AD BOARD

HI-AVL_VE

Specifications

Approval

Rev. 01

Issue Date. 2016. 10. 05

Doc No. HI-AVL_VE 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

(주)하이디스플레이 | 경기도 군포시 공단로140번길 52, 610/611호 (당정동, 에이스하이테크시티군포)
HIDISPLAY Co., Ltd. #610/611, ACE-Gunpo, 52, Gongdan-ro140beon-gil, Gunpo-si, Gyeonggi-do, Korea
T +82. 31. 478. 8142 F +82. 31. 601. 9081 E pys1538@hi-display.co.kr H www.hidisplay.co.kr

HI-AVL_VE

Revision History

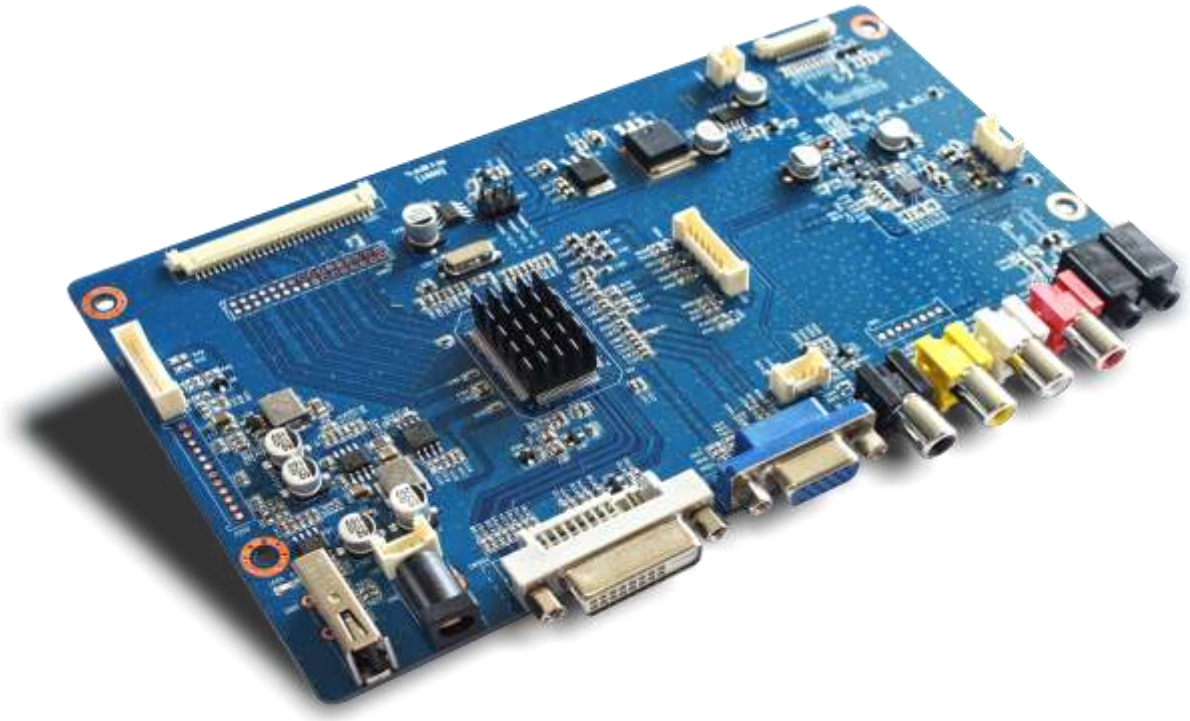
Rev.	ECN No.	Description of Changes	Date	Prepared
V1.0		Initial Release	2016. 10. 05	SW.OH

HI-AVL_VE

Rev. 01

1. General Specification

No.	Item	Description		
1	Model Name	HI-AVL_VE		
2	LCD Module	LVDS 1920X1080		
3	Input	Analog RGB(R, G, B Separate H, V Sync), DVI-D(TMDS), USB, AUDIO		
4	Resolution Support	H: 31 ~ 80kH		
		V: 55 ~ 76Hz		
5	OSD Control	Menu, Select, Down, Up, Left, Right, Power		7 keys
	Plug & Play	VESA DDC 2B Ver1.4		
6	Power Consumption	Supply Voltage	12Vdc	
		Max Power	3.0 Watt	
7	Signal Connector	Analog	DSUB 15P(R, G, B Separate H, V Sync)	
		Digital	DVI-D 24P(TMDS)	
		Audio	5W + 5W	
8	Board Size	W x H x D(mm)	192 x 103 x 17	



