

# HR HALL RESEARCH

**Model VSA-31-SP**

## **A / V Switch-Cat™**

### **All-in-One A/V Distribution System**

Switching, UTP Transmission, Serial Control, and Audio Amplification




UMA1146 Rev E

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FCC and European Union Declaration of Conformity

This equipment generates, uses and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. It complies with the limits for a Class A computing device, pursuant to Part 15 of the FCC rules.

This product complies with the requirements of the European EMC directive 89/336/EEC



**Table of Contents**

1.0 General..... 3

2.0 Features..... 4

3.0 Installation ..... 5

4.0 Operation ..... 8

5.0 Windows™ Projector Configuration Software ..... 9

- . Installing the Software ..... 9
- . Selecting your Projector Configuration file ..... 9
- . Creating the Serial Strings ..... 10
- . Entering ASCII characters into the serial strings ..... 11
- . Entering hexadecimal bytes into the serial strings ..... 12
- . Entering wait times into the serial strings ..... 12
- . Entering Carriage Returns into the serial strings..... 12
- . Selecting the Baud Rate and Parity..... 13
- . Power up Options..... 13
- . Setup to Program VSA-31-SP..... 13
- . Loading or Saving Configurations ..... 14
- . Uploading to the VSA-31-SP..... 14
- . Putting the VSA-31-SP into Operation ..... 14
- . Operating the VSA-31-SP..... 15
- . Resetting the VSA-31-SP..... 15

6.0 Troubleshooting..... 16

7.0 Specifications..... 17

## 1.0 General

Thank you for purchasing the Hall Research Model VSA-31-SP A/V switching control system. The package is comprised of a 3 input connector panel with a microphone XLR connector on a 4-gang Wall plate (transmitter), a control panel A/V switcher on a 2-gang wall plate (user interface) plus a remote receiver with video, audio, serial control outputs, and a serial programming cable are also included in the package.

This device can be used to add audio video capability to any room. The installer need only supply the display device (such as a projector) and passive 4 or 8 ohm speakers.

The unit accommodates the following inputs:

- Input #1: PC (VGA to UXGA) or Component (YPbPr) with Stereo Audio
- Input #2: PC (VGA to UXGA) or Component (YPbPr) with Stereo Audio
- Input #3: S-Video or Composite Video with Stereo Audio

The VSA-31-SP provides individual buttons for turning the projector on/off, volume control selection, selecting the video source for display as well as a user defined 'AUX' button. It connects to the Connector Panel via 1 CAT5 cable, and sends the selected AV to a remote receiver unit via 2 CAT5 Cables. No power supply is needed for the wall plates. The remote unit can be up to 750 ft away and has a built-in 20 Watt (10x2) Stereo Amp which can drive a pair of 4 or 8 ohm speakers directly. A line output is provided for connection to an external amp if necessary. A Volume knob on the User Interface wall plate allows adjustment of the sound level of both the AV volume as well as microphone volume. The VSA-31-SP automatically controls projector operation (on/off and source selection) via serial commands stored in the unit by just the touch of a button.

