

## USER MANUAL

### MODEL:

**VS-44H2A**

**4K HDMI 4x4 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!

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## 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-44H2A](http://www.kramerav.com/downloads/VS-44H2A) 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-44H2A** away from moisture, excessive sunlight and dust.

## Safety Instructions



### Caution:

- This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.
- For products with relay terminals and GPIO ports, please refer to the permitted rating for an external connection, located next to the terminal or in the User Manual.
- There are no operator serviceable parts inside the unit.



### Warning:

- Use only the power cord that is supplied with the unit.
- Disconnect the power and unplug the unit from the wall before installing.
- Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only.
- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label which located on the bottom of the unit.

## Recycling Kramer Products

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

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## Overview

Congratulations on purchasing your Kramer **VS-44H2A**.

**VS-44H2A** is a high-performance 4x4 matrix switcher for 18G 4K@60Hz (4:4:4) HDR HDMI™ signals. It equalizes the signals and can route any one of four HDMI, HDCP-compliant sources (selectable) to any or all outputs simultaneously.

The **VS-44H2A** provides exceptional quality, advanced and user-friendly operation, and flexible control.

## Exceptional Quality

- High-Performance AV Matrix – Switches 4 4K@60Hz (4:4:4) HDR HDMI HDCP-compliant signals to 4 18G 4K@60Hz (4:4:4) HDR HDMI HDCP-compliant outputs at up to 18G data rate. Signals are HDCP 2.2/1.4 compliant, supporting HDR10, color, Dolby /DTS-HD Master Audio, 3D Video as specified in HDMI 2.0.
- Features Kramer Equalization & reKlocking™ Technology – Rebuilds the digital signal to travel longer distances.

## Advanced and User-friendly Operation

- Easy Step-In Collaboration Function – When used with a Kramer Step-In enabled switcher, just plug in your device and press the Step-In button. Your device becomes the active signal on the main display.
- EDID Management – Individual EDID management per input. Captures and stores the EDID from a display device.
- Quick Access to Common Configurations – Save up to four preset configurations.
- Convenient Unit Control and Configuration Options – Local control via front panel switching, memory, lock and EDID buttons, Input/Output LED display and IR remote control. Distance control via user-friendly embedded web pages via the Ethernet, Protocol 3000 API, and RS-232 serial commands transmitted by a PC, touch screen system or other serial controller.
- Cost-Effective Maintenance – IR and Input Selection indicators facilitate easy local maintenance and troubleshooting. Firmware upgrade via Ethernet or USB using a user-friendly software upgrade tool.

## Flexible Connectivity

- Analog and Digital Audio De-embedding (Extraction) – De-embeds the audio signal and outputs it as balanced analog audio with separate volume control on each of the outputs and S/PDIF digital audio.
- Flexible Content Protection – Selectable HDCP per input.
- Easy Installation – 19" enclosure for rack mounting a unit in a 1U rack space with included rack ears and universal 100–240V AC power connection.

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## Typical Applications

The **VS-44H2A** is ideal for the following typical applications:

- Control rooms with multiple displays.
- Presentation and multimedia applications.

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## Controlling your VS-44H2A

Control your **VS-44H2A** 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 VS-44H2A 4K HDMI 4x4 Matrix Switcher

This section defines the VS-44H2A.

## Front Panel

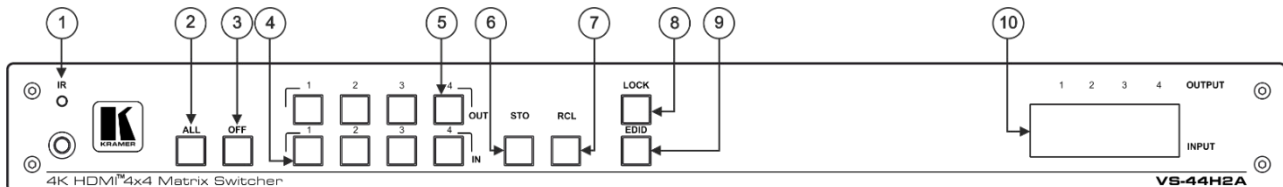


Figure 1: VS-44H2A 4K HDMI 4x4 Matrix Switcher Front Panel

**i** The behavior of the front panel buttons and the 7-segment display changes along with the operation modes. For further details see [Operating VS-44H2A via Front Panel Buttons](#) on page [11](#).

#	Feature	Function
①	IR Sensor	Receives signals from the infrared remote-control transmitter.
	IR LED	Lights yellow when receiving an IR signal.
②	ALL Button	Press to perform an action on all outputs. For switching, press ALL and then a specific INPUT 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 (see <a href="#">Routing All Outputs to a Single Input</a> on page <a href="#">13</a> ).
③	OFF Button	Press after pressing an OUT Button (1 to 4) ⑤ to disconnect the selected output from the inputs. To disconnect all the outputs, press ALL followed by OFF (see <a href="#">Muting All Outputs</a> on page <a href="#">13</a> ).
④	IN Buttons (1 to 4)	Press to select the input to switch after selecting an output (also used for storing machine setups in the STO-RCL (see <a href="#">Storing and Recalling a Routing Setup</a> on page <a href="#">14</a> ).
⑤	OUT Buttons (1 to 4)	Press to select an output (1 to 4) to which the input is routed. Also used for storing machine presets.
⑥	STO Button	Press <b>STO</b> followed by an <b>IN</b> button (1 to 4) to store the current switching configuration to the location corresponding to that INPUT number (see <a href="#">Storing and Recalling a Routing Setup</a> on page <a href="#">14</a> ).
⑦	RCL Button	Press <b>RCL</b> followed by the corresponding <b>IN</b> button (1 to 4) to recall the preset switching configuration saved in that location (see <a href="#">Storing and Recalling a Routing Setup</a> on page <a href="#">14</a> ).
⑧	LOCK Button	Press and hold to toggle between locking and releasing the front panel buttons.
⑨	EDID Button	Press EDID + STO buttons to enter the EDID mode (see <a href="#">Copying an EDID</a> on page <a href="#">14</a> ).
⑩	OUTPUT/INPUT 7-segment LED Display	Displays the selected inputs switched to the outputs (marked above each input).

## Rear Panel

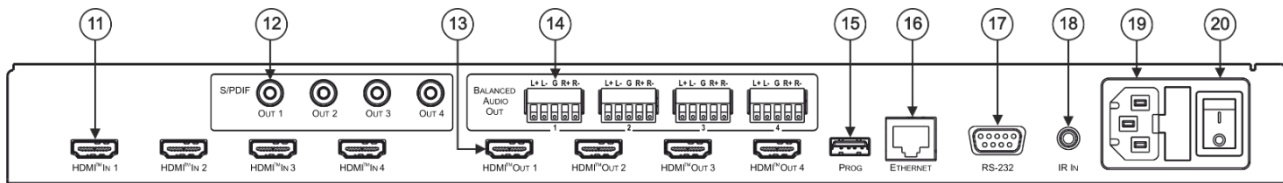


Figure 2: VS-44H2A 4K HDMI 4x4 Matrix Switcher Rear Panel

#	Feature	Function
⑪	HDMI IN Connectors (1 to 4)	Connect to up to 4 HDMI sources.
⑫	S/PDIF OUT (coaxial) RCA Connectors (1 to 4)	Connect to up to 4 digital audio acceptors.
⑬	HDMI OUT Connectors (1 to 4)	Connect to up to 4 HDMI acceptors.
⑭	BALANCED AUDIO OUT Terminal Block Connectors (1 to 4)	Connect to up to 4 balanced stereo audio acceptors.
⑮	PROG USB Connector	Connect to a USB stick to perform firmware upgrades (see <a href="#">Firmware Upgrade</a> on page 16).
⑯	ETHERNET RJ-45 Connector	Connect to a PC via a LAN.
⑰	RS-232 9-pin D-sub Connector	Connect to a PC/serial controller.
⑱	IR IN 3.5mm Mini Jack Connector	Connect to an external IR receiver for controlling the device via IR remote controller Covered by a cap. The 3.5mm jack at the end of the internal IR connection cable fits into this opening.
⑲	Mains Power Connector and Fuse	Plug in the power cord.
	Mains Power Fuse	Fuse for protecting the device.
⑳	Power Illuminated Switch	Turn the device on and off.

# Mounting VS-44H2A

This section provides instructions for mounting **VS-44H2A**. 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.

**Caution:**

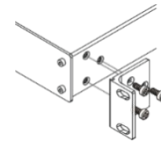
- Mount **VS-44H2A** before connecting any cables or power.

**Warning:**

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

## To mount VS-44H2A 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 or place the machine on a table.



For more information go to [www.kramerav.com/downloads/VS-44H2A](http://www.kramerav.com/downloads/VS-44H2A)

# Connecting VS-44H2A



Always switch off the power to each device before connecting it to your VS-44H2A. After connecting your VS-44H2A, connect its power and then switch on the power to each device.

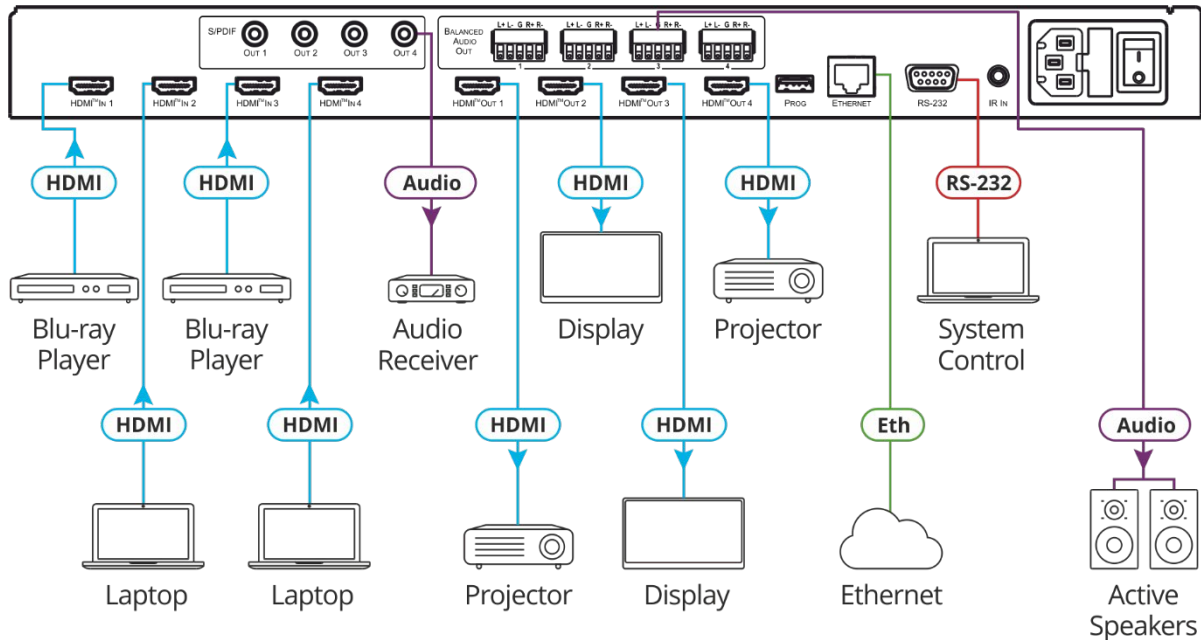


Figure 3: Connecting to the VS-44H2A Rear Panel

To connect VS-44H2A as illustrated in the example in [Figure 3](#):

- Connect up to four video sources to the HDMI inputs (11) (from HDMI IN 1 to HDMI IN 4). For example, connect:
  - A laptop to the HDMI IN 1 and another laptop to HDMI IN 4 using HDMI connectors.
  - Blu-ray players to the HDMI IN 2 and HDMI IN 3 using HDMI connectors.
- Connect the four video HDMI outputs (13) (from HDMI OUT 1 to HDMI OUT 4) to up to four acceptors. For example:
  - Connect HDMI OUT 1 HDMI connector to a projector.
  - Connect HDMI OUT 2, HDMI OUT 3 and HDMI OUT 4 HDMI connectors each to a display.
- Connect the power cord (19).  
We recommend that you use only the power cord that is supplied with this machine.
- Connect ETHERNET port (16) to a system controller.
- Connect RS-232 3-pin terminal block connector (17) to a system controller.
- If required, connect the PROG USB Connector (15) (5V/2A) to a device to charge it.

