SPECIFICATION FOR APPROVAL

(ANALOG RGB AND VIDEO INTERFACE CONTROLLER FOR VGA/SVGA/XGA RESOLUTION TFT-LCDs)

MODEL NO : AP4300 SERIES

BUYER'S PART NO : _____

APPROVED	REFERENCE

(PLEASE RETURN ONE OF THESE TO US IMMEDIATELY WITH YOUR SIGNATURE FOR

CONTENTS OF SPECIFICATION

1 Revision History

Ver. No	Date	Page	Description

2 Product Overview

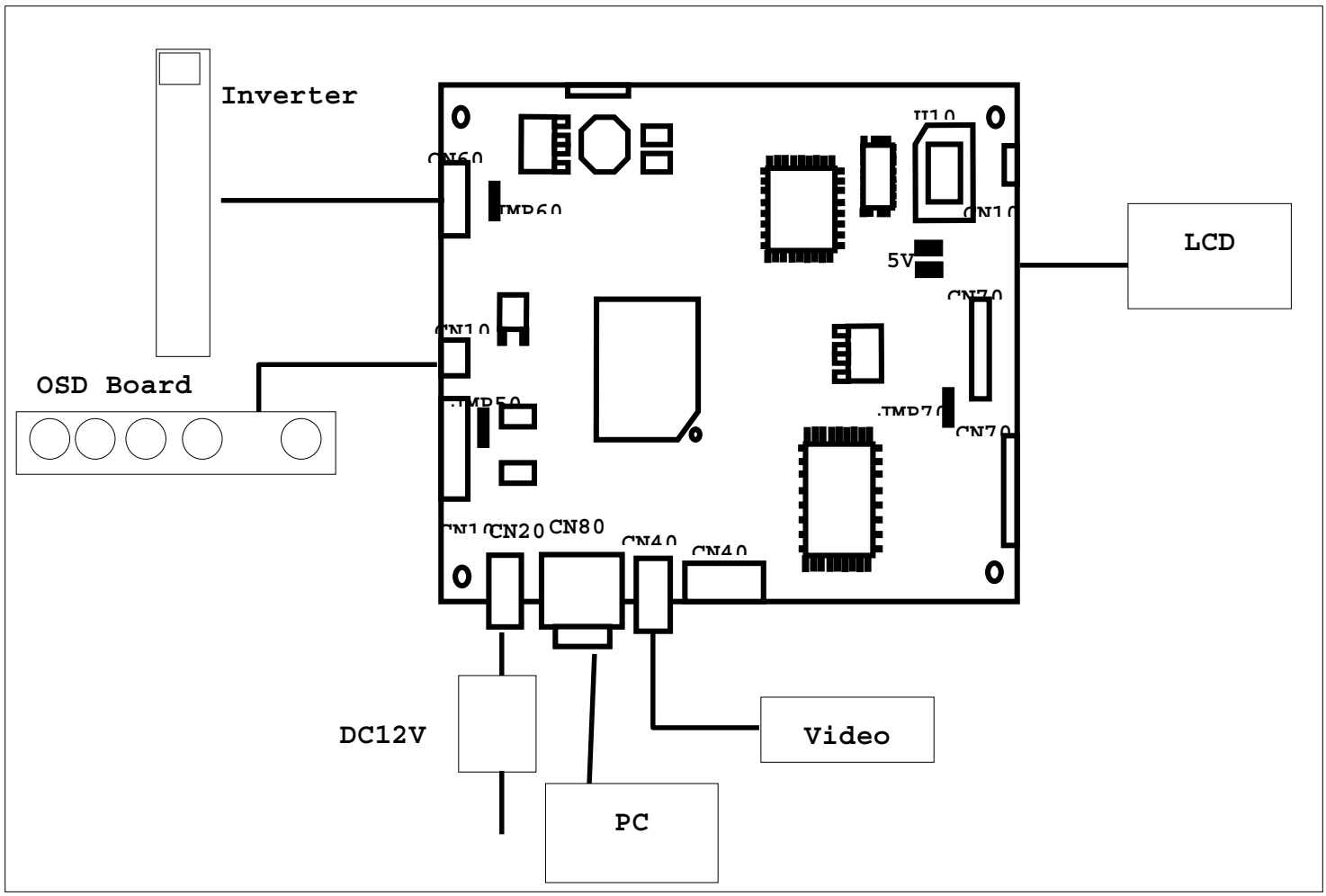
This board accepts standard analog RGB and SYNC(CRT like) signals from any XGA/SVGA/VGA video controller and/or Composite PAL and NTSC signals. And also generates all the necessary control signals and the panel data to drive TFT-LCDs. This board supports from XGA to VGA resolutions at vertical refresh rate to 75Hz. Lower resolution mode can be expanded to full-screen or centered through the On-Screen Menu user interface. The user interface includes Phase, Brightness, Contrast, Horizontal and Vertical Position adjustment etc. via on-screen programming.