## Model VSA-31-SP

### 2.0 Features

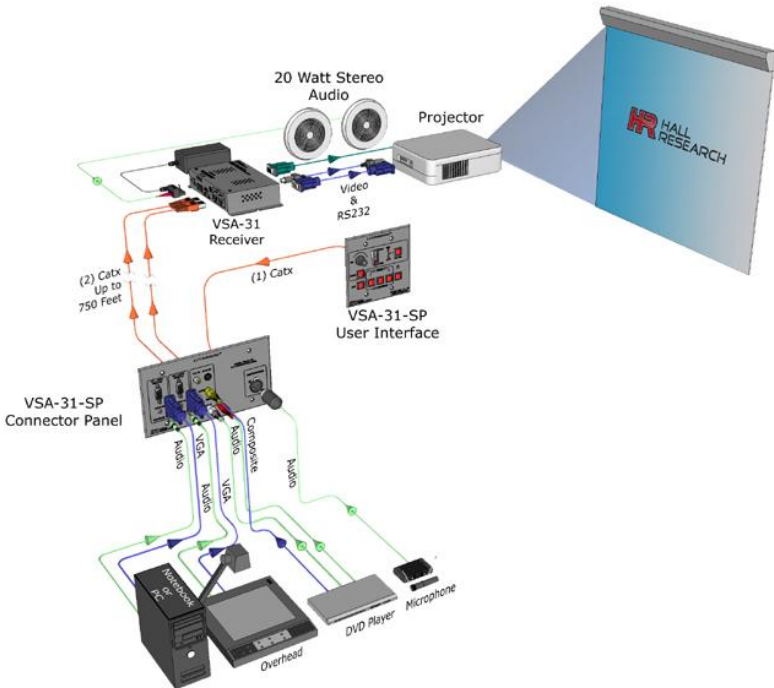
- ✓ User interface control panel available as 2-gang wall plate or desktop standalone keypad
- ✓ Wall plates available in both white or black color
- ✓ Programmable relay contacts can switch on or off with any button
- ✓ Accepts 2 VGA and 1 TV-Video (Composite or S-Video) each with its own stereo audio
- ✓ Accepts microphone input (with phantom power and microphone preamplifier with programmable gain) on XLR connector or rear 3 pin header
- ✓ Selectable volume control and mute button for the AV and Microphone audio
- ✓ Provides individual buttons for turning the projector on/off, selection of the video source, both volume control and mute selection and a user definable button
- ✓ Bidirectional RS232 connection from the control wall plate to the receiver
- ✓ Sends selected AV to a remote receiver unit via 2 CAT5 Cables
- ✓ No power supply is needed for the wall plate or connector panel, only at the receiver
- ✓ Simple UTP (CAT5) cable connections between the wall plates and the receiver
- ✓ Remote unit can be up to 750 ft away with automatic video compensation
- ✓ Built-in 20 Watt (10x2) Stereo Amp drives a 4 or 8 ohm speakers directly
- ✓ Automatically controls projector operation (on/off and source selection) via serial commands stored in the unit
- ✓ In-activity timer capable of up to 8 hours to turn off the projector
- ✓ Comes with Windows™ GUI software and cable for programming
- ✓ Supports 1200, 2400, 4800, 9600, 14400, 38400, 57600 and 115200 Baud Rates
- ✓ Supports Parity of NONE, EVEN or ODD

### 3.0 Installation

In a typical installation, the User interface unit is located on a wall or panel and is wired to the connector panel via 1 CAT5 cable. The connector panel is wired to the receiver unit via 2 CAT5 cables.

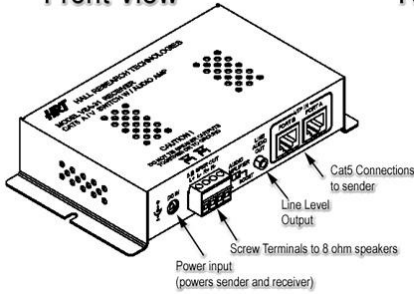
The user interface and connector panels qualify as low-voltage class 2 devices and do not require a J-box in the wall. In fact it does not even need a power supply to be connected to it, as it draws power via the signal connection to the remote unit. However, in most instances it is easier to use standard 2-gang and 4-gang electrical boxes in order to attach the faceplates to the mounting surface or structure.

Please contact Hall Research or your desired electrical supply house for purchasing the J-box. These are generally inexpensive units.

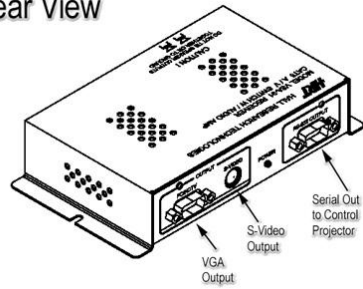


## Model VSA-31-SP

Front View



Rear View



As seen in the above diagrams, the connection between the receiver and the projector could be comprised of VGA, S-Video, and RS232. These cables are not supplied and must be purchased separately.

