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DURApixel™ LED B/L LCD

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DLD2126-A V4
Sunlight Readable 21.5” 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
Sept.30/2025	all		Initial release	

Contents

1 General Description

The DLD2126-A is a 21.5 inch industrial grade sunlight readable LCD, with high brightness 1600 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 1600 nits
- Sunlight Readable
- LED Backlight
- Low Power Consumption
- Wide View Angle
- BL MTBF: 100,000 hours

1.2 General Specifications

Model Name	**DLD2126-A V4**
Description	21.5” TFT LCD, LED Backlight 1600 nits, 1920x1080
Screen Size	21.5”
Display Area (mm)	476.064(H) x 267.786(V)
Brightness (Typical)	1600 cd/m^2
Resolution	1920x1080
Aspect Ratio	16 : 9
Contrast Ratio (Typical)	800 : 1
Pixel Pitch (mm)	0.24795(H) x 0. 24795(V)
Pixel Per Inch (PPI)	102
Viewing Angle	178°(H),178°(V)
Color Saturation (NTSC)	83%
Display Colors	16.7M
Response Time (Typical)	14ms
Panel Interface	LVDS
AD Board Input Interface	DVI-D,HDMI
AD Board Input Power	DC12V
Power Consumption	32W
OSD Key	5 Keys (Power Switch, Menu, +, -, Auto)
OSD Control	Brightness, Color, Contrast, Auto Tuning, H/V Position…etc
Dimensions (mm)	545(W) x 370(H) x 61(D)
Bezel Size(U/B/L/R)	35.1/67.1/34.5/34.5
Mounting	5.7kg
Weight (Net)	75x75, 100x100mm
Operating Temperature	0 ˚C ~ 50 ˚C
Storage Temperature	-20 ˚C ~ 60 ˚C

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

1.3 Electrical Characteristics

Absolute Maximum Rating

Permanent damage may occur if exceeding the following maximum rating.

Symbol	Description	Min	Max	Unit	Remark
VDD	Power Supply Input Voltage	GND-0.3	6.0	[Volt]	Ta=25℃

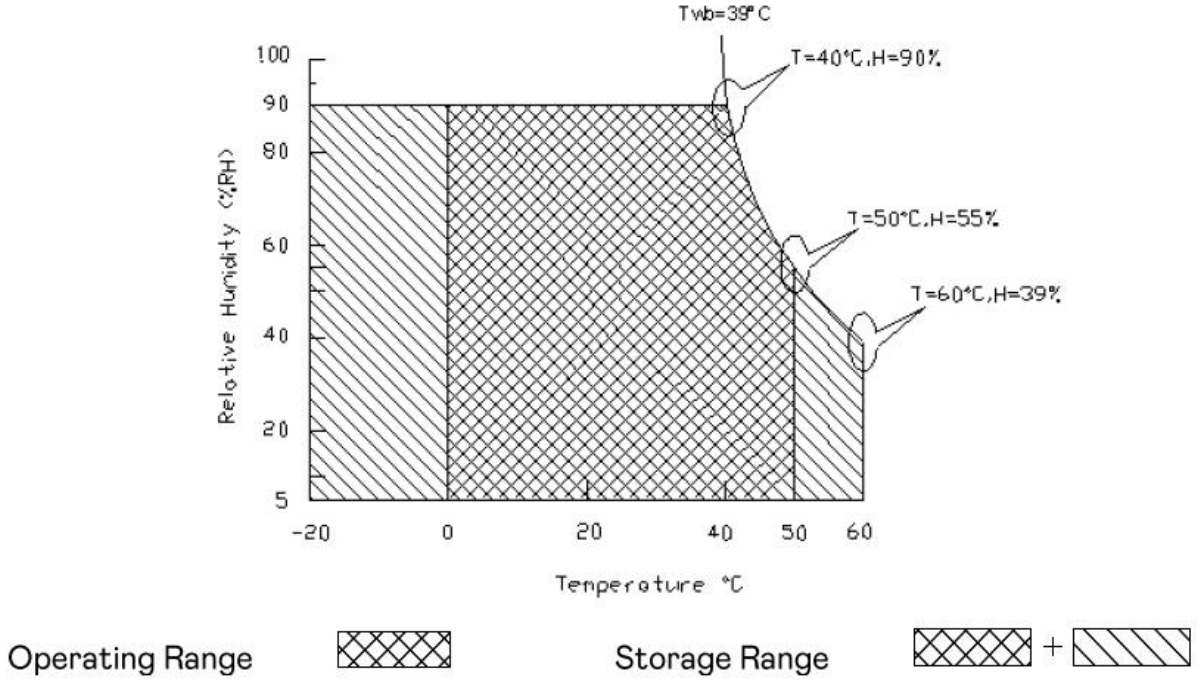
Absolute Maximum Rating of Environment

Permanent damage may occur if exceeding the following maximum rating.

Symbol	Description	Min.	Max.	Unit	Remark
TOP	Operating Temperature	0	+50	[°C]	***Note***
TGS	Glass surface temperature (operation)	0	+65	[°C]	***Note*** *Function judged only*
HOP	Operation Humidity	5	90	[%RH]	***Note***
TST	Storage Temperature	-20	+60	[°C]	
HST	Storage Humidity	5	90	[%RH]	

Note : Temperature and relative humidity range are shown as the below figure.

1. **Operation measured condition is under VDD = V**
2. 90% RH Max (Ta ≦39℃)
3. Max wet-bulb temperature at 39℃ or less. (Ta ≦39℃)
4. No condensation



Recommended Operating Condition

Symbol	Item		Min.	Typ.	Max.	Unit	Note
VDD	Power Supply Input Range		4.5	5	5.5	[Volt]	
IDD	Current of Power Supply@60Hz	White		0.32	0.38	[A]	Note3-1
		Black		0.32	0.38	[A]	
		H-stripe		0.64	0.77	[A]	
	Current of Power Supply@76Hz	White		0.38	0.46	[A]	
		Black		0.38	0.46	[A]	
		H-stripe		0.91	1.09	[A]	
PDD	VDD Power Consumption@60Hz			1.6	1.92	[Watt]	White
	VDD Power Consumption@100Hz			4.55	5.46	[Watt]	H-stripe
IRUSH	Inrush current				3	[A]	Note3-2
VDDrp	Allowable VDD Ripple Voltage				500	[mV]	VDD=.0V, White Pattern @Maxi Frame rate

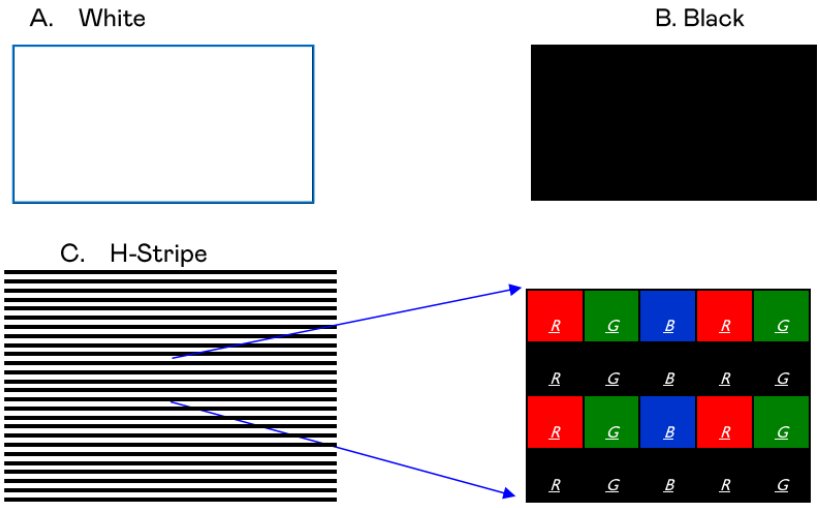
Note3-1: Test Condition

(1) V_{DD}=Typical

(2) Temperature=25℃

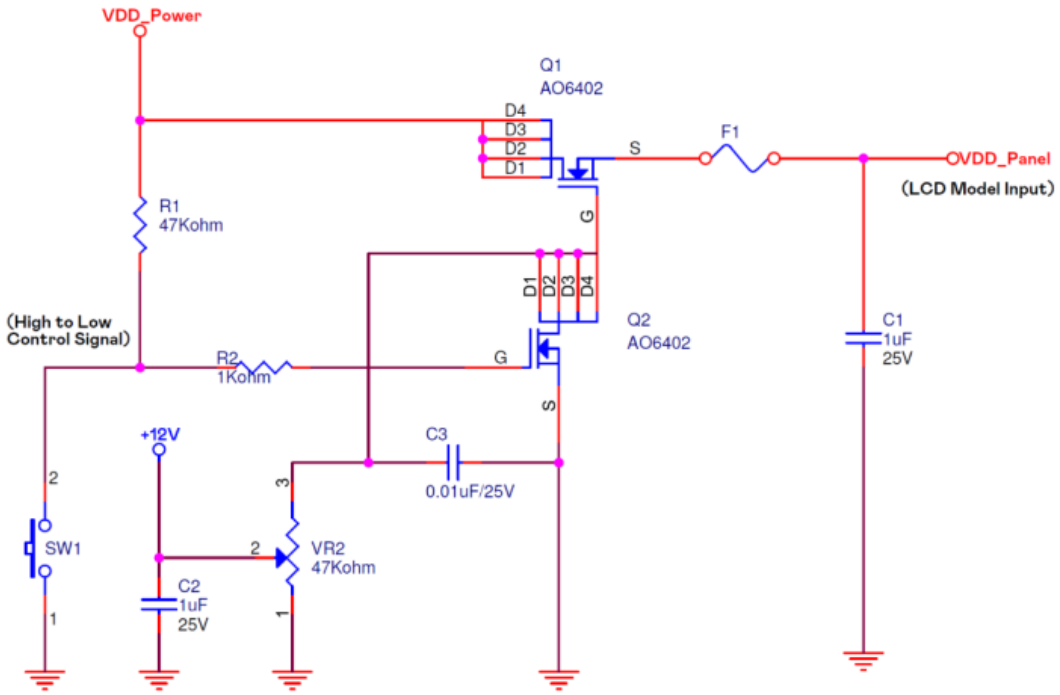
(3) Power dissipation check pattern.(Only for power design)

