

AD BOARD HI-RH

Specifications




Approval

Rev. 03

Issue Date. 2017. 06. 13

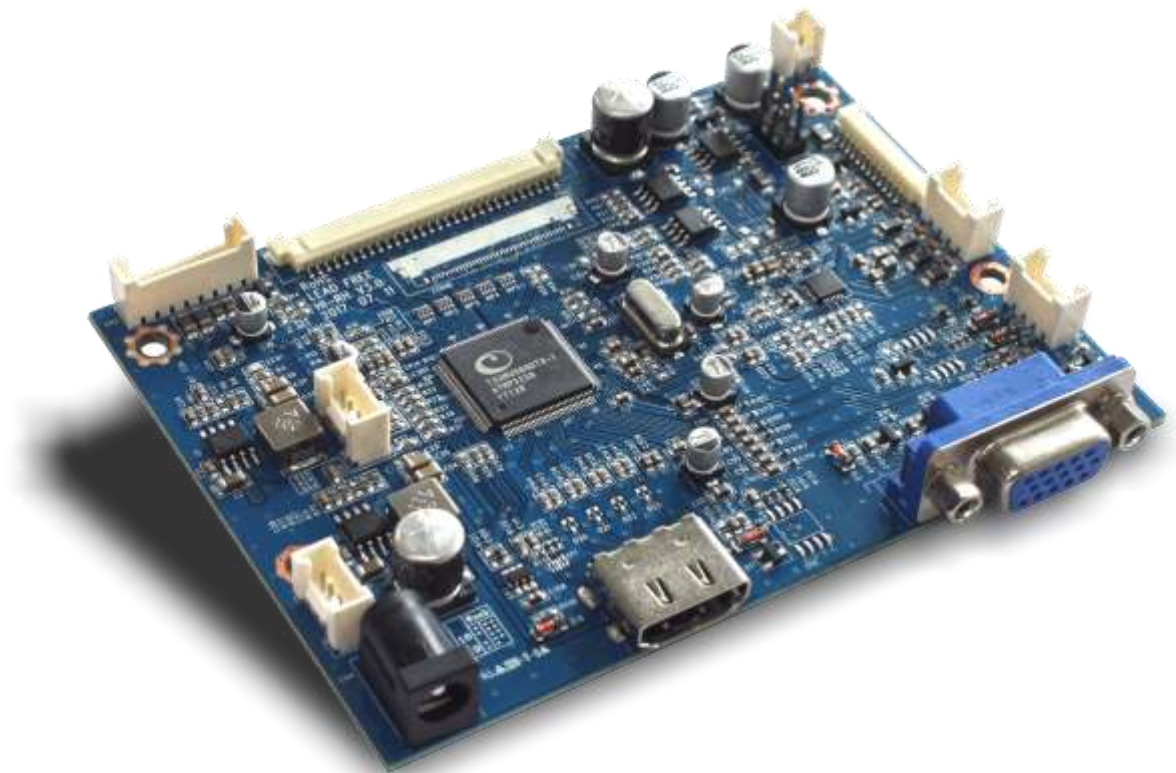
Doc No. HI-RH BOARD 01

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
			
KB. Park	Samuel. Lee		YH. HAN

1. General Specification

No.	Item	Description		
1	Model Name	HI-RH		
2	LCD Module	LVDS 1920X1080 60Hz 8bit		
3	Input	Analog RGB(R, G, B Separate H, V Sync), HDMI 1.4*1(TMDS), AUDIO		
4	Resolution Support	H: 31 ~ 135kH		
		V: 55 ~ 76Hz		
5	OSD Control	Auto, Menu, Select, Down, Up, Power		5 keys
	Plug & Play	VESA DDC 2B Ver1.3		
6	Power Consumption	Supply Voltage	12Vdc	
		Max Power	3.0 Watt	Board Only
7	Signal Connector	Analog	DSUB 15P(R, G, B Separate H, V Sync)	
		Digital	HDMI 1.4(TMDS)/ HDCP Ver1.2	
		Audio	3W x 3W	
8	Board Size	W x H x D(mm)	110 x 80 x 16	



