

AD BOARD HI-2281

Specifications

Approval

Rev. 02

Issue Date. 2017. 12. 01

Doc No. RTD2281 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

Revision History

Rev.	ECN No.	Description of Changes	Date	Prepared
0		Initial Release	2013.11.20	Samuel. Lee
1		OSD UI Change, Board Image Change, Dimension Change	2017.02.21	SW.OH
2		Version Release Board Image Change, Dimension Change	2017.12.01	KB. PARK

1. General Specification

No.	Item	Description		
1	Model Name	HI-2281		
2	LCD Module	LVDS 640x350 ~ MAX 1920X1200		
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	DVI-D 24P(TMDS)	
8	Board Size	W x H x D(mm)	110 x 80 x 15	



2. ELECTRICAL SPECIFICATION

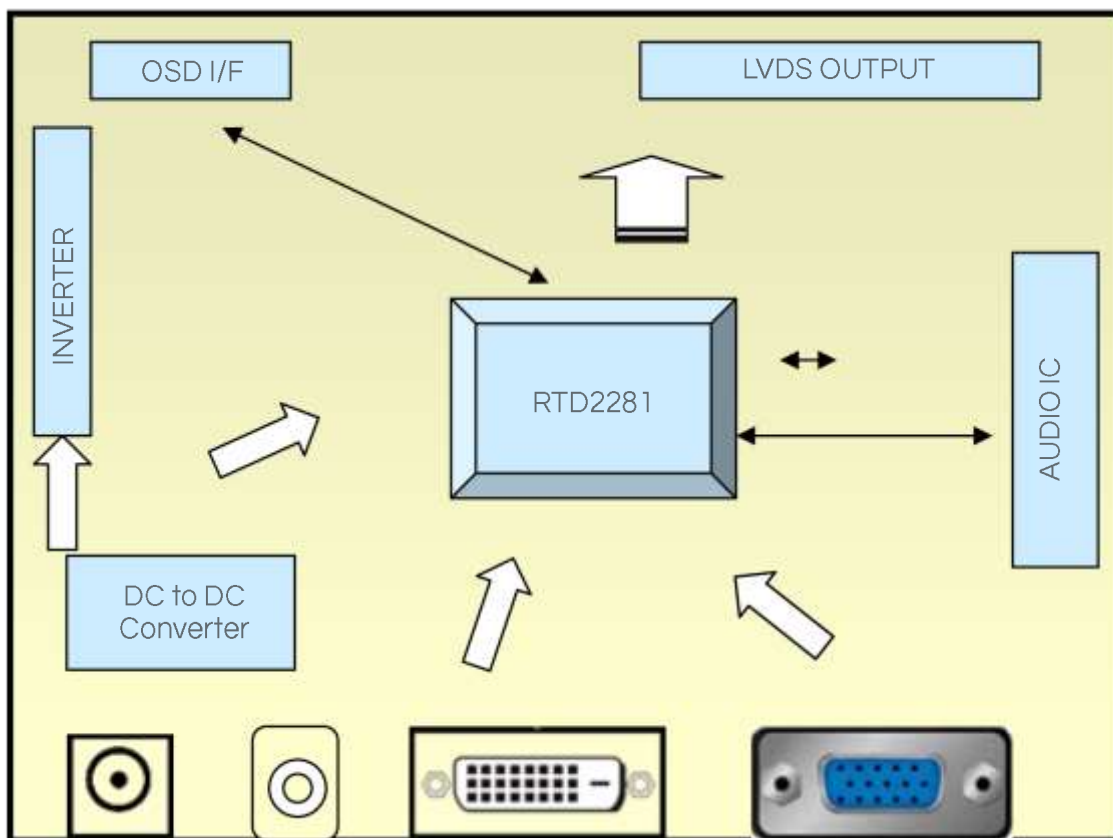
2.1. Input characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Power In (12Vdc)						
	Input	12VDC	11.4	12	12.6	
	Consumption	Watt		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	
	Frequency	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