## Connecting to VS-44H2A via RS-232

You can connect to the VS-44H2A via an RS-232 connection (17) using, for example, a PC.

Connect the RS-232 terminal block on the rear panel of the VS-44H2A to a PC/controller, as follows:

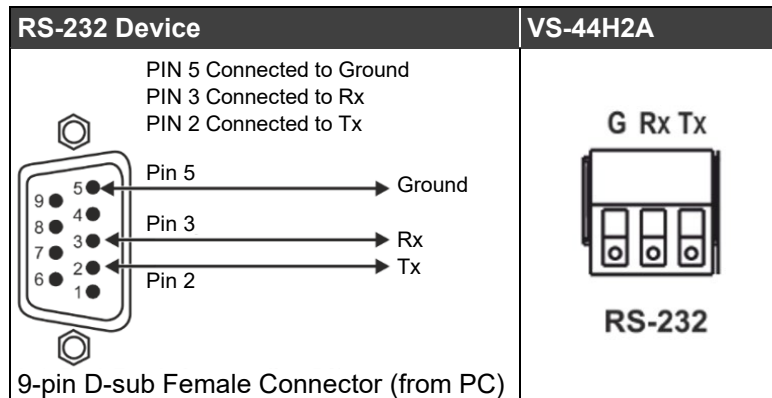


Figure 4: RS-232 Connection

## Connecting VS-44H2A via ETHERNET Port

You can connect to VS-44H2A via Ethernet using either of the following methods:

- Directly to the PC using a crossover cable (see [Connecting the Ethernet Port Directly to a PC](#) on page 8).
- Via a network hub, switch, or router, using a straight-through cable (see [Connecting the Ethernet Port via a Network Hub or Switch](#) on page 10).



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

### Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the VS-44H2A 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-44H2A with the factory configured default IP address.

After connecting the VS-44H2A to the Ethernet port, configure your PC as follows:

1. Click **Start > Control Panel > Network and Sharing Center**.
2. Click **Change Adapter Settings**.
3. Highlight the network adapter you want to use to connect to the device and click **Change settings of this connection**.

The Local Area Connection Properties window for the selected network adapter appears as shown in [Figure 5](#).

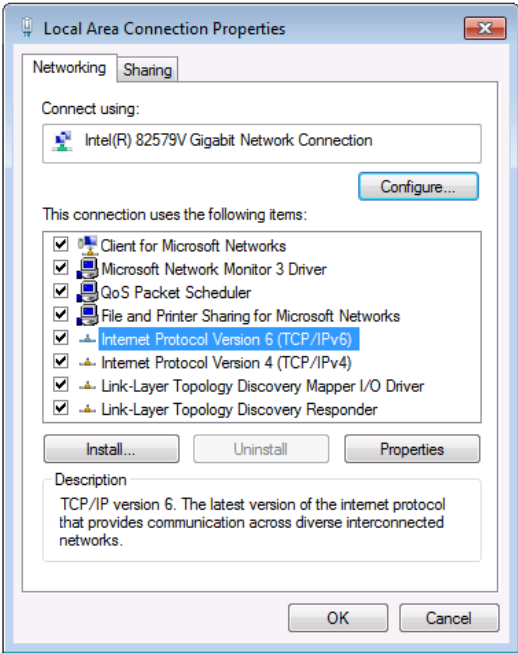


Figure 5: Local Area Connection Properties Window

- 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 6](#) or [Figure 7](#).

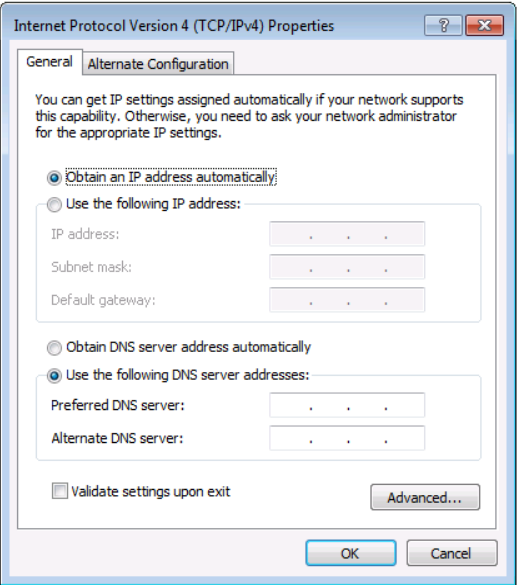


Figure 6: Internet Protocol Version 4 Properties Window

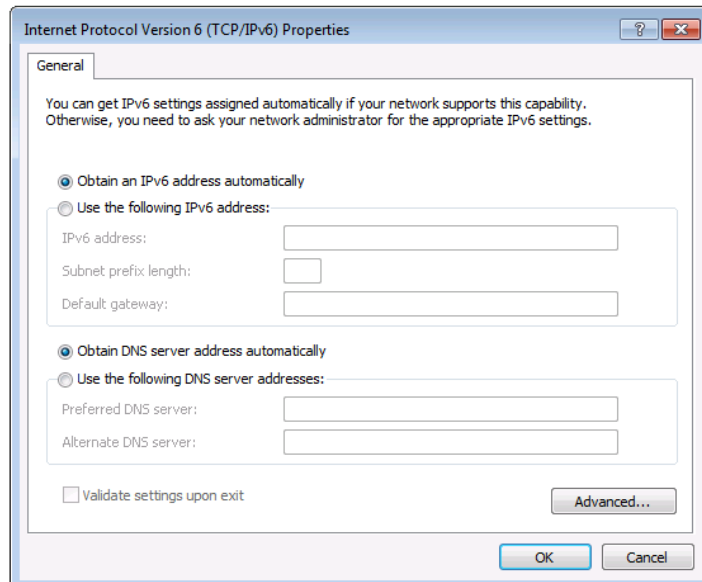


Figure 7: Internet Protocol Version 6 Properties Window

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in [Figure 8](#).

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.

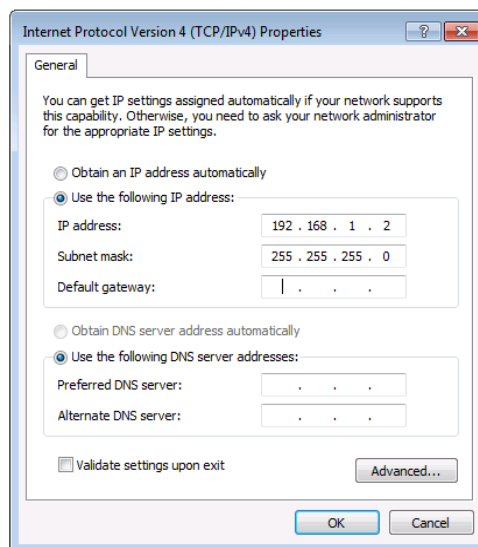


Figure 8: Internet Protocol Properties Window

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-44H2A to the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

## Control Configuration via 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-44H2A via ETHERNET Port](#) on page 8).

# Operating VS-44H2A via Front Panel Buttons

The VS-44H2A front panel buttons enable performing the following functions:

- [Powering On VS-44H2A](#) on page [11](#).
- [Understanding Illuminated Buttons and LEDs](#) on page [11](#).
- [Locking/Unlocking Control Panel Buttons](#) on page [12](#).
- [Routing an AV Output to an Input](#) on page [12](#).
- [Routing All Outputs to a Single Input](#) on page [13](#).
- [Muting an Output](#) on page [13](#).
- [Muting All Outputs](#) on page [13](#).
- [Storing and Recalling a Routing Setup](#) on page [14](#).
- [Copying an EDID](#) on page [14](#).

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## Powering On VS-44H2A

After connecting the power cord, press the Power Switch  to power on the device.



When powering on VS-44H2A, it undergoes a 10-second initialization process during which the front panel displays the following:

The 7-segment display LEDs  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.

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## Understanding Illuminated Buttons and LEDs

Illuminated or flashing front panel buttons indicate signal and acceptor information.

- An illuminated **IN**  button indicates an active signal connected to the input.
- An illuminated **OUT**  button indicates an output connected to an acceptor.
- A flashing **OUT**  button indicates a non-HDCP display connected to an output.



If an HDCP-encrypted input is routed through **VS-44H2A** to a non-HDCP acceptor, the video is not presented and the non-HDCP acceptor displays black.

The LED Display indicates routing and muting information.

- A digit (from 1 to 4) indicates the input number that is currently routed to the output.
- “0” under an output number indicates a muted video signal.



Figure 9: 7-segment display

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## Locking/Unlocking Control Panel Buttons

Locking control panel buttons prevents accidentally switching an AV signal to a different input.

### Locking Control Panel Buttons

To lock control panel buttons:

- Press **LOCK** (8) for 3 seconds.  
The LOCK button (8) illuminates, and control panel buttons are no longer operational.

### Unlocking Control Panel Buttons

To unlock control panel buttons:

- Press the illuminated **LOCK** button (8) for 3 seconds.  
The LOCK button (8) is no longer illuminated, and control panel buttons are now operational.

---

## Routing an AV Output to an Input

Use the IN buttons (1 to 4) (4) and the OUT buttons (1 to 4) (5) to route a selected input to an output.

To route a video output to an input:

1. Press an **OUT** button (1 to 4) (5).  
The selected OUT button illuminates.
2. Press an **IN** button (1 to 4) (4).  
The output is routed to the selected input and the LED Display (10) indicates the change.



You can route multiple outputs to a single input.

---

## Routing All Outputs to a Single Input

Use the IN buttons (1 to 4) ④ and the OUT buttons (1 to 4) ⑤ to route a selected input to all outputs.

To route all video outputs to a single input:

1. Press **ALL** ②.

The ALL button illuminates.

2. Press an **IN** button (1 to 4) ④.

All the outputs are routed to the selected input and the LED Display ⑩ indicates the change.

---

## Muting an Output

**VS-44H2A** enables you to mute each audio and video output individually (muting the volume and displaying black on the screen).

