LITEMAX
Sunlight Readable LCD!

ENRICH YOUR VISUAL WORLD…

LITEMAX

ULF/ULH3205-B

Sunlight Readable 32” 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
Dec./15/2023	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 Absolute Ratings **6**
2.1 TFT LCD Module 6
2.2 Interface Connections 6
2.3 LCD Electrical Characteristics 8
2.4 Signal Timing Specifications 10
2.5 Power Sequence 11
3 Optical Specification **12**
4 LED Driving Board Specifications **14**
4.1 Operating Characteristics 14
4.2 Connector Socket 15
4.3 Mechanical Drawing 16
5 Mechanical Drawing **17**
6 AD68862HP Board & OSD Functions **20**
6.1 OSD Function 26
6.2 OSD Menu 27
7 Precautions **33**
7.1 Handling and Mounting Precautions 33
7.2 Storage Precautions 33
7.3 Operation Precautions 34
8 Disclaimer **34**

1 General Description

The ULF/ULH3205-B is a 32 inch industrial grade sunlight readable LCD, with high brightness 1000 nits and high color saturation, 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, transportation and gaming application.

1.1 Features

- Sunlight readable
- High Brightness 1000 nits
- Wide Viewing Angle of 178°(H), 178°(V)
- LED Backlight
- Low Power Consumption
- BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	**ULF/ULH3205-B**
Description	32” TFT LCD, 1000nits LED Backlight, 1920x1080
Screen Size	32”
Display Area (mm)	698.4(H) x 392.85(V)
Brightness (Typical)	1000 cd/m2
Resolution	1920x1080
Aspect Ratio	16:9
Contrast Ratio (Typical)	1200 : 1
Pixel Pitch (mm)	0.36375(H) x 0.36375 (V)
Pixel Pre Inch (PPI)	69
Viewing Angle	178°(H),178°(V)
Color Saturation (NTSC)	82%
Display Colors	16.7M
Response Time (Typical)	8ms
Panel Interface	LVDS
Input Interface	HDMI, DP
Input Power	DC24V
Power Consumption	56.2W (58.6W With AD Control Board)
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position…etc
Dimensions (mm)	716.2 x 415.05 x 25.35
Bezel Size(U/B/L/R)	8.845/13.355/8.9/8.9
Weight (Net)	4.2 kg
Operating Temperature	0 ˚C ~ 50 ˚C
Storage Temperature	-20 ˚C ~ 60 ˚C

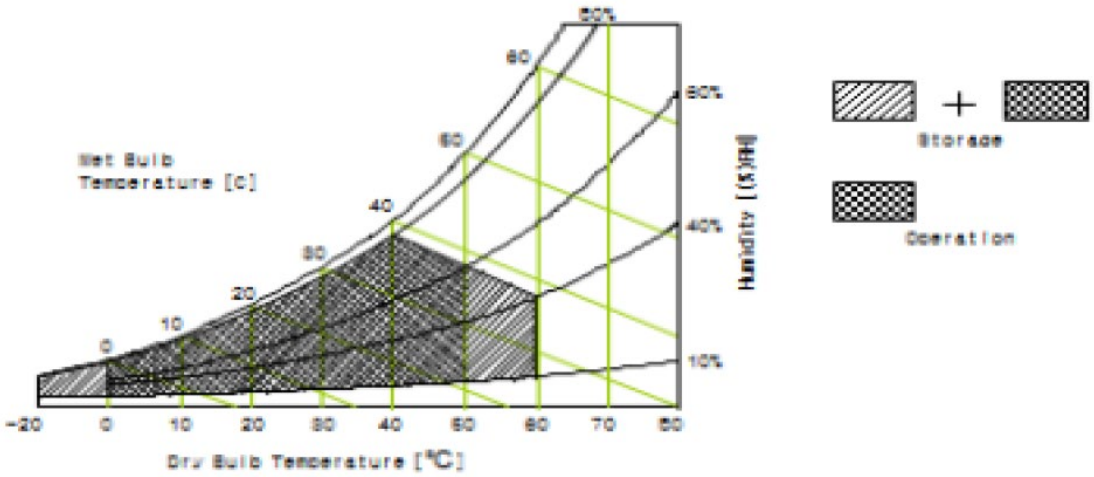
ULF= Panel + LED Driving Board
ULH= Panel + LED Driving Board + AD Control Board

1.3 Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage	VDD	VSS-0.3	14	V	Ta = 25 ℃
Operating Temperature	T_{OP}	0	+50	℃	Note 1
	T_{SUR}	0	+60	℃	
Storage Temperature	T_{ST}	-20	+60	℃	
Operating Ambient Humidity	Hop	10	80	%RH	
Storage Humidity	Hst	10	80	%RH	

Note 1: Temperature and relative humidity range is shown in the figure below.

Wet-bulb temperature should be 39 ºC Max and no condensation of water.



2 Electrical Absolute Ratings

2.1 TFT LCD Module

Item	Symbol	Value		Unit	Note
		Min	Max		
Power Supply Voltage	VDD	VSS-0.3	14	V	(1)
Logic Input Voltage	Vin	-0.3	3.6	V	

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under normal operating conditions.