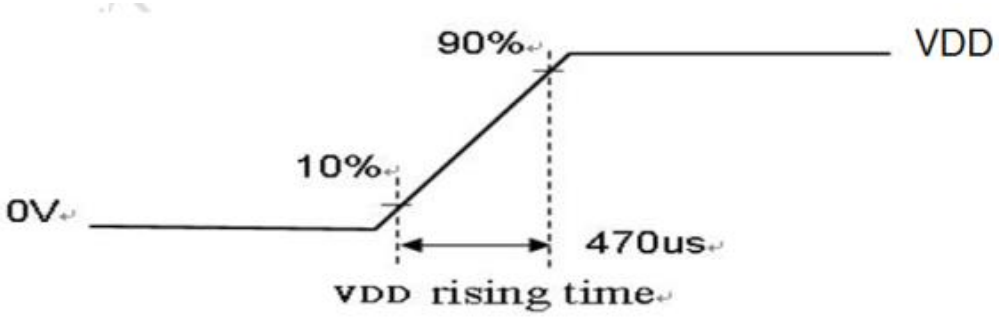
(4) H-stripe is the max power pattern



Note 3-2: Inrush Current measurement:

Test circuit:





The duration of VDD rising time: 470us.

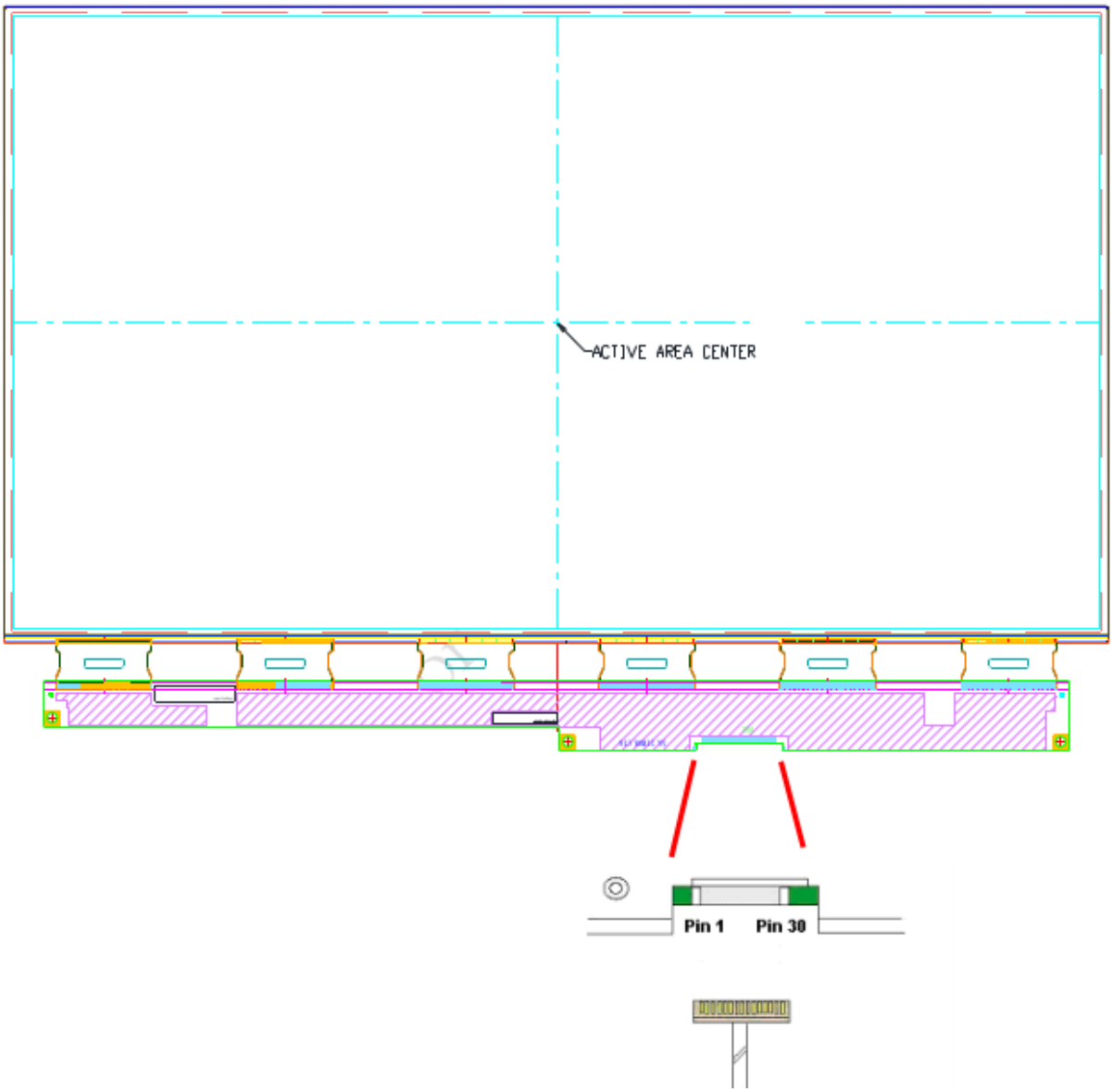
2 Interface Connection

2.1 Connector Type

TFT-LCD Connector	Manufacturer	P-TWO	STM
	Part Number	187034-3009	MSBKT2407P30HB
Mating Connector	Manufacturer	JAE or Compatible	
	Part Number	FI-X30HL (Locked Type)	

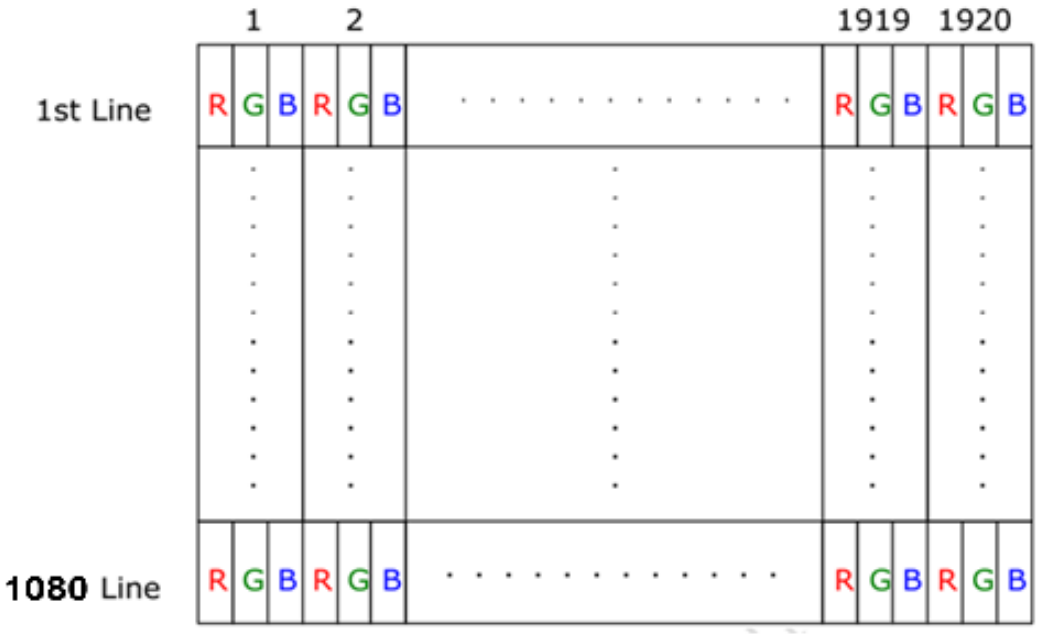
Connector Pin Assignment

PIN #	Symbol	Description	Remark
1	RxO0-	Negative LVDS differential data input (Odd data)	
2	RxO0+	Positive LVDS differential data input (Odd data)	
3	RxO1-	Negative LVDS differential data input (Odd data)	
4	RxO1+	Positive LVDS differential data input (Odd data)	
5	RxO2-	Negative LVDS differential data input (Odd data)	
6	RxO2+	Positive LVDS differential data input (Odd data)	
7	GND	Ground	
8	RxOCLK-	Negative LVDS differential clock input (Odd clock)	
9	RxOCLK+	Positive LVDS differential clock input (Odd clock)	
10	RxO3-	Negative LVDS differential data input (Odd data)	
11	RxO3+	Positive LVDS differential data input (Odd data)	
12	RxE0-	Negative LVDS differential data input (Even data)	
13	RxE0+	Positive LVDS differential data input (Even data)	
14	GND	Ground	
15	RxE1-	Negative LVDS differential data input (Even data)	
16	RxE1+	Positive LVDS differential data input (Even data)	
17	GND	Ground	
18	RxE2-	Negative LVDS differential data input (Even data)	
19	RxE2+	Positive LVDS differential data input (Even data)	
20	RxECLK-	Negative LVDS differential clock input (Even clock)	
21	RxECLK+	Positive LVDS differential clock input (Even clock)	
22	RxE3-	Negative LVDS differential data input (Even data)	
23	RxE3+	Positive LVDS differential data input (Even data)	
24	NC	No connection (for AUO test only. Do not connect)	
25	NC	No connection (for AUO test only. Do not connect)	
26	NC	No connection (for AUO test only. Do not connect)	
27	NC	No connection (for AUO test only. Do not connect)	
28	VDD	Power Supply Input Voltage	
29	VDD	Power Supply Input Voltage	
30	VDD	Power Supply Input Voltage	

