

Contents

Introduction	1
Getting Started	1
Overview	2
Typical Applications	3
Defining VP-429H2 Automatic Video Switcher / Scaler	4
Mounting VP-429H2	6
Connecting VP-429H2	7
Connecting to VP-429H2 via RS-232	8
Setting the DIP-Switches	9
Connecting the Remote Control Switches	9
Operating and Controlling VP-429H2	10
Selecting an Input	10
Auto Adjusting the VGA Signal	11
Adjusting the Output Volume	11
Performing a Step-in Operation	11
Operating via Ethernet	12
Using the Embedded Web Pages	15
Browsing VP-429H2 Web Pages	16
Switching the Inputs and Adjusting the Signal	17
Changing Device Settings	18
Triggering Commands via the DATA RS-232 Port	19
Defining Video and Audio Settings	21
Setting Web Page Access Permission	23
Managing EDID	25
Upgrading the Firmware	29
Viewing the About Page	30
Upgrading the Firmware via USB Port	31
Technical Specifications	32
Supported Input Resolutions	33
Supported Output Resolutions	34
Default Communication Parameters	35
Default EDID	35
Protocol 3000	38
Understanding Protocol 3000	38
Protocol 3000 Commands	39
Result and Error Codes	47

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/VP-429H2 to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

Achieving the 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 **VP-429H2** 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.
- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label which located on the bottom of the unit.

Recycling Kramer Products

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

Overview

Congratulations on purchasing your Kramer **VP-429H2 Automatic Video Switcher / Scaler**. **VP-429H2** is a 4K@60Hz (4:4:4) scaler / switcher tool for HDMI™, DisplayPort, VGA, and unbalanced audio signals. The unit scales the signal and outputs it on HDMI. Step-in functionality provides easy plug-and-play collaboration when connected to a switcher that supports Step-in over HDMI. It also features convenient RS-232 control of monitor or projector activation and supports Ethernet, contact closure switches and RS-232 control. **VP-429H2** provides exceptional quality, advanced and user-friendly operation, and flexible control.

Exceptional Quality

- High-performance switcher/scaler – Scales signals of all standard resolutions up to 4K (4:4:4) HDCP 2.2 for output to the HDMI output. Constant output sync prevents signal disruption when switching between inputs and when no video is detected.
- HDMI support – Deep Color, x.v.Color as specified in HDMI 2.0.
- Superior switching and signal control – Select automatic switching options using live input detection, enable or disable HDCP per input, copy and save the EDID to the inputs (supported on HDMI and DisplayPort inputs), and define output refresh rate and aspect ratio.
- Local Step-in switching – When used with a Step-in enabled switcher, just plug in your device and press the Step-in button or use the contact closure Step-in switch. Your device becomes the active signal on the main display.

Advanced and User-friendly Operation

- Cost-effective and convenient control options – Local control via front panel input selection buttons and setup DIP-switches, Ethernet with embedded web pages, RS-232 serial ports for control of the unit and of a display via the unit, and GPI controls.
- Easy installation – Compact MegaTOOLS® fan-less enclosure for surface mounting or side-by-side mounting of 2 units in a 1U rack space with the recommended rack adapter.

Flexible Connectivity

- Diverse Inputs – 2 HDMI 4K@60Hz (4:4:4), 1 DisplayPort and 1 VGA input.
- A USB port for firmware upgrade.

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

Typical Applications

VP-429H2 is ideal for the following typical applications:

- Small meeting rooms or huddle spaces for simple, hassle-free connection to a display.
- Auto-switching applications with multi-format video sources.
- Systems supporting 4K video resolutions.

Controlling your VP-429H2

Control your VP-429H2 directly via the front panel push buttons, remote contact closure pins, 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 VP-429H2 Automatic Video Switcher / Scaler

This section defines VP-429H2.