To mute a audio/video output:

1. Press an **OUT** button (1 to 4) ⑤.

The selected OUT button illuminates.

2. Press **OFF** ③.

The output selected audio and video is muted, and the LED Display ⑩ indicates the change.

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## Muting All Outputs

**VS-44H2A** enables you to mute all audio and video outputs at once (muting the volume and displaying black on all the screens).

To mute all audio/video outputs:

1. Press **ALL** ②.

The ALL button illuminates.

2. Press **OFF** ③.

All the outputs audio and video are muted, and the LED Display ⑩ indicates the change.

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## Storing and Recalling a Routing Setup

**VS-44H2A** can store up to 4 setups. Each setup includes the signal routing state and the EDID.

In Store-Recall mode each IN button (1 to 4) ④ corresponds to a setup:

- IN 1 corresponds to setup 1.
- IN 2 corresponds to setup 2.
- IN 3 corresponds to setup 3.
- IN 4 corresponds to setup 4.

### Storing a Routing Setup

To store a setup:

1. Press **STO** ⑥.

The **STO** button flashes.

2. Press an **IN** button ④ (1 to 4).

For example, when pressing IN 4, the current device state is stored to setup 4.

3. Press **STO** ⑥ again.

The current device state is stored and the **STO** button ⑥ no longer flashes.



Press **STO** ⑥ within 9 seconds to apply settings, otherwise the action times out.

### Recalling a Routing Setup

To recall a setup:

1. Press **RCL** ⑦.

The RCL button flashes.

2. Press an **IN** button ④ (1 to 4).

The selected button illuminates.

3. Press **RCL** ⑦ again.

The setup stored for that button is restored and the LED Display ⑩ indicates the change.

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## Copying an EDID

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

## Copying the EDID from a Connected Display

To copy the EDID from a connected display:

1. Press and hold **EDID** (9) and **STO** (6) simultaneously until both buttons flash.  
**VS-44H2A** enters EDID mode and the LED Display (10) shows the current EDID status.
2. Press one or more **IN** buttons (4) (1 to 4) (or **ALL**).  
 The selected inputs on the LED Display (10) flash.
3. Press an **OUT** button (1 to 4) (5) connected to a display and press **EDID** (9).  
 Wait about 5 seconds for the device to copy the EDID the connected display to the selected inputs.



Press EDID (9) within 9 seconds to apply settings, otherwise the action times out.

## Copying the Default EDID

To copy the default EDID:

1. Press and hold **EDID** (9) and **STO** (6) simultaneously until both buttons flash.  
**VS-44H2A** enters EDID mode and the LED Display (10) shows the current EDID status.
2. Press one or more **IN** buttons (4) (1 to 4) (or **ALL**).  
 The selected inputs on the LED Display (10) flash.
3. Press an **OUT** button (1 to 4) (5) not connected to a display and press **EDID** (9).  
 Wait about 5 seconds for the device to copy the default EDID.



Press EDID (9) within 9 seconds to apply settings, otherwise the action times out.

# Firmware Upgrade

You can upgrade the **VS-44H2A** via:

- The Ethernet, using embedded web pages.
- 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 Website at [www.kramerav.com/downloads/VS-44H2A](http://www.kramerav.com/downloads/VS-44H2A).

# Using Embedded Web pages

The web pages let you control the **VS-44H2A** via the Ethernet. The web pages include all the OSD items and are accessed using a Web browser and an Ethernet connection (see [Browsing Web Pages](#) on page [18](#)).

Before attempting to connect:

- Perform the procedures described in [Connecting VS-44H2A via ETHERNET Port](#) on page [8](#).
- Ensure that your browser is supported.

The following operating systems and Web browsers are supported:

Operating Systems	Browser
Windows 7	IE
	Firefox
	Chrome
	Safari
Windows 10	IE
	Edge
	Firefox
	Chrome
Mac	Safari
iOS	Safari
Android	N/A

The **VS-44H2A** webpage enables performing the following functions:

- [Browsing Web Pages](#) on page [18](#).
- [Switching and Setting Ports](#) on page [19](#).
- [Changing Device Settings and Upgrading Firmware](#) on page [26](#).
- [Managing EDID](#) on page [27](#).
- [Managing Web page Security](#) on page [30](#).
- [Setting Timeout](#) on page [31](#).
- [Displaying OSD Information](#) on page [32](#).
- [Setting Step-In Devices](#) on page [33](#).
- [Viewing About Page](#) on page [34](#).

## Browsing Web Pages

To browse the VS-44H2A 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 ([Figure 10](#)) if set, security is enabled:

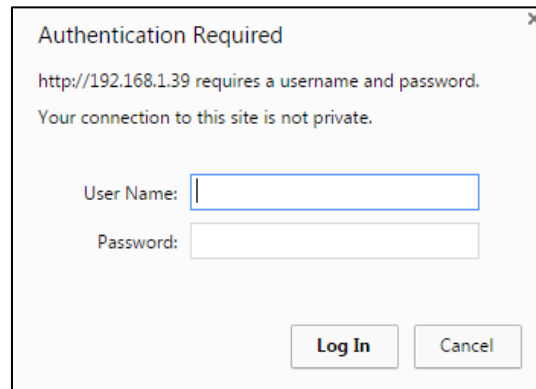


Figure 10: Using the Embedded Web pages – Authentication

3. Enter the **User Name** and **Password** (Admin, empty string, by-default) and click **OK**.  
The Switching page appears:

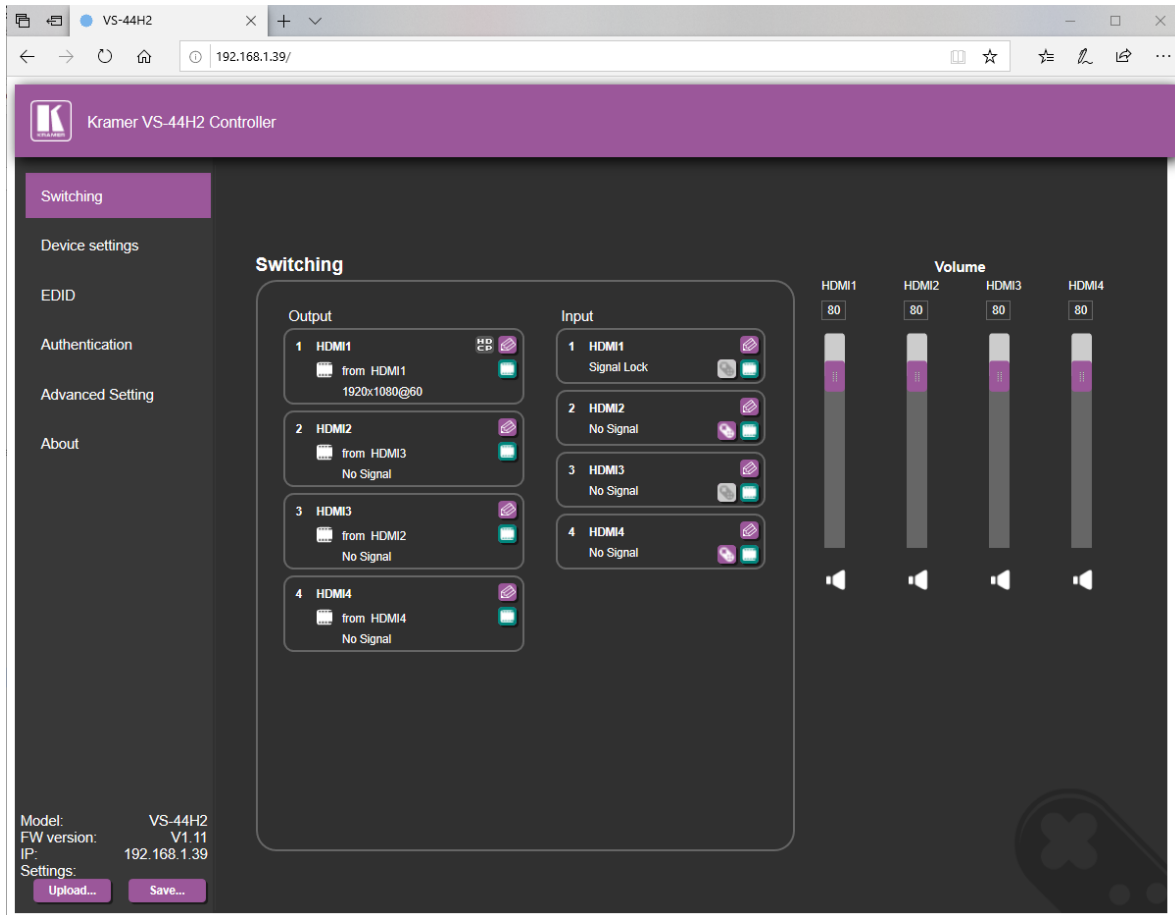


Figure 11: Switching Page with Navigation List on Left

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:

- [Viewing and Adjusting Output Settings](#) on page [20](#).
- [Muting Video](#) on page [20](#).
- [Muting Audio](#) on page [20](#).
- [Changing Output Name](#) on page [21](#).
- [Switching an Output to an Input](#) on page [21](#).
- [Ensuring Output Is Always HDCP](#) on page [21](#).
- [Adjusting Output Volume](#) on page [22](#).
- [Viewing and Adjusting Input Settings](#) on page [23](#).
- [Changing Input Name](#) on page [24](#).
- [Setting Input HDCP Behavior](#) on page [24](#).
- [Controlling a Connected Device Remotely](#) on page [25](#).

## Viewing and Adjusting Output Settings

To view and adjust output settings:

You can view the status of the outputs and adjust their settings via the output buttons.

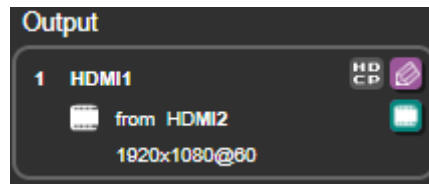







Figure 12: Switching Page – Output button

The Output button contains the following elements:

- Name (in [Figure 12](#), the name is HDMI1).
- Input source (in [Figure 12](#), HDMI2 is the input source for output HDMI1).
- Acceptor Resolution (in [Figure 12](#), 1920x1080@60 is the acceptor resolution).
- HDCP status  appears when output behavior is set to always be HDCP.
- Edit Output icon  to edit the output button name or to designate HDCP behavior for the output button.
- Video Mute icon  to substitute the video signal with a black screen.



## Muting Video

To Mute Video:

1. In the Navigation pane, click **Switching**.  
The Switching page appears ([Figure 11](#)).
2. Click the Video Mute icon  from a specific output button (1 to 4).  
The Video Mute icon  displays an x and the output selected displays a black screen.

## Muting Audio

To Mute Audio:

1. In the Navigation pane, click **Switching**.  
The Switching page appears ([Figure 11](#)).
2. Click the speaker icon  located under a volume slider ([Figure 14](#)).  
The Audio Mute icon  displays an x and the volume of the output selected is muted.

## Changing Output Name

It may be convenient to change output names to reflect the video acceptors connected to them.

**To change output name:**

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

The Switching page appears ([Figure 11](#)).

2. Click the Edit Output icon  from an Output button ([Figure 12](#)).

The Output Settings group appears.

