



TFT Controller Board

VNS Series User's Manual



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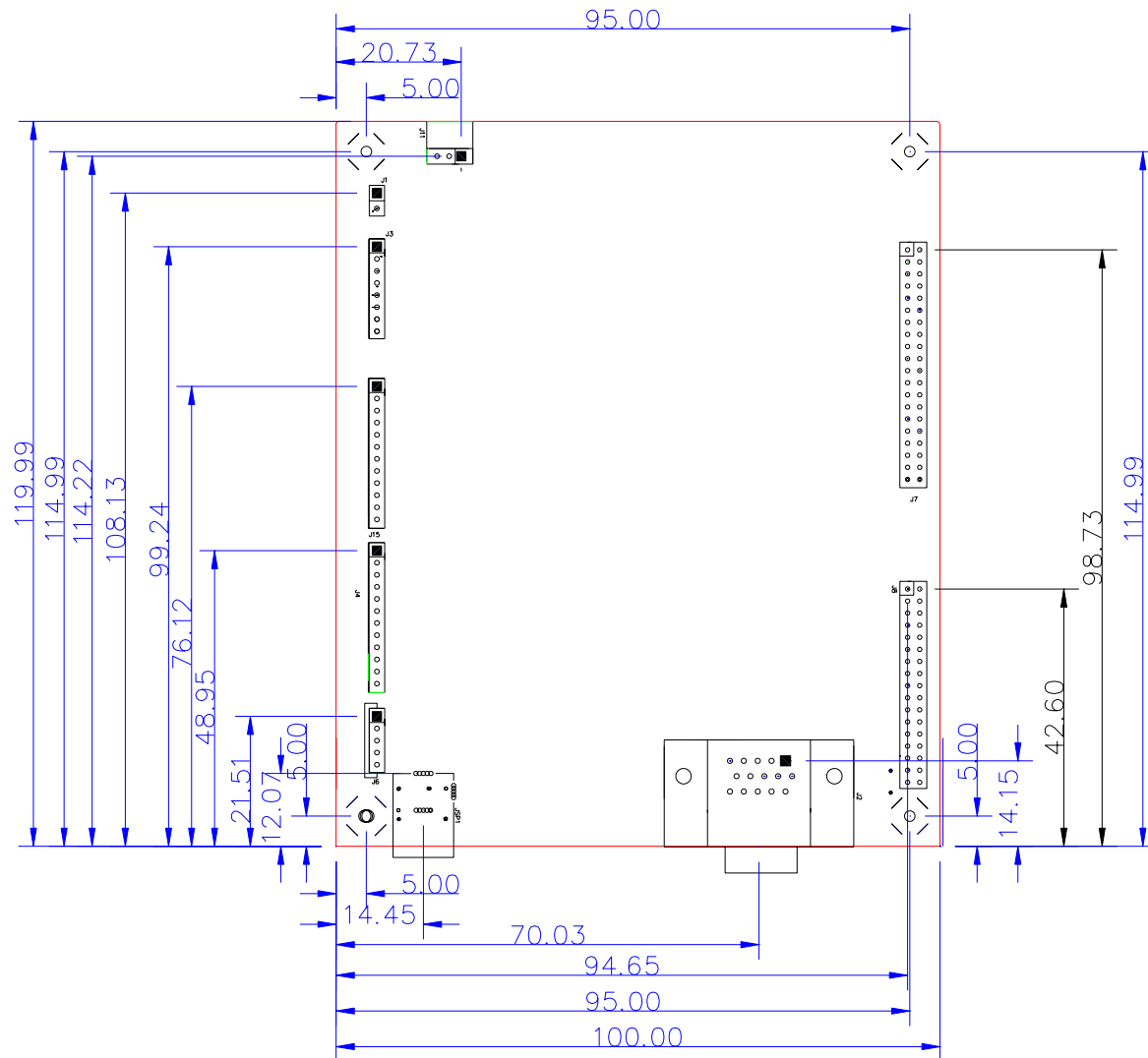
1. FEATURES

Resolution	up to XGA
Color	16,776,216 (8bit/color)
Expansion	True XGA with expansion support from DOS, VGA, SVGA.
Input Signal	Analog RGB / Composite Video / S-Video
Output Signal	TTL (standard) and LVDS (optional daughterboard)
Control	Single control operated with transparent On-Screen-Display (hereafter 'OSD') user interface. OSD provides full control of all relevant display and interface parameters.
Power Input	12VDC $\pm$ 10%
Power	Controller Board in Normal Mode: 7W max. Controller Board in Standby Mode: 3W max. Controller Board with display and inverter connected: Varies with display and inverter
Dimension	4.72" (L) x 3.94" (W) x 0.58"(H), 120mm (L) x 100mm (W) x 15mm(H)
Temperature	Operating: 0 - 45°C, storage: -20 - 70°C
Humidity	90% R.H. max,
Plug-n-Play	DDC1 & DDC2B
Power management	VESA [®] DPMS [™]

2. GENERAL DESCRIPTION

This specification defines the characteristics and performance of the VNS Series TFT LCD controller board. This product is capable of displaying XGA and lower resolutions 16,777,216 colors based on red, green and blue analog video input signals. Synchronization signals for the applicable resolution modes can be detected automatically in the range of 30-to-60 KHz horizontal and 56-to-75 Hz vertical. The Synchronization signal can be applied as separate HSYNC and VSYNC. Unless otherwise specified, the product shall meet the specifications described in this document.