2.2 Interface Connections

Pin Assignment

Pin No	Symbol	Description	Pin No	Symbol	Description
1	NC	No Connection	21	GND	Ground
2	SDA	I²C Data	22	CH1[3]-	First pixel negative LVDS differential data input. Pair3
3	SCL	I²C Clock	23	CH1[3]+	First pixel positive LVDS differential data input. Pair3
4	NC	Not Connected	24	NC	Not Connected
5	NC	Not Connected	25	NC	Not Connected
6	NC	Not Connected	26	NC or GND	Not Connected
7	SELLVDS	High: JEIDA Low or Open: VESA	27	NC	Not Connected
8	NC	Not Connected	28	CH2[0]-	Second pixel negative LVDS differential data input. Pair0
9	NC	Not Connected	29	CH2[0]+	Second pixel positive LVDS differential data input. Pair0
10	NC	Not Connected	30	CH2[1]-	Second pixel negative LVDS differential data input. Pair1
11	GND	Ground	31	CH2[1]+	Second pixel positive LVDS differential data input. Pair1
12	CH1[0]-	First pixel negative LVDS differential data input. Pair0	32	CH2[2]-	Second pixel negative LVDS differential data input. Pair2
13	CH1[0]+	First pixel positive LVDS differential data input. Pair0	33	CH2[2]+	Second pixel positive LVDS differential data input. Pair2
14	CH1[1]-	First pixel negative LVDS differential data input. Pair1	34	GND	Ground
15	CH1[1]+	First pixel positive LVDS differential data input. Pair1	35	CH2CLK-	Second pixel negative LVDS clock
16	CH1[2]-	First pixel negative LVDS differential data input. Pair2	36	CH2CLK+	Second pixel positive LVDS clock
17	CH1[2]+	First pixel positive LVDS differential data input. Pair2	37	GND	Ground
18	GND	Ground	38	CH2[3]-	Second pixel negative LVDS differential data input. Pair3
19	CH1CLK-	First pixel negative LVDS clock	39	CH2[3]+	Second pixel positive LVDS differential data input. Pair3
20	CH1CLK+	First pixel positive LVDS clock			

Pin No	Symbol	Description	Pin No	Symbol	Description
40	NC	Not Connected	46	GND	Ground
41	NC	Not Connected	47	NC	Not Connected
42	NC or GND	Not Connected	48	VCC	Input Voltage +12V
43	NC or GND	Not Connected	49	VCC	Input Voltage +12V
44	NC or GND	Ground	50	VCC	Input Voltage +12V
45	GND	Ground	51	VCC	Input Voltage +12V

Notes: 1. NC(Not Connected): This pins are only used for Litemax internal operations.

2. Input level of LVDS signal is based on the IEA 664 standard.
3. LVDS_SEL: This pin is used for selecting LVDS signal data format.
   If this pin: High (3.3V) → JEIDA LVDS format
   Otherwise: Low (GND) or Open (NC) → Normal NS LVDS Format

Rear view of LCM

BIST Pattern

2.3 LCD Electrical Characteristics

Parameter		Symbol	Values			Unit	Remark
			Min	Typ	Max		
Power Supply Input Voltage		VDD	10.8	12	14	Vdc	
Power Supply Ripple Voltage		VRP			300	mV	
Power Supply Current		IDD	-	333	630	mA	Note 1
Power Consumption		PDD		4.0	7.6	Watt	
Rush current		IRUSH	-	-	3.3	A	Note 2
LVDS Interface	LVDS Swing Voltage	VID	±100		±300	mV	Note 3
	Common Input Voltage	VLVC	1.0	1.2	1.4	V	
CMOS Interface	Input High Threshold Voltage	VIH	2.7	-	3.3	V	
	Input Low Threshold Voltage	VIL	0	-	0.6	V	

Note 1: The supply voltage is measured and specified at the interface connector of LCM.

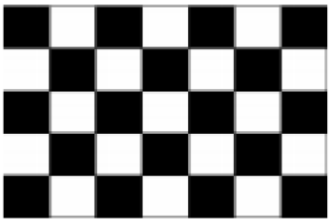
The current draw and power consumption specified for VDD=12V,

Frame rate=60Hz and

Clock frequency=75.4MHz.

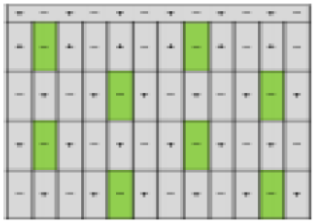
Test pattern of power supply current

a) Typ : Mosaic 7X5 (L0/L255)



b) Max : Horizontal 1 Line (L0/L255))

c) Flicker Pattern



Note 2: The duration of rush current is about 2ms and rising time of power input is 1ms (min)

Note 3: The LVDS test point is at each terminal resistor

Color Data Input Assignment

Input signals, Basic display colors and gray scale of colors

Color		Data Signal																							
		Red								Green								Blue							
		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
	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
	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
	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
	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
	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	Red(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(252)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(252)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(252)	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	Green(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(252)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(252)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(252)	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	Blue(0) / Dark	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(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(252)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(252)	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(252)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

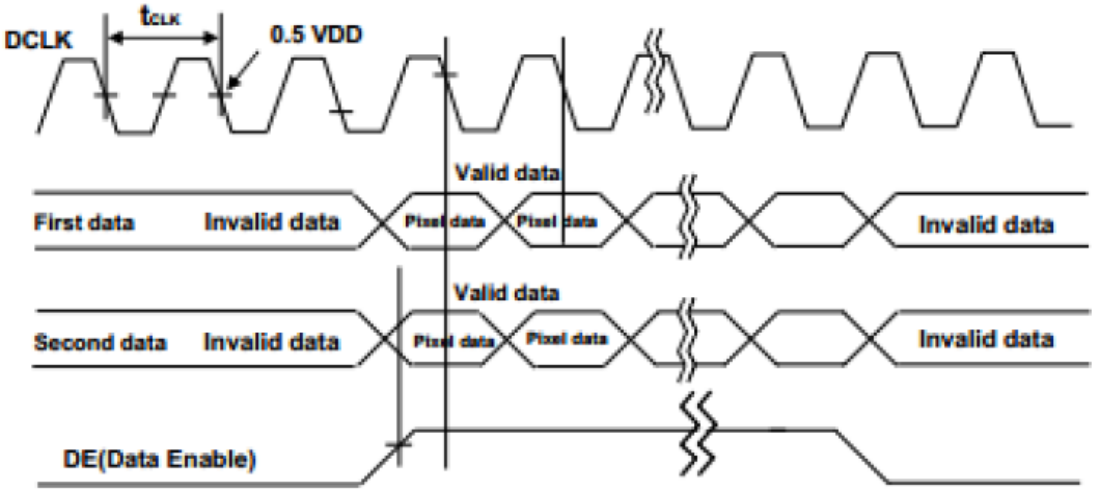
Note (1) 0: Low Level Voltage, 1: High Level Voltage

