

LITEMAX

DPD1334-STQ-Q01

13.3" 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
July/1/2020	all		Initial release	

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1 General Description

The **DPD1334-STQ-Q01** is a 13.3inch industrial grade LCD with touch and wireless charger function for button deck. The Durapixel LED backlight technology ensures high reliability and low power consumption, suitable for gaming application.

1.1 Features

- Resolutions: 1920 x 1080
- Aspect ratio of 16:9
- LED Backlight
- Touch function
- Wireless charger function
- BL MTBF: 70,000 hours

1.2 General Specifications

Model Name	DPD1334-STQ-Q01
Description	13.3" TFT LCD, 300 nits LED backlight, 1920x1080
Screen Size	13.3"
Display Area (mm)	293.76(H) x 165.24(V)
Brightness	300 cd/m ²
Resolution	1920x480
Aspect Ratio	16 : 9
Contrast Ratio	1000 : 1
Pixel Pitch (mm)	0.153(H) x 0.153(V)
Pixel Pre Inch (PPI)	166
Viewing Angle	170°(H),170°(V)
Color Saturation (NTSC)	89%
Display Colors	16.7M
Response Time (Typical)	30ms
Panel Interface	LVDS
AD Board Input Interface	DP
AD Board Input Power	DC 12V (Input Voltage: Min. 11V , Max. 13V , Input Current: 2A Max.)
Power Consumption	9.5W
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position...etc
Dimensions (mm)	651(H) x 235(V) x 46.1 (T)
Weight (Net)	4.22kg
Operating Temperature	0 °C ~ 60 °C
Storage Temperature	-20 °C ~ 60 °C

SPD= Panel + LED Driving Board + AD Control Board + TP + Wireless charger + Chassis

1.3 Absolute Maximum Ratings

項目 Parameter	記号 Symbol	条件 Condition	端子名 Pin	定格値 Ratings	単位 Unit	備考 Remark
電源電圧 Supply voltage	V _{CC}	Ta=25°C	VCC	-0.3 ~ +6.0	V	【Note1,2】
	V _{DD}	Ta=25°C	VDD	-0.3 ~ +15.0	V	【Note1,2】
入力電圧 Input voltage	V _{I1}	Ta=25°C	RxINi-/+	-0.3 ~ +3	V	i=0,1,2,3 x=A,B
	V _{I2}	Ta=25°C	RxCLKIN-/+			
	V _{I4}	Ta=25°C	BL_EN,PWM	-0.3~+VDD	V	
保存温度 Storage temperature	T _{STG}	—	—	-20 ~ +80	°C	【Note1,3】
動作温度 Operating temperature	T _{OPA}	—	—	0 ~ +80	°C	【Note1,3,4】

[Note 1]

Humidity: 95%RH MAX. (Ta≤40°C) Note static electricity.

Maximum Wet-bulb temperature at 39°C or less (Ta>40°C) No condensation

[Note 2]

The VCC power supply capacity must use the one of 2.5A or more.

The VDD power supply capacity must use the one of 5A or more.

There is a possibility of causing smoking and the ignition without fusion of LCD fuse when abnormality occurs when the current capacity is smaller than regulated values.

Please install the protection function in which the over current and the excess voltage are controlled to the side when you design the lower current supply.

[Note 3]

There is a possibility of causing deterioration in the irregularity and others of the screen and the display fineness though the liquid crystal module doesn't arrive at destruction when it at 65~80°C.

There is a possibility of causing the fineness deterioration by the prolonged use in the(high temperature humidity environment (60%RH or more).

[Note 4]

In the operating temperature item, the low temperature side is the ambient temperature regulations. The high temperature side is the panel surface temperature regulations.

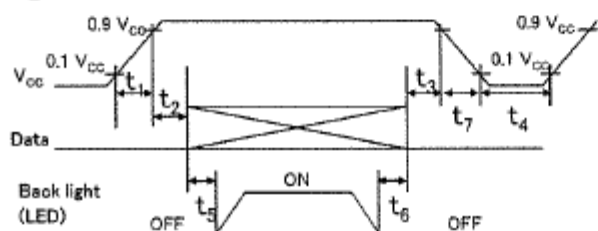
2 Electrical Characteristics

2.1 TFT-LCD panel driving

Ta=+25°C

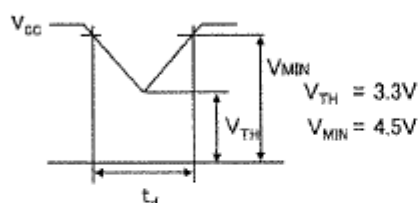
項目 Parameter	記号 Symbol	条件 Condition	最小 Min.	標準 Typ.	最大 Max.	単位 Unit	備考 Remark
電源電圧 Supply voltage	V_{CC}		4.5	5.0	5.5	V	【Note1】
消費電流 Current dissipation	I_{CC}	$V_{CC}=5V$	—	200	300	mA	【Note2】
LVDS入力電圧 Input voltage for LVDS receiver	V_L		0	—	2.4	V	
許容入力リップル電圧 Permissible input ripple voltage	V_{RP}		—	—	200	mV _{p-p}	$V_{CC}=5V$
差動入力 スレッショルド電圧 Differential input threshold voltage	High	V_{TH}	—	—	$V_{CM}+100$	mV	$V_{CM}=+1.2V$ 【Note3】
	Low	V_{TL}	$V_{CM}-100$	—	—	mV	
終端抵抗 Terminal resistor	R_T		—	100	—	Ω	差動信号間 Differential input

【Note1】 入力電圧シーケンス V_{CC} turn-on/off conditions



$20 \mu s < t_1 \leq 10 ms$
$0 < t_2 \leq 500 ms$
$0 < t_3 \leq 1 s$
$1 s \leq t_4$
$300 ms \leq t_5$
$200 ms \leq t_6$
$10 ms \leq t_7 \leq 100 ms$

瞬時電圧降下 V_{CC} -dip conditions



- 1) $V_{TH} < V_{CC} \leq V_{MIN}$
 $t_d \leq 10 ms$

- 2) $V_{CC} < V_{TH}$

瞬時電圧降下条件は入力電圧シーケンスに順ずるものと致します。

V_{CC} -dip conditions should also follow the On-off conditions for supply voltage

データ入力とバックライト点灯との関係は、上記入力シーケンスを推奨致します。

パネル動作以前のバックライト点灯、あるいはパネル動作停止後のバックライト点灯にて、瞬間白表示あるいは正常でない表示を行う場合がありますが、これは入力信号の変動によるものであり、液晶モジュールにダメージを与えるものではありません。

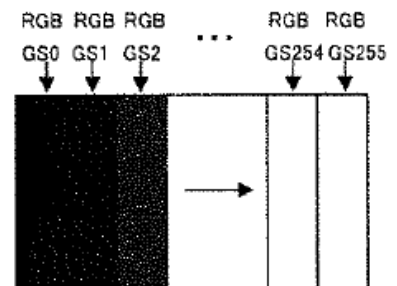
The relation between the data input and the backlight lighting will recommend the above-mentioned input sequence. When the backlight is turned on before the panel operates, there is a possibility of abnormally displaying. The liquid crystal module is not damaged.

【Note2】消費電流 Current dissipation

標準値: 白黒縦階調表示時

Typical current situation : -gray-bar pattern

(測定条件 $V_{CC}=+5V$ 、 $f_{clk} = 70MHz$ 、 $T_a=25^{\circ}C$)



【Note3】 V_{CM} : LVDSドライバのコモンモード電圧

V_{CM} : LVDS common mode voltage

2.2 Interface Connection

LCD Connector : FI-X30SSLA-HF(JAE)

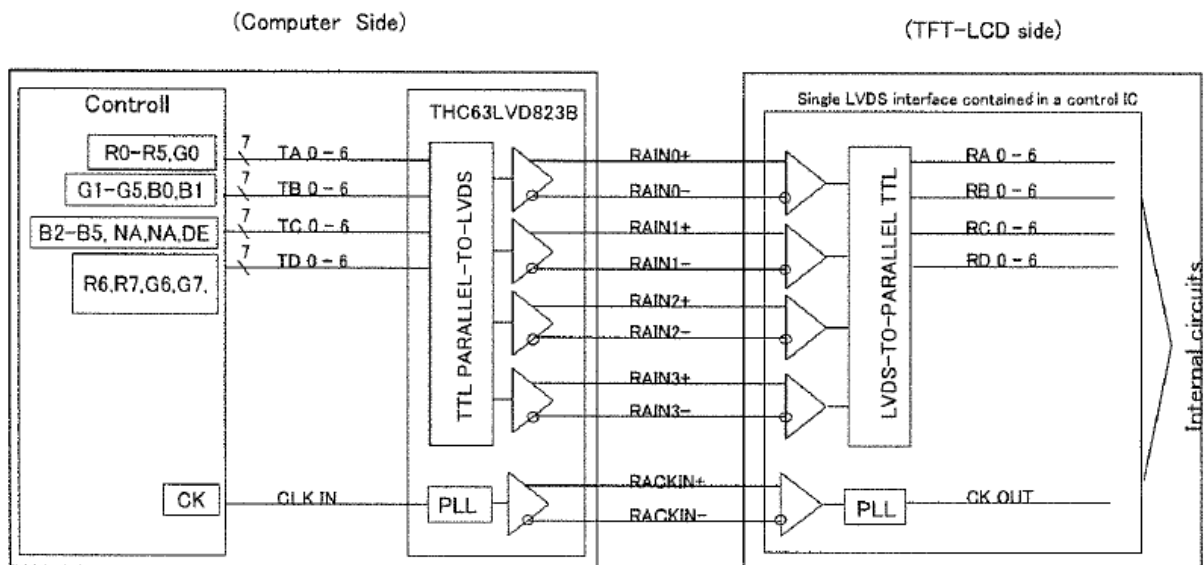
Corresponding Connector: FI-X30HL(connector)(JAE)