3 Features

- Support for all kinds of LG's VGA(640x480), SVGA(800x600) and XGA(1024x768) panels.
- Automatic Mode detection from VGA through XGA.
- Provides up to 16M Colors.
- Flicker-free, sharp image/text data.
- Refresh rates up to 75Hz without external video memory.
- Full screen image expansion or centered-mode display for lower resolutions.
- User friendly On Screen Display Menu to control image
    - Auto-Adjust
    - Brightness
    - Contrast
    - Geometry
    - Input Type
    - Sharpness
    - OSD Control
    - Default-Settings
- Power management support(DPMS - VESA compliant)
- VESA-DDC1/2B display ID for Plug and Play Operation(Option)

4 System Configuration

- *Figure 1. :System Block Diagram*



5 Electrical Specifications

- Video input timing;
  - Supported vertical refresh rates for each modes are as follow:
    - 640x350 70Hz
    - 640x400 70Hz
    - 720x400 70Hz
    - 640x480 60~75Hz
    - 800x600 56~75Hz
    - 1024x768 60~75Hz
  - Sync. : H/V Separate(TTL) and/or Csync(Option)
  - Video : - RGB Analog(750 Ohm, 0.7Vp-p)
    - Composite NTSC or PAL(Option)

- Electrical Characteristics;

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Supply Voltage		------	11.4	12.0	12.6	Vdc
Absolute Max.Rating		------		12.0	13.0	Vdc
Current Consumption		Board Only	0.2	0.2	0.25	A
		With LP064V1*		0.7	0.8	A
		With LP104V2		0.7	0.7	A
		With LP121S2		0.55	0.70	A
		With LM151X2		1.8	2.4	A

- Output ;

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Panel Logic Voltage	Vdd	-----	4.75	5.0	5.25	Vdc
Output Signal Voltage(3.3V Logic)	Vout	High Level	0.8Vdd	5.0	Vdd	Vdc
		Low Level	-----	0.1	0.2Vdd	Vdc
Panel Logic Voltage	Vdd	-----	3.14	3.3	3.47	Vdc
Output Signal Voltage(3.3V Logic)	Vout	High Level	0.7Vdd	3.3	Vdd	Vdc
		Low Level	-----	0.1	0.2Vdd	Vddc
Data Shiftclk Freq.	CP		25.175		65	MHz
Hsync(Latch Clk)	LP/Hsync		31.469			
Frame Frequency	FLM/Vsync		56		75	Hz

6 LCD Panels Supported

This Controller Board supports most TFT panels on the market.

Especially the following models, made by LG.PHILIPS-LCD, are supported without changing any Hardware.