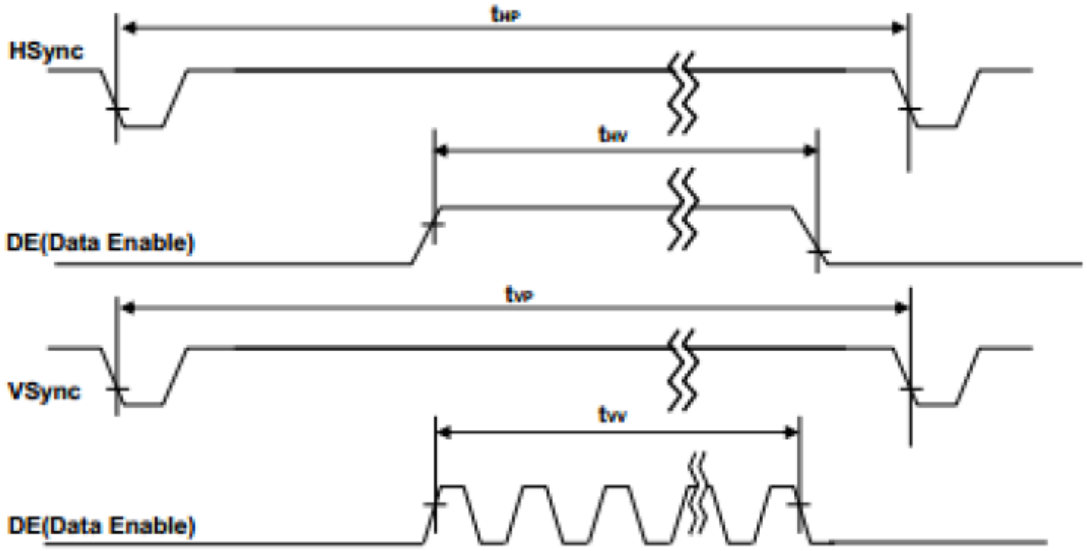
2.4 Signal Timing Specifications

Item		Symbols		Min	Typ	Max	Unit
Clock	Frequency	1/Tc		58	74.25 (92.8)	97	MHz
	High Time	Tch		-	4/7Tc	-	
	Low Time	Tcl		-	4/7Tc	-	
Frame Period		Tv		1100	1125	1149	lines
				47	60 (75)	78	Hz
Horizontal Active Display Term		Valid	t_{HV}	-	960	-	t_{CLK}
		Total	t_{HP}	1060	1100	1200	t_{CLK}
Vertical Active Display Term		Valid	t_{VV}	-	1080	-	t_{HP}
		Total	t_{VP}	1100	1125	1149	t_{HP}

Notes: This product is DE only mode. The input of Hsync & Vsync signal does not have an effect on normal operation.

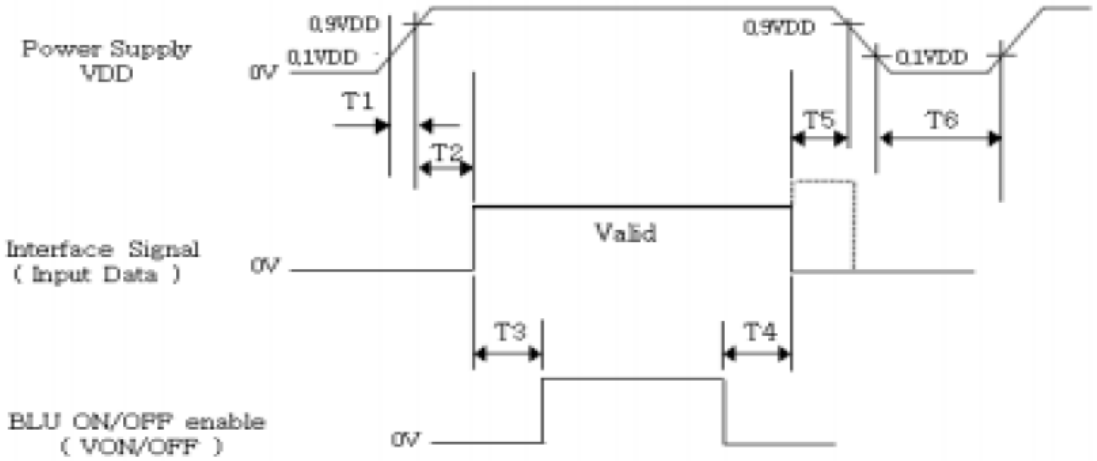
Symbol	Parameter	Condition	Min	Typ	Max	Unit
F	LVDS Input frequency	-	58	74.25 (92.8)	97	MHz
T_{LVSK}	LVDS channel to channel skew	F=100MHz V_{IC}=1.2V V_{ID}=±200mV	-(1/F)* 30%	-	(1/F)*3 0%	ps
F_{LVMOD}	Modulating frequency of inp ut clock during SSC	F=85MHz V_{IC}=1.2V V_{ID}=±200mV	0	-	200	KHz
F_{LVDEV}	Maximum deviation of input clock frequency during SSC		-3	-	+3	%
T_{CY-CY}	Cycle to Cycle jitter		-	-	50	ps





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

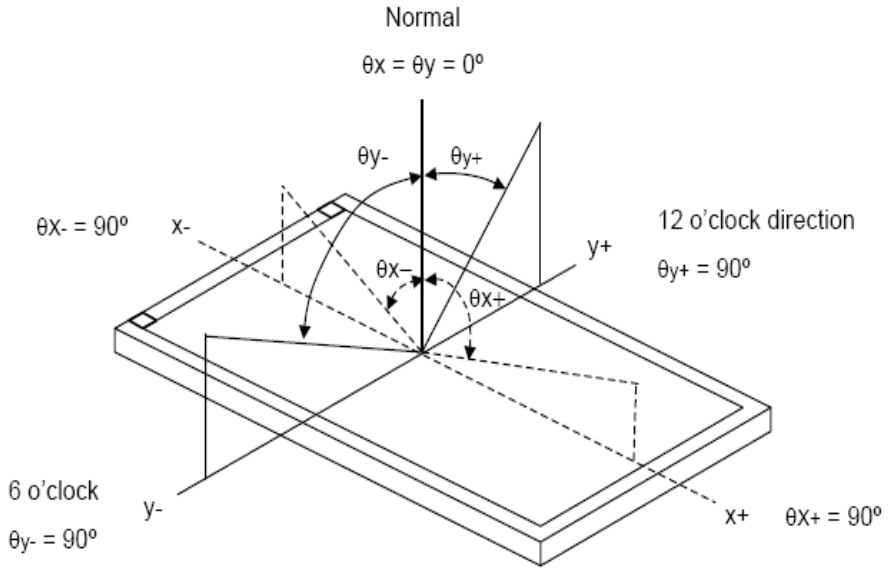
Notes: 1. Back Light must be turn on after power for logic and interface signal are valid.
2. Even though T1 is out of SPEC, it is still ok if the inrush current of VDD is below the limit.