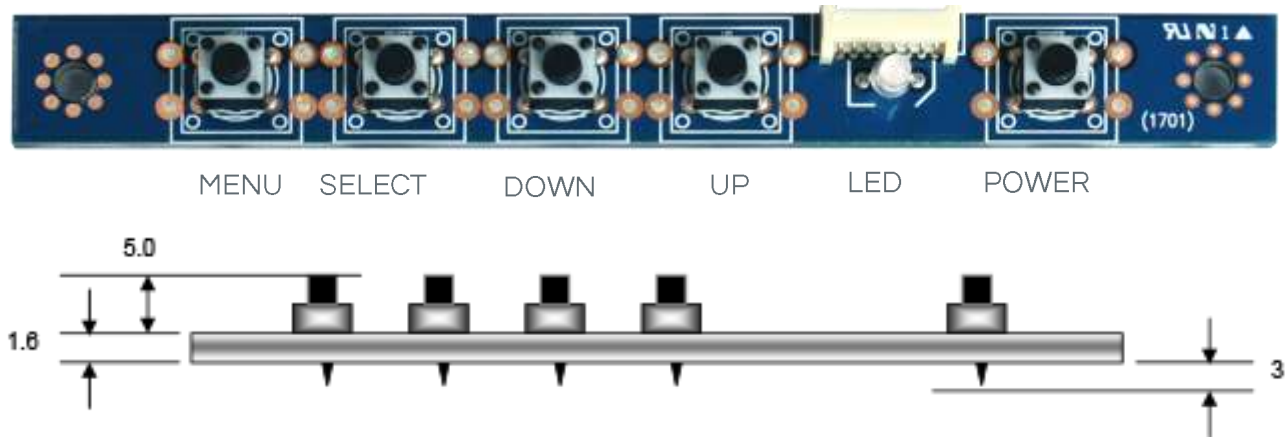
3. FUNCTIONAL BLOCK DIAGRAM



4. OSD Control Board

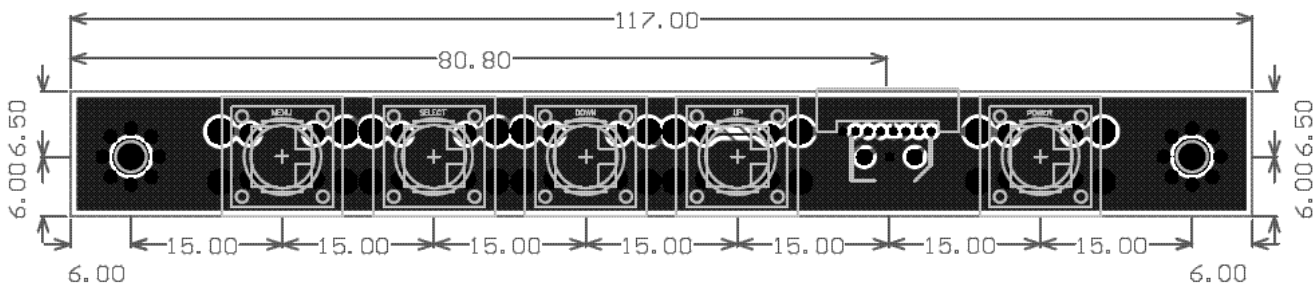
The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 5 buttons OSD operation as a standard. The control functions defined on OSD operation are as below. (Unit: mm)

Appearance

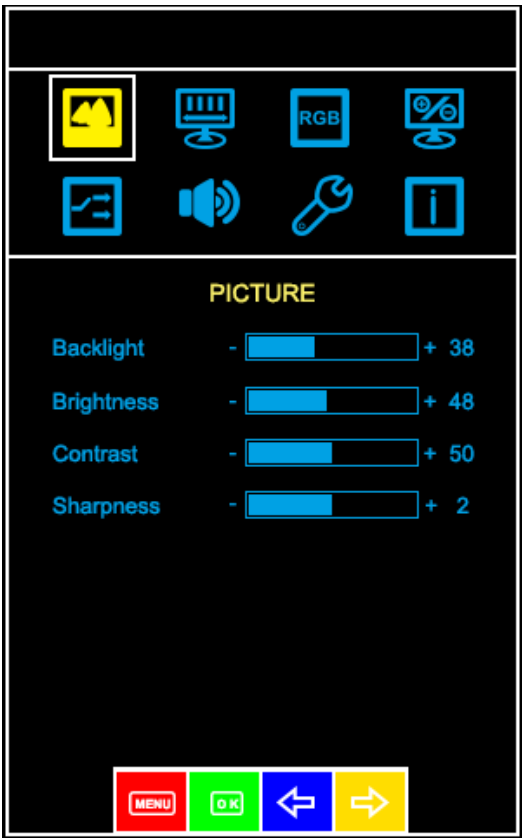


Board Size (W x H x D) : 112 x 12.5 x 6.6 mm

Button	Function	Status	HOT Key
LED	Indicates operation status	Green/ Red/ Amber	On: Green Off: 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		



