



VSA-X21

**HDMI Audio Extractor with 50 Watt Audio
Amplifier, HDBT Input, Line Audio Input
RS-232 Ports and IP Control
(Telnet & Internal Web GUI)**

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FCC RADIO FREQUENCY INTERFERENCE STATEMENT

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation



1.0 Introduction

The VSA-X21 is a 4K HDMI Audio Extractor with built-in 50 watt audio amplifier for direct connection of 8 ohm speakers. It provides an additional line-level stereo audio input that can mix with the HDMI audio. Volume can be controlled using front panel buttons, RS-232 commands, WebGUI, Telnet, or via an external rotary digital encoder.

The VSA-X21 provides an independent RS-232 output port that can control other devices. Typically, to control the power on/off state of the TV or video projector connected to its HDMI output.

Full EDID management provided allows the user to learn, download, upload, emulate or pass-thru the EDID from the connected display. Use the USB port on the front panel to configure the device operation via a free Windows™ GUI available from the VSA-X21 product webpage on <http://www.hallresearch.com>.

The VSA-X21 can pass through commands from its RS-232 input to the RS-232 output, but also supports store user-defined commands for controlling devices connected to its RS-232 output.

The stored RS-232 commands can be triggered automatically (based on detecting +5V or a HDMI input signal) or manually by user command (RS-232, Telnet or WebGUI), button press or contact closure.

The device is IP enabled giving the user the ability to control the device through a PC or Smartphone. The Telnet control uses the same commands as the serial interface.

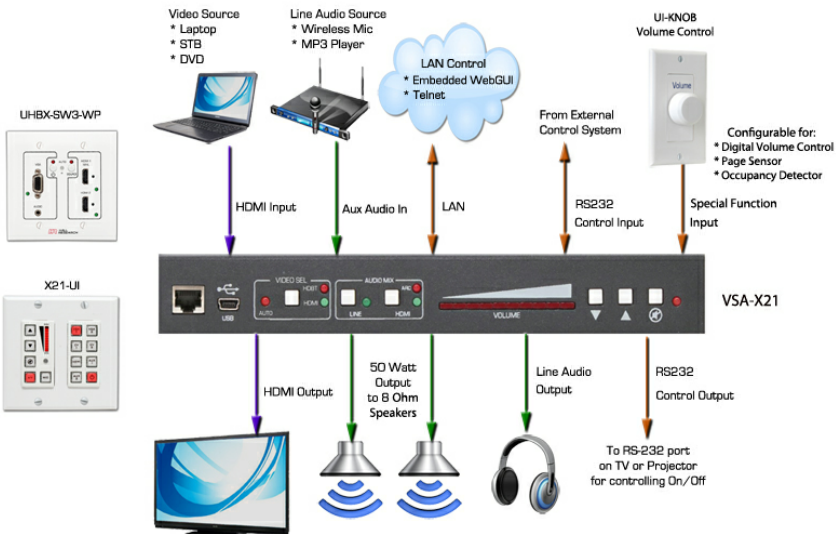


Figure 1 – Connection Diagram

2.0 Features

- 4K HDMI audio extractor with EDID management
- Built-in 50 watt amplifier for connection to 8 Ohm speakers (25 watts/channel)
- Audio input for connecting line-level audio inputs (e.g. wireless microphones).
- Control via, front panel, RS-232, digital pot (rotary encoder), Webpage or Telnet
- HDMI Ducking (when Line input is detected, HDMI sound volume in the mix is automatically lowered)
- Primary RS-232 port for device control
- Secondary RS-232 port for auxiliary device control
- Store separate commands for the auxiliary devices
- HDMI and HDBT Inputs
- Compatible with X21-UI
- Compatible with UHBX-SW3-WP or UHBX-SW3-S
- Compatible with UI-KNOB-DP
- Supports HDMI, DVI, HDCP, 3D and Deep color
- Stereo or Mono output
- Priority Paging Sensor input (for automatically muting the audio output)
- Compact, Rugged, Reliable, and Economical
- Made in the USA

2.1 Package Contents

Qty (1) VSA-X21
Qty (1) 48V DC Universal DC Power Adapter
Qty (1) User's Manual
Qty (1) Type A to Mini-B USB cable
Qty (1) 4 Position Screw Terminal Strip
Qty (1) 9 Position Screw Terminal Strip

3.0 Setup

3.1 Installation

- Connect an HDMI compatible source signal to the HDMI IN connector.
- **Optionally**, connect the HDMI display device to the HDMI OUT connector. A display device is NOT required for audio only applications.
- Connect 8-ohm loudspeakers to the speaker output screw terminals. For connecting more than two speakers, please see Section 4.6 L/R Speaker Connections.
- **Optionally**, connect a compatible line-level audio source to the LINE IN connector. (e.g., wireless microphone or MP3 player)
- **Optionally**, connect a compatible line-level audio output device to the LINE OUT connector. (e.g., headphones, assistive listening devices). The Line out signal volume is variable and is set by adjusting output volume
- **Optionally**, connect a compatible RS-232 control device to the RS-232 **IN** 3-pin terminal connector. (e.g., Serial Controller)
- **Optionally**, connect the compatible RS-232 device to be controlled to the RS-232 **OUT** 3-pin terminal connector. (e.g., Projector or LCD)
- **Optionally**, connect to your compatible LAN using a CAT5e/6 cable plugged to the LAN connector.
- **Optionally**, connect one of the following functions to the configurable pins on the rear terminal strip.

