

## USER MANUAL

### MODEL:

VS-88H2, VS-66H2, VS-84H2, VS-48H2  
Matrix Switcher



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# 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 the video, audio, presentation, and broadcasting professional 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-88H2](http://www.kramerav.com/downloads/VS-88H2) 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-88H2** away from moisture, excessive sunlight and dust.



### 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 is 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](http://www.kramerav.com/support/recycling).

## Overview

Congratulations on purchasing your Kramer **Matrix Switcher**. This User Manual describes the following four devices: **VS-88H2**, **VS-66H2**, **VS-84H2** and **VS-48H2**.



The devices described in this user manual are generally referred to as **VS-88H2** or **Matrix Switcher**. A device is named specifically only when a device-specific feature is described.

The **Matrix Switcher** is a high-quality switcher for 4K@60Hz (4:4:4) HDMI™ signals and embedded audio. It reclocks and equalizes the signals and can route any one of the selectable HDMI, HDCP-compliant sources to any or all outputs simultaneously.

The **Matrix Switcher** offers a flexible audio scheme where any HDMI digital audio input can be routed to any HDMI digital audio output. In addition, an ARC matrix is supported to produce AV matrices, as defined in the table below:

| Device Name | HDMI Video Matrix | HDMI Embedded Audio Matrix (D-Audio Matrix) | ARC Audio                  |                            |        |
|-------------|-------------------|---|----------------------------|----------------------------|--------|
|             |                   |   | ARC In (on HDMI OUT Ports) | ARC Out (on HDMI IN ports) | Matrix |
| VS-88H2     | 8x8               | 8x8   | 8                          | 8                          | 8x8    |
| VS-66H2     | 6x6               | 6x6   | 6                          | 6                          | 6x6    |
| VS-84H2     | 8x4               | 8x4   | 4                          | 8                          | 8x4    |
| VS-48H2     | 4x8               | 4x8   | 8                          | 4                          | 4x8    |

The **Matrix Switcher** provides exceptional quality, advanced and user-friendly operation, and flexible control.

## Exceptional Quality

- Max. data rate – 18Gbps data rate (6Gbps per graphics channel).
- Max. resolution – Up to 4K@60Hz (4:4:4).
- Step-in over HDMI technology.
- HDMI, HDCP and DVI compliance.
- HDMI support – Deep color, 3D, ARC, up to 7.1 uncompressed audio channels.
- Kramer reKlocking™ and equalization technology – rebuilds the digital signal to travel longer distances.

## Advanced and User-friendly Operation

- Automatic input selection – Based on priority selection or last connected input.
- Embedded pattern generator (480p) – With selectable patterns.
- Selectable HDCP per input.
- Memory locations – Up to 16 definable presets for quick access to common configurations.
- Advanced EDID management per input.
- Active source and acceptor detection.
- Easy front-panel operation.
- Selectable switching speed.
- Lock button to prevent tampering.
- Kramer protocol 3000 support.
- Firmware upgrade via mini USB, Ethernet or the RS-232 port.
- Control Options – RS-232 serial commands transmitted by a PC, touch screen system or other serial controller, Ethernet port via LAN.
- 7-segment display, indicating the video and audio status and other functions.
- Audio breakaway and AFV (audio-follow-video) operation support.
- Efficient power-saving features.
- Includes non-volatile memory that retains the last settings, after switching the power off and then on again.

## Flexible Connectivity

- HDMI signal switching.
- Independent Audio Routing – Any embedded digital audio input can be routed to any digital output, in addition to ARC sources.
- Optional ARC from HDMI outputs to all HDMI inputs.
- Housed in a 19" 1U rack mountable enclosure, with rack ears included, and is fed from a 100-240 VAC universal switching power supply.

## Typical Applications

The **Matrix Switcher** is ideal for the following typical applications:

- Control rooms with multiple displays.
- Presentation and multimedia applications.
- Systems that require automatic HDMI routing.

## Controlling your VS-88H2

Control your **Matrix Switcher** directly via the front panel push buttons, or:

- By RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller.
- Via the Ethernet using built-in user-friendly web pages.

# Defining the Matrix Switcher

This section defines the VS-88H2, VS-66H2, VS-84H2 and VS-48H2 front panel.

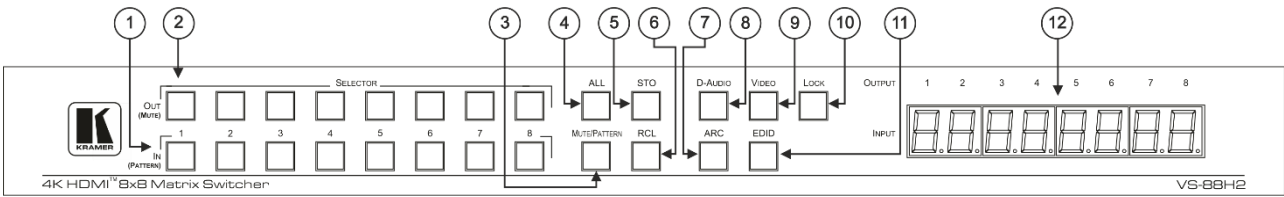


Figure 1: VS-88H2 8x8 H2 Matrix Switcher Front Panel

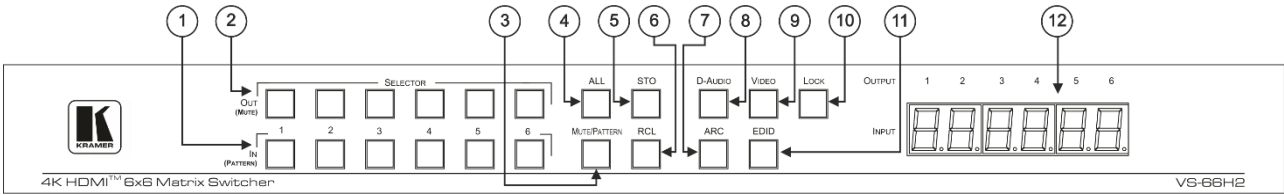


Figure 2: VS-66H2 6x6 Matrix Switcher Front Panel

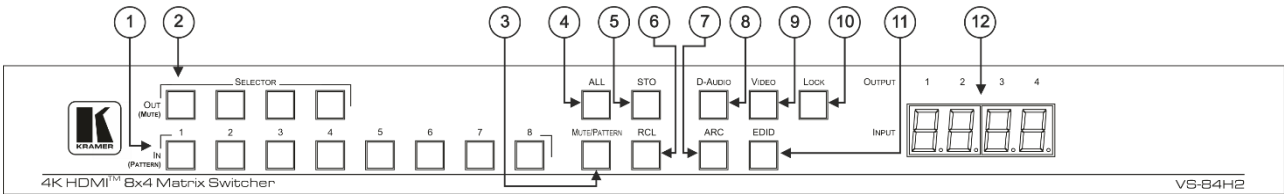


Figure 3: VS-84H2 8x4 Matrix Switcher Front Panel

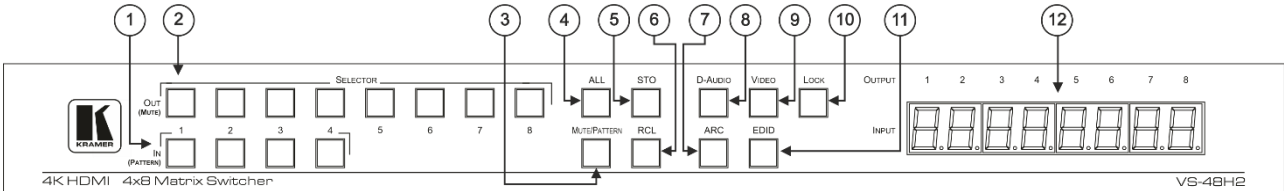


Figure 4: VS-48H2 4x8 Matrix Switcher Front Panel



The behavior of the front panel buttons and the 7-segment display changes along with the operation modes. For further details see [Operating VS-88H2 via Front Panel Buttons](#) on page 13.

| # | Feature                            | Function  |
|---|------------------------------------|---|
| ① | IN (PATTERN) SELECTOR Buttons      | Press to select the input to switch to the output that was previously selected (also used for storing machine setups in the STO-RCL modes and for selecting a pattern in the Pattern mode).<br>In the ARC mode, all inputs can operate as audio outputs (see <a href="#">Operating in ARC Mode</a> on page 17). |
| ② | OUT (MUTE) SELECTOR Buttons        | Press to select an output to which the input is routed. Also used for storing machine presets.<br>In the ARC mode, each output can operate as an audio input (see <a href="#">Operating in ARC Mode</a> on page 17).  |
| ③ | MUTE/PATTERN Button                | Press to view the current pattern status and select the output/s to which a pattern is routed.<br>Press to mute audio or video on a selected output when D-AUDIO and/or VIDEO buttons are pressed (lit).  |
| ④ | ALL Button                         | Press to perform an action on all outputs (for example, setting Mute mode, Pattern mode and so on).<br>For switching, press ALL and then a specific IN button to route the selected input to all outputs. For example, press ALL and then IN 2 to route input 2 to all the outputs.                             |
| ⑤ | STO Buttons                        | Press STO to store the current switching setting to a preset button.  |
| ⑥ | RCL Buttons                        | Press RCL to recall the switching setting from a preset button.   |
| ⑦ | ARC Button                         | Press to set ARC mode on the inputs (see <a href="#">Operating in ARC Mode</a> on page 17).   |
| ⑧ | D-AUDIO Button                     | Press to enable digital audio routing. When pressed together with VIDEO, the digital audio is routed together with the video signal.  |
| ⑨ | VIDEO Button                       | Press to select video inputs. When pressed together with D-AUDIO, video is switched together with audio.  |
| ⑩ | LOCK Button                        | Press and hold (for about 3 seconds) to toggle locking/releasing of the front panel buttons.<br>Press to save the following setups: HDCP (On/Off), ARC, Fast Switch and Switch mode.  |
| ⑪ | EDID Button                        | Press to capture the EDID.  |
| ⑫ | OUTPUT/INPUT 7-segment LED Display | Displays the selected inputs switched to the outputs (marked above each input).   |



This section defines the **VS-88H2**, **VS-66H2**, **VS-84H2** and **VS-48H2** back panel.

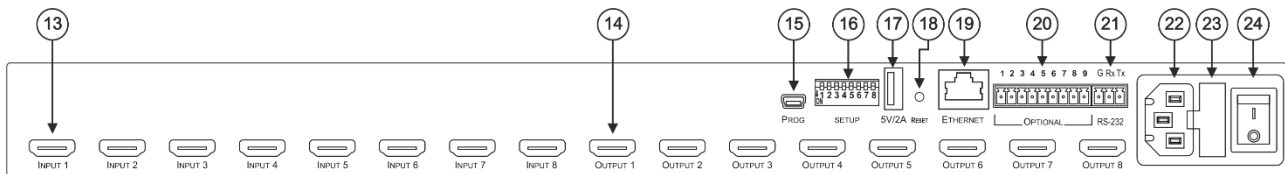


Figure 5: VS-88H2 8x8 H2 Matrix Switcher Rear Panel

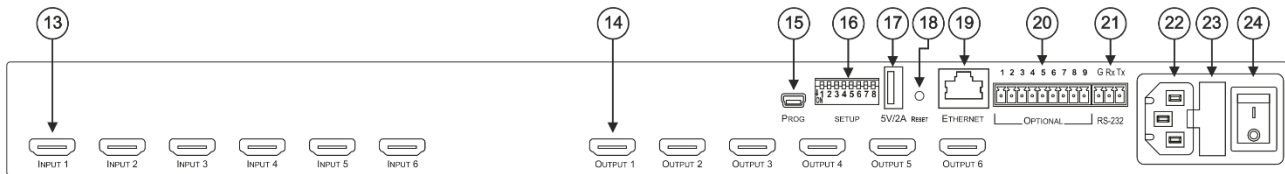


Figure 6: VS-66H2 6x6 Matrix Switcher Rear Panel

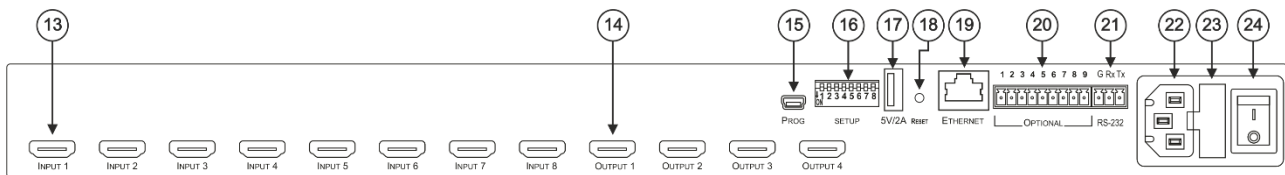


Figure 7: VS-84H2 8x4 Matrix Switcher Rear Panel

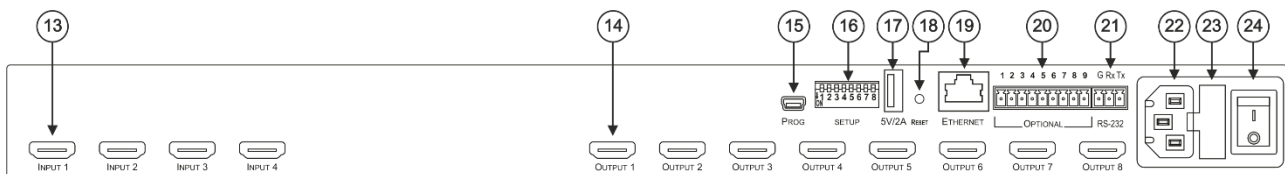


Figure 8: VS-48H2 4x8 Matrix Switcher Rear Panel

| #  | Feature                                | Function   |
|----|--|--|
| 13 | INPUT HDMI Connectors                  | Connect to the HDMI sources.   |
| 14 | OUTPUT HDMI Connectors                 | Connect to HDMI acceptors.   |
| 15 | PROG Mini USB Port                     | Use for firmware upgrade or communication (connecting to a PC or a serial controller).   |
| 16 | SETUP DIP-Switches                     | N/A  |
| 17 | 5V/2A USB Port                         | Use to charge a device.  |
| 18 | Reset Button                           | Press and hold while powering the device to reset IP settings to factory default values. |
| 19 | ETHERNET RJ-45 Port                    | Connect to your LAN.   |
| 20 | OPTIONAL Terminal Block Connectors     | N/A  |
| 21 | RS-232 3-pin Terminal Block Connectors | Connect to a PC or a serial controller.  |
| 22 | Mains Power Connector                  | Connect to the mains power.  |
| 23 | Mains Power Fuse                       | Fuse for protecting the device.  |
| 24 | Mains Power Switch                     | Switch for turning the device on or off.   |

# Mounting VS-88H2

This section provides instructions for mounting **VS-88H2**. 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-88H2** must be placed upright in the correct horizontal position.

**Caution:**

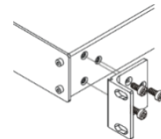
- Mount **VS-88H2** before connecting any cables or power.

**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.




**Mount VS-88H2 in a rack:**

- Attach both rack ears by removing the screws from each side of the machine and replacing those screws through the rack ears.







For more information go to [www.kramerav.com/downloads/VS-88H2](http://www.kramerav.com/downloads/VS-88H2).

# Connecting VS-88H2

-  Although this user manual describes the **VS-88H2** only, it applies also to **VS-66H2**, **VS-84H2** and **VS-48H2** except for the number of inputs and outputs per device.
-  Always switch off the power to each device before connecting it to your **VS-88H2**. After connecting your **VS-88H2**, connect its power and then switch on the power to each device.
-  Although this connecting example shows only several inputs and outputs that are connected, you can connect all the inputs and outputs simultaneously.

To connect the VS-88H2 as illustrated in the example in Figure 9, do the following:

1. Connect up to eight video sources to the INPUT HDMI Connector  (from INPUT1 to INPUT 8). For example, connect:
    - Laptops to INPUT 1, 3, 4 and 8 HDMI connectors.
    - Blu-ray players to the INPUT 2 and INPUT 6 HDMI connectors.
  2. Connect the eight video OUTPUT HDMI Connectors  (from OUTPUT 1 to OUTPUT 8) to up to eight acceptors. For example, connect:
    - OUTPUT 1, 6 and 8 connectors to projectors.
    - OUTPUT 2, 4, 5 and 7 connectors to OLED displays.
  3. Connect the power cord.
- We recommend that you use only the power cord that is supplied with this machine.
4. If required, connect:
    - The 5V/2A USB Port  to the USB port of another device to charge it.
    - The ETHERNET RJ-45 Port  to a control device.

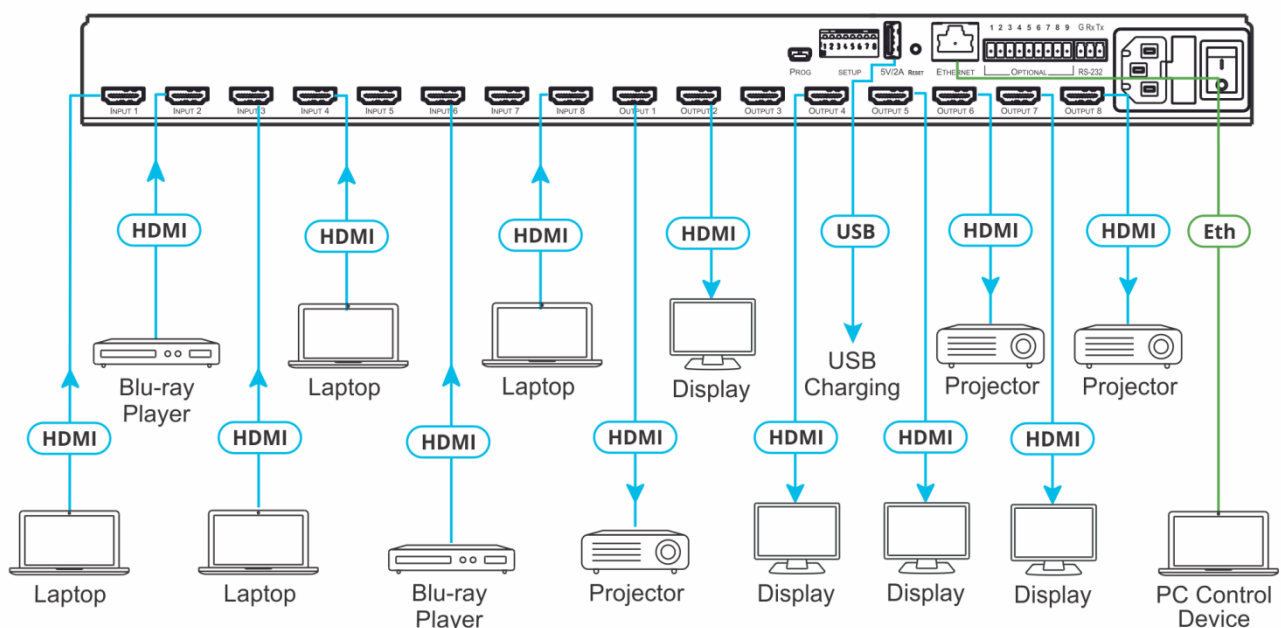


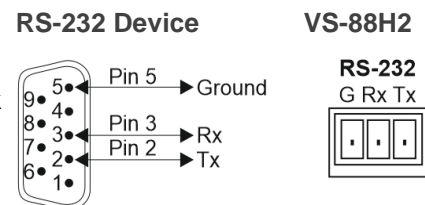
Figure 9: Connecting to the VS-88H2 Rear Panel

## Connecting to VS-88H2 via RS-232

You can connect to the **VS-88H2** via an RS-232 3-pin Terminal Block Connector (21) using, for example, a PC.

To connect to the **VS-88H2** via RS-232:

- Connect the RS-232 rear panel port on the **VS-88H2** unit via a 9-wire straight cable (only Tx to pin 2, Rx to pin 3, and G to pin 5 need to be connected) to the RS-232 9-pin D-sub port on your PC.
- Pin 2 to the TX pin on the **VS-88H2** RS-232 terminal block
- Pin 3 to the RX pin on the **VS-88H2** RS-232 terminal block
- Pin 5 to the G pin on the **VS-88H2** RS-232 terminal block



## Connecting VS-88H2 via the ETHERNET Port

You can connect to the **VS-88H2** 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 10).
- 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 12).



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-88H2** 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-88H2** with the factory configured default IP address.

After connecting the **VS-88H2** to the Ethernet port, configure your PC as follows: compatible

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 10](#).

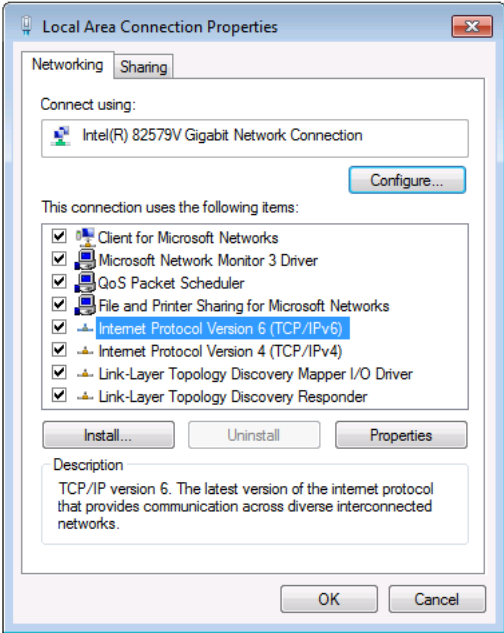


Figure 10: Local Area Connection Properties Window

- 4. Highlight either **Internet Protocol Version 6 (TCP/IPv6)** or **Internet Protocol Version 4 (TCP/IPv4)** depending on the requirements of your IT system.
- 5. Click **Properties**.

The Internet Protocol Properties window relevant to your IT system appears as shown in [Figure 11](#) or [Figure 12](#).

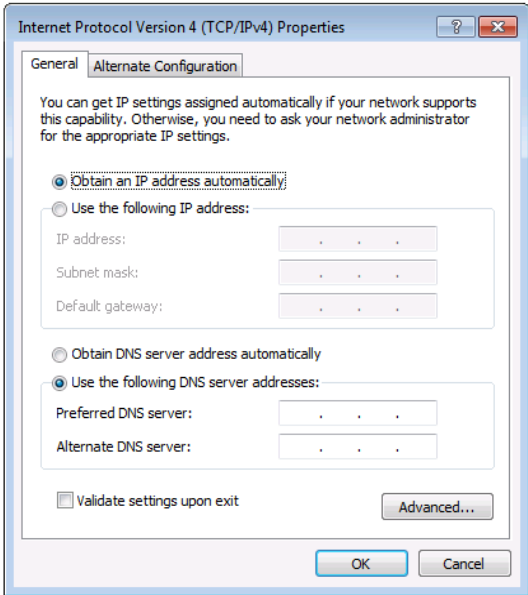


Figure 11: Internet Protocol Version 4 Properties Window

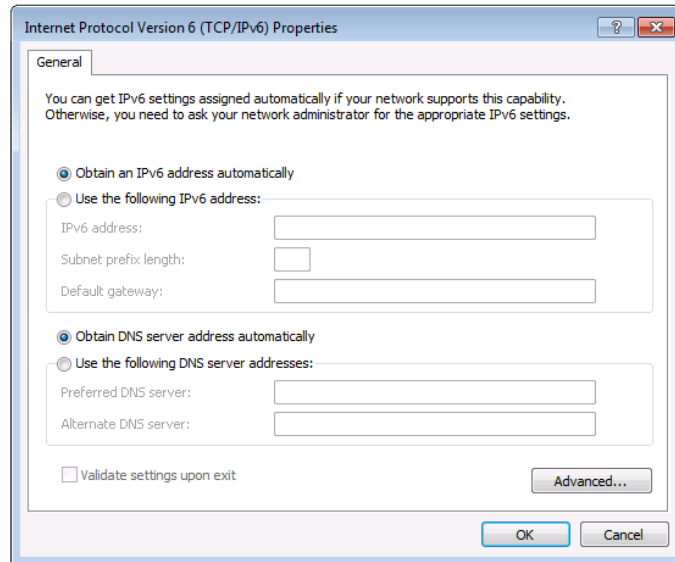


Figure 12: Internet Protocol Version 6 Properties Window

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in [Figure 13](#).

