



LITEMAX

ULF / ULH0705-H

Sunlight Readable 7" 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
May /16/2023	all		Initial release	

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1 General Description

The **ULF/ULH0705-H** is a 7 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 (-40 °C ~ 85 °C)
- BL MTBF: 20,000 hours

1.2 General Specifications

Model Name	ULF / ULH0705-H
Description	7" TFT LCD,1000 nits LED Backlight,800x480
Screen Size	7"
Display Area (mm)	152.4(H) x 91.4(V)
Brightness	1000 cd/m ²
Resolution	800x480
Aspect Ratio	16 : 9
Contrast Ratio	860 : 1
Pixel Pitch (mm)	0.1905(H) x 0.1905(V)
Pixel Pre Inch (PPI)	133
Viewing Angle	170°(H),170°(V)
Color Saturation (NTSC)	83%
Display Colors	16.7M
Response Time (Typical)	30ms
Panel Interface	LVDS
Input Interface	HDMI, DP
Input Power	DC12V
Power Consumption	2.8W (4.8W with AD Board)
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position...etc
Dimensions (mm)	165.00 x 104.07 x 9.15
Bezel Size(U/B/L/R)	3.63/9.0/6.3/6.3 mm
Weight (Net)	0.5kg
Operating Temperature	-40 °C ~ 85 °C
Storage Temperature	-40 °C ~ 95 °C

ULF= Panel + w/LVDS&LID converter board

ULH= Panel + w/LVDS&LID converter board + AD Control Board

1.3 Absolute Maximum Ratings

Permanent damage may occur if exceeding the following maximum rating.

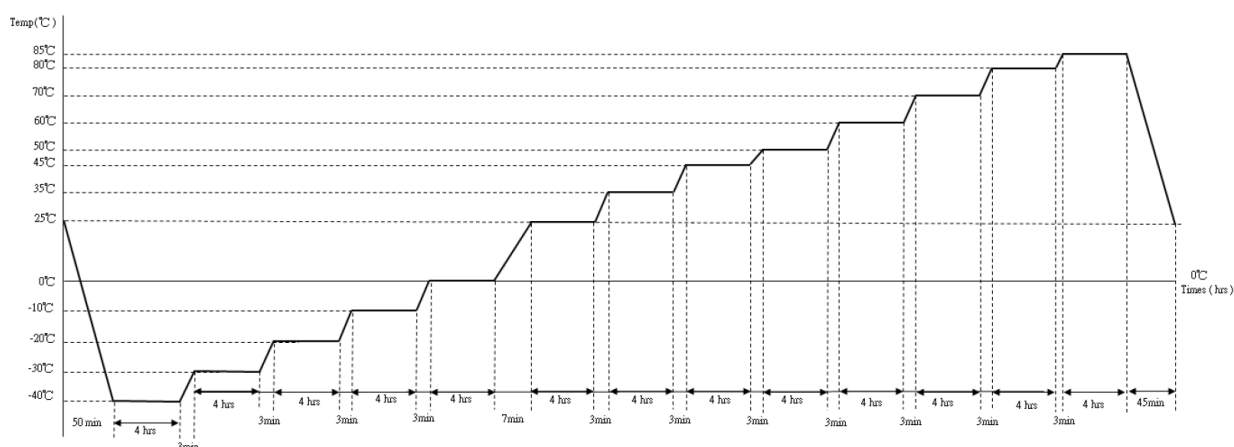
Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V _{CC}	-0.3	4.5	V	GND=0
	V _{GH}	-0.3	V _{GL} +35.0	V	GND=0
	V _{GL}	-15	0.3	V	GND=0
	A _V _{DD}	-0.3	14.5	V	GND=0
	V _{COM}	4	6.5	V	
Logic Signal Input Level	V _I	-0.3	4.5	V	

Note

- (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.
- (2) $T_a = 25 \pm 2^\circ\text{C}$

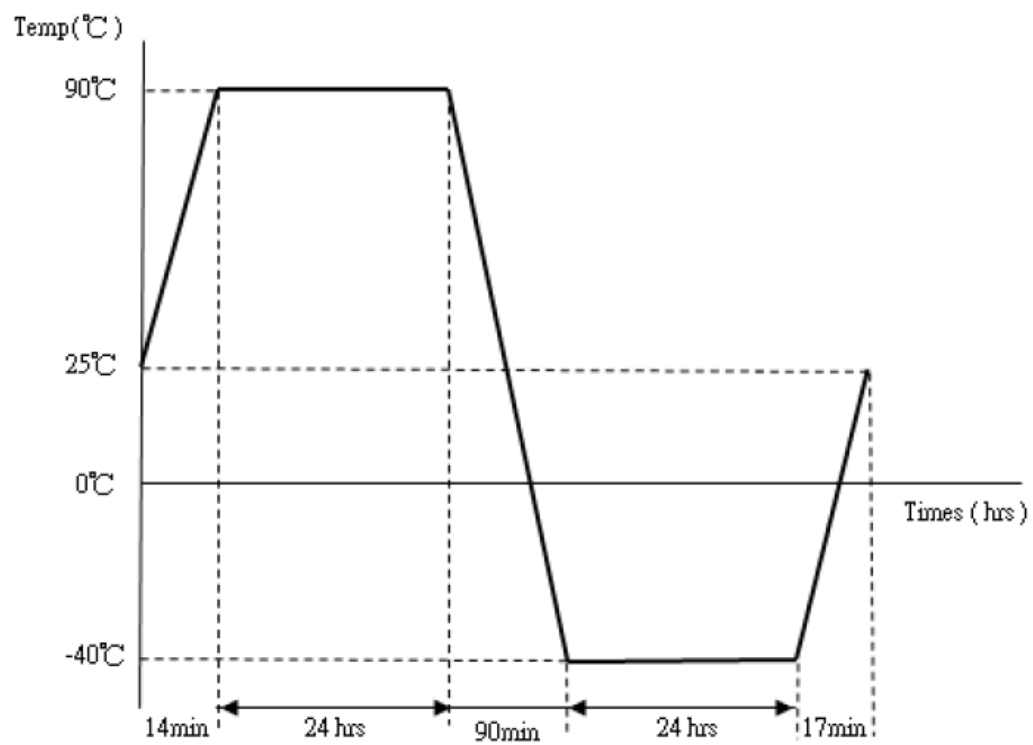
Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	T _{opa}	-40	85	°C	
Storage Temperature	T _{stg}	-40	95	°C	

Operating Temperature



Test Description: -40°C~85°C, 0%

Storage Temperature



Test Description: -40°C~90°C, 0%

2 Electrical Specifications

2.1 FPC Pin Assignment

FPC1:Signal and power input.(Connector:HIROSE FH52E-FH52E-40S-0.5SH)

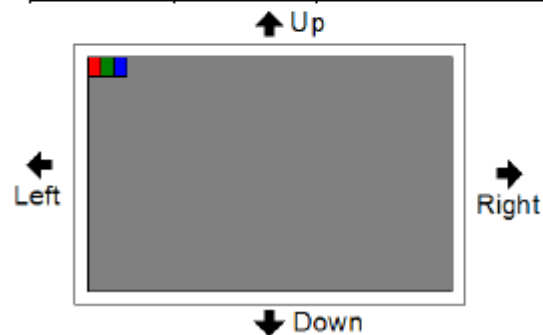
PIN	SYMBOL (Customer)	I/O/P (Note2)	FUNCTION
1	A	P	LED Anode
2	A	P	LED Anode
3	A	P	LED Anode
4	NC	--	Not Connected
5	K1	P	LED Catode 1
6	K2	P	LED Catode 2
7	K3	P	LED Catode 3
8	NTC+	O	Themistor
9	NTC-	O	Themistor
10	VCOM	P	For external VCOM DC input
11	AVDD	P	Analog Power Supply
12	VCC	P	Digital Power Supply
13	VCC	P	Digital Power Supply
14	GND	P	Ground
15	GND	P	Ground
16	VGH	P	Positive power for TFT.
17	VGL	P	Negative power for TFT.
18	STBYB	I	Standby mode. H: normal operation. L: the controller and source driver will turn off. Suggest to connecting with a RC (10K Ω , 0.47 μ F) circuit for stability.
19	SHLR	I	Left or Right display control. Note1.
20	UPDN	I	UP or Down display control. Note1.
21	GND	P	Ground
22	LVDS_RX_IN3+	I	LVDS Data Input 3+
23	LVDS_RX_IN3-	I	LVDS Data Input 3-
24	GND	P	Ground
25	LVDS_CLK_IN+	I	LVDS Clock Input+
26	LVDS_CLK_IN-	I	LVDS Clock Input-
27	GND	P	Ground
28	LVDS_RX_IN2+	I	LVDS Data Input 2+
29	LVDS_RX_IN2-	I	LVDS Data Input 2-
30	GND	P	Ground
31	LVDS_RX_IN1+	I	LVDS Data Input 1+
32	LVDS_RX_IN1-	I	LVDS Data Input 1-
33	GND	P	Ground
34	LVDS_RX_IN0+	I	LVDS Data Input 0+
35	LVDS_RX_IN0-	I	LVDS Data Input 0-
36	GND	P	Ground

37	RST	I	Reset Pin. H:normal operation. L:the controller is in reset state. Suggest to connecting with a RC (10K Ω , 0.1uF) circuit for stability.
38	GND	P	Ground
39	BRS	O	BRS signal output for external detecting. BRS will keep high when inputted CLK/DE/HV signals fail.
40	GND	P	Ground

Note1 : SHLR and UPDN control function. It is recommended to power on with VDD.

