



LITEMAX

ULF / ULH1015-M

Sunlight Readable 10.1" LED B/L LCD

User Manual

Approved by	Checked by	Prepared by

LITEMAX Electronics Inc.
8F, No.137, Lane 235, Bau-chiau Rd.,
Shin-dian Dist., New Taipei City, Taiwan
R.O.C.
Tel : 886-2-8919-1858
Fax: 886-2-8919-1300
Homepage: <http://www.litemax.com>

Record of Revision

Version and Date	Page	Old Description	New Description	Remark
Oct./30/2023	all		Initial release	

Contents

Record of Revision	2
Contents	3
1 General Description.....	4
1.1 Features	4
1.2 General Specifications.....	4
1.3 Absolute Maximum Ratings.....	5
2 Electrical Specifications	6
2.1 Electrical Interface Connection.....	6
2.2 Electrical Characteristics.....	8
2.3 Switching Characteristic For LVDS Receiver.....	8
2.4 Interface Timing.....	11
2.5 Power Sequence	13
3 Optical Specification	14
4 LED Driving Board Specifications.....	16
4.1 Operating Characteristics	16
4.2 Connector Socket	17
4.3 Mechanical Characteristics	18
5 Mechanical Drawing	19
6 AD68862HP Board & OSD Functions	21
6.1 OSD Function.....	27
6.2 OSD Menu	28
7 Precautions	34
7.1 Handling and Mounting Precautions.....	34
7.2 Storage Precautions.....	34
7.3 Operation Precautions	35
8 Disclaimer.....	35

General Description

The **ULF/ULH1015-M** is a 10.1 inch industrial grade sunlight readable LCD, with high brightness 1000 nits, it produce sharp images, crisp text and lifelike colors. The Ubipixel LED backlight technology ensures high reliability and low power consumption, suitable for outdoor application, kiosk, factory automation, military and transportation application.

1.1 Features

- High Brightness 1000 nits
- Sunlight Readable
- LED Backlight
- Low Power Consumption
- Wide Temperature (-20 °C ~ 70 °C)
- BL MTBF: 50,000 hours

1.2 General Specifications

Model Name	ULF/ULH1015-M
Description	10.1" TFT LCD, 1000 nits LED Backlight, 1920x1200
Screen Size	10.1"
Display Area (mm)	216.8(H) x 135.5(V)
Brightness	1000 cd/m2
Resolution	1920x1200
Aspect Ratio	16 : 10
Contrast Ratio	1000 : 1
Pixel Pitch (mm)	0.11292(H) x 0.11292(V)
Pixel Pre Inch (PPI)	224
Viewing Angle	170°(H),170°(V)
Color Saturation (NTSC)	83%
Display Colors	16.7M
Response Time (Typical)	25ms
Panel Interface	LVDS
Input Interface	HDMI, DP
Input Power	DC12V
Power Consumption	6.5W (8.5W with AD Board)
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position...etc
Dimensions (mm)	229.46 x 149.1 x 8.0
Bezel Size(U/B/L/R)	4.35/9.25/5.04/7.62
Weight (Net)	0.8 kg
Operating Temperature	-20 °C ~ 70 °C
Storage Temperature	-30 °C ~ 80 °C

ULF= Panel + LED Driving Board

ULH= Panel + LED Driving Board + AD Control Board

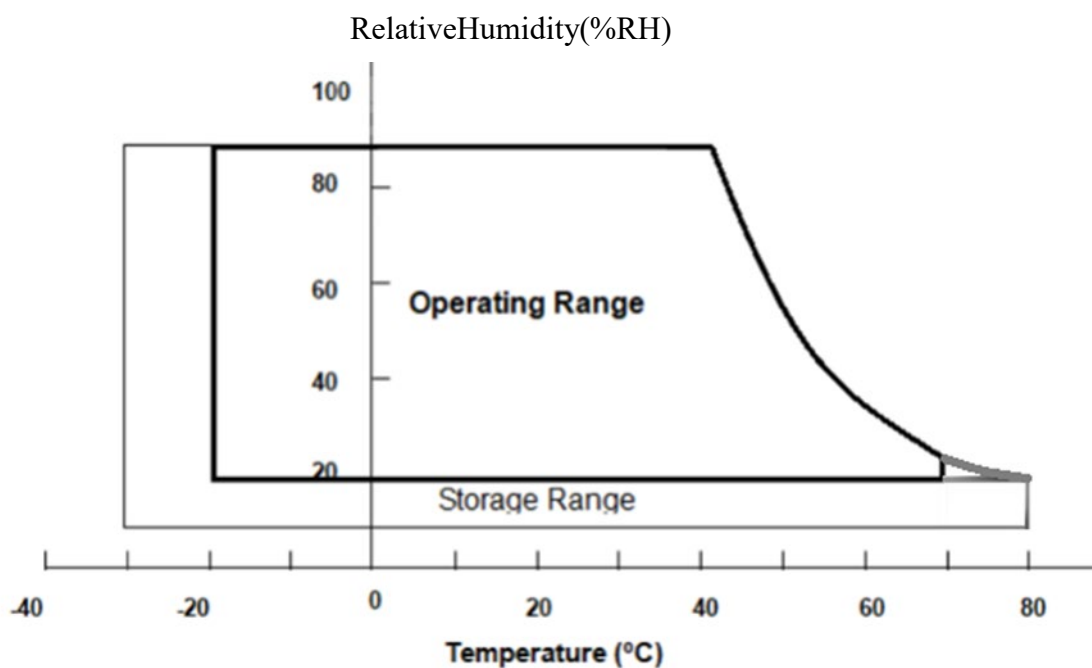
1.3 Absolute Maximum Ratings

Permanent damage may occur if exceeding the following maximum rating.

Item	Symbol	Min.	Max.	Unit.	Note
Power supply voltage	VDDIN	-0.3	6.0	V	GND=0
	VGH	-0.3	42	V	
	VGL	-19	0.3	V	
	VGH-VGL	12	32.0	V	

Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Remarks
Operating Temperature	Topa	-20	+70	°C	
Storage Temperature	Tstg	-30	+80	°C	



2 Electrical Specifications

2.1 Electrical Interface Connection

45PIN connector is used for the module electronics interface the recommended model is FH34SRJ-45S-0.5SH(45)(HRS) or equivalent

Pin No.	Symbol	I/O	Function	Remark
1	VDDIN	P	Power for Analog Circuit(3.3V)	
2	VDDIN	P	Power for Analog Circuit(3.3V)	
3	VDDIN	P	Power for Analog Circuit(3.3V)	
4	VDDIN	P	Power for Analog Circuit(3.3V)	
5	VDDIN	P	Power for Analog Circuit(3.3V)	
6	GND	P	Ground	
7	VDD_OTP	P	OTP Power Supply VDD_OTP:8.6V	
8	I2C_SCL	I	OTP_SCL	
9	I2C_SDA	I	OTP_SDA	
10	GND	P	Ground	
11	OLV0N	I	- LVDS differential data input	
12	OLV0P	I	+ LVDS differential data input	
13	GND	P	Ground	
14	OLV1N	I	- LVDS differential data input	
15	OLV1P	I	+ LVDS differential data input	
16	GND	P	Ground	
17	OLV CLKN	I	- LVDS differential clock input	
18	OLV CLKP	I	+ LVDS differential clock input	
19	GND	P	Ground	
20	OLV2N	I	- LVDS differential data input	
21	OLV2P	I	+ LVDS differential data input	
22	GND	P	Ground	
23	OLV3N	I	- LVDS differential data input	
24	OLV3P	I	+ LVDS differential data input	
25	GND	P	Ground	
26	ELV0N	I	- LVDS differential data input	
27	ELV0P	I	+ LVDS differential data input	

28	GND	P	Ground	
29	ELV1N	I	- LVDS differential data input	
30	ELV1P	I	+ LVDS differential data input	
31	GND	P	Ground	
32	ELV CLKN	I	- LVDS differential clock input	
33	ELV CLKP	I	+ LVDS differential clock input	
34	GND	P	Ground	
35	ELV2N	I	- LVDS differential data input	
36	ELV2P	I	+ LVDS differential data input	
37	GND	P	Ground	
38	ELV3N	I	- LVDS differential data input	
39	ELV3P	I	+ LVDS differential data input	
40	GND	P	Ground	
41	NC	--	Not connected	
42	VLED+(NC)	P	BL Power Input Anode(Same to Not Connected, If Not Use)	
43	VLED+(NC)	P	BL Power Input Anode(Same to Not Connected, If Not Use)	
44	VLED-(NC)	P	BL Power Input Cathode(Same to Not Connected, If Not Use)	
45	VLED-(NC)	P	BL Power Input Cathode (Same to Not Connected, If Not Use)	