The mode in which these pins operate is set using the free Windows GUI available on product's website.

- External digital rotary encoder
 - (Compatible with Model UI-KNOB-DP)
- Priority Page Sensor (for detecting page announcement)
- Occupancy Detector (to trigger the unit to send out serial commands to the display).



See section 4.2 Rear Panel for details.

4.0 Operation

The following is a functional block diagram of the audio routing in the VSA-X21:

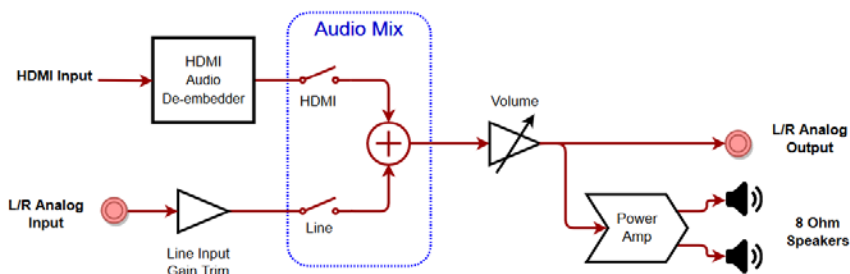


Figure 2 – Audio Routing and Processing Diagram

4.1 Front Panel



Figure 3 - Front Panel

MUTE

Press this button to mute the output audio. When the unit is muted, the LED glows.

▲ & ▼

Press these buttons to increase or decrease the output volume. Volume can be adjusted regardless of mute status. If volume is changed when the output is muted, it will be at the new level when un-muted.

NOTE

Volume setting affects both the Speaker output as well as the 3.5mm stereo output. The volume of the audio embedded in the HDMI output is not affected.

LED Volume Bar

The illuminated LEDs show the current audio setting 0 to 100%. The level is adjusted using the ▲ & ▼ buttons, RS-232, Windows GUI, WebGUI or Telnet.

Audio Mix Buttons

The LINE and HDMI buttons are used to select audio inputs. When both are selected, the audio from each source is mixed together.

LINE

Press this button to select the Line input and add it to the output audio. When the Line input is selected, the LED glows.

HDMI

Press this button to select the audio embedded in the HDMI input and add it to the output audio. When the HDMI input is selected, the LED glows.

NOTE

If nothing is connected to the 3.5mm audio input, it is recommended to deselect the LINE in the audio mix. This eliminates any possible residual noise picked up by the analog circuits connected to the unused LINE input

Using the HDMI ARC audio

Instead of using the audio from the HDMI input, the user can use the audio signal returning from the TV connected to the output (TV must support ARC function). To reassign the HDMI audio from INPUT to ARC, use the free Windows GUI available for free download on the product's website.

When configured to use ARC, selecting the HDMI button on the front panel lights both HDMI and ARC LEDs at the same time. This indicates the ARC pin in the HDMI is being selected.

VIDEO SEL

The VIDEO SEL button selects the desired video input.

HDBT LED

When the HDBT IN connector on the rear panel is the active video input, the RED HDBT LED is on.

HDMI LED

When the HDMI IN connector on the rear panel is the active video input, the GREEN HDMI LED is on.

AUTO LED

When the AUTO LED is on when AUTO MODE has been activated. This means the VSA-X21 can switch to an active INPUT and optionally transmit RS-232 ON and OFF strings to an external device (like a projector or LCD).

The following methods are available for triggering AUTO MODE:

- +5V from SOURCE on HDMI IN or HDBT IN connectors
- VIDEO from the SOURCE on HDMI IN or HDBT IN connectors
- Contact Closure between **CCW** and **GND** terminals

USB

Connect the supplied USB cable to a compatible Windows™ PC using for use with the Software GUI available for download from <http://www.hallresearch.com>.

4.2 Rear Panel



Figure 3 – Rear Panel

HDMI IN

Connect the HDMI connector to a compatible video source. (e.g., such as a DVD or Blu-ray player).

LINE IN

Connect the 3.5mm jack to compatible line level audio source. (e.g., such as a MP3 or Microphone).

NOTE

The Line input is configured for nominal Consumer Level (typical of MP3 players or wireless microphone receivers).

This input connector is stereo (Tip=Left channel, Ring=Right Channel). Care must be taken when connecting to a mono signal or a balanced signal.

Refer to Section 4.5 LINE IN Connection below

HDMI OUT (HDMI Connector)

Connect the HDMI connector to a compatible video sink. (e.g., such as a LCD or Projector).

LINE OUT

Connect the 3.5mm connector to compatible line level audio output devices (e.g., such as headphones)

L/R 2-Channel Output

Connect 8-16 ohm speakers to the 4-position terminal strip. Observe speaker polarity. 25 watts per channel maximum.

