

# AD BOARD HI-DP

## Specifications

**Approval**

Rev. 0

Issue Date.

2013. 11. 20

Doc No.

HI-DP BOARD 01

Note | Specification is subject to change without notice.  
Consequently it is better to contact to our company before proceeding with the design of your product incorporating this board

Prepared	Checked I	CheckedII	Approved



## 1. General Specification

No.	Item	Description		
1	Model Name	HI-DP		
2	LCD Module	LVDS 640x350 ~ MAX 1920X1200		Note 1)
3	Input	Analog RGB(R, G, B Separate H, V Sync), DVI-D(TMDS), AUDIO		
4	Resolution Support	H: 31 ~ 80kHz		
		V: 55 ~ 76Hz		
5	OSD Control	Menu, Select, Down, Up, Power		5 keys
	Plug & Play	VESA DDC 2B Ver1.3		
6	Power Consumption	Supply Voltage	12Vdc	
		Max Power	TBD	
7	Signal Connector	Analog	DSUB 15P(R, G, B Separate H, V Sync)	
		Digital	HDMI, DP	
8	Board Size	W x H x D(mm)	130 x 74 x 15	



## 2. ELECTRICAL SPECIFICATION

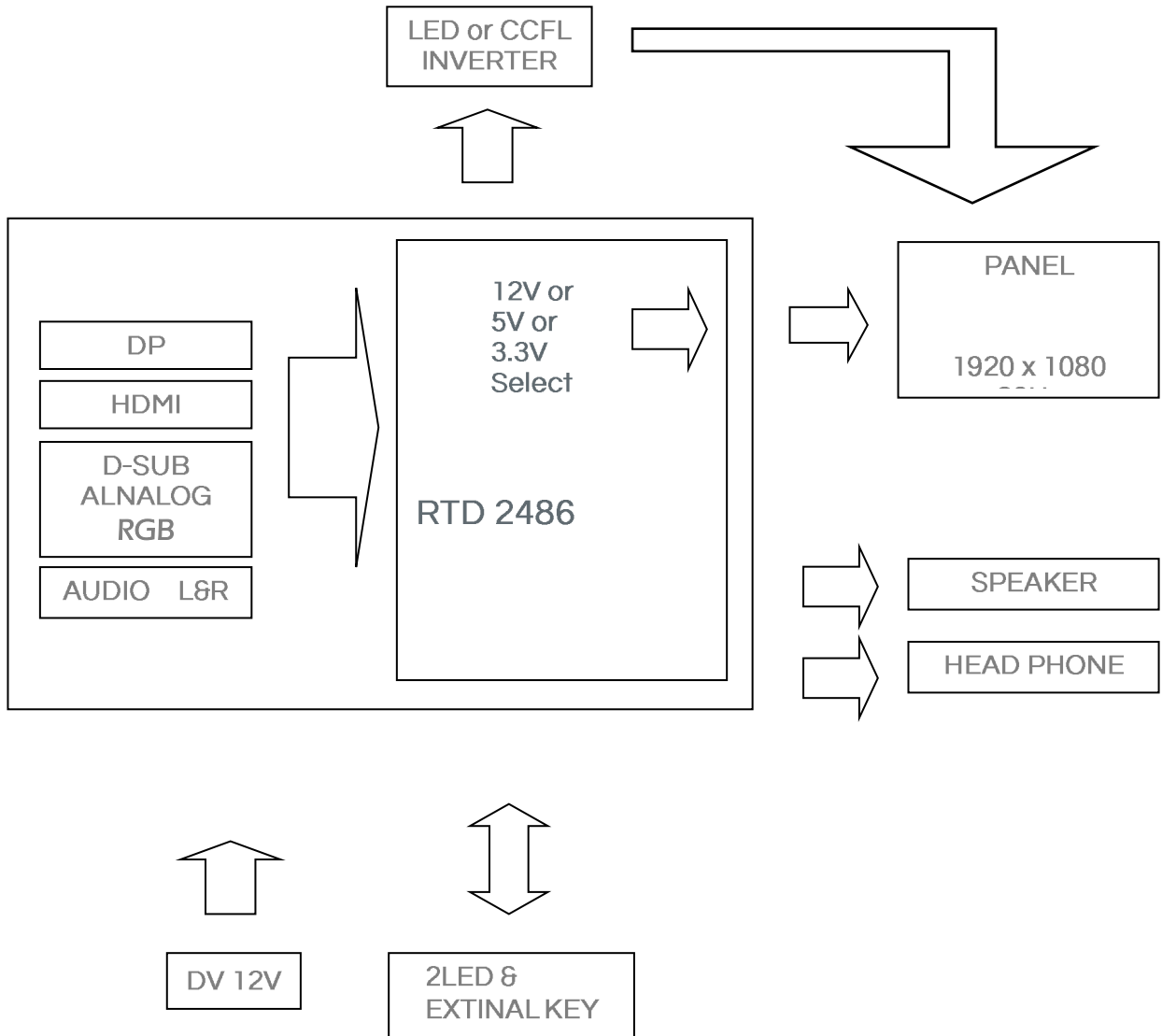
### 2.1. Input characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Power In (12Vdc)						
	Input	12VDC	11.4	12	12.6	
	Consumption	Watt		TBD		
RGB Input						
	Analog RGB	VPP	0	0.7	-	
	Sync	VDC	0	5	5.5	
	H Frequency	KHz	31		80	Depends on Mode
	V Frequency	Hz	55	75	77	Depends on Mode
DVI Input						
	TMDS	mVp-p	450	500	900	

