



Hall Research Technologies, Inc.

TV-to-VGA / HDTV Video Scaler

Component, S-Video, Composite, and PC Inputs

IR Remote, RS-232 Serial Control & Time-base Correction



Model TVB-350

**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, CA 92704

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UMA1070 Rev. D

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FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been designed to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are intended to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.



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1. Introduction

1.1 General

The TVB-350 is a high-end video scaler that up-converts composite, S-video, or Component (YCbCr) inputs to high resolution PC or HDTV output. It also provides an input from a PC.

The VGA output resolution can be selected to be VGA, SVGA, XGA, or SXGA.

It can also be set to output HDTV resolutions of 480P, 576P, 720P and 1080i. The output signal under HDTV mode is YPbPr (a 15-pin HD to 3 RCA adaptor cable is included).

The TVB-350 can be controlled via the front panel through OSD menus, by using the included remote control, or via RS-232 Serial interface. The controls include input selection, choice of output resolution, picture adjust (tint, color, brightness, contrast, sharpness), aspect ratio (16/9 or 4/3), digital noise reduction, 3D comb filter ON/Off and many other advanced features.

The TVB-350 is ideal for use with LCD projectors, CRT/LCD monitors, and plasma or HDTV displays with improved picture quality.

The Unit is shipped with all required cables, IR remote and also a PC RS-232 control software

1.2 Features

- Professional-quality Video Scaler/Deinterlacer
- Can provide VGA, SVGA, XGA, SXGA(1280x1024) outputs
- Can also provide HDTV outputs of 480p, 576p, 720p, 1080i,
- State-of-the-art frame buffer (time-base correction)
- Reverse 3:2/2:2 pull down provides clear and crisp de-interlacing of video originating from 24 fps film, such as DVD movies.
- Digital noise reduction
- Brightness, Color, Contrast, Sharpness and Tint adjustment
- Dynamic format 4:3 or 16:9 output
- 3-D comb filter for composite input ensures jitter-free picture
- Compatible with NISTC, PAL, and SECAM video input

- Easy to use IR remote control
- RS-232 interface allows control from an external device.
- OSD display.

2. Installation

2.1 Connecting the Video inputs (refer to figure 2.1)

The video scaler can accept a composite video, an S-Video or a YCbCr input signal for scaling, as well as a computer signal input that is passed through the unit when the PC in (Bypass) is selected or the unit is tuned off.

Rear Panel

Composite Video: Use a Composite video cable to connect the composite video output of the source equipment to the connector labeled “C-Video” on the back of the Video Scaler.

S-Video: Use an S-Video cable to connect the S-Video output of the source video equipment to the connector labeled “S-Video”. S-Video provides improved performance over Composite Video and is recommended whenever available.

YCbCr input: Use a 3 RCA-to-3 BNC YCbCr cable to connect the YCbCr output of the source video equipment to the connectors labeled “YcbCr”. Note the plug’s colors must match with the color of the RCA Jacks. YCbCr component provides the best picture quality among all three inputs, and should be used whenever possible.

Computer RGB with H&V Sync: Connect the source computer's VGA output signal to the HD 15 connector labeled “PC In” on the Video Scaler. *Note:* This Computer inputs signal is not scaled, but is available for pass-through when the Video Scaler is in the PC In (Bypass) mode or if unit is turned off.

2.2 Connecting the Scaled Output

The output can be connected to any VGA compatible LCD, Projector, or Plasma display. It can also output HDTV compatible YPbPr in various formats as described below.

The same HD-15 connector is used to output VGA (RGBHV) output or HDTV/YPbPr output. When VGA (RGBHV) output is selected, use an HD-15 to HD-15 VGA cable to connect the output to the PC input of your display monitor. When HDTV/YPbPr output (480p, 576p, 720p, 1080i) is selected, use a HD-15 to YPbPr 3 x RCA cable to connect the output to the YPbPr input of your HDTV display. Both cables are provided.