- VGA Grade : **LP064V1, LP104V2**
- SVGA Grade : **LB121S1-A2**
- XGA Grade : **LM151X2, LM151X3(Dual Port)**

Board setting guide for each models:

LCD Model	U102 (EPROM Ver.)	JMP600	5V/3.3V Select	JMP700	Remark
LP064V1	**VGA**	**Yes**	**5V**	**Connect**	
LP104V2	**VGA**	**Yes**	**3.3V**	**NC**	
LB121S1-A2	**SVGA**	**No**	**3.3V**	**NC**	
LM151X2	**XGA**	**No**	**3.3V**	**NC**	
LM151X3	**XGA**	**No**	**5V**	**NC**	

* JMP500 ON : Board runs immediately when power supply is connected.

JMP500 NC : Board runs after push the power s/w on OSD Pad.

7 Assembly Notes for the Controller Board

This section and the Application notes section provides some guidelines assembly and preparation of a finished display solution using this controller.

- ☐ Preparation : Before proceeding it is important to familiarize yourself with the parts making up a system and the various connectors, mounting holes and general layout of the controller. As much as possible connectors have been labeled on the controller. Connector pin-outs mechanical information is shown in the following relevant sections.

- ☐ LCD Panel : This controller is designed for typical TFT panels with 3.3V or 5V TTL interface. Due to the variation between manufactures of signal timing and other panel characteristics factory setup and confirmation should be obtained before connecting to a panel.

- ☐ LCD signal cables : In order to provide a good signal, it is recommended that LCD signal cable is no longer than 30cm(12inches).

- ☐ Inverter : This will be required for the backlight of an LCD. As panels may have one or more backlight tubes and the requirements for different panel backlights may vary it is important to match the inverter in order to obtain optimum performance.

- ☐ Inverter cable : This supply Inverter power, on/off signal and bright signal to inverter. See Application notes for more information on connection.

- ☐ OSD Controller : See Operational setup section

- ☐ 3 Color LED : This shows state of controller. Green color is power on, amber color is video signal to be nothing.

- ☐ Power : +12V DC and GND are required, this should be a regulated supply. Although the controller provides power regulation for the LCD power this does not relate to the power supplied to the backlight inverter.

- ☐ VGA Input : As this may affect regulatory emission test results a suitably shielded cable should be utilized

- ☐ EMI : Shielding will be required for passing certain regulatory emissions tests. Also the choice of external Controller to PC signal cable and power supply can affect the result

- ☐ PC Signal output : Signal quality is very important. If there is noise or instability in the PC Signal output this may result in visible noise on the display

8 Operational Setup

Push button switches are provided for fine tuning of various functional parameters.
Visual feedback is provided in the form of an on-screen menu.
The functionality of these switches is also passed to a header for connection of remote e g faceplate- mounted user inter face buttons.

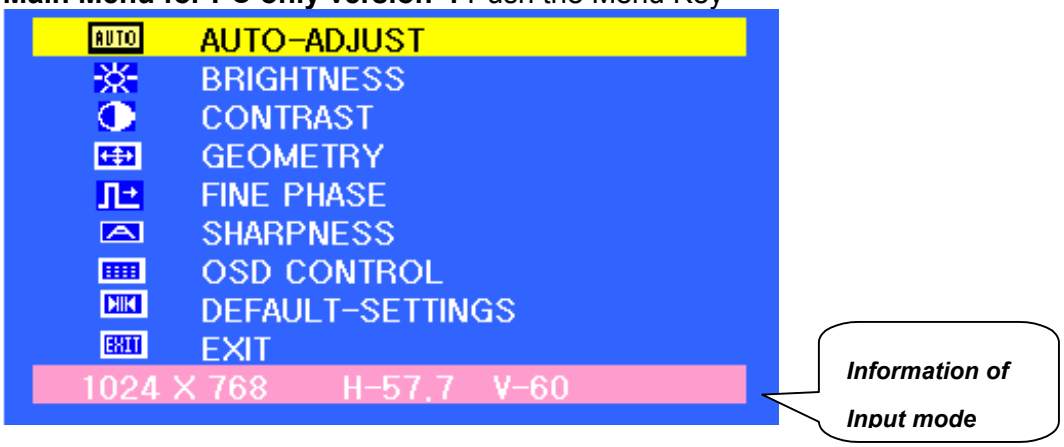
There are 5 tack switch to control the screen on OSD PCB board and the function is as follow:

Interface Switch	Switch Function
MENU	1. First click : Appears the OSD main menu 2. Second Click : Appears sub OSD menu 3. Third Click : Disappears the OSD Menu
SEL	Select: 1. Select a command function. 2. Return to menu.
Down	Down: 1. Move on-screen highlight to next command item. 2. Decrease current option value.
Up	Up: 1. Move on- screen highlight to previous command item. 2. Increase current option value.
POWER	Main power of Board ON/OFF

Interaction display : This section displays the available actions for the selected control function.

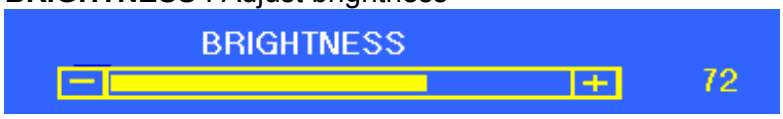
- Main Menu Displays "▲ move up ▼move down" indicating that the Up/Down
- Horizontal Position: Displays "▲ move Left ▼move Right"
- Vertical Position: Display "▲ move Up ▼move Down"
- Horizontal Size: Displays "▲large ▼smaller"
- Expansion type: Displays "▲Center ▼Expand "
- Brightness: Displays "79% ▲High ▼Low"
- Phase(Sharpness): Displays "▲ positive ▼negative"
- Factory Defaults: Not Applicable
- Language: Displays "▲/▼ to change language'
- OSM Position: Displays "▲/▼ to move Menu"

Main Menu for PC only version : Push the Menu Key

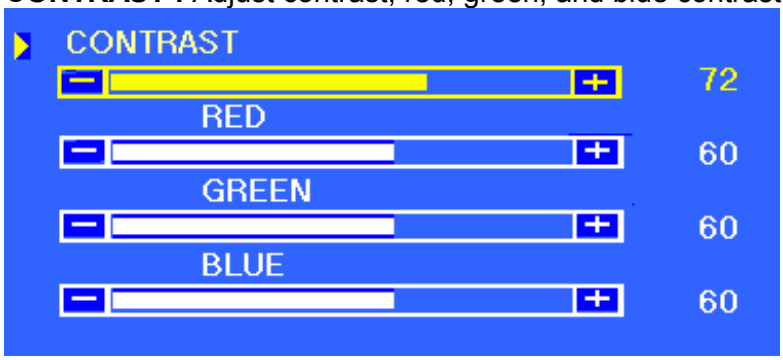


AUTO-ADJUST : Adjust position, horizontal size, and phase automatically

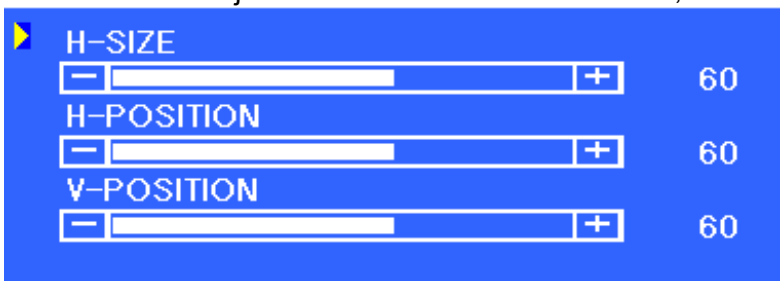
BRIGHTNESS : Adjust brightness



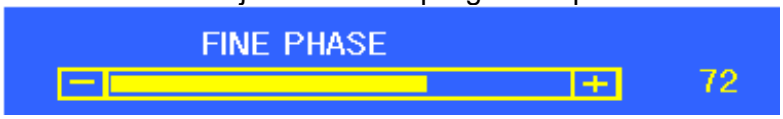
CONTRAST : Adjust contrast, red, green, and blue contrast individually