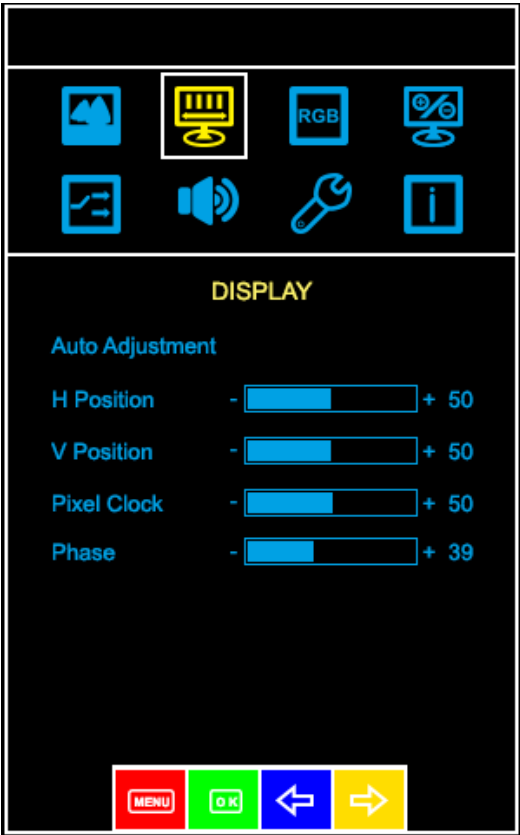
5-1. OSD FUNCTION



Picture Page

OSD Menu			
Backlight	Backlight level Control		
	Range of Value	MIN	0
		MAX	100
Brightness	Brightness level Control		
	Range of Value	MIN	0
		MAX	100
Contrast	Contrast level Control		
	Range of Value	MIN	0
		MAX	100
Sharpness	Sharpness level Control		
	Range of Value	MIN	0
		MAX	4

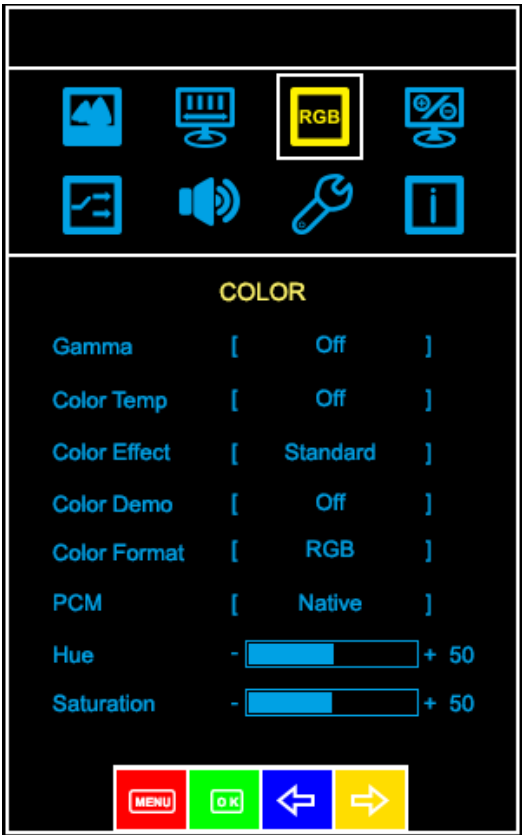
5-2. OSD FUNCTION



Display Page

OSD Menu			
Auto Adjustment	Set Auto Adjustment		
H Position	H Position position Control		
	Range of Value	MIN	0
		MAX	100
V Position	V Position position Control		
	Range of Value	MIN	0
		MAX	100
Pixel Clock	Pixel Clock position Control		
	Range of Value	MIN	0
		MAX	100
Phase	Fine tune the number of sampled data		
	Range of Value	MIN	0
		MAX	100

5-3. OSD FUNCTION



Color Page

OSD Menu					
Gamma	Gamma Mode Select				
	Mode	OFF	1.8	2.0	
		2.2	2.4		
Color Temp	Color Temp Mode Select				
	Mode	9300K	7500K	6500K	5800K
		SRGB	User	Off	
Color Effect	Color Effect Mode Select				
	Mode	Standard	Game	Movie	Photo
		Vivid	User	Off	
Color Demo	Color Demo Mode Select				
	Mode	Type1	Type2	Type3	Type4
		Type5	Off		
Color Format	Color Format Mode Select				
	Mode	RGB		YUV	
PCM	PCM Mode Select				
	Mode	Native			
Hue	Hue level Control				
	Range of Value	MIN		0	
		MAX		100	
Saturation	Saturation level Control				
	Range of Value	MIN		0	
		MAX		100	