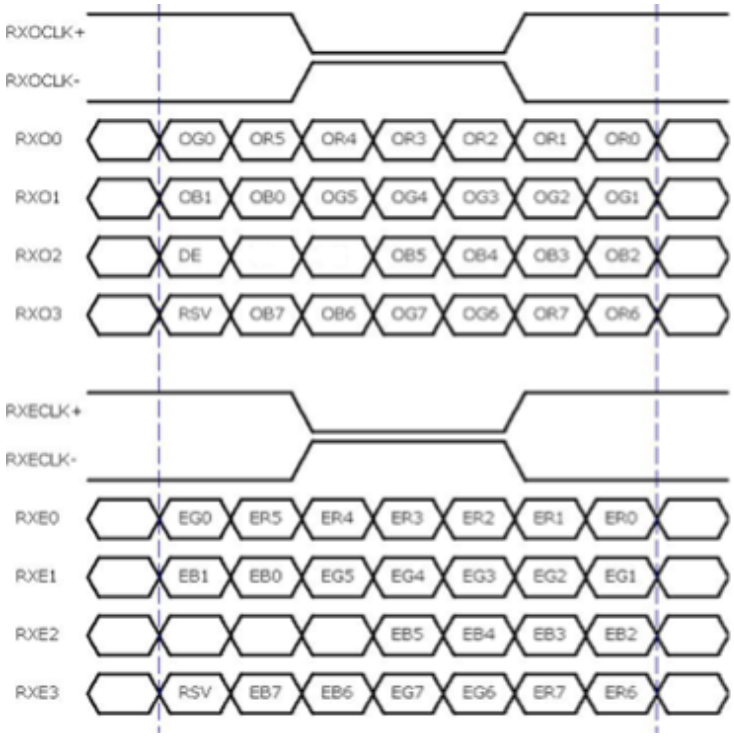

ACTIVE AREA CENTER
Pin 1
Pin 30

2.2 Signal Characteristics

LCD Pixel Format



LVDS Data Format



8 Bit Color Bit Order			
MSB	R7	G7	B7
	R6	G6	B6
	R5	G5	B5
	R4	G4	B4
	R3	G3	B3
	R2	G2	B2
	R1	G1	B1
LSB	R0	G0	B0

a. O=" Odd Pixel Data" E=" Even Pixel Data"
b. Refer to LCD pixel format, the 1st data 1(Odd Pixel Data), the 2nd data is 2 (Even Pixel Data) and the last data is 1920(Even Pixel Data).

2.3 Color Versus Input Data

The following table is for color versus input data (8bit). The higher the gray level, the brighter the color.

Color	Gray Level	Color Input Data																								Remark
		RED data (MSB:R7, LSB:R0)								GREEN data (MSB:G7, LSB:G0)								BLUE data (MSB:B7, LSB:B0)								
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	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	
White	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Gray 127	-	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	
Red	L0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Black
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	L255	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	L0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Black
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	L255	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	L0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Black
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	L255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	

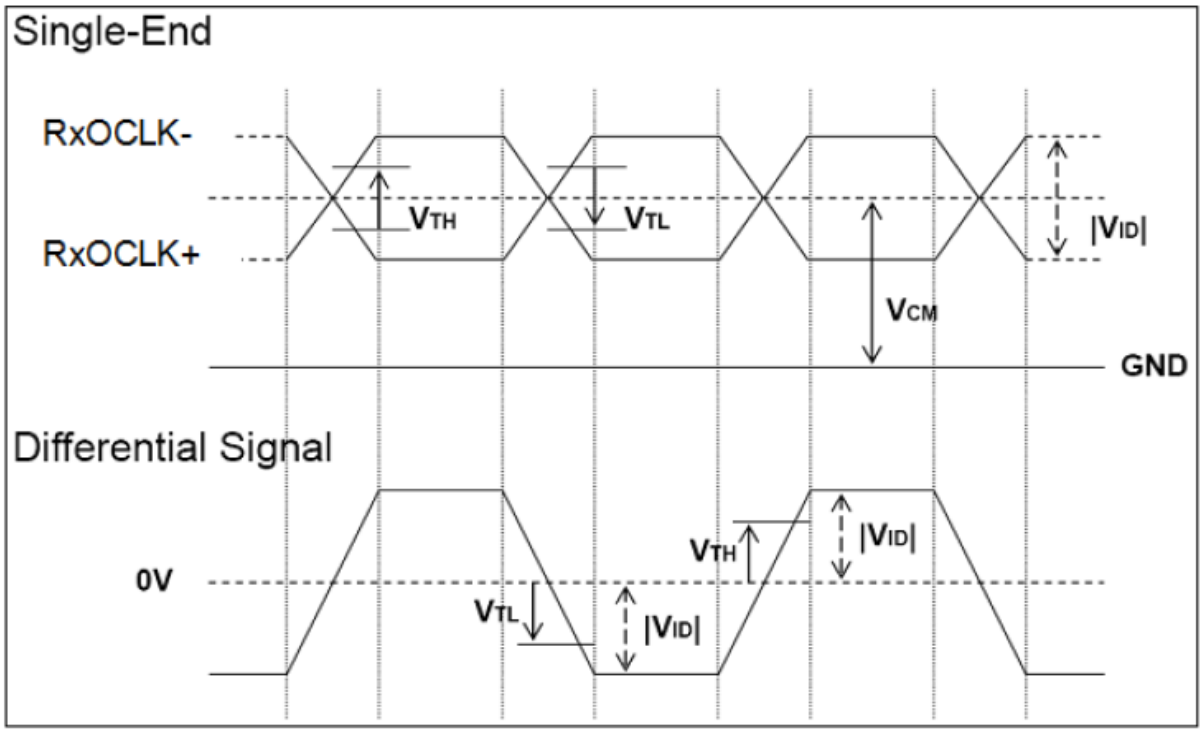
2.4 LVDS Specification

DC Characteristics:

Symbol	Description	Min	Typ	Max	Units	Condition
V_{TH}	LVDS Differential Input High Threshold	-	-	+100	[mV]	V_{CM} = 1.2V
V_{TL}	LVDS Differential Input Low Threshold	-100	-	-	[mV]	V_{CM} = 1.2V
$\lvert V_{ID} \rvert$	LVDS Differential Input Voltage	100	-	600	[mV]	
V_{CM}	LVDS Common Mode Voltage	+1.0	+1.2	+1.5	[V]	V_{TH}-V_{TL} = 200mV
RXJitter	Input clock cycel to cycel jitter	-100	-	+100	[ps]	

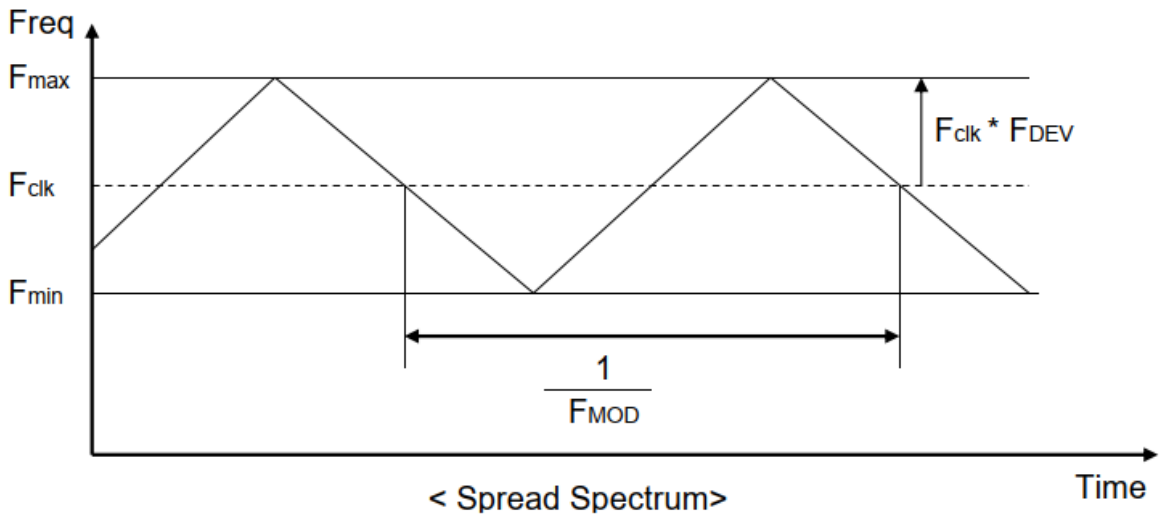
LVDS Signal Waveform:

Use RxOCLK- & RxOCLK+ as example.