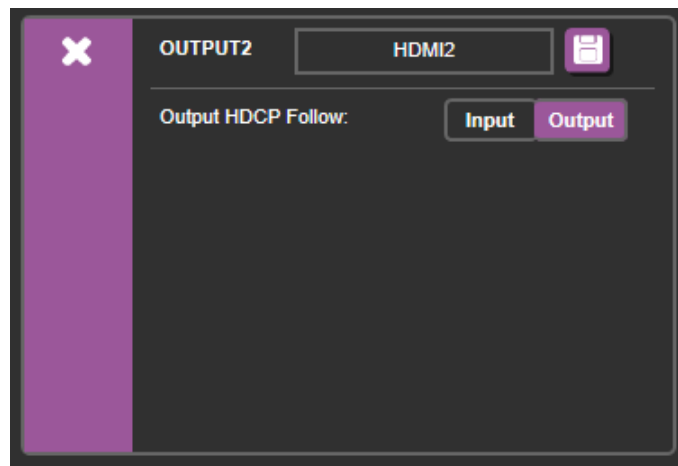



Figure 13: Output Settings group

3. Type a new name (up to 11 characters) and click **Save** .

The output name changes.

## Switching an Output to an Input


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

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

The Switching page appears ([Figure 11](#)).

2. Click an Output button to route an input ([Figure 12](#)).

The Output button's color changes from black to purple.

3. Click the Switch Video icon  from a specific input button (1 to 4) ([Figure 16](#)).

The Output button displays input name selected.

## Ensuring Output Is Always HDCP

It may be convenient (to prevent flickering when switching from an HDCP input to a non-HDCP input) to set an output to always stream HDCP (whether the input is HDCP or not).

**To ensure output is always HDCP:**


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

The Switching page appears ([Figure 11](#)).

2. Click the Edit Output icon  from an Output button ([Figure 12](#)).

The Output Settings group appears ([Figure 13](#)).

3. Select Output HDCP follow Output.

The HDCP status  appears and the output is now always HDCP (independent of the input).

## Adjusting Output Volume

To adjust output volume:

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

The Switching page appears ([Figure 11](#)).

2. Slide a volume slider (1 to 4) or type a number in the field above the slider and press Enter ([Figure 14](#)).

The output volume in accordance with the slider value.

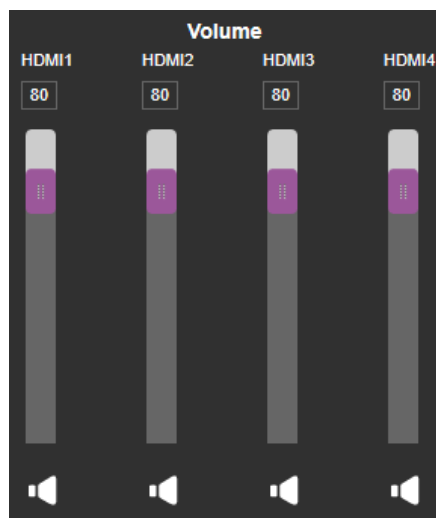


Figure 14: Volume Adjustment Sliders

Figure 15: Switching Page – Changing the Output Label

## Viewing and Adjusting Input Settings

You can view the status of the inputs and adjust their settings via the input buttons.

To view and adjust output settings:

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

The Switching page appears ([Figure 11](#)).

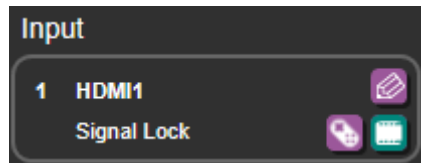


Figure 16: Switching Page – Input button

2. Click the Edit Input icon  from an Input button ([Figure 16](#)).

The Input Settings group appears ([Figure 17](#)).

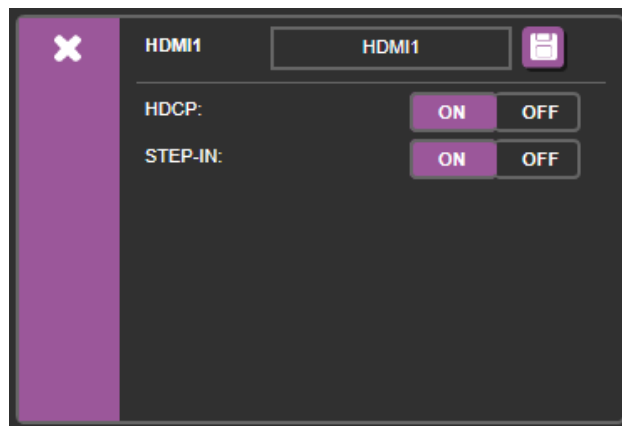





Figure 17: Input Settings group



The Input button contains the following elements:

- Name (in [Figure 16](#), the name is HDMI1).
- Signal status (either “No Signal” or “Signal Lock”).
- Edit Input icon  to edit the Input button name, set input HDCP behavior (i.e. designate whether input device supports HDCP), or set Step-In functionality (see [Setting Step-In Devices](#) on page [33](#)).
- Switch Video icon  to switch a selected output to this input.
- Remote device setting  to manage a Step-In device (for example, Kramer **DIP-30**) connected to **VS-44H2A** (see [Setting Step-In Devices](#) on page [33](#)).

## Changing Input Name


It may be convenient to change input names to reflect the video sources connected to them.

To change input name:

1. In the Navigation pane, click **Switching**.  
The Switching page appears ([Figure 11](#)).
  2. Click the Edit Input icon  from an Input button ([Figure 16](#)).  
The Input Settings group appears ([Figure 17](#)).
  3. Type a new name (up to 11 characters) and click **Save** .
- The input name changes.

## Setting Input HDCP Behavior

To set input HDCP behavior On/Off:

1. In the Navigation pane, click **Switching**.  
The Switching page appears ([Figure 11](#)).
2. Click the Edit Input icon  from an Input button ([Figure 16](#)).  
The Input Settings group appears ([Figure 17](#)).
3. Set input HDCP to On/Off.

Input supports an HDCP device if HDCP is set to On.



There are video sources (e.g., some Apple devices) that automatically switch to HDCP mode if connected to a device that supports HDCP (e.g. **VS-44H2A**). If an acceptor/display connected to **VS-44H2A** does not support HDCP, you might want to set Input HDCP to Off, so that the video source does not auto-switch to HDCP mode and the acceptor does not display the video.

## Controlling a Connected Device Remotely

To manage a Step-In device (for example, Kramer **DIP-30**) connected to **VS-44H2A** remotely.

To control another device remotely:

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

The Switching page appears ([Figure 11](#)).

2. Click the Edit Input icon  from an Input button ([Figure 16](#)).

The Input Settings group appears ([Figure 17](#)).

3. Set input STEP-IN to On.

The Remote device settings icon  is enabled.

4. Click the Remote device settings icon  from an Input button ([Figure 16](#)).

The Step-In Settings group appears ([Figure 18](#)).

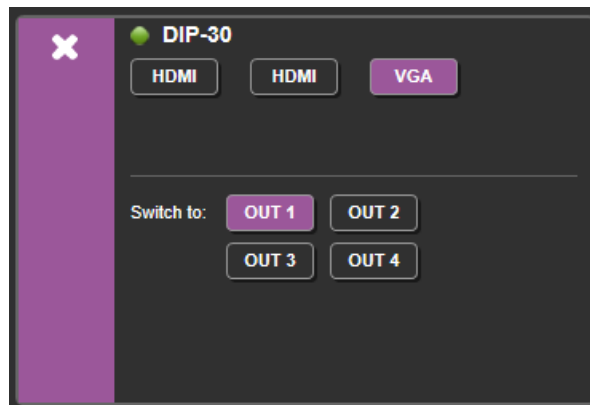


Figure 18: Step-In Settings group

For details on Setting Step-In Devices, see [Setting Step-In Devices](#) on page [33](#).

## 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 [26](#).
- [Performing a Factory Reset](#) on page [27](#).
- [Performing Firmware Upgrade](#) on page [27](#).

### Changing Ethernet Settings

To change the Ethernet settings:

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

The Device Settings page appears ([Figure 19](#)).

Figure 19: Device Settings Page

2. Uncheck the DHCP check box to change any of the parameters (IP Address, Netmask and/or Gateway).

The parameters can be edited.

3. Edit IP Address, Netmask and/or Gateway Parameters and click **Save Changes**.

The Ethernet changes are saved.



- After changing the IP address, reload the web page with the new IP address.
- After changing the subnet mask turn the **VS-44H2A** power off and then on again.
- If DHCP is checked, you need to 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 19](#)).
2. Click **Soft Factory Reset**.

The following window appears:

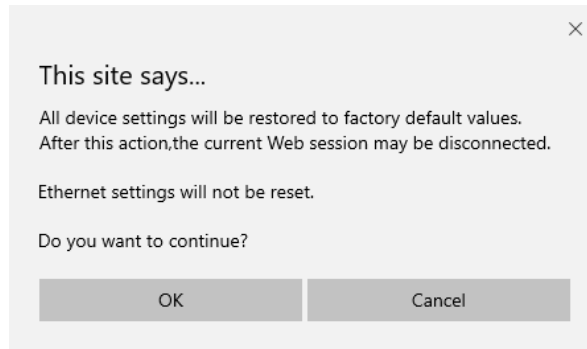


Figure 20: Device Settings Page – Factory Reset

3. Click **OK** to start factory reset and follow the instructions on-screen.  
The device resets to its default parameters.

## Performing Firmware Upgrade

To perform firmware upgrade:

1. In the Navigation pane, click **Device Settings**.  
The Device Settings page appears ([Figure 19](#)).
2. Click **Browse**.  
A browse window appears.
3. Select the new firmware file, click **Upgrade** and follow the instructions on-screen.  
The new firmware reloads.

---

## Managing EDID

The EDID Management page lets you read the EDID from:

- Any of the outputs.
- The default EDID.
- Any of the inputs.
- A file in your PC (File BROWSE).

The selected EDID can be copied to the selected input/s.

**To copy an EDID from the Default, an Input, or an Output EDID:**

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

The EDID page appears ([Figure 21](#)).

