

AD BOARD

Specifications

HI-UHD_TV

Approval

Rev. 01

Issue Date. 2016. 06. 28

Doc No. UHD TV 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

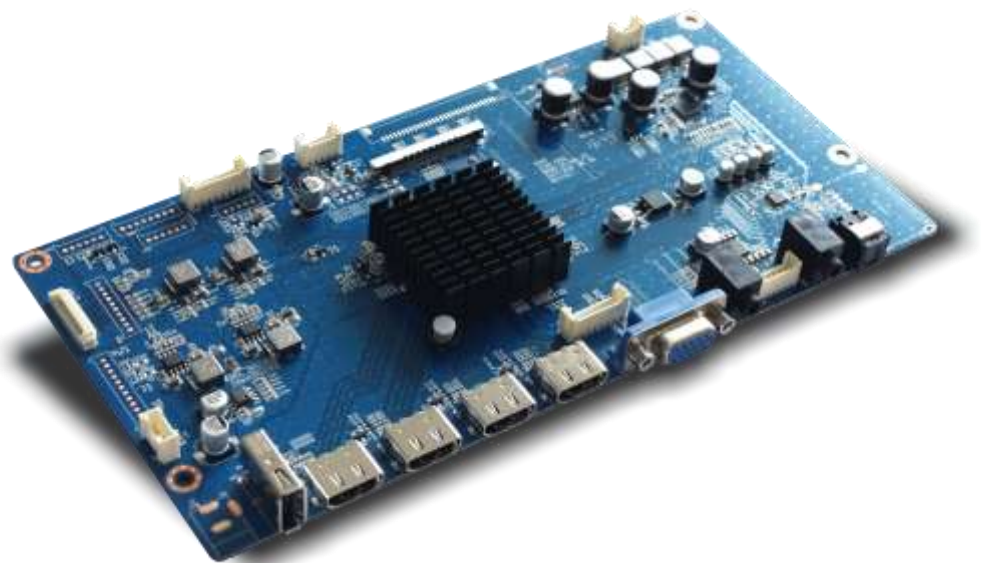
Prepared	Checked I	CheckedII	Approved
			
Samuel. Lee			YH. HAN

Revision History

Rev.	ECN No.	Description of Changes	Date	Prepared
V1.0		Initial Release	2016.06.28	Samuel. Lee

1. General Specification

No.	Item	Description	
1	Model Name	HI-UHD_TV	
2	LCD Module	LVDS 1920X1200 60Hz 8bit(OPTION) V by one 3840X2160 60Hz(OPTION)	
3	Input	Analog RGB(R, G, B Separate H, V Sync), HDMI 2.0*3(TMDs), HDMI 1.4*1(TMDs), CVBS(OPTION), COMPONENT(OPTION), DTV(OPTION),USB, AUDIO	
4	Resolution Support	H: 31 ~ 135kH	
		V: 55 ~ 76Hz	
5	OSD Control	Input, Menu, Left, Right, Down, Up, Power	7 keys
	Plug & Play	VESA DDC 2B Ver1.4	
6	Power Consumption	Supply Voltage	12Vdc,5Vdc
		Power	2.0 Watt
7	Signal Connector	Analog	DSUB 15P(R, G, B Separate H, V Sync)
		Video(OPTION),	RCA(CVBS)
		Component(OPTION),	Y, Pb, Pr
		Digital	HDMI 2.0(TMDs) / HDCP Ver1.4
		Audio	5W x 5W, 15W x 15W(OPT)
		RF(OPTION)	ATSC
8	Board Size	W x H x D(mm)	220 x 110 x 16



