FOR LCD MONITOR (PC Only) Interface Controller
For 640X480, 800X600, 1024X768 Resolutions TFT LCD

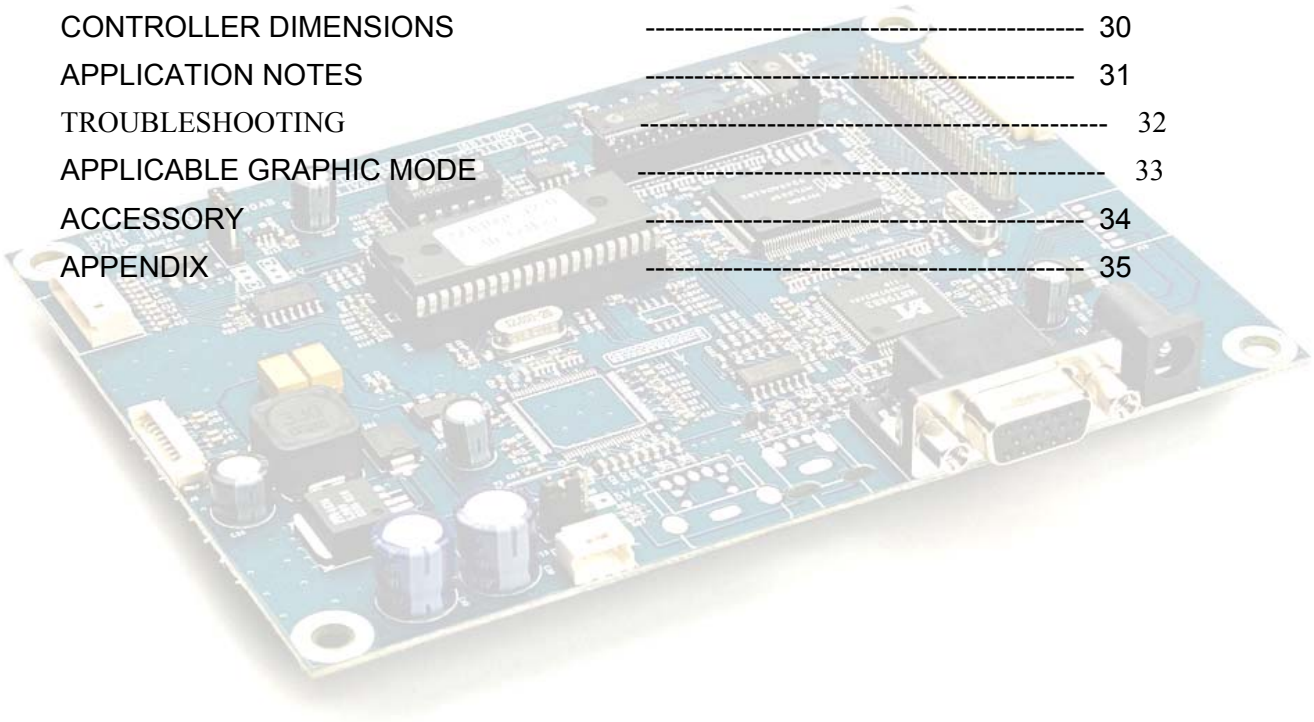
DATA SHEET

TFT LCD Monitor Control Board

NCB110X1-DS-AB
(ROHS Compliant)

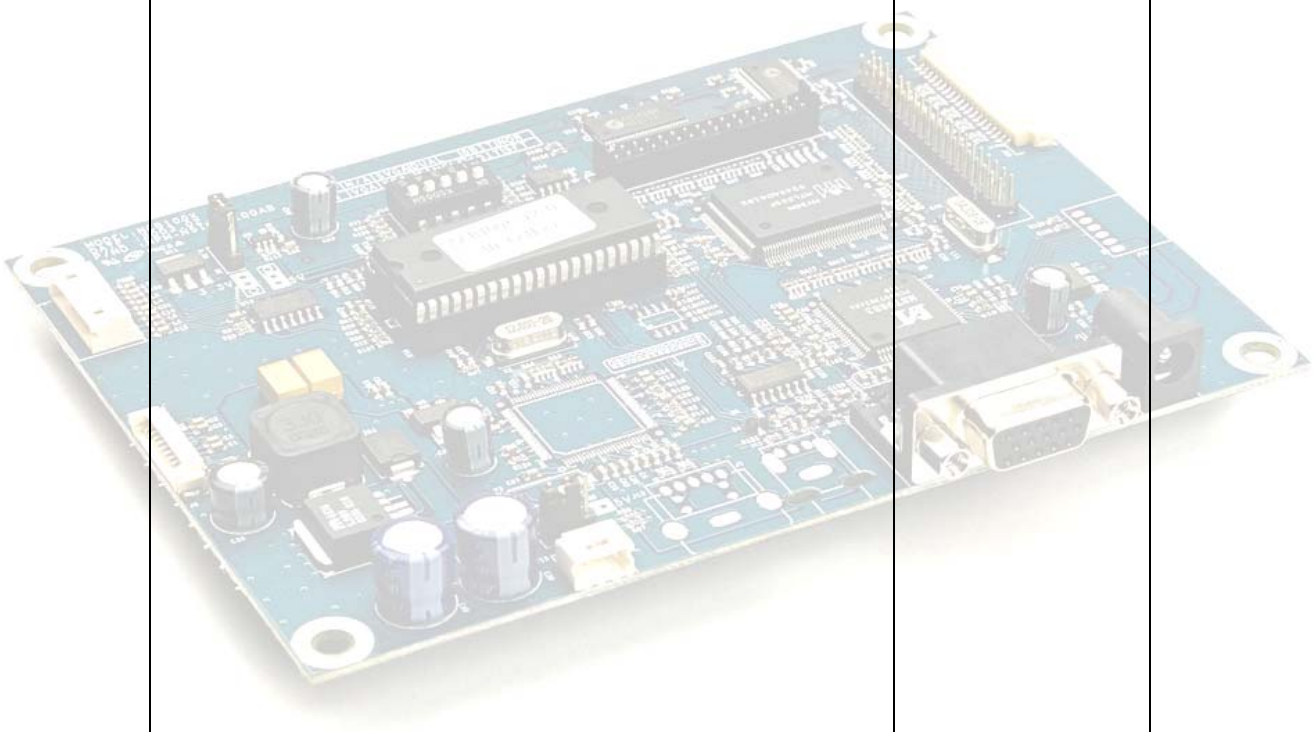
Jun 2006

CONTENTS



History (revision date)

No	Description	Revision	Page
1	Preliminary Release	AA	
2	Changed 5V Panel Power Circuit	AB	

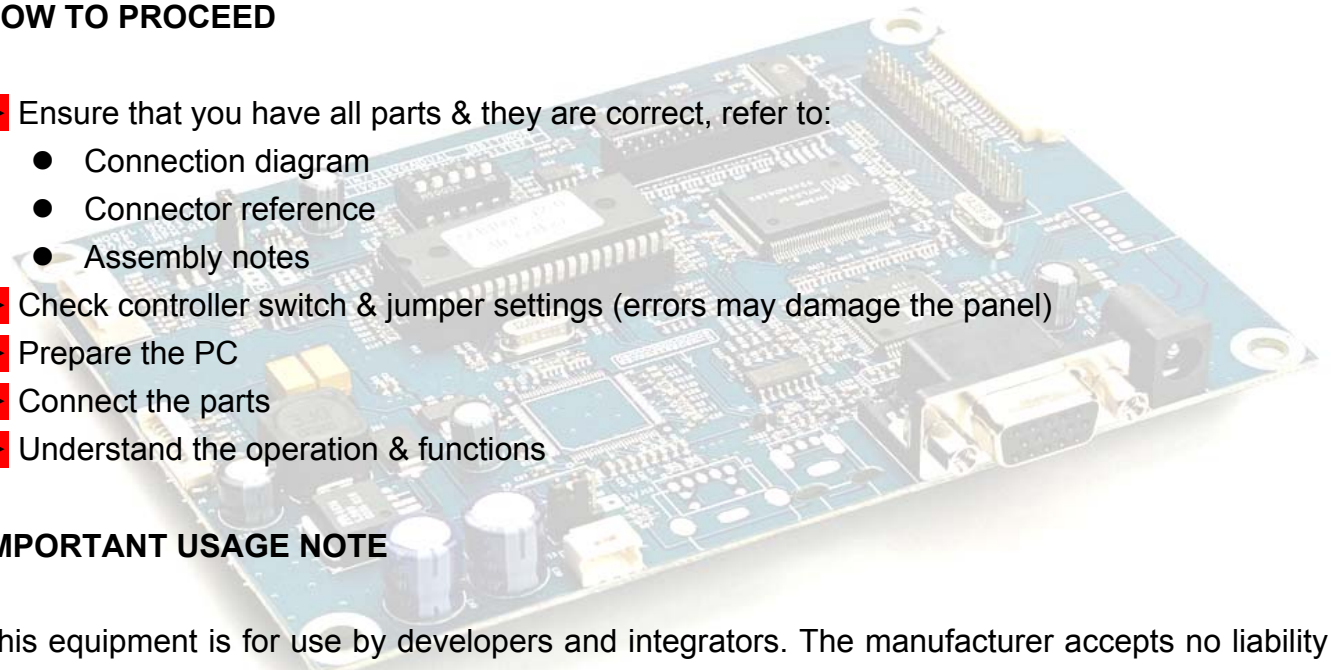


INTRODUCTION

Designed for LCD monitor and other flat panel display application the NCB110X1 controller provides an auto-input synchronization and easy to sue interface controller for:

- TFT (active matrix) LCD panels of 1024x768, 800x600 and 640x480 resolutions
- Computer video signals of VGA, SVGA, XGA standard.
- Input Signal Support
  - All VESA standard
  - In case of VGA option (VGA Input support)
  - In case of SVGA option (VGA/SVGA Input support)
  - In case of XGA option (VGA/SVGA/XGA Input support)

HOW TO PROCEED



- Ensure that you have all parts & they are correct, refer to:
  - Connection diagram
  - Connector reference
  - Assembly notes
- Check controller switch & jumper settings (errors may damage the panel)
- Prepare the PC
- Connect the parts
- Understand the operation & functions

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.

DISCLAIMER

There is no implied or expressed warranty regarding this material

GENERAL SPECIFICATION

No.	Item	Description		
1	Controller name	For VGA panel	NCB110V1	
		For SVGA panel	NCB110S1	
		For XGA Panel	NCB110X1	
2	LCD Module	VGA~XGA TFT LCD (TTL/LVDS Interface)		
3	Signal Input	Analog RGB Input.		
4	Resolution Support	H: 31 ～ 61kHz		
		V: 55 ～ 76Hz		
5	OSD Control	Menu, Select (AUTO), Down, Up(Source change), Power		5 keys
	Plug & Play	VESA DDC 1/2B Ver1.3		
6	Power Connector	Input	Type: IEC320 MALE 3Line Connector	
7.	Power Consumption	Supply Voltage	12Vdc	cf) Back Light Inverter
		Max Power	30W (including Back Light Inverter)	
8	Signal Connector	Analog	15Pin D-SUB Connector	

