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Sunlight Readable LCD!

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DURApixel LED B/L LCD

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DLF1858-T / DLH1858-T V1

Sunlight Readable 18.5” LED B/L LCD

User Manual

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Record of Revision

Version and Date	Page	Old Description	New Description	Remark
Apr /20/2017	all		Initial release	

Contents

1 General Description

The DLF/DLH1858-T is a 18.5 inch industrial grade sunlight readable LCD, with high brightness 1600 nits and high color saturation, it produce sharp images, crisp text and lifelike colors. The Durapixel LED backlight technology ensures high reliability and low power consumption, suitable for outdoor application, kiosk, factory automation, military, transportation and gaming application.

1.1 Features

- High Brightness 1600 nits
- Sunlight Readable
- Wide Viewing Angle of 176 ℃(H), 176 ℃(V)
- Wide Temperature (-20 ℃~70 ℃)
- Low Power Consumption
- BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	DLF1858-T / DLH1858-T V1
Description	18.5” TFT LCD, LED Backlight 1600 nits, FHD (1920x1080)
Screen Size	18.5”
Display Area (mm)	408.9(H) x 230(V)
Brightness	1600 cd/m²
Resolution	1920x1080
Aspect Ratio	16 : 9
Contrast Ratio	1120 : 1
Pixel Pitch (mm)	0.213(H) x 0.213(V)
Pixel Pre Inch (PPI)	119
Viewing Angle	176°(H),176°(V)
Color Saturation (NTSC)	85%
Display Colors	16.7M
Response Time (Typical)	25ms
Panel Interface	LVDS
AD Board Input Interface	VGA, DVI-D, HDMI
AD Board Input Power	DC12V
Power Consumption	35W (40W with AD Board)
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position…etc
Dimensions (mm)	430.4 x 254.6 x 13.4
Bezel Size(U/B/L/R)	10.8/10.8/9.2/9.2 mm
Weight (Net)	1.5kg
Operating Temperature	-20 ˚C ~ 70 ˚C
Storage Temperature	-30 ˚C ~ 80 ˚C

DLF= Panel + LED Driving Board

DLH= Panel + LED Driving Board + AD Control Board

1.3 Absolute Maximum Ratings

Permanent damage may occur if exceeding the following maximum rating.

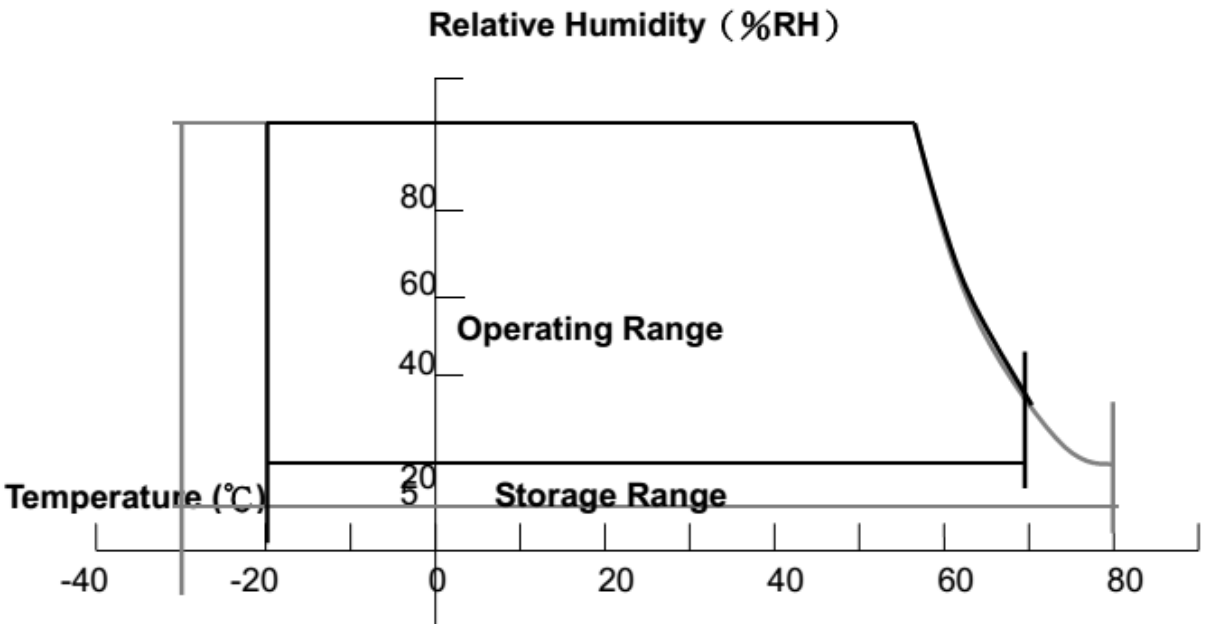
Parameter	Symbol	Rating	Unit	Remarks
Power supply voltage	VCC	-0.3 ~ +6.5	V	Ta = 25℃
Storage temperature	Tst	-30 ~ +80	℃	-
Operating temperature	Tot	-20 ~ +70	℃	Note1 & 2
Relative humidity Note3	RH	≦95	%	Ta ≦ 40℃
Absolute humidity Note4	AH	≦70	%	Ta = 70℃

Note1: Measured at LCD panel surface (including self-heat)

Note2: Measured at LCD module's rear shield surface (including self-heat)

Note3: No condensation

Note4: Water amount at Ta= 70 °C and RH= 36%



2 Electrical Specifications

2.1 Electrical Characteristics

Permanent damage may occur if exceeding the following maximum rating.

(Ta= 25°C)

Parameter		Symbol	min.	typ.	max.	Unit	Remarks
Power supply voltage		VCC	4.5	5.0	5.5	V	-
Power supply current		ICC	-	(420) Note1	(760) Note2	mA	at VCC= 5.0V
Permissible ripple voltage		VRPC	-	-	100	mVp-p	for VCC Note3, Note4, Note5
Differential input threshold voltage	High	VTH	-	-	+100	mV	at VCM= 1.2V Note6, Note7
	Low	VTL	-100	-	-	mV	
Input Differential Voltage		|VID|	-100	400	600	mV	-
Differential Input Common Mode Voltage		VCM	0.7	1.2	1.6	V	-
Terminating resistance		RT	-	100	-	Ω	-

Note1: Checkered flag pattern [by EIAJ ED-2522]

Note2: Pattern for maximum current

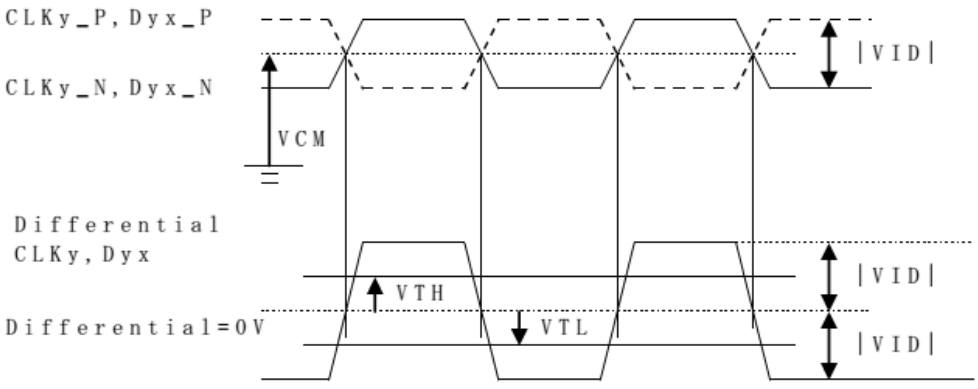
Note3: This product works if the ripple voltage levels are over the permissible values, but there might be noise on the display image.

Note4: The permissible ripple voltage includes spike noise.

Note5: The load variation influence does not include.