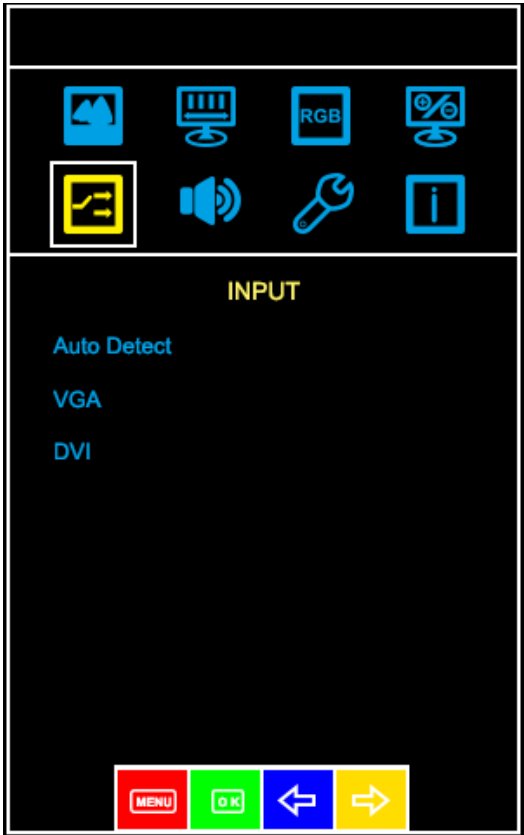
5-4. OSD FUNCTION



Advance Page

OSD Menu				
Aspect Ratio	Aspect Ratio Mode Select			
	Mode	Original	Full	16:9
		4:3	5:4	
Over Scan	Over Scan Mode Select			
	Mode	ON		
		OFF		
Over Drive	Over Drive Mode Select			
	Mode	ON		
		OFF		
Energy Star	Energy Mode Select			
	Mode	ON		
		OFF		
DDCCI	DDCCI Mode Select			
	Mode	ON		
		OFF		
Ultra Vivid	Ultra Vivid Mode Select			
	Range of Value	ON		
		OFF		

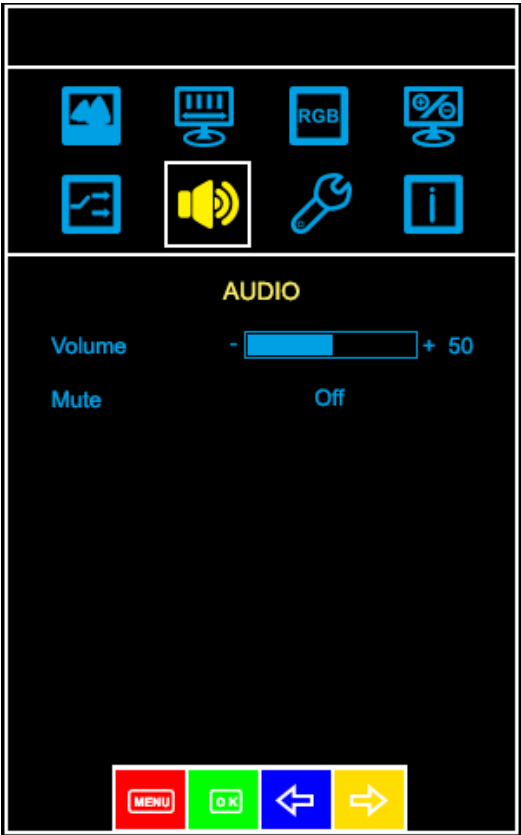
5-5. OSD FUNCTION



Input Page

OSD Menu	
Auto Detect	Change to Auto Detect Mode
VGA	Change to VGA Mode
DVI	Change to DVI Mode