3 Optical Specification

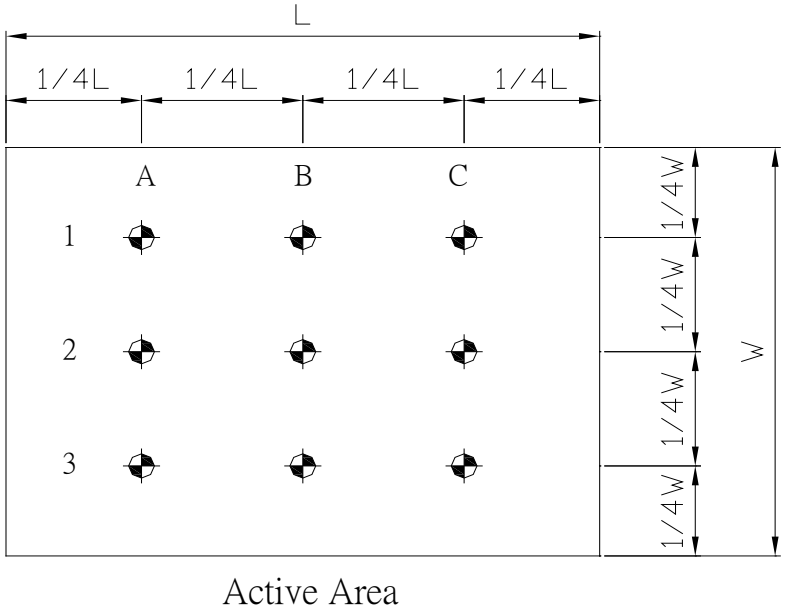
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	θx=0 θy=0 Klein K-10	0.609	0.639	0.669	-	Test Mode: (1) (2) (3)
		Ry		0.314	0.344	0.374	-	
	Green	Gx		0.265	0.295	0.325	-	
		Gy		0.628	0.658	0.688	-	
	Blue	Bx		0.116	0.146	0.176	-	
		By		0.016	0.046	0.076	-	
	White	Wx		0.269	0.299	0.329	-	
		Wy		0.305	0.335	0.365	-	
Uniformity		Lu	θx=0 θy=0 BM-9A	-	81	-	%	
Center Luminance of White		Lc	θx=0 θy=0 Klein K-10	900	1000	-	cd/m^2	Test Mode: (1) (3)
Contrast Ratio		CR		1080:1	1200:1	-	-	
Color Saturation		NTSC		-	82	-	%	
Viewing Angle	Horizontal	θx+	CR ≥ 10	-	89	-	Deg	Test Mode: (1) (3)
		θx-		-	89	-		
	Vertical	θy+		-	89	-		
		θy-		-	89	-		

Test Mode：

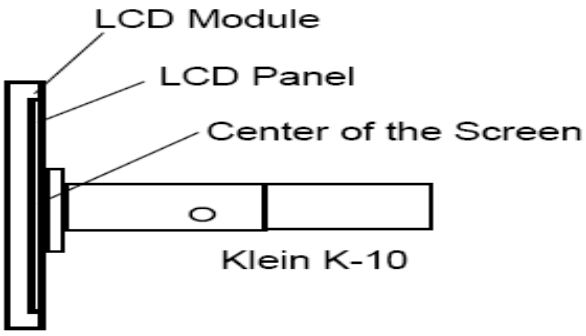
(1) Definition of Viewing Angle (θx , θy):



(2) Definition of Test Point:



(3) 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

Operating Characteristics

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	Vin		22.0	24.0	26.0	V	
Input Current (Low Brightness)	IinL	Brightness = 0%	0.0	-----	-----	mA	
Input Current (High Brightness)	IinH	Brightness = 100%	--	2.25	2.6	A	(1)
LED Current (Low Brightness)	IoutL	Brightness = 0%	0.0	-----	-----	Arms	
LED Current (High Brightness)	IoutH	Brightness = 100%	--	--	--	A	
			--	1.38	--	A	J7
Working Frequency	W_Freq	Brightness = 100%	350	400	450	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	1000	Hz	(4)
ON/OFF Control	Von	Normal Operation	2	-----	5	V	
	Voff		0	-----	0.8	V	
Output Voltage	Vout	Brightness = 100%	--	--	--	V	J2
			35	35.8	36.5	V	J7
Efficiency	η	Brightness = 100%	--	91.1	--	%	(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) η max = Vout(max)*IoutH(max)/Vin(max)*IinH(min)
η min = Vout(min)*IoutH (min)/Vin(min)*IinH(max)

4.2 Connector Socket

nput Connector**:** CN1(JST B10B-PH-K-S or Compatible)

PIN No	Symbol	Description
1	Vin	DC+
2	Vin	DC+
3	Vin	DC+
4	Vin	DC+
5	Vin	DC+
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	GND	Ground

DC or PWM Connector :CN2

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

Note: If you use CN2 to set DC/PWM, please NC the pin1 of CN3

Input Connector :CN3(JST B4B-PH-K-S or Compatible)

PIN No	Symbol	Description
1	CL	PWM or DC selection
2	Control	ON/OFF Control
3	Brightness	Brightness Control
4	GND	Ground

