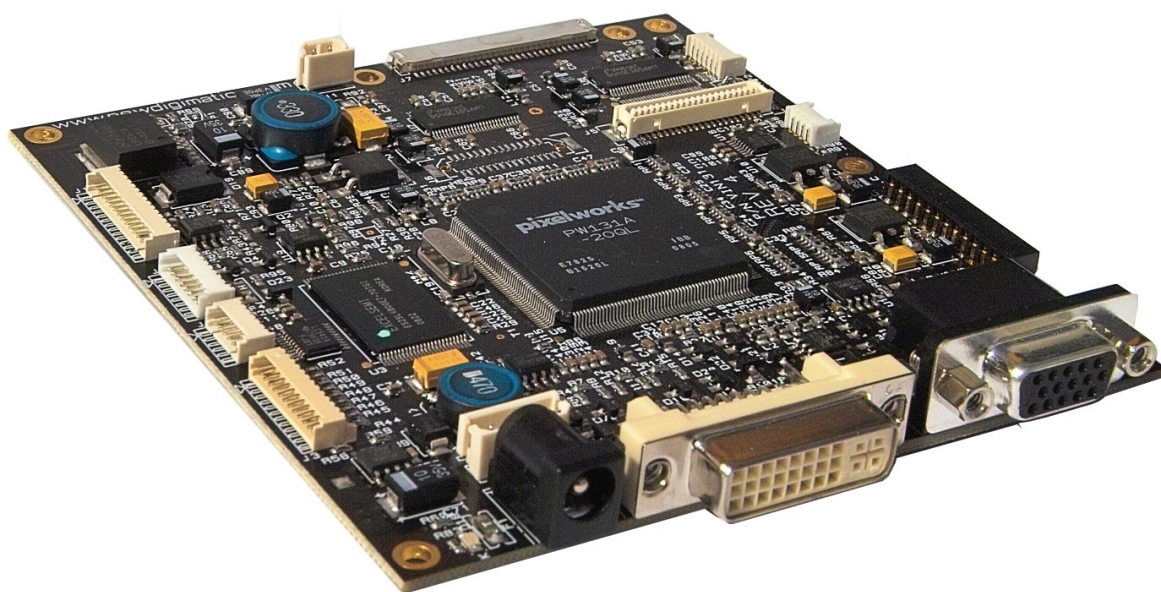




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VIN131_R4 SXGA TFT LCD Controller VGA, DVI and Sensing User Manual





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Revision History

Date	Rev.	Paragraph	Description
September 3, 2008	0	NA	Initial Realise
January 16, 2010	1	2.10 4	Page 6, 12-24VDC Power 60W Max Page 9, 10 J8 and J9 -> VCC (12-24V) Page 11 J10 pin 10-14 -> 12-24VDC



1. Description

The VIN131_R4 is a highly integrated board that interfaces digital DVI and Analog RGB video inputs in virtually any format to a flat-panel display.

The VIN131 is optimized for high-performances, value line, flat-panel monitors.

The VIN131_R4 includes Fail Safe, a unique feature that provides full plug-'n-play VESA compatibility without requiring a Frame Buffer. Sufficient buffer memory is included in the Image Processors (Pixelworks PW131A) to allow Pixel-Rate Conversion, reducing the output clock rate to extend the display system compatibility.

Computer images from VGA to SXGA can be resized to fit on a target display device with any resolution, up to SXGA.

Optimization circuitry. This creates sharp and clear images, centered on the screen, without user intervention.

The VIN131_R4 supports NTSC or PAL RGB - Y/Cb,Cr video data with a 4:3 aspect ratio and 16:9 aspect ratio sources, such as DVD or HDTV.

The VIN131_R4 integrates YUV to RGB conversion and de-interlacing; also includes a PWM output for backlight control.

The VIN131_R4 include light sensor for automatic backlight control and temperature sensor for programmable fan control



2. General Specification

2.1 Chip Set

- PW131A

2.2 Panel Connectivity

- All LCD TFT Panels up to 1280X1024 - 4 :3 and 16:9

2.3 Graphic Digital (DVI) Interface

- Combined Analog and Digital DVI Connector
- TMDS Receiver compliant with DDWG DVI 1.0 Specification
- Supports data transfer rates up to 140 MPixels/S input rate
- Scalable bandwidth from VGA to SXGA
- High inter-pair skew tolerance up to one full clock cycle

2.4 Graphic Analog Interface

- 15-pin, Standard VESA DSUB Connector
- Up to 140 MSPS conversion rate
- Supports Analog input up to SXGA (75Hz)
- 330 MHz Maximum analog bandwidth
- .5 ~ 1.0V Analog input range 75 Ohm terminated
- Offset and Gain adjustment
- Interlaced or progressive inputs
- Supports Separate H/V Sync , Composite H/V Sync (TTL Levels) and Sync-on-Green (SOG)

