KRAMER

USER MANUAL
MODEL:

VS-62HA
6x2 HDMI/Audio Matrix Switcher

Contents

Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront video, audio, presentation, and broadcasting professionals on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment.

- Review the contents of this user manual.

ⓘ Go to www.kramerav.com/downloads/VS-62HA to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

Achieving Best Performance

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).

- Do not secure the cables in tight bundles or roll the slack into tight coils.

- Avoid interference from neighboring electrical appliances that may adversely influence signal quality.

- Position your Kramer **VS-62HA** away from moisture, excessive sunlight and dust.

Safety Instructions

⚠ **Caution:**
- This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

- For products with relay terminals and GPI\O ports, please refer to the permitted rating for an external connection, located next to the terminal or in the User Manual.

- There are no operator serviceable parts inside the unit.

⚠ **Warning:**
- Use only the power cord that is supplied with the unit.

- Disconnect the power and unplug the unit from the wall before installing.

- Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only.

- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label which located on the bottom of the unit.

Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at www.kramerav.com/support/recycling/.

Overview

Congratulations on purchasing your Kramer **VS-62HA 6x2 HDMI/Audio Matrix Switcher**, **VS-62HA** is a 4K UHD 6x2 matrix switcher for HDMI™ and analog audio signals. It reclocks and equalizes the signals and can route any input to either or both outputs simultaneously. It supports resolutions of up to 4K UHD including 4K@60Hz (4:2:0).

In particular, the **VS-62HA** features:

- Up to 8.91Gbps data rate (2.97Gbps per graphics channel).

- Maximum resolution of up to 4K@60Hz UHD (4:2:0).

- Support for HDCP 1.4 (High Definition Digital Content Protection).

- HDMI Support – 3D, Deep Color, x.v.Color™, Lip Sync, Dolby® TrueHD, Dolby Digital Plus, DTS−HD®, and 7.1 multi-channel audio as specified in HDMI 2.0.

- Four unbalanced and two balanced audio inputs and two balanced audio outputs on a matrix switcher.

- Contact closures to mirror front panel switching selection buttons and LEDs.

- Per input EDID capture that copies and stores the EDID from a display device.

- Independent (breakaway) audio routing of HDMI and analog audio content to two balanced audio ports.

- Programmable step-in functionality when used in conjunction with compatible step-in devices, such as the **SID-X3N** and **DIP-31** (using an HDMI cable that supports HEC, the HDMI Ethernet Channel).

- True video clock detection.

- Advanced auto AV switching modes (last connected and priority switching).

- Non-volatile EDID storage.

- Kramer reKlocking™ & Equalization Technology that rebuilds the digital signal to travel longer distances.

- A lock button to prevent unwanted tampering with the buttons on the front panel.

- Internal pattern generator.

- Support for Kramer Protocol 3000.

- Static or dynamic DHCP IP addressing.

- Flexible control options including front panel buttons, optional external remote IR receiver, RS−232, Ethernet, buttons and LED over contact closure, embedded Web server and step-in.
- Mini-USB port for upgrading firmware.
- 19" 1U enclosure for rack mounting.

Using the IR Transmitter

You can use the **RC-IR3** IR transmitter to control the machine via an optional external IR receiver (for example, P/N C-A35M/IRR-50). The external IR receiver can be located up to 15m away from the machine. This distance can be extended to up to 60m when used with three extension cables.

Before using the external IR receiver, be sure to arrange for your Kramer dealer to insert the internal IR connection cable with the 3.5mm connector that fits into the REMOTE IR opening on the rear panel. Connect the external IR receiver to the REMOTE IR 3.5mm connector.

About Fast Switching

To switch to a new digital video signal upon the loss of a digital video signal, older display devices require the following:

- A long period of time between the signal loss and the signal acquisition.
- Physical interconnecting cable disconnection.

These enable older display devices to detect and adjust to the new video attributes and parameters. Therefore, regular switching methods include a 5V signal disconnection and a delay in switching.

However, many new display devices are now capable of "on-the-fly" switching. Depending on the display device in use, the **VS-62HA** enables:

- Fast switching – minor reset, connection kept alive.
- Extra fast switching – no reset, connection kept alive.

Fast and extra fast switching modes enable split-second switching times when using high performance display devices or a scaler on the video output.

Typical Applications

VS-62HA is ideal for the following typical applications:

- Conference rooms.
- Entertainment.
- Hospitality.

Defining the VS-62HA 6x2 HDMI/Audio Matrix Switcher
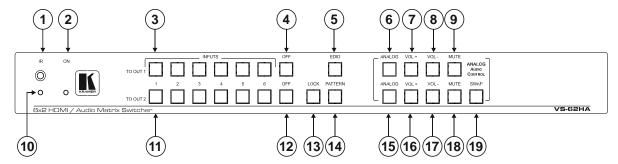
This section defines the VS-62HA front panel.

Figure 1: VS-62HA 6x2 HDMI/Audio Matrix Switcher Front Panel

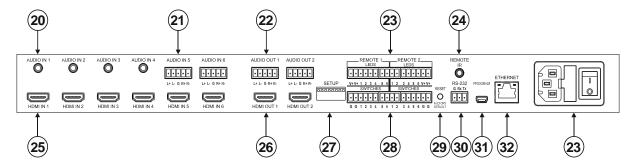| #	Feature		Function
1	IR Sensor		Signal receiver for the infrared remote-control transmitter.
2	ON LED		Lights green when the device is powered on.
3	INPUT Selector Buttons (1 to 6)	TO OUT 1	Press one of the six inputs to switch it to Output 1.
4	OFF Button		Press to turn off HDMI output 1 video and audio.
5	EDID Button		Press to capture the EDID (see Switching Analog Audio on page 14).
6	ANALOG Button		Press to select/de-select the analog audio of output 1, colors are as follows: green – analog audio follows HDMI video input. red – analog audio breakaway (Web control only). off – outputs HDMI audio of the selected HDMI input. (see Switching Analog Audio on page 14 and Analog Audio Switching on page 23).
7	VOL+ Button		Press to increase output 1 volume.
8	VOL- Button		Press to decrease output 1 volume.
9	MUTE Button		Press to toggle muting of output 1 audio.
10	IR LED		Lights yellow when receiving an IR signal.
11	INPUT Selector Buttons (1 to 6)	TO OUT 2	Press one of the six inputs to switch it to Output 2.
12	OFF Button		Press to turn off output 2 video and audio.
13	LOCK Button		Press to inactivate/activate all front panel buttons to prevent tampering.
14	PATTERN Button		Press to activate the test pattern generator. When the generator is active, press one of the input buttons to select a test pattern.
15	ANALOG Button		Press to select the analog audio of output 2.
16	VOL+ Button		Press to increase output 2 volume.
17	VOL- Button		Press to decrease output 2 volume.
18	MUTE Button		Press to toggle muting of output 2 audio.
19	SWAP Button		Press to swap output 1 and output 2.

This section defines the VS-62HA back panel.

Figure 2: VS-62HA 6x2 HDMI/Audio Matrix Switcher Rear Panel

#	Feature	Function
20	AUDIO IN (1-4) 3.5mm Mini Jacks	Connect to unbalanced stereo audio sources (1-4).
21	AUDIO IN (5-6) 5-pin Terminal Blocks	Connect to balanced stereo audio sources (5-6).
22	AUDIO OUT (1-2) 5-pin Terminal Blocks	Connect to balanced stereo audio acceptors (1-2).
23	REMOTE LEDS (1-2) Terminal Blocks	Connect to LEDS that display the selected input channel (1-6).
24	REMOTE IR 3.5mm Mini Jack	Connect to an external IR receiver for controlling the device via an IR remote controller (see Using the IR Transmitter on page 3). Covered by a cap. The 3.5mm mini jack at the end of the internal IR connection cable fits into this opening.
25	HDMI IN (1-6) Connectors	Connect to HDMI sources (1-6).
26	HDMI OUT (1-2) Connectors	Connect to HDMI acceptors (1-2).
27	SETUP DIP-Switches	Sets the device configuration (see Setting the DIP-Switches on page 17).
28	REMOTE SWITCHES (1-2)	Connect to up to six remote, contact-closure input selection switches for Output 1 and Output 2 (see Connecting the Remote Contact-Closure Switches and LEDs on page 11).
29	RESET/FACTORY DEFAULT Button	Press while power-cycling the device to reset to factory default parameters (see For optimum range and performance use the recommended Kramer cables available at www.kramerav.com/product/VS-62HA Default Communication Parameters on page 31).
30	RS-232 3-pin Terminal Block	Connect to a PC/serial controller (see Connecting a Serial Controller to VS-62HA via RS-232 on page 8).
31	PROGRAM USB Connector	Connect to a PC to upgrade the firmware (see Upgrading Firmware on page 18).
32	ETHERNET RJ-45 Connector	Connect to a PC via a LAN (see Connecting to VS-62HA via Ethernet on page 8).
33	Power Module (Socket, Fuse, On/Off Switch)	Connects to mains power and turns the unit on and off.

Mounting VS-62HA

This section provides instructions for mounting **VS-62HA**. Before installing, verify that the environment is within the recommended range:

- Operation temperature – 0° to 40°C (32 to 104°F).
- Storage temperature – -40° to +70°C (-40 to +158°F).
- Humidity – 10% to 90%, RHL non-condensing.

- **VS-62HA** must be placed upright in the correct horizontal position.

Caution:
- Mount **VS-62HA** before connecting any cables or power.

Warning:
- Ensure that the environment (e.g., maximum ambient temperature & air flow) is compatible for the device.
- Avoid uneven mechanical loading.
- Appropriate consideration of equipment nameplate ratings should be used for avoiding overloading of the circuits.
- Reliable earthing of rack-mounted equipment should be maintained.

To mount the VS-62HA in a rack

Attach both ear brackets by removing the screws from each side of the machine and replacing those screws through the ear brackets or place the machine on a table.

For more information go to www.kramerav.com/downloads/VS-62HA

Connecting VS-62HA

ⓘ Always switch off the power to each device before connecting it to your **VS-62HA**. After connecting your **VS-62HA**, connect its power and then switch on the power to each device.

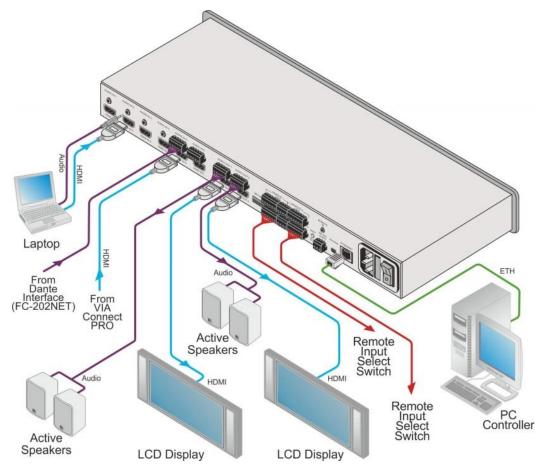**To connect the VS-62HA as illustrated in the example in [Figure 3](#):**

Figure 3: Connecting the VS-62HA 6x2 HDMI/Audio Matrix Switcher

1. Connect up to six HDMI sources, (for example, a laptop, desktop, VIA Connect PRO) to the HDMI In connectors.

2. Connect up to six analog audio sources, (for example, a laptop, desktop, a Dante interface) to the AUDIO IN connectors. AUDIO IN 1 through 4 are unbalanced stereo on 3.5mm mini jacks. AUDIO IN 5 and 6 are balanced stereo audio on 5-pin terminal block connectors.

3. Connect the two HDMI OUT connectors to up to two HDMI acceptors, (for example, LCD displays).

4. Connect the two balanced AUDIO OUT 5-pin terminal block connectors to up to two analog audio acceptors, (for example, audio receivers).

5. If required, connect a PC/controller to the RS-232 port (see Connecting a Serial Controller to VS-62HA via RS-232 on page 8) or the Ethernet port (see Connecting to VS-62HA via Ethernet on page 8).