I: input **O:** output ,**P:** power

2.2 Electrical Characteristics

TFT LCD Module

Item	Symbol	Min.	Type	Max.	Unit.	Note
Power supply voltage	VDD	3.0	3.3	3.6	V	GND=0
	VRP	--	--	300	mV	Ripple
Power Supply Current	IVDD	--	300	360	mA	Note 1
Power consumption	PLCD	--	1.0	1.2	W	
Rush Current	I _{ruch}	--	--	3.0	A	Note 2
Input logic high voltage	V _{IH}	0.7VDD		VDD	V	
Input logic low voltage	V _{IL}	0	--	0.3VDD	V	
LED Reverse Voltage	V _r	-	--	5.0	V	Each LED
LED Forward Current	I _f	-	--	35	mA	Each LED

Note 1

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

The current draw and power consumption specified is for VDD=3.3V, Frame rate $f_v=60\text{Hz}$ and Clock frequency = 80MHz. Test Pattern of power supply current

a) Typ : Mosaic 8 x 6 Pattern(L0/L255)



b) Max : skip subPixel(L255)

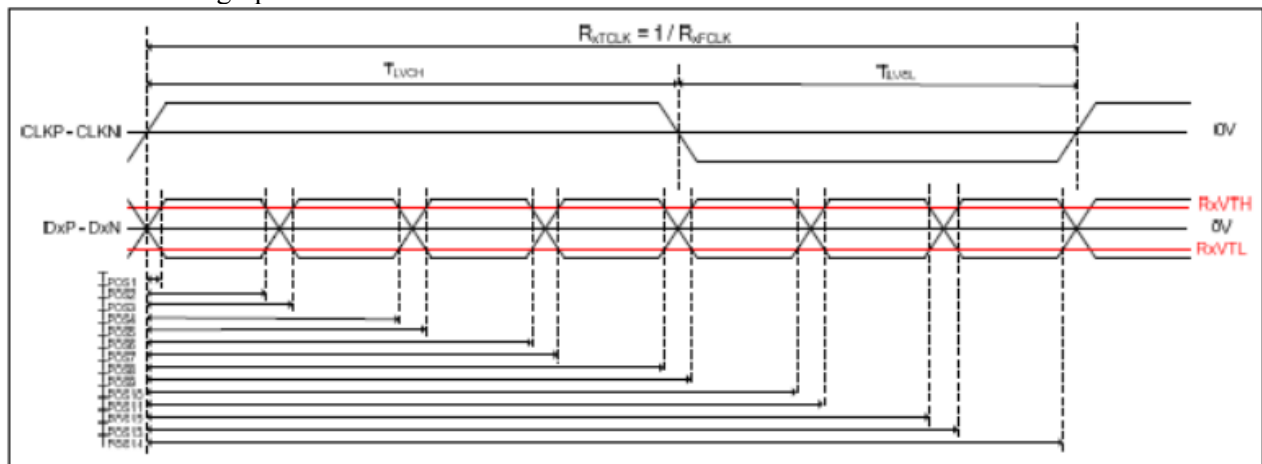


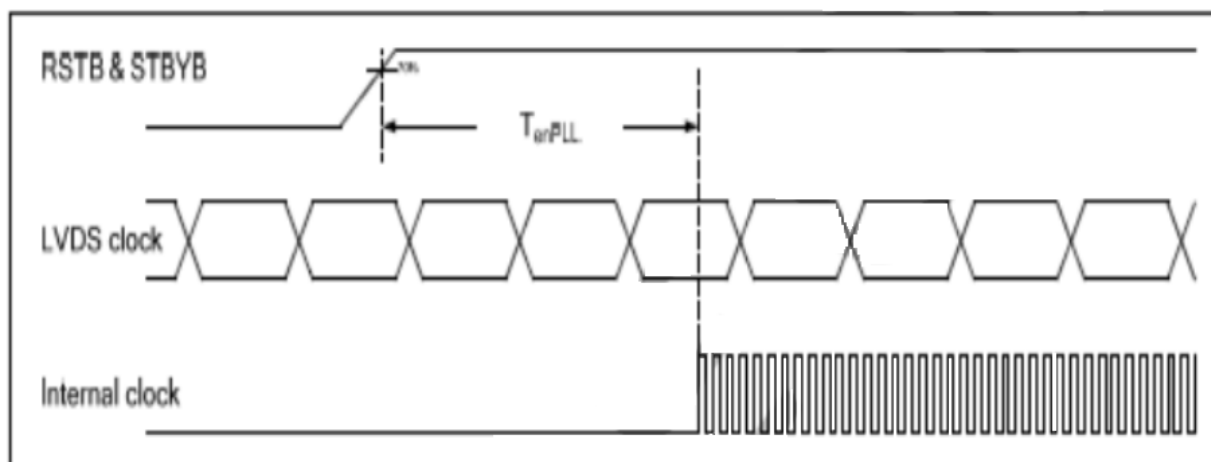
Note 2

The duration of rush current is about 2ms and rising time of Power Input is 1ms(min)

2.3 Switching Characteristic For LVDS Receiver

LVDS AC Timing Specification



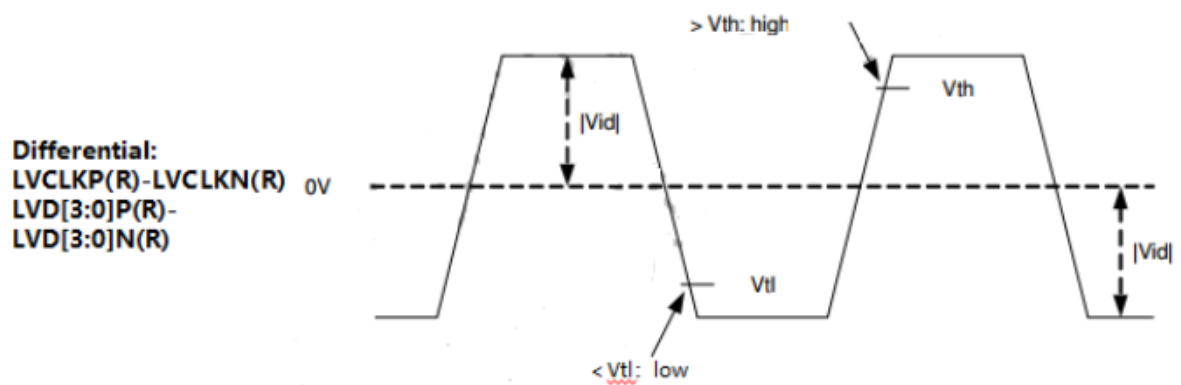


VSSI = VSSR = VSSP = OV, VDDI = VDDP = 3.0 ~ 3.3V, -40 °C ~ 85 °C

Item	Signal	Symbol	Rating			Unit
			Min.	Typ.	Max.	
Clock Frequency	CLK	R_{kfCLK}	20	-	100	MHz
Clock Period		R_{ktCLK}	10	-	50	ns
1 data bit time		UI	-	1/7	-	R_{ktCLK}
Clock high time	CLK	T_{LVCH}		4		UI
Clock low time		T_{LVCL}		3		UI
Position 1	DATA	T_{POS1}	-0.25	0	0.25	UI
Position 2		T_{POS2}	0.75	-	1.25	
Position 3		T_{POS3}	0.75	1	1.25	
Position 4		T_{POS4}	1.75	-	2.25	
Position 5		T_{POS5}	1.75	2	2.25	
Position 6		T_{POS6}	2.75	-	3.25	
Position 7		T_{POS7}	2.75	3	3.25	
Position 8		T_{POS8}	3.75	-	4.25	
Position 9		T_{POS9}	3.75	4	4.25	
Position 10		T_{POS10}	4.75	-	5.25	
Position 11		T_{POS11}	4.75	5	5.25	
Position 12		T_{POS12}	5.75	-	6.25	
Position 13		T_{POS13}	5.75	6	6.25	
Position 14		T_{POS14}	6.75	-	7.25	
PLL wake-up time		T_{enPLL}	-		150	us