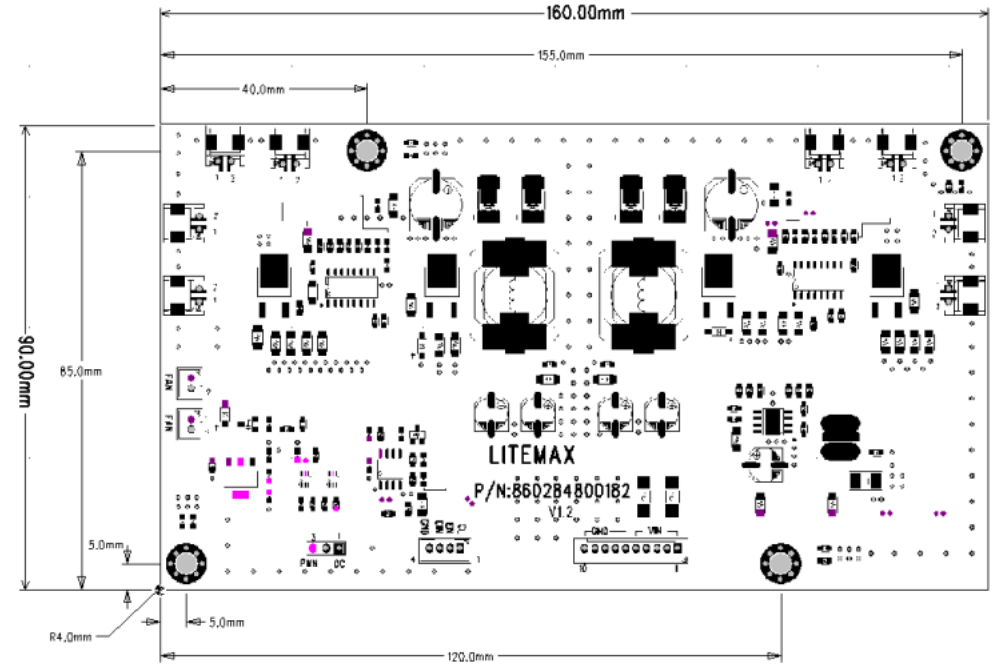
Note: Pin1 is dimming method control pin, Low→DC dimming, High→PWM dimming.
If pin1 is be used, please NC CN2.

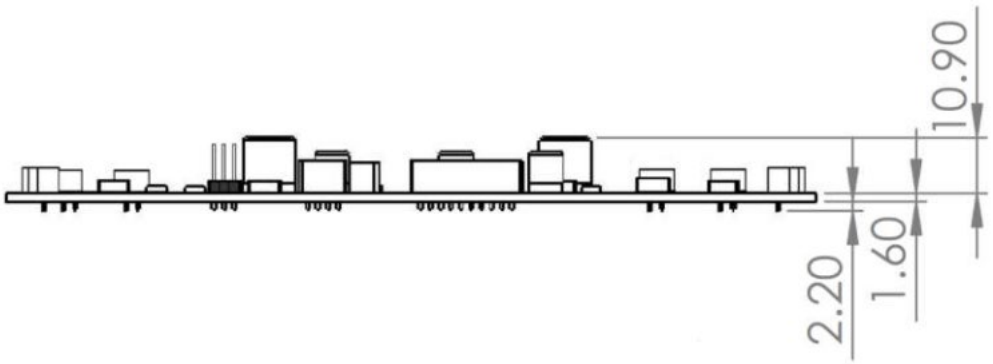
Output Connector :J1,J2, J7,J8(JST S2B-EH or Compatible)