6. If required for remote switching, connect up to 6 contact closure switches per channel to their terminal block connectors (Remote 1 and 2 Switches).

7. If required for remote switch indication, connect up to 6 LEDS per channel to their terminal block connectors (Remote 1 and 2 LEDS).

8. Connect a power cord to the device and plug it into the mains electricity (not shown in [Figure 3](#)).

9. If required, acquire the EDID (see [Switching an Input to an Output](#) on page [21](#)).

Connecting a Serial Controller to VS-62HA via RS-232

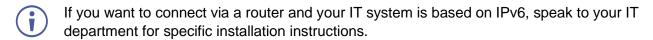**To connect a serial controller to the VS-62HA:**

From the RS-232 9-pin D-sub serial port on the serial controller connect:

- Pin 2 to the TX pin on the **VS-62HA** RS-232 terminal block.

- Pin 3 to the RX pin on the **VS-62HA** RS-232 terminal block.

- Pin 5 to the GND pin on the **VS-62HA** RS-232 terminal block.

Connecting to VS-62HA via Ethernet

You can connect to the **VS-62HA** via Ethernet using either of the following methods:

- Directly to the PC using a crossover cable (see [Connecting the Ethernet Port Directly to a PC](#) on page [8](#)).

- Via a network hub, switch, or router, using a straight-through cable (see [Connecting the Ethernet Port via a Network Hub or Switch](#) on page [10](#)).

ⓘ If you want to connect via a router and your IT system is based on IPv6, speak to your IT department for specific installation instructions.

Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the **VS-62HA** directly to the Ethernet port on your PC using a crossover cable with RJ-45 connectors.

ⓘ This type of connection is recommended for identifying the **VS-62HA** with the factory configured default IP address.

After connecting the **VS-62HA** to the Ethernet port, configure your PC as follows:

1. Click **Start** > **Control Panel** > **Network and Sharing Center**.

2. Click **Change Adapter Settings**.

3. Highlight the network adapter you want to use to connect to the device and click **Change settings of this connection**. The Local Area Connection Properties window for the selected network adapter appears as shown in [Figure 4](#).
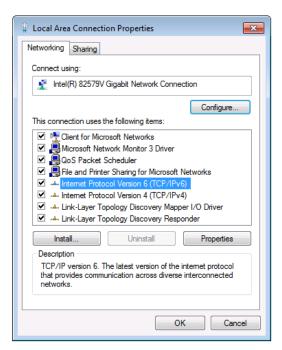
Figure 4: Local Area Connection Properties Window

4. Highlight **Internet Protocol Version 4 (TCP/IPv4)** by clicking on the item.

5. Click **Properties**.
   The Internet Protocol Properties window appears as shown in Figure 5.
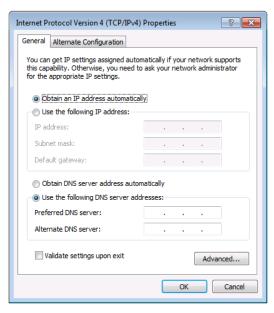

Figure 5: Internet Protocol Version 4 Properties Window

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in Figure 6.
   For TCP/IPv4 you can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.
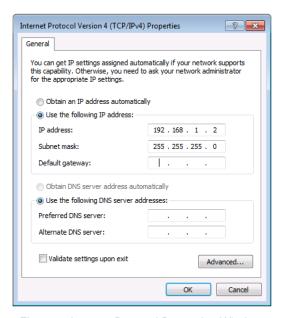
Figure 6: Internet Protocol Properties Window

7. Click **OK**.

8. Click **Close**.

Connecting the Ethernet Port via a Network Hub or Switch

You can connect the Ethernet port of the **VS-62HA** to the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

Connecting the Remote Contact-Closure Switches and LEDs

You can connect up to six remote, contact-closure switches and LEDs per output to control the **VS-62HA** remotely. These switches replicate the Input selection buttons on the front panel of the **VS-62HA**.

Figure 7 illustrates the wiring of the switch connections to the terminal block.
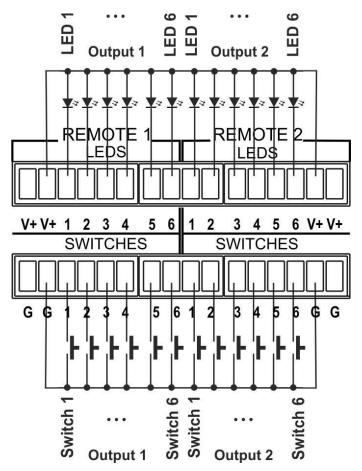

Figure 7: Remote Contact-closure Switch and LED Connections

Principles of Operation

This section describes the operating theory of the **VS-62HA** and includes:

Automatic Signal Detection

The **VS-62HA** can automatically detect the presence of a video signal on an input based on the presence of a video sync or clock signal.

Input Switching Modes

Input switching can be accomplished manually or automatically.

Manual Mode

In Manual switching mode, routing is performed according to the front panel button selection or according to the remote command selection.

Automatic Mode

Automatic switching can be performed in either of the following ways:

- **Input priority**. Upon detection of an active input, the input with the highest priority is automatically selected. Input priority is from the lowest input number (1) to the highest (6).

- **Last Connected**. The device automatically selects the most recently connected input. Should this source become inactive, the device automatically switches to the last connected input that was active. When turning the device on and more than one input is active, the input with the highest priority is selected.

If a manual selection is made when the device is in Automatic mode, the device enters Manual Override mode. The manually selected input remains selected as long as it is active. When a manually selected input becomes inactive, the device returns to Automatic mode.

EDID Operation

The **VS-62HA** has a default EDID (see) stored on all inputs. This EDID can be exchanged for either:

- A custom EDID which is uploaded to one or more inputs using Protocol 3000 commands (see).
  –OR–

- The EDID of a display device connected to an output by using either the front panel buttons (see), a Protocol 3000 command, or the Web pages.

The EDID is non-volatile and the last valid EDID is used when the device is powered up.

Step-in Functionality

The **VS-62HA** can function as a step-in switcher when connected to a suitable HDMI transmitter using the correct HDMI cable with HEC support.

Use the Web pages (see) to assign remote device button actions. The default button actions are shown in the following table. Up to three buttons can be active at the same time.

Command	Action
Echo	Allows a connected controller to be programmed to perform a variety of tasks triggered by the user buttons, such as, room control, (lights, screen, and so on).
Out1	Step in current input to Output 1.
Out2	Step in current input to Output 2.

Operating VS-62HA 6x2 HDMI/Audio Matrix Switcher

This section describes operating the **VS-62HA** and consists of:

Switching an Input to an Output

To switch an input to an output, (for example, Input 5 to Output 2):

- Press the **Input 5** button in the bottom Output (To OUT 2) row.
  The LED lights red and Input 5 is switched to Output 2.

  After cycling power, auto-switching is only predictable after the first active switching.

Switching Analog Audio

This section describes analog audio switching by means of the front panel buttons. The front panel buttons only control AFV analog switching. Breakaway analog switching is only available over Web control. For a description of analog audio switching over the Web, see [Analog Audio Switching](#) on page [23](#).

To output an analog audio source associated with a given HDMI input:

- Press the **ANALOG** button for the desired output

  If the **ANALOG** button lights green, both the HDMI output (embedded) and the analog output receive audio from the selected analog audio input.

  If the **ANALOG** button is not lit, both the HDMI output (embedded) and the analog output receive audio from the HDMI input (embedded).

To change the volume of the selected audio input (HDMI or analog):

- Press **VOL+** to increase and **VOL-** to decrease the output volume.

To mute the output volume:

- Press the **MUTE** button for the desired output.
  The button lights and the volume is turned off.

- Press the **MUTE** button again for the desired output.

The button goes off and the volume is turned on.

To exchange audio outputs:

- Press **SWAP**.
  Audio OUT 1 routes to OUT 2 and audio OUT 2 routes to OUT 1.

- To return the audio outputs to their normal place, press **SWAP** again.

Acquiring an EDID from an Output

You can acquire the EDID from OUT 1 or OUT 2 and copy it to any or all of the six inputs to be stored in non-volatile memory. You can also reset any or all of the inputs to the default EDID.

To copy the EDID from an Output to one or more Inputs:

1. Press the **EDID** button to enter the EDID setting mode.
   The EDID button lights.

ⓘ If there is no button activity for 10 seconds, the device automatically exits the EDID setting mode to normal operation, the EDID button no longer lights and any changes made are lost.

2. From the To OUT 1 (top) row, press each of the Inputs to which you want to copy the EDID from Output 1.
   Each selected Input LED lights.

3. From the To OUT 2 (bottom) row, press each of the Inputs into which you want to copy the EDID from Output 2.
   Each selected Input LED lights.

ⓘ If the VS-62HA reads a corrupted EDID from the sink connected to output 1 or 2, it writes the default EDID to the input.

4. Press the **EDID** button.
   The button no longer lights and the EDID changes are saved.

To copy the default EDID to one or more Inputs:

1. Press the **EDID** button to enter the EDID setting mode.
   The EDID button lights.

2. For each Input to which you want to copy the default EDID, press both the To OUT 1 and To OUT 2 buttons simultaneously.
   Both top row and bottom row Input LEDs light.

3. Press the **EDID** button.
   The button no longer lights and the EDID changes are saved.

Using the OFF Button

Pressing the **OFF** button stops the audio and video for each channel at its output.

Locking and Unlocking the Front Panel Buttons

To lock and unlock the front panel buttons:

1. Press and hold the **LOCK** button.
   The front panel buttons are locked and the button lights.

2. Press and hold the **LOCK** button again.
   The front panel buttons are unlocked and the button no longer lights.

Generating a Test Pattern

For diagnostic purposes, the **VS-62HA** can generate a number of test patterns on the outputs.

To generate a test pattern on the outputs:

1. Press the **PATTERN** button.
   The button lights.

2. Press any of the Input buttons to select a test pattern.
   The selected test pattern is generated on the outputs.

To exit the test pattern generator:

- Press the lit **PATTERN** button.
  The test pattern generation ceases and the button no longer lights.

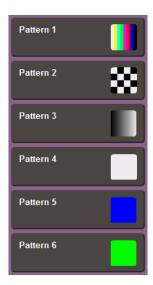Figure 8 shows the test patterns available.

Figure 8: Test Patterns

ⓘ   All test pattern outputs are displayed in RGB 720x480/59Hz, 8-bit color resolution.

Configuring and Maintaining VS-62HA

This section describes the configuration and maintenance of the **VS-62HA** and consists of:

Setting the DIP-Switches

The Setup DIP-switches dictate the behavior of the **VS-62HA**.

All DIP-switches are off by default.

#	Feature	Description
1	HDCP support on inputs	On – Disable HDCP support on all inputs. Off – Enable HDCP support which is defined by P3000 commands.
2	Video mode switching Output 1	On – Auto. Off – Manual.
3	Last connected/Priority mode Output 1	When DIP-switch 2 is set to Auto (ON): On – Enable Last Connected mode. Off – Enable Priority mode where the priority of each input is defined by the input number, (1 is the highest priority).
4	Video mode switching Output 2	On – Auto. Off – Manual.
5	Last connected/Priority mode Output 2	When DIP-switch 4 is set to Auto (ON): On – Enable Last connected mode. Off – Enable Priority mode where the priority of each input is defined by the input number, (1 is the highest priority).
6	N/A	N/A
7	N/A	N/A
8	N/A	N/A

Resetting VS-62HA to Factory Default Settings

To reset the device to factory default settings:

1. Power off the device.

2. Press and hold down the **RESET** button on the rear panel.

3. While holding down the **RESET** button, power on the device.

4. Wait a few seconds and release the button.
   The device is reset to its factory settings.

(i) When running a factory reset from Protocol 3000, you must send the two commands: #FACTORY<CR> and #RESET<CR>.