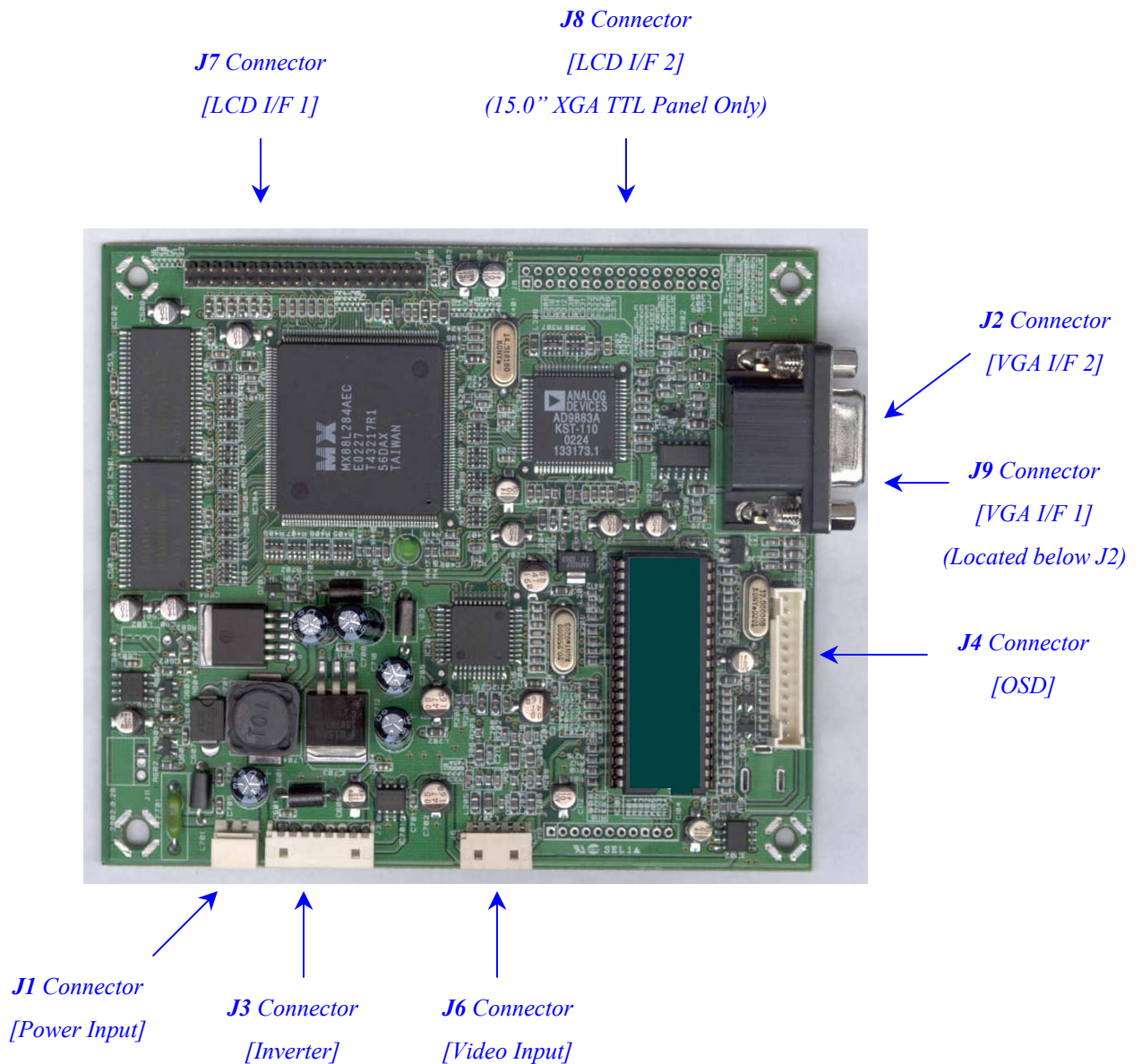
3. VNS SERIES BOARD MECHANICAL DIMENSIONS



Note: Connector locations may vary.

4. BOARD DESCRIPTION

4.1 VNS Series Board (Top View)



Note: Connector locations may vary.



