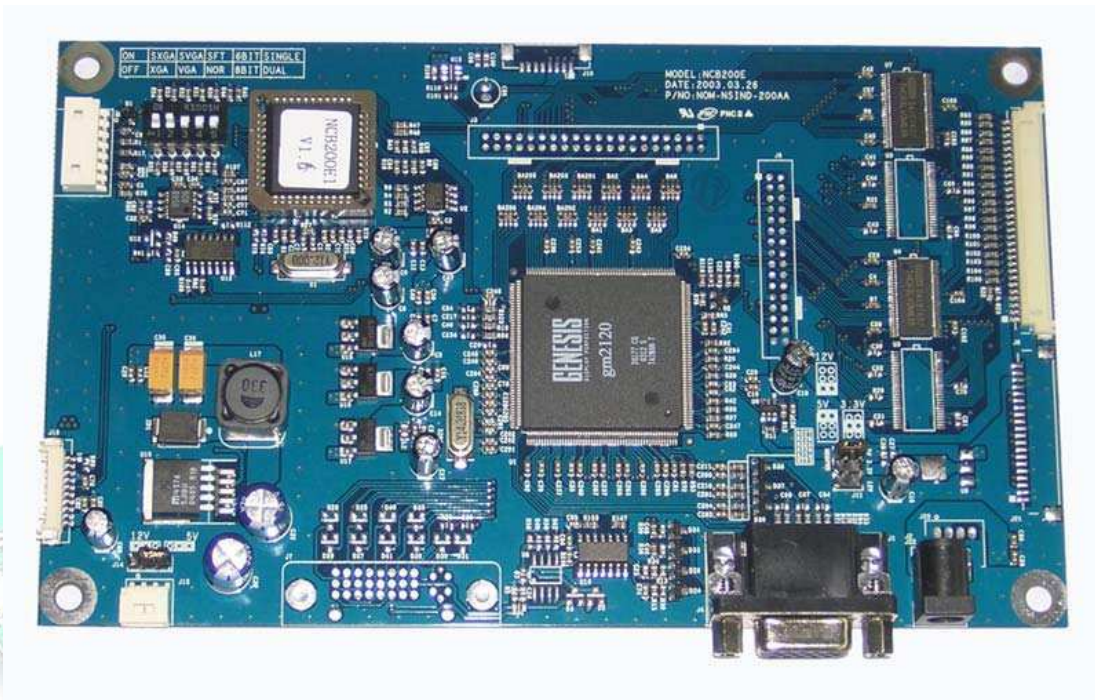For LCD Monitor D-SUB Interface Controller

1280X1024 Resolutions TFT LCD

TFT LCD Monitor Control Board

NCB200E1(VE)-DS-AB

## Decomber. 2003

CONTENT

KORDIS
Kordis Media Co.,Ltd.

History (revision date)

No	Data	Revision	Page
1	Preliminary Release	AA	
2	2003. 05 Update Data Sheet for NCB200E1	AB	
3	2003. 12 VE Update Data Sheet for NCB200E1		
4	2004.04. Update Ver 1.5 F/W for NCB200E1 (Blurred SXGA 60Hz)	Ver 1.5	
5	2004.06. Update Ver 1.6 F/W for NCB200E1 (Picture moves one line to the bottom after auto-adjust and panel OFF/ON)	Ver 1.6	
Revision history			
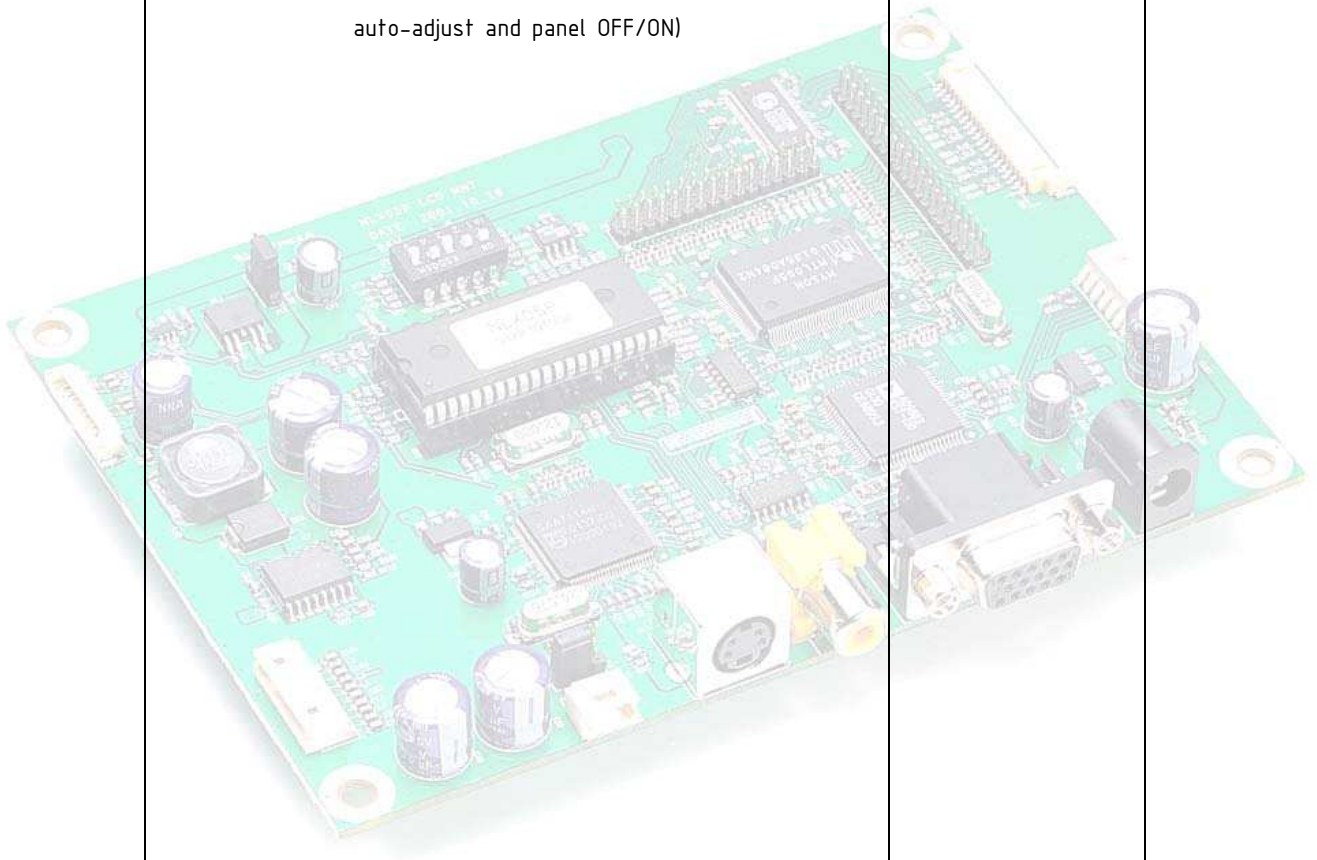
INTRODUCTION

Designed for LCD monitor and other flat panel display application the NCB200E1 controller provides an auto-input synchronization and easy to sue interface controller for:

► TFT (active matrix) LCD panels of 640x480, 800X600, 1024X768 and 1024x768 resolutions

► Computer video signals of VGA, SVGA, XGA, SXGA standard.

► Input Signal Support

● All VESA standard

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.

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GENERAL SPECIFICATION

No.	Item	Description		
1	Model name	For SXGA Panel	NCB200E1	Note 1)
2	LCD Module	SXGA		
3	Signal Input	Analog RGB Input		
4	Resolution Support	H: 31 ～ 80kHz		
		V: 55 ～ 76Hz		
5	OSD Control	Menu, Left, Right, Up, Down, Source, Power		5 keys
	Plug & Play	VESA DDC 2B Ver1.3		
6	Power Connector	Input	Type: IEC320 MALE 3Line Connector	
7.	Power Consumption	Supply Voltage	12Vdc	
		Max Power	50W (With Back-Light Inverter)	
8	Signal Connector	Analog	DSUB 15P(R, G, B Separate H, V Sync)	