VOL Control / PAGE Sense Terminals

These 3 terminal strip connections have different purposes based on the system configuration.

- For VOLUME Control
 - Connect a compatible rotary encoder (Model UI-KNOB-DP) to the **CW**, **CCW** and **GND** terminals for system volume control. (Factory Default)
-
- **OR** for PAGE Sensing and Audio Muting
 - Connect a compatible PAGE SENSOR (Model VSA-PGSNS) to the **CW** and **CCW** terminals for automated PAGE Muting control.
-
- **OR** for switch controlled Audio Muting
 - Connect a SPST switch between the **CW** and **GND** terminals for automated PAGE Muting control.
 - **AND**, optionally, connect a switch between the **CCW** and **GND** terminals for automated transmission of the user programmed RS-232 ON and OFF strings associated with the 'AUTO' function from the RS-232 OUT terminals.

VOL Control

Connect a rotary encoder (Model UI-KNOB-DP) to the 3-pin terminal for controlling the volume or a sensor for page control.

RS-232 IN

Connect the PC's RS-232 port to the input of the unit with a 3-pin terminal connector.

RS-232 OUT

Connect RS-232 out to the controlled device such as a projector using a 3-pin terminal cable.

LAN

Connect to the compatible LAN network.

DC PWR

Connect to the power supply shipped with the unit.
See Section 4.4 Power Connection.

4.3 Factory Default

Hold the 'Auto' and 'Mute' buttons for more than 4 seconds to reset the unit to the 'FACTORY DEFAULT' state.

4.4 Power Connection

A 120/240 VAC 50/60 HZ to 48 Volt DC 1.5A external universal power supply provides all the power required for the system to operate.

4.5 LINE IN Connection

NOTE

The **LINE IN** connection expects a line level signal (maximum of ~ 0.9 VDC), so you may need an external preamp for low-level dynamic microphones, the Hall Research HR-101-S may work for your needs.

In most K-12 installations, the wireless (RF or IR based) microphones used have a line-level output.

Most condenser and some Dynamic microphones may work without external preamps if you turn up the microphone volume on that microphone system.

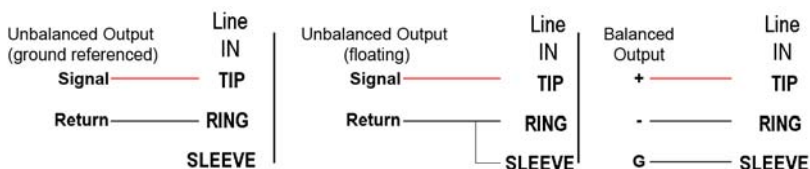
Use the following diagram for connection of external preamp (such as wireless microphone receiver) to the system.

Ground referenced means that the external preamp has a connection to ground (the AC cord has a ground prong).

If the preamp does not provide a balanced (differential) output, you should not tie the return of your source to the ground of the VSA-X21. Doing so would create a ground loop that will most likely cause audio hum.

If you are sure that your external preamp is floating (its AC cord has no ground prong), then it may be advisable to connect the negative input signal to ground at the VSA-X21.

TIP, RING and SLEEVE refer to the **LINE IN 3.5mm connector**



4.6 L/R Speaker Connections

NOTE

The audio amplifier is designed to drive loads equal to or greater than $8\ \Omega$

Using lower loads may cause an over-current shutdown of the audio amplifier, this will be detected and the amplifier will be reset.

Audio output from the amplifier will mute during this time.

It is recommended that when using a single speaker for each side to use $8\ \Omega$ or $16\ \Omega$ speakers.

The amp can drive 50 watts total (25 watts per channel) when using $8\ \Omega$ speakers, which may be loud for a small room. Using $16\ \Omega$ speakers will cut the power delivered by half.

To drive 2 speakers from each side (total of 4 speakers in the room), connect two $16\ \Omega$ speakers in parallel or two $4\ \Omega$ or $8\ \Omega$ speakers in series as shown below.

Never connect two $8\ \Omega$ speakers in parallel.



Figure 6 – Speaker Connection Example

5.0 Serial Commands

- The following table lists the RS-232 commands:
 - A single carriage return character (0x0D) must terminate each command.
 - Invalid input, spaces and line feeds characters (0x0A) are ignored.
- RS-232 communication on the RS-232 **IN** terminal strip is:
 - 9600 bps, 8 Bit, No Parity, 1 Stop bit.
- RS-232 communication on the RS-232 **OUT** terminal strip is:
 - Configurable, **factory default is 9600 bps, 8 Bit, No Parity, 1 Stop bit.**
 - The OUTPUT baud rate can be changed via Software GUI or via the "XBx" and "XPx" commands.
- <CR> in the table below refers to a single carriage return character (0x0D)
- "Error – Invalid Command" is sent in response to invalid RS-232 commands
- "Error" is sent in response to invalid command parameters

5.1 Serial Connections

- (3) Screw Terminal - RS-232 IN (TX, GND and RX)
- (3) Screw Terminal - RS-232 OUT (TX, GND and RX)