2. ELECTRICAL SPECIFICATION

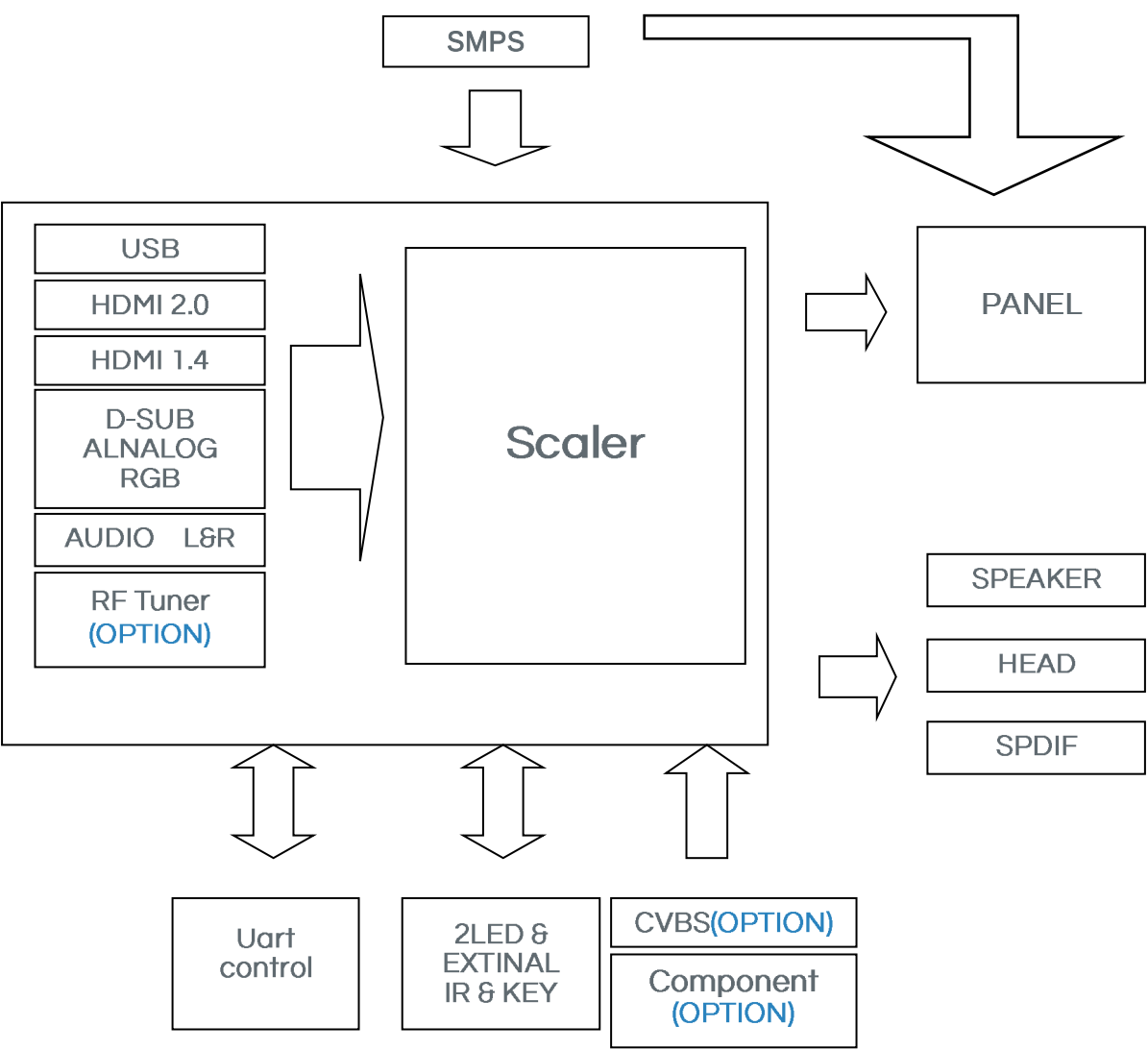
2.1. Input characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Power In (12Vdc)						
	Input	12VDC	11.4	12	12.6	
	Consumption	Watt		16.7		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	
NTSC/PAL						
	Y/CVBS	Vp-p	0.7	1.0	1.4	
	C	Vp-p	0.6	0.8	1.0	

2.2. Output characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Panel Power						
	LCD Power(12V)	VDC	11.4	12	12.6	
V by one Interface						
	Differential output	Vp-p (mV)	250	350	450	Differential +/-
AUDIO Interface						
	Output	Watt		5	6	
	Frequence	Hz	20Hz		20KHz	
	THD	POUT=10W@ 8Ω, THD 1%(at 12V)				
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