AC Characteristics:

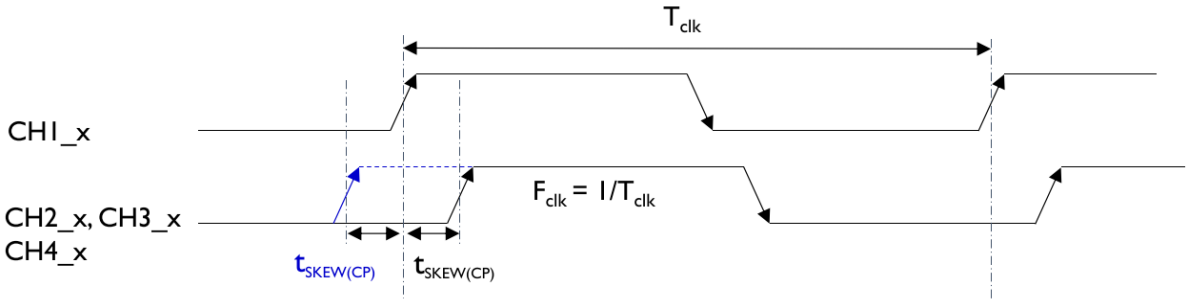
Symbol	Description	Min	Max	Unit	Remark
F_{DEV}	Maximum deviation of input clock frequency during Spread Spectrum	-	± 3	%	
F_{MOD}	Maximum modulation frequency of input clock during Spread Spectrum	-	200	KHz	



Fclk: LVDS Clock Frequency

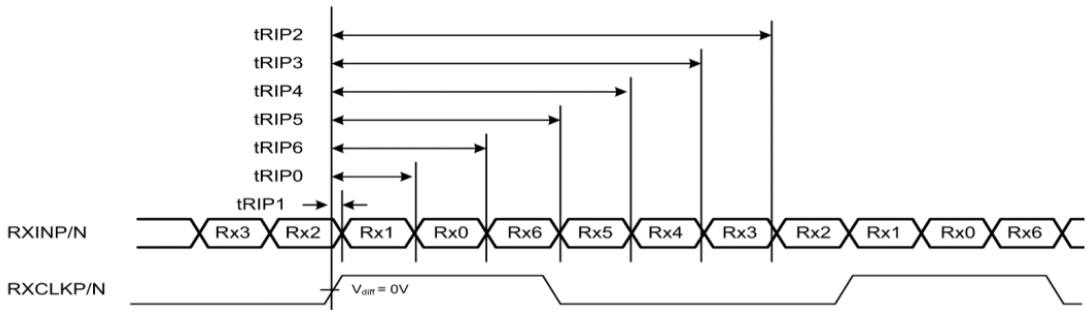
Parameter		Symbol	Value			Unit	Remark
			Min.	Typ.	Max		
LVDS Interface	Input Channel Pair Skew Margin	$t_{SKEW\,(CP)}$	-200	--	+200	ps	Note 1
	Receiver Data Input Margin Fclk = 115 MHz Fclk = 100 MHz Fclk = 85 MHz Fclk = 65 MHz	tRMG	-0.20 -0.38 -0.45 -0.60	-- -- 	+0.20 +0.38 +0.45 +0.60	ns	Note 2

Note 1: VICM=1.25V
Note 2:
Input Channel Pair Skew Margin



LVDS Receiver Clock SSCG (Spread spectrum clock generator) is defined as below figures.

Parameter	Symbol	Rating			Unit	Note
		Min	Type	Max		
Input Clock Frequency	Fclk	Fclk (min)	--	Fclk (max)	MHz	**T=1/Fclk**
Input Data Position0	tRIP1	-|tRMG|	-	|tRMG|	ns	
Input Data Position1	tRIP0	T/7-|tRMG|	T/7	T/7+|tRMG|	ns	
Input Data Position2	tRIP6	2T/7-|tRMG|	2T/7	2T/7+|tRMG|	ns	
Input Data Position3	tRIP5	3T/7-|tRMG|	3T/7	3T/7+|tRMG|	ns	
Input Data Position4	tRIP4	4T/7-|tRMG|	4T/7	4T/7+|tRMG|	ns	
Input Data Position5	tRIP3	5T/7-|tRMG|	5T/7	5T/7+|tRMG|	ns	
Input Data Position6	tRIP2	6T/7-|tRMG|	6T/7	6T/7+|tRMG|	ns	



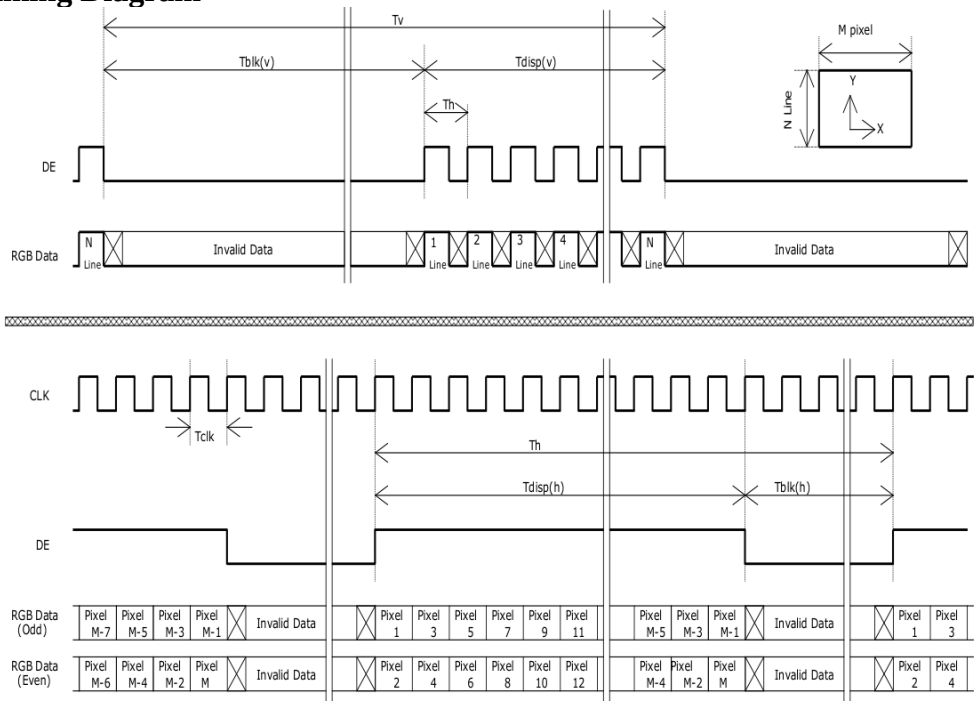
2.5 Input Timing Specification

It only support DE mode,and the input timing are shown as the following table.

Symbol	Description		Min.	Typ.	Max.	Unit	Remark
Tv	Vertical Section	Period	1096	1160	2489	Th	
Tdisp (v)		Active	1080	1080	1080	Th	
Tblk (v)		Blanking	16	80	1409	Th	
Fv		Frequency	47	60	100	Hz	Note 3-5
Th	Horizontal Section	Period	1000	1050	1100	Tclk	
Tdisp (h)		Active	960	960	960	Tclk	
Tblk (h)		Blanking	40	90	140	Tclk	
Fh		Frequency	54.6	69.6	113.3	KHz	Note 3-6
Tclk	LVDS Clock	Period	8.55	13.68	18.32	ns	1/Fclk
Fclk		Frequency	54.6	73.1	117	MHz	Note 3-7