Command	Response	Function and Example
FW	FWx.y<CR>	Current firmware version. X and Y represent the firmware version numbers. (e.g., FW1.1<CR>)
PWx	PWx<CR>	Controls power status. PW?<CR> -- Query current power setting PW1<CR> -- Turn power on PW0<CR> -- Turn power off (Factory Default)
LRx	LRx	Controls Line Level Audio Input LR?<CR> -- Query current Line Level Audio setting LR1<CR> -- Turn on Line Level Audio (Factory Default) LR0<CR> -- Turn off Line Level Audio
HDx	HDx<CR>	Controls HDMI Audio Input HD?<CR> -- Query current HDMI Audio setting HD2<CR> -- Turn on ARC Audio (valid in ARC Mode – AR1) HD1<CR> -- Turn on HDMI Audio (Factory Default) HD0<CR> -- Turn off HDMI Audio
VOLxxx	VOLxxx<CR>	Controls Audio output level. Allowable range is 0 to 100%. VOL?<CR> -- Query current volume level VOL50<CR> -- Set volume level to 50% VOL0<CR> -- Set volume level to 0% (Factory Default)
VUPxxx	VOLxx<CR>	Controls Audio output level. Optional range is 0 to 100%. VUP<CR> -- Adjust volume level up 2% VUP10<CR> -- Adjust volume level up 10%

Command	Response	Function and Example
VDNxx	VOLxx<CR>	Controls Audio output level. Optional range is 0 to 100%. VDN<CR> – Adjust volume level down 2% VDN10<CR> – Adjust volume level down 10%
VCx	VCx<CR>	Controls current volume control setting VC?<CR> – Query current volume control setting VC1<CR> – Line Input (defaulted to 70%) VC2<CR> – HDMI/ARC Input VC3<CR> – Both LINE and HDMI/ARC Inputs together (Factory Default)
		<p>Note: It is recommended that the user always return the setting to VC3 (default) if they have changed to another setting (VC1 or VC2).</p> <p>This is so volume adjustments are set for both the LINE and HDMI/ARC together and not just one.</p> <hr/> <p>For example: To set the LINE Input to 50% Volume and then reset the control to the default LINE+HDMI/ARC, use: VC0<CR>VOL50<CR>VC3<CR></p>
MUTx	MUTx<CR>	Controls the MUTE status MUT?<CR> – Query current Mute Setting MUT1<CR> – Turn on Audio Muting MUT0<CR> – Turn off Audio Muting (Factory Default)
ARx	ARx<CR>	Controls ARC Mode (Audio Return Channel) AR?<CR> – Query current ARC mode setting AR1<CR> – Turn on ARC Mode AR0<CR> – Turn off ARC Mode (Factory Default) <ul style="list-style-type: none"> When ARC mode is turned off, using the HDMI button on the front panel will toggle between HDMI audio and no HDMI audio. When ARC mode is turned on, using the HDMI button on the front panel will toggle between ARC Audio and No ARC Audio.
AUx	AUx<CR>	Controls AUTO DETECT Mode AU?<CR> – Query current Auto Detect Mode Status AU1<CR> – Auto Detect Mode Active AU0<CR> – Auto Detect Mode inactive (Factory Default)
EDx	EDx<CR>	Controls EDID mode setting ED?<CR> – Query current Mute Setting ED1<CR> – Pass-Thru (Factory Default) ED0<CR> – Emulated
FD	FD<CR>	Resets device to Factory Defaults Unit will reboot

Command	Response	Function and Example
MOx	MOx<CR>	Controls the MONO/STEREO Status MO?<CR> – Query current MONO/Stereo Setting MO1<CR> – Turn on MONO MO0<CR> – Turn off MONO (Stereo) (Factory Default)
FPx	FPx<CR>	Controls the Front Panel Lock Status FP?<CR> – Query current Front Panel Lock Setting FP1<CR> – Turn on Front Panel Lock FP0<CR> – Turn off Front Panel Lock (Factory Default)
ST	System status	Queries system status ST<CR> – Query the current system status Current Status for the commands below: FW?, IP?, SB?, GW?, PW?, LR?, HD?, MUT?, VOL?, MO?, VC?, AU?, AT?, AR?, BS?, BE?, BT?, ED?, DA?, XC?, XB?, XP?
XBx	XBx<CR>	Controls the RS-232 Out Baud Rate XB?<CR> – Query current Output Baud Rate Setting XB4<CR> – Set Baud Rate to 9600 (Factory Default) •The baud rate can be set to any of the following: XB1 = 1200, XB2 = 2400, XB3 = 4800 XB4 = 9600, XB5 = 19200, XB6 = 38400 XB7 = 57600, XB8 = 115200
XPx	XPx<CR>	Controls the RS-232 Out Parity XP?<CR> – Query current Output Parity Setting XP0<CR> – Set Parity to 'NONE' (Factory Default) XP1<CR> – Set Parity to 'EVEN' XP2<CR> – Set Parity to 'ODD'
XT	XT<CR>	Transmit from RS-232 OUT with specific baud and parity Terminated with <0x17><0x0D>
XR	Up to 128 bytes received on RS-232 OUT RX line	Reads characters received on the RS-232 OUT RX terminal. 128 characters maximum
IP? or IPx	IPxxx.xxx.xxx.xxx<CR>	Controls IP Address setting IP?<CR> – Query current IP Address IP192.168.001.100<CR> - Set IP Address to 192.168.001.100