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

4.3 Mechanical Characteristics

Dimension: 160 x 90 x 12.5mm

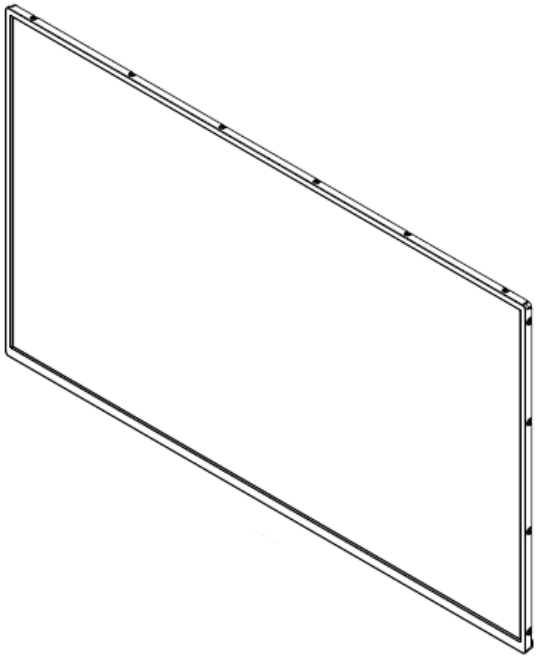


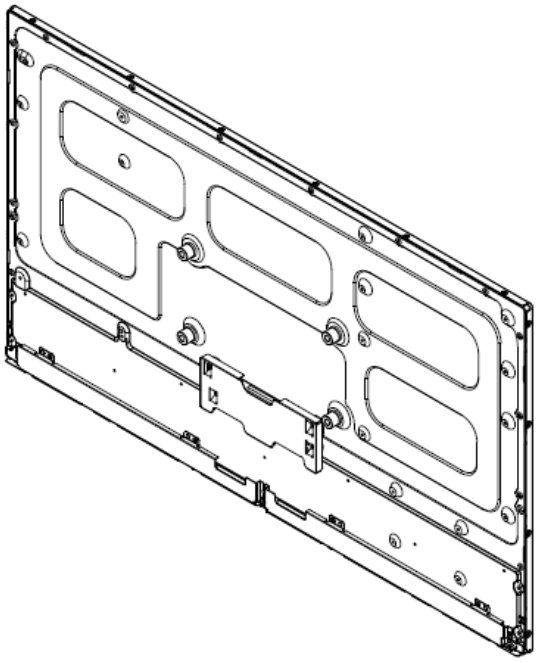


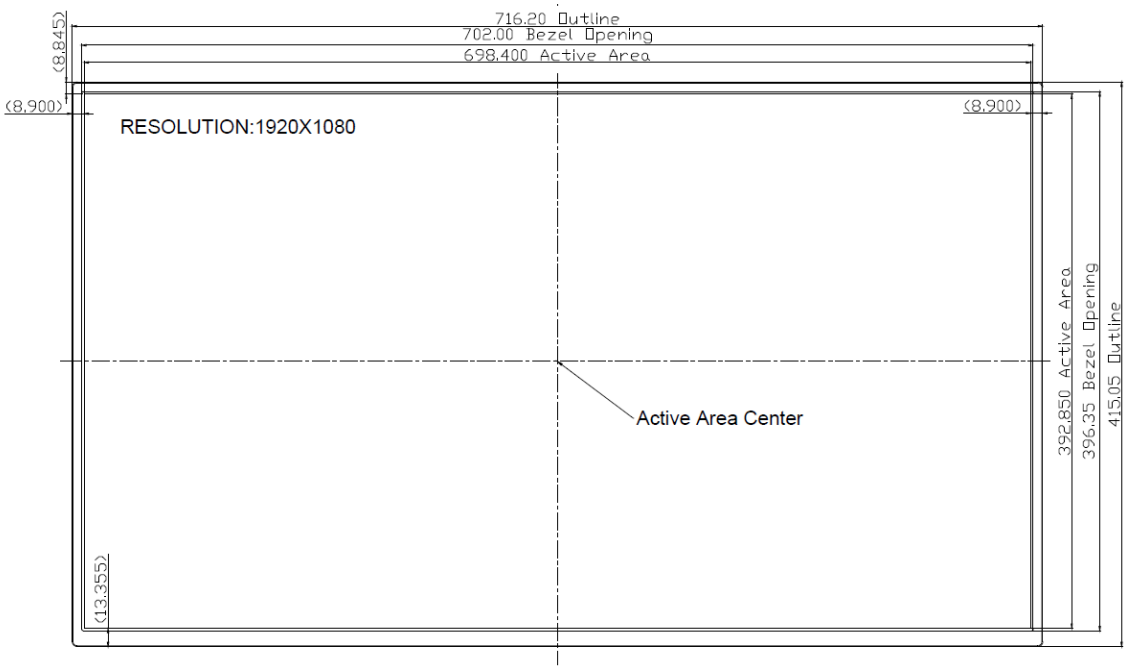
5 Mechanical Drawing

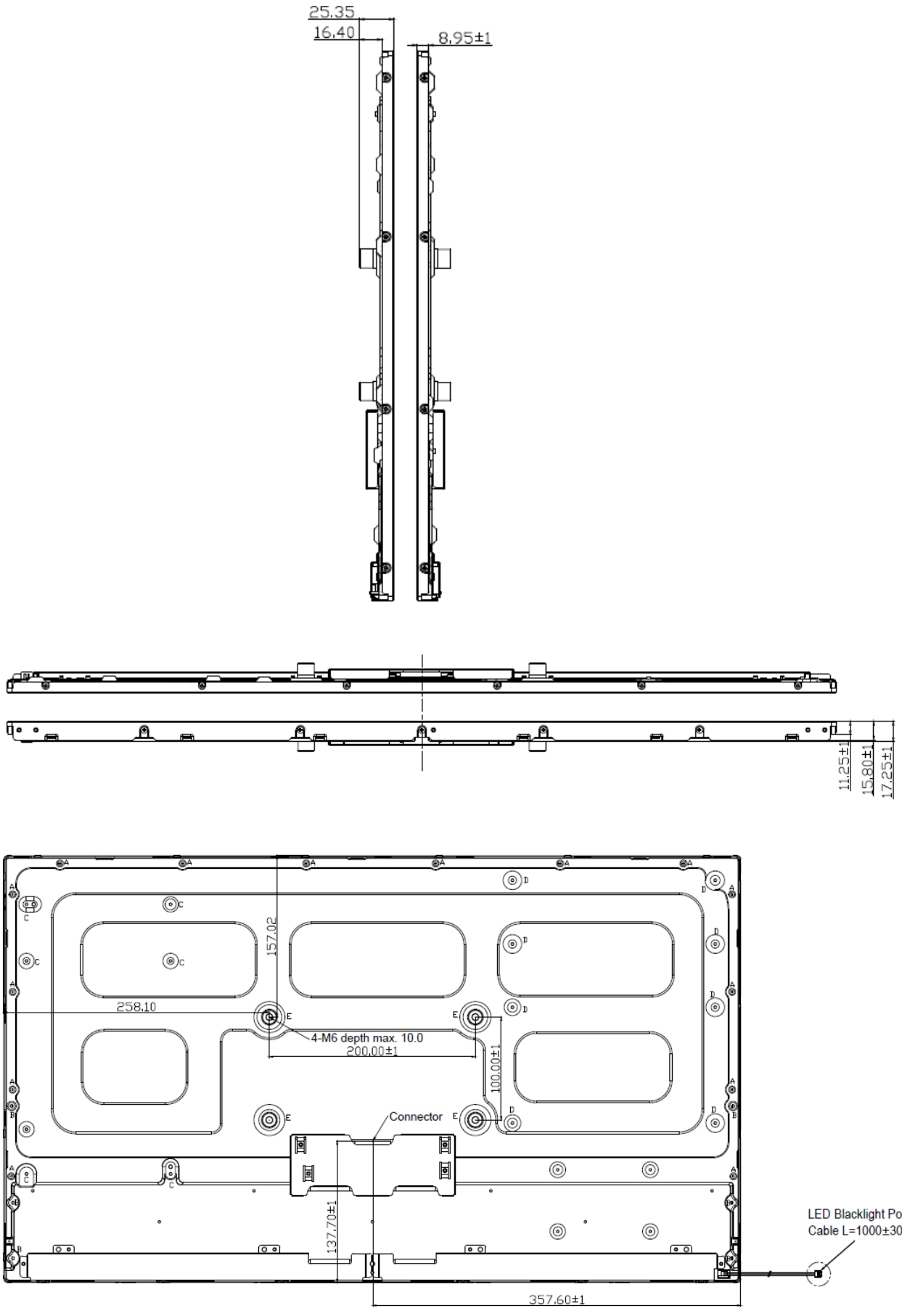
Outline Dimensions

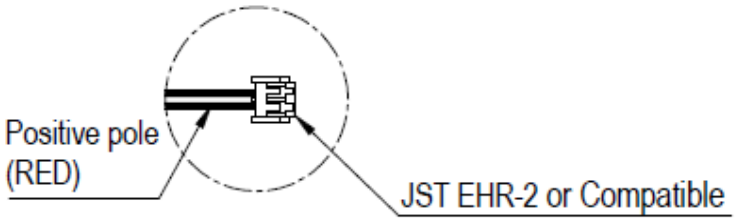
Unit:mm








25.35
16.40
8.95±1
11.25±1
15.80±1
17.25±1
157.02
258.10
4-M6 depth max. 10.0
200.00±1
100.00±1
Connector
137.70±1
357.60±1
LED Blacklight Power
Cable L=1000±30mm