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.

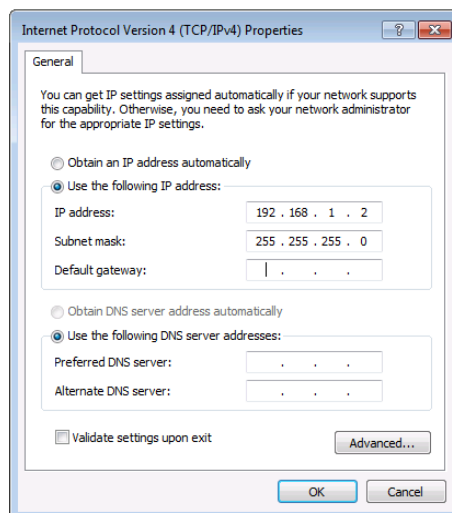


Figure 13: Internet Protocol Properties Window

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-88H2 to the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

## Control Configuration via the Ethernet Port

To control several units via Ethernet, connect the Master unit (Device 1) via the Ethernet port to the Ethernet port of your PC. Use your PC provide initial configuration of the settings (see [Connecting VS-88H2 via the ETHERNET Port](#) on page 10).

# Operating VS-88H2 via Front Panel Buttons

Press the Mains Power Switch (24) to power the device. During the 10-second initialization process, the:

- 7-segment LED Display (12) are on.
- All the front panel buttons illuminate.
- The FPGA/EPLD version (P), the firmware version (F) and the build version (b) appear in succession.

Following initialization, the front panel buttons and 7-segment display enter normal operation:

- The 7-segment display shows the video IN-OUT status.
- The current operation mode button illuminates (**VIDEO**, by default).
- An illuminated IN (PATTERN) SELECTOR Button (1) indicates an active signal connected to the input.
- An illuminated OUT (MUTE) SELECTOR Button (2) indicates that an acceptor is connected to the output.

The VS-88H2 front panel buttons enable performing the following functions:

- [Routing Signals](#) on page [14](#).
- [Storing and Recalling a Setup](#) on page [22](#).
- [Setting Switching Mode](#) on page [23](#).
- [Setting Switching Speed](#) on page [23](#).
- [Setting HDCP](#) on page [24](#).
- [Copying the EDID](#) on page [25](#).

## Routing Signals

You can switch the video and the embedded audio signals together (AFV), or switch them separately, via the following switching modes:

- [Switching Video and Audio Signal Simultaneously](#) on page [14](#).
- [Switching Video Signal](#) on page [15](#).
- [Routing an Audio Input to HDMI Output](#) on page [16](#).
- [Operating in ARC Mode](#) on page [17](#).
- [Muting/Unmuting an Output Audio Signal](#) on page [18](#).
- [Muting/Unmuting an Output Video Signal](#) on page [18](#).
- [Routing a Pattern to an Output](#) on page [19](#).

### Switching Video and Audio Signal Simultaneously

You can select the digital audio signal to switch to the output together with the video signal.

**To switch the audio and video signals together to an output:**

1. Press **D-AUDIO** and **VIDEO** simultaneously.

The button illuminates and the 7-segment LED Display [12](#) shows the current IN-OUT video status.

2. Press an OUT (MUTE) SELECTOR Button [2](#) (1 to 8).

The 7-segment display LED, under the selected output, flashes.



Press the **ALL** Button [4](#) (instead of an output button) to route the selected input to all the outputs. All the 7-segment display LEDs flash.

3. Press an IN (PATTERN) SELECTOR Button [1](#) (1 to 8). The selected video and audio input is switched to the selected output (or to all the outputs if **ALL** was pressed instead) and the 7-segment display shows the current status.



## Switching Video Signal

The **VIDEO** button on the **VS-88H2** front panel enables video routing.

### To switch a video input to an output:

1. Press the **VIDEO** Button (9).

The button illuminates and the 7-segment LED Display (12) shows the current IN-OUT video status.



On the front panel buttons:

- An illuminated input button means that an active signal is detected on that input.
- An illuminated output button means that a display is connected to that output.
- A flashing output button means that a non-HDCP display is connected to that output.

Note that in case an HDCP-encrypted input is routed through the matrix to a non-HDCP screen, the video is not be presented and the non-HDCP screen turns black.

On the 7-segment display:

- A digit (from 1 to 8) shows the input number that is currently routed to the output.
- “P” under an output number indicates that a pattern is routed to that output.
- “0” under an output number indicates that the output is muted.

2. Press an OUT (MUTE) SELECTOR Button (2) (1 to 8).

The 7-segment LED Display (12), under the selected output, flashes.



Press the **ALL** Button (4) (instead of an output button) to route the selected input to all the outputs. All the 7-segment display LEDs flash.

3. Press an IN (PATTERN) SELECTOR Button (1) (1 to 8).

The selected input is switched to the selected output (or to all the outputs if **ALL** was pressed instead) and the 7-segment display shows the current status.

## Routing an Audio Input to HDMI Output

The D-AUDIO Button (8) button on the VS-88H2 front panel enables to route the HDMI embedded audio input signals (13) to the HDMI outputs (14).

Generally, digital audio routing is enabled by pressing **D-AUDIO**. When the button is illuminated, the embedded audio on the HDMI input is the selected audio source.

### To switch an HDMI audio input to an output:

1. Press **D-AUDIO** (8).

The button illuminates (HDMI audio input to HDMI output mode) and the 7-segment LED Display (12) shows the current IN-OUT digital audio status.



On the front panel buttons:

- An illuminated input button means that an active digital audio signal is detected on that input that supports LPCM audio.
- A dark input button means that there is no active digital audio source on that input (or that the source is DVI).
- A flashing input button means that a Dolby digital audio, Dolby-TrueHD audio, or AC-3 audio signal from a DVD player is detected on that input.
- An illuminated output button means that a display that supports LPCM audio is connected to that output.
- A dark button means either that the display that is connected does not support audio or that a display is not connected at all.
- A flashing output button means that a display is connected that supports LPCM, Dolby digital, AC-3 and NLPCM audio.

On the 7-segment display:

- "0" under an output number indicates that the audio output is muted.
- "." under an output number indicates that the HDMI output port is in ARC mode.
- Any digit shows the HDMI audio input switching state.


2. While **D-AUDIO** is on, select an output button (for example, 6) and then an input button (for example, 5). HDMI audio INPUT 5 is routed to HDMI audio OUTPUT 6 and on the 7-segment display, INPUT 5 appears under OUTPUT 6.

When switching you can also press:

- An output button (1 to 8) and then **OUT (MUTE)** (2) to mute the selected output (turns 0 on the 7-segment display).
- **ALL** (4) (instead of an output button) and then an input button to route the selected input to all the outputs.  
All the 7-segment display LEDs flash and then display the selected input.

## Operating in ARC Mode

In ARC mode you can route the audio signal of the connected output to an input that is connected to an audio system (for example, home theater receiver).

 Ensure that the acceptor on the output side has ARC capabilities (follow the manufacturer's instructions).

ARC (Audio Return Channel) can be set via the front panel buttons and the embedded webpages.

You can enable the input to accept the audio output signal, by ARC-enabling the outputs on the device via the embedded web pages (see [Switching Audio in Breakaway Mode](#) on page 38 for further reference). You can then route the audio output to the input either via the embedded web pages (see [Switching ARC to an Input](#) on page 39) or via the front panel buttons.

The following examples show how the output 6 ARC audio signal is routed to input 3, as illustrated in [Figure 14](#):

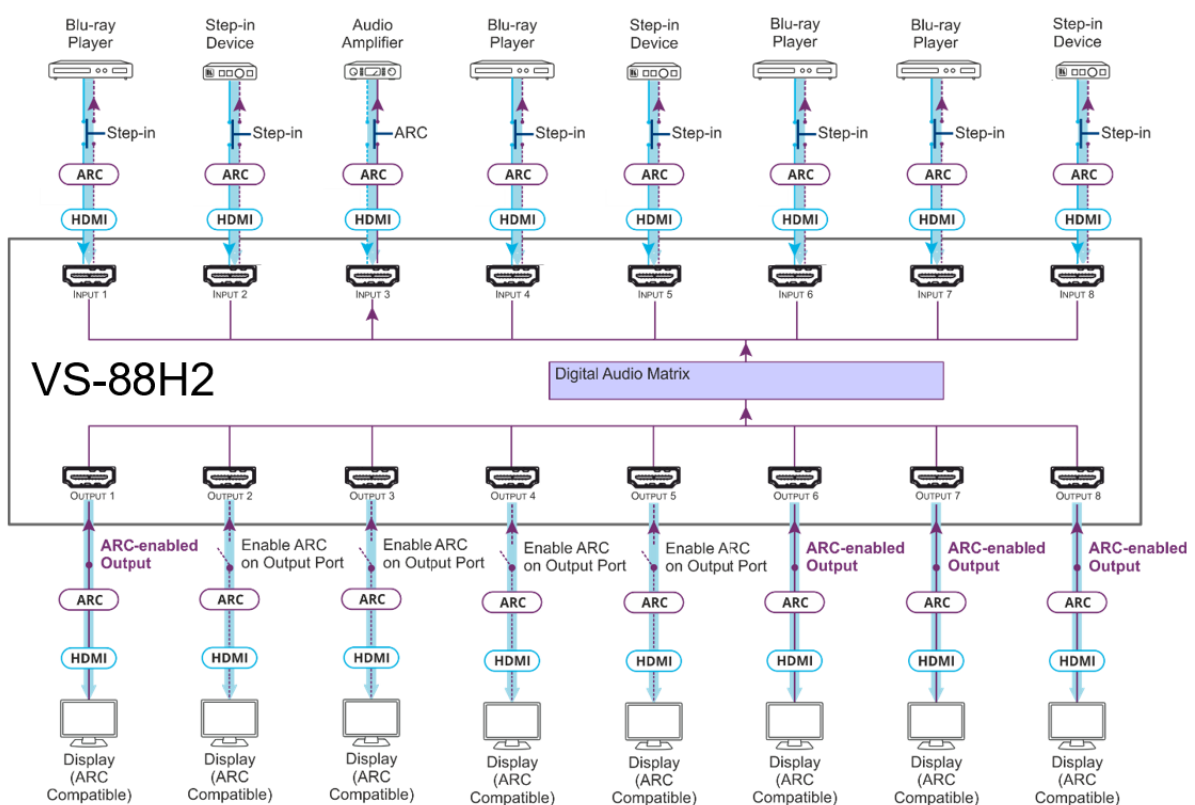



Figure 14: ARC Audio Routing Example

**To route the audio signal from the output to the input via the front panel buttons:**

1. Press the **ARC**  button.

The ARC button illuminates, and the device enters ARC mode.

 On the front panel, an ARC enabled input button:

- Flashes when that input is set to ARC mode.
- Illuminates when that button is not in ARC mode (and is set to Step-in mode).

2. Press a flashing **IN (PATTERN)** Button ① (for example, input 3)  
The corresponding 7-segment display LED flashes.
3. Press an illuminated **OUT (MUTE)** Button ② (for example, output 6).  
The flashing 7-segment display LED shows the selected input number and after selecting the HDMI audio OUT the port number appears (6).



On the 7-segment display:

- “.” under an output number (when in D-AUDIO mode) indicates that arc is enabled on the corresponding output (outputs 1 and 6 to 8 in this example).
- “0” under an output number indicates that the audio output is muted.

The HDMI OUT 6 ARC audio signal is routed to ARC input 3.



Exit ARC mode by pressing **D-AUDIO** ⑦ or **VIDEO** ⑧ buttons.

## Muting/Unmuting an Output Audio Signal

You can mute/unmute an audio signal and a video signal separately.

**To mute/unmute an audio signal:**

1. Press **D-AUDIO** ⑦.  
The D-AUDIO button illuminates.
2. Press an **OUT (MUTE)** ② button (1 to 8).



Press **ALL** ④ (instead of an output button) to mute/unmute all the outputs. All the 7-segment display LEDs flash.

3. Press **MUTE/PATTERN** ③.

The audio signal is muted/unmuted on the output. A muted output appears as “0” on the 7-segment display.

## Muting/Unmuting an Output Video Signal

**To mute/unmute a video signal:**

1. Press **VIDEO** ⑨.  
The button illuminates and the 7-segment LED Display ⑫ shows the current IN-OUT video status.
2. Press an **OUT (MUTE)** ② button (1 to 8).  
The 7-segment display LED, under the selected output, flashes.



Press **ALL** ④ (instead of an output button) to mute/unmute all the outputs. All the 7-segment display LEDs flash.

3. Press **MUTE/PATTERN** ③.

The audio signal is muted/unmuted on the output. A muted output appears as “0” on the 7-segment display.

## Routing a Pattern to an Output

The **Matrix Switcher** generates 6 embedded patterns. These patterns can be routed at a resolution of 480p to any of the outputs:

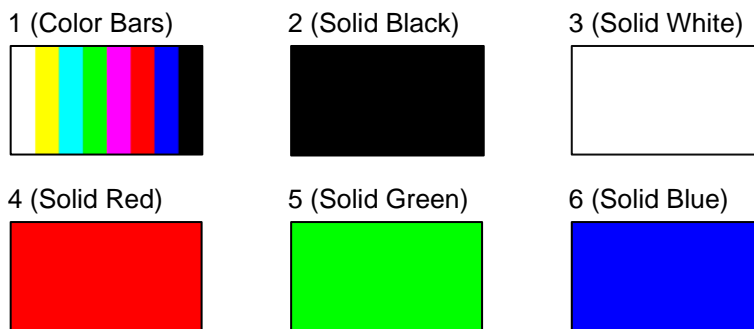


Figure 15: VS-88H2 and VS-84H2 Embedded Patterns



Once a pattern is selected, that same pattern is routed to all the selected outputs.

### VS-88H2 and VS-84H2

A pattern is selected by pressing inputs 1 to 6 when in the Pattern mode.

**To route a pattern on the VS-88H2 and VS-84H2:**

1. Press **MUTE/PATTERN** (3).



On the front panel buttons:

- An illuminated output button means that a display is connected on that output.
- An illuminated input button indicates the current pattern selected.

On the 7-segment display:

- “**P**” under an output number indicates that a pattern is routed to that output.
- “**-**” under an output number indicates that a video input is routed to that output.
- “**0**” under an output number indicates that the output is muted.

2. Press an **OUT (MUTE)** (2) button (1 to 8/4).

The 7-segment display LED, under the selected output, flashes.



Press **ALL** (4) (instead of an output button) to route a pattern to all the outputs. All the 7-segment display LEDs flash.

3. Press an input button to select a pattern (see [Figure 15](#)).

The 7-segment display shows the new pattern status.



Press **VIDEO** or **D-AUDIO** to exit pattern mode.

## VS-48H2

A pattern is selected by pressing inputs 1 to 4 when in the Pattern mode as follows:

- When **MUTE/PATTERN** (3) is illuminated, press IN1 for pattern 1, IN 2 for pattern 2, IN 3 for pattern 3 and IN 4 for pattern 4.
- When **MUTE/PATTERN** (3) flashes, press IN1 for pattern 5, IN 2 for pattern 6.

**To route a pattern on the VS-48H2:**

1. Press **MUTE/PATTERN** (3).
  - Once: button illuminates, press IN 1 to IN 4 to select patterns 1 to 4.
  - Twice: button flashes, press IN 1 to IN 4 to select patterns 5 to 6.



On the front panel buttons:

- An illuminated output button means that a display is connected on that output.
- An illuminated input button indicates the current pattern selected.

On the 7-segment display:

- “**P**” under an output number indicates that a pattern is routed to that output.
- “**-**” under an output number indicates that a video input is routed to that output.
- “**0**” under an output number indicates that the output is muted.

2. Press an **OUT (MUTE)** (1) button (1 to 8).

The 7-segment display LED, under the selected output, flashes.



Press **ALL** (4) (instead of an output button) to route a pattern to all the outputs. All the 7-segment display LEDs flash.

3. Press an input button to select a pattern (see [Figure 15](#)).

The 7-segment display shows the new pattern status.



Press **VIDEO** or **D-AUDIO** to exit pattern mode.

## VS-66H2

A pattern is selected by pressing inputs 1 to 6 when in the Pattern mode as follows:

- When **MUTE/PATTERN** (3) is illuminated, press IN1 for pattern 1, IN 2 for pattern 2, IN 3 for pattern 3, IN 4 for pattern 4, IN 5 for pattern 5 and IN 6 for pattern 6.

**To route a pattern on the VS-66H2:**

1. Press **MUTE/PATTERN** (3).
  - Once: button illuminates, press IN 1 to IN 6 to select patterns 1 to 6.



On the front panel buttons:

- An illuminated output button means that a display is connected on that output.
- An illuminated input button indicates the current pattern selected.

On the 7-segment display:

- “**P**” under an output number indicates that a pattern is routed to that output.
- “**-**” under an output number indicates that a video input is routed to that output.
- “**0**” under an output number indicates that the output is muted.

2. Press an **OUT (MUTE)** ② button (1 to 6).

The 7-segment display LED, under the selected output, flashes.



Press **ALL** ④ (instead of an output button) to route a pattern to all the outputs. All the 7-segment display LEDs flash.

3. Press an input button to select a pattern (see [Figure 15](#)).


The 7-segment display shows the new pattern status.



Press **VIDEO** or **D-AUDIO** to exit pattern mode.

## Storing and Recalling a Setup

The number of setups that the **Matrix Switcher** is the sum of the inputs and outputs of the device. For example, **VS-66H2**, **VS-84H2** and **VS-48H2** can store/recall up to 12 setups, while **VS-88H2** stores/recalls up to 16 setups.

 **VS-66H2**, **VS-84H2** and **VS-48H2** can store/recall up to 16 setups via the protocol commands (see [Protocol 3000 Commands](#) on page 64).

Each setup includes the video and audio current switching state, the EDID, the ARC/audio mode, and the switch mode and speed.

In Store-Recall mode, OUT 1 corresponds to setup 1, IN 1 corresponds to setup 9, and so on.

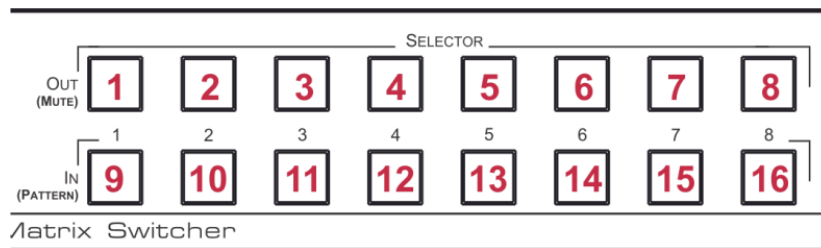



Figure 16: VS-88H2 8x8 H2 Matrix Switcher Front Panel

### To store a setup:


1. Press **STO** .
 

The STO button illuminates.
2. Press an **IN** or an **OUT** button (from 1 to 8).
 

The selected button flashes.
3. Press **STO**.
 


The current device state is stored to the selected setup and the STO button no longer illuminates.

### To recall a setup:

1. Press **RCL** .
 


The RCL button illuminates.
2. Press an **IN** or **OUT** button.
 

The selected button flashes.

 If a setup is stored in the selected setup button, the corresponding 7-segment display LED flashes. If nothing is stored the 7-segment LED is on.

3. Press **RCL**.
 

The recalled setup is applied and the RCL button no longer illuminates.

 If you do not press RCL within 15 seconds, the recall setup process times out.



## Setting Switching Mode

Set the following switching modes separately for each output:

- Manual mode (**IN 1**): inputs are switched to outputs via the front panel buttons.
- Priority mode (**IN 2**): the **VS-88H2** switches the source with the highest priority to the output.
- Last connected mode (**IN 3**): the last detected active source is switched to the output.

**To select the switching mode:**

1. Press **RCL** and **MUTE/PATTERN** simultaneously.  
Both buttons illuminate.
2. Press an output button (or press **ALL**).  
The corresponding 7-segment display LEDs flash and **LOCK** button flashes.
3. Press **IN 1**, **IN 2** or **IN 3**.
4. Press **LOCK**.  
The switching mode is set for the selected output.

## Setting Switching Speed

Set the following switching speed modes separately for each output:

- Extra-Fast switch speed (**IN 1**).
- Fast switch speed (**IN 2**).
- Normal switch speed (**IN 3**).

**To select the switching speed:**

1. Press **STO** and **MUTE/PATTERN** simultaneously.  
Both buttons illuminate and the 7-segment display LEDs show the current switch speed for each port.
2. Press an output button (or press **ALL**).  
The corresponding 7-segment display LEDs flash and **LOCK** button flashes.
3. Press **IN 1**, **IN 2** or **IN 3** and press **LOCK**.  
The selected switching speed is set.

## Setting HDCP

You can enable or disable HDCP for each of the HDMI inputs.

### To set HDCP on or off:

1. Press and hold **EDID** and **RCL**.

Both buttons illuminate and the IN buttons indicate the HDCP status:

- HDCP 1.4 enabled (on): IN button is illuminated.
- HDCP 2.2 enabled (on): IN button flashes.
- HDCP disabled (off): IN button is off.

2. Press one or more input buttons to change their status.

The **LOCK** button flashes.

3. Press **LOCK**.

The HDCP settings are saved.

## Copying the EDID

You can copy the EDID to an input from a connected output or use the default EDID.

### To copy the EDID from a connected output:

1. Press and hold **EDID** and **STO**.

Both buttons illuminate, **VS-88H2** enters the EDID mode, and the 7-segment display shows the current EDID status:



On the front panel button:

Both input and output buttons are dark.

On the 7-segment display:

“**d**” under an output number indicates that the input port is set to the default EDID.

“**L**” under an output number indicates that the EDID was uploaded externally from a file via web page.

A digit under an output number indicates the output from which the EDID was copied.

2. Press one or more input buttons (or **ALL**).

The 7-segment display LEDs of the selected inputs flash.

3. Press the output button (with a connected display) corresponding to the output from which you want to copy the EDID.

4. Press **EDID**.

Wait for about 5 seconds for the device to copy the EDID from the connected display.

### To copy the default EDID:

1. Press and hold **EDID** and **STO**.

Both buttons illuminate, **VS-88H2** enters the EDID mode, and the 7-segment display shows the current EDID status.

2. Press one or more input buttons (or **ALL**).

The 7-segment display LEDs of the selected inputs flash.

3. Press a disconnected output button.

4. Press **EDID**.

Wait for about 5 seconds for the device to copy the default EDID to the selected inputs.

# Firmware Upgrade

**You can upgrade the VS-88H2 via:**

- The Ethernet, using embedded web pages (see [Performing Firmware Upgrade](#) on page 41).
- By USB or RS-232 using Kramer **K-UPLOAD** tool.



The latest firmware version and the latest version of **K-UPLOAD** and installation instructions can be downloaded from the Kramer Web site at [www.kramerav.com/downloads/VS-88H2](http://www.kramerav.com/downloads/VS-88H2).

# Using Embedded Web Pages

The web pages let you control the **VS-88H2** via the Ethernet. The web pages include all the OSD items and more and are accessed using a Web browser and an Ethernet connection.

Before attempting to connect:

- Perform the procedures described in [Connecting VS-88H2 via the ETHERNET Port](#) on page [10](#).
- Ensure that your browser is supported.

The following operating systems and Web browsers are supported:

| OS      | Version | Browser |
|---------|---------|---------|
| Windows | 7       | Firefox |
|         |         | Chrome  |
|         |         | Safari  |
|         | 10      | Edge    |
|         |         | Firefox |
|         |         | Chrome  |
| Mac     | 10.11   | Safari  |
| iOS     | 10.3.2  | Safari  |

The **VS-88H2** web pages enable performing the following:

- [Switching and Setting Ports](#) on page [29](#).
- [Changing Device Settings and Upgrading Firmware](#) on page [40](#).
- [Managing Web Page Security](#) on page [42](#).
- [Managing Timeout](#) on page [46](#).
- [Setting Switching Modes](#) on page [48](#).
- [Setting Step-in Devices](#) on page [51](#).
- [Managing the EDID](#) on page [53](#).
- [Viewing About Page](#) on page [57](#).