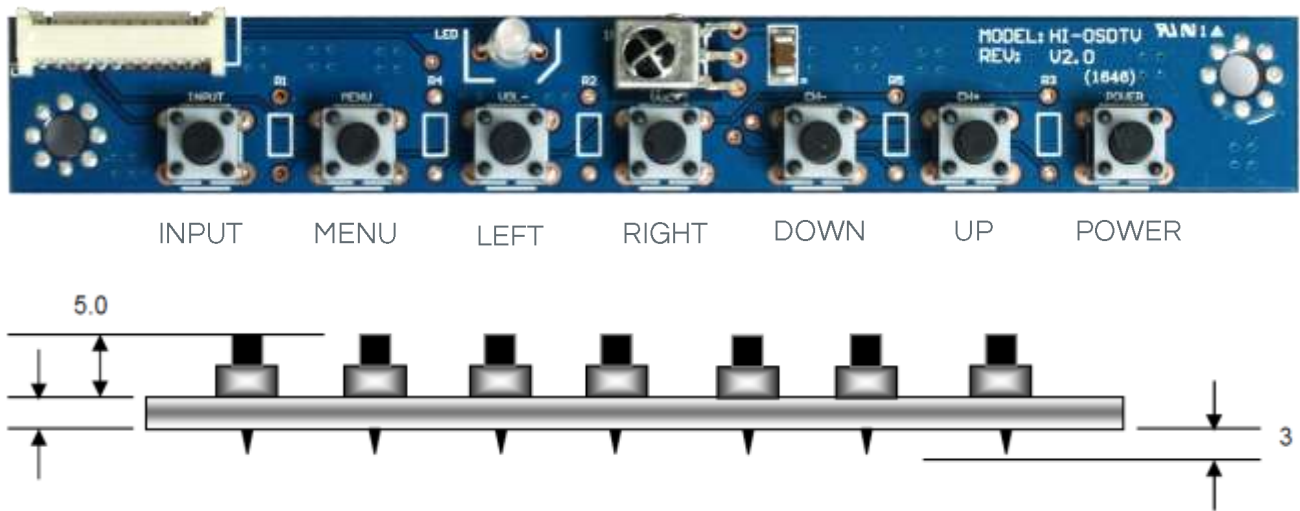
3. FUNCTIONAL BLOCK DIAGRAM



4. OSD Control Board

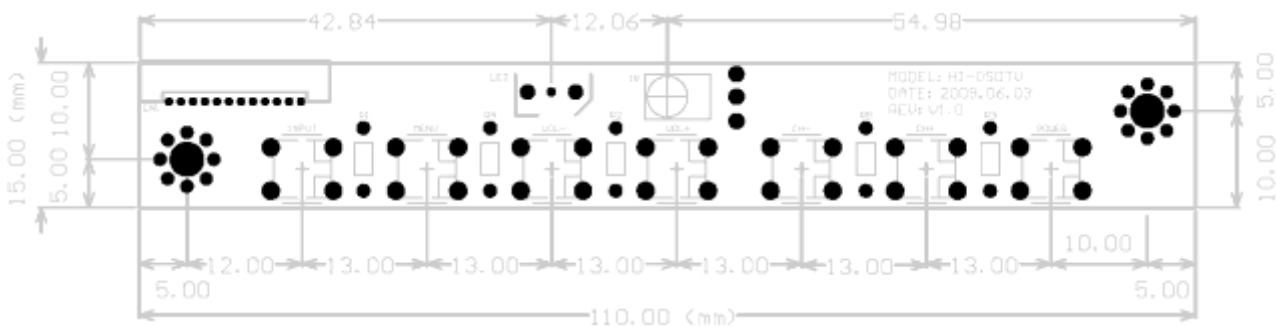
The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 7 buttons OSD operation as a standard. The control functions defined on OSD operation are as below. (Unit: mm)

