# AD BOARD
HI-AVM

Approval

Rev. 01

Issue Date.

2010. 03. 09

Doc No.

AVM 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	Checked II	Approved
			YH. HAN

HI-AVM

Revision History

Rev.	ECN No.	Description of Changes	Date	Prepared
V1.0		Initial Release	2010. 03. 09	YH. HAN

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1. GENERAL DESCRIPTION

This controller board is designed for a LCD monitor and other flat panel display application.

This controller board provides an auto-input synchronization and easy to sue interface controller for:

▷ TFT (active matrix) LCD panels of 800x480, 1024x768, 1280x768, 1366x768, 1280x1024 and 1920X1200 resolutions.

▷ Computer video signals of VGA, SVGA, XGA, WXGA, SXGA and WUXGA standard Input Signal Support All VESA standard

2. INTRODUCTION

A. HOW TO PROCEED

▷ Ensure that you have all parts & they are correct, refer to:

  ▶ Connection diagram

▷ Check controller switch & jumper settings (errors may damage the panel)

▷ Prepare the PC

▷ Connect the parts

▷ Understand the operation & functions

※ Since LSI is used in this controller board, take care of static electricity and insure human earth when handling.

B. IMPORTANT USAGE NOTE

This equipment is for use by developers and integrators. The manufacturer accepts no liability for damage or injury caused by the use of this product. It is the responsibility of the developer, integrators or other users of this product to:

▷ Ensure that all necessary and appropriate safety measures are taken.

▷ Obtain suitable regulatory approvals as may be required.

▷ Check power settings to all component parts before connection.

C. DISCLAIMER

There is no implied or expressed warranty regarding this material.

AD BOARD

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3. General Specification

No.	Item	Description	
1	Model Name	HI-AVM	
2	LCD Module	WVGA, SVGA, XGA, WXGA, SXGA,WUXGA	
3	Signal Input	Analog RGB(R, G, B Separate H, V Sync), CVBS, S-VIDEO	
4	Resolution Support	H: 31 ~ 80kH	
		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)	
		Video	MINIDIN-4P(SVHS, RCA(CVBS)	
8	Board Size	W x H x D(mm)	110 x 90 x 15	

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4. ELECTRICAL SPECIFICATION

4.1. 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
NTSC/PAL						
	Y/CVBS	Vp-p	0.7	1.0	1.4	
	C	Vp-p	0.6	0.8	1.0	

4.2. 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 +/-
TTL LCD Interface						
	RGB Data	Vp-p		3.3		
	DE, Sync, Clock	Vp-p		3.3		
	Clock Freq.	V(MHz)	25		80	
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(1)
			0		4.0	

(1) Default setting: S/W dimming control(0V), If you want to use Analog dimming control, Please contact our company.