Note6: Common mode voltage for LVDS receiver

Note7: DC characteristics (LVDS receiver part)



CLKy_P, CLKy_N: y = A,B
Dyx_P, Dyx_N: y = A,B x = 0,1,2,3
|VID| = |**_P-**_N|
VCM = (**_P+**_N)/2
P: +, N: -
**: CLKy or Dxy

2.2 LVDS Connections

Connector Type
CN1 socket (LCD module side): MDF76KBW-30S-1H (55) (HIROSE)
Adaptable plug: MDF76-30P-1C (HIROSE)

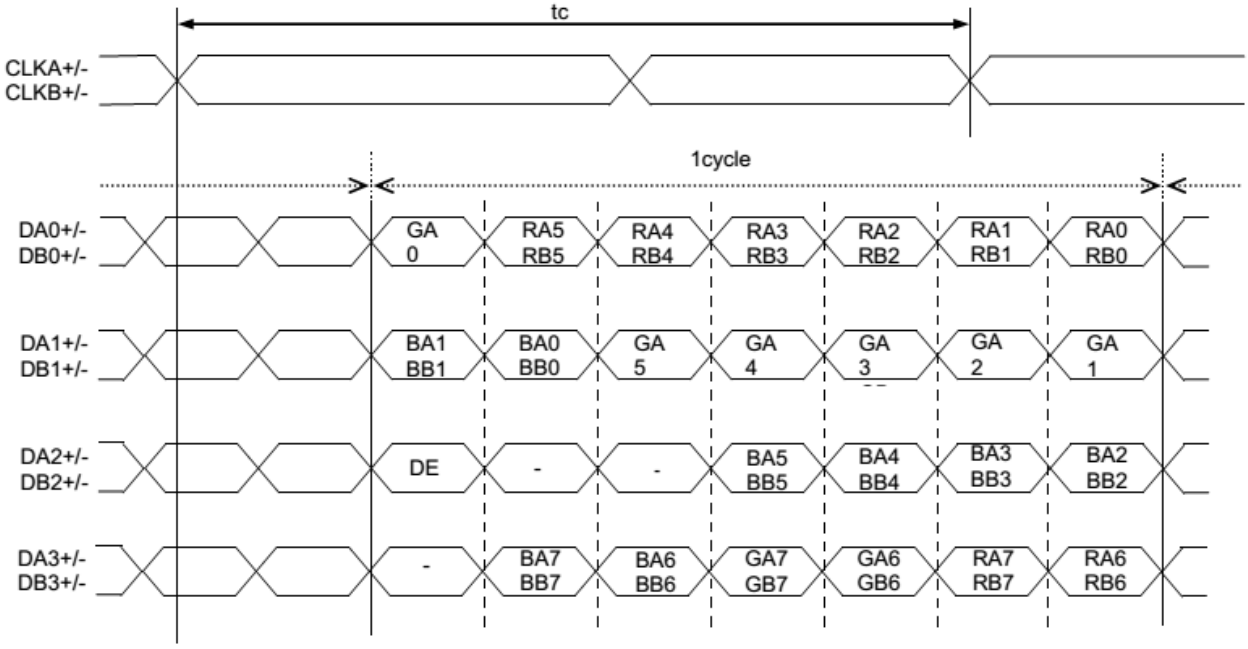
Connector Pin Assignment

Pin No.	Symbol	Signal	Remarks
1	DA0-	Odd pixel data 0	Note1
2	DA0+		
3	DA1-	Odd pixel data 1	Note1
4	DA1+		
5	DA2-	Odd pixel data 2	Note1
6	DA2+		
7	GND	Ground	Note2
8	CLKA-	Odd pixel clock	Note1
9	CLKA+		
10	DA3-	Odd pixel data 3	Note1
11	DA3+		
12	DB0-	Even pixel data 0	Note1
13	DB0+		
14	GND	Ground	Note2
15	DB1-	Even pixel data 1	Note1
16	DB1+		
17	GND	Ground	Note2
18	DB2-	Even pixel data 2	Note1
19	DB2+		
20	CLKB-	Even pixel clock	Note1
21	CLKB+		
22	DB3-	Even pixel data 3	Note1
23	DB3+		
24	GND	Ground	Note2
25	GND	Ground	Note2
26	GND	Ground	Note2
27	GND	Ground	Note2
28	VCC	Power supply	Note2
29			
30			

Note1: Twist pair wires with 100Ω (Characteristic impedance) should be used between LCD panel signal processing board and LVDS transmitter .

Note2: All GND and VCC terminals should be used without any non-connected lines.

Input data mapping



2.3 Signal Characteristics

TIMING CHARACTERISTICS

(Note1, Note2, Note3)

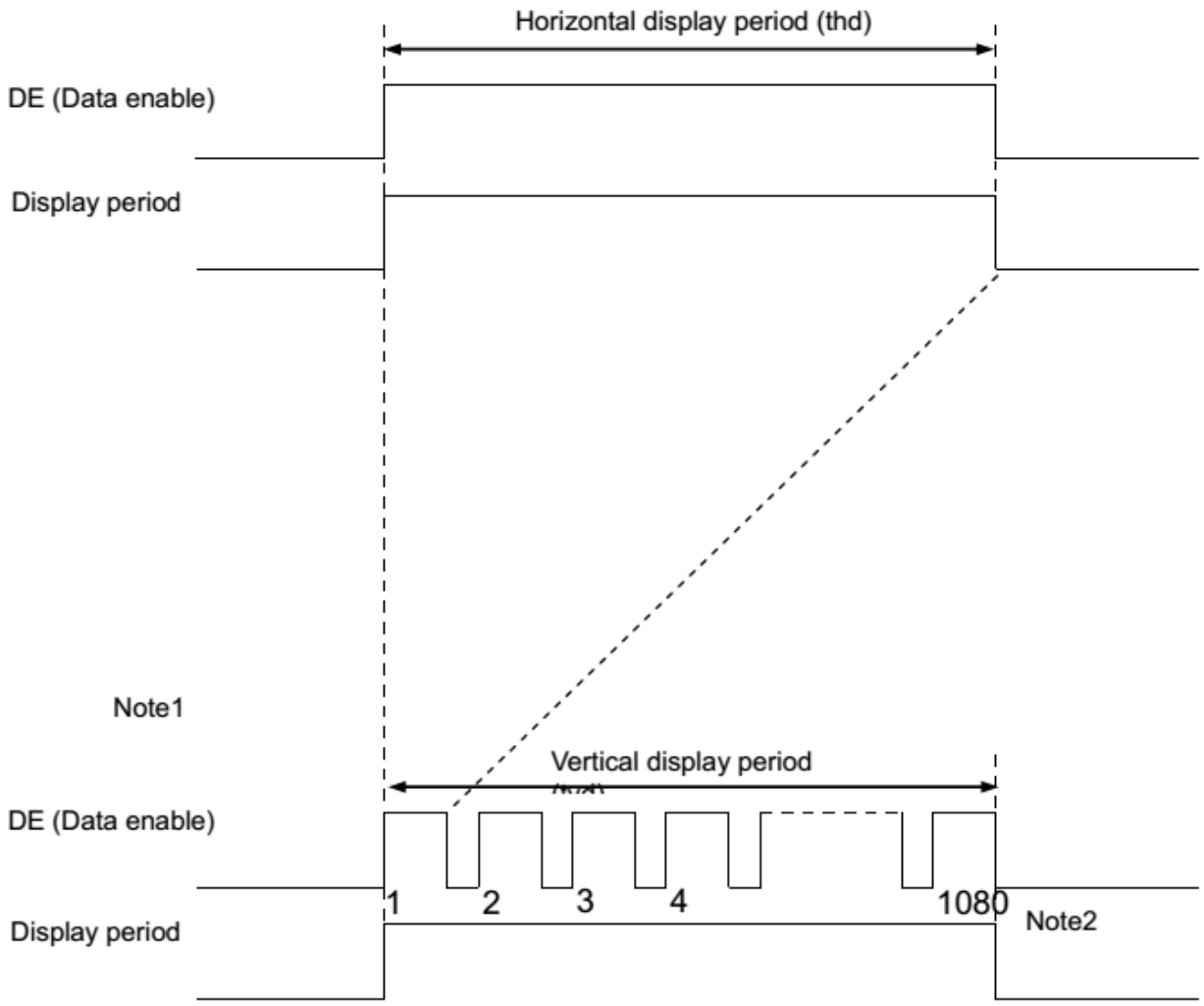
Parameter			Symbol	min.	typ.	max.	Unit	Remarks
CLK	Frequency		1/tc	65.0	74.175	81.5	MHz	13.48ns (typ.)
	Duty ratio		-	-			-	-
	Rise time, Fall time		-				ns	
DATA	CLK-DATA	Setup time	-	-			ns	-
		Hold time	-				ns	
	Rise time, Fall time		-				ns	
DE	Horizontal	Cycle	th	13.19	14.83	16.53	μs	67.43kHz (typ.)
				1,075	1,100	-	CLK	
		Display period	thd	960			CLK	-
	Vertical (One frame)	Cycle	tv	15.39	16.68	18.18	ms	59.94Hz (typ.)
				1,100	1,125	-	H	
		Display period	tvd	1,080			H	-
	CLK-DE	Setup time	-	-			ns	-
		Hold time	-				ns	
	Rise time, Fall time		-				ns	

Note1: Definition of parameters is as follows.
tc= 1CLK, th= 1H

Note2: See the data sheet of LVDS transmitter.

