



Hall Research Technologies, Inc.

# TV-to-VGA Converter & Switcher

With Audio Switching, Volume Control, and Serial Input



Model TVB200-Plus



**CUSTOMER  
SUPPORT  
INFORMATION**

Order toll-free in the U.S. 800-959-6439  
FREE technical support, Call 714-641-6607 or fax 714-641-6698  
Mail order: Hall Research Technologies, 1163 Warner Ave. Tustin, CA 92780  
Web site: [www.hallresearch.com](http://www.hallresearch.com) • E-mail: [info@hallresearch.com](mailto:info@hallresearch.com)

UMA1068, Rev. A



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# 1. Introduction

## 1.1 General

The Model TVB200-Plus converts an NTSC or PAL video signal to VGA for display on PC monitors, projectors, or HDTV (in 480p or 600p modes). The converter de-interlaces and doubles the frame rate by turning the interlaced TV signal into a "progressive scan" signal suitable for high resolution display devices.

The TVB200-Plus provides multiple TV video inputs: two (2) RCA composite video and one (1) S-Video - all with their own corresponding stereo audio inputs.

Additionally, the TVB200-Plus provides a separate VGA and audio input from a PC that can be switched to the output. This makes the TVB200-Plus a 4 multi-standard input to 1 VGA output device.

The user can select any of the inputs using individual push-button switches on the front panel. An RS232 serial port is available for external control and/or changing the internal configuration of the unit.

The unit can also switch between the PC and TV inputs automatically. When the device is in "Auto" mode, if no TV video signal is present, it selects the PC input and as soon as a TV input is detected, it switches to the TV input by itself. This feature makes the unit perfect for educational facilities where the presenter does not even have to worry about making selections on the TVB200-Plus.

The TVB200-Plus also provides 4 Stereo audio inputs, one for each corresponding video input. The audio switching follows the selected video input channel. In addition, each audio input has its own adjustable volume setting making it perfect for balancing the output volume level regardless of the input selection.

The TVB200-Plus's VGA output can drive VGA extension cables to 200 feet. It is recommended that when video extension cables are used, only high quality multi-coaxial VGA or RGBHV (such as Hall Research Standard or Ultra-Thin VGA cables) be used.

When enabled, OSD (On Screen Display) shows the selected TV input for a few seconds, or if the selected input does not have video, it continuously indicates the selected input. Screen Saver feature moves the OSD around the screen when no video input is detected. The OSD can be permanently disabled via the serial port.

The front panel can be locked out. This is a handy feature in many installations. For example if the system is in “Auto” mode, the installer may wish to also lock the front panel so that accidental hitting of the front panel switches does not take the system out of Auto mode.

The unit features a front panel switch for enhancing the TV video input prior to display on a VGA monitor. The enhancement is based on non-linear Gamma correction. If the TV video input has dim areas as well as bright areas (such as in endoscopes used in medical procedures), simply increasing the brightness would not be desirable since it washes the entire image out and causes the already bright areas to “bloom”. The enhancement feature of the TVB200-Plus brings out the details in the dark areas without over driving the already bright regions of the image.

The Serial input give the user or installer full control over all aspects of the device including: *Contrast, Brightness, Saturation, Hue, OSD, Front Panel Lock, Volume settings, Auto mode, TV format (NTSC/PAL), Enhancement factor, and more.* Hall Research offers a free download of PC compatible Windows™ control software that allows you to select inputs and set all operating parameters of the unit.

The unit features non-volatile memory to store all of the settings including the selected channel and performance characteristics.

The Model TVB200-Plus is housed in a compact shielded enclosure and includes a small power adapter and 6 ft video and audio cables for connection to the PC’s VGA and sound outputs.

## 1.2 Features

- 3 NTSC/PAL and 1 PC input to one VGA output
- Full screen 24-bit true color broadcast-quality video
- Eliminates interlace flicker from video presentations
- Includes a line-doubler with motion compensations
- Video enhancement via Gamma factor correction
- VGA input for full screen TV or PC Video display
- RS-232 control input port
- Free Serial Control Software available for download
- 4 Stereo audio inputs
- User programmable brightness and contrast for TV input
- Low cost, high reliability
- Packaged in portable EMI shielded enclosure
- VGA input resolutions to 1600 x 1200
- Individual volume controls for each audio input
- “Auto” mode for switching to active video
- Front panel and OSD enable/disable control



Figure 1.1



## 2. Installation

1. Connect one or more of the video and audio input signals to the input connectors on the TVB200-PLUS. Figure 2.1 shows a typical setup.