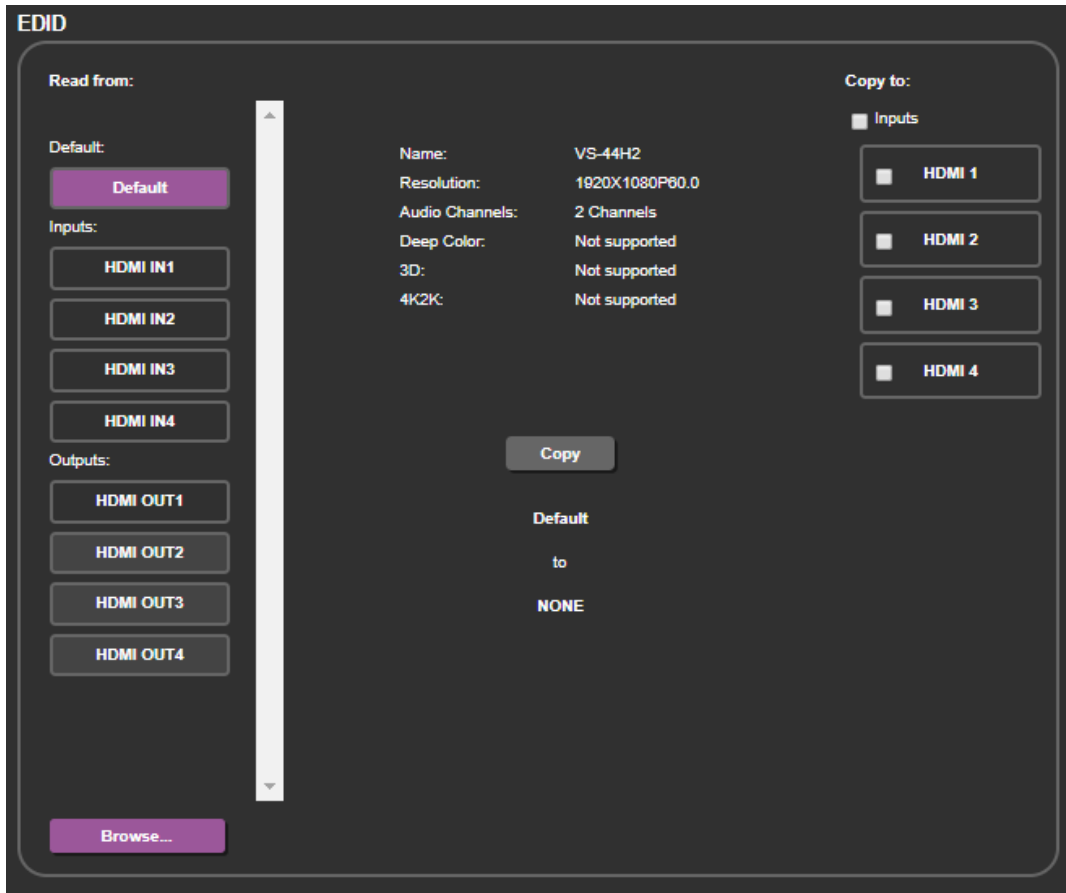


Figure 21: EDID Page – Selecting an EDID Source

2. Select a connected input or output (from the left) as the EDID source.



When reading from an output, make sure that that output is connected to an acceptor.

3. Select an input or all the inputs (from the right) to which the EDID is copied.
4. Click **COPY**.

A message appears.

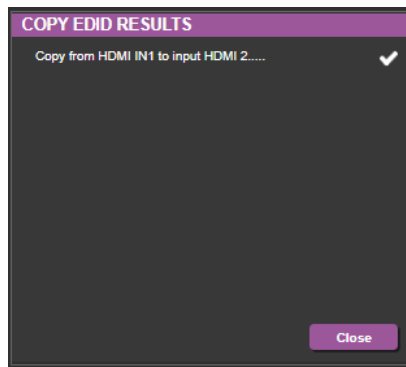


Figure 22: Copy EDID Message

5. Click **Close**.

**To read the EDID from the Default, an Input, or an Output EDID:**

1. In the Navigation pane, click **EDID**.  
The EDID page appears ([Figure 21](#)).
2. Click default, an Input, or an Output (from the left)  
The EDID details appear.

Name:	VS-44H2
Resolution:	1920X1080P60.0
Audio Channels:	2 Channels
Deep Color:	Not supported
3D:	Not supported
4K2K:	Not supported

Figure 23: EDID details

**To Copy the EDID from a file:**

1. In the Navigation pane, click **EDID**.  
The EDID page appears ([Figure 21](#)).
2. Click **File BROWSE** and open the EDID file.  
The EDID details appear.
3. Select one or more inputs (on the right).
4. Click **COPY**.  
A message appears ([Figure 22](#)).
5. If required, Check adding stereo audio to the selected EDID.
6. Click **OK**.
7. Follow the instructions on-screen.



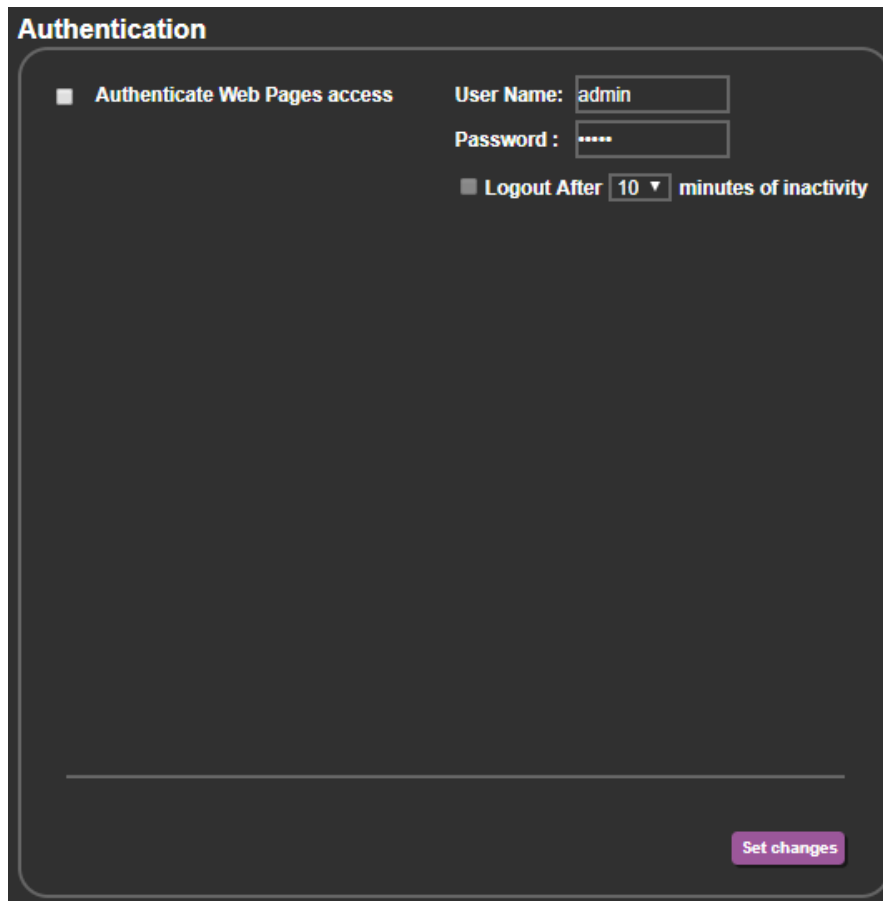
When viewing the 7-segment display in the EDID mode, the input with EDID read from a file displays “L”.

## Managing Web page Security

Use the Authentication page to set web access permission:

### Setting Web page Access Permission

To define access to the web pages In the Navigation pane, click **Authentication**. The Authentication page appears displaying the current status (password protected or free access).



The screenshot shows the 'Authentication' configuration page. It features a dark background with white text and form elements. At the top left, there is a title 'Authentication'. Below it, a checkbox labeled 'Authenticate Web Pages access' is checked. To the right of this checkbox are two input fields: 'User Name:' containing 'admin' and 'Password:' containing six asterisks. Below these fields is another checkbox labeled 'Logout After' which is also checked, followed by a dropdown menu showing '10' and the text 'minutes of inactivity'. At the bottom right of the page, there is a purple button labeled 'Set changes'.

Figure 24: Authentication Page

#### To enable web page security:

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

The Authentication page appears ([Figure 24](#)).

2. Click the **Authenticate Web Pages access** checkbox.

The Logout After checkbox is enabled.

3. Fill in a User Name, Password, how many minutes of inactivity is allowed before the webpage locks, and click the **Set changes** button.

A confirmation message appears and a key icon  appears in the upper right corner.



A password must contain 5 to 15 alphanumeric characters and no spaces.

## 4. Refresh webpage.

The webpage username and password prompt appear.

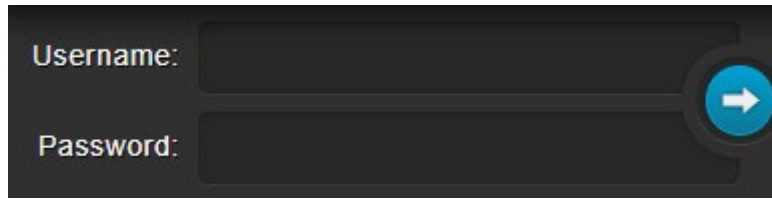


Figure 25: Webpage username and password prompt

## 5. Enter username and password and click arrow button.

The webpage unlocks.

**To disable web page security:**1. In the Navigation pane, click **Authentication**.

The Authentication page appears ([Figure 24](#)).

2. Uncheck the **Authenticate Web Pages access** checkbox and click the **Set changes** button.

The key icon  in the upper right corner disappears and web page security is disabled.

---

## Setting Timeout

Use the **Timeout Settings** web page to set the time delay before shutdown if no input signal is detected for each output.

**To set the timeout:**1. In the Navigation pane, click **Advanced Setting**.

The Advanced Setting page appears ([Figure 26](#)).

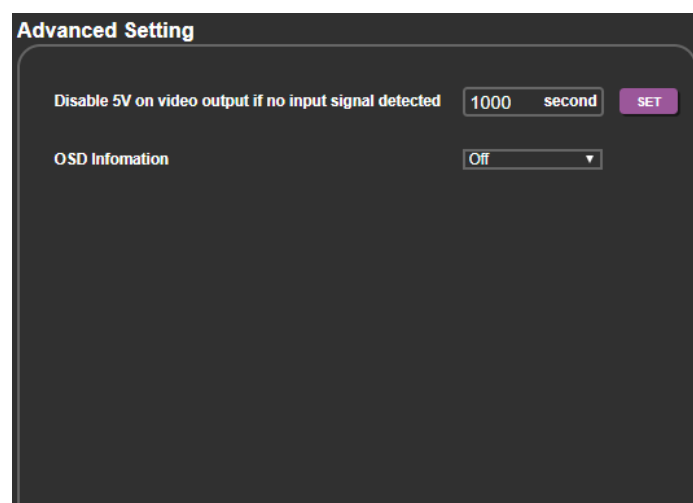


Figure 26: Advanced Setting page

2. Set the delay time 0-9999 seconds (where 0 is no timeout) and click **SET**.

The timeout is set.

---

## Displaying OSD Information

The OSD has three settings:

- Off – Never displayed.
- On – Always displayed.
- Auto – Displayed for a few seconds when a change in settings occurs.

**To set the OSD display to On/Auto:**

1. In the Navigation pane, click **Advanced Setting**.

The Advanced Setting page appears ([Figure 26](#)).

2. Set OSD Information to On/Auto.

The OSDs are displayed according to settings.

**To set the OSD display to Off:**

1. In the Navigation pane, click **Advanced Setting**.

The Advanced Setting page appears ([Figure 26](#)).

2. Set OSD Information to Off.

The OSDs are no longer displayed.

## Setting Step-In Devices

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

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-44H2A**.

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

The Switching page appears ([Figure 11](#)).

3. Click the Remote device settings icon  from an Input button ([Figure 16](#)).

The Step-In Settings group appears and the input button/s to which the Step-In device/s is connected appear/s purple.

