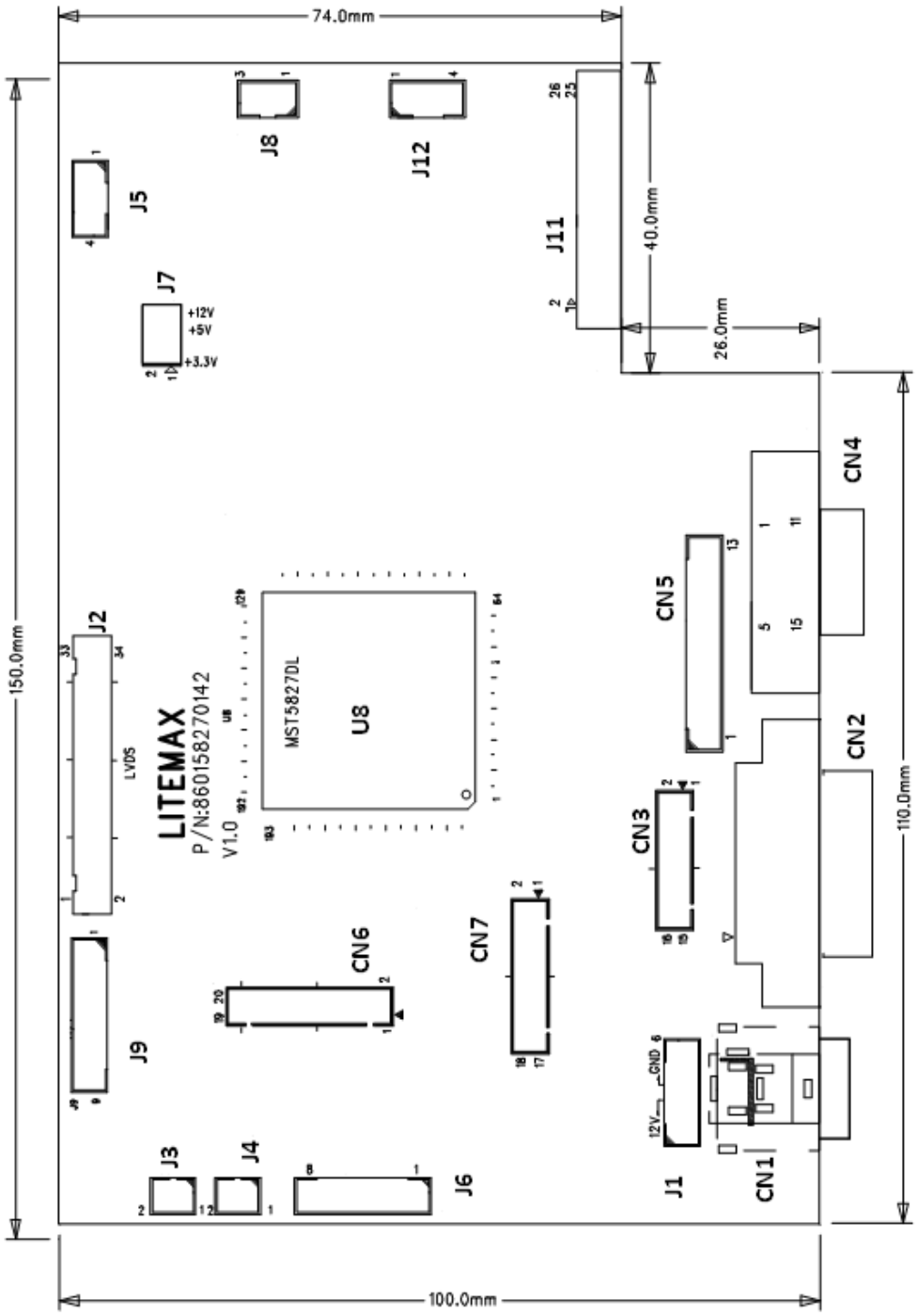
General Description

- Max resolution up to WUXGA
- Analog RGB input up to 205MHz
- DVI operates up to 165MHz
- 1 Ultra-Reliable DVI Input
- 1 VGA Input
- 1 HDMI(HDMI 1.3) Input(Optional)
- 1 Display port Input (DP 1.1a)(Optional)
- Dual/single LVDS interface
- Support Panel DC5V or 3.3V, 12V Output
- External Fan Control by Software
- OSD Control
- Inverter Analog or PWM Dimming Control
- *External light sensor brightness control (optional)
- *External RS232 control (optional)
- *External V.R. brightness control(optional)
- *External AV Input (optional)
- *External S-Video Input(optional)
- *External Y, Pb, Pr Inputl(optional)
- *External Audio Input(optional)
- Input power 24VDC,or 12VDC(12VDC Power Input Is Optional)

Outline Dimensions

AD5827GDHPVR 150mmX100mm




74.0mm
150.0mm
100.0mm
110.0mm
40.0mm
26.0mm
J8
J12
J5
J7
+12V
+5V
+3.3V
J11
J2
LVDS
LITEMAX
P/N:8601582700142
V1.0
MST5827DL
U8
CN5
CN4
CN2
CN3
CN6
CN7
J9
J3
J4
J6
J1
CN1
12V
GND

J2: 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

CN2: 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-

CN3: DVI-D Connector (16pin 2.0mm)

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	RX2-	7	DDC_SDA	13	GND
2	RX2+	8	DDC_SCL	14	GND
3	RX1-	9	GND	15	DVI HP
4	RX1+	10	GND	16	DVI_5V
5	RX0-	11	RXC-		
6	RX0+	12	RXC+		

CN4:Analog RGB Input connector(D-SUB 15Pin)

Pin No.	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	NC	VGA_CAB	13	HSYNC	Horizontal Sync
6	RED_RTN	Red Return	14	VSYNC	Vertical Sync
7	GREEN_RT	Green Return	15	SCL	DDC Data Clock
8	BLUE_RTN	Blue Return			