**Please note that most projectors use a unique and non-standard Serial input connector, therefore you need to build your cable according to the pin out provided by the projector manufacturer or purchase a cable from them.**

If you will be making your own cable, the VSA-31-SP receiver has the following RS-232 pin out:

Connector on VSA-31-SP: DB9-Male

Transmit: Pin 3  
Receive: Pin 2  
Ground: Pin 5

### Note on video signals that go to the Projector

When you select either of the 2 VGA inputs (Source 1 or Source 2), the VGA output to the projector has the selected signal and the S-Video output is blanked out. Conversely, if the input is Composite Video or S-Video (Source 3), only the S-Video output to the projector will have a signal. This means that it is possible to use the projector's auto-detect mode to switch between video inputs and not even connect the serial port to the projector. However in doing so, you will not be able to use the on/off button on the sender to control the projector, and you will still have to rely on the projectors remote to turn the projector on and off.



Prior to final installation of the user interface and connector panel wall plates, you need to use the supplied Windows™ software and the serial cable to program the serial codes needed to operate the projector into the sender wall plate.

### **Note on CV and S-Video Inputs**

Do not connect the Composite Video and S-Video inputs simultaneously. Doing so will produce a poor quality image

### **Note on RS-232 port availability on your PC**

Most PCs and notebooks do not have a serial port. So to program the sender you may need a USB to RS-232 Serial converter. These are available from Hall Research (Model USB-RS232-1).



For more on the topic of Serial Control of the projector please refer to Section 5.0

## 4.0 Operation

The user's operation of the system is almost self-explanatory. There are 7 buttons on the User Interface wall plate for powering the projector, video source selection, volume and mute control as well as a user definable AUX button.

The buttons are back-lit so you can tell which video or audio input is selected. If the command string being transmitted to the projector has a 'wait' delay inserted, then during the prescribed wait time, the LED will be blinking and the user cannot switch channels.

There is a volume knob on the User Interface with a corresponding LED bar to indicate the current loudness setting. The Volume Select button is used to specify whether you are adjusting the AV volume or the Microphone volume.

The VSA-31-SP remembers the settings independently for each input. So as you switch between inputs, the volume setting recalls the last setting of that input. Later versions of the VSA-31-SP allow the user to control which options are remembered, whether to process the user defined strings at power-up and whether the microphone input is disabled or not. The default setting is: Everything off, nothing muted and microphone enabled.

### Notes on Audio Output

The receiver has an "Audio Amplifier" switch with "Normal" and "Boost" settings. For a small room use the "Normal" setting, for larger rooms use the "Boost" setting. This is used to normalize the loudness LED bar display, so in a small room where you never would set the sound volume too loud, with the "Normal" setting the LED bar display is not all the way to the bottom all the time! Also note that if you use 4 Ohm speakers, the power output from the system is maximized, so if you are using 8 Ohm speakers, and in "Boost" you still don't have sufficient loudness, then you better switch to a lower impedance speaker such as 6 or 4 Ohm.

You can add more than one speaker to each of the Left or Right output of the unit. If you are using 8 or 16 Ohm speakers, you can parallel 2 of them on each channel (for a total of 4 speakers). If you are using 4 Ohm speakers, then you need to put 2 of them in series for each channel (for a total of 4 speakers).

The VSA-31-SP receiver has a Line-level audio output. This connector is used in cases where the built-in power amp may not be sufficient. Upon connecting a plug to this jack, the power amp outputs are disabled and you can route a stereo cable to any external Audio Amp of your choosing. The volume knob on the sender still acts on the level of the line output signal.

## 5.0 Windows™ Projector Configuration Software

The VSA-31-SP includes a Windows software application for configuring the stored commands. This software can be downloaded from the product webpage at: <http://www.hallresearch.com/page/Products/VSA-31-SP>

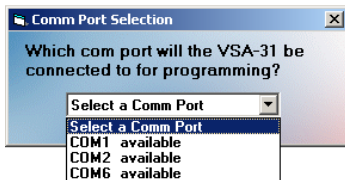
Configuring the software is a one-time task, as long as you do not change your projector or device being controlled. You can also create your own command string set as explained below.

