AD BOARD
HI-GHD

Specifications

Approval

Rev. 01

Issue Date. 2016. 08. 09

Doc No. HI-GHD 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
SW.OH	Samuel. Lee		YH. HAN

HI DISPLAY
High Quality Display Solution
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Revision History

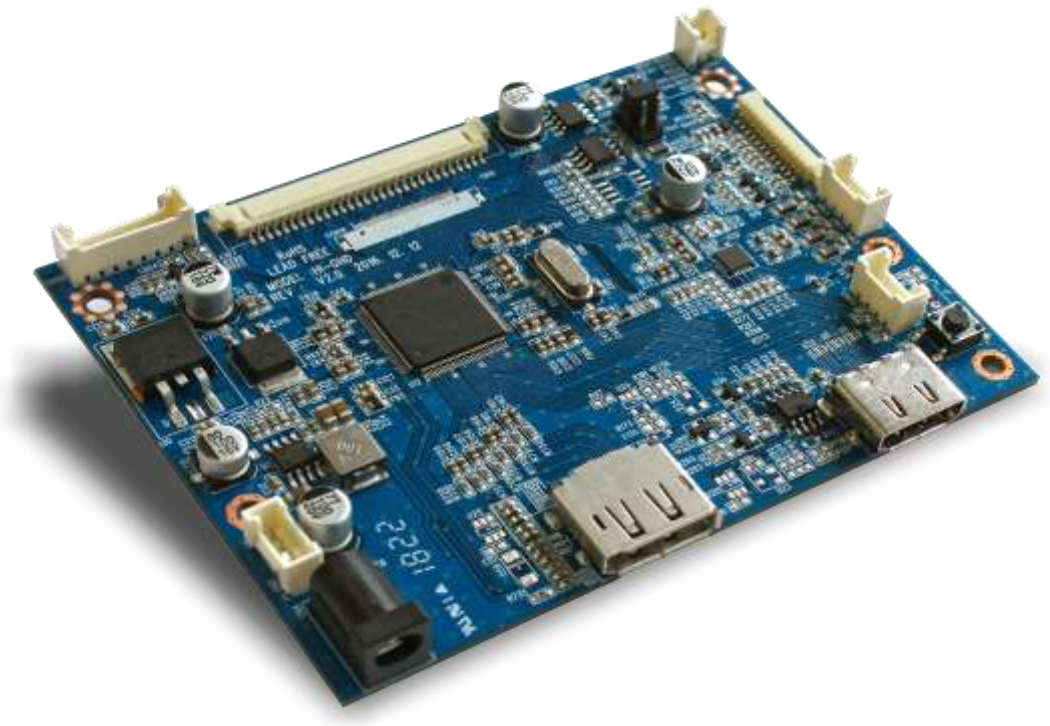
Rev.	ECN No.	Description of Changes	Date	Prepared
V1.0		Initial Release	2016. 08. 09	SW.OH

HI-GHD

Rev. 01

1. General Specification

No.	Item	Description		
1	Model Name	HI-GHD		
2	LCD Module	LVDS 1920X1080 60Hz 8bit		
3	Input	HDMI 1.4*1(TMDS), Display Port		
4	Resolution Support	H: 31 ~ 135kH		
		V: 55 ~ 76Hz		
5	OSD Control	Menu, Select, Down, Up, Power		5 keys
	Plug & Play	VESA DDC 2B Ver1.4		
6	Power Consumption	Supply Voltage	12Vdc	
		Power	3.0 Watt	Board Only
7		Digital	HDMI 1.4(TMDS),Display Port	
			HDCP Ver1.1	
		Audio	3W x 3W	
8	Board Size	W x H x D(mm)	110 x 80 x 15	