4.1.1. TTL Interface Connection

(Optrex 8.4" VGA TTL, 10.4" VGA TTL, 15.0" XGA TTL panels)

J7 Connector [LCD I/F 1]: A3-40PA-2DSA (Hirose)

Mating Connector: DF11-40DS-2C (Hirose)

Pin No.	Function	Pin No.	Function
1	VCC3.3V	21	GREEN 1
2	VCC3.3V	22	GND
3	GND	23	GREEN 2
4	DCLK	24	GREEN 3
5	GND	25	GREEN 4
6	VSYNC	26	GREEN 5
7	HSYNC	27	GREEN 6
8	DE	28	GREEN 7
9	GND	29	GND
10	RED 0	30	BLUE 0
11	RED 1	31	BLUE 1
12	GND	32	GND
13	RED 2	33	BLUE 2
14	RED 3	34	BLUE 3
15	RED 4	35	BLUE 4
16	RED 5	36	BLUE 5
17	RED 6	37	BLUE 6
18	RED 7	38	BLUE 7
19	GND	39	VCC 5.0V
20	GREEN 0	40	VCC 5.0V



J8 Connector [LCD I/F 2]: A3-34-2DSA (Hirose)
Mating Connector: DF11-34DS-2C (Hirose)

Part No.	Function	Pin No.	Function
1	GND	18	Green 5 (even)
2	Red 0 (even)	19	Green 6 (even)
3	Red 1 (even)	20	Green 7 (even)
4	Red 2 (even)	21	GND
5	Red 3 (even)	22	Blue 0 (even)
6	Red 4 (even)	23	Blue 1 (even)
7	GND	24	Blue 2 (even)
8	Red 5 (even)	25	Blue 3 (even)
9	Red 6 (even)	26	Blue 4 (even)
10	Red 7 (even)	27	GND
11	GND	28	Blue 5 (even)
12	Green 0 (even)	29	Blue 6 (even)
13	Green 1 (even)	30	Blue 7 (even)
14	Green 2 (even)	31	GND
15	Green 3 (even)	32	NC
16	Green 4 (even)	33	NC
17	GND	34	NC

4.1.2 LVDS Interface Board

(Optrex 8.4" XGA and 12.1" SVGA LVDS panels)



Connector : 12507WR-20 (Yeonho Electronics)

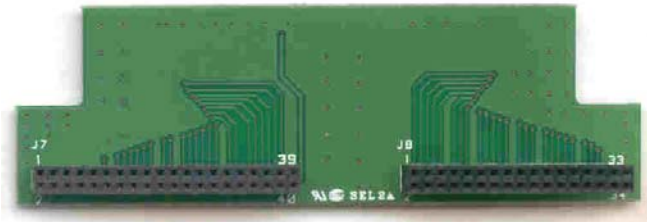
Pin No.	Function	Pin No.	Function	Pin No.	Function	Pin No.	Function
1	GND	6	RxCLKIN+	11	GND	16	RxIN0-
2	GND	7	RxCLKIN-	12	RxIN1+	17	GND-
3	Reserved	8	GND-	13	RxIN1-	18	GND
4	Reserved	9	RxIN2+	14	GND-	19	VDD
5	GND	10	RxIN2-	15	RxIN0+	20	VDD

4.1.3 XGA Interface Board

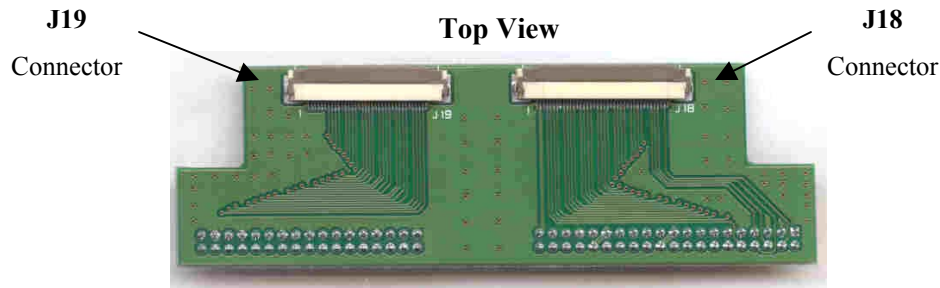
(Optrex 15.0" XGA TTL Panels)

Panel Side / Flat Flex Cable → Daughter Board (Mounted on the VNS Series Pin Connectors)

Bottom View



Refer to Section 4.1.1 for Bottom View header description.