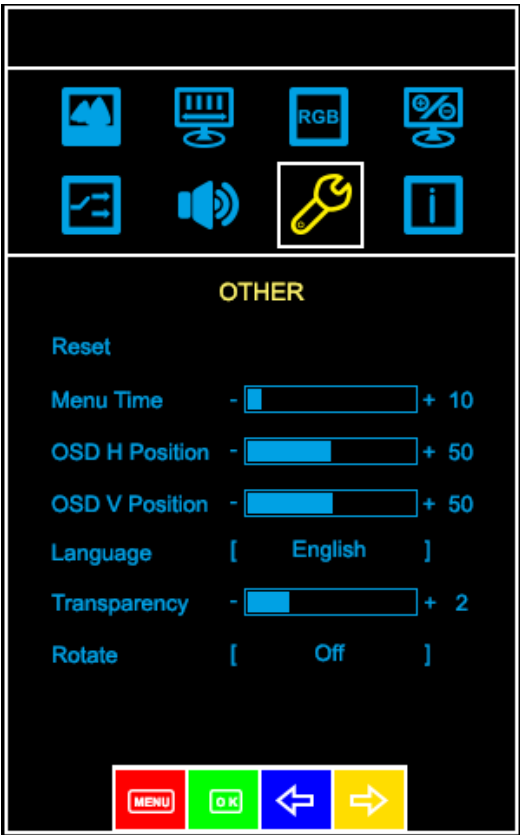
5-6. OSD FUNCTION



Audio Page

OSD Menu			
Volume	Volume level Control		
	Range of Value	MIN	0
		MAX	100
Mute	Mute Mode Select		
	Range of Value	ON	
		OFF	

5-7. OSD FUNCTION



Other Page

OSD Menu			
Reset	Perform a Reset		
Menu Time	Menu Time level Select		
	Range of Value	MIN	0
		MAX	100
OSD H Position	OSD H Position position Select		
	Range of Value	MIN	0
		MAX	100
OSD V Position	OSD V Position position Select		
	Range of Value	MIN	0
		MAX	100
Language	OSD Language Select		
	English		Korean
Transparency	Transparency level Select		
	Range of Value	MIN	0
		MAX	7
Rotate	Rotate Mode Select		
	Mode	ON	
		OFF	