Note:

Setting takes effect when Gateway address is set

Command	Response	Function and Example
SB? or SBx	SBxxx.xxx.xxx.xxx<CR>	Controls Subnet Mask setting SB?<CR> – Query current Subnet Mask SB255.255.255.000<CR> - Set the Subnet Mask to 255.255.255.000
GW? or GWx	GWxxx.xxx.xxx.xxx<CR>	Note: Setting takes effect when Gateway address is set Controls Gateway address setting GW?<CR> – Query current Gateway address SB255.255.255.000<CR> - Set the Subnet Mask to 255.255.255.000
DHCPx	DHCPx<CR>	Note: Setting takes effect when Gateway address is set Controls the DHCP status on LAN Enabled Versions DHCP?<CR> – Query current DHCP Setting DHCP1<CR> – Turn on DHCP (Factory Default) DHCP0<CR> – Turn off DHCP (STATIC Addressing)
SPx	SPx<CR>	Controls the Serial Data Pass-Thru Status SP?<CR> – Query current Serial Pass-Thru Setting SP1<CR> – Turn on Serial Pass-Thru SP0<CR> – Turn off Serial Pass-Thru (Factory Default)
BPx or BPx,y	BPx<CR> BPx,y<CR>	Controls transmission of stored serial commands BP?<CR> – Query current Button Press Status BP1<CR> – Simulates pressing button #1 BP0<CR> – Simulates pressing button #0 BP1,0<CR> – Simulates turning button #1 off
AUX	AUX<CR>	Controls AUTO DETECT Mode AU?<CR> – Query current Auto Detect Mode Status AU1<CR> – Auto Detect Mode Active AU0<CR> – Auto Detect Mode inactive (Factory Default)
ATx	ATx<CR>	Controls the Auto Detection Method Settings AT?<CR> – Query current Auto Detection setting AT0<CR> – Auto Detection Disabled (Factory Default) AT1<CR> – +5VDC on HDMI INPUT AT2<CR> – Video on HDMI INPUT AT3<CR> – Contact Closure (CCW & GND)
		Auto Detect must be active (AU1) for a Trigger to occur. Disabling Auto Detection will turn off Auto Detect (AU0).
		Note: Using the AUTO DETECT Contact Closure (AT3) will disable the ability to use the Encoder or Page Sensor.

Command	Response	Function and Example
PGx	PGx<CR>	<p>Controls the Encoder/Page Sensor Setting</p> <p>PG?<CR> – Query current Encoder/Page Sensor setting</p> <p>PG0<CR> – Rotary Encoder (Factory Default)</p> <p>PG1<CR> – Page Sensor (Model VSA-PGSNS)</p> <p>PG2<CR> – Contact Closure (CW & GND)</p> <hr/> <p>Note:</p> <p>Using the Rotary Encoder or Page Sensor will disable the ability to use the PAGE SENSE (CW & GND) and AUTO DETECT (CCW & GND) contact closures.</p> <p>Using the PAGE SENSE (CW & GND) Contact Closure will disable the ability to use the Rotary Encoder or Page Sensor.</p>
XCxx	XCx <CR>	<p>Controls device addressing</p> <p>XC?<CR> – Query current device address</p> <p>XC0<CR> – Set device address to 0 (Factory Default)</p> <p>XC1<CR> thru XC99<CR></p> <p>Set device address to 1 thru 99</p> <hr/> <p>Note:</p> <p>All devices in the daisy chain will respond with the device address, in order (closest to RS-232 IN 1st and then each subsequent unit).</p>
DA?	DA? <CR>	<p>Queries current device ID # (Factory Default = 0) (Set via USB GUI).</p>
ISx	ISx<CR>	<p>Input Selection</p> <p>IS?<CR> – Query current input selection</p> <p>IS0<CR> – Select LOCAL HDMI Input on rear panel (Factory Default)</p> <hr/> <p>If UHBX-SW3-WP/S Installed (WP1):</p> <p>IS1<CR> – Select HDMI #1 Input on UHBX-SW3</p> <p>IS2<CR> – Select HDMI #2 Input on UHBX-SW3</p> <p>IS3<CR> – Select VGA Input on UHBX-SW3</p> <p>If UHBX-SW-WP/S NOT Installed (WP0):</p> <p>IS1<CR> thru IS3<CR> – Select HDBT Input</p>
IRx	IRx<CR>	<p>IR Direction Selection</p> <p>IR?<CR> – Query current IR direction selection</p> <p>IR0<CR> – IR Detector connected to 3.5mm IR on rear panel</p> <p>IR1<CR> – IR Sender connected to 3.5mm IR on rear panel (Factory Default)</p>