Note 1) Depends On Panel Resolution
  - **E : SXGA (1280X1024)**
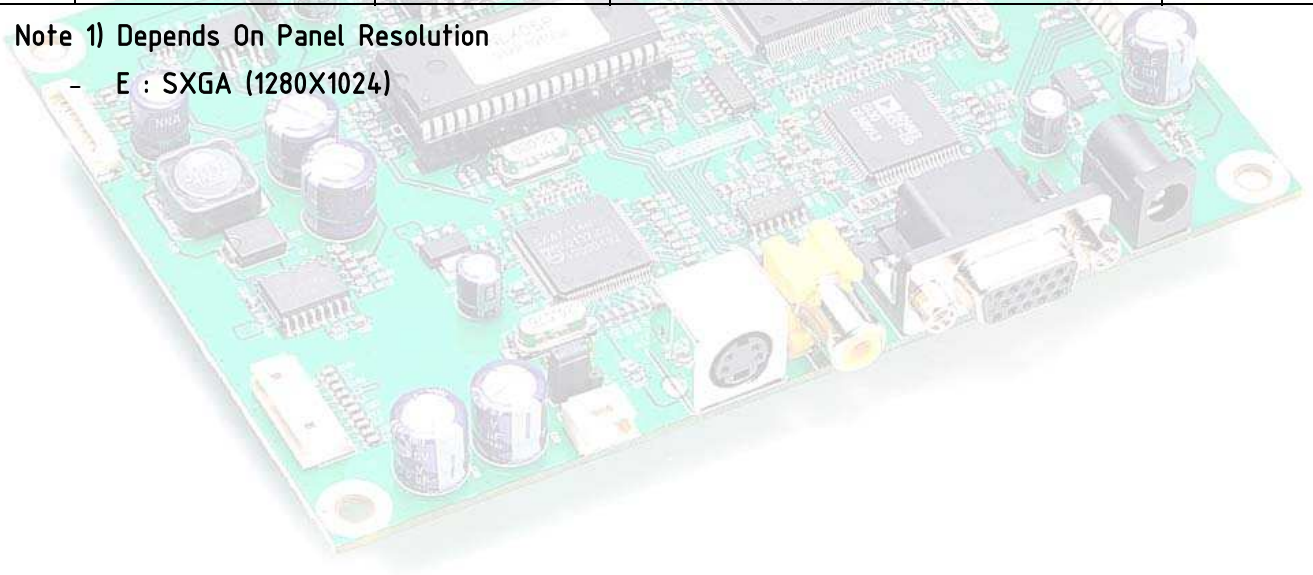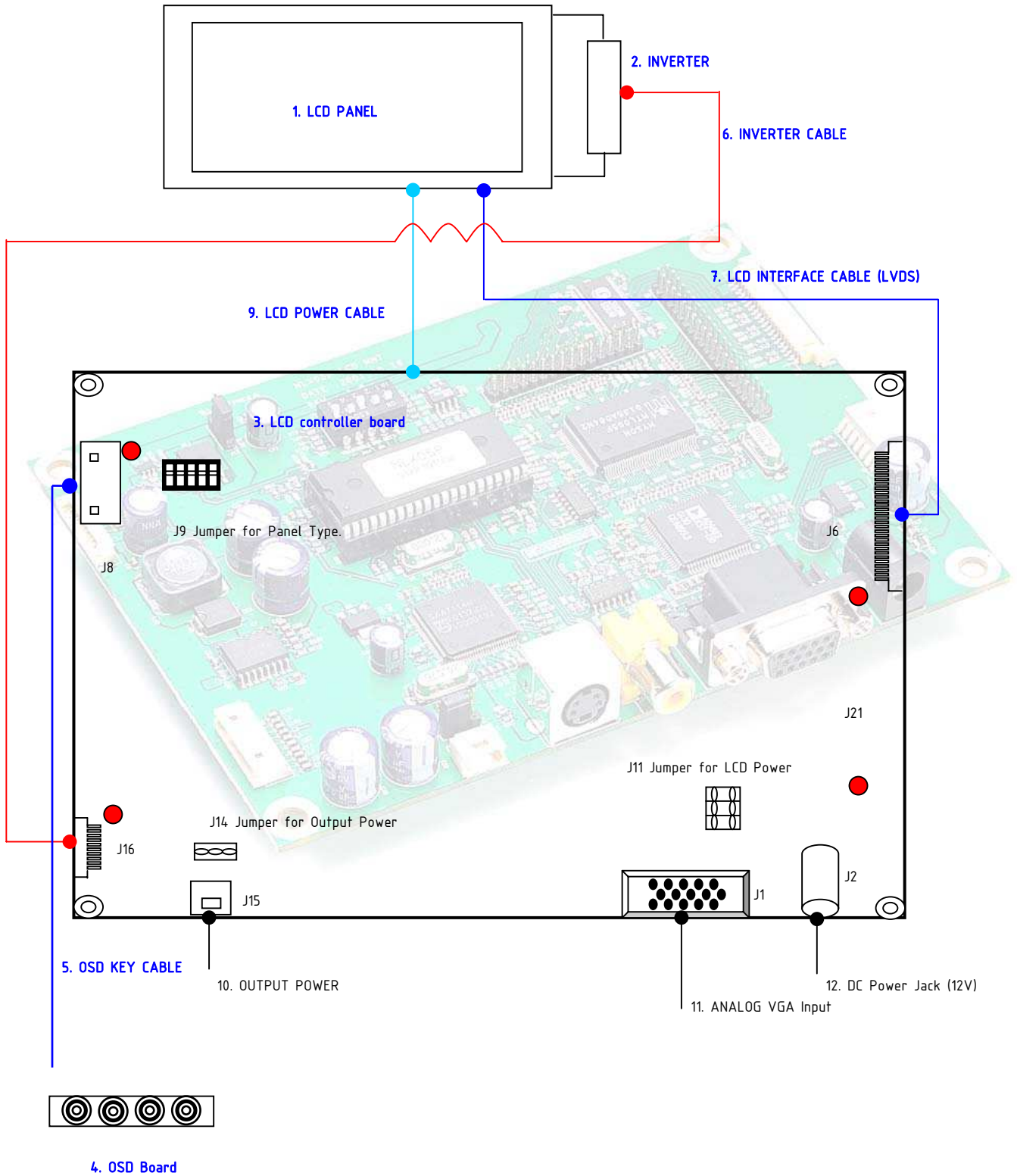
ELECTRICAL SPECIFICATION

Input characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Power In (12Vdc)						
Input	Vdc	11.4	12	12.6		
Consumption	Watt		50			
RGB Input						
Analog RGB	Vp-p	0	0.7	-		
Sync	Vdc	0	5	5.5		
H Frequency	KHz	31		80	Depends on Mode	
V Frequency	Hz	55	60	77	Depends on Mode	

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	12V	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	Different +/-	
Inverter Interface						
Power	V	11.4	12	12.6		
On/Off control	V	0		3.3	L=off, H=on	
Brightness control	V	3.3		0		
	Step	0		100	OSD Value	

SYSTEM DESIGN

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

1. LCD PANEL

2. INVERTER

6. INVERTER CABLE

7. LCD INTERFACE CABLE (LVDS)

9. LCD POWER CABLE

3. LCD controller board

J9 Jumper for Panel Type.

J6

J8

J21

J11 Jumper for LCD Power

J14 Jumper for Output Power

J16

J2

J15

J1

5. OSD KEY CABLE

10. OUTPUT POWER

11. ANALOG VGA Input

12. DC Power Jack (12V)

4. OSD Board

BLOCK DIAGRAM

RED

GREEN

BLUE

SYNC

(DSUB 15P)

SCALER

LVDS

DDC

(EDID)

