





LITEMAX

DLF/DLH1047-N Sunlight Readable 10.4" 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
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1 General Description

The DLF/DLH1047-N is a 10.4 inch industrial grade sunlight readable LCD, with high brightness 1400 nits, it produces 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 Features

• 10.4" sunlight readable, high brightness

• Resolutions: 800x600

• Aspect ratio of 4:3

• Wide temperature (-30°C~85°C)

• Low power consumption

• BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	DLF/DLH1047-N				
Description	10.4" TFT LCD, 1400nits LED Backlight, 800x600				
Screen Size	10.4"				
Display Area (mm)	211.2 (H) x 158.4(V) mm				
Brightness	1400 cd/m2				
Resolution	800x600				
Aspect Ratio	4:3				
Contrast Ratio	1000 : 1				
Pixel Pitch (mm)	0.264(H) x 0.264(V)				
Pixel Pre Inch (PPI)	96				
Viewing Angle	176°(H),176°(V)				
Color Saturation (NTSC)	79%				
Display Colors	16.7M				
Response Time (Typical)	25ms				
Panel Interface	LVDS				
Input Interface	VGA,DVI-D,HDMI				
Input Power	DC 12V				
Power Consumption	6.5W (9.5W with AD Board)				
OSD Key	4 Keys (Power Switch, Menu, +, -)				
OSD Control	Brightness, Color, Contrast, H/V Positionetc				
Dimensions (mm)	243x 184x 8				
Bezel Size(U/B/L/R)	16.5/9.1/17.7/14.1 mm				
Weight (Net)	0.32 kg				
Operating Temperature	-30°C ~ 85°C				
Storage Temperature	-30°C ~ 85°C				

DLF = Panel + LED Driving Board

DLH= Panel + LED Driving Board + AD Control Board

1.3 Absolute Maximum Ratings

Permanent damage may occur if exceeding the following maximum rating.

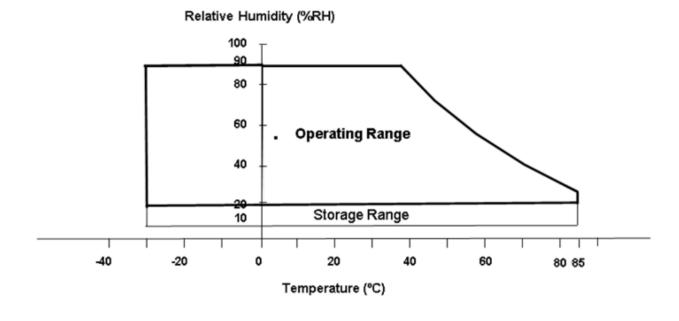
Itom	Cumbal	Va	lue	Unit	Note	
Item	Symbol	Min.	Max.	Offic	Note	
Operating Ambient Temperature	T _{OP}	-30	+85	$^{\circ}\!\mathbb{C}$	(4)(2)	
Storage Temperature	T _{ST}	-30	+85	$^{\circ}$ C	(1)(2)	

Note (1)

- (a) 90 %RH Max.
- (b) Wet-bulb temperature should be 39 °C Max.
- (c) No condensation.

Note (2) Panel surface temperature should be 0° C min. and 65° C max under Vcc=5.0V, fr =60Hz, typical

LED string current, 25° C ambient temperature, and no humidity control . Any condition of ambient operating temperature ,the surface of active area should be keeping not higher than 85° C (Panel sureface temperature).



1.4 Absolute Electrical Ratings

TFT LCD Module

Itom	Cumbal	Val	ue	Linit	Note		
Item	Symbol	Min.	Max.	Unit	Note		
Power Supply Voltage	VCC	-0.3	5.5	V	(1)		
Logic Input Voltage	Vin	-0.3	3.6	V	(1)		

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 Electrical Specifications

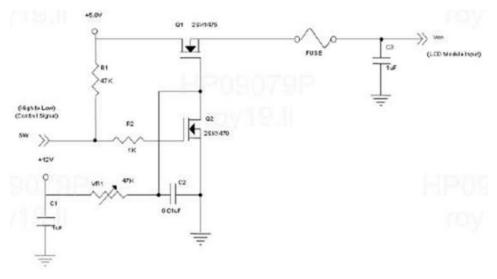
2.1 Electrical Characteristics

 $Ta = 25 \pm 2$ °C

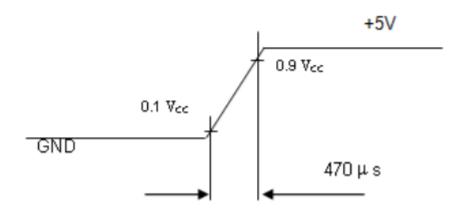
Darameter	Parameter			Symbol Value					
raiaillelei		Symbol	Min.	Тур.	Max.	Unit	Note		
Power Supply Vo	ltage	V _{CC}	4.5	5	5.5	V	-		
Ripple Voltag	е	V_{RP}	•	•	(300)	mVp-p			
Inrush Currer	nt	I _{INRUSH}	•	•	(2.5)	Α	(2)		
Power Supply Current	White	lcc	1	(120)	(135)	mA	(3)a		
Power Supply Current	Black	ICC	•	(115)	(130)	mA	(3)b		
LVDS differential inpu	ıt voltage	V_{id}	200	•	600	mV	(5)		
LVDS common input	voltage	V _{ic}	1.0	1.2	1.4	V	(5)		
Differential Input Voltage for	"H" Level	V_{IH}	•	•	100	mV	-		
LVDS Receiver Threshold	"L" Level	V _{IL}	-100	-	•	mV	-		
Terminating Res	R _T	-	100	-	Ohm	-			

Note (1)The assembly should be always operated within above ranges.