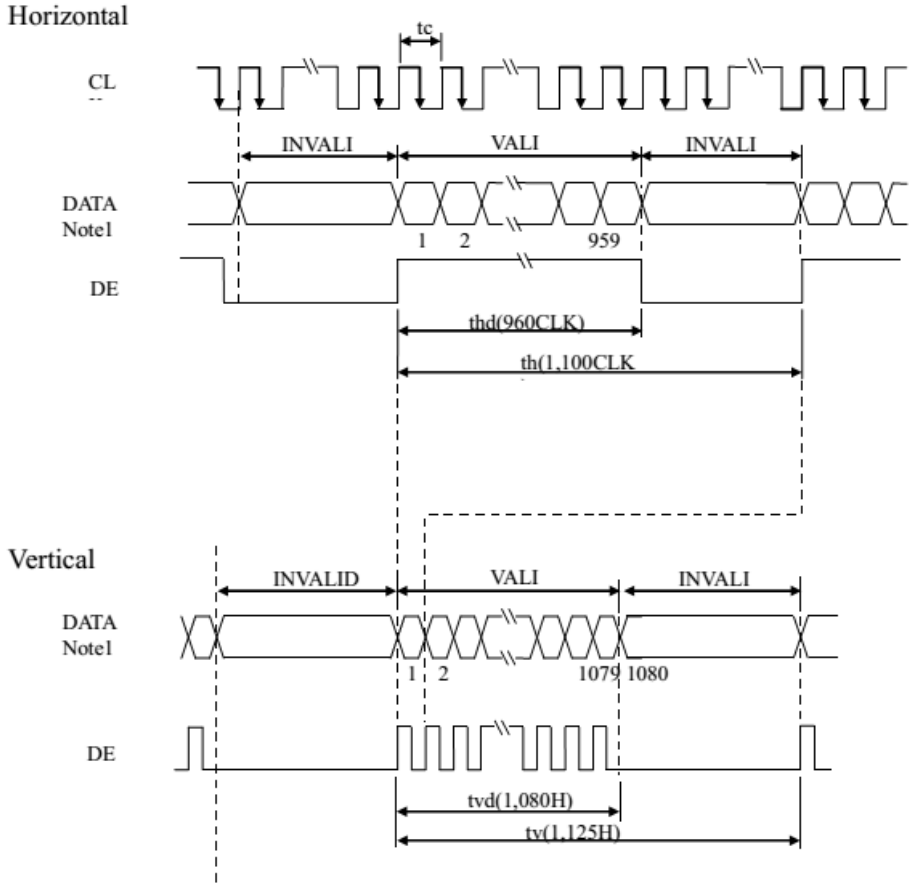
Note3: Vertical cycle (tv) should be specified in integral multiple of Horizontal cycle (th).

Outline of input signal timings



Note1: This diagram indicates virtual signal for set up to timing.

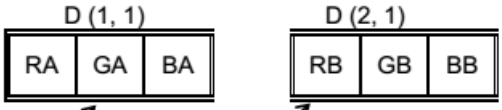
Input signal timing chart



Note1: DATA (A) = RA0-RA7, GA0-GA7, BA0-BA7

DATA (B) = RB0-RB7, GB0-GB7, BB0-BB7

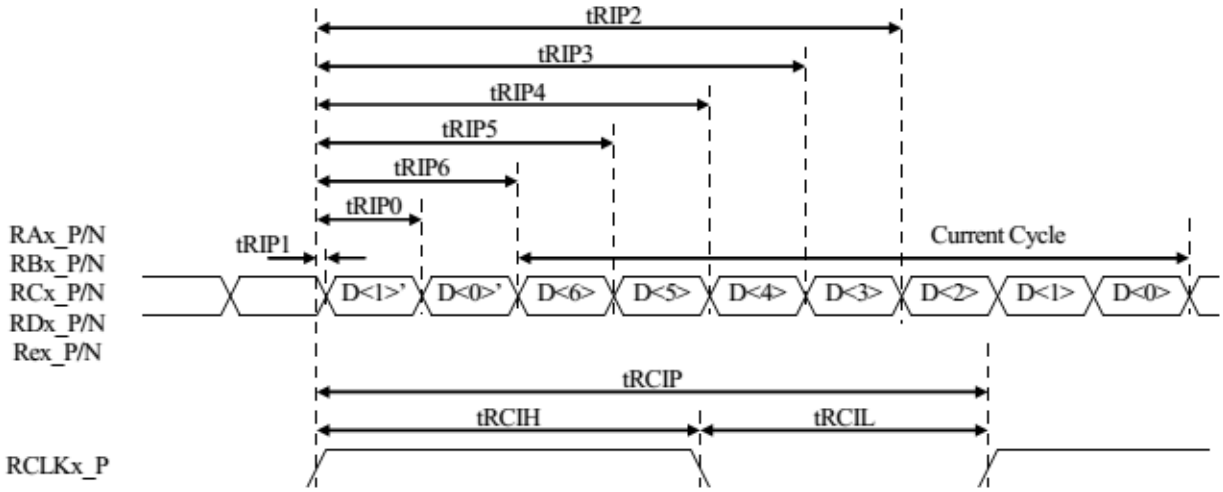
INPUT DATA SIGNALS AND DISPLAY POSITIONS



D(1, 1)	D(2, 1)	• • •	D(959, 1)	D(960, 1)	• • •	D(1919, 1)	D(1920, 1)
D(1, 2)	D(2, 2)	• • •	D(959, 2)	D(960, 2)	• • •	D(1919, 2)	D(1920, 2)
• • •	• • •	• • • •	• • •	• • •	• • • •	• • •	• • •
D(1, Y)	D(2, Y)	• • •	D(959, Y)	D(960, Y)	• • •	D(1919, Y)	D(1920, Y)
• • •	• • •	• • • •	• • •	• • •	• • • •	• • •	• • •
D(1, 1079)	D(2, 1079)	• • •	D(959, 1079)	D(960, 1079)	• • •	D(1919, 1079)	D(1920, 1079)
D(1, 1080)	D(2, 1080)	• • •	D(959, 1080)	D(960, 1080)	• • •	D(1919, 1080)	D(1920, 1080)