To browse the **VS-88H2** web pages:

1. Open your Internet browser.
2. Type the IP address of the device in the address bar of your browser. For example, the default IP address:



The Authentication window appears (if set, security is enabled):

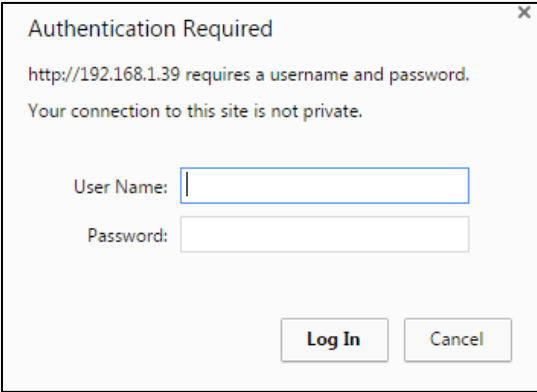


Figure 17: Using the Embedded Web Pages – the Authentication Window

- 3. Enter the **Username** and **Password** and click **OK**.

The Switching page appears:

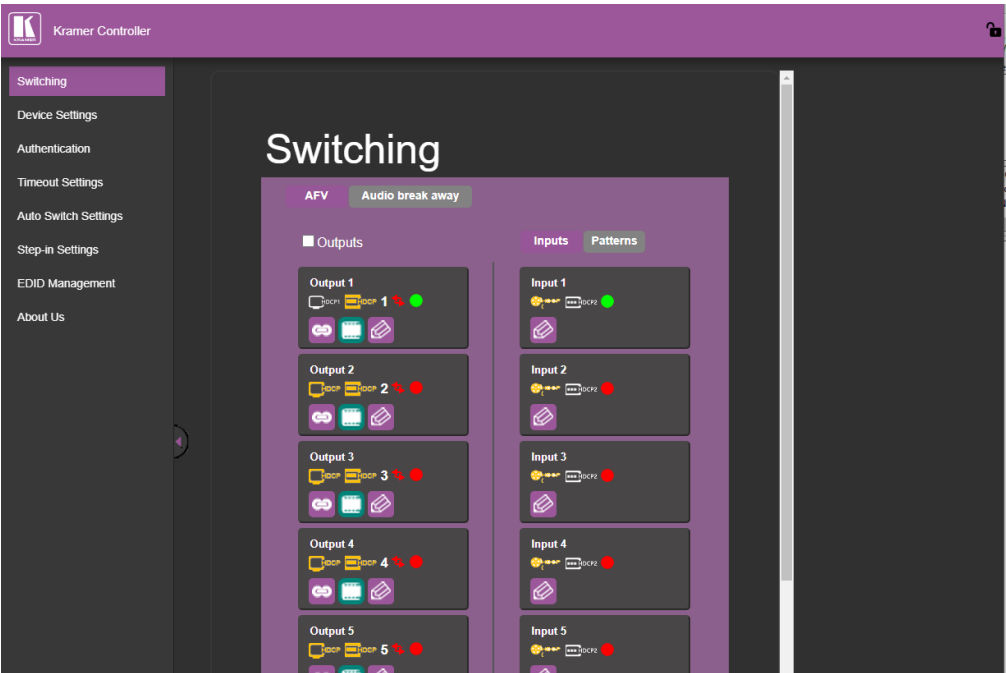


Figure 18: Switching Page with Navigation List on Left

- 4. Click the desired web page or click the  arrow to hide the navigation list.

## Switching and Setting Ports

The Switching web page enables performing the following functions:

- [Switching an Input to an Output](#) on page [29](#).
- [Changing Output or Input Button Label](#) on page [30](#).
- [Setting Output HDCP Status](#) on page [31](#).
- [Setting Input HDCP Status](#) on page [32](#).
- [Setting Switching Speed](#) on page [33](#).
- [Muting/Unmuting Video](#) on page [33](#).
- [Setting Audio Follow Video \(AFV\)/Audio Breakaway Mode](#) on page [34](#).
- [Setting ARC Mode](#) on page [35](#).
- [Enabling ARC Input](#) on page [36](#).
- [Switching a Pattern to an Output](#) on page [37](#).
- [Switching Audio in Breakaway Mode](#) on page [38](#).
- [Switching ARC to an Input](#) on page [39](#).

### Switching an Input to an Output

This section contains information on switching using webpages. For information on switching using front panel buttons, see [Routing Signals](#) on page [14](#).

**To switch an input to an output:**

1. In the Navigation pane, click **Switching**.

The Switching page appears ([Figure 18](#)).

2. Select the **AFV** tab.

The Audio-follow-video tab is displayed ([Figure 18](#)).

3. Select one or more output buttons or check **Outputs** to select all the output buttons.

The selected output buttons change color to purple.

4. Select an input button.

The selected input buttons change color to purple, the LED display shows the change, and the input signal is routed to the selected output(s).

## Changing Output or Input Button Label


To change Output or Input button label:

1. In the Navigation pane, click **Switching**.

The Switching page appears ([Figure 18](#)).

2. Select the **AFV** tab.

The Audio-follow-video tab is displayed ([Figure 18](#)).

3. Click  on an output or input button.

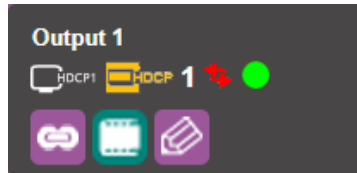


Figure 19: Switching Page – Output Button

The settings window appears:

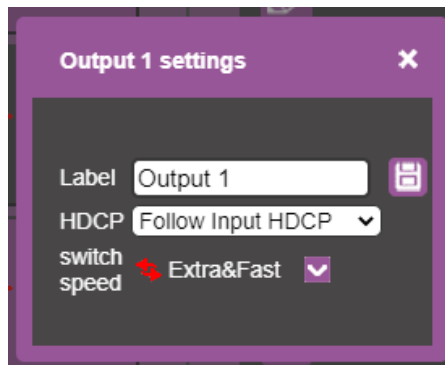


Figure 20: Switching Page – Editing the Output Button Settings

4. Type a new label name (up to 16 alpha-numeric characters) and click .

The button label is changed.



## Setting Output HDCP Status

This section contains information on setting output HDCP status.

### To set output HDCP status:

1. In the Navigation pane, click **Switching**.

The Switching page appears ([Figure 18](#)).

2. Select the **AFV** tab.

The Audio-follow-video tab is displayed ([Figure 18](#)).


3. Click  on an output button ([Figure 19](#)).


The output settings window appears ([Figure 20](#)).

4. Select **HDCP** dropdown box and set HDCP support to Follow input HDCP, Support HDCP 1.4, or Support HDCP 2.2.



Output () HDCP icon appears (2nd icon on button) when output is without HDCP.

Output () HDCP icon appears (2nd icon on button) when output is HDCP 1.4.

Output () HDCP icon appears (2nd icon on button) when output is HDCP 2.0.

## Setting Input HDCP Status


This section contains information on setting input HDCP status using webpages. For information on setting input HDCP status using front panel buttons, see [Setting HDCP](#) on page [24](#).




 indicates HDCP is enabled.

 indicates HDCP is disabled.



 indicates input signal supports HDCP.

 indicates input signal does not support HDCP.

### To set input HDCP status:

1. In the Navigation pane, click **Switching**.

The Switching page appears ([Figure 18](#)).

2. Select the **AFV** tab.

The Audio-follow-video tab is displayed ([Figure 18](#)).

3. Click  on an output button ([Figure 19](#)).

The input settings window appears:

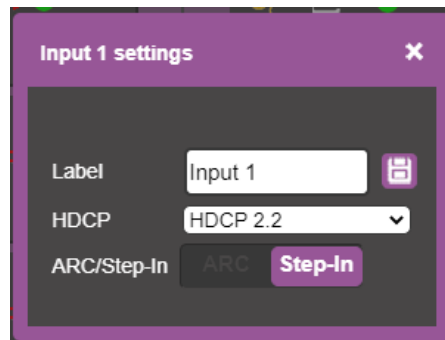





Figure 21: Switching Page – Editing the Input Button Settings

4. Select **HDCP** dropdown box and set HDCP to No HDCP, HDCP 1.4, or HDCP 2.2.



Input () HDCP icon appears on input button when output is without HDCP

Input () HDCP icon appears on input button when output is HDCP 1.4.





Input () HDCP icon appears on input button when output is HDCP 2.0.

Similar icons appear (first icon on button) on all output buttons streaming that input signal ([Figure 19](#)).

## Setting Switching Speed

This section contains information on setting switching speed using webpages. For information on setting switching speed using front panel buttons, see [Setting Switching Speed](#) on page [23](#).

### To set switching speed:

1. In the Navigation pane, click **Switching**.  
The Switching page appears ([Figure 18](#)).
2. Select the **AFV** tab.  
The Audio-follow-video tab is displayed ([Figure 18](#)).
3. Click  on an output button ([Figure 19](#)).  
The output settings window appears ([Figure 20](#)).
4. Select **Switch Speed** dropdown box and set switching speed to normal () , fast () or extra-fast () .

## Muting/Unmuting Video



This section contains information on muting/unmuting video using webpages. For information on muting/unmuting video using front panel buttons, see [Muting/Unmuting an Output Video Signal](#) on page [18](#).





 indicates video is not muted.

 indicates video is muted.

### To mute video:

1. In the Navigation pane, click **Switching**.  
The Switching page appears ([Figure 18](#)).
2. Select the **AFV** tab.  
The Audio-follow-video tab is displayed ([Figure 18](#)).
3. Click **Video Mute** () icon.  
The Video Mute  icon displays an x and the output selected displays a black screen.

### To unmute video:


1. In the Navigation pane, click **Switching**.  
The Switching page appears ([Figure 18](#)).
2. Select the **AFV** tab.  
The Audio-follow-video tab is displayed ([Figure 18](#)).
3. Click **Video Unmute** () icon.  
The Video Unmute  icon's red x disappears, and the output selected displays the signal.

## Setting Audio Follow Video (AFV)/Audio Breakaway Mode

This section contains information on switching Audio Follow Video (AFV)/Audio Breakaway Mode.



 indicates output is AFV mode.

 indicates output is Breakaway mode.

### To set audio breakaway mode:


1. In the Navigation pane, click **Switching**.

The Switching page appears ([Figure 18](#)).

2. Select the **AFV** tab.

The Audio-follow-video tab is displayed ([Figure 18](#)).

3. Click the **AFV/Breakaway** () icon.

The **AFV/Breakaway** icon changes to  and the output changes to audio breakaway mode.

### To set audio follow video (AFV) mode:


1. In the Navigation pane, click **Switching**.

The Switching page appears ([Figure 18](#)).


2. Select the **AFV** tab.

The Audio-follow-video tab is displayed ([Figure 18](#)).

3. Click the **AFV/Breakaway** () icon.

The **AFV/Breakaway** icon changes to  and the output changes to audio follow video mode.



 (gray colored) indicates that the device is in the auto-switch mode and AFV status cannot be altered.



Setting the AFV mode icons to AFV or Breakaway modes reflects the next switching step and not the current status.

When the unit moves from breakaway to audio follow video switching mode, all audio switch settings reset according to the video switch settings.

## Setting ARC Mode

This section contains information on setting ARC mode using webpages. For information on setting ARC mode using front panel buttons, see [Operating in ARC Mode](#) on page 17.

### To ARC-Enable an HDMI output:

1. In the Navigation pane, click **Switching**.

The Switching page appears ([Figure 18](#)).

2. Select **Audio break away** tab.

The Audio-follow-video tab is displayed ([Figure 18](#)).

3. Check the ARC check boxes (under the **Audio Outputs** column) to enable the device to accept audio signals from the selected outputs.

When in the ARC mode, the output buttons of the selected outputs illuminate.

For example, Output 1, 6, 7 and 8 are checked, therefore they are ARC-enabled so they can receive ARC signals from their connected acceptors.

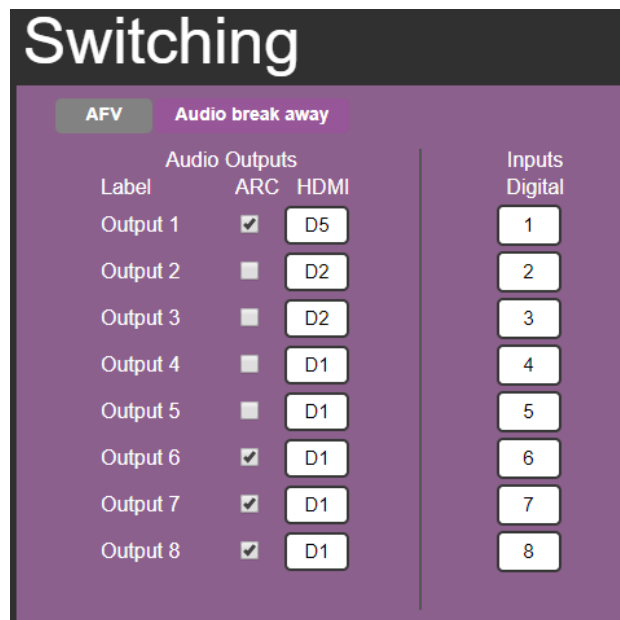


Figure 22: Switching Page –ARC-Enabled Outputs

## Enabling ARC Input

This section contains information on setting ARC mode using webpages. For information on setting ARC mode using front panel buttons, see [Operating in ARC Mode](#) on page 17.

All Inputs can be configured to accept ARC signals. When ARC-enabled you can select the audio output source.

### To enable the ARC input:

1. In the Navigation pane, click **Switching**.

The Switching page appears ([Figure 18](#)).


2. Select the **AFV** tab.

The Audio-follow-video tab is displayed ([Figure 18](#)).

3. Click  on an input button ([Figure 19](#)).

The input settings window appears ([Figure 21](#)):

4. Slide **ARC/Step-in** to ARC mode.

5. Click  (the settings button).

The input ARC Settings window appears (by-default the output source is set to output 1):

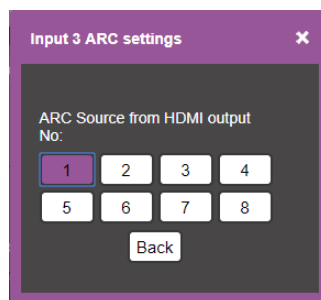


Figure 23: Input 3 ARC Settings

6. Select the desired HDMI output (for example, 6).

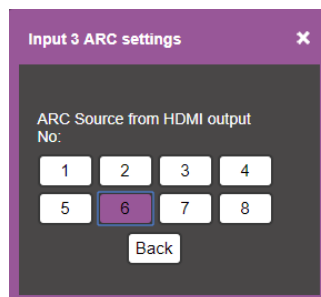



Figure 24: Select ARC Output Source

7. Click  to close the window.

Output 6 is set to be the ARC source for input 3.



Note that output 6 also needs to be checked in the Audio break away window for it to pass through to input 3 in this example.

## Switching a Pattern to an Output

This section contains information on switching a pattern to an output using webpages. For information on switching a pattern to an output using front panel buttons, see [Routing a Pattern to an Output](#) on page 19.

To switch a pattern to an output:

1. In the Navigation pane, click **Switching**.

The Switching page appears ([Figure 18](#)).

2. Select the **AFV** tab.

The Audio-follow-video tab is displayed ([Figure 18](#)).

3. Select the **Patterns** (**Patterns**) tab.

The pattern buttons appear:

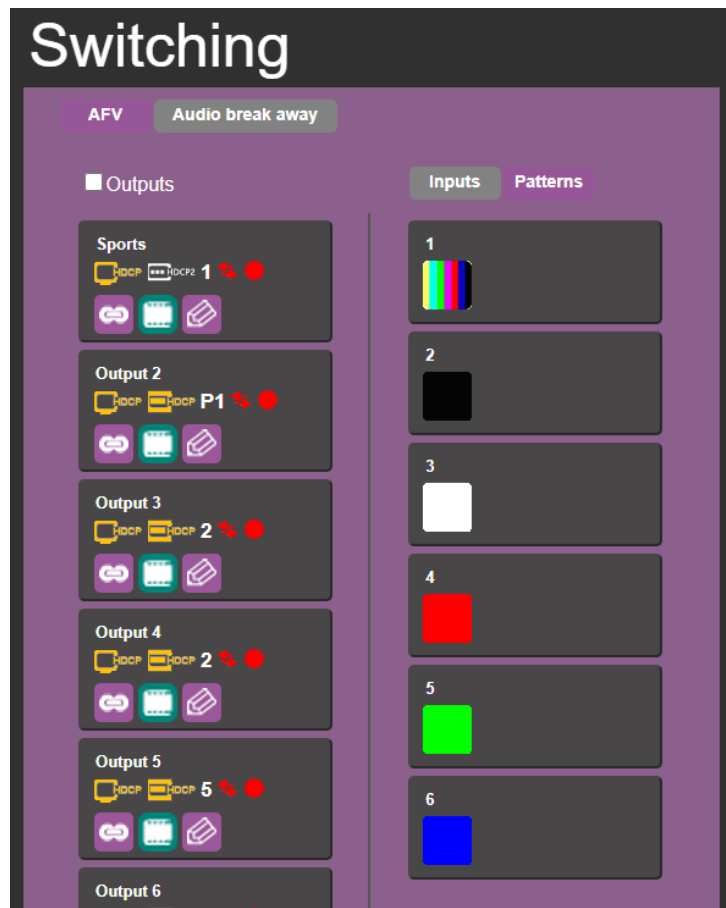


Figure 25: Switching page with pattern buttons on Right

4. Click one or more output buttons or check the **Outputs** box to select all the outputs.

The selected buttons change color to purple.

5. Click a pattern button. The pattern button changes color to purple.

The selected pattern is switched to the selected output(s).

## Switching Audio in Breakaway Mode

This section contains information on switching using webpages. For information on switching using front panel buttons, see [Routing Signals](#) on page 14.

In Breakaway mode, the HDMI embedded audio is switched separately from the video signal.



The audio breakaway mode is enabled only when Auto Switch Setting is set to Manual mode.

You can switch a digital audio input to a digital audio output independently. If HDMI input port and HDMI output port ARC mode are enabled, you can switch a selected HDMI output port ARC to any HDMI input port ARC.

**To switch an audio input to an audio output in Breakaway mode:**

1. In the Navigation pane, click **Switching**.  
The Switching page appears ([Figure 18](#)).
2. Select the **Audio break away** ( **Audio break away** ) tab.

The Audio break away tab is displayed:

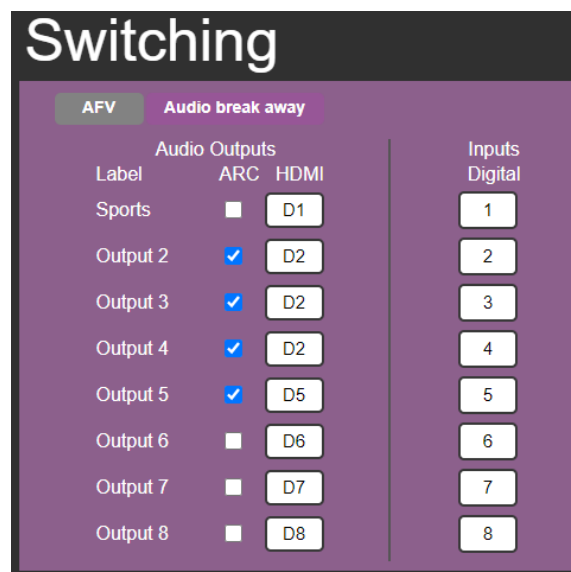


Figure 26: Switching page – Breakaway Mode

3. Click an **HDMI** button (under the **Audio Outputs** column).  
The selected button changes color to purple.
4. Click a **Digital Input** button.  
The selected button changes color to purple.

### EXAMPLE:

Digital Output 5 is switched to D6.



Figure 27: Switching Page – Switching audio signals in the Breakaway Mode



## Switching ARC to an Input

To switch ARC to an input:

1. In the Navigation pane, click **Switching**.  
The Switching page appears ([Figure 18](#)).
2. Select the **Audio break away** (**Audio break away**) tab.  
The Audio break away tab is displayed ([Figure 26](#)):
3. Check the **ARC** check boxes to ARC-enable selected outputs (under the **Audio Outputs** column).

### EXAMPLE:

Output 2 and 4 are checked (ARC-enabled) so they can be switched as ARC signals.

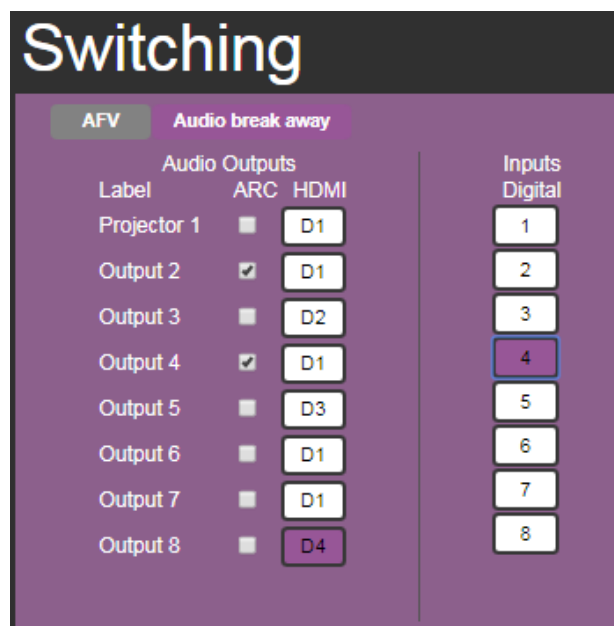


Figure 28: Switching Page – Output 2 and 4 ARC-Enabled



Make sure that the acceptor on the output side has ARC capabilities (see [Enabling ARC Input](#) on page [36](#)).

## Changing Device Settings and Upgrading Firmware

The Device Settings web page shows the device details, such as name, MAC address and firmware version and also enables performing the following functions:

- [Changing Ethernet Settings](#) on page [40](#).
- [Performing a Factory Reset](#) on page [41](#).
- [Performing Firmware Upgrade](#) on page [41](#).

### Changing Ethernet Settings

To change the Ethernet settings:

1. In the Navigation pane, click **Device Settings**.

The Device Settings page appears:

| Information      |   |
|------------------|---|
| Model            | VS-88H2                                   |
| Name             | KRAMER_0037                               |
| Serial Number    | 08190049300037                            |
| MAC Address      | 00-1D-56-05-3D-A3                         |
| Firmware Version | 01.03.0000                                |
| DHCP             | <input checked="" type="checkbox"/>       |
| IP Address       | <input type="text" value="192.168.1.39"/> |
| Subnet Mask      | <input type="text" value="255.255.0.0"/>  |
| Gateway          | <input type="text" value="192.168.0.1"/>  |
| TCP Port         | <input type="text" value="5000"/>         |
| UDP Port         | <input type="text" value="50000"/>        |

Save Changes    Reset

**Firmware Upgrade**  
Choose a file  
BROWSE  
START UPGRADE

Figure 29: Device Settings Page

2. Uncheck/check the **DHCP** check box.
3. If DHCP is unchecked, change any of the parameters (IP Address, Netmask and/or Gateway).
4. Click **Save Changes**.



- After changing the IP number, reload the web page with the new IP address.
- After changing the Subnet mask you need to turn the **VS-88H2** power off and then on again.
- If DHCP is checked, reload the web page with the new IP address.

## Performing a Factory Reset

To reset the device to its factory default values:

1. In the Navigation pane, click **Device Settings**.  
The Device Settings page appears ([Figure 29](#)).
2. Click **Reset**. The following window appears:

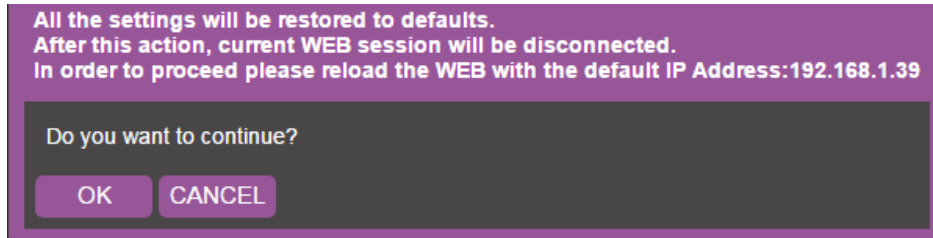


Figure 30: Device Settings Page – Factory Reset

3. Click **OK** to start factory reset and follow the instructions on-screen.

This feature can also be performed manually on **VS-88H2**:

- Press and hold the Reset Button (18) ([Figure 5](#)) while powering the device to reset IP settings to factory default values.