2. ELECTRICAL SPECIFICATION

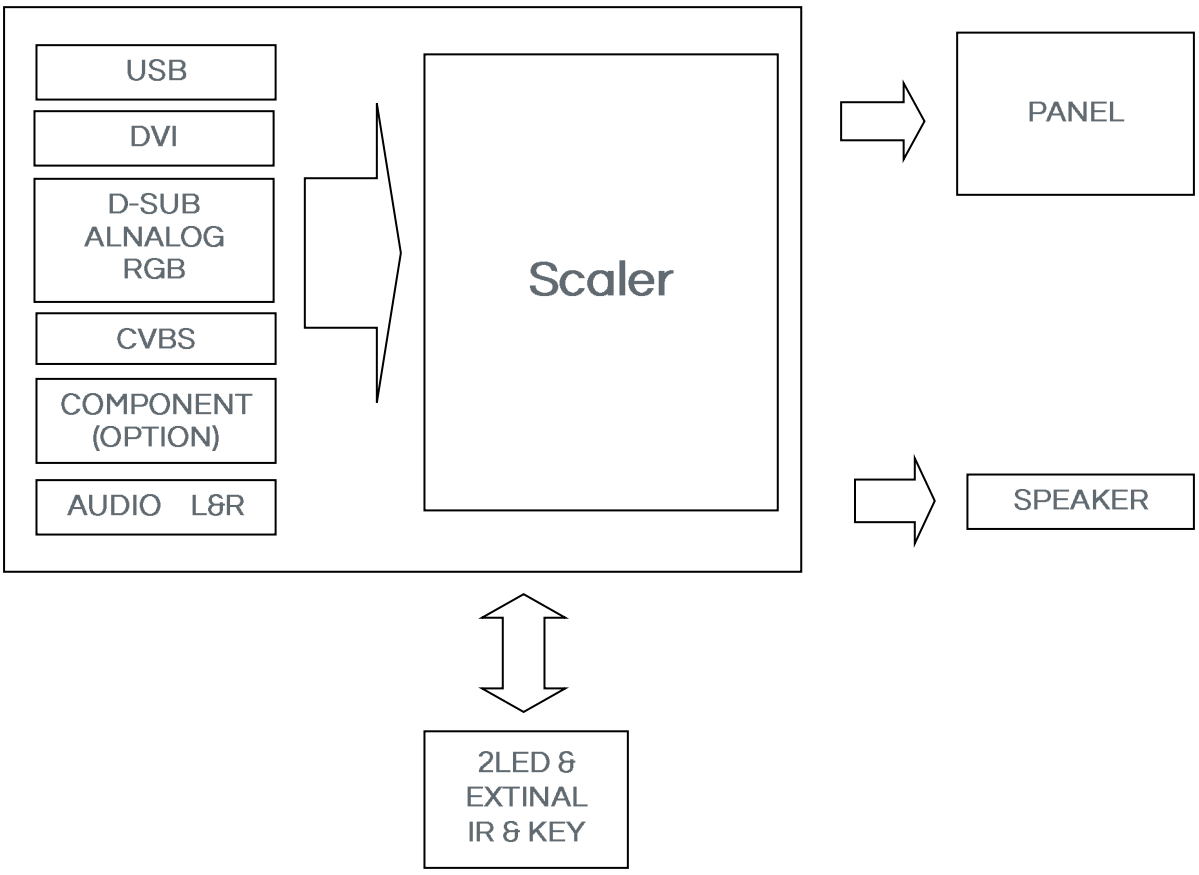
2.1. Input characteristic

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
DVI 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	
	LCD Power(5V)	VDC	4.5	5	5.5	
	LCD Power(3.3V)	VDC	3.16	3.3	3.5	
LVDS Interface						
	Differential output	Vp-p (mV)	250	350	450	Differential +/-
AUDIO Interface						
	Output	Watt		5	6	
	Frequence	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