### 2.2. Output characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Panel Power						
	LCD Power(12V)	VDC	11.4	12	12.6	Jumper option
	LCD Power(5V)	VDC	4.5	5	5.5	Jumper option
	LCD Power(3.3V)	VDC	3.16	3.3	3.5	Jumper option
LVDS Interface						
	Differential output	Vp-p (mV)	250	350	450	Differential +/-
AUDIO Interface						
	Output	Watt			3	
	Frecuence	Hz	700Hz		20KHz	
	THD	5% MAX AT 1500Hz 1.0W				
Inverter Interface						
	Power	V	11.4	12	12.6	Depends on Power
	On/Off control	V	0		3.3	L=off, H=on
	Brightness control	V	3.3		0	Option
			0		4.0	Option

### 3. FUNCTIONAL BLOCK DIAGRAM



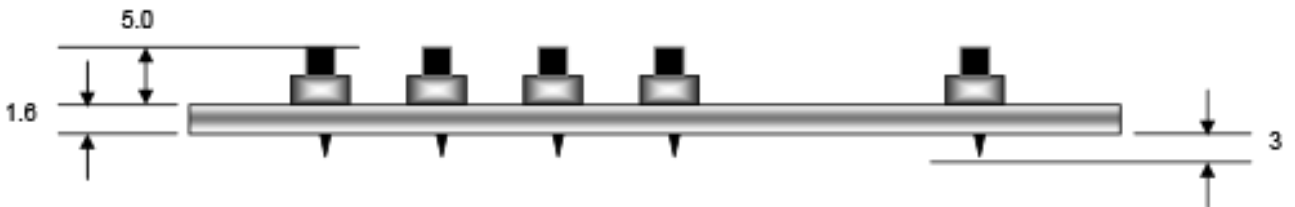
### 4. OSD Control Board

The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 5 buttons OSD operation as a standard. The control functions defined on OSD operation are as below. (Unit: mm)