2.5 Video Graphic Modes Compatibility

- All standard video graphic modes up to SXGA (1280X1024)
- Horizontal Frequency 15Khz to 85Khz (Max 140Mhz Clock rate)
- Vertical Frequency depending on the panel used

2.6 Image Control by On-Screen Display (OSD)

- Brightness
- Contrast
- Sharpness
- Colour Temperature
- Phase and Frequency
- Horizontal and Vertical position
- Auto Adjustments
- Display On/Off
- DPMS On/Off



2.7 Control Modes

- Seven push-buttons
- Infrared (Optional)
- Serial RS232

2.8 Output Panel Signal

- LVTTTL 24bit + Control
- Single or Dual LVDS

2.9 Panel Power Supply

- 3,3 – 5 – 12 VDC / 2A Max

2.10 Inverter Support

- 12-24 VDC Power 60W Max
- Enable pin signal
- Dimmer Adjust pin signal 0 – 5 VDC

2.11 Measurement

- On board temperature -55°C to 125°C
- Ambient Light Dark to 10.000lux (Relative measure)

2.10 Fan Control

- 1 line without processor control (only setup via OSD) 2A-30VDC

2.12 Power requirements

- 12 –24VDC Min. 5W Max 60W depending on the panel used

3. Environmental and Reliability

3.1 Operating Conditions

- Temperature : 0°~ 50°
- Humidity : 10% ~ 80%, non-condensing
- Altitude : maximum 3,000m

3.2 Transportation Conditions

- Temperature : -25°~ 60°
- Humidity : 5% ~ 95%, non-condensing
- Altitude : maximum 15,000m

3.3 Storage Conditions

- Temperature : -20°~ 50°
- Humidity : 5% ~ 95%, non-condensing



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- Altitude : maximum 3,000m

3.4 Reliability Specifications

- MTBF : more than 50,000 hours at 90% confidence level, excluding LCD panel.



4. Electrical Specification

4.1 Connectors Pin Assignment

- P1 - DVI-I Digital & Analog RGB Input

Model	Pin n.	Function	Pin n.	Function
Molex 74320-1004	1	TMDS Data2-	2	TMDS Data2+
	3	TMDS Data2 Shield	4	N.C.
	5	N.C.	6	DDC Clock
	7	DDC Data	8	Analog VSync
	9	TMDS Data1-	10	TMDS Data1+
	11	TMDS Data1/3 Shield	12	TMDS Data3-
	13	TMDS Data3+	14	+5 Power
	15	GND Return +5,H,V	16	Hot Plug Detect
	17	TMDS Data0-	18	TMDS Data0+
	19	TMDS Data0 Shield	20	NC
	21	NC	22	TMDS Clock Shield
	23	TMDS Clock+	24	TMDS Clock-
	C1	Analog Red	C2	Analog Green
	C3	Analog Blue	C4	Analog HSync
	C5	Analog GND Return for R,G,B		



- **P2 - RGB Analog Input**

Model	Pin n.	Function
DB15-HD	1	RED
	2	GREEN
	3	BLUE
	4	GND
	5	GND (DDC RETURN)
	6	GND-RED
	7	GND-GREEN
	8	GND-BLUE
	9	NC
	10	GND-SYNC
	11	GND
	12	DDC DATA
	13	HOR. OR COMPOSITE
	14	VERTICAL SYNC
	15	DDC CLOCK

- **J9 - DC Input**

Model	Pin n.	Function
DC—Plug	1	VCC (12-24V/5A)
	2	GND
	3	GND



- **J8 - Auxiliary DC Input**

Model	Pin n.	Function
Molex 50-37-5043	1	VCC (12-24V/5A)
	2	VCC (12-24V/5A)
	3	GND
	4	GND

- **J3 - OSD Key Control**

Model	Pin n.	Function
Molex 51021-1200	1	SOURCE
	2	RESINC
	3	PLUS
	4	MINUS
	5	DOWN
	6	UP
	7	MENU
	8	STAND-BY
	9	5/3,3V
	10	LED
	11	IR RECEIVER
	12	GND

- **J4 - OSD Serial Control**

Model	Pin n.	Function
Molex 51021-0400	1	TX (RS232 Level)
	2	RX (RS232 Level)
	3	GND
	4	3,3V (50mA)



- **J10 - Output to Inverter**

Model	Pin n.	Function
Molex 51021-1400	1	GND
	2	Brightness_Control 0/5V
	3	GND
	4	ON (5V)- OFF (0V)
	5	GND
	6	GND
	7	GND
	8	GND
	9	GND
	10	12-24VDC
	11	12-24VDC
	12	12-24VDC
	13	12-24VDC
	14	12-24VDC