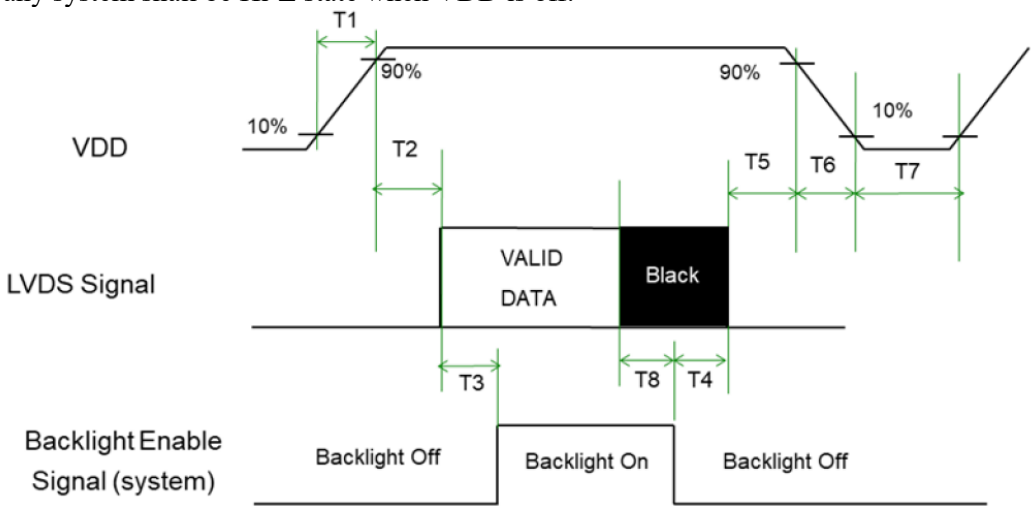
Note 3-5: 75Hz model: The optimal Vertical Frequency is 47-100Hz for best picture quality.
Note 3-6: The equation is listed as following. Please don't exceed the above recommended value.
Fh (Min.) = Fclk (Min.) / Th (Min.);
Fh (Typ.) = Fclk (Typ.) / Th (Typ.)
Note 3-7: The equation is listed as following. Please don't exceed the above recommended value.
Fclk (Typ.) = Fv (Typ.) x Th (Typ.) x Tv (Typ.)
Fclk (Min.) ≦Fv x Th x Tv ≦ Fclk (Max.); SSCG including

Input Timing Diagram



2.6 Power ON/OFF Sequence

VDD power, LVDS signal and backlight on/off sequence are as following. LVDS signals from any system shall be Hi-Z state when VDD is off.

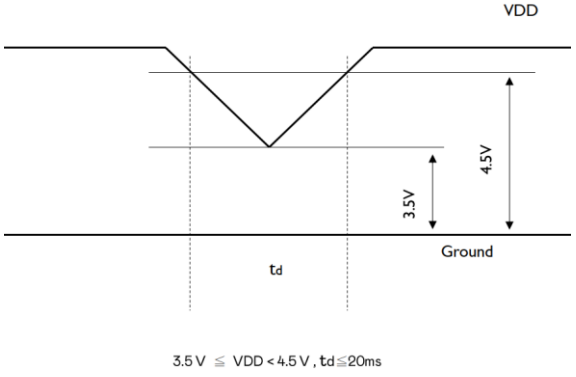


Power Sequence Timing

Symbol	Value			Unit	Remark
	Min.	Typ.	Max.		
T1	0.5	-	10	[ms]	
T2	0	-	50	[ms]	
T3	500	-	-	[ms]	
T4	100	-	-	[ms]	Note 3-10
T5	0	-	50	[ms]	Note 3-8 Note 3-9
T6	0	-	200	[ms]	Note 3-11
T7	1000	-	-	[ms]	
T8	20	-	-	[ms]	

Note 3-8: Recommend setting T5=0ms to avoid electronic noise when VDD is off.
Note 3-9: During T5 period, please keep the level of input LVDS signals with Hi-Z state.
Note 3-10: If T4<100ms, there will be no reliability concern, but the display may momentarily show abnormal screen.
Note 3-11: Voltage of VDD must decay smoothly after power-off.(customer system decide this value)

VDD Power Dip Condition



3.5 V ≦ VDD < 4.5 V , td≦20ms

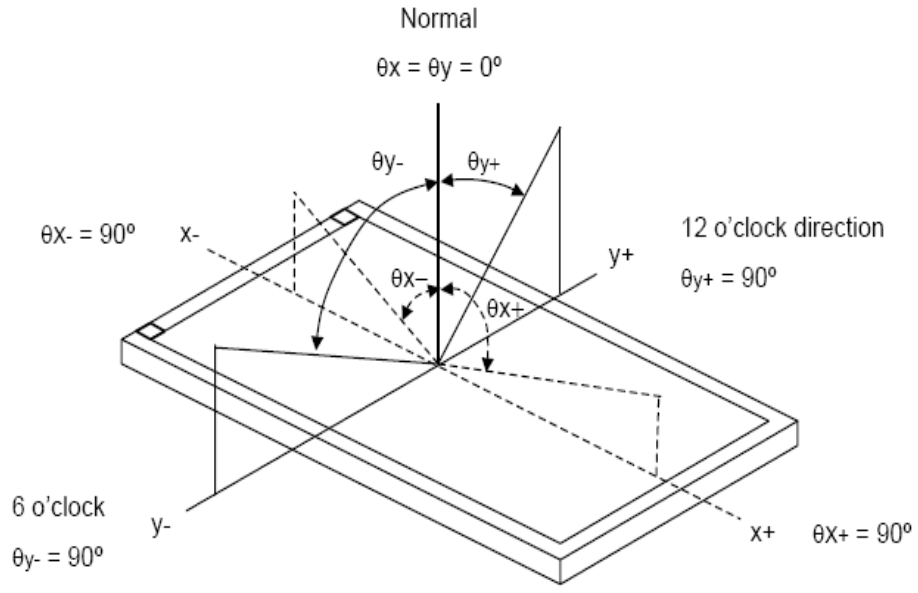
3 Optical Specification

OPTICAL SPECIFICATIONS

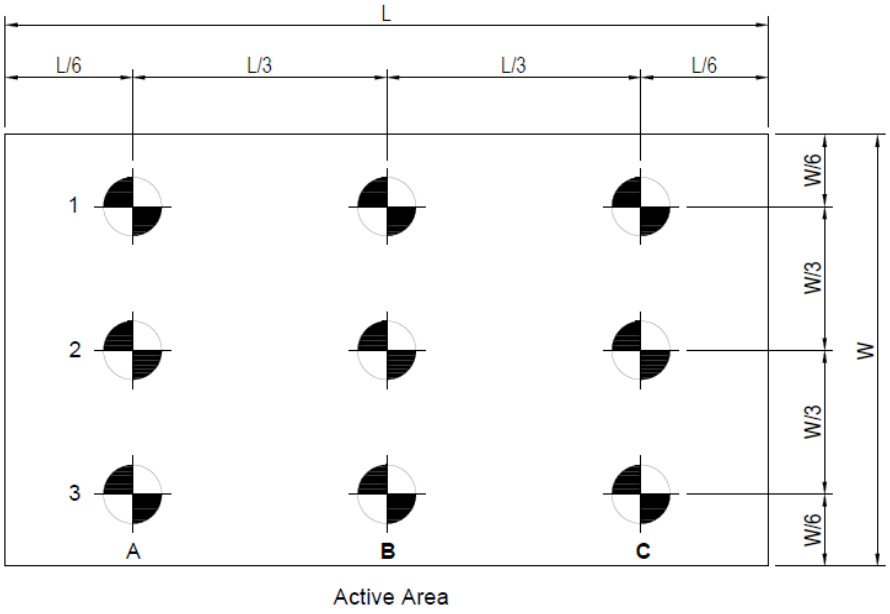
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color chromaticity	Red	Rx	θx=0 θy=0 CA-410	0.613	0.643	0.673	-	Test Mode: (2) (3)
		Ry		0.304	0.334	0.364	-	
	Green	Gx		0.280	0.310	0.340	-	
		Gy		0.60	0.630	0.660	-	
	Blue	Bx		0.125	0.155	0.185	-	
		By		0.022	0.052	0.082	-	
	White	Wx		0.276	0.306	0.336	-	
		Wy		0.303	0.333	0.363	-	
Center Luminance of White		Lc	θx=0 θy=0 CA-410	1440	1600	2080	cd/m^2	
Uniform		Lu		-	80	-	%	
Contrast Ratio		CR	θx=0 θy=0 Klein K-10	720:1	800:1	-	-	Test Mode: (4)
Color Saturation		NTSC		-	83		-	
Viewing Angle	Horizontal	θx+	-	-	89	-	Deg	Test Mode: (1)
		θx-		-	89	-		
	Vertical	θy+		-	89	-		
		θy-		-	89	-		

Test Mode：

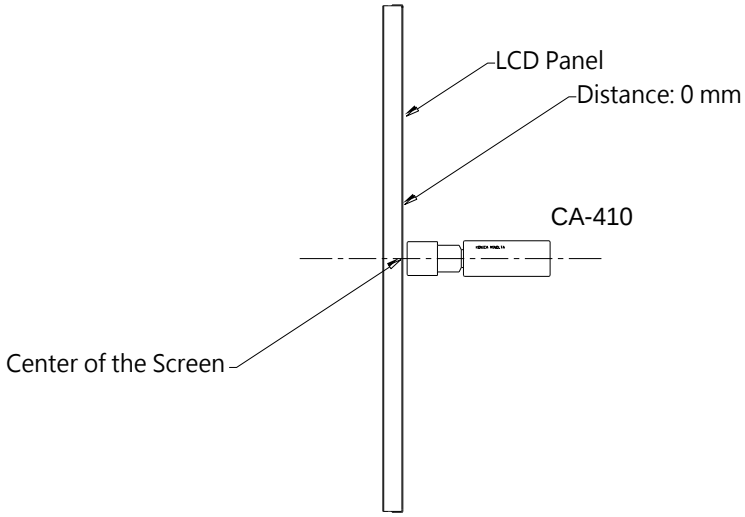
(1) Definition of Viewing Angle (θx , θy):