Appearance

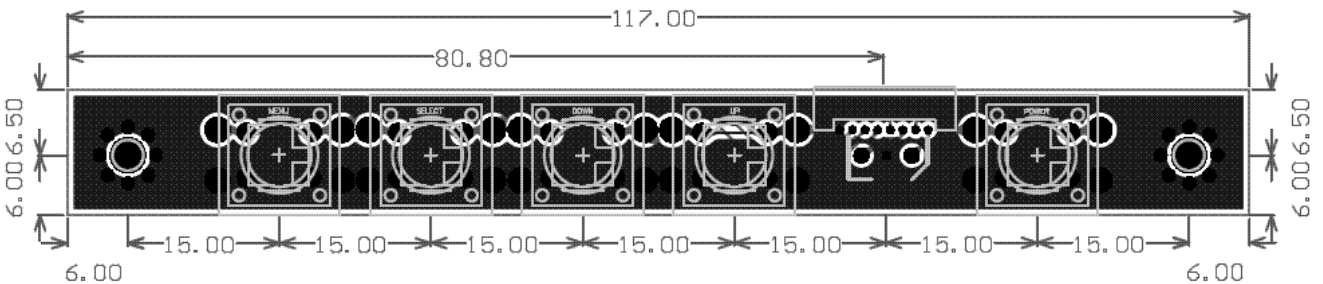


MENU    SELECT    DOWN    UP    LED    POWER



Board Size (W x H x D) : 112 x 12.5x 6.6 mm

Button	Function	Status	HOT Key
LED	Indicates operation status	Green/ Red/ Amber	On: Green Off: Red No Signal: Amber
POWER	Power on/off	On/Off	Menu, Power : INITIALIZE
MENU	Activate menu / Exit Menu		
SELECT	Menu Select / Source(option)		
DOWN	Cursor control Down / Auto Adjust		
UP	Cursor control Up		



## 5. OSD FUNCTION

### A. Main Menu

#### Picture: Backlight/Brightness/ Contrast /Sharpness

- ▷ Backlight: Backlight level Control
- ▷ Brightness: Brightness level Control
- ▷ Contrast : Contrast level Control
- ▷ Sharpness: Sharpness level Control

#### Display: Auto adjustment, H, V position Control, Pixel Clock, Phase

- ▷ Auto adjustment
- ▷ H/V position: Image H, V position Control
- ▷ Phase: Fine tune the position of sampled data
- ▷ Clock: Fine tune the number of sampled data

#### OSD Menu: OSD H, V position, OSD timer Control, Language, Reset

#### Color: Gamma, Color temp, Color Effect, Color Demo, Color Format, PCM, Hue, Saturation

- ▷ Gamma: Gamma value Select
- ▷ Color temp : Color temp Select
- ▷ Color effect: Color effect Select
- ▷ Color Demo: Color test mode Select
- ▷ Color format: Color format Select
- ▷ Color temp : Color temp Select
- ▷ PCM: PCM select
- ▷ Hue : Tint level control
- ▷ Saturation: Saturation control
- ▷ OSD Off timer: OSD Off timer Control
- ▷ OSD language Select
- ▷ Reset: Restore to default Value

#### ADVANCE: Aspect Ratio, Over scan, Over drive, DCR, DDCCI, Ultra Vivid, LAPS

#### Signal Source: D-SUB, DVI

- ▷ Input signal select (VGA, DP, HDMI)