FI-XC3A-1-15000(connector)(JAE)

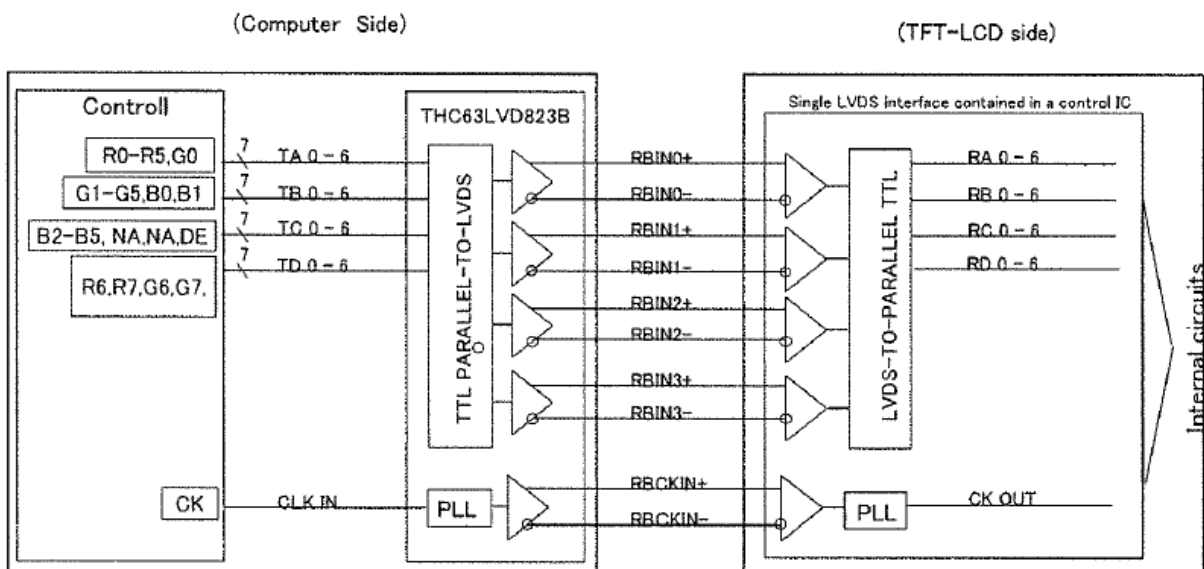
端子 Pin	記号 Symbol	機能 Function	備考 Remark
1	RAIN0-	LVDS receiver signal Odd CH0 (-)	LVDS
2	RAIN0+	LVDS receiver signal Odd CH0 (+)	LVDS
3	RAIN1-	LVDS receiver signal Odd CH1 (-)	LVDS
4	RAIN1+	LVDS receiver signal Odd CH1 (+)	LVDS
5	RAIN2-	LVDS receiver signal Odd CH2 (-)	LVDS
6	RAIN2+	LVDS receiver signal Odd CH2 (+)	LVDS
7	GND	GND	
8	RACKIN-	LVDS receiver signal Odd CK (-)	LVDS
9	RACKIN+	LVDS receiver signal Odd CK (+)	LVDS
10	RAIN3-	LVDS receiver signal Odd CH3 (-)	LVDS
11	RAIN3+	LVDS receiver signal Odd CH3 (+)	LVDS
12	RBIN0-	LVDS receiver signal Even CH0 (-)	LVDS
13	RBIN0+	LVDS receiver signal Even CH0 (+)	LVDS
14	GND	GND	
15	RBIN1-	LVDS receiver signal Even CH1 (-)	LVDS
16	RBIN1+	LVDS receiver signal Even CH1 (+)	LVDS
17	GND	GND	
18	RBIN2-	LVDS receiver signal Even CH2 (-)	LVDS
19	RBIN2+	LVDS receiver signal Even CH2 (+)	LVDS
20	RBCLKIN-	LVDS receiver signal Even CK (-)	LVDS
21	RBCLKIN+	LVDS receiver signal Even CK (+)	LVDS
22	RBIN3-	LVDS receiver signal Even CH3 (-)	LVDS
23	RBIN3+	LVDS receiver signal Even CH3 (+)	LVDS
24	GND	GND	
25	GND	GND	
26	GND	GND	
27	GND	GND	
28	VCC	+5.0V Power supply	
29	VCC	+5.0V Power supply	
30	VCC	+5.0V Power supply	

2.3 LVDS interface block diagram

ODD DATA

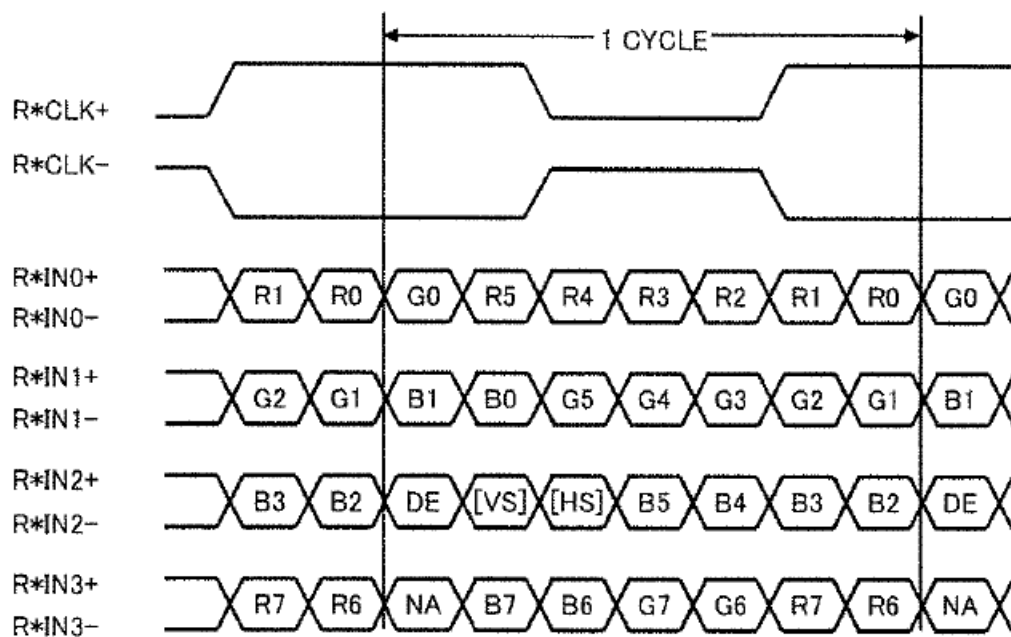


EVEN DATA



2.4 LVDS Data Mapping

Transmitter		Signal
Pin No	Data	
51	TA0	R0 (LSB)
52	TA1	R1
54	TA2	R2
55	TA3	R3
56	TA4	R4
3	TA5	R5
4	TA6	G0 (LSB)
6	TB0	G1
7	TB1	G2
11	TB2	G3
12	TB3	G4
14	TB4	G5
15	TB5	B0 (LSB)
19	TB6	B1
20	TC0	B2
22	TC1	B3
23	TC2	B4
24	TC3	B5
27	TC4	[HS]
28	TC5	[VS]
30	TC6	DE
50	TD0	R6
2	TD1	R7 (MSB)
8	TD2	G6
10	TD3	G7 (MSB)
16	TD4	B6
18	TD5	B7 (MSB)
25	TD6	[NA]
31	CLK IN	CLK



***: A or B**

DE: Data Enable

[HS]: Hsync

[VS]: Vsync

[NA]: Non available

Hsync/Vsync need not be input so that this model may drive only by the ENAB signal.

If Hsync/Vsync is input, it doesn't become a malfunction.