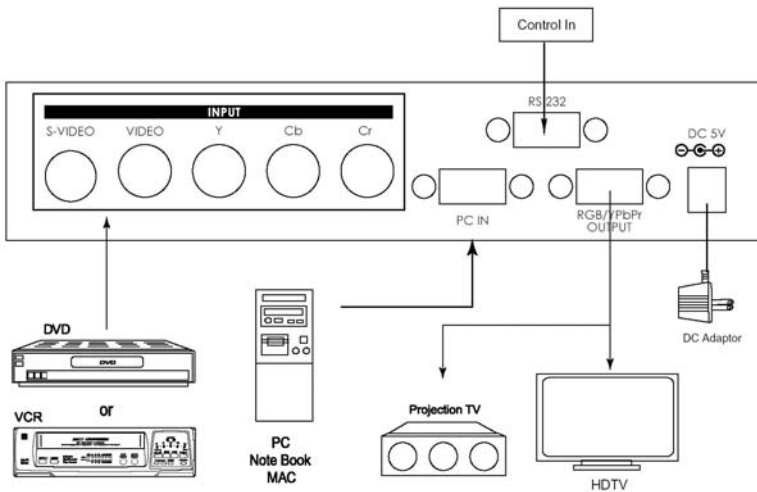


Figure 2.1

2.3 Other Connections

RS232: This 9-pin D-sub connector is for connecting to your PC or other serial control device for remote control of the TVB-350.

DC power jack: 5V 2A DC power input (center positive 2.1 mm jack). From provided Universal Power supply

NOTE: The range of power input is 5 to 9VDC at 1A nominal operating current

3. Configuration & Operation

3.1 Front Panel

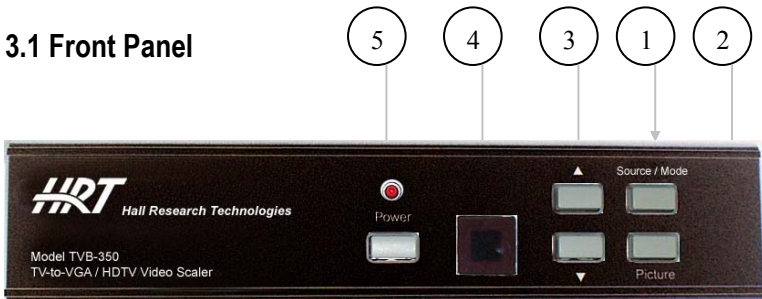


Figure 3.1

1. Source / Mode: Press the button repeatedly will toggle through the following adjustment controls:

Source > Resolution > Output > Aspect > 3D Enhance > Digital NR

Source: While under this mode, press \uparrow or \downarrow buttons to choose your desired input source from Composite Video, S-Video, or Component Video inputs. *Note:* To select the PC input from the front panel turn the unit off. The TVB-350 has a Power off bypass from the PC input to the VGA output. However, if you don't want to turn the unit off to get the PC pass-thru, you can select the PC input (with the unit on) from the IR remote or the Serial Input (please see following sections).

Resolution mode: If output is set to RGB (PC-type), press \uparrow or \downarrow buttons to choose from 640 x 480(VGA), 800 x 600 (SVGA), 1024 x 768(XGA), or 1280 x 1024(SXGA) PC output. If output is set to YPbPr press \uparrow or \downarrow to choose from 480p, 576p, 720P or 1080i HDTV output.

Output mode: Press \uparrow or \downarrow to select between PC RGB output or HDTV YPbPr output.

Aspect mode: Press \uparrow or \downarrow to choose between standard (4:3) aspect and wide (16:9) aspect ratio.

3D Enhance mode: To turn on or off the 3D comb filter function.

When VCR or non-standard video source is connected to the input the output picture may be jittering. If this occurs, please turn off the 3D Enhance function.

Digital NR mode: To turn on or turn off the digital noise reduction function.

2. Picture: Press the button to toggle through picture adjust parameters as follows:

Contrast > Brightness > Color > Tint > Sharpness

Contrast: Press \uparrow or \downarrow to adjust contrast level. The range of adjustment is 0~63. Factory default value is 58.

Brightness: Press \uparrow or \downarrow to adjust Brightness level. The range of adjustment is 0~63. Factory default value is 31.

