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Intelligent Solutions



KORDIS
Kordis Media Co.,Ltd.

Specification

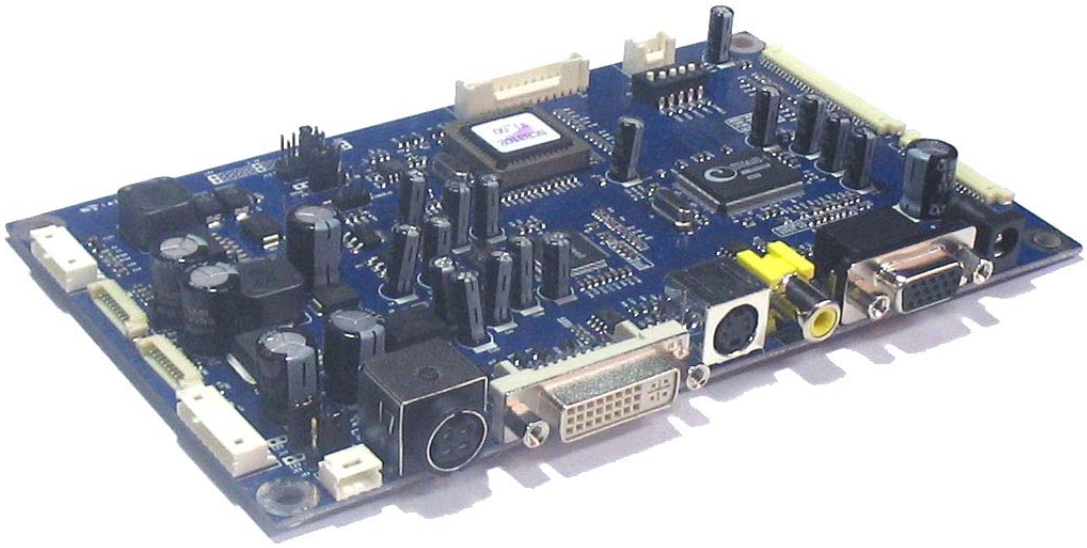
NCB320U*

Version: AA

Date: March 2009

DATA SHEET

TFT LCD Monitor Control Board



NCB320U	
NCB320U1	**Analog input support** **Max resolution : WUXGA**
NCB320U2	**Analog & DVI input support** **Max resolution : WUXGA**
NCB320U4	**Analog & DVI & VIDEO input support** **Max resolution : WUXGA**

RoHS Compliant

March 2009

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Revision History

No	Data	Revision	Page
1	Preliminary Release	AA	

INTRODUCTION

Designed for LCD monitor and other flat panel display application the NCB320U controller provides an auto-input synchronization and easy to sue interface controller for:

▶ TFT (active matrix) LCD panels of 1024x768, 1280x768, 1366x768, 1280x1024, 1440x900, 1680x1050, 1600x1200, 1920x1080 and 1920x1200 resolutions

▶ Computer video signals of VGA, SVGA, XGA, WXGA, SXGA, WXGA+, WSXGA+, UXGA, FHD and WUXGA standard.

▶ CVBS and SVHS Video signals of NTSC, PAL standard

▶ **3-D Comb filter and Noise Reduction adoption**

▶ 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 & Video

▶ 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	Model name	XGA Panel	1024X768	NCB320X4	Note 1)
		WXGA Panel	1280X768	NCB320W4	
		WXGA Panel	1366X768	NCB320WZ4	
		SXGA Panel	1280X1024	NCB320E4	
		WXGA+ Panel	1440X900	NCB320WX4	
		WSXGA+ Panel	1680X1050	NCB320WE4	
		UXGA Panel	1600X1200	NCB320U4	
		HD Panel	1920X1080	NCB320WH4	
		WUXGA Panel	1920X1200	NCB320WU4	
2	LCD Module	XGA, WXGA, SXGA, WXGA+, WSXGA+, UXGA, HD, WUXGA			
3	Signal Input	Analog RGB. TMDS(DVI-D). NTSC/PAL			
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/15Vdc/18Vdc or 24Vdc		
		Max Power	TBD		
8	Signal Connector	Analog	DSUB 15P(R, G, B Separate H, V Sync)		
		Digital	DVI-D(TMDS)		TMDS
		Video	MINIDIN-4P(SVHS), RCA(CVBS)		

Notes 1) Depends On Panel Resolution

- **X : XGA (1024X768)**
- **W : WXGA (1280X768)**
- **WZ : WXGA (1366X768)**
- **E : SXGA (1280X1024)**
- **WX : WXGA+ (1440x900)**
- **WE : WSXGA+ (1680x1050)**
- **U : UXGA (1600x1200)**
- **WH : FHD 1080i (1920x1080)**
- **WU : WUXGA (1920x1200)**

ELECTRICAL SPECIFICATION

Input characteristic

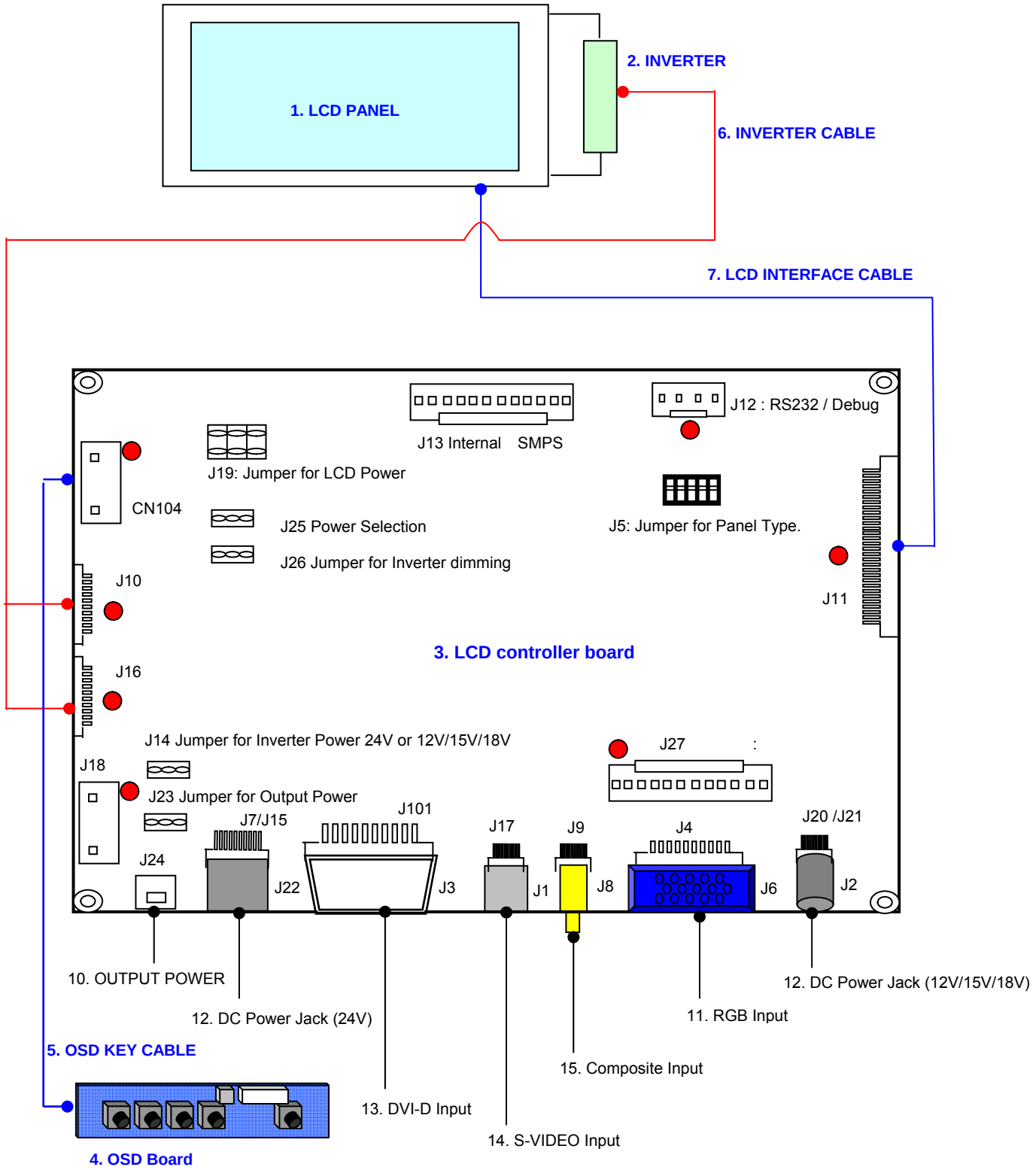
Description	Signal	Unit	Min	Typical	Max	Remarks
Power In (24V)						
	Input	Vdc	22.8	24.0	25.2	
	Consumption	Watt		TBD		Without INV
Power In (18V)						
	Input	Vdc	17.0	18.0	19.0	
	Consumption	Watt		TBD		Without INV
Power In (15V)						
	Input	Vdc	14.75	15.0	15.75	
	Consumption	Watt		TBD		Without INV
Power In (12V)						
	Input	Vdc	11.4	12.0	12.6	
	Consumption	Watt		TBD		Without INV
RGB Input						
	Analog RGB	Vp-p	0	0.7	-	
	Sync	Vdc	0	5.0	5.5	
	H Frequency	KHz	31	64	80	Depends on Mode
	V Frequency	Hz	55	60	75	
DVI Input						
	TMDS	mVp-p	450	500	900	
NTSC/PAL						
	Y/CVBS	Vp-p	0.7	1.0	1.4	
	C	Vp-p	0.6	0.8	1.0	