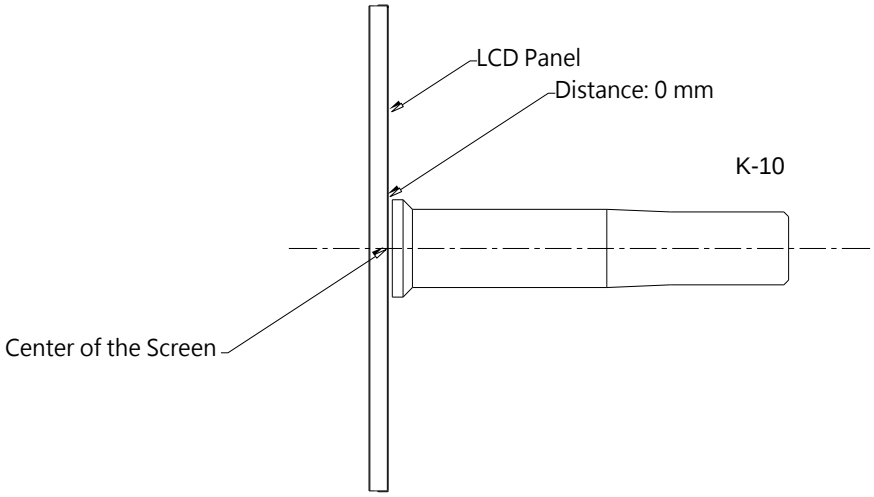
(2) Definition of Test Point:



(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 DLD2126 1600nits LED backlight.

4.1 Operating Characteristics

Item	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Remark
Input Voltage	Vin		10.0	12.0	14.0	V	
Input Current (High Brightness)	IinH	VIN=12V,Vadj=0V	2.31	2.11	1.91	A	(1)
LED Current (High Brightness)	IoutH	VIN=12V,Vadj=0V	-----	0.62	-----	A	
Input Power consumption	Pin	Brightness = 100%	-----	25.3	-----	W	
Working Frequency	Freq	VIN=12V,Vadj=0V	-----	400	-----	KHZ	(3)
Brightness Control	Vadj	Connection of Voltage	0.2	-----	5	V	(2)
ON/OFF Control	Von	Normal Operation	2	-----	5	V	
	Voff	Normal Operation	0	-----	1.8	V	
Output Voltage	Vout	VIN=12V,Vadj=0V	-----	38.3	----	V	
Efficiency	η	VIN=12V,Vadj=0V	-----	94	-----	%	(4)

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 V_{adj}=0.2V. Min brightness at V_{adj}=5V.

(3) Max dimming ratio = 1:100.

(4) Frequency can be adjusted in accordance with demand (120Hz minimum, or lights will be flickering)

(5) $\eta_{max} = V_{out(max)} * I_{outH(max)} / V_{in(max)} * I_{inH(min)}$

$\eta_{min} = V_{out(min)} * I_{outH(min)} / V_{in(min)} * I_{inH(max)}$

4.2 Connector Socket

Input Connector: J1(JST S8B-PH-SM3-TB or Compatible)

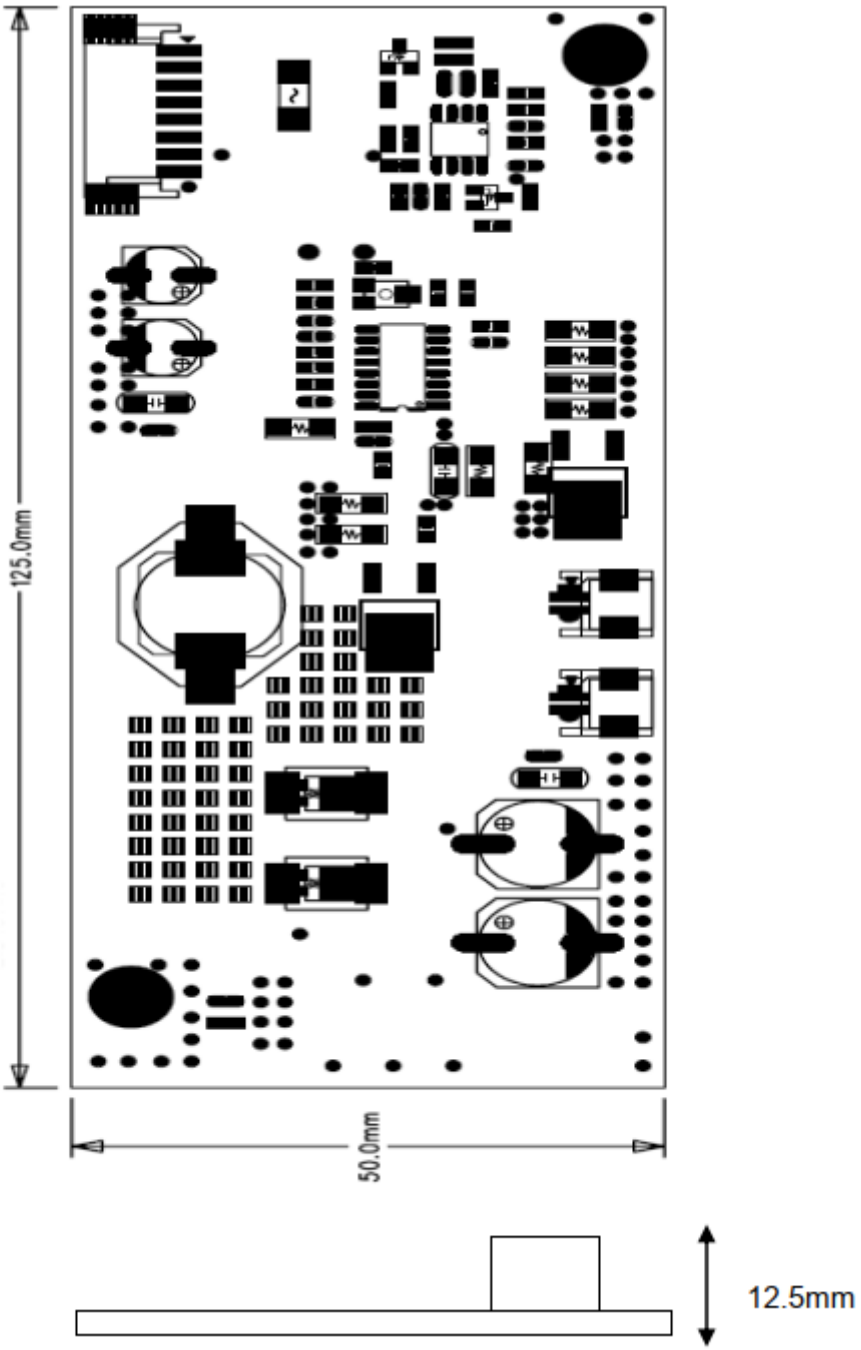
PIN No	Symbol	Description
1	Vin	DC+12V
2	Vin	DC+12V
3	Vin	DC+12V
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	Brightness	Brightness Control
8	Control	ON/OFF Control

Output Connector: J2,J3(JST S2B-EH or Compatible)