MCU

E²PROM

POWER

DC/DC
Power Control

Inverter
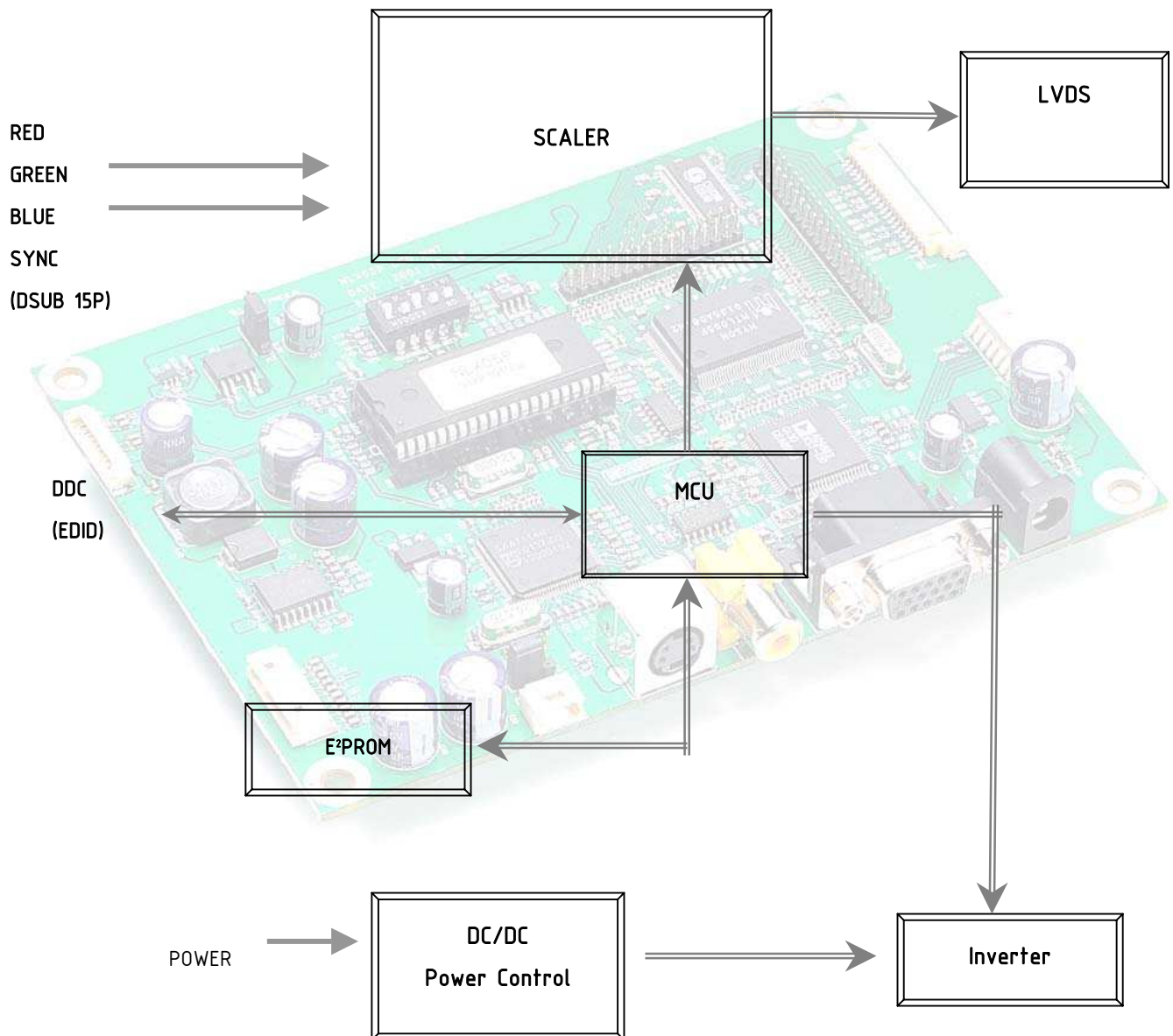
ASSEMBLY NOTES

This controller is designed for monitors and custom display projects using 1280x1024, resolution TFT LCD panels with a VGA, SVGA, XGA and SXGA 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 and 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 LVDS interface logic on the Board for different kind of TFT LCD panel. For the other type of LCD interface like a TMDS 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 J9 on the right position following LCD panel specification. For selecting DC power level, put jumper marked J11 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 provide a clean signal it is recommended that LCD signal cables should not longer than 30cm. If loose wire cabling is utilized these can be a made into a harness with cable ties. Care should be taken when you place 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 have an inverter built in. 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.

7. 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.
- Preventing electrical shock such as ESD
- 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.

13. Setup for operation

Once the circuit has been connected, a setup procedure for optimal is 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 specification 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. **LVDS type panels**: Plug the signal cables direct to J6(Dual Channel) of 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).
3. **Inverter & Controller**: Plug the inverter cable to J10 or 16 of the controller board and another end to the connector on the inverter.
4. **Function switch & Controller**: Plug the OSD switch mount cable to J8 of the controller board and another end to the OSD board.
5. **Jumpers & Switch**: Check all jumpers J14 (External power Setting), J11 (Target panel power is setting) and J9 (Target Panel Option switch) are set correctly. Details referring the jumpers and switches setting table (in the following section)
6. **VGA cable & Controller**: Plug the VGA cable to the connector J1 of 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.
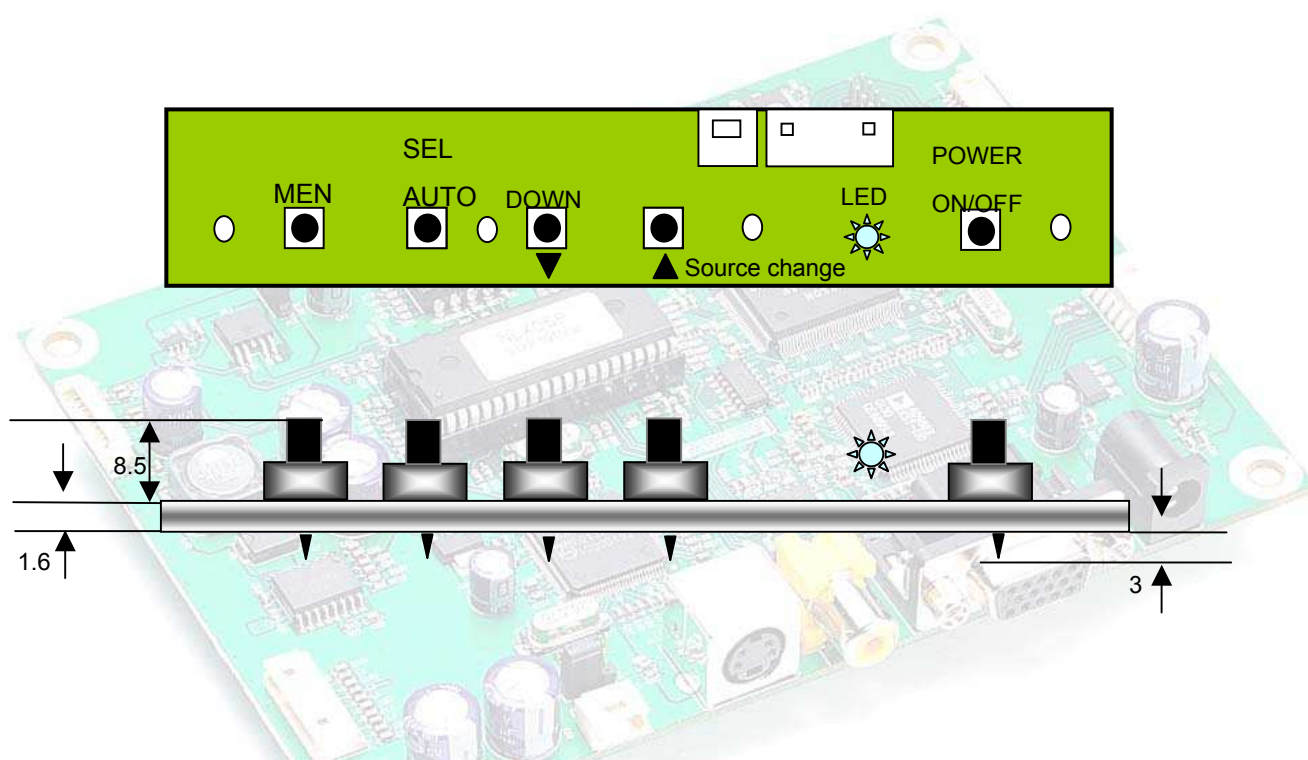
PC Setting:
The controller has been designed to take a very wide range of input signals however to optimize the

11

PC's graphic performance we recommend choosing 60Hz vertical refresh rate — this will not cause screen flicker.

OSD Control Board

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)

Appearance

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) Down(Decrement)/Up(Increment)		

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

OSD MAIN MENU
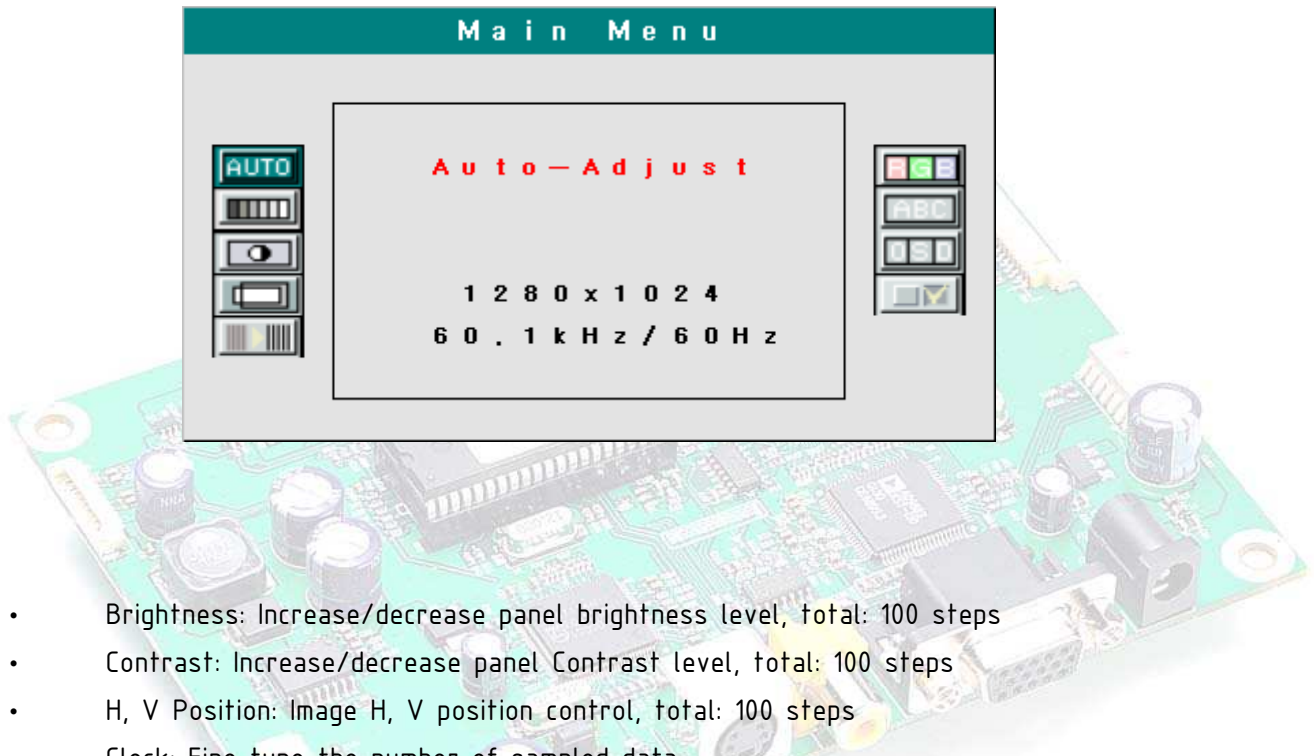
- Brightness: Increase/decrease panel brightness level, total: 100 steps
- Contrast: Increase/decrease panel Contrast level, total: 100 steps
- H, V Position: Image H, V position control, total: 100 steps
- Clock: Fine tune the number of sampled data.
- Phase: Fine tune the position of sampled data (adjust image quality), total: 31 steps
- Color: Color Temperature control, total: 100 steps
- OSD Function: OSD position, OSD Language, OSD Off Timer control
- SEL, input sign: Select input signal (Analog, Digital)
- Power Switch Option: Select Power Switch on/off.
- DPMS LED: IF When the DPMS select Amber LED color is Amber, otherwise LED is off.
- Information: Displays current video mode and frequency
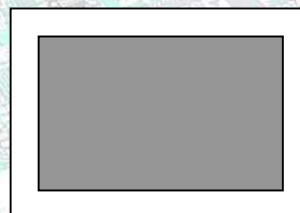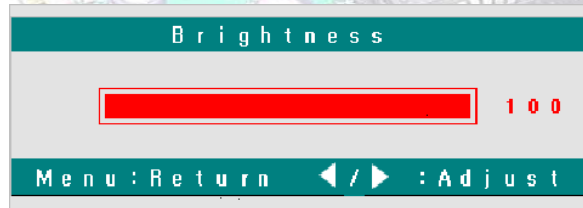
OSD FUNCTION