CN5: 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_RT	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			

CN7: 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		

CN6: DISPLAY PORT Connector (20pin 2.0mm)

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

CN1: Power DIN(24V or 12V)

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

CN1: Power Jack(24V or 12V)

Pin No.	Function	Pin No.	Function
1	24VDC or 12VDC	2	24VDC or 12VDC
3	GND		

J1: Power input connector (6 pin 2.0mm)

Pin No.	Function	Pin No.	Function
1	24VDC or 12VDC	2	24VDC or 12VDC
3	24VDC or 12VDC	4	GND
5	GND	6	GND

J5: Power out connector (5V/12V)(4PIN 2.0mm)

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

J6: Inverter Connector (8PIN 2.0mm)

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

J3,J4: FAN (2PIN 2.0mm)

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

J9: 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		

J8: LS/VR connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	3.3VDC	2	LS or VR OUT
3	GND		

J7: PANEL VCC (3PIN 2.54mm)

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

J12: Speaker Connector (4PIN 2.0mm)

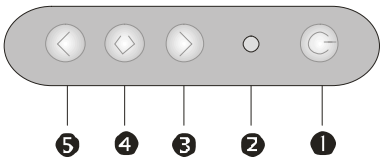
Pin No.	Function	Pin No.	Function
1	SPK_R+	2	SPK_R-
3	SPK_L-	4	SPK_L+

J11: Extended Function Connector (13P X2 Pin 2.0mm)

Pin No.	Function	Pin No.	Function
1	Pb	2	Y
3	GND	4	Pr
5	GND	6	SY
7	GND	8	SC
9	GND	10	AV
11	GND	12	GND
13	TXD	14	RXD
15	GND	16	GND
17	GND	18	GND
19	Audio-L	20	Audio-R
21	GND	22	GND
23	12VDC	24	12VDC
25	LS-SCL	26	LS-SDA

6.1 OSD Functions

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 :