Color: Press \uparrow or \downarrow to adjust color level. The range of adjustment is 0~63. Factory default value is 31.

Tint: Press \uparrow or \downarrow to adjust NTSC Tint level. The range of adjustment is 0~63. Factory defaults value is 31.

Sharpness: Press \uparrow or \downarrow to adjust sharpness level. The range of adjustment is 0~63. Factory defaults at 10.

3. \uparrow or \downarrow : Press to toggle through various adjustment controls to alter settings

_____ **Note** _____

Under picture adjust mode, pressing \uparrow and \downarrow simultaneously will revert the selected parameter back to factory preset value. Pressing both buttons for over 5 seconds will revert all picture parameters back to their factory preset values.

4. IR Sensor: Infrared remote control sensor.

5. Power and LED button: Press once to power on the unit, press again to turn off. *Note:* with power off the PC input is passed to the output.

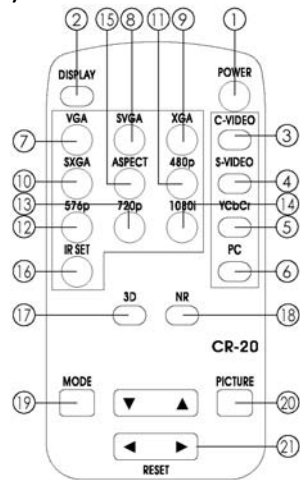
Front Panel Lockout - Under certain circumstances it may be desirable to disable the front panel controls (e.g. to prevent unauthorized or accidental changes to the settings while the unit is in use). To disable the front panel controls you must use the RS-232 port (see Serial Control section for details)

It is still possible to lift this lockout from the front panel by performing a full factory default reset operation !

To reset all parameters back to factory preset value, press the “Source/Mode” and “Picture” buttons simultaneously for over 10 seconds.

3.2 Infra-Red Remote control (IR Remote)

1. Power: Power ON/OFF.
2. Display: To enable or disable the on screen display of the resolution information.
3. C-Video: Select composite video as input.
4. S-Video: Select S-Video as input source.
5. YCbCr: Select YCbCr as input source.
6. PC: Select PC input loop-thru to the output.
7. VGA: Select 640 x 480 output resolution.
8. SVGA: Select 800 x 600 output resolution.
9. XGA: Select 1024 x 768 output resolution.
10. SXGA: Select 1280 x 1024 output resolution.
11. 480p: Select 852 x 480p output resolution.
12. 576p: Select 852 x 576p output resolution.
13. 720p: Select 1280 x 720p output resolution.
14. 1080i: Select 1920 x 1080i output resolution.
15. Aspect ratio: Switch between standard (4:3) and wide (16:9) aspect ratio.
16. IR-Set: When front panel is locked out by RS-232, Press this button for over 15 seconds will lift the lock out.
17. 3D: Press to turn ON/OFF the 3D enhance.
18. NR: Press to turn ON/OFF digital noise reduction.
19. Mode: Same as "mode" button on front panel.
20. Picture: Same as picture button on front panel.
21. Reset: Press this button will revert picture adjust back to factory preset.



4. Serial Control

The video input selection and signal parameter settings for the TVB-350 can be controlled via an external control system by using the RS-232 port on the unit. A free Windows® control software is available that permits remote control of the unit from a PC via RS-232.

Use a straight thru M/F DB9 serial cable to connect the unit to the PC. Only the TX, RX and GND pins are implemented in the connector. Set port operates at 9600 baud, no parity and 1 stop bit. Control codes are 3 bytes long. In the table shown below, the 1st 2 characters are ASCII and the 3rd argument is binary.