Output Characteristics

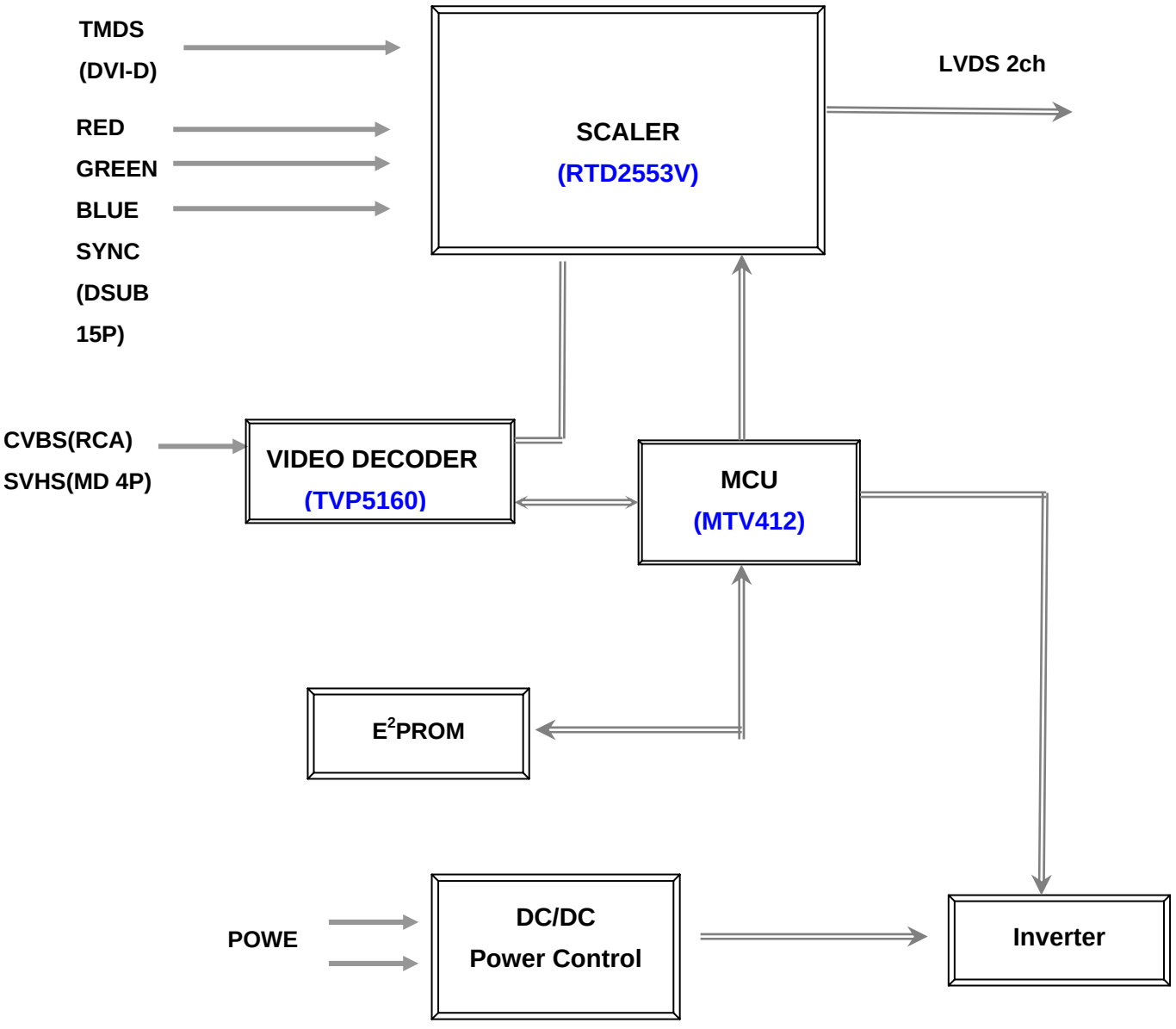
Description	Signal	Unit	Min	Typical	Max	Remarks
Panel Power						
	LCD Power (18V)	Vdc	17.1	18.0	18.9	Jumper option (Representative 12V)
	LCD Power (15V)	Vdc	14.25	15.0	15.75	
	LCD Power (12V)	Vdc	11.4	12.0	12.6	
	LCD Power(5V)	Vdc	4.75	5.0	5.25	Jumper option
	LCD Power(3.3V)	Vdc	3.13	3.3	3.46	Jumper option
LVDS Interface						
	Differential output	Vp-p (mV)	250	350	450	Different +/-
Inverter Interface						
	Power out	Vdc	22.8	24.0	25.2	Depends on Power Input and Spec.
			17.1	18.0	18.9	
			14.25	15.0	15.75	
			11.4	12.0	12.6	
	On/Off control	V	0		3.3	L=off, H=on
	Brightness control	V	3.3		0	Option
			0		3.3	Option
		Step	0		100	OSD Value

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 projects using TFT (active matrix) LCD panels of 1024x768, 1280x768, 1366x768, 1280x1024, 1440x900, 1680x1050, 1600x1200, 1920x1080 and 1920x1200 resolutions,

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 LVDS interface logic on the Board for different kind of TFT LCD panel. 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 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. AV cable: Standard composite or S-video cables can be used. Reasonable quality cables should be used to avoid image quality degradation.

8. OSD Button: See Operational Function section.

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

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

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

11. Power input: Proper power 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, One LCD panel sample and full technical specifications for the LCD panel from the manufacturer are required to test for tuning up screen image.

Kordis can provide engineering service for customers specific controller development.

Please contact **Kordis** . (**dyoh@kordis.co.kr**)

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 5 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 J11 of the controller board for Single Channel interface resolution Panel or for dual channel interface panel. Plug the other end of cables to the LCD connector board.
3. **Inverter & Controller:** Plug the inverter cable to J10/J16 of the controller board and another end to the connector on the inverter. Make sure J14 jumper position for Inverter Power
4. **Function switch & Controller:** Plug the OSD switch mount cable to CN104 of the controller board and another end to the OSD board.
5. **Jumpers & Switch:** Check all jumpers J23 (External power Setting), J19 (Target panel power is setting), J5 (Target Panel Option switch) and J14 (Inverter Power) 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 J6/J4 of the controller board.
7. **DIV-D Cable & Controller**: Plug the DVI-D Cable to the connector J3/J101 of the controller board.
8. **C/S-Video Cable & Controller**: Plug S-Video Cable to the connector J1/J7, C-Video Cable to the J8/J9
9. **Power supply & Controller:** Plug the DC 12V/15V/18V power in to the connector J2/J20 and DC 24V power in to the connector J22/J7 of controller board.
10. **SMPS & Controller :** Plug the SMPS power in to the connector J13 of controller board
11. **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.

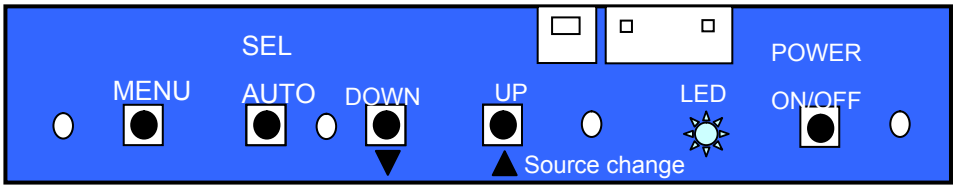
PC Setting:

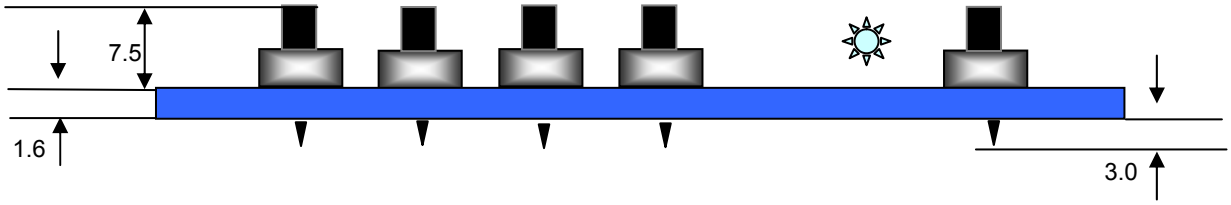
The controller has been designed to take a very wide range of input signals however to optimize the PC’s graphic performance we recommend choosing 60Hz vertical refresh rate – this will not cause screen flicker.

OSD Control Board

The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 5 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		No OSD Auto Adjust
LED	Indicates operation status	Green/ Red/ Amber	
DOWN, UP ▼ ▲	Cursor control(Value Control) Down(Decrement)/Up(Increment)		UP : Source change

