

LITEMAX

DLD0765-I V1

Sunlight Readable 7" LED B/L LCD

User Manual

Approved by	Checked by	Prepared by

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Record of Revision

Version and Date	Page	Old Description	New Description	Remark
Sep/25/2024	all		Initial release	

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1 General Description

The **DLD0765-I** is a 7 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 Durapixel LED backlight technology ensures high reliability and low power consumption, suitable for outdoor application, kiosk, factory automation, military, transportation and gaming application.

1.1 Key Features

- High Brightness 1000 nits
- Sunlight Readable
- Resolution: 1024x600
- LED Backlight
- Aspect Ratio of 16:9
- Wide Temperature (-20°C ~70°C)
- Low Power Consumption
- BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	DLD0765-I
Description	7" TFT LCD, LED Backlight 1000 nits, 1024x600
Screen Size	7"
Display Area (mm)	154.21(H) x 85.92(V) mm
Brightness (Typical)	1000 cd/m2
Resolution	1024x600
Aspect Ratio	16 : 9
Contrast Ratio (Typical)	1100 : 1
Pixel Pitch (mm)	0.1506(H) x 0.1432(V)
Pixel Pre Inch (PPI)	170
Viewing Angle	160°(H),130°(V)
Color Saturation (NTSC)	66%
Display Colors	16.7M
Response Time (Typical)	25ms
Panel Interface	LVDS
Input Interface	VGA,DVI-D,HDMI
Input Power	DC12V
Power Consumption	6W
OSD Key	4 Keys (Power Switch, Menu, +, -)
OSD Control	Brightness, Color, Contrast, Auto Turing, H/V Position...etc
Dimensions (mm)	190.4x128.4x41.5 mm
Bezel Size(U/B/L/R)	19.38/23.1/18.2/17.99 mm
Mounting	75x75 mm
Weight (Net)	0.8 kg
Operating Temperature	-20 °C ~ 70 °C
Storage Temperature	-30 °C ~ 80 °C

DLD= Panel + LED Driving Board + AD Control Board + Chassis

1.3 Absolute Maximum Rating

Permanent damage may occur if exceeding the following maximum rating.

(Note 1)

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Power voltage	DV _{DD}	-0.3	5.0	V	
	AV _{DD}	-0.3	15	V	
	V _{GH}	-0.3	42.0	V	
	V _{GL}	-20.0	0.3	V	
	V _{GH} -V _{GL}	-0.3	40.0	V	
Operation Temperature	T _{OP}	-20	70	°C	
Storage Temperature	T _{ST}	-30	80	°C	

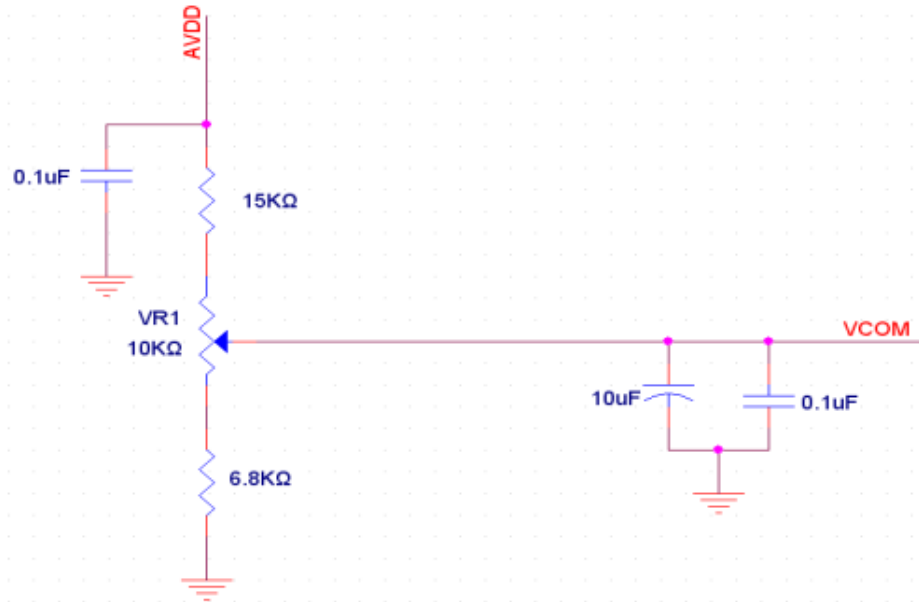
2 Electronic Specification

2.1 Typical Operation Conditions

(Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DV _{DD}	3.0	3.3	3.6	V	Note 2
	AV _{DD}	11.9	12	12.1	V	
	V _{GH}	14.5	15	15.5	V	
	V _{GL}	-10.5	-10	-9.5	V	
Input signal voltage	V _{COM}	4.05	4.21	5.05	V	Note 4
Input logic high voltage	V _{IH}	0.7 DV _{DD}	-	DV _{DD}	V	Note 3
Input logic low voltage	V _{IL}	0	-	0.3 DV _{DD}	V	

- Note 1: Be sure to apply DV_{DD} and V_{GL} to the LCD first, and then apply V_{GH} .
- Note 2: DV_{DD} setting should match the signals output voltage (refer to Note 3) of customer's system board.
- Note 3: LVDS, Reset, STBYB, SELB, L/R, U/D
- Note 4: Typ. V_{COM} is only a reference value, it must be optimized according to each LCM. Be sure to use VR.
- Note 5: The power voltage ripple of AV_{DD} & V_{COM} is $\pm 50\text{mV}$, others power voltage ripple such as DV_{DD} , V_{GH} & V_{GL} is $\pm 100\text{mV}$.



2.2 Current Consumption

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Current for Driver	IV_{GH}	0.1	0.4	0.8	mA	$V_{GH} = 15\text{V}$
	IV_{GL}	0.2	0.8	1.2	mA	$V_{GL} = -10\text{V}$
	IDV_{DD}	16	35	55	mA	$DV_{DD} = 3.3\text{V}$
	IAV_{DD}	4	20	32	mA	$AV_{DD} = 12\text{V}$

Note: test pattern: Black pattern.

3 Connector PIN assignment

FPC Connector is used for the module electronics interface. The recommended model is FH12A-40S-0.5SH manufactured by Hirose.

Pin No.	Symbol	I/O	Function	Remark
1	VCOM	P	Common Voltage	
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	---	No connection	
5	Reset	I	Global reset pin	
6	STBYB	I	Standby mode, Normally pulled high STBYB = "1", normal operation STBYB = "0", timing controller, source driver will turn off, all output are High-Z	
7	GND	P	Ground	
8	RXIN0-	I	- LVDS differential data input	
9	RXIN0+	I	+ LVDS differential data input	
10	GND	P	Ground	
11	RXIN1-	I	- LVDS differential data input	
12	RXIN1+	I	+ LVDS differential data input	
13	GND	P	Ground	
14	RXIN2-	I	- LVDS differential data input	
15	RXIN2+	I	+ LVDS differential data input	
16	GND	P	Ground	
17	RXCLKIN-	I	- LVDS differential clock input	
18	RXCLKIN+	I	+ LVDS differential clock input	
19	GND	P	Ground	
20	RXIN3-	I	- LVDS differential data input	
21	RXIN3+	I	+ LVDS differential data input	

22	GND	P	Ground	
23	NC	---	No connection	
24	NC	---	No connection	
25	GND	P	Ground	
26	NC	---	No connection	
27	NC	---	No connection	
28	SELB	I	6bit/8bit mode select	Note1
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	L/R	I	Horizontal inversion	Note2
34	U/D	I	Vertical inversion	Note2
35	VGL	P	Gate OFF Voltage	
36	NC	---	No connection	
37	NC	---	No connection	
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

I: input, O: output, P: Power

Note1: If LVDS input data is 6 bits ,SELB must be set to High;
If LVDS input data is 8 bits ,SELB must be set to Low.