2. ELECTRICAL SPECIFICATION

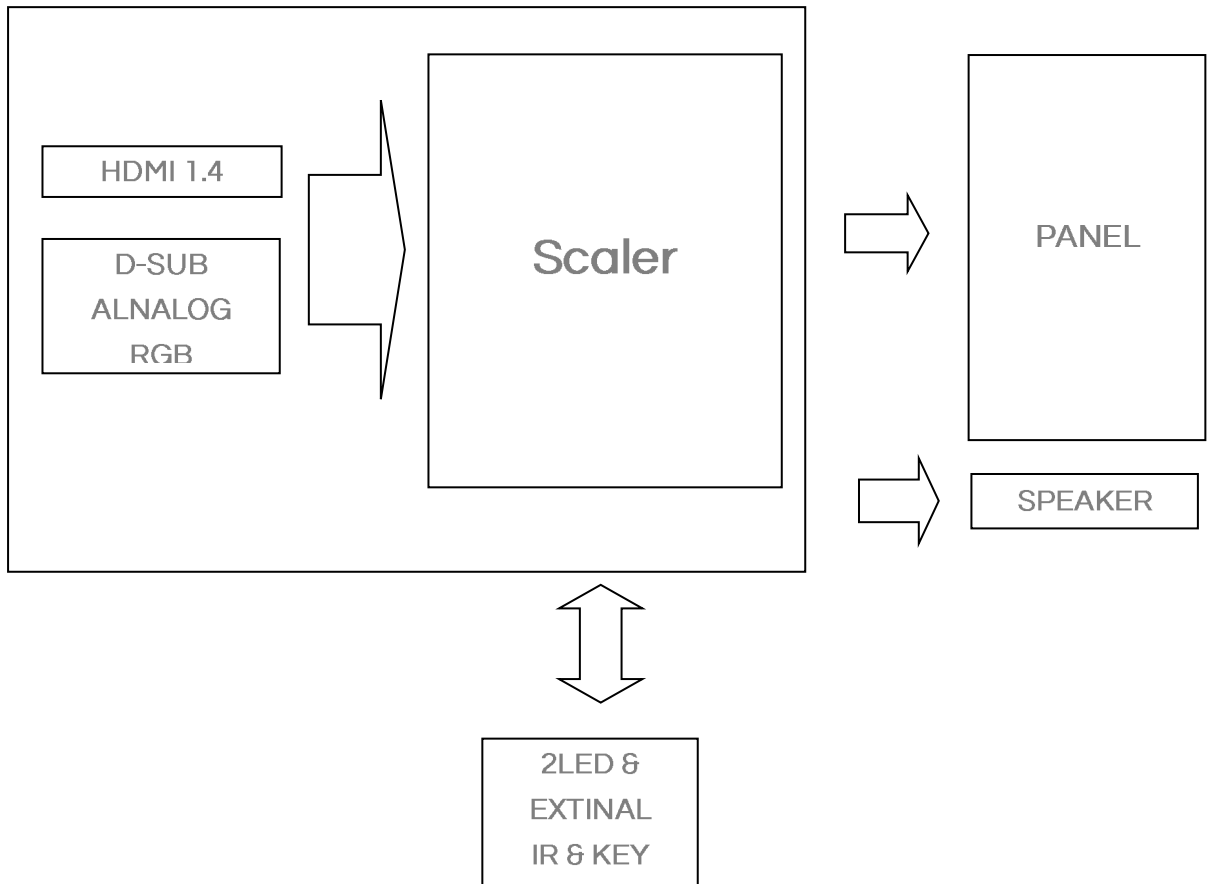
2.1. Input characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Power In (12Vdc)						
	Input	12VDC	11.4	12	12.6	
	Consumption	Watt		3		Board Only
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
HDMI Input						
	TMDS	mVp-p	450		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	3.14	3.3	3.46	Jumper option
AUDIO Interface						
	Output	Watt		2.8		
	Frequence	Hz	0Hz		40KHz	
	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