Brightness Control

☑ Menu

Main Menu

Brightness

1 2 8 0 x 1 0 2 4
6 0 . 1 k H z / 6 0 H z
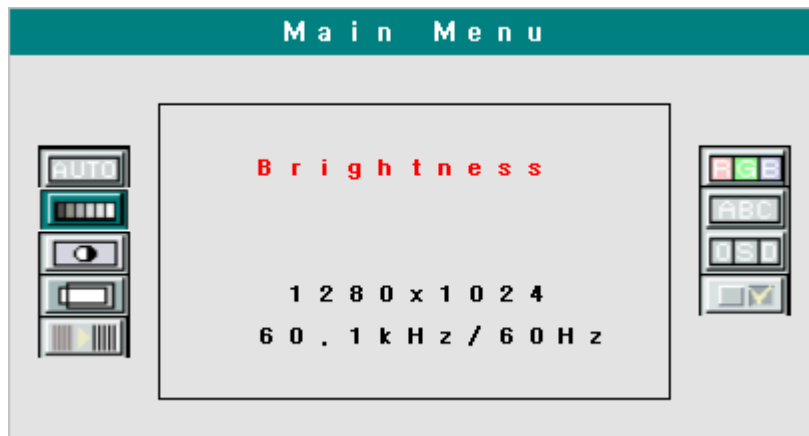
Brightness

Procedure   Menu > Brightness (Highlighted) > Select (Brightness)

▼ Dark   ▲ Bright

Brightness

1 0 0

Menu : Return   ◀ / ▶ : Adjust

Contrast Control

☑ Menu

Main Menu

AUTO

Contrast

RGB
ABC
OSD

1 2 8 0 x 1 0 2 4
6 0 . 1 k H z / 6 0 H z
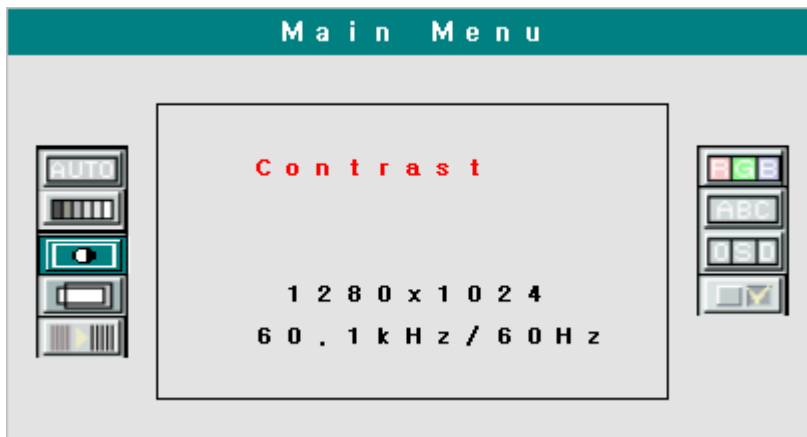
Contrast

Procedure   Menu > Contrast (Highlighted) > Select

▼   ▲ Saturated
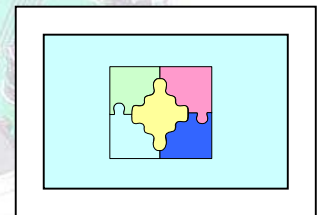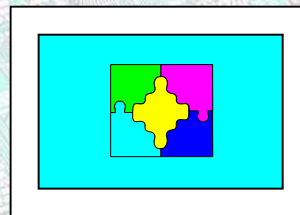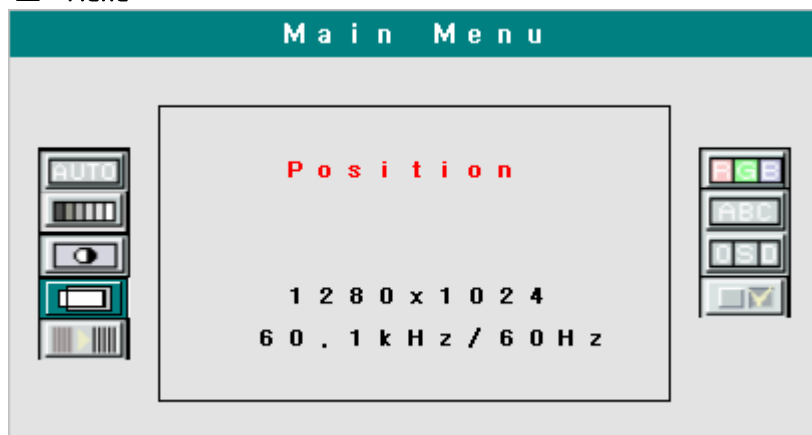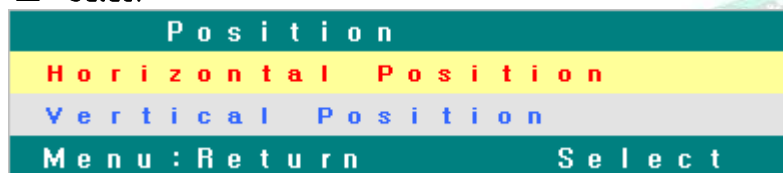
Contrast

1 0 0

Menu : Return   ◄ / ► : Adjust

Position Control

☑ Menu

```
M a i n   M e n u

AUTO

               P o s i t i o n         RGB
                                       ABC
                                       OSD
         1 2 8 0 x 1 0 2 4
         6 0 . 1 k H z / 6 0 H z       ☑
```

☑ Select

```
P o s i t i o n
H o r i z o n t a l   P o s i t i o n
V e r t i c a l   P o s i t i o n
M e n u : R e t u r n          S e l e c t
```

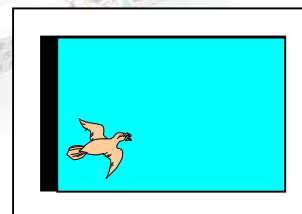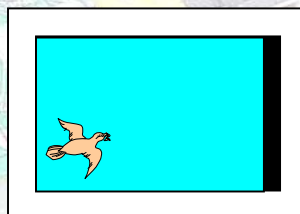When display image is out of screen, can adjust with this
function for getting Optimized Image)

HORIZONTAL Position

Procedure   Menu > POSITION > HORIZONTAL > select   Adjustment

```
H o r i z o n t a l   P o s i t i o n

   [■■■■■■■■■■■■■■■■■]           1 0 0

M e n u : R e t u r n   ◄ / ►  : A d j u s t
```

◄   ►
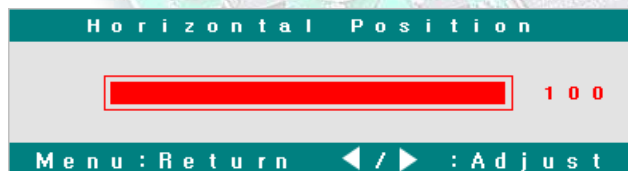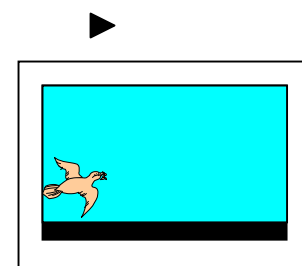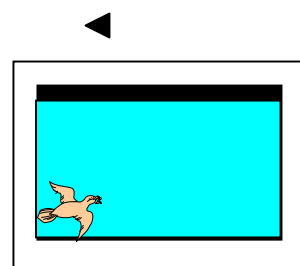
When display image is out of screen, can adjust with this
function for getting Optimized Image)

VERTICAL Position

Procedure   POSITION > VERTICAL > select

◄   ►

```
V e r t i c a l   P o s i t i o n

   [■■■■■■■■■■■■■■■■■]           1 0 0

M e n u : R e t u r n   ◄ / ►  : A d j u s t
```