- **J11 - Auxiliary LCD Panel Power Supply**

Model	Pin n.	Function
Molex 51021-0600	1	LCD_Power_Supply *
	2	LCD_Power_Supply *
	3	LCD_Power_Supply *
	4	GND
	5	GND
	6	GND

Use this connector for large current LCD Panel

- *See Table 1



- **J16 - Front Panel Board**

Model	Pin n.	Function
Molex 51021-0610	1	5/3,3VDC OUT (100mA)
	2	LED
	3	IR RECEIVER
	4	GND
	5	GND
	6	LIGHT SENSOR

- **J17 - Fans Connector**

Model	Pin n.	Function
Molex 51021-0810	1	12-24 VDC
	2	12-24 VDC
	3	12-24 VDC
	4	12-24 VDC
	5	GND
	6	GND
	7	GND
	8	GND



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- J5 - Output to Panel Data (TTL)

Model	Pin n.	Function	Pin n.	Function
Hirose DF9-41S-1V	1	GND	2	DCLK
	3	GND	4	HSYNC
	5	VSNC	6	GND
	7	RE0 (NC 18bit Panel)	8	RE1 (NC 18bit Panel)
	9	RE2 (R0 18bit Panel)	10	RE3 (R1 18bit Panel)
	11	RE4 (R2 18bit Panel)	12	GND
	13	RE5 (R3 18bit Panel)	14	RE6 (R4 18bit Panel)
	15	RE7 (R5 18bit Panel)	16	GND
	17	GE0 (NC 18bit Panel)	18	GE1 (NC 18bit Panel)
	19	GE2 (G0 18bit Panel)	20	GE3 (G1 18bit Panel)
	21	GE4 (G2 18bit Panel)	22	GND
	23	GE5 (G3 18bit Panel)	24	GE6 (G4 18bit Panel)
	25	GE7 (G5 18bit Panel)	26	GND
	27	BE0 (NC 18bit Panel)	28	BE1 (NC 18bit Panel)
	29	BE2 (B0 18bit Panel)	30	BE3 (B1 18bit Panel)
	31	BE4 (B2 18bit Panel)	32	GND
	33	BE5 (B3 18bit Panel)	34	BE6 (B4 18bit Panel)
	35	BE7 (B5 18bit Panel)	36	GND
	37	DEN	38	H JP2 Open L JP2 Clos
	39	LCD_Power_Supply *	40	LCD_Power_Supply *
	41	H JP4 Open L JP4 Closed		

* See Table 1



- J7 - Output to Panel Data (LVDS)

Model	Pin n.	Function
Hirose DF19-30S-1C	1	GND
	2	TXE3+
	3	TXE3-
	4	TXEClk+
	5	TXEClk-
	6	TXE2+
	7	TXE2-
	8	TXE1+
	9	TXE1-
	10	TXE0+
	11	TXE0-
	12	GND
	13	GND
	14	LCD_Power_Supply *
	15	LCD_Power_Supply *
	16	LCD_Power_Supply *
	17	LCD_Power_Supply *
	18	LCD_Power_Supply *
	19	GND
	20	TXO3+
	21	TXO3-
	22	TXOClk+
	23	TXOClk-
	24	TXO2+
	25	TXO2-
	26	TXO1+
	27	TXO1-
	28	TXO0+
	29	TXO0-
	30	GND

