



LITEMAX

UL02703-KHT
27" 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
Dec/18/2025	all		Initial release	

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1 General Description

The **ULO2703-KHT** is a 27 inch industrial grade LCD, with brightness **500 nits**, it produces sharp images, crisp text and lifelike colors. The Ubipixel 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

- Projected capacitive touch
- Brightness 500nits
- Resolutions: 1920 x 1080
- LED Backlight
- Aspect ratio of 16:9
- Low power consumption
- BL MTBF: 30,000 hours

1.2 General Specifications

Model Name	ULO2703-KHT
Description	27" TFT LCD, 500 nits LED Backlight, 1920 x 1080, Projected Capacitive Touch
Screen Size	27"
Display Area (mm)	597.89(H) x 336.31(V)
Brightness	500 cd/m ²
Resolution	1920x1080
Aspect Ratio	16:9
Contrast Ratio	1000:1
Pixel Pitch (mm)	0.3114(H) x 0.3114(V)
Pixel Per Inch (PPI)	82
Viewing Angle	178°(H),178°(V)
Color Saturation (NTSC)	83%
Display Colors	16.7M
Response Time (Typical)	14ms
Panel Interface	LVDS
Input Interface	HDMI, DP
Input Power	DC12V
Touch Interface	USB
Power Consumption	26W
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Tuning, H/V Position...etc
Dimensions (mm)	658.6(W) x 396.6 (H) x 54.4(D)
Bezel Size(U/B/L/R)	30.2/30.2/30.4/30.4 mm
Weight (Net)	8.7 kg
Mounting	75x75, 100x100mm
Operating Temperature	0 °C ~ 50 °C
Storage Temperature	-20 °C ~ 60 °C

ULO= Panel + LED Driving Board + AD Control Board + Housing + PCAP Touch

1.3 Absolute Maximum Ratings

Absolute Electrical Ratings

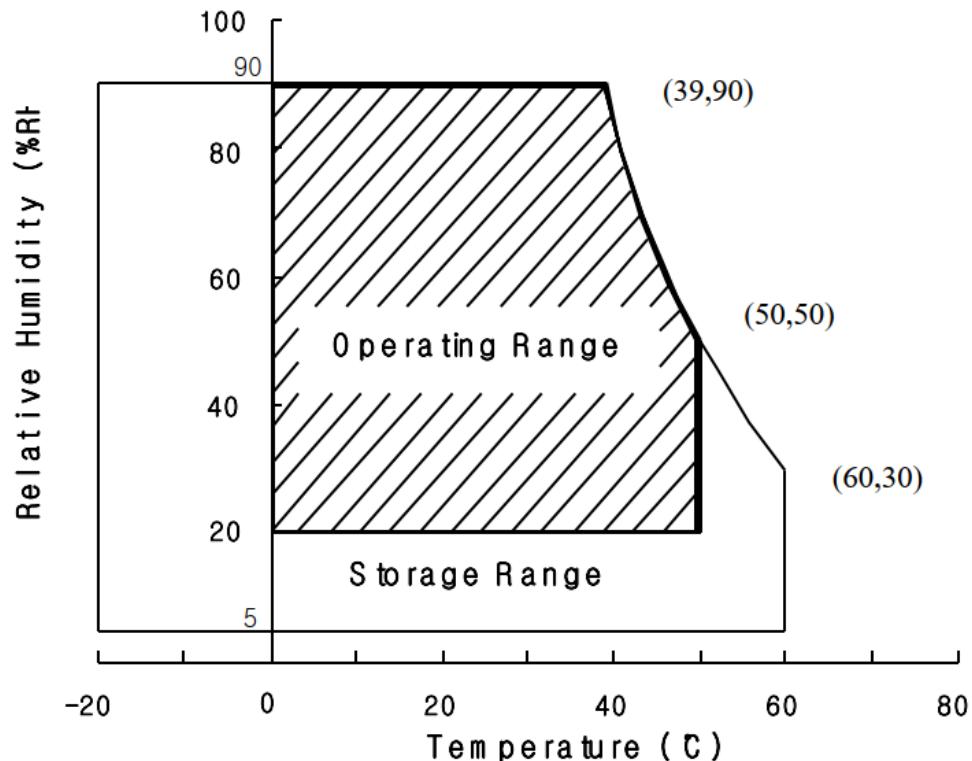
The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table down below.

<Table. Absolute Maximum Ratings>

[VSS=GND=0V]

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	V_{DD}	GND-0.3	6	V	
Logic Supply Voltage	V_{IN}	VSS-0.3	$V_{DD}+0.3$	V	T _a = 25 °C
Operating Temperature	T _{OP}	0	+50	°C	1)
Storage Temperature	T _{ST}	-20	+60	°C	1)

Note1: Temperature and relative humidity range are shown in the figure below.
Wet bulb temperature should be 39°C max. and no condensation of water.



2 Electrical Specifications

2.1 Electrical Characteristics

< Table. Electrical specifications >

[Ta = 25 ± 2°C]

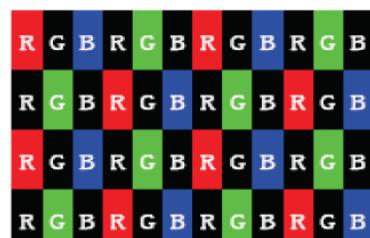
Parameter		Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	V _{DD}	4.5	5	5.5	V	Note1
Power Supply Current	I _{DD}	-	640	960	mA	
In-Rush Current	I _{RUSH}	-	-	4.0	A	Note 2
Permissible Input Ripple Voltage	V _{RF}	-	-	400	mV	Note1,3
High Level Differential Input Threshold Voltage	V _{IH}	+100	-	+300	mV	
Low Level Differential Input Threshold Voltage	V _{IL}	-300	-	-100	mV	
Differential input voltage	V _{ID}	200	-	600	mV	
Differential input common mode voltage	V _{cm}	1.0	1.2	1.5		V _{IH} =100mV, V _{IL} =-100mV
Power Consumption	P _D	-	3.2	5.3	W	

Notes:

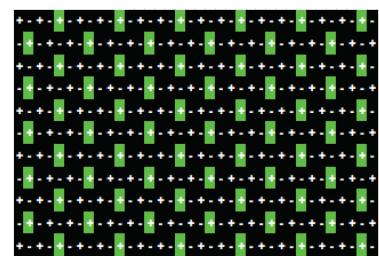
1. The supply voltage is measured and specified at the interface connector of LCM. The current draw and power consumption specified is for VDD=5.0V, frame rate=75Hz Clock frequency = 74.3MHz. Test Pattern of power supply current.
 - a) Typ: Color Test
 - b) Max: Skip Subpixel255
 - c) Flicker Pattern



(a)



(b)



(c)

2. Duration of rush current is about 2ms and rising time of VDD is 520µs±20%
3. Ripple Voltage should be covered by Input voltage Spec.
4. Calculated value for reference (Input pins*VPIN*IPIN) excluding inverter loss.