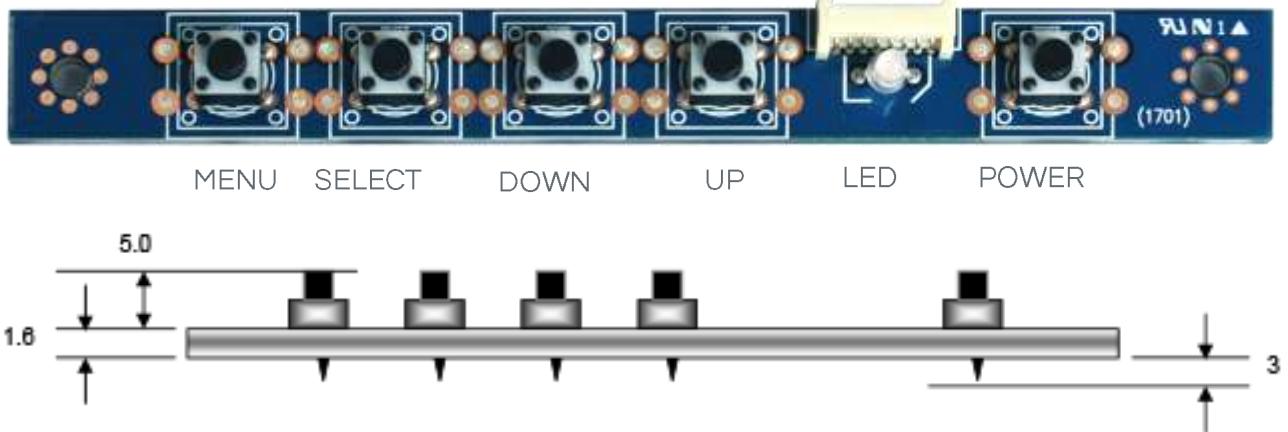
3. FUNCTIONAL BLOCK DIAGRAM



4. OSD Control Board

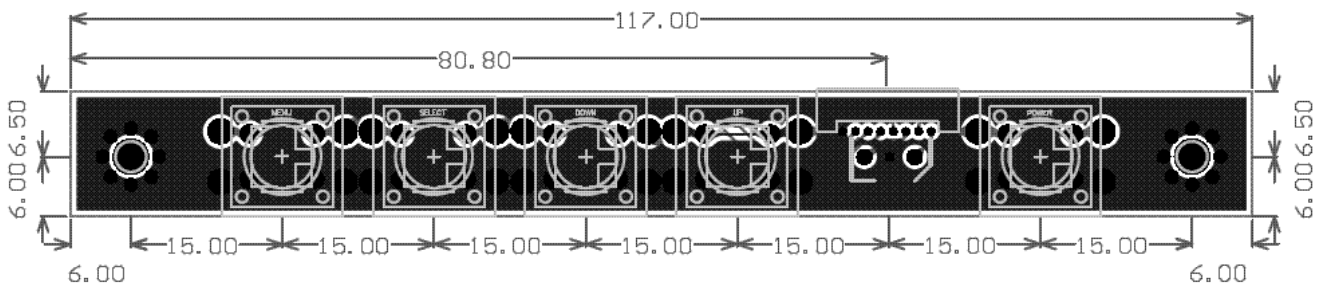
The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 5 buttons OSD operation as a standard. The control functions defined on OSD operation are as below. (Unit: mm)

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/ Amber	On: Green Off: Colorlessness No Signal: Red Idle : Red Flicker
POWER	Power on/off	On/Off	
MENU	Activate menu / Exit Menu		
SELECT	Menu Select / Source(option)		
DOWN	Cursor control Down / Auto Adjust		
UP	Cursor control Up /Volume Window		AUDIO MUTE ON/OFF








