



LITEMAX

DLF/DLH2150-T
21.5" LED B/L LCD

User Manual

Approved by	Checked by	Prepared by

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Record of Revision

Version and Date	Page	Old Description	New Description	Remark
Oct/7/2026	all		Initial release	

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1 General Description

The **DLF/DLH2150-T** is a 21.5 inch industrial grade LCD, with brightness **2000 nits**, it produces sharp images, crisp text and lifelike colors. The Durapixel LED backlight technology ensures high reliability and low power consumption, suitable for indoor application, kiosk, factory automation, military, transportation and gaming application.

1.1 Key Features

- High Brightness 2000 nits
- Sunlight Readable
- LED Backlight
- Low Power Consumption
- Wide Temperature (-20°C ~ 70°C)
- LCD Blackening Defect Free (Hi-Tni 110°C)
- BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	DLF/DLH2150-T
Description	21.5" TFT LCD, 2000 nits LED Backlight, 1920x1080
Screen Size	21.5"
Display Area (mm)	476.06(H) x 267.79(V)
Brightness	2000 cd/m ²
Resolution	1920x1080
Aspect Ratio	16:9
Contrast Ratio	960:1
Pixel Pitch (mm)	0.24795(H) x 0.24795(V)
Pixel Per Inch (PPI)	102
Viewing Angle	178°(H),178°(V)
Color Saturation (NTSC)	74%
Display Colors	16.7M
Response Time (Typical)	20ms
Panel Interface	LVDS
Input Interface	HDMI, DP
Input Power	DC12V
Power Consumption	22W (25W with AD Board)
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Tuning, H/V Position...etc
Dimensions (mm)	497.6(W) x 292.4(H) x 13.35(D) mm
Bezel Size(U/B/L/R)	12.207/12.207/10.768/10.768 mm
Weight (Net)	1.85kg
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

Absolute Electrical Ratings

The followings are maximum values which, if exceeded, may cause damage to the unit.

Parameter		Symbol	Rating	Unit	Remarks
Power supply voltage	LCD panel signal processing board	VLCD _{5V}	-0.3 to +15	V	Ta= 25°C
Input voltage for signals	LCD panel signal processing board Note1	Vi	-0.3 to +2.8	V	VDD= 5.0V Ta= 25°C

Note1: ORXn+/- , ERXn+/-

2 Electrical Specifications

2.1 Electrical Characteristics

DC Characteristics for Panel Driving

(Ta= 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
Power supply voltage	VLCD_5V	4.5	5.0	5.5	V	-
Power supply current	IDD	-	300	900	mA	at VDD=5.0V Note1,2
Permissible ripple voltage	VRP	-	-	200	mVp-p	for VDD Note3,4,5
Differential input threshold voltage	High	VTH	-	-	+100	mV
Logic-Low Output Voltage	Low	VTL	-100	-	-	mV

Note1: Write pattern [by IEC 61747-6]

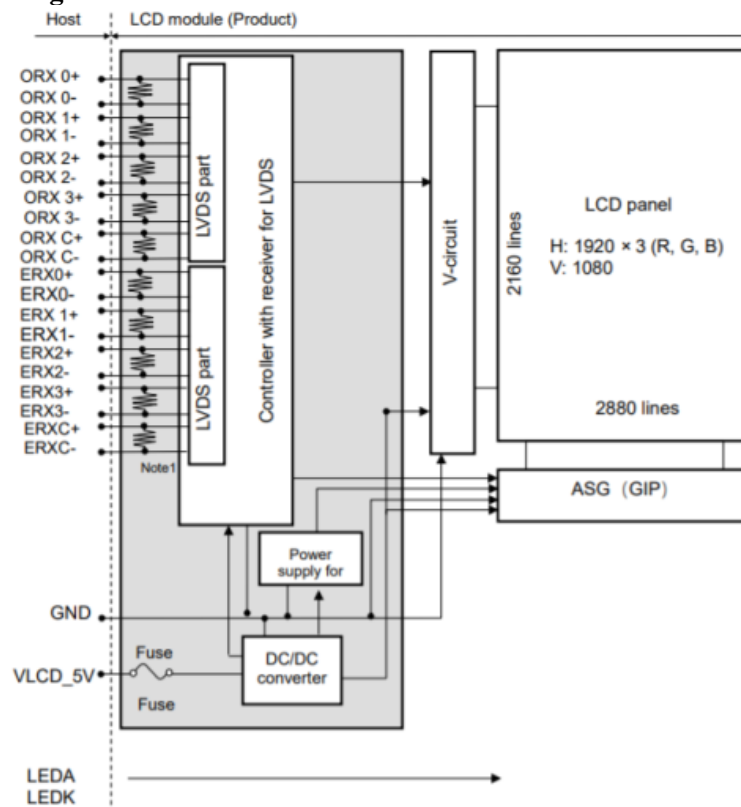
Note2: Pattern for maximum current

Note3: This product works even 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.

LCD Module Block Diagram



Note1: The terminating resistor (typ: 100 Ω) of the LVDS signal lines is inside TCON

Note2: Relations between GND (Signal ground), FG (Frame ground) and GNDB (LED driver ground)