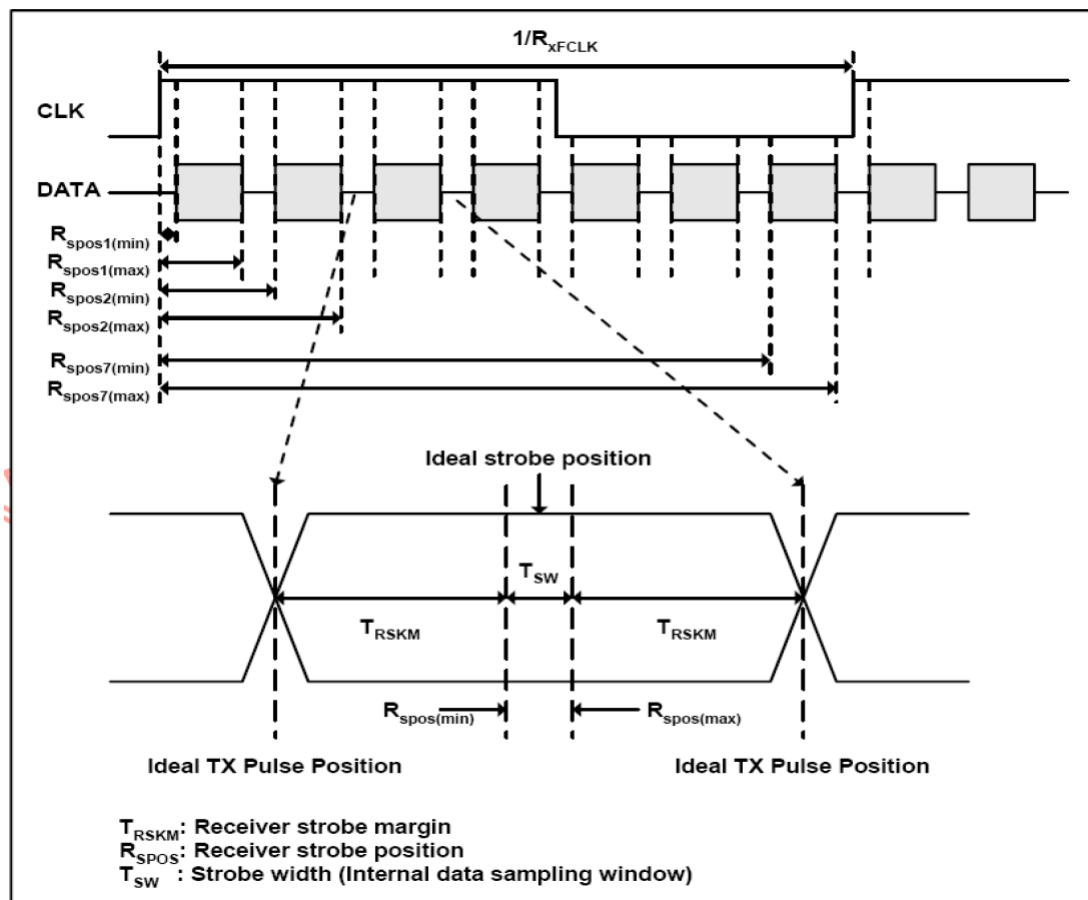
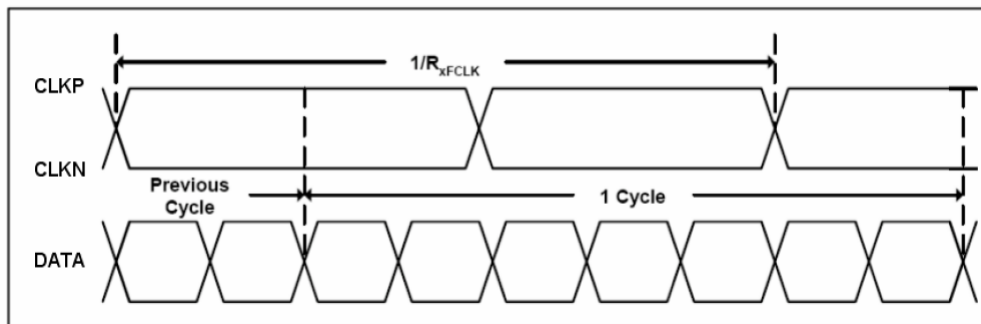
Note2: When L/R="0", set right to left scan direction.
When L/R="1", set left to right scan direction.
When U/D="0", set top to bottom scan direction.
When U/D="1", set bottom to top scan direction.

4 Timing Characteristics

4.1 AC Electrical Characteristics

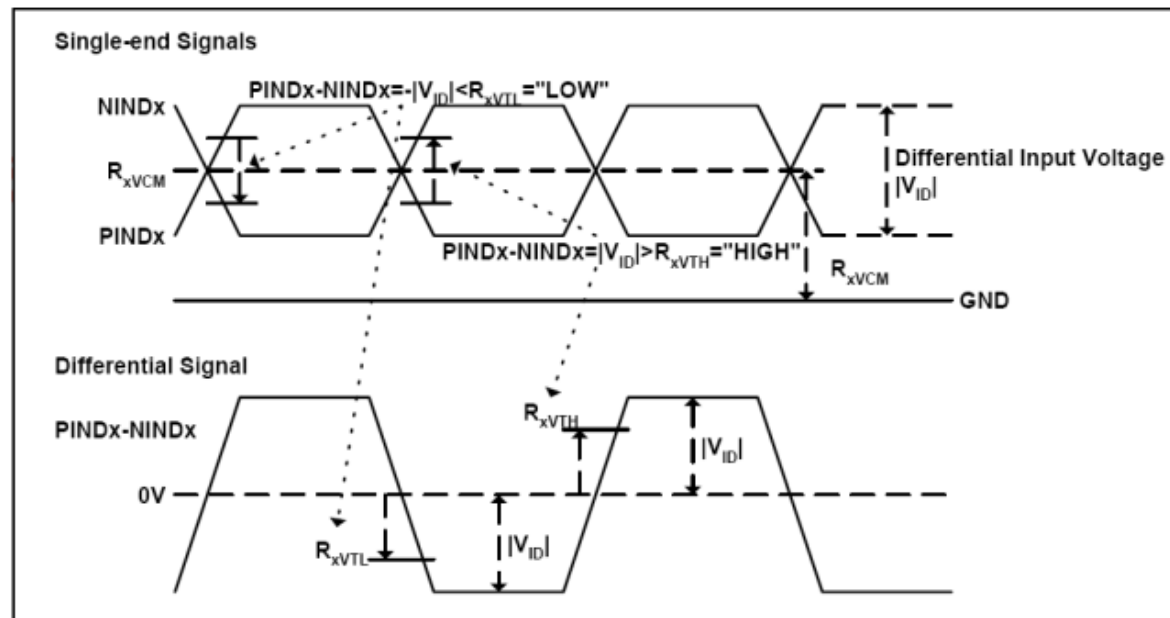
Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	40.8	51.2	67.2	MHz	
Input data skew margin	T_{RSKM}	500	900	1200	ps	
Clock high time	T_{LVCH}	$3.8/(7 * R_{xFCLK})$	$4/(7 * R_{xFCLK})$	$4.2/(7 * R_{xFCLK})$	ns	
Clock low time	T_{LVCL}	$2.8/(7 * R_{xFCLK})$	$3/(7 * R_{xFCLK})$	$3.2/(7 * R_{xFCLK})$	ns	