Note2 : I ->Input; O->Output; P->Power

SHLR	UPDN	Data shifting
H	H	Left→Right, Up→Down
L	H	Right→Left, Up→Down
L	L	Right→Left, Down→Up
H	L	Left→Right, Down→Up



2.2 Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	Vcc	3.0	3.3	3.6	V	
	VGH	18.5	19	19.5	V	
	VGL	-10.5	-10	-9.5	V	
	AVDD	12.3	12.5	12.7	V	
VCOM	VCOM	4.9	5.5	6.1	V	Note (4)
Input signal voltage	ViH	0.7*Vcc	-	Vcc	V	Note (1)
	ViL	0	-	0.3*Vcc	V	
Current of power supply	VCOM		1	(2)	mA	
	I _{VCC}	-	15	(25)	mA	Vcc =3.3V, white pattern
	I _{AVDD}	-	20	(30)	mA	AVDD=12.5V, white pattern
	I _{VGH}	-	0.25	(0.38)	mA	VGH=19V, white pattern
	I _{VGL}	-	0.50	(0.75)	mA	VGL=-10V, white pattern

Note (1): HSYNC, VSYNC, DE, Digital Data

Note (2): Be sure to apply the power voltage as the power sequence spec.

Note (3): GND=AGND=0V

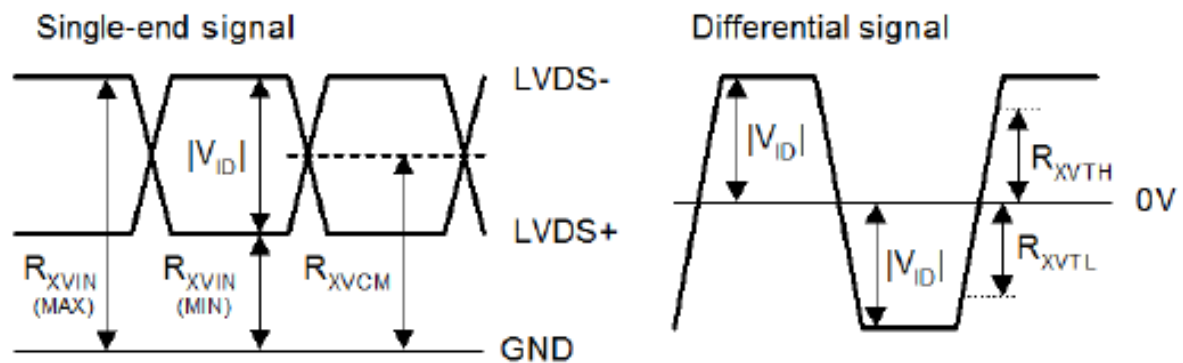
Note (4): 5.5V is for reference, strongly suggest to do Vcom calibration in customer side.

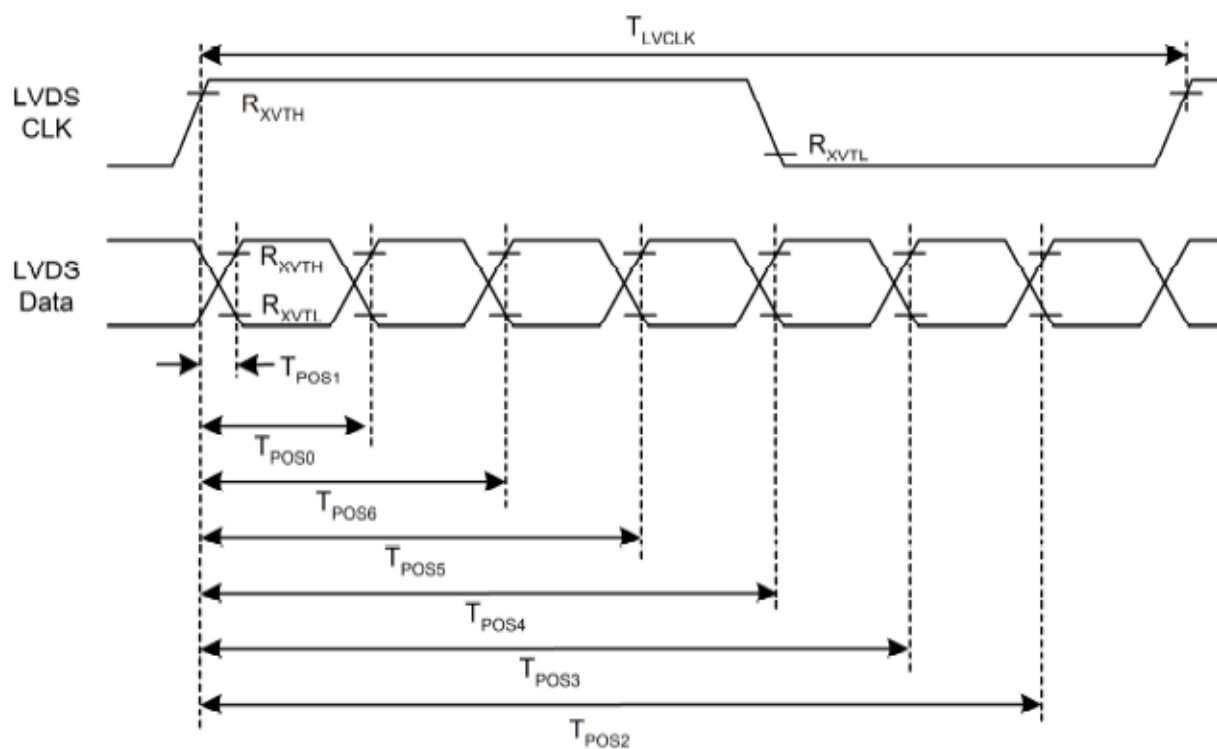
Note (5): The value in () represent estimated value

2.3 Switching Characteristic For LVDS Receiver

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	R_{XVTH}	100	-	-	mV	$R_{XVCM} = 1.2V$
Differential Input Low Threshold	R_{XVTL}	-	-	-100	mV	
Input voltage range (singled-end)	R_{XVIN}	0.7	-	1.7	V	
Differential input common mode voltage	R_{XVCM}	1.0	1.2	1.4	V	
Differential input voltage	$ V_{ID} $	0.2	-	0.6	V	
Input Current (Stand-by)	I_{IN}	-	-	100	μA	Note*
1 data bit time	UI	-	1/7	-	T_{LVCLK}	
Position 1	T_{POS1}	-0.2	0	0.2	UI	
Position 0	T_{POS0}	0.8	1	1.2	UI	
Position 6	T_{POS6}	1.8	2	2.2	UI	
Position 5	T_{POS5}	2.8	3	3.2	UI	
Position 4	T_{POS4}	3.8	4	4.2	UI	
Position 3	T_{POS3}	4.8	5	5.2	UI	
Position 2	T_{POS2}	5.8	6	6.2	UI	