*** See Table 1**

For single LVDS channel LCD panel use E (Even) connection

- 4.2 Connectors Position

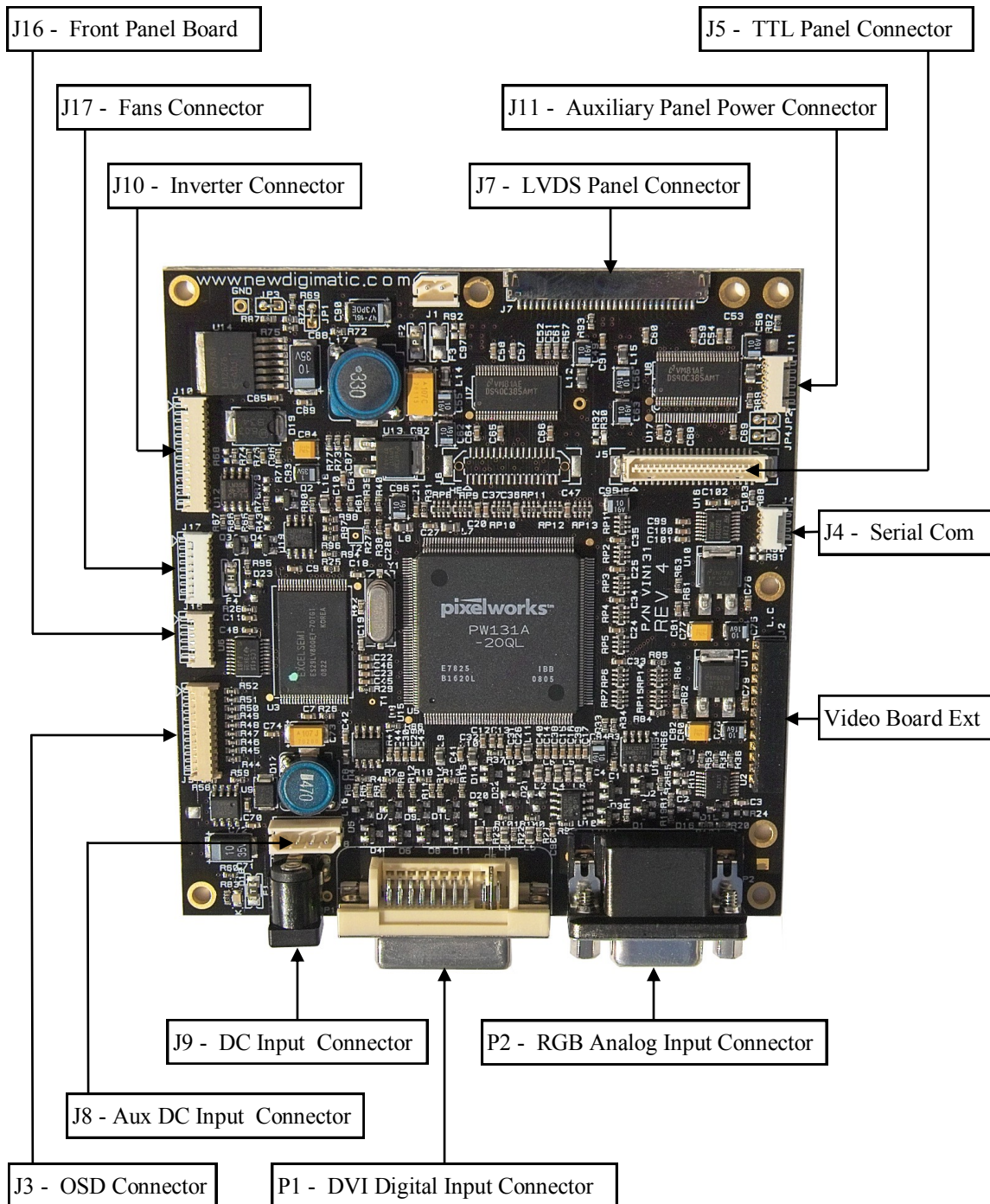
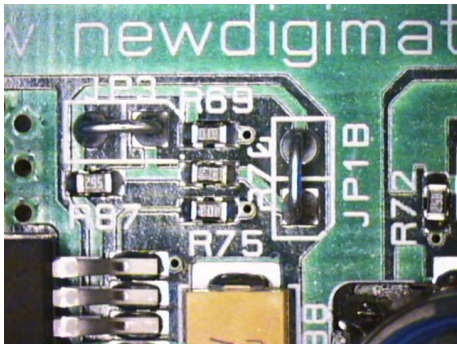
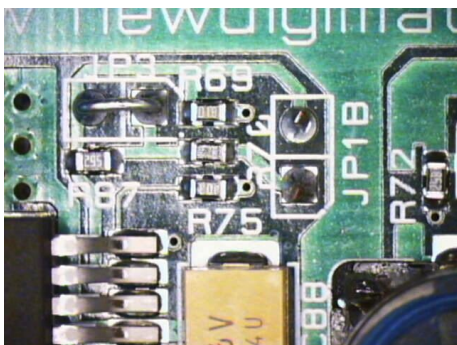