ELECTRICAL SPECIFICATION

Input characteristic

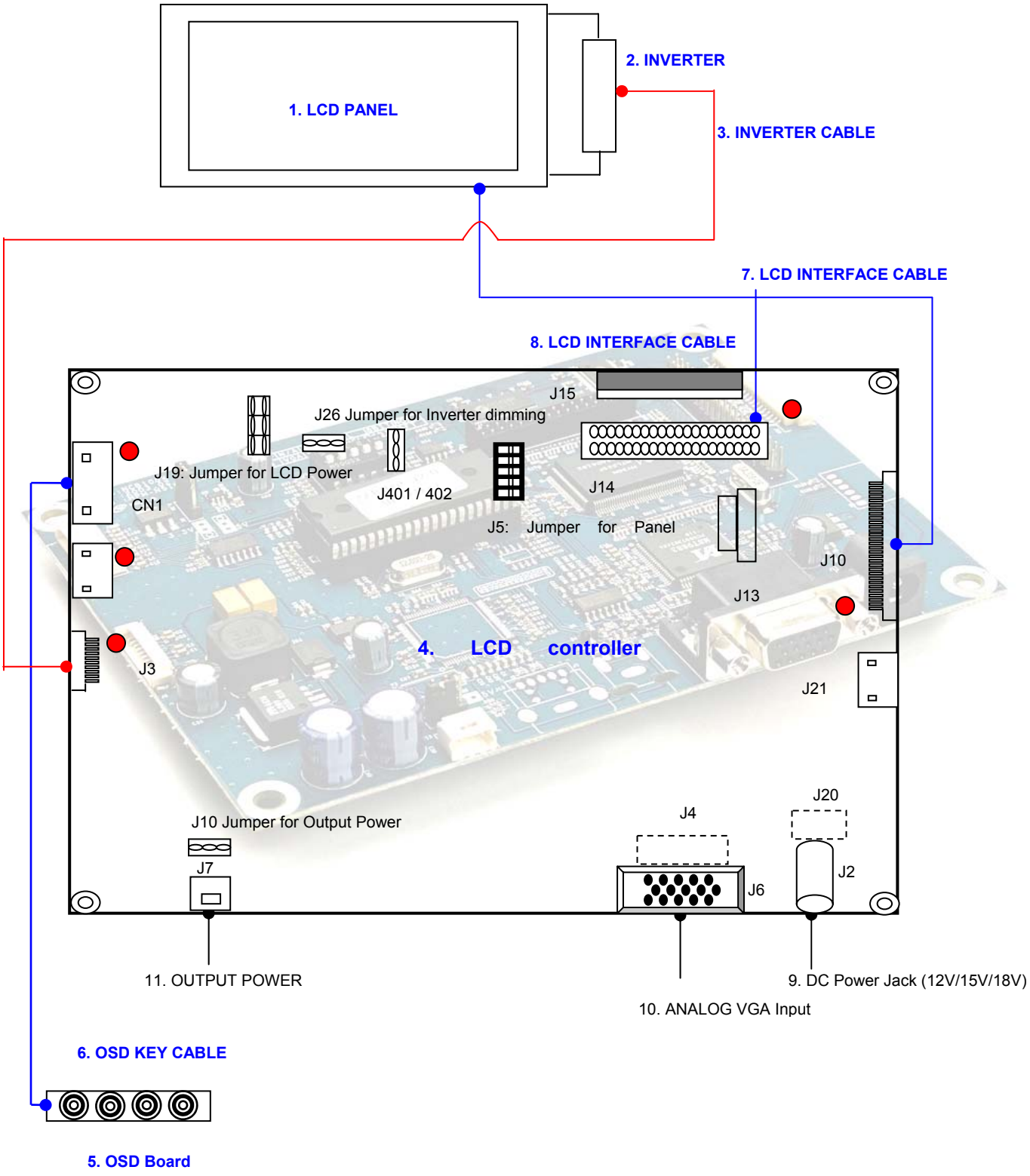
Description	Signal	Unit	Min	Typical	Max	Remarks
Power In (12Vdc)						
	Input	Vdc	11.4	12	12.6	
	Consumption	Watt		5		Board only
RGB Input						
	Analog RGB	Vp-p	0		0.7	
	Sync	Vdc	0		5.5	
	H Frequency	KHz	31		61	Depends on Mode
	V Frequency	Hz	55	60	75	

Output Characteristics

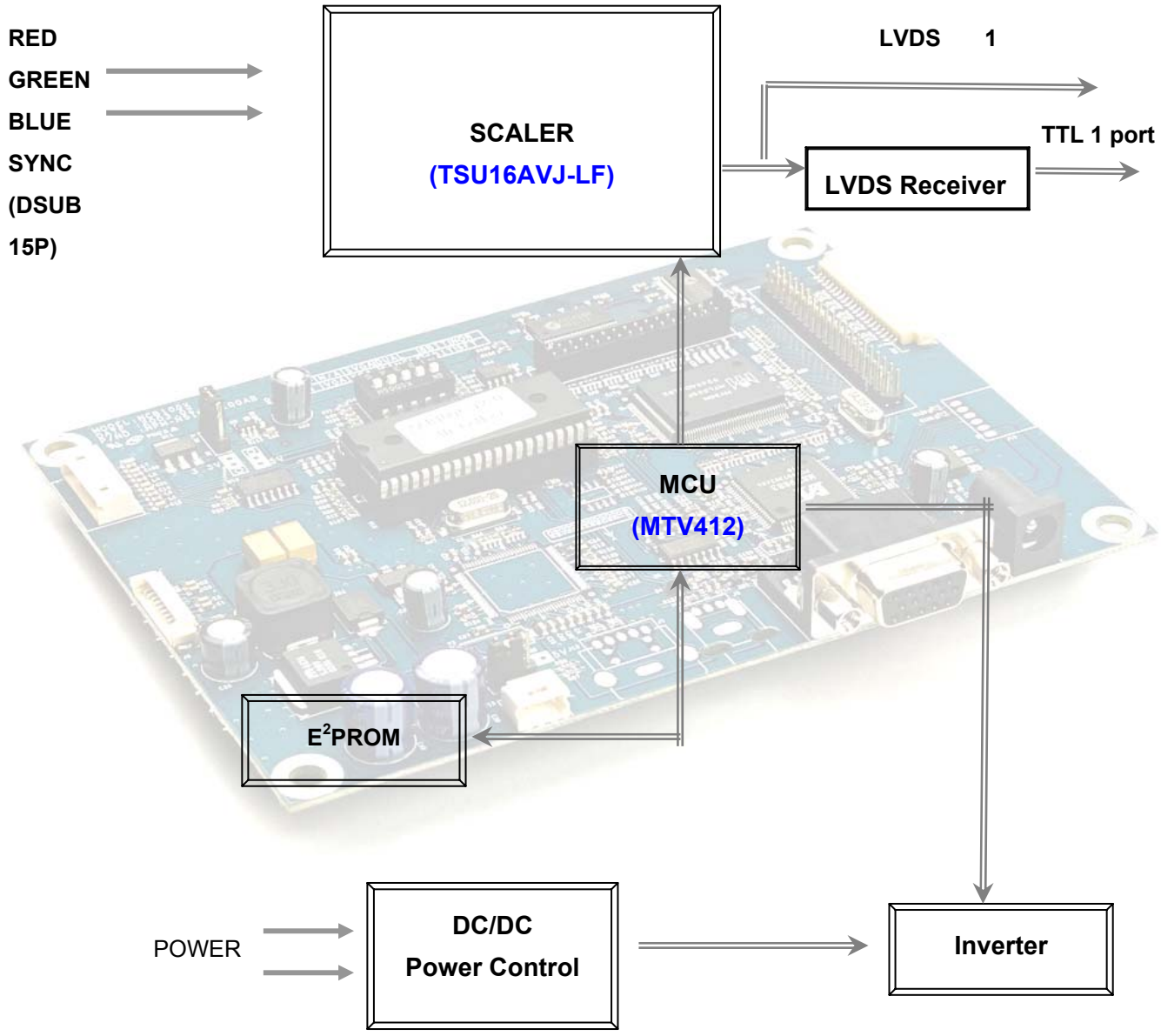
Description	Signal	Unit	Min	Typical	Max	Remarks
TTL LCD Interface						
	RGB Data	Vp-p		3.3		
	DE, Sync, Clock	Vp-p		3.3		
	Clock Freq.	MHZ	25		80	Depends on Mode
	LCD Power(12V)	Vdc	11.4	12.0	12.6	Jumper option
	LCD Power (5v)	Vdc	4.5	5	5.5	Jumper option
	LCD Power(3.3v)	Vdc	3.16	3.3	3.5	Jumper option
LVDS Interface						
	Differential output	MVp-p	250	350	450	
	LCD Power (12V)	Vdc	11.4	12.0	12.6	Jumper option
	LCD Power (5v)	Vp-p	4.5	5	5.5	Jumper option
	LCD Power (3.3v)	Vp-p	3.16	3.3	3.5	Jumper option
Inverter Interface						
	Power out	Vdc	11.5	12	12.5	
	On/Off control	Vp-p	0		5.25	L=off, H=on
	Bright control	Vp-p	3.3V		0	Option
		Vp-p	0		3.3V	Option
			0		100	OSD Brightness

SYSTEM DESIGN

A typical LCD based display system utilizing this controller is likely to comprise the following.



BLOCK DIAGRAM



ASSEMBLY NOTES

This controller is designed for monitors and custom display project using 1024x768, resolution TFT LCD panels with a VGA, SVGA, XGA signal input. The following provides some guidelines for installation and preparation of a finished display solution.

Preparation: Before proceeding, it is important to familiarize yourself with the parts making up the system the various connectors, mounting holes and general layout of the controller. As much as possible connectors have been labeled. Guides to connectors and mounting holes are shown in the following relevant sections.

1. LCD Panel: This controller has 12V, 5V or 3.3V TTL and LVDS interface logic on the Board for different kind of TFT LCD panel. For the other type of LCD interface like Panel Link interface and etc, this board can accommodate a daughter board instead of on-board LCD interface. Due to the different signal timing and electrical characteristics from each LCD panel manufacturer, for selecting LCD interface type and resolution, put jumper marked J5 on the right position following LCD panel specification. For selecting DC power level, put jumper marked J19 on the right position. Supplied power level depends on LCD panel specification.

2. Controller: Handle the controller with care as static charge may damage electronic components, Make sure correct jumper and switches settings to match the target LCD panel

3. LCD connector board: Different makers and models of LCD panel require different panel signal connectors and different pin assignments.

4. LCD signal cables: In order to provide a clean signal it is recommended that LCD signal cables should not be longer than 30cm. If loose wire cabling is utilized these can be a made into a harness with cable ties. You should take care when placing the cables to avoid signal interface. Additionally it may necessary in some systems to add ferrite cores to the cables to minimize signal noise.

5. Inverter: This will be required for the backlight of an LCD, some LCD panel has an inverter in it. As LCD panels may have 1 or more backlight tubes and the power requirements for different panel backlights may vary it is important to match the inverter in order to obtain optimum performance. See application notes for more information on connection.

6. Inverter cable: Different inverter models require different cables and different pin assignment. Make sure the correct cable pin out to match the inverter. Unsuitable cable pins out may damage the inverter.

8. OSD Button: See Operational Function section.

9. 3 Color LED: This LED shows the state of controller.

- Green – Normal state
- Off – Off mode (Can't find video signals)

- Amber – DPMS mode

10. Power switch: This switch is located on OSD button board.

11. Power input: +12Vdc is required to supply power for the controller, the Inverter and the LCD panel.

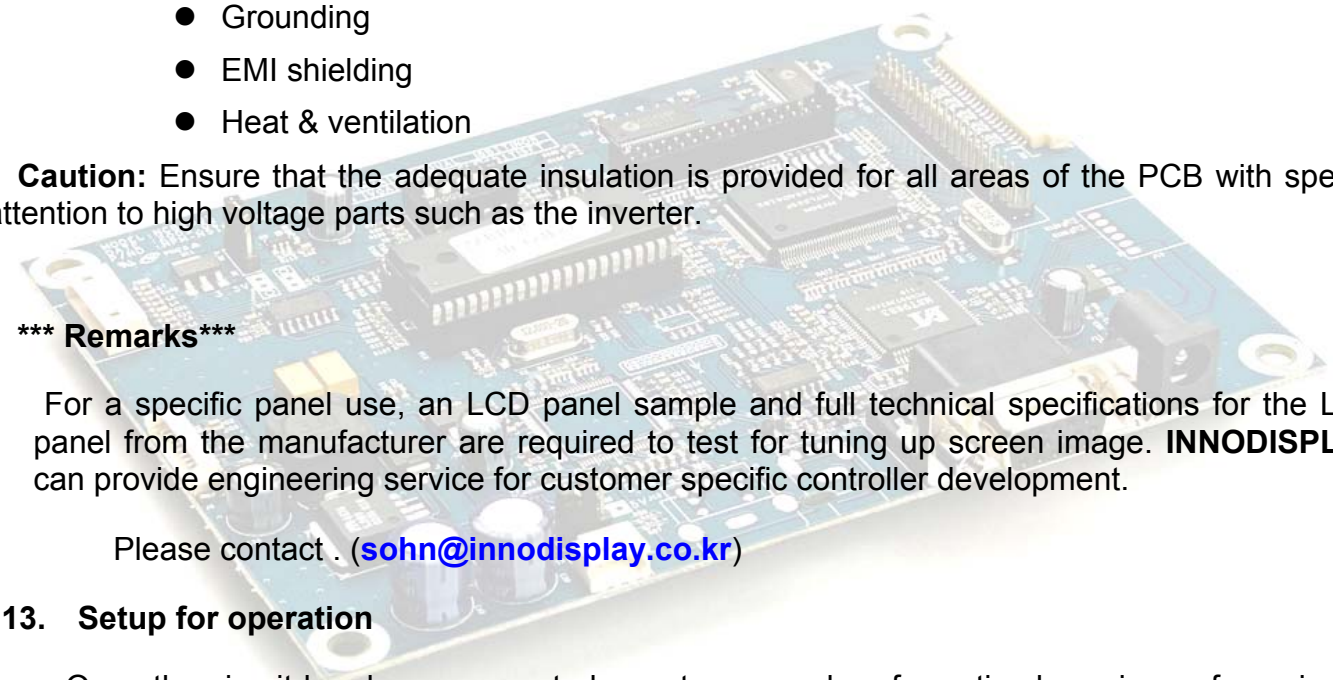
12. VGA Input Cable: As this may affect regulatory emission test result, a suitably shielded cable should be utilized.