2. ELECTRICAL SPECIFICATION

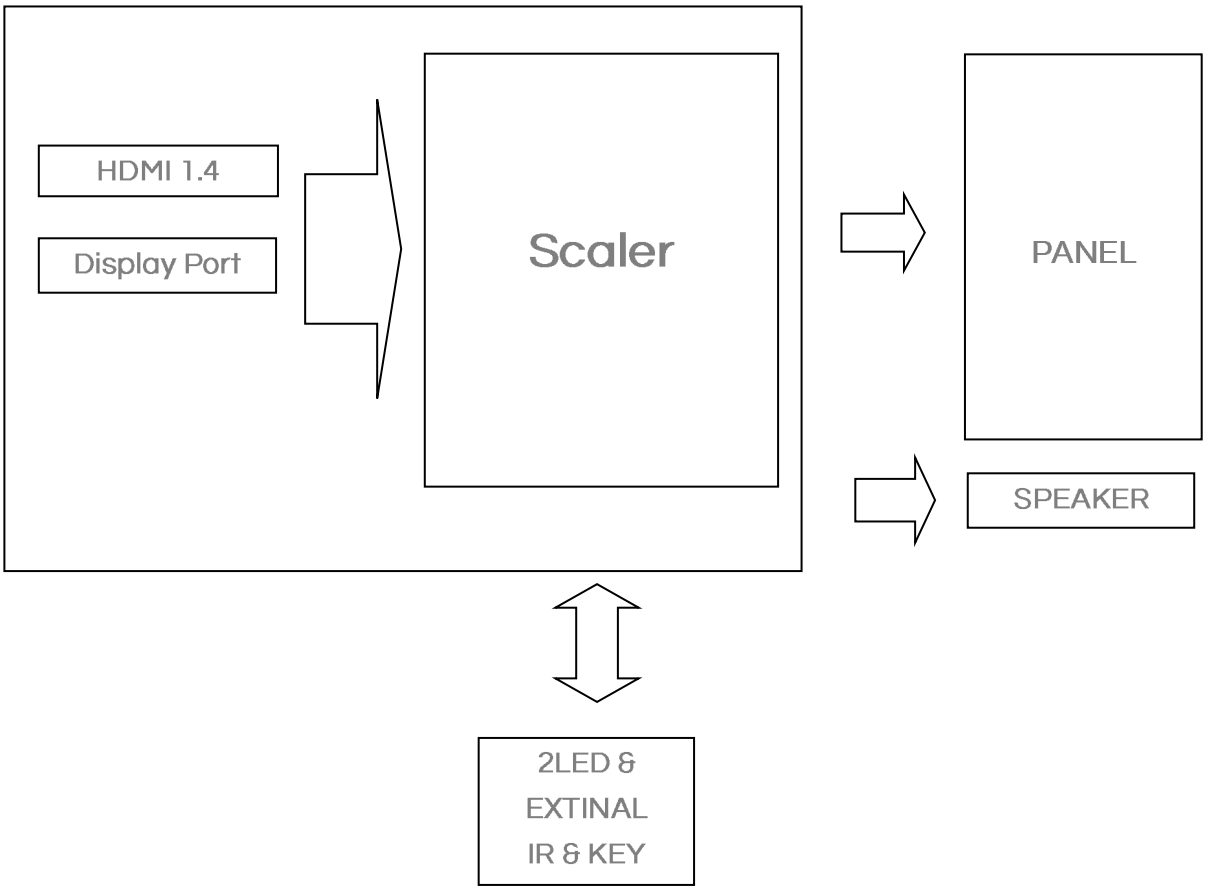
2.1. Input characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Power In (12Vdc)						
	Input	12VDC	11.4	12	12.6	
	Consumption	Watt		3		
HDMI Input						
	TMDS	mVp-p	450		900	
DP Input						
	HBR1	Vp-p	1		1.3	

2.2. Output characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Panel Power						
	LCD Power(12V)	VDC	11.4	12	12.6	
	LCD Power(5V)	VDC	4.5	5	5.5	
	LCD Power(3.3V)	VDC	3.16	3.3	3.5	
AUDIO Interface						
	Output	Watt		3		
	Frequence	Hz	20Hz		20KHz	
	THD	POUT=3W@ 4Ω, THD 10%(at 5V)				
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