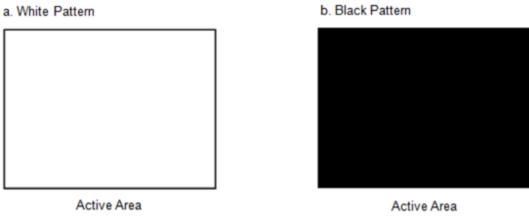
Note (2)Measurement Conditions:



VCC rising time is 470 μ s



Note (3) The specified power supply current is under the conditions at VDD =5V, $Ta = 25 \pm 2$ °C, DC Currentand fv = 60 Hz, whereas a power dissipation check pattern below is displayed.



2.2 Input Terminal Pin Assignment

TFT LCD MODULE

1 RXO0+ Negative LVDS differential data input. Channel O0 Negative 2 RXO0+ Positive LVDS differential data input. Channel O1 Negative 3 RXO1+ Negative LVDS differential data input. Channel O1 Negative 4 RXO1+ Positive LVDS differential data input. Channel O2 Negative 5 RXO2+ Negative LVDS differential data input. Channel O2 Negative 6 RXO2+ Positive LVDS differential clock input. Negative 7 GND Ground Negative LVDS differential clock input. Negative 9 RXOC+ Positive LVDS differential clock input. Positive 10 RXO3- Negative LVDS differential data input. Channel O3 Negative 11 RXO3+ Positive LVDS differential data input. Channel O3 Negative 12 GND Ground Not connection, this pin should be open 14 LED_PWM Backlight Adjust (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) Positive 15 LED_GND Converter ground Converter ground Converter ground Double of the proper of the prope	Pin No.	Symbol	Function	Polarity	Note
3 RXO1- Negative LVDS differential data input. Channel O1 Positive 4 RXO1+ Positive LVDS differential data input. Channel O1 Positive 5 RXO2- Negative LVDS differential data input. Channel O2 Negative 6 RXO2+ Positive LVDS differential data input. Channel O2 Positive 7 GND Ground RXOC- Negative LVDS differential clock input. Negative 9 RXOC+ Positive LVDS differential clock input. Positive 10 RXO3- Negative LVDS differential data input. Channel O3 Negative 11 RXO3+ Positive LVDS differential data input. Channel O3 Negative 12 GND Ground RXO3- Negative LVDS differential data input. Channel O3 Positive 14 LED_PWM Ground Positive LVDS differential data input. Channel O3 Positive 15 LED_EN Enable pin 3.3V Channel Data Enable pin 3.3V Channel Data Enable pin 3.3V Converter ground Converter ground Converter ground Converter ground Converter ground Converter ground Data LED_GND Converter ground Conve	1	RXO0-	Negative LVDS differential data input. Channel O0	Negative	
4 RXO1+ Positive LVDS differential data input. Channel O1 Positive 5 RXO2- Negative LVDS differential data input. Channel O2 Negative 6 RXO2+ Positive LVDS differential data input. Channel O2 Positive 7 GND Ground 8 RXOC- Negative LVDS differential clock input. Negative 9 RXOC+ Positive LVDS differential clock input. Positive 10 RXO3- Negative LVDS differential data input. Channel O3 Negative 11 RXO3+ Positive LVDS differential data input. Channel O3 Negative 12 GND Ground 13 NC Not connection, this pin should be open 14 LED_PWM Backlight Adjust (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V	2	RXO0+	Positive LVDS differential data input. Channel O0	Positive	
5 RXO2- Negative LVDS differential data input. Channel O2 Positive 6 RXO2+ Positive LVDS differential data input. Channel O2 Positive 7 GND Ground 8 RXOC- Negative LVDS differential clock input. Negative 9 RXOC+ Positive LVDS differential clock input. Positive 10 RXO3- Negative LVDS differential data input. Channel O3 Negative 11 RXO3+ Positive LVDS differential data input. Channel O3 Positive 12 GND Ground 13 NC Not connection, this pin should be open 14 LED_PWM Backlight Adjust (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V	3	RXO1-	Negative LVDS differential data input. Channel O1	Negative	
6 RXO2+ Positive LVDS differential data input. Channel O2 Positive 7 GND Ground 8 RXOC- Negative LVDS differential clock input. Negative 9 RXOC+ Positive LVDS differential clock input. Positive 10 RXO3- Negative LVDS differential data input. Channel O3 Negative 11 RXO3+ Positive LVDS differential data input. Channel O3 Positive 12 GND Ground 13 NC Not connection, this pin should be open 14 LED_PWM Backlight Adjust (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 3 (3)(4)	4	RXO1+	Positive LVDS differential data input. Channel O1	Positive	
7 GND Ground 8 RXOC- Negative LVDS differential clock input. Negative 9 RXOC+ Positive LVDS differential clock input. Positive 10 RXO3- Negative LVDS differential data input. Channel O3 Negative 11 RXO3+ Positive LVDS differential data input. Channel O3 Positive 12 GND Ground 13 NC Not connection, this pin should be open 14 LED_PWM Backlight Adjust (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan (3)(4)	5	RXO2-	Negative LVDS differential data input. Channel O2	Negative	