Video Conferencing    Document Camera    Notebook PC    VCR or DVD

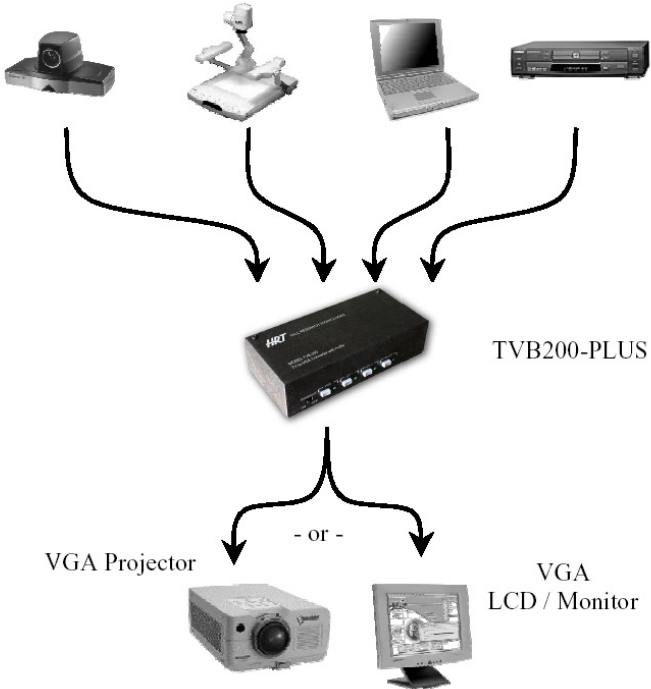


Figure 2.1

2. The following table summarizes the available inputs:

Connector Name	Connector Type	Signal Type	Comments
VGA IN	HD15, Female	VGA, SVGA, XGA	From any PC, MAC, or Notebook. A 6 ft high-resolution VGA cable is supplied with unit
AUDIO IN	3.5mm (1/8") Mini-Stereo	Line-level stereo Audio	One 6 ft m/m input cable is provided for connection to a PC sound output
CV IN 1	RCA, Female	Composite NTSC or PAL	From any video source
AUDIO IN	3.5mm (1/8") Mini-Stereo	Line-level stereo Audio	
CV IN 2	RCA, Female	Composite NTSC or PAL	From any video source
AUDIO IN	3.5mm (1/8") Mini-Stereo	Line-level stereo Audio	
S-VID IN	MiniDin 4, Female	Y/C (S-Video, S-VHS)	
AUDIO IN	3.5mm (1/8") Mini-Stereo	Line-level stereo Audio	



Figure 2.2

The output connectors are a HD15-F (VGA), and a 3.5mm (1/8") Mini-Stereo audio. Plug your VGA monitor and speakers (must be powered) to these connectors.

- Plug the supplied AC adapter to the Power input connector. Use the supplied adapter or a 100% equivalent only.

**NOTE**

Do not connect a supply with an output voltage of greater than 7.5 V DC to the unit. The power connector is center-positive.

**NOTE**

The VGA input and out connectors have standard pin-outs as shown below

High-Density 15-pin VGA Output Connector	
PIN	Function
1	Red
2	Green
3	Blue
4	Not Used
5	Gnd
6	Red Return (Gnd)
7	Green Return (Gnd)
8	Blue Return (Gnd)
9	Key (Not Used)
10	Gnd
11	Gnd
12	SDA (plug-n-play)
13	Horizontal Sync
14	Vertical Sync
15	SCL (plug-n-play)

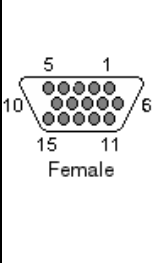


Table 2.1

## 3. Operation

Upon plugging in the power, the unit performs a self-test and selects the video input that was previously selected. If the unit was in “Auto” mode prior to shut down, then it will come up in auto mode. To select an input, simply press the push-button on the front of the unit corresponding to that input. Corresponding LED indicates the selected input.