2.5 LED backlight

LED backlight Connector(CN2): SM10B-SHLS-TF(J.S.T Mfg. Co. Ltd)

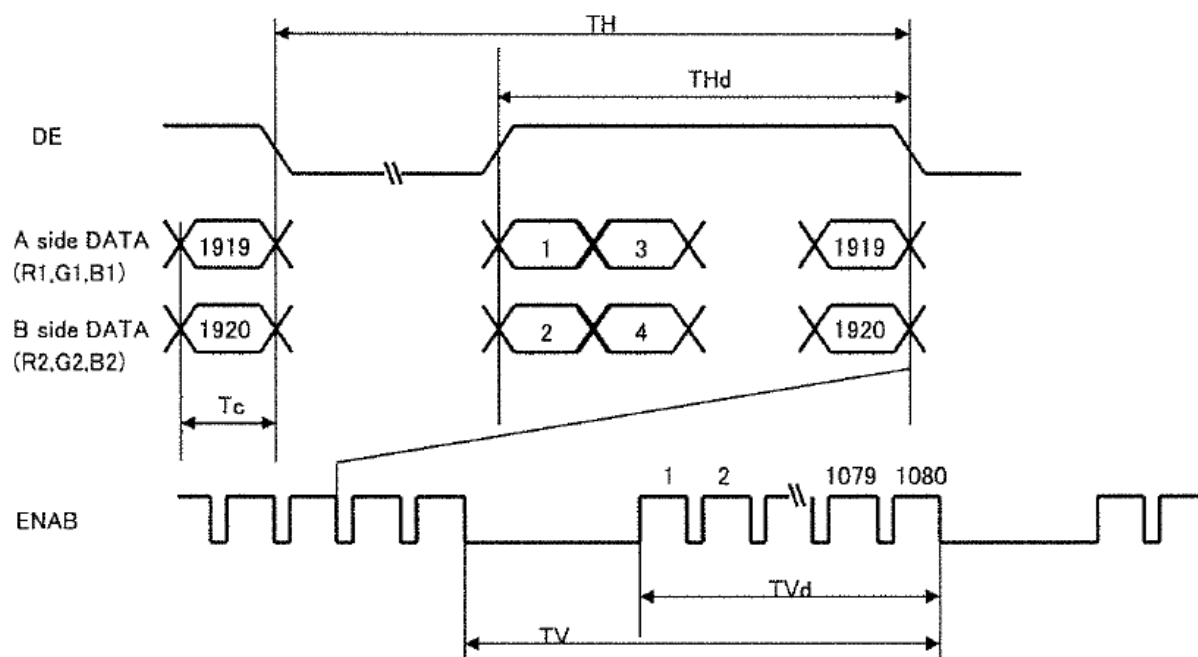
Corresponding Connector: SHLP-10V-S-B(J.S.T Mfg. Co. Ltd)

コネクタNo. Connector No.	端子No. Pin No.	記号 Symbol	機能 Function
CN2	1	VDD	+12V電源 +12V power supply
	2	VDD	+12V電源 +12V power supply
	3	VDD	+12V電源 +12V power supply
	4	VDD	+12V電源 +12V power supply
	5	GND	GND
	6	GND	GND
	7	GND	GND
	8	GND	GND
	9	BL_EN	バックライトON/OFF制御信号入力端子 ON/OFF control signal for backlight
	10	PWM	バックライト輝度調整用PWM信号入力端子 PWM signal for backlight dimming

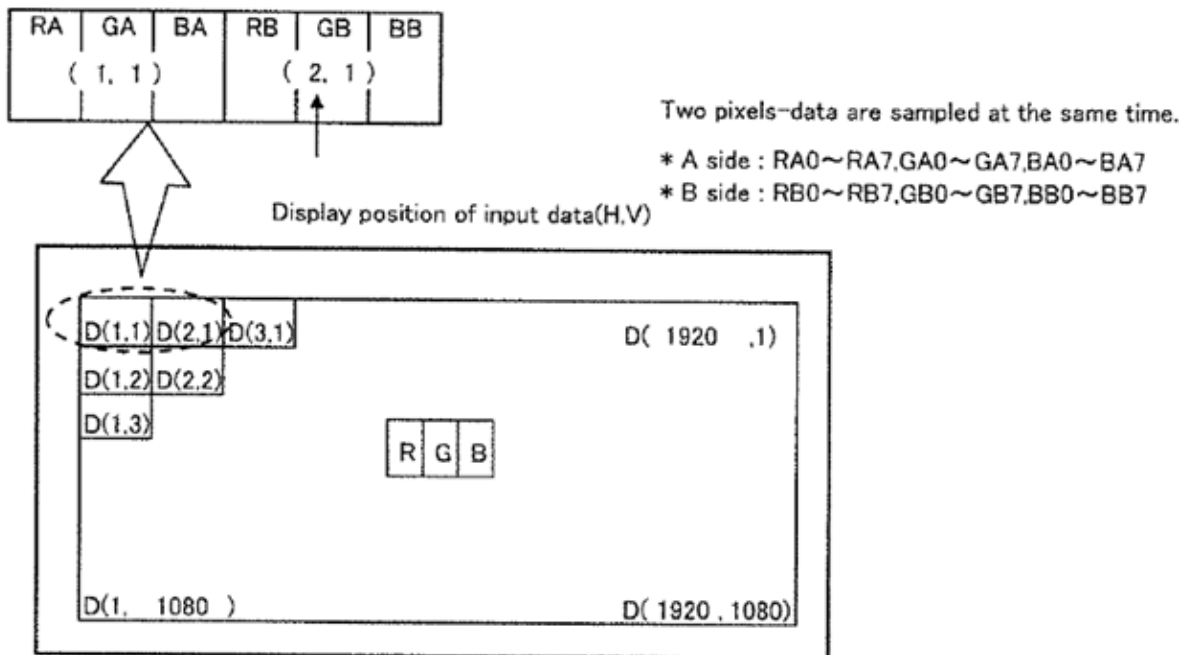
2.6 Timing Characteristics of Input Signals

項目 Parameter	記号 Symbol	最小 Min.	標準 Typ.	最大 Max.	単位 Unit	備考 Remark
クロック CLK						
周波数 Frequency	$1/T_c$	60.0	70	85.0	MHz	
イネーブル DE	水平周期 Horizontal period	1010	1040	1200	clock	【Note1】
		13.1	14.9	—	μs	
	有効表示領域 Horizontal display period	THd	960 × 2ch	960 × 2ch	960 × 2ch	
	垂直周期 Vertical period	1090	1111	1200	line	
		—	16.51	—	ms	
	有効表示領域 Vertical display period	TVd	1080	1080	1080	line

[Note1] In case of using the long vertical period, the deterioration of display quality, flicker etc. may occur.



2.7 Input Data Signals and Display Position on the screen



2.8 Input Signals, Basic Display Colors and Gray Scale of Each Color

	色・階調 Colors & Gray scale	データ信号 Data signal																											
		Gray Scale	R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7			
基本色 Basic Color	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		
	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	1		
	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	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	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	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	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	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	1		
赤の階調 Gray Scale of Red	Black	GS0	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		
	↑	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	↑	↓	↓								↓								↓										
	↓	↓	↓								↓								↓										
	Brighter	GS253	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	↓	GS254	0	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	GS255	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
緑の階調 Gray Scale of Green	Black	GS0	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		
	↑	GS1	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	GS2	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		
	↑	↓	↓								↓								↓										
	↓	↓	↓								↓								↓										
	Brighter	GS253	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0		
	↓	GS254	0	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	GS255	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		
青の階調 Gray Scale of Blue	Black	GS0	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		
	↑	GS1	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		
	Darker	GS2	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		
	↑	↓	↓								↓								↓										
	↓	↓	↓								↓								↓										
	Brighter	GS253	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1		
	↓	GS254	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1		
	Blue	GS255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1		

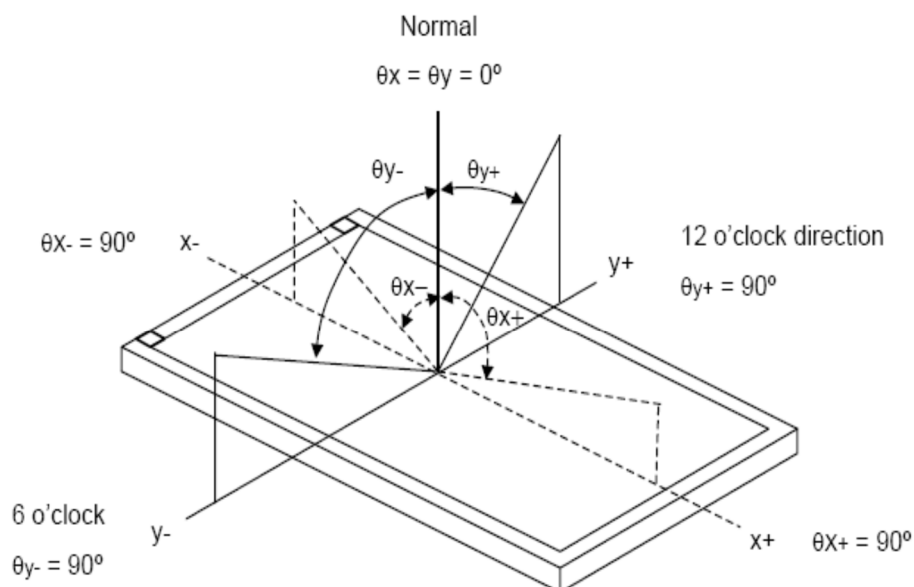
Each basic color can be displayed in gray scales from bit data signals. According to the combination of total 24 bit data signals, the 16.77-million-color display can be achieved on the screen.