8 RXOC- Negative LVDS differential clock input. Positive 9 RXOC+ Positive LVDS differential clock input. Positive 10 RXO3- Negative LVDS differential data input. Channel O3 Negative 11 RXO3+ Positive LVDS differential data input. Channel O3 Positive 12 GND Ground 13 NC Not connection, this pin should be open 14 LED_PWM (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V	6	RXO2+	Positive LVDS differential data input. Channel O2	Positive	
9 RXOC+ Positive LVDS differential clock input. Positive 10 RXO3- Negative LVDS differential data input. Channel O3 Negative 11 RXO3+ Positive LVDS differential data input. Channel O3 Positive 12 GND Ground 13 NC Not connection, this pin should be open 14 LED_PWM Backlight Adjust (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 27 NC Not connection, this pin should be open Reverse Scan Control, Low → Normal Mode. High → Reverse Scan (3)(4) 29 VCC Power supply 5V	7	GND	Ground		
10 RXO3- Negative LVDS differential data input. Channel O3 Negative 11 RXO3+ Positive LVDS differential data input. Channel O3 Positive 12 GND Ground 13 NC Not connection, this pin should be open 14 LED_PWM Backlight Adjust (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V	8	RXOC-	Negative LVDS differential clock input.	Negative	
11 RXO3+ Positive LVDS differential data input. Channel O3 Positive 12 GND Ground 13 NC Not connection, this pin should be open 14 LED_PWM Backlight Adjust (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V	9	RXOC+	Positive LVDS differential clock input.	Positive	
12 GND Ground 13 NC Not connection, this pin should be open 14 LED_PWM Backlight Adjust (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode (3)(4) 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan (3)(4) 29 VCC	10	RXO3-	Negative LVDS differential data input. Channel O3	Negative	
13 NC Not connection, this pin should be open 14 LED_PWM Backlight Adjust (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode (3)(4) 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan (3)(4) 29 VCC Power supply 5V	11	RXO3+	Positive LVDS differential data input. Channel O3	Positive	
14 LED_PWM Backlight Adjust (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode (3)(4) 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan (3)(4) 29 VCC Power supply 5V	12	GND	Ground		
14 LED_FWM (PWM Dimming 190-210Hz,H: 3.3VDC, L: 0VDC) 15 LED_EN Enable pin 3.3V 16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V	13	NC	Not connection, this pin should be open		
16 LED_GND Converter ground 17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V	14	LED_PWM			
17 LED_GND Converter ground 18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V	15	LED_EN	Enable pin 3.3V		
18 LED_GND Converter ground 19 NC Not connection, this pin should be open 20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V	16	LED_GND	Converter ground		
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20 LED_VCC Converter input voltage 12V 21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V (3)(4)	18	LED_GND	Converter ground		
21 LED_VCC Converter input voltage 12V 22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode (3)(4) 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan (3)(4) 29 VCC Power supply 5V	19	NC	Not connection, this pin should be open		
22 LED_VCC Converter input voltage 12V 23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V (3)(4)	20	LED_VCC	Converter input voltage 12V		
23 NC Not connection, this pin should be open 24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode (3)(4) 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan (3)(4) 29 VCC Power supply 5V	21	LED_VCC	Converter input voltage 12V		
24 NC Not connection, this pin should be open 25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode (3)(4) 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan (3)(4) 29 VCC Power supply 5V	22	LED_VCC	Converter input voltage 12V		
25 SEL68 LVDS 6/8 bit select function control, Low → 6 bit Input Mode. High → 8bit Input Mode 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan 29 VCC Power supply 5V (3)(4)	23	NC	Not connection, this pin should be open		
25 SEL68 Low → 6 bit Input Mode. High → 8bit Input Mode (3)(4) 26 NC Not connection, this pin should be open 27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan (3)(4) 29 VCC Power supply 5V	24	NC	Not connection, this pin should be open		
27 NC Not connection, this pin should be open 28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan (3)(4) 29 VCC Power supply 5V	25	SEL68			(3)(4)
28 UD/LR Reverse Scan Control, Low → Normal Mode. High → Reverse Scan (3)(4) 29 VCC Power supply 5V	26	NC			
28 UD/LR Low → Normal Mode. High → Reverse Scan (3)(4) 29 VCC Power supply 5V	27	NC	Not connection, this pin should be open		
	28	UD/LR			(3)(4)
30 VCC Power supply 5V	29	VCC	Power supply 5V		
	30	VCC	Power supply 5V		