Appearance

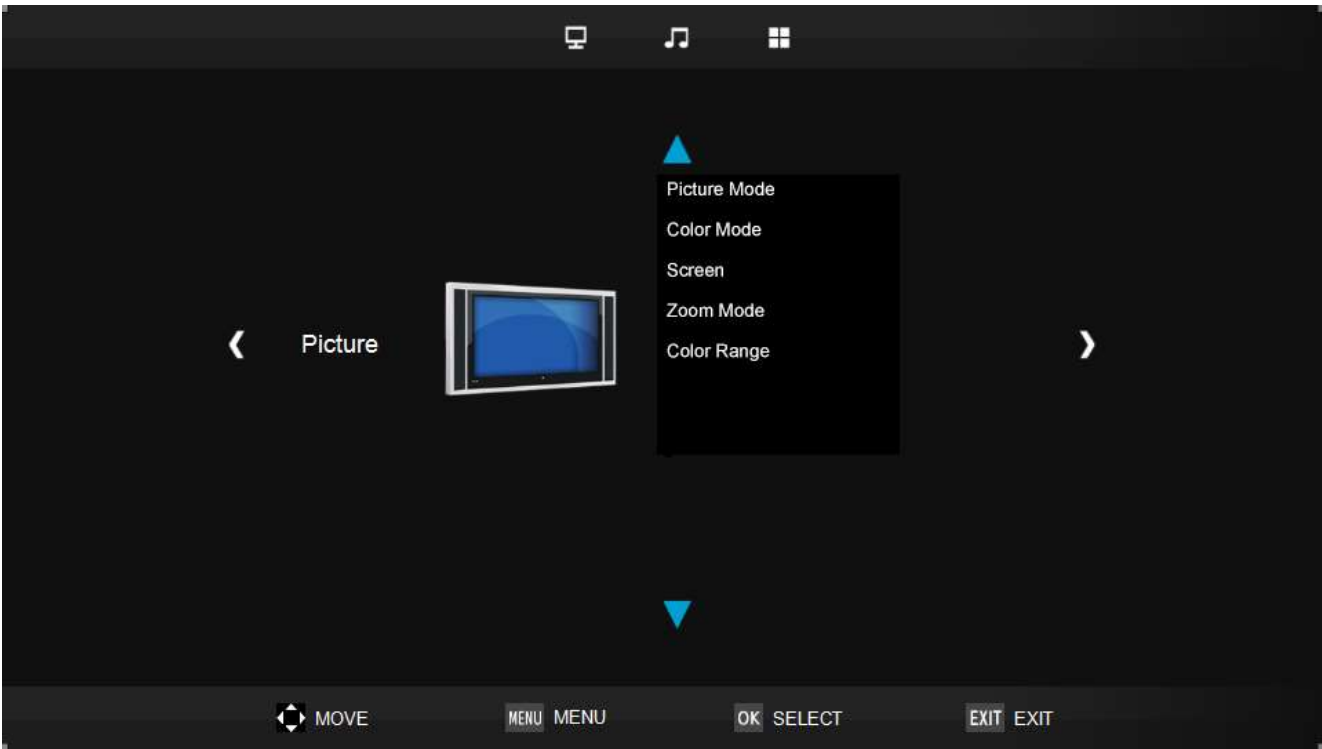


Board Size (W x H x D) : 110 x 15 x 6.6 mm

Button	Function	Status	HOT Key
LED	Indicates operation status	Green	On: Green Off: LED
POWER	Power on/off	On/Off	
MENU	Activate menu / Exit Menu		
INPUT	Input Select / Source		
LEFT	Cursor control Left		
RIGHT	Cursor control Right		
DOWN	Cursor control Down		
UP	Cursor control Up / Auto Adjust		



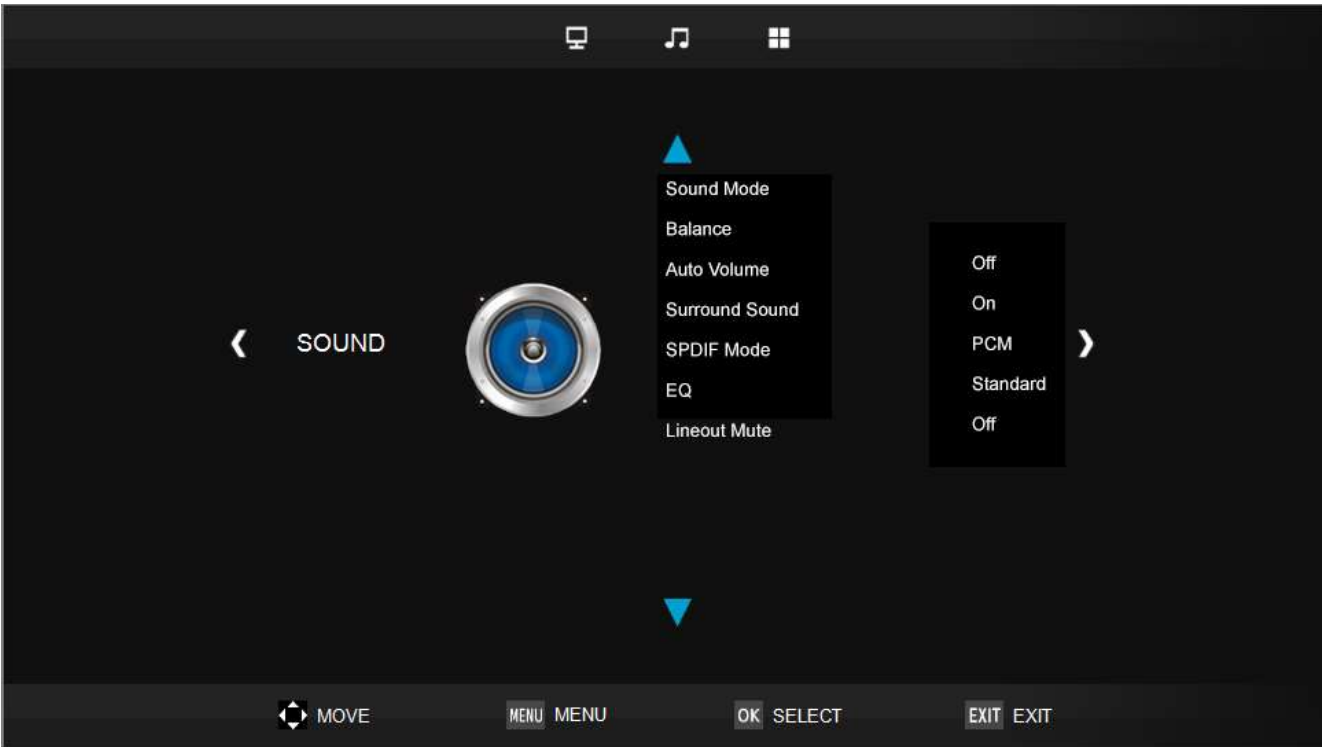
5-1. OSD FUNCTION



Picture Page

OSD Menu					
Picture Mode	Mode	Dynamic	Standard	Personal	Soft
	Contrast	0 ~ 100			
	Brightness				
	Sharpness				
	Tint	-50 ~ +50 (Standard Value is 0)			
	Color	0 ~ 100			
Color Mode	Mode	Cool	Normal	Warm	Personal
	Red	0 ~ 255			
	Green				
	Blue				
Screen (※ In this page active only PC mode)	Auto Adjust				
	HorizontalPos.50(0~100)				
	VerticalPos.50(0~100)				
	Size50(0~100)				
	Phase4(0~100)				
Zoom Mode	Full				
	4:03				
	16:09				
	Zoom1				
	Zoom2				
	Just Scan				
Color Range	0~255				
	16~235				