5-1. OSD FUNCTION

Brightness/Contrast	Brightness	 100
Color Settings	Contrast	 50
Input Source	DPS	Off
Display Settings	DSC	Off
Other Settings	DCR	Off
Informaiton		
Auto Adjust		

Brightness/Contrast page

OSD Menu			
Brightness	Backlight level Control		
	Range of Value	MIN	0
		MAX	100
Contrast	Contrast level Control		
	Range of Value	MIN	0
		MAX	100
DPS	Gamma value Select		
	Mode	ON	
		OFF	
DSC	Gamma value Select		
	Mode	ON	
		OFF	
DCR	Gamma value Select		
	Mode	ON	
		OFF	

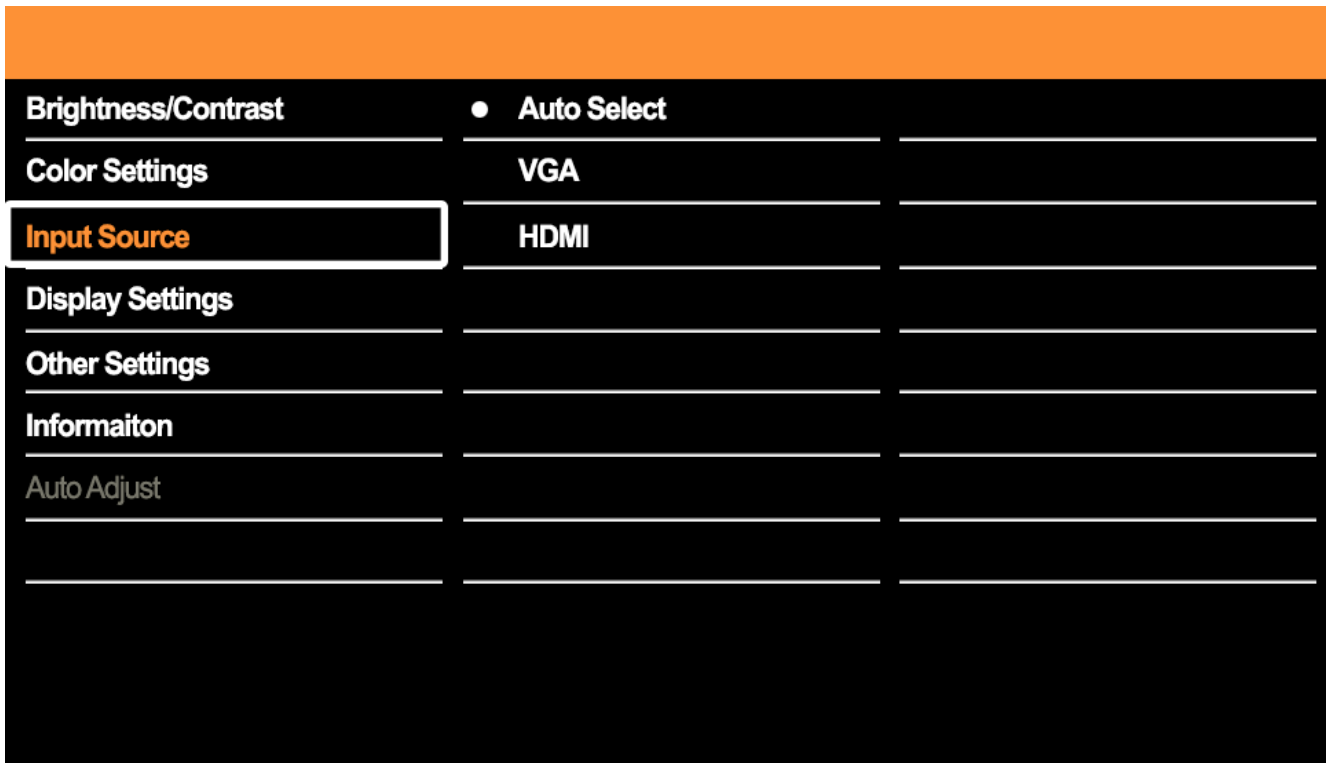
5-2. OSD FUNCTION

Brightness/Contrast	Color Temp.	5700K
Color Settings	Red	 50
Input Source	Green	 50
Display Settings	Blue	 50
Other Settings	Hue	 50
Informaiton	Saturation	 50
Auto Adjust	Color Mode	Off
	Color Format	Off