Note (1) Connector Part No.: STM MSAK24025P30MB(Exterior silver) or I-PEX 20455-030E-76(Exterior gold) or equivalent.

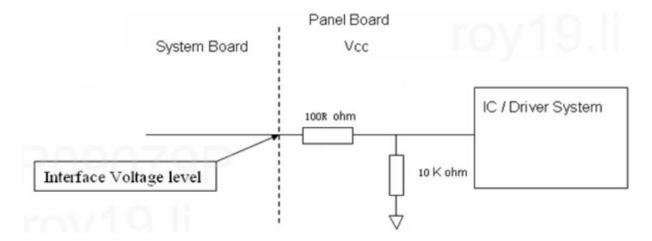
Note (2) User's connector Part No.: I-PE X20453-030T-03 or equivalent.

Note (3) "Low" stands for 0V. "High" stands for 3.3V.

Note (4)Interface optional pin has internal scheme as following diagram, Customer should keep the interface voltage level requirement which including panel board loading as below

Note (5) Pin1 location is RXO0- to comply with mechanical characterics

RPFI pin:



2.3 Color Data Input Assignment

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color.

									Data Signal																
	Color					ed							Gre									ue			
		R7	R6	R5	R4	_	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	GO	B7	B6	B5	B4	B3	B2	B1	B0
	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
Basic	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
Colors	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
	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
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
Gray	: '	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Scale	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Of	Red(253)	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	Red(254)	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(255)	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)/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
Cross	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
Gray	: ` ′	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Scale Of	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(253)	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	Green(254)	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(255)	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) / 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
0	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
Gray	: '	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Scale Of	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
Blue	Blue(253)	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	Blue(254)	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(255)	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 Input Signal Timing Specifications

The input signal timing specifications are shown as the following table and timing diagram.

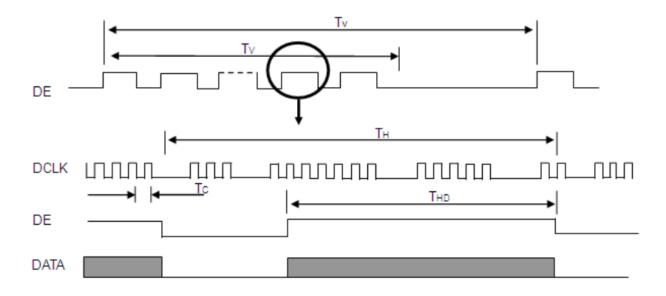
Signal	Item	Symbol	Min.	Тур.	Max.	Unit	Note
	Frequency	Fr	(35)	40	(48)	MHz	-
	Period	T _c	(20.8)	25	(28.6)	ns	
1) (DO OL1-	Input Clock to data skew	TLVCCS	•	1	0.25	UI	(a)
LVDS Clock	Spread spectrum modulation range	F _{clkin_mod}	-1.5		1.5	%	(b)
	Spread spectrum modulation frequency	F _{SSM}	25	1	90	KHz	(b)
	Frame Rate	Fr	60	60	60	Hz	-
Vertical Display	Total	T _v	(610)	628	(790)	T _h	$Tv=T_{vd}+T_{vb}$
Term	Active Display	T_{vd}	600	600	600	T _h	-
	Blank	T _{vb}	T_v - T_{vd}	28	T_{v} - T_{vd}	T _h	-
	Total	T _h	(960)	1056	(1060)	T _c	$T_h = T_{hd} + T_{hb}$
Horizontal Display Term	Active Display	T _{hd}	800	800	800	T _c	-
101111	Blank	T _{hb}	$T_h\text{-}T_hd$	256	$T_{h}\text{-}T_{hd}$	T _c	-

Note (1) Because this module is operated by DE only mode, Hsync and Vsync input signals should be set to low logic level or ground. Otherwise, this module would operate abnormally.

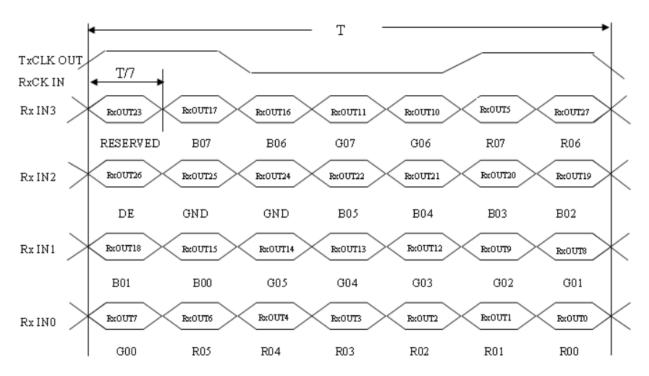
Note (2) The Tv(Tvd+Tvb) must be integer, otherwise, the module would operate abnormally.

.

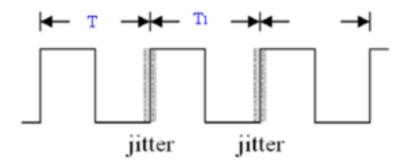
INPUT SIGNAL TIMING DIAGRAM



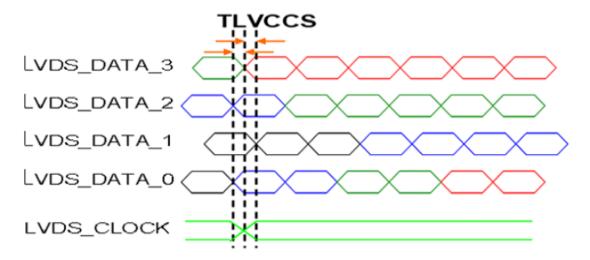
TIMING DIAGRAM of LVDS



Note (a) The input clock cycle-to-cycle jitter is defined as below figures. Trcl = IT1 - TI

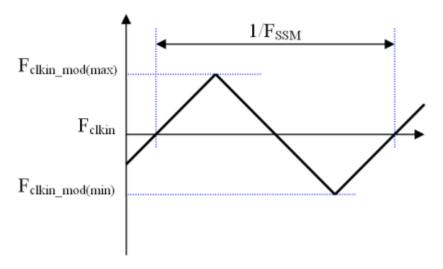


Note (b) Input Clock to data skew is defined as below figures.