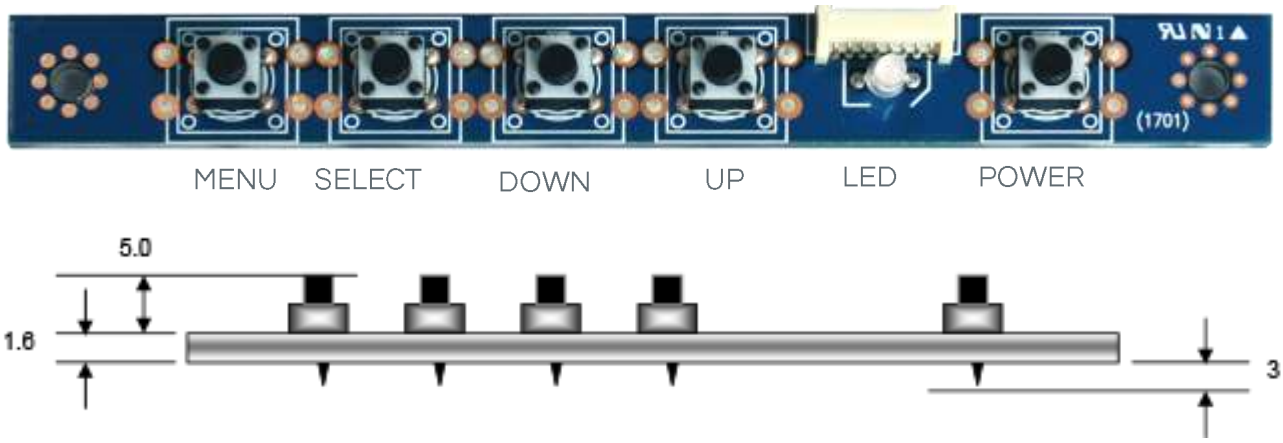
3. FUNCTIONAL BLOCK DIAGRAM



4. OSD Control Board

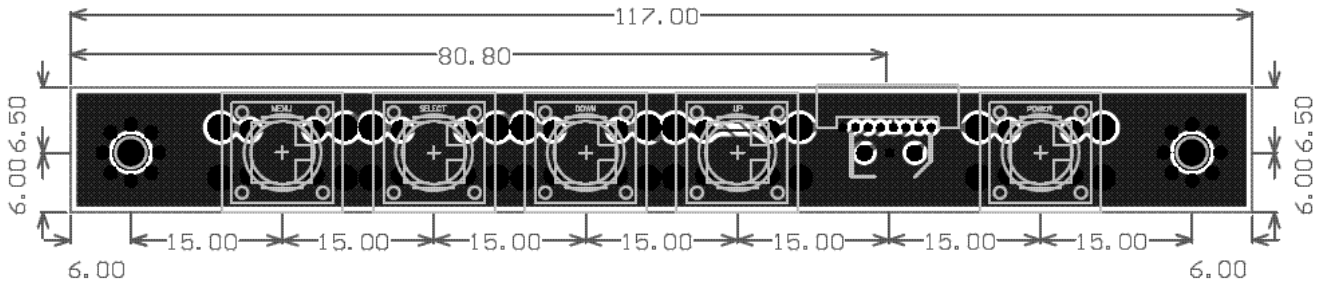
The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 5 buttons OSD operation as a standard. The control functions defined on OSD operation are as below. (Unit: mm)

Appearance



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

Button	Function	Status	HOT Key
LED	Indicates operation status	Green/ Red	On: Green Off: Red
POWER	Power on/off	On/Off	
MENU	Activate menu / Exit Menu		
SELECT	Input Select / Source		
DOWN	Cursor control Down		
UP	Cursor control Up / Volume Select		