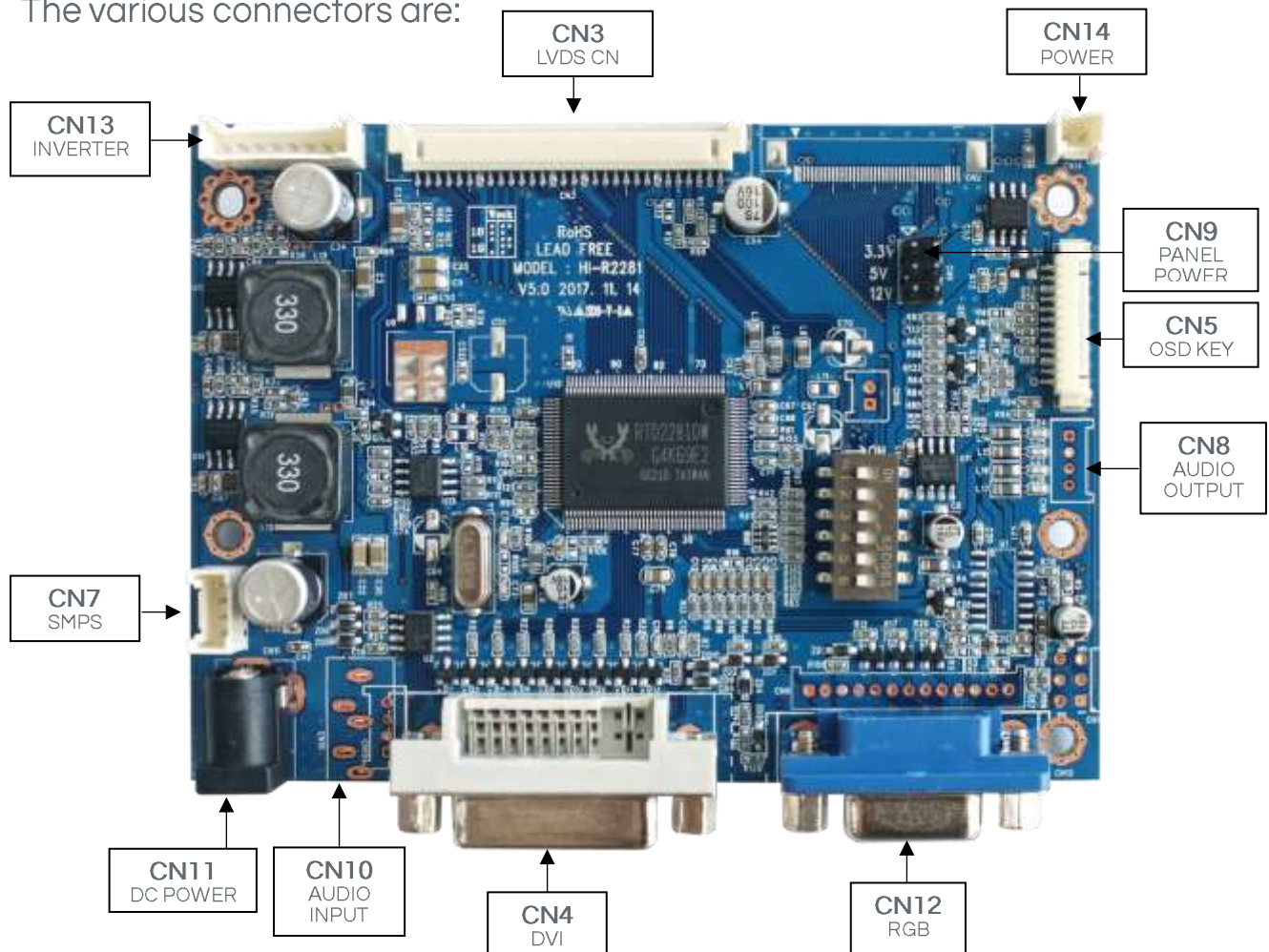
5-8. OSD FUNCTION

Operation Message

	Execute 'Auto Adjust' Function.
	Input Signal is not present. This message is disappeared after 5 seconds.

6. CONNECTOR, PINOUT & JUMPERS

The various connectors are:



Summary:

Reference	Item	Description	Type	Manufacture
CN3	Connector	LVDS CONNECTOR	12507WR-30P	
CN4	Jack	DVI CONNECTOR		
CN5	Connector	OSD KEY CONNECTOR	12505WR-12P	
CN7	Connector	SMPS CONNECTOR	SMW200-04P-2.0mm	YEONHO
CN8	Connector	AUDIO OUTPUT CONNECTOR		
CN10	Jack	AUDIO INPUT CONNECTOR		-
CN11	Jack	DC POWER JACK	2.5ø DC Jack	
CN12	Jack	D-SUB CONNECTOR DSUB-15P	DSUB-15P	
CN13	Connector	INVERTER CONNECTOR	SMW200-08P-2.0mm	YEONHO
CN14	Connector	POWER CONNECTOR	SMW200-02P-2.0mm	YEONHO

CN3: LVDS Dual Interface Connector

Pin No.	Symbol	Description
1~3	MOD_PWR	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)

CN8: Audio Output Connector

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

CN4: DVI-D Input Connector

Pin No.	Symbol	Description
1	TMDS DATA2-	TMDS DATA2 Differential Negative Signal
2	TMDS DATA2+	TMDS DATA2 Differential Positive Signal
3	TMDS DATA2 Shield	Shield for TMDS Channel #2
4	NC	No Connection
5	NC	No Connection
6	DDC Clock	The Data Line for the DDC Interface
7	DDC Data	The Clock Line for the DDC Interface
8	NC	No Connection
9	TMDS DATA1-	TMDS DATA1 Differential Negative Signal
10	TMDS DATA1+	TMDS DATA1 Differential Positive Signal
11	TMDS DATA1 Shield	Shield for TMDS Channel #1
12	NC	No Connection
13	NC	No Connection
14	+5V Power	+5 Volt signal for EDID (Un-powered Monitor)
15	GND(for +5V)	Ground for +5 Volt Power pin, Sync return
16	HPD	Identify the presence of a monitor
17	TMDS DATA0-	TMDS DATA0 Differential Negative Signal
18	TMDS DATA0+	TMDS DATA0 Differential Positive Signal
19	TMDS DATA0 Shield	Shield for TMDS Channel #0
20	NC	No Connection
21	NC	No Connection
22	TMDS CLOCK Shield	Shield for TMDS Clock differential Pair
23	TMDS CLOCK+	TMDS DATA0 Differential Positive Signal
24	MDS CLOCK-	TMDS DATA0 Differential Negative Signal

CN5: OSD KEY 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

CN7: SMPS Power input connector

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

CN11: DC power Input Jack(12V)

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

CN12: 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	VSNC	Vertical Sync
15	DSCL	Serial Clock Input