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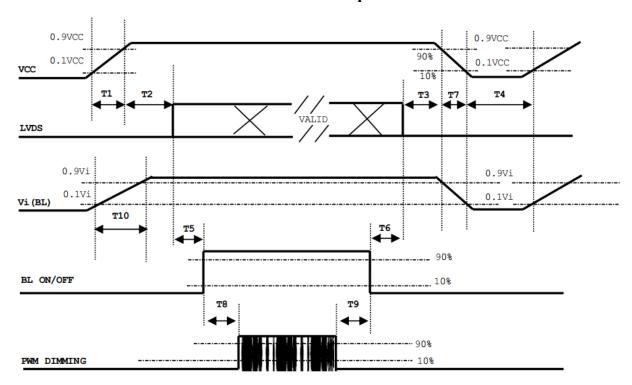
Note (c) The SSCG (Spread spectrum clock generator) is defined as below figures.



2.5 Power ON/OFF Sequence

To prevent a latch-up or DC operation of LCD assembly, the power on/off sequence should be as the diagram below.

Power ON/OFF sequence



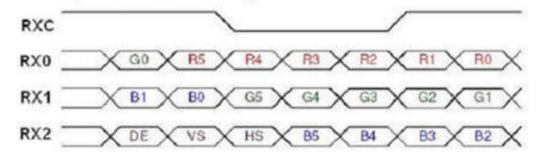
Parameter		Value	Value					
Parameter	Min	Тур	Max	Units				
T1	0.5		10	ms				
T2	0		50	ms				
Т3	0		50	ms				
T4	500			ms				
T5	450			ms				
Т6	200			ms				
T7	10		100	ms				
Т8	10			ms				
Т9	10			ms				
T10	20		50	ms				

Note:

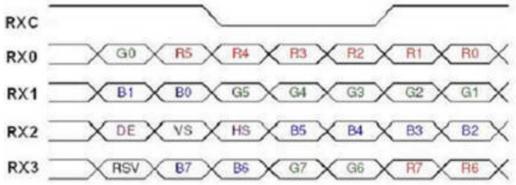
- (1) The supply voltage of the external system for the module input should be the same as the definition of Vcc.
- (2)When the backlight turns on before the LCD operation of the LCD turns off, the display may momentarily become abnormal screen.
- (3)In case of VCC = off level, please keep the level of input signals on the low or keep a high impedance.
- (4)T4 should be measured after the module has been fully discharged between power off and on period.
- (5)Interface signal shall not be kept at high impedance when the power is on.
- (6)INX won't take any responsibility for the products which are damaged by the customers not following the Power Sequence.
- (7) There might be slight electronic noise when LCD is turned off (even backlight unit is also off). To avoid this symptom, we suggest "Vcc falling timing" to follow "T7 spec".

2.6 Input Data Format

SEL 6/8="Low" for 6 Bits LVDS



SEL 6/8="High" for 8 Bits LVDS



Note (1) R/G/B data 7: MSB, R/G/B data 0: LSB

Note (2) Please follow PSWG

Signal Name	Description	Remark
R7	Red Data 7 (MSB)	Red-pixel Data
R6	Red Data 6	Each red pixel's brightness data consists of these
R5	Red Data 5	8 bits pixel data.
R4	Red Data 4	A Control of the Cont
R3	Red Data 3	
R2	Red Data 2	
R1	Red Data 1	
R0	Red Data 0 (LSB)	
G7	Green Data 7 (MSB)	Green-pixel Data
G6	GreenData 6	Each green pixel's brightness data consists of these
G5	GreenData 5	8 bits pixel data.
G4	GreenData 4	31-12-04-04-04-04-04-04-04-04-04-04-04-04-04-
G3	GreenData 3	
G2	GreenData 2	
G1	GreenData 1	
G0	GreenData 0 (LSB)	
B7	Blue Data 7 (MSB)	Blue-pixel Data
B6	Blue Data 6	Each blue pixel's brightness data consists of these
B5	Blue Data 5	8 bits pixel data.
B4	Blue Data 4	
B3	Blue Data 3	
B2	Blue Data 2	
B1	Blue Data 1	
B0	Blue Data 0 (LSB)	
RXCLKIN+	LVDS Clock Input	
RXCLKIN-		
DE	Display Enable	
VS	Vertical Sync	
HS	Horizontal Sync	

2.7 Scanning Direction

The following figures show the image see from the front view. The arrow indicates the direction of scan.

Fig.1 Normal Scan



Fig.2 Reverse Scan



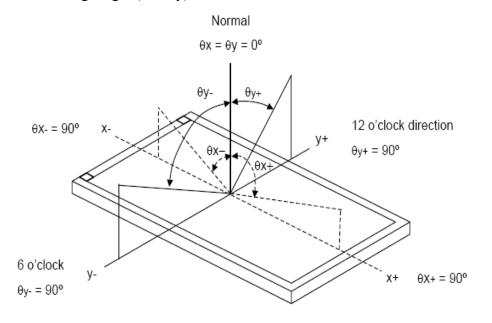
- Fig. 1 Normal scan (pin 28, UD/LR = Low)
- Fig. 2 Reverse scan (pin 28, UD/LR = Hight)