5-1. OSD FUNCTION

Luminance page

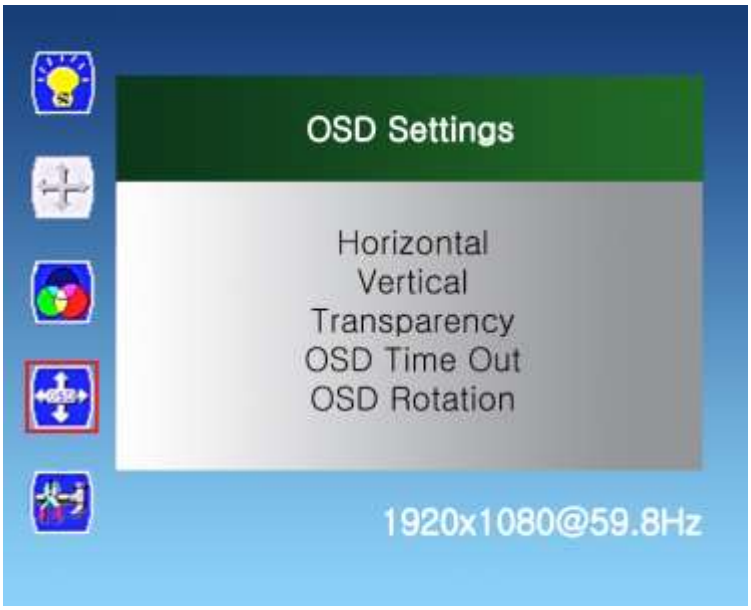
OSD Menu			
Brightness	Brightness level Control		
	Range of Value	MIN	0
		MAX	100
Contrast	Contrast level Control		
	Range of Value	MIN	0
		MAX	100
Gamma	Gamma value Select		
	Mode	ON	
		OFF	
DCR (Dynamic Contrast Ration)	DCR mode Select		
	Mode	OFF	
		DBC	
		DCR	
Super Resolution	Super Resolution mode Select		
	Mode	OFF	
		Weak	
		Median	
		Strong	
		Strongest	

5-2. OSD FUNCTION

Color page

OSD Menu		
Color Temperature	Color Temperature mode Select	
	Mode	5000K
		6500K
		7500K
		8200K
		9200K
		9300K
		11500K
		SRGB
		User Define
Red		
Green		
Blue		

5-3. OSD FUNCTION



OSD Settings page

OSD Menu			
Horizontal	OSD Horizontal position Control		
	Range of Value	MIN	0
		MAX	100
Vertical	OSD Vertical position Control		
	Range of Value	MIN	0
		MAX	100
Transparency	Transparency level Control		
	Range of Value	MIN	0
		MAX	4
OSD Time Out	OSD Time Out level Control		
	Range of Value	MIN	0
		MAX	60
OSD Rotation	OSD Rotation mode Select		
	Mode	ON	
		OFF	