ZIF-style Connection for Top View are described as follows:

J18 Connector: IL – FHR – BF40S – HF (JAE)

Pin No	Symbol	Function	Pin No	Symbol	Function
1	GND		21	GO6	Green Odd Data
2	VCC		22	GO7	Green Odd Data (MSB)
3	VCC		23	GND	
4	RO0	Red Odd Data (LSB)	24	BO0	Blue Odd Data (LSB)
5	RO1	Red Odd Data	25	BO1	Blue Odd Data
6	RO2	Red Odd Data	26	BO2	Blue Odd Data
7	RO3	Red Odd Data	27	BO3	Blue Odd Data
8	GND		28	GND	
9	RO4	Red Odd Data	29	BO4	Blue Odd Data
10	RO5	Red Odd Data	30	BO5	Blue Odd Data
11	RO6	Red Odd Data	31	BO6	Blue Odd Data
12	RO7	Red Odd Data (MSB)	32	BO7	Blue Odd Data (MSB)
13	GND		33	GND	
14	GO0	Green Odd Data (LSB)	34	NC	This pin should be open or GND.
15	GO1	Green Odd Data	35	HD	Horizontal Sync
16	GO2	Green Odd Data	36	VD	Vertical Sync
17	GO3	Green Odd Data	37	DENA	Data enable
18	GND		38	GND	
19	GO4	Green Odd Data	39	DCLK	Pixel Dot Clock
20	GO5	Green Odd Data	40	GND	



J19 Connector: IL – FHR – BF36S – HF (JAE)

Pin No	Symbol	Function	Pin No	Symbol	Function
1	GND		19	GE2	Green Even Data
2	TEST	This pin should be open, Test signal output for only internal test use.	20	GE3	Green Even Data
3	TEST		21	GND	
4	TEST		22	GE4	Green Even Data
5	GND		23	GE5	Green Even Data
6	GND		24	GE6	Green Even Data
7	RE0	Red Even Data (LSB)	25	GE7	Green Even Data (MSB)
8	RE1	Red Even Data	26	GND	
9	RE2	Red Even Data	27	BE0	Blue Even Data (LSB)
10	RE3	Red Even Data	28	BE1	Blue Even Data
11	GND		29	BE2	Blue Even Data
12	RE4	Red Even Data	30	BE3	Blue Even Data
13	RE5	Red Even Data	31	GND	
14	RE6	Red Even Data	32	BE4	Blue Even Data
15	RE7	Red Even Data (MSB)	33	BE5	Blue Even Data
16	GND		34	BE6	Blue Even Data
17	GE0	Green Even Data (LSB)	35	BE7	Blue Even Data (MSB)
18	GE1	Green Even Data	36	GND	

4.2 VNS Series Board Connectors Styles/Manufacturers

Item	Ref No.	Vendor	P/N	Description
LCD I/F 1	J7	Hirose	A3-40PA2DSA	2mm,40P,2 Row Pin HDR
LCD I/F 2	J8	Hirose	A3-34PA-2DSA	2mm,34P,2 Row Pin HDR
VGA I/F 1	J9	Molex	53015-14	2mm,14P,RA
VGA I/F 2	J2	Leoco	DHSL-15	15P D-sub female
OSD	J4	Molex	53015-12	2mm,12P,RA
Inverter	J3	Molex	53015-8	2mm,8P,RA
Power In	J1	Molex	5268-02	2.5mm,2P,RA
DC Jack (not populated)	JSP11	Dong-hea	EJ210-2.5	2.5Φ DC power jack
Video Input	J6	Molex	53015-05	2.0mm,5P,RA
Power Out (not populated)	J11	Molex	5268-03	2.5mm,3P,RA
Control Out (not populated)	J15	Molex	53015-11	2mm,11P,RA

4.3 VNS Series Board Connector Pin Descriptions

J3 Connector [Inverter]: 53015-08 (Molex)
Mating connector: 51004-08P (Molex)

Pin No.	Function	Pin No.	Function
1	Brightness adjust	5	GND
2	Backlight on-off	6	GND
3	GND	7	12V
4	5V	8	12V

J4 Connector [OSD]: 53015-12 (Molex)
Mating connector: 51004-12P (Molex)

Pin No.	Function	Pin No.	Function
1	VCC 5.0V	7	LED (Green)
2	Menu	8	Reserved
3	Menu-down	9	Reserved
4	Menu-up	10	Power S/W
5	Source (menu-select)	11	GND
6	LED (Red)	12	Reserved

J9 Connector [VGA I/F 1]: 53015-14 (Molex)
Mating connector: 51004-14P (Molex)

Pin No.	Function	Pin No.	Function
1	Red	8	HSYNC
2	GND	9	VSYNC
3	Green	10	GND
4	GND	11	SDA
5	Blue	12	SCLK
6	GND	13	GND
7	GND	14	5V



J2 Connector [VGA I/F 2]: DHSL-15 (Leoco)
Mating connector: DHPD-15 (Leoco)