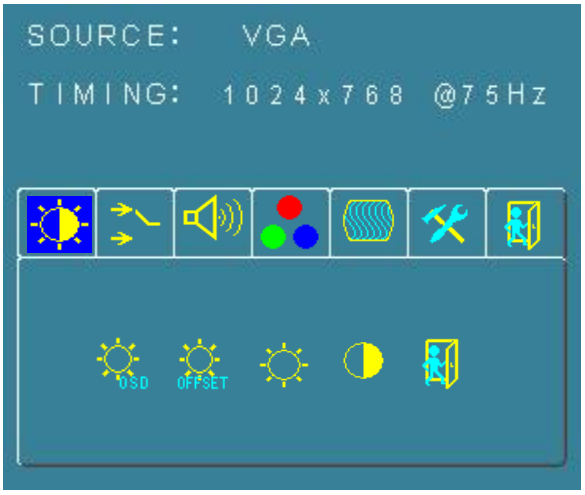
Decrease item number or item value when OSD is on. When OSD is off, it is hot key for input switch between VGA, AV, and S-video.

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.

6.2 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, H-frequency, and V-frequency of the panel. Version shows the firmware control version. This 2 information is not changeable by user.



There are 5 subpages inside the OSD manual, Brightness, Signal select, Sound, Color, Image, Tools, and Exit.

When you press “Menu” button, you enter the “Brightness” subpage. You will see 5 selections:

press ’’Menu’’

press ’’Menu

OSD Brightness:

press ’’Right’’ key


Press “Menu” once, 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”.

Ambient light sensor: press this Icon, must to accompany with ambient light sensor to auto dimming.

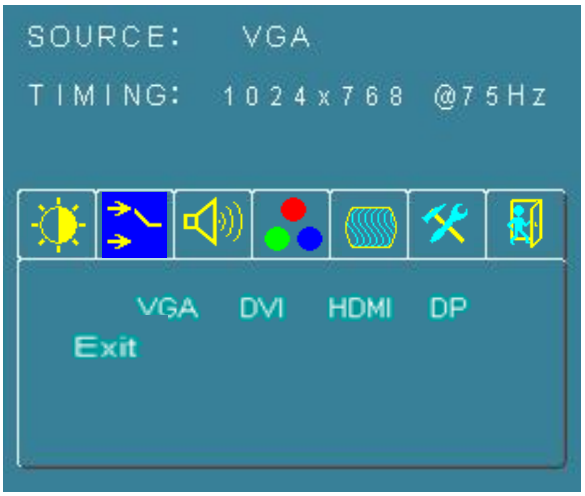
Ambient light sensor with OSD offset: press this Icon

Press ’Menu’’ once, you can adjust min. luminance to fit your application


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


Exit: You can exit this sub menu back to normal screen.

Source:



There are 4 options for “Source” sub page.

VGA **VGA:** When you press “Menu” button, you can go to VGA channel.

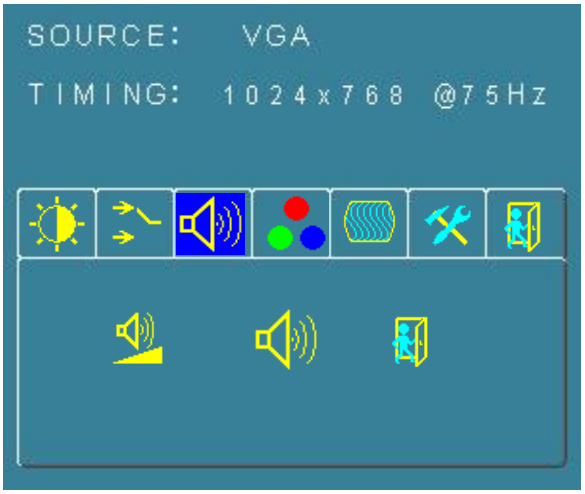
DVI **DVI:** When you press “Menu” button, you can go to DVI channel.