GEOMETRY : Adjust horizontal size and Horizontal, Vertical position

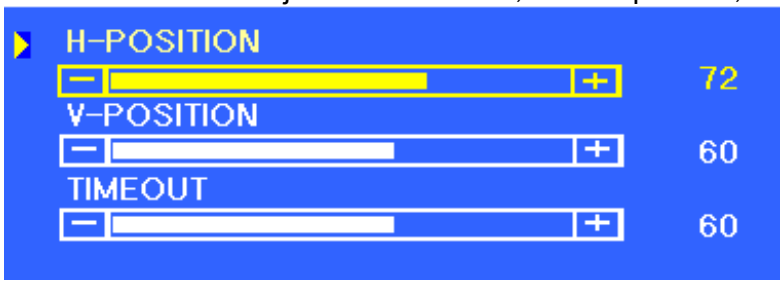


FINE PHASE : Adjust ADC sampling Clock phase



SHARPNESS : Adjust zooming sharpness (step : 4)

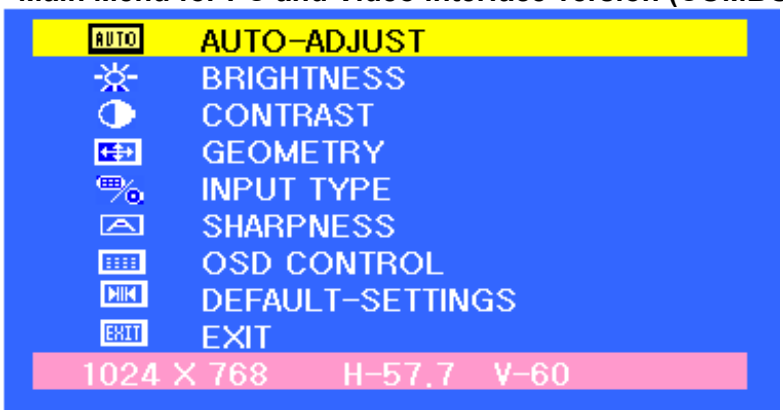
OSD CONTROL : Adjust the horizontal, vertical position, and timeout of OSD screen.



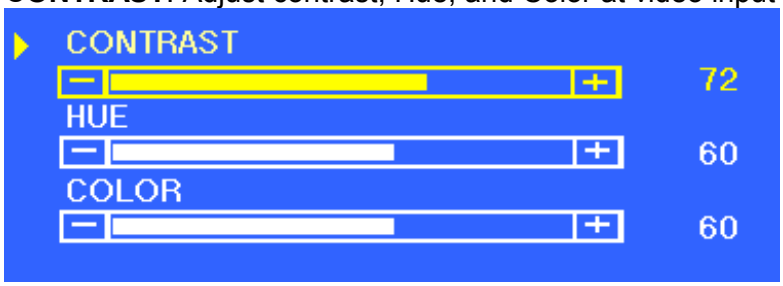
DEFAULT-SETTING: Reset to factory set parameters except screen position.

EXIT : Exit OSD menu after save the changed parameters.

<Main Menu for PC and Video interface version (COMBO)>



CONTRAST: Adjust contrast, Hue, and Color at video input mode



9 Input Connectors

- Power Input connector(CN200, 201)
  - Connector : 53015-0210 made by Molex (J603) or DC12 Jack(J604)

Pin No.	Symbol	Description
1	Vin	+12Vdc
2	GND	GND

- Analog RGB Input connector(CN801)
  - Connector : Mini D_Sub 15pin

Pin No No.No.	Symbol	Signal Name	Pin No.	Symbol	Signal Name
1	RED	Analog Red	9	+5V	+5Vdc
2	GREEN	Analog Green	10	SGND	Sync GND
3	BLUE	Analog Blue	11	ID0	Reserved
4	ID2	Reserved	12	SDA	DDC Serial Data
5	GND	Digital GND	13	HSYNC	Horizontal Sync
6	RGND	Red Return	14	VSYNC	Vertical Sync.
7	GGND	Green Return	15	SCL	DDC Data Clock
8	BGND	Blue Return			