EMI: Shielding will be required for passing certain regulatory emissions tests. Also the choice of video board and power supply can affect the test result.

Consideration should be given to:

- Electrical insulation
- Grounding
- EMI shielding
- Heat & ventilation

Caution: Ensure that the adequate insulation is provided for all areas of the PCB with special attention to high voltage parts such as the inverter.



***** Remarks*****

For a specific panel use, an LCD panel sample and full technical specifications for the LCD panel from the manufacturer are required to test for tuning up screen image. **INNODISPLAY** can provide engineering service for customer specific controller development.

Please contact . (**sohn@innodisplay.co.kr**)

13. Setup for operation

Once the circuit has been connected, a setup procedure for optimal requires a few minutes The following instructions are likely to form the basis of the finished product operation manual.

PC Settings

The PC needs to be set to an appropriate graphics mode that has the same resolution with the LCD panel to have clear screen image. And the vertical refresh rate should be set to one of 56~75Hz, non – interlaced signal.

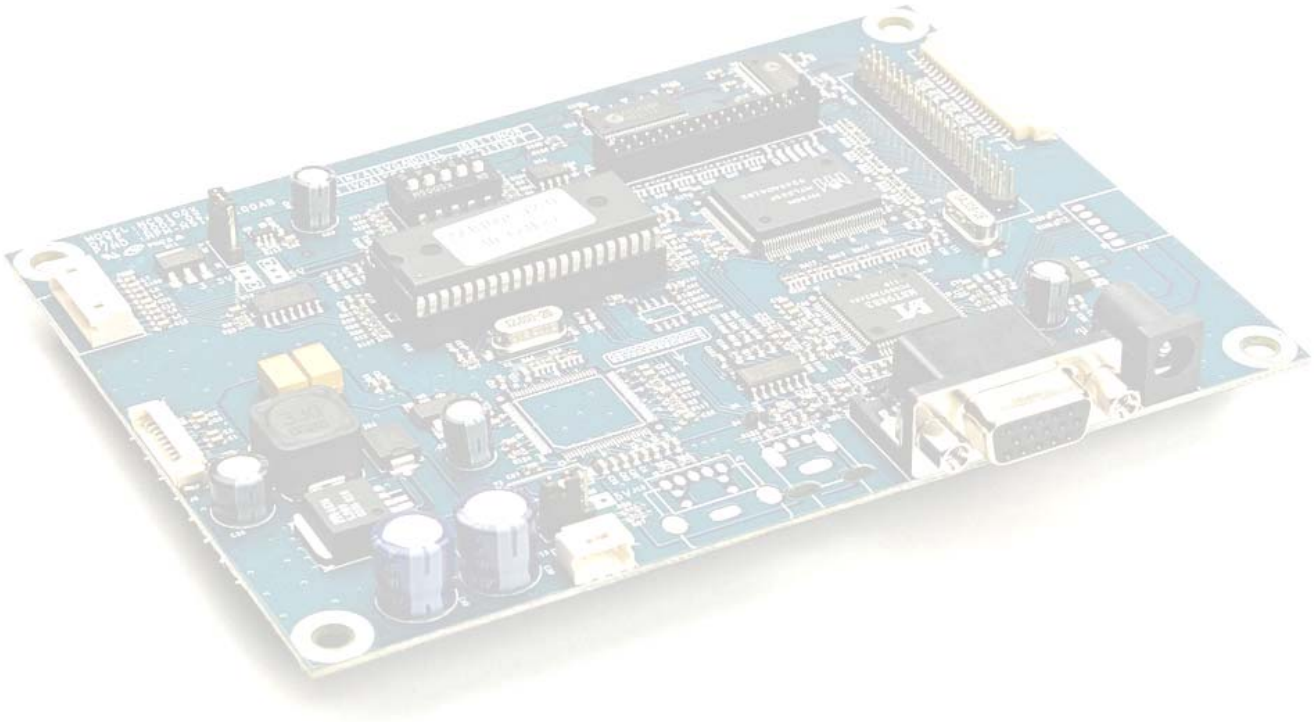
LCD display System Settings

The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 4 buttons OSD operation as a standard, The control functions defined on OSD operation are as below.

Pc Graphics Output: A few guidelines:

- Signal quality is very important, if there is noise or instability in the PC graphics output this may result in visible noise on the display
- Refer to the graphic modes table in specifications section for supported modes.
- Non-interlaced & interlaced video input is acceptable.

Important: please read the application notes section for more information.



CONNECTION & OPERATION

CAUTION: Never connect or disconnect parts of the display system when the system is powered up as this may cause serious damage.

CONNECTION

1. **LCD panel & inverter**: Connect the inverter (if it is not built- in the panel) to the CCFT lead connector of the LCD panel.
2. **TTL type panels**: Plug the signal cable direct to J14 (for Single 6bits, or Single (Dual first) higher 6bit, J13 (8bit dual (J13) and 8bits single lower 2bit) on the controller board. Plug the other end of cables to the LCD connector board (if connector board is required, otherwise the signal can be directly plugged to the LCD panel connector).

   LVDS type panels: Plug the signal cables direct to J100 on the controller board. Plug the other end of cable to the LCD connector board (if connector board is required, otherwise the signal can be direct plug to the LCD panel connector).
3. **Inverter & Controller:** Plug the inverter cable to J3 on the controller board and the other end to the connector on the inverter.
4. **Function switch & Controller:** Plug the OSD switch mount cable to J04 on the controller board and another end to the OSD board.
5. **Jumpers & Switch:** Check all jumpers J10 (External power Setting), J19 (Target panel power is set)} and switches (J5, Target panel selection) are set correctly. Details about the jumpers and switches setting table are in the following section
6. **VGA cable & Controller:** Plug the VGA cable to the connector J6 on the controller board.
7. **Power supply & Controller:** Plug the DC 12V power in to the connector J2.
8. **Power on:** Switch on the controller board and panel by using the OSD switch mount.

General:

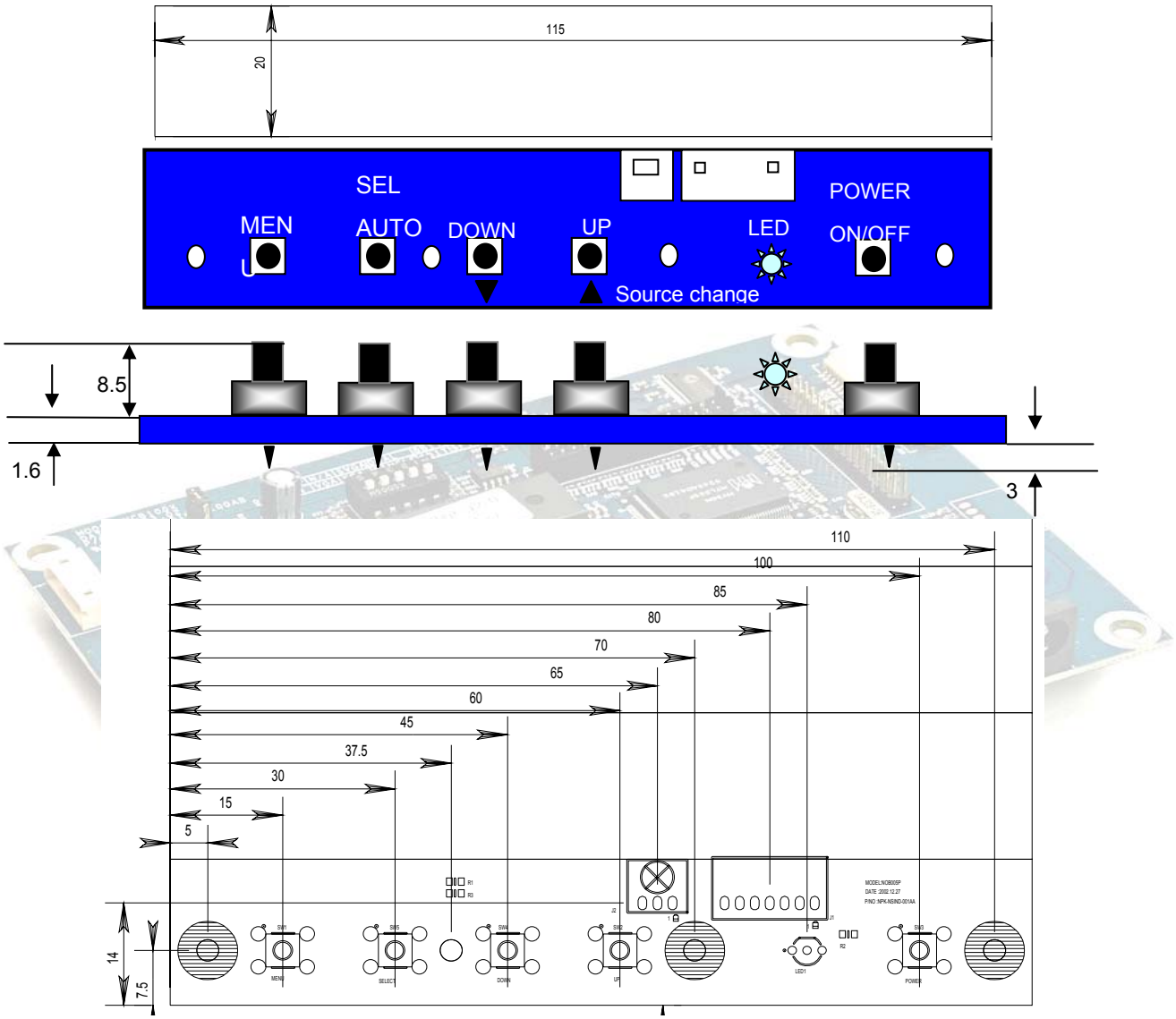
- If you use supplied cables & accessories, ensure that they are correct for the model of the panel and the controller.
- If you make your own cables & connectors refer carefully to both the panel & inverter specifications and the section in this manual, “Connectors, Pin outs & Jumpers” to ensure the correct pin to pin wiring.

PC SETTING

The controller has been designed to take a very wide range of input signals however to optimize the PC’s graphics performance. We recommend you to choose 60Hz vertical refresh rate – this will not cause screen flicker.