3 Optical Specification

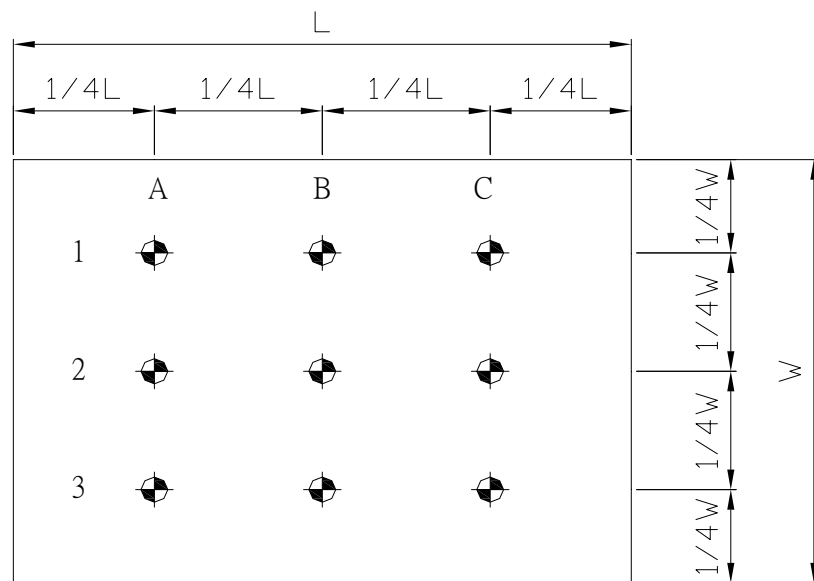
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	$\theta_x=0$ $\theta_y=0$ Klein K-10	0.577	0.607	0.637	-	Test Mode: (1) (2) (3)
		Ry		0.285	0.315	0.345	-	
	Green	Gx		0.276	0.306	0.336	-	
		Gy		0.558	0.588	0.618	-	
	Blue	Bx		0.123	0.153	0.183	-	
		By		0.061	0.091	0.121	-	
	White	Wx		0.251	0.281	0.311	-	
		Wy		0.269	0.299	0.329	-	
Center Luminance of White		Lc	$\theta_x=0$	-	2500	-	cd/m ²	
Uniformity		Lu	$\theta_y=0$ BM-7	-	88	-	%	
Contrast Ratio		CR	$\theta_x=0$	-	7500:1	-	-	Test Mode: (1) (4)
Color Saturation		NTSC	$\theta_y=0$ Klein K-10	-	70	-	%	
Viewing Angle	Horizontal	θ_{x+}	$CR \geq 10$	-	89	-	Deg	Test Mode: (1) (3)
		θ_{x-}		-	89	-		
	Vertical	θ_{y+}		-	89	-		
		θ_{y-}		-	89	-		

Test Mode :

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

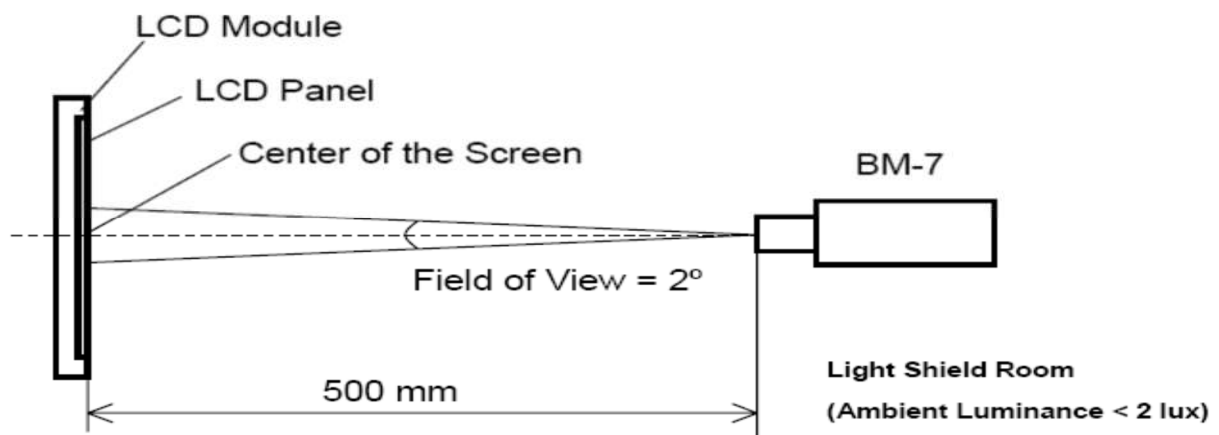


(2) Definition of Test Point:

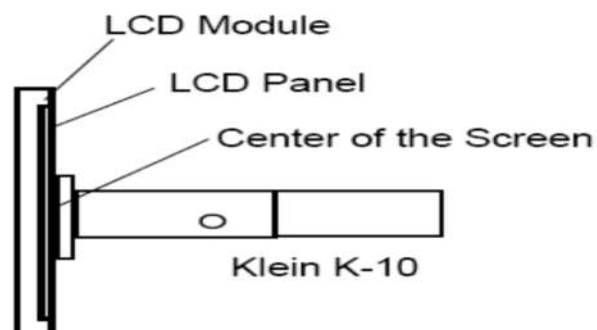


Active Area

(3) BM-7 Measurement Setup:



(4) Klein K-10 Measurement Setup:

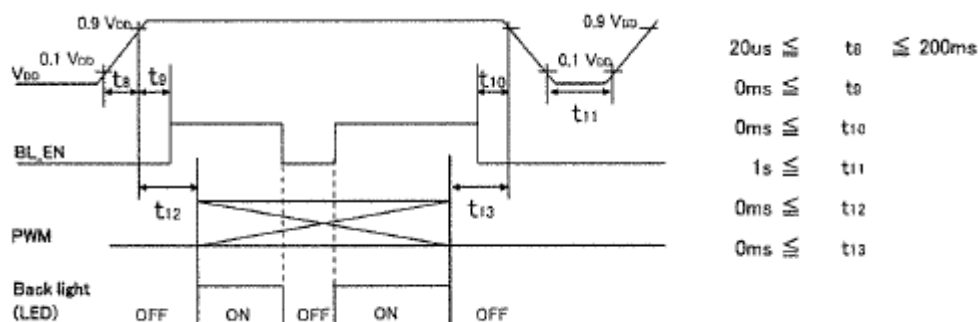


4 Backlight driving Section

T_a=+25°C

項目 Parameter	記号 Symbol	最小 Min.	標準 Typ.	最大 Max.	単位 Unit	備考 Remark
電源電圧 Supply voltage	V _{DD}	10.8	12.0	13.2	V	【Note1】
消費電流 Current dissipation	I _{DD1}	—	650	900	mA	【Note2】
	I _{DD5}	—	—	100	μA	【Note3,4】
許容入力リップル電圧 Permissible input ripple voltage	V _{RP, BL}	—	—	200	mV _{p-p}	V _{DD} =+12.0V
BL_EN	入力Hi電圧 High voltage	V _{IH, BL_EN}	2.7	—	V _{DD}	【Note3,5】
	入力Lo電圧 Low voltage	V _{IL, BL_EN}	—	0.4	V	【Note3,5】
PWM	入力Hi電圧 High voltage	V _{IH, PWM}	2.7	—	V _{DD}	【Note4】
	入力Lo電圧 Low voltage	V _{IL, PWM}	—	0.4	V	【Note4】
PWM周波数 PWM frequency	f _{PWM}	200	—	1K	Hz	【Note6】
PWMデューティ比 PWM duty ratio	D _{PWM}	10	—	100	%	【Note6】
寿命 Life time	L	—	70,000 (Module)	—	h	【reference】 【Note7,8】

【Note1】 On-off conditions for supply voltage



【Notw2】 Current dissipation

V_{DD}= +12.0V, PWM Duty=100%

【Note3】 BL_EN terminal is connected to a 68K ohm pull-down resistor.

【Note4】 PWM terminal is not connected pull-down resistor.

【Note5】 High: Backlight ON
Low: Backlight OFF

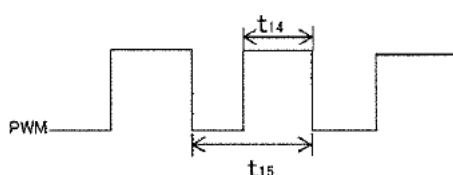
【Note6】 f_{PWM} = 1/t15

Duty 10%: MIN. Luminance

Duty 100%: MAX. Luminance

Luminance changes in proportion to the duty ratio. (t14 ≥ 500 us)

When the frequency slows, the display fineness might decrease.

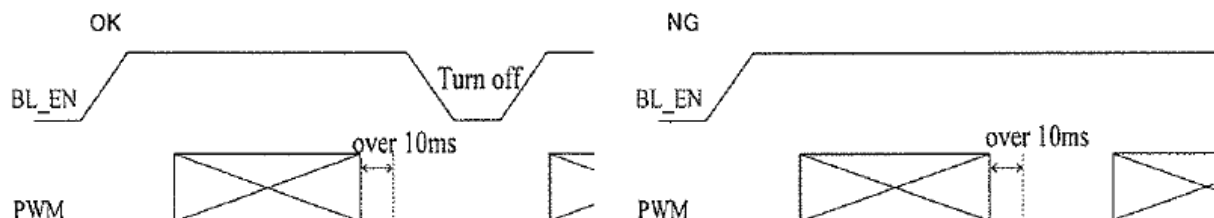


[Note7] Luminance becomes 50% of an initial value. ($T_a=50^{\circ}\text{C}$, PWM=100%)

[Note8] The LED used in this LCD module is very sensitive to temperature change. If it operates for extremely long time under high temperature. It is possible rapidly to shorten the life time of LED. In case of such condition, consult with us.