## Performing Firmware Upgrade

- This section contains information on upgrading the firmware using webpages. For information on upgrading the firmware using By USB or RS-232 using Kramer **K-UPLOAD** tool, go to Kramer Web site at [www.kramerav.com/downloads/VS-88H2](http://www.kramerav.com/downloads/VS-88H2).



To perform firmware upgrade:

1. In the Navigation pane, click **Device Settings**.  
The Device Settings page appears ([Figure 29](#)).
2. Click **BROWSE** and select the new firmware file.
3. Click **START UPGRADE** and follow the instructions on-screen.



Do not power off your device while you are uploading a file to prevent the damage of the file.

## Managing Web Page Security

Embedded web pages can either be free access (indicated by the unlocked  symbol in the top right corner) or password protected (indicated by the locked  symbol in the top right corner).

The Authentication web page enables performing the following functions:

- [Setting up a Password](#) on page [42](#).
- [Changing a Password](#) on page [44](#).
- [Setting up Free Access No Password](#) on page [45](#).

### Setting up a Password

To set up a password:

1. In the Navigation pane, click **Authentication**.

The Authentication page appears:

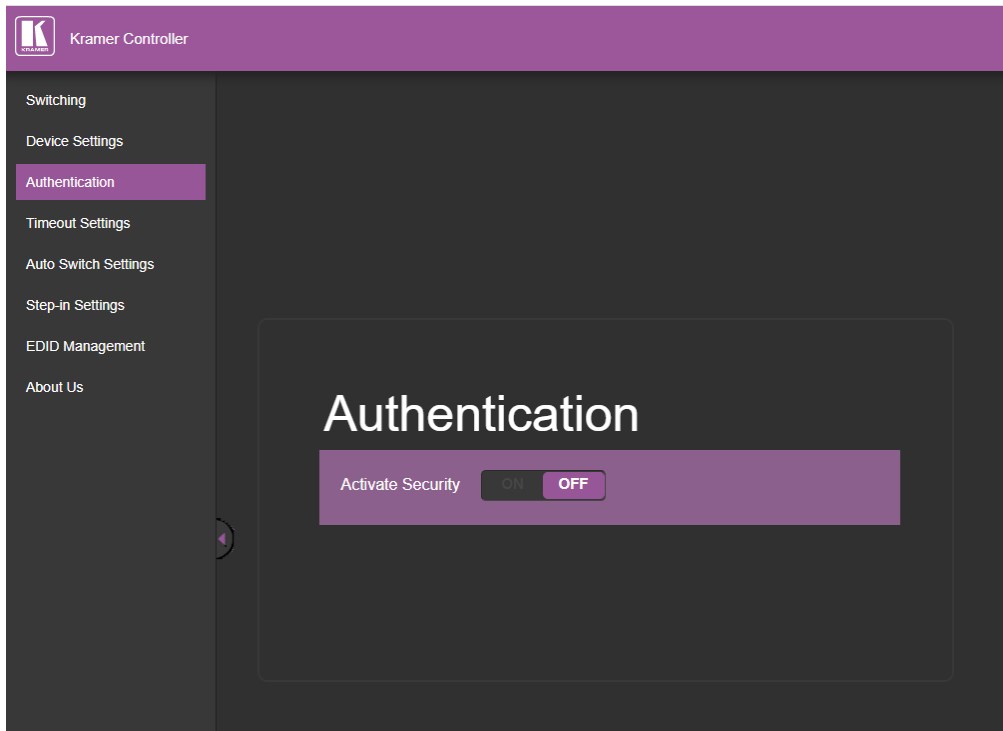


Figure 31: Authentication Page

2. Slide **Activate Security** to **ON**.

The Set Password dialog appears:

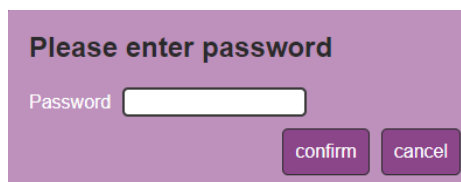


Figure 32: Password Settings Page – Entering the Password

3. Click **confirm** (If no password was established before then leave password field blank).

A confirmation dialog appears:

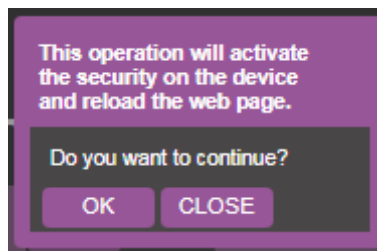


Figure 33: Password Settings Page – Security Activation Message

4. Click **OK**.

The connection is interrupted, and authentication is required to access web pages.

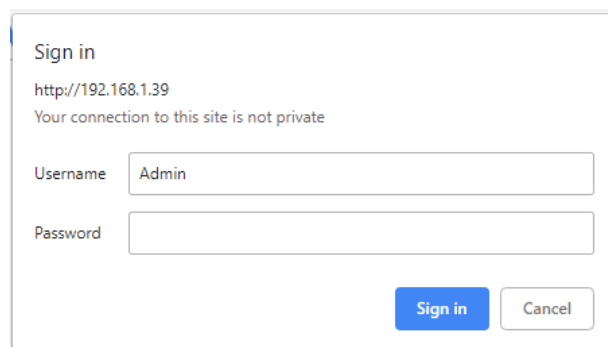



Figure 34: Password Settings Page – Security Log In

5. Type a Username (Admin, by default) and Password and click **Sign In**.

The web page reloads and the lock icon in the upper right of the screen changes to .

## Changing a Password

To change a password:

1. In the Navigation pane, click **Authentication**.

The Authentication page appears:

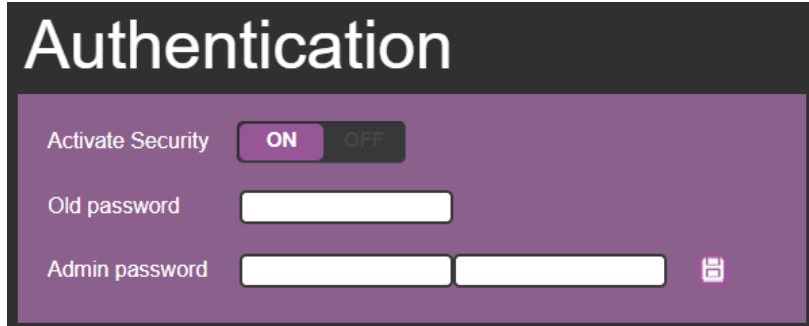



Figure 35: Password Settings Page – Password Protected

2. Type the existing password in the Old password text box and type the new password twice in both **Admin password** text boxes.
3. Click . The following message appears:

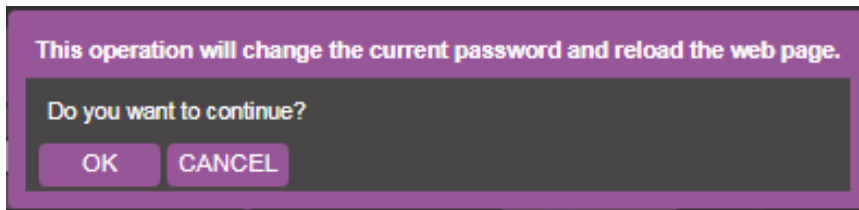



Figure 36: Password Settings Page – Password Warning

4. Click **OK**.

The page is reloaded and can be accessed by entering the new password.

The web page reloads and the lock icon in the upper right of the screen changes to .

## Setting up Free Access No Password

To set free access to the embedded web pages (without requiring a password):

1. In the Navigation pane, click **Authentication**.

The Authentication page appears:

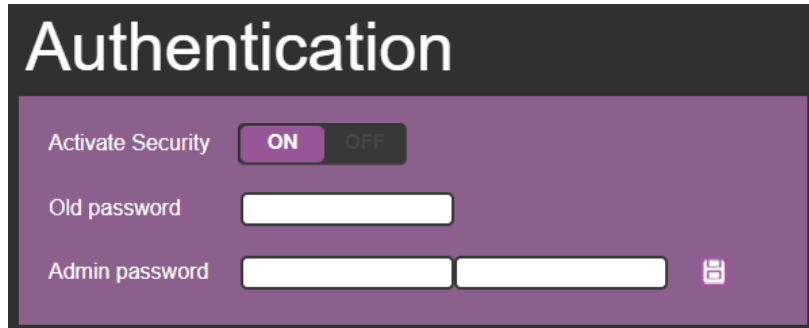


Figure 37: Password Settings Page – Password Protected

2. Set **Activate Security** to **OFF**.

Enter Password dialog appears.

3. Enter the password and click **confirm**.

The following dialog appears:

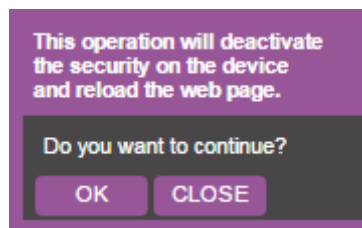



Figure 38: Password Settings Page – Deactivating the Security

4. Click **OK**.

The web page reloads and the lock icon in the upper right of the screen changes to .

## Managing Timeout Settings

Use the **Timeout Settings** web page to set the time delay to shut down if no input signal is detected for each output and also to set the auto switching time.

The Timeout Settings web page enables performing the following functions:

- [Setting Timeout](#) on page [46](#).
- [Setting Support Audio Only](#) on page [47](#).
- [Setting Video Signal Lost Timer](#) on page [47](#).

### Setting Timeout

To set the timeout:

1. In the Navigation pane, click **Timeout Settings**.

The Timeout Settings page appears:

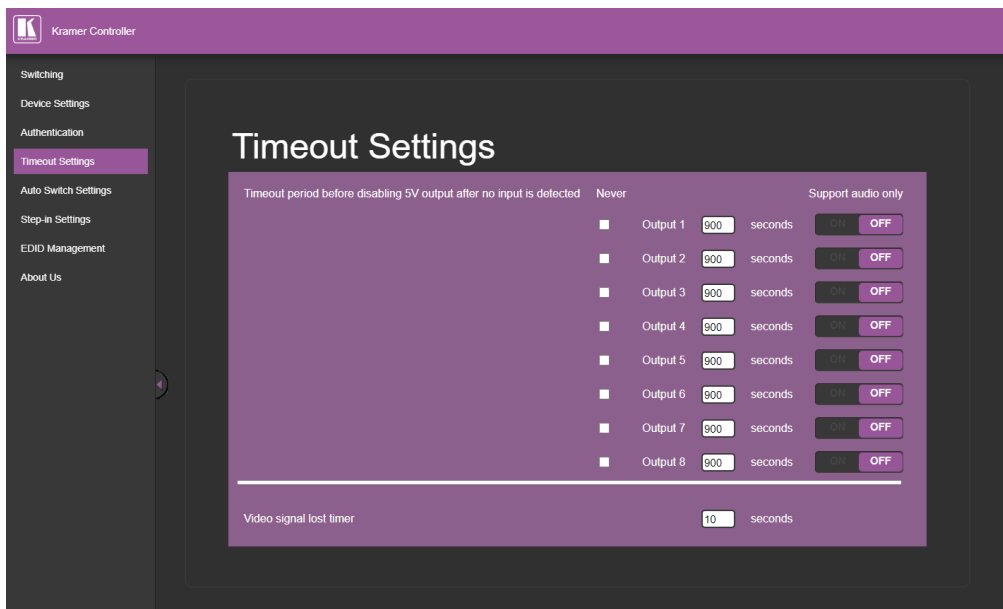
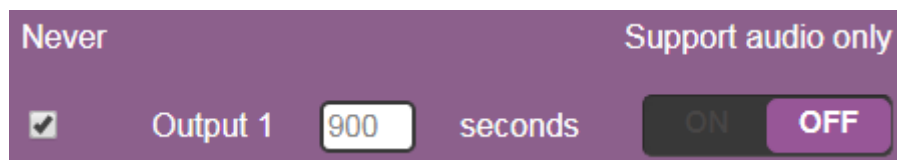


Figure 39: Timeout Settings Page

2. Set the specific output delay time.



If you do not want a specific output to shut down when an input signal is not detected, check the **Never** box next to the desired output.





## Setting Support Audio Only

Set audio support **ON** if you want shutdown to occur only if an audio signal is lost.

**Support audio only** can be used if the video and audio signals routed to an output, come from separate sources.

**To set support audio only:**

1. In the Navigation pane, click **Timeout Settings**.

The Timeout Settings page appears ([Figure 39](#)).

- Set Support audio only to **ON** – The audio signal routed to the output remains active when the video source (coming from a different input) is deactivated.
- Set Support audio only to **OFF** – The audio signal routed to the output is deactivated together with the deactivation of the video source (coming from a different input).

## Setting Video Signal Lost Timer

**To set the video signal lost timer (when in auto-switching mode):**

1. In the Navigation pane, click **Timeout Settings**.

The Timeout Settings page appears ([Figure 39](#)).

2. Set the video lost timer.



If the video is lost when in the auto switching mode (Priority or Last connected) you can set the time the device waits before it switches to the next source.

## Setting Switching Modes

Use the **Auto Switch Settings** page to set the switching mode per output.



Setting to priority or last connected mode forces **VS-88H2** to operate in AFV mode.

The Switching Mode web page enables performing the following functions:

- [Setting Switching Mode to Manual](#) on page [48](#).
- [Setting Switching Mode to Priority](#) on page [49](#).
- [Setting Switching Mode to Last Connected](#) on page [50](#).

This feature can also be performed manually on **VS-88H2** (see [Setting Switching Mode](#) on page [23](#)).

### Setting Switching Mode to Manual

To set the switching mode to **Manual**:

1. In the Navigation pane, click **Auto Switch Settings**.

The Auto Switch Settings page appears:

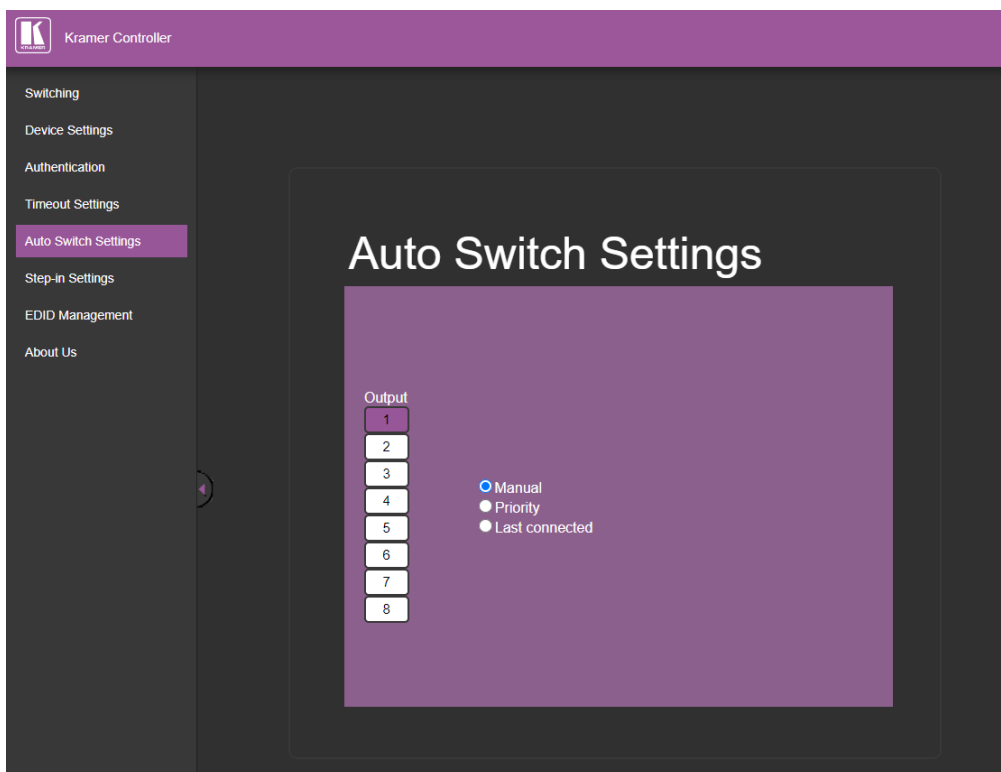


Figure 40: Auto Switch Settings Page

2. Select an output and set the switching mode to **Manual**.

The outputs are switched manually to the selected output.

# Setting Switching Mode to Priority

To set the switching mode to Priority:

1. In the Navigation pane, click **Auto Switch Settings**.  
The Auto Switch Settings page appears ([Figure 40](#)).
2. Select an output and set the switching mode to **Priority**.

The following page appears:

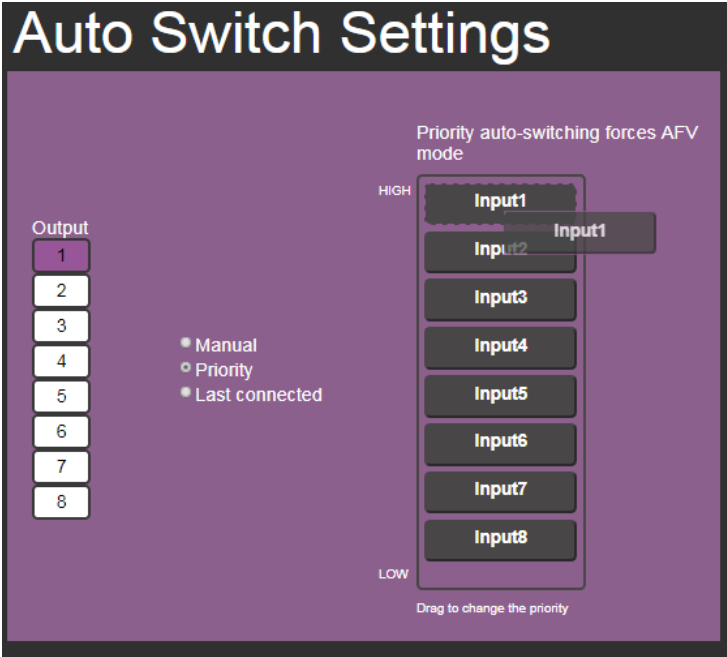


Figure 41: Auto Switch Settings Page – Setting the switching Priority

3. Drag and drop the inputs from the highest to the lowest priority.  
The inputs are then switched according to the set priority to the selected output.

# Setting Switching Mode to Last Connected

To set the switching mode to Last Connected:

- 1. In the Navigation pane, click **Auto Switch Settings**.

The Auto Switch Settings page appears ([Figure 40](#)).

- 2. Select an output and set the switching mode to **Last Connected**.

The following page appears:

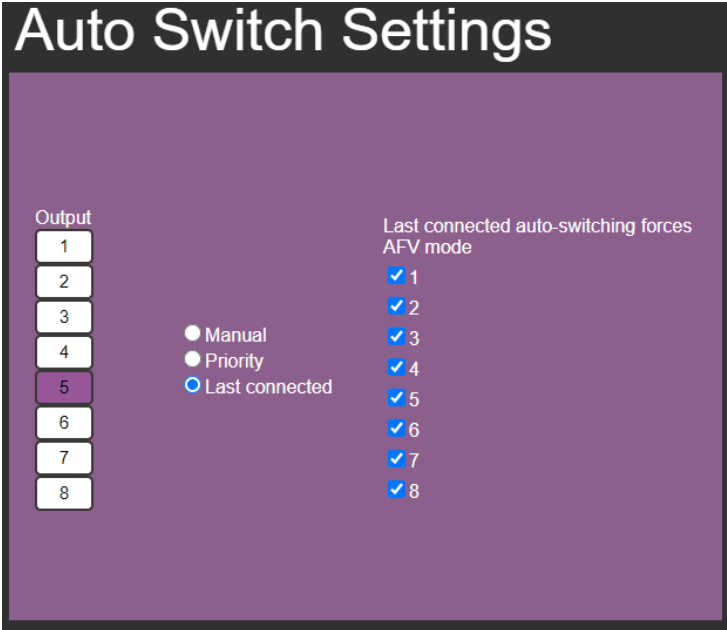


Figure 42: Auto Switch Settings Page – Last Connected Mode

- 3. Select the inputs that are included in the last connected scan that are switched to the selected output.

# Setting Step-in Devices

Use the Step-In Settings page to manage step-in devices (for example Kramer **DIP-30**).

If a step-in device is not connected to **VS-88H2**, the following page appears:

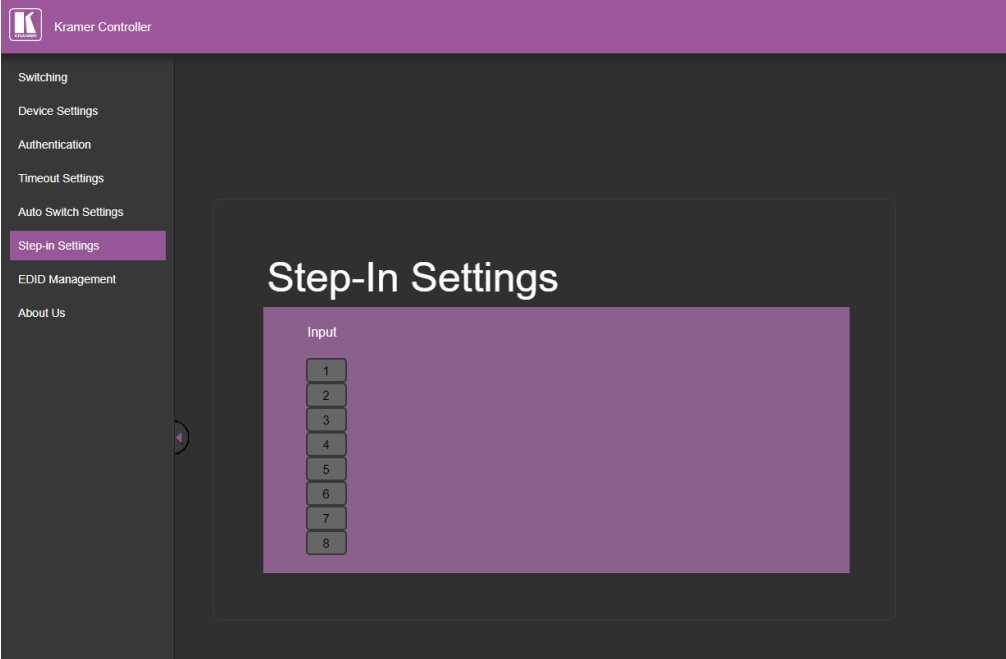


Figure 43: Step-In Settings Page (Step-in Device is not Connected)

**To manage a step-in device:**

1. Connect the HDMI output of a step-in device (for example **DIP-30**) to an HDMI input on the **VS-88H2**.
2. In the Navigation pane, click **Step-in Settings**.

The Step-in Settings page appears and the input button/s to which the step-in device/s is connected turn/s white.

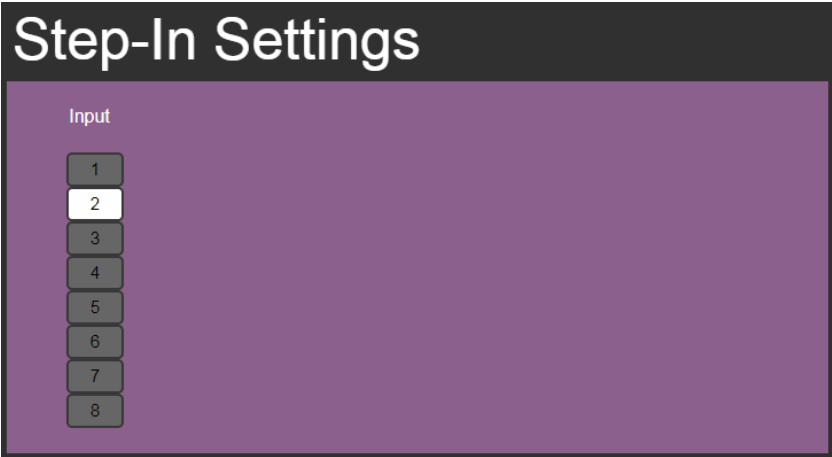


Figure 44: Step-In Settings Page – Displaying Step-In Inputs

- Click an active step-in input (button 2 in this example).