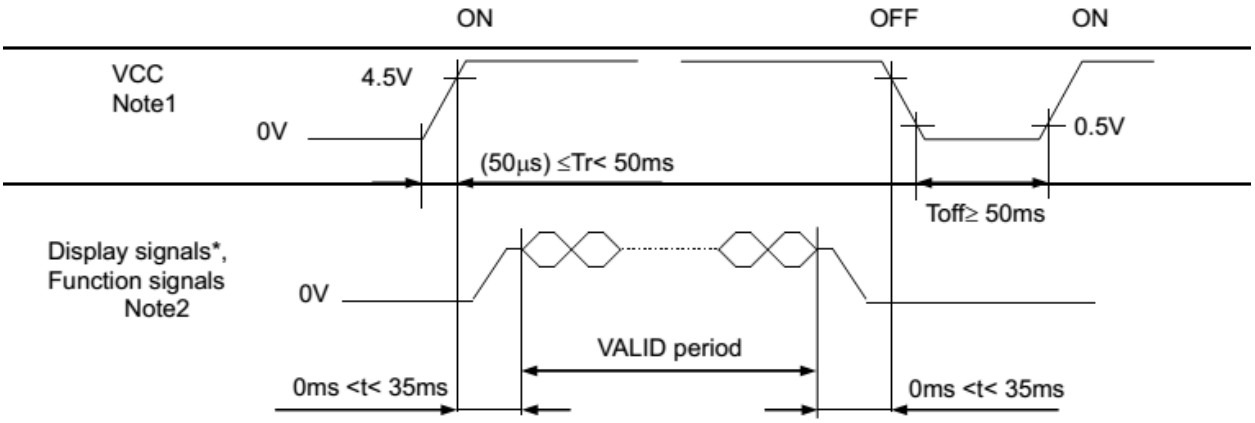
LVDS Rx AC SPEC

Symbol	Parameter	min.	typ.	max.	Units
t_{RCIP}	CKy_+ Period	(12.27)	-	(15.38)	ns
t_{RCIH}	CKy_+ High pulse width	-	$\frac{4}{7}t_{RCIP}$	-	ns
t_{RCIL}	CKy_+ Low pulse width	-	$\frac{3}{7}t_{RCIP}$	-	ns
t_{RMG}	Receiver Data Input Margin CLK= 75MHz	(-0.4)	-	(0.4)	ns
t_{RIP1}	Input Data Position0	$-\lvert t_{RMG}\rvert$	0.0	$+\lvert t_{RMG}\rvert$	ns
t_{RIP0}	Input Data Position1	$\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$\frac{t_{RCIP}}{7}$	$\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns
t_{RIP6}	Input Data Position2	$2\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$2\frac{t_{RCIP}}{7}$	$2\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns
t_{RIP5}	Input Data Position3	$3\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$3\frac{t_{RCIP}}{7}$	$3\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns
t_{RIP4}	Input Data Position4	$4\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$4\frac{t_{RCIP}}{7}$	$4\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns
t_{RIP3}	Input Data Position5	$5\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$5\frac{t_{RCIP}}{7}$	$5\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns
t_{RIP2}	Input Data Position6	$6\frac{t_{RCIP}}{7}-\lvert t_{RMG}\rvert$	$6\frac{t_{RCIP}}{7}$	$6\frac{t_{RCIP}}{7}+\lvert t_{RMG}\rvert$	ns



2.4 Power Supply Voltage Sequence

LCD panel signal processing board



These signals should be measured at the terminal of 100Ω resistance.

Note1: If there is a voltage variation (voltage drop) at the rising edge of VCC below (4.5)V, there is a possibility that a product does not work due to a protection circuit.

Note2: Display signals (DA0+/-, DA1+/-, DA2+/-, DA3+/-,CLKA+/-,DB0+/-, DB1+/-, DB2+/-, DB3+/- and CLKB+/-) must be set to Low or High-impedance, except the VALID period (See above sequence diagram), in order to avoid the circuitry damage.

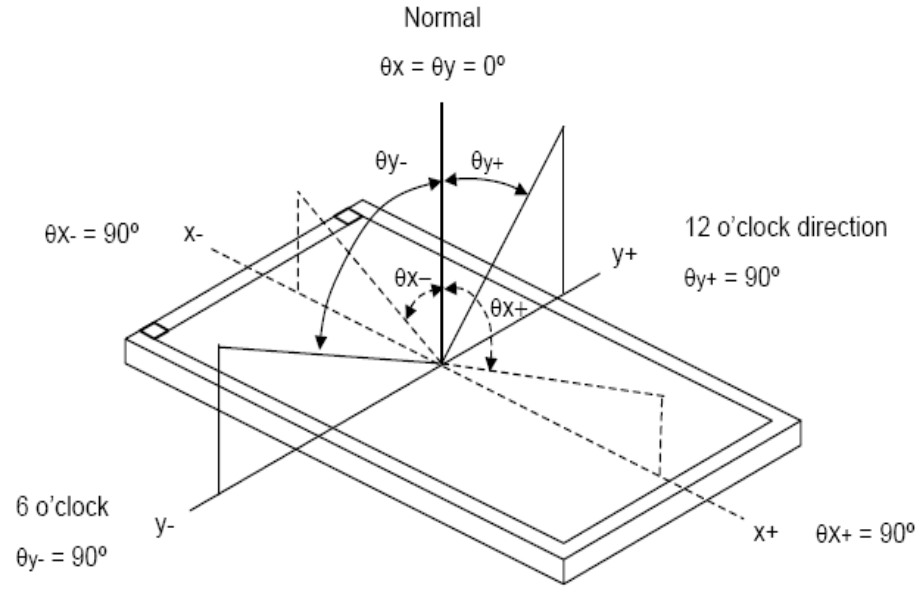
If some of display signals of this product are cut while this product is working, even if the signal input to it once again, it might not work normally. If a customer stops the display signals, VCC also must be shut down.

3 Optical Specification

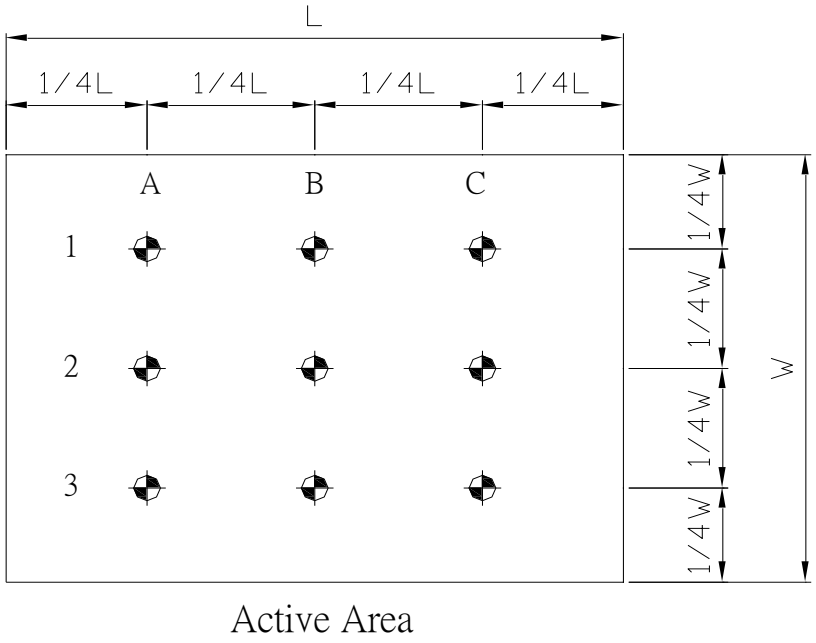
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	θx=0 θy=0 Klein K-10	0.612	0.642	0.672	-	Test Mode: (1) (2) (3)
		Ry		0.310	0.340	0.370	-	
	Green	Gx		0.235	0.265	0.295	-	
		Gy		0.612	0.642	0.672	-	
	Blue	Bx		0.113	0.143	0.173	-	
		By		0.038	0.068	0.098	-	
	White	Wx		0.255	0.285	0.315	-	
		Wy		0.270	0.320	0.350	-	
Center Luminance of White		Lc	θx=0 θy=0 BM-7		1600		cd/m^2	
Uniform		Lu			89		%	
Contrast Ratio		CR	θx=0 θy=0 Klein K-10		1120:1		-	Test Mode: (1) (4)
Color Saturation		NTSC			85		%	
Viewing Angle	Horizontal	θx+	CR ≥ 10		88		Deg	Test Mode: (1) (3)
		θx-			88			
	Vertical	θy+			88			
		θy-			88			

Test Mode：

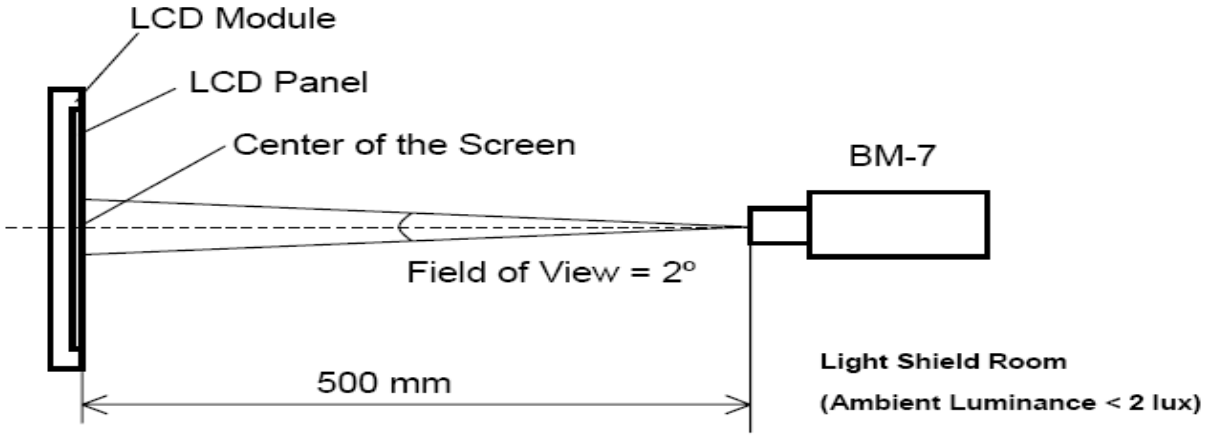
(1) Definition of Viewing Angle (θx , θy):