Connector View

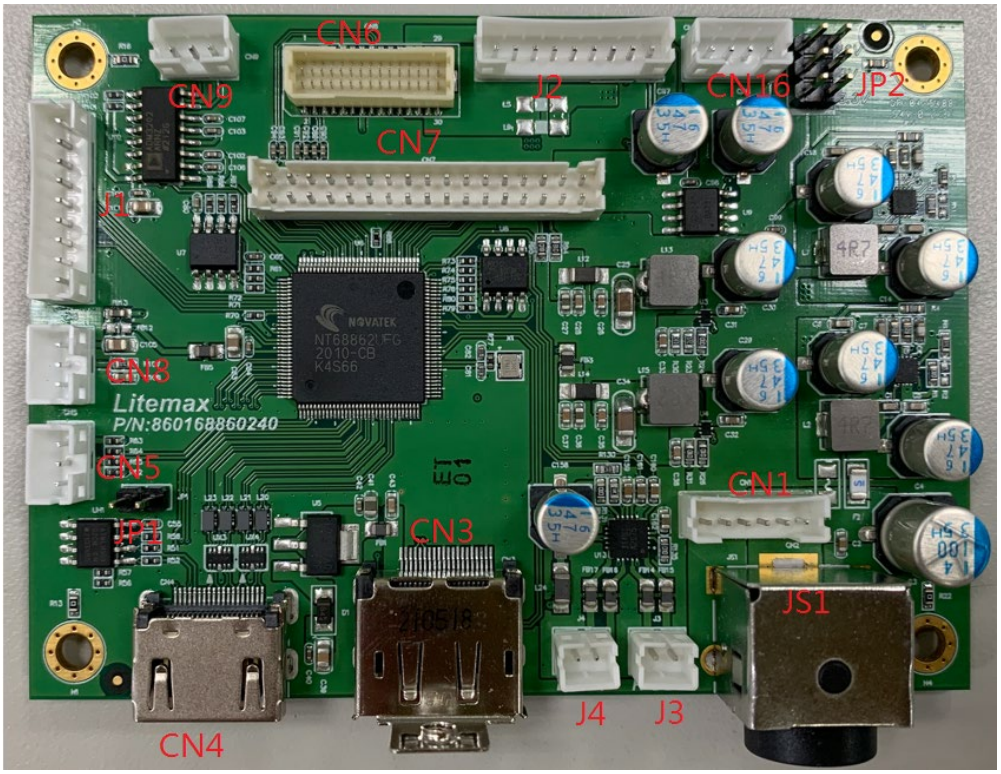
Note：
1. THE DIMENSION EXCLUDES DEFORMATION.
2. Connector : IS050-C51B-C39-S (UJU) / FI-RE51S-HF-R1500 (JAE) or Equivalent.
3. M2 USER HOLE SCREW TORQUE 4.0 kgf- cm MAX
   M3 USER HOLE SCREW TORQUE 6.0 kgf- cm MAX.
   M6 USER HOLE SCREW TORQUE 20.0 kgf- cm MAX
4.A:14-M2 Depth max2.0
  B:3-M3 Depth max3.0
  C:6-M3 Depth max4.0
  D:8-M3 Depth max5.0
  E:4-M6 Depth max10.0

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.