Upgrading Firmware

The **VS-62HA** can be upgraded via any of the following:

- Mini USB.

- RS-232.

- Ethernet.

For instructions on upgrading the firmware see "K-Upload Software".

The latest version of **K-UPLOAD** and installation instructions can be downloaded from our website at: www.kramerav.com/support/product_downloads.asp.

Operating VS-62HA Remotely via Web Pages

The **VS-62HA** can be operated remotely using the embedded Web pages. The Web pages are accessed using a Web browser and an Ethernet connection.

Before attempting to connect:

- Perform the procedures in Connecting to VS-62HA via Ethernet on page 8.

- Ensure that JavaScript is enabled.

ⓘ In the event that a Web page does not update correctly, clear your Web browser's cache (by pressing CTRL-F5).

To browse the VS-62HA Web pages:

1. Open your Internet browser.

2. Type the IP number of the device (see Connecting to VS-62HA via Ethernet on page 8) the Address bar of your browser.

🟦 http://192.168.1.39	⌄

There are six Web pages:

- Video Switching (see Video Switching on page 20).

- Analog Audio Switching (see Analog Audio Switching on page 23).

- EDID Management (see EDID Management on page 24).

- Authentication (see Authentication on page 26).

- Device Settings (see Device Setting on page 27).

- Firmware Upgrade (see Firmware Upgrade on page 28).

- About Us (see About Us on page 29).

Video Switching

The **VS-62HA** video switching page lets you perform operational actions, such as, switching inputs/outputs and selecting HDCP support.

The following illustration explains the elements of the video switching page.

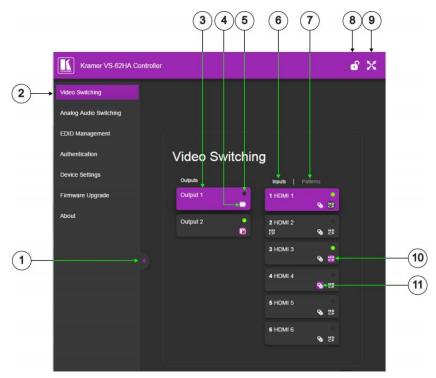ℹ️ Most elements have tool tips that appear when the element is touched.

Figure 9: The Video Switching page

#	Item	Description
1	Show/Hide Panel	Click to show or hide the Web page panel.
2	Web Page Selector	Click to show the desired Web page.
3	Output Buttons 1 and 2	2 buttons to select the output (highlighted when selected).
4	Mute/Unmute Video	Click to turn off/on.
5	Connection Indicator	Lights green when connected, grey when off.
6	Inputs Tab	Click to display the 6 input buttons for input selection, and port and signal identification (see Switching an Input to an Output on page 21).
7	Patterns Button Tab	Click to display 6 test patterns (see Using Test Patterns as Video Inputs on page 22).
8	Security Icon	Open lock indicates security not active, closed lock indicates active security (set security on the Authentication tab).
9	Full Screen Icon	Click to toggle full screen on/off.
10	HDCP Icon	Click to toggle HDCP on/off (highlighted when active).
11	Remote Device Icon	Click to setup remote device (see Controlling a Remote Transmitter on page 21) (highlighted when active).

Switching an Input to an Output

To switch an Input to an Output, (for example, Input 2 to Output 2):

1. Click **Video Switching** in the Navigation pane.
   The Video Switching page appears ([Figure 9](#)).

2. Click **Output 2**.
   The button changes color to purple and the Output is selected.

3. Click **Input 2**.
   The button changes color to purple and the output is switched.
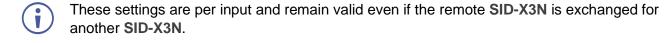
Controlling a Remote Transmitter

Compatible remote transmitters, (for example, the **SID-X3N**) that are connected to the **VS-62HA** can be controlled using the Web pages.

Figure 10: The Remote Device Control Window

The **VS-62HA** allows you to program the general purpose buttons on remote modules. The table shows the functionality defined for each button. The options are:

- HDMI, DP, DVI, PC – selects one of the inputs.

- Echo – allows a connected controller to be programmed to perform a variety of tasked triggered by the user buttons, such as, room control, (lights, screen, and so on).

- Out 1 – step-in current input to output 1.

- Out 2 – step-in current input to output 2.

These settings are per input and remain valid even if the remote **SID-X3N** is exchanged for another **SID-X3N**.

Up to three of the Echo, Out 1 and Out 2 buttons can be active at the same time.

Using Test Patterns as Video Inputs

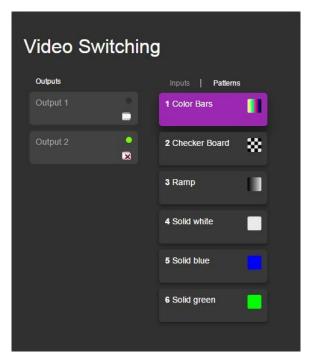You can use one of six built-in, video test patterns as a video Input.

Figure 11: Test Pattern tab

To select a test pattern as an Input for an Output:

1. Click **Video Switching** in the Navigation pane.
   The Video Switching page appears (Figure 9).

2. Select the **Patterns** tab.
   The six test pattern buttons are shown.

3. Click the required Output.
   The button changes color.

4. Click the required test pattern button.
   The button changes color and the selected test pattern is switched to the Output.

Analog Audio Switching

The Analog Audio Switching page allows you to switch analog audio inputs to the outputs.

The following illustration explains the elements of the analog audio switching page.

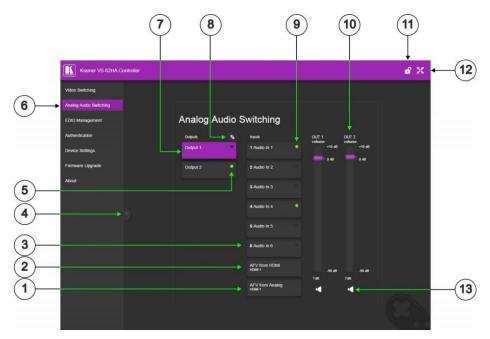ⓘ   Most elements have tool tips that appear when the element is touched.

Figure 12: The Analog Audio Switching page

#	Item	Description
1	AFV from Analog	Click to enable audio-follow-video mode. Analog audio from a selected video input is routed to output 1 or 2 as chosen. In this case the front panel ANALOG button lights green.
2	AFV from HDMI	Click to enable audio-follow-video mode. HDMI audio from a selected video input is routed to output 1 or 2 as chosen. In this case the front panel ANALOG button is not lit.
3	Input Buttons 1 to 6	Click to select analog audio input. Breakaway mode is enabled. The front panel ANALOG button lights red.
4	Show/Hide Panel	Click to show or hide the Web page panel.
5	Connection Indicator	Lights green when connected, grey when off.
6	Web Page Selector	Click to show the desired Web page.
7	Output Buttons 1 and 2	2 buttons to select the output (highlighted when selected).
8	Swap Audio Outputs	Click to swap Out 1 to Out 2 and Out 2 to Out 1, click again to return to the original state. When swap is active, the button lights.
9	Selection Indicator	Color of LED indicates the following: green – analog audio follows HDMI video input. red – analog audio breakaway (Web control only). off – outputs HDMI audio of the selected HDMI input.
10	OUT Volume Slider 1 and 2	Click and drag the purple slider to the desired volume level. Click above or below the slider to increase or decrease the setting by 10dB. The set level shows at the bottom of the slider.
11	Security Icon	Open lock indicates security not active, closed lock indicates active security (set security on the Authentication tab).
12	Full Screen Icon	Click to toggle full screen on/off.
13	Mute/Unmute Output	Click to turn audio off/on.

EDID Management

The **VS-62HA** EDID page lets you copy EDID data to one or more Inputs from an:

- Output.

- Input.

- Default EDID.

- EDID data file.

The following illustration explains the elements of the video switching page.

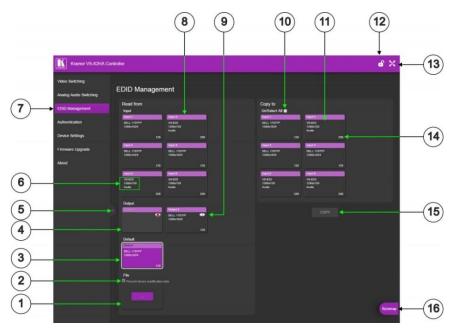ℹ️ Most elements have tool tips that appear when the element is touched.

Figure 13: The EDID Management page

#	Item	Description
1	File Selector (…)	Click to browse saved EDID files on the computer.
2	Prevent Modification Checkbox	Click to prevent modification of data.
3	Default EDID Button	Click to read the default EDID.
4	Output Buttons 1 and 2	2 buttons to select the output (highlighted when selected).
5	Show/Hide Panel	Click to show or hide the Web page panel.
6	EDID Source Information	Device model, resolution, if audio connected.
7	Web Page Selector	Click to show the desired Web page.
8	Input Buttons (1-6)	Click to display the 6 input buttons for input selection, and port and signal identification (see Switching an Input to an Output on page 21).
9	Output Connection Status	Shows whether output is connected or not.
10	Un/Select All Checkbox	Check to select or unselect copying EDID to all inputs.
11	Copy To Section	From this section select the required EDID destination to copy to.
12	Security Icon	Open lock indicates security not active, closed lock indicates active security (set security on the Authentication tab).
13	Full Screen Icon	Click to toggle full screen on/off.
14	Audio Bitrate	Indicates the audio bitrate on the input or output.
15	Copy Button	Click to copy the EDID from the selected source to the selected input.
16	Bytemap Button	Click to open a window showing the selected EDID raw information.

The display is not updated automatically when the status of an EDID changes on the device due to outputs being exchanged. Click Refresh to update the display.

To copy EDID data from an Output or Input to one or more inputs:

1. Click **EDID Management** in the Navigation pane.
   The EDID Management page appears (Figure 13).

2. Click the source button from which to copy the EDID (Output or Input).
   The button changes color and the EDID summary information reflects the EDID data.

3. Click one or more destination Inputs, or select all Inputs by checking the Inputs check-box.
   All selected Input buttons change color and the EDID summary information reflects the Input selection(s).

4. Click **Copy**.
   The "EDID was copied" success message is displayed and the EDID data are copied to the selected Input(s).

5. Click **OK**.

To copy EDID data to an Input from an EDID data file:

1. Click **EDID Management** in the Navigation pane.
   The EDID Management page appears (Figure 13).

2. Click the source **Browse** button.
   The Windows Browser opens.

3. Browse to the required file.

4. Select the required file and click **Open**.
   The EDID summary information reflects the selection.

5. Click one or more destination Inputs or select all Inputs by checking the Inputs check-box.
   All selected Input buttons change color and the EDID summary information reflects the Input selection(s).

6. Click **Copy**.
   The "EDID was copied" success message is displayed and the EDID data are copied to the selected Input(s).

7. Click **OK**.

Authentication

The Authentication page lets you assign or change logon authentication details.

To activate security:

1. Click **Authentication** in the Navigation pane.
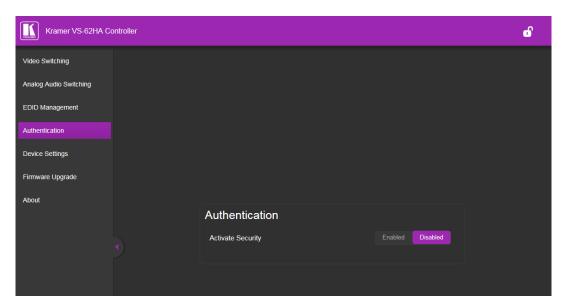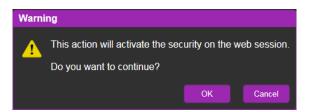   The Authentication page appears (Figure 14).