GND - FG	Connected
GND - GNDB	Connected
FG - GNDB	Connected

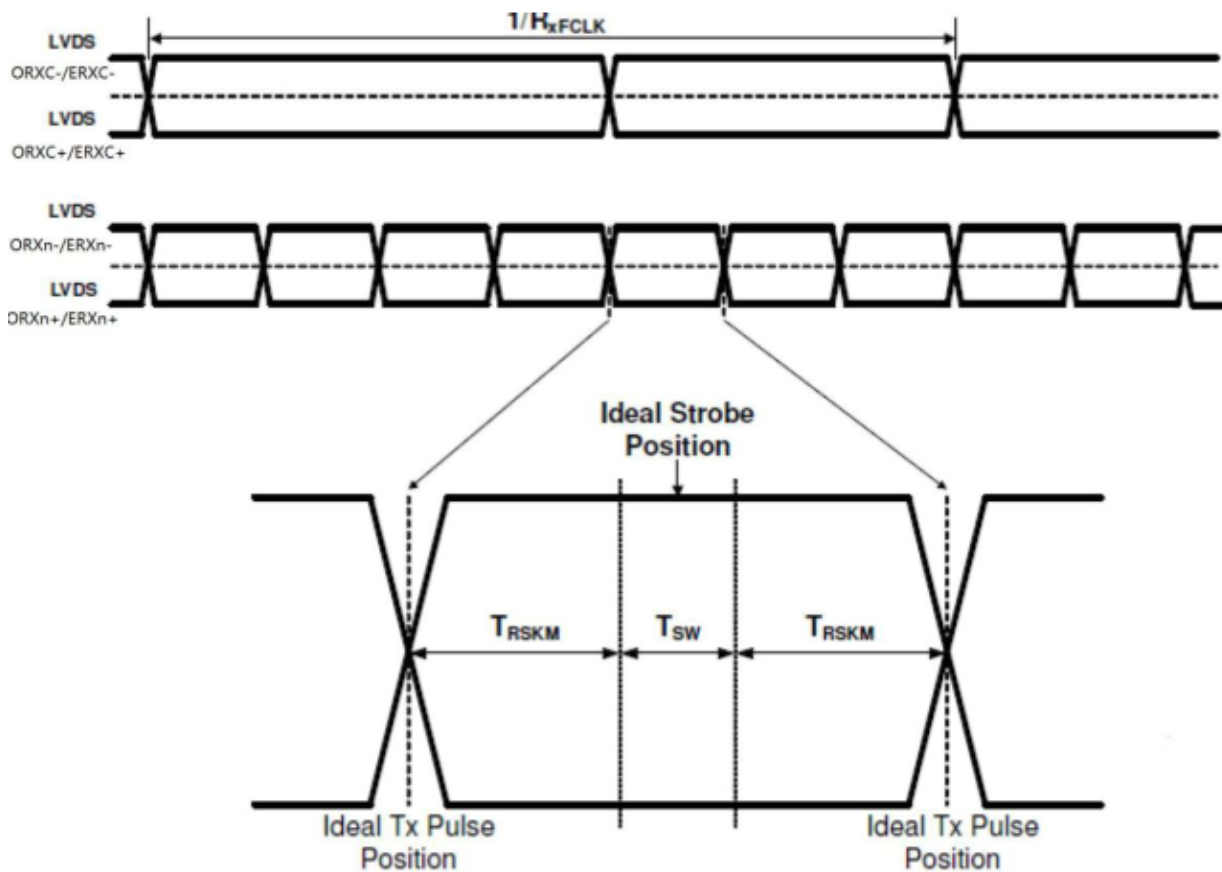
2.2 Interface Timing Characteristics

LVDS DC Electrical Characteristics

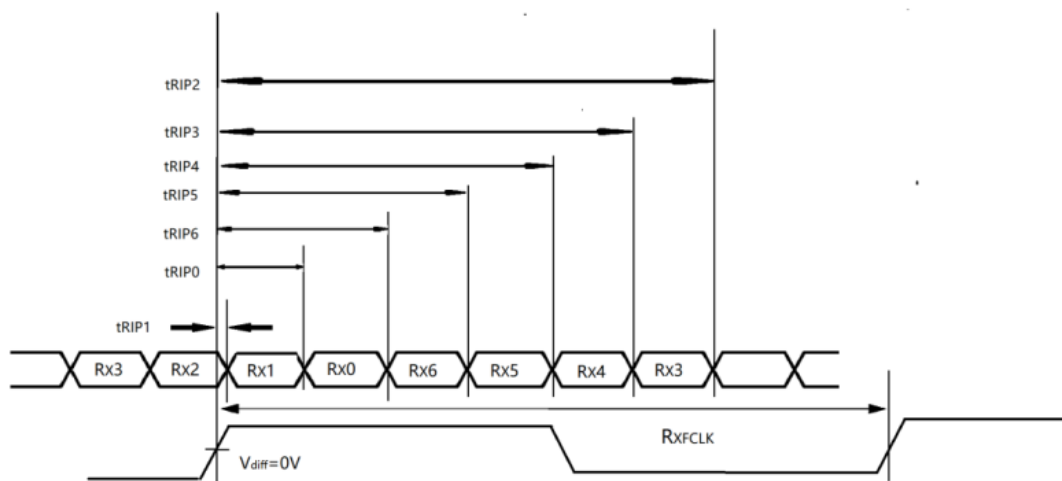
Parameter	Symb ol	Condition	Min.	Typ.	Max.	Unit
Differential input high threshold voltage	R_{xVTH}	$R_{xVCM} = 1.2\text{ V}$	+100	-	-	mV
Differential input low threshold voltage	R_{xVTL}		-	-	-100	mV
Input voltage range (singled-end)	R_{xVIN}		0	-	2.4	V
Fail safe				0.3		V
Differential input voltage	$ V_{ID} $		100	-	600	mV
Input common mode voltage	R_{xVCM}	$V_{DD} = 2.5\text{V}$	0.6	0.8	1.6	V
		$V_{DD} = 3.3\text{V}$	1.0	1.2	2.4 $- V_{ID} /2$	V
Differential input voltage	$ V_{ID} $		100	-	600	mV
Differential input leakage current	R_{VxLIK}		-10	-	+10	uA
Internal terminate resistor	R_{int}		80	100	120	Ω

LVDS AC Electrical Characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Clock frequency	R_{xCLK}			74.25		MHz
Input data Position0	tRIP1		$- tRMG $	0.0	$ tRMG $	ns
Input data Position1	tRIP0		$T/7 - tRMG $	$T/7$	$T/7 + tRMG $	ns
Input data Position2	tRIP6		$2T/7 - tRMG $	$2T/7$	$2T/7 + tRMG $	ns
Input data Position3	tRIP5		$3T/7 - tRMG $	$3T/7$	$3T/7 + tRMG $	ns
Input data Position4	tRIP4		$4T/7 - tRMG $	$4T/7$	$4T/7 + tRMG $	ns
Input data Position5	tRIP3		$5T/7 - tRMG $	$5T/7$	$5T/7 + tRMG $	ns
Input data Position6	tRIP2		$6T/7 - tRMG $	$6T/7$	$6T/7 + tRMG $	ns
Input data skew margin	T_{RSKM}	$R_{xCLK} = 85\text{MHz}$ $R_{xVTH} - R_{xVTL} = 200\text{ mV}$	-450	-	+450	ps
Input spread spectrum ratio	SSR		-	-	+/-3	%
Input modulation frequency	F_M		-	-	200k	Hz



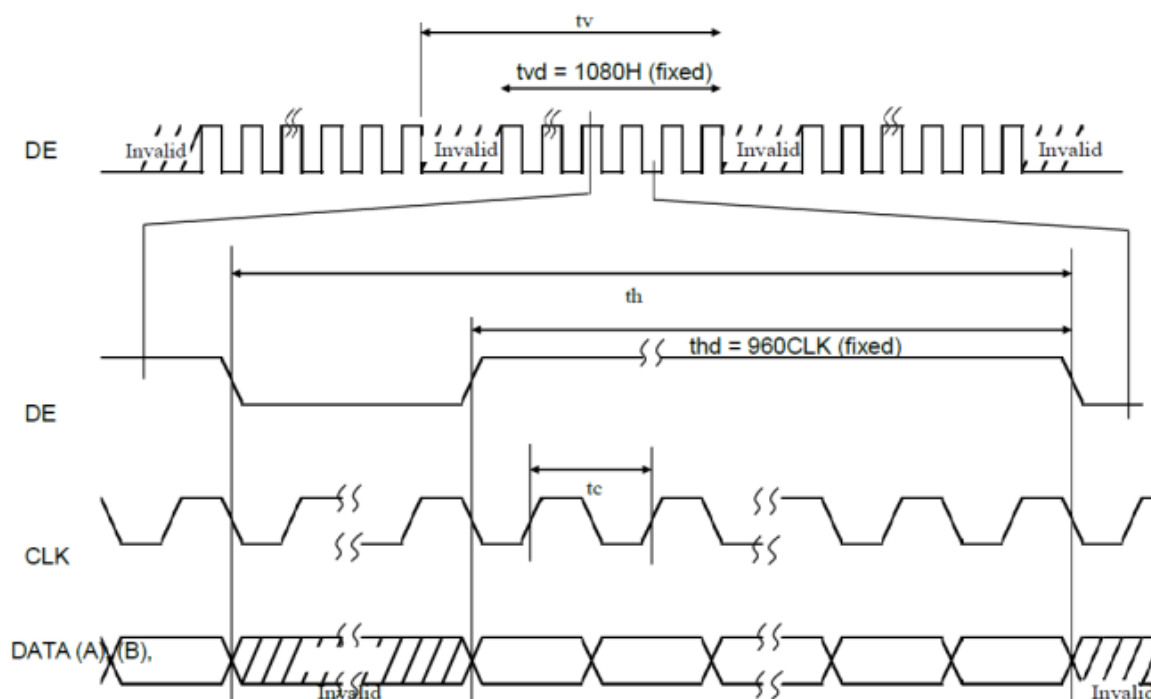
Note 1: T_{SW} : Strobe width (LVDS IP internal data sampling window)



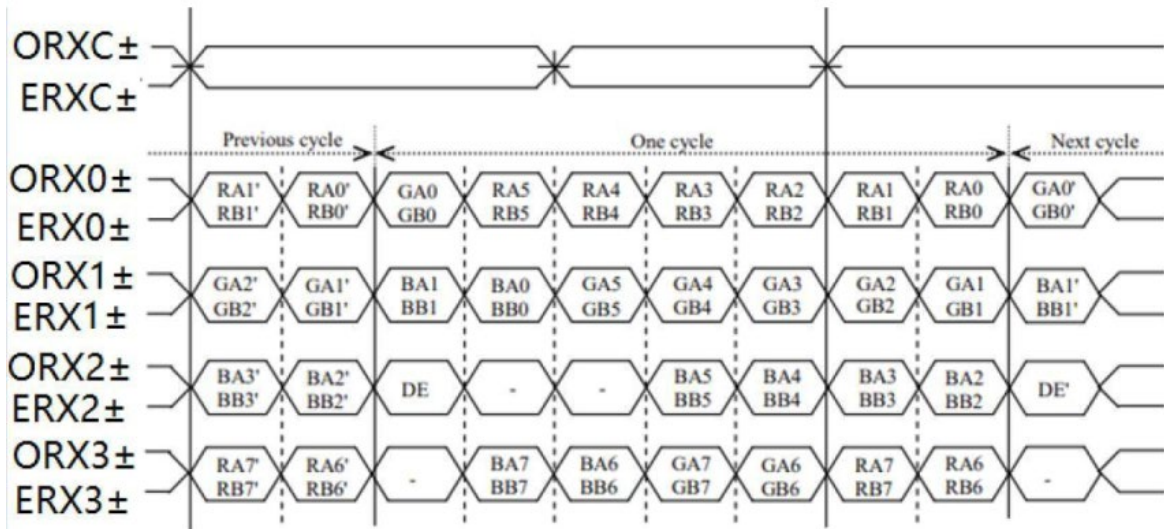
2.3 Timing Characteristics

Parameter	Symbol	MIN	Typ	MAX	Unit	Remark
CLK frequency	tclk	71.23	74.25	77.28	MHz	
Horizontal display area	thd	960			tclk	
Horizontal Blanking time	thbt	100	140	160	tclk	
HSYNC period	th	1060	1100	1120	tclk	
Vertical display area	tvd	1080			th	
Vertical Blanking time	tvbt	40	45	70	th	
VSD period	tv	1120	1125	1150	th	
Frame rate	FR	60			Hz	