2.2 Interface Connection

Electrical Interface Connection

CN1 Module Side Connector: MSBKT2407P30HC

Pin No	Symbol	Function	Remark
1	RXO0N	Negative LVDS differential data input	
2	RXO0P	Positive LVDS differential data input	
3	RXO1N	Negative LVDS differential data input	
4	RXO1P	Positive LVDS differential data input	
5	RXO2N	Negative LVDS differential data input	
6	RXO2P	Positive LVDS differential data input	
7	BIST	BIST	
8	RXOCN-	Negative LVDS differential clock input	
9	RXOCP	Positive LVDS differential clock input	
10	RXO3N	Negative LVDS differential data input	
11	RXO3P	Positive LVDS differential data input	
12	RXE0N	Negative LVDS differential data input	
13	RXE0P	Positive LVDS differential data input	
14	GND	Ground	
15	RXE1N	Negative LVDS differential data input	
16	RXE1P	Positive LVDS differential data input	
17	GND	Ground	
18	RXE2N	Negative LVDS differential data input	
19	RXE2P	Positive LVDS differential data input	
20	RXECN	Negative LVDS differential clock input	
21	RXECP	Positive LVDS differential clock input	
22	RXE3N	Negative LVDS differential data input	
23	RXE3P	Positive LVDS differential data input	
24	GND	Ground	
25	SDA	I2C Data (For VCOM tuning)	
26	SCL	I2C Clock (For VCOM tuning)	
27	NC	NC	
28	VIN	Power Supply 5V	
29	VIN	Power Supply 5V	
30	VIN	Power Supply 5V	

LVDS Interface (Tx; THC63LVDF83A or Equivalent)

	Input Signal	Transmitter		Interface		ULF_ULH_ULO2703-K (CN1)	Remark
		Pin No.	Pin No.	System (Tx)	TFT-LCD (Rx)		
LVDS	OR0	51	48 47	OUT0- OUT0+	RXO0- RXO0+	2	
	OR1	52					
	OR2	54	46 45	OUT1- OUT1+	RXO1- RXO1+	3 4	
	OR3	55					
	OR4	56	42 41	OUT2- OUT2+	RXO2- RXO2+	5 6	
	OR5	3					
	OG0	4	38 37	OUT3- OUT3+	RXO3- RXO3+	10 11	
	OG1	6					
	OG2	7	40 39	CLK OUT- CLK OUT+	RXO CLK- RXO CLK+	8 9	
	OG3	11					
	OG4	12	42 41	OUT2- OUT2+	RXO2- RXO2+	5 6	
	OG5	14					
	OB0	15	38 37	OUT3- OUT3+	RXO3- RXO3+	10 11	
	OB1	19					
	OB2	20	40 39	CLK OUT- CLK OUT+	RXO CLK- RXO CLK+	8 9	
	OB3	22					
	OB4	23	38 37	OUT3- OUT3+	RXO3- RXO3+	10 11	
	OB5	24					
	Hsync	27	40 39	CLK OUT- CLK OUT+	RXO CLK- RXO CLK+	8 9	
	Vsync	28					
	DE	30	40 39	CLK OUT- CLK OUT+	RXO CLK- RXO CLK+	8 9	
	MCLK	31					
	OR6	50	38 37	OUT3- OUT3+	RXO3- RXO3+	10 11	
	OR7	2					
	OG6	8	40 39	CLK OUT- CLK OUT+	RXO CLK- RXO CLK+	8 9	
	OG7	10					
	OB6	16	40 39	CLK OUT- CLK OUT+	RXO CLK- RXO CLK+	8 9	
	OB7	18					
	RSVD	25	40 39	CLK OUT- CLK OUT+	RXO CLK- RXO CLK+	8 9	

Note: The order of even data is the same with old data.

2.3 Signal Timing Specification

The M270B96-202-1404 is operated by the DE (Display Enable) only.

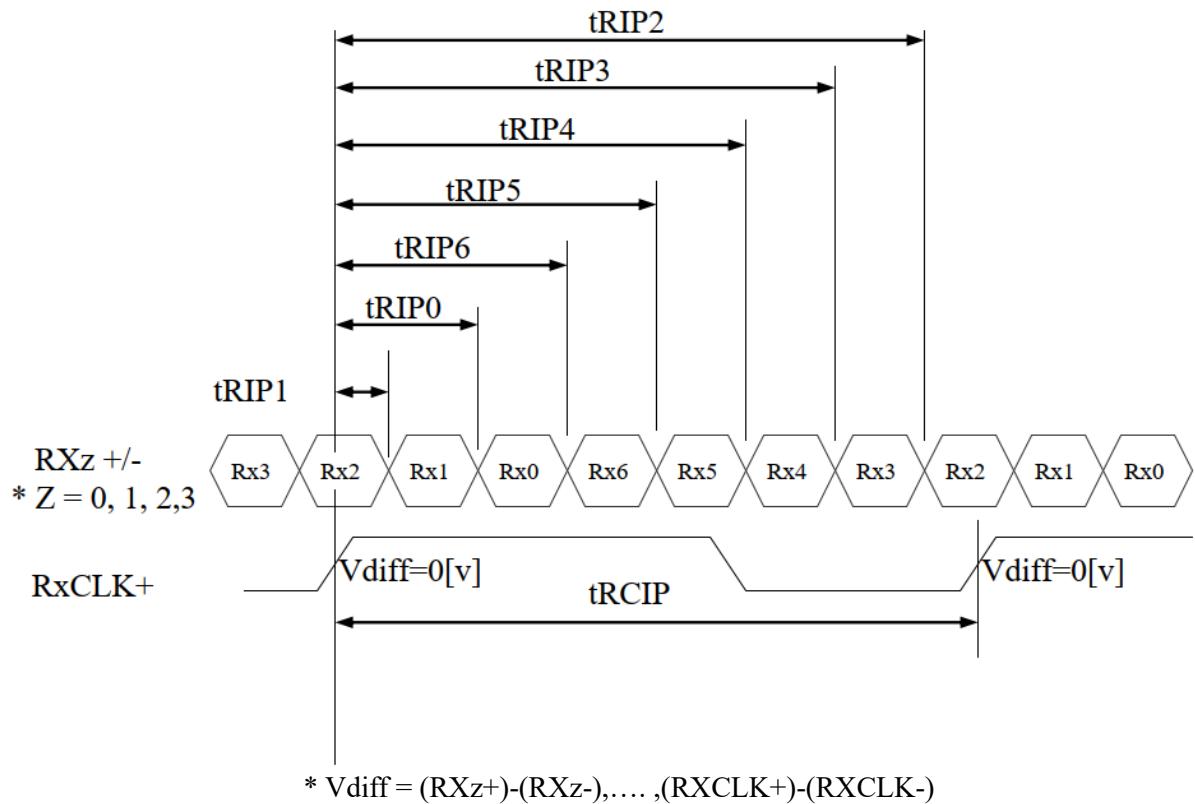
Item	Symbols		Min	Typ	Max	Unit	Note
DCLK	Period	tCLK	11	13.8	18	ns	
	Frequency	fCLK	54.3	72.4	90	MHz	
Hsync	Period	tHP	1020	1073	1120	tCLK	
	Horizontal Valid	tHV	960	960	960	tCLK	
	Horizontal Blank	tHB	50	113	160	tCLK	
	Frequency	fH	53.2	67.5	147.3	KHz	=tVP*fV
Vsync	Period	tVP	1110	1126	1965	tHP	
	Vertical Valid	tVV	1080	1080	1080	tHP	
	Vertical Blank	tVB	30	46	885	tHP	
	Frequency	fV	48	60	75	Hz	
LVDS Receiver clock	Input spread spectrum ratio	SSr	-3%	-	+3%	%	

LVDS Rx Interface Timing Parameter

The specification of the LVDS Rx interface timing parameter is shown in Table down below.

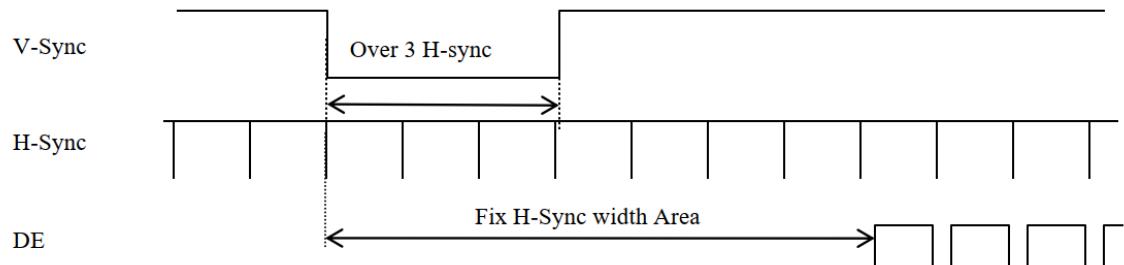
<Table. LVDS Rx Interface Timing Specification>