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5. FUNCTIONAL BLOCK DIAGRAM

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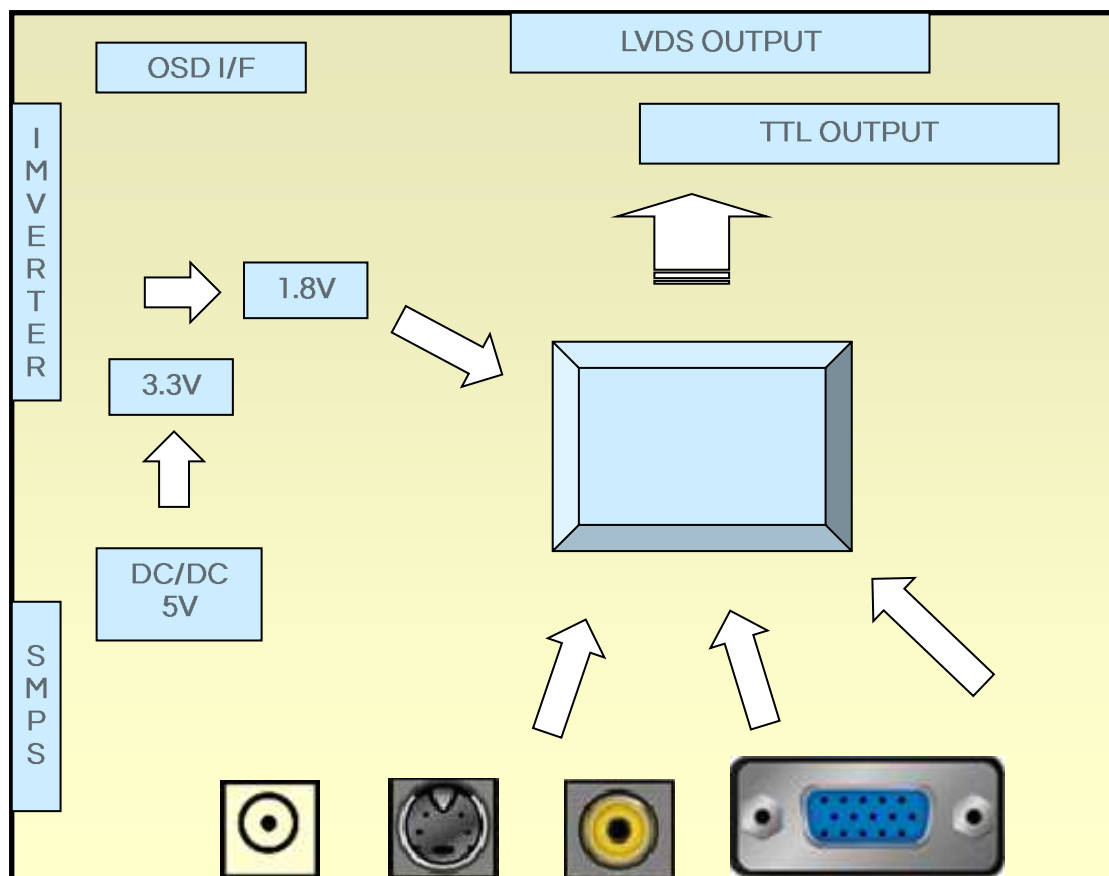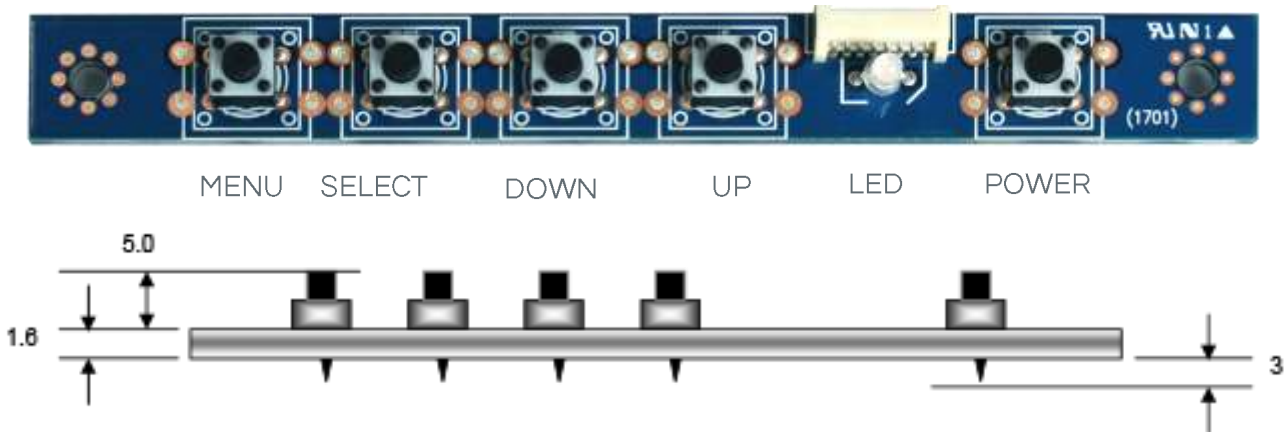
6. OSD Control Board