Image Control

☑ Menu

M a i n   M e n u

I m a g e

1 2 8 0 x 1 0 2 4
6 0 . 1 k H z / 6 0 H z

AUTO

RGB
ABC
OSD

☑ Select

I m a g e

C l o c k
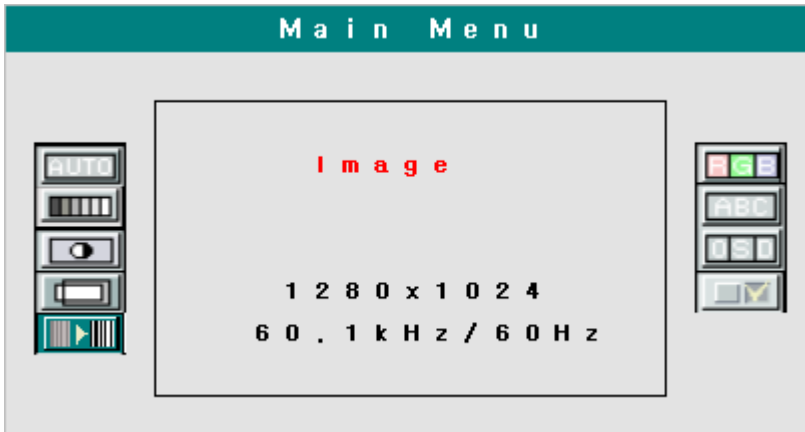
P h a s e

M e n u : R e t u r n   S e l e c t

CLOCK

<u>Procedure</u> POSITION > CLCOK > select

When display image is wrinkled, can adjust with this

function for getting Optimized Image)

◀   ▶

Noisy   Optimized

C l o c k

5 0

M e n u : R e t u r n   ◀ / ▶ : A d j u s t
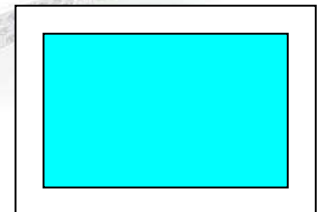
Phase

<u>Procedure</u> POSITION > Phase select

When display image is vague, can adjust with this

function for getting Optimized Image)
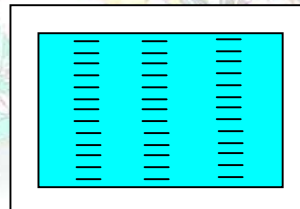
◀   ▶

Noisy   Optimized

P h a s e

5 0

M e n u : R e t u r n   ◀ / ▶ : A d j u s t

Color Control

☑ **Menu**

```
Main Menu

                    Color

              1280x1024
              60.1kHz/60Hz
```
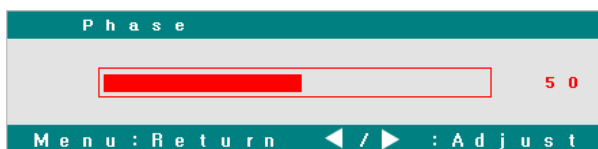
☑ **Select**
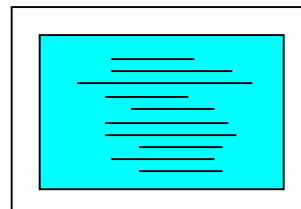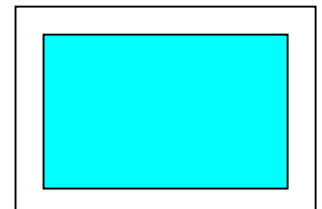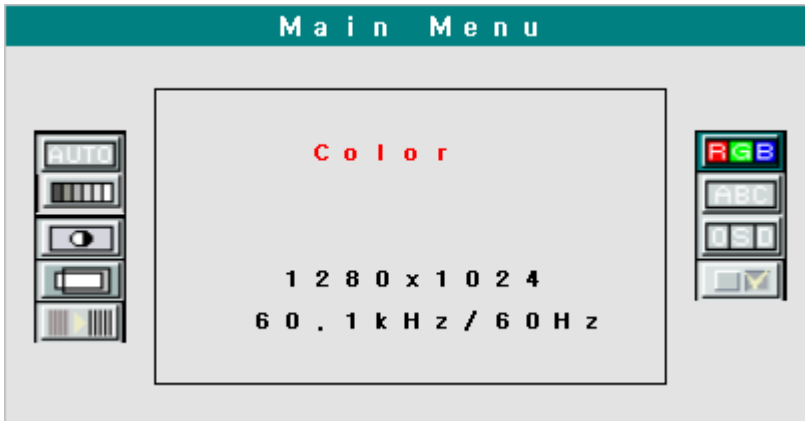
```
        Color
Preset  1
Preset  2
User  Color
Menu:Return   ◀/▶ :Adjust
```
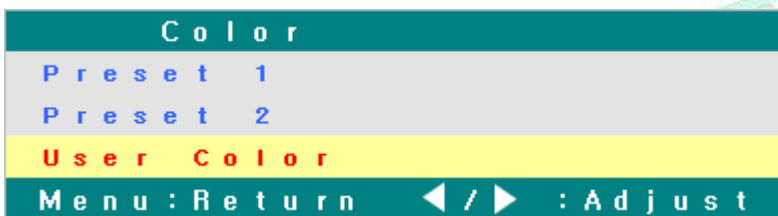
Preset 1: Bluish white

Preset 2: Default Bluish white

User Color : RED/GREEN/BLUE Control

Color

Procedure   Menu > Color (Highlighted) > Select

```
    User  Color
R  ████████████      50
G  ██████████        50
B  ██████████        50
Menu:Return  ◀/▶ :Select
```

```
    User  Color
R  ████████████      50
G  ██████████        50
B  ██████████        50
Menu:Return  ◀/▶ :Adjust
```
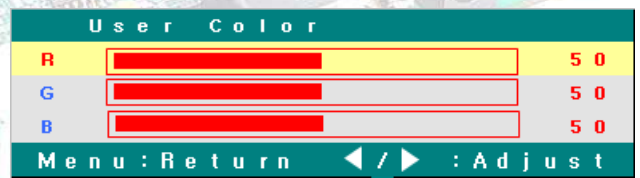
☐   Select (Highlighted) > RED Color Control (select return to Left Status)

☐   Select (Highlighted) > GREEN Color Control

☐   Select (Highlighted) > BLUE Color Control

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Language Control

☑ Menu


```
       M a i n   M e n u

              L a n g u a g e


          1 2 8 0 x 1 0 2 4
          6 0 . 1 k H z / 6 0 H z
```

☑ Select


```
           L a n g u a g e
   E n g l i s h
   D e u t s c h
   F r a n ç a i s
   E s p a ñ o l
   I t a l i a n o
   M e n u : R e t u r n    ◀ / ▶   : S e l e c t
```

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OSD Control

☑ Menu


```
M a i n   M e n u

        O S D   A d j u s t .


        1 2 8 0 x 1 0 2 4
        6 0 . 1 k H z / 6 0 H z
```

☑ Select
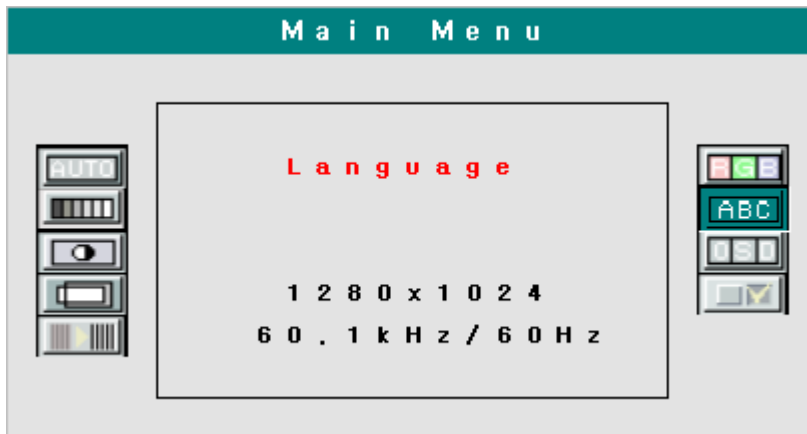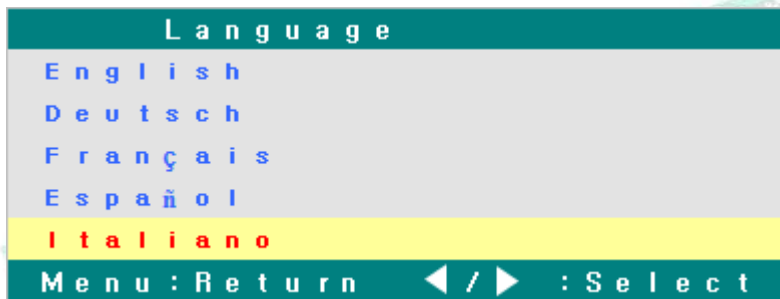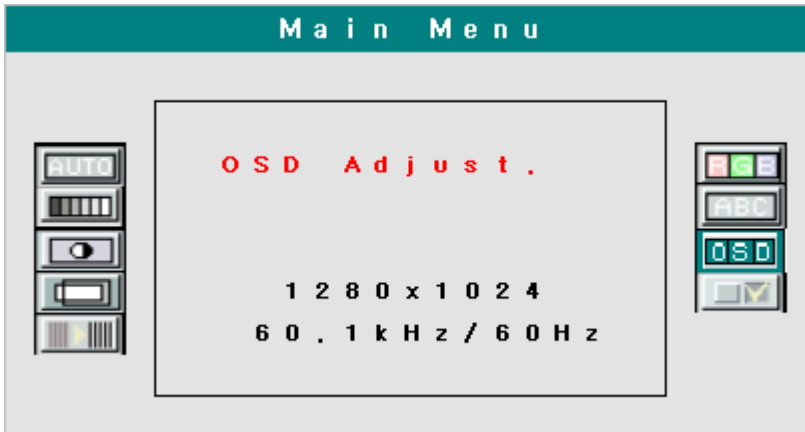
```
O S D   P o s i t i o n
H o r i z o n t a l   P o s i t i o n
V e r t i c a l   P o s i t i o n
O S D   T i m e
M e n u : R e t u r n          S e l e c t
```