Item	Symbol	Min	Typ	Max	Unit	Remark
CLKIN Period	tRCIP	11.9	12.9	15.6	nsec	
Input Data 0	tRIP1	-0.4	0.0	+0.4	nsec	
Input Data 1	tRIP0	tRCIP/7-0.4	tRCIP/7	tRCIP/7+0.4	nsec	
Input Data 2	tRIP6	$2 \times tRCIP/7-0.4$	$2 \times tRCIP/7$	$2 \times tRCIP/7+0.4$	nsec	
Input Data 3	tRIP5	$3 \times tRCIP/7-0.4$	$3 \times tRCIP/7$	$3 \times tRCIP/7+0.4$	nsec	
Input Data 4	tRIP4	$4 \times tRCIP/7-0.4$	$4 \times tRCIP/7$	$4 \times tRCIP/7+0.4$	nsec	
Input Data 5	tRIP3	$5 \times tRCIP/7-0.4$	$5 \times tRCIP/7$	$5 \times tRCIP/7+0.4$	nsec	
Input Data 6	tRIP2	$6 \times tRCIP/7-0.4$	$6 \times tRCIP/7$	$6 \times tRCIP/7+0.4$	nsec	



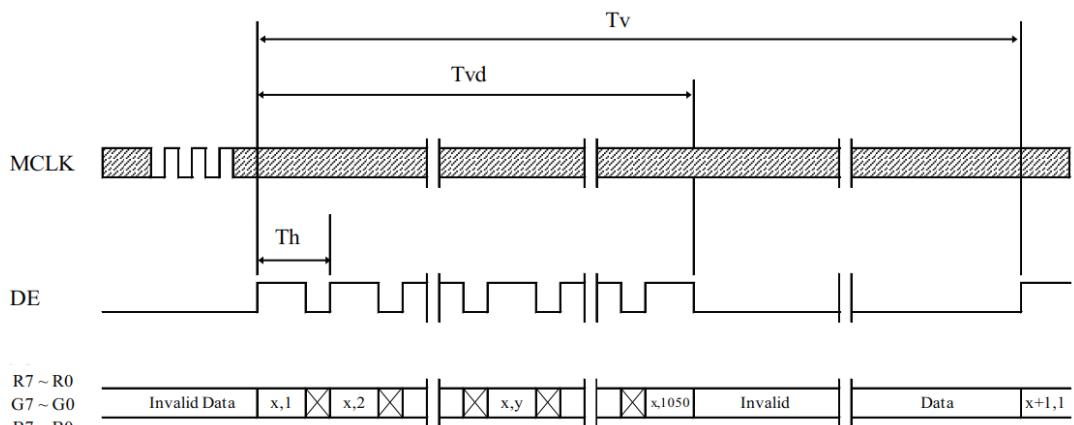
2.4 Signal Timing Waveforms of Interface Signal

Sync Timing Waveforms

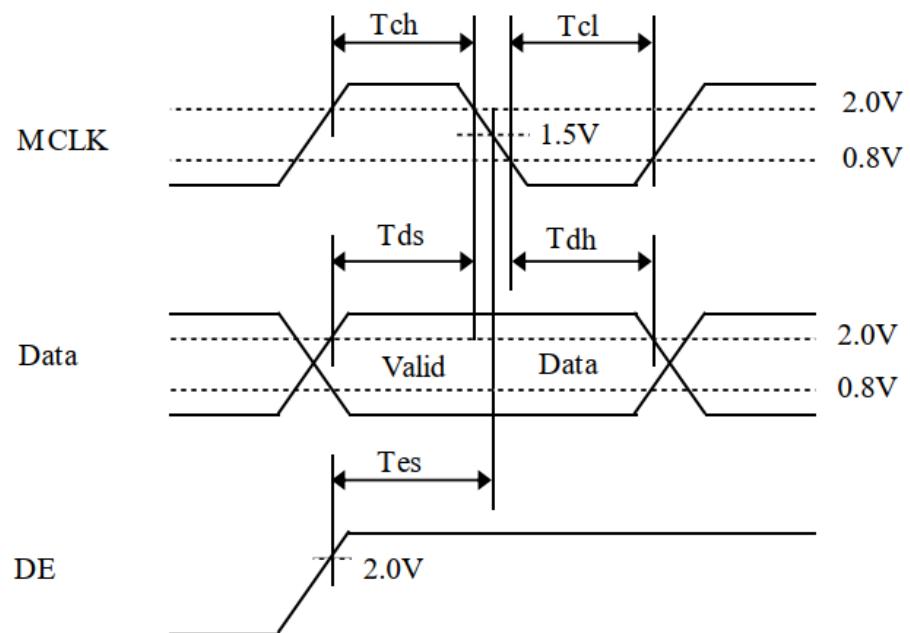
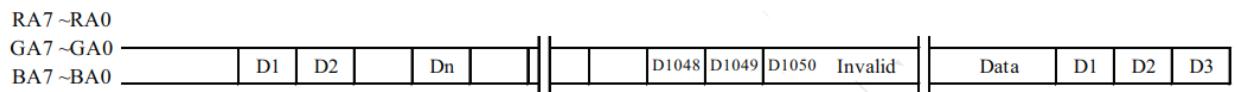
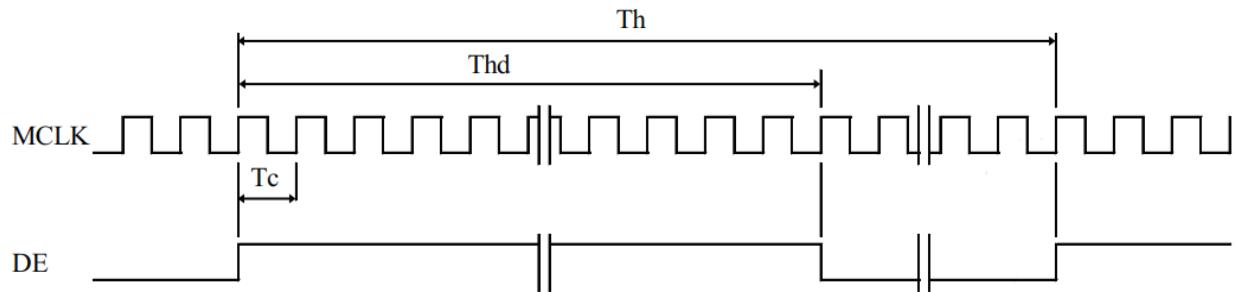


- (1.) Need over 3 H-sync during V-Sync Low
- (2.) Fix H-Sync width from V-Sync falling edge to first rising edge

Vertical Timing Waveforms



Horizontal Timing Waveforms

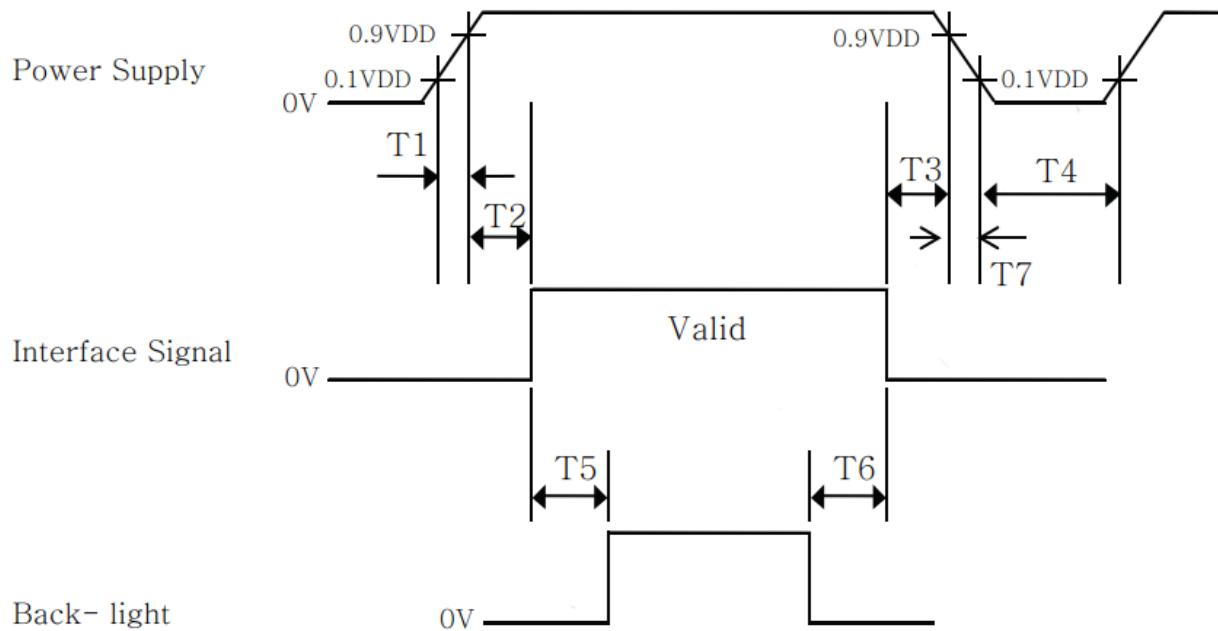


2.5 Input Signals, Basic Display Colors & Gray Scale of Colors

Color & Gray Scale		RED DATA								GREEN DATA								BLUE DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of RED	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of GREEN	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0
	▽	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of BLUE	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of WHITE	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
	▽	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