#### Signal Source: D-SUB, DVI

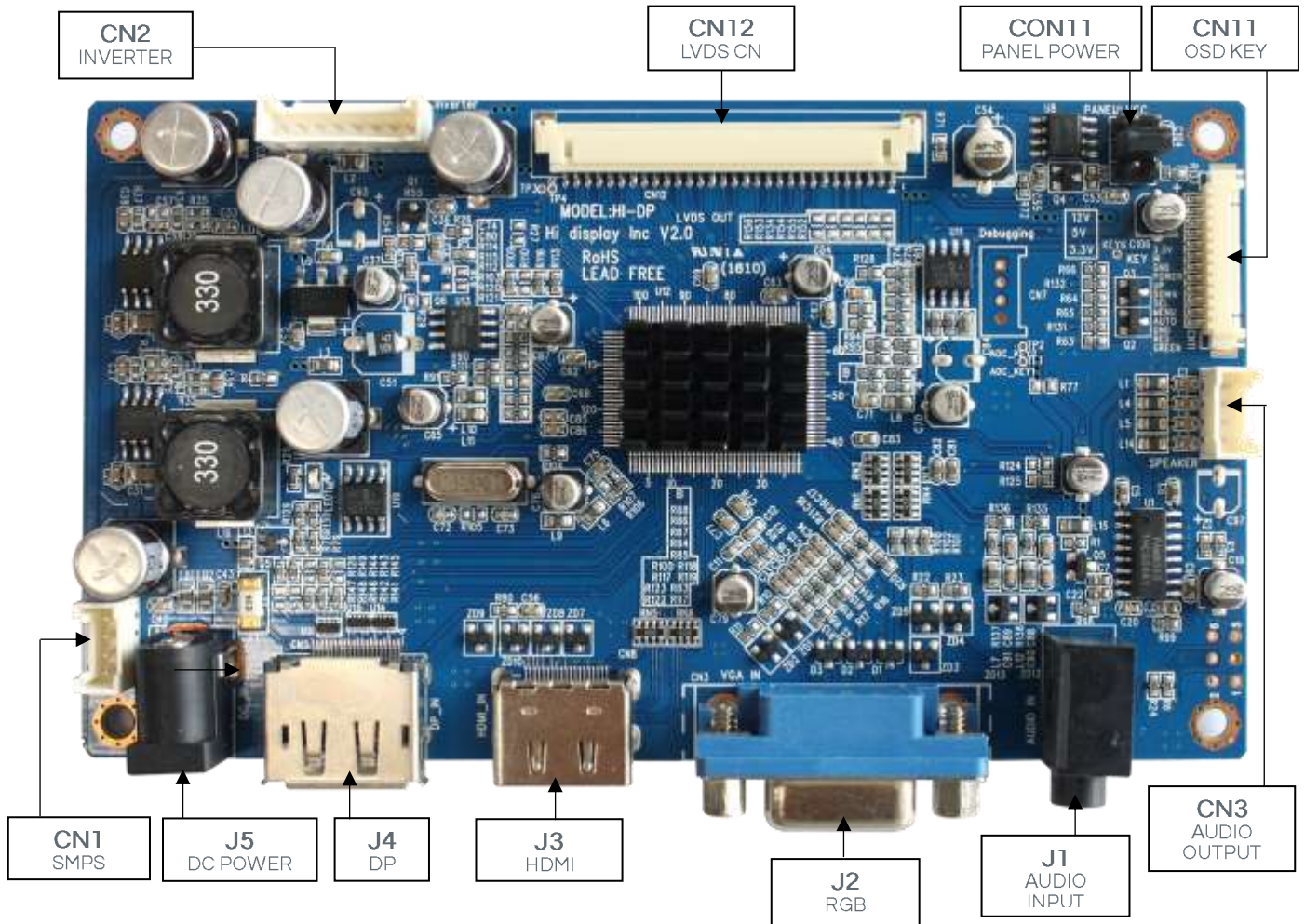
- ▷ Volume: Audio Volume control
- ▷ Mute: Audio Mute
- ▷ Stand a long : Stand a long on/off
- ▷ Audio Source: Audio Source select
- ▷ Sound Mode: Sound mode select

#### OTHER: Reset, Menu time, OSD H/V position, Language Transparency, Rotate

#### INFORMATION: Display information view

## 6. CONNECTOR, PINOUT & JUMPERS

The various connectors are:



Summary:

Reference	Item	Description	Type	Manufacture
J1	Connector	Audio Input Connector		
J2	Connector	R G B Connector	DSUB-15P	YEONHO
J3	Connector	HDMI Connector	HDMI 19P SMD	-
J4	Connector	DP Connector	DP 19P SMD	
J5	Connector	Dc power Jack	2.5ø DC Jack	-
CN1	Connector	SMPS Connector	SMW200-04P-2.0mm	YEONHO
CN2	Connector	Inverter Connector	SMW200-08P-2.0mm	YEONHO
CN12	Connector	LVDS Dual Interface Connector	12507WR-30P	YEONHO
CN11	Connector	OSD Connector	12505wr-12P	YEONHO
CN3	Connector	Audio Output Connector	SMW200-04P-2.0mm	YEONHO