Pin No.	Function	Pin No.	Function
1	Red	9	NC
2	Green	10	NC
3	Blue	11	NC
4	GND	12	SDA
5	D-GND	13	HSYNC
6	R-GND	14	VSYNC
7	G-GND	15	SCLK
8	B-GND		

J1 Connector [Power In]: 5268-02 (Molex)
Mating connector: 5264-02 (Molex)

Pin No.	Function	Pin No.	Function
1	12V	2	GND

J6 Connector [Video Input]: 53015-05 (Molex)
Mating connector: 51004-05 (Molex)

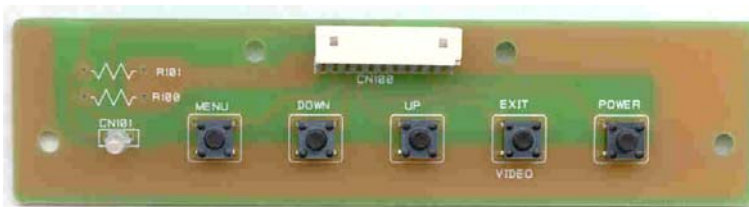
Pin No.	Function	Pin No.	Function
1	S-Video (Y)	4	Composite
2	Composite	5	GND
3	S-Video (C)		

J11 Connector [Power Out]: 5268-03(Molex)
Matching connector: 5264-03(Molex)

Pin No.	Function	Pin No.	Function
1	12V	3	5V
2	GND		

5. OSD (ON-SCREEN-DISPLAY) BOARD DESCRIPTION

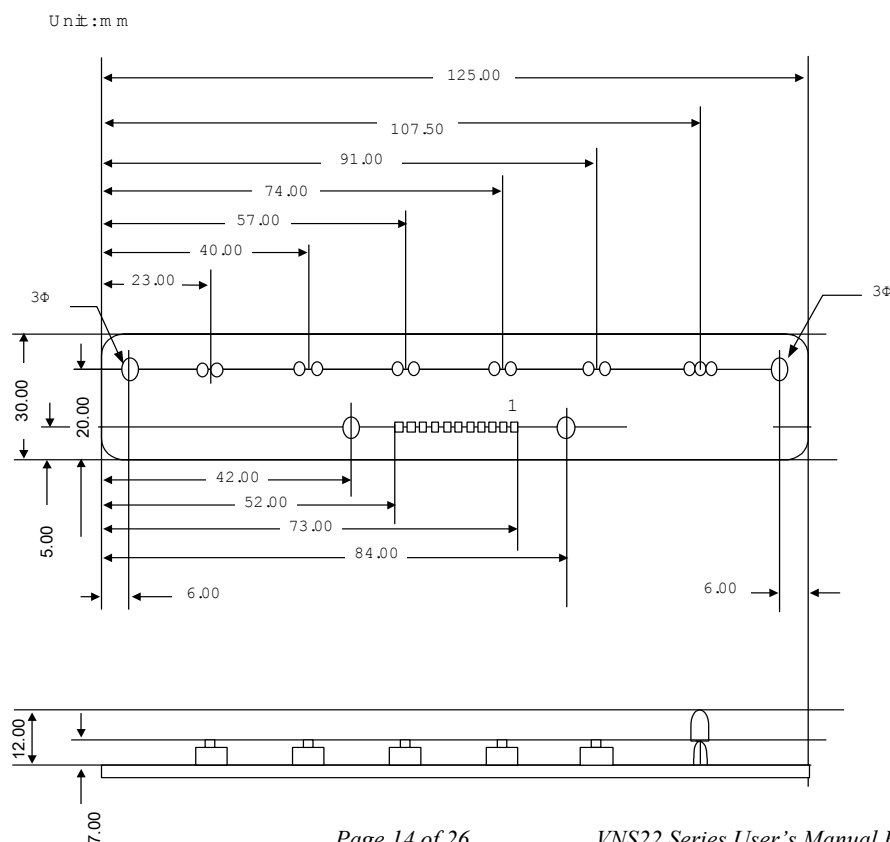
5.1 OSD Control Buttons



NO.	1	2	3	4	5	6
Function	LED	MENU	DOWN	UP	EXIT/VIDEO	POWER

LED	Status display <i>Green : Normal operation mode</i> <i>Red : Power stand-by mode</i>
MENU	Activate OSD menu or save OSD setting and EXIT
DOWN	Decrease setting or left shift the menu
UP	Increase setting or right shift the menu
EXIT/VIDEO	Toggles video input source or selects a menu option
POWER	Turn on or off the main board