- Alternate Analog RGB Input Connector(CN800)
  - Connector : 53015-1410 made by Molex

Pin No.	Symbol	Signal Name	Pin No.	Symbol	Signal Name
15	RED	Analog Red	7	+5V	+5Vdc
14	GREEN	Analog Green	6	SGND	Sync GND
13	BLUE	Analog Blue	5	ID0	Reserved
12	ID2	Reserved	4	SDA	DDC Serial Data
11	GND	Digital GND	3	HSYNC	Horizontal Sync
10	RGND	Red Return	2	VAYNC	Vertical Sync.
9	GGND	Green Return	1	SCL	DDC Data Clock
8	BGND	Blue Return			

- CVBS input connector for Composite Video (CN401)

Pin No.	Symbol	Description
1	CVBS	Composite video signal
2	GND	GND

- **CN400 : Reserved connector for Audio, S-Video, and TV Tuner Interface(Option)**

- OSD, LED Interface Connector(CN100)
  - Connector : 53015-1010 made by Molex

Pin No.	Symbol	Description
1	Menu On/Off	OSD Menu control
2	MENUSEL	OSD menu selection
3	GND	
4	MENU UP	Increase
5	Menu Down	Decrease
6	LED	Red
7	NC	No connection
8	LED	Green
9	GND	
10	Power	On/Off