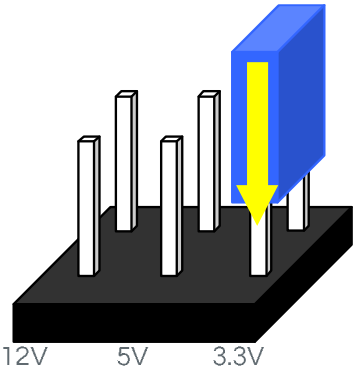
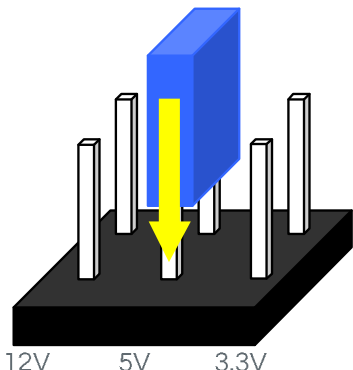
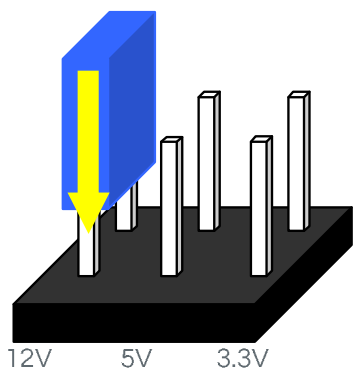
CN13: Backlight Inverter connector

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

CN14: Power input connector

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

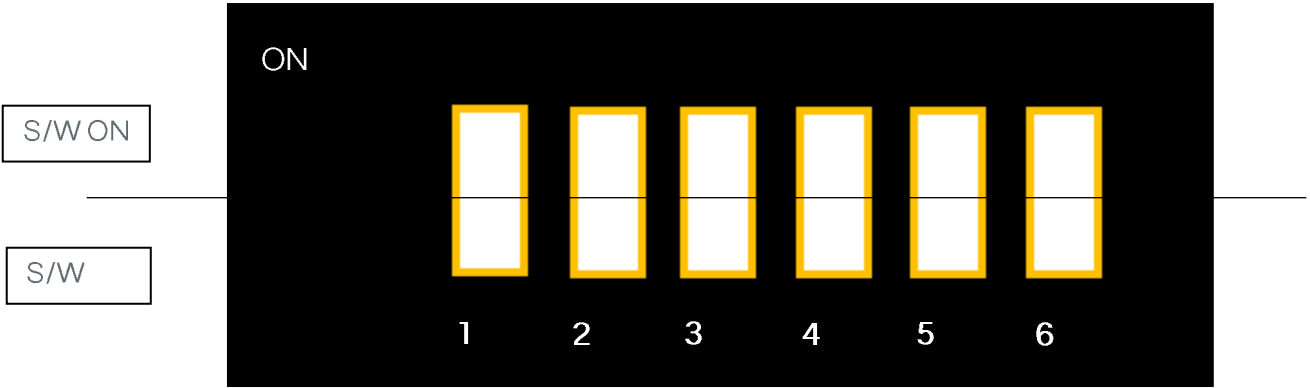
Summary: Panel Power setting

Reference	Description	Connector Type
CN9	3.3V panel power CAUTION: Incorrect setting can damage panel	 Diagram showing the 3.3V pin of the CN9 connector highlighted with a blue box and a yellow arrow pointing down to it. The pins are labeled 12V, 5V, and 3.3V.
	5.0V panel power CAUTION: Incorrect setting can damage panel	 Diagram showing the 5.0V pin of the CN9 connector highlighted with a blue box and a yellow arrow pointing down to it. The pins are labeled 12V, 5V, and 3.3V.
	12V/18V panel power CAUTION: Incorrect setting can damage panel	 Diagram showing the 12V pin of the CN9 connector highlighted with a blue box and a yellow arrow pointing down to it. The pins are labeled 12V, 5V, and 3.3V.