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

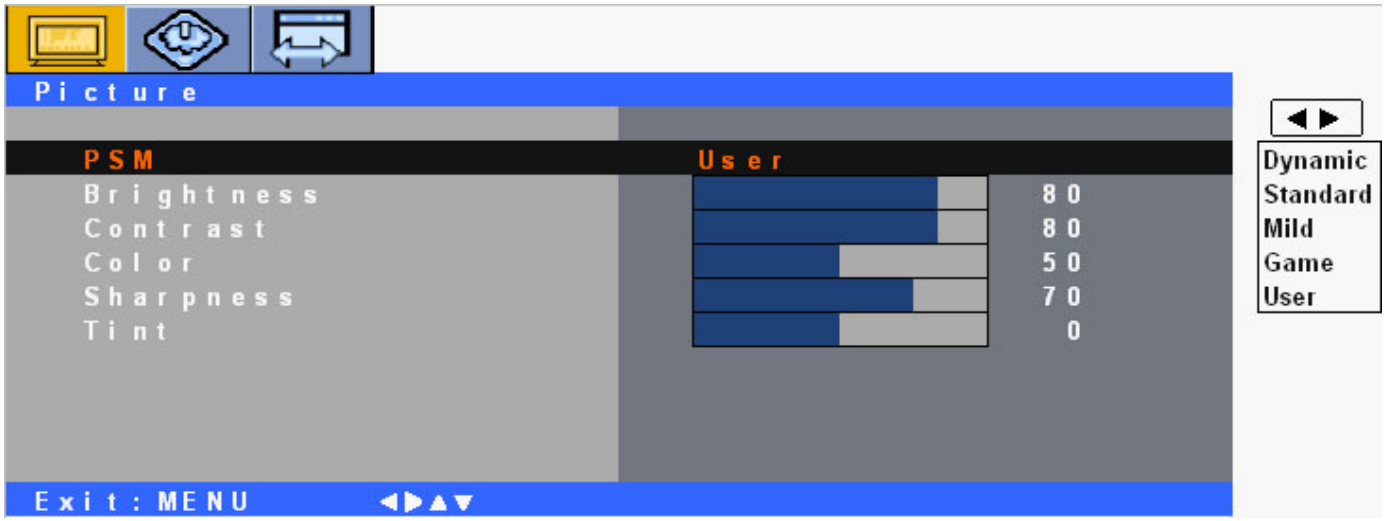
OSD MAIN MENU



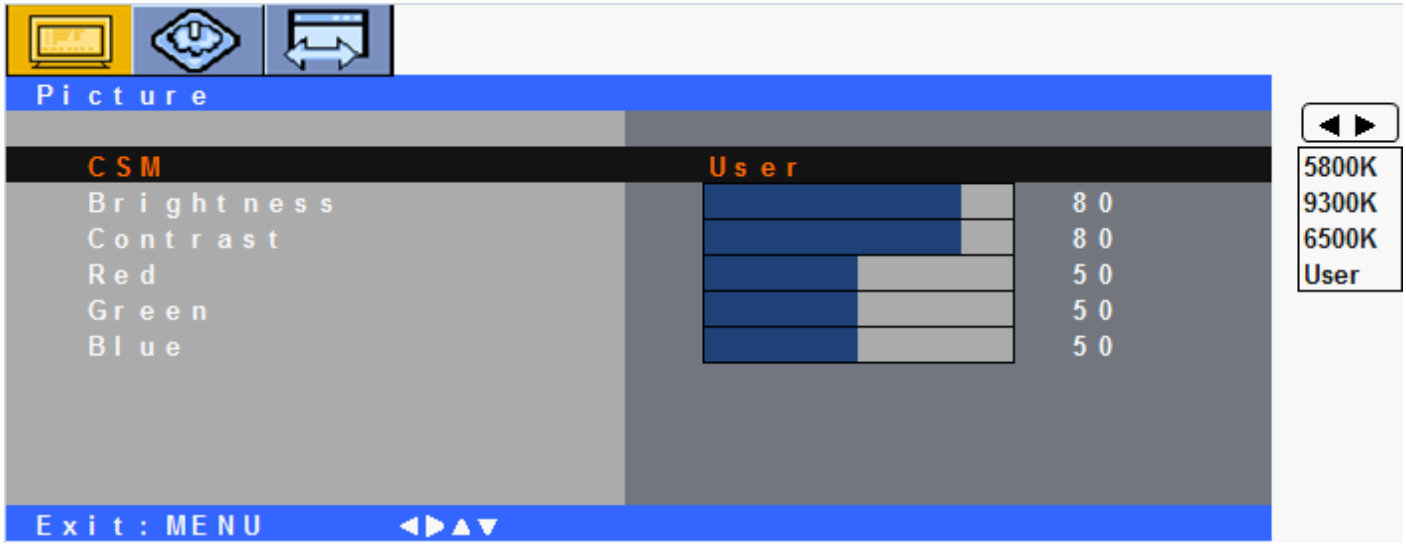
Picture



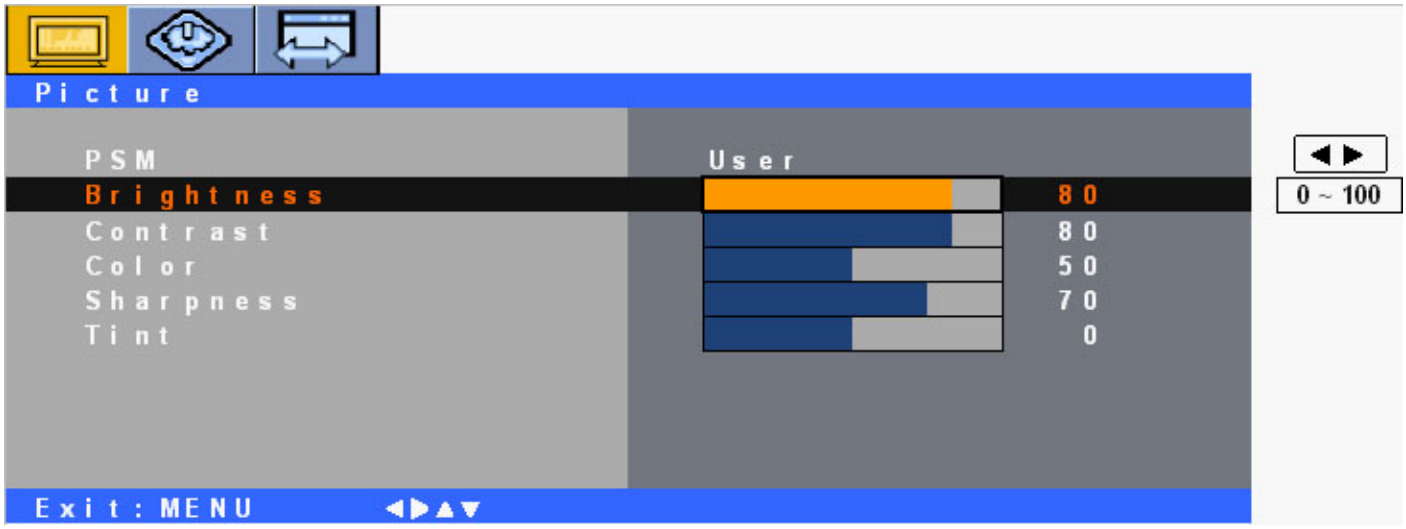
VIDEO MODE



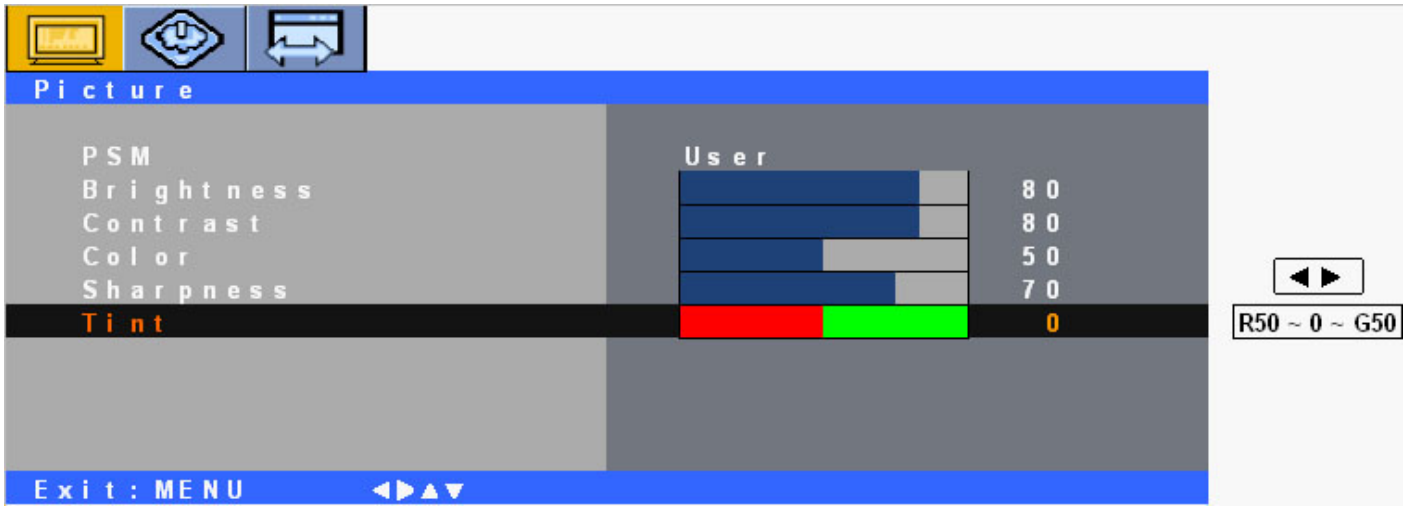
RGB MODE



Brightness / Contrast / Color / Sharpness



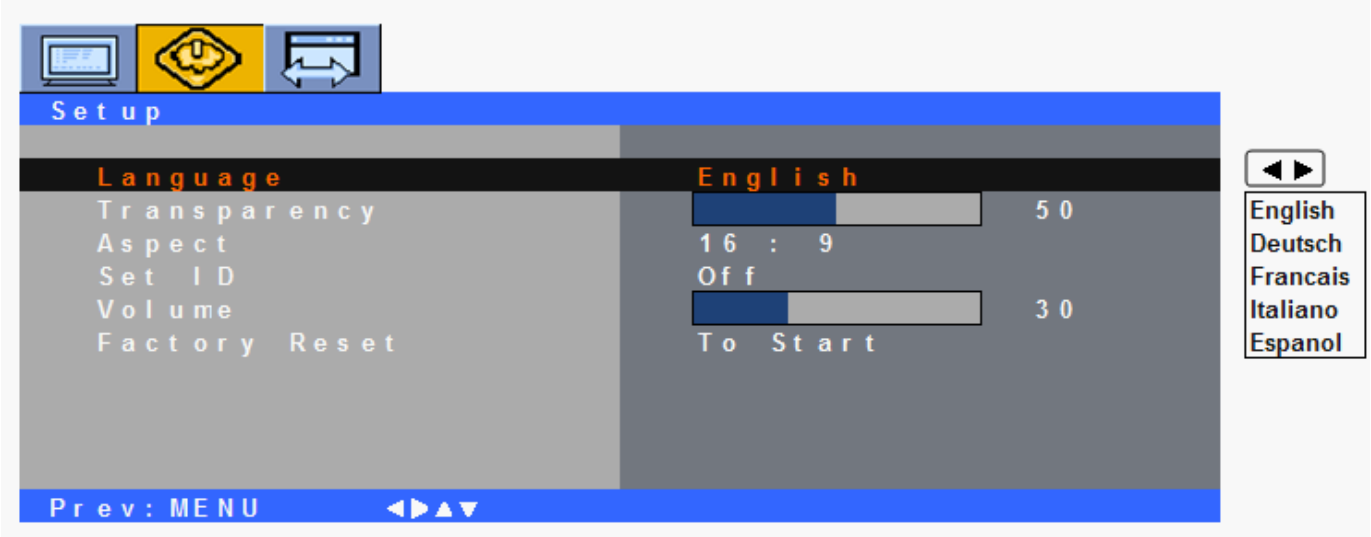
Tint



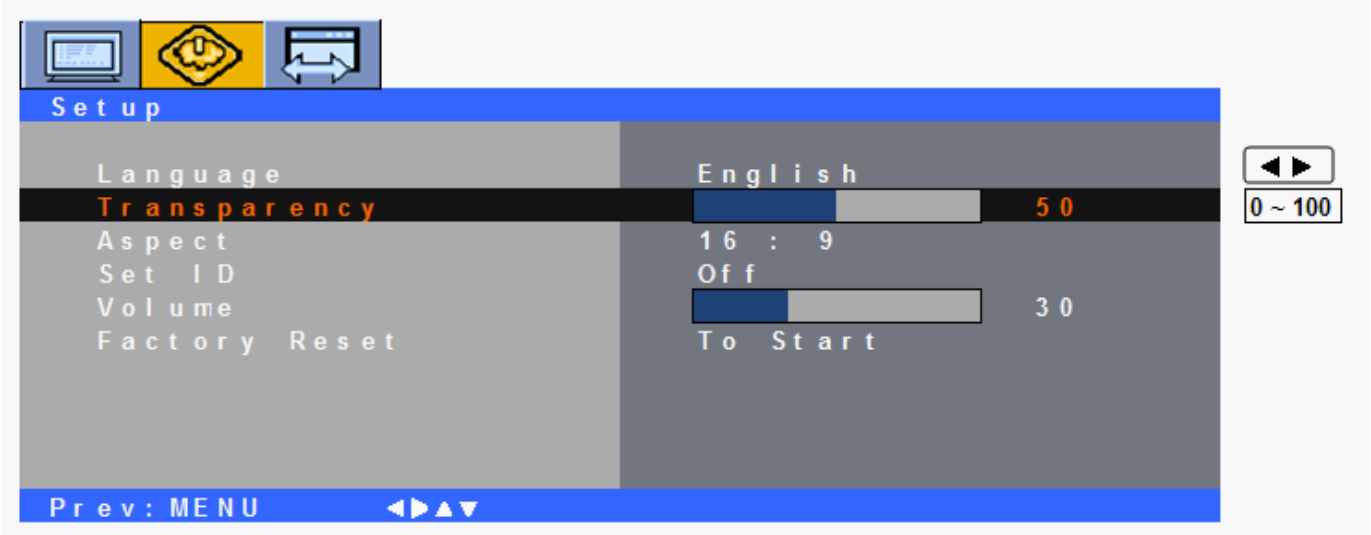
Setup



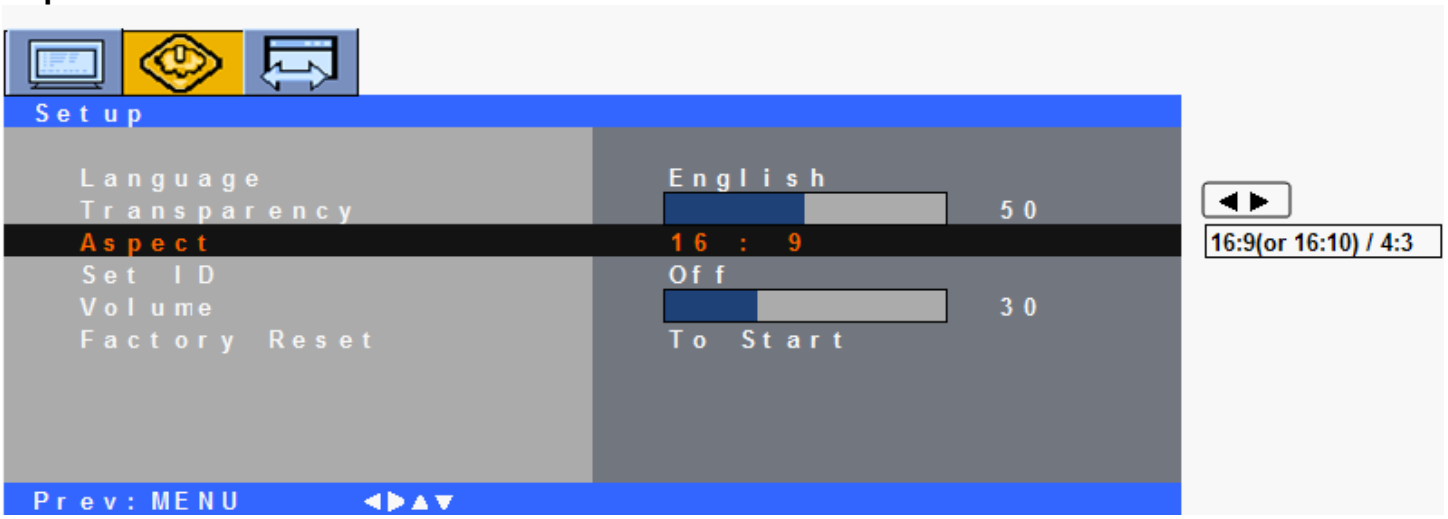
Language



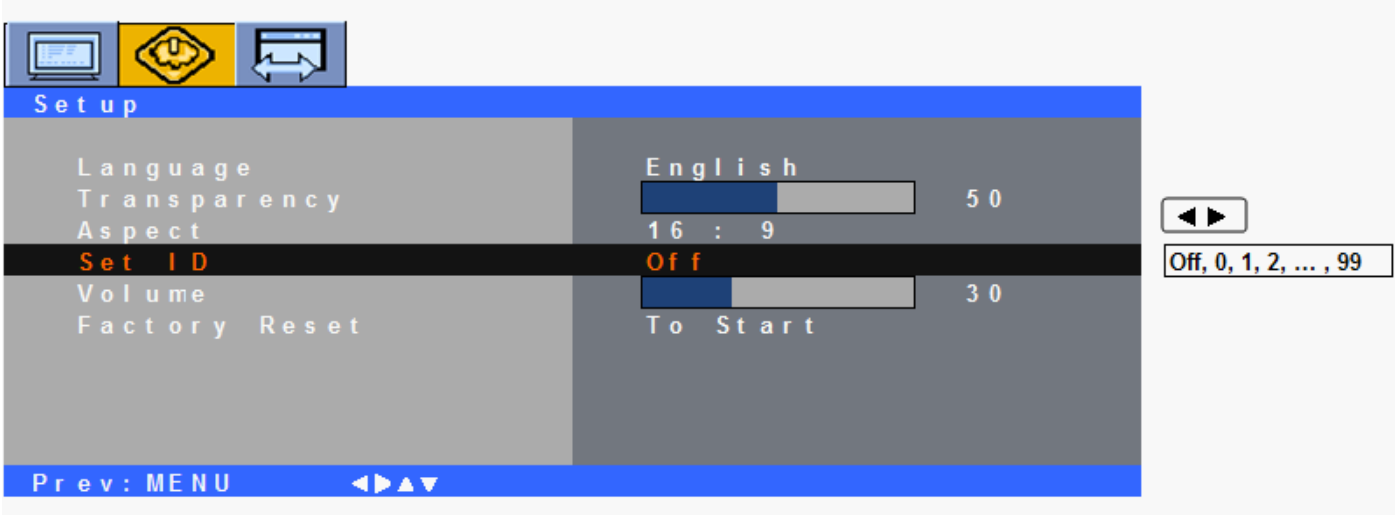
Transparency



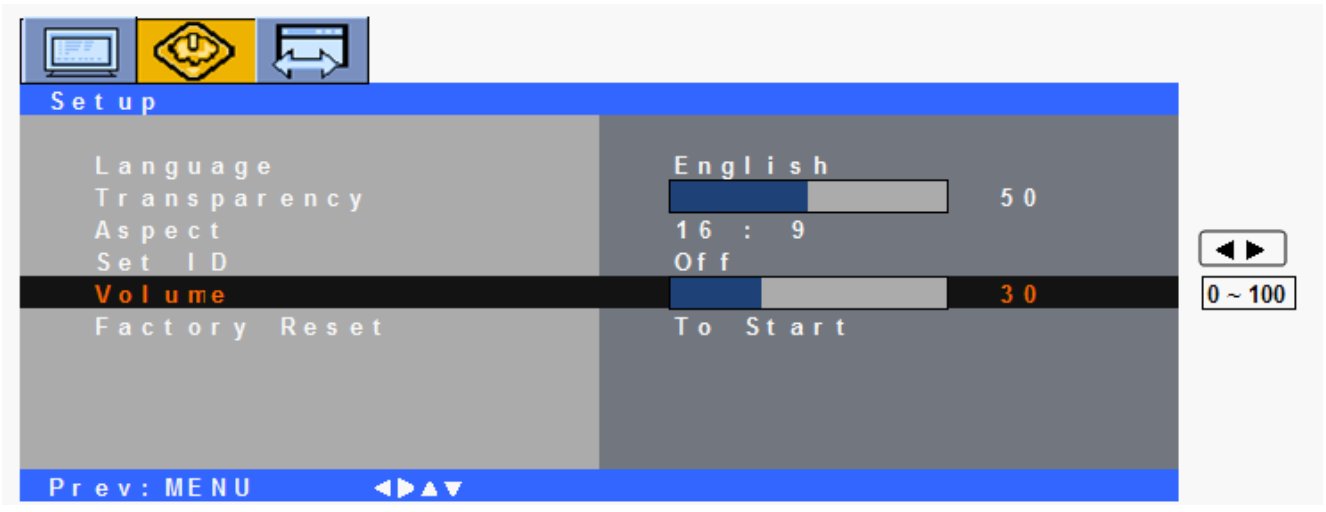
Aspect



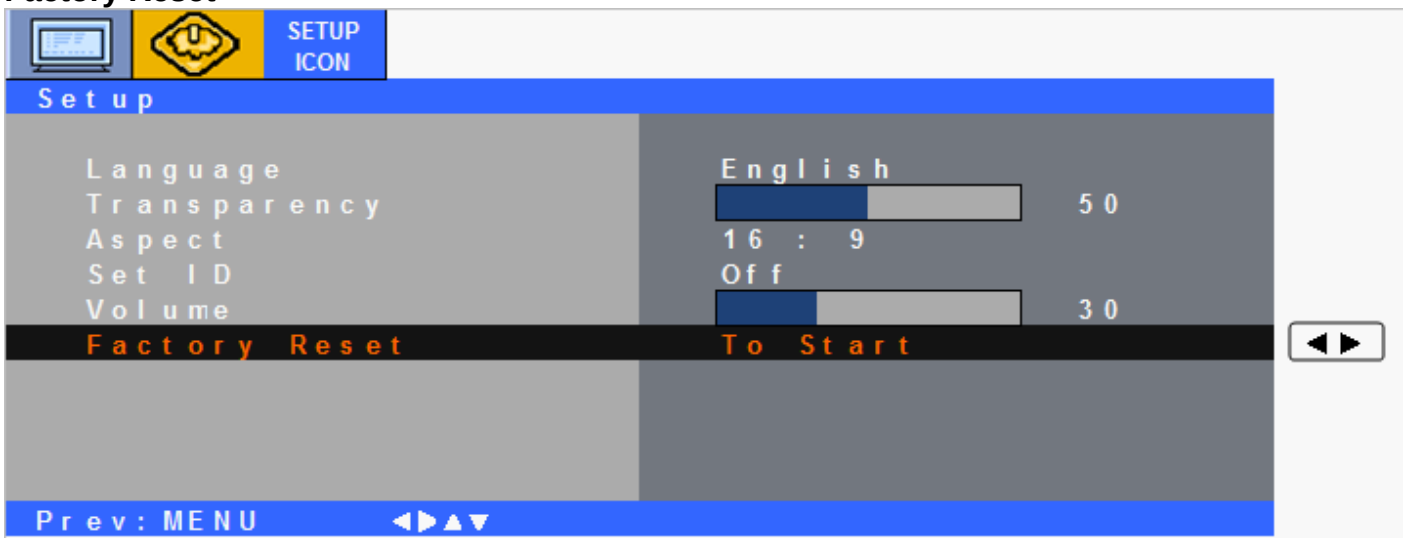
Set ID



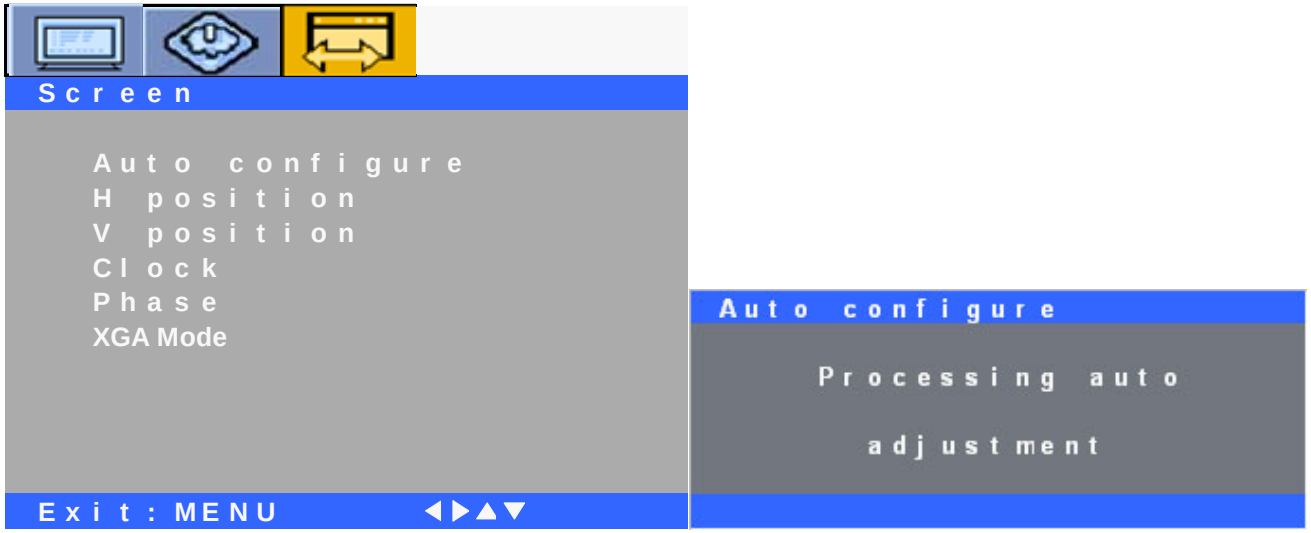
Volume



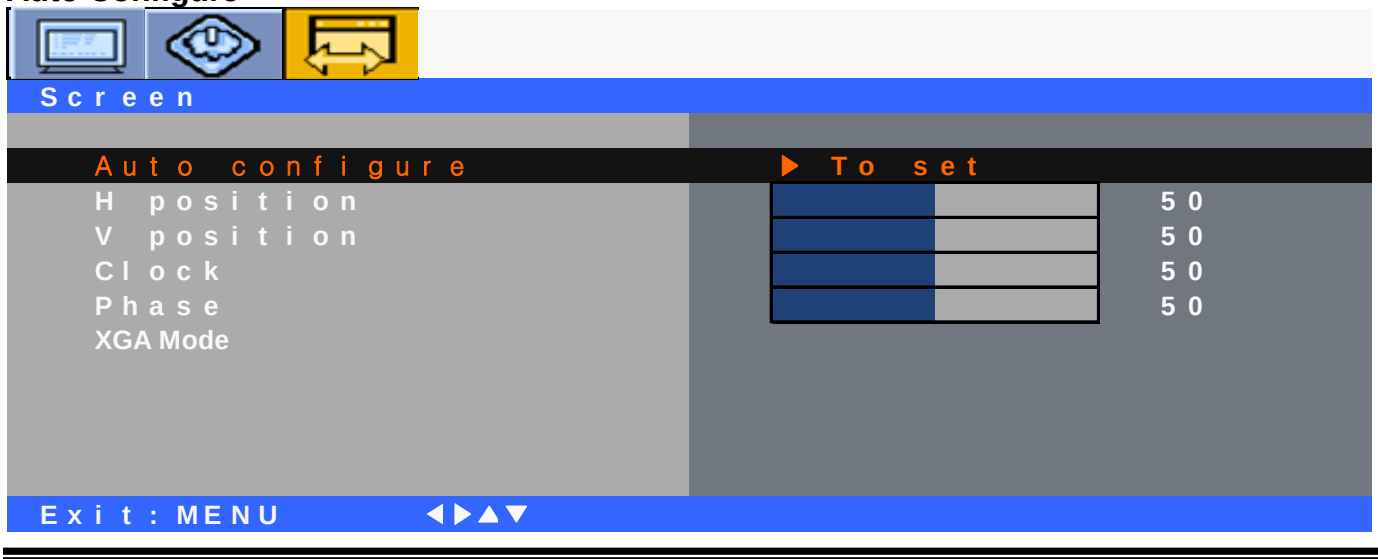
Factory Reset



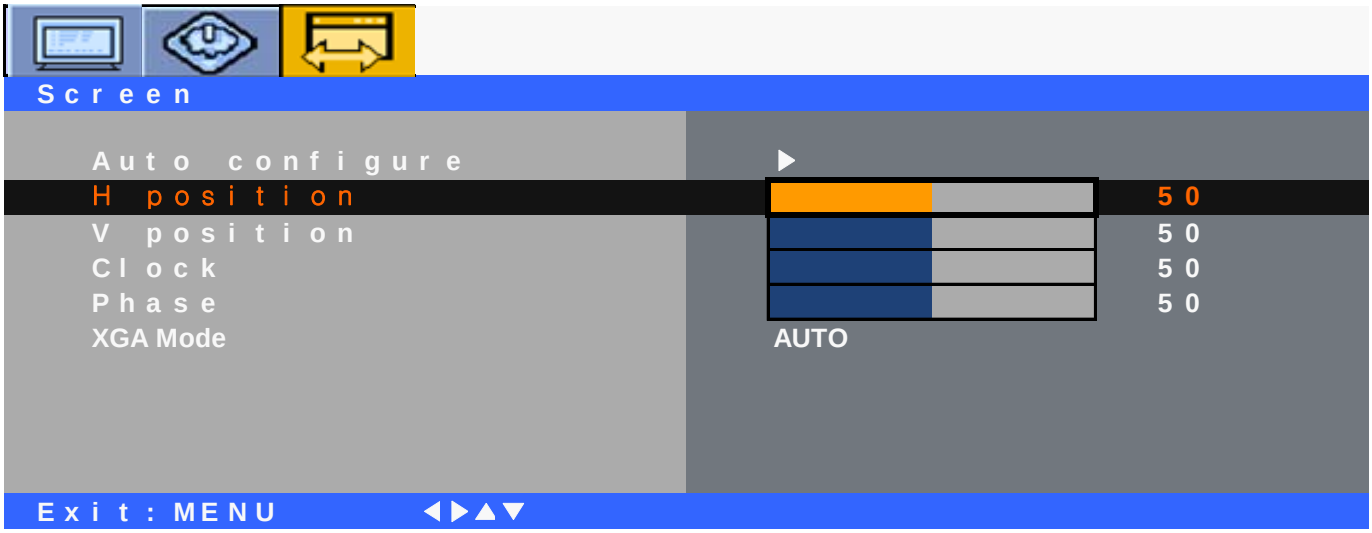
Screen



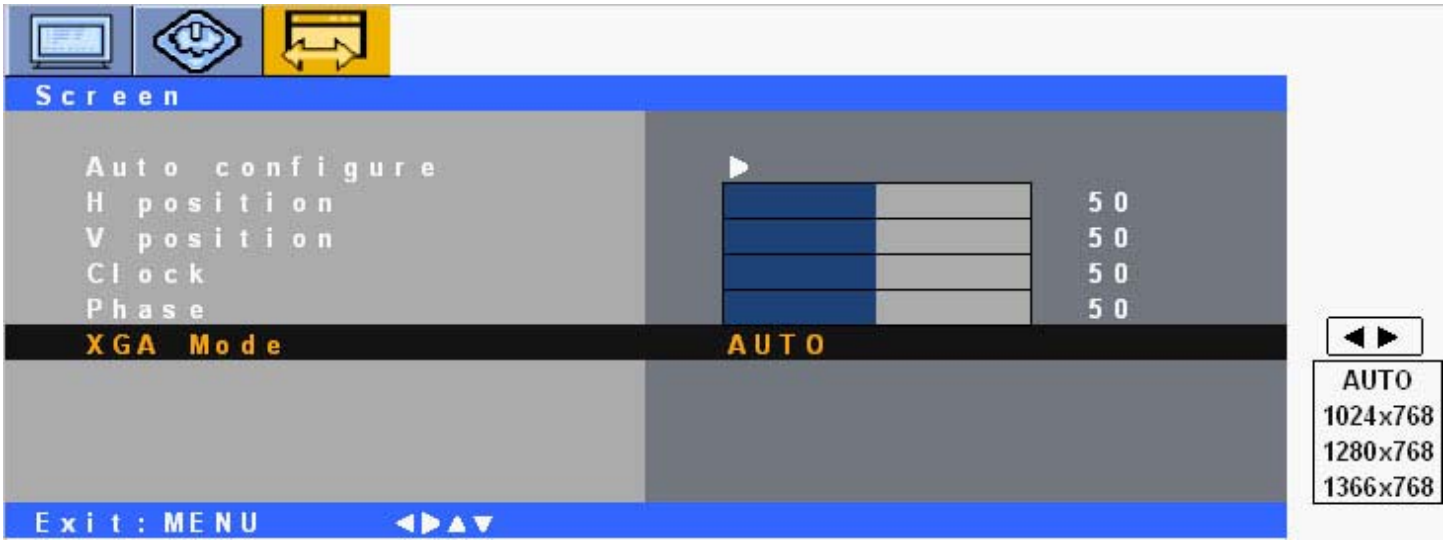
Auto Configure



H Position / V Position / Clock / Phase



XGA Mode



*** XGA Mode : Setting of Auto configuration for XGA up to WXGA at Analog input**

OSD GUI Control Table

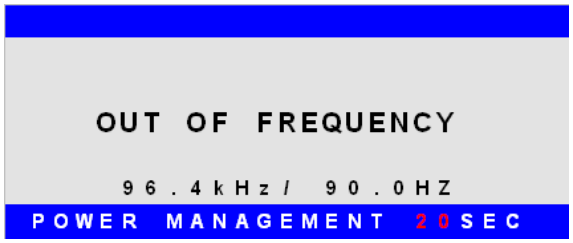
MAIN MENU	SUB MENU	CONTROL		
PICTURE	PSM	Dynamic/Standard/Mild/Game/User		VIDEO
		USER	Brightness, Contrast, Color, Sharpness	
	CSM	CSM/Brightness/Contrast		PC
		CSM	5800K/9300K/6500K/User	
		User	Red/Green/Blue	