The selected input button changes color to purple, the **DIP-30** Inputs list and the **VS-88H2** outputs to which the **DIP-30** input is routed are displayed:

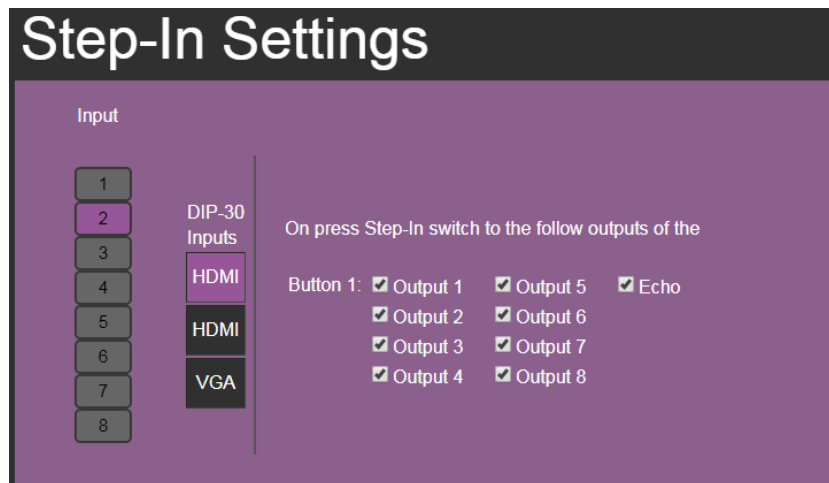


Figure 45: Step-In Settings Page – Step In Selected

- Select a **DIP-30** input (HDMI IN 1, HDMI IN 2 or VGA).

The respective button on **DIP-30** illuminates.



You can also press an input button on the **DIP-30**. The selected input is displayed on the web page.

- Check the outputs to which the inputs are routed.
- Press the **STEP-IN** button on **DIP-30**.

The selected step-in button is routed to all the checked outputs.



Any time the output Step-in configuration changes, press the **STEP-IN** button on the Step-In device to update the configuration.



Selecting Echo sends an instruction via **VS-88H2** RS-232 port.

## Managing the EDID

The Switching Mode web page enables performing the following functions:

- [Copying an EDID from an Output to an Input](#) on page 53.
- [Copying the EDID from Default EDID](#) on page 55.
- [Copying an EDID from an Input to Another Input](#) on page 55.

### Copying an EDID from an Output to an Input

To copy an EDID from an output to an input:

1. In the Navigation pane, click **EDID Management**.

The EDID Management page appears:

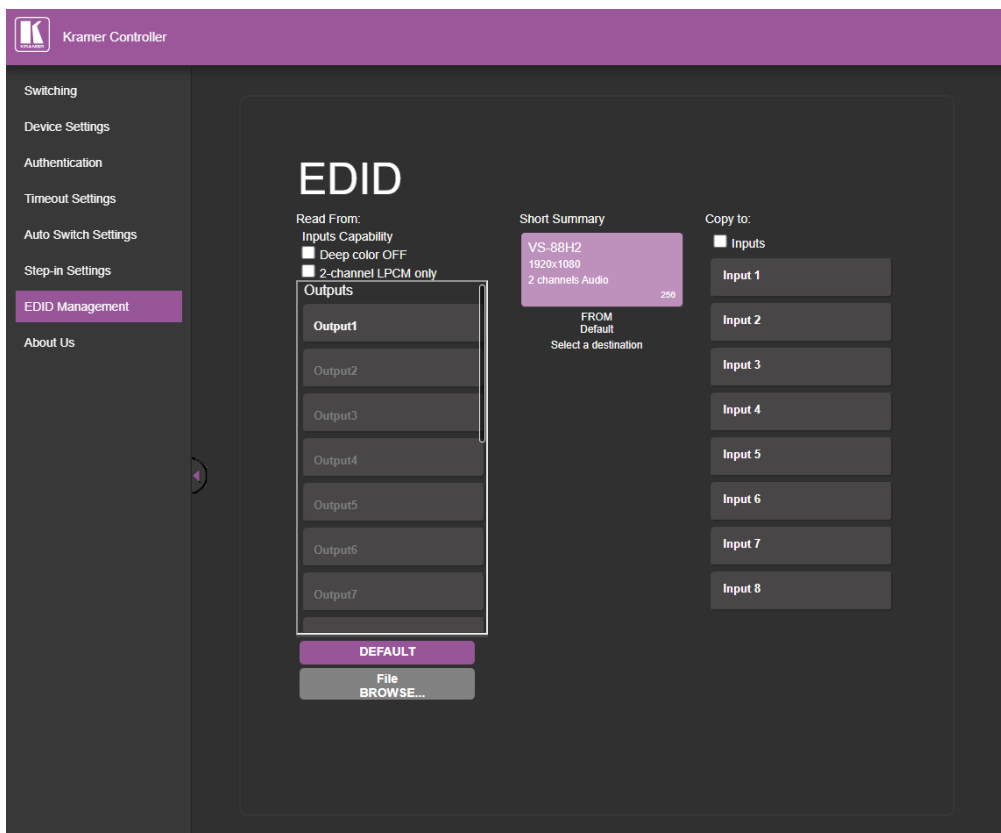


Figure 46: EDID Management Page – Select an EDID Source

2. Select a connected output as the EDID source.

The selected output button changes color to purple.



Make sure that the output is connected to an acceptor.

- Select one or more input buttons or check **Inputs** to select all the inputs buttons.  
The selected input button(s) changes color to purple.

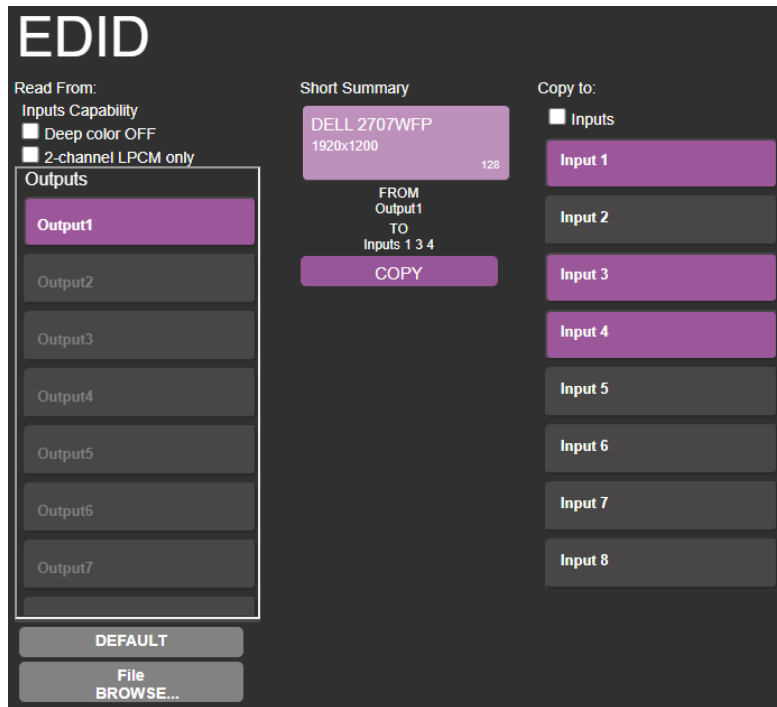


Figure 47: EDID Management Page – Select an EDID output and input(s)

- Click **COPY**.

The following EDID message appears:

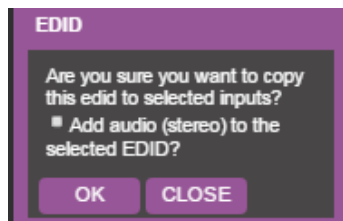


Figure 48: EDID Page –EDID Copy Message

- Click **OK**.

The following message appears:

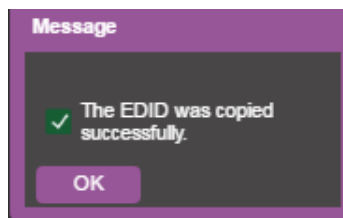


Figure 49: EDID Management Page – Loading the EDID from Output to Input

- Click **OK**.

The output EDID is copied.



## Copying the EDID from Default EDID

To copy the EDID from the default EDID:

1. In the Navigation pane, click **EDID Management**.  
The EDID Management page appears ([Figure 46](#)).
2. Click **DEFAULT**.  
The DEFAULT button changes color to purple.
3. Select one or more input buttons or check **Inputs** to select all the inputs buttons.  
The selected input button(s) changes color to purple.
4. Click **COPY** and follow the instructions.  
The default EDID is copied.

## Copying an EDID from an Input to Another Input

To copy the EDID from an input to another input/s:

1. In the Navigation pane, click **EDID Management**.  
The EDID Management page appears ([Figure 46](#)).
2. Scroll down and select an input from the list (on the left).  
The input button changes color to purple.
3. Select one or more input buttons on the right or check **Inputs** to select all the inputs buttons.  
The selected input button(s) changes color to purple.
4. Click **COPY** and follow the instructions.  
The select input EDID is copied.

## Copying the EDID from a PC File

To copy the EDID from a PC file:

1. In the Navigation pane, click **EDID Management**.  
The EDID Management page appears ([Figure 46](#)).
2. Click **File BROWSE**.  
A select File manager opens.
3. Select an EDID file and click **Open**.  
The selected EDID file is selected.
4. Select one or more input buttons or check **Inputs** to select all the input buttons.  
The selected input button(s) changes color to purple.
5. Click **COPY** and follow the instructions.  
The PC EDID is copied.



When viewing the 7-segment display in the EDID mode, the input with EDID read from a file displayed as “L”

## Setting Input Port EDID Data Only for 24 Bits

To set input port EDID data only for 24 bits

1. In the Navigation pane, click **EDID Management**.  
The EDID Management page appears ([Figure 46](#)).
2. Check **Deep color OFF**  
Input port setting EDID data is set only for 24 bits.

## Setting Input Port Setting EDID Data Only for 2 Channel Audio

To set input port setting EDID data only for 2 channel audio

1. In the Navigation pane, click **EDID Management**.  
The EDID Management page appears ([Figure 46](#)).
2. Check **2-channel LPCM only**  
Input port setting EDID data is set only for 2-channel audio.

## Viewing About Page

The VS-88H2 About page lets you view the web page version and Kramer Electronics Ltd details.

To viewing the About page:

1. In the Navigation pane, click **About Us**.

The About page appears:

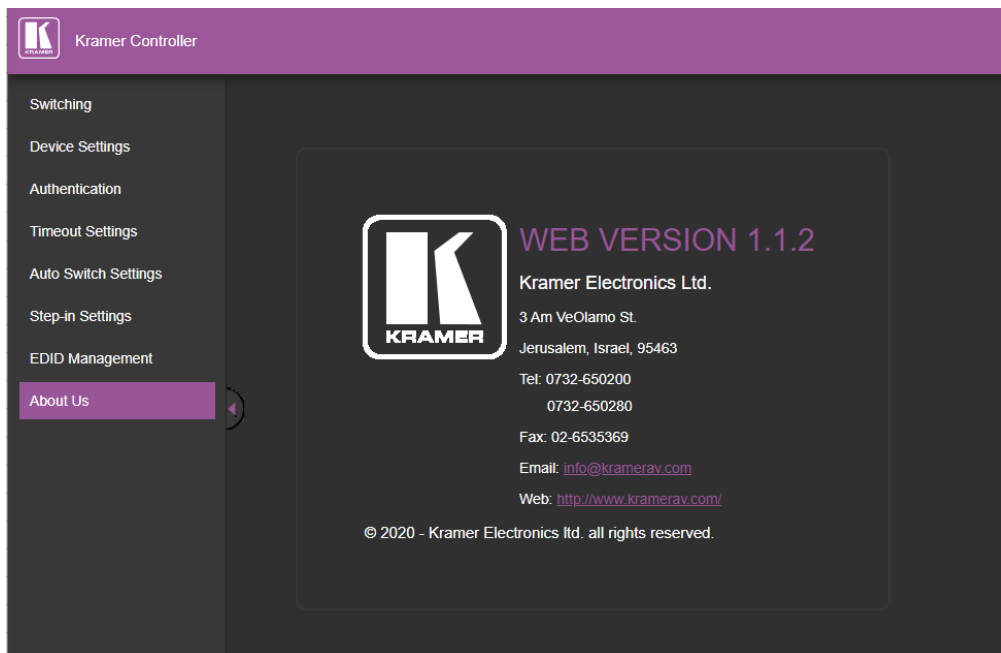


Figure 50: About Page

# Technical Specifications

|   |                               |  |
|---|-------------------------------|--|
| Inputs  | VS-88H2: 8 HDMI               | On female HDMI connectors  |
|   | VS-66H2: 6 HDMI               |  |
|   | VS-84H2: 8 HDMI               |  |
|   | VS-48H2: 4 HDMI               |  |
| Outputs   | VS-88H2: 8 HDMI               | On female HDMI connectors  |
|   | VS-66H2: 6 HDMI               |  |
|   | VS-84H2: 4 HDMI               |  |
|   | VS-48H2: 8 HDMI               |  |
| Ports   | Ethernet                      | On an RJ-45 female connector for device control                                      |
|   | RS-232                        | On a 3-pin terminal block for serial device control                                  |
|   | Mini-USB                      | On a female Mini-USB connector for serial device control                             |
|   | USB                           | On a female USB-A connector for powering another device                              |
| Video   | Max. Resolution               | 4K@60Hz (4:4:4)  |
|   | Compliance                    | Deep Color, 3D, ARC, up to 7.1 uncompressed audio channels as specified in HDMI 2.0. |
| Control   | Front Panel                   | Front panel buttons  |
|   |                               | 7-segment display  |
| Power   | Consumption                   | 600mA  |
|   | Source                        | 100-240V AC, 50/60Hz   |
| Regulatory Compliance   | Safety                        | CE, FCC  |
|   | Environmental                 | RoHs, WEEE   |
| Environmental Conditions  | Operating Temperature         | 0° to +40°C (32° to 104°F)   |
|   | Storage Temperature           | -40° to +70°C (-40° to 158°F)  |
|   | Humidity                      | 10% to 90%, RH non-condensing  |
| Enclosure   | Size                          | 19", 9.3", 1U, rack mountable  |
|   | Cooling                       | Fan ventilation  |
| General   | Net Dimensions (W, D, H)      | 43.6 cm x 18.3 cm x 4.4 cm<br>(17.2" x 7.2" x 1.7")                                  |
|   | Shipping Dimensions (W, D, H) | 52.5cm x 33.0cm x 10.7cm<br>(20.7" x 13" x 4.2")                                     |
|   | Net Weight                    | VS-66H2, VS-84H2, VS-48H2: 2.4kg (5.3lbs) approx.<br>VS-88H2: 2.6kg (5.7lbs) approx. |
|   | Shipping Weight               | VS-66H2, VS-84H2, VS-48H2: 3.3kg (7.3lbs) approx.<br>VS-88H2: 3.6kg (7.9lbs) approx. |
| Accessories   | Included                      | Rack ears, power cord  |
| Specifications are subject to change without notice at <a href="http://www.kramerav.com">www.kramerav.com</a> |                               |  |

## Default Communication Parameters

| RS-232/Ethernet                      |                     |
|--------------------------------------|---------------------|
| Baud Rate:                           | 115,200             |
| Data Bits:                           | 8                   |
| Stop Bits:                           | 1                   |
| Parity:                              | None                |
| Command Format:                      | ASCII Protocol 3000 |
| Example (Route input 1 to output 1): | #VID 1>1<CR>        |

| Ethernet Parameters    |              |
|------------------------|--------------|
| IP Address:            | 192.168.1.39 |
| Subnet Mask:           | 255.255.0.0  |
| Default Gateway:       | 192.168.0.1  |
| Default TCP Port #:    | 5000         |
| Default UDP Port #:    | 50000        |
| Number of TCP ports:   | 8            |
| Number of web clients: | 5            |
| Default username:      | Admin        |
| Default password:      | Admin        |

| Full Factory Reset   |  |
|----------------------|--|
| Front Panel Buttons: | Power off the device, press and hold the LOCK, EDID and STO buttons simultaneously for about 3 seconds while powering the device, and then release. Until all front panel buttons illuminate |
| Protocol 3000:       | "#factory" command.  |
| Web Pages:           | In the Device Settings page, click <b>Reset</b> .  |

## Default EDID

Model name..... VS-88H2  
 Manufacturer..... KMR  
 Plug and Play ID..... KMR03ED  
 Serial number..... 295-883450100  
 Manufacture date..... 2016, ISO week 20  
 Filter driver..... None  
 -----  
 EDID revision..... 1.3  
 Input signal type..... Digital  
 Color bit depth..... Undefined  
 Display type..... Monochrome/grayscale  
 Screen size..... 520 x 320 mm (24.0 in)  
 Power management..... Standby, Suspend, Active off/sleep  
 Extension blocs..... 1 (CEA-EXT)  
 -----  
 DDC/CI..... Not supported

### Color characteristics

Default color space..... Non-sRGB  
 Display gamma..... 2.20  
 Red chromaticity..... Rx 0.674 - Ry 0.319  
 Green chromaticity..... Gx 0.188 - Gy 0.706  
 Blue chromaticity..... Bx 0.148 - By 0.064  
 White point (default).... Wx 0.313 - Wy 0.329  
 Additional descriptors... None

### Timing characteristics

Horizontal scan range.... 30-83kHz  
 Vertical scan range..... 56-76Hz  
 Video bandwidth..... 170MHz  
 CVT standard..... Not supported  
 GTF standard..... Not supported  
 Additional descriptors... None  
 Preferred timing..... Yes  
 Native/preferred timing.. 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 1024p at 75Hz - VESA STD  
 1280 x 1024p at 85Hz - VESA STD  
 1600 x 1200p at 60Hz - VESA STD  
 1024 x 768p at 85Hz - VESA STD  
 800 x 600p at 85Hz - VESA STD  
 640 x 480p at 85Hz - VESA STD  
 1152 x 864p at 70Hz - VESA STD  
 1280 x 960p at 60Hz - VESA STD

### EIA/CEA-861 Information

Revision number..... 3  
 IT underscan..... Supported  
 Basic audio..... Supported  
 YCbCr 4:4:4..... Not supported  
 YCbCr 4:2:2..... Not supported  
 Native formats..... 1  
 Detailed timing #1..... 1920x1080p at 60Hz (16:10)  
 Modeline..... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync  
 Detailed timing #2..... 1920x1080i at 60Hz (16:10)  
 Modeline..... "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync  
 Detailed timing #3..... 1280x720p at 60Hz (16:10)  
 Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync  
 Detailed timing #4..... 720x480p at 60Hz (16:10)  
 Modeline..... "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync

CE audio data (formats supported)

LPCM 2-channel, 16/20/24 bit depths at 32/44/48 kHz

CE video identifiers (VICs) - timing/formats supported

1920 x 1080p at 60Hz - HDTV (16:9, 1:1) [Native]  
 1920 x 1080i at 60Hz - HDTV (16:9, 1:1)  
 1280 x 720p at 60Hz - HDTV (16:9, 1:1)  
 720 x 480p at 60Hz - EDTV (16:9, 32:27)  
 720 x 480p at 60Hz - EDTV (4:3, 8:9)  
 720 x 480i at 60Hz - Doublescan (16:9, 32:27)  
 720 x 576i at 50Hz - Doublescan (16:9, 64:45)  
 640 x 480p at 60Hz - Default (4:3, 1:1)  
 NB: NTSC refresh rate = (Hz\*1000)/1001

CE vendor specific data (VSDB)

IEEE registration number. 0x000C03  
 CEC physical address..... 1.0.0.0  
 Maximum TMDS clock..... 165MHz

CE speaker allocation data

Channel configuration.... 2.0  
 Front left/right..... Yes  
 Front LFE..... No  
 Front center..... No  
 Rear left/right..... No  
 Rear center..... No  
 Front left/right center.. No  
 Rear left/right center... No  
 Rear LFE..... No


Report information

Date generated..... 15/05/2019  
 Software revision..... 2.90.0.1020  
 Data source..... Real-time 0x0041  
 Operating system..... 10.0.17134.2

Raw data

00,FF,FF,FF,FF,FF,FF,FF,00,2D,B2,ED,03,01,00,00,00,14,1A,01,03,80,34,20,78,E2,B3,25,AC,51,30,B4,26,  
 10,50,54,FF,FF,80,81,8F,81,99,A9,40,61,59,45,59,31,59,71,4A,81,40,02,3A,80,18,71,38,2D,40,58,2C,  
 45,00,A0,5A,00,00,00,1E,00,00,00,FF,00,32,39,35,2D,38,38,33,34,35,30,31,30,30,00,00,00,FC,00,56,  
 53,2D,38,38,48,32,0A,20,20,20,20,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,01,BC,  
 02,03,1B,C1,23,09,07,07,48,90,05,04,03,02,07,16,01,65,03,0C,00,10,00,83,01,00,00,02,3A,80,18,71,  
 38,2D,40,58,2C,45,00,07,44,21,00,00,1E,01,1D,80,18,71,1C,16,20,58,2C,25,00,07,44,21,00,00,9E,01,  
 1D,00,72,51,D0,1E,20,6E,28,55,00,07,44,21,00,00,1E,8C,0A,D0,8A,20,E0,2D,10,10,3E,96,00,07,44,21,  
 00,00,18,00,77

## Default Parameters

| Parameter  | Value  |
|--|--|
| Protocol:  | K3000  |
| K3000 Model Name:  | VS-88H2  |
| K3000 Serial Number:   | 0000000000000000   |
|  Model name and serial number do not change back to the default status after a factory reset. |  |
| TCP/IP address:  | 192.168.1.39   |
| TCP/IP port:   | 5000   |
| UDP port:  | 50000  |
| Mask number:   | 255.255.0.0  |
| Gateway number:  | 192.168.0.1  |
| DHCP enable:   | Disable (OFF)  |
| EDID status:   | Default, all input ports use the default EDID data.        |
| Input port HDCP:   | All ON, support HDCP.                                      |
| Step-In button setting:  | Default, all the output checked for an input.              |
| Video status:  | Output 1 to 8 route to input 1 to 8 separately.            |
| All setups:  | All empty. No preset status.                               |
| EDID data:   | All input ports use the default EDID data.                 |
| V-mute:  | Open the video.  |
| Mute:  | Open the audio.  |
| Switch mode:   | Manual.  |
| Switch speed:  | Extra-fast switch.   |
| ARC or de-embedded:  | De-embedded.   |
| Video Priority settings  | Lower input index has higher priority.                     |
| Auto Switching mode  | Priority: Priority order is Highest for 1 and lowest for 8 |
| Auto Switching settings  | All video inputs are routed to each of the video outputs   |
| Default switching mode - manual/auto   | Manual, IN1 to OUT1, etc. for 2,3,4                        |
| Default EDID   | Kramer default EDID with "monitor name"="VS-88H2"          |
| HDCP mode  | ENABLED  |
| Video Signal loss timeout (no 5V)  | 0  |
| Video Signal loss timeout (5V is on)   | 10 sec   |
| New video signal gain timeout  | 0  |
| Audio Signal loss timeout (no 5V)  | 0  |
| Audio Signal loss timeout (5V is on)   | 5 sec  |
| New audio signal gain timeout  | 0  |
| Output inactivity timeout  | 15 min   |
| Apply switch mode configuration on startup   | 10   |