3 Optical Specification

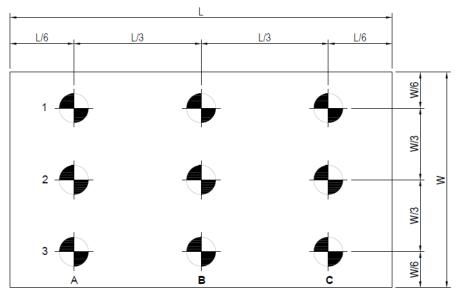
Item		Symbol	Condition	Min.	Тур.	Max.	Unit	Note
	D 1	Rx		0.615	0.645	0.675	-	
	Red	Ry		0.310	0.340	0.370	-	
		Gx	0 0	0.281	0.311	0.341	-	
	Green	Gy	$\theta x = 0$	0.590	0.620	0.650	-	
Color chromaticity	D1	Bx	$\theta y=0$	0.116	0.146	0.176	-	T (M 1
	Blue	By	CA-410	0.012	0.042	0.072	-	Test Mode:
	****	Wx		0.279	0.309	0.339	-	(2) (3)
	White	Wy		0.309	0.339	0.369	-	
Center Luminance of	f White	Lc	$\theta x=0$	1260	1400	1820	cd/m ²	
Uniform		Lu	θy=0 CA-410		89		%	
Contrast Ratio		CR	$\theta x=0$	900:1	1000:1		-	Tank Mada
Color Saturation		NTSC	θy=0 Klein K-10		79		%	Test Mode: (4)
Viewing Angle	II a mi ma m ta 1	$\theta_{X}+$			88			Test Mode: (1)
	Horizontal	θx-	GD : 10		88		Deg	
	Vertical	θу+	$CR \ge 10$		88			
	vertical	θу-			88			

Test Mode:

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

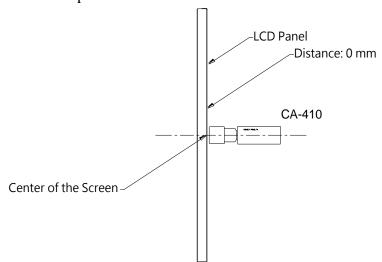


(2) Definition of Test Point:

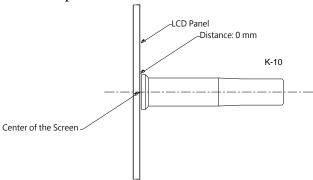


Active Area

(3) CA-410 Measurement Setup:



(4) 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

	-								
Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remark		
Input Voltage	Vin		10.0	12.0	14.0	V			
Input Current (High Brightness)	linH	Brightness = 100%	0.71	0.59	0.50	A	(1)		
LED Current (High Brightness)	loutH	Brightness = 100%		0.23		A			
Working Frequency	W_Freq	Brightness = 100%		400		KHZ			
Input Power consumption	Pin	Brightness = 100%		7.08		w			
	DC mode								
	Vadj	/adj Connection of Voltage			5.0	V	(2)		
Brightness Control	PWM mode								
	PWM	Connect to PWM	0		100	%	(3)		
	Freq	Connection vini		200		Hz	(4)		
ON/OFF Control	Von		2		5	٧			
ON/OFF Control	Voff	Normal Operation	0		0.8	V			
Output Voltage	Vout	Brightness = 100%		27.85	27.90	V			
Efficiency	η	Brightness = 100%		90.4		%	(5)		

Remark:

- (1) this data is based on the testing result of practical input voltage, Iin is measured by related Vin(min, typ, max). If the voltage is increased, the current will decrease. If the voltage is decrease, the current will increase
- (2) Max brightness at 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) ηmax = Vout(max)*IoutH(max)/Vin(max)*IinH(min) η min = Vout(min)*IoutH (min)/Vin(min)*IinH(max)

4.2 Connector Socket

Input Connector: J3(JST S9B-PH-SM3-TB or Compatible)

PIN No	Symbol	Description
1	Vin	DC+
2	Vin	DC+
3	Vin	DC+
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	Brightness	Brightness Control
8	Control	ON/OFF Control
9	CL	PWM or DC selection (Low → DC , Hi → PWM)

Output Connector :J1,J2(JST S2B-ZR-SM4A-TF or Compatible)

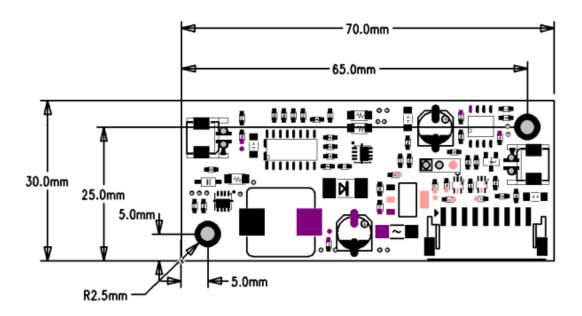
PIN NO	Symbol	Description
1	Output	LED High Voltage(+)
2	Output	LED Low Voltage (-)

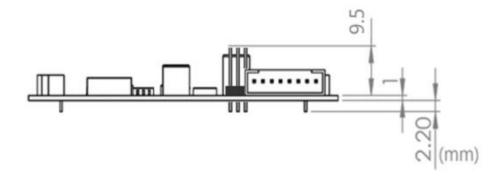
DC or PWM Connector :J4

PIN NO	Symbol	Description
1	DC	JUMP pin 1,2
	OND	LED driver is DC input
2	GND	JUMP pin 2,3
3	PWM	LED driver is PWM input