## J2: ANALOG RGB INPUT (D-Sub 15P)

Pin No.	Symbol	Description
1	Red1	Red analog input
2	Green1	Green analog input
3	Blue1	Blue analog input
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	NC	Not connected
10	GND	Ground
11	GND	Ground
12	DSDA	DDC-SDA
13	HSYNC	Horizontal Sync
14	VSYNC	Vertical Sync
15	DSCL	Serial Clock Input

## J5: DC power Input Jack(12V)

Pin No.	Symbol	Description	Pin No.	Symbol	Description
Center	Vcc	12V	Shell	GND	Ground

## CN1: SMPS Power input connector

Pin No.	Symbol	Description
1,2	VCC	12V
3,4	GND	Ground

## CN2: Backlight Inverter connector

Pin No.	Symbol	Description
1,2	VCC	12V
3,4	VCC	5V
5,6	GND	Ground
7	ON/OFF	Inverter digital ON(3.3V)/OFF(0V) signal
8	ADJ	DIM-adjustment analog dimming control signal * make sure inverter specification

## CN3: Audio Output Connector

Pin No.	Symbol	Description
1	L	AUDIO L
2	GND	Ground
3	GND	Ground
4	R	AUDIO R

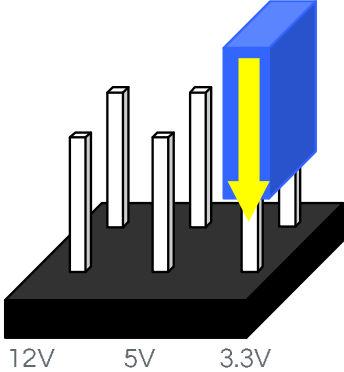
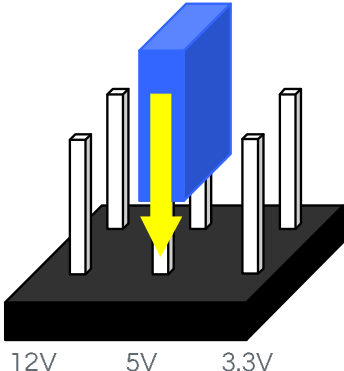
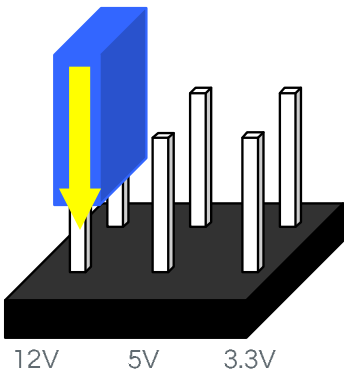
## CN12: LVDS Dual Interface Connector

Pin No.	Symbol	Description
1~3	PANEL-VCC	Panel Power (12V/18V, 5V or 3.3V)
4~6	N.C	No Connection
7	GND	Ground
8	Y3P-EVEN	Positive(+) LVDS differential first 3 data(B port)
9	Y3M-EVEN	Negative(-) LVDS differential first 3 data(B port)
10	YCP-EVEN	Positive(+) LVDS differential first Clock(B port)
11	YCM-EVEN	Negative(-) LVDS differential first Clock(B port)
12	Y2P-EVEN	Positive(+) LVDS differential first 2 data(B port)
13	Y2M-EVEN	Negative(-) LVDS differential first 2 data(B port)
14	GND	Ground
15	Y1P-EVEN	Positive(+) LVDS differential first 1 data(B port)
16	Y1M-EVEN	Negative(-) LVDS differential first 1 data(B port)
17	GND	Ground
18	Y0P-EVEN	Positive(+) LVDS differential first 0 data(B port)
19	Y0M-EVEN	Negative(-) LVDS differential first 0 data(B port)
20	Y3P-ODD	Positive(+) LVDS differential second 3 data(A port)
21	Y3M-ODD	Negative(-) LVDS differential second 3 data(A port)
22	YCP-ODD	Positive(+) LVDS differential second Clock(A port)
23	YCM-ODD	Negative(-) LVDS differential second Clock(A port)
24	GND	Ground
25	Y2P-ODD	Positive(+) LVDS differential second 2 data(A port)
26	Y2M-ODD	Negative(-) LVDS differential second 2 data(A port)
27	Y1P-ODD	Positive(+) LVDS differential second 1 data(A port)
28	Y1M-ODD	Negative(-) LVDS differential second 1 data(A port)
29	Y0P-ODD	Positive(+) LVDS differential second 0 data(A port)
30	Y0M-ODD	Negative(-) LVDS differential second 0 data(A port)