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

MENU   SELECT   DOWN   UP   LED   POWER

Board Size (W x H x D) : 112 x 12.5x 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	Activate menu / Exit Menu		
SELECT	Menu Select / Source(option)		
DOWN	Cursor control Down / Auto Adjust		
UP	Cursor control Up		

HI-AVM
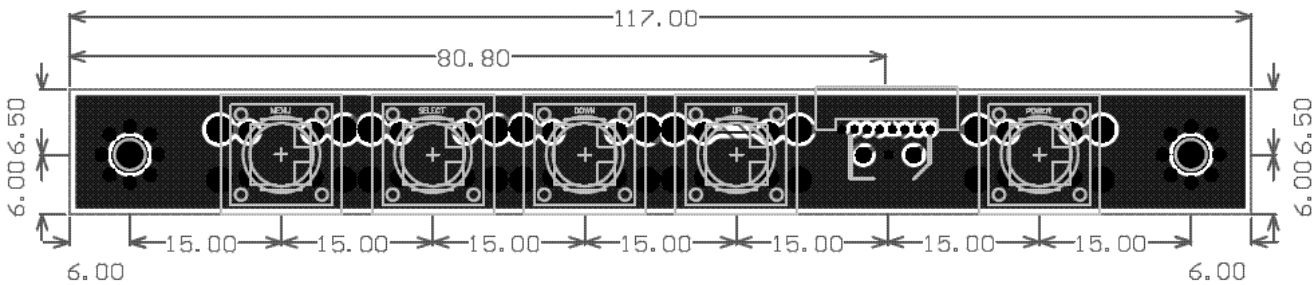
7. OSD FUNCTION

A. Main Menu

PC
Auto Adjust / H,V. Position / Clock Phase
▷ Auto Adjust
▷ H/V position : Image H, V position Control
▷ Clock : Fine tune the number of sampled data
▷ Phase : Fine tune the position of sampled data

Picture(VGA)
Brightness/Contrast/Color Temp
▷ Brightness: Brightness level Control
▷ Contrast : Contrast level Control
▷ Color Temp : Color temperature Select

Picture(Video)
Brightness/Contrast/Saturation/Hue/Sharpness/Display Ratio
▷ Brightness: Brightness level Control
▷ Contrast : Contrast level Control
▷ Saturation : Saturation level Control
▷ Hue : Hue level Control
▷ harpness : Sharpness level Control
▷ Display Ratio : Display Ratio Select

Setup
Language, OSD Timer, Sleep, OSD Blending, Clock
▷ Language
▷ OSD Timer
▷ Sleep
▷ OSD Blending
▷ Clock

Advanced
Closed Caption, Reset, Version
▷ Closed Caption
▷ Reset : Restore to default Value
▷ Version

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B. Operation Message

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

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8. CONNECTOR, PINOUT & JUMPERS

The various connectors are:

| J35
OSD CONN | J38
5V POWER | J30
Panel power | CN5
LVDS CONN |

J32, J33
INVERTER CONN

J5
TTL CONN

J34
TTL CONN

J13
SMPS CONN

J15
COMP CONN

J3
RGB CONN

| J1
DC POWER | J4
S-VIDEO CONN | J2
VIDEO JACK | CN1
RGB CONN |
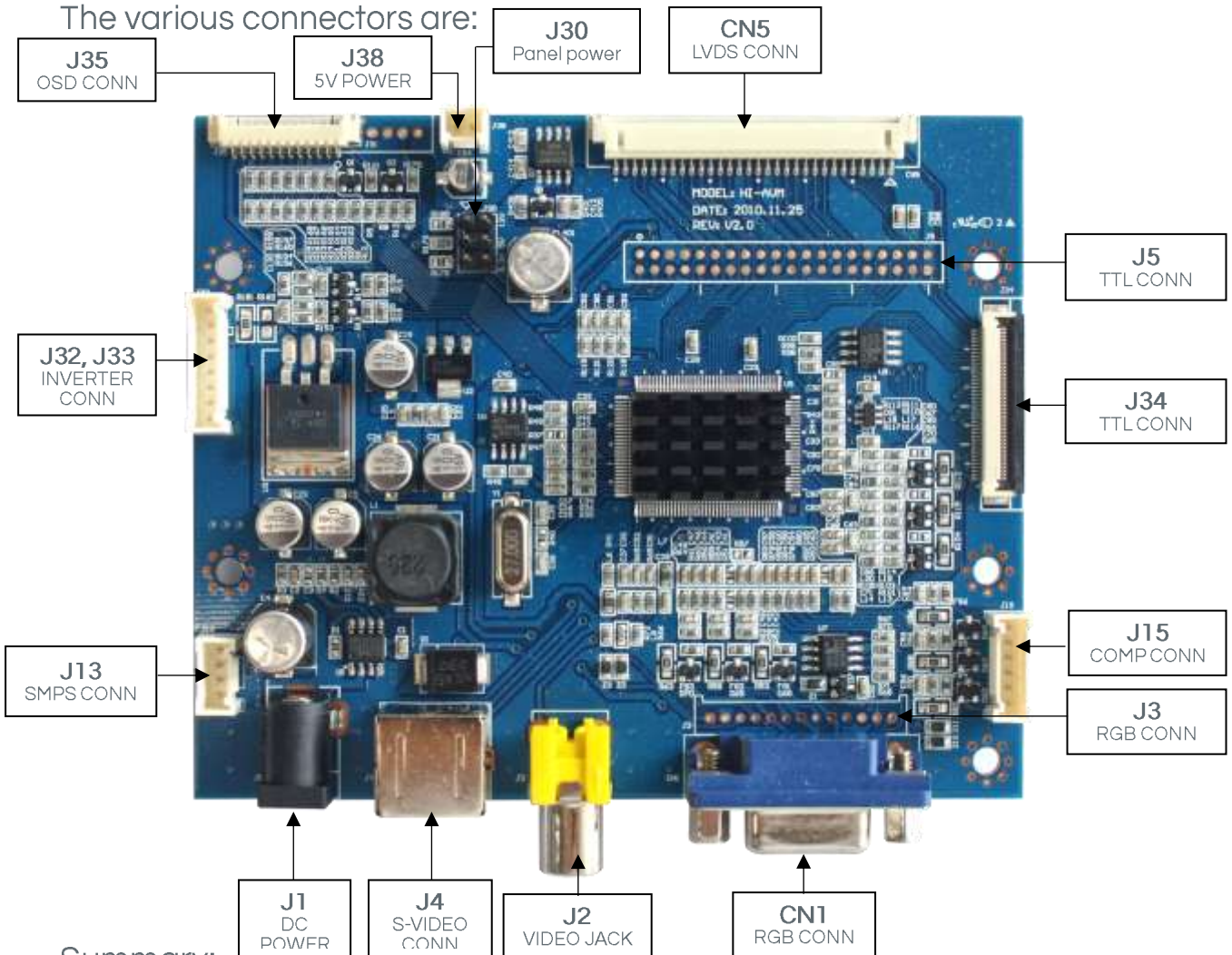
Summary:

Reference	Item	Description	Type	Manufacture
CN1	Connector	Analog RGB Input Jack	15P D-SUB	-
J2	Jack	Composite Video Input Jack	RCA(Yellow)	-
J4	Connector	S-Video Video Input Connector	MINIDIN-4P	-
J1	Jack	DC power Input Jack	2.5Ø	-
J13	Connector	SMPS Power Input Connector	SMW200-04A	YEONHO
J32, J33	Connector	Backlight Inverter Connector	SMW200-08A, 06A	YEONHO
J35	Connector	OSD Board Connector	12505WR-12A	YEONHO
J38	Connector	5V Power Connector	Smh200-02	
J30	Jumper	Panel power select jumper	2*3P_2.5mm	-
CN5	Connector	LVDS Dual Interface Connector	12507WR-30	YEONHO
J5	Connector	TTL Interface Connector	2*20P_2.0mm	-
J34	Connector	TTL Interface Connector	FPC 40(A070VW05)	-
J15	Connector	Composite Connector	Smh200-06	
J3	Connector	Analog RGB Input Connector	SMW200-13A	YEONHO