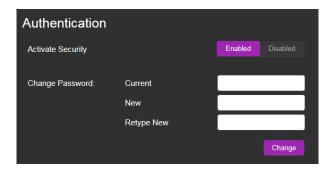Figure 14: The Authentication page

2. Click **Enabled**.
   A warning appears:

3. Click **OK**.
   The sign-in window appears.

4. Enter the admin user ID: **Admin** and password: **Admin**.
   Security is enabled and the page reloads with fields for entering a password.

Device Setting

The **VS-62HA** Device Settings page lets you modify some communication parameters and view others.
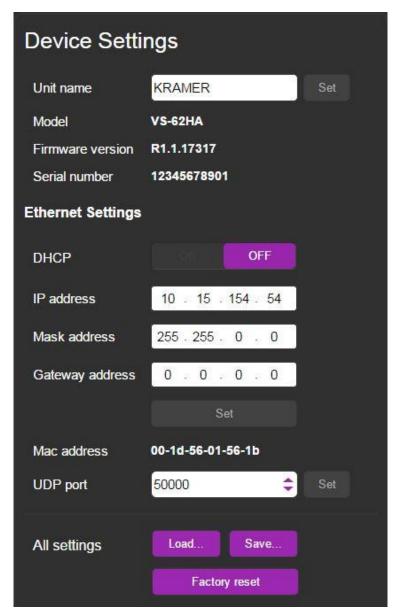

Figure 15: The Device Setting page

To modify serial or Ethernet communication parameters:

1. Click **Device Settings** in the Navigation pane.
The Device Settings page appears (Figure 15).

2. Adjust the parameters as required, either by entering the parameters directly or by using the drop-down list.

3. Click **Set**.
The changes are saved.

About Us

The **VS-62HA** About Us page displays the Web page version and Kramer Electronics Ltd company details.

Figure 17: About Us page

Wiring the Twisted Pair RJ-45 Connectors

Connect/solder the cable shield to the RJ-45 connector shield.

⚠️ **Do not use a crossed TP cable with this product**.
Using a TP cable that is incorrectly wired may cause permanent damage to the device.

Do not use unshielded TP cables with this product.

Figure 18 defines the TP pinout using a straight pin-to-pin cable with RJ-45 connectors.

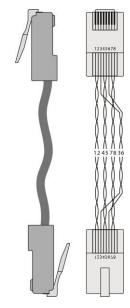| EIA /TIA 568B	
PIN	Wire Color
1	Orange / White
2	Orange
3	Green / White
4	Blue
5	Blue / White
6	Green
7	Brown / White
8	Brown
Pair 1	4 and 5
Pair 2	1 and 2
Pair 3	3 and 6
Pair 4	7 and 8

Figure 18: TP Pinout Wiring

Technical Specifications

INPUTS:	6 HDMI connectors, 4 unbalanced stereo audio on 3.5mm mini jacks, 2 balanced stereo audio on 5-pin terminal blocks
OUTPUTS:	2 HDMI connectors, 2 balanced stereo audio on 5-pin terminal blocks
PORTS:	1 RS-232 on a 3-pin terminal block, 1 Ethernet on an RJ-45 connector, 1 USB Type-C, 1 remote IR on a 3.5mm mini jack, 2 x 6 remote LED outputs on terminal blocks, 2 x 6 remote contact closure switches on terminal blocks
CONTROLS:	Front panel buttons, infrared remote-control transmitter, RS-232, Ethernet, remote input selection switches and LEDS, built-in Web browser
LED INDICATORS:	IR active - red, ON - green
MAX. DATA RATE:	Up to 8.91Gbps data rate (2.97Gbps per graphic channel)
COMPLIANCE WITH HDMI STANDARD:	HDMI 2.0 and HDCP 1.4
RESOLUTION:	Up to 4K@60Hz UHD (4:2:0)
SUPPORTED BAUD RATES:	9600, 115200bps

SUPPORTED WEB BROWSERS:	The following operating systems and Web browsers are supported:
	• Windows 7:
	  ▪ Google Chrome v25
	  ▪ FireFox v15
	  ▪ Opera v12
	  ▪ Microsoft Internet Explorer v9
	• Windows XP:
	  ▪ Google Chrome v25
	  ▪ FireFox v15
	• Apple Mac:
	  ▪ Google Chrome v25
	  ▪ FireFox v20
	  ▪ Opera v12.14
	  ▪ Safari v6

POWER CONSUMPTION:	100-240V AC, 22VA
OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)
STORAGE TEMPERATURE:	-40° to +70°C (-40° to 158°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	43.6cm x 18.3cm x 4.36cm (17.2" x 7.2" x 1.7") W, D, H
WEIGHT:	1.65kg (3.63lb)
SHIPPING DIMENSIONS:	55cm x 27.6cm x 10.7cm (21.7" x 10.9" x 4.2") W, D, H
SHIPPING WEIGHT:	2.5kg (5.5lb)
INCLUDED ACCESSORIES:	Power cord, rack "ears"
OPTIONAL:	External remote IR receiver cable
Specifications are subject to change without notice at www.kramerav.com	

For optimum range and performance use the recommended Kramer cables available at www.kramerav.com/product/VS-62HA

Default Communication Parameters

RS-232	
Protocol 3000	
Baud Rate:	115,200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII
TCP/IP Parameters	
IP Address:	192.168.1.39
Netmask:	255.255.0.0
Gateway:	0.0.0.0
TCP Port #:	5000
UDP Port #:	50000
Default username:	Admin
Default password:	Admin

Default EDID

```
Monitor
 Model name............... VS-62H
 Manufacturer............. KMR
 Plug and Play ID......... KMR0200
 Serial number............ 1
 Manufacture date........ 2010, ISO week 24
 Filter driver............ None
 -----------------------
 EDID revision............ 1.3
 Input signal type........ Digital (DVI)
 Color bit depth.......... Undefined
 Display type............. RGB color
 Screen size.............. 700 x 390 mm (31.5 in)
 Power management......... Not supported
 Extension blocs.......... 1 (CEA-EXT)
 -----------------------
 DDC/CI................... n/a
Color characteristics
 Default color space...... Non-sRGB
 Display gamma............ 2.20
 Red chromaticity......... Rx 0.640 - Ry 0.341
 Green chromaticity....... Gx 0.286 - Gy 0.610
 Blue chromaticity........ Bx 0.146 - By 0.069
 White point (default).... Wx 0.284 - Wy 0.293
 Additional descriptors... None
Timing characteristics
 Horizontal scan range.... 31-94kHz
 Vertical scan range...... 50-85Hz
 Video bandwidth.......... 170MHz
 CVT standard............. Not supported
 GTF standard............. Not supported
 Additional descriptors... None
 Preferred timing......... Yes
 Native/preferred timing.. 1280x720p at 60Hz
  Modeline............... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 746 +hsync -vsync
 Detailed timing #1....... 1920x1080p at 60Hz (16:9)
  Modeline............... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
 Standard timings supported
  720 x  400p at  70Hz - IBM VGA
  720 x  400p at  88Hz - IBM XGA2
  640 x  480p at  60Hz - IBM VGA
  640 x  480p at  67Hz - Apple Mac II
  640 x  480p at  72Hz - VESA
  640 x  480p at  75Hz - VESA
  800 x  600p at  56Hz - VESA
  800 x  600p at  60Hz - VESA
  800 x  600p at  72Hz - VESA
  800 x  600p at  75Hz - VESA
  832 x  624p at  75Hz - Apple Mac II
 1024 x  768i at  87Hz - IBM
 1024 x  768p at  60Hz - VESA
 1024 x  768p at  70Hz - VESA
 1024 x  768p at  75Hz - VESA
```

```
    1280 x 1024p at  75Hz - VESA
    1152 x  870p at  75Hz - Apple Mac II
    1280 x  720p at  60Hz - VESA STD
    1280 x  800p at  60Hz - VESA STD
    1440 x  900p at  60Hz - VESA STD
    1280 x  960p at  60Hz - VESA STD
    1280 x 1024p at  60Hz - VESA STD
    1400 x 1050p at  60Hz - VESA STD
    1680 x 1050p at  60Hz - VESA STD
    1600 x 1200p at  60Hz - VESA STD
EIA/CEA-861 Information
 Revision number.......... 3
 IT underscan............. Not supported
 Basic audio.............. Supported
 YCbCr 4:4:4.............. Supported
 YCbCr 4:2:2.............. Supported
 Native formats........... 1
 Detailed timing #1....... 720x480p at 60Hz (4:3)
   Modeline............... "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync
 Detailed timing #2....... 1920x1080i at 60Hz (16:9)
   Modeline............... "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
 Detailed timing #3....... 1920x1080i at 50Hz (16:9)
   Modeline............... "1920x1080" 74.250 1920 2448 2492 2640 1080 1084 1094 1124 interlace +hsync +vsync
 Detailed timing #4....... 1280x720p at 60Hz (16:9)
   Modeline............... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
 Detailed timing #5....... 1280x720p at 50Hz (16:9)
   Modeline............... "1280x720" 74.250 1280 1720 1760 1980 720 725 730 750 +hsync +vsync
 CE video identifiers (VICs) - timing/formats supported
    720 x  576p at  50Hz - EDTV (4:3, 16:15)
   1280 x  720p at  50Hz - HDTV (16:9, 1:1)
   1920 x 1080i at  60Hz - HDTV (16:9, 1:1)
   1920 x 1080i at  50Hz - HDTV (16:9, 1:1)
   1280 x  720p at  60Hz - HDTV (16:9, 1:1) [Native]
   1920 x 1080p at  60Hz - HDTV (16:9, 1:1)
   1920 x 1080p at  50Hz - HDTV (16:9, 1:1)
    NB: NTSC refresh rate = (Hz*1000)/1001
 CE audio data (formats supported)
  LPCM   3-channel, 24-bits      at 44/48 kHz
 CE speaker allocation data
  Channel configuration.... 3.0
  Front left/right......... Yes
  Front LFE................ No
  Front center............. Yes
  Rear left/right.......... No
  Rear center.............. No
  Front left/right center.. No
  Rear left/right center... No
  Rear LFE................. No
 CE vendor specific data (VSDB)
  IEEE registration number. 0x000C03
  CEC physical address..... 1.0.0.0
  Maximum TMDS clock....... 165MHz
 Raw data
 00,FF,FF,FF,FF,FF,00,2E,4D,00,02,01,00,00,00,00,18,14,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,
 11,48,4B,FF,FF,80,81,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,01,1D,00,72,51,D0,1A,20,6E,28,
 55,00,7E,88,42,00,00,1A,02,3A,80,18,71,38,2D,40,58,2C,45,00,C4,8E,21,00,00,1E,00,00,00,FC,00,56,
 53,2D,34,32,48,4E,0A,20,20,00,00,00,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,20,01,7B,
 02,03,1A,71,47,11,13,05,14,84,10,1F,23,0A,06,04,83,05,00,00,65,03,0C,00,10,00,8C,0A,D0,8A,20,E0,
 2D,10,10,3E,96,00,58,C2,21,00,00,18,01,1D,80,18,71,1C,16,20,58,2C,25,00,C4,8E,21,00,00,9E,01,1D,
 80,D0,72,1C,16,20,10,2C,25,80,C4,8E,21,00,00,9E,01,1D,00,72,51,D0,1E,20,6E,28,55,00,C4,8E,21,00,
 00,1E,01,1D,00,BC,52,D0,1E,20,B8,28,55,40,C4,8E,21,00,00,1E,00,00,00,00,00,00,00,00,00,00,00,90
```

Protocol 3000

Kramer devices can be operated using Kramer Protocol 3000 commands sent via serial or Ethernet ports.