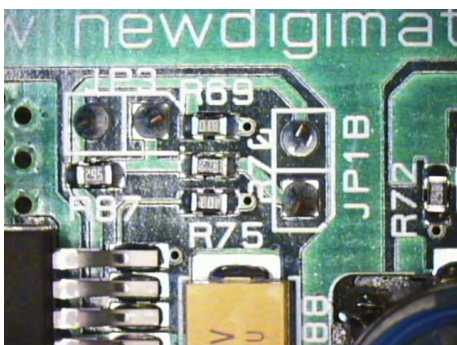
Table 1 : LCD Voltage Programming



LCD_Power_Supply 3,3V (Default)
JP1B, JP3 Installed

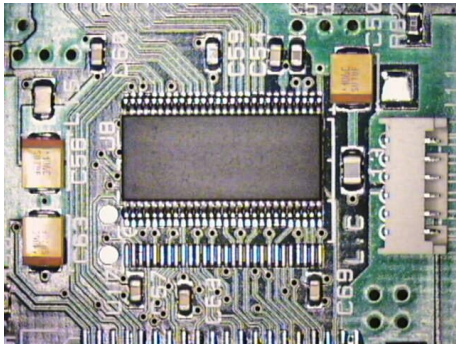


LCD_Power_Supply 5V
JP1B Removed JP3 Installed

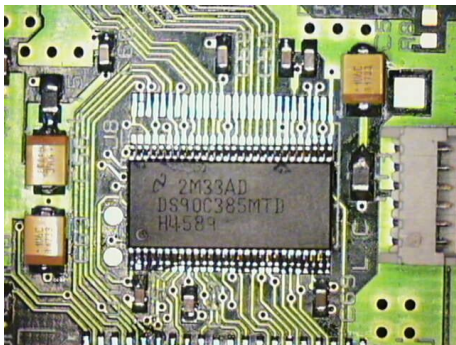


LCD_Power_Supply 12V
JP1B, JP3 Removed

Table 2 : LVDS Output Format



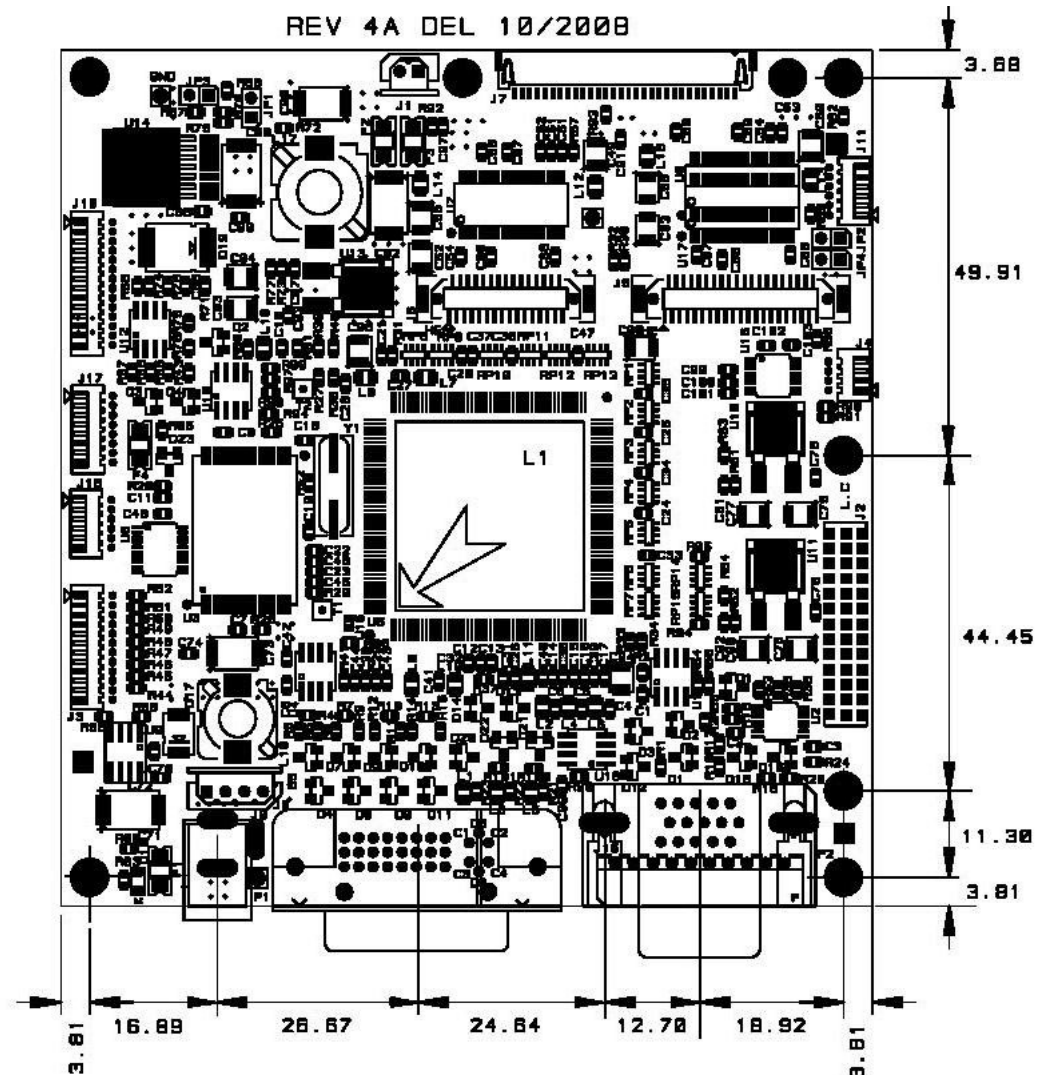
NS VESA (Standard Assembly)