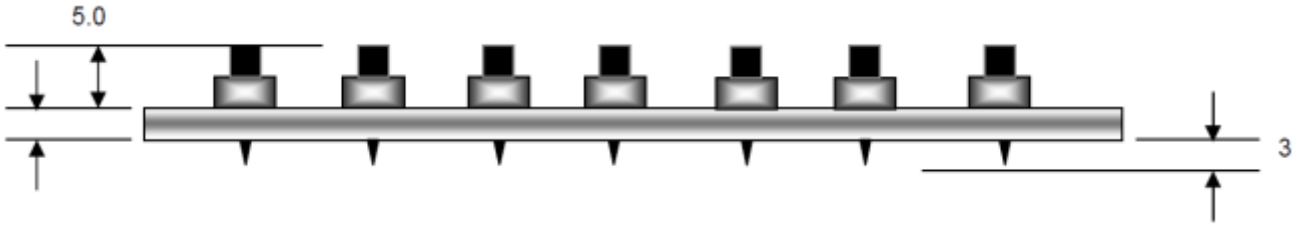


HI-AVL_VE

4. OSD Control Board

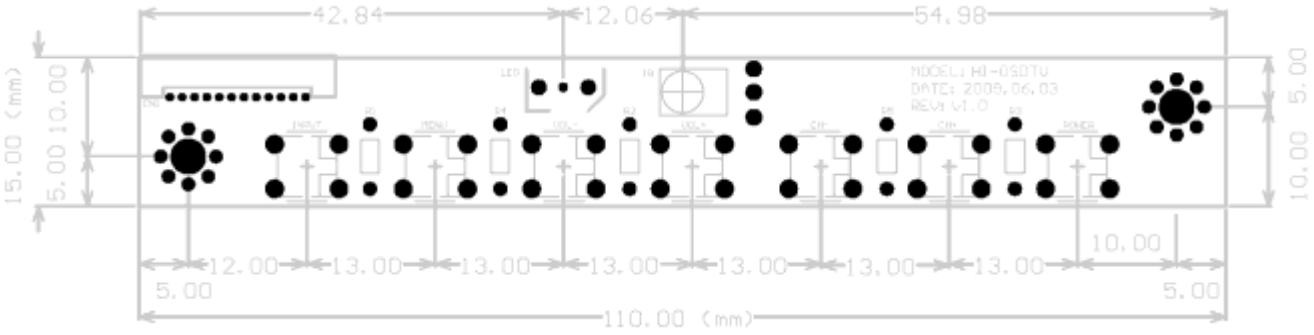
The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 7 buttons OSD operation as a standard. The control functions defined on OSD operation are as below. (Unit: mm)

Appearance



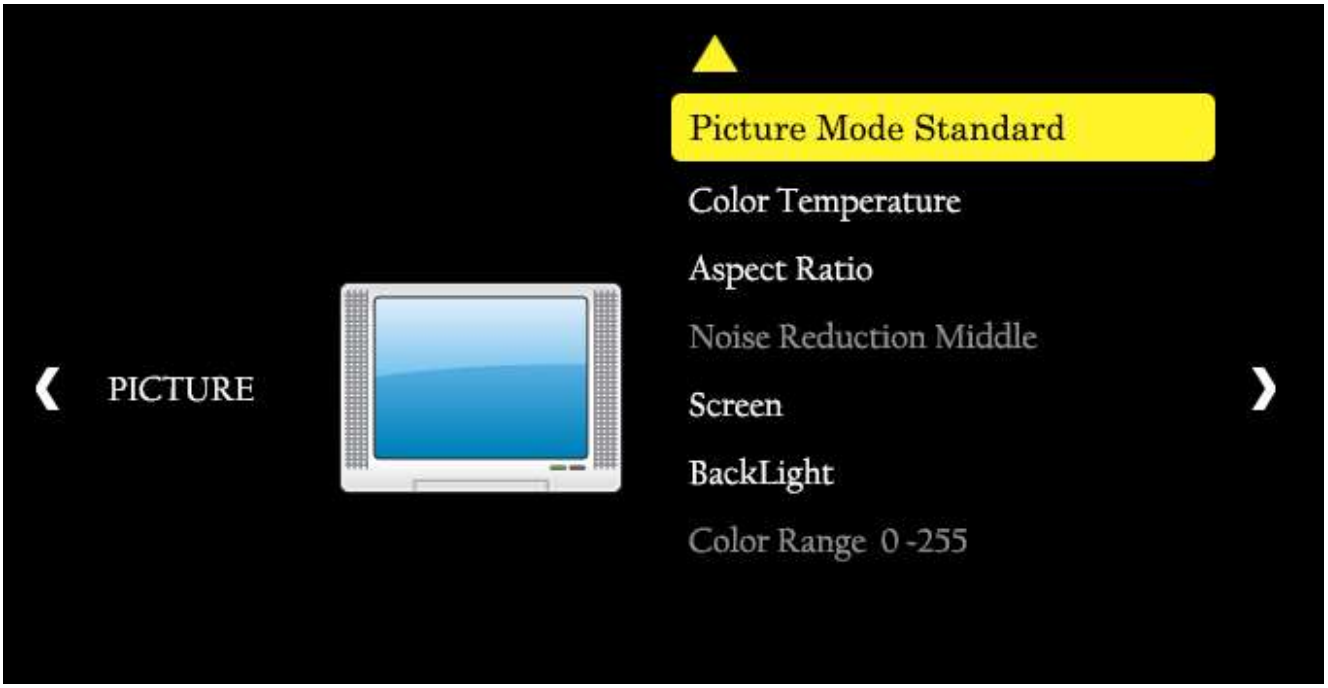
Board Size (W x H x D) : 110 x 15 x 6.6 mm