4.2 Input Clock And Data Timing Diagram



4.3 DC Electrical Characteristics

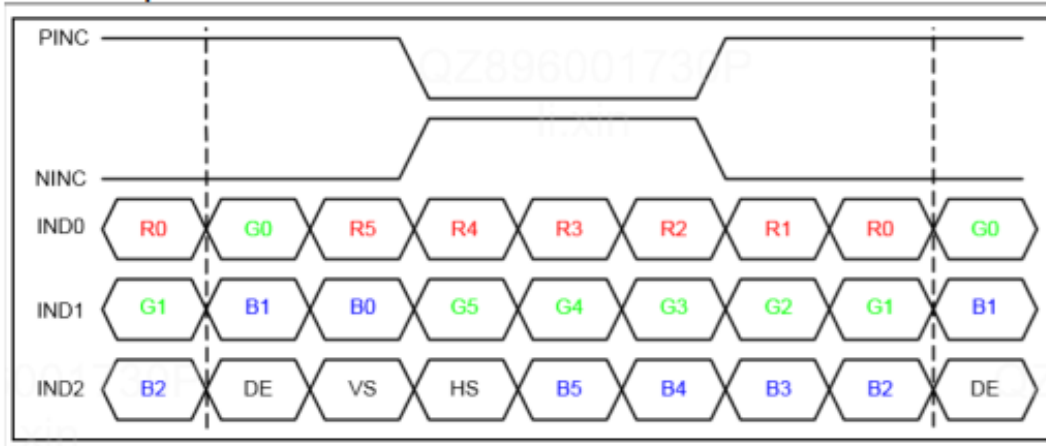
Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Differential input high Threshold voltage	R_{xVTH}	-	-	0.1	V	$R_{xVCM}=1.2V$
Differential input low Threshold voltage	R_{xVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{xVIN}	0	-	2.4	V	
Differential input common mode voltage	R_{xVCM}	$ V_{ID} /2$	-	$2.4- V_{ID} /2$	V	
Differential voltage	$ V_{ID} $	0.2	-	0.6	V	
Differential input leakage current	$R_{V_{xIIZ}}$	-10	-	+10	uA	



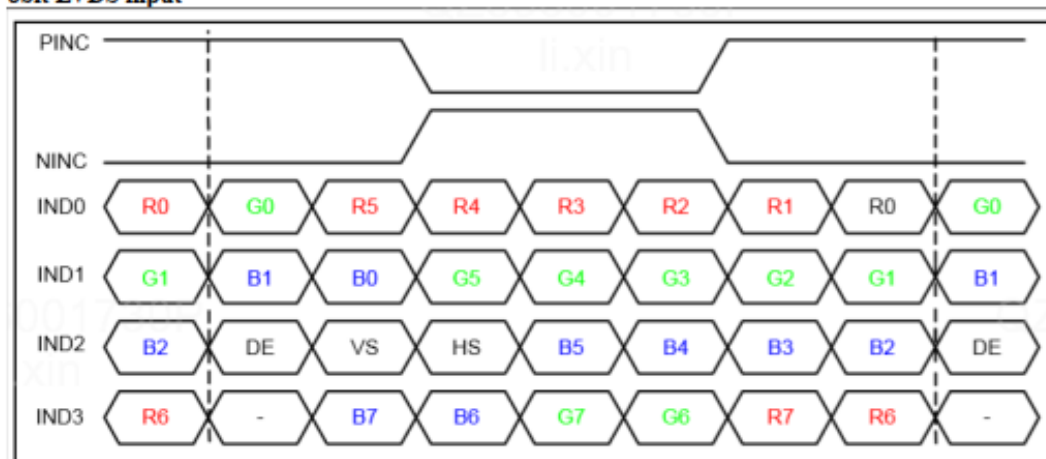
4.4 Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	fclk	40.8	51.2	67.2	MHz	Frame rate =60Hz
Horizontal display area	thd	1024			DCLK	
HS period time	th	1114	1344	1400	DCLK	
HS Blanking	thb	90	320	376	DCLK	
Vertical display area	tvd	600			H	
VS period time	tv	610	635	800	H	
VS Blanking	thb	10	35	200	H	

6bit LVDS input



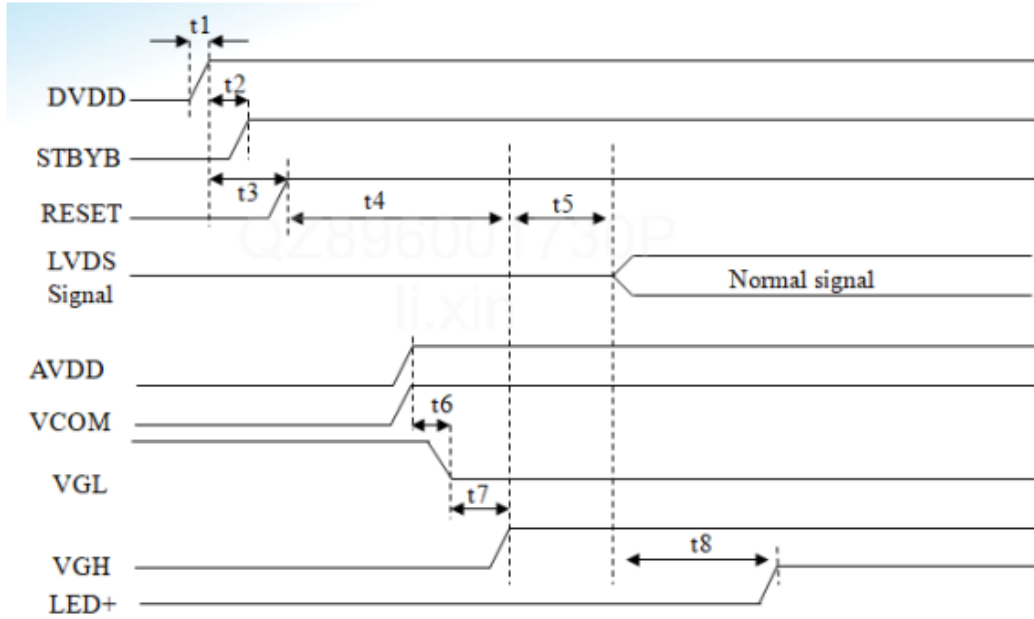
8bit LVDS input



Note: Support DE timing mode only, SYNC mode not supported.

4.5 Power ON/OFF Sequence

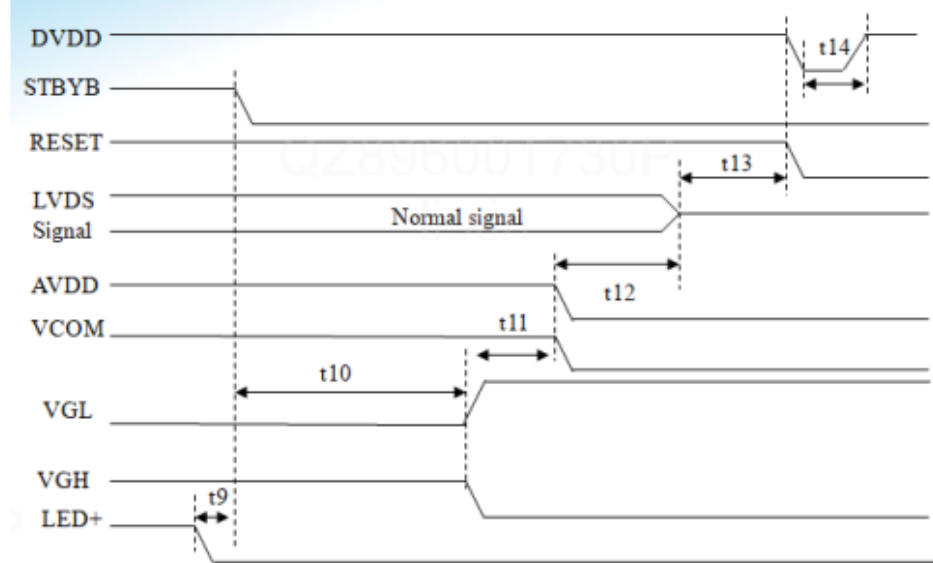
a. Power on:



DVDD→RESET→DATA→AVDD Gamma →VGL→VGH→LED+

Symbol	SPEC			Unit
	Min.	Typ.	Max.	
t1	0.5	5	20	ms
t2	20	30	50	ms
t3	1	10(RC Delay)	12	ms
t4	90	-	150	ms
t5	30	-	50	ms
t6	20	-	75	ms
t7	20	-	75	ms
t8	150	-	-	ms

b. Power off:



LED+ → VGL\VGH → AVDD Gamma → DATA → RESET → DVDD

Symbol	SPEC			Unit
	Min.	Typ.	Max.	
t9	0.1	1	10	ms
t10	120	150	200	ms
t11	50	100	200	ms
t12	1	10	20	ms
t13	0.1	10	100	ms
t14	500	-	-	ms

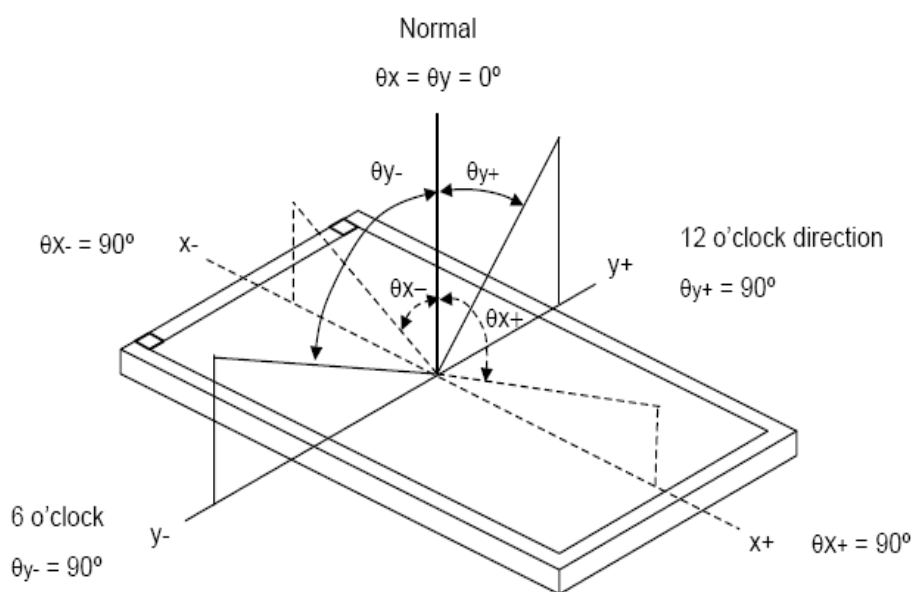
5 Optical Specification

OPTICAL SPECIFICATIONS

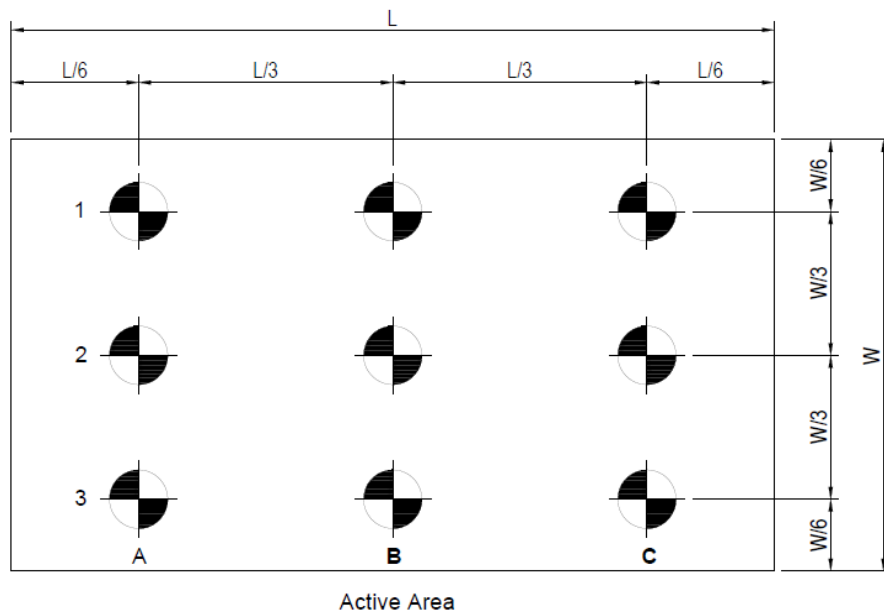
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	R _x	$\theta_x=0$ $\theta_y=0$ CA-410	0.580	0.610	0.640	-	Test Mode: (2) (3)
		R _y		0.327	0.357	0.387	-	
	Green	G _x		0.298	0.328	0.358	-	
		G _y		0.544	0.574	0.604	-	
	Blue	B _x		0.116	0.146	0.176	-	
		B _y		0.025	0.055	0.085	-	
	White	W _x		0.277	0.307	0.337	-	
		W _y		0.284	0.314	0.344	-	
Center Luminance of White		L _c	$\theta_x=0$ $\theta_y=0$	900	1000	1300	cd/m ²	
Uniformity		L _u	CA-410	-	80	-	%	
Contrast Ratio		CR	$\theta_x=0$	990:1	1100:1	-	-	Test Mode: (4)
Color Saturation		NTSC	$\theta_y=0$ Klein K-10	-	66		-	
Viewing Angle	Horizontal	θ_{x+}	-	-	80	-	Deg	Test Mode: (1)
		θ_{x-}		-	80	-		
	Vertical	θ_{y+}	-	-	60	-		
		θ_{y-}	-	-	70	-		

Test Mode :

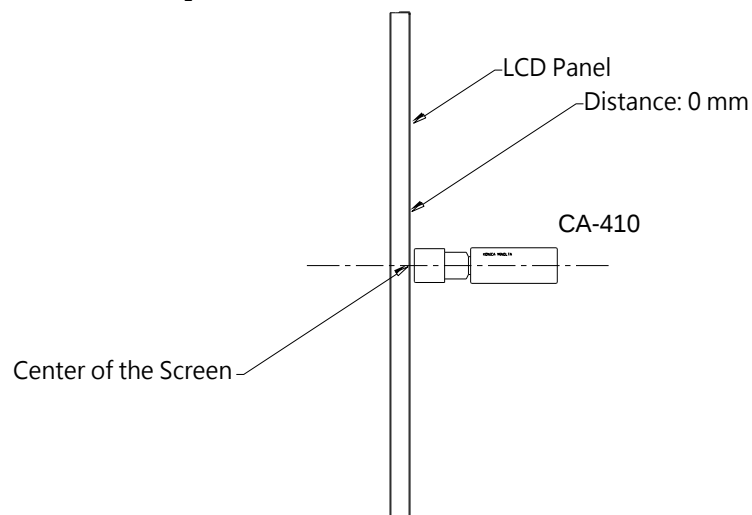
(1) Definition of Viewing Angle (θ_x , θ_y):



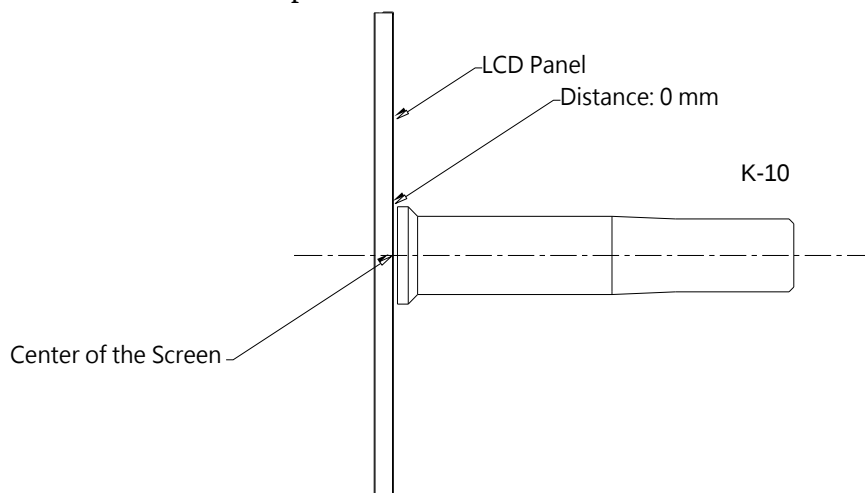
(2) Definition of Test Point:



(3) CA-410 Measurement Setup:



(4) Klein K-10 Measurement Setup:



6 LED Driving Board Specifications

This specification is applied to LED converter unit for LED backlight.