2.6 Power Sequence

To prevent a latch-up or DC operation of the LCD module, the power on/off sequence shall be as shown in below.



- $0.5 \text{ ms} \leq T1 \leq 10 \text{ ms}$
- $0 \text{ ms} \leq T2 \leq 50 \text{ ms}$
- $0 \text{ ms} < T3 \leq 50 \text{ ms}$
- $1 \text{ sec} \leq T4$
- $200 \text{ ms} \leq T5$
- $200 \text{ ms} \leq T6$

Notes:

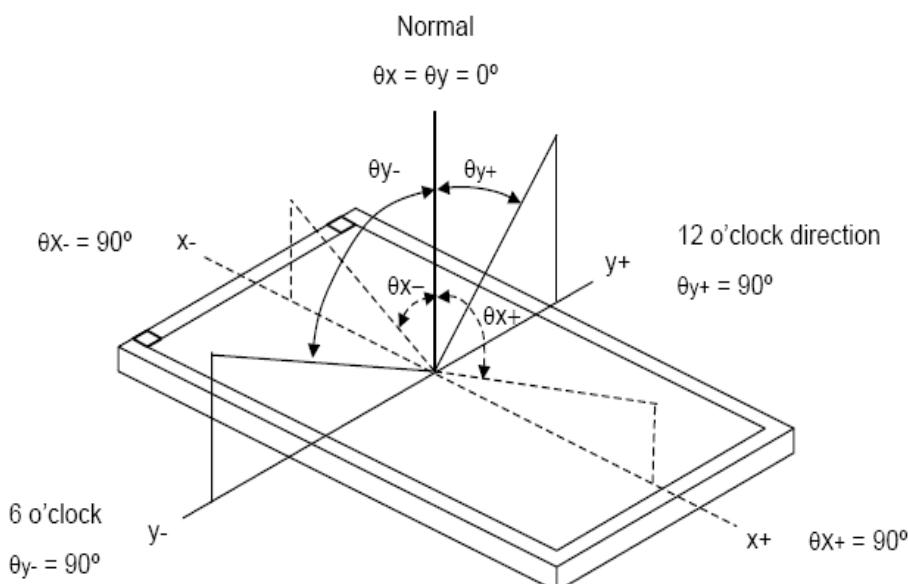
1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on.
3. Back Light must be turn on after power for logic and interface signal are valid.
4. T7 decreases smoothly, there is none re-bouncing voltage.

3 Optical Specification

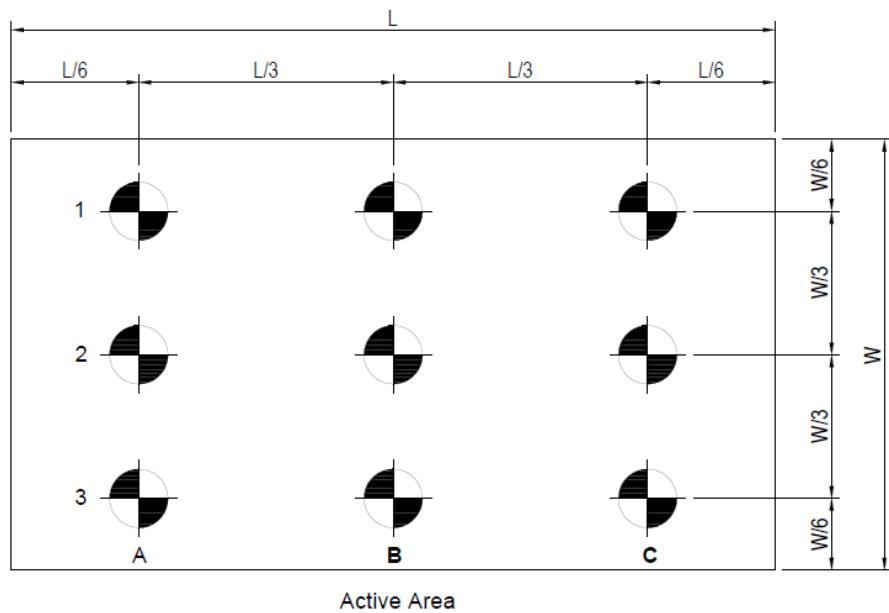
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Color chromaticity	Red	θx=0 θy=0 CA-410	0.615	0.645	0.675	-	Test Mode: (2) (3)	
			0.313	0.343	0.373	-		
	Green		0.280	0.310	0.340	-		
			0.596	0.626	0.656	-		
	Blue		0.122	0.152	0.182	-		
			0.039	0.069	0.099	-		
	White		0.273	0.303	0.333	-		
			0.322	0.352	0.382	-		
Center Luminance of White	Lc	θx=0 θy=0 CA-410	450	500	650	cd/m ²	Test Mode: (4)	
Uniform	Lu			82		%		
Contrast Ratio	CR	θx=0 θy=0 Klein K-10	900:1	1000:1		-		
Color Saturation	NTSC			83		%		
Viewing Angle	Horizontal	CR ≥ 10	θx+	89			Test Mode: (1)	
			θx-	89				
	Vertical		θy+	89				
			θy-	89				
						Deg		

Test Mode :

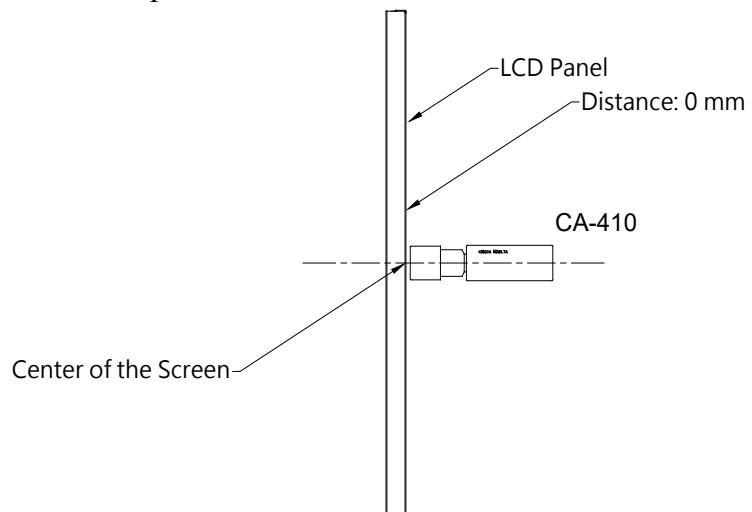
(1) Definition of Viewing Angle (θ_x , θ_y):