LVDS DC Timing Specification

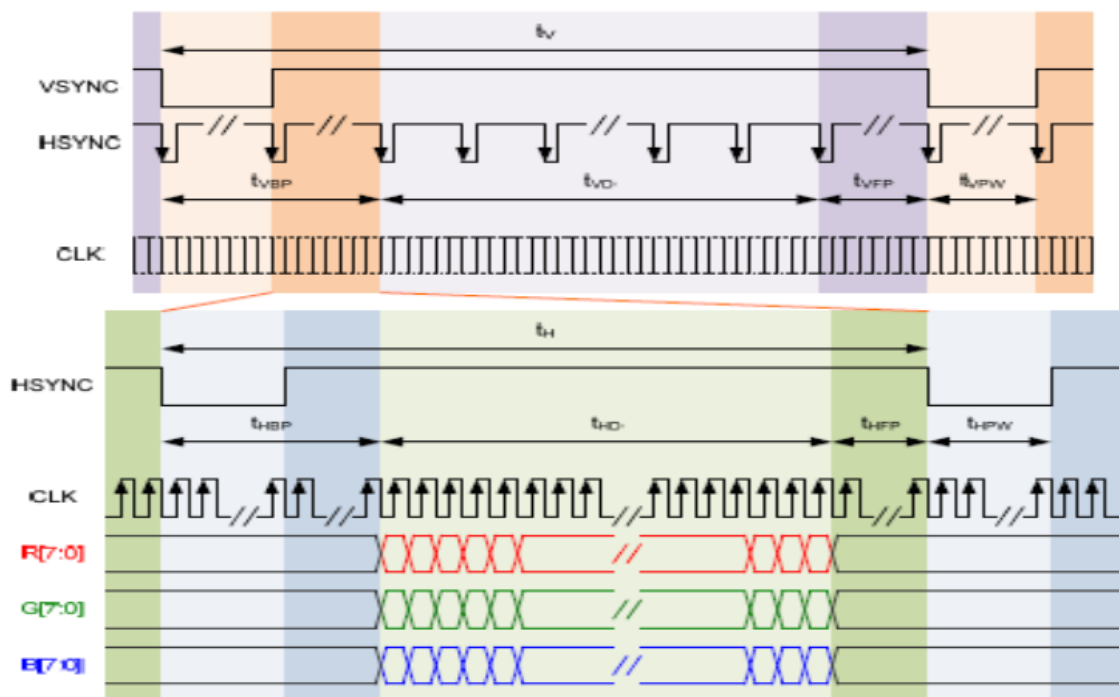
Item	Symbol	Condition	MIN	TYP	MAX	Unit
Differential input high Threshold voltage	<u>V_{th}</u>	<u>V_{cm}</u> =1.2V	-	-	+0.1	V
Differential input low Threshold voltage	<u>V_{tl}</u>	-	-0.1	-	-	V
Differential input common Threshold voltage	<u>V_{cm}</u>	-	1	1.2	1.7- V _{id} /2	V
LVDS input voltage	<u>V_{inlv}</u>	-	0.7	-	1.7	V
Differential input voltage	V _{id}	-	0.35	-	0.6	V
Differential input leakage voltage	<u>I_{vleak}</u>	-	-10	-	+10	<u>uA</u>



2.4 Interface Timing

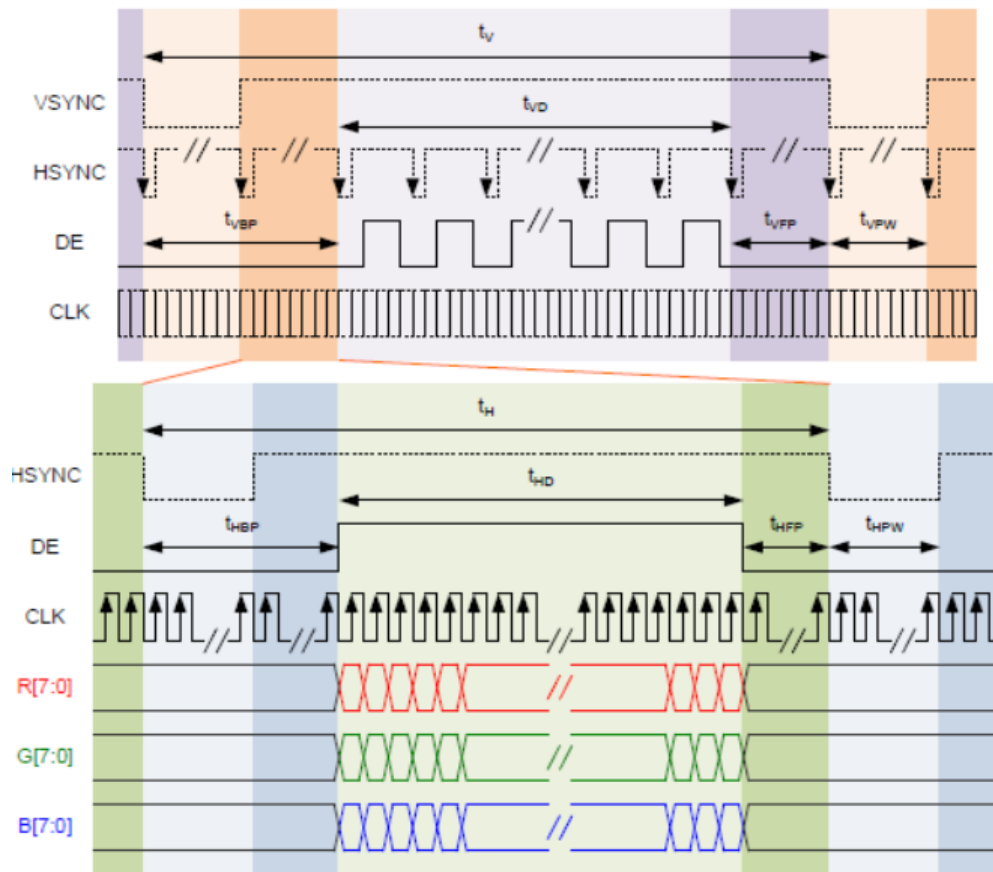
Timing Diagram Of Interface Signal (SYNC Mode)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
CLK frequency	tCLK	73.7	75.7	78	Mhz	
Horizontal blanking time	tHBT	48	50	54	tCLK	tHBP + tHFP
Horizontal back porch	tHBP	24	26	28	tCLK	Include tHPW
Horizontal display area	tHD	960			tCLK	
Horizontal front porch	tHFP	24	24	26	tCLK	
Horizontal period	tH	1008	1010	1014	tCLK	
Horizontal pulse width	tHPW	2	2	2	tCLK	
Vertical blanking time	tVBT	40	50	60	tH	tVBP + tVFP
Vertical back porch	tVBP	20	26	30	tH	Include tVPW
Vertical display area	tVD	1200			tH	
Vertical front porch	tVFP	20	24	30	tH	
Vertical period	tV	1240	1250	1260	tH	
Vertical pulse width	tVPW	2	2	2	tH	
Frame rate	FR	59	60	61	Hz	