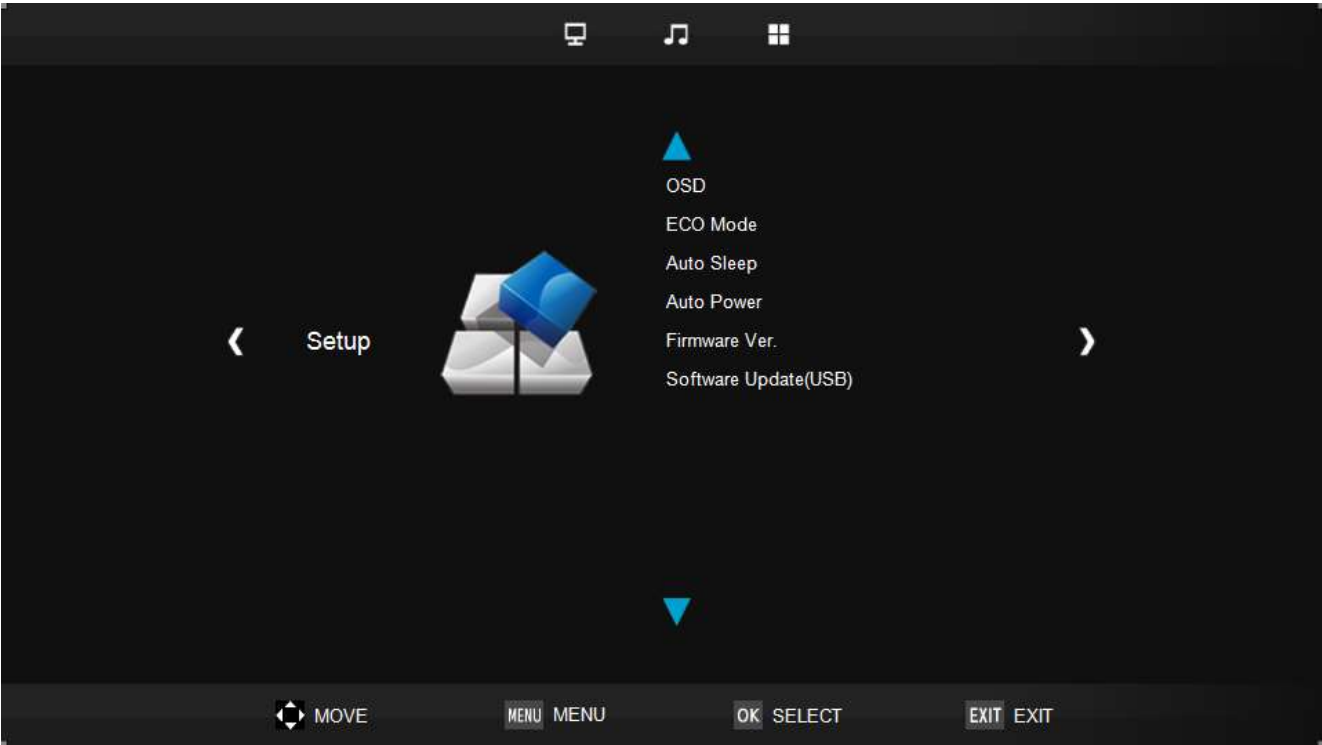
5-2. OSD FUNCTION



Sound page

OSD Menu						
Sound Mode		Standard	Music	Movie	ports	User
	Treble	0 ~ 100				
	Bass					
Balance	-50 ~ +50(Standard Value is 0)					
Auto volume	Off					
	ON					
Surround Sound	Off					
	ON					
SPDIF Mode	PCM					
	Raw					
EQ		Movie	Standard	Music	Personal	
	120Hz	0 ~ 100				
	500Hz					
	1.5KHz					
	5KHz					
	10KHz					
Lineout Mute	Off					
	ON					