## CN11: OSD Connector

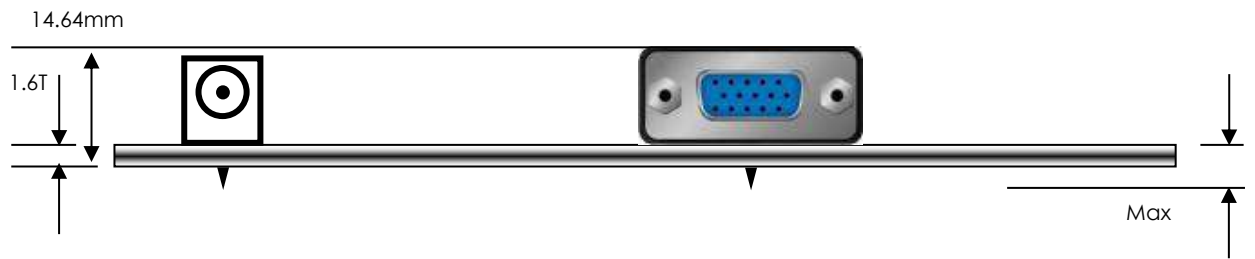
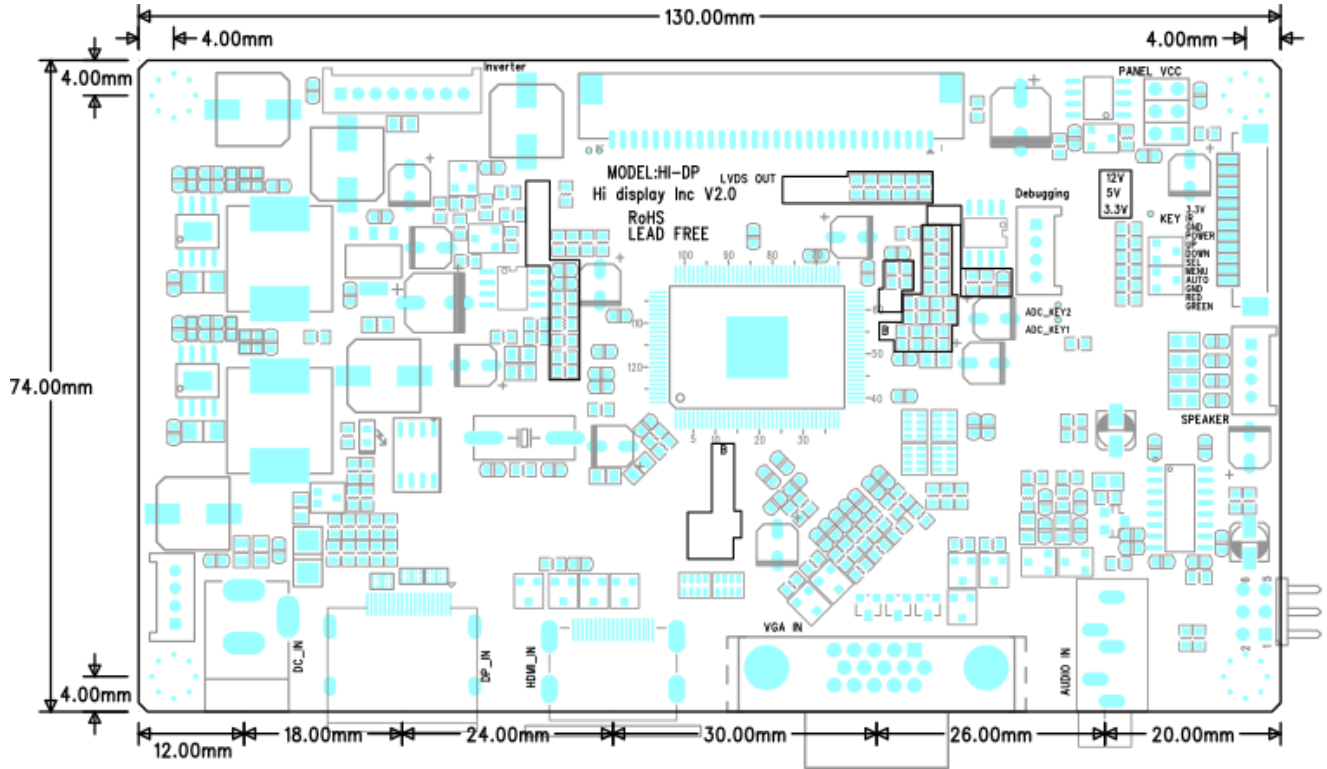
Pin No.	Symbol	Description
1	LED-Red	Red Color
2	LED-Green	Green Color
3	GND	Ground
4	AUTO	For Auto Switch
5	MENU	For Menu Switch
6	SEL	For Select Switch
7	DOWN	For Down Switch
8	UP	For Up Switch
9	POWER	For Power Switch
10	CDS	For Auto Brightness (Option)
11	IRD	IR DATA
12	5V	IR POWER 5V