6.1 Operating Characteristics

Item	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	Vin		10.0	12.0	14.0	V	
Input Current (Low Brightness)	IinL	PWM=0%	0.0	-	-	mA	
Input Current (High Brightness)	IinH	PWM=100%	0.369	0.314	0.277	A	Note 1
LED Current (Low Brightness)	IoutL	PWM=0%	0.0	-	-	Arms	
LED Current (High Brightness)	IoutH	PWM=100%	0.136	0.137	0.139	mA	
Working Frequency	Freq	PWM=100%	390	400	410	KHz	
Brightness Control	PWM	Connection of PWM	0	-	100	%	
PWM Frequency	Freq	Dimming Signal		200		Hz	
ON/OFF Control	Von	Normal Operation	2	-	5	V	
	Voff	Normal Operation	0	-	1.8	V	
Output Voltage	Vout	PWM=100%	24.46	24.99	25.31	V	
Efficiency	η	PWM=100%	89.3	89.9	90.6	%	Note 2

Note 1: this data is based on the testing result of practical input voltage, Iin is measured by related Vin.(min, typ, max)

Note 2: $\eta_{\max} = V_{\text{out}}(\max) \cdot I_{\text{outH}}(\max) / V_{\text{in}}(\max) \cdot I_{\text{inH}}(\min)$
 $\eta_{\min} = V_{\text{out}}(\min) \cdot I_{\text{outH}}(\min) / V_{\text{in}}(\min) \cdot I_{\text{inH}}(\max)$

6.2 Connector Socket

Input Connector:J1(JST S 8B-PH-SM3-TB or Compatible)

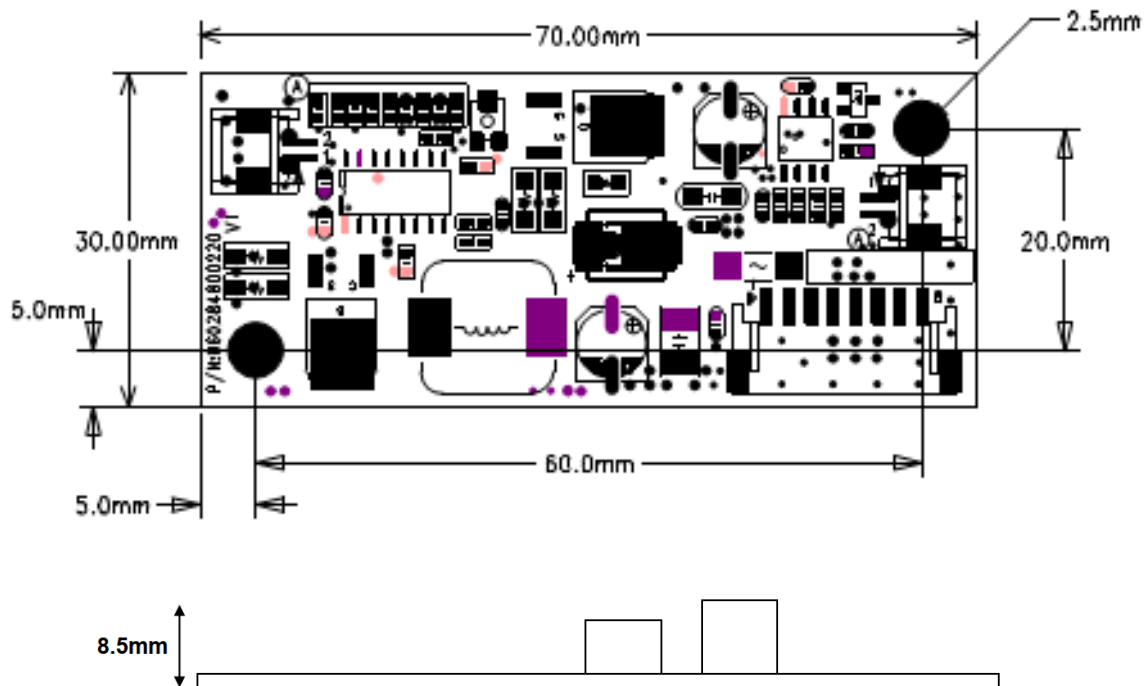
PIN No	Symbol	Description
1	Vin	DC+12V
2	Vin	DC+12V
3	Vin	DC+12V
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	Brightness	Brightness Control
8	Control	ON/OFF Control

Output Connector: J2,J3 (JST S 2B-ZR-SM4A-TF or Compatible)