Understanding Protocol 3000

Protocol 3000 commands are a sequence of ASCII letters, structured according to the following.
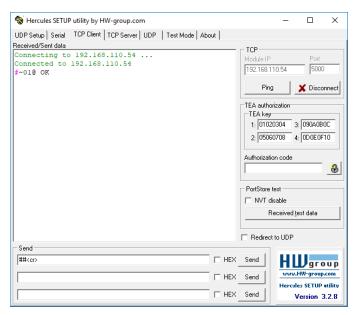
- **Command format**:

Prefix	Command Name	Constant (Space)	Parameter(s)	Suffix
#	Command	␣	Parameter	**<CR>**

- **Feedback format**:

Prefix	Device ID	Constant	Command Name	Parameter(s)	Suffix
~	nn	@	Command	Parameter	**<CR><LF>**

- **Command parameters** – Multiple parameters must be separated by a comma (,). In addition, multiple parameters can be grouped as a single parameter using brackets ([and]).

- **Command chain separator character** – Multiple commands can be chained in the same string. Each command is delimited by a pipe character (|).

- **Parameters attributes** – Parameters may contain multiple attributes. Attributes are indicated with pointy brackets (<…>) and must be separated by a period (.).

The command framing varies according to how you interface with the **VS-88UT**. The following figure displays how the # command is framed using terminal communication software (such as Hercules):

Protocol 3000 Commands

Function	Description	Syntax	Parameters/Attributes	Example
#	Protocol handshaking. ⓘ Validates the Protocol 3000 connection and gets the machine number. Step-in master products use this command to identify the availability of a device.	**COMMAND** **#<CR>** **FEEDBACK** **~nn@␣OK<CR><LF>**		#<CR>
AFV	Set audio follow video/audio breakaway mode. ⓘ When the unit moves from breakaway to audio follow video switching mode, all audio switch settings reset according to the video switch settings.	**COMMAND** **#AFV␣**afv_mode,channel**<CR>** **FEEDBACK** **~nn@AFV␣**afv_mode**<CR><LF>**	**afv_mode** – Front panel AFV mode 　0 – afv – sets the unit to the audio-follow-video switching mode 　2 – brk – sets the unit to the audio breakaway switching mode **channel** – Output audio channel to configure.	Set audio breakaway mode: **#AFV␣2,1<CR>**
AFV?	Get audio follow video mode status. ⓘ When the unit moves from breakaway to audio follow video switching mode, all audio switch settings reset according to the video switch settings.	**COMMAND** **#AFV?␣**channel**<CR>** **FEEDBACK** **~nn@AFV␣**afv_mode,channel**<CR><LF>**	**afv_mode** – Front panel AFV mode 　0 – afv – sets the unit to the audio-follow-video switching mode 　2 – brk – sets the unit to the audio breakaway switching mode **channel** – Output audio channel to configure.	Get audio follow video mode status: **#AFV?␣1<CR>**
AUD	LEGACY COMMAND. Set audio switch state. ⓘ When AFV switching mode is active, this command also switches video and unit replies with command ~AV.	**COMMAND** **#AUD␣**in>out,in>out,…**<CR>** **FEEDBACK** **~nn@AUD␣**in>out**<CR><LF>** **~nn@AUD␣**in>out**<CR><LF>**	**In** – Input number or '0' to disconnect output **>** – Connection character between in and out parameters **out** – Output number or '*' for all outputs	Switch embedded audio HDMI™ IN 1 to HDMI OUT 3: **#AUD␣1>3<CR>**
AUD?	LEGACY COMMAND. Get audio switch state. ⓘ When AFV switching mode is active, this command also switches video and unit replies with command ~AV.	**COMMAND** **#AUD?␣**out**<CR>** **#AUD?␣***<CR>** **FEEDBACK** **~nn@AUD␣**in>out**<CR><LF>** **~nn@AUD␣**in>1,in>2,…**<CR><LF>**	**In** – Input number or '0' to disconnect output **>** – Connection character between in and out parameters **out** – Output number or '*' for all outputs	Get audio switch state for output 1: **#AUD?␣1<CR>**
AUD-LVL	Set volume level.	**COMMAND** **#AUD-LVL␣**stage,channel,volume**<CR>** **FEEDBACK** **~nn@AUD-LVL␣**stage,channel,volume**<CR><LF>**	**stage** – 1 (Output processing) **channel** – 1 (Analog audio output) **volume** – Volume level -60db to 30dB; ++ (increase current value by 1dB); –– (decrease current value by 1dB)	Set AUDIO OUT 2 level to -50dB: **#AUD-LVL␣1,1,-50<CR>**
AUD-LVL?	Get volume level.	**COMMAND** **#AUD-LVL?␣**stage,channel**<CR>** **FEEDBACK** **~nn@AUD-LVL␣**stage,channel,volume**<CR><LF>**	**stage** – 1 (Output processing) **channel** – 1 (Analog audio output) **volume** – Volume level -60db to 30dB	Get AUDIO OUT 1 level **#AUD-LVL?␣1,1<CR>**
AUD-SIGNAL?	Get audio input signal status.	**COMMAND** **#AUD-SIGNAL?␣**inp_id**<CR>** **FEEDBACK** **~nn@AUD-SIGNAL␣**inp_id,status**<CR><LF>**	**inp_id** – Input number 　1 – Input 1 　n – Input n **status** – On/Off 　0 – Off (no signal) 　1 – On (signal present)	Get the status of input 1: **#AUD-SIGNAL?␣1<CR>**
AUD-SWAP	Set audio output swap.	**COMMAND** **#AUD-SWAP␣**swap_mode**<CR>** **FEEDBACK** **~nn@AUD-SWAP␣**swap_mode**<CR><LF>**	**swap_mode** – On/Off 　0 – Off 　1 – On	Swap outputs: #AUD-SWAP␣1<CR>
AUD-SWAP?	Get audio output swap status.	**COMMAND** **#AUD-SWAP?␣<CR>** **FEEDBACK** **~nn@AUD-SWAP␣**swap_mode**<CR><LF>**	**swap_mode** – On/Off 　0 – Off 　1 – On	Get audio output swap status: #AUD-SWAP?␣<CR>
AV-SW-MODE	Set input auto switch mode (per output).	**COMMAND** **#AV-SW-MODE␣**layer,output_id,mode**<CR>** **FEEDBACK** **~nn@AV-SW-MODE␣**layer,output_id,mode**<CR><LF>**	**layer** – Layer Enumeration 　1 – Video 　2 – Audio 　3 – Data 　4 – IR 　5 – USB **output_id** – 1 to number of system outputs **mode** – 　0 – manual 　1 – priority switch 　2 – last connected switch	Set input auto switch mode (per output) for audio 1 to manual: **#AV-SW-MODE␣2,1,0<CR>**

Function	Description	Syntax	Parameters/Attributes	Example

AV-SW-MODE?	Get input auto switch mode (per output).	**COMMAND**
		`#AV-SW-MODE? layer,output_id<CR>`
		FEEDBACK
		`~nn@AV-SW-MODE layer,output_id,mode<CR><LF>`
			layer – Layer Enumeration
			1 – Video
			2 – Audio
			3 – Data
			4 – IR
			5 – USB
			output_id – 1 to number of system outputs
			mode –
			0 – manual
			1 – priority switch
			2 – last connected switch
				Get the input audio switch mode for HDBT Out:
				`#AV-SW-MODE? 1,1<CR>`

BUILD-DATE?	Get device build date.	**COMMAND**
		`#BUILD-DATE? <CR>`
		FEEDBACK
		`~nn@BUILD-DATE date,time<CR><LF>`
			date – Format: YYYY/MM/DD where
			YYYY = Year
			MM = Month
			DD = Day
			time – Format: hh:mm:ss where
			hh = hours
			mm = minutes
			ss = seconds
				Get the device build date:
				`#BUILD-DATE?<CR>`

CPEDID	Copy EDID data from the output to the input EEPROM.
	
	ⓘ Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word).
	
	Example: bitmap 0x0013 means inputs 1,2 and 5 are loaded with the new EDID.
	
	In certain products Safe_mode is an optional parameter. See the HELP command for its availability.
		COMMAND
		`#CPEDID src_type,src_id,dst_type,dest_bitmap<CR>`
		or
		`#CPEDID src_type,src_id,dst_type,dest_bitmap,safe_mode<CR>`
		FEEDBACK
		`~nn@CPEDID src_stg,src_id,dst_type,dest_bitmap<CR><LF>`
		`~nn@CPEDID src_stg,src_id,st_type,dest_bitmap,safe_mode<CR><LF>`
			src_type – EDID source type (usually output)
			0 – Input
			1 – Output
			2 – Default EDID
			3 – Custom EDID
			src_id – Number of chosen source stage
			0 – Default EDID source
			1 – Output 1
			2 – Output 2
			dst_type – EDID destination type (usually input)
			0 – Input
			1 – Output
			2 – Default EDID
			3 – Custom EDID
			dest_bitmap – Bitmap representing destination IDs. Format: XXXX…X, where X is hex digit. The binary form of every hex digit represents corresponding destinations.
			0 – indicates that EDID data is not copied to this destination.
			1 – indicates that EDID data is copied to this destination.
			safe_mode –
			0 – device accepts the EDID as is without trying to adjust
			1 – device tries to adjust the EDID (default value if no parameter is sent)
				Copy the EDID data from the Output 1 (EDID source) to the Input:
				`#CPEDID 1,1,0,0x1<CR>`
				Copy the EDID data from the default EDID source to the Input:
				`#CPEDID 2,0,0,0x1<CR>`

Function	Description	Syntax	Parameters/Attributes	Example

DEF-RES	Set custom defined scaled video output resolution to ID index.
	
	ⓘ If a requested custom resolution is not defined, yet is in the device, it returns ERRSP003 (out of range).
	
	Only indexes 100-104 are valid for custom defined resolution.
		COMMAND
		#DEF-RES␣Table_id,Width,Height,Htotal,VTotal,HSyncW,HSyncBackPorch,VSyncW,VSyncBackPorch,FrRate,Interlaced**<CR>**
		FEEDBACK
		~nn@**DEF-RES**␣Table_id,Width,Height,Htotal,VTotal,HSyncW,HSyncBackPorch,VSyncW,VSyncBackPorch,FrRate,Interlaced**<CR><LF>**
			Table_id – Index in resolution table
			0=No Signal (for input) / Native – EDID (for output)
			1=640x480p@59.94Hz/60Hz
			2=720x480p@59.94Hz/60Hz
			3=720x480p@59.94Hz/60Hz
			4=1280x720p@59.94Hz/60Hz
			5=1920x1080i@59.94Hz/60Hz
			6=720(1440)x480i@59.94Hz/60Hz
			7=720(1440)x480i@59.94Hz/60Hz
			8=720(1440)x240p@59.94Hz/60Hz
			9=720(1440)x240p@59.94Hz/60Hz
			10=2880x480i@59.94Hz/60Hz
			11=2880x480i@59.94Hz/60Hz
			12=2880x240p@59.94Hz/60Hz
			13=2880x240p@59.94Hz/60Hz
			14=1440x480p@59.94Hz/60Hz
			15=1440x480p@59.94Hz/60Hz
			16=1920x1080p@59.94Hz/60Hz
			17=720x576p@50Hz
			18=720x576p@50Hz
			19=1280x720p@50Hz
			20=1920x1080i@50Hz
			21=720(1440)x576i@50Hz
			22=720(1440)x576i@50Hz
			23=720(1440)x288p@50Hz
			24=720(1440)x288p@50Hz
			25=2880x576i@50Hz
			26=2880x576i@50Hz
			27=2880x288p@50Hz
			28=2880x288p@50Hz
			29=1440x576p@50Hz
			30=1440x576p@50Hz
			31=1920x1080p@50Hz
			32=1920x1080p@23.97Hz/24Hz
			33=1920x1080p@25Hz
			34=1920x1080p@29.97Hz/30Hz
			35=2880x480p@59.94Hz/60Hz
			36=2880x480p@59.94Hz/60Hz
			37=2880x576p@50Hz
			38=2880x576p@50Hz
			39=1920x1080i@50Hz
			40=1920x1080i@100Hz
			41=1280x720p@100Hz
			42=720x576p@100Hz
			43=720x576p@100Hz
			44=720(1440)x576i@100Hz
			45=720(1440)x576i@100Hz
			46=1920x1080i@119.88/120Hz
			47=1280x720p@119.88/120Hz
			48=720x480p@119.88/120Hz
			49=720x480p@119.88/120Hz
			50=720(1440)x480i@119.88/120Hz
			51=720(1440)x480i@119.88/120Hz
			52=720x576p@200Hz
			53=720x576p@200Hz
			54=720(1440)x576i@200Hz
			55=720(1440)x576i@200Hz
			56=720x480p@239.76/240Hz
			57=720x480p@239.76/240Hz
			58=720(1440)x480i@239.76/240Hz
			59=720(1440)x480i@239.76/240Hz
			60=1280x720p@23.97Hz/24Hz
			61=1280x720p@25Hz
			62=1280x720p@29.97Hz/30Hz
			63=1920x1080p@119.88/120Hz
			64=1920x1080p@100Hz
			65-99=(Reserved)
			100=Custom resolution 1
			101=Custom resolution 2
			102=Custom resolution 3
			103=Custom resolution 4
			104=Custom resolution 5
			104-**254**=(Reserved)
			*Valid indexes for SET are 100-104 only
			Custom – *Resolution parameters* - by name (self-explanatory), numeric value
			Interlaced – Interlaced/progressive according to On/Off ("ON"- I, "OFF" - P)
			Stage – Input/Output
			  0=Input
			  1=Output
			Stage_id – Number of chosen stage (1...max number of inputs/outputs)	