OSD POSITION Function

<u>Procedure</u>   SETUP > OSD Adjust   > Horizontal Position   ◀   ▶

```
H o r i z o n t a l   P o s i t i o n

                                    5 0

M e n u : R e t u r n   ◀ / ▶ : A d j u s t
```
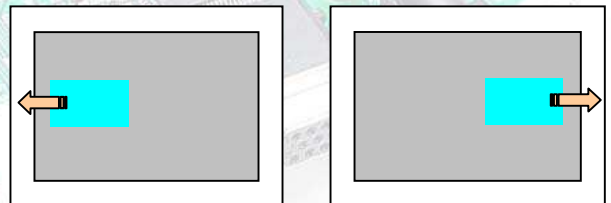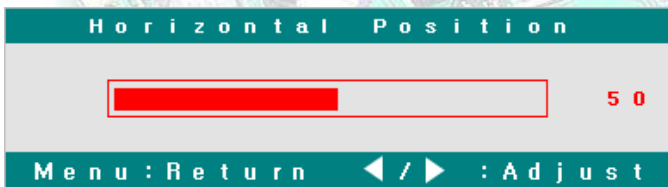
<u>Procedure</u>   SETUP > OSD Adjust   > Vertical Position   ◀   ▶

```
V e r t i c a l   P o s i t i o n

                                    5 0

M e n u : R e t u r n   ◀ / ▶ : A d j u s t
```
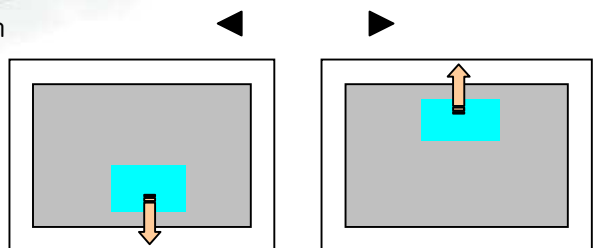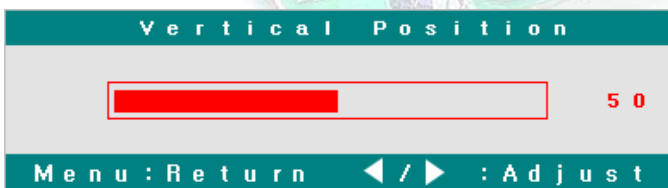
<u>Procedure</u>   SETUP > OSD Adjust   > OSD Time

```
O S D   T i m e

                                    2 0

M e n u : R e t u r n   ◀ / ▶ : A d j u s t
```

20

Miscellaneous Control

☑ Menu

```
M a i n   M e n u

        M i s c e l l a n e o u s

        1 2 8 0 x 1 0 2 4
        6 0 . 1 k H z / 6 0 H z
```

☑ Select
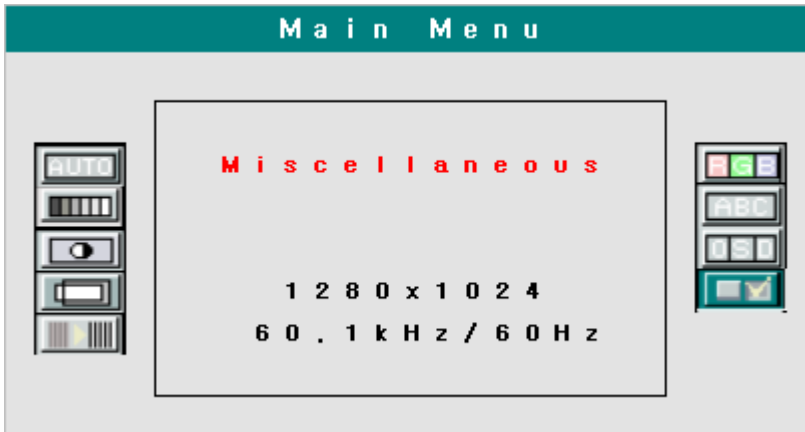
```
M i s c e l l a n e o u s
R e s e t
B l e n d i n g
M e n u : R e t u r n        S e l e c t
```

Reset Function

Procedure   SETUP > Miscellaneous   > Reset

* Restore value : Brightness, Contrast, OSD position, OSD Time, User Color, Blending

```
R e s e t

            Y E S

M e n u : R e t u r n        S e l e c t
```
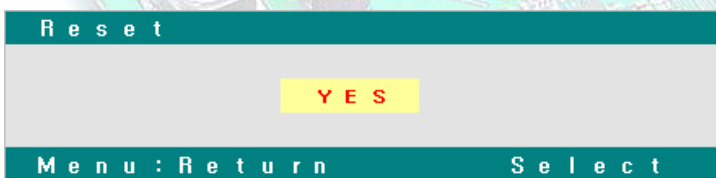
Blending Function

Procedure   SETUP > Miscellaneous   > Blending

* Transparency of OSD Background

```
B l e n d i n g

                              1 0

M e n u : R e t u r n    ◄ / ►  : A d j u s t
```

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Operation Message

OUT OF FREQUENCY

Input Signal is over the supporting range

```
 ANALOG

OUT OF RANGE

48.0kHz/ 67.0HZ
```

POWER SAVER MODE

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

```
 ANALOG

POWER SAVING MODE
```

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.

```
 ANALOG

CHECK SIGNAL CABLE
```

AUTO CONFIGURATION

Execute AUTO Function.

```
 AUTO CONFIGURATION
```

CONNECTOR, PINOUT & JUMPERS

The various connectors are:

J9 Jumper for Panel Type.

J8

J6

J11 Jumper for LCD Power

J14 Jumper for Output Power

J16

J4

J20

J1

J2

J15
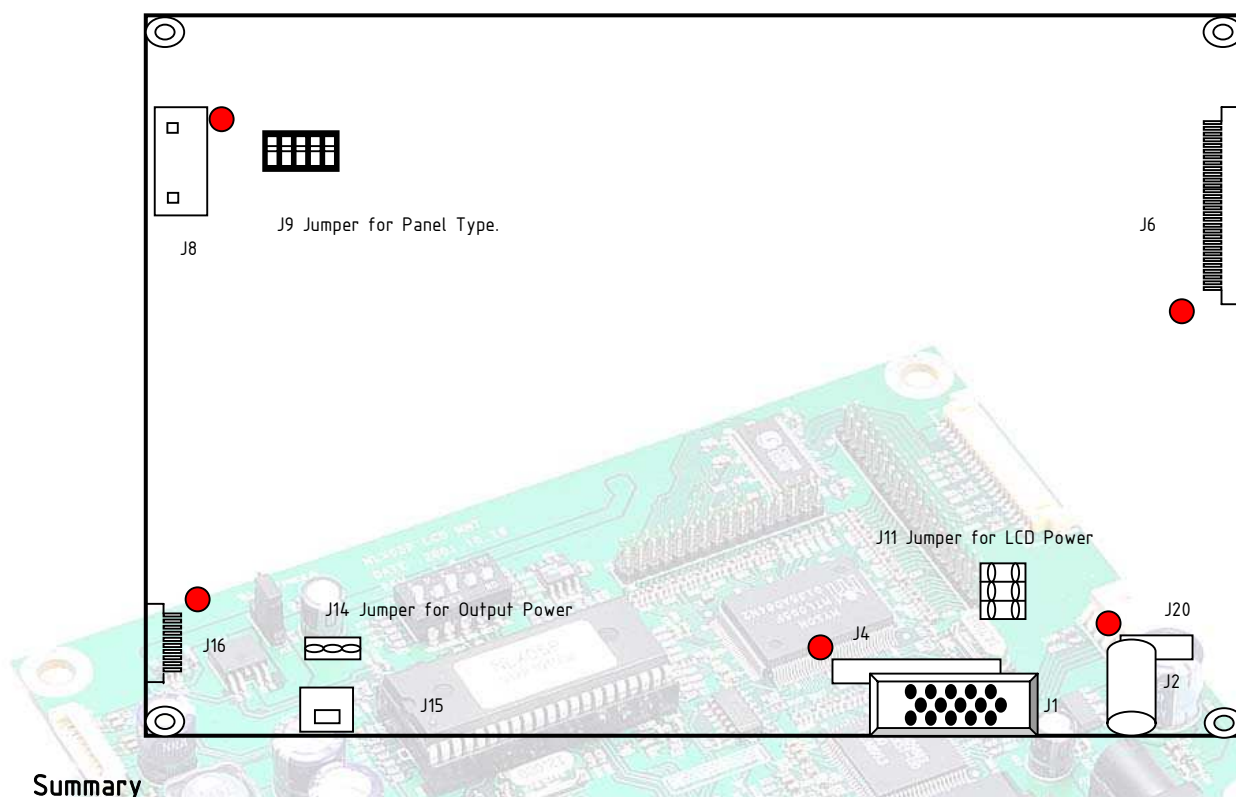
Summary

Reference	Item	Description	Type	Manufacture
J1	Connector	D-SUB Connector	D-SUB15	-
J2	Jack	DC power Input Jack	2.5Ø	-
J4	Connector	Analog RGB Input Connector	53015-1210	MOLEX
J6	Connector	LVDS Dual (LCD interface Signal)	12505WR-30	YEONHO
J8	Connector	To OSD Board	53015-0710	MOLEX
J9	Switch	Panel Type Select Switch	HDR5X2	-
J11	Jumper	LCD Power Select Jumper	3*2 Header	-
J14	Jumper	Output Power Select Jumper	3*1 Header	-
J15	Connector	Output Power Connector	53015-0310	MOLEX
J16	Connector	To Inverter Board	53261-1010	MOLEX
J20	Connector	DC power Input Connector	53015-0410	MOLEX