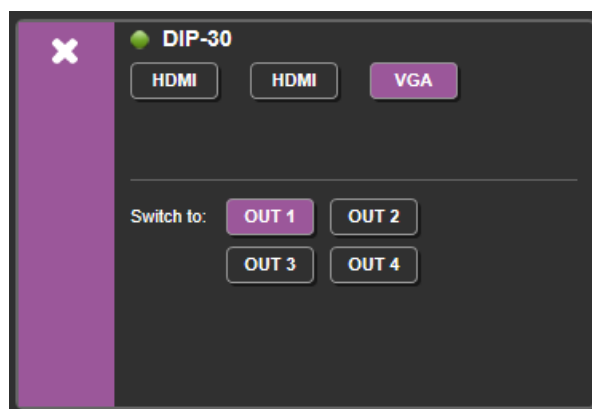


Figure 27: Step-In Settings group

4. Select an input in the Step-In Settings group (HDMI IN 1, HDMI IN 2 or VGA).

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



Press an input button on the **DIP-30**. The selected input is displayed on the web page.

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

The selected Step-In input on the **DIP-30** is routed to the selected outputs on the **VS-44H2A**.



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

# Viewing About Page

The VS-44H2A About Us page lets you view the web page version and Kramer Electronics Ltd details.



Figure 28: About Page

# Technical Specifications

Inputs	4 HDMI	On female HDMI connectors
Outputs	4 HDMI	On female HDMI connectors
Ports	1 USB	On a mini USB connector
	1 RS-232	On a 3-pin terminal block
	1 Ethernet	On an RJ-45 female connector
	1 USB	On a female USB-A connector for powering another device
Video	Max. Resolution	4K@60Hz (4:2:0) and 4K@30Hz (4:4:4)
	Compliance	Supports HDMI and HDCP 1.4
Control	Front Panel	Front panel buttons
		7-segment display
Power	Consumption	42VA
	Source	100-240V AC, 50/60Hz
Regulatory Compliance	Safety	CE, FCC
	Environmental	RoHs, WEEE
Enclosure	Type	Aluminum
	Cooling	Fan
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
General	Net Dimensions (W, D, H)	19", 7.2", 1U, rack mountable
	Shipping Dimensions (W, D, H)	52.5cm x 33cm x 10.7cm (20.7" x 13" x 4.2")
	Net Weight	1.9kg (4.2lbs) approx.
	Shipping Weight	2.9kg (6.39lbs) 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>		


The terms HDMI, HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing Administrator, Inc.

## Default Communication Parameters

RS-232/Ethernet			
Baud Rate:	115,200	Parity:	None
Data Bits:	8	Command Format:	ASCII Protocol 3000
Stop Bits:	1		
Example (Route input 1 to output 1):			#VID 1>1<cr>
Ethernet Parameters			
IP Address:	192.168.1.39	Default TCP Port #:	5000
Subnet Mask:	255.255.0.0	Default UDP Port #:	50000
Default Gateway:	192.168.0.1	Number of TCP ports:	8
Default username:	Admin	Number of web clients:	5
Default password:	Admin		
Full Factory Reset			
Front Panel Buttons:	There is no option for factory reset from front panel.		
Protocol 3000:	"#factory" command.		

Web pages:	Device Settings page, Soft Factory Reset resets all parameters to factory default except for network parameters.
------------	--

## Default Parameters

Parameter	Value
Protocol:	K3000
K3000 Model Name:	V', 'S', '-', '4', '4', 'U', 'H', 'D'"
K3000 Serial Number:	00000000000001
 Model name and serial number will not change back to the default status after a factory reset.	
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 4 route to input 1 to 4 separately.
Audio status:	Output 1 to 4 route to digital input 1 to 4 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:	Ex-fast switch.
Default EDID	Kramer default EDID with "monitor name"= "VS-44H2A"
Lock EDID state	Not locked
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
Output inactivity timeout	15 min
Apply switch mode configuration on startup	10

# Protocol 3000

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

## Understanding Protocol 3000

Protocol 3000 commands are a sequence of ASCII letters, structured according to the following.

- **Command format:**

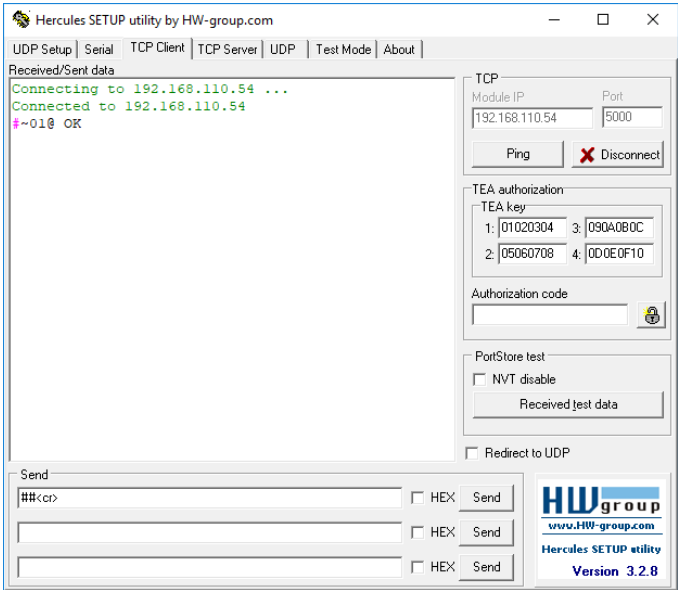
Prefix	Command Name	Constant (Space)	Parameter(s)	Suffix
#	Command	_	Parameter	<CR>

- **Feedback format:**



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

- **Command parameters** – Multiple parameters must be separated by a comma (,). In addition, multiple parameters can be grouped as a single parameter using brackets ([ and ]).
- **Command chain separator character** – Multiple commands can be chained in the same string. Each command is delimited by a pipe character (|).
- **Parameters attributes** – Parameters may contain multiple attributes. Attributes are indicated with pointy brackets (<...>) and must be separated by a period (.).

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












# Protocol 3000 Commands

Function	Description	Syntax	Parameters/Attributes	Example
#	Protocol handshaking.  Validates the Protocol 3000 connection and gets the machine number.  Step-in master products use this command to identify the availability of a device.	<b>COMMAND</b> <b>#&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@_ok<CR><LF>		#<CR>
AUD-LVL	Set volume level.	<b>COMMAND</b> <b>#AUD-LVL_&lt;io_mode&gt;,&lt;io_index&gt;,&lt;vol_level&gt;&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@AUD-LVL_<io_mode>,<io_index>,<vol_level><CR><LF>	<b>io_mode</b> – Input/Output 0 – Input 1 – Output <b>io_index</b> – Number that indicates the specific input or output port: 1-N (N= the total number of input or output ports) <b>vol_level</b> – Volume level -60db to 30dB; ++ (increase current value by 1dB); -- (decrease current value by 1dB)	Set AUDIO OUT 2 level to -50dB: <b>#AUD-LVL_1,1,-50&lt;CR&gt;</b>
AUD-LVL?	Get volume level.	<b>COMMAND</b> <b>#AUD-LVL?_&lt;io_mode&gt;,&lt;io_index&gt;&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@AUD-LVL_<io_mode>,<io_index>,<vol_level><CR><LF>	<b>io_mode</b> – Input/Output 0 – Input 1 – Output <b>io_index</b> – Number that indicates the specific input or output port: 1-N (N= the total number of input or output ports) <b>vol_level</b> – Volume level -60db to 30dB	Get AUDIO OUT 1 level <b>#AUD-LVL?_1,1&lt;CR&gt;</b>
AV-SW-TIMEOUT	N/A			
AV-SW-TIMEOUT	N/A			
BAUD	Set the RS-232 baud rate	<b>COMMAND</b> <b>#BAUD_&lt;baud_rate&gt;&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@BAUD_<baud_rate><CR><LF>	<b>Baud Rate</b> – 9600 19200 38400 57600 115200	Set the baud rate to 9600: <b>#BAUD_9600&lt;CR&gt;</b>
BAUD?	Get the RS-232 baud rate	<b>COMMAND</b> <b>#BAUD?&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@BAUD_<baud_rate><CR><LF>	<b>Baud Rate</b> – 9600 19200 38400 57600 115200	Get the baud rate to 9600: <b>#BAUD?&lt;CR&gt;</b>
BUILD-DATE?	Get device build date.	<b>COMMAND</b> <b>#BUILD-DATE?_&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@BUILD-DATE_<date>,<time><CR><LF>	<b>date</b> – Format: YYYY/MM/DD where YYYY = Year MM = Month DD = Day <b>time</b> – Format: hh:mm:ss where hh = hours mm = minutes ss = seconds	Get the device build date: <b>#BUILD-DATE?&lt;CR&gt;</b>
CPEDID	Copy EDID data from the output to the input EEPROM.   Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word).  Example: bitmap 0x0013 means inputs 1,2 and 5 are loaded with the new EDID.  In certain products Safe_mode is an optional parameter. See the HELP command for its availability.	<b>COMMAND</b> <b>#CPEDID_&lt;edid_io&gt;,&lt;src_id&gt;,&lt;edid_io&gt;,&lt;dest_bitmap&gt;&lt;CR&gt;</b> or <b>#CPEDID_&lt;edid_io&gt;,&lt;src_id&gt;,&lt;edid_io&gt;,&lt;dest_bitmap&gt;,&lt;safe_mode&gt;&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@CPEDID_<edid_io>,<src_id>,<edid_io>,<dest_bitmap><CR><LF> ~nn@CPEDID_<edid_io>,<src_id>,<edid_io>,<dest_bitmap>,<safe_mode><CR><LF>	<b>edid_io</b> – EDID source type (usually output) 0 – Input 1 – Output 2 – Default EDID 3 – Custom EDID <b>src_id</b> – Number of chosen source stage 0 – Default EDID source 1 – Output 1 2 – Output 2 <b>edid_io</b> – EDID destination type (usually input) 0 – Input 1 – Output 2 – Default EDID 3 – Custom EDID <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. 0 – indicates that EDID data is not copied to this destination. 1 – indicates that EDID data is copied to this destination. <b>safe_mode</b> – Safe mode 0 – device accepts the EDID as is without trying to adjust 1 – device tries to adjust the EDID (default value if no parameter is sent)	Copy the EDID data from the Output 1 (EDID source) to the Input: <b>#CPEDID_1,1,0,0x1&lt;CR&gt;</b>  Copy the EDID data from the default EDID source to the Input: <b>#CPEDID_2,0,0,0x1&lt;CR&gt;</b>