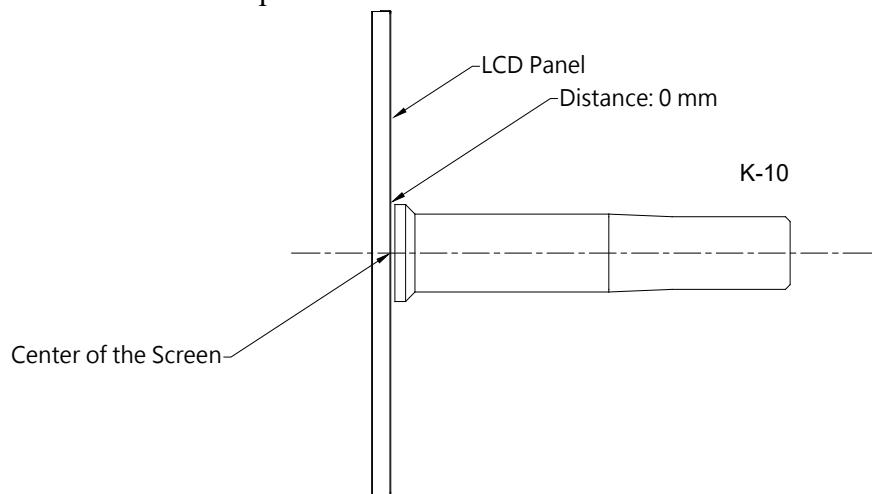
(2) Definition of Test Point:



(3) CA-410 Measurement Setup:



(4) Klein K-10 Measurement Setup:



4 LED Driving Board Electrical Specifications

This specification is applied to LED converter unit for ULO2703 500nits LED backlight.

4.1 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%	2.2	1.8	1.4	A	(1)
Input Power Consumption	P _{in}	Brightness = 100%	-----	21.6	-----	W	
LED Current (High Brightness)	I _{outH}	Brightness = 100%	-----	0.56	-----	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%	-----	35.8	-----	V	
Efficiency	η	Brightness = 100%	-----	92.8	-----	%	(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) $\eta_{\text{max}} = V_{\text{out(max)}} * I_{\text{outH(max)}} / V_{\text{in(max)}} * I_{\text{inH(min)}}$
 $\eta_{\text{min}} = V_{\text{out(min)}} * I_{\text{outH(min)}} / V_{\text{in(min)}} * I_{\text{inH(max)}}$

4.2 Connector Pin Assignment

1. 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

Note: Pin 9 is dimming method control pin, Low→DC dimming, High→PWM dimming.
If pin 9 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 (-)

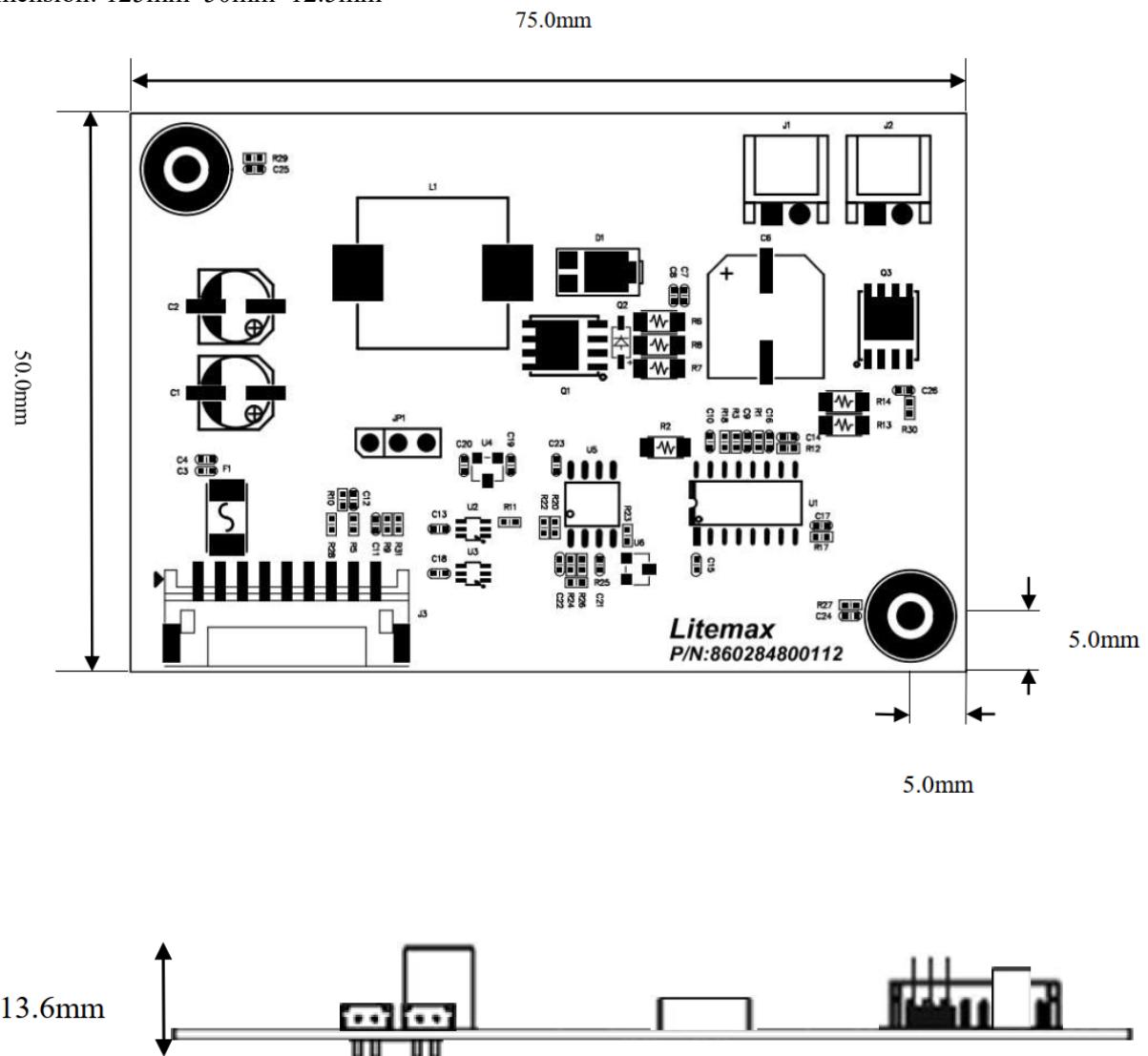
3. DC or PWM Connector: JP1

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 pin 9 of J3.