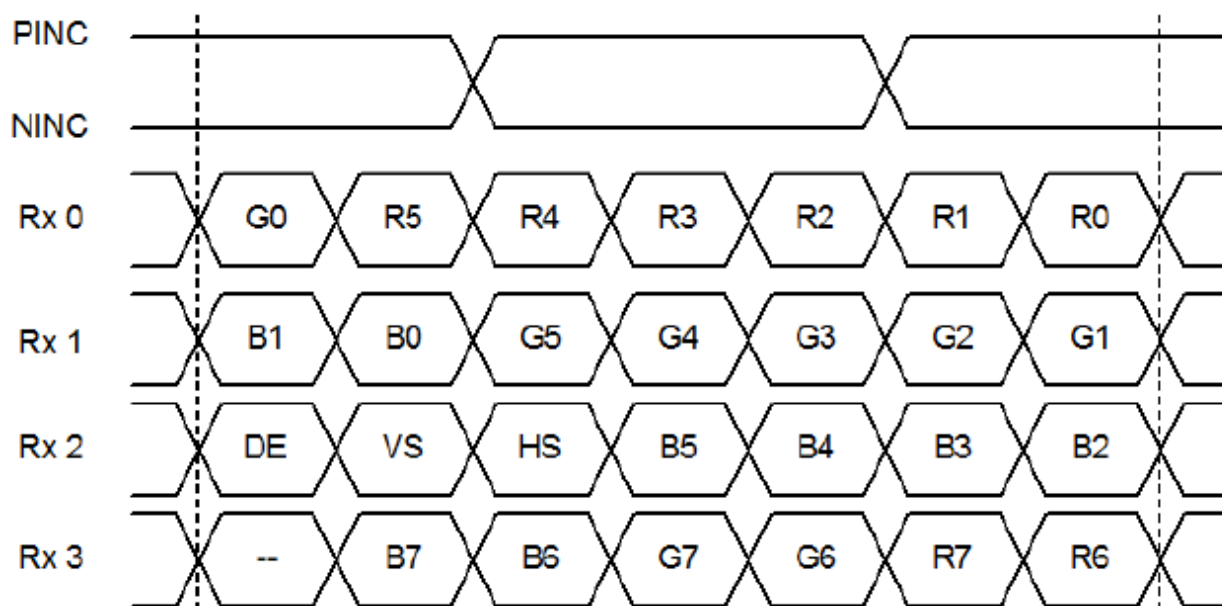
Note* : Temp.= +25 C, $V_{CC}=3.3V$, Input Pin $V_{IH}=3.3V$, $V_{IL}=0V$, Clock & all function are stopped, STBYB=Low.





2.4 Bit LVDS Input

VESA Format 8 Bits



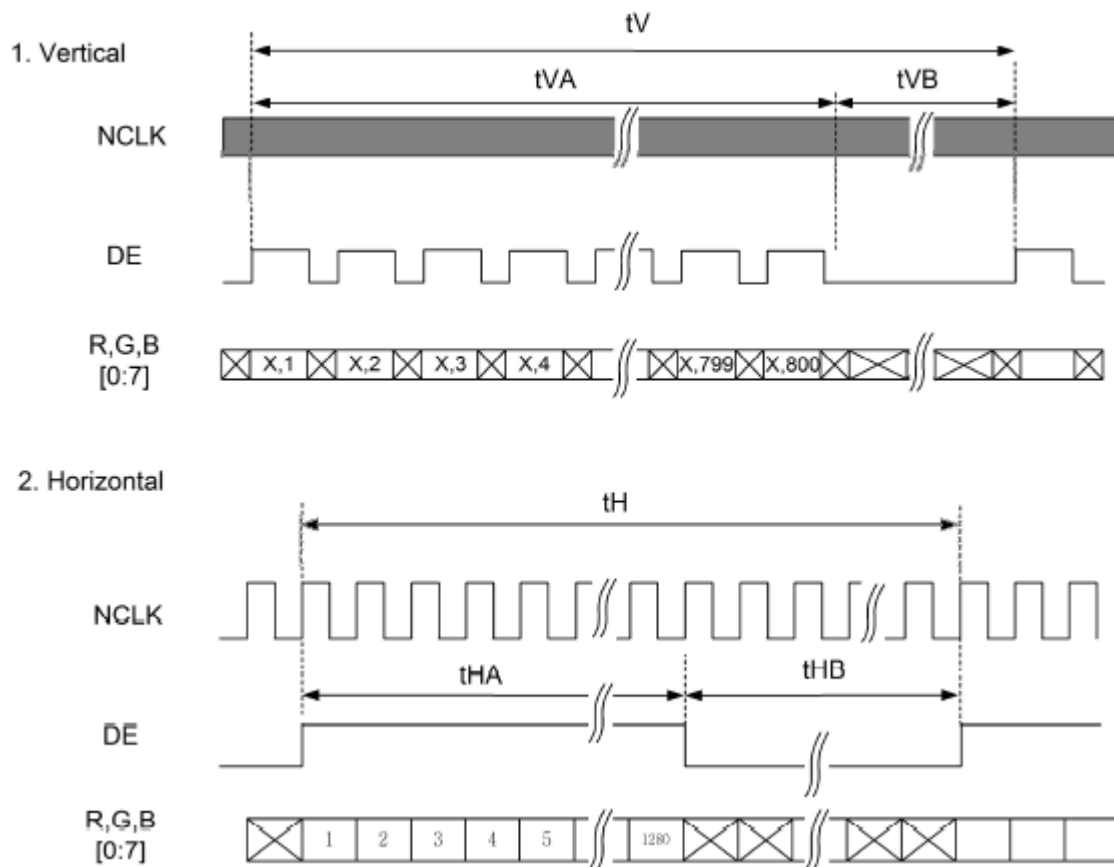
Relationship Between Displayed Color And Input

	Display	MSB R7 R6 R5 R4 R3 R2 R1 R0	LSB G7 G6 G5 G4 G3 G2 G1 G0	MSB B7 B6 B5 B4 B3 B2 B1 B0	Gray scale Level
Basic color	Black	L L L L L L L L	L L L L L L L L	L L L L L L L L	-
	Blue	L L L L L L L L	L L L L L L L L	H H H H H H H H	-
	Green	L L L L L L L L	H H H H H H H H	L L L L L L L L	-
	Light Blue	L L L L L L L L	H H H H H H H H	H H H H H H H H	-
	Red	H H H H H H H H	L L L L L L L L	L L L L L L L L	-
	Purple	H H H H H H H H	L L L L L L L L	H H H H H H H H	-
	Yellow	H H H H H H H H	H H H H H H H H	L L L L L L L L	-
	White	H H H H H H H H	H H H H H H H H	H H H H H H H H	-
Gray scale of Red	Black	L L L L L L L L	L L L L L L L L	L L L L L L L L	L0
	Dark ↑ ↓ Light	L L L L L L L H	L L L L L L L L	L L L L L L L L	L1
		L L L L L L H L	L L L L L L L L	L L L L L L L L	L2
		:	:	:	L3...L251
		H H H H H H L L	L L L L L L L L	L L L L L L L L	L252
	Light	H H H H H H L H	L L L L L L L L	L L L L L L L L	L253
		H H H H H H H L	L L L L L L L L	L L L L L L L L	L254
	Red	H H H H H H H H	L L L L L L L L	L L L L L L L L	Red L255
Gray scale of Green	Black	L L L L L L L L	L L L L L L L L	L L L L L L L L	L0
	Dark ↑ ↓ Light	L L L L L L L L	L L L L L L L H	L L L L L L L L	L1
		L L L L L L L L	L L L L L L H L	L L L L L L L L	L2
		:	:	:	L3...L251
		L L L L L L L L	H H H H H H L L	L L L L L L L L	L252
	Light	L L L L L L L L	H H H H H H L H	L L L L L L L L	L253
		L L L L L L L L	H H H H H H H L	L L L L L L L L	L254
	Green	L L L L L L L L	H H H H H H H H	L L L L L L L L	Green L255
Gray scale of Blue	Black	L L L L L L L L	L L L L L L L L	L L L L L L L L	L0
	Dark ↑ ↓ Light	L L L L L L L L	L L L L L L L L	L L L L L L L H	L1
		L L L L L L L L	L L L L L L L L	L L L L L L H L	L2
		:	:	:	L3...L251
		L L L L L L L L	L L L L L L L L	H H H H H H L L	L252
	Light	L L L L L L L L	L L L L L L L L	H H H H H H L H	L253
		L L L L L L L L	L L L L L L L L	H H H H H H H L	L254
	Blue	L L L L L L L L	L L L L L L L L	H H H H H H H H	Blue L255
Gray scale of White & Black	Black	L L L L L L L L	L L L L L L L L	L L L L L L L L	L0
	Dark ↑ ↓ Light	L L L L L L L H	L L L L L L L H	L L L L L L L H	L1
		L L L L L L H L	L L L L L L H L	L L L L L L H L	L2
		:	:	:	L3...L251
		H H H H H H L L	H H H H H H L L	H H H H H H L L	L252
	Light	H H H H H H L H	H H H H H H L H	H H H H H H L H	L253
		H H H H H H H L	H H H H H H H L	H H H H H H H L	L254
	White	H H H H H H H H	H H H H H H H H	H H H H H H H H	White L255