5-4. OSD FUNCTION

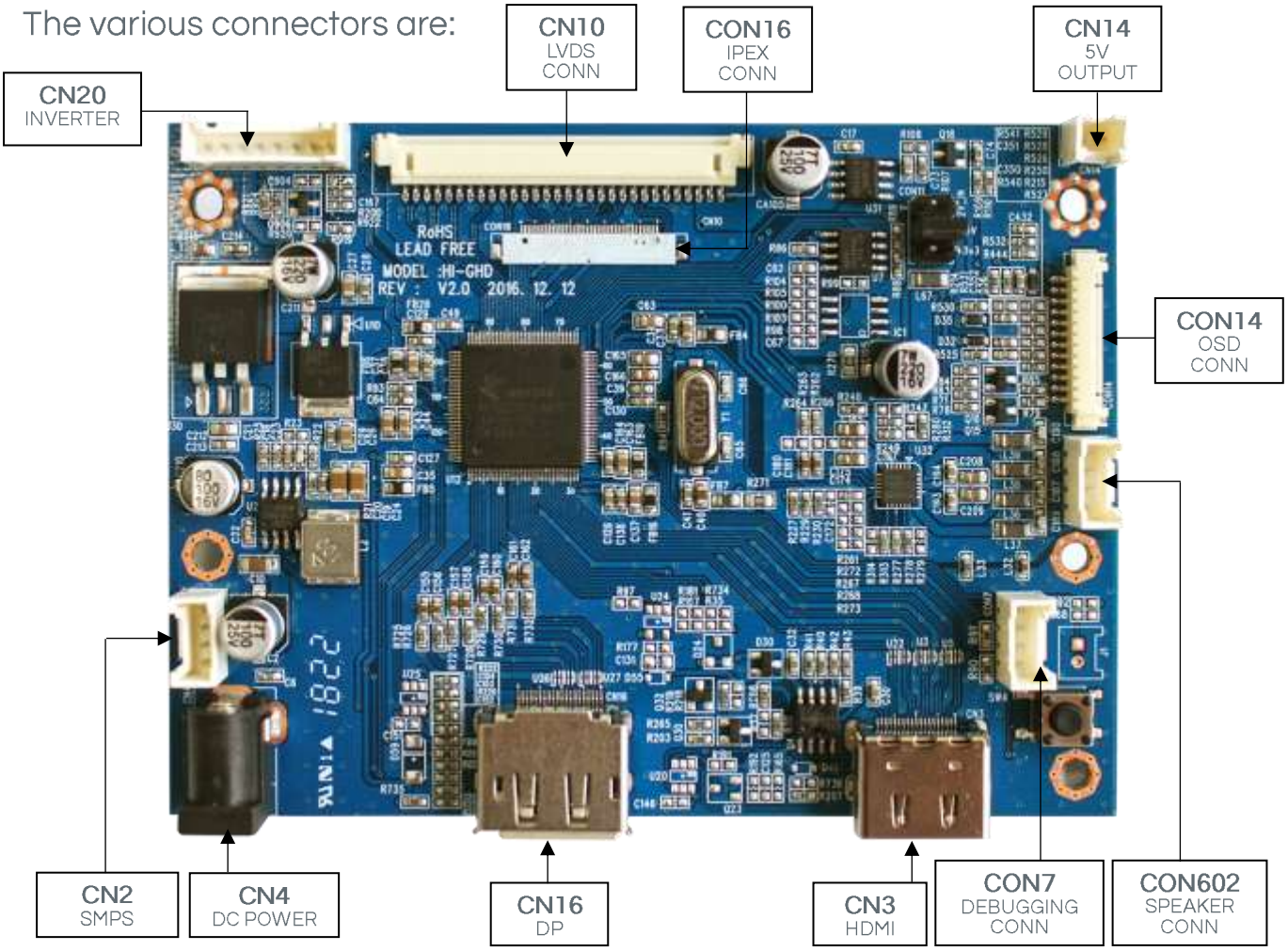
Setup page

OSD Menu				
Language	Aspect Ratio Mode Select			
	English	Spanish	French	German
	Italian	Portuguese	Russian	Chinese
Mute	Audio Mute Select			
	Mode	ON		
		OFF		
Input	Input signal Select			
	Mode	HDMI		
		DP		
Display Size	Display Size Select			
	Mode	Full Screen		Smart Fit
		4:3		Smart 4:3
Over Scan	Over Scan Mode Select			
	Mode	ON		
		OFF		
Over Driver	Over Driver Mode Select			
	Mode	ON		
		OFF		
Reset	Restore to default Value			
	Mode	ON		
		OFF		

HI-GHD

6. CONNECTOR, PINOUT & JUMPERS

The various connectors are:



Summary:

Reference	Item	Description	Type	Manufacture
CON7	Connector	DEBUGGING CONNECTOR	SMW200-04P-2.0mm	YEONHO
CN3	Connector	HDMI CONNECTOR		
CN16	Connector	DP CONNECTOR		-
CN4	Jack	DC POWER JACK	2.5ø DC Jack	-
CN2	Connector	SMPS CONNECTOR	SMW200-04P-2.0mm	YEONHO
CN20	Connector	INVERT CONNECTOR	SMW200-08P-2.0mm	YEONHO
CN10	Connector	LVDS CONNECTOR	12507WR-30	
CON16	Connector	IPEX CONNECTOR		
CN14	Connector	5V OUTPUT	SMW200-02P-2.0mm	YEONHO
CON14	Connector	OSD CONNECTOR	12505WR-12P	
CON602	Connector	SPEAKER CONNECTOR	SMW200-04P-2.0mm	YEONHO

CON7: Debugging CONNECTOR

Pin No.	Symbol	Description
1	+5V	+5V
2	GND	Ground
3	RXD0	RX0 Data Input of Micro-Processor F8031-
4	TXD0	TX0 Data Input of Micro-Processor F8031