Alternatively, the TVB200-Plus can be controlled by the serial RS232 port from any computer or RS-232 device (see details in following section).



Figure 2.2

If the VGA input is selected, then the unit buffers the signal and passes it to the output without modification. If the input is from one of the 3 NTSC or PAL channels, the unit automatically converts the signal to VGA. The conversion is performed by line doubling and image processing via digital filtering. The output signal preserves the entire information contained in the TV input signal, and also improves the way it appears on the screen by line doubling (de-interlaced). The output resolution during conversion is 640x480 for NTSC Systems and 768x576 for PAL. Almost all VGA monitors and LCD's today should automatically size the image to perfectly fit the screen.

Some VCR's (particularly lower cost ones with no time-base correction), may not output accurate and clean video signal timing

(especially in FF, REV, or PAUSE modes); however, the TVB200-Plus performs the conversion to VGA regardless. Some VGA monitors or LCD's may not be able to handle the instability in refresh rate and may lose the image lock periodically. If this occurs, the solution is to use a different VCR with time base correction (TBC), change the monitor to a different brand/model, or use a Video Scaler with time-base correction (such as Hall Research Model TVB-350). DVD players and video cameras do not exhibit this characteristic, as their signal timing is always very accurate.

The Enhancement switch on the front panel applies the level of gamma correction previously defined via the Serial control. Default level is 1.

The audio selection follows the video input signal. If the “line-level” volume of the input is different between your sources, for example if the DVD player has louder output than the VCR, you can balance (equalize) the volume settings using the serial input control so that when you switch from one input to another the output volume level stays the same.

### **Special Front Panel Operations**

- ❑ To enter the “Auto” mode from the front panel press the left two switches (VGA and CV1) simultaneously for 1 second. In auto mode if there are no TV inputs, the unit selects the PC input. As soon as it detects a valid TV input on any of the video inputs, the TVB200-Plus switches to the TV input. (The TV inputs have priority over the VGA input from the PC; there is no priority structure among TV inputs as soon as a valid TV signal is found on CV1, CV2, or S-Video, the unit selects it and stays on it as long as the video signal is present.
- ❑ To reset the system to factory default settings, press the left and right switches (VGA and S-Video) simultaneously for 3 seconds. The system will reset to factory settings. This capability is available even if the front panel has been locked.

## 4. Configuration

### 4.1 RS-232 Control and configuration

The TVB200-Plus is ready and fully operational right out of the box and no customer configuration is normally needed.

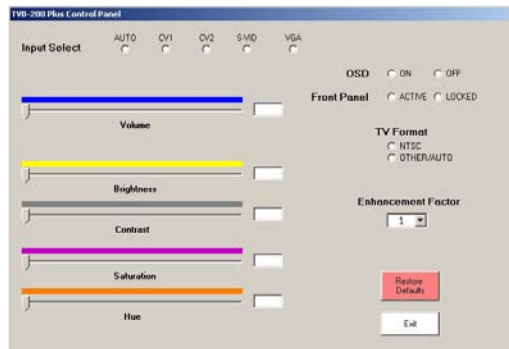
However, the RS-232 port provided on the box can be used not only to make input channel selection, but to adjust a number of the internal settings of the TVB200-Plus such as default contrast, brightness, and audio volume parameters.

You can use any ASCII terminal emulation software (such as Windows Hyper Terminal), or contact Hall Research to obtain a Windows-based control and setup program for the TVB200-PLUS. You would need a straight through DB9 Male-to-Female cable for connection to a PC.

For example, when using Windows Hyper-Terminal, do the following: Use Comm. port 1 or 2 of the PC. Configure for 4800 baud, 8 bits, no parity, and one stop bit. Set for ANSI emulation, ASCII with no Local Echo.

### 4.2 Control Panel Software for Windows

Optional Windows-based "Control Panel" software is available for the TVB200-Plus. The software includes options for changing the default brightness, contrast, audio setup, selecting input channels, and restoring factory default settings. If you are interested, please contact the Hall Research ftp site or Tech Support to obtain a copy. You would need a straight-through DB9 Male-to-Female cable for connection to a PC.