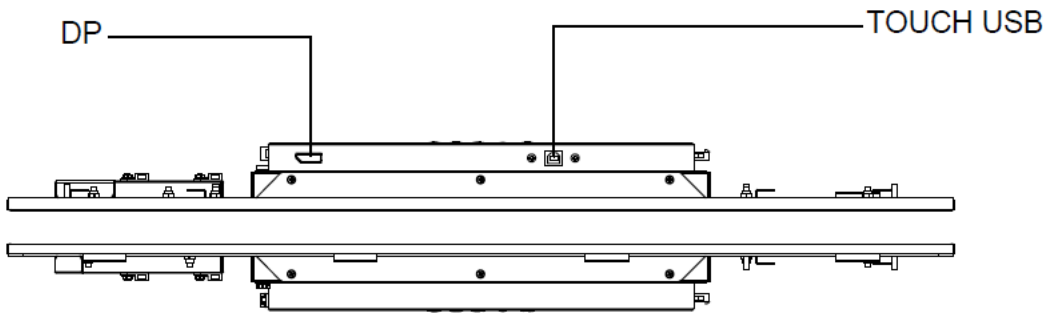
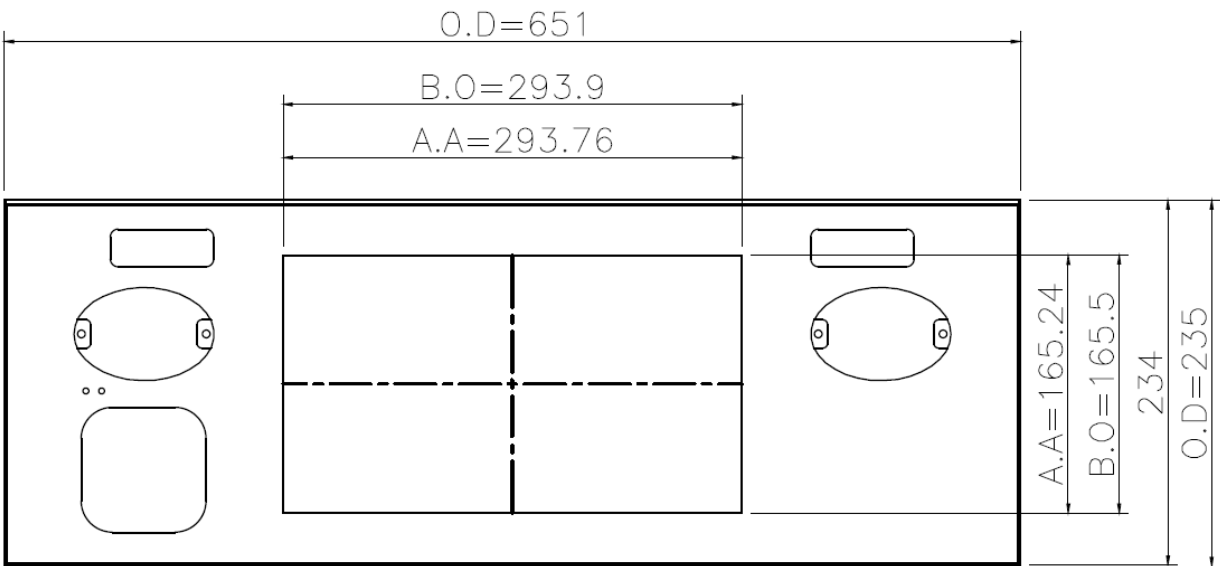
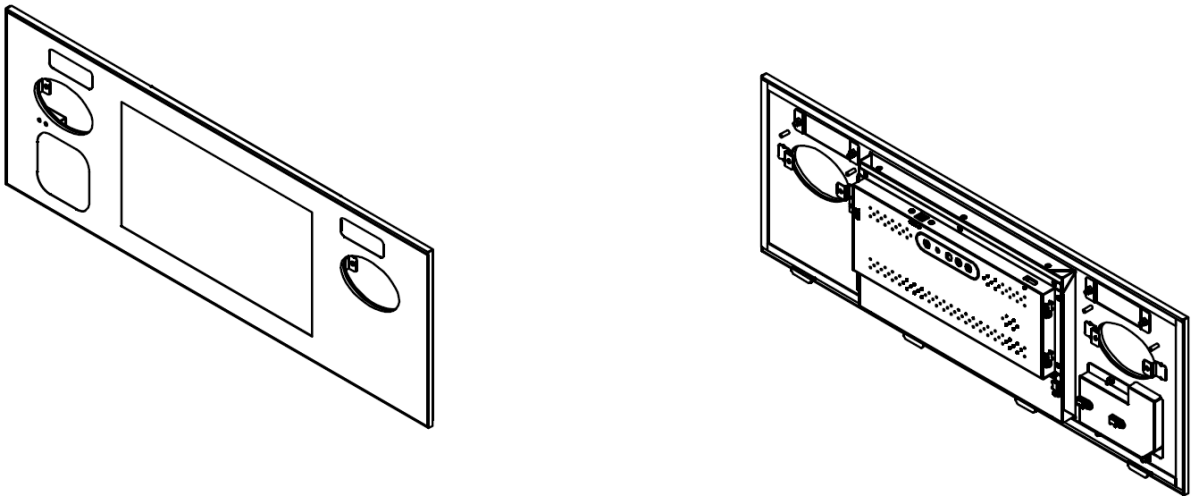
[Note9] When PWM signal is set “Low” more than 10ms, please turn off BL_EN.

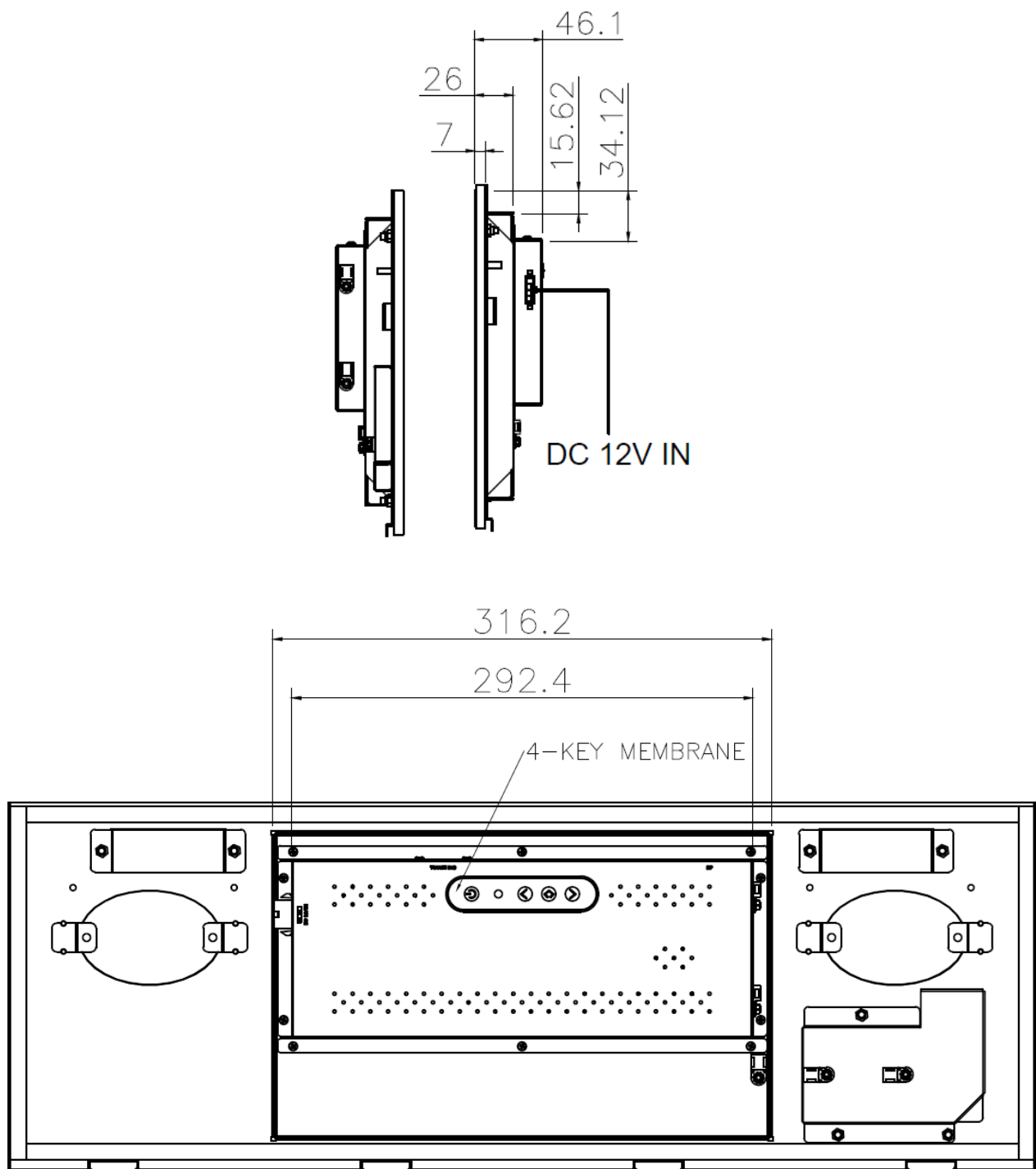
If PWM signal is input without reset of BL_EN. Soft start function of LED driving circuit is invalid and inrush current may occur.