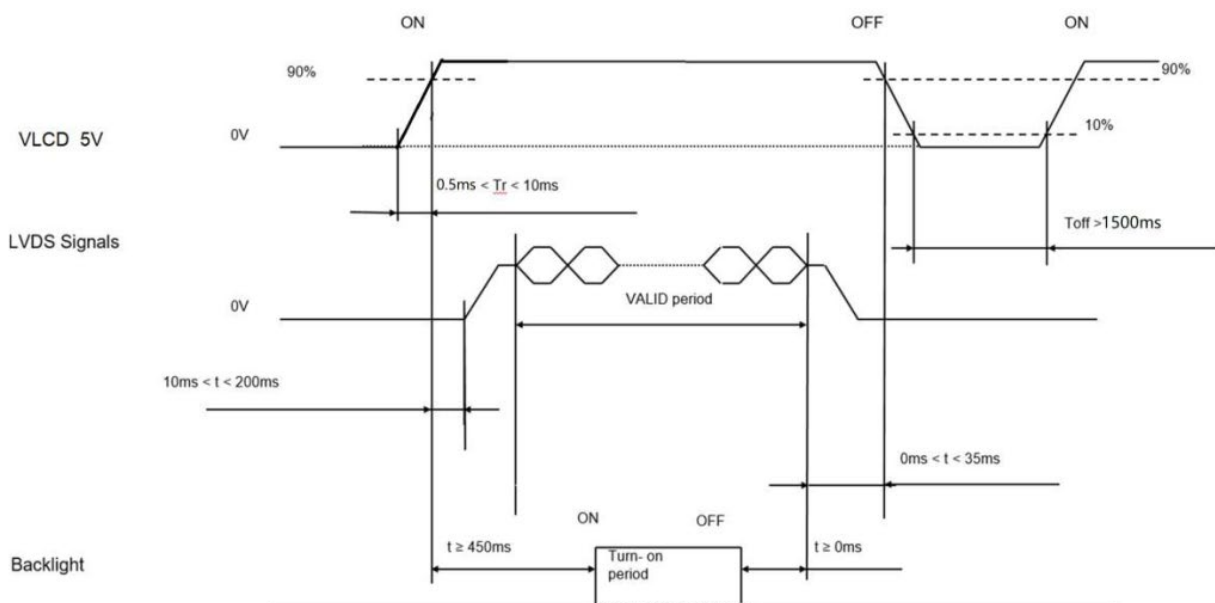
Input Signal Timing Chart



Input Data Mapping



Power ON/OFF



Note. Border means the area that 3.5mm inside the V.A. window

2.4 Input/ Output Terminals

Connector Information	
LCD Module connector	STM:MSBKT2407P30HB

Pin assignment (LCD Interface)

Pin No.	Symbol	Signal	Remarks
1	ORX0-	-LVDS differential data input	I
2	ORX0+	+LVDS differential data	I
3	ORX1-	-LVDS differential data input	I
4	ORX1+	+LVDS differential data	I
5	ORX2-	-LVDS differential data input	I
6	ORX2+	+LVDS differential data	I
7	GND	Power Ground	P
8	ORXC-	-LVDS differential clk input	I
9	ORXC+	+LVDS differential clk	I
10	ORX3-	-LVDS differential data input	I
11	ORX3+	+LVDS differential data	I
12	ERX0-	-LVDS differential data input	I
13	ERX0+	+LVDS differential data	I
14	GND	Power Ground	P
15	ERX1-	-LVDS differential data input	I
16	ERX1+	+LVDS differential data	I
17	GND	Power Ground	P
18	ERX2-	-LVDS differential data input	I
19	ERX2+	+LVDS differential data	I
20	ERXC-	-LVDS differential clk input	I
21	ERXC+	+LVDS differential clk	I
22	ERX3-	-LVDS differential data input	I
23	ERX3+	+LVDS differential data	I
24	GND	Power Ground	P
25	NC	Keeping Dummy	-
26	NC	Keeping Dummy	-
27	NC	Keeping Dummy	-
28	VLCD_5V	Power supply (5V)	P
29	VLCD_5V	Power supply (5V)	P
30	VLCD_5V	Power supply (5V)	P

Pin Assignment for LCD Interface

Note1: I/O definition: I---Input, O---Output, P---Power/Ground, N---No connection

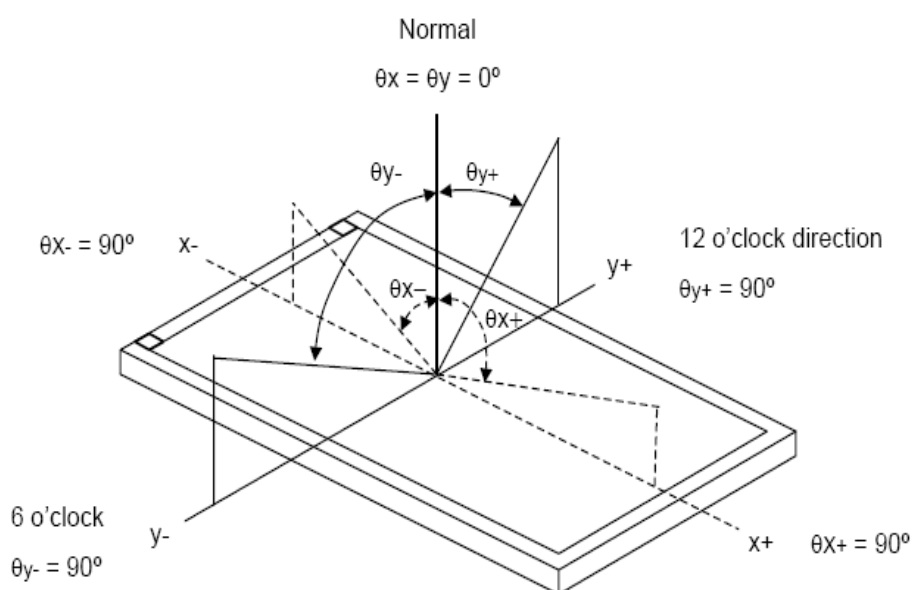
Note2: All of the GND pins should be connected to the system ground.

3 Optical Specification

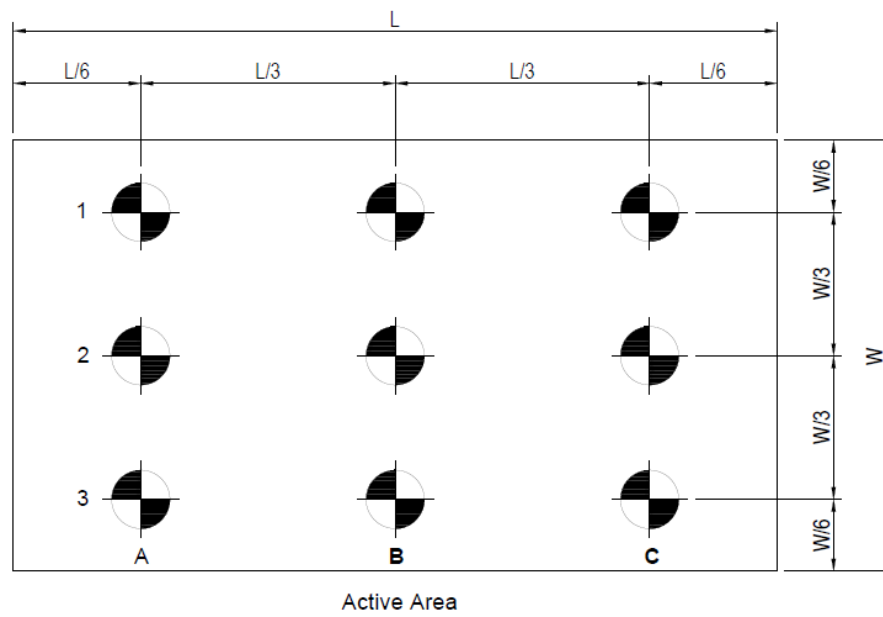
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	R _x	$\theta_x=0$ $\theta_y=0$ CA-410	0.603	0.633	0.663	-	Test Mode: (2) (3)
		R _y		0.311	0.341	0.371	-	
	Green	G _x		0.311	0.341	0.371	-	
		G _y		0.555	0.585	0.615	-	
	Blue	B _x		0.126	0.156	0.186	-	
		B _y		0.034	0.064	0.094	-	
	White	W _x		0.296	0.326	0.356	-	
		W _y		0.327	0.357	0.387	-	
Center Luminance of White		L _c	$\theta_x=0$	1800	2000	2600	cd/m ²	
Uniform		L _u	$\theta_y=0$ CA-410		82		%	
Contrast Ratio		CR	$\theta_x=0$	864:1	960:1		-	Test Mode: (4)
Color Saturation		NTSC	$\theta_y=0$ Klein K-10		74		%	
Viewing Angle	Horizontal	θ_{x+}	$CR \geq 10$		89		Deg	Test Mode: (1)
		θ_{x-}			89			
	Vertical	θ_{y+}			89			
		θ_{y-}			89			