#DEF-RES␣Table_id,Width,Height,Htotal,VTotal,HSyncW,HSyncBackPorch,VSyncW,VSyncBackPorch,FrRate,Interlaced**<CR>**

Function	Description	Syntax	Parameters/Attributes	Example
DEF-RES?	Get custom defined video resolution. ⓘ If a requested custom resolution is not defined, yet is in the device, it returns ERRSP003 (out of range). Only indexes 100-104 are valid for custom defined resolution. In Get command when sending: index 0 - device replies with detailed info of native resolution. index 255 - device replies with detailed info of current resolution.	**COMMAND** **#DEF-RES?**␣Table_id,stage,stage_id**<CR>** **FEEDBACK** ~nn@**DEF-RES**␣Table_id,Width,Height,Htotal,VTotal,HSyncW,HSyncBackPorch,VSyncW,VSyncBackPorch,FrRate,Interlaced**<CR><LF>**	Table_id – Index in resolution table **0**=No Signal (for input) / Native – EDID (for output) **1**=640x480p@59.94Hz/60Hz **2**=720x480p@59.94Hz/60Hz **3**=720x480p@59.94Hz/60Hz **4**=1280x720p@59.94Hz/60Hz **5**=1920x1080i@59.94Hz/60Hz **6**=720(1440)x480i@59.94Hz/60Hz **7**=720(1440)x480i@59.94Hz/60Hz **8**=720(1440)x240p@59.94Hz/60Hz **9**=720(1440)x240p@59.94Hz/60Hz **10**=2880x480i@59.94Hz/60Hz **11**=2880x480i@59.94Hz/60Hz **12**=2880x240p@59.94Hz/60Hz **13**=2880x240p@59.94Hz/60Hz **14**=1440x480p@59.94Hz/60Hz **15**=1440x480p@59.94Hz/60Hz **16**=1920x1080p@59.94Hz/60Hz **17**=720x576p@50Hz **18**=720x576p@50Hz **19**=1280x720p@50Hz **20**=1920x1080i@50Hz **21**=720(1440)x576i@50Hz **22**=720(1440)x576i@50Hz **23**=720(1440)x288p@50Hz **24**=720(1440)x288p@50Hz **25**=2880x576i@50Hz **26**=2880x576i@50Hz **27**=2880x288p@50Hz **28**=2880x288p@50Hz **29**=1440x576p@50Hz **30**=1440x576p@50Hz **31**=1920x1080p@50Hz **32**=1920x1080p@23.97Hz/24Hz **33**=1920x1080p@25Hz **34**=1920x1080p@29.97Hz/30Hz **35**=2880x480p@59.94Hz/60Hz **36**=2880x480p@59.94Hz/60Hz **37**=2880x576p@50Hz **38**=2880x576p@50Hz **39**=1920x1080i@50Hz **40**=1920x1080i@100Hz **41**=1280x720p@100Hz **42**=720x576p@100Hz **43**=720x576p@100Hz **44**=720(1440)x576i@100Hz **45**=720(1440)x576i@100Hz **46**=1920x1080i@119.88/120Hz **47**=1280x720p@119.88/120Hz **48**=720x480p@119.88/120Hz **49**=720x480p@119.88/120Hz **50**=720(1440)x480i@119.88/120Hz **51**=720(1440)x480i@119.88/120Hz **52**=720x576p@200Hz **53**=720x576p@200Hz **54**=720(1440)x576i@200Hz **55**=720(1440)x576i@200Hz **56**=720x480p@239.76/240Hz **57**=720x480p@239.76/240Hz **58**=720(1440)x480i@239.76/240Hz **59**=720(1440)x480i@239.76/240Hz **60**=1280x720p@23.97Hz/24Hz **61**=1280x720p@25Hz **62**=1280x720p@29.97Hz/30Hz **63**=1920x1080p@119.88/120Hz **64**=1920x1080p@100Hz **65-99**=(Reserved) **100**=Custom resolution 1 **101**=Custom resolution 2 **102**=Custom resolution 3 **103**=Custom resolution 4 **104**=Custom resolution 5 104-**254**=(Reserved) *Valid indexes for SET are 100-104 only Custom – *Resolution parameters* - by name (self-explanatory), numeric value Interlaced – Interlaced/progressive according to On/Off ("ON"- I, "OFF" - P) Stage – Input/Output **0**=Input **1**=Output Stage_id – Number of chosen stage (1...max number of inputs/outputs)	
DISPLAY?	Get output HPD status.	**COMMAND** **#DISPLAY?**␣out_id**<CR>** **FEEDBACK** ~nn@**DISPLAY**␣out_id,status**<CR><LF>**	out_id – Output number 1 – Output 1 2 – Output 2 … n – Output n status – HPD status according to signal validation 0 – Signal or sink is not valid 1 – Signal or sink is valid 2 – Sink and EDID is valid	Get the output HPD status of Output 1: **#DISPLAY?**␣1**<CR>**

Function	Description	Syntax	Parameters/Attributes	Example

ETH-PORT	Set Ethernet port protocol.
	
	ⓘ If the port number you enter is already in use, an error is returned. The port number must be within the following range: 0-(2^16-1).
		COMMAND
		`#ETH-PORT␣portType,ETHPort<CR>`
		FEEDBACK
		`~nn@ETH-PORT␣portType,ETHPort<CR><LF>`
			portType – TCP/UDP
			ETHPort – TCP/UDP port number (0 – 65535)
				Set the Ethernet port protocol for TCP to port 12457:
				`#ETH-PORT␣0,12457<CR>`

ETH-PORT?	Get Ethernet port protocol.	**COMMAND**
		`#ETH-PORT?␣portType<CR>`
		FEEDBACK
		`~nn@ETH-PORT␣portType,ETHPort<CR><LF>`
			portType – TCP/UDP
			0 – TCP
			1 – UDP
			ETHPort – TCP / UDP port number (0 – 65535)
				Get the Ethernet port protocol for UDP:
				`#ETH-PORT?␣1<CR>`

FACTORY	Reset device to factory default configuration.
	
	ⓘ This command deletes all user data from the device. The deletion can take some time.
	
	Your device may require powering off and powering on for the changes to take effect.
		COMMAND
		`#FACTORY<CR>`
		FEEDBACK
		`~nn@FACTORY␣OK<CR><LF>`
				Reset the device to factory default configuration:
				`#FACTORY<CR>`

GEDID	Get EDID support on certain input/output.
	
	ⓘ For old devices that do not support this command, `~nn@ERR 002<CR><LF>` is received.
		COMMAND
		`#GEDID␣stage,stage_id<CR>`
		FEEDBACK
		`~nn@GEDID␣stage,stage_id,size<CR><LF>`
			stage – Input/Output
			0 – Input
			1 – Output
			2 – Default EDID
			3 – Custom EDID
			stage_id – Number of chosen stage (1 to max number of inputs/outputs)
			size – Size of data to be sent from device, 0 means no EDID support
				Get EDID support information for input 1:
				`#GEDID␣0,1<CR>`

HDCP-MOD	Set HDCP mode.
	
	ⓘ Set HDCP working mode on the device input:
	
	HDCP supported - HDCP_ON [default].
	
	HDCP not supported - HDCP OFF.
	
	HDCP support changes following detected sink - MIRROR OUTPUT.
	
	When you define 3 as the mode, the HDCP status is defined according to the connected output in the following priority: OUT 1, OUT 2. If the connected display on OUT 2 supports HDCP, but OUT 1 does not, then HDCP is defined as not supported. If OUT 1 is not connected, then HDCP is defined by OUT 2.
		COMMAND
		`#HDCP-MOD␣inp_id,mode<CR>`
		FEEDBACK
		`~nn@HDCP-MOD␣inp_id,mode<CR><LF>`
			inp_id – Input number:
			1 – IN 1 HDMI
			2 – IN 2 HDBT
			mode – HDCP mode:
			0 – HDCP Off
			3 – HDCP defined according to the connected output
				Set the input HDCP-MODE of IN 1 to Off:
				`#HDCP-MOD␣1,0<CR>`

HDCP-MOD?	Get HDCP mode.
	
	ⓘ Set HDCP working mode on the device input:
	
	HDCP supported - HDCP_ON [default].
	
	HDCP not supported - HDCP OFF.
	
	HDCP support changes following detected sink - MIRROR OUTPUT.
		COMMAND
		`#HDCP-MOD?␣inp_id<CR>`
		FEEDBACK
		`~nn@HDCP-MOD␣inp_id,mode<CR><LF>`
			inp_id – Input number:
			1 – IN 1 HDMI
			2 – IN 2 HDBT
			mode – HDCP mode:
			0 – HDCP Off
			3 – HDCP defined according to the connected output
				Get the input HDCP-MODE of IN 1 HDMI:
				`#HDCP-MOD?␣1<CR>`

HDCP-STAT?	Get HDCP signal status.
	
	ⓘ Output stage (1) – get the HDCP signal status of the sink device connected to the specified output.
	
	Input stage (0) – get the HDCP signal status of the source device connected to the specified input.
		COMMAND
		`#HDCP-STAT?␣stage,stage_id<CR>`
		FEEDBACK
		`~nn@HDCP-STAT␣stage,stage_id,status<CR><LF>`
			stage – Input/Output
			0 – Input
			1 – Output
			stage_id – Number of chosen stage for the input stage
			1 – IN 1 HDMI
			2 – IN 2 HDBT
			For the output stage
			1 – OUT 1 HDMI
			2 – OUT 2 HDBT
			3 – OUT 3 HDBT
			4 – OUT 4 HDBT
			5 – OUT 5 HDBT
			6 – OUT 6 HDBT
			7 – OUT 7 HDBT
			8 – OUT 8 HDBT
			9 – OUT 9 HDBT
			status – Signal encryption status - valid values On/Off
			0 – HDCP Off
			1 – HDCP On
				Get the output HDCP-STATUS of IN 1:
				`#HDCP-STAT?␣0,1<CR>`

Function	Description	Syntax	Parameters/Attributes	Example
HELP	Get command list or help for specific command.	**COMMAND** **#HELP\<CR\>** **#HELP␣command_name\<CR\>** **FEEDBACK** 1. Multi-line: **~nn@Device␣command,␣command…\<CR\>\<LF\>** To get help for command use: HELP (COMMAND_NAME)\<CR\>\<LF\> **~nn@HELP␣command:\<CR\>\<LF\>** **description\<CR\>\<LF\>** **USAGE:usage\<CR\>\<LF\>**	**command** – Name of a specific command	Get the command list: **#HELP\<CR\>** To get help for AV-SW-TIMEOUT: HELP␣**AV-SW-TIMEOUT\<CR\>**

LDFW	Load new firmware file.
	
