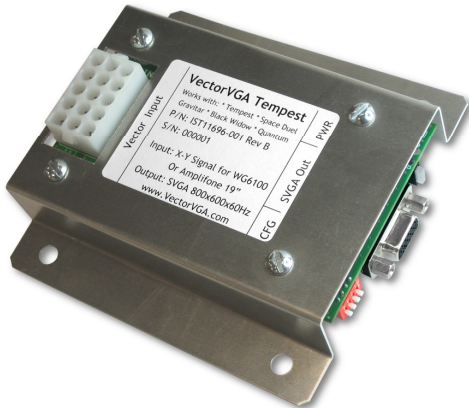


# VectorVGA Tempest Specifications



## Features

VectorVGA Tempest converts the analog vector video signal to a standard SVGA raster video signal. This allows regular SVGA monitors to work with vector arcade games. VectorVGA Tempest has a variety of features and options that allow you to enjoy the best possible quality on a variety of SVGA displays.

### High Resolution Rendering

The VectorVGA Tempest converter digitizes the analog vector signal with a dual 12-bit analog to digital convertor (ADC). It plots 40 million samples per second to faithfully render the vectors to look like the original monitor. The custom rendering and frame buffering are handled entirely in hardware in a powerful FPGA.

### 24-Bit VGA Output

VectorVGA Tempest outputs SVGA video using a 24-bit video DAC to achieve maximum picture quality. While the compatible arcade games all use 7-color graphics (3-bit), the VectorVGA Tempest converter renders these vector graphics to a high-resolution, anti-aliased, full-color output. The additional color depth bits are used to provide realistic anti-aliasing and properly render areas where several colored vectors overlap.

### Arcade Game Compatibility

VectorVGA Tempest is designed to work with Atari Tempest, Space Duel, Gravitator, Black Widow, and Quantum. Each of these games has similar vector specifications and are all fully supported by this converter.

### Self Powered

The converter is powered by the monitor wiring harness and does not need an external power adapter. This makes installation simpler and cleaner.

### **No Harness Modifications**

The VectorVGA Tempest converter does not require any hacks to your arcade game wiring harness. It plugs into the monitor cable from the game board and outputs a standard SVGA video signal to your monitor.

### **Monitor Rotation Switch**

Some vector arcade games mount the monitor horizontally, like Space Duel, and others mount it vertically, like Tempest. For each orientation there are two possible ways to rotate your monitor, and your monitor stand may only allow one particular orientation. The VectorVGA Tempest converter uses DIP Switch 1 to rotate the SVGA video output 180° to allow you to mount your SVGA monitor in the most convenient orientation.

### **Pincushion Correction**

Pincushion correction was required for old CRT displays to correct geometry problems inherent in the technology, and when it is not set correctly the image looks curvy. The VectorVGA Tempest converter always enables perfectly straight vectors by enabling / disabling pincushion correction using DIP Switch 2.

### **Gamma Correction**

Some displays have different gamma values than others, and line quality is not maximized when it is set incorrectly. The most common display gamma value is 2.2, and most CRT's use this gamma. Many LCD displays have a lower gamma value of about 1.5. Using the wrong gamma value causes a subtle difference in the apparent thickness of horizontal or vertical versus diagonal lines. To achieve the most authentic display quality with all displays, the VectorVGA Tempest converter can switch between these two gamma values using DIP Switch 3.

### **Auto Adjust for Digital Monitors**

Digital displays like LCD monitors and computer projectors give the best quality picture when the "Auto Adjust" or "Pixel Sync" function is used. This allows the monitor to properly scale the image and to sample the center of each pixel. The VectorVGA Tempest converter generates an optimum pattern for "Auto Adjust" by turning on DIP Switch 4.

## **Hardware Specifications**

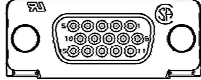
### **Vector Input Specification**

VectorVGA Tempest is designed to be plug-compatible with Wells-Gardner 6100 and Amplifone 19" monitors. It is powered by the vector monitor harness and therefore doesn't require an external power supply.

<b>Vector Input Specification</b>	
Connector:	15-pin AMP Header, Male pin
X Input Level:	±8V
X Input Impedance:	2.4 kΩ
Y Input Level:	±6V
Y Input Impedance:	2.4 kΩ

X & Y Bandwidth:	1.6 MHz
RGB Input Level:	1V Black, 3.5V Max
RGB Input Impedance:	1.0 k $\Omega$
RGB Bandwidth:	2.0 MHz
Power:	25 VAC <sub>rms</sub> Center Tapped, 60 Hz +30% / -20%, 3W

### SVGA Output Specification

SVGA Output Specification	
Connector:	DE-15 Female 
Resolution:	800 x 600 pixels
Vertical Refresh Rate:	60 Hz
Horizontal Refresh Rate:	38 kHz
Aspect Ratio:	4:3
RGB Output Level:	0.7V
RGB Output Impedance:	75 $\Omega$ double terminated
Sync Signal Level:	3.3V TTL
Hsync Polarity:	Negative
Vsync Polarity:	Positive

### Dimensions

4.90" x 4.80" x 1.52"

### Warranty

30-day Limited Warranty