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

6.3 Mechanical Characteristics

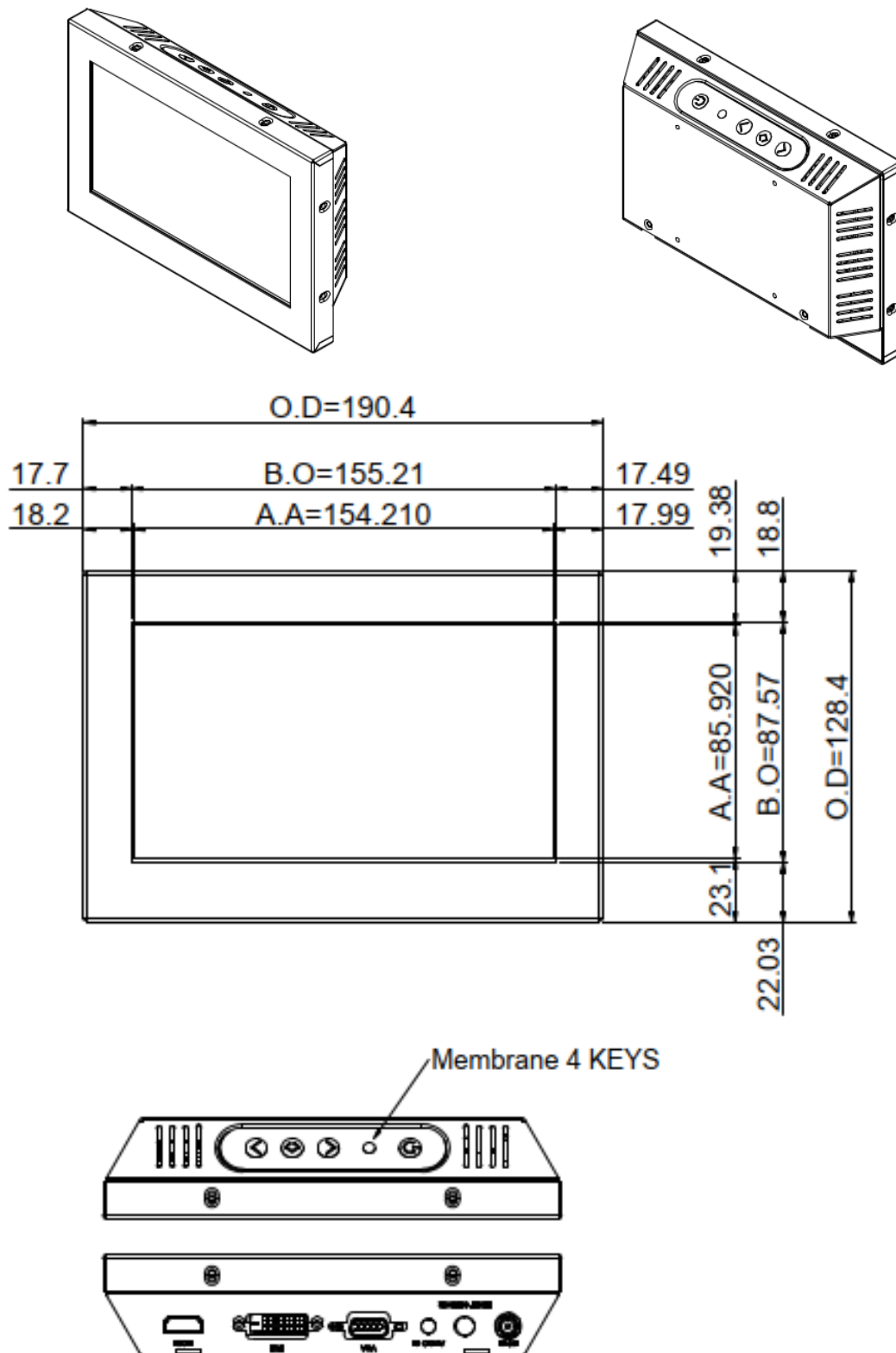
Dimension: 70 x30 x 8.5mm

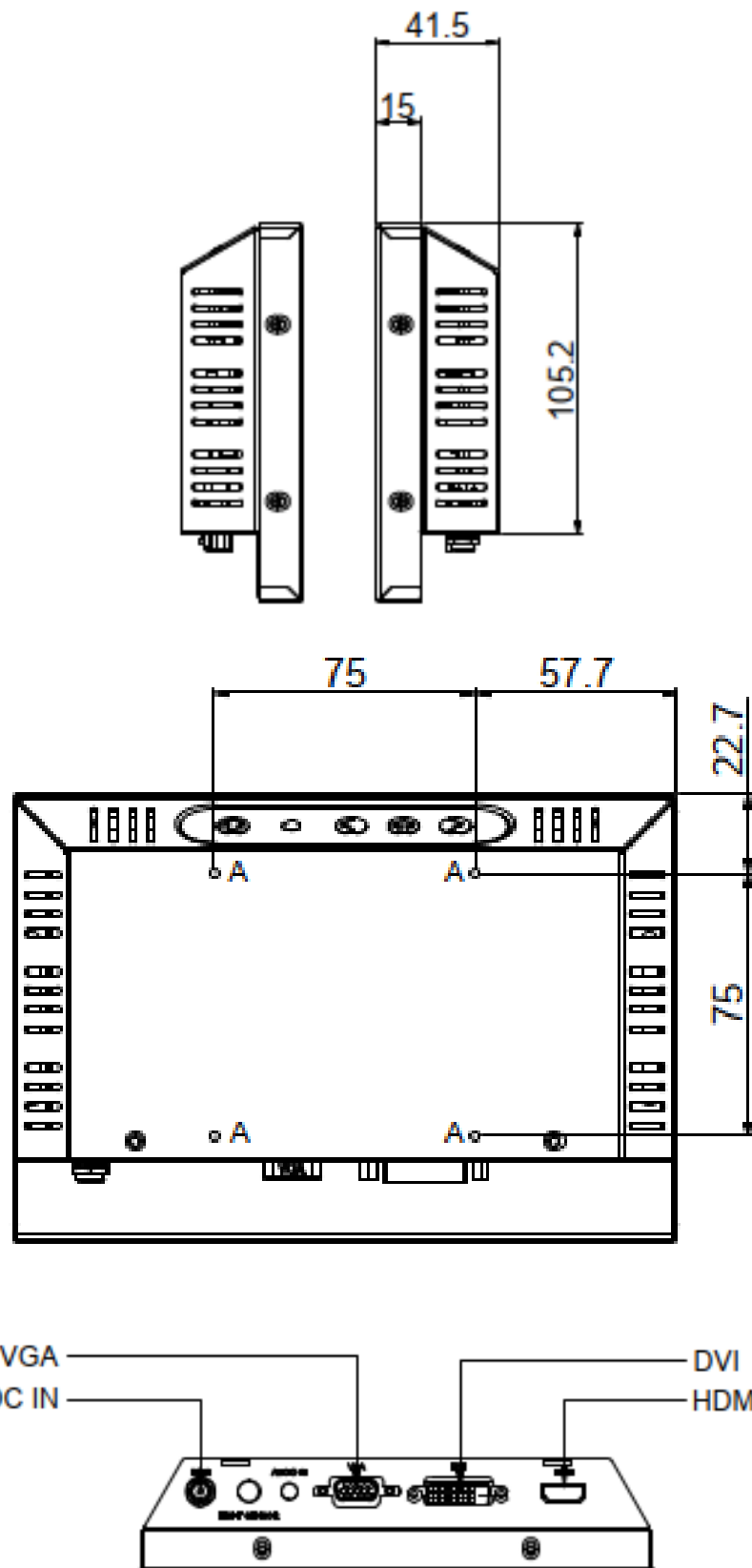


7 Mechanical Drawing

Outline Dimensions

Unit:mm





NOTE :
O.D : OUTLINE DIMENSION
B.O : BEZEL OPENING
A.A : LCD ACTIVE AREA

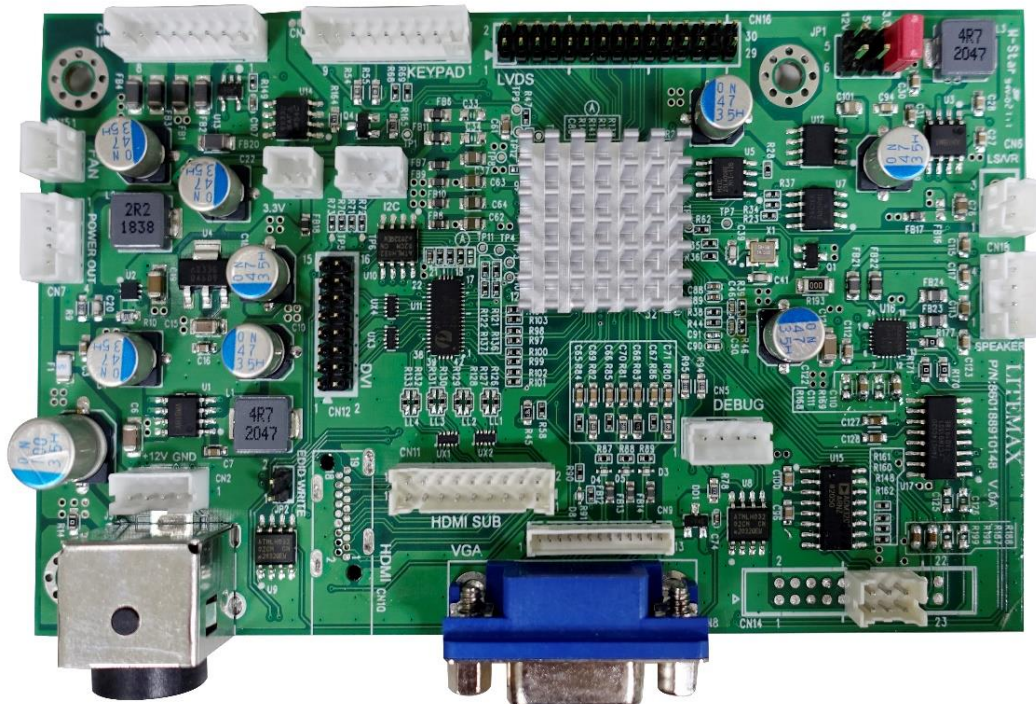
A : 4-M4_USER_HOLE_MAX. DEPTH=3mm

8 AD8891G-DH 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 VGA and DVI-D and HDMI input. Rev.1 is European RoHS compliant.