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		



HI-AVL_VE

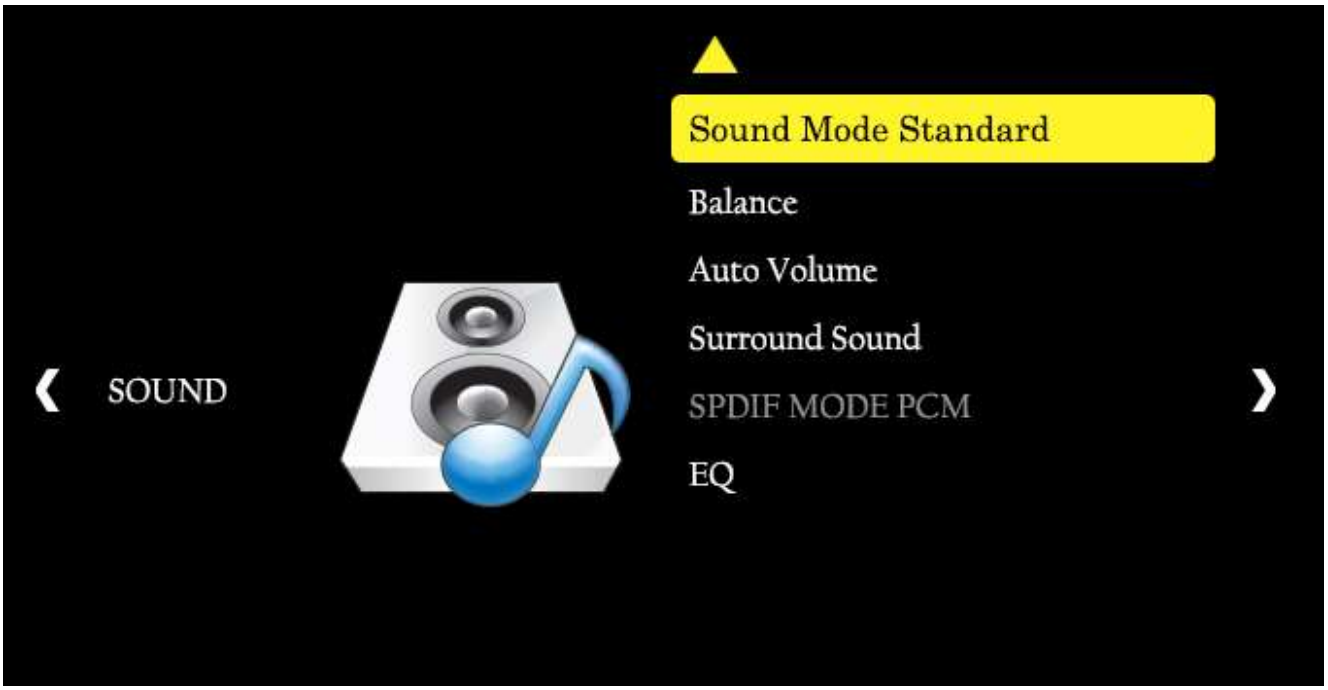
5-1. OSD FUNCTION



Picture Page

OSD Menu		
Picture Mode	Picture Mode Select	
	Mode	Standard
		Mild
		Dynamic
		User
Color Temperature	Color Temperature Mode Select	
	Mode	Cool
		Warm
		Medium
		User
Aspect Ratio	Aspect Ration Mode Select	
	Mode	4:3
		16:9
		Point To Point
Noise Reduction (DVI)	Noise Reduction Mode Select	
	Mode	OFF
		Low
		Middle
		High
		Default
Screen (D-SUB)	Screen mode Select	
	Mode	Auto Adjust
		Not Auto Adjust
Backlight	BackLight level Control	
	MIN	0
	MAX	100
Color Range (DVI)	Color Range Mode Select	
	Mode	0-255
		16-255