Test Mode :

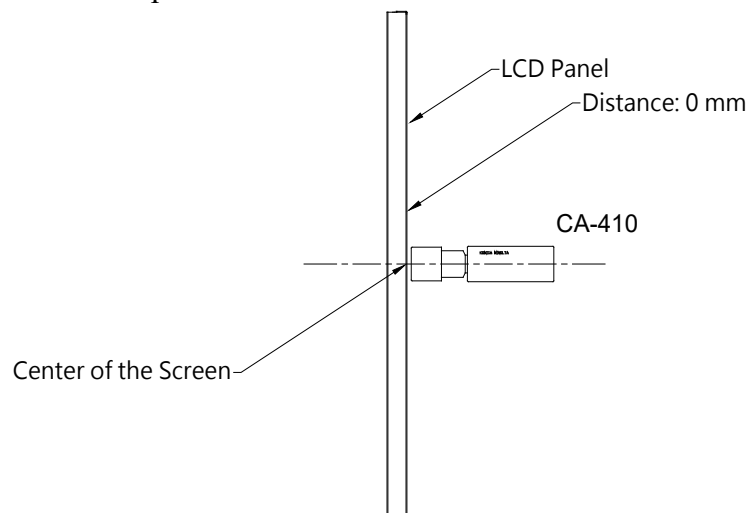
(1) Definition of Viewing Angle (θ_x , θ_y):



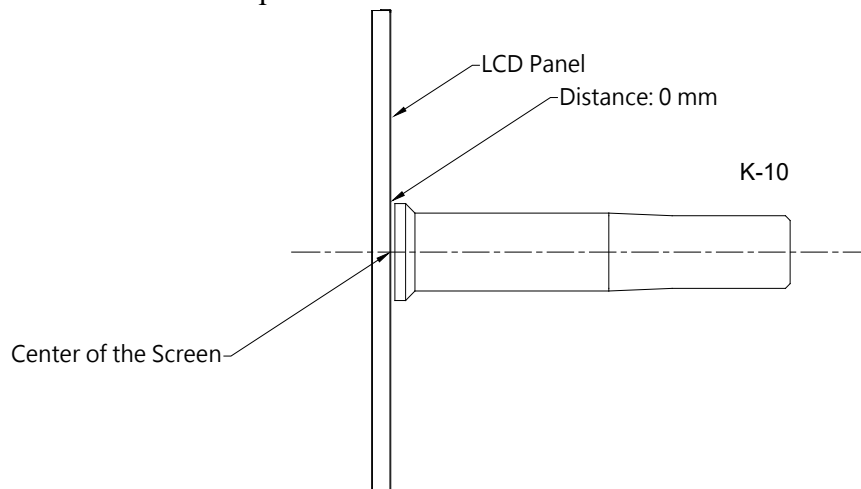
(2) Definition of Test Point:



(3) CA-410 Measurement Setup:



(4) Klein K-10 Measurement Setup:



4 LED Driving Board Electrical Characteristics

4.1 LED Driving Board Operating Characteristics

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	V _{in}		10.0	12.0	14.0	V	
Input Current (High Brightness)	I _{inH}	Brightness = 100%	1.94	1.62	1.38	A	(1)
Input Power Consumption	P _{in}	Brightness = 100%	-----	19.44	-----	W	
LED Current (High Brightness)	I _{outH}	Brightness = 100%	-----	0.47	-----	A	
Working Frequency	W_Freq	Brightness = 100%	-----	400	-----	KHZ	
Brightness Control	DC mode						
	V _{adj}	Connection of Voltage	0.2	-----	4.8	V	(2)
	PWM mode						
	PWM	Connect to PWM	0	-----	100	%	(3)
	Freq		-----	200	-----	Hz	(4)
ON/OFF Control	V _{on}	Normal Operation	2	-----	5	V	
	V _{off}		0	-----	0.8	V	
Output Voltage	V _{out}	Brightness = 100%	-----	38.26	34.87	V	
Efficiency	η	Brightness = 100%	-----	92.5	-----	%	(5)

Remark:

- (1) This data is based on the testing result of practical input voltage, I_{in} is measured by related V_{in}. (min, typ, max) .If the voltage is increased, the current will decrease. If the voltage is decrease, the current will increase
- (2) Max brightness at V_{adj}=0.2V. Min brightness at V_{adj}=4.8V.
- (3) Max dimming ratio = 1:100.
- (4) Frequency can be adjusted in accordance with demand(120Hz minimum, or lights will be flickering)
- (5) $\eta_{\max} = V_{\text{out}(\max)} * I_{\text{outH}(\max)} / V_{\text{in}(\max)} * I_{\text{inH}(\min)}$
 $\eta_{\min} = V_{\text{out}(\min)} * I_{\text{outH}(\min)} / V_{\text{in}(\min)} * I_{\text{inH}(\max)}$

4.2 LED Driving Board Connector Pin Assignment

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

PIN No	Symbol	Description
1	V _{in}	DC+
2	V _{in}	DC+
3	V _{in}	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

Note: Pin9 is dimming method control pin, Low → DC dimming, High → PWM dimming.
If pin9 is be used, please NC JP1.