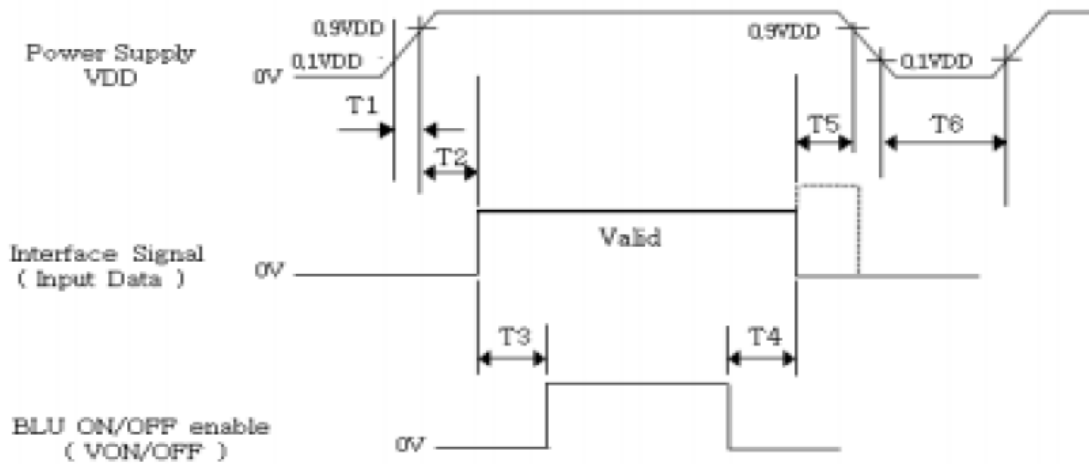
Timing Diagram Of Interface Signal (DE Mode)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
CLK frequency	tCLK	73.7	75.7	78	Mhz	
Horizontal blanking time	tHBT	48	50	54	tCLK	tHBP + tHFP
Horizontal display area	tHD	960			tCLK	
Horizontal period	tH	1008	1010	1014	tCLK	
Horizontal pulse width	tHPW	2	2	2	tCLK	
Vertical blanking time	tVBT	40	50	60	tH	tVBP + tVFP
Vertical display area	tVD	1200			tH	
Vertical period	tV	1240	1250	1260	tH	
Vertical pulse width	tVPW	2	2	2	tH	
Frame rate	FR	59	60	61	Hz	



2.5 Power Sequence

To prevent a latch-up or DC operation of LCD assembly, the power on/off sequence should be as diagram below.



Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	20	ms
T2	10	-	-	ms
T3	200	-	-	ms
T4	100	-	-	ms
T5	0	-	-	ms
T6	1	-	-	s

Notes: 1. Back Light must be turn on after power for logic and interface signal are valid.

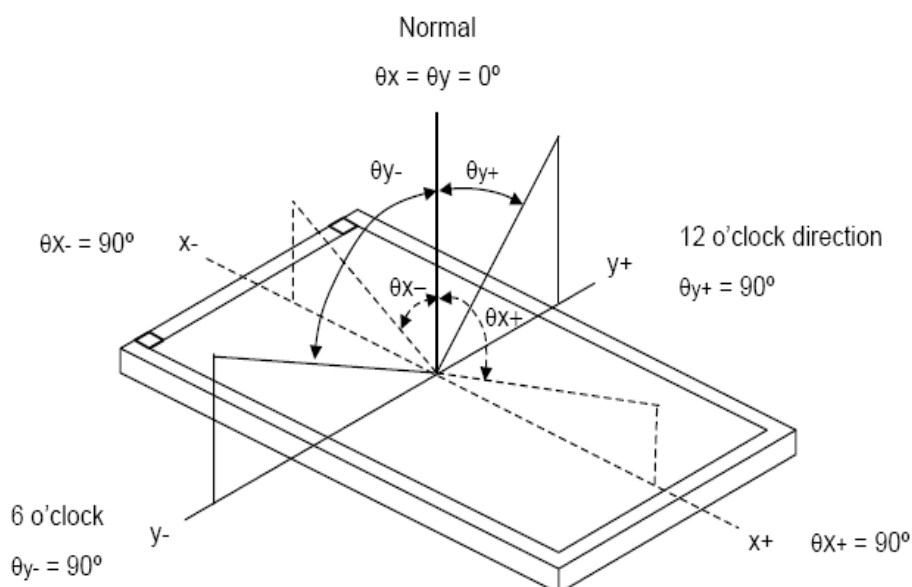
2. Even though T1 is out of SPEC, it is still ok if the inrush current of VDD is below the limit.

3 Optical Specification

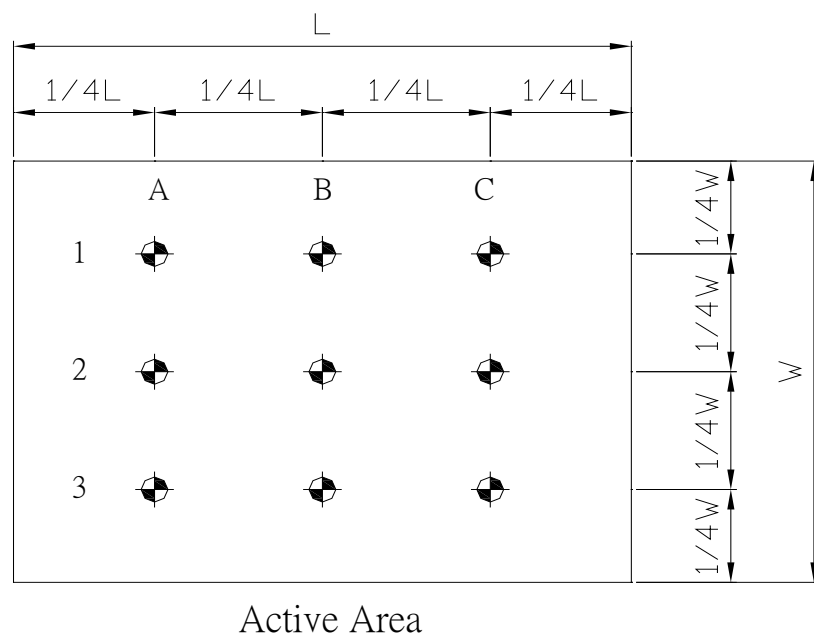
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	$\theta_x=0$ $\theta_y=0$ Klein K-10	0.621	0.651	0.681	-	Test Mode: (1) (2) (3)
		Ry		0.307	0.337	0.367	-	
	Green	Gx		0.269	0.299	0.329	-	
		Gy		0.604	0.634	0.664	-	
	Blue	Bx		0.117	0.147	0.177	-	
		By		0.028	0.058	0.088	-	
	White	Wx		0.251	0.281	0.311	-	
		Wy		0.268	0.298	0.328	-	
Center Luminance of White		Lc	$\theta_x=0$		1000		cd/m ²	
Uniform		Lu	$\theta_y=0$ BM-7		90		%	
Contrast Ratio		CR	$\theta_x=0$		1000:1		-	Test Mode: (1) (4)
Color Saturation		NTSC	$\theta_y=0$ Klein K-10		83		%	
Viewing Angle	Horizontal	θ_{x+}	$CR \geq 10$		85		Deg	Test Mode: (1) (3)
		θ_{x-}			85			
	Vertical	θ_{y+}			85			
		θ_{y-}			85			

Test Mode :

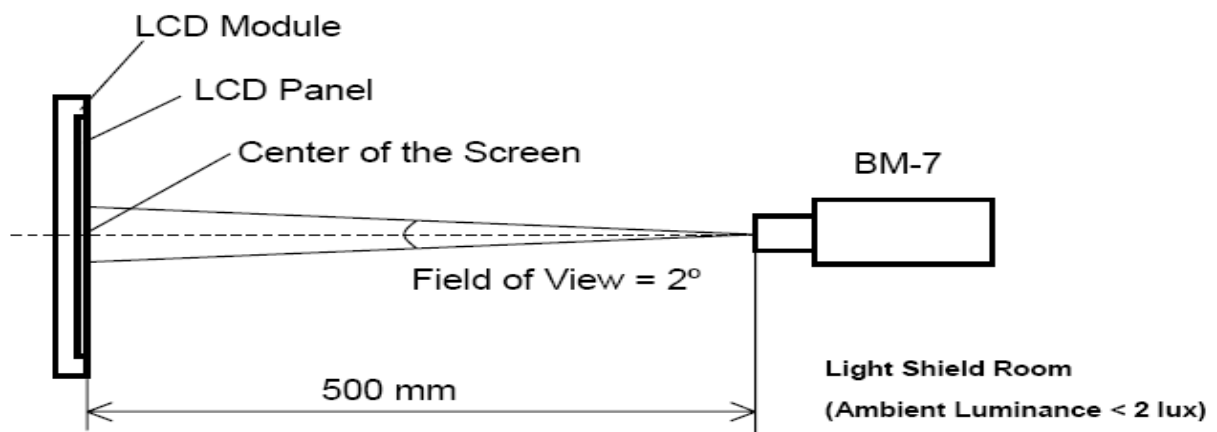
(1) Definition of Viewing Angle (θ_x , θ_y):