5 Mechanical Drawing

Unit:mm





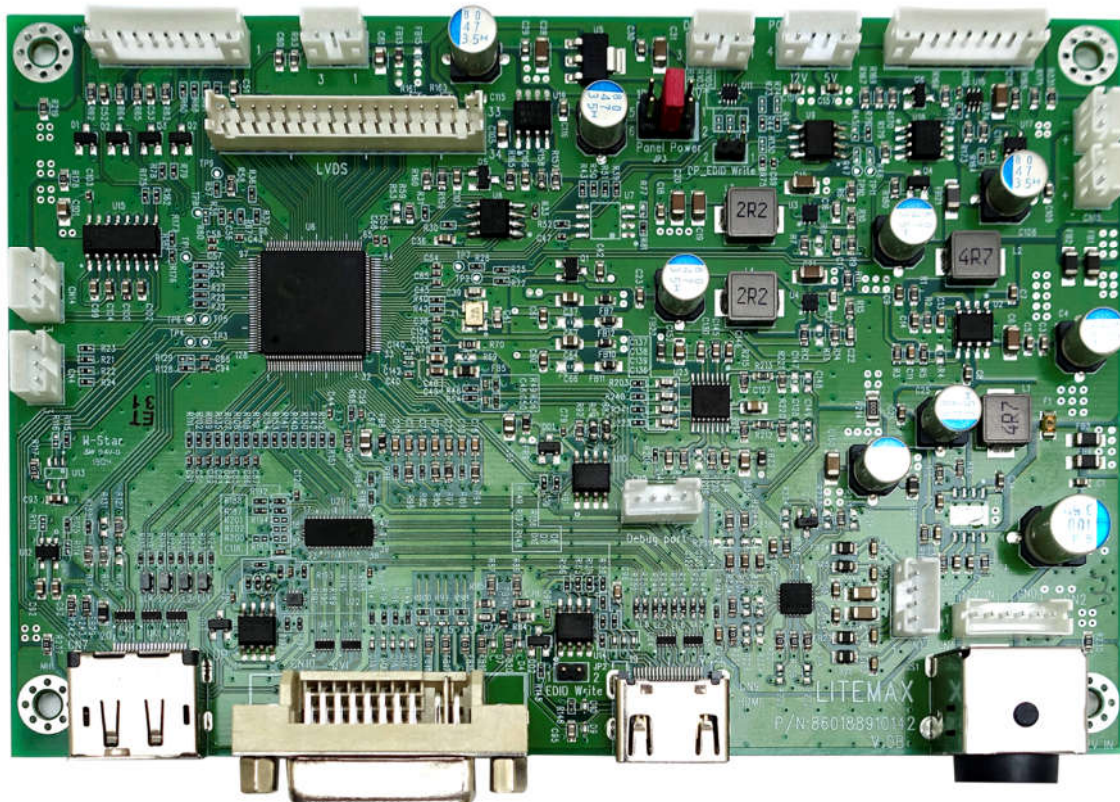
Note :
 O.D. : Outline Dimension
 B.O. : Bezel Opening
 A.A. : LCD Active Area

6 AD8891DHP 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 display port and DVI-I and HDMI input. Rev.1 is European RoHS compliant.