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

4.3 Mechanical Characteristics

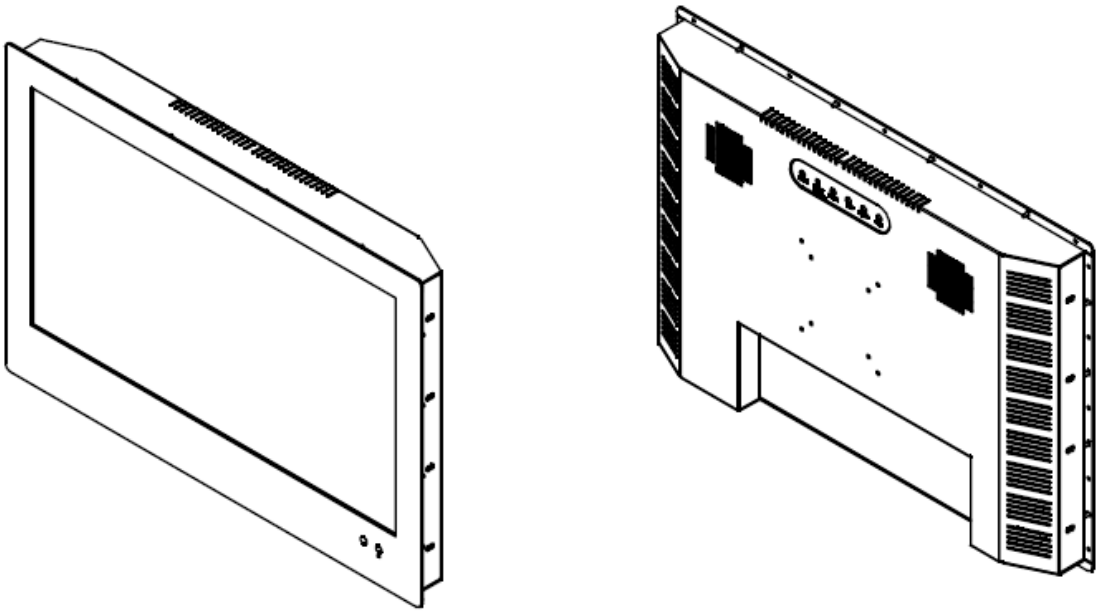
Dimension: 125 x 50 x 12.5mm

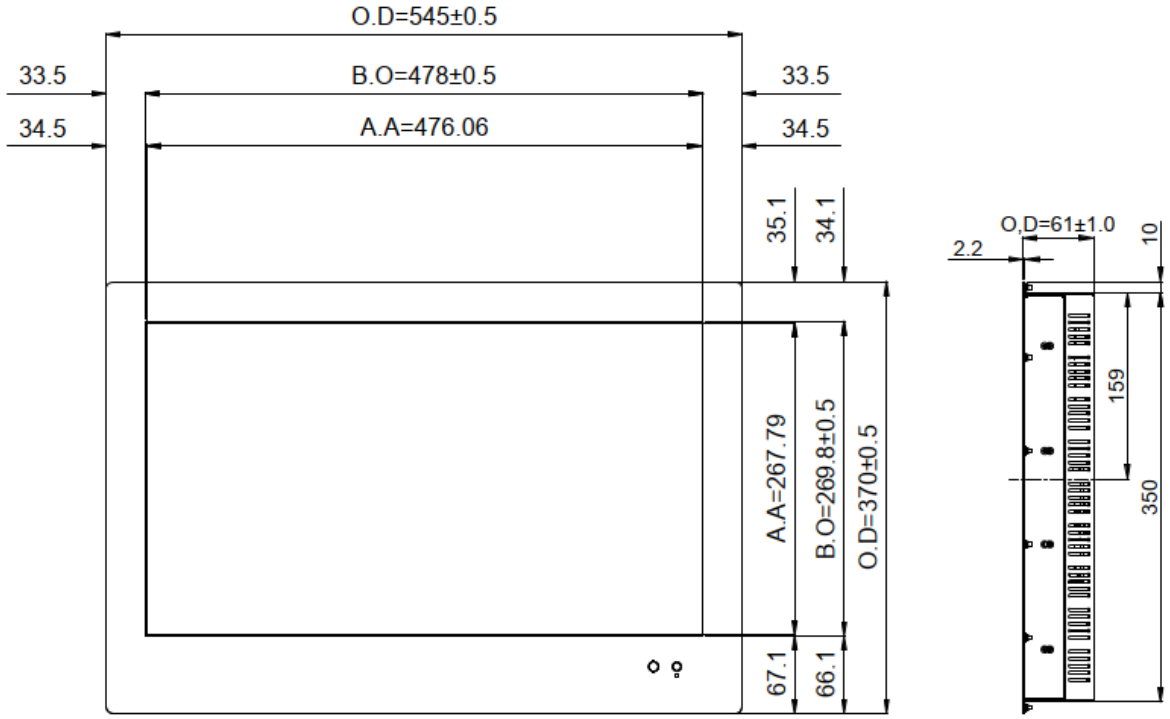


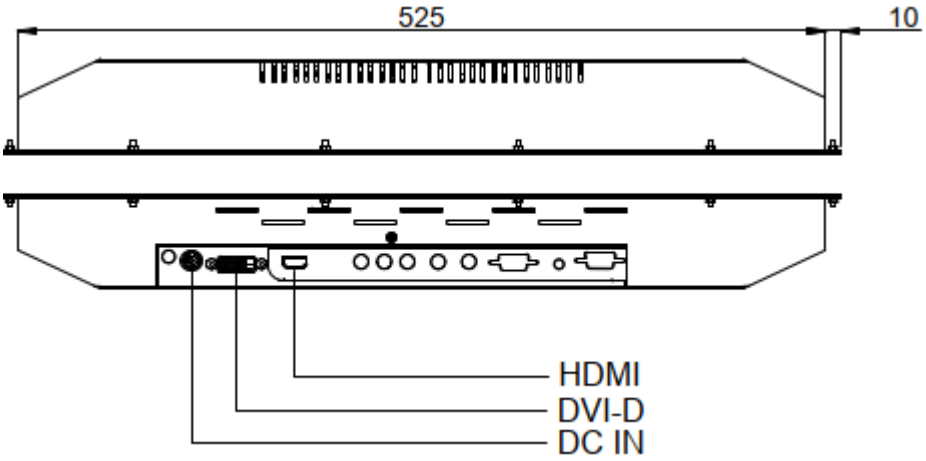
5 Mechanical Drawing

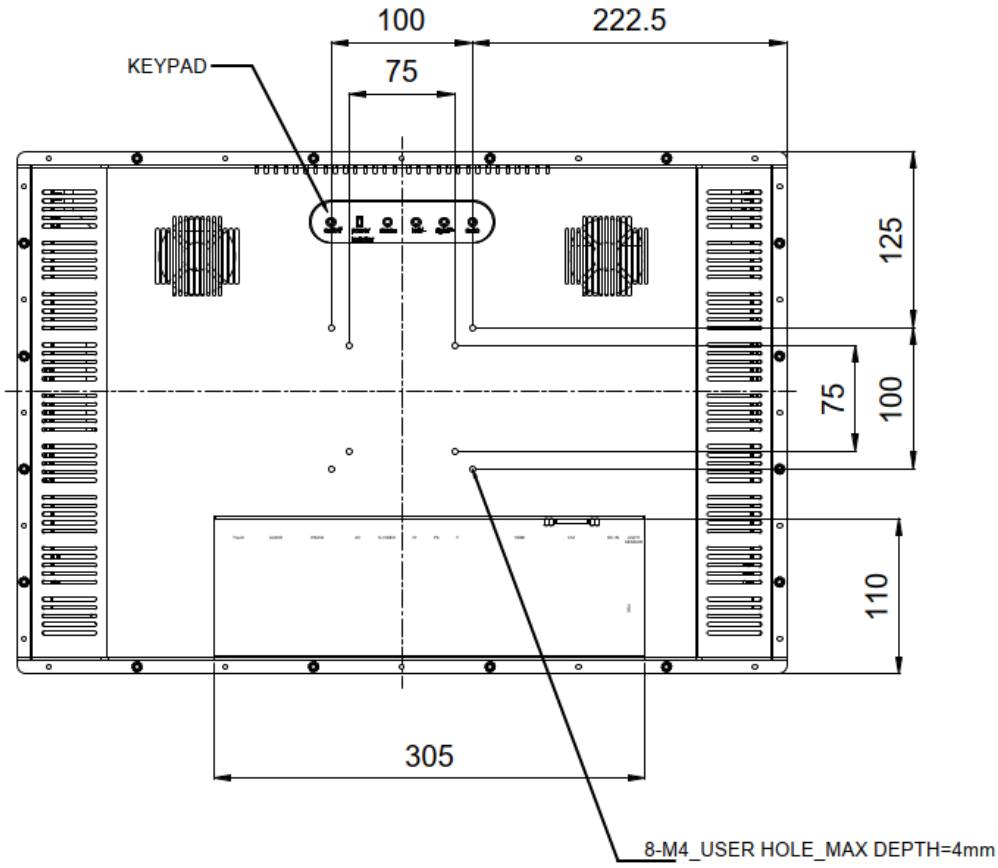
Outline Dimensions

Unit:mm






525
10
HDMI
DVI-D
DC IN


100
222.5
KEYPAD
75
125
75
100
110
305
8-M4_USER HOLE_MAX DEPTH=4mm

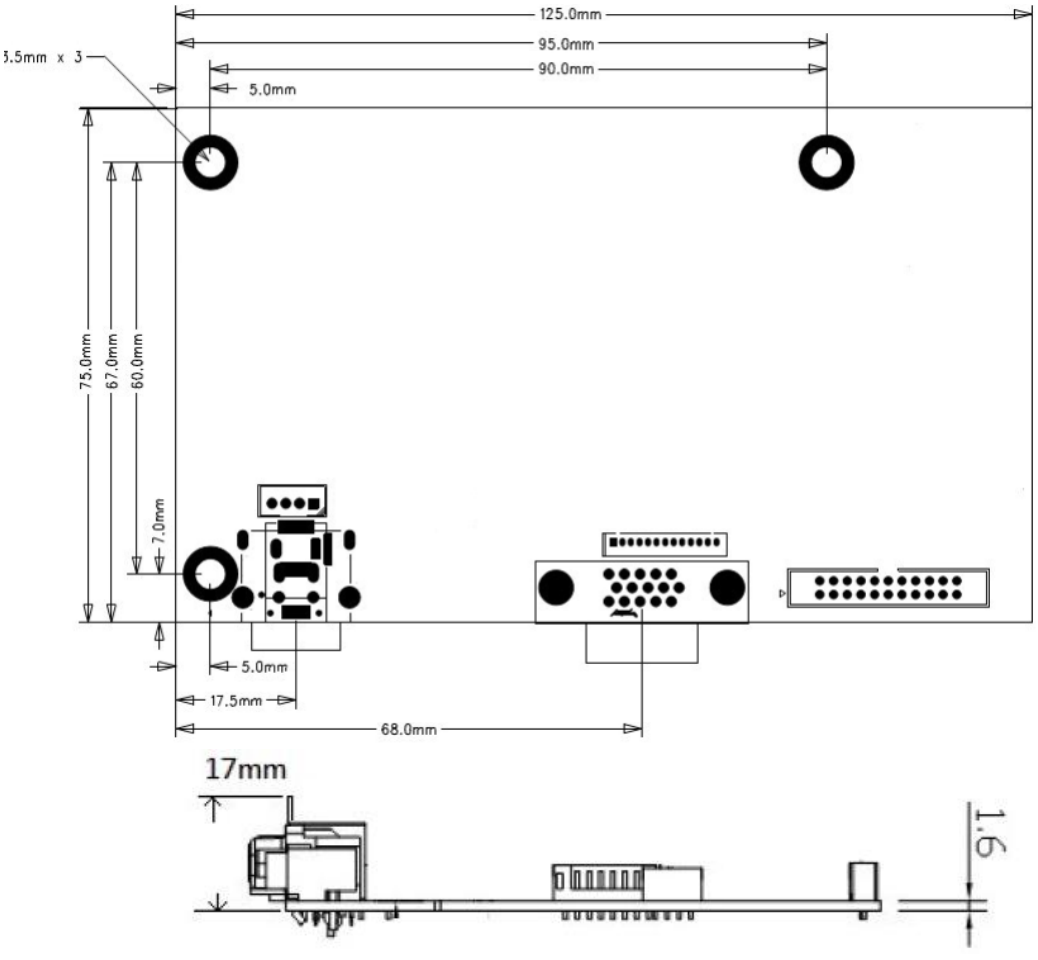
6 AD8891DH Board & OSD Functions

We developed this A/D board to support industrial high brightness and commercial applications. This A/D board has many functions. It has a DVI-D and HDMI input. Rev.1 is European RoHS compliant.

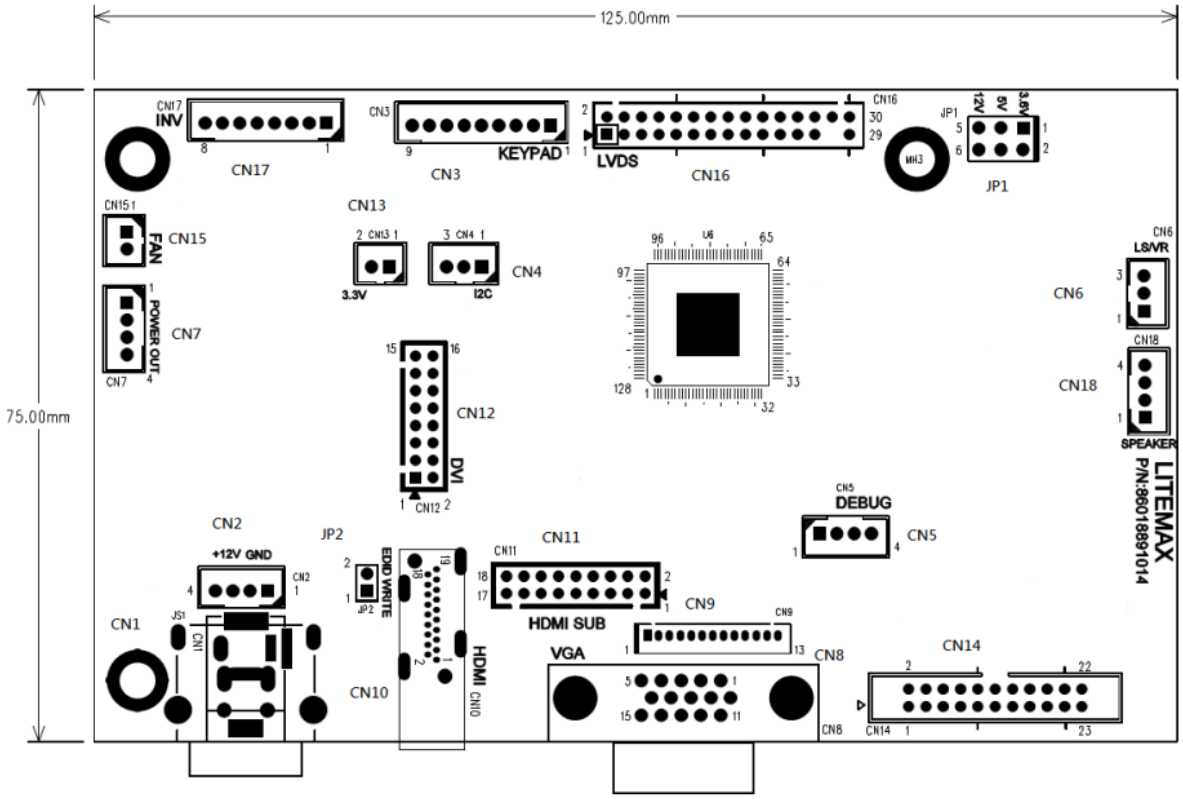
- **Max Resolution Up To Full HD**
- **Ultra-Reliable DVI-D Input (CN12 Pin Header)**
- **HDMI Input (HDMI 1.3) (CN11 Pin Header) (CN10 Optional)**
- **Dual/Single LVDS Interface**
- **Inverter Analog or PWM Dimming Control.**
- **Support Panel DC 5V or 12V,3.6V Output**
- **OSD Control**
- **External RS232 Control (Optional)**
- **Input Power DC 12V**
- **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

AD8891DH 125mmX75mm



AD8891DH Board Pin Define



CN16: Panel LVDS Connector (THS201-152-4.0/2.8)

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

CN12: DVI-D Input Connector (THS201-82-4.0/2.8)

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	DATA2-	7	DVI_SDA	13	GND
2	DATA2+	8	DVI_SCL	14	GND
3	DATA1-	9	GND	15	DVI HP
4	DATA1+	10	DET_DVI	16	DVI_5V
5	DATA0-	11	DCLK-		
6	DATA0+	12	DCLK+		

CN10: HDMI Input Connector (HDMI 19Pin)(Optional)

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. Data0+	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	DC 12V	4	DC 12V

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)(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	I^2C_SDA	2	I^2C_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 EDID want 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 DC 12V
3	GND	GND	7	12VDC	Input DC 12V
4	GND	GND	8	12VDC	Input DC 12V

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

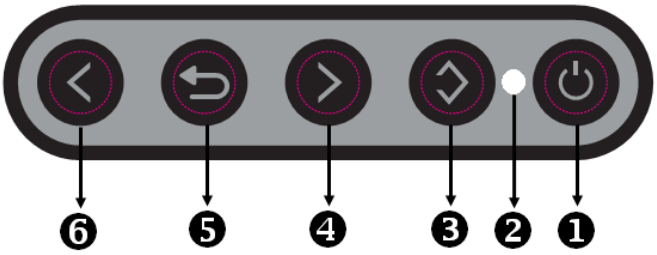
Pin No.	Function	Pin No.	Function
1	SPK_R+	2	SPK_R-
3	SPK_L-	4	SPK_L+

CN14: 11P X 2 Connector

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

6.1 OSD Functions

MEMBRANE CONTROL BUTTOM



❶ **Key:** (Power) function key

Press the power switch will turn the monitor on.

Press it again to turn the monitor off.

❷ **LED Status:** Power ON-Green / Power off-No.

❸ **Key:** (Menu + Selection Right + Enter) function key

Press this button to the OSD “main menu”. And then press this button go to the “Selection Right” function, and press again this button to “Enter”.