4.3 Mechanical Characteristics

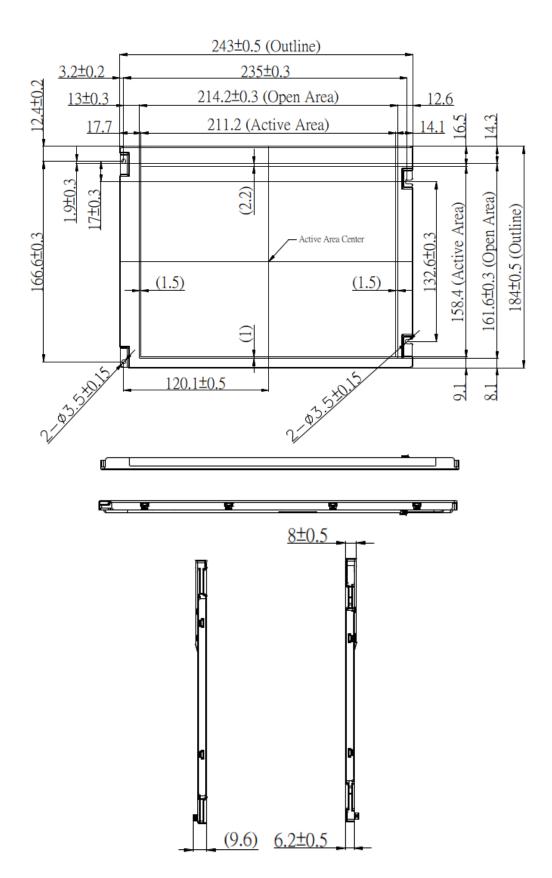
Dimension: 70mm*30mm*10.5mm

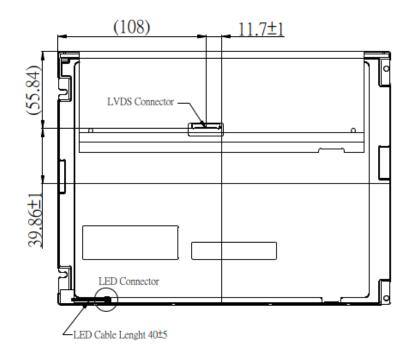


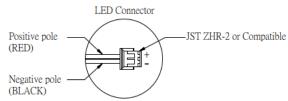


5 Mechanical Drawing

Unit:mm







Note:

1.THE DIMENSION EXCLUDES DEFORMATION.

2.LED B/L CONNECTOR: JST ZHR-2 OR COMPATIBLE

6 AD8891GDH 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

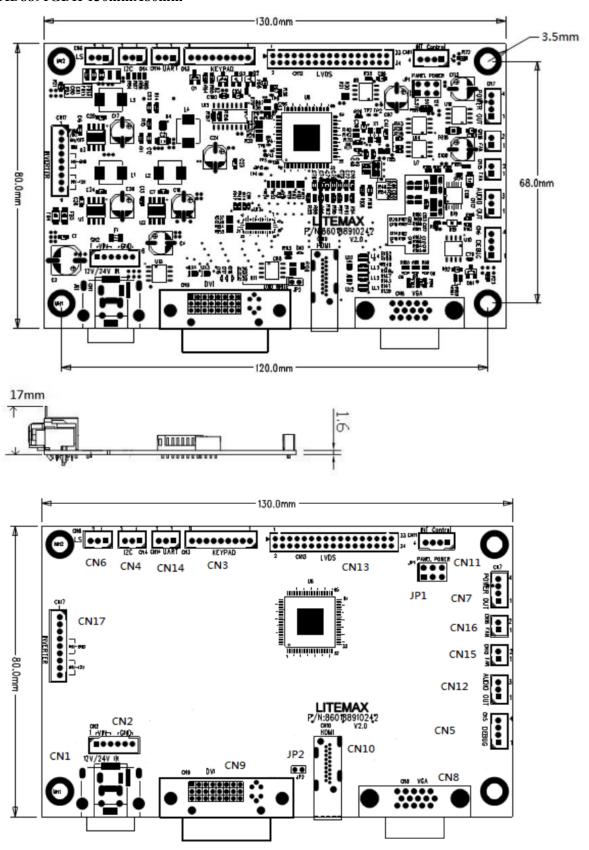
- Max resolution up to Full HD
- Analog RGB input up to 205MHz
- Ultra-reliable DVI-I input
- HDMI input (HDMI 1.3)
- Dual/single LVDS interface
- Inverter analog or PWM dimming control.
- Support panel DC 5V or 12V,3.3V output
- OSD control
- **External RS232 control (optional)**
- Input Power 24V or 12V DC
- Audio out (optional)
- *****External Digital light sensor brightness control (optional)
- *External light sensor brightness control (optional)
- Support output voltage 12V(1A) and 5V(1A)



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Outline Dimensions

AD8891GDH 130mmX80mm



AD8891GDH Board Pin Define

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	NC
9	RxO3-	26	NC
10	RxO3+	27	GND
11	NC	28	GND
12	NC	29	Pull Height
13	GND	30	Pull Low
14	GND	31	VLCD
15	RxE0-	32	VLCD
16	RxE0+	33	VLCD
17	RXE1-	34	VLCD

CN9: DVI-D 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	DET_DVI	19	T.M.D.S. Data0/5 Shield
4	NC	12	NC	20	NC
5	NC	13	NC	21	NC
6	DDC Clock	14	+5V Power		T.M.D.S. Clock Shield
7	DDC Data	15	Ground (for +5∀)	23	T.M.D.S. Clock+
8	NC	16	Hot Plug Detect	24	T.M.D.S. Clock-

CN8: Analog RGB Input connector (D-SUB 15Pin)

Pin	Symbol	Description	Pin No.	Symbol	Description
1	RED	Analog Red	9	+5V	+5VDDC
2	GREEN	Analog Green	10	SGND	Sync GND
3	BLUE	Analog Blue	11	NCD	Reserved
4	GND	Reserved	12	SDA	DDC Serial Data
5	GND	DET_VGA	13	HSYNC	Horizontal Sync
6	RED_RTN	Red Return	14	VSYNC	Vertical Sync
7	GREEN_RTN	Green Return	15	SCL	DDC Data Clock
8	BLUE_RTN	Blue Return			