5-3. OSD FUNCTION

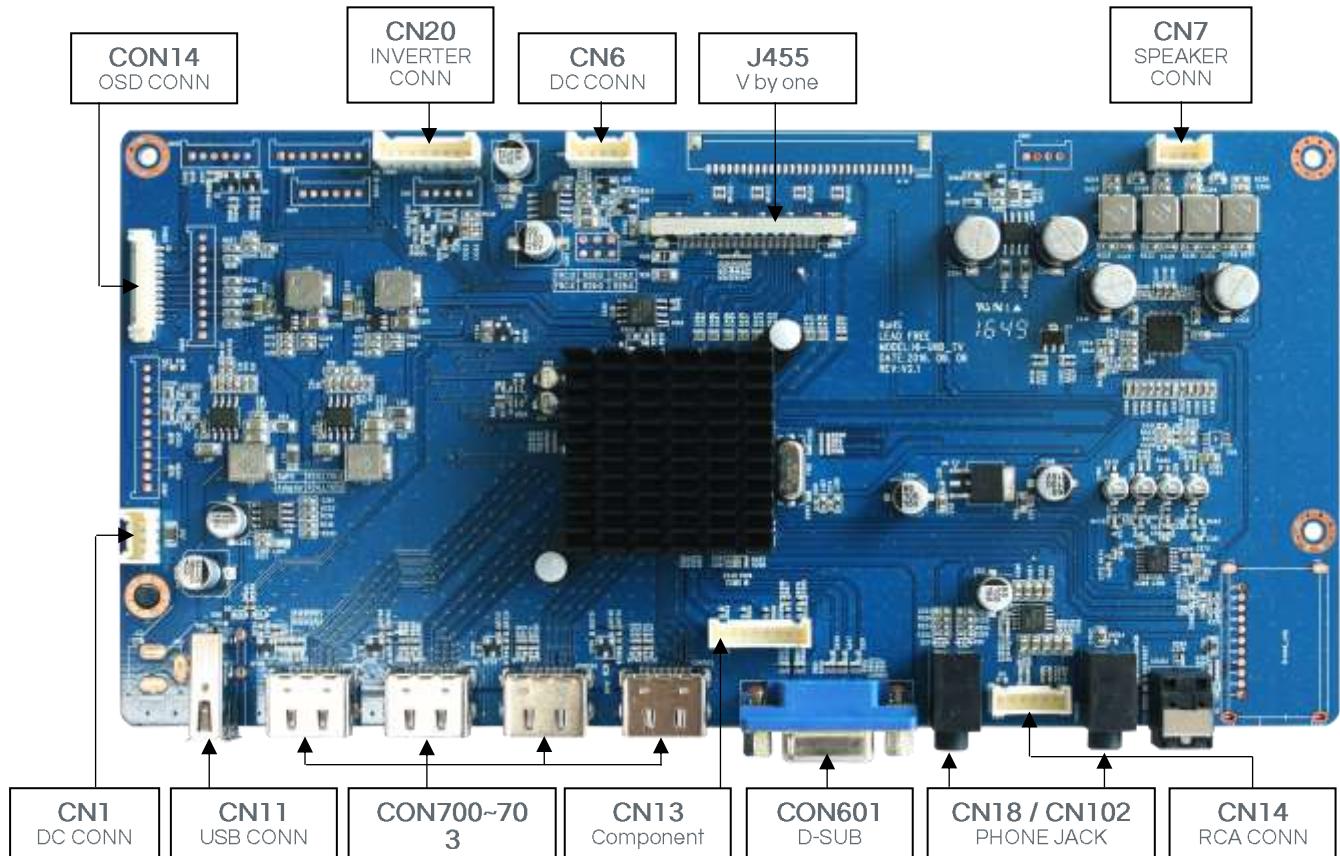


Setup page

OSD Menu									
OSD	OSD Language	English		EN_GB		German		French	
		Spanish		Italian		Swedish		Danish	
		Polish		Dutch		Portuguese		Norwegian	
		Russian		Chinese					
	OSD Transp.	0%	25%	50%	75%	100%			
	OSD Time	5 sec	15 sec	30 sec	45 sec	60 sec			
ECO Mode	Global	0 ~ 100							
Auto Sleep	On								
	Off								
Auto Power	On								
	Off								
Firmware Ver.									
Software update(USB)									

6. CONNECTOR, PINOUT & JUMPERS

The various connectors are:



Summary:

Reference	Item	Description	Type	Manufacturer
CON102	JACK	PHONE OUTPUT JACK	AUDIO JACK PJ-325D	-
CN11	CONNECTOR	USB CONNECTOR	MOLEX_15051	-
CN14	CONNECTOR	RCA CONNECTOR	SMW200-06P-2.0mm	YEONHO
CN601	CONNECTOR	D-SUB CONNECTOR	DSH-15FR/A SHORT	
CN18	JACK	PHONE INPUT JACK	AUDIO JACK PJ-325D	-
CN700~703	CONNECTOR	HDMI CONNECTOR	SD-47266-00	-
CN13	CONNECTOR	COMPONENT CONNECTOR	SMW200-08P-2.0mm	YEONHO
CN7	CONNECTOR	SPEAKER CONNECTOR	SMW200-04P-2.0mm	YEONHO
CON14	CONNECTOR	OSD CONNECTOR	SMW200-10P-2.0mm	YEONHO
CN6	CONNECTOR	DC CONNECTOR(PANEL_VCC)	SMW200-05P-2.0mm	YEONHO
CN20	CONNECTOR	INVERTER CONNECTOR	SMW200-08P-2.0mm	
CN1	CONNECTOR	DC CONNECTOR(12V)	SMW200-04P-2.0mm	YEONHO
J455	CONNECTOR	V by One CONNECTOR(OPTION)	FI-RE51S-VF-0.5MM	