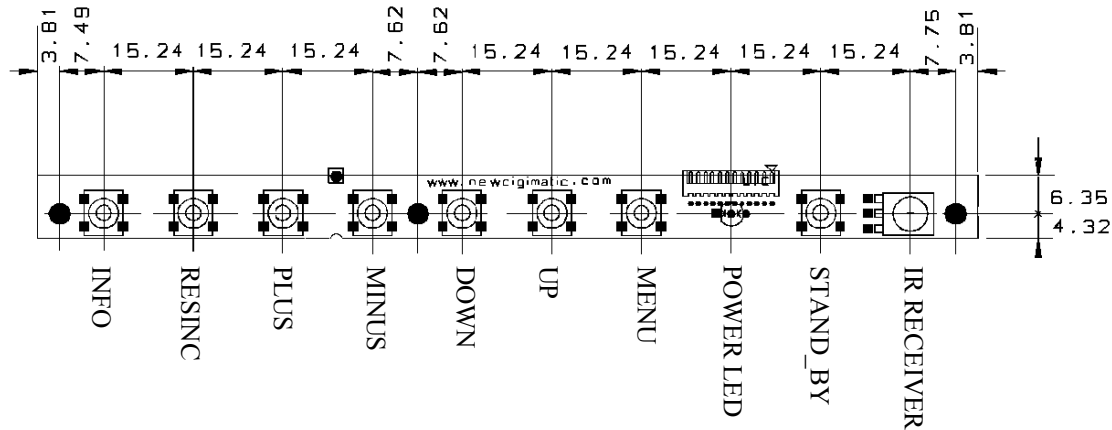
JEIDA Format (Optional Assembly)

5. Mechanical Specification

- 5.1 Main Board Dimension



5.2 OSD Keyboard Dimension and Function



6. Operation Guide

6.1 OSD Adjustment

VIN131_R4 gives various and very easy graphic user interface. User can easily access to the function that user wants. Be sure that your system power and LED is turned on (Green) before operating key board.

6.2 Key Name and Function

KEY NAME	DESCRIPTION
STAND_BY	Turns ON/STAND_BY the system
MENU	Activates the OSD menu or goes to previous menu
UP	Moves the highlight icon up to the function that user wants
DOWN	Moves the highlight icon down to the function that user wants
MINUS	Decreases the adjustment of the selected function
PLUS	Increases the adjustment of the selected function
RESINC	Performs "Auto-adjustment" function *
INFO	Analog input video information
IR	Receives the signal from Remote Control (Optional)

*"Auto-adjustment" allows the monitor to self-adjust to the incoming video signal. The values of phase, frequency and position are adjusted automatically.



- 6.3 Accessing the menu system

1. With the OSD off, push the **Menu** button to activate the main OSD menu
2. Use the **Up** or **Down** buttons to move from one function to another. As you move from one icon to another, the function name changes to reflect the function or group of functions represented by that icon.
3. Press the **Menu** button once to activate the highlighted function, use the **Up** or **Down** buttons to select the function.
4. After selecting a function, use the **Minus** or **Plus** buttons to make optimum adjustments. The setting bar moves and the numeric value indicator changes to reflect your adjustments. (Note : the numeric value indicator is provided as a point of reference only and has nothing to do with a real measurement.)
5. Press the **Menu** button once to return to the main menu to select another function or press twice to exit from the OSD.



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7. Appendix

• 7.1 Timing Chart

Originator Mode Name Resolution	IBMVGA1 640/70Hz 640x350	N/I 640/70Hz 640x400	IBMVGA2 VGA2/60Hz 640x480	IBMVGA3 VGA3/70 720x400	VESA 640/72Hz 640x480
HORIZONTAL					
Frequency	31.468kHz	31.468kHz	31.469kHz	31.469kHz	37.861kHz
Total time	31.778us	31.778us	31.778us	31.780us	26.413us
Active time	25.418us	25.418us	25.422us	25.420us	20.317us
Blank time	6.360us	6.360us	6.356us	6.356us	6.095us
Border (L / R)	0.000us	0.000us	0.000us	0.000us	0.000us
Data time	25.418us	25.418us	25.422us	25.420us	20.317us
Front porch	0.638us	0.638us	0.636us	0.640us	0.762us
Sync. width	3.823us	3.813us	3.813us	3.810us	1.270us
Back porch	1.909us	1.909us	1.907us	1.906us	4.063us
Sync. polarity	Positive	Negative	Negative	Negative	Negative
VERTICAL					
Frequency	70.090Hz	70.090Hz	59.940Hz	70.082Hz	72.800Hz
Total time	14.268ms	14.268ms	16.683ms	14.270ms	13.735ms
Active time	11.122ms	12.712ms	15.253ms	12.710ms	12.678ms
Blank time	3.147ms	1.556ms	1.430ms	1.557ms	1.057ms
Border (T / B)	0.000ms	0.000ms	0.000ms	0.000ms	0.000ms
Data time	11.122ms	12.712ms	15.253ms	12.710ms	12.678ms
Front porch	0.381ms	0.381ms	0.064ms	0.413ms	0.238ms
Sync. width	0.064ms	0.064ms	0.064ms	0.064ms	0.079ms
Back porch	1.111ms	1.111ms	0.794ms	1.080ms	0.740ms
Sync. polarity	Negative	Positive	Negative	Positive	Negative
Dot Clock	25.175MHz	25.175MHz	25.175MHz	28.324MHz	31.500MHz
Sync. Type	Separate	Separate	Separate	Separate	Separate