OSD

The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 4 buttons OSD operation as a standard. The control functions defined on OSD operation are as below. (unit: mm)



Button	Function	Status	HOT Key
Power	Power on/off	On/Off	
Menu	Activate menu		
Select	Menu Select		Auto setting
LED	Indicates operation status	Green/ Off/ Amber	
DOWN, UP ▼ ▲	Cursor control(Value Control) Dow(Decrement/UP(Increment)		UP : Source change

The chosen OSD settings will be stored in memory. The OSD menu can be cleared from the screen by moving the selection bar to the **EXIT MENU** icon pressing the **SEL** button, otherwise it will automatically be cleared after a few second of non-use

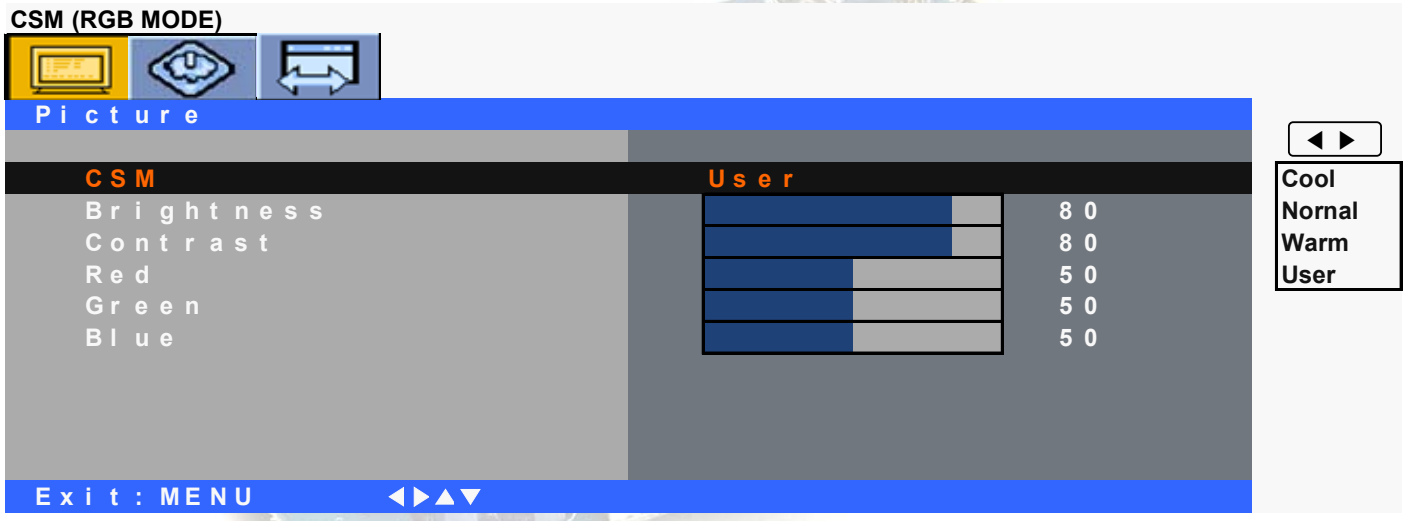
OSD Function (MAIN MENU)

Picture **RGB MODE**

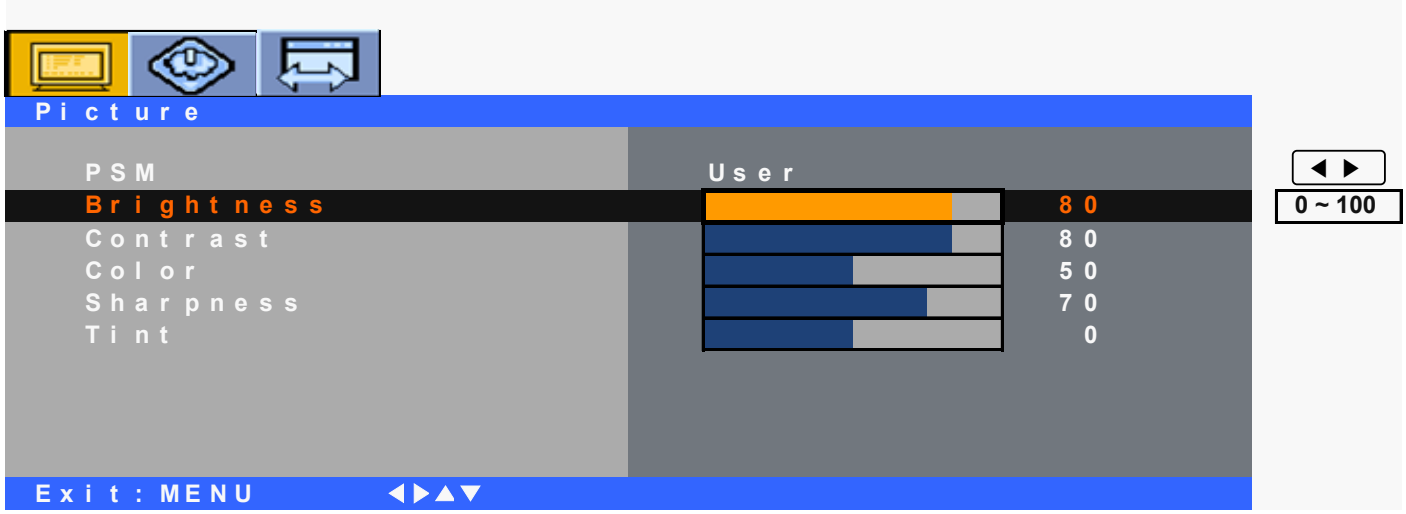
Set up

Screen

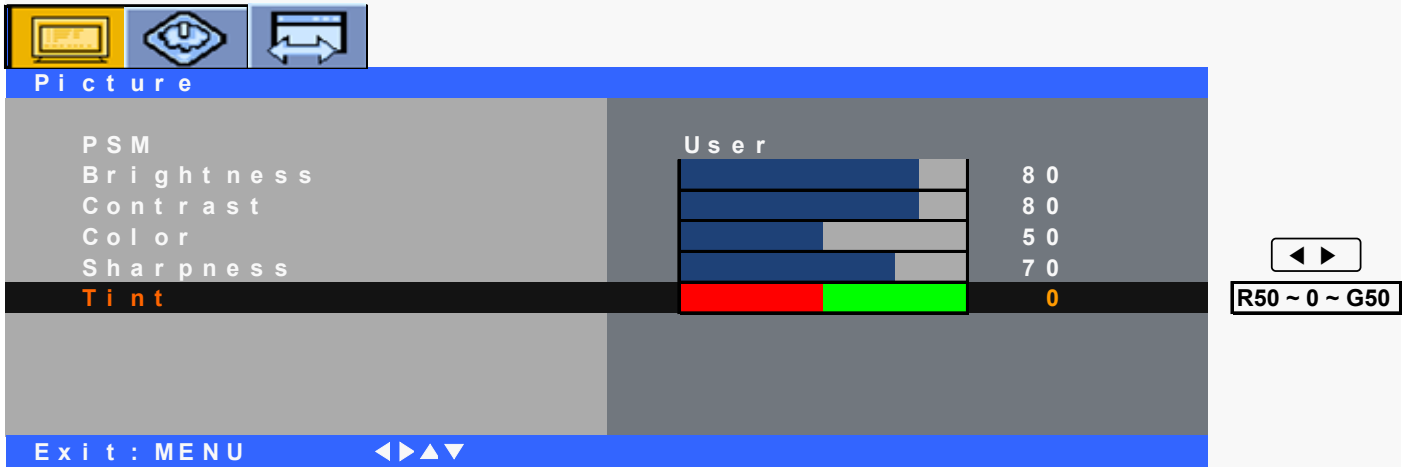
CSM (RGB MODE)



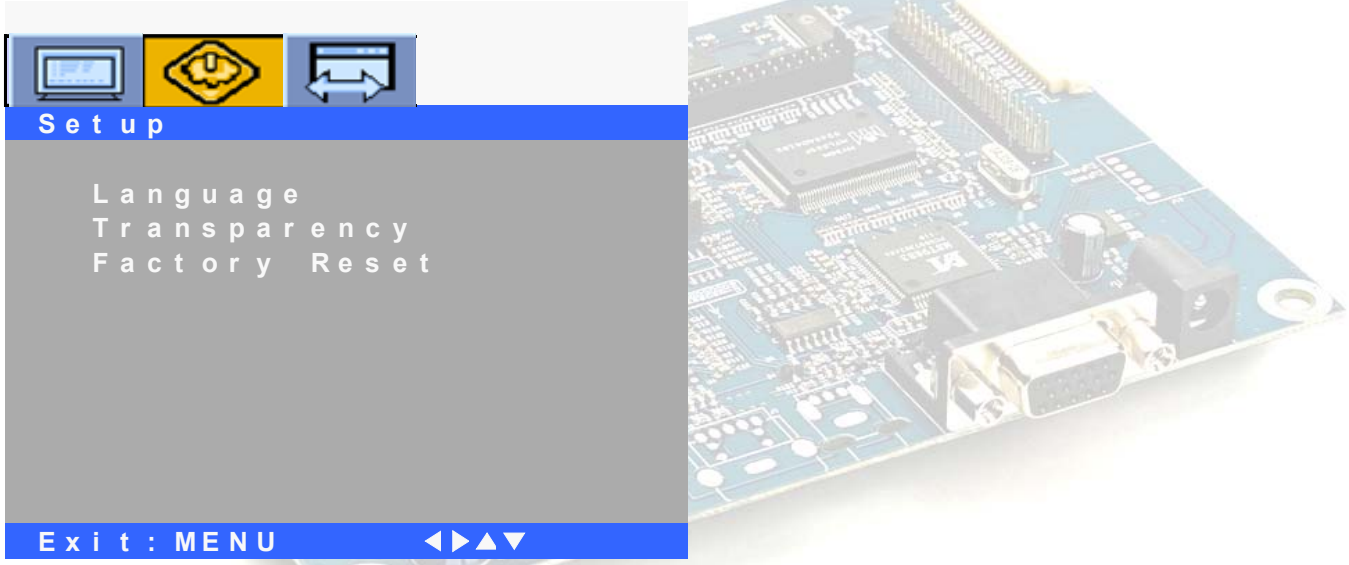
Brightness / Contrast / Color / Sharpness