J1: ANALOG VGA INPUT

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

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

J2: 12V DC power supply

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

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J20: DC power Input Connector

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

J8: OSD control connector

Pin No.	Symbol	Description
1	Vcc	+5V
2	IRQ	IR(Infrared Rays) Line for Remote Control (Option)
3	LED2	RED LED
4	LED1	GREEN LED
5	GND	Ground
6	KEY1	Up, Power
7	KEY0	Menu, Select, Down

J16: Backlight Inverter connector

Pin No.	Symbol	Description
1	DIM-ADJ	Dimming adjustment analog dimming control signal Min 3.3V, Max 0V (cross check inverter specification)
2,6	NC	No Connection
5	ON/OFF	Inverter digital ON(3.3V)/OFF(0V) signal
3,4,7,8	GND	Ground
9,10	Vcc	12V

J14: On board +12V/+5V Output Power enable select jumper

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

J15: +12V/+5V Output Power Connector

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

J6: LCD Interface connector for 2 Channel LVDS type

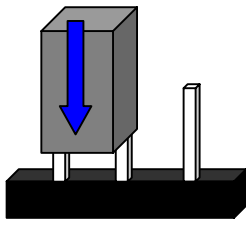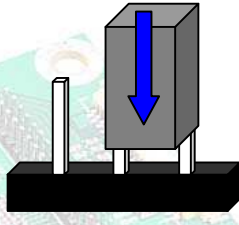| Pin No.	Symbol	Description
1	MOD_PWR	VDD For LCD Module (12V, 5V or 3.3V)
2	MOD_PWR	VDD For LCD Module (12V, 5V or 3.3V)
3	MOD_PWR	VDD For LCD Module (12V, 5V or 3.3V)
4	MOD_PWR	VDD For LCD Module (12V, 5V or 3.3V)
5	GND	Ground
6	SELLDS	LVDS DATA ORDER SELECT(Depends on Panel)/ No Connection
7	GND	Ground
8	Y3P-EVEN	Positive(+) LVDS differential first 3 data(A port)
9	Y3M-EVEN	Negative(-) LVDS differential first 3 data(A port)
10	YCP-EVEN	Positive(+) LVDS differential first Clock(A port)
11	YCM-EVEN	Negative(-) LVDS differential first Clock(A port)
12	Y2P-EVEN	Positive(+) LVDS differential first 2 data(A port)
13	Y2M-EVEN	Negative(-) LVDS differential first 2 data(A port)
14	GND	Ground
15	Y1P-EVEN	Positive(+) LVDS differential first 1 data(A port)
16	Y1M-EVEN	Negative(-) LVDS differential first 1 data(A port)
17	Y0P-EVEN	Positive(+) LVDS differential first 0 data(A port)
18	Y0M-EVEN	Negative(-) LVDS differential first 0 data(A port)
19	GND	Ground
20	Y3P-ODD	Positive(+) LVDS differential second 3 data(B port)
21	Y3M-ODD	Negative(-) LVDS differential second 3 data(B port)
22	YCP-ODD	Positive(+) LVDS differential second Clock(B port)
23	YCM-ODD	Negative(-) LVDS differential second Clock(B port)
24	Y2P-ODD	Positive(+) LVDS differential second 2 data(B port)
25	Y2M-ODD	Negative(-) LVDS differential second 2 data(B port)
26	GND	Ground
27	Y1P-ODD	Positive(+) LVDS differential second 1 data(B port)
28	Y1M-ODD	Negative(-) LVDS differential second 1 data(B port)
29	Y0P-ODD	Positive(+) LVDS differential second 0 data(B port)
30	Y0M-ODD	Negative(-) LVDS differential second 0 data(B port)

J9: Panel Type Select Switch
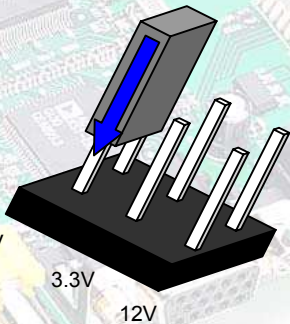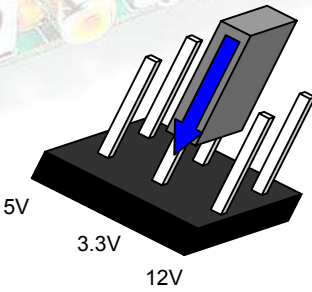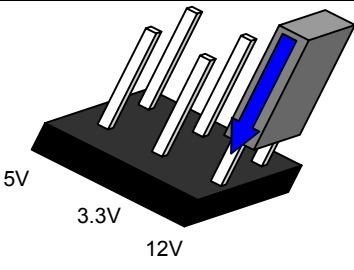
Pin No / Symbol		Description	
		OFF	ON
1	XGA/SXGA	XGA	SXGA
2	VGA/SVGA	VGA	SVGA
3	NOR/SFT	NORMAL	SIFT
4	8BIT/6BIT	8BIT	6BIT
5	DUAL/SINGLE	DUAL	SINGLE

J11: LCD Panel power select jumper

Pin No.	Symbol	Description
1	5.0V	+5.0V for LCD Module
2	3.3V	+3.3V for LCD Module
3	12V	+12.0V for LCD Module
4,5,6	VDD	LCD Module Power

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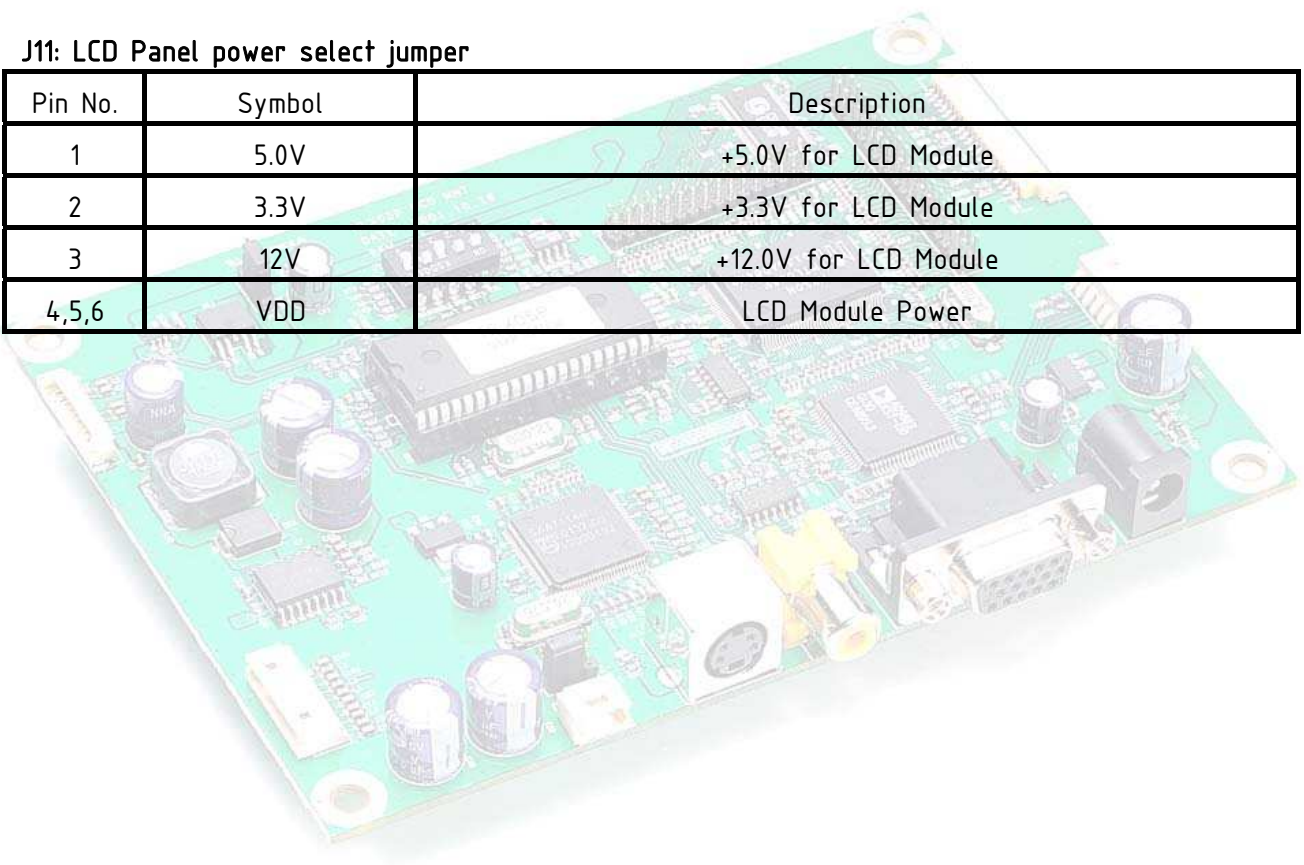
Summary: jumpers setting