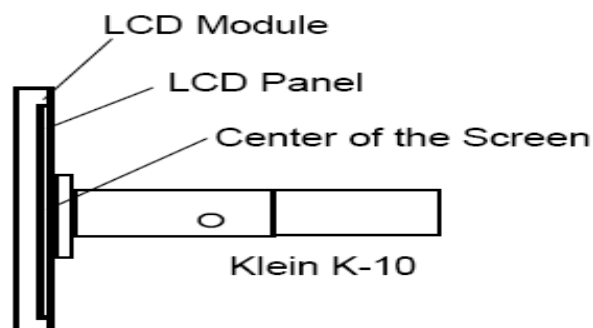
(2) Definition of Test Point:



(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	Condition	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	Vin		10.0	12.0	14.0	V	
Input Current (Low Brightness)	IinL	Brightness = 0%	0.0	-----	-----	mA	
Input Current (High Brightness)	IinH	Brightness = 100%	418	488	586	mA	(1)
LED Current (Low Brightness)	IoutL	Brightness = 0%	0.0	-----	-----	Arms	
LED Current (High Brightness)	IoutH	Brightness = 100%	204	211	232	mA	
Working Frequency	W_Freq	Brightness = 100%	-----	400	-----	KHZ	
Brightness Control	DC mode						
	Vadj	Connection of Voltage	0.2	-----	4.8	V	(2)
	PWM mode						
	PWM	Connect to PWM	0	-----	100	%	(3)
	Freq		-----	200	400	Hz	(4)
ON/OFF Control	Von	Normal Operation	2	-----	5	V	
	Voff		0	-----	0.8	V	
Output Voltage	Vout	Brightness = 100%	24.8	25.0	25.3	V	
Efficiency	η	Brightness = 100%	-----	90.0	-----	%	(5)

Remark:

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

4.2 Connector Socket

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

PIN No	Symbol	Description
1	Vin	DC+
2	Vin	DC+
3	Vin	DC+
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	Brightness	Brightness Control
8	Control	ON/OFF Control
9	CL	PWM or DC selection (Low → DC , Hi → PWM)

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

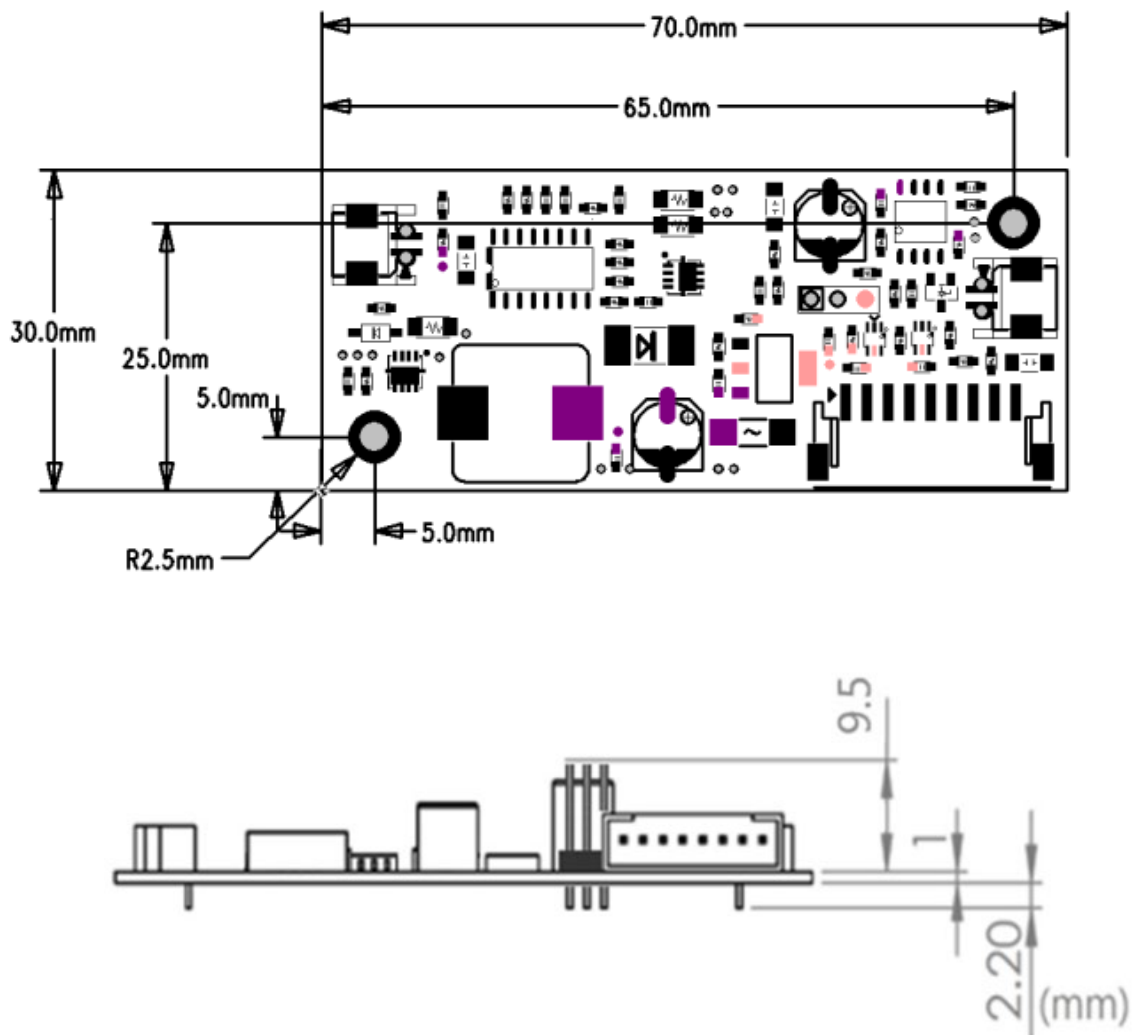
PIN NO	Symbol	Description
1	Output	LED High Voltage(+)
2	Output	LED Low Voltage (-)

DC or PWM Connector :J4

PIN NO	Symbol	Description
1	DC	JUMP pin 1,2 LED driver is DC input
2	GND	
3	PWM	JUMP pin 2,3 LED driver is PWM input