## Input or Output Resolutions

VS-88H2, VS-66H2, VS-84H2, VS-48H2 support the following resolutions:

|              |                |                |              |
|--------------|----------------|----------------|--------------|
| 4096*2160P60 | 1080P24        | 1600*900P60rb  | 800*600P75   |
| 4096*2160P30 | 1080P23        | 1440*900P60    | 800*600P72   |
| 4096*2160P29 | 1080i60        | 1440*900P60rb  | 800*600P60   |
| 4096*2160P25 | 1080i59        | 1400*1050P75   | 800*600P56   |
| 4096*2160P24 | 1080i50        | 1400*1050P60   | 720*400P70   |
| 4096*2160P23 | 720P60         | 1400*1050P60rb | 640*480P75   |
| 3840*2160P60 | 720P59         | 1366*768P60    | 640*480P72   |
| 3840*2160P30 | 720P50         | 1366*768P60rb  | 640*480P59   |
| 3840*2160P29 | 576P50         | 1360*768P60    | 680*480P60   |
| 3840*2160P25 | 576i50         | 1280*1024P60   | 1440*480i60  |
| 3840*2160P24 | 480P60         | 1280*960P60    | 1440*240P60  |
| 3840*2160P23 | 480P59         | 1280*768P60    | 1440*480P60  |
| 1080P60      | 480i60         | 1280*768P60rb  | 720*576P50   |
| 1080P59      | 480i59         | 1152*864P75    | 1440*576i50  |
| 1080P50      | 1920*1200P60rb | 1024*768P75    | 1280*768P75  |
| 1080P30      | 1680*1050P60   | 1024*768P70    | 1280*800P60  |
| 1080P29      | 1680*1050P60rb | 1024*768P60    | 1360*768P60  |
| 1080P25      | 1600*1200P60   | 848*480P60     | 1280*1024P75 |

# Protocol 3000 Commands

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:**

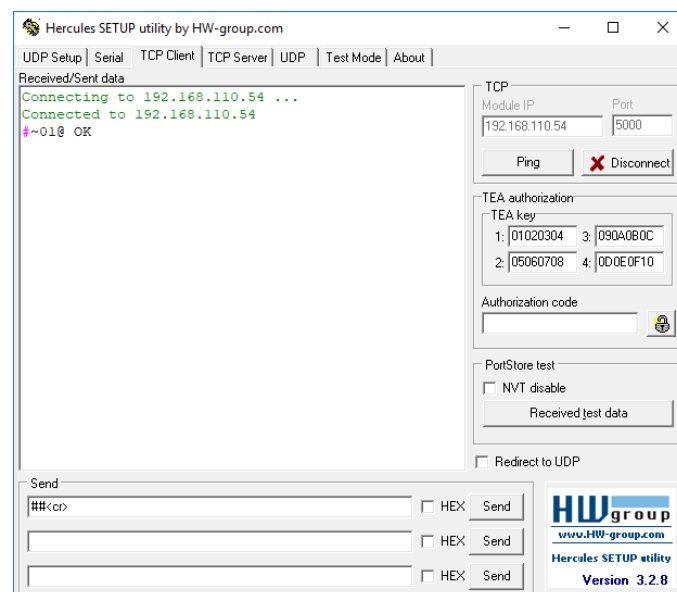
| Prefix | Command Name | Constant (Space) | Parameter(s) | Suffix |
|--------|--------------|------------------|--------------|--------|
| #      | Command      | _                | Parameter    | <CR>   |

- **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-88H2**. 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  |
|----------|---|---|---|--|
| #        | <p>Protocol handshaking.</p> <p>ⓘ Validates the Protocol 3000 connection and gets the machine number.</p> <p>Step-in master products use this command to identify the availability of a device.</p>           | <p><b>COMMAND</b></p> <p>#&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@_ok&lt;CR&gt;&lt;LF&gt;</p>  |   | #<CR>  |
| AFV      | <p>Set audio follow video/audio breakaway mode.</p> <p>ⓘ When the unit moves from breakaway to audio follow video switching mode, all audio switch settings reset according to the video switch settings.</p> | <p><b>COMMAND</b></p> <p>#AFV_afv_mode&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@AFV_afv_mode&lt;CR&gt;&lt;LF&gt;</p>   | <p><b>afv_mode</b> – Front panel AFV mode</p> <p>0 – afv – sets the unit to the audio-follow-video switching mode</p> <p>1 – brk – sets the unit to the audio breakaway switching mode</p>  | <p>Set audio breakaway mode:</p> <p>#AFV_1&lt;CR&gt;</p>                           |
| AFV?     | <p>Get audio follow video mode status.</p> <p>ⓘ When the unit moves from breakaway to audio follow video switching mode, all audio switch settings reset according to the video switch settings.</p>          | <p><b>COMMAND</b></p> <p>#AFV?_&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@AFV_afv_mode&lt;CR&gt;&lt;LF&gt;</p>  | <p><b>afv_mode</b> – Front panel AFV mode</p> <p>0 – afv – sets the unit to the audio-follow-video switching mode</p> <p>1 – brk – sets the unit to the audio breakaway switching mode</p>  | <p>Get audio follow video mode status:</p> <p>#AFV?_&lt;CR&gt;</p>                 |
| AUD      | <p>LEGACY COMMAND. Set audio switch state.</p> <p>ⓘ When AFV switching mode is active, this command cannot switch video.</p>  | <p><b>COMMAND</b></p> <p>#AUD_in&gt;out_id,in&gt;out_id,..&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@AUD_in&gt;out_id&lt;CR&gt;&lt;LF&gt;</p> <p>~nn@AUD_in&gt;out_id&lt;CR&gt;&lt;LF&gt;</p>           | <p><b>in</b> – Input number</p> <p>0 – disconnect output</p> <p>1 – HDMI IN 1</p> <p>2 – HDMI IN 2</p> <p>3 – HDMI IN 3</p> <p>4 – HDMI IN 4</p> <p>5 – HDMI IN 5</p> <p>6 – HDMI IN 6</p> <p>7 – HDMI IN 7</p> <p>8 – HDMI IN 8</p> <p>&gt; – Connection character between in and out parameters</p> <p><b>out_id</b> – Output number</p> <p>* – All outputs</p> <p>1 – HDMI OUT 1</p> <p>2 – HDMI OUT 2</p> <p>3 – HDMI OUT 3</p> <p>4 – HDMI OUT 4</p> <p>5 – HDMI OUT 5</p> <p>6 – HDMI OUT 6</p> <p>7 – HDMI OUT 7</p> <p>8 – HDMI OUT 8</p> | <p>Switch embedded audio HDMI IN 1 to HDMI OUT 3:</p> <p>#AUD_1&gt;3&lt;CR&gt;</p> |
| AUD?     | <p>LEGACY COMMAND. Get audio switch state.</p> <p>ⓘ When AFV switching mode is active, this command cannot switch video.</p>  | <p><b>COMMAND</b></p> <p>#AUD?_out_id&lt;CR&gt;</p> <p>#AUD?_*&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@AUD_in&gt;out_id&lt;CR&gt;&lt;LF&gt;</p> <p>~nn@AUD_in&gt;1,in&gt;2,..&lt;CR&gt;&lt;LF&gt;</p> | <p><b>in</b> – Input number</p> <p>1 – HDMI IN 1</p> <p>2 – HDMI IN 2</p> <p>3 – HDMI IN 3</p> <p>4 – HDMI IN 4</p> <p>5 – HDMI IN 5</p> <p>6 – HDMI IN 6</p> <p>7 – HDMI IN 7</p> <p>8 – HDMI IN 8</p> <p>&gt; – Connection character between in and out parameters</p> <p><b>out_id</b> – Output number</p> <p>* – All outputs</p> <p>1 – HDMI OUT 1</p> <p>2 – HDMI OUT 2</p> <p>3 – HDMI OUT 3</p> <p>4 – HDMI OUT 4</p> <p>5 – HDMI OUT 5</p> <p>6 – HDMI OUT 6</p> <p>7 – HDMI OUT 7</p> <p>8 – HDMI OUT 8</p>                              | <p>Get audio switch state for HDMI OUT 3:</p> <p>#AUD?_3&lt;CR&gt;</p>             |

| Function       | Description   | Syntax   | Parameters/Attributes  | Example  |
|----------------|---|--|--|--|
| AV             | Switch audio and video.   | <b>COMMAND</b><br>#AV_in>out_id,in>out_id,...<CR><br><b>FEEDBACK</b><br>~nn@AV_in>out_id,in>out_id,...<CR><LF>   | <b>in</b> – Number that indicates the specific input:<br>0 – disconnect output<br>1 – HDMI IN 1<br>2 – HDMI IN 2<br>3 – HDMI IN 3<br>4 – HDMI IN 4<br>5 – HDMI IN 5<br>6 – HDMI IN 6<br>7 – HDMI IN 7<br>8 – HDMI IN 8<br><b>&gt;</b> – Connection character between in and out parameters<br><b>out_id</b> – Output number<br>* – All outputs<br>1 – HDMI OUT 1<br>2 – HDMI OUT 2<br>3 – HDMI OUT 3<br>4 – HDMI OUT 4<br>5 – HDMI OUT 5<br>6 – HDMI OUT 6<br>7 – HDMI OUT 7<br>8 – HDMI OUT 8 | Switch HDMI IN 1 to HDMI OUT 4:<br>#AV_1>4<CR>   |
| AV-SW-MODE     | Set input auto switch mode (per output).  | <b>COMMAND</b><br>#AV-SW-MODE_layer_type,out_index,connection_mode<CR><br><b>FEEDBACK</b><br>~nn@AV-SW-MODE_layer_type,out_index,connection_mode<CR><LF>   | <b>layer_type</b> – Number that indicates the signal type:<br>1 – Video<br><b>out_index</b> – Number that indicates the specific output:<br>1 – HDMI OUT 1<br>2 – HDMI OUT 2<br>3 – HDMI OUT 3<br>4 – HDMI OUT 4<br>5 – HDMI OUT 5<br>6 – HDMI OUT 6<br>7 – HDMI OUT 7<br>8 – HDMI OUT 8<br><b>connection_mode</b> – Connection mode<br>0 – manual<br>1 – priority switch<br>2 – last connected switch   | Set input auto switch mode (per output) for HDMI OUT 1 to manual:<br>#AV-SW-MODE_1,1,0<CR>   |
| AV-SW-MODE?    | Get input auto switch mode (per output).  | <b>COMMAND</b><br>#AV-SW-MODE?_layer_type,out_index<CR><br><b>FEEDBACK</b><br>~nn@AV-SW-MODE_layer_type,out_index,connection_mode<CR><LF>  | <b>layer_type</b> – Number that indicates the signal type:<br>1 – Video<br><b>out_index</b> – Number that indicates the specific output:<br>1 – HDMI OUT 1<br>2 – HDMI OUT 2<br>3 – HDMI OUT 3<br>4 – HDMI OUT 4<br>5 – HDMI OUT 5<br>6 – HDMI OUT 6<br>7 – HDMI OUT 7<br>8 – HDMI OUT 8<br><b>connection_mode</b> – Connection mode<br>0 – manual<br>1 – priority switch<br>2 – last connected switch   | Get the input auto switch mode for HDMI OUT 1:<br>#AV-SW-MODE?_1,1<CR>   |
| AV-SW-TIMEOUT  | Set auto switching timeout.   | <b>COMMAND</b><br>#AV-SW-TIMEOUT_switching_mode,time_out<CR><br><b>FEEDBACK</b><br>~nn@AV-SW-TIMEOUT_switching_mode,time_out<CR><LF>   | <b>switching_mode</b> – Switching mode<br>0 – Video signal lost<br>4 – Disable 5V on video output if no input signal detected<br><b>time_out</b> – Timeout in seconds<br>0 - 999   | Set the auto switching timeout to 5 seconds in the event of 5V disable when no input signal is detected:<br>#AV-SW-TIMEOUT_4,5<CR> |
| AV-SW-TIMEOUT? | Get auto switching timeout.   | <b>COMMAND</b><br>#AV-SW-TIMEOUT?_switching_mode<CR><br><b>FEEDBACK</b><br>~nn@AV-SW-TIMEOUT_switching_mode,time_out<CR><LF>   | <b>switching_mode</b> – Switching mode<br>0 – Video signal lost<br>4 – Disable 5V on video output if no input signal detected<br><b>time_out</b> – Timeout in seconds<br>0 - 999   | Get the Disable 5V on video output if no input signal detected timeout:<br>#AV-SW-TIMEOUT?_4<CR>                                   |
| BAUD           | Set protocol serial port baud rate.<br><i>i</i> The new defined baud rate is stored in the EEPROM and used when powering up.<br>Default baud rate is 115200 (on factory reset).<br>Only works with devices supporting this command (if ERR 002 is returned, the default baud rate is used). | <b>COMMAND</b><br>#BAUD_baud_rate<CR><br><b>FEEDBACK</b><br>~nn@BAUD_baud_rate<CR><LF><br>Option 1:<br>~nn@BAUD_current_baud_rate<CR><LF><br>Option 2:<br>~nn@BAUD_baud_rate1,baud_rate2,...<CR><LF> | <b>baud_rate</b> – 9600 / 115200 / else - new baud rate to set<br><b>current_baud_rate</b> – 9600 / 115200 / else - current protocol serial port baud rate<br><b>baud_param</b> – 0 - get the list of supported baud rates<br><b>baud_rate1,baud_rate2,...</b> – List of supported baud rates  | Set the baud rate to 9600:<br>#BAUD_9600<CR>   |





| Function           | Description   | Syntax  | Parameters/Attributes   | Example  |
|--------------------|---|---|---|--|
| <b>BAUD?</b>       | <p>Get protocol serial port baud rate.<br/>(Option 1 - for current baud rate.<br/>Option 2 - for list of supported baud rates).</p> <p><b>i</b> The new defined baud rate is stored in the EEPROM and used when powering up.</p> <p>Default baud rate is 115200 (on factory reset).</p> <p>Only works with devices supporting this command (if ERR 002 is returned, the default baud rate is used).</p> | <p><b>COMMAND</b></p> <pre>#BAUD?_&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@BAUD_&lt;baud_rate&gt;&lt;CR&gt;&lt;LF&gt;</pre> <p>Option 1:</p> <pre>~nn@BAUD_&lt;current_baud_rate&gt;&lt;CR&gt;&lt;LF&gt;</pre> <p>Option 2:</p> <pre>~nn@BAUD_&lt;baud_rate1,baud_rate2,...&gt;&lt;CR&gt;&lt;LF&gt;</pre> | <p><b>baud_rate</b> – 9600 / 115200 / else - new baud rate to set</p> <p><b>current_baud_rate</b> – 9600 / 115200 / else - current protocol serial port baud rate</p> <p><b>baud_param</b> – 0 - get the list of supported baud rates</p> <p><b>baud_rate1, - Baud_rate2, ...</b> - list of supported baud rates</p>  | <p>Get protocol serial port baud rate:</p> <pre>#BAUD?_&lt;CR&gt;</pre>  |
| <b>BUILD-DATE?</b> | <p>Get device build date.</p>   | <p><b>COMMAND</b></p> <pre>#BUILD-DATE?_&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@BUILD-DATE_&lt;date,time&gt;&lt;CR&gt;&lt;LF&gt;</pre>   | <p><b>date</b> – Format: YYYY/MM/DD where<br/>YYYY = Year<br/>MM = Month<br/>DD = Day</p> <p><b>time</b> – Format: hh:mm:ss where<br/>hh = hours<br/>mm = minutes<br/>ss = seconds</p>  | <p>Get the device build date:</p> <pre>#BUILD-DATE?&lt;CR&gt;</pre>  |
| <b>CPEDID</b>      | <p>Copy EDID data from the output to the input EEPROM.</p> <p><b>i</b> Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word).</p> <p>Example: bitmap 0x0013 means inputs 1,2 and 5 are loaded with the new EDID.</p> <p>In certain products Safe_mode is an optional parameter. See the HELP command for its availability.</p>                                       | <p><b>COMMAND</b></p> <pre>#CPEDID_&lt;edid_io,src_id,dst_type,dest_bitmap&gt;&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@CPEDID_&lt;edid_io,src_id,dst_type,dest_bitmap&gt;&lt;CR&gt;&lt;LF&gt;</pre>   | <p><b>edid_io</b> – EDID source type (usually output)<br/>0 – Input<br/>1 – Output<br/>2 – Default EDID</p> <p><b>src_id</b> – Number of chosen source stage<br/>For input source:<br/>1 – HDMI IN 1<br/>2 – HDMI IN 2<br/>3 – HDMI IN 3<br/>4 – HDMI IN 4<br/>5 – HDMI IN 5<br/>6 – HDMI IN 6<br/>7 – HDMI IN 7<br/>8 – HDMI IN 8<br/>For output source:<br/>0 – Default EDID source<br/>1 – HDMI OUT 1<br/>2 – HDMI OUT 2<br/>3 – HDMI OUT 3<br/>4 – HDMI OUT 4<br/>5 – HDMI OUT 5<br/>6 – HDMI OUT 6<br/>7 – HDMI OUT 7<br/>8 – HDMI OUT 8</p> <p><b>dst_type</b> – EDID destination type (usually input)<br/>0 – Input</p> <p><b>dest_bitmap</b> – Bitmap representing destination IDs. Format: XXXX...X, where X is hex digit. The binary form of every hex digit represents corresponding destinations.<br/>0 – indicates that EDID data is not copied to this destination.<br/>1 – indicates that EDID data is copied to this destination.</p> | <p>Copy the EDID data from the HDMI OUT 1 (EDID source) to the Input:</p> <pre>#CPEDID_1,1,0,0x1&lt;CR&gt;</pre> <p>Copy the EDID data from the default EDID source to the Input:</p> <pre>#CPEDID_2,0,0,0x1&lt;CR&gt;</pre> |
| <b>DIR</b>         | <p>List files in device.</p>  | <p><b>COMMAND</b></p> <pre>#DIR&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <p>Multi-line:</p> <pre>~nn@DIR&lt;CR&gt;&lt;LF&gt;</pre> <pre>file_name TABfile_size_bytes,id:_file_id&lt;CR&gt;&lt;LF&gt;</pre> <pre>TABfree_size_bytes.&lt;CR&gt;&lt;LF&gt;</pre>   | <p><b>file_name</b> – Name of file</p> <p><b>file_size</b> – File size in bytes. A file can take more space on device memory</p> <p><b>file_id</b> – Internal ID for file in file system</p> <p><b>free_size</b> – Free space in bytes in device file system</p>  | <pre>#DIR&lt;CR&gt;</pre>  |
| <b>DISPLAY?</b>    | <p>Get output HPD status.</p>   | <p><b>COMMAND</b></p> <pre>#DISPLAY?_&lt;out_index&gt;&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@DISPLAY_&lt;out_index,status&gt;&lt;CR&gt;&lt;LF&gt;</pre>   | <p><b>out_index</b> – Number that indicates the specific output:<br/>1 – HDMI OUT 1<br/>2 – HDMI OUT 2<br/>3 – HDMI OUT 3<br/>4 – HDMI OUT 4<br/>5 – HDMI OUT 5<br/>6 – HDMI OUT 6<br/>7 – HDMI OUT 7<br/>8 – HDMI OUT 8</p> <p><b>status</b> – HPD status according to signal validation<br/>0 – Signal or sink is not valid<br/>1 – Signal or sink is valid<br/>2 – Sink and EDID is valid</p>  | <p>Get the output HPD status of HDMI OUT 1:</p> <pre>#DISPLAY?_1&lt;CR&gt;</pre>   |

| Function            | Description  | Syntax   | Parameters/Attributes  | Example  |
|---------------------|--|--|--|--|
| DPSW-STATUS?<br>N/A | Get the DIP-switch state.  | <b>COMMAND</b><br>#DPSW-STATUS?_dip_id<CR><br><b>FEEDBACK</b><br>~nn@DPSW-STATUS_dip_id,status<CR><LF>         | dip_id – 1 to 8 (number of DIP switches)<br>status – Up/down<br>0 – Up<br>1 – Down   | get the DIP-switch 2 status:<br>#DPSW-STATUS?_2<CR>                            |
| ETH-PORT            | Set Ethernet port protocol.<br><br>ⓘ 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).   | <b>COMMAND</b><br>#ETH-PORT_port_type,port_id<CR><br><b>FEEDBACK</b><br>~nn@ETH-PORT_port_type,port_id<CR><LF> | port_type – TCP/UDP<br>port_id – TCP/UDP port number (2000 – 65535)  | Set the Ethernet port protocol for TCP to port 12457:<br>#ETH-PORT_0,12457<CR> |
| ETH-PORT?           | Get Ethernet port protocol.  | <b>COMMAND</b><br>#ETH-PORT?_port_type<CR><br><b>FEEDBACK</b><br>~nn@ETH-PORT_port_type,port_id<CR><LF>        | port_type – TCP/UDP<br>0 – TCP<br>1 – UDP<br>port_id – TCP / UDP port number (2000 – 65535)  | Get the Ethernet port protocol for UDP:<br>#ETH-PORT?_1<CR>                    |
| FACTORY             | Reset device to factory default configuration.<br><br>ⓘ This command deletes all user data from the device. The deletion can take some time.<br><br>Your device may require powering off and powering on for the changes to take effect. | <b>COMMAND</b><br>#FACTORY<CR><br><b>FEEDBACK</b><br>~nn@FACTORY_ok<CR><LF>                                    |  | Reset the device to factory default configuration:<br>#FACTORY<CR>             |
| FPGA-VER?           | Get current FPGA version.  | <b>COMMAND</b><br>#FPGA-VER?_fpga_id<CR><br><b>FEEDBACK</b><br>~nn@FPGA-VER_fpga_id,expected_ver,ver<CR><LF>   | fpga_id – FPGA id 1<br>expected_ver – Expected FPGA version for current firmware<br>ver – Actual FPGA version  | Get current FPGA version:<br>#FPGA-VER?_1<CR>                                  |
| GEDID               | Get EDID support on certain input/output.<br><br>ⓘ For old devices that do not support this command, ~nn@ERR 002<CR><LF> is received.  | <b>COMMAND</b><br>#GEDID_io_mode,in_index<CR><br><b>FEEDBACK</b><br>~nn@GEDID_io_mode,in_index,size<CR><LF>    | io_mode – Input/Output<br>0 – Input<br>1 – Output<br>2 – Default EDID<br>in_index – Number that indicates the specific input:<br>1 – HDMI IN 1<br>2 – HDMI IN 2<br>3 – HDMI IN 3<br>4 – HDMI IN 4<br>5 – HDMI IN 5<br>6 – HDMI IN 6<br>7 – HDMI IN 7<br>8 – HDMI IN 8<br>size – Size of data to be sent from device, 0 means no EDID support | Get EDID support information for HDMI IN 1:<br>#GEDID_0,1<CR>                  |
| HDCP-MOD            | Set HDCP mode.<br><br>ⓘ Set HDCP working mode on the device input:<br><br>HDCP supported - HDCP_ON [default].<br><br>HDCP not supported - HDCP OFF.  | <b>COMMAND</b><br>#HDCP-MOD_in_index,mode<CR><br><b>FEEDBACK</b><br>~nn@HDCP-MOD_in_index,mode<CR><LF>         | in_index – Number that indicates the specific input:<br>1 – HDMI IN 1<br>2 – HDMI IN 2<br>3 – HDMI IN 3<br>4 – HDMI IN 4<br>5 – HDMI IN 5<br>6 – HDMI IN 6<br>7 – HDMI IN 7<br>8 – HDMI IN 8<br>mode – HDCP mode:<br>0 – HDCP Off<br>1 – HDCP On   | Set the input HDCP-MODE of HDMI IN 1 to Off:<br>#HDCP-MOD_1,0<CR>              |
| HDCP-MOD?           | Get HDCP mode.<br><br>ⓘ Set HDCP working mode on the device input:<br><br>HDCP supported - HDCP_ON [default].<br><br>HDCP not supported - HDCP OFF.  | <b>COMMAND</b><br>#HDCP-MOD?_in_index<CR><br><b>FEEDBACK</b><br>~nn@HDCP-MOD_in_index,mode<CR><LF>             | in_index – Number that indicates the specific input:<br>1 – HDMI IN 1<br>2 – HDMI IN 2<br>3 – HDMI IN 3<br>4 – HDMI IN 4<br>5 – HDMI IN 5<br>6 – HDMI IN 6<br>7 – HDMI IN 7<br>8 – HDMI IN 8<br>mode – HDCP mode:<br>0 – HDCP Off<br>1 – HDCP On   | Get the input HDCP-MODE of HDMI IN 1:<br>#HDCP-MOD?_1<CR>                      |