2. Output Connector: J1,J2(JST S2B-EH or Compatible)

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

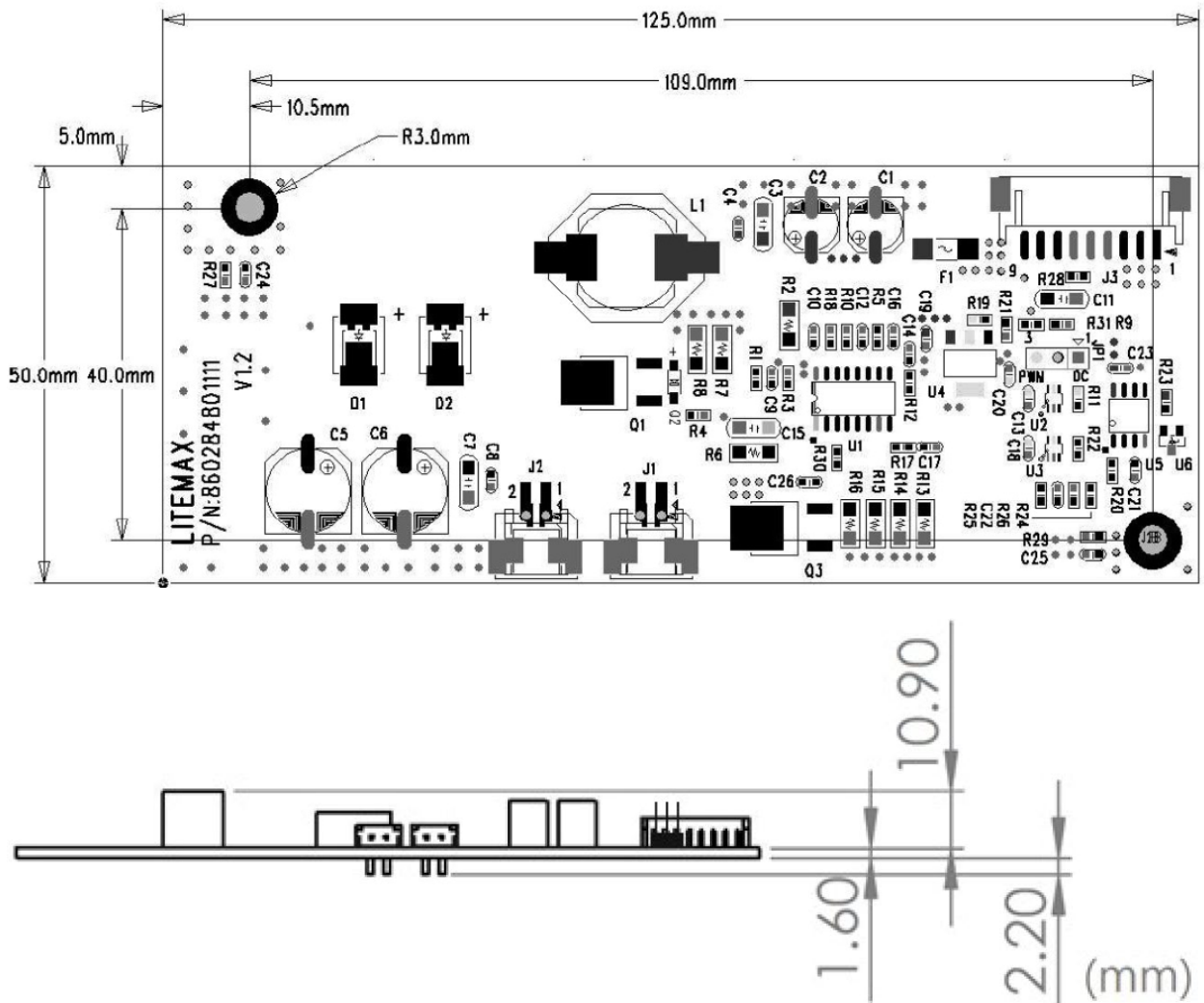
3. DC or PWM Connector: JP1

PIN NO	Symbol	Description
1	DC	Close pin 1,2 LED driver is DC dimming
2	GND	
3	PWM	Close pin 2,3 LED driver is PWM dimming

Note: If you use JP1 to set DC/PWM, please NC the pin9 of J3.

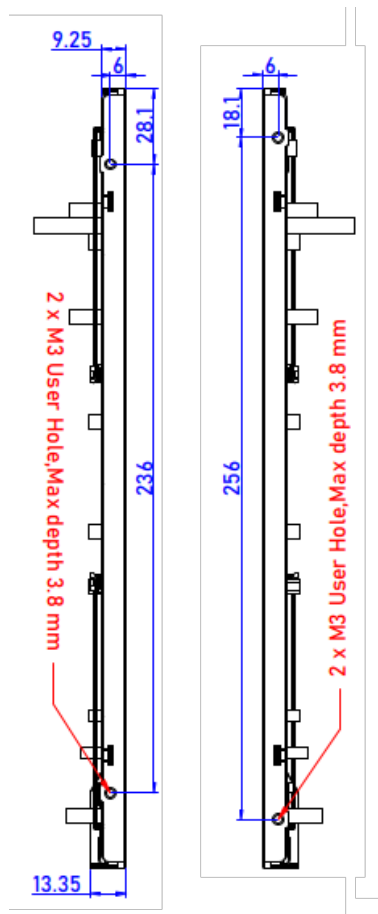
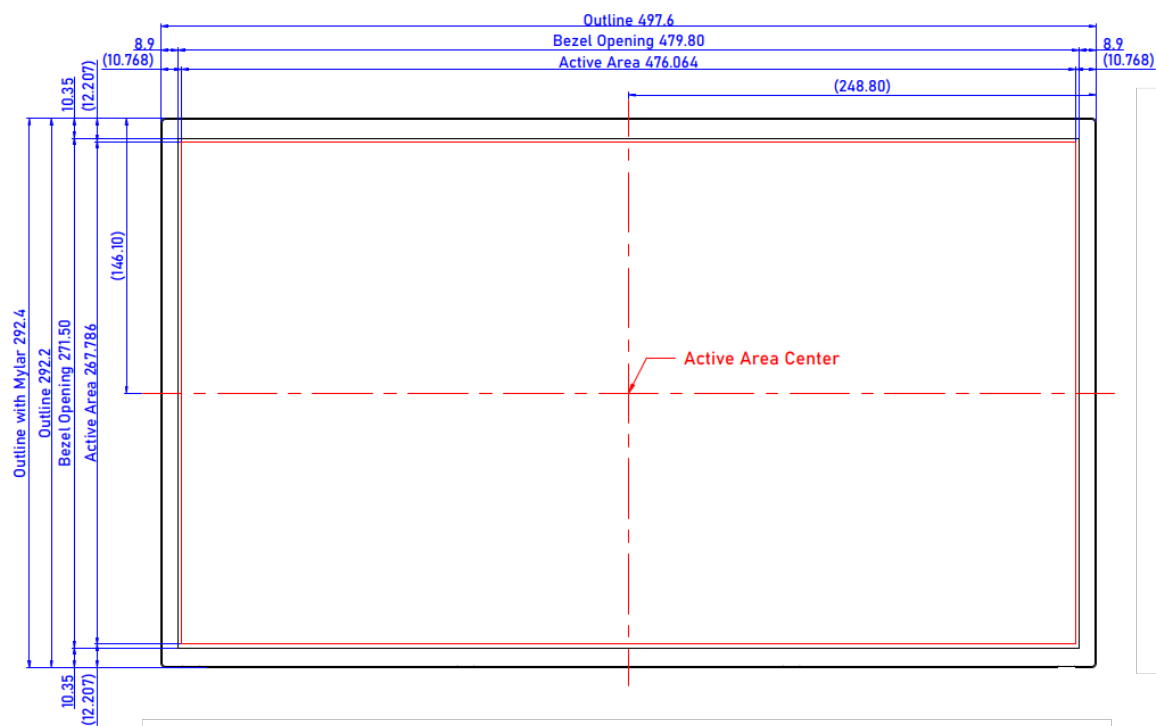
4.3 LED Driving Board Mechanical Characteristics

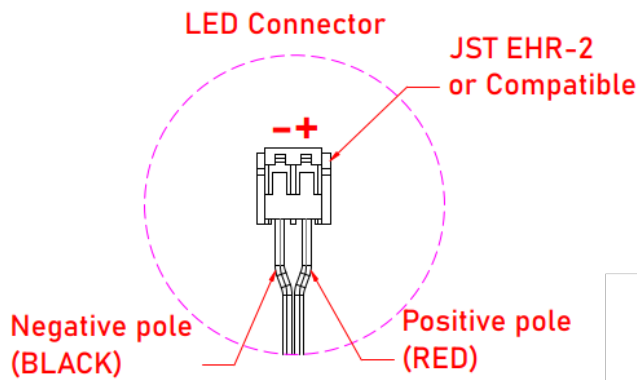
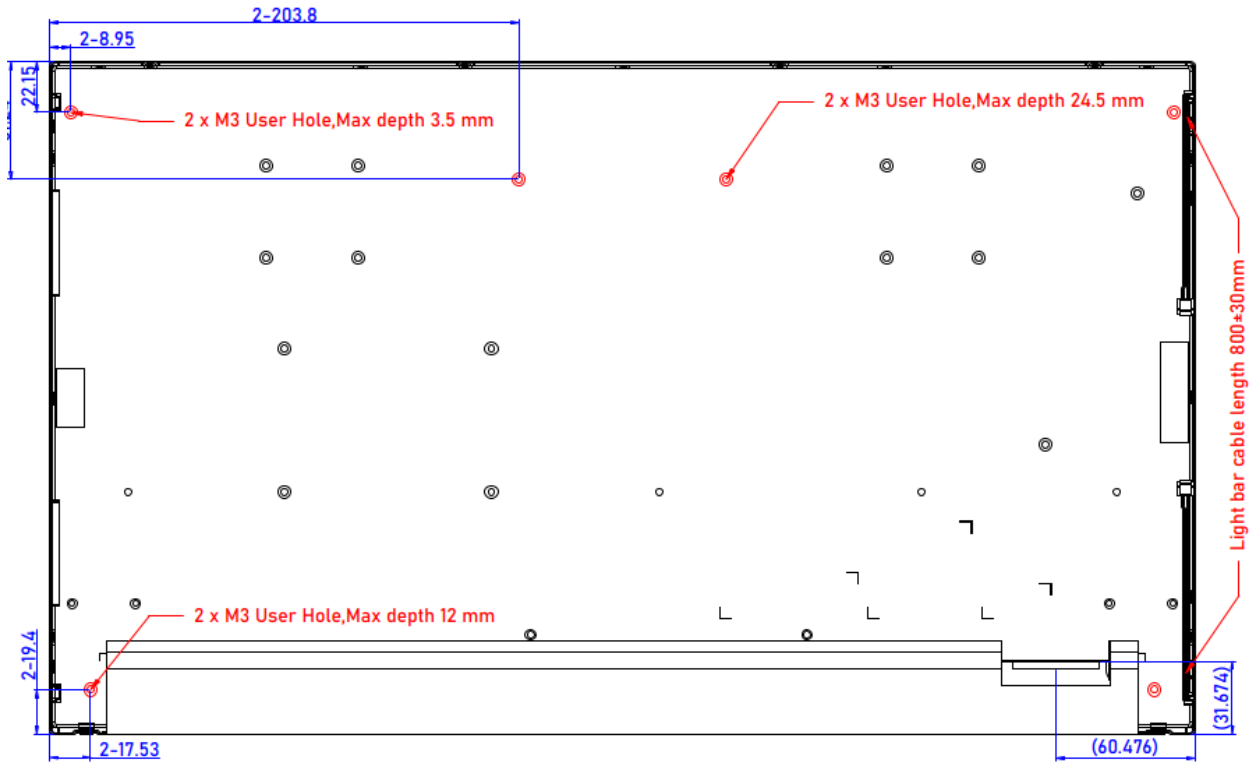
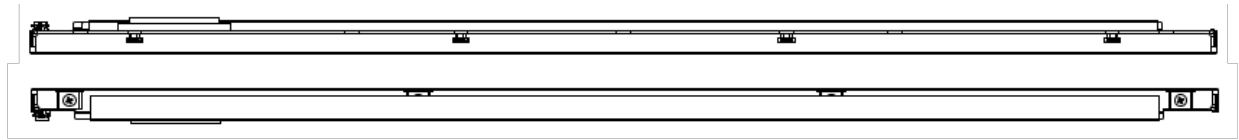
Dimension: 125 x 50 x 12.5mm