10 Output Connectors for LCD Interface

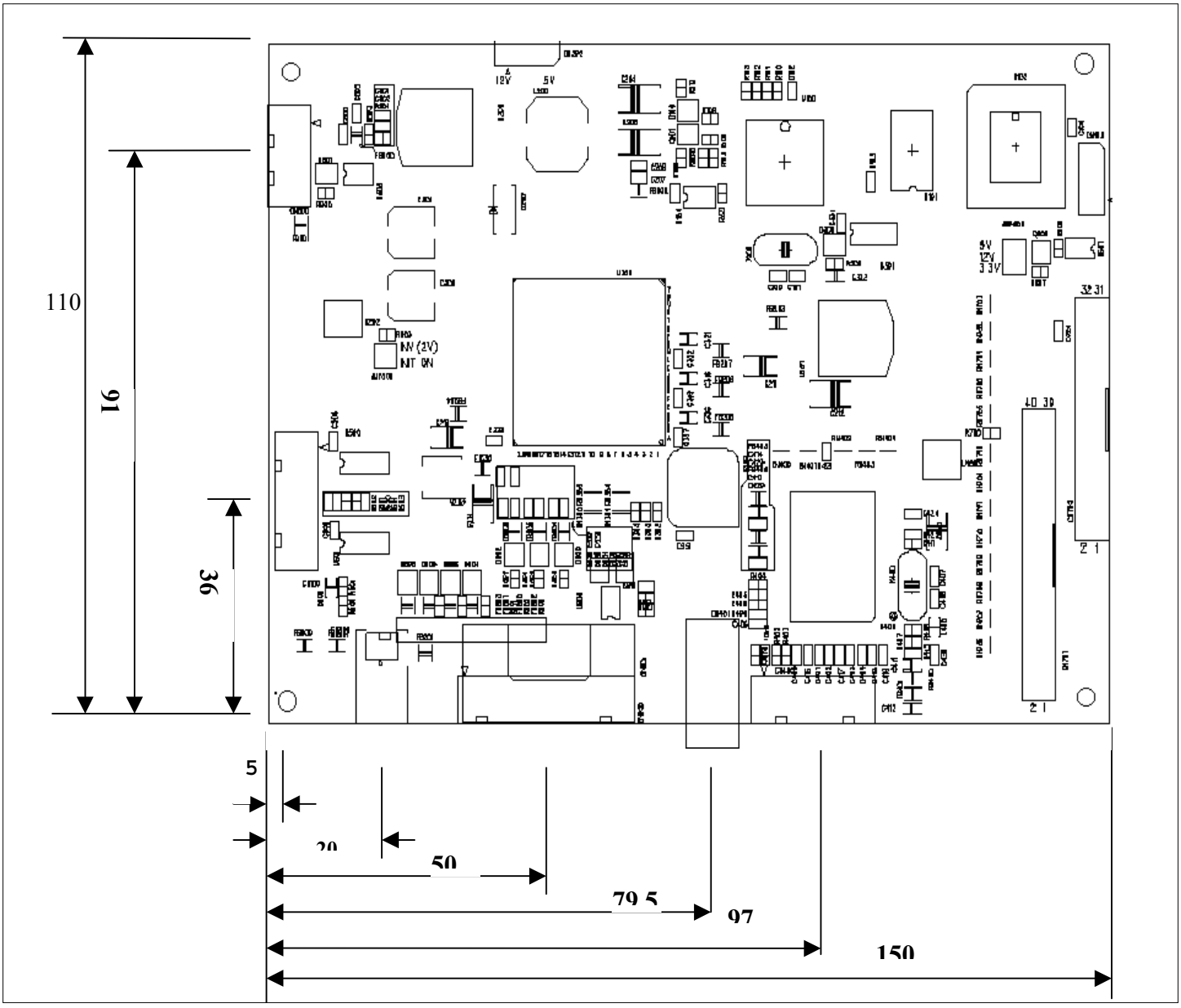
Pin No	CN700 (for Single Port)	CN701 (For Dual Port)	Pin No.	CN700	CN701 (For Dual Port)
1	GND	GND	22	B3	GND
2	CLOCK	R0	23	B4	G'2
3	GND	R1	24	B5	G'3
4	HSYNC	G0	25	B6	G'4
5	VSYNC	G1	26	B7	G'5
6	GND	B0	27	GND	G'6
7	R2	B1	28	DTMG	G'7
8	R3	GND	29	GND	GND
9	R4	R'0	30	VCC	B'2
10	R5	R'1	31	VCC	B'3
11	R6	G'0	32	VCC	B'4
12	R7	G'1	33		B'5
13	GND	B'0	34		B'6
14	G2	B'1	35		B'7
15	G3	GND	36		GND
16	G4	R'2	37		NC
17	G5	R'3	38		3.3V
18	G6	R'4	39		3.3V
19	G7	R'5	40		3.3V
20	GND	R'6			
21	B3	R'7			

- Backlight Power Connector(CN600)
  - Connector : 53015-0710 made by Molex

Pin No.	Symbol	Description
1	GND	Ground
2	GND	
3	GND	
4	Vbr	0.0 ~ 3.5Vdc
5	On/Off	0/5Vdc(High Active)
6	Vin	+12Vdc Input
7	Vin	+12Vdc Input

11 Mechanical Specification

- Dimension
  - 150mmx110mmx17mm
- *Figure 1*.



- A complete set consists of
  1. A/D Video controller board
  2. OSD Control board and Cable
  3. Backlight inverter and Cable for LCD
  4. Cable for the LCD panel Interface
  5. Cable for the VGA Card interface
  6. +12/GND Power supply(12V/3.0A).

12 Caution

- Never touch the inverter(dc-ac) while power is connected. Inverter should be properly mounted in the system. All transformers on the inverter should be covered with non-conductive heat-resistant material.
- Inverter is a source of very high voltages. Precaution must be taken to avoid electrical shocks.
- When preparing a cable for a specific flat panel, always refer to appropriate cable pin-out and flat panel specification. Always check the flat panel signals before connecting the cable. Any incorrect pin connection may damage the flat panel permanently.
- Should you need any technical help, please contact Alpha Point Technical Support.

13 Contact information

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