5-2. OSD FUNCTION



Sound page

OSD Menu			
Sound Mode	Sound Mode Select		
	Mode	Standard	
		Music	
		Movie	
		Sports	
		User	
Balance	Sound Balance level Control		
	Range of Value	MIN	-50
		MAX	+50
Auto Volume	Auto Volume Mode Select		
	Mode	OFF	
		ON	
Surround Sound	Surround Sound Mode Select		
	Mode	OFF	
		Surround	
		SRS TruSurround XT	
EQ	EQ Mode Select		
	Mode	120Hz 50	
		500Hz 50	
		1.5KHz 50	
		5KHz 50	
		10KHz 50	

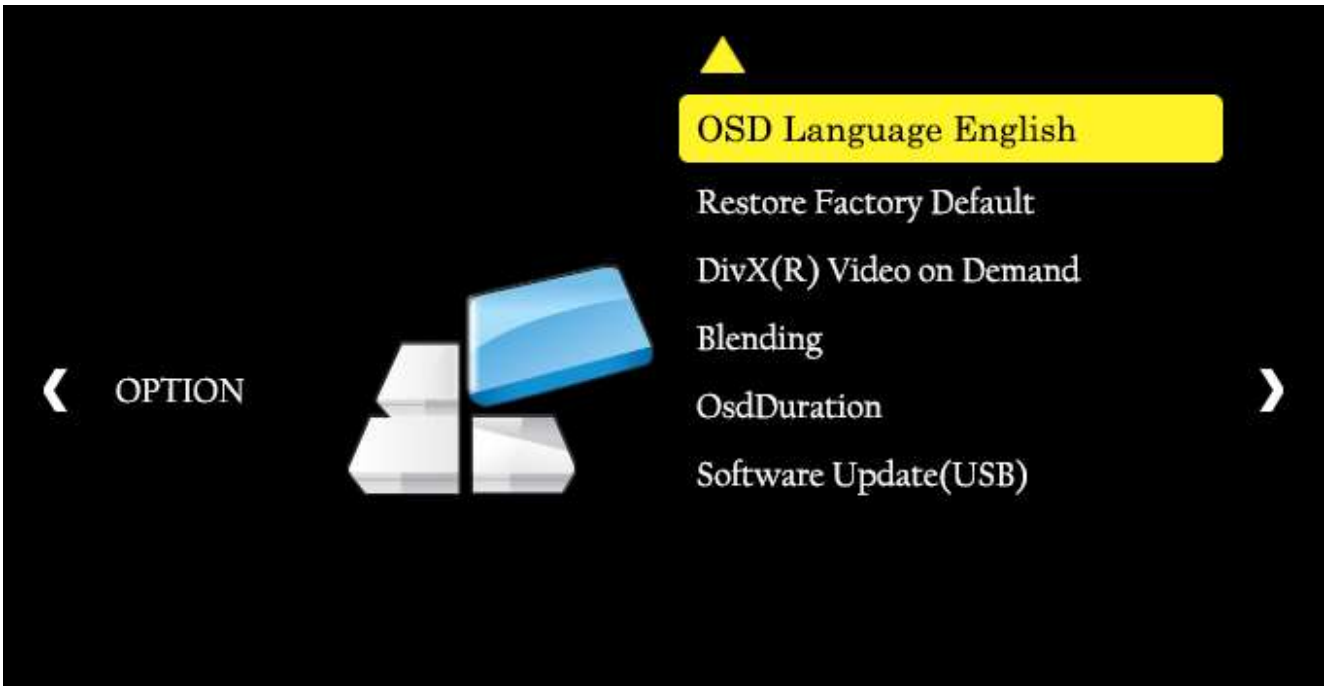
HI-AVL_VE

5-3. OSD FUNCTION

Time page

OSD Menu		
Clock	This mode can change current time	
Off Time	Off Time Mode Select	
	Mode	Off
		Once
		Every Day
		Monday To Friday
		Monday To Saturday
		Saturday To Sunday
		Sunday
On Time	On Time Mode Select	
	Mode	Off
		Once
		Every Day
		Monday To Friday
		Monday To Saturday
		Saturday To Sunday
		Sunday
Sleep Timer	Sleep Timer Mode Select	
	Mode	Off
		10 Min
		20 Min
		30 Min
		60 Min
		90 Min
		120 Min
		180 Min
		240 Min
Auto Sleep	Auto Sleep Mode Select	
	Mode	Off
		On