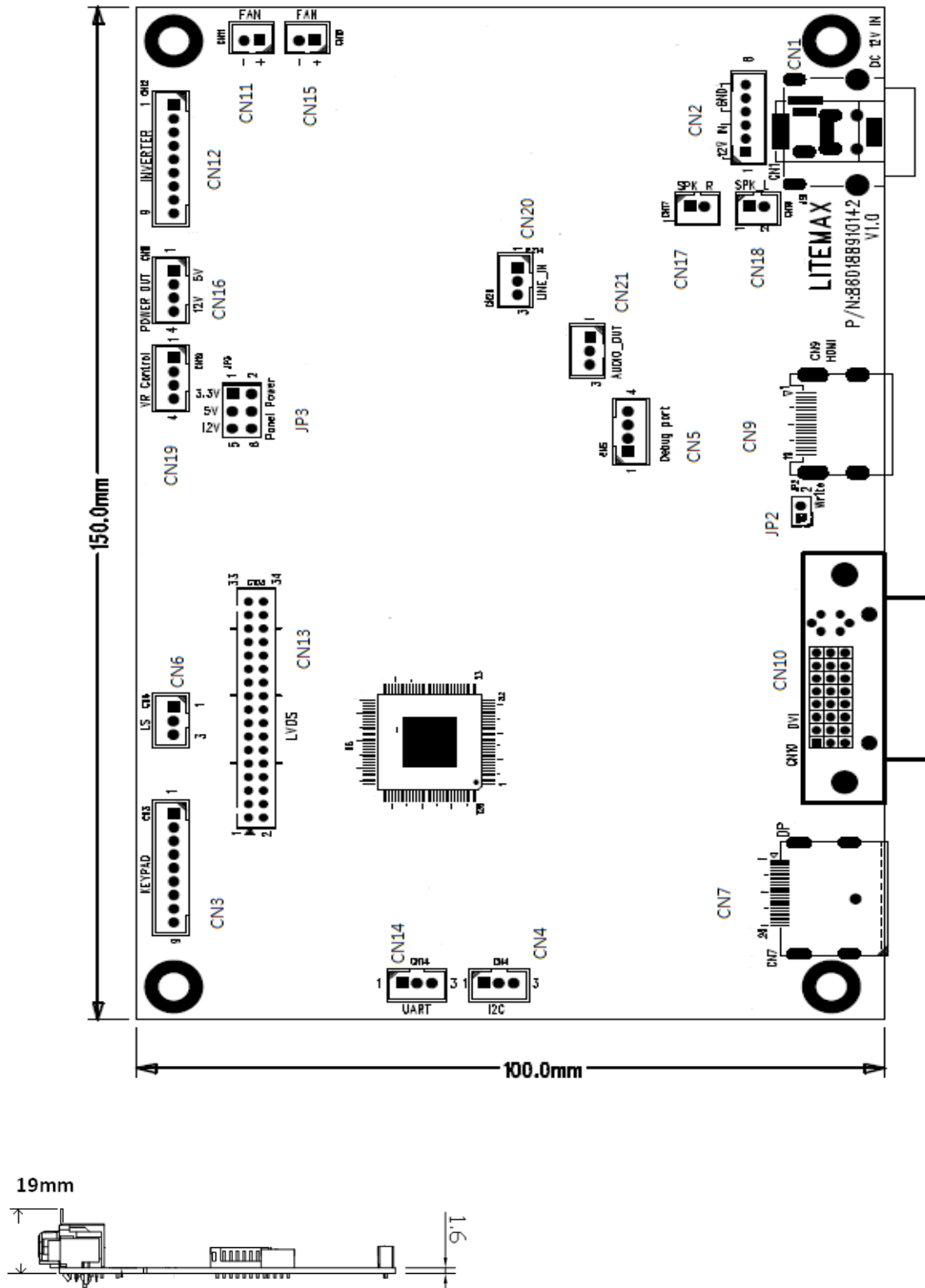
General Description

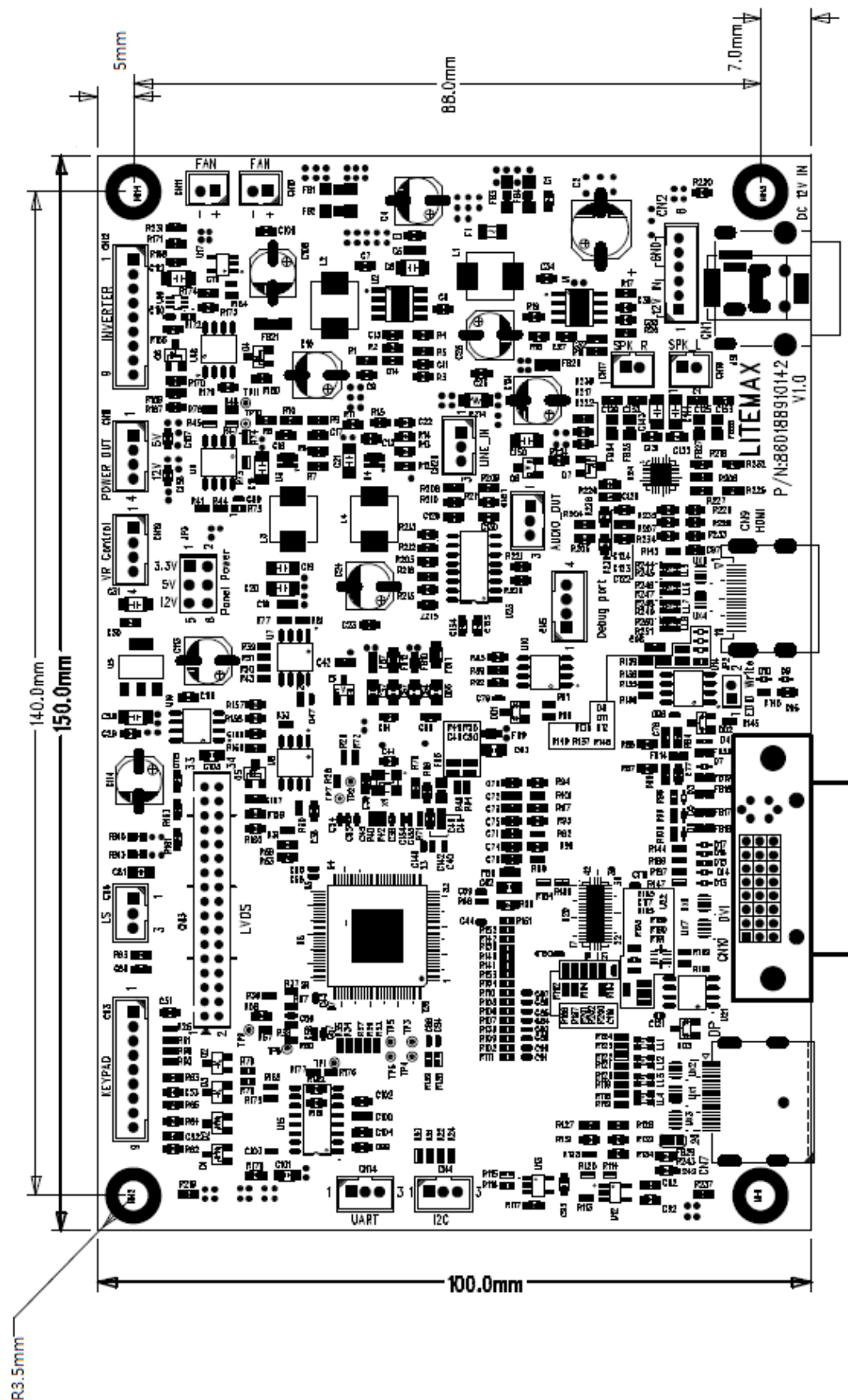
- Max Resolution Up To Full HD
- Analog RGB Input up to 205MHz
- ULTRA-RELIABLE DVI-I INPUT
- HDMI INPUT(HDMI 1.3)
- Dual/single LVDS interface
- Support Panel DC 5V or 12V,3.3V Output
- OSD Control
- PWM/DC Dimming Control for backlight driver.
- External RS232 control (optional)
- Input Power 12Vdc or 24Vdc
- Display port input. (Support display port 1.2a)
- Audio in and 3Wx2 (4 Ω)Audio Out(optional)
- *External Digital light sensor brightness control (optional)
- *External light sensor brightness control (optional)
- Support output voltage 12V(1A) and 5V(1A)



Outline Dimensions

AD8891 150mmX100mm





CN13: Panel LVDS connector

Pin No.	Function	Pin No.	Function
1	RxO0-	18	RxE1+
2	RxO0+	19	RxE2-
3	RxO1-	20	RxE2+
4	RxO1+	21	RxEC-
5	RxO2-	22	RxEC+
6	RxO2+	23	RxE3-
7	RxOC-	24	RxE3+
8	RxOC+	25	RxE4-
9	RxO3-	26	RxE4+
10	RxO3+	27	GND
11	RxO4-	28	GND
12	RxO4+	29	Pull Low
13	GND	30	Pull Height
14	GND	31	VLCD
15	RxE0-	32	VLCD
16	RxE0+	33	VLCD
17	RxE1-	34	VLCD

CN10: DVI-I INPUT Connector

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2/4 Shield	11	T.M.D.S. Data1/3 Shield	19	T.M.D.S. Data0/5 Shield
4	T.M.D.S. Data4-	12	T.M.D.S. Data3-	20	T.M.D.S. Data5-
5	T.M.D.S. Data4+	13	T.M.D.S. Data3+	21	T.M.D.S. Data5+
6	DDC Clock	14	+5V Power	22	T.M.D.S. Clock Shield
7	DDC Data	15	Ground (for +5V)	23	T.M.D.S. Clock+
8	Vertical SYNC.	16	Hot Plug Detect	24	T.M.D.S. Clock-
C1	Red input	C2	Green input	C3	Blue input
C4	Horizontal SYNC.	C5	Analog GND		

CN7: DISPLAY PORT

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

CN9: HDMI Input connector (HDMI 19Pin)

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

CN1: Power DIN (12V)

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

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

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

CN16: Touch Power connector

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

CN21: Inverter Connector(9PIN 2.0mm)

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

CN11, CN15: Fan control (2PIN 2.0mm)

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

CN3: Key Pad (9PIN 2.0mm)

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

JP3: Panel Power

Pin No.	Function	Pin No.	Function
1-2	3.3	5-6	12V
3-4	5V		

CN14: RS232 Connector (3PIN 2.0mm)

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

CN20: LINE IN (3PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	AUDIO-R	2	AUDIO-L
3	GND		

CN17: Speaker Connector (2PIN 2.0mm)

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

CN18: Speaker Connector (2PIN 2.0mm)

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

CN19: Interrupt Control (4PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	5V	2	INT
3	GPIO	4	GND

Reserve for some control

CN6: Ambient (2PIN 2.0mm)

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

CN21: Audio out connector (3PIN 2.0mm)

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

For audio connect to another Audio AMP

CN4: I2C Connector (3PIN 2.0mm)

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

For digital LS

JP2: EDID Jumper (2PIN 2.0mm)

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

When EDIE wan to update it must be short.

CN5: Debug Connector (4PIN 2.0mm)

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

For F/W debug

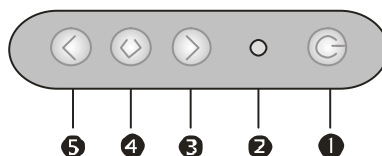
DC Characteristics.

Power Consumption	10W	Note1
Operation Temperature	-30~85	°C
Storage Temperature	-20~85	°C

Note: These values are for the A/D board body.

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.

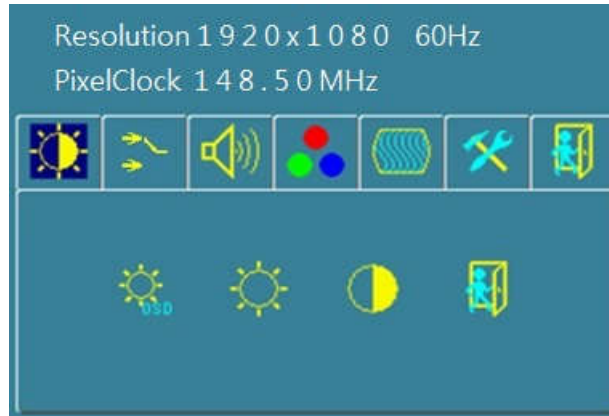
5. Return & Exit the main menu

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 7 sub menus within the OSD user interface:
Brightness, Signal Select, Sound, Color, Image, Tools, and Exit.

When you press the “menu” button, you enter the “Brightness” sub directory. In this directory, you will see 4 selections:



press “menu” once, you can go into the **Ambient light sensor**.



Ambient light sensor:

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



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”.



Exit: back to the beginning menu.



HDMI

HDMI: HDMI input

DVI

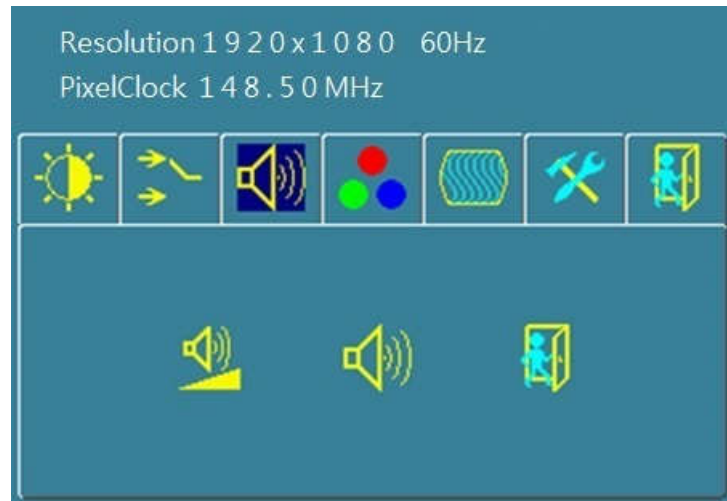
Digital: DVI input

DP

DP: DisplayPort input (Optional)

Exit

Exit: back to the beginning menu.