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CN1: 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	VSYNC	Vertical Sync
15	DSCL	Serial Clock Input

J1: DC power Input Jack (12V)

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

J13: SMPS Power input connector

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

J32: 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

J33: Backlight Inverter connector

Pin No.	Symbol	Description
1,2	VCC	12V
3,4	GND	Ground
5	ON/OFF	Inverter digital ON(3.3V)/OFF(0V) signal
6	ADJ	DIM-adjustment analog dimming control signal * make sure inverter specification

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J35: OSD Board 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

CN5: LVDS Dual Interface Connector

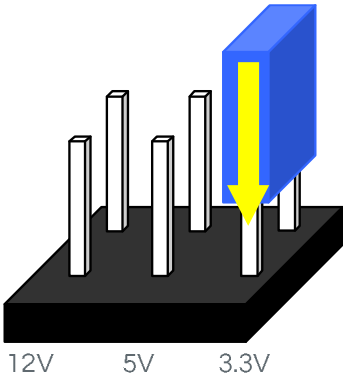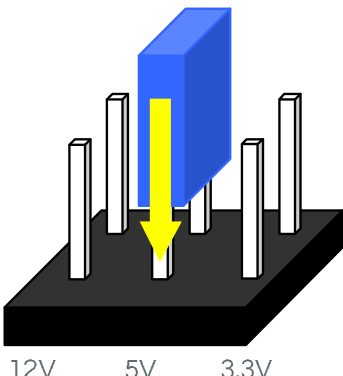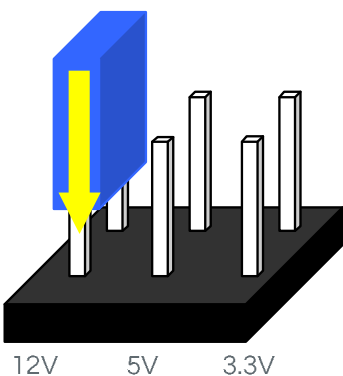| Pin No.	Symbol	Description
1	MOD_PWR	Panel Power (12V/18V, 5V or 3.3V)
2	MOD_PWR	Panel Power (12V/18V, 5V or 3.3V)
3	MOD_PWR	Panel Power (12V/18V, 5V or 3.3V)
4	MOD_PWR	Panel Power (12V/18V, 5V or 3.3V)
5	GND	Ground
6	LVDS OPTION	3.3V
7	GND	Ground
8	Y3P-EVEN	Positive(+) LVDS differential first 3 data(B 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	YOP-EVEN	Positive(+) LVDS differential first 0 data(B port)
18	Y0M-EVEN	Negative(-) LVDS differential first 0 data(B port)
19	GND	Ground
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	Y2P-ODD	Positive(+) LVDS differential second 2 data(A port)
25	Y2M-ODD	Negative(-) LVDS differential second 2 data(A port)
26	GND	Ground
27	Y1P-ODD	Positive(+) LVDS differential second 1 data(A port)
28	Y1M-ODD	Negative(-) LVDS differential second 1 data(A port)
29	YOP-ODD	Positive(+) LVDS differential second 0 data(A port)
30	Y0M-ODD	Negative(-) LVDS differential second 0 data(A port)