Summary: Panel Power setting

Reference	Description	Connector Type
	<p>3.3V panel power CAUTION: Incorrect setting can damage panel</p>	
CON11	<p>5.0V panel power CAUTION: Incorrect setting can damage panel</p>	
	<p>12V/18V panel power CAUTION: Incorrect setting can damage panel</p>	

CAUTION: Incorrect setting can damage panel

## 7. CONTROLLER DIMENSIONS



[DIMENSION DOWNLOAD](#)

## 8 APPLICATION NOTES

### A. USING THE CONTROLLER WITHOUT BOTTONS ATTACHED::

This is very straightforward:

- ▷ Firstly setup the controller/display system with the buttons. With the attached controllers and display system active make any settings for color, contrast and image position as required then switch everything off.
- ▷ Remove the control switches, the 7-way cable.
- ▷ Refer to inverter specifications for details as to fixing brightness to a desired level, this may require a resistor, an open circuit or closed circuit depending on inverter

### B. INVERTER CONNECTION:

There are 3 potential issues to consider with inverter connection:

- ▷ Power
- ▷ ON/OFF
- ▷ Brightness (DIM-ADJ)

**Inverter power** : This should be matched with the inverter specification.

**Inverter ON/OFF** : This is a pin provided on some inverter for ON/OFF function and is used by this panel controller for VESA DPMS compliance. If the inverter does not have on/off pin or the on/off pin is not used DPMS will not operate. Pin5 should be matched to the inverter specification for the ON/OFF pin.

**Brightness Dimming control** : This controller boards are supported analog dimming and PWM dimming control method too. And it is important to consider the specifications for the inverter to be used.

## 9. TROUBLESHOOTING

### A. General:

A general guide to troubleshooting of a flat panel display system it worth considering the system as separate elements, such as:

- ▷ Controller (jumpers, PC settings)
- ▷ Panel (controller, cabling, connection, panel, PC settings)
- ▷ Backlight (inverter, cabling, connection, panel, Pc settings)
- ▷ Cabling
- ▷ Computer system (display settings, operating system)

Through checking the system step by step cross with instruction manuals and a process of elimination to isolate the problem it is usually possible to clearly identify the problem area.

### B. No image:

- ▷ If the panel backlight is not working it may still be possible to see just some image.
- ▷ A lack of image is most likely to be caused by incorrect connection, lack of power, failure to provide a signal or incorrect graphic card settings.

### C. Image position:

If it is impossible to position the image correctly, the image adjustment controls will not move the image far enough, then test using another graphics card. This situation can occur when a graphic card is not close to standard timing or when something is in the graphics line that may affect the signal such as a signal splitter (please note that normally a signal splitter will not have any adverse effect).