CN3: HDMI Connector

Pin No.	Symbol	Description
1	HDMI0-RX2P	HDMI 2line 2data +
2	GND	Ground
3	HDMI0-RX2N	HDMI 2line 2data -
4	HDMI0-RX1P	HDMI 2line 1data +
5	GND	Ground
6	HDMI0-RX1N	HDMI 2line 1data -
7	HDMI0-RX0P	HDMI 2line 0data +
8	GND	Ground
9	HDMI0-RX0N	HDMI 2line 0data -
10	HDMI0-CLKP	HDMI 2line CLK+
11	GND	Ground
12	HDMI0-CLKN	HDMI 2line CLK -
13	CEC	HDMI CEC
14	HDMI_ARC	Opt
15	HDMI0-DDC-SCL	HDMI DDC SCL
16	HDMI0-DDC-SDA	HDMI DDC SDA
17	GND	Ground
18	HDMI0/5V	HDMI power signal
19	HDMI0-HPD	HPD pin

CN16: Display Port Connector

Pin No.		Symbol	Des
1		DPX3-	P Channel1 i
2		GND	G
3		DPX3+	DP Channel1
4		DPX2-	DP Channel1
5		GND	G
6		DPX2+	DP Channel1
7		DPX1-	DP Channel1
8		GND	G
9		DPX1+	DP Channel1
10		DPX0-	DP Channel1
11		DET_DP	DP Cable Co
12		DPX0+	DP Channel1
13		NC	Not
14		NC	Not
15		AUX+	DP Cho
16		GND-	G
17		AUX-	DP Cho
18		HPD_DP	DP Channel
19		GND	G
20		NC	Not
21		GND	G
22		GND	G
23		GND	G
24		GND	G

CN2: SMPS Power input Connector

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

CN20: Invertor Connector

Pin No.	Symbol	Description
1~2	12V_IN	12V Power in
3~4	+5V	+5V
5	GND	Ground
6	GND	Ground
7	BL-ON/OFF	Backlight on signal
8	BL-ADJUST	Backlight dimming signal

CN10: LVDS 60Hz 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)

CON16: IPEX Connector

Pin No.	Symbol	Description
1	NC	No Connection
2	VLCD	PANEL POWER PIN
3	VLCD	PANEL POWER PIN
4	VLCD	PANEL POWER PIN
5	NC	No Connection
6	NC	No Connection
7	NC	No Connection
8	T4M	A Channel 0 Minus
9	T4P	A Channel 0 Plus
10	GND	Ground
11	T5M	A Channel 1 Minus
12	T5P	A Channel 1 Plus
13	GND	Ground
14	T6M	A Channel 2 Minus
15	T6P	A Channel 2 Plus
16	GND	Ground
17	TCLK2M	CLK Minus
18	TCLK2P	CLK Plus
19	GND	Ground
20	NC	No Connection
21	NC	No Connection
22	GND	Ground
23	NC	No Connection
24	NC	No Connection
25	GND	Ground
26	NC	No Connection
27	NC	No Connection
28	GND	Ground
29	NC	No Connection
30	NC	No Connection
31	GND	Ground
32	GND	Ground
33	GND	Ground
34	NC	No Connection
35	BL-ADJUST	Backlight dimming signal
36	BL-ON/OFF	Backlight on signal
37	NC	No Connection
38	12V_IN	12V Power in
39	12V_IN	12V Power in
40	12V_IN	12V Power in