Tint



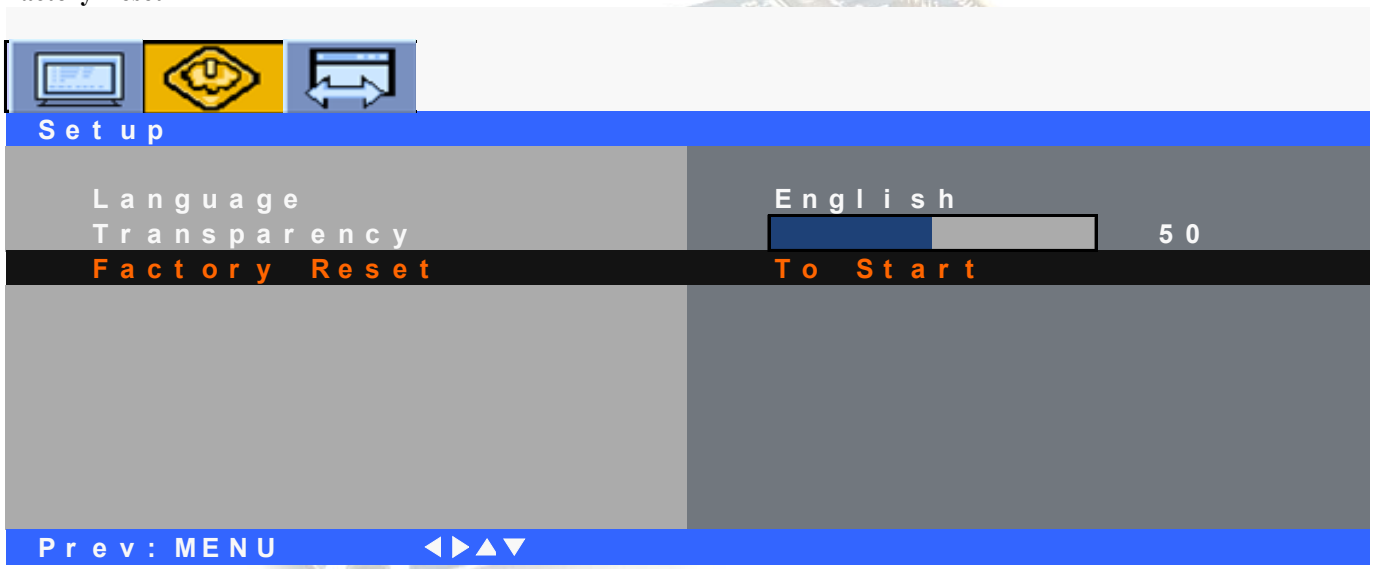
Setup



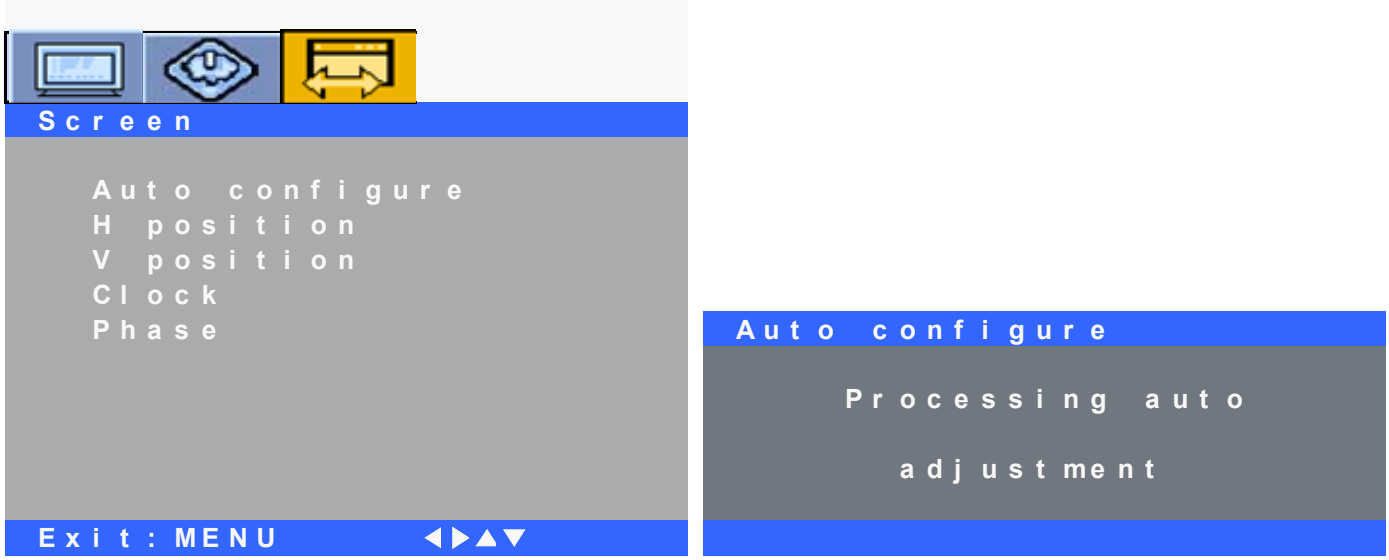
Language

Transparency

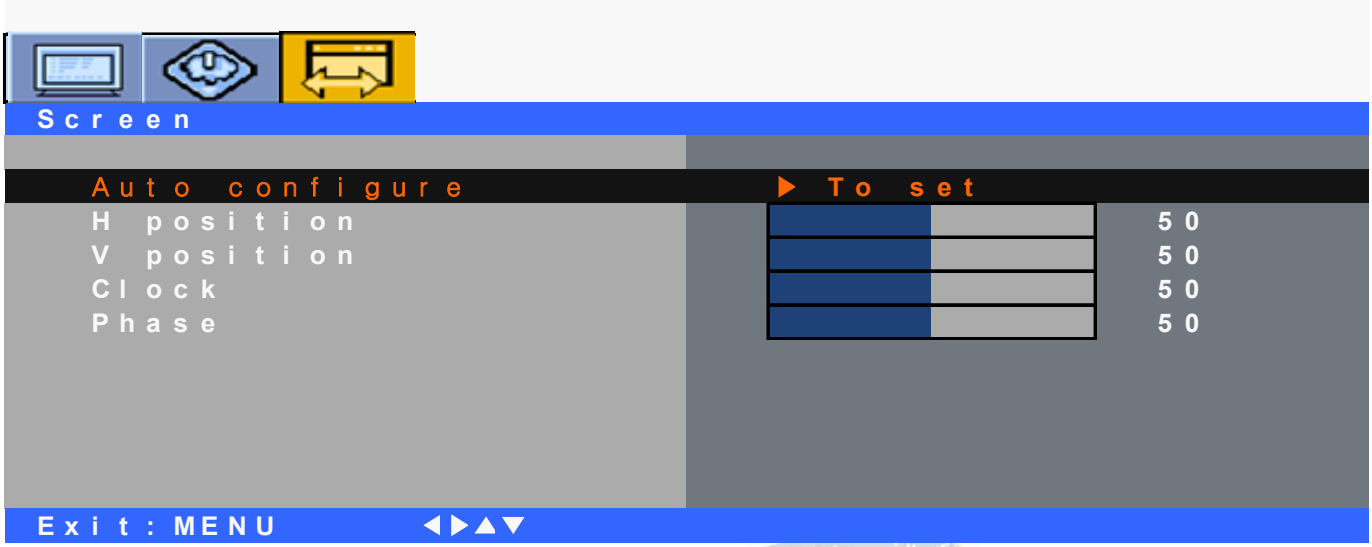
Factory Reset



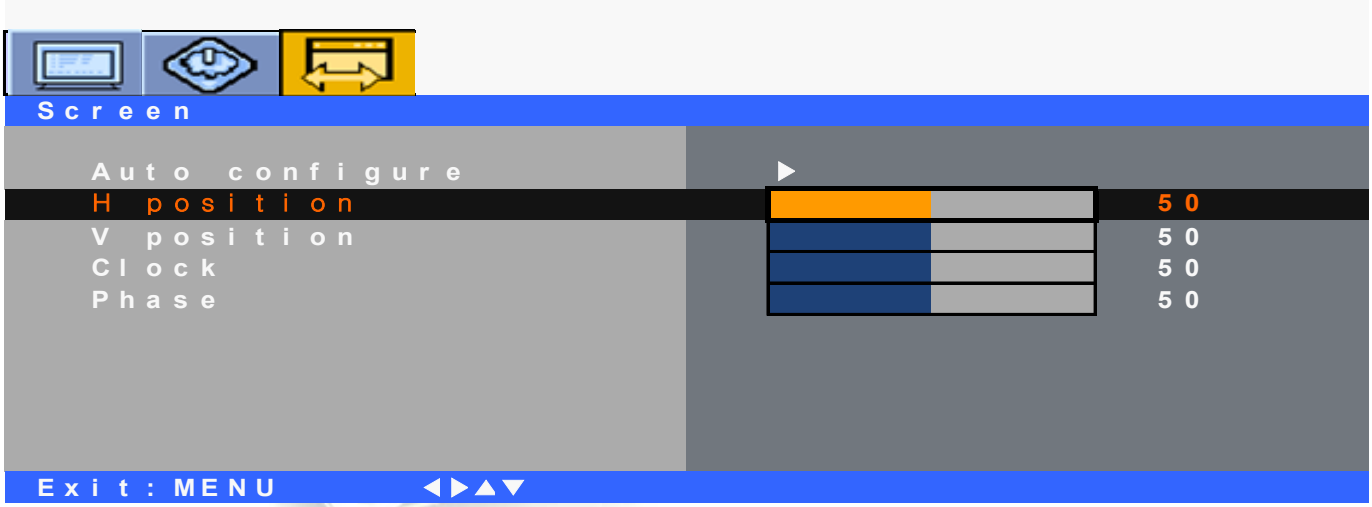
Screen



Auto Configure

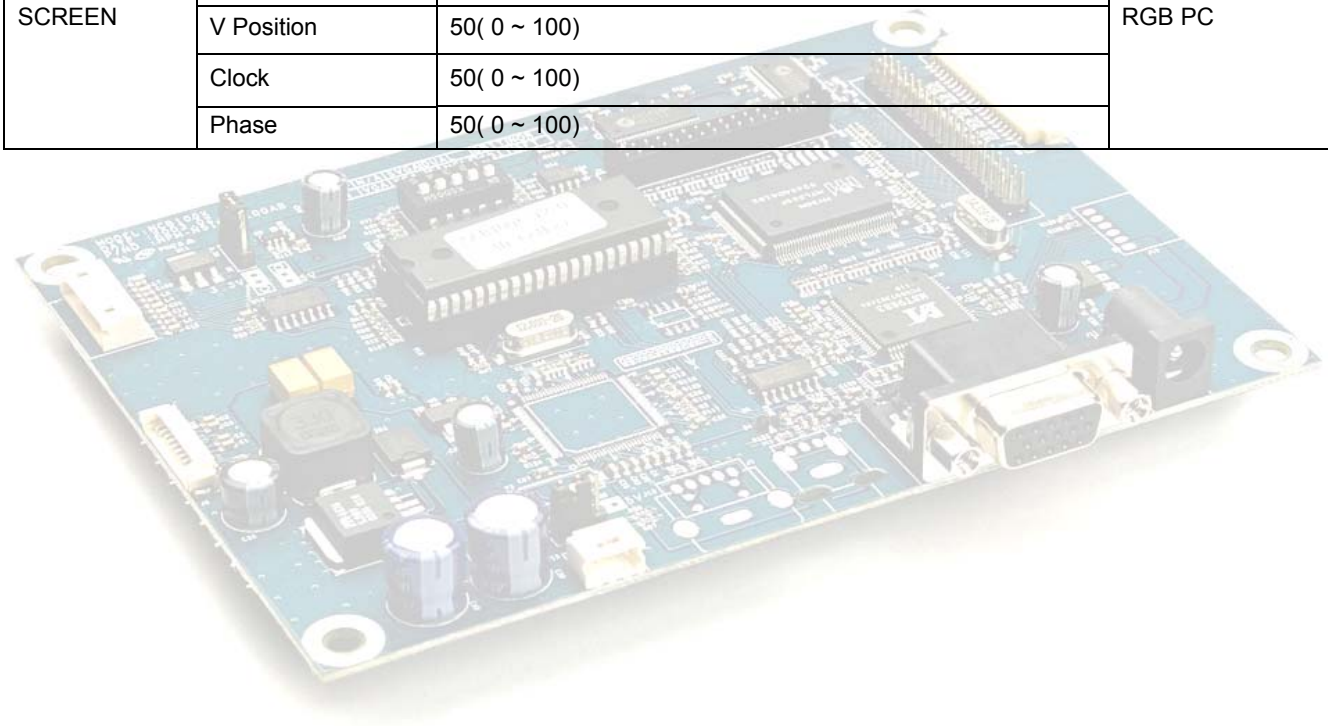


H Position / V Position / Clock / Phase



OSD GUI Control Table

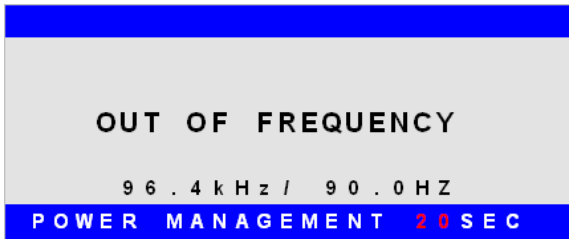
MAIN MENU	SUB MENU	CONTROL		
PICTURE	CSM	CSM/Brightness/Contrast		PC
		CSM	Normal/Warm/User	
		User	Red/Green/Blue	
SETUP	Language	English/Deutsch/François/Italiano/Espanol		
	Transparency	50 (1 ~100)		
	ISM Method	Normal, Orbit, White		
	Factory Reset	On/Off		
SCREEN	Auto Configure	On/Off		RGB PC
	H Position	50(0 ~ 100)		
	V Position	50(0 ~ 100)		
	Clock	50(0 ~ 100)		
	Phase	50(0 ~ 100)		



Operation Message

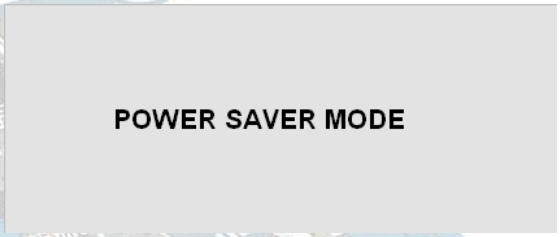
OUT OF FREQUENCY

Input Signal is over the supporting range



POWER SAVER MODE

Input Signal is not present. This message is disappeared after 5 seconds.

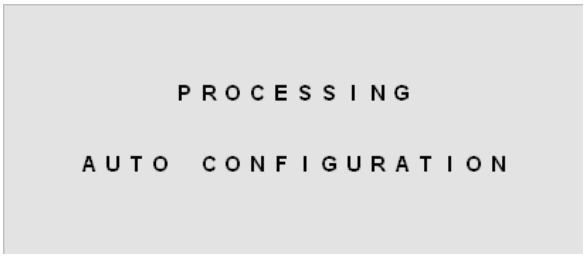


SELF DIAGNOSTICS

Input Signal is not present after power on with power switch. This message is not disappeared before power off or activity of input signal.