### . Installing the Software

Run the setup .exe. The installation wizard will walk you through the rest of the installation. After installation, note that the version number of the software is displayed on the main screen.

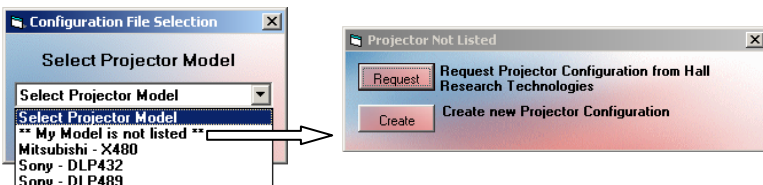
### . Selecting the Com Port

The VSA-31-SP Programming Software will detect your available COM ports. Just select the COM port you will use to connect the VSA-31-SP to your PC



### . Selecting your Projector Configuration file

Select your projector model from the drop down list. If your projector model is not listed, contact Hall Research via the Request button for your projector configuration file or create your own. There may be a nominal fee for this service. You may also enter the projector codes in a new configuration file yourself if you would prefer.



## Model VSA-31-SP

### . Creating the Serial Strings

The serial string to the projector can be comprised of ASCII characters, hexadecimal bytes, relay control sequences and wait times embedded in the strings. The length of each serial string must not exceed 250 characters. The current length of each string will be displayed in the String Length box. In the Projector Commands drop down menu there are 10 options which are related to the string that would be sent when that particular button is pressed. Select the Projector command you wish to edit and then start typing the serial string into the Serial String text box.



#### 1. Source = SRC1 On / Off

The On command will be issued when the Source 1 VGA/HD input is selected via the VSA-31-SP's front panel button and the button is illuminated. This command can tell the projector to select the VGA input.

The Off command is issued when the Source 1 button is pressed again. The button LED turns off, and Source 1 audio/video is disconnected. (Microphone Volume is still active at this time)

#### 2. Source = SRC2 On / Off, SRC3 On / Off

The Source 2 and Source 3 commands function in the same manner as Source 1. Source 2 corresponds to the second VGA/HD input, while source 3 is for Composite/S-Video input. The VSA-31-SP converts the Composite video into S-Video so the projector is always receiving S-Video when Source 3 is selected. The serial command associated with this command will tell the projector to select the S-Video input.

**3. Source = Aux On / Aux Off**

These commands are issued when the Aux button is pushed. When the Aux On command is sent, the Aux button illuminates, and vice versa. These commands can be used for additional projector control, or to toggle the VSA-31-SP's relay to raise/lower a screen, etc.

**4. Power = On**

This command will be issued when the Power button is pressed and the Power button LED is off. This command would normally tell the projector to power on.

Note: We recommend inserting a 15-45 second wait after the power on serial command to allow the projector to completely power up before sending it more serial commands. (The time to wait will vary with the projector model)

**5. Power = Off**

This command will be issued when the Power button is pressed and the Power button LED is on. This command would normally tell the projector to power off.

Note: We recommend inserting a 45-90 second wait to allow the projector to completely power off before sending it more serial commands. (The time to wait will vary with the projector model)

**. Entering ASCII characters into the serial strings**

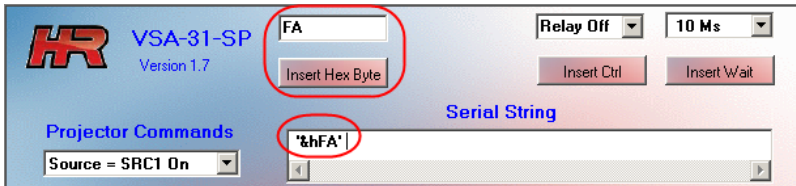
Just start typing in either Serial Output text box to enter ASCII characters. You will see the characters as you type. You cannot paste or copy text and you cannot delete more than 1 character at a time. In the below example I typed uppercase ABCDEFG