5-4. OSD FUNCTION



Option page

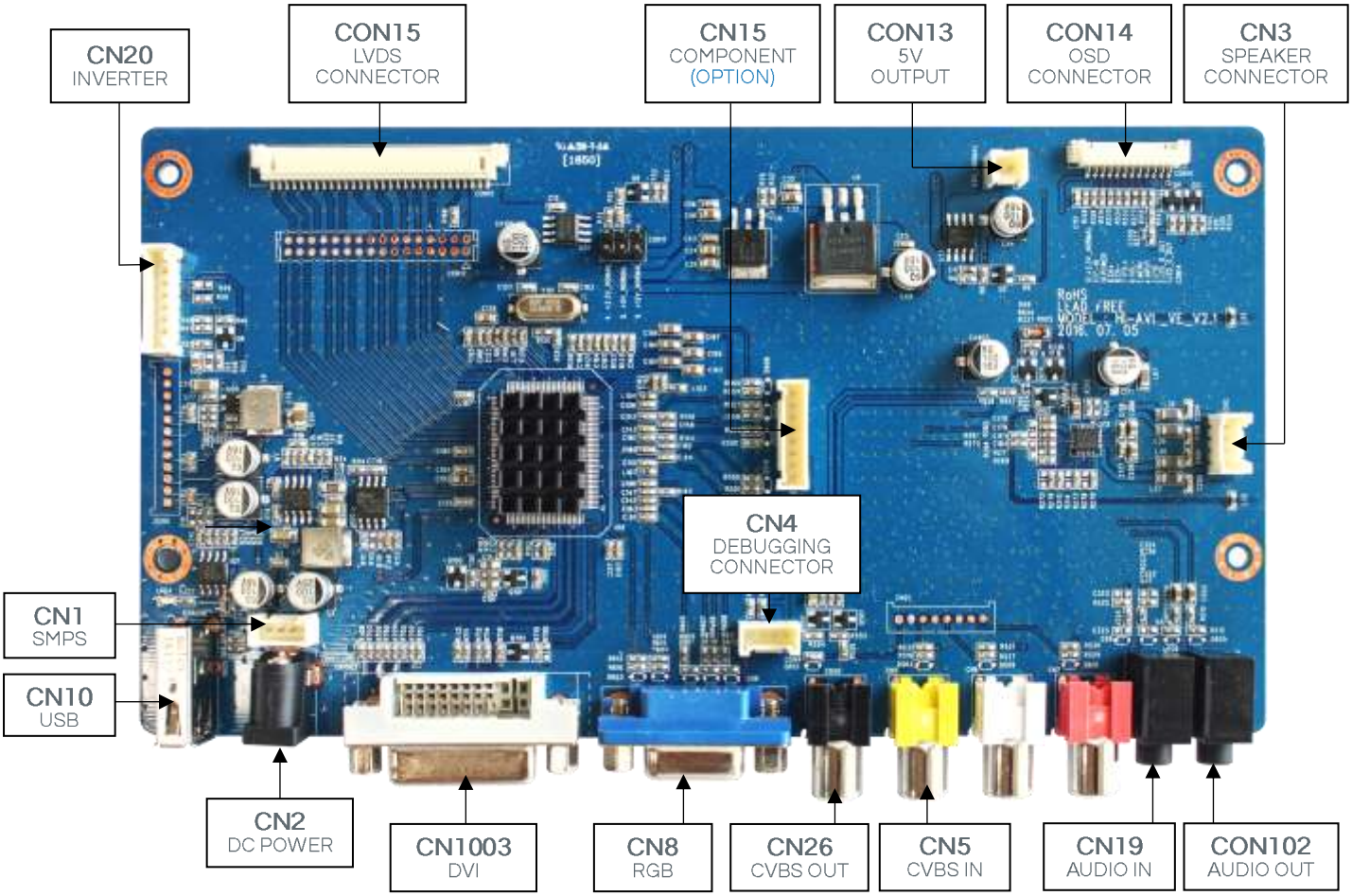
OSD Menu				
OSD Language	OSD Language Select			
	English	Spanish	French	German
	Italian	Portuguese	Russian	Chinese
Restore Factory Default	Restore Factory Default Mode Select			
	Mode	Yes		
		No		
DivX(R) Video on Demand				
Blending	Blending Mode Select			
	Mode	Low		
		Middle		
		High		
		Off		
OsdDuration	OsdDuration Mode Select			
	Mode	Off		
		5Sec		
		10Sec		
		15Sec		
Software Update(USB)	You can update the software via USB			