Function	Description	Syntax	Parameters/Attributes	Example
DISPLAY?	Get output HPD status.	<b>COMMAND</b> #DISPLAY?_out_index<CR> <b>FEEDBACK</b> ~nn@DISPLAY_out_index,status<CR><LF>	<b>out_index</b> – Number that indicates the specific output: 1-4 <b>status</b> – HPD status according to signal validation 0 – Signal or sink is not valid 1 – Signal or sink is valid 2 – Sink and EDID is valid	Get the output HPD status of Output 1: #DISPLAY?_1<CR>
ETH-PORT	Set Ethernet port protocol. <b>i</b> 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 <sup>16</sup> -1).	<b>COMMAND</b> #ETH-PORT_port_type,port_id<CR> <b>FEEDBACK</b> ~nn@ETH-PORT_port_type,port_id<CR><LF>	<b>port_type</b> – TCP/UDP <b>port_id</b> – TCP/UDP port number (0 – 65535)	Set the Ethernet port protocol for TCP to port 12457: #ETH-PORT_0,12457<CR>
ETH-PORT?	Get Ethernet port protocol.	<b>COMMAND</b> #ETH-PORT?_port_type<CR> <b>FEEDBACK</b> ~nn@ETH-PORT_port_type,port_id<CR><LF>	<b>port_type</b> – TCP/UDP 0 – TCP 1 – UDP <b>port_id</b> – TCP / UDP port number (0 – 65535)	Get the Ethernet port protocol for UDP: #ETH-PORT?_1<CR>
FACTORY	Reset device to factory default configuration. <b>i</b> This command deletes all user data from the device. The deletion can take some time.  Your device may require powering off and powering on for the changes to take effect.	<b>COMMAND</b> #FACTORY<CR> <b>FEEDBACK</b> ~nn@FACTORY_ok<CR><LF>		Reset the device to factory default configuration: #FACTORY<CR>
GEDID	Get EDID support on certain input/output. <b>i</b> For old devices that do not support this command, ~nn@ERR 002<CR><LF> is received.	<b>COMMAND</b> #GEDID_io_mode,in_index<CR> <b>FEEDBACK</b> ~nn@GEDID_io_mode,in_index,size<CR><LF>	<b>io_mode</b> – Input/Output 0 – Input 1 – Output 2 – Default EDID 3 – Custom EDID <b>in_index</b> – Number that indicates the specific input: 1-4 <b>size</b> – Size of data to be sent from device, 0 means no EDID support	Get EDID support information for input 1: #GEDID_111<CR>
HDCP-MOD	Set HDCP mode. <b>i</b> Set HDCP working mode on the device input:  HDCP supported - HDCP_ON [default].  HDCP not supported - HDCP OFF.  HDCP support changes following detected sink - MIRROR OUTPUT.  When you define 3 as the mode, the HDCP status is defined according to the connected output in the following priority: OUT 1, OUT 2. If the connected display on OUT 2 supports HDCP, but OUT 1 does not, then HDCP is defined as not supported. If OUT 1 is not connected, then HDCP is defined by OUT 2.	<b>COMMAND</b> #HDCP-MOD_in_index,mode<CR> <b>FEEDBACK</b> ~nn@HDCP-MOD_in_index,mode<CR><LF>	<b>in_index</b> – Number that indicates the specific input: 1-4 <b>mode</b> – HDCP mode: 0 – HDCP Off 3 – HDCP defined according to the connected output	Get the input HDCP-MODE of IN 1 to Off: #HDCP-MOD_1,0<CR>
HDCP-MOD?	Get HDCP mode. <b>i</b> Set HDCP working mode on the device input:  HDCP supported - HDCP_ON [default].  HDCP not supported - HDCP OFF.  HDCP support changes following detected sink - MIRROR OUTPUT.	<b>COMMAND</b> #HDCP-MOD?_in_index<CR> <b>FEEDBACK</b> ~nn@HDCP-MOD_in_index,mode<CR><LF>	<b>in_index</b> – Number that indicates the specific input: 1-4 <b>mode</b> – HDCP mode: 0 – HDCP Off 3 – HDCP defined according to the connected output	Get the input HDCP-MODE of IN 1 HDMI: #HDCP-MOD?_1<CR>
HDCP-STAT?	Get HDCP signal status. <b>i</b> io_mode =1 – get the HDCP signal status of the sink device connected to the specified output.  io_mode =0 – get the HDCP signal status of the source device connected to the specified input.	<b>COMMAND</b> #HDCP-STAT?_io_mode,in_index<CR> <b>FEEDBACK</b> ~nn@HDCP-STAT_io_mode,in_index,status<CR><LF>	<b>io_mode</b> – Input/Output 0 – Input 1 – Output <b>in_index</b> – Number that indicates the specific input: 1-4 <b>status</b> – Signal encryption status - valid values On/Off 0 – HDCP Off 1 – HDCP On	Get the output HDCP-STATUS of IN 1: #HDCP-STAT?_0,1<CR>

Function	Description	Syntax	Parameters/Attributes	Example										
HELP	Get command list or help for specific command.	<b>COMMAND</b> <b>#HELP&lt;CR&gt;</b> <b>#HELP_cmd_name&lt;CR&gt;</b> <b>FEEDBACK</b> 1. Multi-line: ~nn@Device_cmd_name,cmd_name.<CR><LF> To get help for command use: HELP (COMMAND_NAME)<CR><LF> ~nn@HELP_cmd_name:<CR><LF> description<CR><LF> USAGE:usage<CR><LF>	<b>cmd_name</b> – Name of a specific command	Get the command list: <b>#HELP&lt;CR&gt;</b>  To get help for AV-SW-TIMEOUT: <b>HELP_av-sw-timeout&lt;CR&gt;</b>										
INFO-IO?	LEGACY COMMAND. Get in/out count.	<b>COMMAND</b> <b>#INFO-IO?_u&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@INFO-IO_IN_in_count, T_out_count<CR><LF>	<b>in_count</b> – Number of inputs in the unit <b>out_count</b> – Number of outputs in the unit	Get inputs count: <b>#INFO-IO?_u&lt;CR&gt;</b>										
INFO-PRST?	LEGACY COMMAND. Get maximum preset count.  ⓘ In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.	<b>COMMAND</b> <b>#INFO-PRST?_u&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@INFO-PRST_vid_video_preset_count, aud_audio_preset_count<CR><LF>	<b>video_preset_count</b> – Maximum number of video presets in the unit <b>audio_preset_count</b> – Maximum number of audio presets in the unit	Get number of video and audio presets: <b>#INFO-PRST?_u&lt;CR&gt;</b>										
LDEDID	Write EDID data from external application to device.  ⓘ When the unit receives the LDEDID command it replies with READY and enters the special EDID packet wait mode. In this mode the unit can receive only packets and not regular protocol commands.  If the unit does not receive correct packets for 30 seconds or is interrupted for more than 30 seconds before receiving all packets, it sends timeout error ~nn@LDEDID_err01<CR><LF> and returns to the regular protocol mode. If the unit received data that is not a correct packet, it sends the corresponding error and returns to the regular protocol mode.	<b>COMMAND</b> Multi-step syntax <b>FEEDBACK</b> Step 1: <b>#LDEDID_edid_io,dest_bitmask,edid_size,safe_mode&lt;CR&gt;</b> Response 1: ~nn@LDEDID_edid_io,dest_bitmask,edid_size,safe_mode_ready<CR><LF> or ~nn@LDEDID_errnn<CR><LF> Step 2: If ready was received, end EDID_DATA Response 2: ~nn@LDEDID_edid_io,dest_bitmask,edid_size,safe_mode_ok<CR><LF> or ~nn@LDEDID_errnn<CR><LF>	<b>edid_io</b> – EDID destination type (usually input) 0 – Input 1 – Output 2 – Default EDID 3 – Custom EDID <b>dest_bitmask</b> – Bitmap representing destination IDs. Format: 0x*****, where * is ASCII presentation of hex digit. The binary presentation of this number is a bit mask for destinations. Setting '1' means EDID data has to be copied to this destination <b>edid_size</b> – EDID data size <b>safe_mode</b> – Safe mode 0 – Device accepts the EDID as is without trying to adjust 1 – Device tries to adjust the EDID <b>edid_data</b> – Data in protocol packets <b>Using the Packet Protocol</b> Send a command: LDRV, LOAD, IROUT, LDEDID Receive Ready or ERR### If Ready: a. Send a packet, b. Receive OK on the last packet, c. Receive OK for the command Packet structure: <b>Packet ID</b> (1, 2, 3...) (2 bytes in length) <b>Length</b> (data length + 2 for CRC) – (2 bytes in length) <b>Data</b> (data length -2 bytes) <b>CRC</b> – 2 bytes <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 colspan="2">CRC</td> </tr> </tbody> </table> 5. Response: ~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		Write the EDID data from an external application to the HDMI In 1 input without adjustment attempts: <b>#LDEDID_0,0x1,2340,0&lt;CR&gt;&gt;</b>  Write the EDID data from an external application to HDMI In 1 and PC In inputs with adjustment attempts: <b>#LDEDID_0,0x5,2340,1&lt;CR&gt;&gt;</b>
01	02	03	04	05										
Packet ID	Length	Data	CRC											
LOAD	Load file to device.	<b>COMMAND</b> <b>#LOAD_file_name,size&lt;CR&gt;</b> <b>FEEDBACK</b> Data sending negotiation: * Device - ~01@LOAD_file_name,size_ready<CR><LF> * End User (+Device)- Send file in Protocol Packets * Device - ~01@LOAD_file_name,size_ok<CR><LF>	<b>file_name</b> – Name of file to save on device <b>size</b> – Size of file data that is sent <b>Using the Packet Protocol</b> Send a command: LDRV, LOAD, IROUT, LDEDID Receive Ready or ERR### If Ready: a. Send a packet, b. Receive OK on the last packet, c. Receive OK for the command Packet structure: <b>Packet ID</b> (1, 2, 3...) (2 bytes in length) <b>Length</b> (data length + 2 for CRC) – (2 bytes in length) <b>Data</b> (data length -2 bytes) <b>CRC</b> – 2 bytes <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 colspan="2">CRC</td> </tr> </tbody> </table> 5. Response: ~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: <b>#LOAD_file_response.dat,5360&lt;CR&gt;</b>
01	02	03	04	05										
Packet ID	Length	Data	CRC											
LOCK-FP	Lock the front panel.  ⓘ In NT-52N, this command includes the PortNumber (1-2) parameter.	<b>COMMAND</b> <b>#LOCK-FP_lock/unlock&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@LOCK-FP_lock/unlock<CR><LF>	<b>lock/unlock</b> – On/Off 0 – Off unlocks EDID 1 – On locks EDID	Unlock front panel: <b>#LOCK-FP_0&lt;CR&gt;</b>										