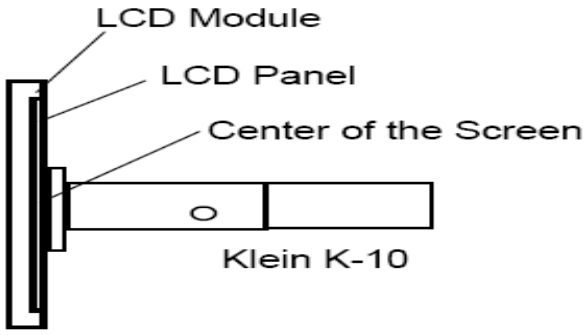
(2) Definition of Test Point:



(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		10.0	12.0	14.0	V	
Input Current (Low Brightness)	IinL	VIN=12V,Vadj=5V	0.0	-----	-----	mA	
Input Current (High Brightness)	IinH	VIN=12V,Vadj=0V	1.95	1.79	1.68	A	(1)
4.1.1.1.1 LED Current (Low Brightness)	IoutL	VIN=12V,Vadj=5V	0.0	-----	-----	Arms	
LED Current (High Brightness)	IoutH	VIN=12V,Vadj=0V	0.83	0.88	0.93	A	
Working Frequency	Freq	VIN=12V,Vadj=0V	350	400	450	KHZ	
Brightness Control	DC mode						
	Vadj	Connection of Voltage	0.2	-----	4.8	V	Vadj±5%
	PWM mode						
	PWM	Connect to PWM	0	-----	100	%	Max ratio 1:100
	Freq		-----	200	-----	Hz	(2)
ON/OFF Control	Von	Normal Operation	2	-----	5	V	
	Voff	Normal Operation	0	-----	0.8	V	
Output Voltage	Vout	VIN=12V,Vadj=0V	31.2	31.7	32.2	V	
Efficiency	η	VIN=12V,Vadj=0V	90.7	91.3	92.2	%	(3)

Remark:

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

(2) Frequency can be adjusted in accordance with demand(120Hz minimum, or lights will be flickering)

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

4.2 Connector Socket

Input Connector:

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)

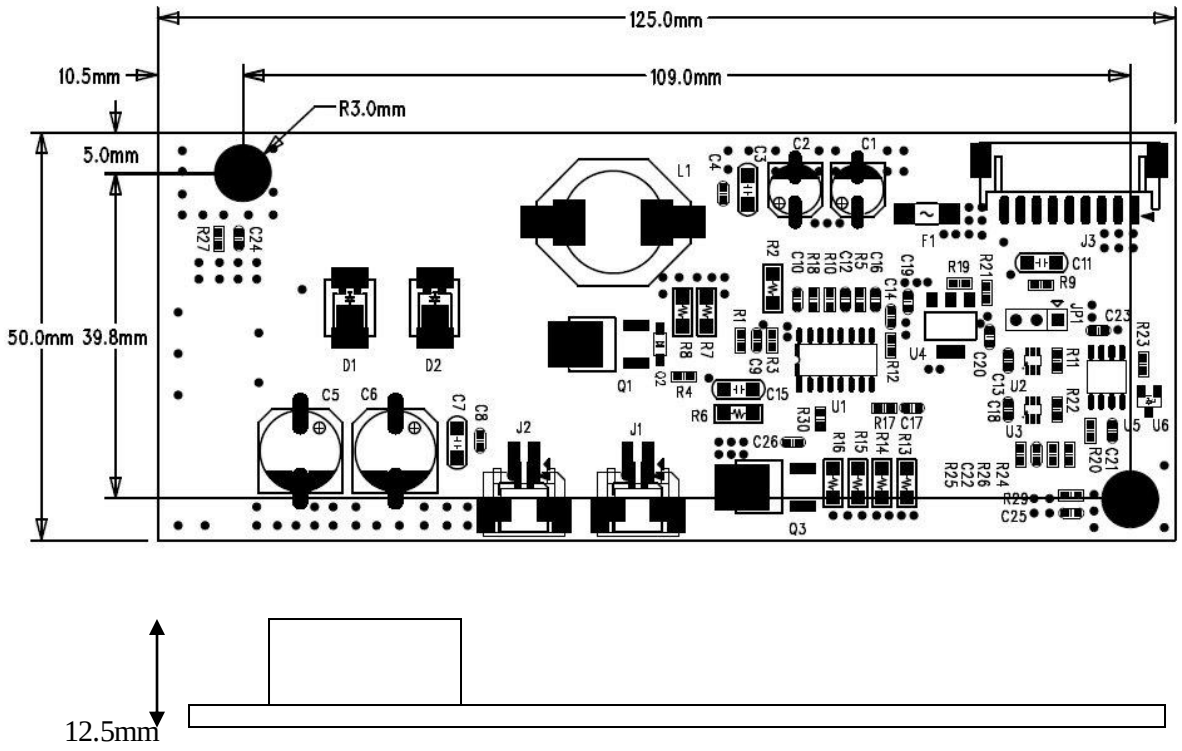
PIN NO	Symbol	Description
1	Output	LED High Voltage(+)
2	Output	LED Low Voltage (-)