* You can use an even port for 1Ch LVDS

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J5: TTL Interface Connector

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	VCC	Panel Power	21	GND	Ground
2	DCLK	Display Clock	22	AGRN2	Green output data
3	ADJ	LED	23	AGRN3	Green output data
4	DE	Data Enable Signal	24	AGRN4	Green output data
5	GND	Ground	25	AGRN5	Green output data
6	HS	H sync Signal	26	AGRN6	Green output data
7	GND	Ground	27	AGRN7	Green output data
8	VS	V sync Signal	28	GND	Ground
9	ARED0	Red output data	29	ABLU0	Blue output data
10	ARED1	Red output data	30	ABLU1	Blue output data
11	GND	Ground	31	GND	Ground
12	ARED2	Red output data	32	ABLU2	Blue output data
13	ARED3	Red output data	33	ABLU3	Blue output data
14	ARED4	Red output data	34	ABLU4	Blue output data
15	ARED5	Red output data	35	ABLU5	Blue output data
16	ARED6	Red output data	36	ABLU6	Blue output data
17	ARED7	Red output data	37	ABLU7	Blue output data
18	GND	Ground	38	GND	Ground
19	AGRN0	Green output data	39	VCC	Panel Power
20	AGRN1	Green output data	40	VCC	Panel Power

J3: ANALOG RGB INPUT (13P Connector)

Pin No.	Symbol	Description
1	HSYNC	Horizontal Sync
2	GND	Ground
3	VSYNC	Vertical Sync
4	GND	Ground
5	Red1	Red analog input
6	GND	Ground
7	Green1	Green analog input
8	GND	Ground
9	Blue1	Blue analog input
10	NC	-
11	DET	-
12	DSCL	Serial Clock Input
13	DSDA	DDC-SDA

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Summary: Panel Power Jumpers setting

Reference	Description	Connector Type
J30	3.3V panel power CAUTION: Incorrect setting can damage panel	12V 5V 3.3V
	5.0V panel power CAUTION: Incorrect setting can damage panel	12V 5V 3.3V
	12V/18V panel power CAUTION: Incorrect setting can damage panel	12V 5V 3.3V