HI-AVL_VE

Rev. 01

6. CONNECTOR, PINOUT & JUMPERS

The various connectors are:



Summary:

Reference	Item	Description	Type	Manufacture
CN1	CONNECTOR	SMPS CONNECTOR	SMW200-04P-2.0mm	YEONHO
CN2	JACK	DC POWER JACK	2.5ø DC Jack	
CN3	CONNECTOR	Speaker CONNECTOR	SMW200-04P-2.0mm	YEONHO
CN4	CONNECTOR	DEBUGGING CONNECTOR	SMW200-04P-2.0mm	YEONHO
CN5	CONNECTOR	CVBS-IN CONNECTOR		
CN8	CONNECTOR	D-SUB CONNECTOR	DSUB-15P	-
CN10	CONNECTOR	USB CONNECTOR	USB LEFT ANGLE	
CN15	CONNECTOR	COMPONENT(OPTION)	SMW200-08P-2.0mm	YEONHO
CN19	CONNECTOR	AUDIO-IN CONNECTOR		
CN20	CONNECTOR	INVERT CONNECTOR	SMW200-08P-2.0mm	YEONHO
CN26	CONNECTOR	CVBS-OUT CONNECTOR		
CN1003	CONNECTOR	DVI CONNECTOR		
CON13	CONNECTOR	5V OUTPUT	SMW200-02P-2.0mm	YEONHO
CON14	CONNECTOR	OSD CONNECTOR	12505WR-12P	YEONHO
CON15	CONNECTOR	LVDS CONNECTOR	12507WR-30P	YEONHO
CON102	CONNECTOR	AUDIO-OUT CONNECTOR		

HI-AVL_VE

CN1: SMPS Power input Connector

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

CN2: DC power Input Jack(12V)

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

CN3: Speaker Connector

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

CN4: Debugging CONNECTOR

Pin No.	Symbol	Description
1	UART-TX	TX Data Input of Micro-Processor F8031
2	UART-RX	RX Data Input of Micro-Processor F8031-
3	GND	Ground
4	+5V_STANDBY	+5V

CN8: D-SUB Connector

Pin No.	Symbol	Description
1	VGA-RIN	VGA Red analog signal
2	VGA-GIN	VGA Green analog signal
3	VGA-BIN	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	UART-TX	TX Data Input of Micro-Processor F8031
13	VGA-HS	Horizontal Sync
14	VGA-VS	Vertical Sync
15	UART-RX	RX Data Input of Micro-Processor F8031
16	GND	Ground
17	GND	Ground

HI-AVL_VE

CN10: USB Connector

Pin No.	Symbol	Description
1	GND	Ground
2	USB1_D1+_N	USB DATA+
3	USB1_D1-_N	USB DATA-
4	+5V_USB1	USB POWER
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground

CN15: COMPONENT(OPTION)

Pin No.	Symbol	Description
1	HD_Y	Component Y signal
2	GND	Ground
3	HD_PB	Component PB signal
4	GND	Ground
5	HD_PR	Component PR signal
6	GND	Ground
7	AV2_L	Component Audio Left Signal
8	AV2_R	Component Audio Right Signal

CN19: AUDIO-IN Connector

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

CN20: Invertor Connector

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

CON13: 5V OUTPUT

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

CON14: OSD Connector

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

CON15: 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)