| Function          | Description   | Syntax   | Parameters/Attributes   | Example   |
|-------------------|---|--|---|---|
| <b>HDCP-STAT?</b> | Get HDCP signal status.<br><br><p>ⓘ io_mode =1 – get the HDCP signal status of the sink device connected to the specified output.</p> <p>io_mode =0 – get the HDCP signal status of the source device connected to the specified input.</p> | <b>COMMAND</b><br>#HDCP-STAT?_io_mode,io_index<CR><br><b>FEEDBACK</b><br>~nn@HDCP-STAT_io_mode,io_index,status<CR><LF>                   | <b>io_mode</b> – Input/Output<br>0 – Input<br>1 – Output<br><b>io_index</b> – Number that indicates the specific input:<br>1 – HDMI IN 1<br>2 – HDMI IN 2<br>3 – HDMI IN 3<br>4 – HDMI IN 4<br>5 – HDMI IN 5<br>6 – HDMI IN 6<br>7 – HDMI IN 7<br>8 – HDMI IN 8<br><br>1 – HDMI OUT 1<br>2 – HDMI OUT 2<br>3 – HDMI OUT 3<br>4 – HDMI OUT 4<br>5 – HDMI OUT 5<br>6 – HDMI OUT 6<br>7 – HDMI OUT 7<br>8 – HDMI OUT 8<br><b>status</b> – Signal encryption status - valid values On/Off<br>0 – HDCP Off<br>1 – HDCP On                    | Get the output HDCP-STATUS of HDMI IN 1:<br>#HDCP-STAT?_0,1<CR> |
| <b>HELP</b>       | Get command list or help for specific command.  | <b>COMMAND</b><br>#HELP<CR><br><b>FEEDBACK</b><br>1. Multi-line:<br>~nn@Device_cmd_name,_cmd_name...<CR><LF>                             | <b>cmd_name</b> – Name of a specific command  | Get the command list:<br>#HELP<CR>                              |
| <b>IDV</b>        | Set visual indication from device.<br><br><p>ⓘ Using this command, some devices can light a sequence of buttons or LEDs to allow identification of a specific device from similar devices.</p>  | <b>COMMAND</b><br>#IDV<CR><br><b>FEEDBACK</b><br>~nn@IDV_ok<CR><LF>  |   | #IDV<CR>  |
| <b>INFO-IO?</b>   | LEGACY COMMAND. Get in/out count.   | <b>COMMAND</b><br>#INFO-IO?_<CR><br><b>FEEDBACK</b><br>~nn@INFO-IO_IN_in_count,OUT_out_count<CR><LF>                                     | <b>in_count</b> – Number of inputs in the unit<br><b>out_count</b> – Number of outputs in the unit  | Get inputs count:<br>#INFO-IO?_<CR>                             |
| <b>INFO-PRST?</b> | LEGACY COMMAND. Get maximum preset count.<br><br><p>ⓘ In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.</p>   | <b>COMMAND</b><br>#INFO-PRST?_<CR><br><b>FEEDBACK</b><br>~nn@INFO-PRST_vid_video_preset_count,audio_audio_preset_count<CR><LF>           | <b>video_preset_count</b> – Maximum number of video presets in the unit<br><b>audio_preset_count</b> – Maximum number of audio presets in the unit  | Get number of video and audio presets:<br>#INFO-PRST?_<CR>      |
| <b>LABEL</b>      | Set input/output label.   | <b>COMMAND</b><br>#LABEL_io_mode,io_index,switch,label_txt<CR><br><b>FEEDBACK</b><br>~nn@LABEL_io_mode,io_index,switch,label_txt<CR><LF> | <b>io_mode</b> – Input/Output<br>0 – Input<br>1 – Output<br><b>io_index</b> – Number that indicates the specific input or output port:<br>1 – HDMI IN 1<br>2 – HDMI IN 2<br>3 – HDMI IN 3<br>4 – HDMI IN 4<br>5 – HDMI IN 5<br>6 – HDMI IN 6<br>7 – HDMI IN 7<br>8 – HDMI IN 8<br><br>1 – HDMI OUT 1<br>2 – HDMI OUT 2<br>3 – HDMI OUT 3<br>4 – HDMI OUT 4<br>5 – HDMI OUT 5<br>6 – HDMI OUT 6<br>7 – HDMI OUT 7<br>8 – HDMI OUT 8<br><b>switch</b> – On/Off (enable/disable)<br>custom label<br><b>label_txt</b> – Custom label string | Set HDMI OUT 1 label on:<br>#LABEL_1,1,1,1<CR>                  |

| Function        | Description  | Syntax   | Parameters/Attributes   | Example   |    |    |    |    |           |        |      |     |  |   |
|-----------------|--|--|---|---|----|----|----|----|-----------|--------|------|-----|--|---|
| <b>LABEL?</b>   | Get input/output label.  | <b>COMMAND</b><br><b>#LABEL?_io_mode,io_index&lt;CR&gt;</b><br><b>FEEDBACK</b><br>~nn@LABEL_io_mode,io_index,switch,label_txt<CR><LF>  | <b>io_mode</b> – Input/Output<br>0 – Input<br>1 – Output<br><b>io_index</b> – Number that indicates the specific input or output port:<br>1 – HDMI IN 1<br>2 – HDMI IN 2<br>3 – HDMI IN 3<br>4 – HDMI IN 4<br>5 – HDMI IN 5<br>6 – HDMI IN 6<br>7 – HDMI IN 7<br>8 – HDMI IN 8<br><br>1 – HDMI OUT 1<br>2 – HDMI OUT 2<br>3 – HDMI OUT 3<br>4 – HDMI OUT 4<br>5 – HDMI OUT 5<br>6 – HDMI OUT 6<br>7 – HDMI OUT 7<br>8 – HDMI OUT 8<br><br><b>switch</b> – On/Off (enable/disable)<br>custom label<br><b>label_txt</b> – Custom label string   | Get HDMI IN 1 label:<br><b>#LABEL?_0,1&lt;CR&gt;</b>          |    |    |    |    |           |        |      |     |  |   |
| <b>LOAD</b>     | Load file to device.   | <b>COMMAND</b><br><b>#LOAD_file_name,size&lt;CR&gt;</b><br><b>FEEDBACK</b><br>Data sending negotiation:<br>* Device -<br>~01@LOAD_file_name,size_ready<CR><LF><br>* End User (+Device)-<br>Send file in Protocol Packets<br>* Device -<br>~01@LOAD_file_name,size_ok<CR><LF> | <b>file_name</b> – Name of file to save on device<br><b>size</b> – Size of file data that is sent<br><b>Using the Packet Protocol</b><br>Send a command: LDRV, LOAD, IROUT, LDEDID<br>Receive Ready or ERR###<br>If Ready:<br>a. Send a packet,<br>b. Receive OK on the last packet,<br>c. Receive OK for the command<br>Packet structure:<br><b>Packet ID</b> (1, 2, 3...) (2 bytes in length)<br><b>Length</b> (data length + 2 for CRC) – (2 bytes in length)<br><b>Data</b> (data length -2 bytes)<br><b>CRC</b> – 2 bytes<br><table border="1"> <thead> <tr> <th>01</th> <th>02</th> <th>03</th> <th>04</th> <th>05</th> </tr> </thead> <tbody> <tr> <td>Packet ID</td> <td>Length</td> <td>Data</td> <td>CRC</td> <td></td> </tr> </tbody> </table> 5. Response:<br>~nnnn_ok<CR><LF> (Where <b>NNNN</b> is the received packet ID in ASCII hex digits.) | 01  | 02 | 03 | 04 | 05 | Packet ID | Length | Data | CRC |  | Load the file_response.dat file to the device:<br><b>#LOAD_file_response.dat,5360&lt;CR&gt;</b> |
| 01              | 02   | 03   | 04  | 05  |    |    |    |    |           |        |      |     |  |   |
| Packet ID       | Length   | Data   | CRC   |   |    |    |    |    |           |        |      |     |  |   |
| <b>LOCK-FP</b>  | Lock the front panel.<br><i>i</i> In NT-52N, this command includes the PortNumber (1-2) parameter.           | <b>COMMAND</b><br><b>#LOCK-FP_lock/unlock&lt;CR&gt;</b><br><b>FEEDBACK</b><br>~nn@LOCK-FP_lock/unlock<CR><LF>  | <b>lock/unlock</b> – On/Off<br>0 – Off unlocks front panel<br>1 – On locks front panel  | Unlock front panel:<br><b>#LOCK-FP_0&lt;CR&gt;</b>            |    |    |    |    |           |        |      |     |  |   |
| <b>LOCK-FP?</b> | Get the front panel lock state.<br><i>i</i> In NT-52N, this command includes the PortNumber (1-2) parameter. | <b>COMMAND</b><br><b>#LOCK-FP?_&lt;CR&gt;</b><br><b>FEEDBACK</b><br>~nn@LOCK-FP_lock/unlock<CR><LF>  | <b>lock/unlock</b> – On/Off<br>0 – Off unlocks front panel<br>1 – On locks front panel  | Get the front panel lock state:<br><b>#LOCK-FP?&lt;CR&gt;</b> |    |    |    |    |           |        |      |     |  |   |



| Function | Description  | Syntax   | Parameters/Attributes   | Example   |
|----------|--|--|---|---|
| LOGIN    | <p>Set protocol permission.</p> <p> The permission system works only if security is enabled with the "SECUR" command.</p> <p>LOGIN allows the user to run commands with an End User or Administrator permission level. When the permission system is enabled, LOGIN enables running commands with the User or Administrator permission level. When set, login must be performed upon each connection.</p> <p>It is not mandatory to enable the permission system in order to use the device.</p> <p>In each device, some connections allow logging in to different levels. Some do not work with security at all.</p> <p>Connection may logout after timeout.</p> | <p><b>COMMAND</b></p> <pre>#LOGIN_login_level,password&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@LOGIN_login_level,password_ok&lt;CR&gt;&lt;LF&gt;</pre> <p>or</p> <pre>~nn@LOGIN_err_004&lt;CR&gt;&lt;LF&gt;</pre> <p>(if bad password entered)</p> | <p><b>login_level</b> – Level of permissions required (User or Admin)</p> <p><b>password</b> – Predefined password (by PASS command). Default password is an empty string</p> | <p>Set the protocol permission level to Admin (when the password defined in the PASS command is 33333):</p> <pre>#LOGIN_Admin,33333&lt;CR&gt;</pre> |
| LOGIN?   | <p>Get current protocol permission level.</p> <p> The permission system works only if security is enabled with the "SECUR" command.</p> <p>For devices that support security, LOGIN allows the user to run commands with an End User or Administrator permission level.</p> <p>In each device, some connections allow logging in to different levels. Some do not work with security at all.</p> <p>Connection may logout after timeout.</p>  | <p><b>COMMAND</b></p> <pre>#LOGIN?_&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@LOGIN_login_level&lt;CR&gt;&lt;LF&gt;</pre>  | <p><b>login_level</b> – Level of permissions required (User or Admin)</p>   | <p>Get current protocol permission level:</p> <pre>#LOGIN?_&lt;CR&gt;</pre>   |
| LOGOUT   | <p>Cancel current permission level.</p> <p> Logs out from End User or Administrator permission levels to Not Secure.</p>  | <p><b>COMMAND</b></p> <pre>#LOGOUT&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@LOGOUT_ok&lt;CR&gt;&lt;LF&gt;</pre>   |   | <pre>#LOGOUT&lt;CR&gt;</pre>  |
| MODEL?   | <p>Get device model.</p> <p> This command identifies equipment connected to VS-88H2 and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests.</p>   | <p><b>COMMAND</b></p> <pre>#MODEL?_&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@MODEL_model_name&lt;CR&gt;&lt;LF&gt;</pre>   | <p><b>model_name</b> – String of up to 19 printable ASCII chars</p>   | <p>Get the device model:</p> <pre>#MODEL?_&lt;CR&gt;</pre>  |

| Function         | Description   | Syntax  | Parameters/Attributes  | Example   |
|------------------|---|---|--|---|
| <b>MTX-MODE</b>  | <p>LEGACY COMMAND.<br/>Set auto-switch mode.</p> <p>ⓘ Not recommended for new devices.</p>  | <p><b>COMMAND</b><br/>#MTX-MODE_ out_id,connection_mode&lt;CR&gt;</p> <p><b>FEEDBACK</b><br/>~nn@MTX-MODE_ out_id,connection_mode&lt;CR&gt;&lt;LF&gt;</p> | <p>out_id – number of system outputs</p> <ul style="list-style-type: none"> <li>* – All outputs</li> <li>1 – HDMI OUT 1</li> <li>2 – HDMI OUT 2</li> <li>3 – HDMI OUT 3</li> <li>4 – HDMI OUT 4</li> <li>5 – HDMI OUT 5</li> <li>6 – HDMI OUT 6</li> <li>7 – HDMI OUT 7</li> <li>8 – HDMI OUT 8</li> </ul> <p>connection_mode – Connection mode</p> <ul style="list-style-type: none"> <li>0 – manual</li> <li>1 – auto priority</li> <li>2 – auto last connected</li> </ul> | <p>Set HDMI OUT 1 to last connected:</p> <p>#MTX-MODE_1,2&lt;CR&gt;</p>               |
| <b>MTX-MODE?</b> | <p>LEGACY COMMAND.<br/>Get auto-switch mode.</p> <p>ⓘ Not recommended for new devices.</p>  | <p><b>COMMAND</b><br/>#MTX-MODE?_out_id&lt;CR&gt;</p> <p><b>FEEDBACK</b><br/>~nn@MTX-MODE_ out_id,connection_mode&lt;CR&gt;&lt;LF&gt;</p>                 | <p>out_id – number of system outputs</p> <ul style="list-style-type: none"> <li>1 – HDMI OUT 1</li> <li>2 – HDMI OUT 2</li> <li>3 – HDMI OUT 3</li> <li>4 – HDMI OUT 4</li> <li>5 – HDMI OUT 5</li> <li>6 – HDMI OUT 6</li> <li>7 – HDMI OUT 7</li> <li>8 – HDMI OUT 8</li> </ul> <p>connection_mode – Connection mode</p> <ul style="list-style-type: none"> <li>0 – manual</li> <li>1 – auto priority</li> <li>2 – auto last connected</li> </ul>                          | <p>Get auto-switch mode for HDMI OUT 2:</p> <p>#MTX-MODE?_2&lt;CR&gt;</p>             |
| <b>NAME</b>      | <p>Set machine (DNS) name.</p> <p>ⓘ The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on).</p>  | <p><b>COMMAND</b><br/>#NAME_ machine_name&lt;CR&gt;</p> <p><b>FEEDBACK</b><br/>~nn@NAME_ machine_name&lt;CR&gt;&lt;LF&gt;</p>                             | <p>machine_name – String of up to 14 alpha-numeric chars (can include hyphen, not at the beginning or end)</p>   | <p>Set the DNS name of the device to room-442:</p> <p>#NAME_ room-442&lt;CR&gt;</p>   |
| <b>NAME?</b>     | <p>Get machine (DNS) name.</p> <p>ⓘ The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on).</p>  | <p><b>COMMAND</b><br/>#NAME?_&lt;CR&gt;</p> <p><b>FEEDBACK</b><br/>~nn@NAME_ machine_name&lt;CR&gt;&lt;LF&gt;</p>   | <p>machine_name – String of up to 14 alpha-numeric chars (can include hyphen, not at the beginning or end)</p>   | <p>Get the DNS name of the device:</p> <p>#NAME?_&lt;CR&gt;</p>                       |
| <b>NAME-RST</b>  | <p>Reset machine (DNS) name to factory default.</p> <p>ⓘ Factory default of machine (DNS) name is "KRAMER_" + 4 last digits of device serial number.</p>  | <p><b>COMMAND</b><br/>#NAME-RST&lt;CR&gt;</p> <p><b>FEEDBACK</b><br/>~nn@NAME-RST_ ok&lt;CR&gt;&lt;LF&gt;</p>   |  | <p>Reset the machine name (S/N last digits are 0102):</p> <p>#NAME-RST_&lt;CR&gt;</p> |
| <b>NET-DHCP</b>  | <p>Set DHCP mode.</p> <p>ⓘ Only 1 is relevant for the mode value. To disable DHCP, the user must configure a static IP address for the device.</p> <p>Connecting Ethernet to devices with DHCP may take more time in some networks.</p> <p>To connect with a randomly assigned IP by DHCP, specify the device DNS name (if available) using the <b>NAME</b> command. You can also get an assigned IP by direct connection to USB or RS-232 protocol port, if available.</p> <p>For proper settings consult your network administrator.</p> <p>ⓘ For Backward compatibility, the <b>id</b> parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.</p> | <p><b>COMMAND</b><br/>#NET-DHCP_ dhcp_state&lt;CR&gt;</p> <p><b>FEEDBACK</b><br/>~nn@NET-DHCP_ dhcp_state&lt;CR&gt;&lt;LF&gt;</p>                         | <p>dhcp_state –</p> <ul style="list-style-type: none"> <li>1 – Try to use DHCP. (If unavailable, use the IP address set by the factory or the net-ip command).</li> </ul>  | <p>Enable DHCP mode for port 1, if available:</p> <p>#NET-DHCP_1&lt;CR&gt;</p>        |

| Function  | Description  | Syntax   | Parameters/Attributes  | Example   |
|-----------|--|--|--|---|
| NET-DHCP? | Get DHCP mode.<br> For Backward compatibility, the <code>id</code> parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.                  | <b>COMMAND</b><br>#NET-DHCP?_<CR><br><b>FEEDBACK</b><br>~nn@NET-DHCP_netw_id,dhcp_mode<CR><LF>               | <code>dhcp_mode</code> –<br>0 – Do not use DHCP. Use the IP set by the factory or using the <code>net-ip</code> or <code>net-config</code> command.<br>1 – Try to use DHCP. If unavailable, use the IP set by the factory or using the <code>net-ip</code> or <code>net-config</code> command. | Get DHCP mode for port 1:<br>#NET-DHCP?<CR>   |
| NET-GATE  | Set gateway IP.<br> 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. | <b>COMMAND</b><br>#NET-GATE_ip_address<CR><br><b>FEEDBACK</b><br>~nn@NET-GATE_ip_address<CR><LF>             | <code>ip_address</code> – Format:<br>xxx.xxx.xxx.xxx   | Set the gateway IP address to 192.168.0.1:<br>#NET-GATE_192.168.0.001<CR>                   |
| NET-GATE? | Get gateway IP.<br> A network gateway connects the device via another network and maybe over the Internet. Be aware of security problems.   | <b>COMMAND</b><br>#NET-GATE?_<CR><br><b>FEEDBACK</b><br>~nn@NET-GATE_ip_address<CR><LF>                      | <code>ip_address</code> – Format:<br>xxx.xxx.xxx.xxx   | Get the gateway IP address:<br>#NET-GATE?_<CR>  |
| NET-IP    | Set IP address.<br> For proper settings consult your network administrator.   | <b>COMMAND</b><br>#NET-IP_ip_address<CR><br><b>FEEDBACK</b><br>~nn@NET-IP_ip_address<CR><LF>                 | <code>ip_address</code> – Format:<br>xxx.xxx.xxx.xxx   | Set the IP address to 192.168.1.39:<br>#NET-IP_192.168.001.039<CR>                          |
| NET-IP?   | Get IP address.  | <b>COMMAND</b><br>#NET-IP?_<CR><br><b>FEEDBACK</b><br>~nn@NET-IP_ip_address<CR><LF>                          | <code>ip_address</code> – Format:<br>xxx.xxx.xxx.xxx   | Get the IP address:<br>#NET-IP?_<CR>  |
| NET-MAC?  | Get MAC address.<br> For backward compatibility, the <code>id</code> parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.                | <b>COMMAND</b><br>#NET-MAC?<CR><br><b>FEEDBACK</b><br>~nn@NET-MAC_mac_address<CR><LF>                        | <code>mac_address</code> – Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit  | #NET-MAC?<CR>   |
| NET-MASK  | Set subnet mask.<br> For proper settings consult your network administrator.  | <b>COMMAND</b><br>#NET-MASK_net_mask<CR><br><b>FEEDBACK</b><br>~nn@NET-MASK_net_mask<CR><LF>                 | <code>net_mask</code> – Format:<br>xxx.xxx.xxx.xxx   | Set the subnet mask to 255.255.0.0:<br>#NET-MASK_255.255.000.000<CR>                        |
| NET-MASK? | Get subnet mask.   | <b>COMMAND</b><br>#NET-MASK?_<CR><br><b>FEEDBACK</b><br>~nn@NET-MASK_net_mask<CR><LF>                        | <code>net_mask</code> – Format:<br>xxx.xxx.xxx.xxx   | Get the subnet mask:<br>#NET-MASK?<CR>  |
| PASS      | Set password for login level.<br> The default password is an empty string.  | <b>COMMAND</b><br>#PASS_login_level,password<CR><br><b>FEEDBACK</b><br>~nn@PASS_login_level,password<CR><LF> | <code>login_level</code> – Level of login to set (End User or Admin):<br>0 – User<br>1 – Admin<br><code>password</code> – Password for the <code>login_level</code> . Up to 15 printable ASCII chars   | Set the password for the Admin protocol permission level to 33333:<br>#PASS_Admin,33333<CR> |
| PASS?     | Get password for login level.<br> The default password is an empty string.  | <b>COMMAND</b><br>#PASS?_login_level<CR><br><b>FEEDBACK</b><br>~nn@PASS_login_level,password<CR><LF>         | <code>login_level</code> – Level of login to set (User or Admin):<br>0 – User<br>1 – Admin<br><code>password</code> – Password for the <code>login_level</code> . Up to 15 printable ASCII chars   | Get the password for the Admin protocol permission level:<br>#PASS?_1<CR>                   |

| Function     | Description  | Syntax   | Parameters/Attributes   | Example  |
|--------------|--|--|---|--|
| PROG-ACTION? | <p>Get step-in button action bitmap.</p> <p>ⓘ Programs matrix action as a response for external event (programmable button pressed).</p>   | <p><b>COMMAND</b></p> <p>#PROG-ACTION?_port_type,port_id,button_id&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@PROG-ACTION_port_type,port_id,button_id,bitmap_actions_id&lt;CR&gt;&lt;LF&gt;</p>   | <p><b>io_mode</b> – Input</p> <p>0 – Input</p> <p><b>port_id</b> – input number on the device:</p> <p>1 – HDMI IN 1</p> <p>2 – HDMI IN 2</p> <p>3 – HDMI IN 3</p> <p>4 – HDMI IN 4</p> <p>5 – HDMI IN 5</p> <p>6 – HDMI IN 6</p> <p>7 – HDMI IN 7</p> <p>8 – HDMI IN 8</p> <p><b>button_id</b> – External programmable button ID</p> <p><b>bitmap_actions_id</b> – 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</p> <p>0 – Echo to controller</p> <p>1 – Step-in out 1</p> <p>2 – Step-in out 2</p> <p>3 – Step-in out 3</p> <p>4 – Step-in out 4</p> <p>5 – Step-in out 5</p> <p>6 – Step-in out 6</p> <p>7 – Step-in out 7</p> <p>8 – Step-in out 8</p> <p>Setting '1' says that the corresponding action must be executed.</p> | <p>Get step-in button action bitmap on HDMI IN 3:</p> <p>#PROG-ACTION?_0,3,1&lt;CR&gt;</p> |
| PROT-VER?    | <p>Get device protocol version.</p>  | <p><b>COMMAND</b></p> <p>#PROT-VER?_&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@PROT-VER_3000:version&lt;CR&gt;&lt;LF&gt;</p>   | <p><b>version</b> – XX.XX where X is a decimal digit</p>  | <p>Get the device protocol version:</p> <p>#PROT-VER?_&lt;CR&gt;</p>                       |
| PRST-AUD?    | <p>LEGACY COMMAND. Get audio connections from saved preset.</p> <p>ⓘ In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.</p> | <p><b>COMMAND</b></p> <p>#PRST-AUD?_preset,out&lt;CR&gt;</p> <p>#PRST-AUD?_preset,*&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~@PRST-AUD_preset,&gt;out&lt;CR&gt;&lt;LF&gt;</p> <p>~@PRST-AUD_preset,i&gt;1,i&gt;2,i&gt;3,..&lt;CR&gt;&lt;LF&gt;</p> | <p><b>preset</b> – Preset number –</p> <p>1 – Preset 1</p> <p>2 – Preset 2</p> <p>3 – Preset 3</p> <p>4 – Preset 4</p> <p>5 – Preset 5</p> <p>6 – Preset 6</p> <p>7 – Preset 7</p> <p>8 – Preset 8</p> <p>9 – Preset 9</p> <p>10 – Preset 10</p> <p>11 – Preset 11</p> <p>12 – Preset 12</p> <p>13 – Preset 13</p> <p>14 – Preset 14</p> <p>15 – Preset 15</p> <p>16 – Preset 16</p> <p>&gt; – Connection character between in and out parameters</p> <p><b>out</b> – Number that indicates the specific output:</p> <p>* – All outputs</p> <p>1 – HDMI OUT 1</p> <p>2 – HDMI OUT 2</p> <p>3 – HDMI OUT 3</p> <p>4 – HDMI OUT 4</p> <p>5 – HDMI OUT 5</p> <p>6 – HDMI OUT 6</p> <p>7 – HDMI OUT 7</p> <p>8 – HDMI OUT 8</p>   | <p>Get audio connection from saved preset 1:</p> <p>#PRST-AUD?_1,*&lt;CR&gt;</p>           |
| PRST-LST?    | <p>Get saved preset list.</p> <p>ⓘ In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.</p>                                   | <p><b>COMMAND</b></p> <p>#PRST-LST?_&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@PRST-LST_preset,preset,..&lt;CR&gt;&lt;LF&gt;</p>   | <p><b>preset</b> – Preset number</p>  | <p>Show preset list:</p> <p>#PRST-LST?&lt;CR&gt;</p>                                       |
| PRST-RCL     | <p>Recall saved preset list.</p> <p>ⓘ In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.</p>                                | <p><b>COMMAND</b></p> <p>#PRST-RCL_preset&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@PRST-RCL_preset&lt;CR&gt;&lt;LF&gt;</p>  | <p><b>preset</b> – Preset number</p>  | <p>Recall preset 1:</p> <p>#PRST-RCL_1&lt;CR&gt;</p>                                       |