SETUP	Language	English/Deutsch/Français/Italiano/Espanol		
	Transparency	50 (1 ~100)		
	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)		
	XGA Mode	AUTO / 1366*768 / 1280*768 / 1024*768		

*** XGA Mode : Setting of Auto configuration for XGA up to WXGA at Analog input**

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.



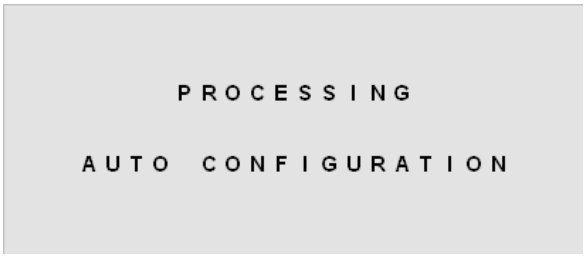
SELF DIAGNOSTICS

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



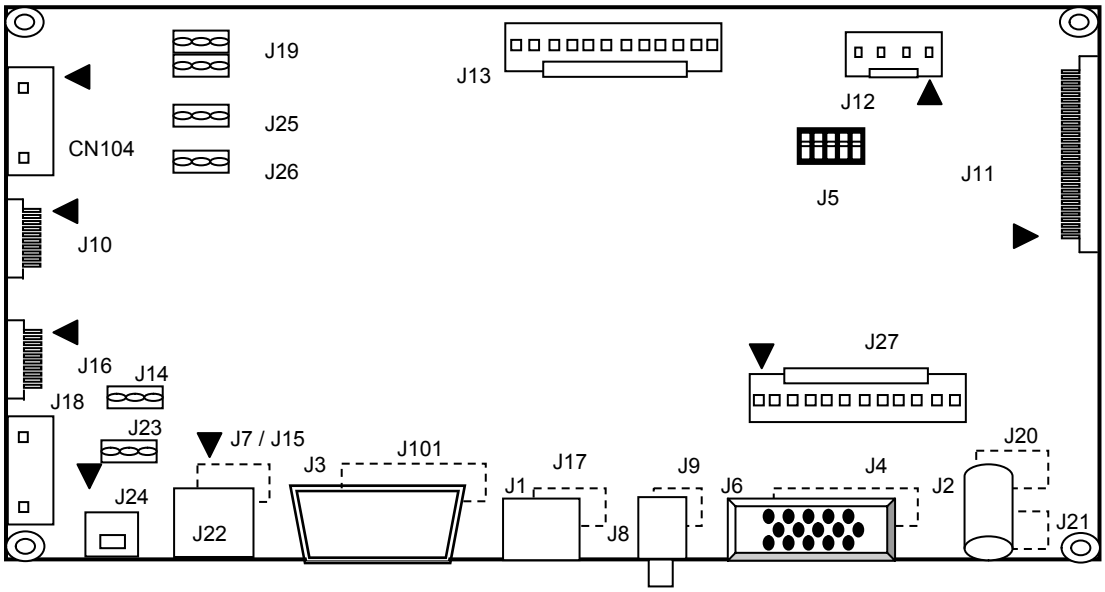
AUTO CONFIGURATION

Execute AUTO Function.



CONNECTOR, PINOUT & JUMPERS

The various connectors are:



Summary

Reference	Item	Description	Type	Manufacture
J1	Jack	S-video Input	MJ373	MINIDIN 4PIN
J2	Jack	12V Input Dc power	2.5Ø	-
J3	Connector	DVI-D Input(TMDS)	DVI-D 24P	
J4	Wafer	Analog RGB Input	20017WR-1210	YEONHO
J5	Switch	Panel Type Selection	HDR5X2	-
J6	Connector	Analog RGB Input	15P D-SUB	-
J7	Wafer	24V Power Input	20017WR-0410	YEONHO
J8	Jack	C-video Input	RCA(Yellow)	-
J9	Wafer	C-video Input	20017WR-0310	YEONHO
J10, J16	Wafer	Inverter Interface	12505WR-1090	YEONHO
J11	Wafer	LVDS Interface	12507WR-30	YEONHO
J12	Wafer	To RS232 or Debugger	SMW200-0410	YEONHO
J13	Wafer	Internal SMPS Power Input	SMW200-1410	YEONHO
J14	Jumper	Inverter Power Selection	HDR3X1	