4.3 Mechanical Characteristics

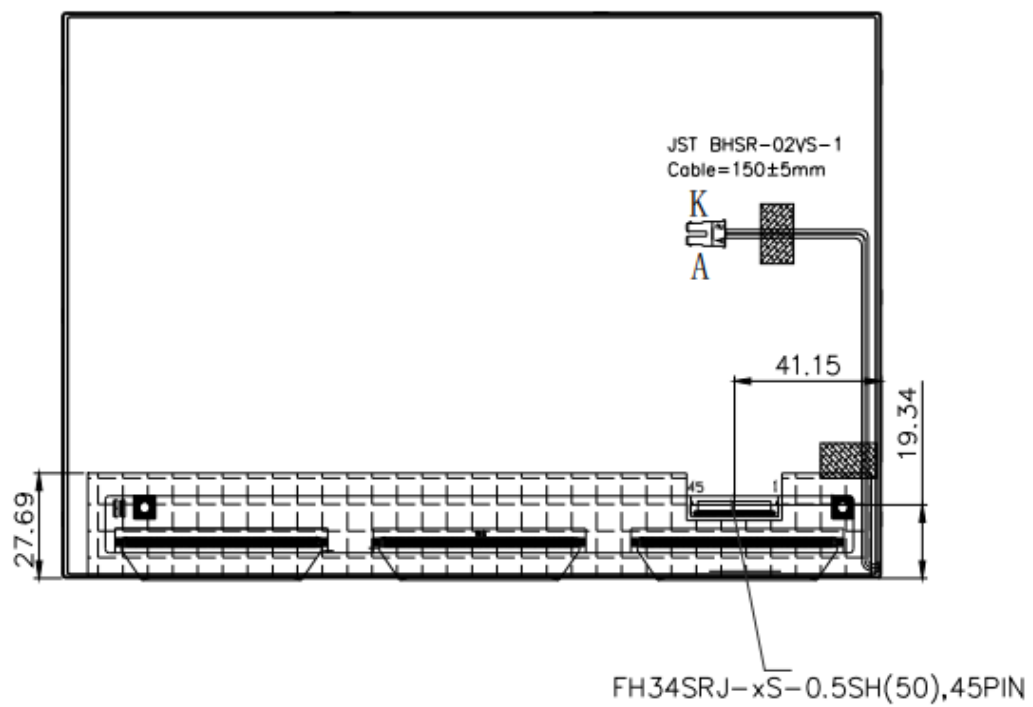
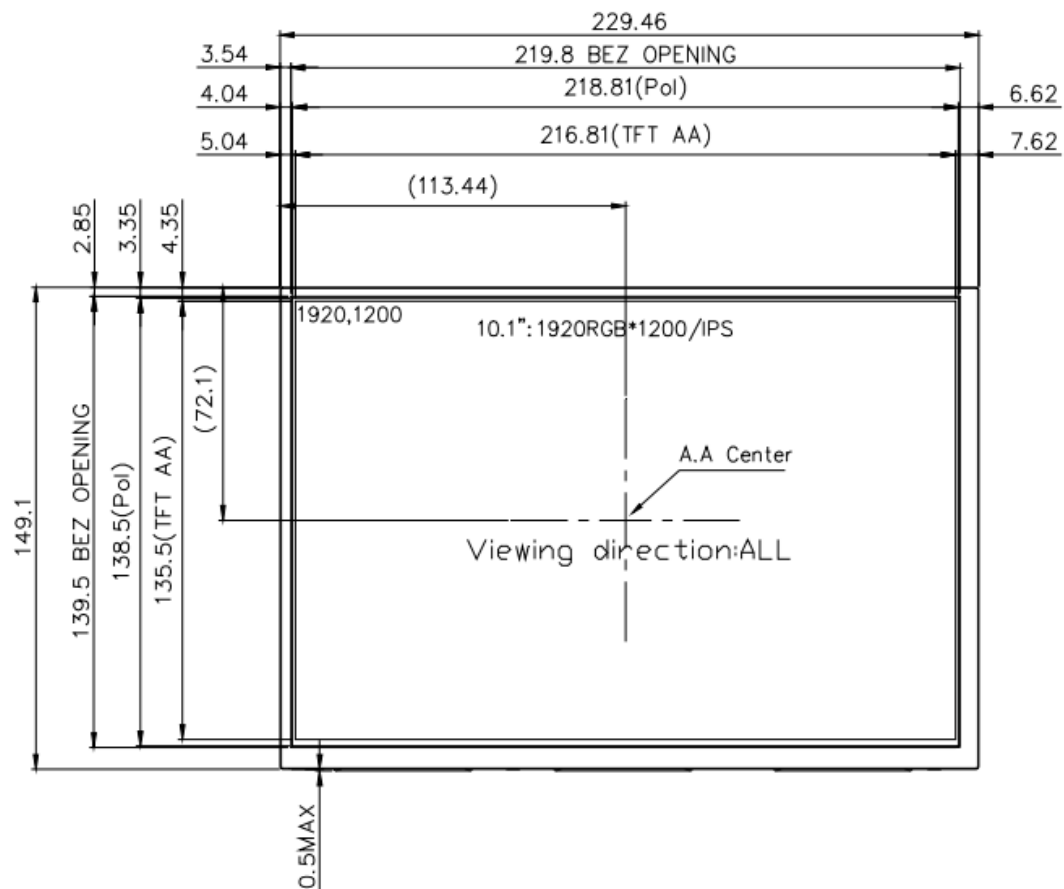
Dimension: 70mm*30mm*10.5mm

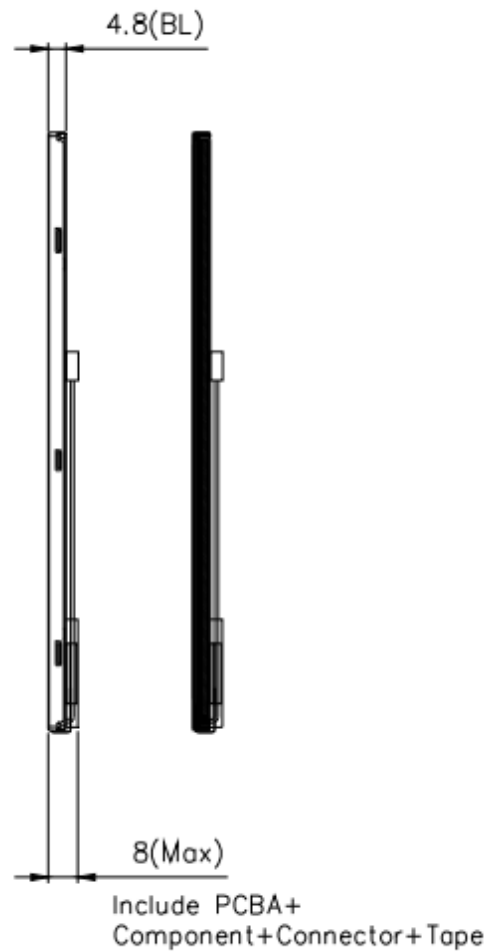
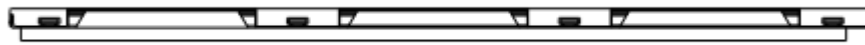


5 Mechanical Drawing

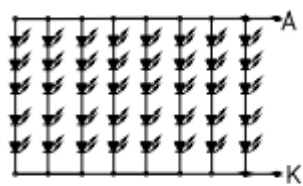
Outline Dimensions

Unit:mm





LED CIRCUIT DIAGRAM:



NOTE:

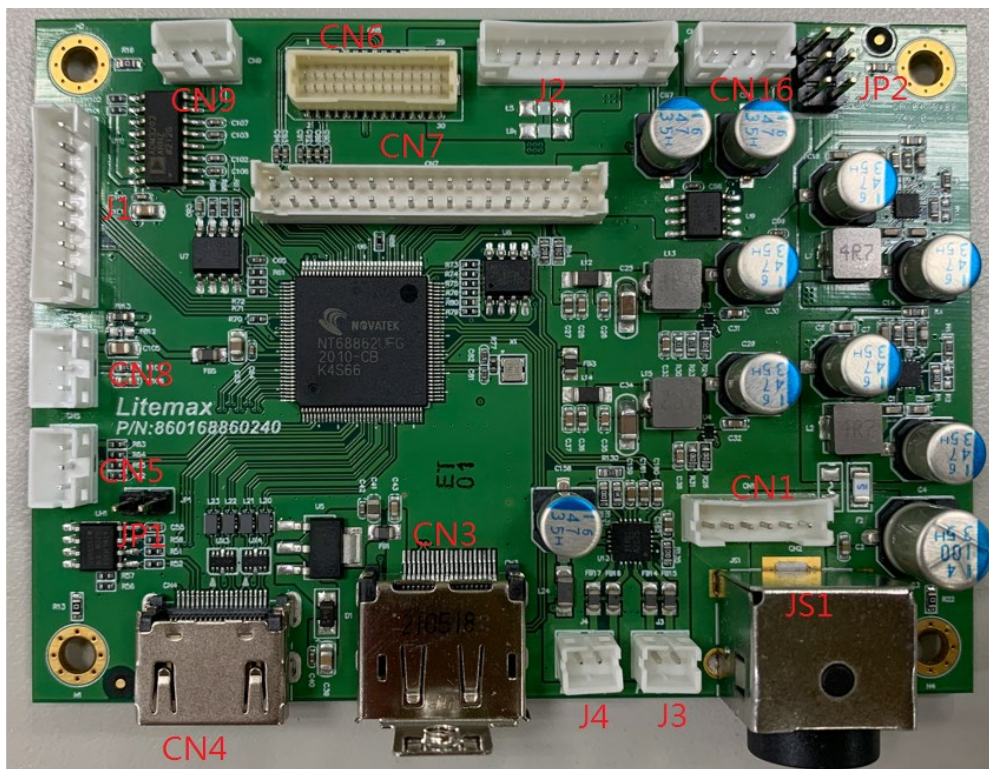
- 1 DISPLAY: 10.1" TFT TRANSMISIVE
- 2 VIEW DIRECTION: ALL
- 3 DRIVER IC: ST5892B
- 4 BL LED: 聚飞01.JB.ZF4014W65P00
- 5 OPERATION TEMP.: $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$
- 6 STORAGE TEMP.: $-30^{\circ}\text{C} \sim +80^{\circ}\text{C}$
- 7 UNSPECIFIED TOLERANCES IS $\pm 0.2\text{mm}$
- 8 ALL MATERIAL AND PROCESSING SHOULD BE LEAD FREE
- 9 CRITICAL DEMENSION MARKED *