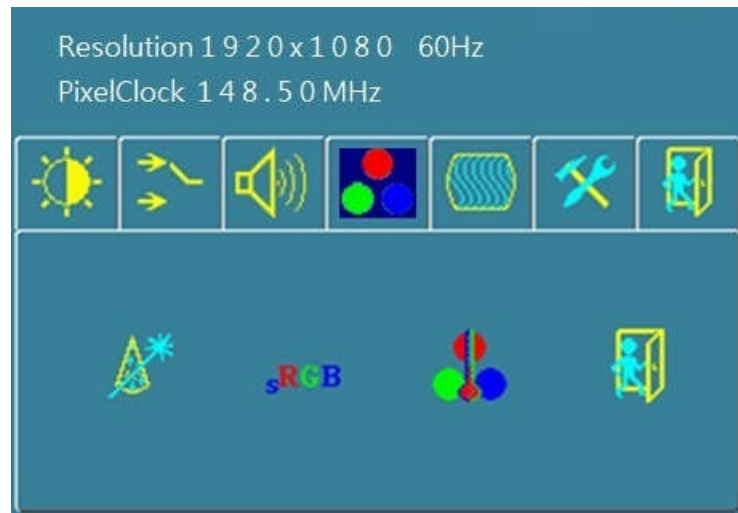
Audio Volume: Audio volume adjustment.



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



Exit: back to the beginning menu.



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



sRGB: Windows standard color setting



Color Temperature: You have 4 options in this selection



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



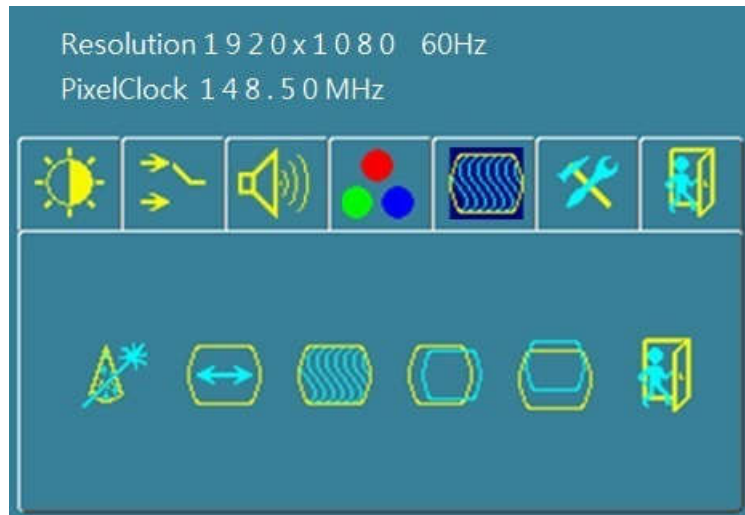
Color Tempture_6500K: Warm color scheme



Color Tempture_9300K: Cold color scheme



Exit: back to the beginning menu.



Auto Adjust:

Choose this option and the AD6038 will adjust to the optimal horizontal and vertical frequency.



Clock: If you are not satisfied with the Auto tune result, you can adjust manually by pressing “Clock”. Using this will make the image wider.



Phase: If “double images” appear around the characters, choose “Phase” to remove them..



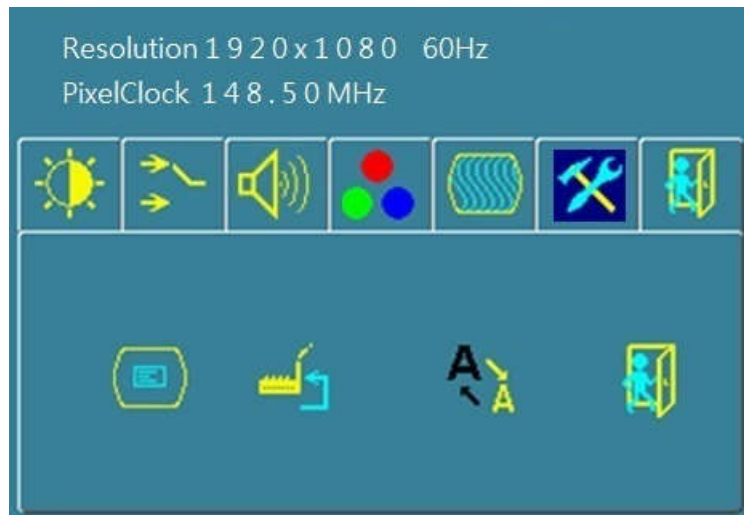
HPos: You can shift the screen horizontally using this function.



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



Exit: back to the beginning menu.



OSD Control: Selecting this option, brings you to 4 more options:



Osd_time: Select time for the OSD user interface to stay on screen, for 2 sec. to 16 sec. Default is 10 sec.



Osd_HPos: Moves the OSD user interface horizontally on screen.



Osd_VPos: Moves the OSD user interface vertically on screen.



Exit: You can exit this sub menu back to the beginning



Factory_Reset: By pressing this, the screen will revert to factory settings, and the previous settings will be deleted.



Sharpness: Sharpen characters.



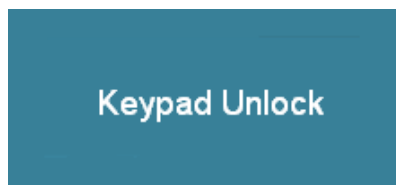
Exit: back to the normal screen

OSD Lock Function :

It is possible to lock all the OSD buttons to prevent unauthorized changes to occur by pressing “**right >**” and “Menu” buttons simultaneously. You will see the “lock” icon below on the center of the screen for 8 ~ 9 seconds. If any button is pushed after the lock function is initiated, the below icon will appear on the screen.'



To release the OSD lock, press and “**right >**” and “Menu”. The below icon will appear on the center of the screen for 8 ~ 9 seconds. Now all OSD keys are active again.



7 Wireless Charger Module Characteristics

7.1 Input Characteristics

7.1.1 Input Voltage & Frequency

Item	Minimum	Normal	Maximum
Input Voltage	11Vdc	12Vdc	13Vdc
Frequency	110KHZ ~ 145KHZ		

7.1.2 Input Current

1.8mA max. @ 12Vdc Full load

7.1.3 Inrush Current (cold)

2.0mA max. @12Vdc Full load & Ambient temperature 25°C

7.1.4 Energy Consumption

At 11.5Vdc or 12.5Vdc, Energy Consumption $\leq 0.03A$

7.2 Output Characteristics

7.2.1 Static Output Characteristics< Vo & R+N>

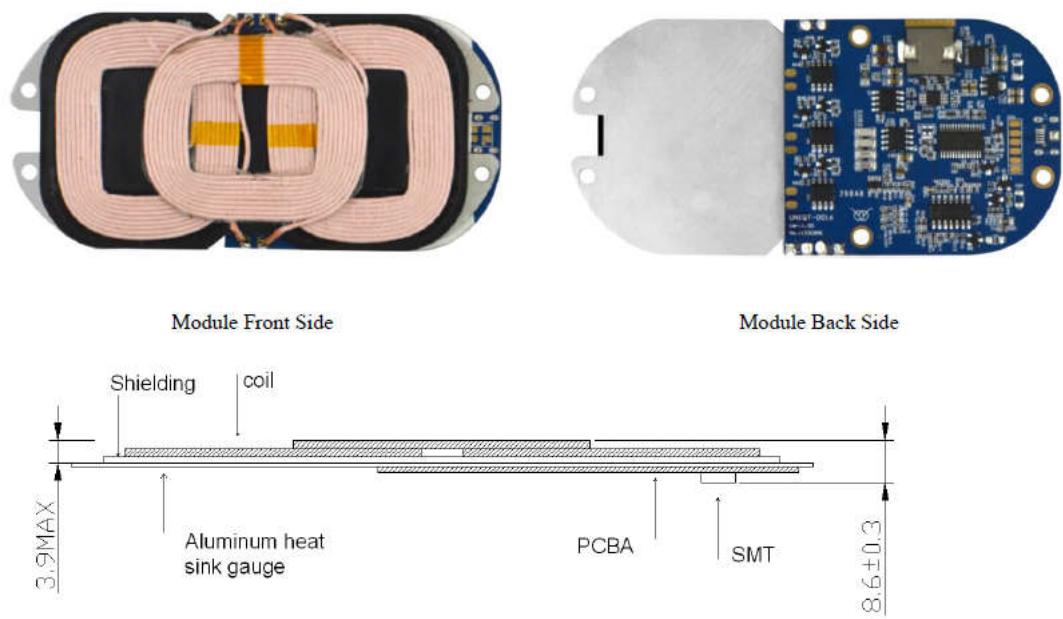
Output	Rated Load		Peak Load	Output Range	R+N	Remark
Power	Min. Load	Max. Load				
15W	0.10A	1.25A	1.50A	12V $\pm$ 5%	$\leq 300m$ Vp-p	

Note: Ripple & Noise: Measurement is done by 20MHZ bandwidth oscilloscope and the output end paralleled a 0.1uF ceramic capacitor and a 47uF electrolysis capacitor.

7.2.2 Line & Load Regulation

Output	Load Condition		Line Regulation	Load Regulation	Remark
Power	Min. Load	Max. Load			
15W	0.1A	1.25A			

7.3 Mechanical Drawing



8 Precautions

8.1 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.

8.2 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.

8.3 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.

9 Disclaimer

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