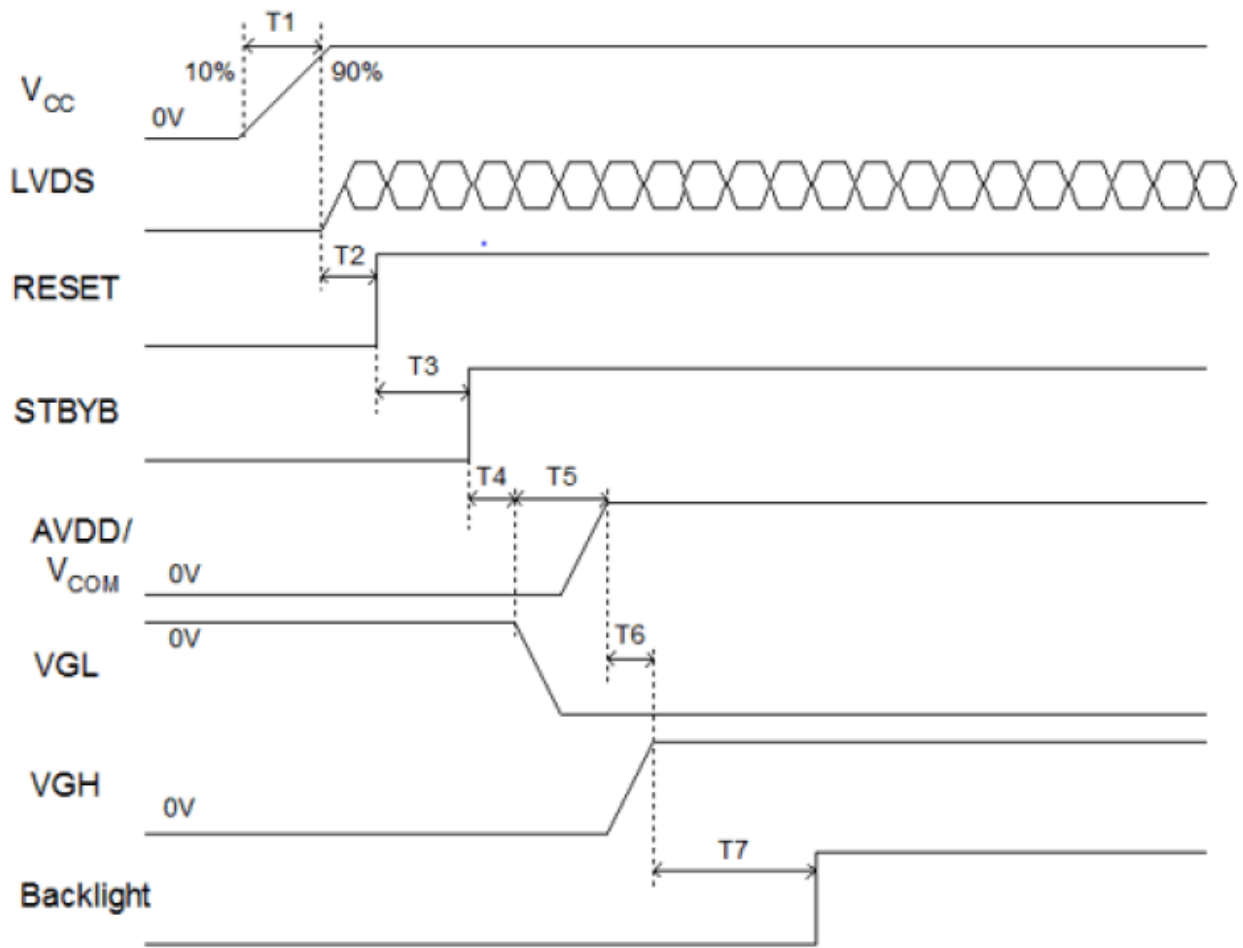
2.5 Interface Timing

Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK frequency	fCLK	28	30	32	MHz	
Horizontal Display Time	tHA	800			Clock	
Horizontal Total Time	tH	890	902	915	Clock	
Horizontal Blanking Time	tHB	90	102	115	Clock	$T_{HB} = T_{HBP} + T_{HFP}$
Vertical Display Time	tVA	480			Line	
Vertical Total Time	tV	546	555	564	Line	
Vertical Blanking Time	tVB	66	75	84	Line	$T_{VB} = T_{VBP} + T_{VFP}$
Frame rate	--	54	60	66	Hz	

Timing Diagram Of Interface Signal

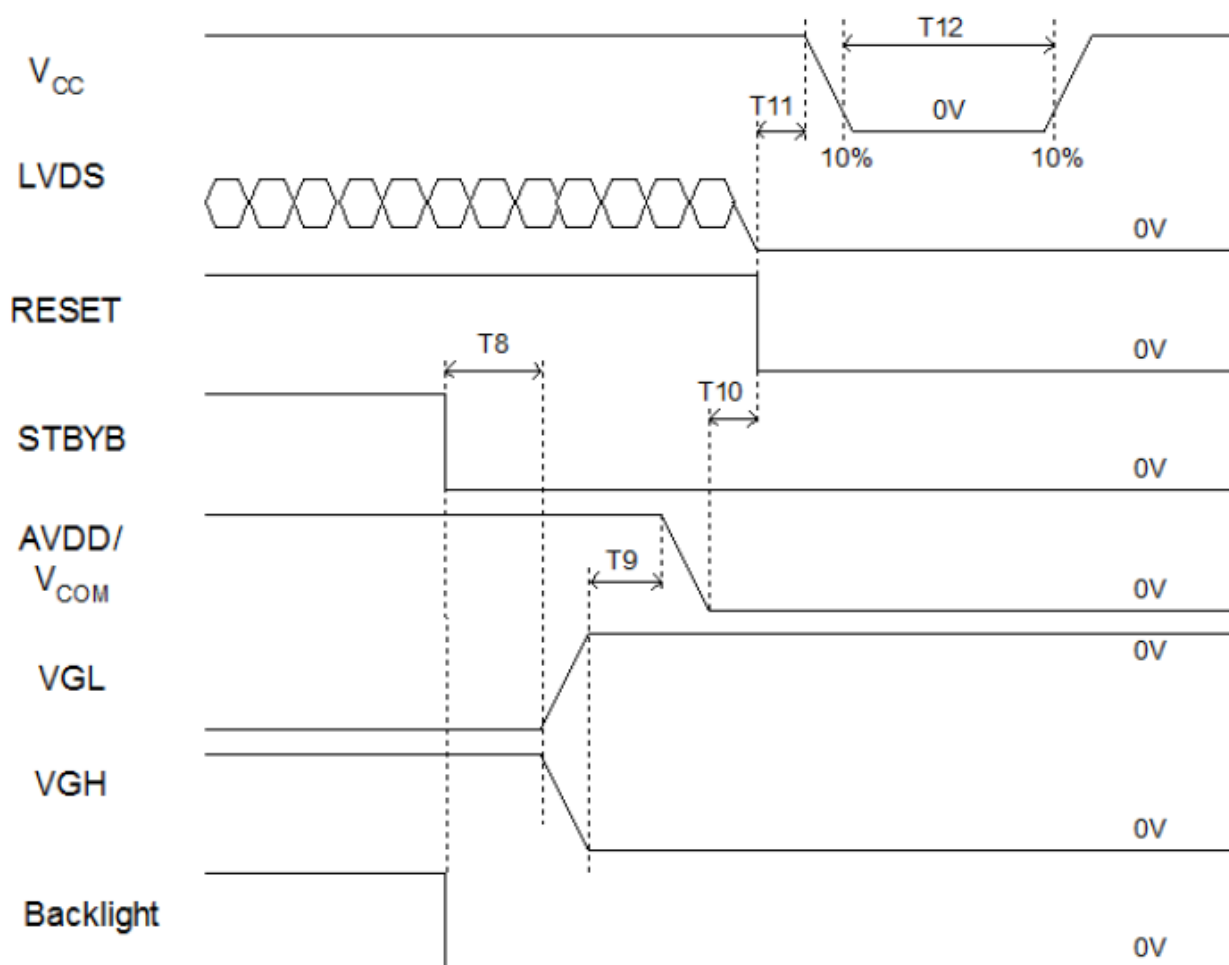


2.6 Power Sequence



Item	Min.	Max.	Note
T1	0.5	20	
T2	1	---	
T3	20	---	
T4	16	---	
T5	15	48-	
T6	0	15	
T7	150	---	

Unit: ms.



Item	Min.	Max.	Note
T8	100	---	
T9	0	---	
T10	16	---	
T11	16	---	
T12	(1000)	---	

Unit: ms.