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	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	24V/12V	2	24V/12V
3	GND	4	GND

CN1: Power Jack (12V)

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

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

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

CN7: Touch Power connector

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

CN15, CN16: 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	NC
5	UP KEY		

JP1: Panel Power

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

CN11: INT 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)/VR (3PIN 2.0mm)

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

CN12: 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	Pull High	2	GND

When EDID want 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

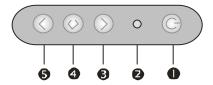
For F/W debug

CN17: Inverter Connector (9PIN 2.0mm)

Pin No.	Function	Pin No.	Function
1	PWM/DC SEL	6	GND
2	Backlight ON/OFF	7	24V/12V
3	Dimming adjust	8	24V/12V
4	GND	9	24V/12V
5	GND		

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.

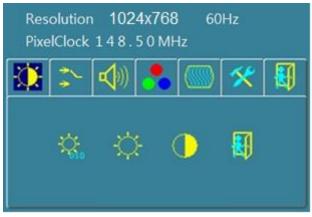
5. Return & Exit the main menu

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".





VGA Analog: RGB/VGA input

DVI Digital: DVI input

HDMI: HDMI input

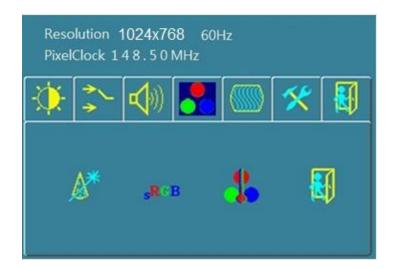
Exit: back to the beginning menu.



Audio Volume: Audio volume adjustment.

(0)

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

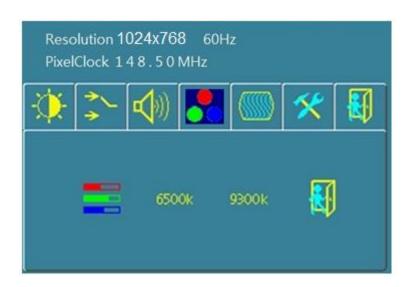




Auto Color: By navigating over to the "Auto Color" option, optimal color performance is invoked.



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".

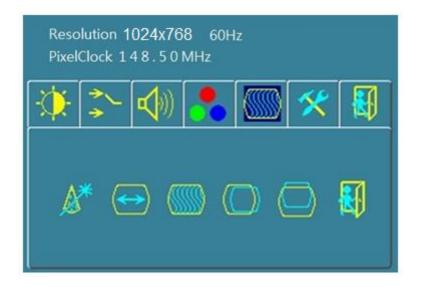


Color Tempture_6500K: Warm color scheme



Color Tempture_9300K: Cold color scheme







Auto Adjust:

Choose this option and the AD8891 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..

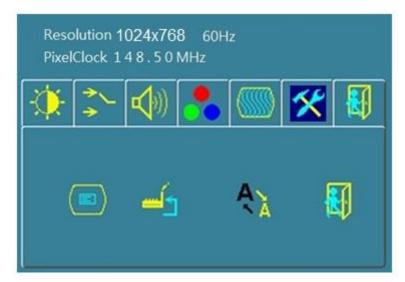


HPos: You can shift the screen horizontally using this function.



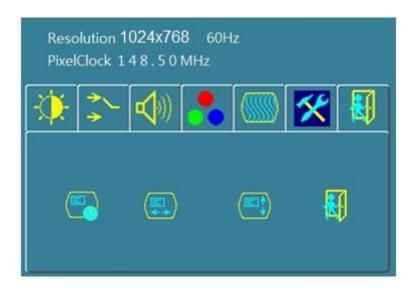
VPos: You can shift the screen vertically using this function.







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 $8 \sim 9$ 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 $8 \sim 9$ seconds. Now all OSD keys are active again.

Keypad Unlock

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°C and 35°C at normal humidity.
- (3) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
- (4) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

7.3 Operation Precautions

- (1) Do not pull the I/F connector in or out while the LCD module is operating.
- (2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.
- (3) Response time depends on the temperature. (In lower temperature, it becomes longer.)
- (4) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
- (5) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods are very important to minimize the interference.
- (7) Please do not give any mechanical and/or acoustical impact to module. Otherwise, module can't be operated its full characteristics perfectly.
- (8) Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.
- (9) Do not display the fixed pattern for a long time because it may cause image sticking.
- (10) In order to prevent image sticking, periodical power-off or screen save is needed after fixed pattern long time display.
- (11) Black image or moving image is strongly recommended as a screen save.
- (12) Static information display recommended to use with moving image. Cycling display between 10 minutes' information (static) display and 10 seconds' moving image.
- (13) Background and character (image) color change is recommended. Use different colors for background and character, respectively. And change colors themselves periodically.
- (14) LCD system is required to place in well-ventilated environment. Adapting active cooling system is highly recommended.
- (15) Product reliability and functions are only guaranteed when the product is used under right operation usages.
- (16) If product will be used in extreme conditions, such as high temperature/ humidity, shock and vibration it is strongly recommended to contact Litemax for filed application engineering advice. Otherwise, its reliability and function may not be guaranteed. Extreme conditions are commonly found at airports, transit stations, taxi-top, in vehicle and controlling systems.

8 Disclaimer

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