❹ **Key:** (Menu + Selection Up + Increase) function key

Press this button to the OSD “main menu”. And then press this button go to the “Selection Up” function, and press again this button to adjustment value “Increase”.

❺ **Key:** (Menu + Exit) function key

Enter to the OSD adjustment menu. It also used for go back to previous menu for sub-menu.

❻ **Key:** (Menu + Selection Down + Decrease) function key

Press this button to the OSD “main menu”. And then press this button go to the “Selection Down” function, and press again this button to adjustment value “Decrease”.

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 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 30 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

By pressing the "menu" button, you will see the below picture. Across from timing you will see resolution, frequency, and V-frequency of the panel. These cannot be altered by the user.

7 Precautions

7.1 Handling and Mounting Precautions

(1) The module should be assembled into the system firmly by using every mounting hole. Do not apply rough force such as bending or twisting to the LCD during assembly.
(2) You should consider the mounting structure so that uneven force (ex. Twisted stress, Concentrated stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the LCD module.
(3) While assembling or installing LCD modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
(4) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
(5) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily be scratched.
(6) Please attach the surface transparent protection film to the surface in order to protect the polarizer. Transparent protection film should have sufficient strength in order to the resist external force.
(7) When the transparent protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
(8) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.
(9) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.
(10) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.
(11) Protect the LCD module from static electricity, it may cause damage to the C-MOS Gate Array IC.
(12) Do not disassemble the module.
(13) Do not pull or fold the lamp wire.
(14) Pins of I/F connector should not be touched directly with bare hands.

7.2 Storage Precautions

(1) High temperature or humidity may reduce the performance of LCD module. Please store LCD module within the specified storage conditions.
(2) If possible store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.
(3) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
(4) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

7.3 Operation Precautions

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

8 Disclaimer

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