CAUTION: Incorrect setting can damage panel

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9. CONTROLLER DIMENSIONS

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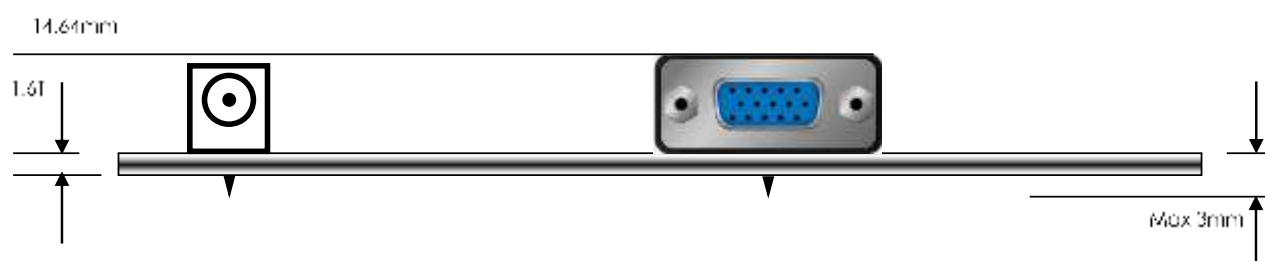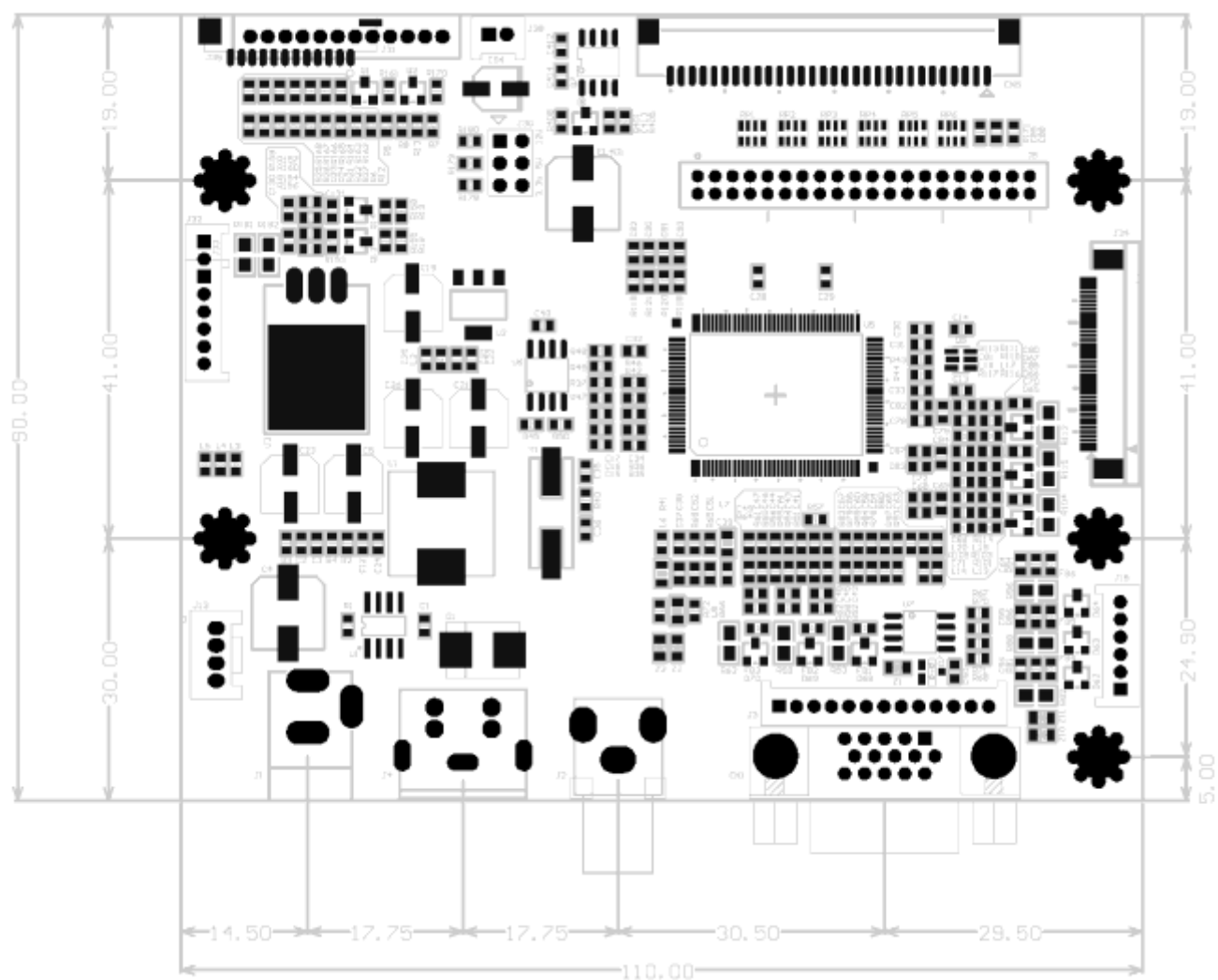
10. APPLICATION NOTES

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.

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11. 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.

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12. 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 mare 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	Lind
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
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

13. ACCESSORY

This controller board requires several accessories to build a complete display unit. We can provide standard accessory for this board as below.

No.	Items	Part No.	Ex) LG. Philips LP121S1
1			
2			
3			
4			
5			

14. APPENDIX

A. Tested panel

This controller board can support various LCD panels, which have WVGA, SVGA, XGA, WXGA and SXGA resolution.

The table below shows the model names of LCD panel, Jumper setting for LCD power, LCD panel selection and the dedicated inverter for each LCD panel. All of the LCD Panels listed can work without changing the control program of this board. And we will try continuously to the model names of the LCD panels that have been tested.

No.	LCD Model Name	LCD vendor	LCD VCC	Remarks