	ⓘ In most devices firmware data is saved to flash memory, but the memory does not update until receiving the "UPGRADE" command and is restarted.
		COMMAND
		Step 1:
		#LDFW␣size\<CR\>
		
		Step 2: If ready was received, send FIRMWARE_DATA
		FEEDBACK
		Response 1:
		~nn@LDFW␣size␣READY\<CR\>\<LF\>
		or
		~nn@LDFW␣ERRnn\<CR\>\<LF\>
		Response 2:
		~nn@LDFW␣size␣OK\<CR\>\<LF\>
			size – Size of firmware data that is sent
			FIRMWARE_DATA – HEX or KFW file in protocol packets
			Using the Packet Protocol
			  Send a command: LDRV, LOAD, IROUT, LDEDID
			  Receive Ready or ERR###
			  If Ready:
			    a. Send a packet,
			    b. Receive OK on the last packet,
			    c. Receive OK for the command
			  Packet structure:
			    Packet ID (1, 2, 3…) (2 bytes in length)
			    Length (data length + 2 for CRC) – (2 bytes in length)
			    Data (data length -2 bytes)
			    CRC – 2 bytes
			
			| 01
				02	03	04	05	

Packet ID		Length	Data	CRC		
						
						  5. Response:
						    ~NNNN␣OK\<CR\>\<LF\> (Where **NNNN** is the received packet ID in ASCII hex digits.)
							Load new firmware file:
							Step 1:

LOCK-FP	Lock the front panel. ⓘ In NT-52N, this command includes the PortNumber (1-2) parameter.	**COMMAND** **#LOCK-FP␣Lock/Unlock\<CR\>** **FEEDBACK** **~nn@LOCK-FP␣Lock/Unlock\<CR\>\<LF\>**	**Lock/Unlock** – On/Off 0 – (Off) Unlocks EDID 1 – (On) Locks EDID	Unlock front panel: **#LOCK-FP␣0\<CR\>**
LOCK-FP?	Get the front panel lock state. ⓘ In NT-52N, this command includes the PortNumber (1-2) parameter.	**COMMAND** **#LOCK-FP?␣\<CR\>** **FEEDBACK** **~nn@LOCK-FP␣Lock/Unlock\<CR\>\<LF\>**	**Lock/Unlock** – On/Off Off – Unlocks EDID On – Locks EDID	Get the front panel lock state: **#LOCK-FP?\<CR\>**
MODEL?	Get device model. ⓘ This command identifies equipment connected to **VS-62HA** and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests.	**COMMAND** **#MODEL?␣\<CR\>** **FEEDBACK** **~nn@MODEL␣model_name\<CR\>\<LF\>**	**model_name** – String of up to 19 printable ASCII chars	Get the device model: **#MODEL?␣\<CR\>**
MUTE	Set audio mute.	**COMMAND** **#MUTE␣channel,mute_mode\<CR\>** **FEEDBACK** **~nn@MUTE␣channel,mute_mode\<CR\>\<LF\>**	**channel** – 1 (Output number) **mute_mode** – On/Off 0 – Off 1 – On	Set speaker output to mute: **#MUTE␣1,1\<CR\>**
MUTE?	Get audio mute.	**COMMAND** **#MUTE?␣channel\<CR\>** **FEEDBACK** **~nn@MUTE␣channel,mute_mode\<CR\>\<LF\>**	**channel** – 1 (Output number) **mute_mode** – On/Off 0 – Off 1 – On	Get mute status of output 1 **#MUTE␣1?\<CR\>**
NAME-RST	Reset machine (DNS) name to factory default. ⓘ Factory default of machine (DNS) name is "KRAMER_" + 4 last digits of device serial number.	**COMMAND** **#NAME-RST\<CR\>** **FEEDBACK** **~nn@NAME-RST␣OK\<CR\>\<LF\>**		Reset the machine name (S/N last digits are 0102): **#NAME-RST␣KRAMER_0102\<CR\>**

Function	Description	Syntax	Parameters/Attributes	Example

NET-DHCP	Set DHCP mode.
	
	ⓘ Only 1 is relevant for the mode value. To disable DHCP, the user must configure a static IP address for the device.
	
	Connecting Ethernet to devices with DHCP may take more time in some networks.
	
	To connect with a randomly assigned IP by DHCP, specify the device DNS name (if available) using the **NAME** command. You can also get an assigned IP by direct connection to USB or RS-232 protocol port, if available.
	
	For proper settings consult your network administrator.
	
	ⓘ For Backward compatibility, the **id** parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.
		COMMAND
		`#NET-DHCP␣id,mode<CR>`
		FEEDBACK
		`~nn@NET-DHCP␣id,mode<CR><LF>`
			id – Network ID–the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3….
			mode –
			1 – Try to use DHCP. (If unavailable, use the IP address set by the factory or the `NET-IP` command).
				Enable DHCP mode for port 1, if available:
				`#NET-DHCP␣1,1<CR>`

NET-DHCP?	Get DHCP mode.
	ⓘ For Backward compatibility, the **id** parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.
		COMMAND
		`#NET-DHCP?␣id<CR>`
		FEEDBACK
		`~nn@NET-DHCP␣id,mode<CR><LF>`
			id – Network ID–the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3….
			mode –
			0 – Do not use DHCP. Use the IP set by the factory or using the `NET-IP` or `NET-CONFIG` command.
			1 – Try to use DHCP. If unavailable, use the IP set by the factory or using the `NET-IP` or `NET-CONFIG` command.
				Get DHCP mode for port 1:
				`#NET-DHCP?␣1<CR>`

NET-GATE	Set gateway IP.
	
	ⓘ A network gateway connects the device via another network and maybe over the Internet. Be careful of security issues. For proper settings consult your network administrator.
		COMMAND
		`#NET-GATE␣ip_address<CR>`
		FEEDBACK
		`~nn@NET-GATE␣ip_address<CR><LF>`
			ip_address – Format: xxx.xxx.xxx.xxx	Set the gateway IP address to 192.168.0.1:
				`#NET-GATE␣192.168.000.001<CR>`

NET-GATE?	Get gateway IP.
	
	ⓘ A network gateway connects the device via another network and maybe over the Internet. Be aware of security problems.
		COMMAND
		`#NET-GATE?␣<CR>`
		FEEDBACK
		`~nn@NET-GATE␣ip_address<CR><LF>`
			ip_address – Format: xxx.xxx.xxx.xxx	Get the gateway IP address:
				`#NET-GATE?␣<CR>`

NET-MAC?	Get MAC address.
	ⓘ For backward compatibility, the **id** parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.
		COMMAND
		`#NET-MAC?␣id<CR>`
		FEEDBACK
		`~nn@NET-MAC␣id,mac_address<CR><LF>`
			id – Network ID–the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3….
			mac_address – Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit
				`#NET-MAC?␣id<CR>`

NET-MASK	Set subnet mask.
	ⓘ For proper settings consult your network administrator.
		COMMAND
		`#NET-MASK␣net_mask<CR>`
		FEEDBACK
		`~nn@NET-MASK␣net_mask<CR><LF>`
			net_mask – Format: xxx.xxx.xxx.xxx	Set the subnet mask to 255.255.0.0:
				`#NET-MASK␣255.255.000.000<CR>`

NET-MASK?	Get subnet mask.	**COMMAND**
		`#NET-MASK?␣<CR>`
		FEEDBACK
		`~nn@NET-MASK␣net_mask<CR><LF>`
			net_mask – Format: xxx.xxx.xxx.xxx	Get the subnet mask:
				`#NET-MASK?<CR>`

PRIO	Set input priority.
	
	ⓘ The PRIO max value may vary for different devices.
		COMMAND
		`#PRIO␣input_id,prio<CR>`
		FEEDBACK
		`~nn@PRIO␣input_id,prio<CR><LF>`
			input_id – Window number setting new source
			prio – Assigned priority (1…max priority)
				Set input priority
				`#PRIO␣1,4<CR>`

PRIO?	Get input priority.
	
	ⓘ The PRIO max value may vary for different devices.
		COMMAND
		`#PRIO?␣input_id<CR>`
		FEEDBACK
		`~nn@PRIO␣input_id,prio<CR><LF>`
			input_id – Window number setting new source
			prio – Assigned priority (1…max priority)
				Get input 1 priority
				`#PRIO?␣1<CR>`

Function	Description	Syntax	Parameters/Attributes	Example

`PROG-ACTION`	Set Step-In button action bitmap.
	
	ⓘ Programs matrix action as a response for external event (programmable button pressed).
		COMMAND
		`#PROG-ACTION␣type,<direction_type>.<port_type>.<port_index>,button_id,actions_bitmap<CR>`
		FEEDBACK
		`~nn@PROG-ACTION␣port_type,<direction_type>.<port_type>.<port_index>,button_id,actions_bitmap<CR><LF>`
			`port_type` – Input/Output
			0 – Input
			1 – Output
			`port_id` – The following attributes comprise the port ID:
			▪ `<direction_type>` –
			  ○ IN
			  ○ OUT
			  ○ BOTH
			▪ `<port_type>` –
			  ○ HDMI
			  ○ HDBT
			  ○ ANALOG_AUDIO
			  ○ AMPLIFIED_AUDIO
			  ○ TOS
			  ○ SPDIF
			  ○ MIC
			  ○ RS-232
			  ○ IR
			  ○ USB_A
			  ○ USB_B
			▪ `<port_index>` – The port number as printed on the front or rear panel
			`button_id` – External programmable button ID
			`actions_bitmap` – Bitmap representing actions to perform after receiving button_id. format: XXXX…X, where X is a hex digit. The binary form of every hex digit represents actions from the table
			0 – Echo to controller
			1 – Step-in out 1
			2 – Step-in out 2
			… – …
			N – Step-in out N
			Setting '1' says that the corresponding action must be executed.
				Set step-in button actions on input 3:
				`#PROG-ACTION␣0,3,1,0x07<CR>`

`PROG-ACTION?`	Get step-in button action bitmap.
	
	ⓘ Programs matrix action as a response for external event (programmable button pressed).
		COMMAND
		`#PROG-ACTION?␣port_type,<direction_type>.<port_type>.<port_index>,button_id<CR>`
		FEEDBACK
		`~nn@PROG-ACTION␣port_type,<direction_type>.<port_type>.<port_index>,button_id,actions_bitmap<CR><LF>`
			`port_type` – Input/Output
			0 – Input
			1 – Output
			`port_id` – The following attributes comprise the port ID:
			▪ `<direction_type>` –
			  ○ IN
			  ○ OUT
			  ○ BOTH
			▪ `<port_type>` –
			  ○ HDMI
			  ○ HDBT
			  ○ ANALOG_AUDIO
			  ○ AMPLIFIED_AUDIO
			  ○ TOS
			  ○ SPDIF
			  ○ MIC
			  ○ RS-232
			  ○ IR
			  ○ USB_A
			  ○ USB_B
			▪ `<port_index>` – The port number as printed on the front or rear panel
			`button_id` – External programmable button ID
			`actions_bitmap` – Bitmap representing actions to perform after receiving button_id. format: XXXX…X, where X is a hex digit. The binary form of every hex digit represents actions from the table
			0 – Do nothing
			1 – Step-in out 1
			2 – Step-in out 2
			… – …
			128 – Step-in out 128
			129 – Echo to controller
			Setting '1' says that the corresponding action must be executed
				Get step-in button action bitmap:
				`#PROG-ACTION?␣0,3,1,0x07<CR>`

`PROT-VER?`	Get device protocol version.	**COMMAND**
		`#PROT-VER?␣<CR>`
		FEEDBACK
		`~nn@PROT-VER␣3000:version<CR><LF>`
			`version` – XX.XX where X is a decimal digit	Get the device protocol version:
				`#PROT-VER?␣<CR>`

`RESET`	Reset device.
	