Command	Response	Function and Example
WPx	WPx<CR>	UHBX-SW3-WP/S Installed Selection WP?<CR> – Query current UHBX-SW3-WP/S Installed selection WP1<CR> – UHBX-SW3-WP/S Installed WP0<CR> – UHBX-SW3-WP/S NOT Installed
UIx	UIx<CR>	X21-UI Installed Selection UI?<CR> – Query current X21-UI Installed selection UI1<CR> – X21-UI Installed UI0<CR> – X21-UI NOT Installed
HPx	HPx<CR>	HDBT RS-232 Bypass Selection HP?<CR> – Query current HDBT RS-232 Bypass selection HP1<CR> – HDBT RS-232 is bypassed directly to the RS-232 OUT terminal strip. HP0<CR> – HDBT RS-232 is NOT bypassed to the RS-232 OUT terminal strip.
Note: When HDBT Bypass is active, the user cannot control the unit from the HDBT input until HDBT Bypass is made inactive again.		
APx	APx<CR>	Auto Detection Input Priority Selection AP?<CR> – Query current Auto Detection Input Priority selection AP0<CR> – Manual Control AP1<CR> – HDBT over Local HDMI AP2<CR> – Local over HDBT AP3<CR> – Last Plugged
BSx	BSx<CR>	Button State Selection (Bit Addressable) BS?<CR> – Query current button state BS0 thru BS255<CR> – Set the 8 programmable buttons to a specific state, On or Off. '1' bit = Button ON '0' bit = Button OFF
BEx	BEx<CR>	Button Enable Selection (Bit Addressable) BE?<CR> – Query current button enable/disable state BE0 thru BE255<CR> – Enable or disable the 8 programmable buttons. '1' bit = Button Enabled '0' bit = Button Disabled
BTx	BTx<CR>	Button Type Selection (Bit Addressable) BT?<CR> – Query current button type state BT0 thru BT255<CR> – Sets the 8 programmable button types. '1' bit = Momentary button '0' bit = Toggle button

Command	Response	Function and Example
BGx	BGx,y<CR>	<p>Button Group Selection</p> <p>Button x = 0 thru 7 Button Group y = 0 thru 8 0 = NO GROUP, 1 thru 8 separate groups available</p> <p>BG?<CR> – Query current all button group states BGx?<CR> – Query button group state for button 'x' BG0,1<CR> – Set Button '0' to Group #1 BG4,0<CR> – Set Button '4' to Group None</p>
BFx,y	BFx,y<CR>	<p>Button Function Selection</p> <p>Button x = 0 thru 7 Button Function y = 0 thru 11</p> <p>BG?<CR> – Query current all button group states BGx?<CR> – Query button group state for button 'x' BG0,1<CR> – Set Button '0' function to Power BG4,0<CR> – Set Button '4' function to None 0 = No Function 1 = Power (PW) 2 = Mute (MUT) 3 = HDMI (HD) 4 = LINE (LR) 5 = IR (IR) 6 = Volume Up (VUP) 7 = Volume Down (VDN) 8 = Local HDMI Input (IS0) 9 = HDBT Input or UHBX-SW3 HDMI Input #1 (IS1) 10 = HDBT Input or UHBX-SW3 HDMI Input #2 (IS2) 11 = HDBT Input or UHBX-SW3 VGA Input #3 (IS3) 12 = AUTO (AU)</p>
BNx,y	BNx,y<CR>	<p>Button Name Selection (displayed in WEBGUI)</p> <p>Button x = 0 thru 7 Button Name y = Up to 8 characters in length</p> <p>BN?<CR> – Query current all button names BNx?<CR> – Query button name for button 'x' BN0,VCR<CR> – Set Button '0' name to "VCR" BN4,SAT<CR> – Set Button '4' name to "SAT"</p>

5.2 Auto Detection

This model supports sending user programmed RS-232 strings associated with the 'AUTO' function from the RS-232 OUT terminal strip based on different events:

Source +5V – Local or HDBT HDMI Source +5V

+5V from source detected sends the ON string.

+5V from source lost for more than the programmed OFF Delay sends the OFF string.
The OFF Delay is programmable from approximately 0 to 240 minutes (+/- 10%).

Factory default - 3 minutes

Source Video – Local HDMI Source VIDEO

HDMI Source Video detected for more than 1 second sends the ON string.

HDMI Source Video lost for more than the programmed OFF Delay sends the OFF string.

The OFF Delay is programmable from approximately 0 to 240 minutes (+/- 10%).

Factory default - 3 minutes

Contact Closure – External contact closure connected on the **CW & GND** terminals.

Contact closed sends the ON string.

Contact open sends the OFF string.

Using this feature disables the use of a Rotary Encoder or Page Sensor.

5.3 Device Addressing

The model VSA-X21 units have the ability to daisy chain the RS-232 IN and RS-232 OUT together with other units and have a serial controller at the head of the chain be able to access all the units in the chain.