DC or PWM Connector: JP1

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

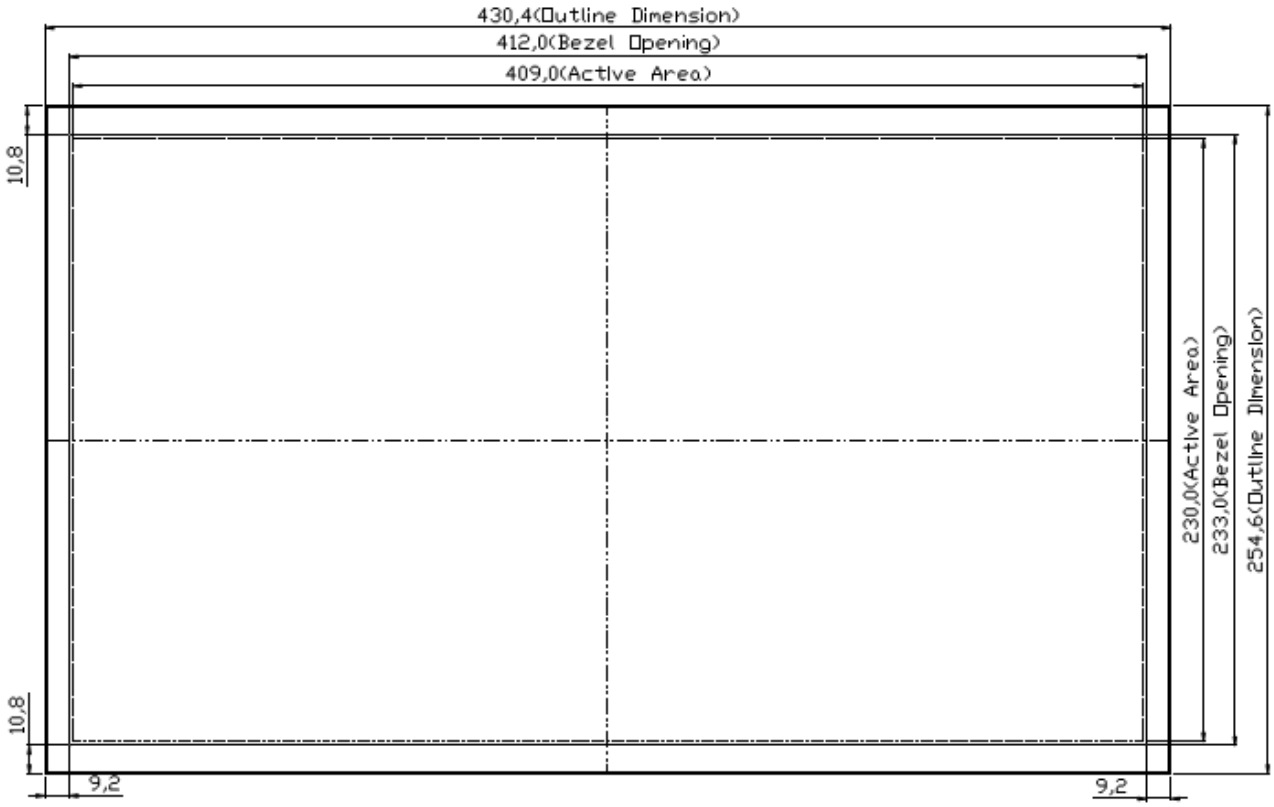
4.3 Mechanical Characteristics

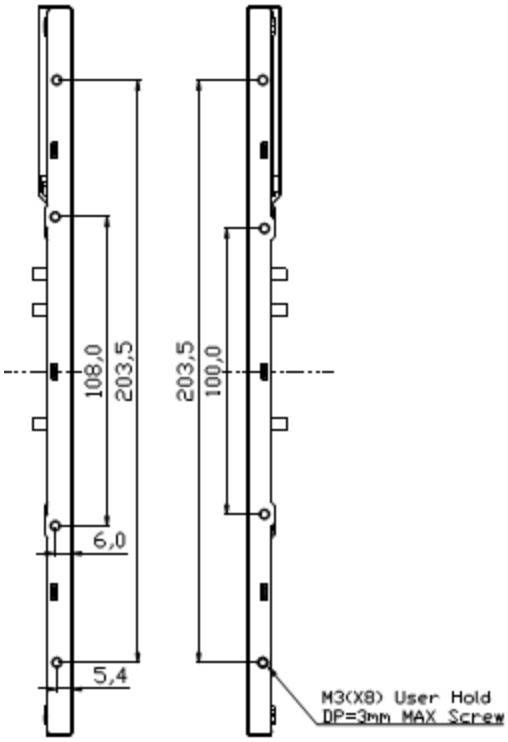
Dimension: 125mm*50mm*12.5mm

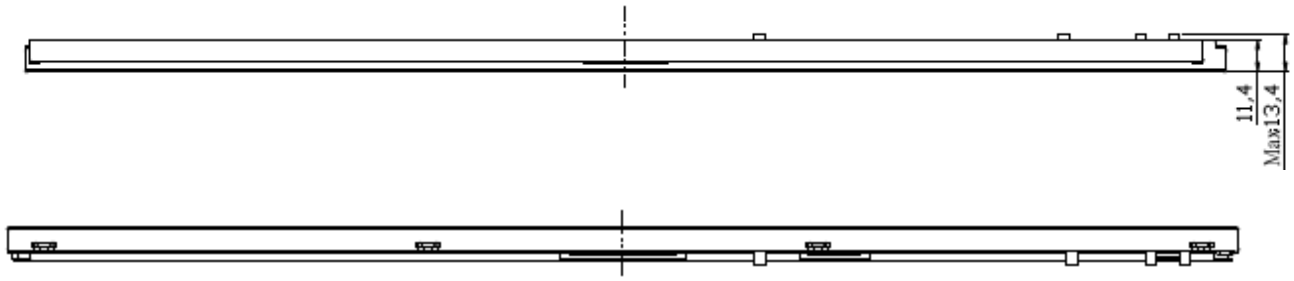


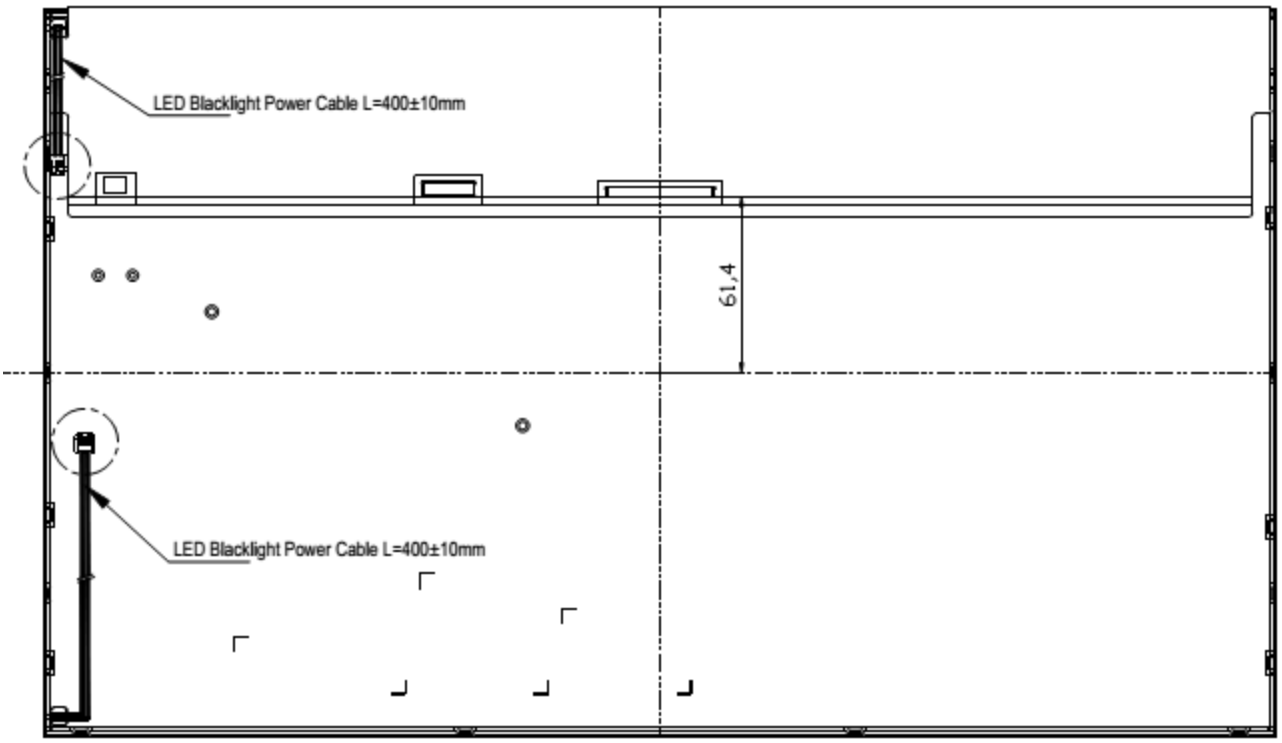
5 Mechanical Drawing

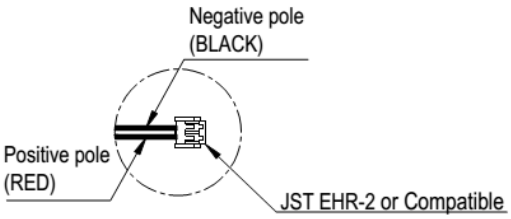
Unit:mm











Connector View

Note：

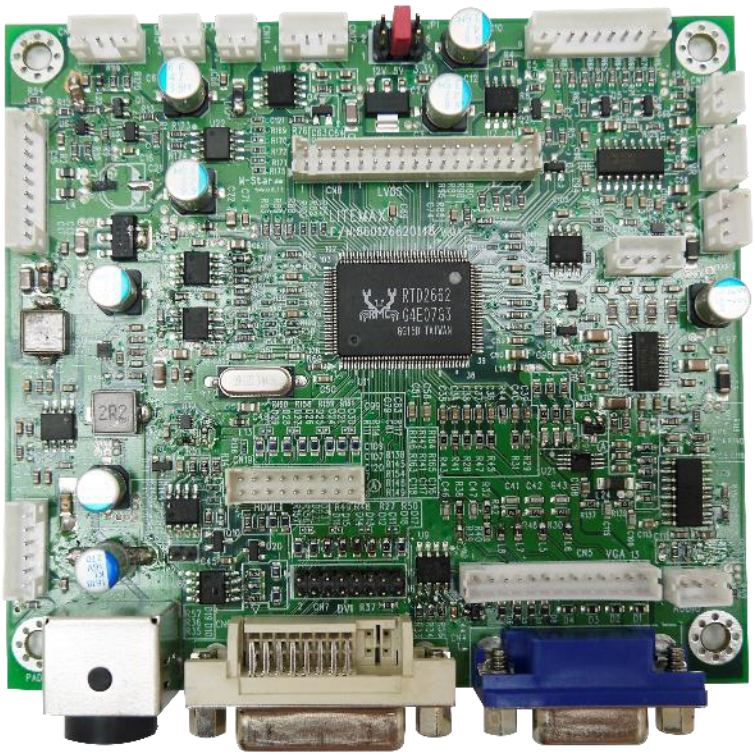
1. THE DIMENSION EXCLUDES DEFORMATION.
2. MODULE THICKNESS TO BE MAX.13.4mm(With BSO)
3. I/F CONNECTOR TO BE JAE FI-X30HL OR COMPATIBLE
4. M3 USER HOLE SCREW TORQUE 5.0 kgf- cm MAX.