Reference	Description	Connector Type
J14	On board +12V logic power enable	12V 5V
	On board +5V logic power enable	12V 5V
J11	5V panel power CAUTION: Incorrect setting can damage panel	5V 3.3V 12V
	3.3V panel power CAUTION: Incorrect setting can damage panel	5V 3.3V 12V
	123V panel power CAUTION: Incorrect setting can damage panel	5V 3.3V 12V

CONTROLLER DIMENSIONS
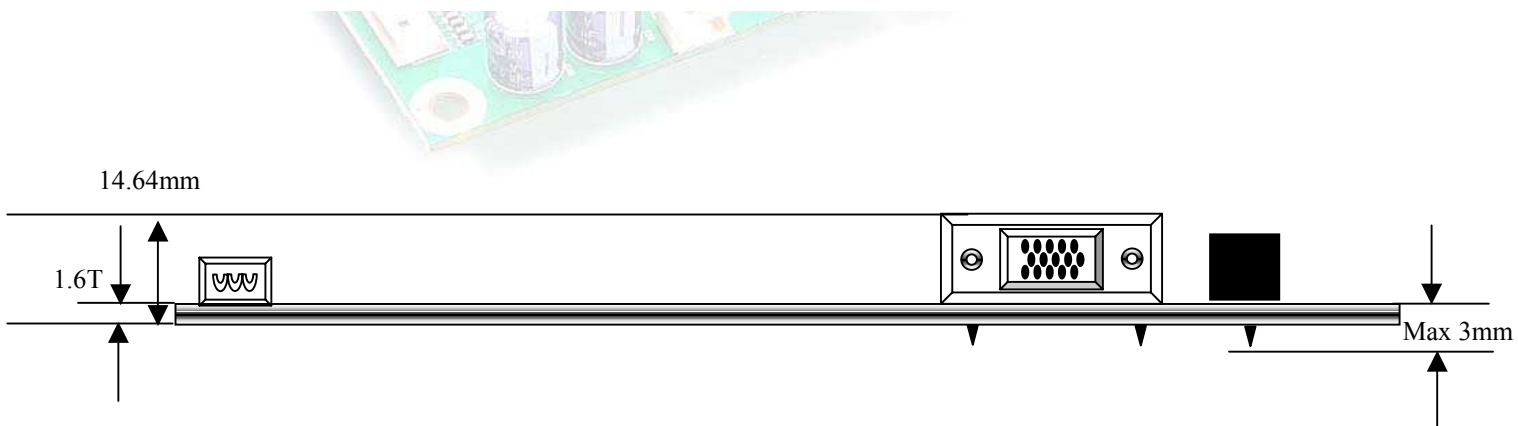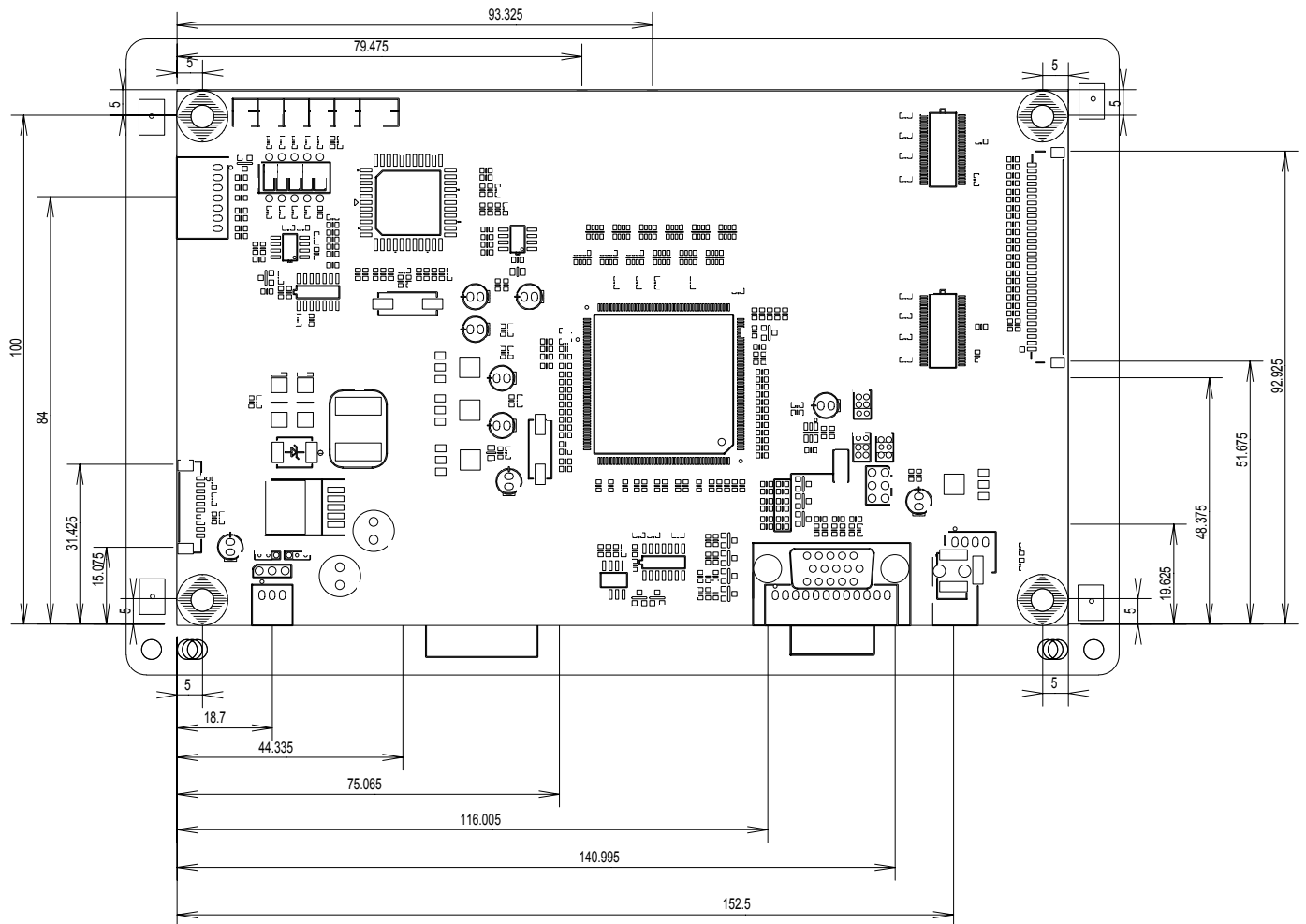
APPLICATION NOTES

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.
- 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 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. Pin 5 should be matched to the inverter specification for the ON/OFF pin.

Brightness Dimming control: NCB200 controller boards are analog dimming control method. And it is important to consider the specifications for the inverter to be used.

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TROUBLESHOOTING

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.

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.

Image position:

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

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.

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.

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

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
1280*1024@60Hz	108.000	P	63.981	1688	1280	P	60.020	1066	1024
1280*1024@75Hz	135.000	P	79.976	1688	1280	P	75.035	1066	1024

ACCESSORY

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

No.	Items	Part No.	Ex) LG. Philips LB064V2
1	LCD signal cable	SC–Panel Part No.–mm	SC–LB064V2–20
2	Inverter	Part no. of Manufacturer	GH006
3	Inverter cable	IC–Panel Part No.–mm	IC–GH006–20
4	OSD Board	NLX05–OSD	NLX05–OSD
5	OSD Cable	OC–NID01–mm	OC–NID01–20

＊ **SC**: LCD **S**ignal **C**able   **IC**: Inverter Interface cable   **OC**: OSD Board cable

APPENDIX

A. Tested panel

This board can support various LCD panels, which have VGA, SVGA, XGA 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 the NCB100 board. And SUCH will try continuously to the model names of the LCD panels that have been tested.

No.	LCD Model Name	LCD vendor	LCD VCC	Option (note1)	SW1	SW2	SW3	SW4	SW5
1	HT17E11	HYDIS	+5.0V	ED8N	ON	ON	OFF	OFF	OFF
2	LTM17EH-L01	SAMSUNG	+5.0V	ED8N	ON	ON	OFF	OFF	OFF
3	LM170E01	LG Philips LCD	+5.0V	ED8N	ON	ON	OFF	OFF	OFF
4	LM181E1, 05, 06	LG Philips LCD	+12.0V	ED8N	ON	ON	OFF	OFF	OFF
5	HT18E22	HYDIS	+3.3V	ED8S	ON	ON	ON	OFF	OFF
6	LTM190E1	SAMSUNG	+5.0V	ED8N	ON	ON	OFF	OFF	OFF
7	LM190E-C4	LG Philips LCD	+12.0V	ED8N	ON	ON	OFF	OFF	OFF
8	FLC48SXC8V-10	Fujitsu	+5.0V	ED8N	ON	ON	OFF	OFF	OFF

Note1 : Abbreviated word : $E^{\text{ⓐ}}S^{\text{ⓑ}}6^{\text{ⓒ}}S^{\text{ⓓ}}$

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

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