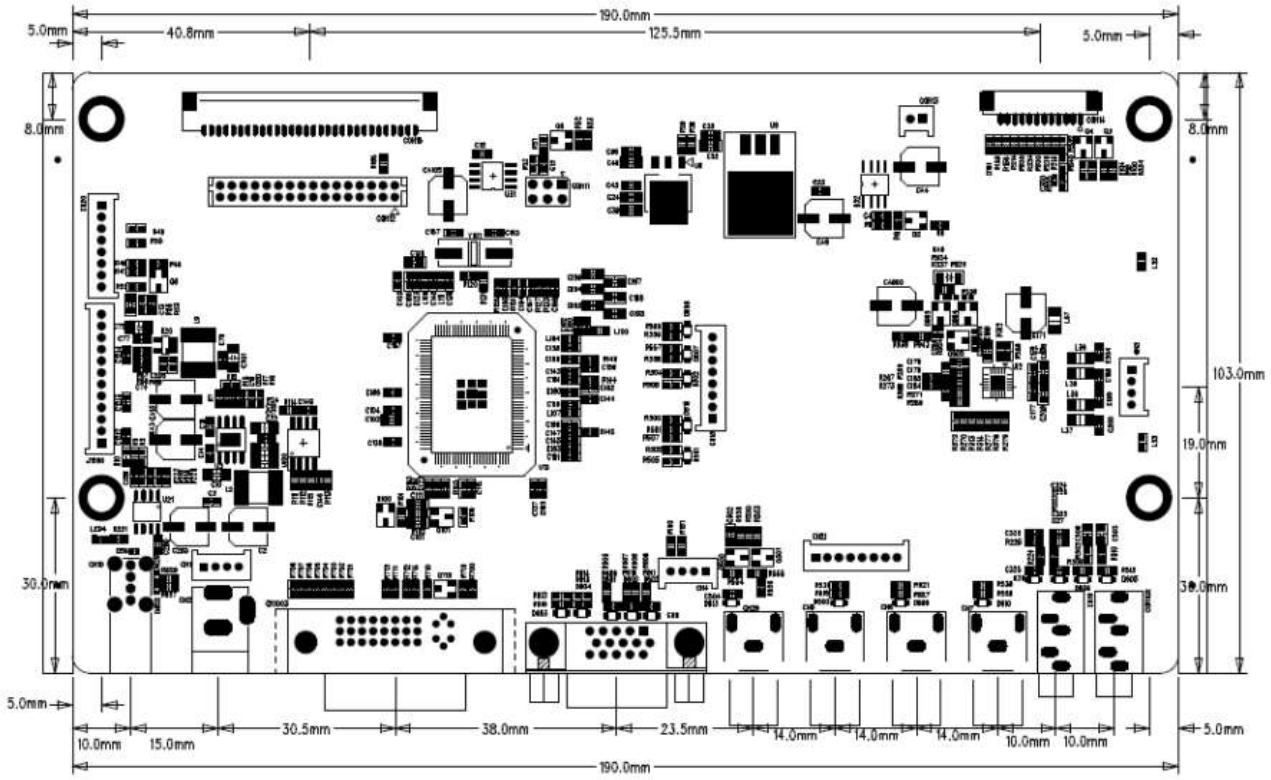
CN1003: DVI CONNECTOR

Pin No.	Symbol	Description
1	HDMIO-RX2-	TMDS DATA2 Differential Negative Signal
2	HDMIO-RX2+	TMDS DATA2 Differential Positive Signal
3	GND	Ground
4	NC	No Connection
5	NC	No Connection
6	HDMIO-DDC-SCL	The Clock Line for the DDC Interface
7	HDMIO-DDC-SDA	The Data Line for the DDC Interface
8	NC	No Connection
9	HDMIO-RX1-	TMDS DATA1 Differential Negative Signal
10	HDMIO-RX1+	TMDS DATA1 Differential Positive Signal
11	GND	Ground
12	NC	No Connection
13	NC	No Connection
14	HDMIO/5V	5 Volt signal for EDID
15	NC	No Connection
16	HDMIO-HPD	Identify the presence of a monitor
17	HDMIO-RX0-	TMDS DATA0 Differential Negative Signal
18	HDMIO-RX0+	TMDS DATA0 Differential Positive Signal
19	GND	Ground
20	NC	No Connection
21	NC	No Connection
22	GND	Ground
23	HDMIO-RXC+	TMDS CLOCK Differential Positive Signal
24	HDMIO-RXC-	TMDS CLOCK Differential Negative Signal
25	NC	No Connection
26	NC	No Connection
27	NC	No Connection
28	NC	No Connection
29	NC	No Connection
30	NC	No Connection
31	GND	Ground
32	GND	Ground

CON102: AUDIO-OUT Connector

Pin No.	Symbol	Description
1	GND	Ground
2	NC	No Connection
3	AV_LOUT	Audio Left Out
4	NC	No Connection
5	AV_ROUT	Audio Right Out

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 mare clear and stable image on a screen.

PC input format

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