Function	Description	Syntax	Parameters/Attributes	Example
LOCK-FP?	Get the front panel lock state.  ❗ In NT-52N, this command includes the PortNumber (1-2) parameter.	<b>COMMAND</b> #LOCK-FP?_<CR> <b>FEEDBACK</b> ~nn@LOCK-FP_lock/unlock<CR><LF>	lock/unlock – On/Off 0 – Off unlocks EDID 1 – On locks EDID	Get the front panel lock state: #LOCK-FP?<CR>
MODEL?	Get device model.  ❗ This command identifies equipment connected to VS-44H2A and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests.	<b>COMMAND</b> #MODEL?_<CR> <b>FEEDBACK</b> ~nn@MODEL_model_name<CR><LF>	model_name – String of up to 19 printable ASCII chars	Get the device model: #MODEL?_<CR>
MUTE	Set audio mute.	<b>COMMAND</b> #MUTE_out_index,mute_mode<CR> <b>FEEDBACK</b> ~nn@MUTE_out_index,mute_mode<CR><LF>	out_index – Number that indicates the specific output: 1-4 mute_mode – On/Off 0 – Off 1 – On	Set Output 1 to mute: #MUTE_1,1<CR>
MUTE?	Get audio mute.	<b>COMMAND</b> #MUTE?_out_index<CR> <b>FEEDBACK</b> ~nn@MUTE_out_index,mute_mode<CR><LF>	out_index – Number that indicates the specific output: 1-4 mute_mode – On/Off 0 – Off 1 – On	Get mute status of output 1 #MUTE_1?<CR>
NAME	Set machine (DNS) name.  ❗ 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).	<b>COMMAND</b> #NAME_machine_name<CR> <b>FEEDBACK</b> ~nn@NAME_machine_name<CR><LF>	machine_name – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end)	Set the DNS name of the device to room-442: #NAME_room-442<CR>
NAME?	Get machine (DNS) name.  ❗ 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).	<b>COMMAND</b> #NAME?_<CR> <b>FEEDBACK</b> ~nn@NAME_machine_name<CR><LF>	machine_name – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end)	Get the DNS name of the device: #NAME?_<CR>
NAME-RST	Reset machine (DNS) name to factory default.  ❗ Factory default of machine (DNS) name is "KRAMER_" + 4 last digits of device serial number.	<b>COMMAND</b> #NAME-RST<CR> <b>FEEDBACK</b> ~nn@NAME-RST_ok<CR><LF>		Reset the machine name (S/N last digits are 0102): #NAME-RST_kramer_0102<CR>
NET-DHCP	Set DHCP mode.  ❗ Only 1 is relevant for the mode value. To disable DHCP, the user must configure a static IP address for the device.  Connecting Ethernet to devices with DHCP may take more time in some networks.  To connect with a randomly assigned IP by DHCP, specify the device DNS name (if available) using the NAME command. You can also get an assigned IP by direct connection to USB or RS-232 protocol port, if available.  For proper settings consult your network administrator.  ❗ For Backward compatibility, the id parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.	<b>COMMAND</b> #NET-DHCP_netw_id,dhcp_state<CR> <b>FEEDBACK</b> ~nn@NET-DHCP_netw_id,dhcp_state<CR><LF>	netw_id – Network ID—the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3.... dhcp_state – 1 – Try to use DHCP. (If unavailable, use the IP address set by the factory or the net-ip command).	Enable DHCP mode for port 1, if available: #NET-DHCP_1,1<CR>
NET-DHCP?	Get DHCP mode.  ❗ For Backward compatibility, the id parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.	<b>COMMAND</b> #NET-DHCP?_netw_id<CR> <b>FEEDBACK</b> ~nn@NET-DHCP_netw_id,dhcp_mode<CR><LF>	netw_id – Network ID—the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3.... dhcp_mode – 0 – Do not use DHCP. Use the IP set by the factory or using the net-ip or net-config command. 1 – Try to use DHCP. If unavailable, use the IP set by the factory or using the net-ip or net-config command.	Get DHCP mode for port 1: #NET-DHCP?_1<CR>

Function	Description	Syntax	Parameters/Attributes	Example
NET-GATE	Set gateway IP.  A network gateway connects the device via another network and maybe over the Internet. Be careful of security issues. For proper settings consult your network administrator.	<b>COMMAND</b> #NET-GATE_ip_address<CR> <b>FEEDBACK</b> ~nn@NET-GATE_ip_address<CR><LF>	<b>ip_address</b> – Format: xxx.xxx.xxx.xxx	Set the gateway IP address to 192.168.0.1: #NET-GATE_192.168.000.001<CR>
NET-GATE?	Get gateway IP.  A network gateway connects the device via another network and maybe over the Internet. Be aware of security problems.	<b>COMMAND</b> #NET-GATE?_<CR> <b>FEEDBACK</b> ~nn@NET-GATE_ip_address<CR><LF>	<b>ip_address</b> – Format: xxx.xxx.xxx.xxx	Get the gateway IP address: #NET-GATE?_<CR>
NET-IP	Set IP address.  For proper settings consult your network administrator.	<b>COMMAND</b> #NET-IP_ip_address<CR> <b>FEEDBACK</b> ~nn@NET-IP_ip_address<CR><LF>	<b>ip_address</b> – Format: xxx.xxx.xxx.xxx	Set the IP address to 192.168.1.39: #NET-IP_192.168.001.039<CR>
NET-IP?	Get IP address.	<b>COMMAND</b> #NET-IP?_<CR> <b>FEEDBACK</b> ~nn@NET-IP_ip_address<CR><LF>	<b>ip_address</b> – Format: xxx.xxx.xxx.xxx	Get the IP address: #NET-IP?_<CR>
NET-MAC?	Get MAC address.  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.	<b>COMMAND</b> #NET-MAC?_id<CR> <b>FEEDBACK</b> ~nn@NET-MAC_id,mac_address<CR><LF>	<b>id</b> – Network ID—the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3.... <b>mac_address</b> – Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit	#NET-MAC?_id<CR>
NET-MASK	Set subnet mask.  For proper settings consult your network administrator.	<b>COMMAND</b> #NET-MASK_net_mask<CR> <b>FEEDBACK</b> ~nn@NET-MASK_net_mask<CR><LF>	<b>net_mask</b> – Format: xxx.xxx.xxx.xxx	Set the subnet mask to 255.255.0.0: #NET-MASK_255.255.000.000<CR>
NET-MASK?	Get subnet mask.	<b>COMMAND</b> #NET-MASK?_<CR> <b>FEEDBACK</b> ~nn@NET-MASK_net_mask<CR><LF>	<b>net_mask</b> – Format: xxx.xxx.xxx.xxx	Get the subnet mask: #NET-MASK?_<CR>
PROT-VER?	Get device protocol version.	<b>COMMAND</b> #PROT-VER?_<CR> <b>FEEDBACK</b> ~nn@PROT-VER_3000:version<CR><LF>	<b>version</b> – XX.XX where X is a decimal digit	Get the device protocol version: #PROT-VER?_<CR>
PRST-LST?	Get saved preset list.  In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.	<b>COMMAND</b> #PRST-LST?_<CR> <b>FEEDBACK</b> ~nn@PRST-LST_preset,preset,...<CR><LF>	<b>preset</b> – Preset number	Show preset list: #PRST-LST?_<CR>
PRST-RCL	Recall saved preset list.  In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.	<b>COMMAND</b> #PRST-RCL_preset<CR> <b>FEEDBACK</b> ~nn@PRST-RCL_preset<CR><LF>	<b>preset</b> – Preset number	Recall preset 1: #PRST-RCL_1<CR>
PRST-STO	Store current connections, volumes and modes in preset.  In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.	<b>COMMAND</b> #PRST-STO_preset<CR> <b>FEEDBACK</b> ~nn@PRST-STO_preset<CR><LF>	<b>preset</b> – Preset number	Store preset 1: #PRST-STO_1<CR>
RESET	Reset device.  To avoid locking the port due to a USB bug in Windows, disconnect USB connections immediately after running this command. If the port was locked, disconnect and reconnect the cable to reopen the port.	<b>COMMAND</b> #RESET<CR> <b>FEEDBACK</b> ~nn@RESET_ok<CR><LF>		Reset the device: #RESET<CR>
SIGNAL?	Get input signal status.	<b>COMMAND</b> #SIGNAL?_in_index<CR> <b>FEEDBACK</b> ~nn@SIGNAL_in_index,status<CR><LF>	<b>in_index</b> – Number that indicates the specific input: 1-4 <b>status</b> – Signal status according to signal validation: 0 – Off 1 – On	Get the input signal lock status of IN 1: #SIGNAL?_1<CR>
SN?	Get device serial number.	<b>COMMAND</b> #SN?_<CR> <b>FEEDBACK</b> ~nn@SN_serial_num<CR><LF>	<b>serial_num</b> – 14 decimal digits, factory assigned	Get the device serial number: #SN?_<CR>

Function	Description	Syntax	Parameters/Attributes	Example
VERSION?	Get firmware version number.	<b>COMMAND</b> #VERSION?_<CR> <b>FEEDBACK</b> ~nn@VERSION_firmware_version<CR><LF>	<b>firmware_version</b> – XX.XX.XXXX where the digit groups are: major.minor.build version	Get the device firmware version number: #VERSION?_<CR>
VID	LEGACY COMMAND. Set video switch state. <i>i</i> The SET command is for remote input switching on Step-in clients (essentially via by the Web). This is a legacy command. New Step-in modules support the ROUTE command.	<b>COMMAND</b> #VID_in_id>out_id<CR> <b>FEEDBACK</b> ~nn@VID_in_id>out_id<CR><LF>	<b>in_id</b> – Indicates the ID of the input: 1-n (n= the total number of inputs) > – Connection character between in and out parameters <b>out_id</b> –Output number * for all outputs	Switch IN 1 to OUT 3: #VID_1>3<CR>
VID?	LEGACY COMMAND. Set video switch state. <i>i</i> The GET command identifies input switching on Step-in clients. This is a legacy command. New Step-in modules support the ROUTE command.	<b>COMMAND</b> #VID?_out_id<CR> <b>FEEDBACK</b> ~nn@VID?_out_id<CR><LF>	<b>in_id</b> – Indicates the ID of the input: 1-n (n= the total number of inputs) > – Connection character between in and out parameters <b>out_id</b> –Output number * for all outputs	Get video switch state: #VID?_2<CR>
VMUTE	Set enable/disable video on output. <i>i</i> Video mute parameter 2 (blank picture) is not supported.	<b>COMMAND</b> #VMUTE_out_index, flag<CR> <b>FEEDBACK</b> ~nn@VMUTE_out_index, flag<CR><LF>	<b>out_index</b> – Number that indicates the specific output: 1-4 <b>flag</b> – Video Mute 0 – Video enabled 1 – Video disabled 2 – Blank picture	Disable the video output on OUT 2: #VMUTE_2, 0<CR>
VMUTE?	Get video on output status. <i>i</i> Video mute parameter 2 (blank picture) is not supported.	<b>COMMAND</b> #VMUTE?_out_index<CR> <b>FEEDBACK</b> ~nn@VMUTE_out_index, flag<CR><LF>	<b>out_index</b> – Number that indicates the specific output: 1-4 <b>flag</b> – Video Mute 0 – Video enabled 1 – Video disabled 2 – Blank picture	Get video on output status: #VMUTE?_2<CR>

## Result and Error Codes

### Syntax

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

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

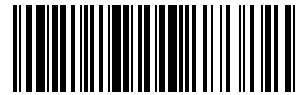
### Error Codes

Error Name	Error Code	Description
P3K_NO_ERROR	0	No error
ERR_PROTOCOL_SYNTAX	1	Protocol syntax
ERR_COMMAND_NOT_AVAILABLE	2	Command not available
ERR_PARAMETER_OUT_OF_RANGE	3	Parameter out of range
ERR_UNAUTHORIZED_ACCESS	4	Unauthorized access
ERR_INTERNAL_FW_ERROR	5	Internal FW error
ERR_BUSY	6	Protocol busy
ERR_WRONG_CRC	7	Wrong CRC
ERR_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 – no changed
ERR_WRONG_MODE	33	Wrong operation mode
ERR_NOT_CONFIGURED	34	Device/chip was not initialized





P/N:



2900-301078

Rev:



6



## 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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