HDMI **HDMI:** When you press “Menu” button, you can go to HDMI channel.

DP **DP:** When you press “Menu” button, you can go to DP channel.

Exit **Exit:** back to the normal screen.

Sound:



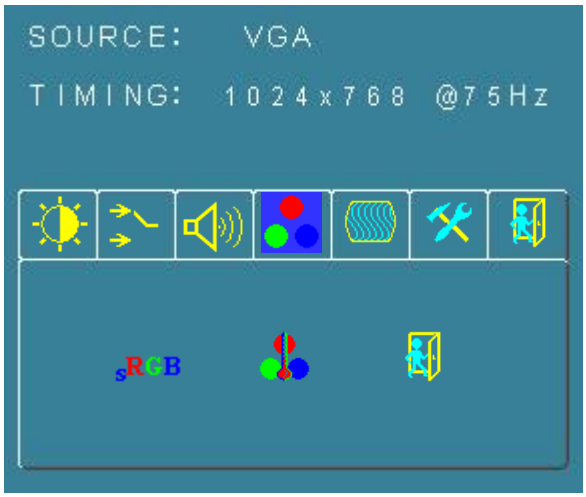
There are 3 options for “Sound” subpage.

Audio Volume: Audio volume adjustment.

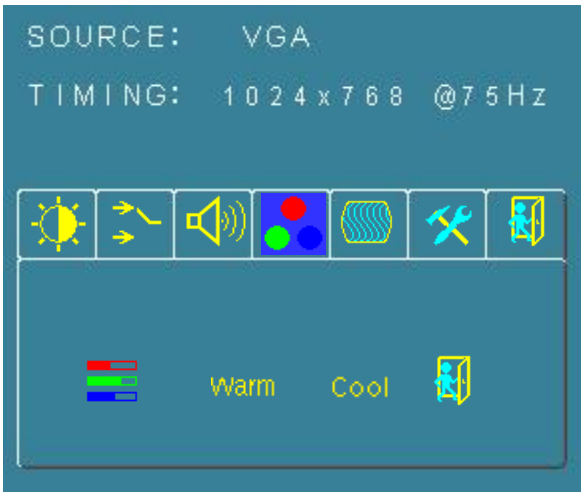
Mute: You can mute the speaker by pressing this icon And icon will change to Mute Icon. 

Exit: back to the normal screen.

Color:



SRGB: Windows standard color setting.



Color Temperature: You can have 3 options in this selection.

Color Temperature User

Color Temperature is Warm

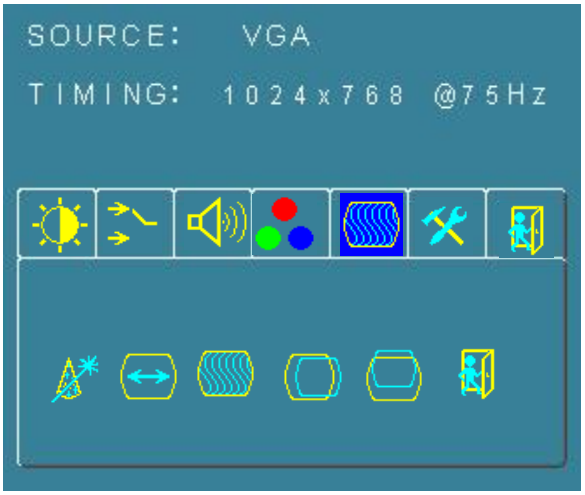
Color Temperature is Cool

"User mode", "6500K" (Warm color scheme), "9300K (Cold color scheme).
Default is "user", and inside all "R", "G", and "B" are set "100"

Exit: back to the normal screen.

Image:

Go into the “Image” page, you can see below picture.



Auto just: Pressing this option, the display will adjust the optimal frequency of horizontal and vertical. You will see “Auto tune….” On the screen for around 3 seconds.

Clock: If you are not satisfied about the Auto tune result, you can adjust manually by “Clock”.
The screen will be “wider” if you adjust this function.