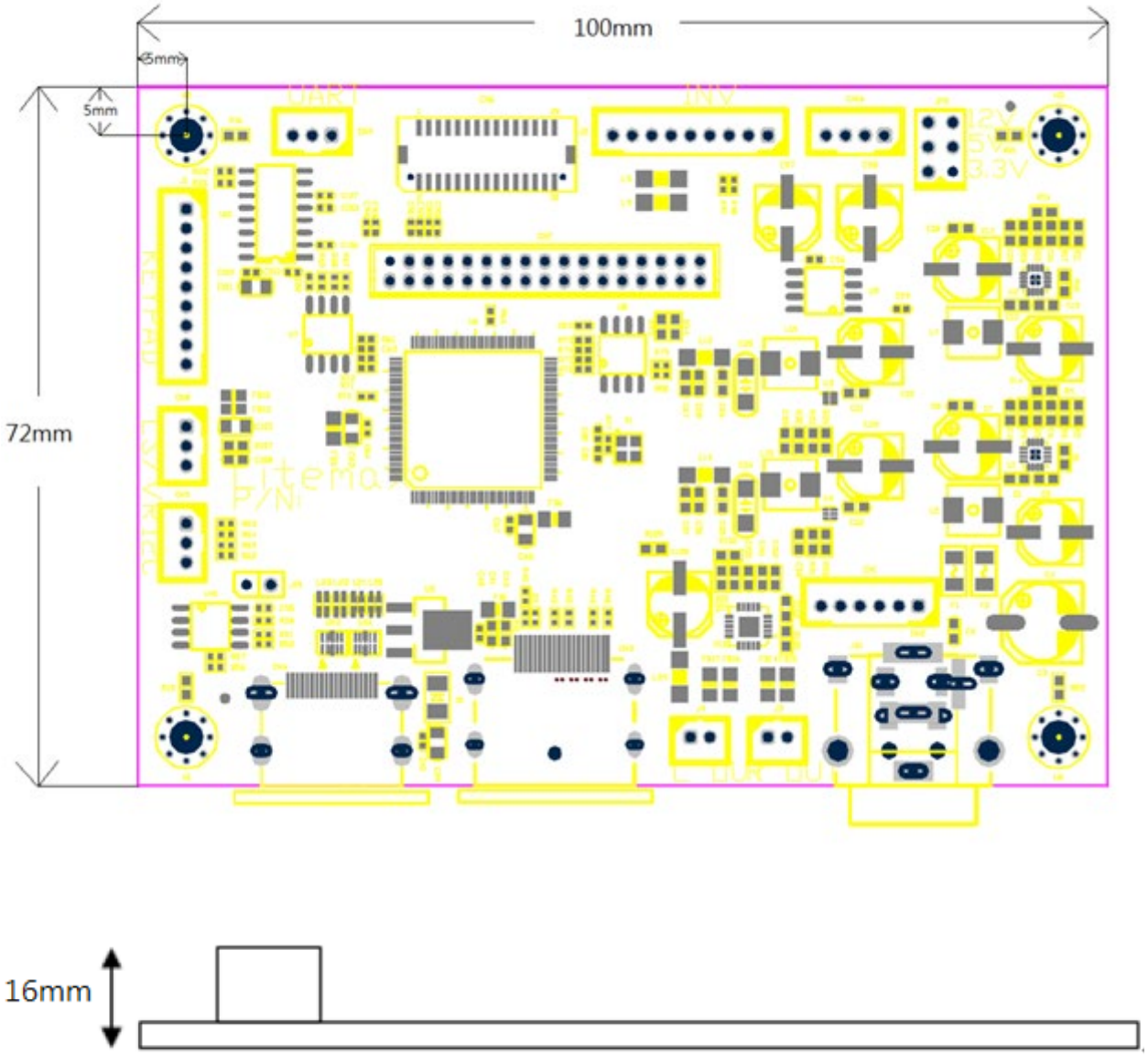
General Description

- **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 X 16mm



AD68862 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)

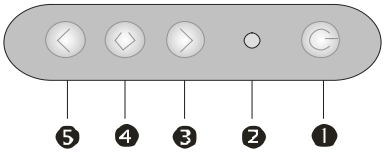
Pin	Function	Pin	Function
1	ROUTP	2	ROUTN

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



- **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.

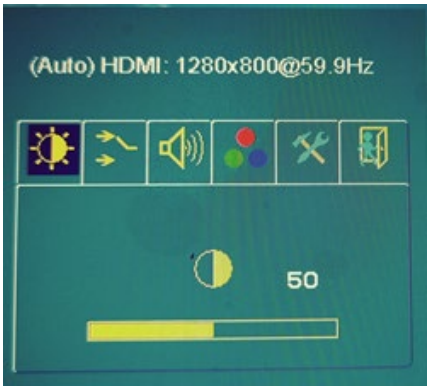
Ambient light sensor: (OPTION)
press this Icon, must to accompany with Litemax ambient light sensor to auto dimming.

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”

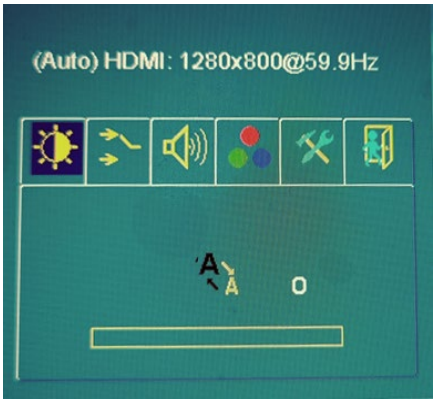
Contrast：

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



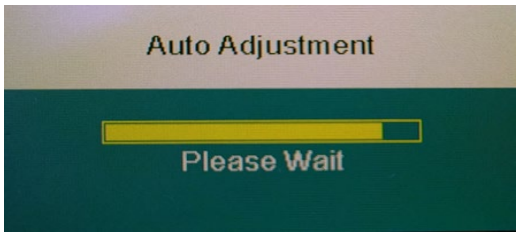
Sharpness：

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.

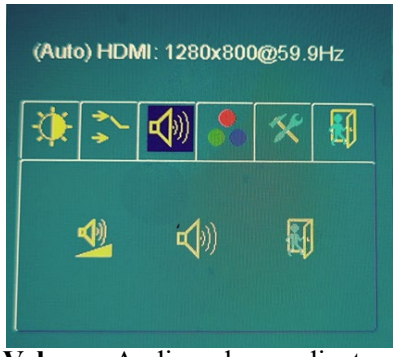
Input Signal: (default auto detect)

AUTO: Auto detect

HDMI: HDMI input

DP: DisplayPort input

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.

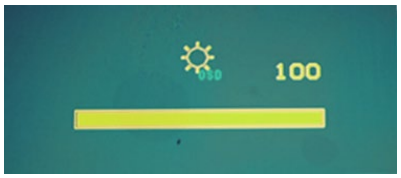
Rotation: You can rotate the screen to 0° (No)、270° (Yes).

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

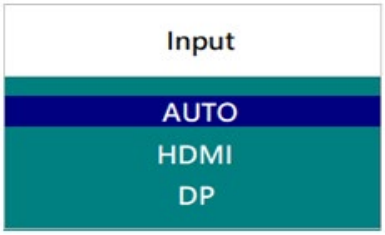
Exit: Back to the beginning menu.

< **Hot Key** >

Left click to display brightness adjustment.

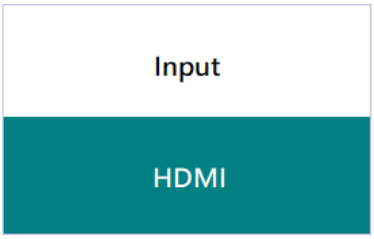


Right click to display Input Source Menu.



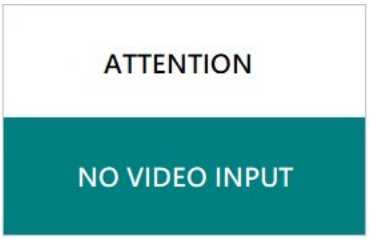
<Others>

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



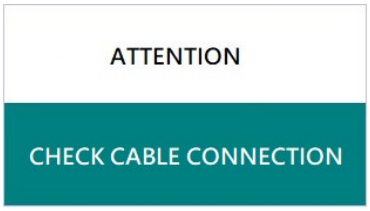
(Signal Information)

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 the 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℃ and 35℃ 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.