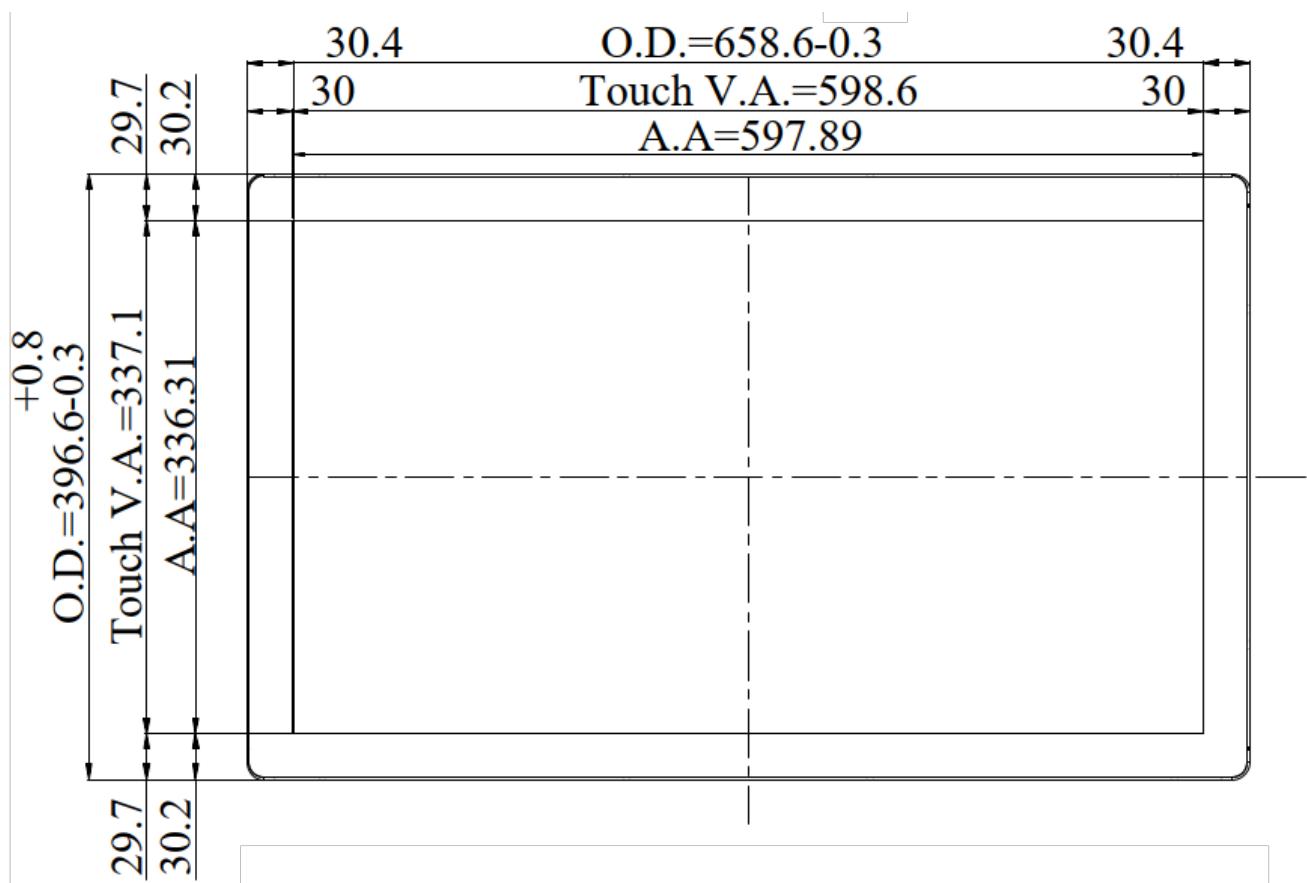
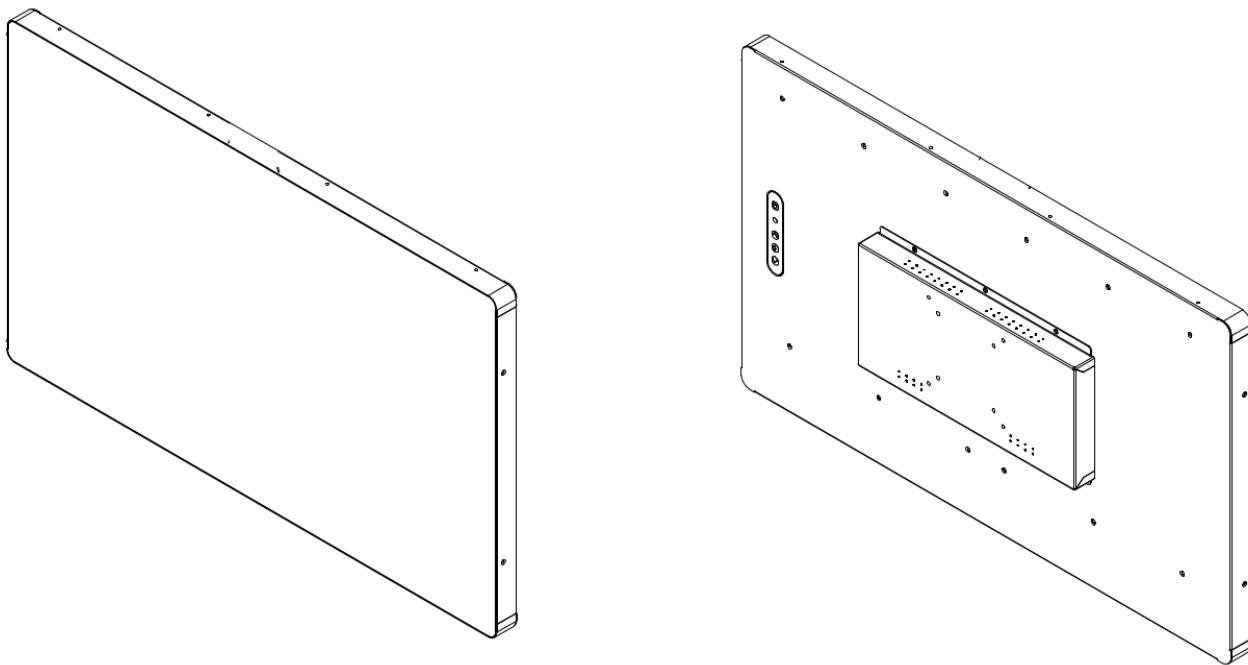
4.3 LED Driving Board Mechanical Characteristics

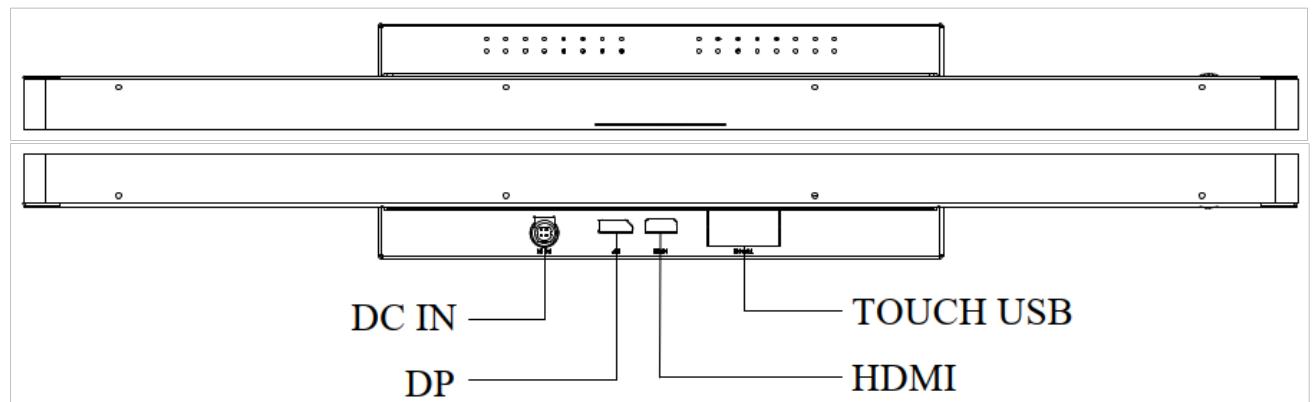
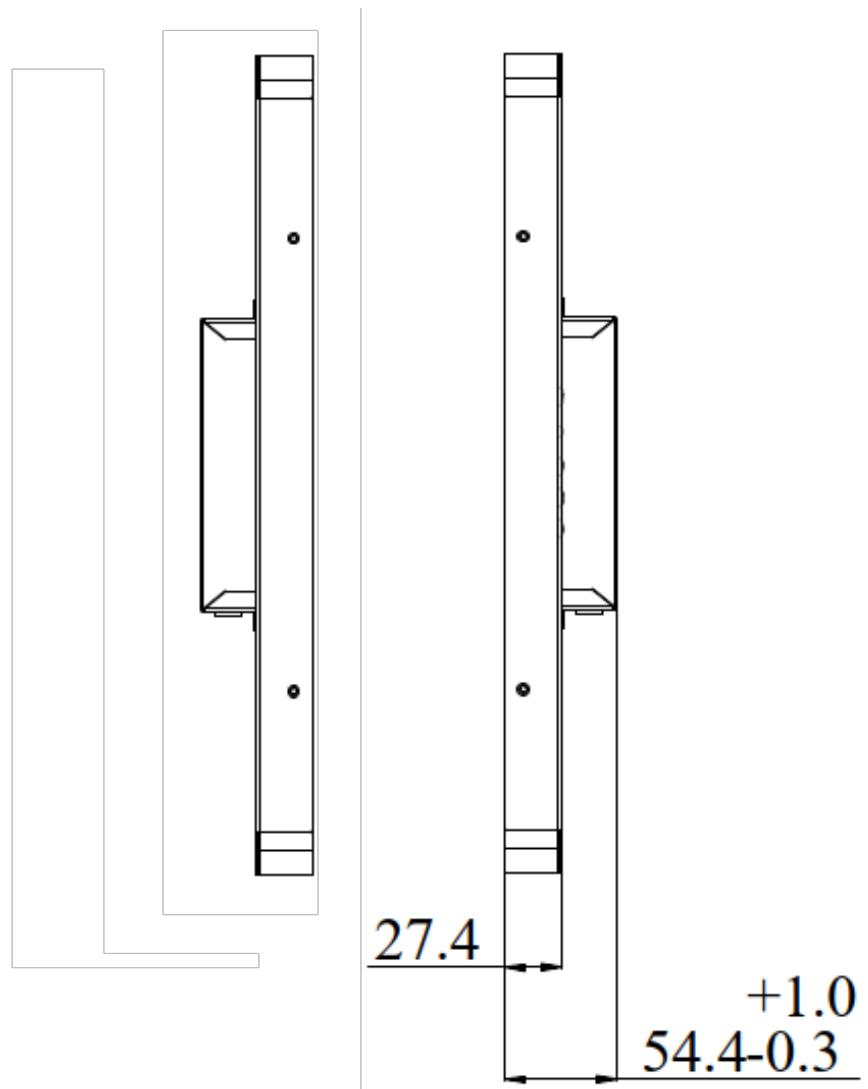
Dimension: 125mm*50mm*12.5mm