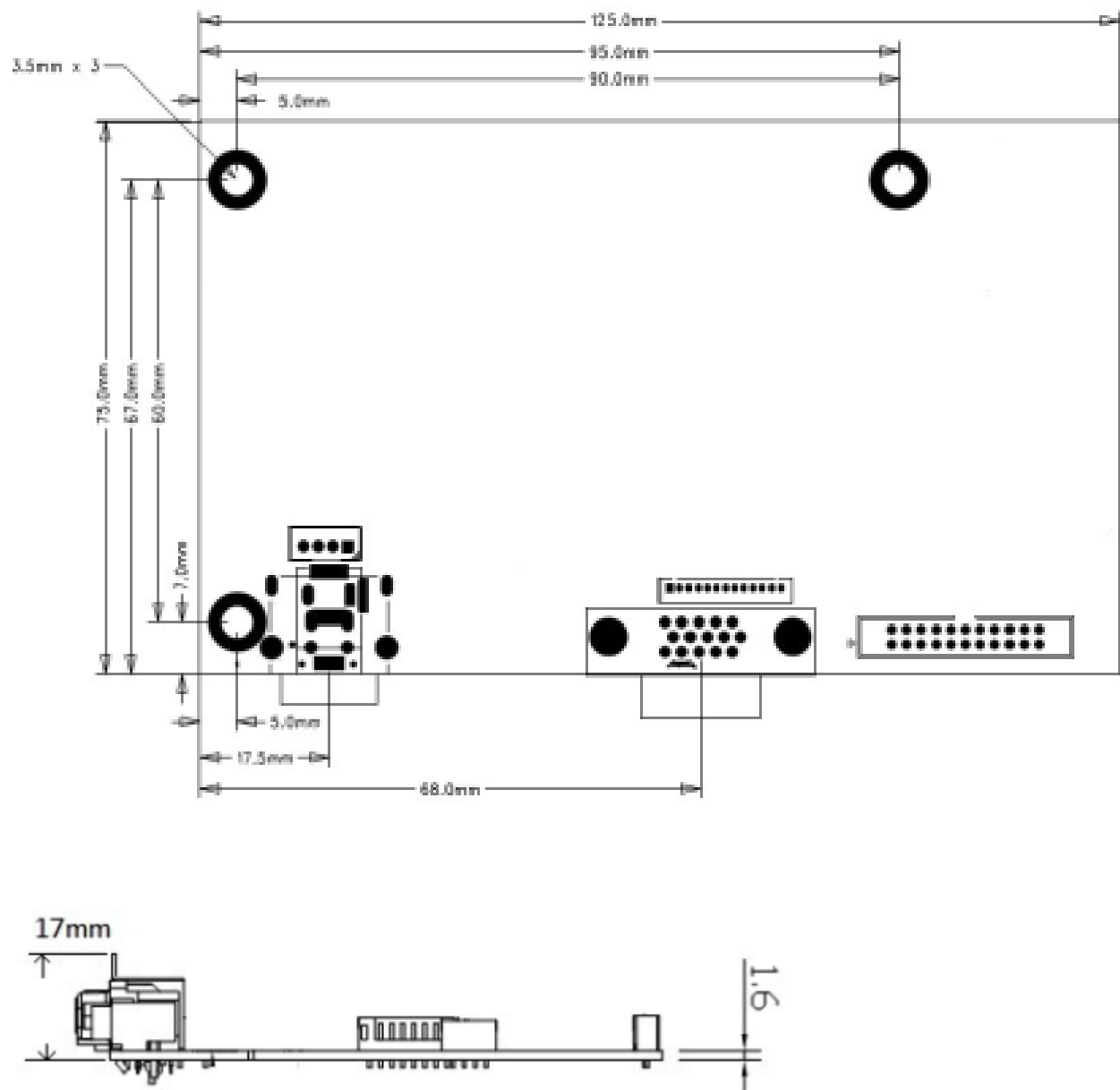
General Description

- Max resolution up to Full HD
- Analog RGB input up to 205MHz
- Ultra-reliable DVI-D input (CN12 Pin header)
- HDMI input (HDMI 1.3) (CH11 Pin header) (CH10 Optional)
- Dual/single LVDS interface
- Inverter analog or PWM dimming control.
- Support panel DC 5V or 12V,3.6V output
- OSD control
- External RS232 control (optional)
- Input Power 12V DC
- Audio speaker out (MAX 3W 4Ω) (optional),Audio in (optional)
- *External Digital light sensor brightness control (optional)
- *External light sensor brightness control or VR (optional)
- Support output voltage 12V(1A) and 5V(1A)
- External FAN control (optional)

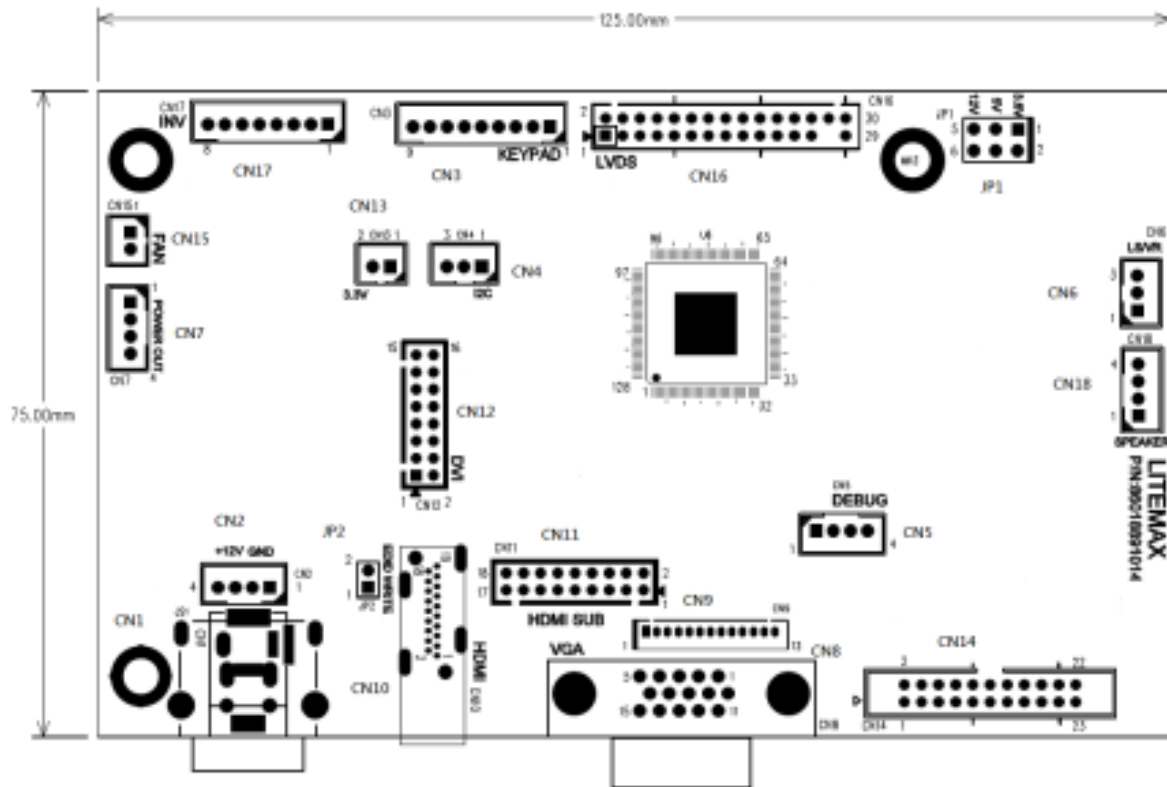


Outline Dimensions

AD8891 125mm x 75mm



AD8891G-DH Board Pin Define



CN16: Panel LVDS connector

Pin No.	Function	Pin No.	Function
1	RxO0-	16	RxE1+
2	RxO0+	17	RxE2-
3	RxO1-	18	RxE2+
4	RxO1+	19	RxEC-
5	RxO2-	20	RxEC+
6	RxO2+	21	RxE3-
7	RxOC-	22	RxE3+
8	RxOC+	23	GND
9	RxO3-	24	GND
10	RxO3+	25	GND
11	GND	26	GND
12	GND	27	NC
13	RxE0-	28	PANEL-VCC
14	RxE0+	29	PANEL-VCC
15	RxE1-	30	PANEL-VCC