5 Mechanical Drawing

Unit:mm





Note

1. Resolution : 1920 x 1080
2. Unspecified Tolerance : ±0.50 mm
3. "()" marks the reference dimension
4. Front case is black paint.
5. M3 User Hole Max Torque 4.5 kg-cm

6 AD9700DHP Board & OSD Functions

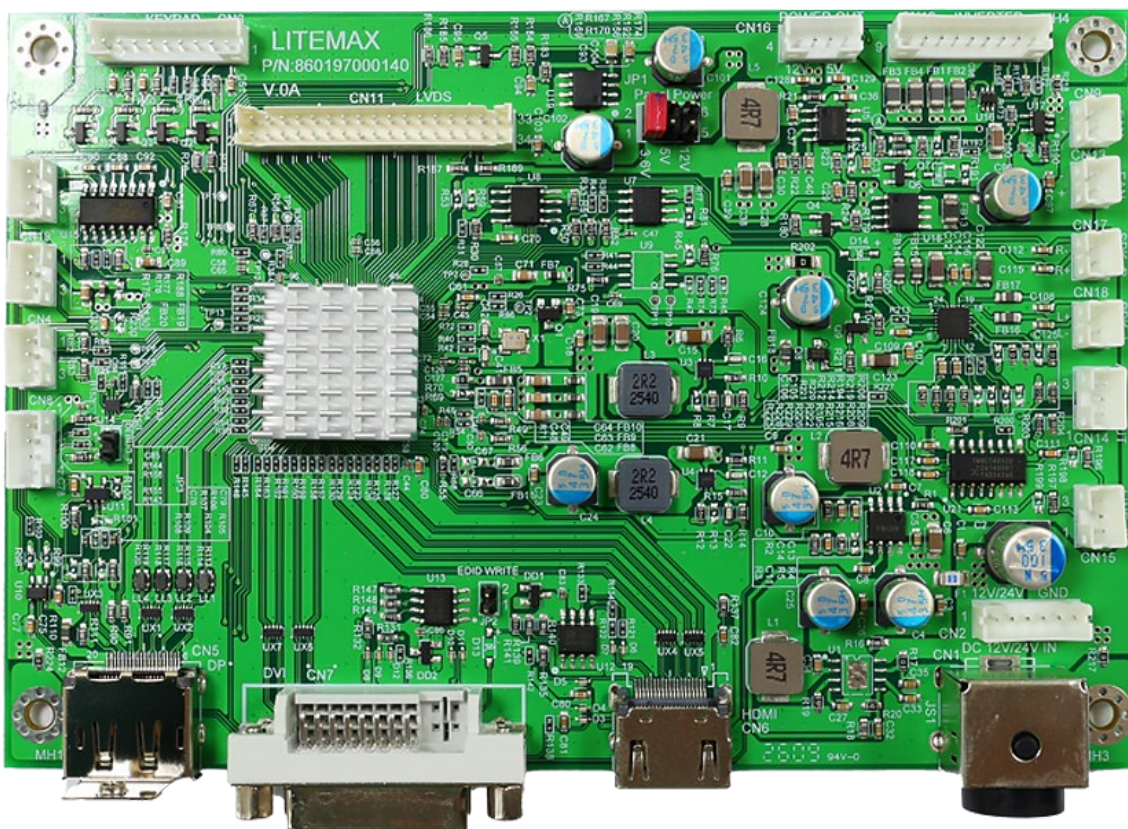
We developed this A/D board to support industrial high brightness and commercial applications.

This A/D board has many functions. It has a DVI-D ,HDMI and Display Port input. Rev.1 is

European RoHS compliant.