Code		Description
'PW'+0	Power	power off (standby)
'PW'+1		power on (normal)
'IN'+0	Input Selection	Composite video
'IN'+1		S video
'IN'+2		YCbCr
'IN'+3		PC (pass - through)
'OU'+0	Output Resolution	VGA
'OU'+1		480p
'OU'+2		SVGA
'OU'+3		XGA
'OU'+4		SXGA
'OU'+5		576p
'OU'+6		720p
'OU'+7		1080i
'OS'+0	OSD	OSD OFF
'OS'+1		OSD ON
'DI'+0	Display	display OFF
'DI'+1		display ON
'BR'+value	Brightness	value = 0~63 (default 31)
'CO'+value	Contrast	value = 0~63 (default 58)
'SA'+value	Saturation	value = 0~63 (default 31)
'SH'+value	Sharpness	value = 0~63 (default 10)
'TI'+value	Tint	value = 0~63 (default 31)
'RE'+0	Reset	video adjustment reset
'IR'+0	IR	IR sensor OFF
'IR'+1		IR sensor ON
'FP'+0	Front Panel	front panel lockout ON
'FP'+1		front panel lockout OFF
'TD'+0	Three D	3 D enhance OFF
'TD'+1		3 D enhance ON

Code		Description	
'NR'+0	Noise Reduction	Digital NR OFF	
'NR'+1		Digital NR ON	
'AS'+0	Aspect Ratio	aspect 16:9(letter box)	
'AS'+1		aspect standard(full screen)	
'AS'+2		aspect 4:3 (pan & scan)	
'AL'+0	Retrieve video scaler all status		
	'PW'+?	'IN'+?	'OS'+?
	'OU'+?	'DI'+?	'IR'+?
	'FP'+?	'BR'+?	'CO'+?
	'SA'+?	'SH'+?	'TI'+?
	'TD'+?	'NR'+?	'AS'+?

5. Troubleshooting

There are no field serviceable parts or circuits in the device. If you think that the device is malfunctioning, please first try to reset to factory default settings:

Resetting the TVB-350 to Factory Defaults

To reset all parameters back to the factory preset value, press the “Source/Mode” and “Picture” buttons simultaneously for over 10 seconds.

Contacting Hall Research Technologies

If you determine that your scaler is malfunctioning, do not attempt to repair the unit. Contact HRT’s Tech. 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 Scaler:

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

6. Specifications

Computer input (Loop Thru)		RGB with HV Sync			
Max computer input resolution		1600 x 1200			
Computer input connector type		HD 15 Female			
Computer input signal level		RGB @ 0.7V Analog, H&V Sync TTL			
Video inputs		Composite Video @ 1 Vp-p 75 ohm S-Video @ 1 Vp-p 75 ohm YCbCr Y : 1 Vpp 75 ohm CbCr : 0.7 Vp-p 75 ohm			
Video standard		NTSC 3.58, PAL B/D/G/I, SECAM			
Video input connectors		Composite video on BNC S-Video on 4-pin Mini-DIN Component on BNC			
Scaled output resolutions		PC Resolution		Format	Scan
		HDTV Resolution			
		Pixels			
		VGA 640 x 480		RGBHV	Progressive
		SVGA 800 x 600		RGBHV	Progressive
		XGA 1024 x 768		RGBHV	Progressive
		SXGA 1280 x 1024		RGBHV	Progressive
		16:9 1280 x 720p (720p)		YPbPr	Progressive
		16:9 1920 x 1080i (1080i)		YPbPr	Interlaced
		852 x 480p (480p)		YPbPr	Progressive
		852 x 576p (576p)		YPbPr	Progressive
Scaled output vertical refresh rates & Horizontal scan rates		Output resolution	Vert. (Hz)	Hori. (Hz)	
		VGA	59.94	31.469	
		SVGA	60.320	37.880	
		XGA	60.000	48.360	
		SXGA	60.020	63.981	
		480p	59.940	31.469	
		576p	50	31.25	
		720P	59.94	44.995	
1080i	59.94	33.716			
Manual control		Front panel buttons			
RS-232 control		Via rear panel DB9F connector			
IR remote control		Yes			
Video adjustments		Brightness, Contrast, Color Saturation, Tint (NTSC), Sharpness			
Weight		3 lbs			
Dimensions		8 inch(D)x 6 inch (W) x 1.83 inch (H)			
Power source		100~240VAC to DC 5V/2A Desktop switching adaptor			

Notes



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