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Originator Mode Name Resolution	VESA 640/75Hz 640x480	VESA 640/85Hz 640x480	VESA 800/56Hz 800x600	VESA 800/60Hz 800x600	VESA 800/72Hz 800x600
HORIZONTAL					
Frequency	37.500kHz	43.269kHz	35.156kHz	37.879kHz	48.077kHz
Total time	26.667us	23.111us	28.444us	26.400us	20.800us
Active time	20.317us	17.778us	22.222us	20.000us	16.000us
Blank time	6.350us	5.333us	6.222us	6.400us	4.800us
Border (L / R)	0.000us	0.000us	0.000us	0.000us	0.000us
Data time	20.317us	17.778us	22.222us	20.000us	16.000us
Front porch	0.508us	1.556us	0.667us	1.000us	1.120us
Sync. width	2.032us	1.556us	2.000us	3.200us	2.400us
Back porch	3.810us	2.222us	3.556us	2.200us	1.280us
Sync. polarity	Negative	Negative	Positive	Positive	Positive
VERTICAL					
Frequency	75.000Hz	85.008Hz	56.250Hz	60.317Hz	72.188Hz
Total time	13.333ms	11.764ms	17.778ms	16.579ms	13.853ms
Active time	12.800ms	11.093ms	17.067ms	15.840ms	12.480ms
Blank time	0.533ms	0.671ms	0.711ms	0.739ms	1.373ms
Border (T / B)	0.000ms	0.000ms	0.000ms	0.000ms	0.000ms
Data time	12.800ms	11.093ms	17.067ms	15.840ms	12.480ms
Front porch	0.027ms	0.023ms	0.028ms	0.026ms	0.770ms
Sync. width	0.080ms	0.069ms	0.057ms	0.106ms	0.125ms
Back porch	0.427ms	0.578ms	0.626ms	0.626ms	0.478ms
Sync. polarity	Negative	Negative	Positive	Positive	Positive
Dot Clock	31.500MHz	36.000MHz	36.000 MHz	40.000MHz	50.000MHz
Sync. Type	Separate	Separate	Separate	Separate	Separate



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Originator Mode Name Resolution	VESA 800/75Hz 800x600	VESA 800/85Hz 800x600	VESA 1024/60Hz 1024x768	VESA 1024/70Hz 1024x768	VESA 1024/75Hz 1024x768
HORIZONTAL					
Frequency	46.875kHz	53.674kHz	48.363kHz	56.476kHz	60.023kHz
Total time	21.333us	18.631us	20.677us	17.707us	16.660us
Active time	16.162us	14.222us	15.754us	13.653us	13.003us
Blank time	5.171us	4.409us	4.923us	4.053us	3.657us
Border (L / R)	0.000us	0.000us	0.000us	0.000us	0.000us
Data time	16.162us	14.222us	15.754us	13.003us	13.003us
Front porch	0.323us	0.569us	0.369us	0.320us	0.203us
Sync. width	1.616us	1.138us	2.092us	1.813us	1.219us
Back porch	3.232us	2.702us	2.462us	1.920us	2.235us
Sync. polarity	Positive	Positive	Negative	Positive	Positive
VERTICAL					
Frequency	75.000Hz	85.061Hz	60.004Hz	70.069Hz	75.029Hz
Total time	13.333ms	11.756ms	16.666ms	14.272ms	13.328ms
Active time	12.800ms	11.179ms	15.880ms	13.599ms	12.795ms
Blank time	0.533ms	0.577ms	0.786ms	0.673ms	0.533ms
Border (T / B)	0.000ms	0.000ms	0.000ms	0.000ms	0.000ms
Data time	12.800ms	11.179ms	15.880ms	13.599ms	12.795ms
Front porch	0.021ms	0.019ms	0.062ms	0.053ms	0.017ms
Sync. width	0.064ms	0.056ms	0.124ms	0.106ms	0.050ms
Back porch	0.448ms	0.503ms	0.600ms	0.513ms	0.466ms
Sync. polarity	Positive	Positive	Negative	Positive	Positive
Dot Clock	49.500MHz	56.250MHz	65.000MHz	75.000MHz	78.750MHz
Sync. Type	Separate	Separate	Separate	Separate	Separate