CON102: PHONE out Connector

Pin No.	Symbol	Description
1	GND	Ground
2	NC	No Connection
3	HPO_OUT_L	Head phone left
4	NC	No Connection
5	HPO_OUT_P	Head phone right

CN11: USB Connector

Pin No.	Symbol	Description
1	GND	Ground
2	USB1_D+	USB DATA +
3	USB1_D-L	USB DATA +
4	+5V_USB0	USB Power

CN14: RCA Connector

Pin No.	Symbol	Description
1	GND	Ground
2	AV-AURIN	Analog Audio Right signal
3	GND	Ground
4	AV-AULIN	Analog Audio Left signal
5	GND	Ground
6	AV_IN	Composite signal

CON601: D-SUB Connector

Pin No.	Symbol	Description
1	RGB0_R+	VGA Red analog signal
2	RGB0_G+	VGA Green analog signal
3	RGB0_B+	VGA Blue analog signal
4	NC	No Connection
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	NC	No Connection
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

N18: PHONE input Connector

Pin No.	Symbol	Description
1	GND	Ground
2	GND	Ground
3	VGA-AULIN	Phone jack Left in
4	GND	Ground
5	VGA-AURIN	Phone jack Right in

CON700~703: HDMI Connector

Pin No.	Symbol	Description
1	HDMI0-RX2P	HDMI 2line +
2	GND	Ground
3	HDMI0-RX2N	HDMI 2line +
4	HDMI0-RX1P	HDMI 2line +
5	GND	Ground
6	HDMI0-RX1N	HDMI 2line +
7	HDMI0-RX0P	HDMI 2line +
8	GND	Ground
9	HDMI0-RX0N	HDMI 2line +
10	HDMI0-CLKP	HDMI 2line +
11	GND	Ground
12	HDMI0-CLKN	HDMI 2line +
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

CN13: Component Connector

Pin No.	Symbol	Description
1	YPBPR_Y	Component Y signal
2	GND	Ground
3	YPBPR_PB	Component PB signal
4	GND	Ground
5	YPBPR_PR	Component PR signal
6	GND	Ground
7	COP-AULIN	Component audio Left signal
8	COP-AURIN	Component audio Right signal

CN7: Speaker Connector

Pin No.	Symbol	Description
1	OUT1A	Speaker Left +
2	OUT1B	Speaker Left -
3	OUT2A	Speaker Right -
4	OUT2B	Speaker Right +

CON14: OSD Connector

Pin No.	Symbol	Description
1	LED-Red	RED Color
2	LED-Green	GREEN Color
3	GND	Ground
4	SOURCE	For Source Switch
5	MENU	For Menu Switch
6	LEFT	For Left Switch
7	RIGHT	For Right Switch
8	DOWN	For Down Switch
9	UP	For Up Switch
10	POWER	For Power Switch
11	IRD	IR DATA
12	3.3V	IR POWER 3.3V

CN6: DC Connector

Pin No.	Symbol	Description
1	PANEL-VCC	Panel T-con board supply power
2	PANEL-VCC	Panel T-con board supply power
3	PANEL-VCC	Panel T-con board supply power
4	GND	Ground
	GND	Ground