5.2 OSD Mechanical Dimensions



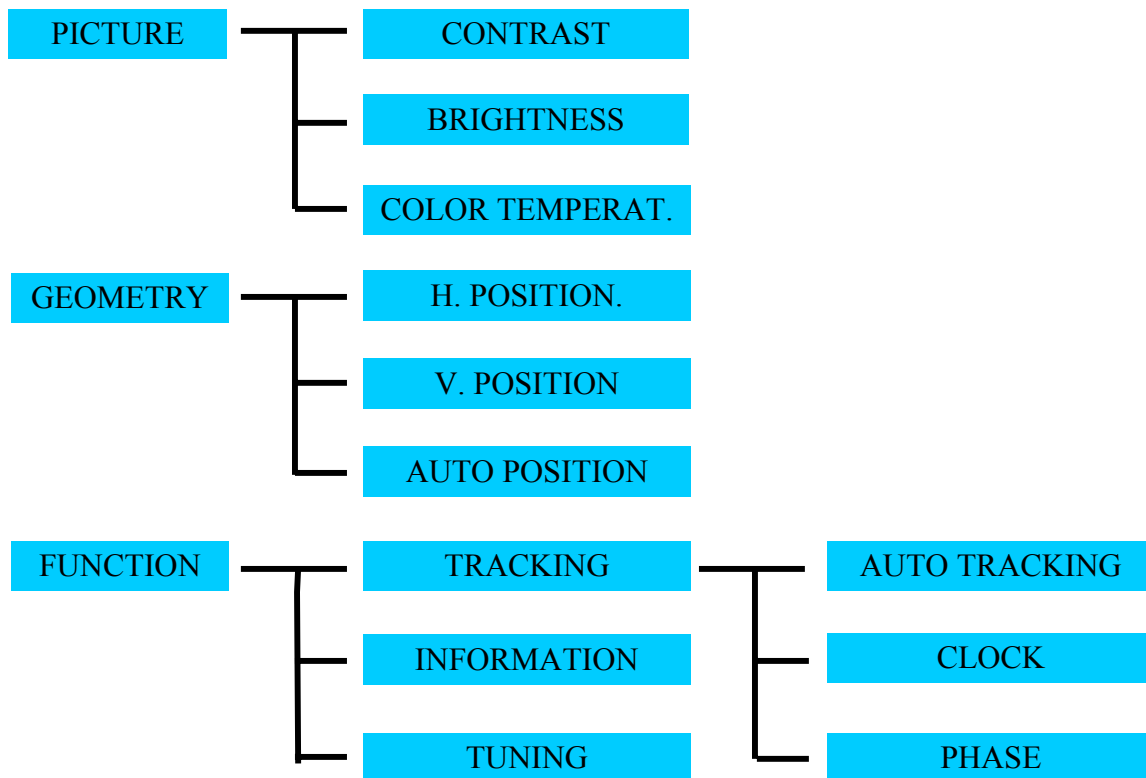
5.3 OSD Users Manual.

5.3.1 Changing Video Input Source

With power supplied to VNS Series Controller Board, press the EXIT / VIDEO button on the OSD Board to toggle the video source input. The sequence is:

PC (Analog RGB) → Composite Video → S-Video → PC (Analog RGB)

5.3.2 OSD Menu Tree for Analog RGB Mode (PC)



Note: “TUNING” adjustment is not available in the Analog RGB (PC) mode.**5.3.3**
PC Mode (Analog RGB) OSD Options

5.3.2.1 PICTURE Menu



- Using the OSD board, press MENU to display the OSD main menu.
- Press EXIT/VIDEO to select the PICTURE menu.
- Use DOWN or UP to navigate through the PICTURE menu.
- Press EXIT/VIDEO to select CONTRAST, BRIGHTNESS or COLOR, TEMPERATURE option.
- Use DOWN or UP to adjust the desired value.

PICTURE/CONTRAST

CONTRAST: 0 = Minimum Contrast
 31 = Maximum Contrast

PICTURE/BRIGHTNESS

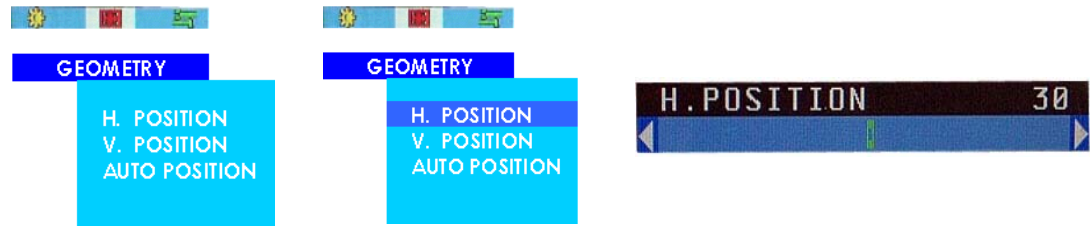
BRIGHTNESS: 0 = Maximum Brightness
 31 = Minimum Brightness

PICTURE/COLOR TEMPERATURE

COLOR TEMPERATURE: Standard
 9300K
 Reset
 User
 6500K

- Press MENU again to save settings.
- Use DOWN or UP to select GEOMETRY or FUNCTION menu, or press MENU again to exit the OSD main menu.