## Model VSA-31-SP

### . Entering hexadecimal bytes into the serial strings

Enter Hexadecimal bytes by typing the hexadecimal byte into the box above the 'Insert Hex Byte' button. Then click 'Insert Hex Byte' button. The Hexadecimal byte will be inserted at the end of the current string. In this example I inserted the Hex byte FA



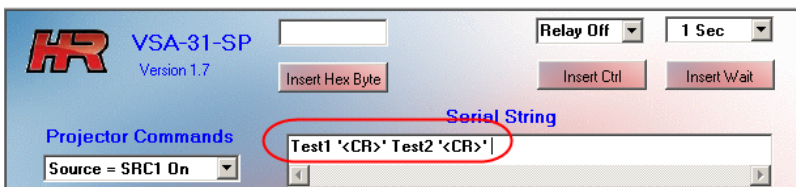
### . Entering wait times into the serial strings

Waits can be entered into the serial strings by choosing the wait duration from the drop down menu then clicking 'Insert Wait' button. Each wait uses the space of 2 ASCII characters in the overall string length. In this example I inserted (2) 1-second waits for a total of a 2 second wait. When a wait time is being executed by the VSA-31-SP you will see the button that triggered that command blinking. During this wait period the VSA-31-SP will not accept user input from selection buttons.



### . Entering Carriage Returns into the serial strings

To enter a Carriage Return <CR> into the serial string, just press the 'Enter' key on your keyboard. In this example I typed Test1 then I pressed Enter then I typed Test2 then I pressed Enter again



## . **Selecting the Baud Rate and Parity**

Select the Baud Rate from the drop down menu that the VSA-31-SP needs to use to communicate with the projector. Use a rate that matches your projector's setting. Choices are: 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600 or 115200 bits per second.

Select the Parity from the drop down menu that the VSA-31-SP needs to use to communicate with the projector. Use a rate that matches your projector's setting. Choices are: NONE, EVEN or ODD

## . **VSA-31-SP Optional Settings**

- “Restore Last State?” – Select this option to cause the VSA-31-SP to return the buttons to the last state they were in before being reset or power cycled. Default is all buttons OFF
- “Strings @ Powerup?” – Select this option to cause the VSA-31-SP to process the associated serial strings for POWER (and SOURCE if ON) or AUX buttons. Default is not to send RS232 at powerup.
- “Disable Mic?” – Select this option to cause the microphone input on the VSA-31-SP to be disabled. The microphone volume is set at minimum and muted. The A/V volume selection is made and can not be changed. The default is to NOT disable the microphone.
- “Sleep Timer” – Use the drop down menu to either disable or select the desired time period to wait with no button or volume control activity before processing the “POWER OFF” commands. This can be useful to ensure the projector is powered off after a preset time period automatically. Default is DISABLED.

## . **Setup to Program VSA-31-SP**

1. Install the VSA-31-SP Programmer software on the PC.
2. Connect power to the VSA-31-SP.
3. Connect the VSA-31-SP to the PC via the supplied DB9-to-3.5 cable. The serial connection is on the REAR of the User Interface.
4. Startup the VSA-31-SP Programmer software. (Start -> Programs -> Hall Research -> VSA-31-SP Uploader)
5. Create the serial command strings
6. Save file and Upload

## **Model VSA-31-SP**

### **. Loading or Saving Configurations**

You can save or load a configuration file by clicking on the File menu or choosing the appropriate icon. You can also create a new configuration file from the File menu or the New File icon

### **. Uploading to the VSA-31-SP**

To upload to the VSA-31-SP, make sure the VSA-31-SP is connected to the PC, via the supplied DB9-to-mini-stereo programming cable, and is powered on then simply click on the Upload button

### **. Putting the VSA-31-SP into Operation**

After you have successfully uploaded a configuration to the VSA-31-SP Transmitter, disconnect the VSA-31-SP Transmitter from the computer and power it off. Connect the VSA-31-SP Transmitter to the Receiver via 2 UTP (CAT5/5e/6) cables. Connect the User Interface to the Transmitter via 1 CAT5 cable. When you connect power to the Receiver, you will see the LED's on the User Interface flash twice and scroll, to indicate the boot up sequence. If any of the optional settings have been enabled, those will process first. Afterwards, the VSA-31-SP will now be ready to control the projector by powering, select video inputs and adjust the volume.