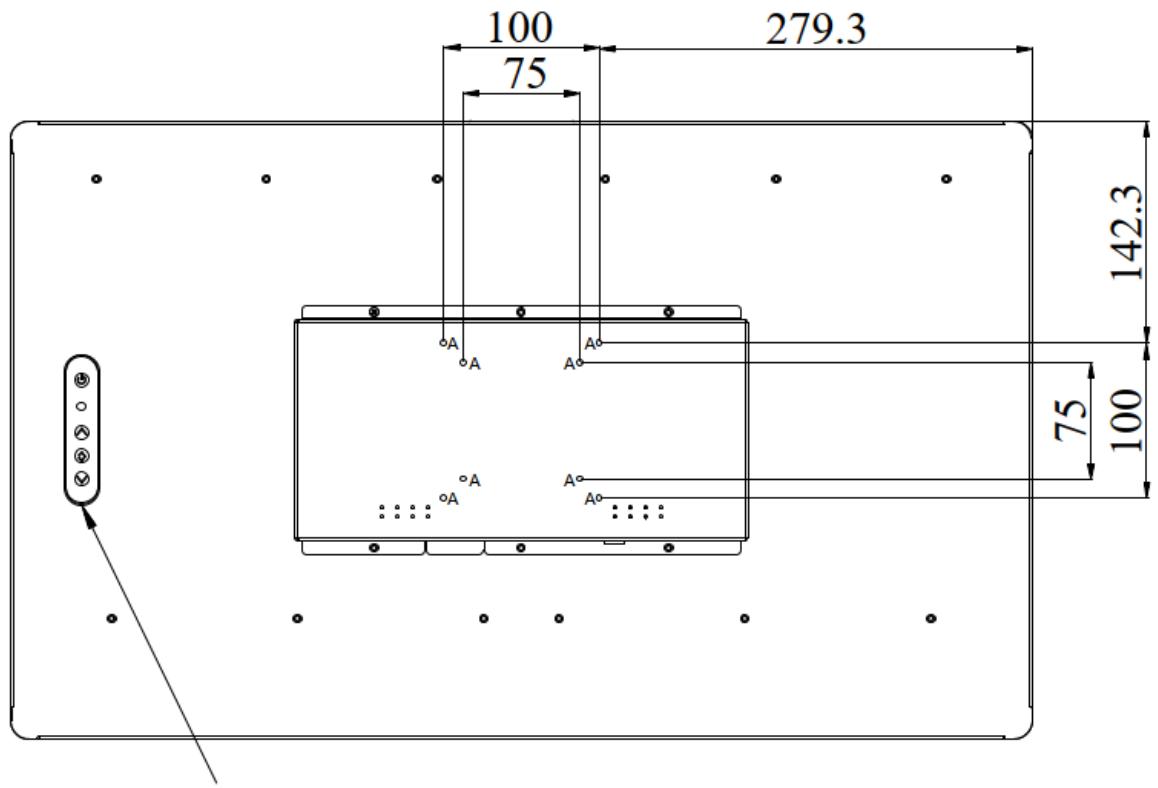


5 Mechanical Drawing

Unit:mm







MEMBRANE 4-KEYS

Note :

O.D. : Outline Dimension

V.A. : View Area

A.A. : LCD Active Area

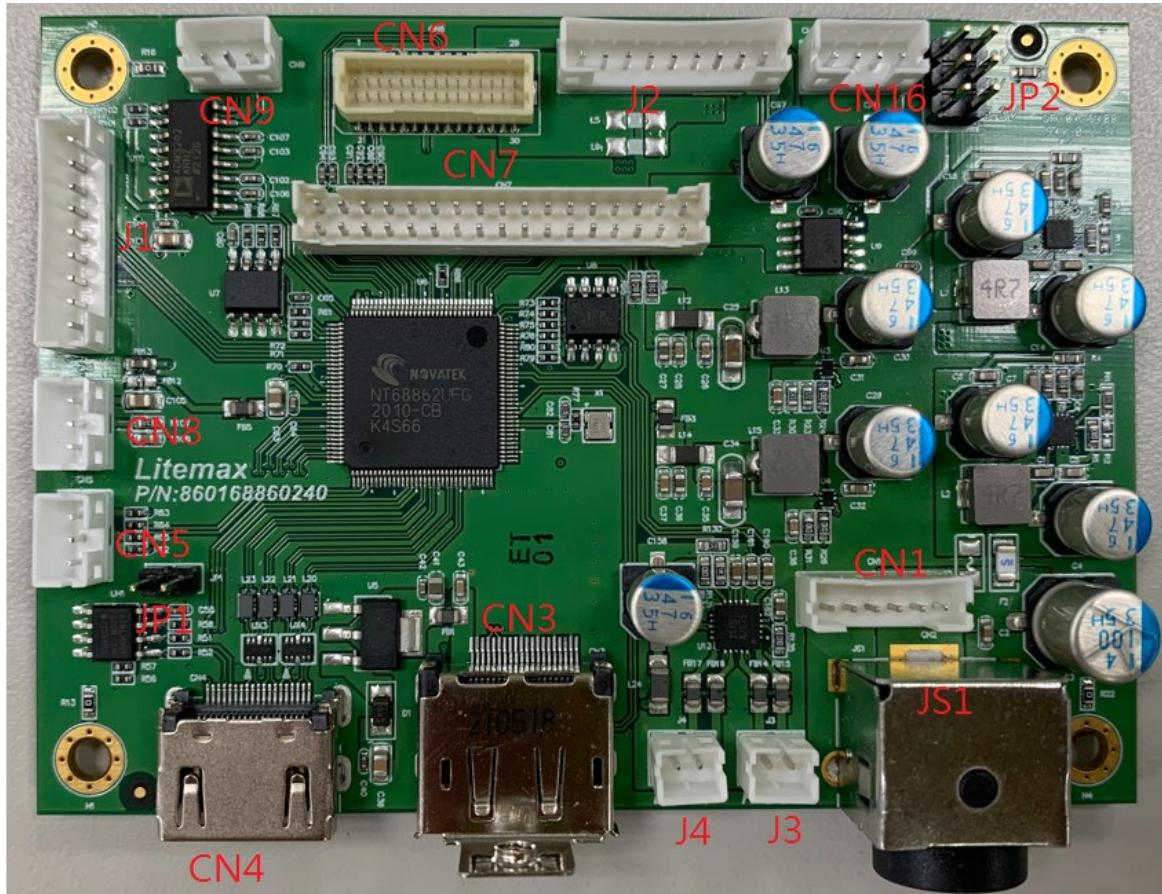
A : 8-M4_USER HOLE_MAX_DEPTH=5mm

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.