5.3.2.2 GEOMETRY Menu



- Using the OSD board, press MENU to display the OSD main menu.
- Use DOWN or UP to navigate to the GEOMETRY menu.
- Press EXIT/VIDEO to select the GEOMETRY menu.
- Use DOWN or UP to navigate through the GEOMETRY menu.
- Press EXIT/VIDEO to select HPOSITION, VPOSITION or AUTO POSITION option.
 - When selecting HPOSITION and VPOSITION, use DOWN or UP to adjust the desired value.
 - When selecting AUTO POSITION, image is automatically centered.

GEOMETRY/HPOSITION

HPOSITION: 0 = Maximum Shift Left
 31 = Maximum Shift Right

GEOMETRY/VPOSITION

VPOSITION: 0 = Maximum Shift Up
 31 = Maximum Shift Down

GEOMETRY/AUTO POSITION

AUTO POSITION: Automatically centers image on screen.

- Press MENU again to save settings.
- Use DOWN or UP to select FUNCTION or PICTURE menu, or press MENU again to exit the OSD main menu.

5.3.2.3 FUNCTION Menu



- Using the OSD board, press MENU to display the OSD main menu.
 - Use DOWN or UP to navigate to the FUNCTION menu.
 - Press EXIT/VIDEO to select the FUNCTION menu.
 - Use DOWN or UP to navigate through the FUNCTION menu.
 - Press EXIT/VIDEO to select TRACKING or INFORMATION.
- Note: TUNING menu is not available.

FUNCTION/TRACKING

AUTO TRACKING: Auto tracking attempts to adjust the best condition of clock and phase; however, it depends on the image displayed. If the auto-adjusted image is not satisfactory, then manual fine-tune is required.

Note: PC graphics card vary from manufacturer, so the TFT controller board may not auto-adjust the clock and phase. Manual clock and phase adjust is required.

FUNCTION/CLOCK

CLOCK:

0	= Minimum clock adjustment for horizontal size.
250	= Maximum clock adjustment for horizontal size.

FUNCTION/PHASE

PHASE:

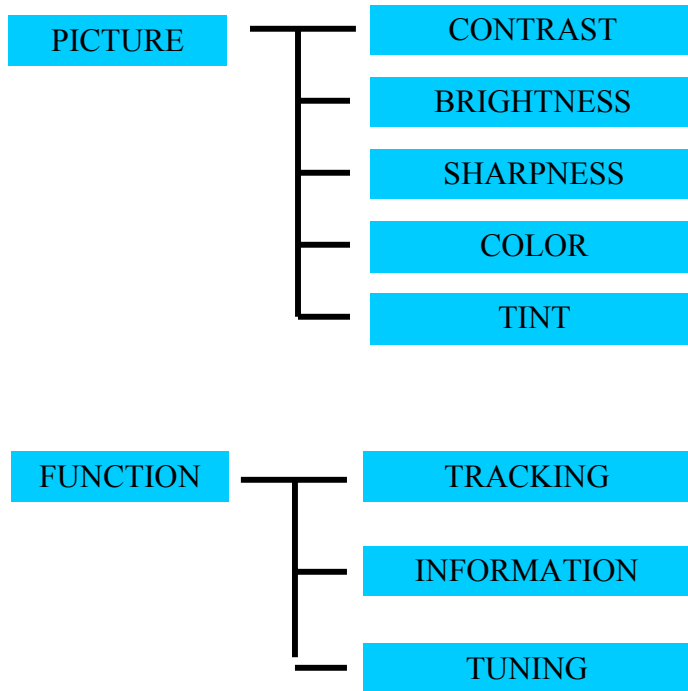
0	= Minimum phase adjust to remove noise or sharpen image.
31	= Maximum phase adjust to remove noise or sharpen image.

FUNCTION/INFORMATION

Displays current resolution and refresh frequency (VSYNC)



5.3.3 OSD Menu Tree for Video Mode (S-Video and Composite Video)



Note: “TRACKING” and “TUNING” adjustments are not available in the Video mode (S-Video and Composite Video.)

5.3.3.1 PICTURE Menu



- Using the OSD board, press MENU to display the OSD main menu.
- Press EXIT/VIDEO to select the PICTURE menu.
- Use DOWN or UP to navigate through the PICTURE menu.
- Press EXIT/VIDEO to select CONTRAST, BRIGHTNESS, SHARPNESS, COLOR or TINT option.
- Use DOWN or UP to adjust the desired value.