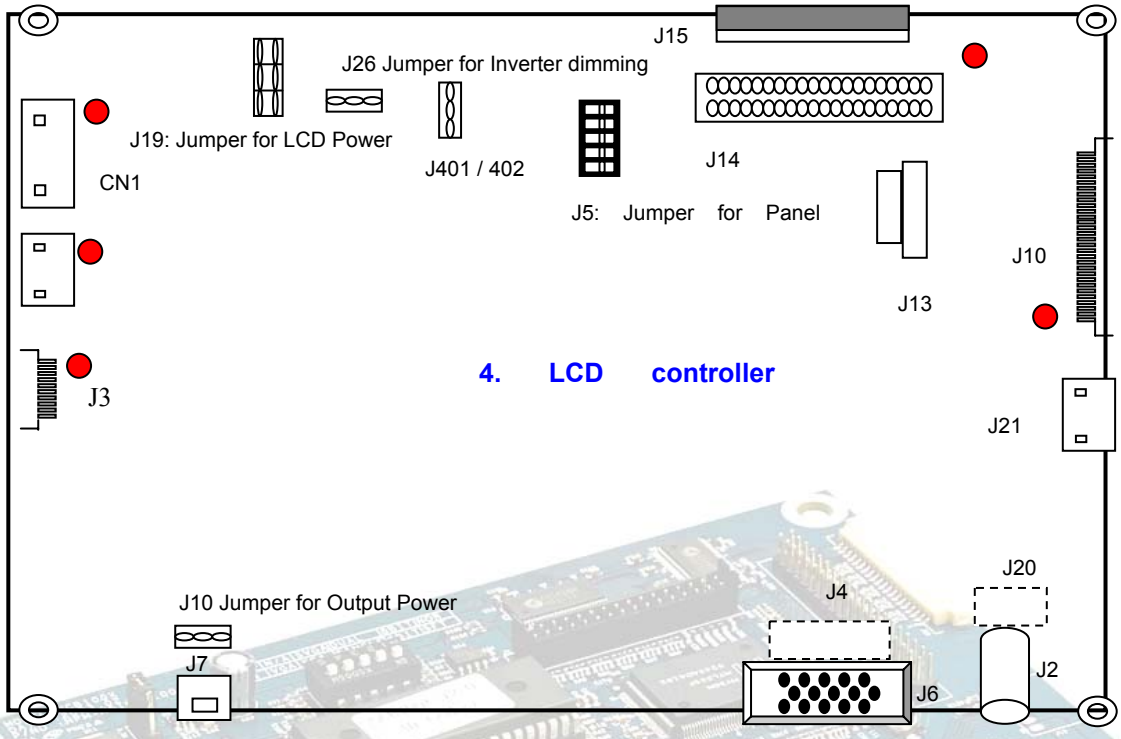
AUTO CONFIGURATION

Execute AUTO Function.



CONNECTOR, PINOUT & JUMPERS

The various connectors are:



Summary

Reference	Item	Description	Type	Manufacture
CN104	Connector	OSD Control Connector	20017WR-0710	YEONHO
J2	Jack	Input Dc power Jack	2.5Ø	-
J3	Connector	Inverter Connector	12505WR-1090	YEONHO
J4	Connector	Analog RGB Input Connector	20017WR-1210	YEONHO
J5	Switch	Panel Type Select Switch	HDR5X2	-
J6	Jack	Analog RGB Input	15P D-SUB	-
J7	Connector	Out Power Jumper	20017WR-0310	YEONHO
J10	Jumper	Output Power Jumper	HDR3X1	
J13	Connector	LCD Interface TTL-Single lower 2bit	SMW200-0610	YEONHO
J14	Connector	LCD interface board Connector for TTL 6bit	16*2 HEADER	-
J15	Connector	LCD Interface TTL 8bit FPC Connector	05002HR-50A01	YEONHO
J19	Jumper	Panel Power Out Jumper	HDR3X2	-
J20	Connector	DC Power Input Connector	20017WR-0410	YEONHO
J26	Jumper	Inverter Dimming Selection	HDR3X1	-
J100	Connector	LVDS Single Interface	12507WR-20	YEONHO

CN104 : OSD control connector

Pin No.	Symbol	Description
1	VCC	+5V power for IR sensor
2	IRQ	Infrared rays signal line.
3	LED2	RED LED
4	LED1	GREEN LED
5	GND	Ground
6	KEY1	Up, Power
7	KEY0	Menu, Select, Down

J2 : 12V DC Power Supply

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

J3 : Backlight Inverter connector

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	DIM-adj	DIM-adjustment	6	GND	Ground
2	GND	Ground	7	GND	Ground
3	GND	Ground	8	GND	Ground
4	GND	Ground	9	Vcc	12V
5	ON/OFF	Inverter ON/OFF	10	Vcc	12V

J4: Analog RGB Input Connector

Pin No.	Symbol	Description
1	SCL	Serial Clock Line for DDC
2	SDA	Serial Data Line for DDC
3	NC	No Connection
4	VSYNC	Vertical Sync
5	HSYNC	Horizontal Sync
6	GND	Ground for HSYNC, VSNC, SCL, SDA
7	BLUE	BLUE analog input
8	BLUE GND	Ground for BLUE Input Signal
9	GREEN	GREEN analog input
10	GREEN GND	Ground for GREEN Input Signal
11	RED	RED analog input
12	RED GND	Ground for RED Input Signal

J5 : Panel Type Select Switch

*** Refer to Appendix for setting**

J6 : ANALOG VGA INPUT

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

J7 : Power out Connector

Pin No.	Symbol	Description
1	Vcc	12V/5V
2	GND	Ground
3	GND	Ground

J10 : On board +12V/+5V logic power enable select jumper

Pin No.	Symbol	Description
1	12V	12V
2	Vcc	**On board power enable**
3	5V	5V

J13 : LCD Interface connector for TTL type- Single lower 2bit

Pin No.	Symbol	Description
1	R0	Red output data
2	R1	Red output data
3	G0	Green output data
4	G1	Green output data
5	B0	Blue output data
6	B1	Blue output data

J14 : LCD Interface connector for TTL type- 6bit For Single 6bits, or Single (Dual first) higher 6bit

Pin No.	Symbol	Description
1	ROA (7)	Red output data
2	ROA (6)	Red output data
3	ROA (5)	Red output data
4	ROA (4)	Red output data
5	ROA (3)	Red output data
6	ROA (2)	Red output data
7	GND	Ground
8	GND	Ground
9	GOA (7)	Green output data
10	GOA (6)	Green output data
11	GOA (5)	Green output data
12	GOA (4)	Green output data
13	GOA (3)	Green output data
14	GOA (2)	Green output data
15	GND	Ground
16	GND	Ground
17	BOA (7)	Blue output data
18	BOA (6)	Blue output data
19	BOA (5)	Blue output data
20	BOA (4)	Blue output data
21	BOA (3)	Blue output data
22	BOA (2)	Blue output data
23	GND	Ground
24	GND	Ground

25	DVS	Display Vertical Sync
26	DHS	Display Horizontal Sync
27	DCLK	Display Clock
28	GND	Ground
29	DEN	Display Enable
30	MOD_PWR	VDD For LCD Module
31	MOD_PWR	VDD For LCD Module
32	MOD_PWR	VDD For LCD Module

J15 : LCD Interface connector for 8bit TTL Type

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	NC		26	R1	Red output data
2	NC		27	R2	Red output data
3	GND	Ground	28	R3	Red output data
4	GND	Ground	29	GND	Ground
5	B0	Blue output data	30	R4	Red output data
6	B1	Blue output data	31	R5	Red output data
7	B2	Blue output data	32	R6	Red output data
8	B3	Blue output data	33	R7	Red output data
9	GND	Ground	34	GND	Ground
10	B4	Blue output data	35	CLK	Display Clock
11	B5	Blue output data	36	GND	Ground
12	B6	Blue output data	37	DE	Display Enable
13	B7	Blue output data	38	GND	Ground
14	GND	Ground	39	VSYC	Display Vertical Sync
15	G0	Green output data	40	HSYC	Display Horizontal Sync
16	G1	Green output data	41	GND	Ground
17	G2	Green output data	42	VCC	VDD For LCD Module
18	G3	Green output data	43	VCC	VDD For LCD Module
19	GND	Ground	44	VCC	VDD For LCD Module
20	G4	Green output data	45	VCC	VDD For LCD

					Module
21	G5	Green output data	46	GND	Ground
22	G6	Green output data	47	GND	Ground
23	G7	Green output data	48	NC	
24	GND	Ground	49	NC	
25	R0	Red output data	50	NC	

* Optional connector for LC201V01(LG) & A201SN01/2(AU)

J19 : LCD Panel power select jumper

Pin No.	Symbol	Description
1	12V	12V
2	5VS	5V
3	3.3V	3.3V

J20: DC power Input Connector

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

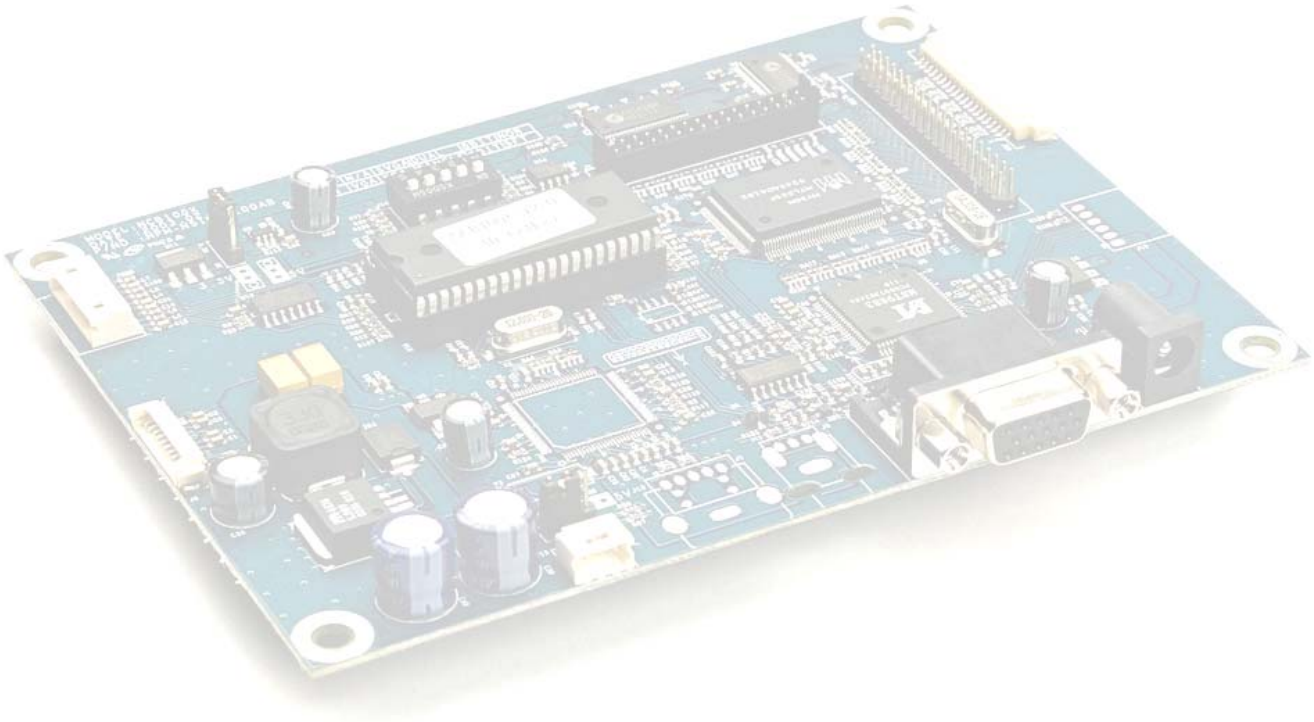
J26 : Inverter Dimming Selection

*** Refer to Appendix for Summary jumper setting**

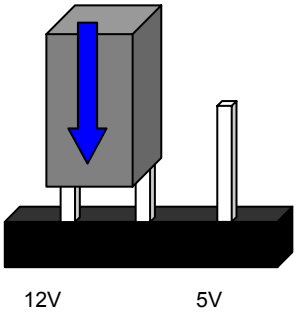
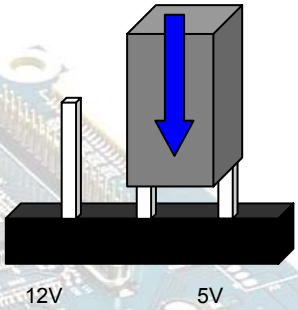
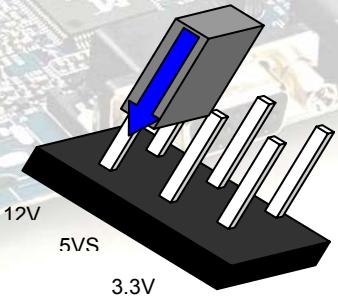
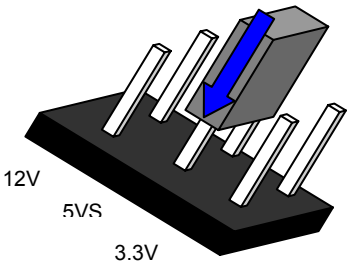
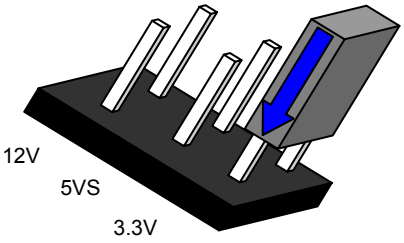
J100 : LCD Interface connector for LVDS type