Color Settings page

OSD Menu			
Color Temp.	Mode	9300K	
		6500K	
		5700K	
		SRGB	
		User color	
Red	Range of Value	Red level control	
		MIN	0
		MAX	100
Green	Range of Value	Green level control	
		MIN	0
		MAX	100
Blue	Range of Value	Blue level control	
		MIN	0
		MAX	100
Hue	Range of Value	Hue level control	
		MIN	0
		MAX	100
Saturation	Range of Value	Saturation level control	
		MIN	0
		MAX	100
Color Mode	Mode	Color mode select	
		Enhance	Demo
		Off	
Color Format	Mode	Color Format select	
		RGB	
		YUV	

5-3. OSD FUNCTION



Input Source page

OSD Menu		
Input Source	Input Source select	
	Mode	Auto Select
		VGA
		HDMI

5-4. OSD FUNCTION

Brightness/Contrast	Gamma	On
Color Settings	H.Position	■■■■■■■■■■ 50
Input Source	V.Position	■■■■■■■■■■ 50
Display Settings	Sharpness	■■■■■■■■■■ 48
Other Settings	Clock	■■■■■■■■■■ 50
Informaiton	Phase	■■■■■■■■■■ 50
Auto Adjust	Aspect Ratio	Full

Display Settings

OSD Menu			
Gamma	Gamma mode Select		
	Mode	ON OFF	
H. Position	H. position Control		
	Range of Value	MIN	0
		MAX	100
V. position	V. position Control		
	Range of Value	MIN	0
		MAX	100
Sharpness	Sharpness level Control		
	Range of Value	MIN	0
		MAX	100
Clock	Clock level Control		
	Range of Value	MIN	0
		MAX	100
Phase	Phase level Control		
	Range of Value	MIN	0
		MAX	100
Aspect Ratio	Aspect Ratio Select		
	Mode	Full	
		4:3	
		16:9	
		1:1	
Keep input ratio			

5-5. OSD FUNCTION

Brightness/Contrast	Volume		50
Color Settings	OSD Transparency		1
Input Source	OSD H.Position		50
Display Settings	OSD V.Position		50
Other Settings	OSD Timeout		10
Informaiton	OSD Rotation	Ratate Off	
Auto Adjust	Factory Reset		

Other Settings

OSD Menu			
Volume	Volume level control		
	Range of Value	MIN	0
		MAX	100
OSD Transparency	OSD Transparency level control		
	Range of Value	MIN	0
		MAX	100
OSD H. Position	OSD H. Position level control		
	Range of Value	MIN	0
		MAX	100
OSD V. Position	OSD V. Position level control		
	Range of Value	MIN	0
		MAX	100
OSD Timeout	OSD Timeout level control		
	Range of Value	MIN	0
		MAX	100
OSD Rotation	OSD Rotation select		
	Mode	Rotate off	Rotate 90
		Rotate 180	Rotate 270
Factory Reset			