CN10: 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	HDMI_DET	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		

CN11: HDMI connector (18pin 2.0mm) (2001D-18-ST)

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

CN1: Power DIN (12V)

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

CN1: Power Jack (12V) (Optional)

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

CN2: Power connector (12V) (4PIN 2.0mm) (B4B-PH-KL)

Pin No.	Function	Pin No.	Function
1	GND	2	GND
3	12VDC	4	12VDC

CN7: Touch Power connector (4PIN 2.0mm) (B4B-PH-KL)

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

CN15: Fan control (2PIN 2.0mm) (B2B-PH-KL)

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

CN3: Key Pad (9PIN 2.0mm) (B9B-PH-KL)

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	NC
5	UP KEY		

JP1: Panel Power (3PIN 2.54mm) (PHS201-23) (B3B-PH-KL)

Pin No.	Function	Pin No.	Function
1-2	3.6V	5-6	12V
3-4	5V		

CN6: Ambient (2PIN 2.0mm) / VR (3PIN 2.0mm)

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

CN4: I2C Connector (3PIN 2.0mm) (B3B-PH-KL)

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

For digital LS

CN13: 3.3V OUT (2PIN 2.0mm) (B2B-PH-KL)

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

JP2: EDID Jumper (2PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	Pull Height	2	GND

When EDIE wan to update it must be short .

CN5: Debug Connector (4PIN 2.0mm) (B4B-PH-KL)

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

For F/W debug

CN17: Inverter Connector(8PIN 2.0mm) (B8B-PH-KL)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	ON/OFF	Backlight ON/OFF	5	GND	GND
2	BRIGHT	Dimming adjust	6	12VDC	Input 12VDC
3	GND	GND	7	12VDC	Input 12VDC
4	GND	GND	8	12VDC	Input 12VDC

CN18: Speaker Connector (4PIN 2.0mm) (B4B-PH-KL)

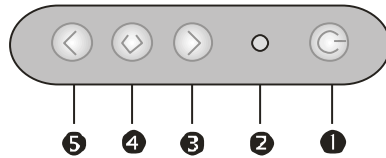
Pin No.	Function	Pin No.	Function
1	SPK_R+	2	SPK_R-
3	SPK_L+	4	SPK_L-

CN14: 11P X 2Connector

Pin No.	Function	Pin No.	Function
1	NC	2	NC
3	NC	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	GND	12	GND
13	TXD	14	RXD
15	GND	16	GND
17	GND	18	GND
19	Audio IN(R)	20	Audio IN(L)
21	GND	22	GND

8.1 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.

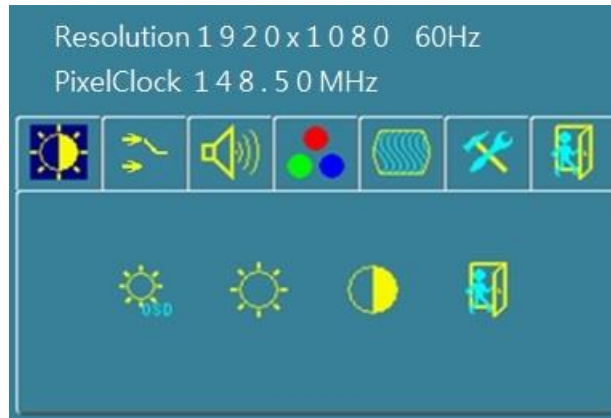
Screen Adjustment Operation Procedure

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.

8.2 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”.



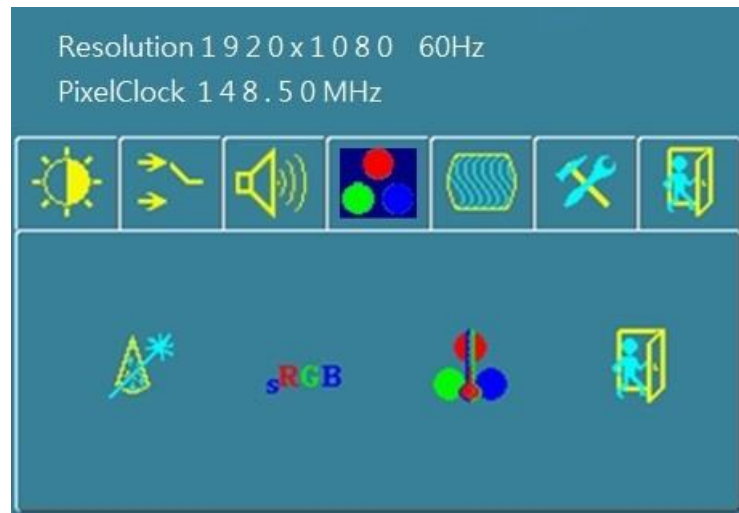
Exit: back to the beginning menu.



- VGA** **Analog:** RGB/VGA 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”.



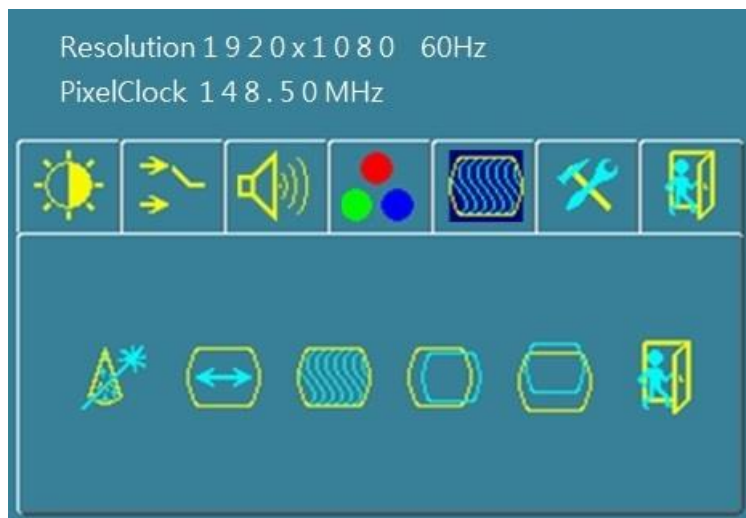
Color Tempture_6500K: Warm color scheme



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.



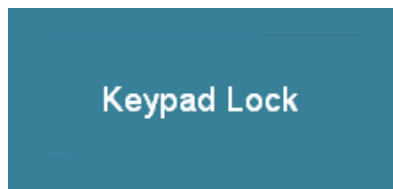
Sharpness: Sharpen characters.



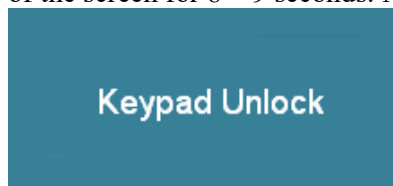
Exit: back to the normal screen

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.



9 Precautions

9.1 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.

9.2 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.

9.3 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.

10 Disclaimer

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