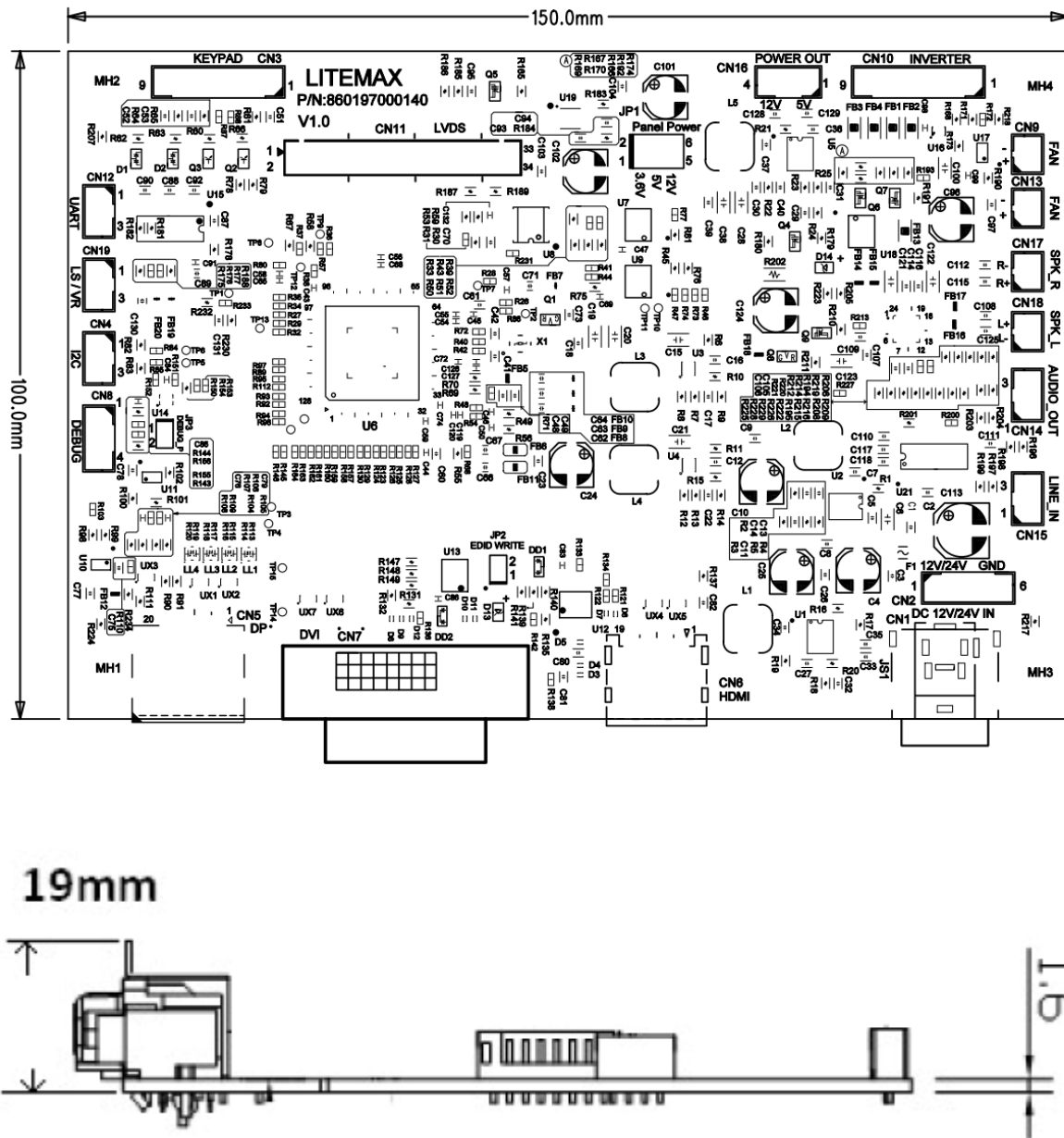
General Description

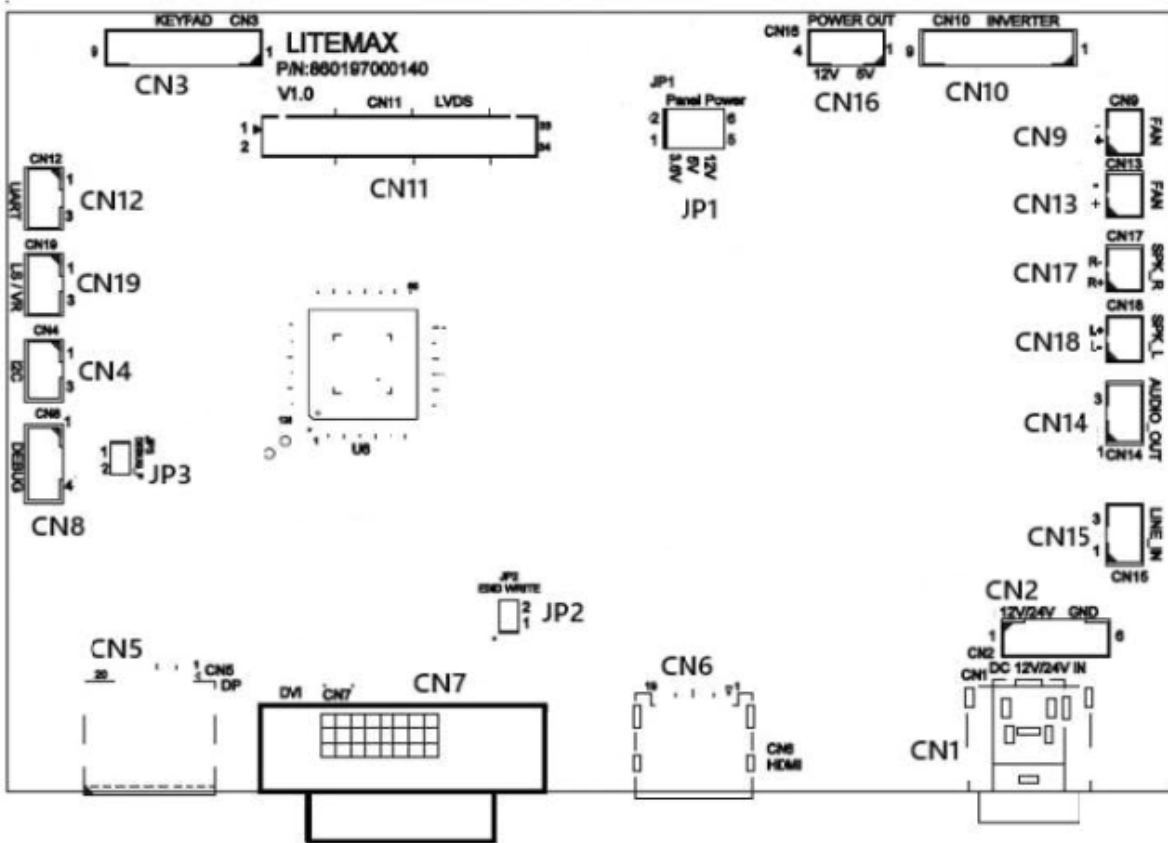
- Max Resolution Up To Full HD
- Analog RGB Input up to 205MHz
- Ultra-Reliable DVI-D Input
- HDMI Input(HDMI 2.0)
- Dual/Single LVDS Interface
- Inverter Analog or PWM Dimming Control.
- Support Panel DC 5V or 12V,3.3V Output
- OSD Control
- External RS232 control (Optional)
- Input Power 24V or 12V DC
- Audio Out(optional)
- *External Digital Light Sensor Brightness Control (Optional)
- *External Light Sensor Brightness Control (Optional)
- Support Output Voltage 12V(1A) and 5V(1A)



Outline Dimensions

AD9700DHP 150 mm x 100mm





AD9700DHP Board Pin Define

CN11: Panel LVDS connector

Pin No.	Function	Pin No.	Function
1	RxO0-	18	RxE1+
2	RxO0+	19	RxE2-
3	RxO1-	20	RxE2+
4	RxO1+	21	RxEC-
5	RxO2-	22	RxEC+
6	RxO2+	23	RxE3-
7	RxOC-	24	RxE3+
8	RxOC+	25	NC
9	RxO3-	26	NC
10	RxO3+	27	GND
11	NC	28	GND
12	NC	29	Pull Height
13	GND	30	Pull Low
14	GND	31	VLCD
15	RxE0-	32	VLCD
16	RxE0+	33	VLCD
17	RxE1-	34	VLCD

CN7: DVI-D Input Connector

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2/4 Shield	11	T.M.D.S. Data1/3 Shield (DET DVI)	19	T.M.D.S. Data0/5 Shield
4	NC	12	NC	20	NC
5	NC	13	NC	21	NC
6	DDC Clock	14	+5V Power	22	Shield (DVI_DET)
7	DDC Data	15	Ground (for +5V)	23	T.M.D.S. Clock+
8	NC	16	Hot Plug Detect	24	T.M.D.S. Clock-

CN5: Display Port

Pin No.	Function	Pin No.	Function
1	RX3-	11	GND
2	Shield (DP_DET)	12	RX0+
3	RX3+	13	DP_SCL
4	RX2-	14	DP_SDA
5	GND	15	AUX+
6	RX2+	16	GND
7	RX1-	17	AUX-
8	GND	18	Hot plug detect
9	RX1+	19	GND
10	RX0-	20	DP +3.3V

Note: pin13, pin14 for FW update

CN6: HDMI Input Connector (HDMI 19Pin)

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	T.M.D.S. Data2+	9	T.M.D.S. Data0-	17	GND
2	Shield (HDMI DET)	10	T.M.D.S. Clock+	18	HDMI 5V
3	T.M.D.S. Data2-	11	Shield	19	Hot Plug Detect
4	T.M.D.S. Data1+	12	T.M.D.S. Clock-		-
5	Shield	13	CEC		
6	T.M.D.S. Data1-	14	NC		
7	T.M.D.S. Data0+	15	HDMI_SCL		
8	Shield	16	HDMI_SDA		

CN1: Power DIN (24V or 12V)

Pin No.	Function	Pin No.	Function
1	24V/12V DC	2	24V/12V DC
3	GND	4	GND

CN1: Power Jack (24V or 12V)

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

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

Pin No.	Function	Pin No.	Function
1	24V/12V DC	2	24V/12V DC
3	24V/12V DC	4	GND
5	GND	6	GND

CN16: Touch Power connector

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

CN10: Inverter Connector (9PIN 2.0mm)

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

CN9, CN13: Fan Control (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	12V	2	GND

CN3: Key Pad (9PIN 2.0mm)

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

JP1: Panel Power

Pin No.	Function	Pin No.	Function
1-2	3.6V	5-6	12V
3-4	5V		

CN12: RS232 Connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	UART TX	2	UART RX
3	GND		

CN15: Line In (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	Audio R out	2	Audio L out
3	GND		

CN17: Speaker Connector (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	SPK_R+	2	SPK_R-

CN18: Speaker Connector (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	SPK_L-	2	SPK_L+

CN19: Ambient/VR (3PIN 2.0mm)

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

CN14: Audio Out Connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	Audio R out	2	Audio L out
3	GND		

For audio connect to another Audio AMP

CN4: I2C Connector (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	I2C_SDA	2	I2C_SCL
3	GND		

For Digital LS

JP2: EDID Jumper (2PIN 2.0mm)

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

When EDIE wan to update it must be short .

CN8: Debug Connector (4PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	3.3V	2	DDCA_SCL
3	DDCA_SDA	4	GND

For F/W debug

JP3: Debug Jumper (2PIN 2.0mm)

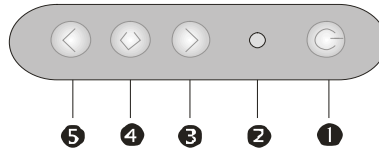
Pin No.	Function	Pin No.	Function
1	3.3V	2	GND

When Debug jump is open, then DP update FW.

When Debug jump is short, then CN8 update FW or debug FW.

6.1 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.

Screen Adjustment Operation Procedure

1. Entering the screen adjustment

The setting switches are normally at stand-by. Push the **Menu Key** once to display the main menu of the screen adjustment. The adjustable items will be displayed in the main menu.

2. Entering the settings

Use the **Down Key <** and **Up Key >** buttons to select the desired setting icon and push the **SELECT** button to enter sub-menu.

3. Change the settings

After the sub-menu appears, use the **Down Key <** and **Up Key >** buttons to change the setting values.