J15	Block	24V Input Terminal Block	BR-500C	
J17	Wafer	S-Video Input	20017WR-0510	YEONHO
J18	Wafer	24V Power Input	20017WR-0910	YEONHO
J19	Jumper	Panel Power Selection	HDR2X4	
J20	Wafer	12V Power Input	20017WR-0410	YEONHO

Reference	Item	Description	Type	Manufacture
J21	Block	12V Input Terminal Block	BR-500C	
J22	Jack	24V Input Dc power	KPJ-4S-S	KYCON
J23	Jumper	Output Power Selection	HDR3X1	
J24	Wafer	Output Power	20017WR-0310	YEONHO
J25	Jumper	5V Power Selection	HDR3X1	
J26	Jumper	Inverter Dimming Selection	HDR3X1	
J27	Wafer	External (YPbPr, Audio Board)	SMW200-1210	YEONHO
J101	Wafer	DVI-D Input	12507WR-20	YEONHO
CN104	Wafer	To OSD Board	20017WR-0710	YEONHO

J1: S-Video Input Jack

Pin No.	Symbol	Description
1	GND	Ground
2	GND	Ground
3	C-in	CROMA signal input
4	Y-in	LUMA signal input
5	GND	Ground
6	GND	Ground
7	GND	Ground

J2: 12V DC power supply Jack

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

J3: DVI-D Input Connector

Pin No.	Symbol	Description
1	TMDS DATA2-	TMDS DATA2 Differential Negative Signal
2	TMDS DATA2+	TMDS DATA2 Differential Positive Signal
3	TMDS DATA2 Shield	Shield for TMDS Channel #2
4	NC	No Connection
5	NC	No Connection
6	SDA	The Data Line for the DDC Interface

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

J4: Analog RGB Input Wafer