### 4.3 Serial Command Set

Configure port for: 4800 Baud, 8-bits, no parity, 1 stop bit

Command	Description
D1[enter]	Restore Defaults
I0[enter]	Auto Scan
Ix[enter]	Select Input ( x=1:CV1, 2: CV2, 3:S-Vid, 4:VGA)
Bx[enter]	Brightness set & Save ( 0 < x < 255)
^Bx[enter]	Brightness set ( 0 < x < 255)
Cx[enter]	Contrast set & Save ( 0 < x < 127)
^Cx[enter]	Contrast set ( 0 < x < 127)
Vx[enter]	Volume set & Save for current input selection ( 0 < x < 255)
^Vx[enter]	Volume set ( 0 < x < 255)
Sx[enter]	Saturation set & Save( 0 < x < 127)
^Sx[enter]	Saturation set ( 0 < x < 127)
Hx[enter]	Hue set ( 0 < x < 255)
^Hx[enter]	Hue set ( 0 < x < 255)
Ox[enter]	OSD Control (x=0:Off, 1:On)
Fx[enter]	Front Panel Control (x=0:Off or Disabled, 1:On or active)
Gx[enter]	Gamma Enhancement Level ( x=1:1.3, 2:1.5, 3:1.8)
Nx[enter]	NTSC ( x=1:Configure Specifically for NTSC, 0:Other or Auto)
Rx [enter]	Read Bus (follow instructions) ** FOR ADVANCED USE ONLY **
Wx [enter]	Write Bus (follow instructions) ** FOR ADVANCED USE ONLY **

## 5. Troubleshooting

### **If your monitor goes blank periodically ...**

Some VCR's (particularly lower cost ones with no time-base correction), output jittery and unstable video signal timing (especially in FF or PAUSE modes); however, the TVB200-Plus performs the conversion to VGA regardless. Some VGA monitors or LCD's may not be able to handle the instability in refresh rate and may lose the image lock periodically. If this occurs, the solution is to: use a different VCR with time base correction (TBC), change the monitor to a different brand/model, or use a scaler with time-base correction instead of the TVB200-Plus (such as Hall Research Technologies' Model TVB-350).

### **If you want to substitute power supplies ...**

The converter relies on the AC power adapter that is supplied with it. The adapter generates a 6v DC at 800 mA. You can substitute your own power supply as long as it does not exceed 7.5 volts. The power jack on the unit is center positive 2.5mm coaxial power connector.

### **Calling Hall Research**

If you determine that your converter is malfunctioning, do not attempt to repair the unit. Contact HRT Support at 714-641-6607.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description.

### **Shipping and Packaging**

If you need to transport or ship your converter:

- Package it carefully. We recommend that you use the original container.
- Before you ship the unit back to Hall Research for repair or return, contact us to get a Return Material Authorization (RMA) number.



## 6. Specifications

<b>Compliance</b>	CE; FCC Part 15 Subpart B Class A, IC Class
<b>Standards</b>	VGA, SVGA, or XGA video. RGBHV
<b>Interfaces Supported</b>	Video: VGA, Composite, and S-Video, Audio: Stereo line-level analog Serial: RS-232, pinned according to TIA-574, DCE
<b>Video Types</b>	VGA Input: to 1600 x 1200 up to 100 Hz TV Inputs: NTSC or PAL (auto detect) VGA Output: Same as VGA input, or 640x480 / 800x600 for conversion (NTSC / PAL respectively)
<b>Bandwidth</b>	Video: DC to 250 MHz
<b>Video Level</b>	0.7 volts peak-to-peak, on RGB, TTL on H & V
<b>Connectors</b>	HD15 for VGA, RCA for CV, MD4 for S-VHS
<b>Temperature Tolerance</b>	Operating: 32 to 122°F (0 to 50°C); Storage: -40 to +185°F (-40 to +85°C)
<b>Enclosure</b>	Steel
<b>MTBF</b>	200,000 hours (calculated estimate)
<b>Power</b>	From a utility-power (mains) outlet through the included external power adapter. Output Voltage: 6v DC to 7.5 v DC Center-Positive 800 ma, minimum
<b>Size</b>	6.9" W x 3.3" D x 1.8" H
<b>Weight</b>	1.2.lb box only; 2.7 lb shipping

# Notes





Products Designed and Made in the USA



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