### D. Image appearance:

- ▷ A faulty panel can have blank lines, failed sections, flickering or flashing display.
- ▷ Incorrect graphic card refresh rate, resolution or interlaced mode will probably cause the image to be the wrong size, to scroll to, flicker badly or possibly even no image.
- ▷ Incorrect jumper settings on the controller may cause everything from incorrect image viewing to total failure.

**CAUTION:** Do not set the panel power input incorrectly.

- ▷ Sparkling on the display: faulty panel signal cable.

### E. Backlight:

Items to check include: Power input, controls, inverter and Tubes generally in this order. If half the screen is dimmer than the other half:

- ▷ Check cabling for the inverter.
- ▷ Also: If system does not power down when there is a loss of signal.

## 10. APPLICABLE GRAPHIC MODE

### A. General:

The microprocessor measures the, H – sync V – sync and polarity for RGB inputs, and uses this timing information to control all of the display operation to get the proper image on a screen. This board can detect all VESA standard Graphic modes shown on the table below and Provide more clear and stable image on a screen

RGB input format

Mode \ Spec	Pixel Freq.	Horizontal Timing			Vertical Timing		
		Sync Polar	Freq.	Active	Sync Polar	Freq.	Active
		MHz	KHz	Pixel	Hz	Line	
640*350@70Hz	25.144	P	31.430	640	N	70.000	350
640*400@70Hz	28.287	N	31.430	640	P	70.000	400
720*400@ 70Hz	28.287	N	31.430	720	P	70.000	400
640*480@60Hz	28.175	N	31.469	640	N	59.940	480
640*480@72Hz	31.500	N	37.861	640	N	72.809	480
640*480@75Hz	31.500	N	37.500	640	N	75.000	480
800*600@56 Hz	36.000	P	35.156	800	P	56.250	600
800*600@60Hz	40.000	P	37.879	800	P	60.317	600
800*600@72Hz	50.000	P	48.077	800	P	72.188	600
800*600@75Hz	49.500	P	46.875	800	P	75.000	600
1024*768@60Hz	65.000	N	48.363	1024	N	60.005	768
1024*768@70Hz	75.000	N	56.476	1024	P	70.070	768
1024*768@75Hz	78.750	P	60.023	1024	P	75.030	768
1280*720@60Hz	74.500	P	44.772	1280	P	59.855	720
1152*864@75Hz	108.000	P	67.500	1152	P	75.000	864
1360*768@60Hz	84.75	P	47.72	1360	P	59.799	768
1440*900@60Hz	106.500	N	55.935	1440	P	59.887	900
1280*1024@60Hz	108.000	P	63.981	1280	P	60.020	1024
1280*1024@75Hz	135.000	P	79.976	1280	P	75.035	1024
1600*1200@60Hz	162.000	P	75.000	1600	p	60.000	1200
1680*1050@60Hz	119.000	P	64.674	1680	N	59.883	1050
1920*1080@60Hz	138.500	P	66.587	1920	N	59.934	1080
1920*1200@60Hz	154.000	P	74.038	1920	N	59.950	1200

## HDMI input format

Mode \ Spec	Horizontal Timing		Vertical Timing	
	Freq.	Active	Freq.	Active
	KHz	Pixel	Hz	Lind
720X480(P)	31.469	720	59.94	480
1280X720(P)	45	1280	60	720
1920X1080(I)	33.75	1920	60	540
720X480(I)	15.734	720	59.94	240
720X576(P)	31.25	720	50	576
1280X720(P)	37.50	720	50	720
1920X1080(I)	28.125	1920	50	540
720X576(I)	15.625	720	50	288
1920X1080(P)	67.432	1920	59.940	1080
1920X1080(P)	56.250	1920	50	1080

## 11. ACCESSORY

This controller board requires several accessories to build a complete display unit. We can provide standard accessory for this board as below.

No.	Items	Part No.	Ex) LG. Philips LP121S1
1	LCD I/F cable		
2	Inverter		
3	Inverter Cable		
4	OSD Board		
5	OSD Cable		