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 Selection Switch

*** See the appendix more information – 41 Page**

J6: Analog RGB Input Connector

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: 24V DC power Input Wafer

Pin No.	Symbol	Description
1,2	Vcc	24V
3,4	GND	Ground

J8: C-video Input Jack

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1,2	CVBS	Composite-video input	3	GND	Ground

J9: C-video Input Wafer

Pin No.	Symbol	Description
1,3	Composite	CVBS input signal
2	GND	Ground

J11: LCD Interface Wafer for 2 Ch LVDS Type

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	SELLDS	LVDS DATA ORDER SELECT(Depends on Panel)/ No Connection
7	GND	Ground
8	Y3P-EVEN	Positive(+) LVDS differential first 3 data(B port)
9	Y3M-EVEN	Negative(-) LVDS differential first 3 data(B port)
10	YCP-EVEN	Positive(+) LVDS differential first Clock(B port)
11	YCM-EVEN	Negative(-) LVDS differential first Clock(B port)
12	Y2P-EVEN	Positive(+) LVDS differential first 2 data(B port)
13	Y2M-EVEN	Negative(-) LVDS differential first 2 data(B port)
14	GND	Ground
15	Y1P-EVEN	Positive(+) LVDS differential first 1 data(B port)
16	Y1M-EVEN	Negative(-) LVDS differential first 1 data(B port)
17	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)