5-6. OSD FUNCTION

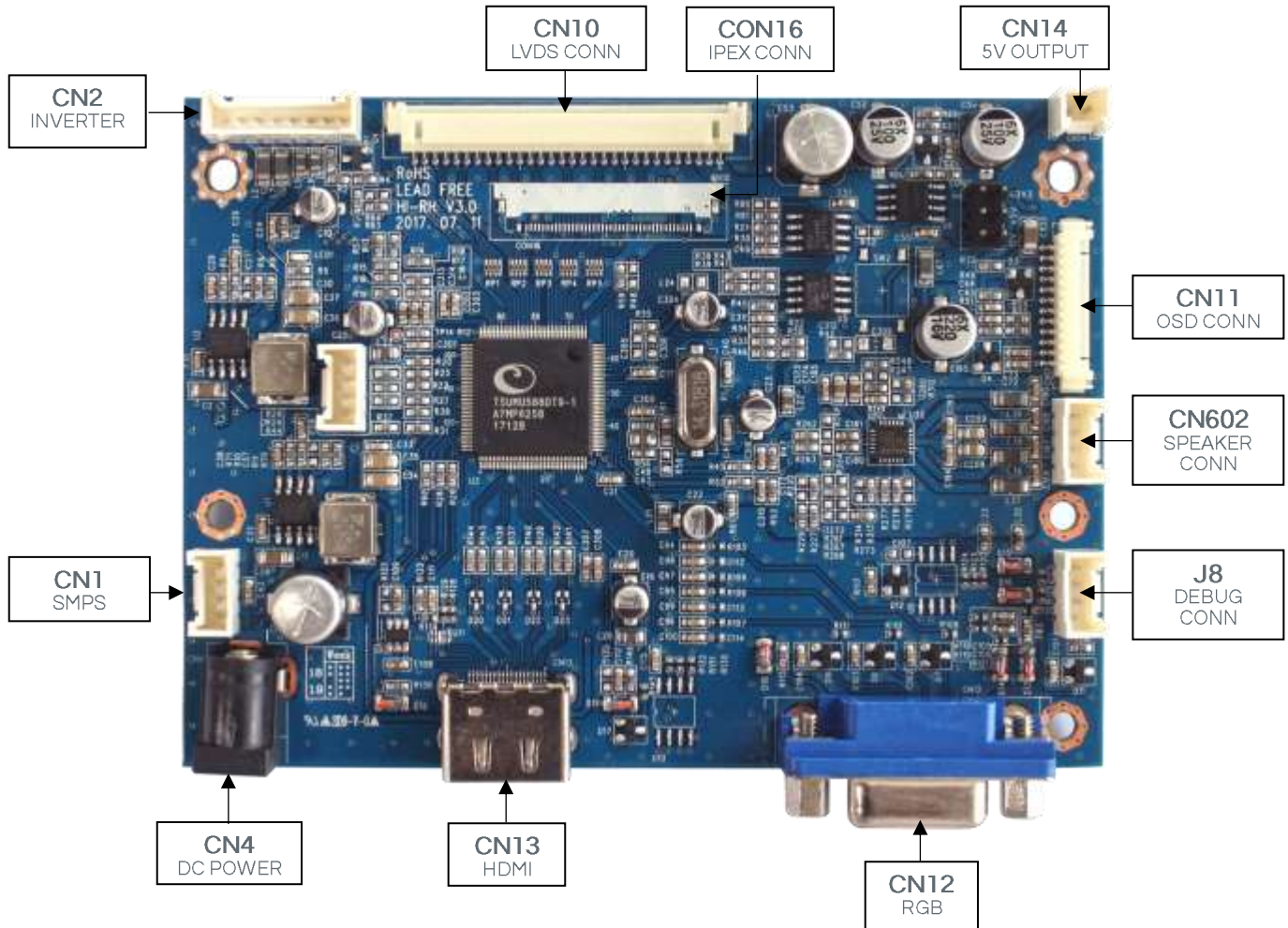
Brightness/Contrast	Resolution : 1920 X 1080
Color Settings	H.Freq : 68 KHz
Input Source	V.Freq : 60 Hz
Display Settings	V.Total : 1125 Lines
Other Settings	Color Format : YUV422
Informaiton	
Auto Adjust	

Information

OSD Menu
Information
Auto Adjust

6. CONNECTOR, PINOUT & JUMPERS

The various connectors are:



Summary:

Reference	Item	Description	Type	Manufacture
CN1	CONNECTOR	SMPS CONNECTOR	SMW200-04P	YEONHO
CN2	CONNECTOR	INVERTER CONNECTOR	SMW200-08P	YEONHO
CN10	CONNECTOR	LVDS CONNECTOR	12507WR-30P	YEONHO
CON16	CONNECTOR	IPEX CONNECTOR	FI-JT40S-HF10-R3000	JAE
CN14	CONNECTOR	5V OUTPUT	SMW200-02P	YEONHO
CN11	CONNECTOR	OSD CONNECTOR	12505WR-12P	YEONHO
CN602	CONNECTOR	SPEAKER CONNECTOR	SMW200-04P	YEONHO
J8	CONNECTOR	DEBUG CONNECTOR	SMW200-04P	YEONHO
CN12	CONNECTOR	D-SUB CONNECTOR	DSUB-15P	YENDA
CN13	CONNECTOR	HDMI CONNECTOR	HDMI R-S151L-3	CFD
CN4	CONNECTOR	DC POWER JACK	R / A 2.5PIE	CFD

CN1: 12V DC POWER INPUT

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

CN2: INVERTER CONNECTOR

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

CN10: LVDS 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 Out Put

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

CN11: 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	OUT1A	Speaker Right -
2	OUT1B	Speaker Right +
3	OUT2A	Speaker Left +
4	OUT2B	Speaker Left -

J8: Debug Connector

Pin No.	Symbol	Description
1	VCC	5V
2	GND	GND
3	DDCA_SCL	SCL
4	DDCA_SDA	SDA

CN12: DSUB Connector

Pin No.	Symbol	Description
1	RGB1_R+	VGA Red analog signal
2	RGB1_G+	VGA Green analog signal
3	RGB1_B+	VGA Blue analog signal
4	NC	No Connection
5	DET_VGA	VGA Cable Connection Detect
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	VGA_5V	VGA 5V input
10	GND	Ground
11	NC	No Connection
12	SDA	VGA DDC-SDA
13	VGA_HSYNC	Horizontal Sync
14	VGA_VSYNC	Vertical Sync
15	SCL	VGA DDC-SCL