CAUTION: Incorrect setting can damage panel

7. PANEL MODEL SETTINGS

DIP S/W



0 : OFF / 1 : ON

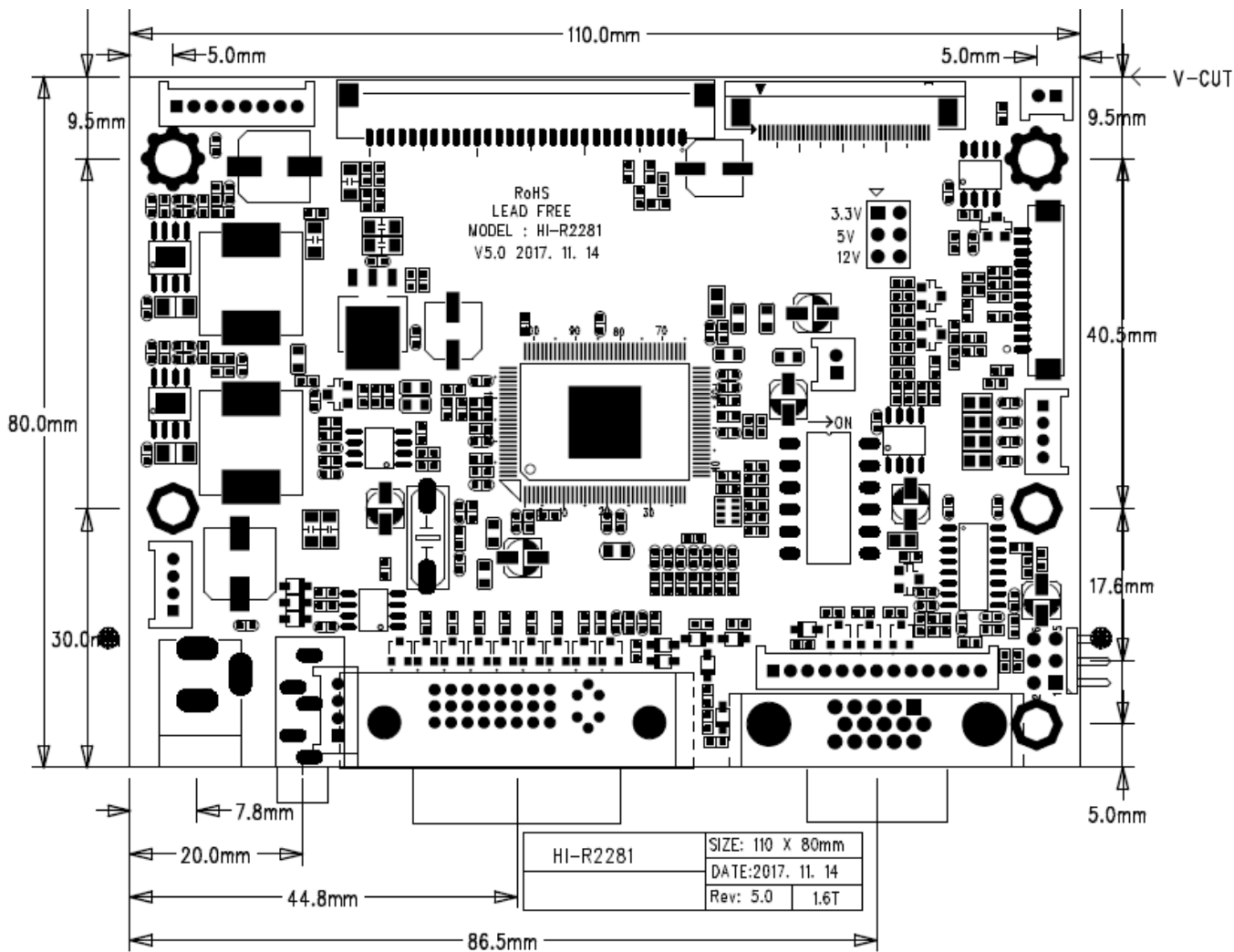
1) Panel Resolutions Setting

S/W 1, 2, 3			Panel Resolutions	ETC.
0	0	0	800X600	
1	0	0	1024X768	
0	1	0	1280X1024	
1	1	0	1366X768	
0	0	1	1440X900	
1	0	1	1680X1050	
0	1	1	1920X1080	
1	1	1	1920X1200	

2) Panel Option Setting

S/W 4	Panel Bit Setting	0 : 8bit / 1 : 6Bit
S/W 5	LED & Inverter Setting	0 : 0V(Max) / 1 : 5V(Max)
S/W 6	LVDS Map Setting	0 : Jeida / 1 : TI

8. CONTROLLER DIMENSIONS



[DIMENSION DOWNLOAD](#)

9. APPLICATION NOTES

A. USING THE CONTROLLER WITHOUT BUTTONS 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.

10. 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.

11. 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