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Originator Mode Name Resolution	VESA 1024/85Hz 1024x768	VESA 1152/60Hz 1152x864	VESA 1152/70Hz 1152x864	VESA 1152/75H 1152x864	VESA 1280/60Hz 1280x1024
HORIZONTAL					
Frequency	68.677kHz	54.348kHz	63.995kHz	67.500kHz	63.974kHz
Total time	14.561us	18.400us	15.626us	14.815us	15.631us
Active time	10.836us	14.400us	12.229us	10.667us	11.797us
Blank time	3.725us	4.000us	3.657us	4.148us	3.834us
Border (L / R)	0.000us	0.000us	0.000us	0.000us	0.000us
Data time	10.836us	14.400us	12.229us	10.667us	11.797us
Front porch	0.508us	0.400us	0.203us	0.593us	0.590us
Sync. width	1.016us	1.200us	1.219us	1.185us	1.180us
Back porch	2.201us	2.400us	2.235us	2.370us	2.065us
Sync. polarity	Positive	Positive	Positive	Positive	Positive
VERTICAL					
Frequency	84.997Hz	60.053Hz	70.016Hz	75.029Hz	60.013Hz
Total time	11.765ms	16.652ms	14.282ms	13.333ms	16.663ms
Active time	11.183ms	15.898ms	13.501ms	12.800ms	16.006ms
Blank time	0.582ms	0.754ms	0.781ms	0.533ms	0.657ms
Border (T / B)	0.000ms	0.000ms	0.000ms	0.000ms	0.000ms
Data time	11.183ms	15.898ms	13.501ms	12.795ms	16.006ms
Front porch	0.015ms	0.0178s	0.016ms	0.015ms	0.016ms
Sync. width	0.044ms	0.055ms	0.047ms	0.044ms	0.047ms
Back porch	0.524ms	0.681ms	0.719ms	0.474ms	0.594ms
Sync. polarity	Positive	Positive	Positive	Positive	Positive
Dot Clock	78.750MHz	80.000MHz	92.00MHz	108.00MHz	108.50MHz
Sync. Type	Separate	Separate	Separate	Separate	Separate



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Originator Mode Name Resolution	VESA 1280/75H 1280x1024	VESA 1280/85Hz 1280x1024	1600/60Hz 1600x1024
HORIZONTAL			
Frequency	79.976kHz	91.146kHz	62.110kHz
Total time	12.504	12.504us	13.379us
Active time	9.481us	9.481us	11.840us
Blank time	3.023us	3.023us	1.539us
Border (L / R)	0.000us	0.000us	0.000us
Data time	9.481us	9.481us	11.840us
Front porch	0.119us	0.119us	0.666us
Sync. width	1.067us	1.067us	0.222us
Back porch	1.837us	1.837us	0.651us
Sync. polarity	Positive	Positive	Positive
VERTICAL			
Frequency	75.025Hz	75.025Hz	60.000Hz
Total time	13.329ms	13.329ms	16.777ms
Active time	12.804ms	12.804ms	16.042ms
Blank time	0.525ms	0.525ms	0.635ms
Border (T / B)	0.000ms	0.000ms	0.000ms
Data time	12.804ms	12.804ms	16.042ms
Front porch	0.013ms	0.013ms	0.156ms
Sync. width	0.038ms	0.038ms	0.047ms
Back porch	0.475ms	0.475ms	0.047ms
Sync. polarity	Positive	Positive	Positive
Dot Clock	135.00MHz	135.00MHz	112.27MHz
Sync. Type	Separate	Separate	Separate



Warranty

The products are warranted against defects in workmanship and material for a period of one (1) year from the date of purchase provided no modifications are made to it and it is operated under normal conditions and in compliance with the instruction manual.

The warranty does not apply to:

- Product that has been installed incorrectly, this specifically includes but is not limited to cases where electrical short circuit is caused.
- Product that has been altered or repaired except by the manufacturer (or with the manufacturer's consent).
- Product that has subjected to misuse, accidents, abuse, negligence or unusual stress whether physical or electrical.
- Ordinary wear and tear.

Except for the above express warranties, the manufacturer disclaims all warranties on products furnished hereunder, including all implied warranties of merchantability and fitness for a particular application or purpose. The stated express warranties are in lieu of all obligations or liabilities on the part of the manufacturer for damages, including but not limited to special, indirect consequential damages arising out of or in connection with the use of or performance of the products.

Caution

Whilst care has been taken to provide as much detail as possible for use of this product it cannot be relied upon as an exhaustive source of information. This product is for use by suitably qualified persons who understand the nature of the work they are doing and are able to take suitable precautions and design and produce a product that is safe and meets regulatory requirements.

Limitation of Liability

The manufacturer's liability for damages to customer or others resulting from the use of any product supplied hereunder shall in no event exceed the purchase price of said product.