CN14: 5V Output

Pin No.	Symbol	Description
1	GND	Ground
2	+5V	+5V

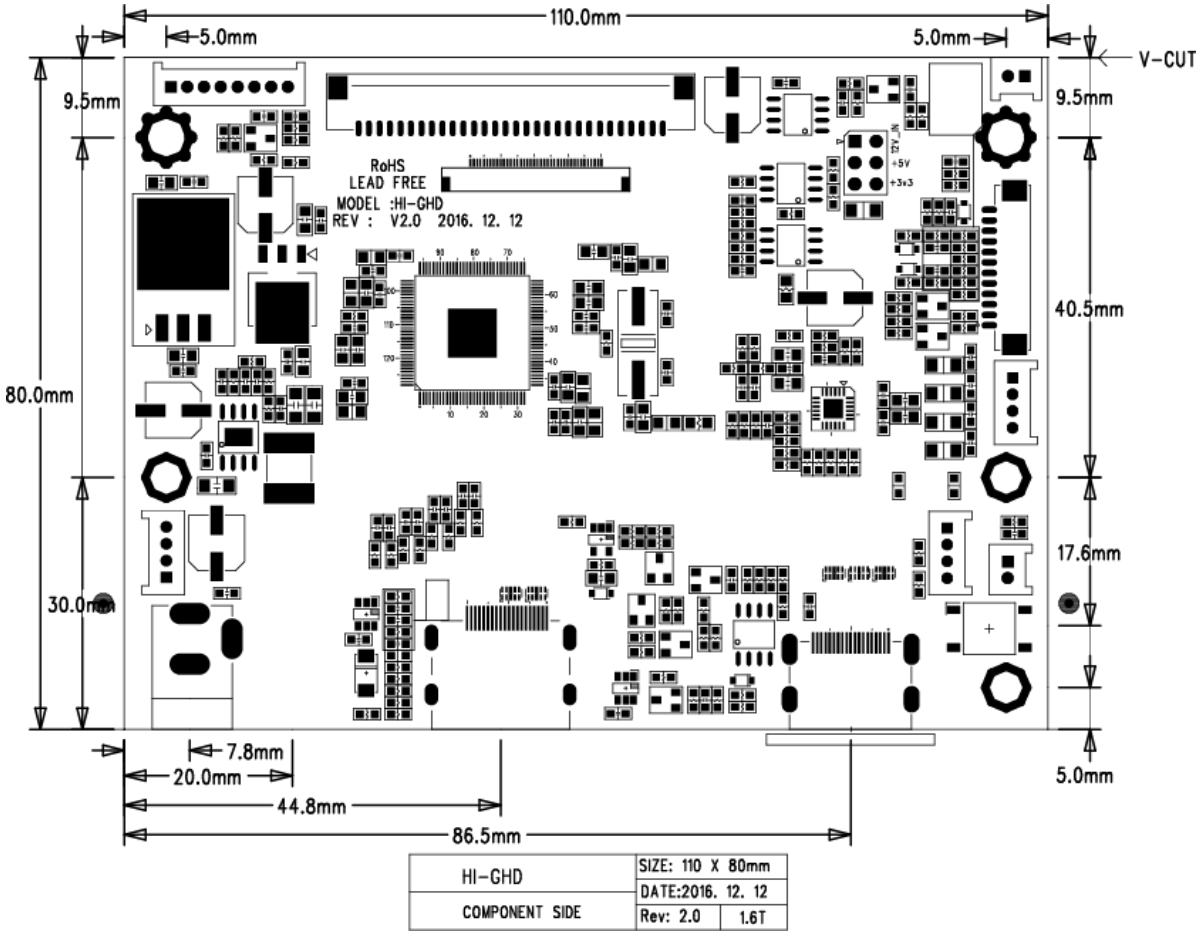
CON14: OSD Connector

Pin No.	Symbol	Description
1	LED-Red	Red Color
2	LED-Green	Green Color
3	GND	Ground
4	INPUT	For INPUT Switch
5	MENU	For Menu Switch
6	VOL+	For Volume Up Switch
7	VOL-	For Volume Down Switch
8	CH-	For Up Switch
9	CH+	For Down Switch
10	POWER	For Power Switch
11	IR_OUT	IR DATA
12	+3V3	IR Power 3.3V

CN602: Speaker Connector

Pin No.	Symbol	Description
1	R-	Speaker Right -
2	R+	Speaker Right +
3	L+	Speaker Left +
4	L-	Speaker Left -

8. CONTROLLER DIMENSIONS



DIMENSION DOWNLOAD

9. 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. APPLICABLE GRAPHIC MODE

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 mare clear and stable image on a screen.

HDMI input format

Spec / Mode	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(P)	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
1920X1080(I)	26.973	1920	23.976	1080
1920X1080(I)	33.750	920	30	1080

DP input format

Spec / Mode	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(P)	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
1920X1080(I)	26.973	1920	23.976	1080
1920X1080(I)	33.750	1920	30	1080