J10, J16: Backlight Inverter Interface Wafer

Pin No.	Symbol	Description
1	DIM-ADJ	DIM-adjustment analog dimming control signal * make sure inverter specification
2	ON/OFF	Inverter digital ON(3.3V) / OFF(0V) signal
3,4,5,6	GND	Ground
7,8,9,10	Vcc	B+(24V or 12/18V)

J12: To RS232 or Debugger Interface Wafer

Pin No.	Symbol	Description
1	SCL/RXD	I2C_SCL_ISP / UART_RX
2	SDA/TXD	I2C_SDA_ISP / UART_TX
3	GND	Ground
4	5VS	+5V

J13: Internal SMPS Input Power Supply Wafer

Pin No.	Symbol	Description	I/O	Remarks
1	NC	No Connection		
2	GND	Ground		
3,4	12V	12V Logic Power Supply	I	Max 1.0A
5,6	GND	Ground		
7,8	5VP	5V Logic Power Supply	I	Max 1.0A
9	5VS	5V Standby Power Supply	I	
10,11	GND	Ground		
12	PWR_ON	SMPS Power On Control Signal	O	3.3V(High):On, 0.7V:OFF
13	INV_DIM	Inverter Dimming Control Signal	O	
14	INV_CTRL	Inverter ON/OFF Control Signal	O	

J14 : For Inverter power(12V/24V) Selection Jumper

Pin No.	Symbol	Description
1	12V	representative 12V/15V/18V, depends on power supply from **J2**
2	B+	Inverter power selected by J14' Jumper
3	24V	24V from **J22**

J15: +24V Power Input Terminal Block

Pin No.	Symbol	Description
1	24V	24V
2	GND	Ground

J17: S-Video Input Wafer

Pin No.	Symbol	Description
1,2	C-in	CROMA signal input
3	GND	Ground
4,5	Y-in	LUMA signal input

J18 : 24V Power Input Wafer

Pin No.	Symbol	Description
1,2,3,4	GND	Ground
5,6,7,8,9	Vcc	24V

J19 : Panel Power Selection Jumper

*** See the Summary: jumpers setting more information – 35 Page**

J20: 12V Power Input Wafer

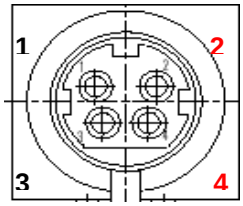
Pin No.	Symbol	Description
1,2	Vcc	12V
3,4	GND	Ground

J21: +12V Power Input Terminal Block

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

J22: 24V Input Dc power Jack

Pin No.	Symbol	Description
1,3	GND	Ground
2,4	Vcc	24V



EX) LSE0227B24130(4PIN) Li-shin Adapter / SLS0227B24118

J23: Output Power Selection Jumper

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

J24: Out Power Wafer

Pin No.	Symbol	Description
1	Vcc	12V/5V from selected J23
2	GND	Ground
3	GND	Ground

J25 : 5V Power Selection Jumper

*** See the Summary: jumpers setting more information – 33 Page**

J26 : Inverter Dimming Selection jumper

*** See the Summary: jumpers setting more information – 34 Page**

J27: External (YPbPr, Audio Board) Wafer

Pin No.	Symbol	Description
1	VOLUME	Volume for Audio amp.
2	MUTE	Mute for Audio amp.
3	GND	Ground
4	Pb/B	Pb or BLUE
5	GND	Ground
6	Y/G	Y or GREEN
7	GND	Ground
8	Pr/R	Pr or RED
9	GND	Ground
10	GND	Ground
11	12V	12V Power for Audio amp.
12	12V	12V Power for Audio amp.

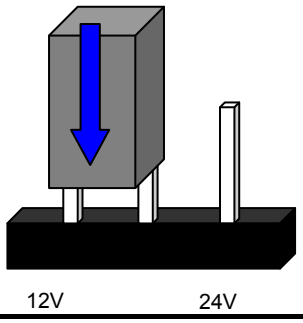
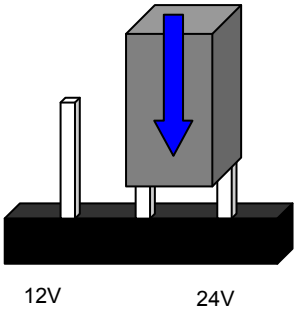
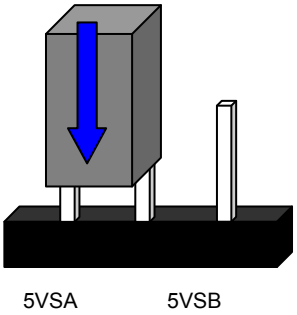
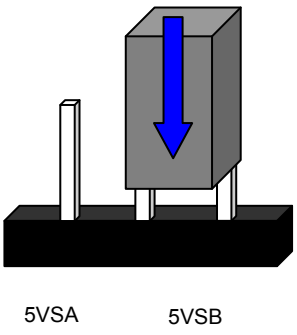
J101 : DVI-D Input Wafer

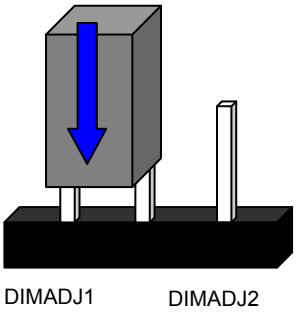
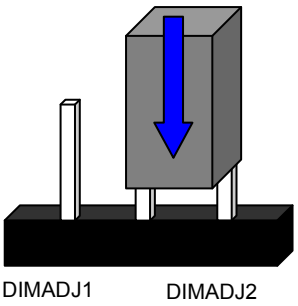
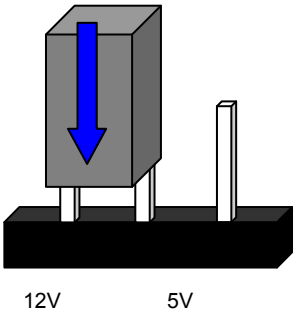
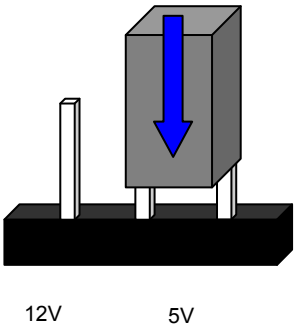
Pin No.	Symbol	Description
1	GND	GROUND
2	HPD	Hot Plug Detect
3	TMDS DATA2+	TMDS DATA2 Differential Positive Signal
4	TMDS DATA2-	TMDS DATA2 Differential Negative Signal
5	GND	GROUND
6	TMDS DATA1+	TMDS DATA1 Differential Positive Signal
7	TMDS DATA1-	TMDS DATA1 Differential Negative Signal
8	GND	GROUND
9	GND	GROUND
10	TMDS DATA0+	TMDS DATA0 Differential Positive Signal
11	TMDS DATA0-	TMDS DATA0 Differential Negative Signal
12	GND	GROUND
13	TMDS CLOCK+	TMDS DATA0 Differential Positive Signal
14	TMDS CLOCK-	TMDS DATA0 Differential Negative Signal
15	GND	GROUND
16	DDV5VD	+5 Volt signal for EDID (Un-powered Monitor)
17	NC	No Connection
18	SCL	The Clock Line for the DDC Interface
19	SDA	The Data Line for the DDC Interface
20	GND	GROUND

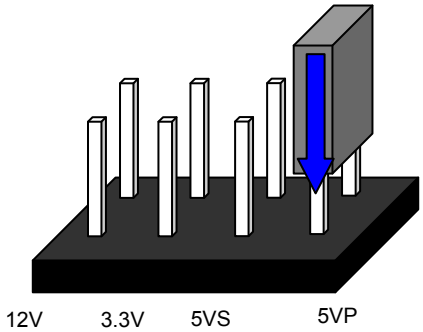
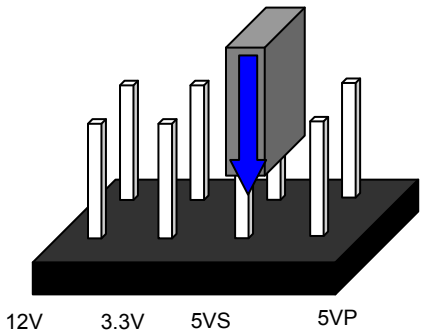
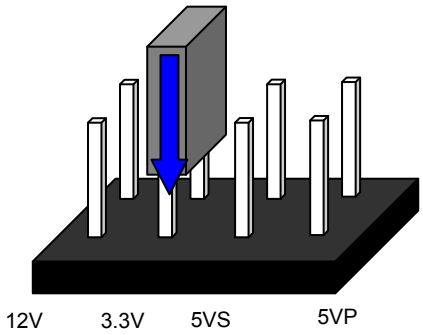
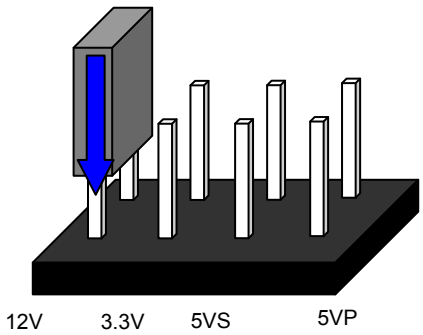
CN104: To OSD Board Control Wafer

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

Summary : Jumpers Setting

Reference	Description	Connector Type
J14	+12/15/18V inverter power enable	
	+24V inverter power enable	
J25	LCD External PSU Input	
	LCD Internal SMPS Input	

Reference	Description	Connector Type
J26	Inverter Brightness Max High	
	Inverter Brightness Max Low	
J23	For External Power 12V	
	For External Power 5V	