	ⓘ To avoid locking the port due to a USB bug in Windows, disconnect USB connections immediately after running this command. If the port was locked, disconnect and reconnect the cable to reopen the port.
		COMMAND
		`#RESET<CR>`
		FEEDBACK
		`~nn@RESET␣OK<CR><LF>`
				Reset the device:
				`#RESET<CR>`

Function	Description	Syntax	Parameters/Attributes	Example

ROUTE	Set layer routing.
	
	ⓘ This command replaces all other routing commands.
		COMMAND
		`#ROUTE_layer,dest,src<CR>`
		FEEDBACK
		`~nn@ROUTE_layer,dest,src<CR><LF>`
			layer Layer Enumeration
			1 – Video
			dest
			1 – OUT 1 HDMI
			2 – OUT 2 HDBT
			3 – OUT 3 HDBT
			4 – OUT 4 HDBT
			5 – OUT 5 HDBT
			6 – OUT 6 HDBT
			7 – OUT 7 HDBT
			8 – OUT 8 HDBT
			9 – OUT 9 HDBT
			* – ALL
			x – disconnect
			src – Source id
			1 – IN 1 HDMI
			2 – IN 2 HDBT
				Route video IN 2 HDBT to video OUT 8 HDBT:
				`#ROUTE_1,8,2<CR>`

ROUTE?	Get layer routing.
	
	ⓘ This command replaces all other routing commands.
		COMMAND
		`#ROUTE?_layer,dest<CR>`
		FEEDBACK
		`~nn@ROUTE_layer,dest,src<CR><LF>`
			layer Layer Enumeration
			1 – Video
			Dest
			1 – OUT 1 HDMI
			2 – OUT 2 HDBT
			3 – OUT 3 HDBT
			4 – OUT 4 HDBT
			5 – OUT 5 HDBT
			6 – OUT 6 HDBT
			7 – OUT 7 HDBT
			8 – OUT 8 HDBT
			9 – OUT 9 HDBT
			* – ALL
			x – disconnect
			src – Source id
			1 – IN 1 HDMI
			2 – IN 2 HDBT
				Get the layer routing:
				`#ROUTE?_ layer,dest<CR>`

SIGNAL?	Get input signal status.	**COMMAND**
		`#SIGNAL?_inp_id<CR>`
		FEEDBACK
		`~nn@SIGNAL_inp_id,status<CR><LF>`
			inp_id – Input number
			1 – IN 1 HDMI
			2 – IN 2 HDBT
			status – Signal status according to signal validation:
			0 – Off
			1 – On
				Get the input signal lock status of IN 1:
				`#SIGNAL?_1<CR>`

SN?	Get device serial number.	COMMAND
		`#SN?_<CjR>`
		FEEDBACK
		`~nn@SN_serial_number<CR><LF>`
			serial_number – 14 decimal digits, factory assigned	Get the device serial number:
				`#SN?_<CR>`

VERSION?	Get firmware version number.	**COMMAND**
		`#VERSION?_<CR>`
		FEEDBACK
		`~nn@VERSION_firmware_version<CR><LF>`
			firmware_version – XX.XX.XXXX where the digit groups are: major.minor.build version	Get the device firmware version number:
				`#VERSION?_<CR>`

VID	LEGACY COMMAND. Set video switch state.
	
	ⓘ The GET command identifies input switching on Step-in clients.
	
	The SET command is for remote input switching on Step-in clients (essentially via by the Web).
	
	This is a legacy command. New Step-in modules support the ROUTE command.
		COMMAND
		`#VID_in>out<CR>`
		FEEDBACK
		`~nn@VID_in>out<CR><LF>`
			in – Input number or '0' to disconnect output
			> – Connection character between in and out parameters
			out – Output number or '*' for all outputs
				Switch IN 1 to OUT 3:
				`#VID_1>3<CR>`

VID?	LEGACY COMMAND. Get video switch state.
	
	ⓘ The GET command identifies input switching on Step-in clients.
	
	The SET command is for remote input switching on Step-in clients (essentially via by the Web).
	
	This is a legacy command. New Step-in modules support the ROUTE command.
		COMMAND
		`#VID?_out<CR>`
		FEEDBACK
		`~nn@VID_in>out<CR><LF>`
			in – Input number or '0' to disconnect output
			> – Connection character between in and out parameters
			out – Output number or '*' for all outputs
				Get video switch state:
				`#VID?_2<CR>`

VID-PATTERN	Set test pattern on output.	**COMMAND**
		`#VID-PATTERN_output_id,pattern_id<CR>`
		FEEDBACK
		`~nn@VID-PATTERN_output_id,pattern_id<CR><LF>`
			output_id – 1 to number of system outputs
			pattern_id – 1 to number of system patterns
				Switch PATTERN 1 to OUT 3:
				`#VID-PATTERN_3,1<CR>`

VID-PATTERN?	Get test pattern on output.	**COMMAND**
		`#VID-PATTERN?_output_id<CR>`
		FEEDBACK
		`~nn@VID-PATTERN_output_id,pattern_id<CR><LF>`
			output_id – 1 to number of system outputs
			pattern_id – 1 to number of system patterns
				Get test pattern on output:
				`#VID-PATTERN?_3<CR>`

Function	Description	Syntax	Parameters/Attributes	Example

VMUTE	Set enable/disable video on output.
	
	ⓘ Video mute parameter 2 (blank picture) is not supported.
		COMMAND
		#VMUTE␣output_id,flag**<CR>**
		FEEDBACK
		~nn@VMUTE␣output_id,flag**<CR><LF>**
			output_id – 1 to number of system outputs
			flag – Video Mute
			  0 – Video enabled
			  1 – Video disabled
			  2 – Blank picture
				Disable the video output on OUT 2:
				#VMUTE␣2,0<CR>

VMUTE?	Get video on output status.
	
	ⓘ Video mute parameter 2 (blank picture) is not supported.
		COMMAND
		#VMUTE?␣output_id␣**<CR>**
		FEEDBACK
		~nn@VMUTE␣output_id,flag**<CR><LF>**
			output_id – 1 to number of system outputs
			flag – Video Mute
			  0 – Video enabled
			  1 – Video disabled
			  2 – Blank picture
				Get video on output status:
				#VMUTE?␣2<CR>

Result and Error Codes

Syntax

In case of an error, the device responds with an error message. The error message syntax:

- **~NN@ERR XXX<CR><LF>** – when general error, no specific command
- **~NN@CMD ERR XXX<CR><LF>** – for specific command
- **NN** – machine number of device, default = 01
- **XXX** – error code

Error Codes

Error Name	Error Code	Description
P3K_NO_ERROR	0	No error
ERR_PROTOCOL_SYNTAX	1	Protocol syntax
ERR_COMMAND_NOT_AVAILABLE	2	Command not available
ERR_PARAMETER_OUT_OF_RANGE	3	Parameter out of range
ERR_UNAUTHORIZED_ACCESS	4	Unauthorized access
ERR_INTERNAL_FW_ERROR	5	Internal FW error
ERR_BUSY	6	Protocol busy
ERR_WRONG_CRC	7	Wrong CRC
ERR_TIMEDOUT	8	Timeout
ERR_RESERVED	9	(Reserved)
ERR_FW_NOT_ENOUGH_SPACE	10	Not enough space for data (firmware, FPGA…)
ERR_FS_NOT_ENOUGH_SPACE	11	Not enough space – file system
ERR_FS_FILE_NOT_EXISTS	12	File does not exist
ERR_FS_FILE_CANT_CREATED	13	File can't be created
ERR_FS_FILE_CANT_OPEN	14	File can't open
ERR_FEATURE_NOT_SUPPORTED	15	Feature is not supported
ERR_RESERVED_2	16	(Reserved)
ERR_RESERVED_3	17	(Reserved)
ERR_RESERVED_4	18	(Reserved)
ERR_RESERVED_5	19	(Reserved)
ERR_RESERVED_6	20	(Reserved)
ERR_PACKET_CRC	21	Packet CRC error
ERR_PACKET_MISSED	22	Packet number isn't expected (missing packet)
ERR_PACKET_SIZE	23	Packet size is wrong
ERR_RESERVED_7	24	(Reserved)
ERR_RESERVED_8	25	(Reserved)
ERR_RESERVED_9	26	(Reserved)
ERR_RESERVED_10	27	(Reserved)
ERR_RESERVED_11	28	(Reserved)
ERR_RESERVED_12	29	(Reserved)
ERR_EDID_CORRUPTED	30	EDID corrupted
ERR_NON_LISTED	31	Device specific errors
ERR_SAME_CRC	32	File has the same CRC – no changed
ERR_WRONG_MODE	33	Wrong operation mode
ERR_NOT_CONFIGURED	34	Device/chip was not initialized

The warranty obligations of Kramer Electronics Inc. ("Kramer Electronics") for this product are limited to the terms set forth below:

What is Covered

This limited warranty covers defects in materials and workmanship in this product.

What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product.

Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

How Long this Coverage Lasts

The standard limited warranty for Kramer products is seven (7) years from the date of original purchase, with the following exceptions:

1. All Kramer VIA hardware products are covered by a standard three (3) year warranty for the VIA hardware and a standard three (3) year warranty for firmware and software updates; all Kramer VIA accessories, adapters, tags, and dongles are covered by a standard one (1) year warranty.

2. Kramer fiber optic cables, adapter-size fiber optic extenders, pluggable optical modules, active cables, cable retractors, ring mounted adapters, portable power chargers, Kramer speakers, and Kramer touch panels are covered by a standard one (1) year warranty. Kramer 7-inch touch panels purchased on or after April 1st, 2020 are covered by a standard two (2) year warranty.

3. All Kramer Calibre products, all Kramer Minicom digital signage products, all HighSecLabs products, all streaming, and all wireless products are covered by a standard three (3) year warranty.

4. All Sierra Video MultiViewers are covered by a standard five (5) year warranty.

5. Sierra switchers & control panels are covered by a standard seven (7) year warranty (excluding power supplies and fans that are covered for three (3) years).

6. K-Touch software is covered by a standard one (1) year warranty for software updates.

7. All Kramer passive cables are covered by a lifetime warranty.

Who is Covered

Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

What Kramer Electronics Will Do

Kramer Electronics will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.

2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product. If a direct or similar replacement product is supplied, the original product's end warranty date remains unchanged and is transferred to the replacement product.

3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

What Kramer Electronics Will Not Do Under This Limited Warranty

If this product is returned to Kramer Electronics or the authorized dealer from which it was purchased or any other party authorized to repair Kramer Electronics products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. Kramer Electronics will not be responsible for any costs related to the removal or re-installation of this product from or into any installation. Kramer Electronics will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

How to Obtain a Remedy Under This Limited Warranty

To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, visit our web site at www.kramerav.com or contact the Kramer Electronics office nearest you.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required (RMA number). You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

If it is decided that this product should be returned directly to Kramer Electronics, this product should be properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization number will be refused.

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This limited warranty is void if (i) the label bearing the serial number of this product has been removed or defaced, (ii) the product is not distributed by Kramer Electronics or (iii) this product is not purchased from an authorized Kramer Electronics reseller. If you are unsure whether a reseller is an authorized Kramer Electronics reseller, visit our web site at www.kramerav.com or contact a Kramer Electronics office from the list at the end of this document.

Your rights under this limited warranty are not diminished if you do not complete and return the product registration form or complete and submit the online product registration form. Kramer Electronics thanks you for purchasing a Kramer Electronics product. We hope it will give you years of satisfaction.

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⚠ SAFETY WARNING
Disconnect the unit from the power supply before opening and servicing

For the latest information on our products and a list of Kramer distributors, visit our Web site where updates to this user manual may be found.

We welcome your questions, comments, and feedback.

www.KramerAV.com
info@KramerAV.com