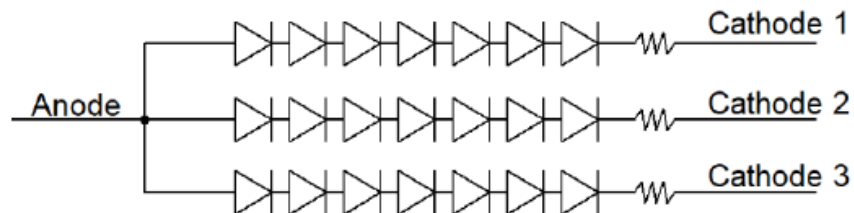
2.7 Backlight Unit

Parameter	Symbol	Min	Typ	Max	Units	Condition
LED Current	I_L	--	210	--	mA	$T_a=25^{\circ}\text{C}$
LED Voltage	V_F	--	--	23.8	Volt	$T_a=25^{\circ}\text{C}$
LED Life-Time	N/A	20,000	--	--	Hour	$T_a=25^{\circ}\text{C}$ Note (2)

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: $T_a=25\pm3^{\circ}\text{C}$, typical I_L value indicated in the above table until the brightness becomes less than 50%.

Note (2) The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}\text{C}$. and $I_L=210\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 210mA. The constant current driving method is suggested.

Note (3) LED Light Bar Circuit

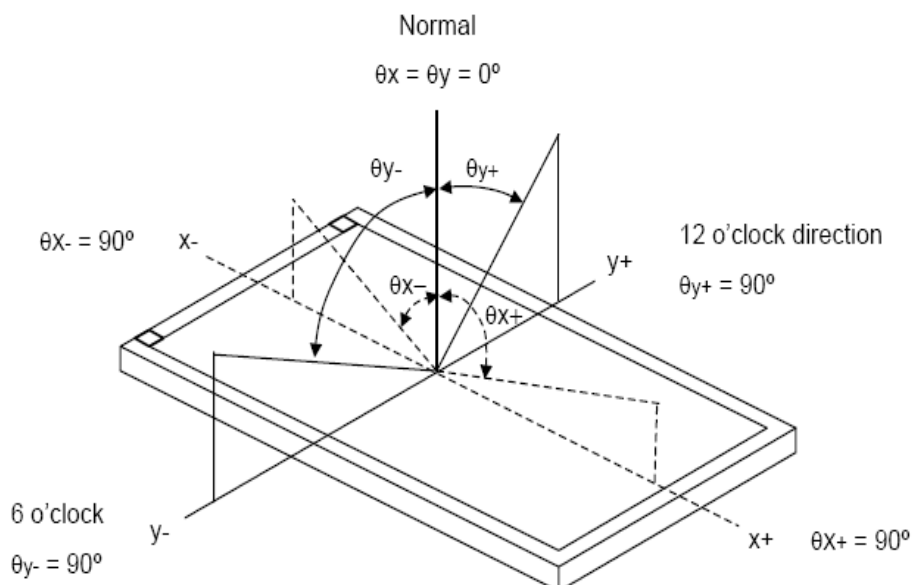


3 Optical Specification

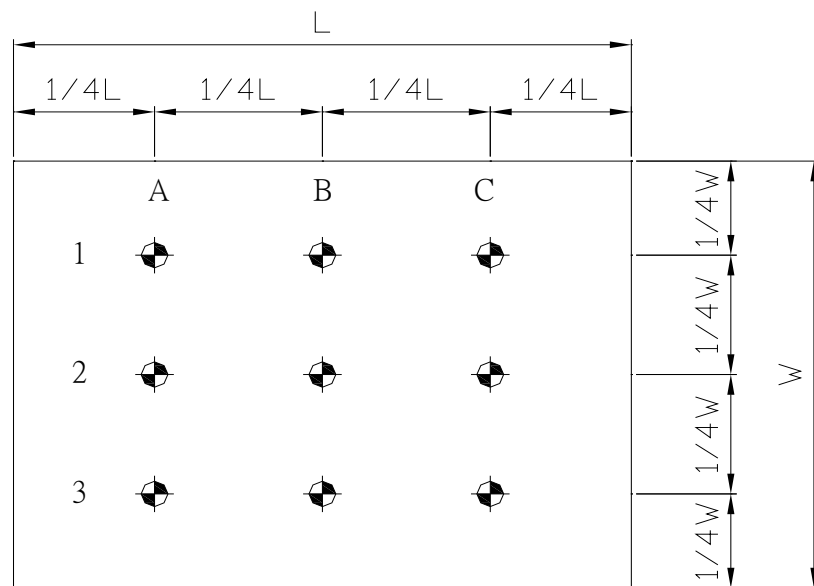
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	R _x	$\theta_x=0$ $\theta_y=0$ Klein K-10	0.616	0.646	0.676	-	Test Mode: (1) (2) (3)
		R _y		0.299	0.329	0.359	-	
	Green	G _x		0.239	0.269	0.299	-	
		G _y		0.587	0.617	0.647	-	
	Blue	B _x		0.116	0.146	0.176	-	
		B _y		0.022	0.052	0.082	-	
	White	W _x		0.248	0.278	0.308	-	
		W _y		0.268	0.298	0.328	-	
Center Luminance of White		L _c	$\theta_x=0$		1000		cd/m ²	
Uniform		L _u	$\theta_y=0$ BM-7		90		%	
Contrast Ratio		CR	$\theta_x=0$		860:1		-	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):

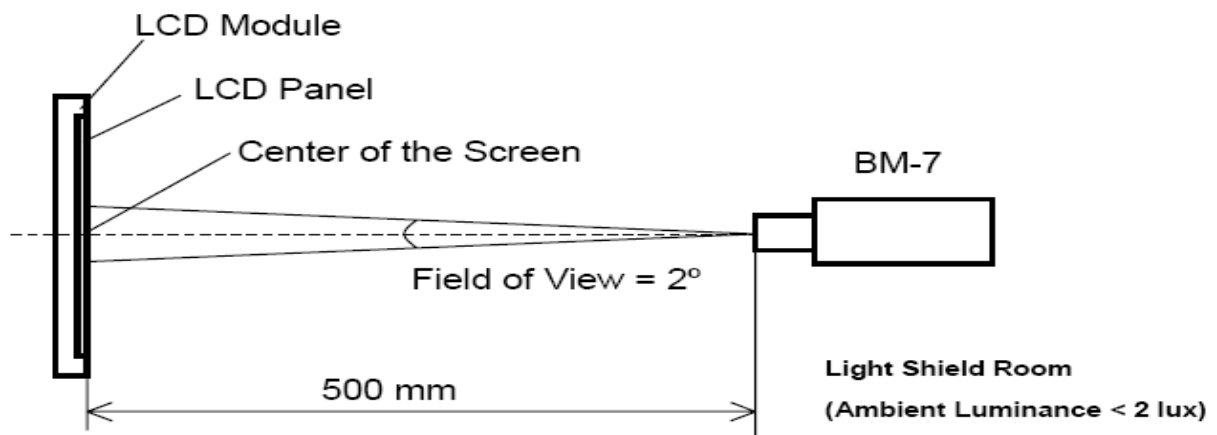


(2) Definition of Test Point:

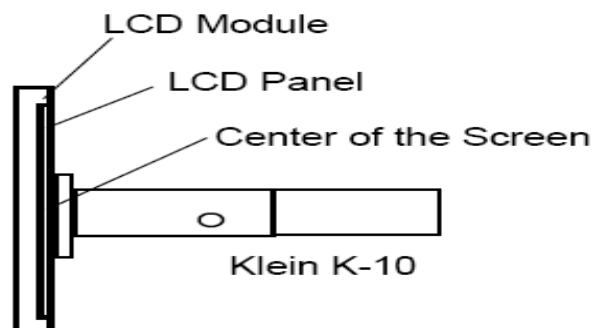


Active Area

(3) BM-7 Measurement Setup:

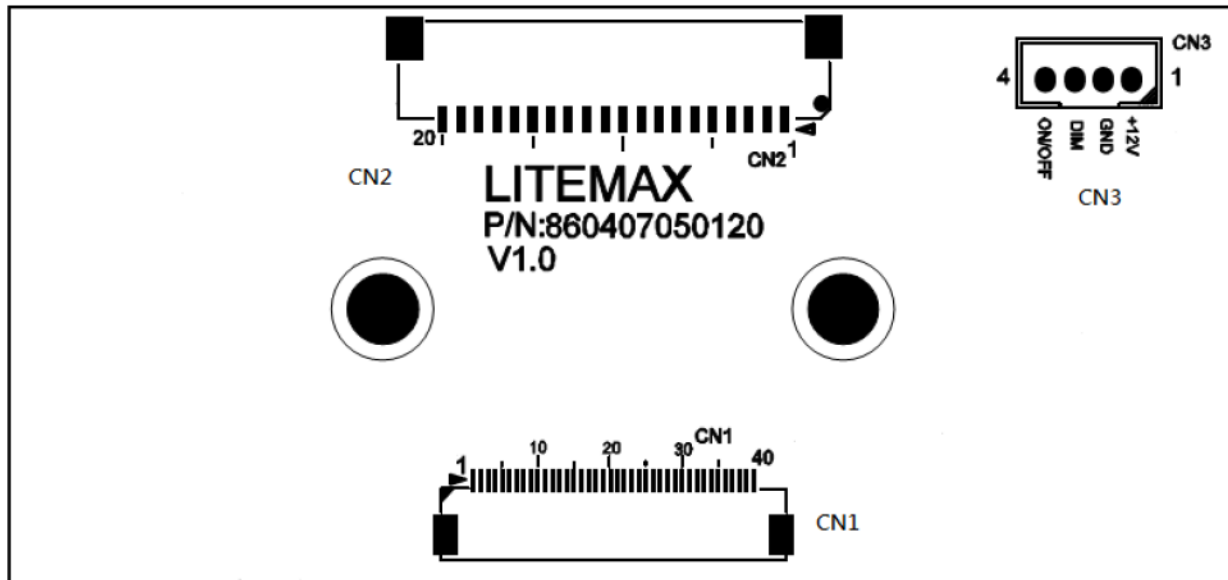


(4) Klein K-10 Measurement Setup:



4 LVDS Bias Converter PCB Specifications

4.1 Dimension:85mm(L) x 40mm



4.2 Pin Define:

CN2: LVDS Connector(To A/D Board PCB)

Pin NO.	Function	Pin NO.	Function
1	Vdd(5V)	2	Vdd(5V)
3	Vdd(5V)	4	GND
5	Rx0-	6	Rx0+
7	GND	8	Rx1-
9	Rx1+	10	GND
11	Rx2-	12	Rx2+
13	GND	14	RxCLK-
15	RxCLK+	16	GND
17	Rx3-	18	Rx3+
19	NC	20	NC

CN1:Panel Connector (To 7"Panel-FPC 0.5mm Connector 40P)

Pin NO.	Function	Pin NO.	Function
1	VLED	2	VLED
3	VLED	4	NC
5	VLED-	6	VLED-
7	VLED-	8	NC
9	NC	10	VCOM(5.5V)
11	AVDD(12.5V)	12	Vcc(3.3V)
13	Vcc(3.3V)	14	GND
15	GND	16	VGH(19V)
17	VGL(-10V)	18	STBYB(NOTE1)
19	SHLR(NOTE2)	20	UPDN(NOTE2)
21	GND	22	RX3+
23	RX3-	24	GND
25	RXCK+	26	RXCK-
27	GND	28	RX2+
29	RX2-	30	GND
31	RX1+	32	RX1-
33	GND	34	RX0+
35	RX0-	36	GND
37	RST(Reset)	38	GND
39	NC	40	GND

NOTE 1:STBYB Control Function

SELB	Function
1	Normal Operation.
0	The Controller And Source Driver Will Turn OFF.

NOTE 2:U/D And L/R Are Control Function

SHLR	Function
0	Right→Left
1	Left→Right
UPDN	
1	Up→Down
0	Down→Up

CN3: LED Control Connector (To A/D Board PCB)—Original Screen Use

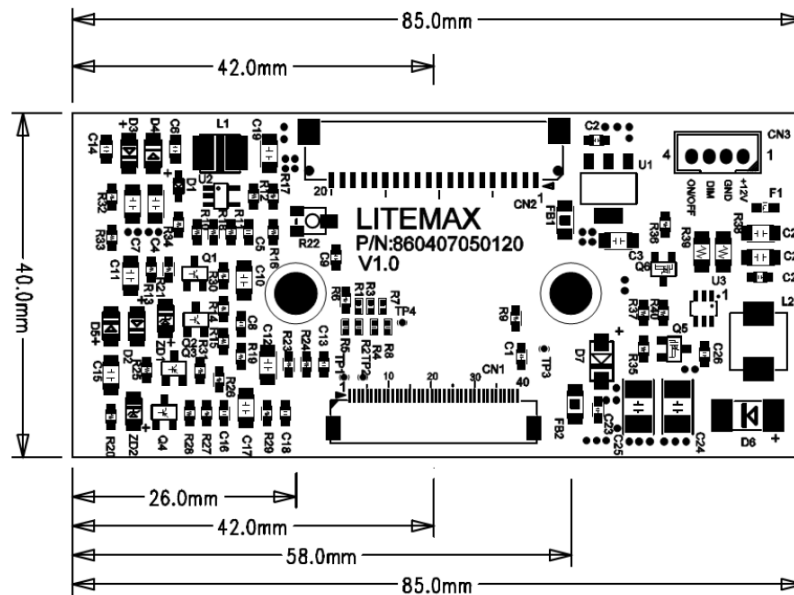
Pin NO.	Function	Pin NO.	Function
1	12V	2	GND
3	DIM(PWM)	4	ON/OFF

NOTE: (1)ADJ Signal=0~3.3V,PWM Operation Frequency=1KHz---100KHz

4.3 Mechanical Characteristics

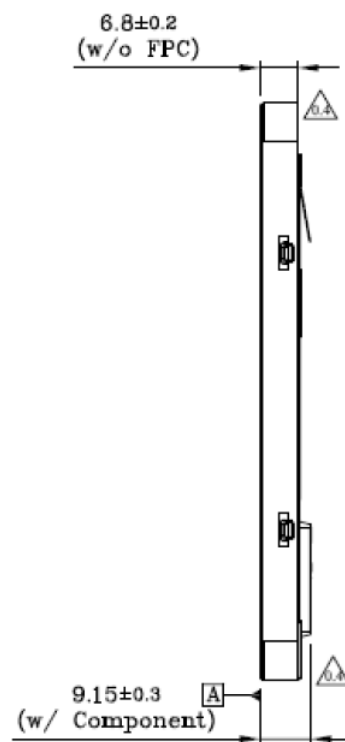
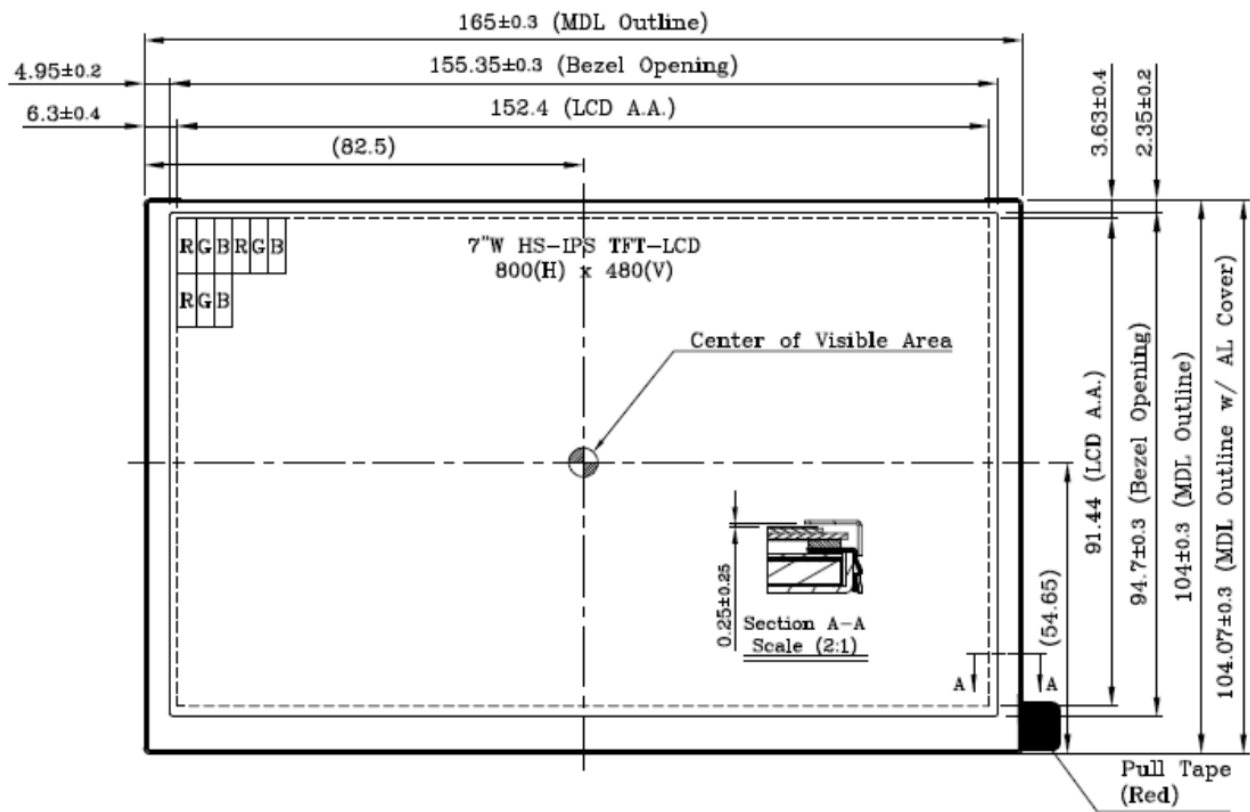
Dimension: 85mm*40mm