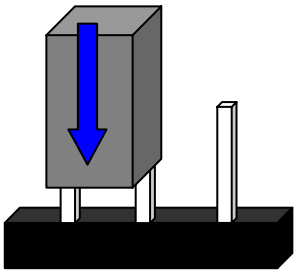
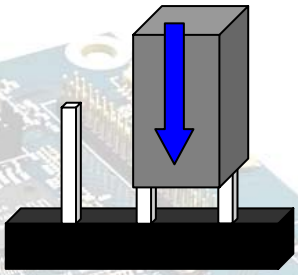
Pin No.	Symbol	Description
1	GND	Ground
2	GND	Ground
3	Y3P	LVDS 3 Channel Positive Signal for LCD Module (6Bit Unused)
4	Y3M	LVDS 3 Channel Negative Signal for LCD Module (6Bit Unused)
5	GND	Ground
6	CLKOUTP	LVDS Clock Positive Signal of Channel for LCD Module
7	CLKOUTM	LVDS Clock Negative Signal of Channel for LCD Module
8	GND	Ground
9	Y2P	LVDS 2 Channel Positive Signal for LCD Module
10	Y2M	LVDS 2 Channel Negative Signal for LCD Module
11	GND	Ground

12	Y1P	LVDS 1 Channel Positive Signal for LCD Module
13	Y1M	LVDS 1 Channel Negative Signal for LCD Module
14	GND	Ground
15	Y0P	LVDS 0 Channel Positive Signal for LCD Module
16	Y0M	LVDS 0 Channel Negative Signal for LCD Module
17	GND	Ground
18	GND	Ground
19	MOD_PWR	VDD For LCD Module
20	MOD_PWR	VDD For LCD Module

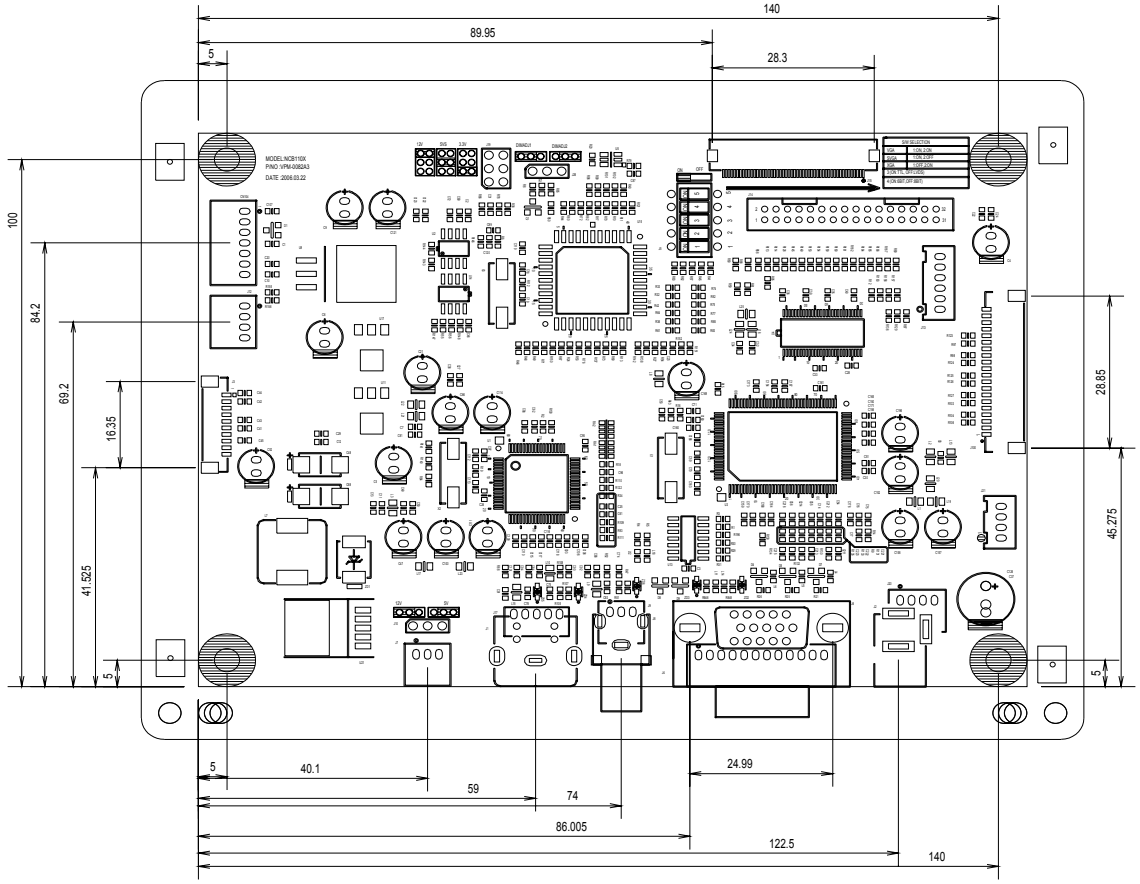


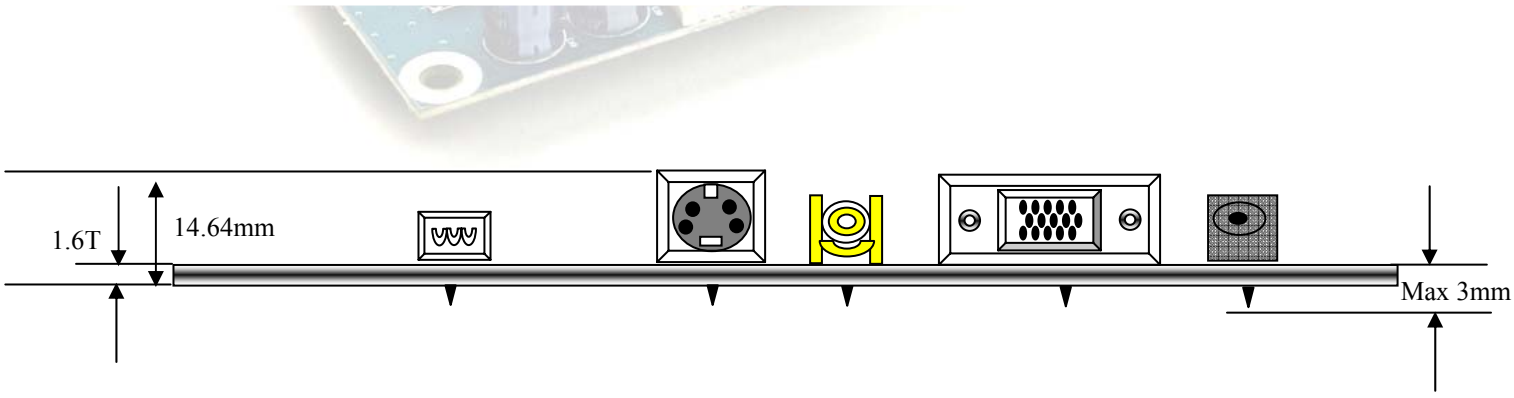
Summary: jumpers setting

Reference	Description	Connector Type
J10	On board +12V logic power enable	
	On board +5V logic power enable	
J19	12V panel power **CAUTION**: Incorrect setting can damage panel	
	5V panel power **CAUTION**: Incorrect setting can damage panel	
	3.3V panel power **CAUTION**: Incorrect setting can damage panel	

Reference	Description	Connector Type
J26	Inverter Dimming Setting 0V (For Monitor LCD)	
	Inverter Dimming Setting 3.3V (For LCD TV)	

CONTROLLER DIMENSIONS





APPLICATION NOTES

USING THE CONTROLLER WITHOUT THE ATTACHED BOTTONS

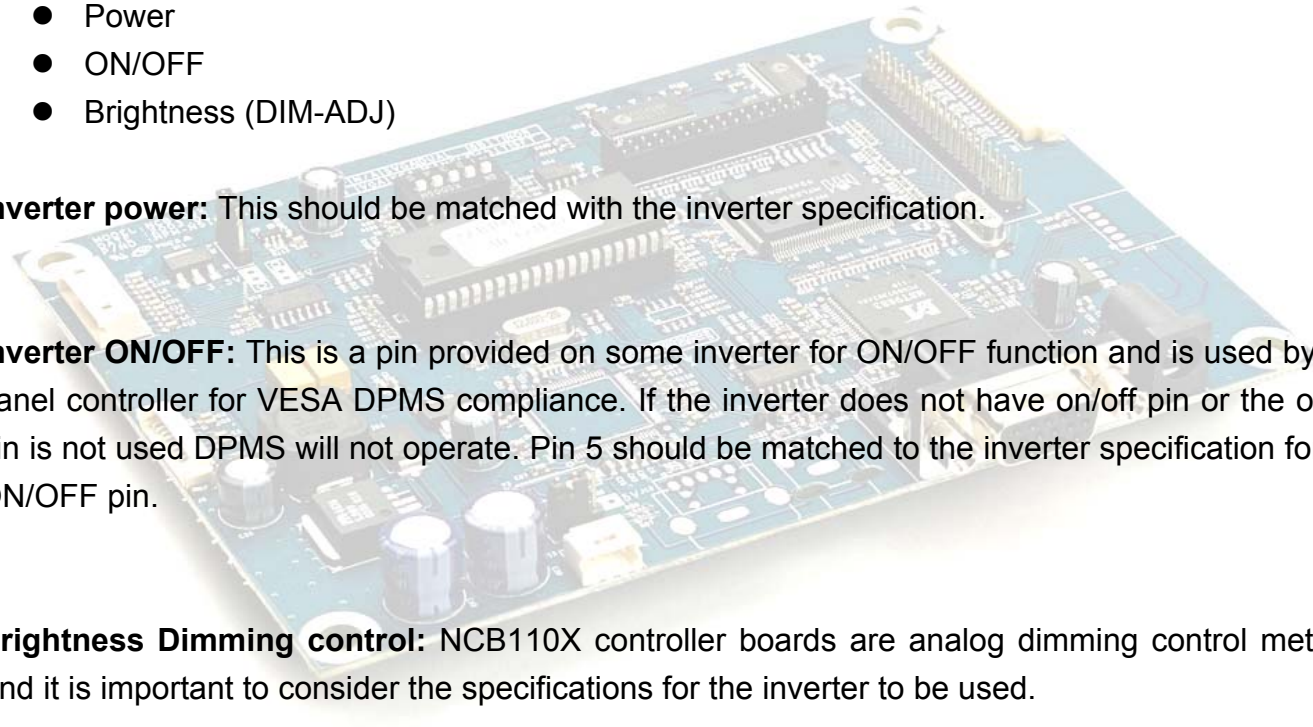
This is very straightforward:

- First, set up the controller/display system with the buttons. With the attached controller 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 (J2) 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

INVERTER CONNECTION

There are 3 potentially issues to consider with the 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. Pin 5 should be matched to the inverter specification for the ON/OFF pin.

Brightness Dimming control: NCB110X controller boards are analog dimming control method. And it is important to consider the specifications for the inverter to be used.

TROUBLESHOOTING

General

A general guide to troubleshooting of flat panel display system it is 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.

No image:

- If the panel backlight is not working it may still be possible to just see some image.
- A lack of image is most likely to be caused by an incorrect connection, lack of power, failure to provide a signal or incorrect graphic card settings.

Image position:

If it is impossible to position the image correctly, in 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 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).

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 bigger or smaller, to scroll, to flicker badly or to have even no images.
- 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.

Backlight:

Items to check include: Power input, controls, inverter and Tubes generally in this order.

If half the screen is dimmer than the other :

- Check cabling for the inverter.

Also:

- If system does not power down when there is a loss of signal.