PICTURE/CONTRAST

CONTRAST: 0 = Minimum Contrast
 31 = Maximum Contrast

PICTURE/BRIGHTNESS

BRIGHTNESS: 0 = Maximum Brightness
 31 = Minimum Brightness

PICTURE/SHARPNESS

SHARPNESS: 0 = Minimum Sharpness
 2 = Maximum Sharpness

PICTURE/COLOR

COLOR: 0 = Minimum Color
 31 = Maximum Color

PICTURE/TINT

TINT: G0 - R30
 G30 – R0

- Press MENU again to save settings.
- Use DOWN or UP to select FUNCTION menu, or press MENU again to exit the OSD main menu.

5.3.3.2 FUNCTION Menu



- Using the OSD board, press MENU to display the OSD main menu.
- Press EXIT/VIDEO to select the FUNCTION menu.
- Use DOWN or UP to navigate through the FUNCTION menu (INFORMATION is the only available option.)
- Press EXIT/VIDEO to select INFORMATION option.

FUNCTION/INFORMATION

Displays current video mode: Video (Composite) or S-Video

- Press MENU again to save settings.
- Use DOWN or UP to select PICTURE menu, or press MENU again to exit the OSD main menu.



5.4. OSD Lamp Indication (Complies with VESA DPMS Requirements)

Mode	HSYNC	VSYNC	Video Signal	LED Indication		Max Power Consume
Power On	Active	Active	Active	Green	Always on	Panel/Inverter Dependent
No Signal	In-Active	Active	Blank			Panel/Inverter Dependent
DPMS	Active	Inactive	Blank			Panel/Inverter Dependent
Standby	-	-	Blank	Red	Always on	Max. 3W

6. FRAME FREQUENCY SETTING

The VNS Series TFT controller board is designed to operate up to a 75Hz refresh rate. Refer to the LCD panel specification specific pixel frequency (dot clock) for the native mode refresh rate.

7. APPLICABLE TIMING

Resolution	Refresh	Horizontal	Pixel Freq.	Standard type
640x480	60Hz	31.5KHz	25.175MHz	Industry Standard
	72Hz	37.9KHz	31.500MHz	VESA standard
	75Hz	37.5KHz	31.500MHz	VESA standard
800x600	60Hz	37.9KHz	40.000MHz	VESA guideline
	72Hz	48.1KHz	50.000MHz	VESA standard
	75Hz	46.9KHz	49.500MHz	VESA standard
1024x768	60Hz	48.4KHz	65.000MHz	VESA guideline
	70Hz	56.5KHz	75.000MHz	VESA standard
	75Hz	60.0KHz	78.750MHz	VESA standard



8. COMPATIBILITY

Many PC graphic cards exist in the marketplace. In general, the video signal of various PC graphics cards complies with VESA recommendations, but some do not. This TFT LCD controller board was designed under the assumption that the video signal is within VESA standards; therefore, this TFT controller board might not function properly with non-standard timing.

9. CONTACTS

Contact in USA

Address : *OPTREX America, Inc.*
46723 Five Mile Road
Plymouth, MI 48170-2422, USA
Tel: 734 - 416 - 8500
Fax: 734 - 416 - 8520



10. PART NUMBERING SYSTEM

VNS – XX – YYYZZZAAAA

VNS	:	TFT Controller Board Series (VNS-Version 1)
XX	:	Input source <i>AO: Analog I/F only, VO: Video I/F only, AV: Analog & Video I/F</i>
YYY	:	Panel Size <i>8.4", 12.1", 10.4" or 15.0"</i>
ZZZZ	:	Panel Resolution <i>VGA, SVGA or XGA</i>
AAAA	:	Panel Interface <i>TTL or LVDS</i>

VNS Series TFT Controller Board

Part Numbers Available in Kits:

VNS-AV-084VGATTTL-00
VNS-AV-084XGALVDS-00
VNS-AV-121SVGALVDS-00
VNS-AV-104VGATTTL-00
VNS-AV-150XGATTTL-00



11. BIOS & FIRMWARE SETTING

VNS Series Board can support the BIOS and harness settings for the Optrex TFTLCD models as follows.

11.1. TTL Models (LVDS Daughter Board Not Required)

Manufacturer	Part Number	Resolution
Optrex	T-51638D084-FW-A-A*	VGA
Optrex	T-51513D104U-FW-A-A*	VGA
Optrex	T-51511D150-FW-A-A*	XGA

11.2. LVDS Models (LVDS Daughter Board Required)

Manufacturer	Part Number	Resolution
Optrex	T-51639D084U-FW-A-A*	XGA
Optrex	T-51512D121J-FW-A-A*	SVGA

Note: Displays subject to change without notice. Check our website for current product offering: <http://www.optrex.com>



12. DOCUMENT HISTORY

Revision	Date	Revision History
1.0	04/03/03	Initial specification
1.1	01/23/04	Added/deleted available board part numbers.