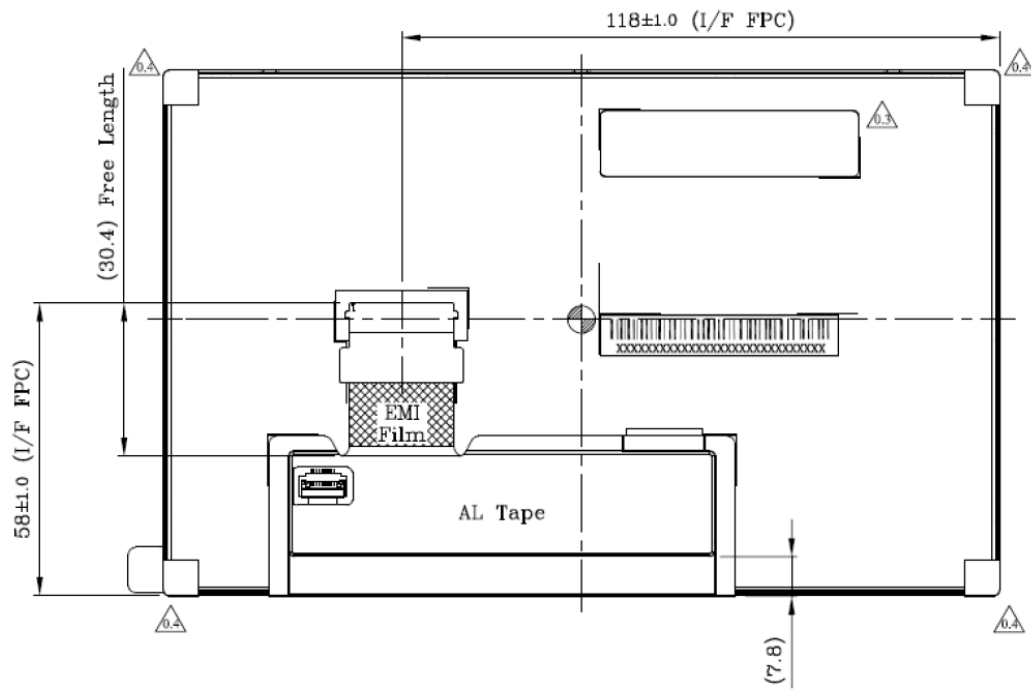
Dimension : 85mm(L) x 40mm(W)



5 Mechanical Drawing

Unit:mm





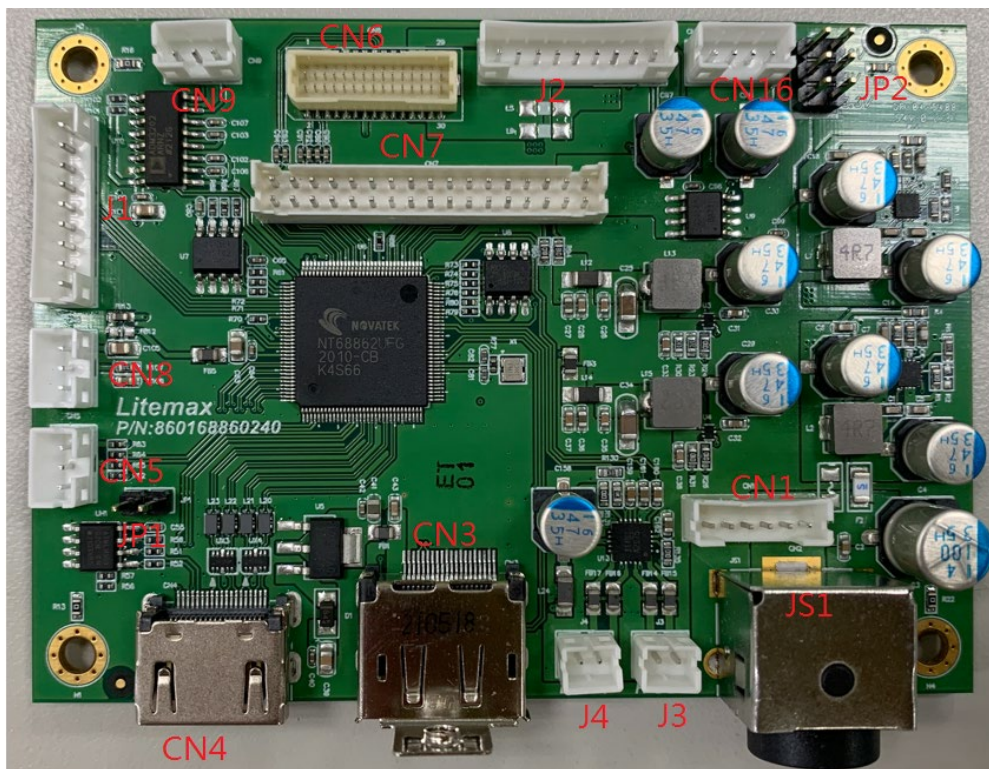
Notes :
General tolerance: $\pm 0.3\text{mm}$

6 AD68862HP Board & OSD Functions

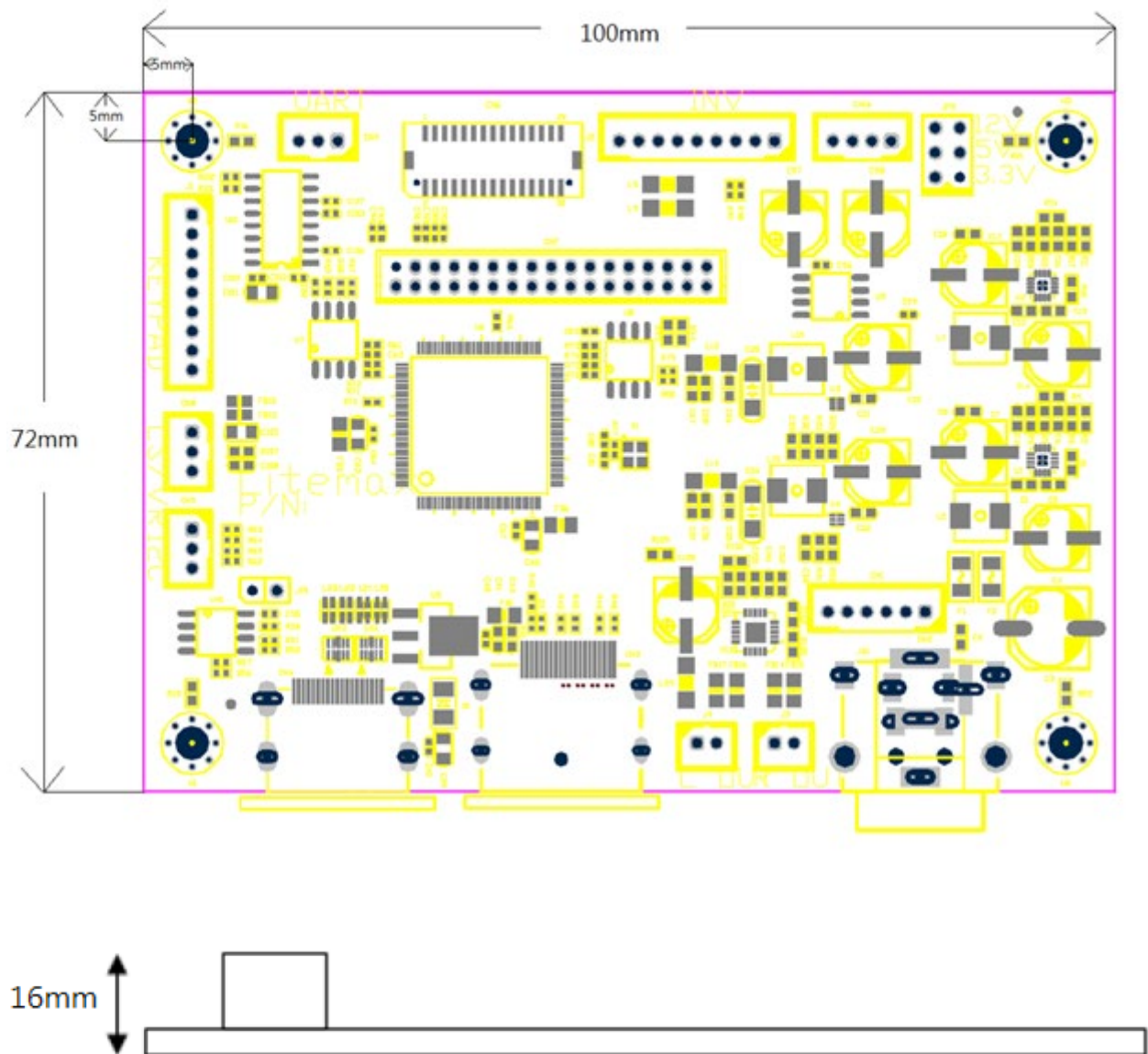
We developed this A/D board to support industrial high brightness and commercial applications. This A/D board has many functions. It has a HDMI and Display Port input. Rev.1 is European RoHS compliant.