6 AD68862HP Board & OSD Functions

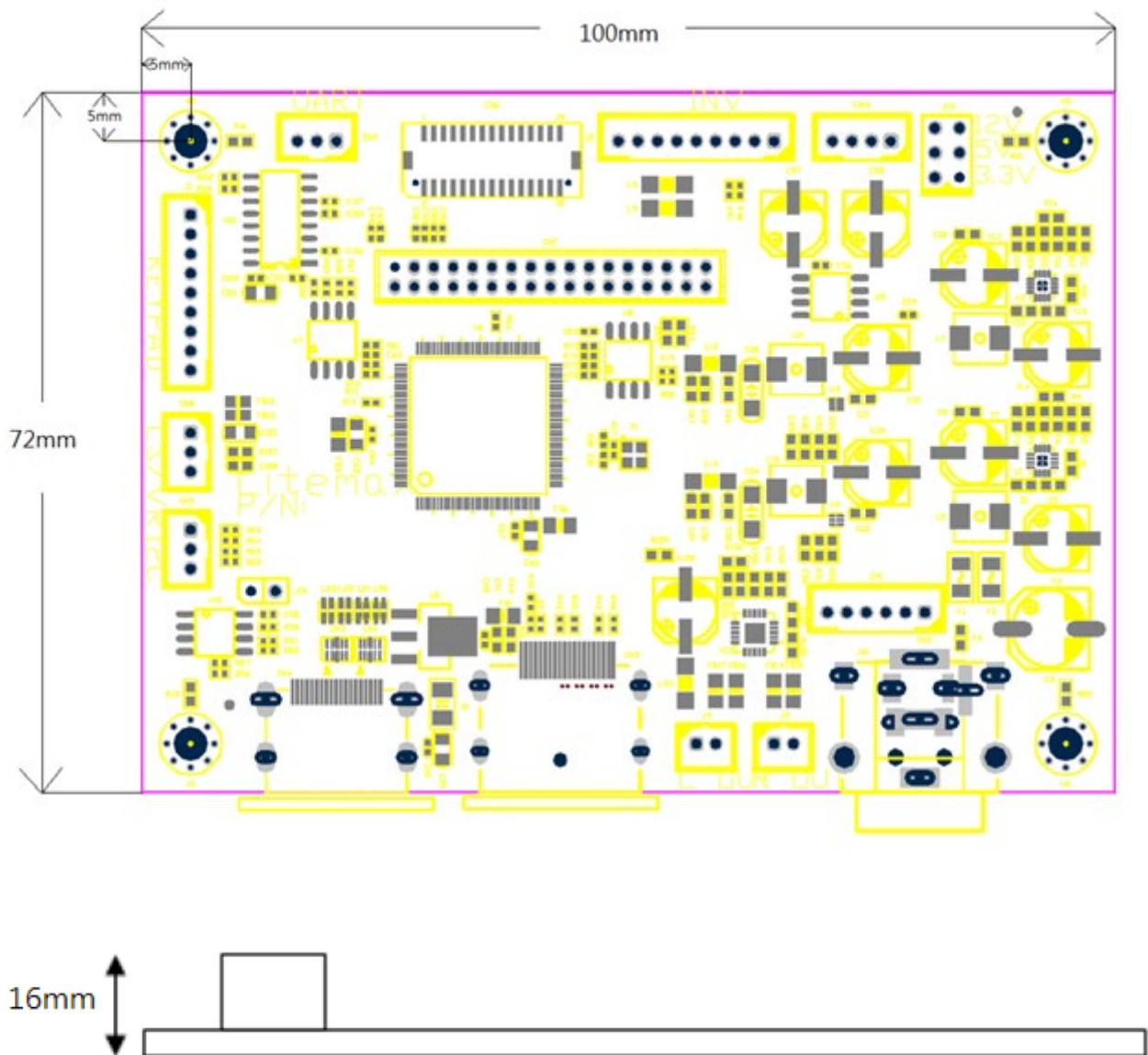
We developed this A/D board to support industrial high brightness and commercial applications. This A/D board has many functions. It has a HDMI and Display Port input. Rev.1 is European RoHS compliant.

General Description

- Max resolution 1920 x 1080 60Hz
- One DP 1.2 , supports 1920 x 1080 60Hz
- One HDMI 1.4 , supports 1920 x 1080 60Hz
- Embedded MCU with ADC port for VR, Light Sensor application. (Optional)
- Embedded OSD.
- Support panel voltage 3.3/ 5/ 12 V
- Support eDP panel.
- Support Dual/Single LVDS
- Support 2.8W speaker x 2 (Optional)
- Size 100mm*72mm
- Support output voltage 12V(1A) or 5V(1A)



Outline Dimensions
AD68862HP 100mm X 72mm



AD68862 Board Pin Define

CN6: eDP output(Wafer 1.0mm, 15*2P)

Pin	Function	Pin	Function
1	TX0P	16	TXAUX-
2	TX0N	17	TX_HPDP
3	TX1P	18	GND
4	TX1N	19	VCC
5	GND	20	VCC
6	GND	21	DIM_EDP
7	NC	22	ON/OFF_EDP
8	NC	23	INVGND
9	GND	24	INVGND
10	GND	25	INVGND
11	NC	26	GND
12	NC	27	12INV
13	GND	28	12INV
14	GND	29	12INV
15	TXAUX+	30	12INV

CN7: LVDS output(Wafer 2.0mm,17x2P)

Pin	Function	Pin	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	+3.3V
13	GND	30	GND
14	GND	31	VCC
15	RXE0-	32	VCC
16	RXE0+	33	VCC
17	RXE1-	34	VCC

CN3: DP input

Pin	Function	Pin	Function
1	ML_Lane3(n)	11	GND
2	GND	12	ML_Lane0(p)
3	ML_Lane3(p)	13	CONFIG1
4	ML_Lane2(n)	14	CONFIG2
5	GND	15	AUX_CH(p)
6	ML_Lane2(p)	16	GND
7	ML_Lane1(n)	17	AUX_CH(n)
8	GND	18	Hot_Plug
9	ML_Lane1(p)	19	Return
10	ML_Lane0(n)	20	DP_PWR

CN4: HDMI input

Pin	Function	Pin	Function	Pin	Function
1	RX2+	9	RX0-	17	GND
2	GND	10	TMDS Clock+	18	HDMI +5V
3	RX2-	11	HDMI DET	19	HPD
4	RX1+	12	TMDS Clock-		
5	GND	13	NC		
6	RX1-	14	NC		
7	RX0+	15	HDMI_SCL		
8	GND	16	HDMI_SDA		

CN1: Power input (Wafer 2.0mm pitch 6 pin)

Pin	Function	Pin	Function
1	Power Input	4	GND
2	Power Input	5	GND
3	Power Input	6	GND

JS1: Power input (Power Din 4 pin)

Pin	Function	Pin	Function
1	Power Input	3	GND
2	Power Input	4	GND

CN2: Power input (Power Jack 3 pin)

Pin	Function	Pin	Function
1	Power Input	3	GND
2	GND		

CN16: Power output (Wafer 2.0mm pitch 4 pin)

Pin	Function	Pin	Function
1	+5V(1A)	3	+12V(1A)
2	GND	4	GND

J2: Backlight Power and Control (Wafer 2.0mm pitch 9 pin)

Pin	Function	Pin	Function
1	DC/PWM SEL	6	GND
2	Enable	7	12V (Note3)
3	Dimming	8	12V (Note3)
4	GND	9	12V (Note3)
5	GND		

Note3: Pin 7,8,9 are for 12V version only. If you choose 24V version, these 3 pin are NC.