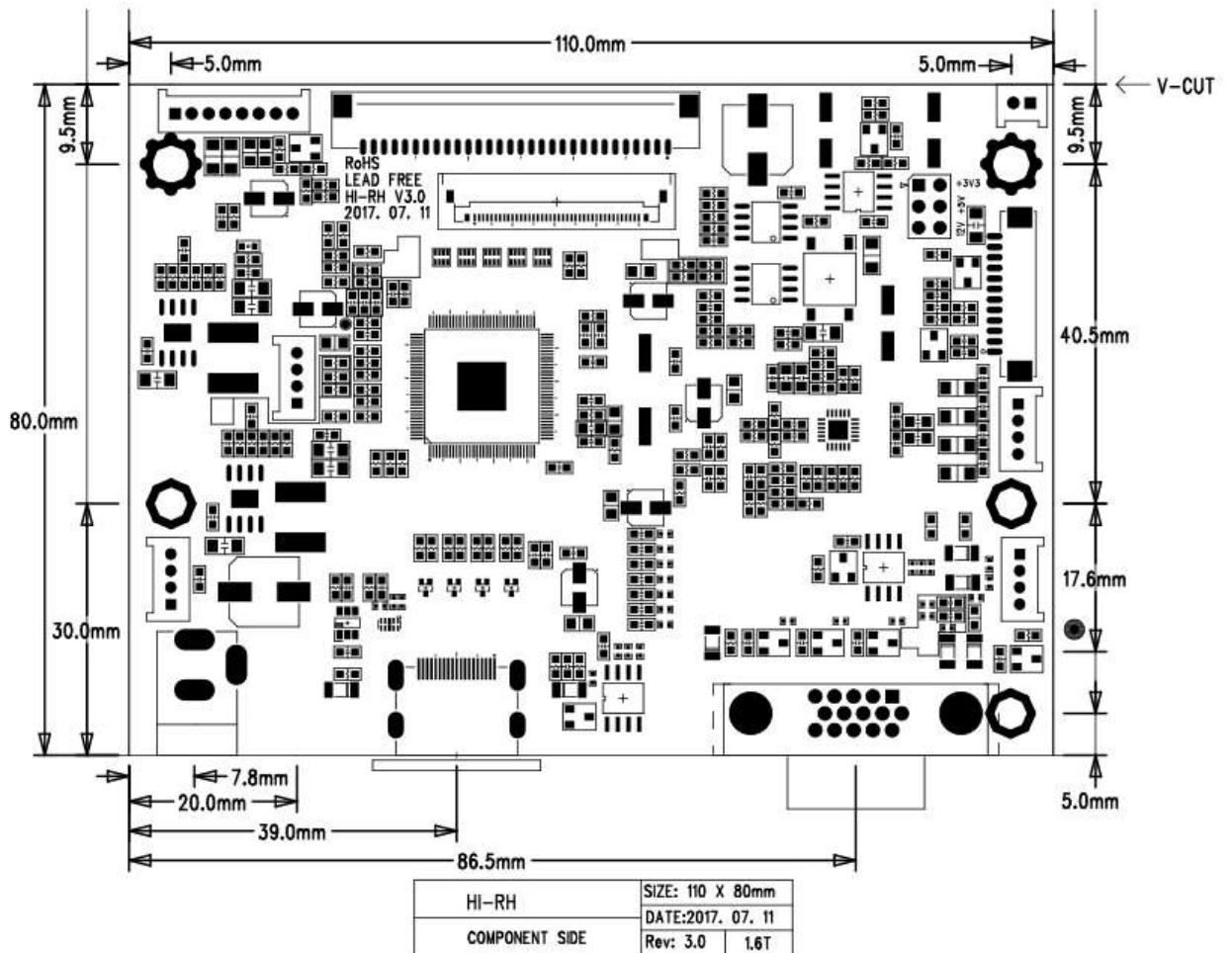
CN13: HDMI Connector

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

CN4: DC power Input Jack(12V)

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

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. 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

Spec Mode	Pixel Freq. MHz	Horizontal Timing		Vertical Timing	
		Freq. KHz	Active Pixel	Freq. Hz	Active Lind
720*400@ 85Hz	35.500	37.927	720	85.000	400
640*480@60Hz	28.175	31.469	640	59.940	480
640*480@72Hz	31.500	37.861	640	72.809	480
640*480@75Hz	31.500	37.500	640	75.000	480
800*600@56 Hz	36.000	35.156	800	56.250	600
800*600@60Hz	40.000	37.879	800	60.317	600
800*600@72Hz	50.000	48.077	800	72.188	600
800*600@75Hz	49.500	46.875	800	75.000	600
1024*768@60Hz	65.000	48.363	1024	60.005	768
1024*768@ 70Hz	75.000	56.476	1024	70.070	768
1024*768@75Hz	78.750	60.023	1024	75.030	768
1280*720@60Hz	74.500	44.772	1280	59.855	720
1280*720@75Hz	95.75	56.456	1280	74.777	720
1280*768@60Hz	80.14	47.7	1280	60	768
1280*768@75Hz	102.25	60.289	1280	74.893	768
1280*960@60Hz	101.25	59.699	1280	59.939	960
1280*960@75Hz	129.6	75	1280	75	960
1360*768@60Hz	84.75	47.72	1360	59.799	768
1280*1024@60Hz	108.000	63.981	1280	60.020	1024
1280*1024@75Hz	135.000	79.976	1280	75.035	1024
1600*1200@60Hz	162.000	75.000	1600	60.000	1200
1920*1080@60Hz	138.500	66.587	1920	59.934	1080

HDMI input format

Spec Mode	Horizontal Timing		Vertical Timing	
	Freq. KHz	Active Pixel	Freq. Hz	Active 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