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)

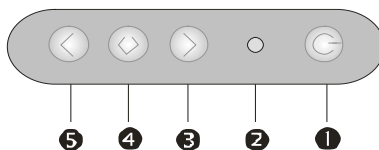
Pin	Function	Pin	Function
1	ROUTP	2	ROUTN

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.

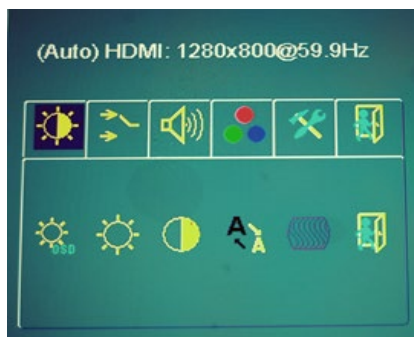
5. Return & Exit the main menu

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)

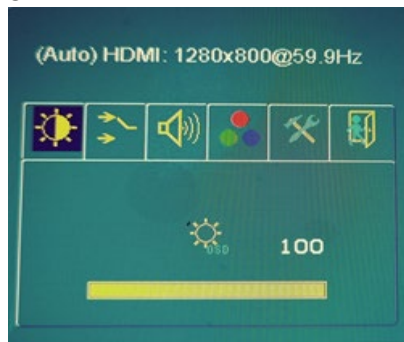
press this Icon, must to accompany with Litemax ambient light sensor to auto dimming.





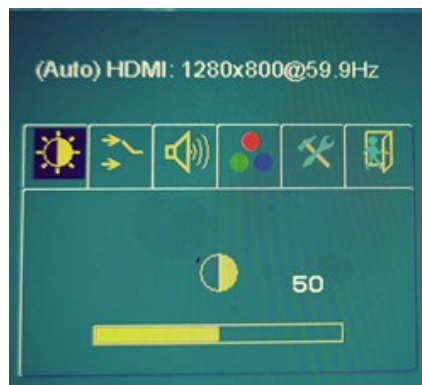
OSD Brightness :

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”



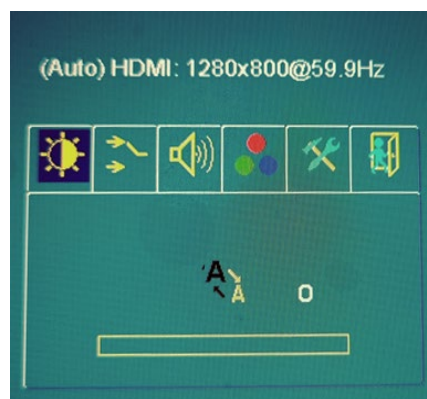
Contrast :

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



Sharpness :

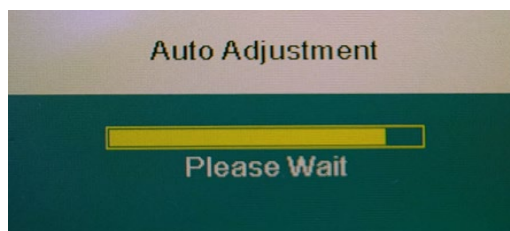
Press “Menu” once, you can adjust the Sharpness from “0” to “4” by pressing the “Left” and “Right”.





Auto Tune : (VGA only)

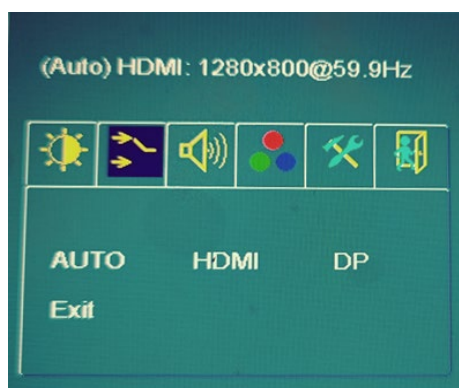
Press “Menu” once, you can activate the Auto Tune.



Exit: Back to the beginning menu.



Input Signal: (default auto detect)



AUTO

AUTO: Auto detect

HDMI

HDMI: HDMI input

DP

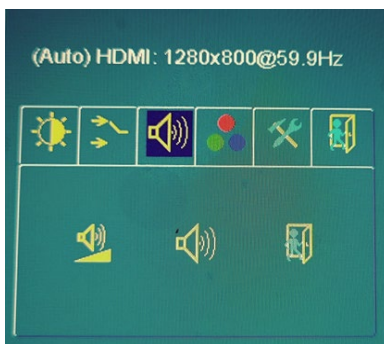
DP: DisplayPort input

Exit

Exit: Back to the beginning menu.



Audio:



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



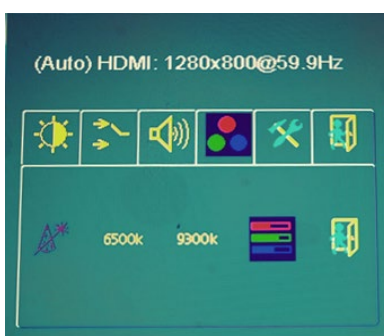
UnMute/Mute: You can mute the speaker by pressing this option.



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.



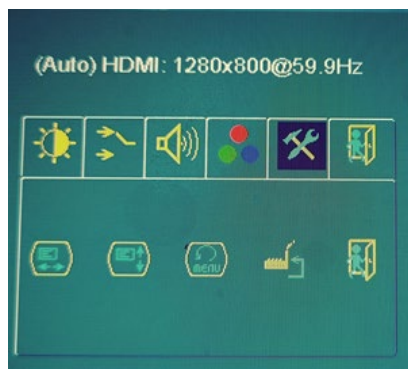
Color Temperature User Define: Default is 100 for “R”, “G”, and “B”. Range is “0” to “255”.



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).



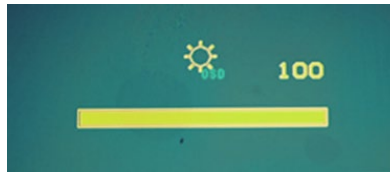
Load Default: You can load the default data using this function.



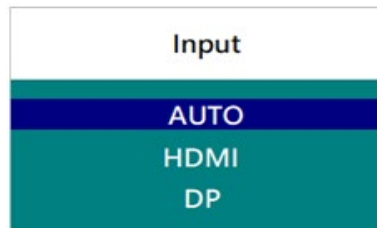
Exit: Back to the beginning menu.

< Hot Key >

Left click to display brightness adjustment.

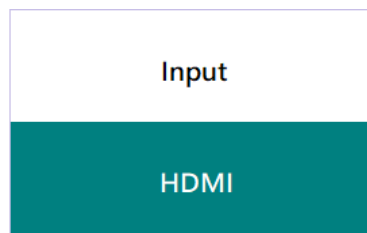


Right click to display Input Source Menu.



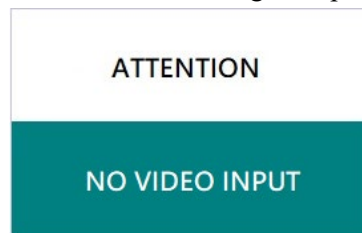
<Others>

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



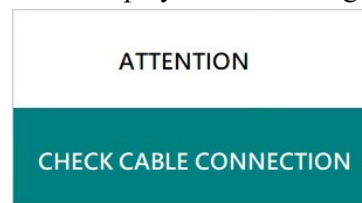
(Signal Information)

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.