Phase: If you see “double image” on characters, you can adjust “Phase” to make it perfect image.

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

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

Exit: Back to normal screen.

TOOLS:

On the “Tools” sub menu, you will see 4 icons.

OSD Control: Select this option, you will see 4 more options:

Factory_Reset: By pressing this, the screen will be back to the default settings.

Sharpness: Adjust the sharpness of the characters

To change 640x350 70hz and 720x400 70hz signal.

Exit

OSD_time: You can selection the time of OSD from 2 sec. to 16 sec. Default is 6 sec.

OSD_HPos: You can move the OSD horizontally.

OSD_VPos: You can move the OSD Vertically.

Exit: back to main menu.

BURNIN MODE:

Factory Burn-in mode: While your VGA cable is connected on the monitor, press “Menu” and Left and Right <” simultaneously, you will see “BURN IN MODE” on the center of the screen for 3 sec. Then unplug the VGA cable, the screen will show Red, Green, Blue, White, and Black in sequence automatically.

You can plug in the VGA signal cable, and re-plug the power connector to exit the burn-in mode.

FACTORY MODE

Press “Menu and Left and Right” When the OSD Icon is not on screen.

KEY LOCK MODE :

OSD Lock Function: It is possible to lock all the OSD buttons to prevent unauthorized changes to occur by pressing “Menu” and “Right >” buttons simultaneously. You will see the “lock” icon below on the center of the screen for 15 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 “Menu” and “Right >”. The below icon will appear on the center of the screen for 3 seconds. Now all OSD keys are active again.

7 Precautions

7.1 Handling and Mounting Precautions

(1) The module should be assembled into the system firmly by using every mounting hole. Do not apply rough force such as bending or twisting to the LCD during assembly.
(2) You should consider the mounting structure so that uneven force (ex. Twisted stress, Concentrated stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the LCD module.
(3) While assembling or installing LCD modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
(4) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
(5) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily be scratched.
(6) Please attach the surface transparent protection film to the surface in order to protect the polarizer. Transparent protection film should have sufficient strength in order to the resist external force.
(7) When the transparent protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
(8) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.
(9) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.
(10) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.
(11) Protect the LCD module from static electricity, it may cause damage to the C-MOS Gate Array IC.
(12) Do not disassemble the module.
(13) Do not pull or fold the lamp wire.
(14) Pins of I/F connector should not be touched directly with bare hands.

7.2 Storage Precautions

(1) High temperature or humidity may reduce the performance of LCD module. Please store LCD module within the specified storage conditions.
(2) If possible store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.
(3) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
(4) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

7.3 Operation Precautions

(1) Do not pull the I/F connector in or out while the LCD module is operating.
(2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.
(3) Response time depends on the temperature. (In lower temperature, it becomes longer.)
(4) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
(5) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods are very important to minimize the interference.
(7) Please do not give any mechanical and/or acoustical impact to module. Otherwise, module can't be operated its full characteristics perfectly.
(8) Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.
(9) Do not display the fixed pattern for a long time because it may cause image sticking.
(10) In order to prevent image sticking, periodical power-off or screen save is needed after fixed pattern long time display.
(11) Black image or moving image is strongly recommended as a screen save.
(12) Static information display recommended to use with moving image. Cycling display between 10 minutes' information (static) display and 10 seconds' moving image.
(13) Background and character (image) color change is recommended. Use different colors for background and character, respectively. And change colors themselves periodically.
(14) LCD system is required to place in well-ventilated environment. Adapting active cooling system is highly recommended.
(15) Product reliability and functions are only guaranteed when the product is used under right operation usages.
(16) If product will be used in extreme conditions, such as high temperature/ humidity, shock and vibration it is strongly recommended to contact Litemax for filed application engineering advice. Otherwise, its reliability and function may not be guaranteed. Extreme conditions are commonly found at airports, transit stations, taxi-top, in vehicle and controlling systems.

8 Disclaimer

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