| Function     | Description  | Syntax  | Parameters/Attributes  | Example   |
|--------------|--|---|--|---|
| PRST-STO     | <p>Store current connections, volumes and modes in preset.</p> <p><b>i</b> In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.</p> | <p><b>COMMAND</b></p> <pre>#PRST-STO_preset&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@PRST-STO_preset&lt;CR&gt;&lt;LF&gt;</pre>   | <p>preset – Preset number</p>  | <p>Store preset 1:</p> <pre>#PRST-STO_1&lt;CR&gt;</pre>   |
| PRST-VID?    | <p>Get video connections from saved preset.</p> <p><b>i</b> In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.</p>                | <p><b>COMMAND</b></p> <pre>#PRST-VID?_preset,out_id&lt;CR&gt;</pre> <pre>#PRST-VID?_preset,*&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@PRST-VID_preset,in_id&gt;out_id&lt;CR&gt;&lt;LF&gt;</pre> <pre>~nn@PRST-VID_preset,&gt;1,&gt;2,&gt;3,...&lt;CR&gt;&lt;LF&gt;</pre> | <p>preset – Preset number –</p> <ul style="list-style-type: none"> <li>1 – Preset 1</li> <li>2 – Preset 2</li> <li>3 – Preset 3</li> <li>4 – Preset 4</li> <li>5 – Preset 5</li> <li>6 – Preset 6</li> <li>7 – Preset 7</li> <li>8 – Preset 8</li> <li>9 – Preset 9</li> <li>10 – Preset 10</li> <li>11 – Preset 11</li> <li>12 – Preset 12</li> <li>13 – Preset 13</li> <li>14 – Preset 14</li> <li>15 – Preset 15</li> <li>16 – Preset 16</li> </ul> <p>In_id</p> <ul style="list-style-type: none"> <li>0 – disconnect output</li> <li>1 – HDMI IN 1</li> <li>2 – HDMI IN 2</li> <li>3 – HDMI IN 3</li> <li>4 – HDMI IN 4</li> <li>5 – HDMI IN 5</li> <li>6 – HDMI IN 6</li> <li>7 – HDMI IN 7</li> <li>8 – HDMI IN 8</li> </ul> <p>&gt; – Connection character between in and out parameters</p> <p>out_id – Output number</p> <ul style="list-style-type: none"> <li>* – All outputs</li> <li>1 – HDMI OUT 1</li> <li>2 – HDMI OUT 2</li> <li>3 – HDMI OUT 3</li> <li>4 – HDMI OUT 4</li> <li>5 – HDMI OUT 5</li> <li>6 – HDMI OUT 6</li> <li>7 – HDMI OUT 7</li> <li>8 – HDMI OUT 8</li> </ul>   | <p>Get video connections from preset 3 for all outputs:</p> <pre>#PRST-VID?_3,*&lt;CR&gt;</pre>       |
| REMOTE-INFO? | <p>Get connected Step-in module information.</p> <p><b>i</b> The matrix uses this command to notify about Step-in client changes.</p>  | <p><b>COMMAND</b></p> <pre>#REMOTE-INFO?_io_mode,io_index&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@REMOTE-INFO_io_mode,io_index,connected_state, model_name,in_selected,step-in_state,in_count, cntl_btn_count,in_src1,in_src2...&lt;CR&gt;&lt;LF&gt;</pre>              | <p>io_mode – Input/Output</p> <ul style="list-style-type: none"> <li>0 – Input</li> <li>1 – Output</li> </ul> <p>io_index – Number that indicates the specific input or output port:</p> <ul style="list-style-type: none"> <li>1 – HDMI IN 1</li> <li>2 – HDMI IN 2</li> <li>3 – HDMI IN 3</li> <li>4 – HDMI IN 4</li> <li>5 – HDMI IN 5</li> <li>6 – HDMI IN 6</li> <li>7 – HDMI IN 7</li> <li>8 – HDMI IN 8</li> </ul> <ul style="list-style-type: none"> <li>1 – HDMI OUT 1</li> <li>2 – HDMI OUT 2</li> <li>3 – HDMI OUT 3</li> <li>4 – HDMI OUT 4</li> <li>5 – HDMI OUT 5</li> <li>6 – HDMI OUT 6</li> <li>7 – HDMI OUT 7</li> <li>8 – HDMI OUT 8</li> </ul> <p>connected_state – 0/1 (if module connected)</p> <p>model_name – Model name string</p> <p>in_selected – Input, currently chosen on module</p> <p>step-in_state – Step-in state</p> <ul style="list-style-type: none"> <li>0 – module doesn't support Step-in</li> <li>1 – module supports Step-in</li> <li>None</li> </ul> <p>in_count – 8</p> <p>cntl_btn_count – Number of control buttons on module</p> <p>in_src – Type2... typeN – Input type according to num_of_inputs</p> <ul style="list-style-type: none"> <li>0 – Undefined</li> <li>2 – HDMI</li> </ul> | <p>Get connected Step-in module information for HDMI IN 1:</p> <pre>#REMOTE-INFO?_0,1&lt;CR&gt;</pre> |

| Function    | Description   | Syntax   | Parameters/Attributes  | Example  |
|-------------|---|--|--|--|
| RESET       | Reset device.<br><br>ⓘ 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. | <b>COMMAND</b><br>#RESET<CR><br><b>FEEDBACK</b><br>~nn@RESET_ok<CR><LF>  |  | Reset the device:<br>#RESET<CR>  |
| SECUR       | Start/stop security.<br><br>ⓘ The permission system works only if security is enabled with the "SECUR" command.   | <b>COMMAND</b><br>#SECUR_security_state<CR><br><b>FEEDBACK</b><br>~nn@SECUR_security_state<CR><LF>                       | <b>security_state</b> – Security state<br>0 – OFF (disables security)<br>1 – ON (enables security)   | Enable the permission system:<br>#SECUR_0<CR>                              |
| SECUR?      | Get current security state.<br><br>ⓘ The permission system works only if security is enabled with the "SECUR" command.  | <b>COMMAND</b><br>#SECUR?_<CR><br><b>FEEDBACK</b><br>~nn@SECUR_security_state<CR><LF>                                    | <b>security_state</b> – Security state<br>0 – OFF (disables security)<br>1 – ON (enables security)   | Get current security state:<br>#SECUR?_<CR>                                |
| SET-IN-CAP  | Set input EDID status.  | <b>COMMAND</b><br>#SET-IN-CAP_stage,stage_id,mode<CR><br><b>FEEDBACK</b><br>~nn@SET-IN-CAP_stage,stage_id,mode<CR><LF>   | <b>stage</b> – Input:<br>0 – Input<br><b>stage_id</b> – Number that indicates the specific input:<br>0 – Color Space<br>1 – Color Depth<br>2 – Two Audio Channels<br><b>mode</b> –<br>0 – Pass<br>1 – Set  | Set the input EDID support to Two Audio Channels:<br>#SET-IN-CAP_0,2,1<CR> |
| SET-IN-CAP? | Get input EDID status.  | <b>COMMAND</b><br>#SET-IN-CAP?_stage,stage_id<CR><br><b>FEEDBACK</b><br>~nn@SET-IN-CAP?_stage,stage_id,mode<CR><LF>      | <b>stage</b> – Input:<br>0 – Input<br><b>stage_id</b> – Number that indicates the specific input:<br>0 – Color Space<br>1 – Color Depth<br>2 – Two Audio Channels<br><b>mode</b> –<br>0 – Pass<br>1 – Set  | Get the input EDID support to Color Depth:<br>#SET-IN-CAP?_0,1<CR>         |
| SIGNAL?     | Get input signal status.  | <b>COMMAND</b><br>#SIGNAL?_in_index<CR><br><b>FEEDBACK</b><br>~nn@SIGNAL_in_index,status<CR><LF>                         | <b>in_index</b> – Number that indicates the specific input:<br>1 – HDMI IN 1<br>2 – HDMI IN 2<br>3 – HDMI IN 3<br>4 – HDMI IN 4<br>5 – HDMI IN 5<br>6 – HDMI IN 6<br>7 – HDMI IN 7<br>8 – HDMI IN 8<br><b>status</b> – Signal status according to signal validation:<br>0 – Off<br>1 – On  | Get the input signal lock status of HDMI IN 1:<br>#SIGNAL?_1<CR>           |
| SIG-TYPE?   | Get signal type on input/output.<br><br>ⓘ "Set" command is not available for all devices (refer to device specifications).  | <b>COMMAND</b><br>#SIG-TYPE?_io_mode,io_index<CR><br><b>FEEDBACK</b><br>~nn@SIG-TYPE_io_mode,io_index,signal_src<CR><LF> | <b>io_mode</b> – Input/Output<br>0 – Input<br>1 – Output<br><b>io_index</b> – Number that indicates the specific input or output port:<br>1 – HDMI IN 1<br>2 – HDMI IN 2<br>3 – HDMI IN 3<br>4 – HDMI IN 4<br>5 – HDMI IN 5<br>6 – HDMI IN 6<br>7 – HDMI IN 7<br>8 – HDMI IN 8<br><br>1 – HDMI OUT 1<br>2 – HDMI OUT 2<br>3 – HDMI OUT 3<br>4 – HDMI OUT 4<br>5 – HDMI OUT 5<br>6 – HDMI OUT 6<br>7 – HDMI OUT 7<br>8 – HDMI OUT 8<br><b>signal_src</b> – Signal type<br>0 – No signal<br>2 – HDMI | Get signal type on HDMI OUT 1:<br>#SIG-TYPE?_1,1<CR>                       |
| SN?         | Get device serial number.   | <b>COMMAND</b><br>#SN?_<CR><br><b>FEEDBACK</b><br>~nn@SN_serial_num<CR><LF>  | <b>serial_num</b> – 14 decimal digits, factory assigned  | Get the device serial number:<br>#SN?_<CR>                                 |

| Function    | Description  | Syntax   | Parameters/Attributes  | Example  |
|-------------|--|--|--|--|
| TUNNEL-CTRL | LEGACY COMMAND.<br>Send an asynchronous command to a remote Step-in equipment.   | <b>COMMAND</b><br>#TUNNEL-CTRL, <i>io_mode</i> , <i>io_index</i> , <i>cmd_name</i> <CR><br><b>FEEDBACK</b><br>None   | <i>io_mode</i> – Input/Output<br>0 – Input<br>1 – Output<br><i>io_index</i> – Number that indicates the specific input or output port:<br>1-N (N= the total number of input or output ports)<br><i>cmd_name</i> – Command to send to the Step-in client  | LEGACY COMMAND:<br>#TUNNEL-CTRL, <i>1</i> , <i>1</i> , <i>1</i> <CR>   |
| UART        | Set com port configuration.<br><br>ⓘ In the FC-2x the serial port is selectable to RS-232 or RS-485 (usually serial port 1).<br><br>If Serial is configured when RS-485 is selected, the RS-485 UART port automatically changes.<br><br>The command is backward compatible, meaning that if the extra parameters do not exist, FW goes to.<br><br>RS-232.<br><br>Stop_bits 1.5 is only relevant for 5 data_bits. | <b>COMMAND</b><br>#UART, <i>com_id</i> , <i>baud_rate</i> , <i>data_bits</i> , <i>parity</i> , <i>stop_bits_mode</i> , <i>serial_type</i> , <i>485_term</i> <CR><br><b>FEEDBACK</b><br>~nn@UART, <i>com_id</i> , <i>baud_rate</i> , <i>data_bits</i> , <i>parity</i> , <i>stop_bits_mode</i> , <i>serial_type</i> , <i>485_term</i> <CR><LF> | <i>com_id</i> – 1 to n (machine dependent)<br><i>baud_rate</i> – 9600 - 115200<br><i>data_bits</i> – 5-8<br><i>parity</i> – Parity Type<br>0 – No<br>1 – Odd<br>2 – Even<br>3 – Mark<br>4 – Space<br><i>stop_bits_mode</i> – 1/1.5/2<br><i>serial_type</i> – 232/485<br>0 – 232<br>1 – 485<br><i>485_term</i> – 485 termination state<br>0 – disable<br>1 – enable<br>(optional - this exists only when <i>serial_type</i> is 485) | Set baud rate to 9600, 8 data bits, parity to none and stop bit to 1:<br>#UART?, <i>1</i> , <i>9600</i> , <i>8</i> , <i>none</i> , <i>1</i> <CR> |
| UART?       | Get com port configuration.<br><br>ⓘ In the FC-2x the serial port is selectable to RS-232 or RS-485 (usually serial port 1).<br><br>If Serial is configured when RS-485 is selected, the RS-485 UART port automatically changes.<br><br>The command is backward compatible, meaning that if the extra parameters do not exist, FW goes to.<br><br>RS-232.<br><br>Stop_bits 1.5 is only relevant for 5 data_bits. | <b>COMMAND</b><br>#UART?, <i>com_id</i> <CR><br><b>FEEDBACK</b><br>~nn@UART, <i>com_id</i> , <i>baud_rate</i> , <i>data_bits</i> , <i>parity</i> , <i>stop_bits_mode</i> , <i>serial_type</i> , <i>485_term</i> <CR><LF>   | <i>com_id</i> – 1 to n (machine dependent)<br><i>baud_rate</i> – 9600 - 115200<br><i>data_bits</i> – 5-8<br><i>parity</i> – Parity Type<br>0 – No<br>1 – Odd<br>2 – Even<br>3 – Mark<br>4 – Space<br><i>stop_bits_mode</i> – 1/1.5/2<br><i>serial_type</i> – 232/485<br>0 – 232<br>1 – 485<br><i>485_term</i> – 485 termination state<br>0 – disable<br>1 – enable<br>(optional - this exists only when <i>serial_type</i> is 485) | Get baud rate to 9600, 8 data bits, parity to none and stop bit to 1:<br>#UART?, <i>1</i> <CR>   |
| VERSION?    | Get firmware version number.   | <b>COMMAND</b><br>#VERSION?,<CR><br><b>FEEDBACK</b><br>~nn@VERSION, <i>firmware_version</i> <CR><LF>   | <i>firmware_version</i> – XX.XX.XXXX where the digit groups are: major.minor.build version   | Get the device firmware version number:<br>#VERSION?,<CR>  |
| VID         | LEGACY COMMAND.<br>Set video switch state.<br><br>ⓘ The GET command identifies input switching on Step-in clients.<br><br>The SET command is for remote input switching on Step-in clients (essentially via by the Web).<br><br>This is a legacy command. New Step-in modules support the ROUTE command.   | <b>COMMAND</b><br>#VID, <i>in_id</i> > <i>out_id</i> <CR><br><b>FEEDBACK</b><br>~nn@VID, <i>in_id</i> > <i>out_id</i> <CR><LF>   | <i>in_id</i> – Indicates the ID of the input:<br>1-n (n= the total number of inputs)<br>> – Connection character between in and out parameters<br><i>out_id</i> – Output number<br>* for all outputs   | Switch HDMI IN 1 to HDMI OUT 3:<br>#VID, <i>1</i> > <i>3</i> <CR>  |

| Function     | Description  | Syntax  | Parameters/Attributes  | Example  |
|--------------|--|---|--|--|
| VID?         | <p>LEGACY COMMAND. Get video switch state.</p> <p><b>i</b> The GET command identifies input switching on Step-in clients.</p> <p><b>i</b> The SET command is for remote input switching on Step-in clients (essentially via by the Web).</p> <p>This is a legacy command. New Step-in modules support the ROUTE command.</p> | <p><b>COMMAND</b></p> <pre>#VID?_out_id&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@VID_in_id&gt;out_id&lt;CR&gt;&lt;LF&gt;</pre>                                   | <p><b>in_id</b> – Indicates the ID of the input:</p> <ul style="list-style-type: none"> <li>1 – HDMI IN 1</li> <li>2 – HDMI IN 2</li> <li>3 – HDMI IN 3</li> <li>4 – HDMI IN 4</li> <li>5 – HDMI IN 5</li> <li>6 – HDMI IN 6</li> <li>7 – HDMI IN 7</li> <li>8 – HDMI IN 8</li> </ul> <p><b>&gt;</b> – Connection character between in and out parameters</p> <p><b>out_id</b> – Output number:</p> <ul style="list-style-type: none"> <li>1 – HDMI OUT 1</li> <li>2 – HDMI OUT 2</li> <li>3 – HDMI OUT 3</li> <li>4 – HDMI OUT 4</li> <li>5 – HDMI OUT 5</li> <li>6 – HDMI OUT 6</li> <li>7 – HDMI OUT 7</li> <li>8 – HDMI OUT 8</li> </ul> | <p>Get video switch state of HDMI OUT 2:</p> <pre>#VID?_2&lt;CR&gt;</pre>      |
| VID-PATTERN  | Set test pattern on output.  | <p><b>COMMAND</b></p> <pre>#VID-PATTERN_out_index,pattern_id&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@VID-PATTERN_out_index,pattern_id&lt;CR&gt;&lt;LF&gt;</pre> | <p><b>out_index</b> – Number that indicates the specific output:</p> <ul style="list-style-type: none"> <li>1 – HDMI OUT 1</li> <li>2 – HDMI OUT 2</li> <li>3 – HDMI OUT 3</li> <li>4 – HDMI OUT 4</li> <li>5 – HDMI OUT 5</li> <li>6 – HDMI OUT 6</li> <li>7 – HDMI OUT 7</li> <li>8 – HDMI OUT 8</li> </ul> <p><b>pattern_id</b> – Number of system patterns:</p> <ul style="list-style-type: none"> <li>1 – Color bars</li> <li>2 – Ramp</li> <li>3 – Solid White</li> <li>4 – Solid Black</li> <li>5 – Solid Red</li> <li>6 – Solid Green</li> </ul>   | <p>Switch PATTERN 1 to HDMI OUT 3:</p> <pre>#VID-PATTERN_3,1&lt;CR&gt;</pre>   |
| VID-PATTERN? | Get test pattern on output.  | <p><b>COMMAND</b></p> <pre>#VID-PATTERN?_out_index&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@VID-PATTERN_out_index,pattern_id&lt;CR&gt;&lt;LF&gt;</pre>           | <p><b>out_index</b> – Number that indicates the specific output:</p> <ul style="list-style-type: none"> <li>1 – HDMI OUT 1</li> <li>2 – HDMI OUT 2</li> <li>3 – HDMI OUT 3</li> <li>4 – HDMI OUT 4</li> <li>5 – HDMI OUT 5</li> <li>6 – HDMI OUT 6</li> <li>7 – HDMI OUT 7</li> <li>8 – HDMI OUT 8</li> </ul> <p><b>pattern_id</b> – Number of system patterns:</p> <ul style="list-style-type: none"> <li>1 – Color bars</li> <li>2 – Ramp</li> <li>3 – Solid White</li> <li>4 – Solid Black</li> <li>5 – Solid Red</li> <li>6 – Solid Green</li> </ul>   | <p>Get test pattern on HDMI OUT 3:</p> <pre>#VID-PATTERN?_3&lt;CR&gt;</pre>    |
| VMUTE        | <p>Set enable/disable video on output.</p> <p><b>i</b> Video mute parameter 2 (blank picture) is not supported.</p>  | <p><b>COMMAND</b></p> <pre>#VMUTE_out_index,flag&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@VMUTE_out_index,flag&lt;CR&gt;&lt;LF&gt;</pre>                         | <p><b>out_index</b> – Number that indicates the specific output:</p> <ul style="list-style-type: none"> <li>1 – HDMI OUT 1</li> <li>2 – HDMI OUT 2</li> <li>3 – HDMI OUT 3</li> <li>4 – HDMI OUT 4</li> <li>5 – HDMI OUT 5</li> <li>6 – HDMI OUT 6</li> <li>7 – HDMI OUT 7</li> <li>8 – HDMI OUT 8</li> </ul> <p><b>flag</b> – Video Mute</p> <ul style="list-style-type: none"> <li>0 – Video enabled</li> <li>1 – Video disabled</li> <li>2 – Blank picture</li> </ul>   | <p>Disable the video output on HDMI OUT 2:</p> <pre>#VMUTE_2,0&lt;CR&gt;</pre> |
| VMUTE?       | <p>Get video on output status.</p> <p><b>i</b> Video mute parameter 2 (blank picture) is not supported.</p>  | <p><b>COMMAND</b></p> <pre>#VMUTE?_out_index&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@VMUTE_out_index,flag&lt;CR&gt;&lt;LF&gt;</pre>                             | <p><b>out_index</b> – Number that indicates the specific output:</p> <ul style="list-style-type: none"> <li>1 – HDMI OUT 1</li> <li>2 – HDMI OUT 2</li> <li>3 – HDMI OUT 3</li> <li>4 – HDMI OUT 4</li> <li>5 – HDMI OUT 5</li> <li>6 – HDMI OUT 6</li> <li>7 – HDMI OUT 7</li> <li>8 – HDMI OUT 8</li> </ul> <p><b>flag</b> – Video Mute</p> <ul style="list-style-type: none"> <li>0 – Video enabled</li> <li>1 – Video disabled</li> <li>2 – Blank picture</li> </ul>   | <p>Get video on output 2 status:</p> <pre>#VMUTE?_2&lt;CR&gt;</pre>            |



## 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_TIMEOUT                | 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 – not 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](http://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.

### **Limitation of Liability**

THE MAXIMUM LIABILITY OF KRAMER ELECTRONICS UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

### **Exclusive Remedy**

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF KRAMER ELECTRONICS CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN ALL IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT AS PROVIDED UNDER APPLICABLE LAW. IF ANY PRODUCT TO WHICH THIS LIMITED WARRANTY APPLIES IS A "CONSUMER PRODUCT" UNDER THE MAGNUSON-MOSS WARRANTY ACT (15 U.S.C.A. §2301, ET SEQ.) OR OTHER APPLICABLE LAW, THE FOREGOING DISCLAIMER OF IMPLIED WARRANTIES SHALL NOT APPLY TO YOU, AND ALL IMPLIED WARRANTIES ON THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE, SHALL APPLY AS PROVIDED UNDER APPLICABLE LAW.

### **Other Conditions**

This limited warranty gives you specific legal rights, and you may have other rights which vary from country to country or state to state.

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](http://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.



P/N:



2900-301419

Rev:



1



## 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 website where updates to this user manual may be found.

We welcome your questions, comments, and feedback.

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