J1: Keypad (Wafer 2.0mm pitch 9 pin)

Pin	Function	Pin	Function
1	POWER KEY	6	MENU KEY
2	GREEN LED	7	NC
3	RED LED	8	GND
4	DOWN KEY	9	NC
5	UP KEY		

CN8: Light sensor (Wafer 2.0mm pitch 3 pin)

Pin	Function	Pin	Function
1	3.3V	3	GND
2	Sensor Out		

JP2: Panel power selection (2.54mm pitch 2x3 jump)

Pin	Function	Pin	Function
1-2 close	3.3V	5-6 close	12V
3-4 close	5V		

CN9: UART (Wafer 2.0mm pitch 3 pin)

Pin	Function	Pin	Function
1	TX	3	GND
2	RX		

CN5: I2C (Wafer 2.0mm pitch 3 pin)

Pin	Function	Pin	Function
1	SDA	3	GND
2	SCL		

J3: Audio out R (Wafer 2.0mm pitch 2 pin)(2.8W 4ΩLoad)

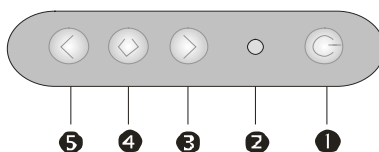
Pin	Function	Pin	Function
1	ROUTP	2	ROUTN

J4: Audio out L (Wafer 2.0mm pitch 2 pin) (2.8W 4ΩLoad)

Pin	Function	Pin	Function
1	LOUTP	2	LOUTN

6.1 OSD Function

MEMBRANE CONTROL BUTTOM



- **POWER SWITCH:** Pushing the power switch will turn the monitor on. Pushing it again to turn the monitor off.
- **Power LED:** Power ON-Green / Power off-No.
- **Up Key >:** Increase item number or value of the selected item.
- **Menu Key:** Enter to the OSD adjustment menu. It also used for go back to previous menu for sub-menu, and the change data don't save to memory.
- **Down Key <:** Decrease item number or item value when OSD is on.

Screen Adjustment Operation Procedure

1. Entering the screen adjustment

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

2. Entering the settings

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

3. Change the settings

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

4. Save

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

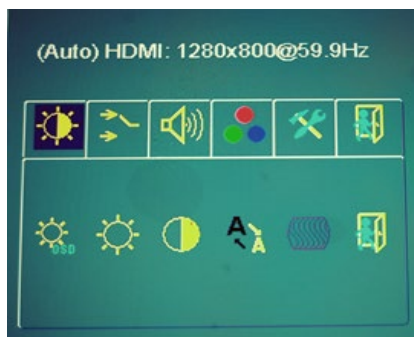
5. Return & Exit the main menu

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

6.2 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)

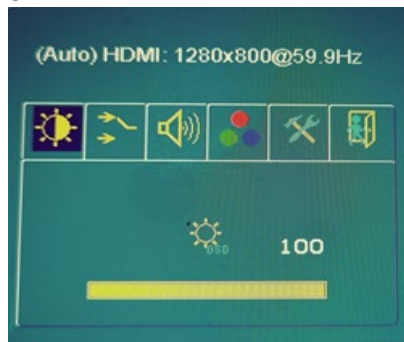
press this Icon, must to accompany with Litemax ambient light sensor to auto dimming.





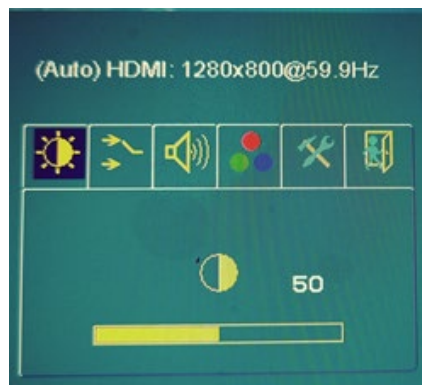
OSD Brightness :

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”



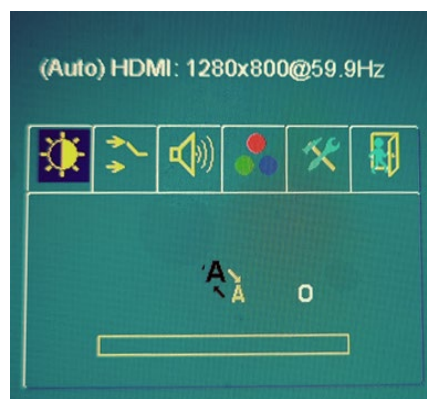
Contrast :

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



Sharpness :

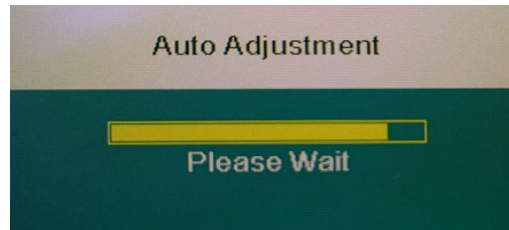
Press “Menu” once, you can adjust the Sharpness from “0” to “4” by pressing the “Left” and “Right”.





Auto Tune : (VGA only)

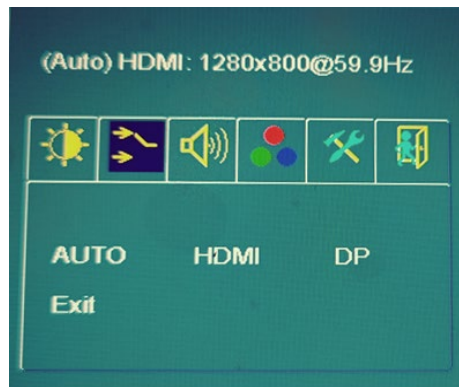
Press “Menu” once, you can activate the Auto Tune.



Exit: Back to the beginning menu.



Input Signal: (default auto detect)



AUTO

AUTO: Auto detect

HDMI

HDMI: HDMI input

DP

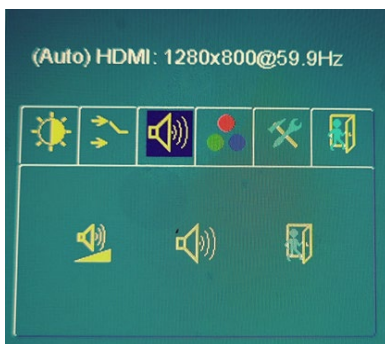
DP: DisplayPort input

Exit

Exit: Back to the beginning menu.



Audio:



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



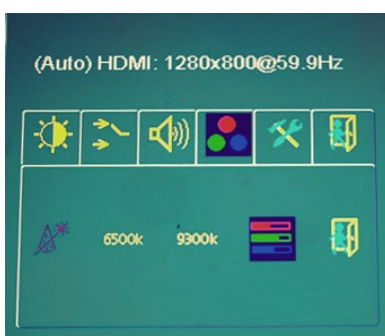
UnMute/Mute: You can mute the speaker by pressing this option.



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).



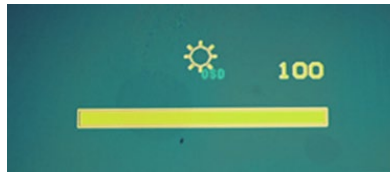
Load Default: You can load the default data using this function.



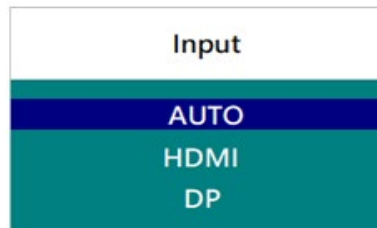
Exit: Back to the beginning menu.

< Hot Key >

Left click to display brightness adjustment.

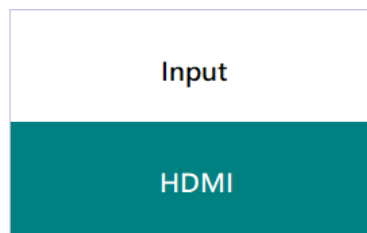


Right click to display Input Source Menu.



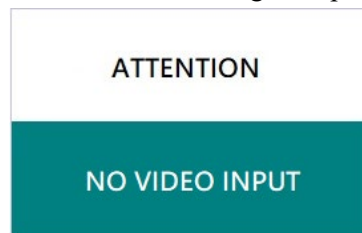
<Others>

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



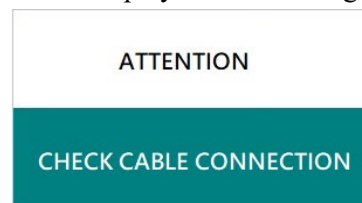
(Signal Information)

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.