## . **Operating the VSA-31-SP**

To operate the VSA-31-SP, first press the power button. The power button on the VSA-31-SP will now light up. If you have uploaded a serial command for the “Power = On” command then that serial command will now be issued to the projector. Next, select an input 1-3 by pressing the corresponding button. The button you just pressed will light up and the serial command associated with that button will be sent to the projector. In addition to issuing serial commands to the projector the VSA-31-SP Transmitter will also switch the source of the video being transmitted to the Receiver to the input you just selected. Only 1 video source will be transmitted to the VSA-31-SP at any given time. Volume is adjusted by selecting either A/V or Mic with the “Vol Sel” button and turning the volume knob. You will see the volume level indicated by the volume LED bar. Volume level is adjusted per input and saved in memory for each input.

Pressing the “POWER ON” button while a source is on will result in the POWER = ON serial string being sent to the projector and then the corresponding SRCx=ON serial string being sent. This is done so the projector and the VSA-31-SP panel remain synchronized.

If the microphone has been disabled in the optional settings, the user is prevented from changing the “Vol Sel” button, adjusting the microphone volume or changing the microphone mute status. If microphone operation is desired, it must be enabled via the GUI.

## . **Resetting the VSA-31-SP**

If for any reason you need to reset the VSA-31-SP, press buttons 1 and 3 simultaneously and the unit will reset. This will not result in the loss of any serial command programming; this will only reboot the unit. All the serial commands are still stored in the unit. You may need to press the power on button and reselect the input you wish to display depending on the optional settings used.

## **Model VSA-31-SP**

### **6.0 Troubleshooting**

Do not open or try to repair the unit yourself. There are no customer repairable items in the unit and you will void your warranty.

Make sure that all connections are properly wired and check for the proper state on the User Interface control panel. (Power On, Source On, Not muted, Volume turned up)

Ensure that the proper configuration serial cables are used and that the VSA-31-SP is properly programmed with the appropriate commands and baud rate for the device being controlled.

Disconnect the VSA-31-SP and verify the projector can be controlled serially by utilizing a RS232 terminal such as Hyperterminal and manually sending the projector commands. If you can't control the device serially, troubleshoot the cause before reconnecting the VSA-31-SP.

Utilizing a RS232 terminal such as Hyperterminal, verify the user programming of the VSA-31-SP when pressing buttons. Ensure the commands output match the projectors commands EXACTLY.

Contact Hall Research Technical Support at 714-641-6607 or via email or web. If you need to ship your converter for repair, make sure to get a Return Material Authorization (RMA) number first.

## 7.0 Specifications

|                         |  |
|-------------------------|--|
| <b>Resolutions</b>      | PC resolutions up to 1920x1440 @ 60 Hz & HDTV to 1080i, NTSC, PAL, or SECAM S-Video and CV   |
| <b>Video Level</b>      | Unity Gain. 1V p-p for Y, 0.3 V p-p for C  |
| <b>Audio Level</b>      | Variable Gain. 0 to +4dBu (0.78 to 1.23Vrms) line level with Amplified outputs L + R at 10 Watts per Channel                                   |
| <b>Temperature</b>      | Operating: 32 to 122°F (0 to 50°C);<br>Storage: -40 to +185°F (-40 to +85°C)   |
| <b>Enclosure</b>        | Steel Receiver, Aluminum Sender  |
| <b>MTBF</b>             | 90,000 hours (calculated estimate)   |
| <b>Power</b>            | 15V DC from supplied universal power supply.   |
| <b>Size (H x W x D)</b> | User Interface: 4.5" High x 4.56" Wide x 1.5" Deep<br>Sender: 4.5" High x 8.2" Wide x 1.4" Deep<br>Receiver: 1.4" High x 3.6" Wide x 6.5" Deep |
| <b>Weight</b>           | 2.5 pounds   |





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