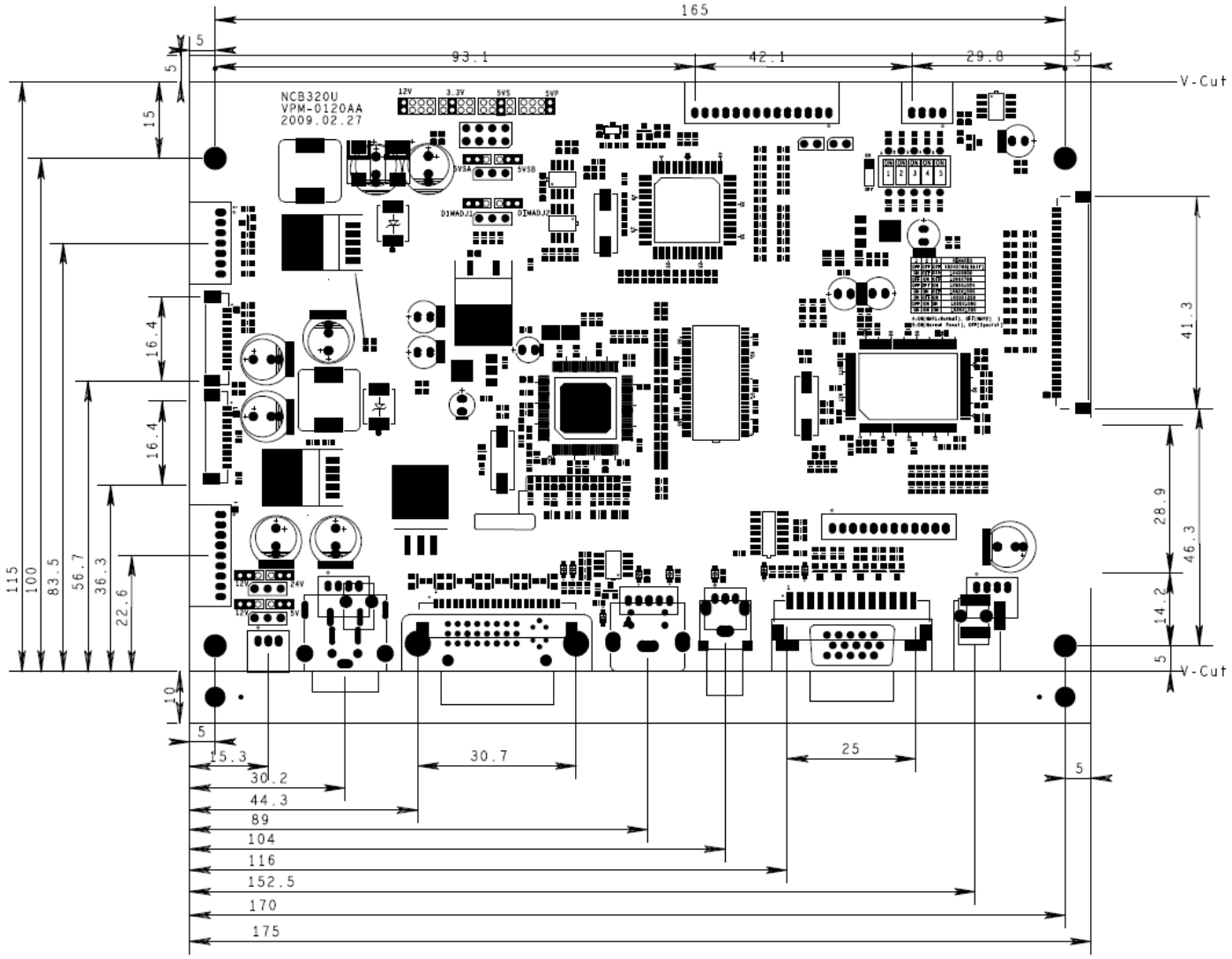
J19	5.0V panel power Only Internal SMPS *(If Power come from **J13**)* **CAUTION**: Incorrect setting can damage panel	
	5.0V panel power Only PSU Input **CAUTION**: Incorrect setting can damage panel	
	3.3V panel power Only PSU Input **CAUTION**: Incorrect setting can damage panel	
	12V panel power - PSU & Internal SMPS **CAUTION**: Incorrect setting can damage panel	

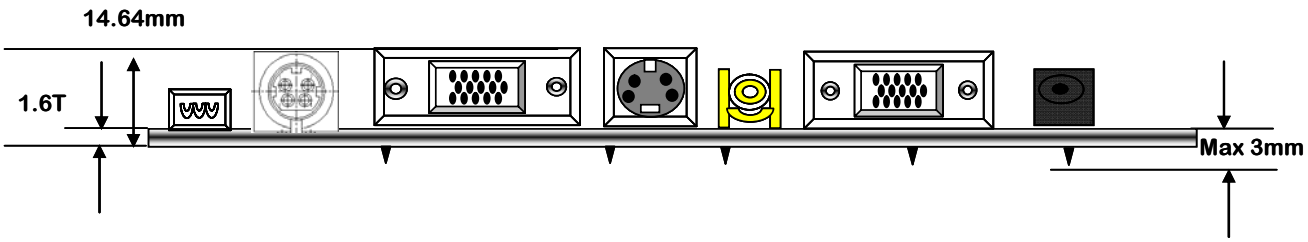
*** Power operation scheme：**

- 24V power supply from J22, 12V power generated by DC/DC converter so all 12V as marked 12V

- 12V, 15V or 18V from J2, marked 12V is representative 12V, 15V or 18V as well as power supply

CONTROLLER DIMENSIONS





APPLICATION NOTES

USING THE CONTROLLER WITHOUT BOTTONS ATTACHED

This is very straight forward:

- 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

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: NCB320U 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 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, 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@56 Hz	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*720@60Hz	74.500	P	44.772	1664	1280	P	59.855	748	720
1280*768@60Hz	68.250	P	47.396	1440	1280	N	59.995	790	768
1360*768@60Hz	84.75	P	47.72	1776	1360	P	59.799	798	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
1440*1050@60Hz	101.000	P	64.744	1560	1400	N	59.948	1080	1050
1680*1050@60Hz	119.125	P	64.742	1840	1680	N	59.946	1080	1050
1600*1200@60Hz	162,000	P	75,000	2160	1600	P	60.00	1250	1200
1920*1080@60Hz	138.625	P	66.647	2080	1920	N	59.988	1111	1080
1920*1200@60Hz	154.125	P	74.099	2080	1920	N	59.999	1235	1200

ACCESSORY

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

No.	Items	Part No.	Length	Ex) Samsung LTM170E8_L01
1	LCD signal cable	SC-Panel Part No.-mm	300mm	SC-LTM170E8-30
2	Inverter	Part no. of Manufacturer		DS-1307WK
3	Inverter cable	IC-Inverter Part No.-mm	200mm	IC-DS1307-20
4	OSD Board	NOB005P		NOB005P
5	OSD Cable	OC- OSD Part No -mm	200mm	OC-NOB005P-20

APPENDIX

A. Target panel jumper setting (J5)

☞ *LCD1 (Normal Mode)*

1~3 : Output Resolution Selection (#5:ON)

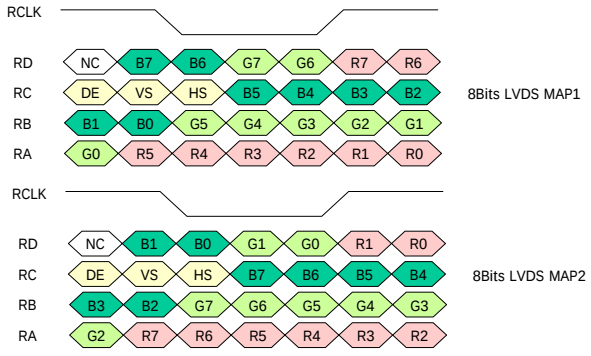
1	*2*	*3*	*Remarks*
OFF	*OFF*	*OFF*	*1024 X 768*
ON	*OFF*	*OFF*	*1440 X 900*
OFF	*ON*	*OFF*	*1366 X 768*
OFF	*OFF*	*ON*	*1280 X 1024*
ON	*ON*	*OFF*	*1680 X 1050*
ON	*OFF*	*ON*	*1600 X 1200*
OFF	*ON*	*ON*	*1920 X 1080*
ON	*ON*	*ON*	*1920 X 1200*

☞ *LCD2 (Special Mode)*

1~3 : Output Resolution Selection (#5:OFF)

1	*2*	*3*	*Remarks*	*Support Panel*
OFF	*OFF*	*OFF*	*1024x768 (6bit)*	*M150XN07 V.2*
ON	*OFF*	*OFF*	*1680x1050 (6bit)*	*LTN190W1_LO2*
OFF	*ON*	*OFF*		
ON	*ON*	*OFF*		
OFF	*OFF*	*ON*		
ON	*OFF*	*ON*		
OFF	*ON*	*ON*		
ON	*ON*	*ON*		

4 : LVDS MAP Selection => ON : Map1 (Normal Type), OFF : Map2 (Shift Type)



5 : LCD/PDP Selection

* **ON : LCD1 (Normal Mode) OFF : LCD2 (Special Mode)**

A. Tested panel

This board can support various LCD panels, which have XGA, WXGA, SXGA WSXGA+, UXGA and WUXGA 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 NCB320U board. And Kordis will try continuously to the model names of the LCD panels that have been tested.

No.	LCD Model Name	LCD vendor	LCD VCC	Option	SW1	SW2	SW3	SW4	SW5	J25	J26
1											
2											
3											
4											
5											
6											
7											
8											
9											
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Note1 : Abbreviated word : U$^{ⓐ}$S$^{ⓑ}$6$^{ⓒ}$S$^{ⓓ}$

ⓐ WU/WH/U/WS/E/W/WZ/X/WV : WU WUXGA, WH HD 1080i, U UXGA, WS WSXGA+, E SXGA, W WXGA(1280), WZ WXGA(1366), X XGA, WV WVGA

ⓑ S/N : S(SFT) SHIFT, N(NOR) NORMAL

ⓒ 6/8 : 6 6BITS 8 8BITS

ⓓ S/D : SINGLE PORT, D DUAL PORT

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