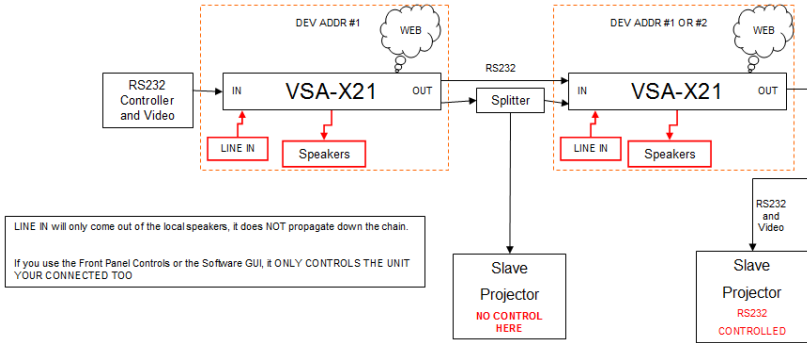
This is accomplished by setting a unique device ID for each model in the chain and then enabling the serial pass-thru mode. This allows the RS-232 commands from the serial controller to pass thru each unit to the end of the chain.

Commands will only work on the last device that the 'XCx' serial command was set for.
The factory default setting is DEVICE ADDRESS "0".

All units in the daisy chain with the same DEVICE ID # ('DA?') will react to those commands.

For example:

With any number of units daisy chained together and factory default setting of "0" for a device address, sending a "PW1" command will result in all units powering on.



- RS-232 Controller connected to Unit #1 RS-232 IN
- Unit #1 RS-232 OUT connected to Unit #2 RS-232 IN
- Unit #1 set for Device Address #1 (Via Windows™ Software GUI)
- Unit #1 set for Serial Pass-Thru (Via Windows™ Software GUI or RS-232 command "SP1")
- Unit #2 set for Device Address #2 (Via Windows™ Software GUI)

Add more devices in the chain as needed

- To control Unit #1, send the XC1<CR> serial command 1st.
 - All subsequent RS-232 commands will only be understood by Unit #1.
 - Unit #2 will ignore all the commands.
- To control Unit #2, send the XC2<CR> serial command.
 - All subsequent RS-232 commands will only be understood by Unit #2.
 - Unit #1 will ignore all the commands

Note: When any 'XCn' commands are sent, all devices in the chain respond with that command. This means that all devices in the chain understand the device being addressed.

If any devices in the chain are web enabled and unique addresses are being used, it is imperative that the device address be left set for the device that will be controlled by that specific Web GUI.

Figure 7– Daisy Chain Example

6.0 WebGUI and Telnet Operation

The VSA-X21 has a built-in webpage that can control the basic functions of this model via a compatible LAN Network.

The webpage has buttons and indicators that show the state of that feature.

The 8 programmable buttons are shown only when 'Enabled'.

Momentary buttons do not have an 'Indicator'.



Figure 8– Webpage Example

6.1 Auto Detection

AUTO Button

Click this button to enable or disable the AUTO DETECTION capability

6.2 Input Select

HDBT/Local Button

Click this button to select between the HDBT input and the LOCAL HDMI input at the rear of the unit.

6.3 Audio Mix

LINE Button

Click this button to enable or disable the LINE IN Audio

HDMI Button

Click this button to enable or disable the HDMI INPUT Audio

6.4 Volume Control

UP & DN Buttons

Click these buttons to Increase or decrease the volume slightly
Sliding the Volume Control to adjust the volume

Mute Button

Click this button to enable or disable the audio OUTPUT.

6.5 Locating the device on a compatible LAN Network

This model is shipped from the factory set for DHCP. The device will get an IP address from the compatible LAN network router.

The users may set the device to a static IP address by using the Windows™ Software GUI, RS-232 or Telnet.

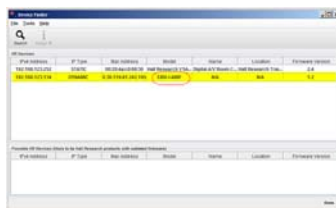


Figure 9– Device Finder GUI

The Hall Research **Device Finder** and GUI software are available for download from <http://www.hallresearch.com>.

6.5 Telnet

The model VSA-X21 is controllable across a compatible LAN network via the device IP address on PORT 6324. The control commands are the same as the RS-232 control commands.

7.0 SENSE Functionality

This model supports automated or selective PAGE 'SENSE'.

This feature allows the audio outputs to be 'muted' automatically using (2) different methods. PAGE SENSOR or CONTACT CLOSURE.

NOTE

These methods cannot be used at the same time or if the rotary encoder is installed.

7.1 PAGE SENSOR

When a "Page Sense" signal of sufficient amplitude is detected, the audio output will automatically 'MUTE'. After the "Page Sense" signal is no longer detected and small delay, the audio output will automatically be "UN-MUTED".

The VSA-PGSNS is optional equipment compatible with the Page Sense muting feature. It uses a non-invasive sensor that monitors existing PA lines without having to splice into the wires. The sensor detects when an external PA system has activated and sends a signal to the VSA-X21 to mute the audio. Once the external PA line goes quiet, the VSA-X21 will resume audio output.

NOTE

The optional Page Sensor works with 25 V or 70 V and even some 4-8 ohm PA systems. It is not designed for, two-way intercoms or IP-based paging systems. The sensor measures the AC audio current going to the external PA speaker and compares it against a "set point" to ignore background PA system noise. The mute trigger sensitivity is easily set using the software from any PC.