4. Save

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

5. Return & Exit the main menu

Exit the screen adjustment; push the "MENU" button. When no operation is done around 10 sec (default OSD timeout), it goes back to the stand-by mode and no more switching is accepted except MENU to restart the setting.

6.2 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 and V-frequency of the panel. This 2 information is not changeable by user.



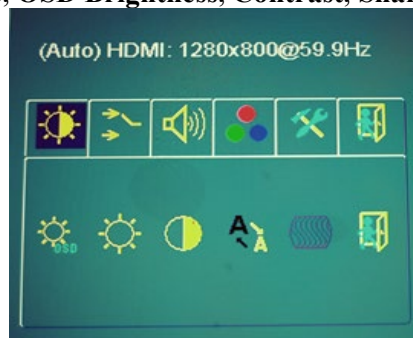
There are 6 sub menus within the OSD user interface:

Brightness, Signal Select, Sound, Color, Tools, and Exit.



Brightness

When you press the “menu” button, you enter the “Brightness” sub directory. In this directory, you will see 6 selections: **Brightness Mode, OSD Brightness, Contrast, Sharpness, Auto Tune, Exit.**



Brightness Mode :

press “menu” once, you can go into the Brightness Mode.



VR: (OPTION)

press this Icon to activate the VR control of brightness.



Ambient light sensor: (OPTION)

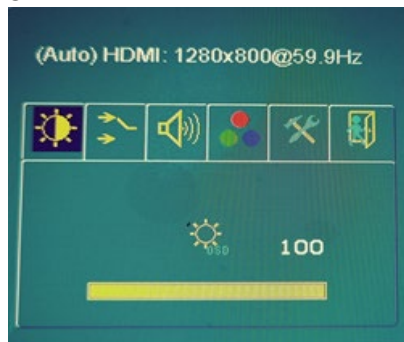
press this Icon, must to accompany with Litemax ambient light sensor to auto dimming.





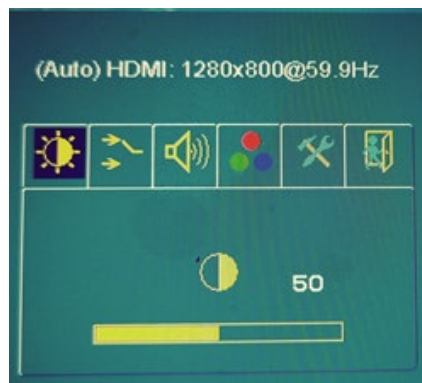
OSD Brightness :

Press the “menu” once, to adjust the brightness. Press “left” to dim down the brightness to “0”, press “right” to increase the brightness to “100”



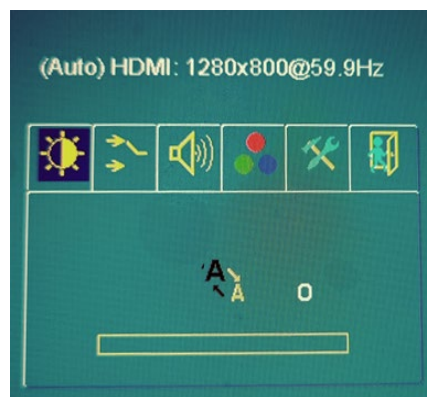
Contrast :

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



Sharpness :

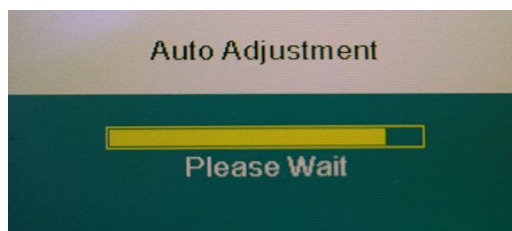
Press “Menu” once, you can adjust the Sharpness from “0” to “4” by pressing the “Left” and “Right”.





Auto Tune : (VGA only)

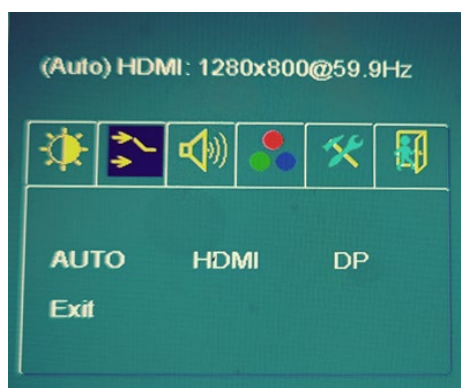
Press “Menu” once, you can activate the Auto Tune.



Exit: back to the beginning menu.



Input Signal: (default auto detect)



AUTO

AUTO: auto detect

HDMI

HDMI: HDMI input

DP

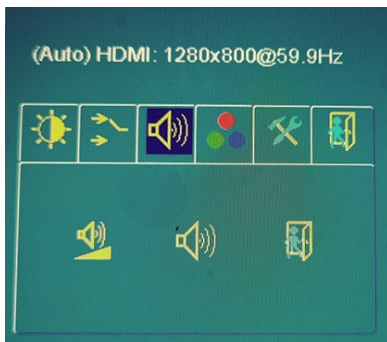
DP: DisplayPort input

Exit

Exit: back to the beginning menu.



Audio:



Audio Volume: Audio volume adjustment, from “0” to “100”.



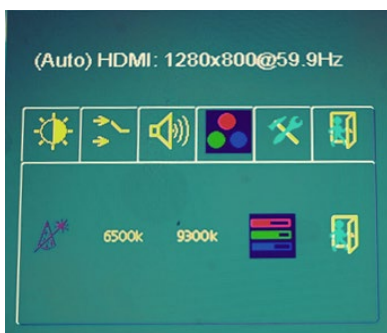
UnMute/Mute: You can mute the speaker by pressing this option.



Exit: back to the beginning menu.



Color:



Auto Color (VGA only) :

By navigating over to the “Auto Color” option, optimal color performance is invoked.



Color Tempture_6500K: Warm color scheme.



Color Tempture_9300K: Cold color scheme.



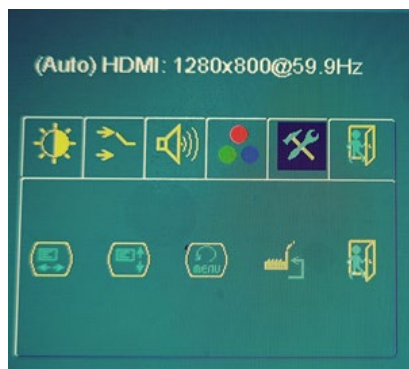
Color Temperature User Define: Default is 100 for “R”, “G”, and “B”. Range is “0” to “255”.



Exit: back to the beginning menu.



Other Setting:



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



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



Rotation: You can rotate the screen to 0° (No) 、 270° (Yes).



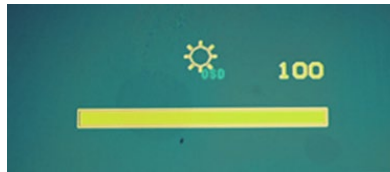
Load Default: You can load the default data using this function.



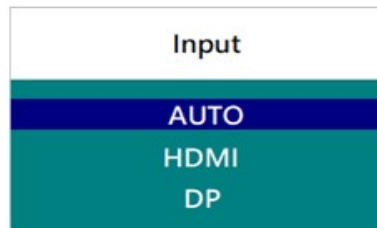
Exit: back to the beginning menu.

< Hot Key >

Left click to display brightness adjustment.

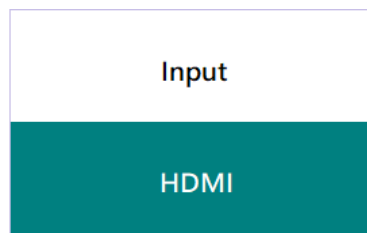


Right click to display Input Source Menu.



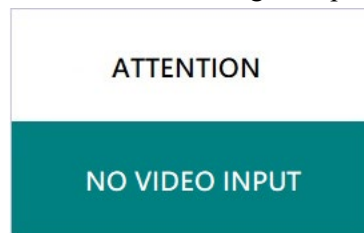
<Others>

Signal Information will be displayed after powering on or switching the signal.



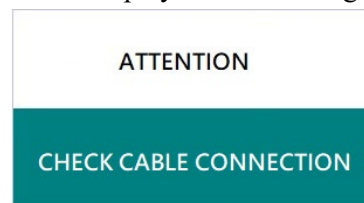
(Signal Information)

NO VIDEO INPUT will be displayed when there is no signal input.



(No Video Input)

CHECK CABLE CONNECTION will be displayed when the signal cable is not connected.



(Check Cable Connection)

7 Precautions

7.1 Handling and Mounting Precautions

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

7.2 Storage Precautions

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

7.3 Operation Precautions

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

8 Disclaimer

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