6 AD2662GDH Board & OSD Functions

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

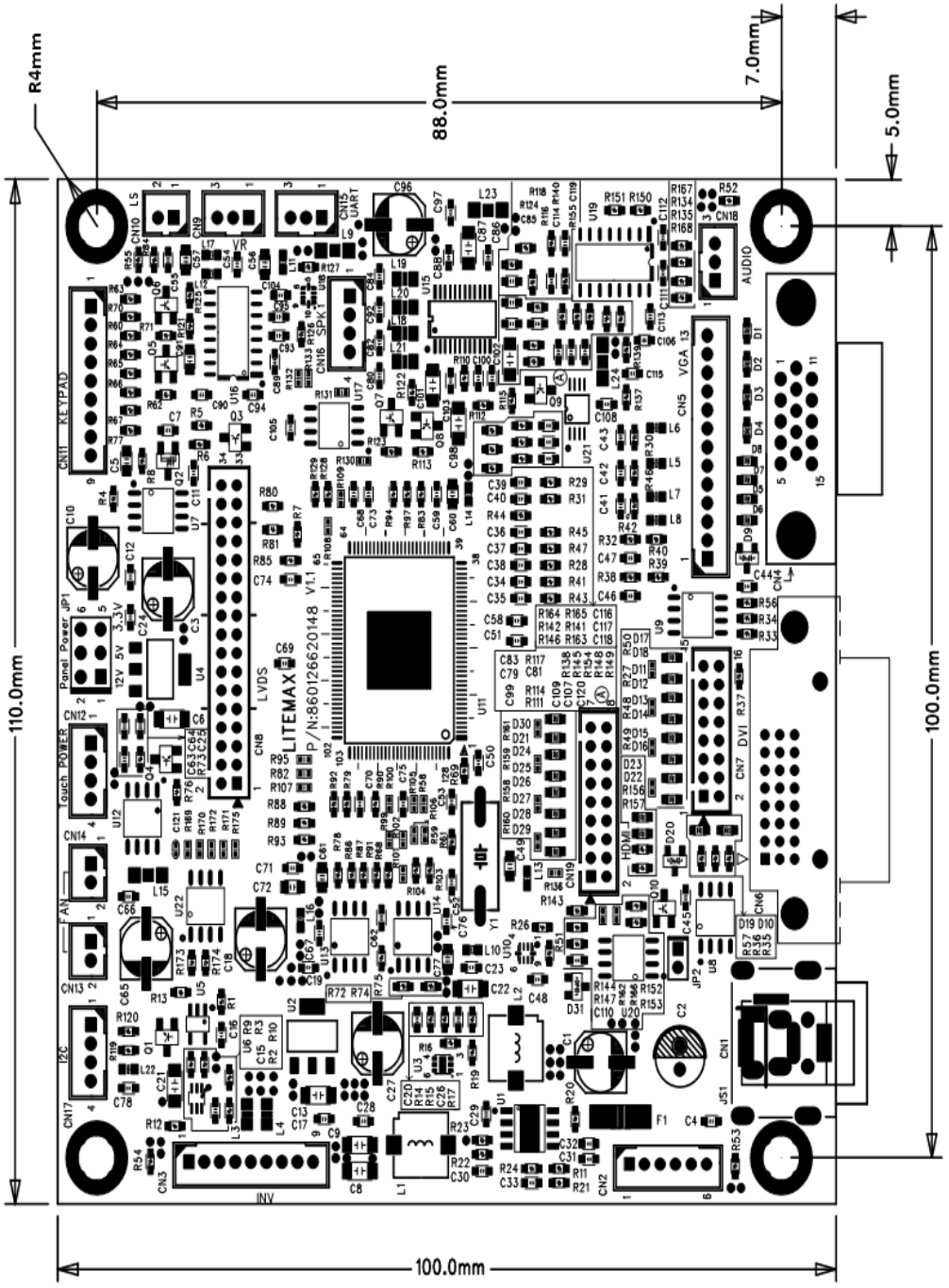
6.1 General Description

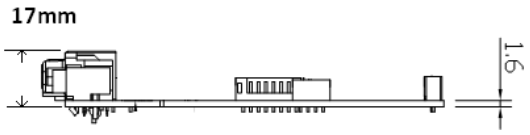
- Max Resolution Up To WUXGA
- Analog RGB Input up to 205MHz
- ULTRA-RELIABLE DVI INPUT
- HDMI INPUT(optional)
- Dual/single LVDS interface
- Support Panel DC5V or 3.3V, 12V Output
- External Fan Control by Software
- OSD Control
- Inverter Analog or PWM Dimming Control
- *External V.R. brightness control (optional)
- *External light sensor brightness control (optional)
- *External RS232 control (optional)
- Input Power 12Vdc
- Audio in and 2Wx2 Audio Out(optional)



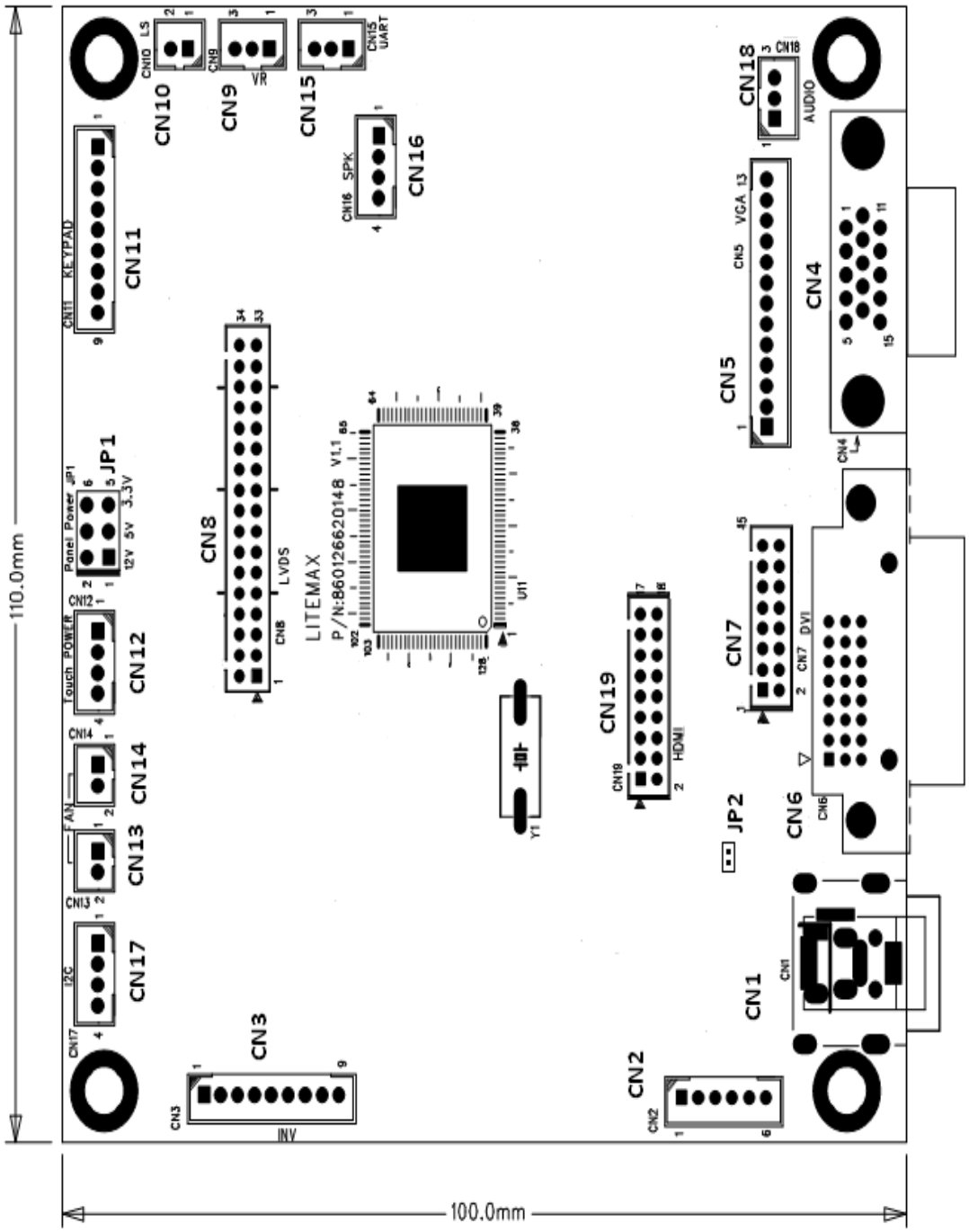
6.2 Outline Dimensions

AD2662GDH 110mm x 100mm





2. AD2662 Board Pin Define



CN8: Panel connector (34 pin 2.0mm)(2001D-34-ST)