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 clearer and more stable image on a screen

Table 6.1) RGB input format

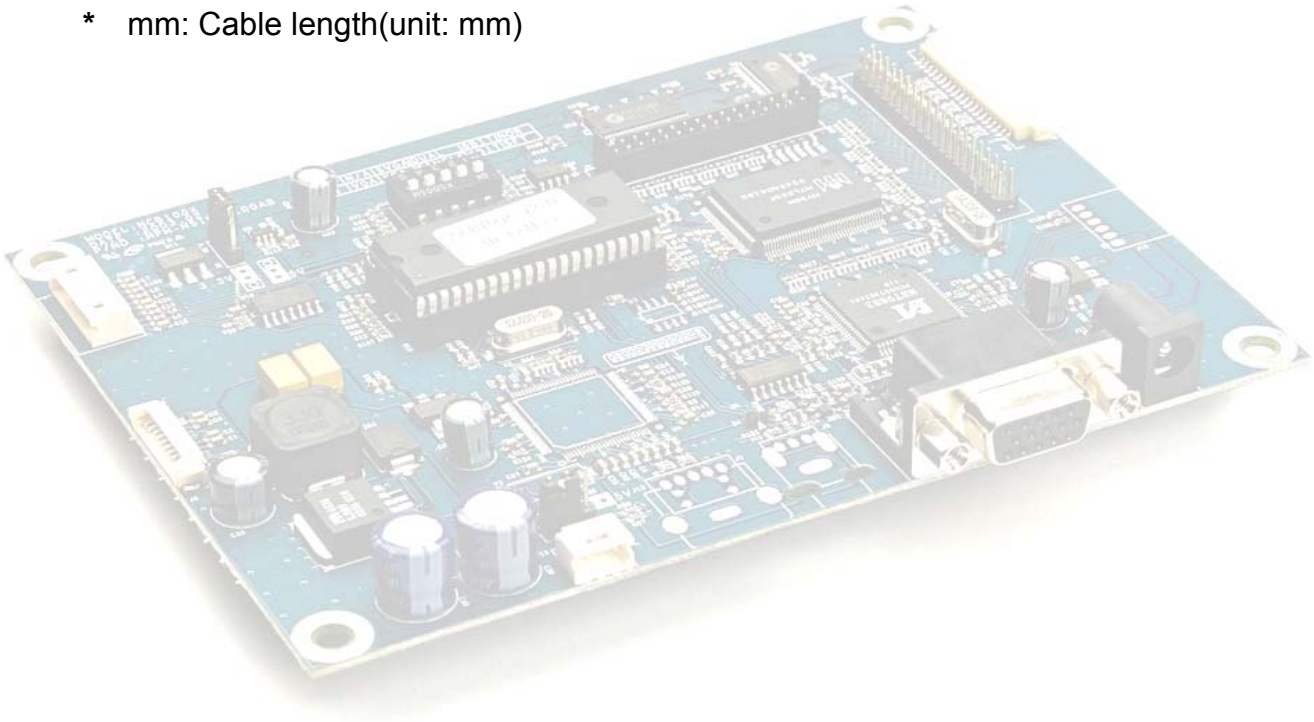
Spec / Mode	Pixel Freq.	Horizontal Timing				Vertical Timing			
		Sync Polar	Freq.	Total	Active	Sync Polar	Freq.	Total	Active
	MHz		KHz	Pixel	Pixel		Hz	Line	Lind
640*350@70Hz	25.144	P	31.430	800	640	N	70.000	449	350
640*400@70Hz	28.287	N	31.430	800	640	P	70.000	449	400
720*400@70Hz	28.287	N	31.430	900	720	P	70.000	449	400
640*480@60Hz	28.175	N	31.469	800	640	N	59.940	525	480
640*480@72Hz	31.500	N	37.861	832	640	N	72.809	520	480
640*480@75Hz	31.500	N	37.500	840	640	N	75.000	500	480
800*600@56Hz	36.000	P	35.156	1024	800	P	56.250	625	600
800*600@60Hz	40.000	P	37.879	1056	800	P	60.317	628	600
800*600@72Hz	50.000	P	48.077	1040	800	P	72.188	666	600
800*600@75Hz	49.500	P	46.875	1056	800	P	75.000	625	600
1024*768@60Hz	65.000	N	48.363	1344	1024	N	60.005	806	768
1024*768@70Hz	75.000	N	56.476	1328	1024	P	70.070	806	768
1024*768@75Hz	78.750	P	60.023	1312	1024	P	75.030	800	768

ACCESSORY

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

No.	Items	Part No.	Ex) LG. Philips LP064V1
1	LCD signal cable	VSC-Panel Part No.-mm	VSC-LB064V2-30
2	Inverter	Part no. of Manufacturer	DS-1002WE
3	Inverter cable	VIC-Inverter Part No.-mm	VIC-DS1002WE-20
4	OSD Board	NOB005P-OSD	NOB005P-OSD
5	OSD Cable	VOC-NOBOO5P-mm	VOC-NOB005P-20

* mm: Cable length(unit: mm)



APPENDIX

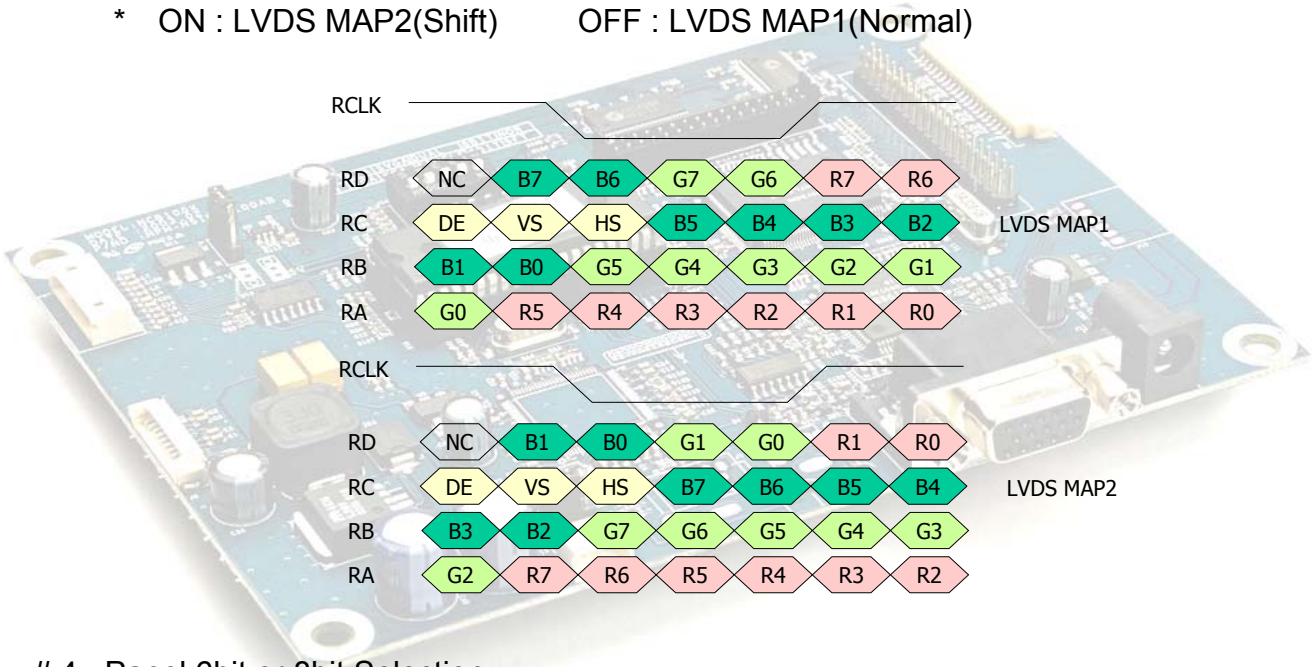
A. Target panel jumper setting

1~2 : Output Resolution Selection

1	2	Resolution
ON	ON	640 x 480
ON	OFF	800 X 600
OFF	ON	1024 X 768
OFF	OFF	*

3 : LVDS Map Selection

* ON : LVDS MAP2(Shift) OFF : LVDS MAP1(Normal)



4 : Panel 6bit or 8bit Selection

* ON : 6bit OFF : 8bit

5 : LVDS Channel Selection (*)

* ON : Normal Panel OFF : SHARP / HYDIS Panel

(VGA / SVGA : SHARP)

B. Tested panel

This board can support various LCD panels, which have VGA, SVGA and XGA 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 the NCB110X1 board. And INNODISPLy will try continuously to the model names of the LCD panels that have been tested.

No.	LCD Model Name	LCD Vendor	LCD VCC	Resolution	Option (note1)	SW 1	SW 2	SW 3	SW 4	SW 5	Dim
1	LP064V02	LG Philips	+3.3V	VGA	VS6S	ON	ON	ON	ON	ON	Dim 1
2	LB104V3	LG Philips	+3.3V	VGA	VS6S	ON	ON	ON	ON	ON	Dim 1
3	LP104S5	LG Philips	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	ON	Dim 1
4	LP104S6	LG Philips	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	ON	Dim 1
5	LB121S1	LG Philips	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	ON	Dim 1
6	LB121S02	LG Philips	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	ON	Dim 1
7	LC121S1	LG Philips	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	ON	Dim 1
8	LC151X01-C3	LG Philips	+12.0V	XGA	XS8N	OFF	ON	OFF	OFF	ON	Dim 1
9	LM150X08-A4	LG Philips	+3.3V	XGA	XS8N	OFF	ON	OFF	OFF	ON	Dim 1
10	LC151X01-C3	LG Philips	+5.0V	XGA	XS8N	OFF	ON	OFF	OFF	ON	Dim 1
11	LC201V01	LG Philips	+5.0V	VGA	VS8N	ON	ON	ON	ON	ON	Dim 1
12	LC201V02	LG Philips	+12.0V	VGA	VS8N	ON	ON	ON	ON	ON	Dim 1
13	HT10X21-100	HYDIS	+3.3V	XGA	XS65	OFF	ON	ON	ON	ON	Dim 1
14	HT12X11	HYDIS	+3.3V	XGA	XS65	OFF	ON	ON	ON	ON	Dim 1

15	HLT15X15	HYDIS	+3.3V	XGA	XS8N	OFF	ON	OFF	OFF	ON	Dim 1
16	B104SN02	AU	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	ON	Dim 1
17	G121SN01	AU	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	ON	Dim 1
18	B150XG05	AU	+3.3V	XGA	XS6S	OFF	ON	ON	ON	ON	Dim 1
19	M150XN07	AU	+3.3V	XGA	XS6S	OFF	ON	ON	ON	ON	Dim 1
20	G150XG01	AU	+3.3V	XGA	XS6S	OFF	ON	ON	ON	ON	Dim 1
21	A201SN01	AU	+5.0V	SVGA	SS8N	ON	OFF	ON	ON	ON	Dim 1
22	T-51750GD065J-FW-AA	Optrex	+3.3V	VGA	VS6S	ON	ON	ON	ON	ON	Dim 1
23	T-51638D084J-FW-A-AC	Optrex	+3.3V	VGA	VS6S	ON	ON	ON	ON	ON	Dim 1
24	T-51639D084JU-FW-A-AB	Optrex	+3.3V	XGA	XS6S	OFF	ON	ON	ON	ON	Dim 1
25	T-51513D104JU-FW-A-AC	Optrex	+3.3V	VGA	VS6S	ON	ON	ON	ON	ON	Dim 1
26	T-51944D104J-FW-A-AA	Optrex	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	ON	Dim 1
27	T-51512D121J-FW-A-AB	Optrex	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	ON	Dim 1
28	T-51866D121J-FW-A-AA	Optrex	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	ON	Dim 1
29	T-51756D121J-FW-A-AA	Optrex	+3.3V	XGA	XS6S	OFF	ON	ON	ON	ON	Dim 1
30	T-51863D150J-FW-A-AB	Optrex	+3.3V	XGA	XS6S	OFF	ON	ON	ON	ON	Dim 1
31	T-51863D150J-FW-A-AA	Optrex	+3.3V	XGA	XS6S	OFF	ON	ON	ON	ON	Dim 1
32	LQ064V3DG01	Sharp	+3.3V	VGA	VS6S	ON	ON	ON	ON	OFF	Dim 1
33	LQ104V1DG51	Sharp	+3.3V	VGA	VS6S	ON	ON	ON	ON	OFF	Dim 1

34	LQ104S1DG21	Sharp	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	OFF	Dim 1
35	LQ10D368	Sharp	+3.3V	VGA	VS6S	ON	ON	ON	ON	OFF	Dim 1
36	LQ121S1DG41	Sharp	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	OFF	Dim 1
37	NL10276BC12-02	NEC	+3.3V	XGA	XS6N	OFF	ON	ON	ON	ON	Dim 1
38	LTN104S2-L01	SAMSUNG	+3.3V	SVGA	SS6S	ON	OFF	ON	ON	ON	Dim 1

Note1 : Abbreviated word : S ⓐ S ⓑ 6 ⓒ S ⓓ

ⓐ V/S/X : V VGA, S SVGA, X XGA ⓑ S/D : SINGLE PORT, D DUAL PORT

ⓒ 6/8 : 6 6BITS 8 8BITS ⓓ S/N : (SFT) SHIFT, N(NOR) NORMAL