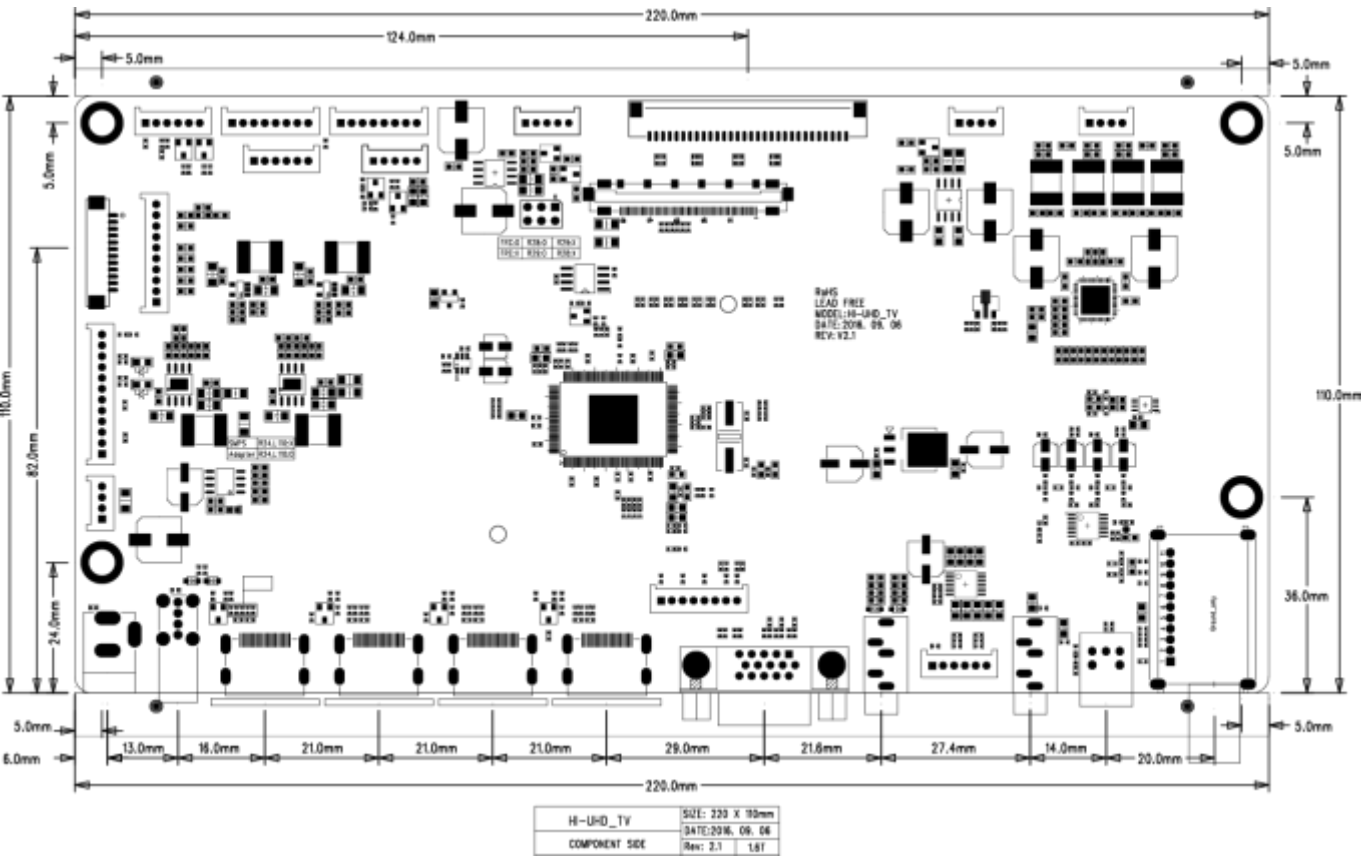
CN20: Invertor Connector

Pin No.	Symbol	Description
1~2	12V_IN	Ground
3~4	+5V_NORMAL	No Connection
5	GND	Head phone left
7	BL-ON/OFF	Backlight on signal
8	BL-ADJUST	Backlight dimming signal

J455: V by One Connector [\[option\]](#)

Pin No.	Symbol	Description
1~7	PANEL-VCC	POWER OUTPUT
8~9	NC	No Connection
10~13	GND	Ground
14~17	NC	No Connection
18	SDA	I2C Data signal
19	SCL	I2C Clock Signal
20~24	N.C	No Connection
25	HTPDN	Hot plug detect output, Open drain
26	LOCKN	Lock detect output, Open drain
27	GND	Ground
28	RX0N	1st Pixel Negative V-by-One Differential data input in area A
29	RX0P	1st Pixel Positive V-by-One Differential data input in area A
30	GND	Ground
31	RX1N	2nd Pixel Negative V-by-One Differential data input in area A
32	RX1P	2nd Pixel Positive V-by-One Differential data input in area A
33	GND	Ground
34	RX2N	3rd Pixel Negative V-by-One Differential data input in area A
35	RX2P	3rd Pixel Positive V-by-One Differential data input in area A
36	GND	Ground
37	RX3N	4th Pixel Negative V-by-One Differential data input in area A
38	RX3P	4th Pixel Positive V-by-One Differential data input in area A
39	GND	Ground
40	RX4N	5th Pixel Negative V-by-One Differential data input in area A
41	RX4P	5th Pixel Positive V-by-One Differential data input in area A
42	GND	Ground
43	RX5N	6th Pixel Negative V-by-One Differential data input in area A
44	RX5P	6th Pixel Positive V-by-One Differential data input in area A
45	GND	Ground
46	RX6N	7th Pixel Negative V-by-One Differential data input in area A
47	RX6P	7th Pixel Positive V-by-One Differential data input in area A
48	GND	Ground
49	RX7N	8th Pixel Negative V-by-One Differential data input in area A
50	RX7P	8th Pixel Positive V-by-One Differential data input in area A
51	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

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.	Horizontal Timing		Vertical Timing	
		Freq.	Active	Freq.	Active
	MHz	KHz	Pixel	Hz	Line
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

Mode \ Spec	Horizontal Timing		Vertical Timing	
	Freq.	Active	Freq.	Active
	KHz	Pixel	Hz	Line
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
2560X1440 60Hz		2560	60	1440
3840X2160 30Hz		3840	30	2160
3840X2160 60Hz		3840	60	2160

10. ACCESSORY

REMOCON