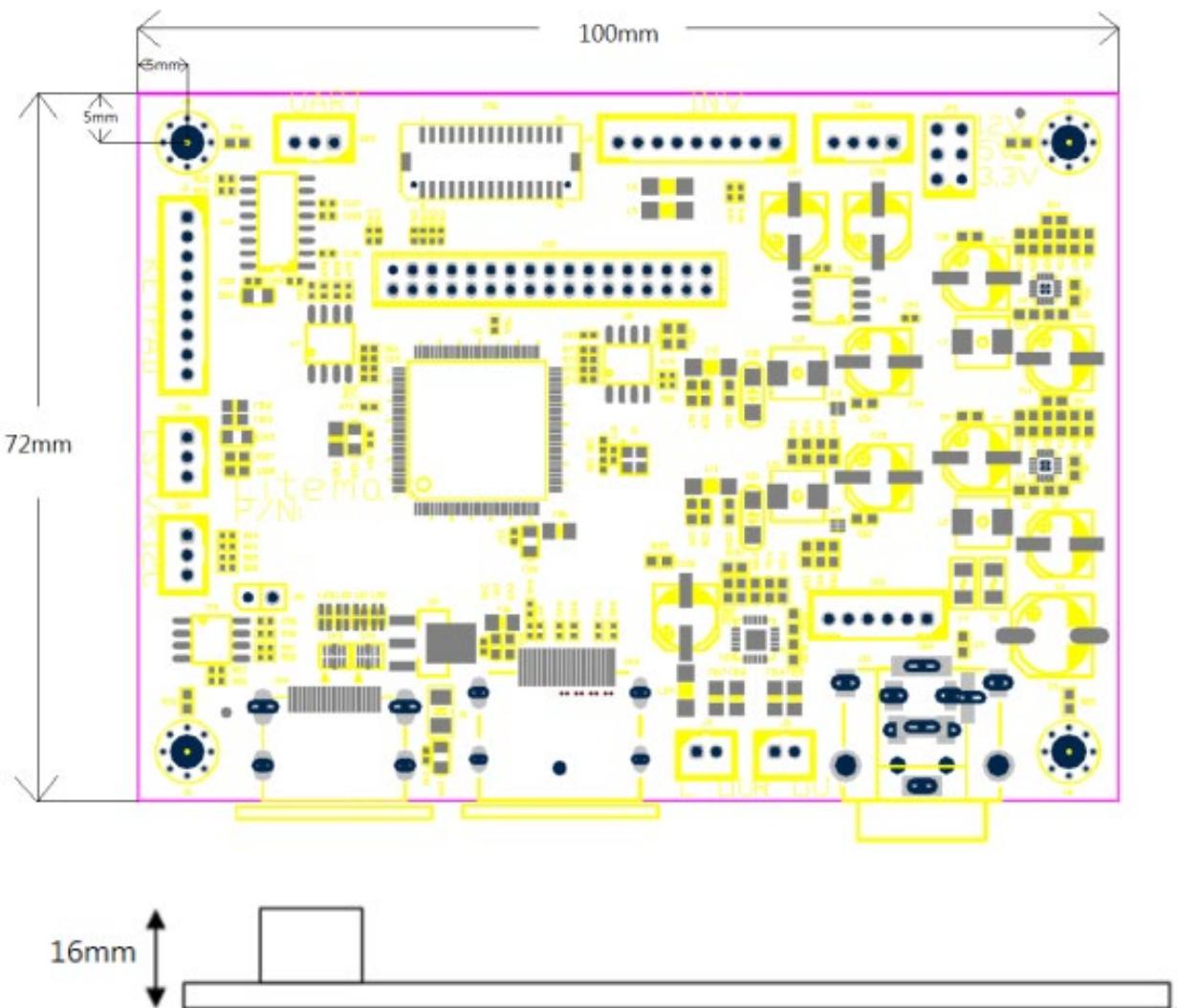
General Description

- **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 100 mm x 72mm



AD68862HP Board Pin Define

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

Pin	Function	Pin	Function
1	TX0P	16	TXAUX-
2	TX0N	17	TX_HPD
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)

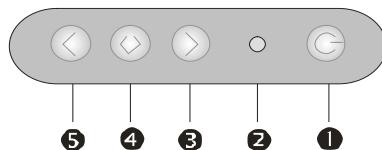
Pin	Function	Pin	Function
1	ROUTP	2	ROUTN

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



①POWER SWITCH: Pushing the power switch will turn the monitor on. Pushing it again to turn the monitor off.

②Power LED: Power ON-Green / Power OFF-No.

③Up Key >: Increase item number or value of the selected item.

④Menu 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.

⑤Down 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”



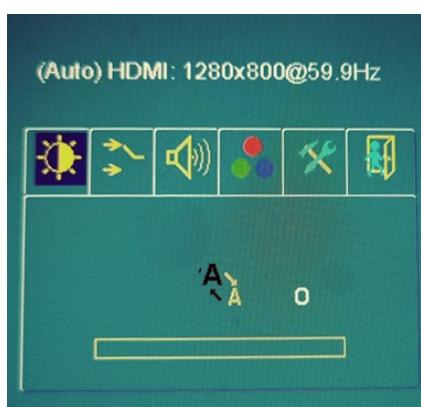
Contrast :

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



Sharpness :

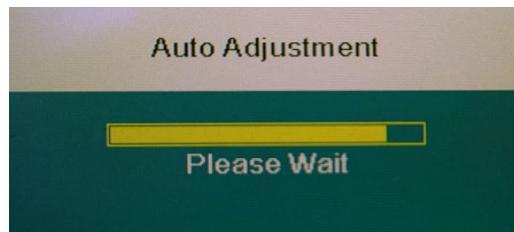
Press “Menu” once, you can adjust the Sharpness from“0” to “4” by pressing the “Left” and “Right”.





Auto Tune : (VGA only)

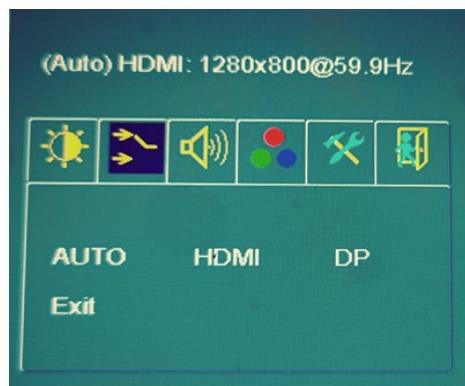
Press “Menu” once, you can activate the Auto Tune.



Exit: back to the beginning menu.



Input Signal: (default auto detect)



AUTO

AUTO: auto detect

HDMI

HDMI: HDMI input

DP

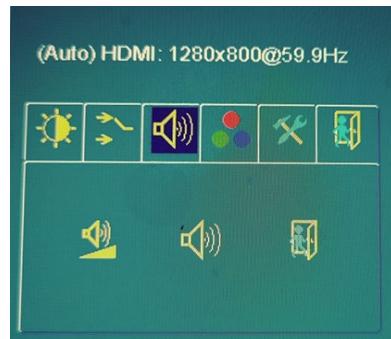
DP: DisplayPort input

Exit

Exit: back to the beginning menu.



Audio:



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



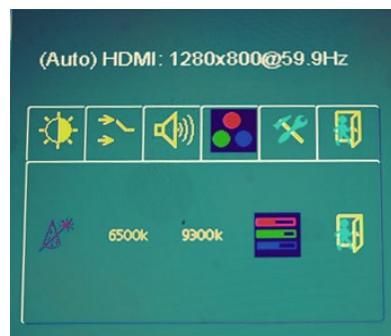
UnMute/Mute: You can mute the speaker by pressing this option.



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.



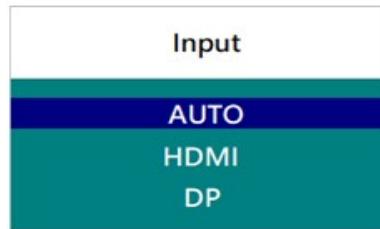
Exit: back to the beginning menu.

< 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 contact LiteMax for any new design.