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 HI
13	GND	30	PULL LOW
14	GND	31	PANEL-VCC
15	RxE0-	32	PANEL-VCC
16	RxE0+	33	PANEL-VCC
17	RxE1-	34	PANEL-VCC

CN7: HDMI Connector (18pin 2.0mm) (2001D-18-ST)

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: 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-

CN7: DVI-D Connector (16pin 2.0mm) (2001D-16-ST)

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_RTN	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	SCL	DDC Data Clock	8	BLUE	Analog Blue
2	SDA	DDC Serial Data	9	GGND	Green Return
3	GND	Reserved	10	GREEN	Analog Green
4	GND	Reserved	11	RGND	Red Return
5	HSYNC	Horizontal Sync	12	RED	Analog Red
6	VSYNC	Vertical Sync	13	+5V	+5VDDC
7	BGND	Blue Return			

Cn1: Power DIN (12V)

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

CN1: Power Jack (12V)

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

CN2: Power connector (12V) (6PIN 2.0mm) (B6B-PH-KL)

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

CN12: Power out connector (5V/12v) (4PIN 2.0mm) (B4B-PH-KL)

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

CN3: Inverter Connector (9PIN 2.0mm) (B9B-PH-KL)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	DIM_SEL	SEL DC or PWM Adj	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			

CN13,CN14: FAN (2PIN 2.0mm) (B2B-PH-KL)

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

CN11: Key Pad (9PIN 2.0mm) (B9B-PH-KL)

Pin No.	Function	Pin No.	Function
1	POWER KEY	6	MENU KEY
2	RED LED	7	AUTO KEY
3	GREEN LED	8	GND
4	DOWN KEY	9	FUNCTION KEY
5	UP KEY		

CN16: Speaker Connector (4PIN 2.0mm) (B4B-PH-KL)

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

CN18: Audio in (3PIN 2.0mm) (B3B-PH-KL)

Pin No.	Function	Pin No.	Function
1	AUDIO_R	2	AUDIO_L
3	GND		

CN10: Ambient (2PIN 2.0mm) (B2B-PH-KL)

Pin No.	Function	Pin No.	Function
1	3.3VDC	2	Sensor Out

CN9: VR connector (3PIN 2.0mm) (B3B-PH-KL)

Pin No.	Function	Pin No.	Function
1	3,3VDC	2	VR Out
3	GND		

JP1: PANEL VCC (3PIN 2.54mm) (PHS201-23)

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

JP2: EDID Write protect

Pin No.	Function	Pin No.	Function
1	EE-WP	2	GND

Note: Short 1,2 pin could be write EDID.

CN15: UART (RS232/RS485) (3PIN 2.0mm) (B3B-PH-KL)

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

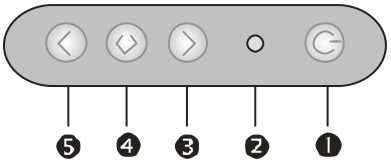
CN17:I2C PORT(4PIN 2.0mm) (B4B-PH-KL)

Pin No.	Function	Pin No.	Function
1	GND	2	SDA
3	SCL	4	3.3V

Note; I2C PORT can connect our smart BD(optional)

6.4 OSD Function

MEMBRANE CONTROL BUTTOM



❶**POWER SWITCH:** Pushing the power switch will turn the monitor on. Pushing it again to turn the monitor off.

❷**Power LED:** Power ON-Green / Power off-No.

❸**Up Key >:** Increase item number or value of the selected item.

❹**Menu Key:** Enter to the OSD adjustment menu. It also used for go back to previous menu for sub-menu, and the change data don't save to memory.

❺**Down Key <:** Decrease item number or item value when OSD is on.

When OSD is off, it is hot key for input switch between VGA, 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**

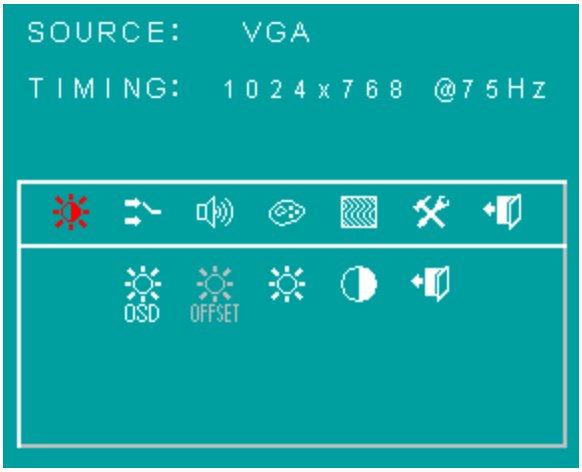
   After finishing the adjustment, push the SELECT button to memorize the setting.

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.

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



There are 7 sub pages inside the OSD manual, Brightness, Signal select, Sound, Color, Image, Tools, and Exit.

When you press "menu" button, you enter the "Brightness" sub page. You will see 5 selections:

press ''menu''

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 Litemax ambient light sensor to auto dimming.(OPTION)

Potentiometer: press this icon, adjust VR function.(OPTION)

Ambient light sensor with OSD offset: press this Icon

Press 'menu'' once, you can adjust min. luminance to fit your application (OPTION)


Contrast: Press "menu" and "right" 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 6 options for “Source”sub page.
There have VGA,DVI,HDMI,AV,S-VIDEO,YPBPR source input.

Sound :

There are 3 options for “Sound” sub page.

Audio Volume: Audio volume adjustment.

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

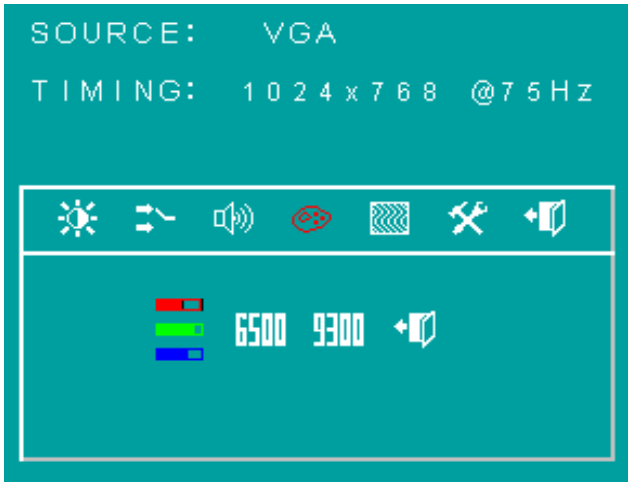
Exit: back to the normal screen.

Color :

Auto Color: by press this "Auto Color" option, you can get the optimal color performance.

SRGB: Windows standard color setting.

Color Tempture: You can have 3 options in this selection , have User/6500/9300



Color Tempture User

Color Tempture_6500K

Color Tempture_93OOK

Exit: back to the normal screen.

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

Image :

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

Auto just: Pressing this option, the AD5621 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 Autotune 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 factory setting on very beginning and lost all the personal settings.

Sharpness: You can make the characters looks sharper.

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 over the screen.

Osd_VPos: You can move the OSD Vertically over the screen.

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.

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 3 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 Precautions

(1) The module should be assembled into the system firmly by using every mounting hole. Be careful not to twist or bend the module.
(2) While assembling or installing modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
(3) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
(4) Do not press or scratch the surface harder than a HB pencil lead on the panel
(5) because the polarizer is very soft and easily scratched.
(6) 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.
(7) Wipe off water droplets or oil immediately. Staining and discoloration may occur if
(8) they left on panel for a long time.
(9) 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.
(10) Protect the module from static electricity, it may cause damage to the C-MOS Gate Array IC.
(11) Do not disassemble the module.
(12) Do not pull or fold the lamp wire.
(13) 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 module. Please store LCD module within the specified storage conditions.
(2) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
(3) It may reduce the display quality if the ambient temperature is lower than 10 ℃. For example, the response time will become slowly, and the starting voltage of lamp will be higher than the room temperature.

7.3 Operation Precautions

(1) Do not pull the I/F connector in or out while the 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.

8 Disclaimer

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