7.2 Page Sensor Installation

- To install the VSA-PGSNS, locate the external PA wiring.
- Isolate one of the wires from the pair to run through the sensor. Carefully separate the wire pair taking caution not to cut the line or expose the wire inside the insulation.
- Wrap one of wires around the sensor lid 2-3 times as shown. The sensitivity is related to the number of turns used.
- Connect the leads on the sensor to the VSA-X21 terminals labeled “**SENSE**” (**CW and CCW**). Connect white to CW (+) and black to CCW (-) terminals.
- When the sensor is installed, the sensitivity can be adjusted using the Windows™ Software GUI.



Figure 10– Page Sensor

7.2 Page Mute on Contact Closure

Connect a normally open switch between the **CW and GND** terminals.
Closed = Muted. Open = NOT Muted.

8.0 Ducking and AutoMute Functionality

This model supports automated ‘DUCKING’.

This allows the HDMI audio input volume level to be ‘reduced’ automatically when a signal of sufficient amplitude is detected on the LINE IN audio input. (Like when someone starts speaking through a microphone)

The “Ducking” feature constantly monitors the LINE IN audio level and when a signal of sufficient amplitude crosses the ‘Threshold’, the HDMI audio input volume level will automatically be ‘reduced’ by the ratio specified in the configuration.

After the LINE IN audio level drops below the ‘Threshold’, and after small delay (~5 seconds), the HDMI audio input will automatically be returned to its previous level.

The “Ducking” Threshold and Ratio values are settable via the Windows™ Software GUI.

8.2 Auto Muting

This model supports automated ‘MUTING’ to reduce the amount of noise on the audio out.

The LINE IN Audio will mute if the input level is **BELOW** a programmable level is detected on the LINE IN audio input after a programmable time delay (0-100 seconds). The LINE IN Audio will immediately un-mute if the input level is **ABOVE** this level. (Like when someone starts speaking on a microphone).

9.0 Troubleshooting

If you are experiencing problems getting the VSA-X21 to work properly, please use the following troubleshooting suggestions.

- Make sure that all of the connections are solid. Loose connections are the number one cause of issues.
- Try resetting the system by unplugging the power supply, waiting 5 seconds and plugging it back.
- Try performing a factory default. Holding the Video Select Button and Mute Buttons together for more than 4 seconds will reset the unit back to 'Factory Default'.

NOTE: Ensure you backup your configuration first using the Windows™ GUI. Setting Factory Default will delete any user programmed RS-232 strings.

- Check the state of the LED's on the front of the unit. Refer to the table in Section 4.1 Front Panel to interpret the status being indicated.
- Make sure the display is compatible with the video source by connecting them directly.
- If you still are not able to get the system working properly, contact Hall Research support (preferably via email at support@hallresearch.com or via www.hallresearch.com) with a detailed description of the issue and the troubleshooting steps you have taken.

Do not open or try to repair the unit, this will void your warranty.

To return the device for repair, you must contact HR Support at 714-641-6607 or via email or web to obtain an RMA. Please have the serial number of the unit available when you contact us.

To ship the unit back for repair, ensure you obtain a Return Material Authorization (RMA) number from Hall Research.

10.0 Specifications

Video

Standards	HDMI 1.4 video specifications including 12 bit color depth, 3D video HDCP 1.1
Signal type	TMDS
Connectors	(1) Locking HDMI INPUT (1) Locking HDMI OUTPUT (1) HDBT POH INPUT
Resolutions	VGA (640x480) thru WUXGA (1920x1200), 480i up to 4K@30 Hz

Audio

Formats	All HDMI Embedded Audio including: LPCM 7.1CH, Dolby TrueHD and DTS-HD Master Audio (32-192kHz sample rate)
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Other Signals

DDC	Pass-Thru DDC for reading EDID directly from remotely connected LCD and HDCP handshake
CEC	Pass-Thru
RS-232	(2) 3 Screw Terminal RS-232 IN Baud Rate: 9600, N, 8, 1 RS-232 OUT Baud Rate: Configurable at 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200 Output factory default is 9600, N, 8, 1
USB	(1) Mini-B
Encoder	3 Terminal, 24 Detent, 15 Position Grey Code

General

Power Supply	100 VAC to 240 VAC, 47-63 Hz, External; 48 VDC, 1.5A (Model: 511-M480150A001)
Temp/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, non-condensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, non-condensing
Consumption	55.33 Watts at Full Power
Cooling	Convection + Fan (speed controlled)
Enclosure type	Metal (Steel)
Dimensions	1.25" H x 9.00" W x 4.3" D (32mm H x 229mm W x 109mm D) Depth excludes connectors
Product weight	Amplifier 1.5 lbs Kit (shipping) 4.2 lbs includes: VSA-X21, power supply w/cord, USB cable, terminal strips, users manual, and packaging
Vibration	ISTA 1A in carton (International Safe Transit Association)
Safety	CE
EMI/EMC	CE, FCC Class A
MTBF	90,000 hours (Calculated Estimate)
Warranty	3 years parts and labor

Specifications are subject to change without notice



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