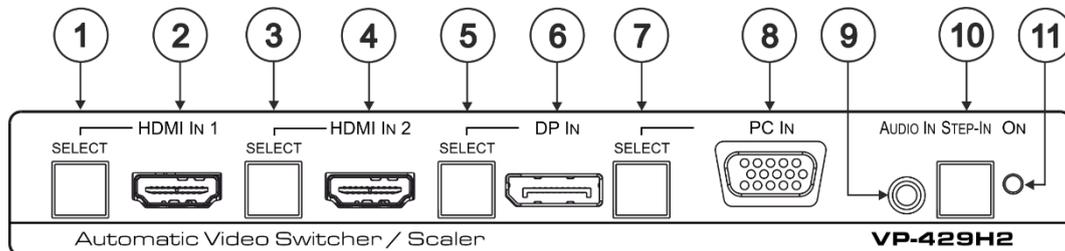


Figure 1: VP-429H2 Automatic Video Switcher / Scaler Front Panel

#	Feature	Function
①	HDMI IN 1 SELECT Button	Press to select the HDMI IN 1 input. When HDMI IN 1 is selected, the button lights and indicates the selected audio: Red – External audio from the analog Audio IN is selected. Green – Embedded audio from HDMI IN 1 is selected. Press HDMI IN 1 for over 15 seconds to enter the firmware upgrade mode (see Upgrading the Firmware via USB Port on page 31).
②	HDMI IN 1 Connector	Connect to an HDMI source.
③	HDMI IN 2 SELECT Button	Press to select the HDMI IN 2 input. When HDMI IN 2 is selected, the button lights and indicates the selected audio: Red – External audio from the analog Audio IN is selected. Green – Embedded audio from HDMI IN 2 is selected.
④	HDMI IN 2 Connector	Connect to an HDMI source.
<p> Press and hold HDMI IN 1 and HDMI IN 2 SELECT buttons simultaneously for a few seconds to reset the output resolution to 1080p.</p>		
⑤	DP IN SELECT Button	Press to select the DP input. When DP is selected, the button lights and indicates the selected audio: Red – External audio from the analog Audio IN is selected. Green – Embedded audio from DP IN is selected.
⑥	DP IN DisplayPort Connector	Connect to a DisplayPort source.
⑦	PC IN SELECT Button	Press to select the PC IN input. When PC IN is selected, the button lights red. Press and hold PC IN SELECT button for a few seconds to auto-adjust the VGA signal.
⑧	PC IN 15-pin HD Connector	Connect to the VGA source.
⑨	AUDIO IN 3.5mm Mini Jack	Connects to an unbalanced stereo audio source.
⑩	STEP-IN Button	Press to take control of the input of the device to which VP-429H2 is connected (when connected to a compatible switcher).
⑪	ON LED	Lights green when the device is powered on.

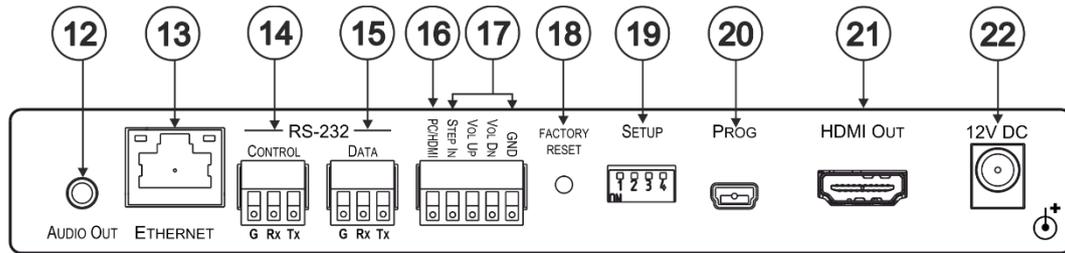


Figure 2: VP-429H2 Automatic Video Switcher / Scaler Rear Panel

#	Feature	Function
12	AUDIO OUT 3.5mm Mini Jack	Connect to the unbalanced stereo audio acceptor (for example, active speakers).
13	ETHERNET RJ-45 Connector	Connect to the LAN via a PC controller.
14	RS-232 CONTROL 3-pin Terminal Block	Connect to a serial controller or PC to control the device.
15	RS-232 DATA 3-pin Terminal Block	Connect to the RS-232 port of the acceptor (for example, a projector). The VP-429H2 sends a predefined command (for example, ON or OFF) to the acceptor when triggered to do so. The triggers and specific commands are configured via the Control Settings web page.
16	PC/HDMI Remote Switch Terminal Block	Connect to a remote switch to cycle through the inputs. Each press cycles through the inputs HDMI IN 1 → HDMI IN 2 → DP IN → PC IN or according to the cycle specified in the Video & Audio Settings web page (see Connecting the Remote Control Switches on page 9).
17	Remote Contact-Closure 4-pin Terminal Block	Connect to remote momentary switches to control Step-in and audio volume.
18	FACTORY RESET Recessed Button	Short press to reboot, long press to reset the device to factory default parameters.
19	SETUP 4-way DIP-switch	Switches for setting the video and audio input behavior (see Setting the DIP-Switches on page 9).
20	PROG Mini USB Connector	For firmware upgrade.
21	HDMI OUT Connector	Connect to an HDMI acceptor.
22	12V DC Connector	12V DC connector for powering the unit.

Mounting VP-429H2

This section provides instructions for mounting **VP-429H2**. 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.



- **VP-429H2** must be placed upright in the correct horizontal position.

**Caution:**

- Mount **VP-429H2** before connecting any cables or power.

**Warning:**

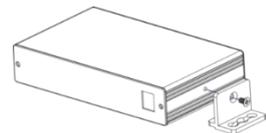
- Ensure that the environment (e.g., maximum ambient temperature & air flow) is compatible for the device.
- Avoid uneven mechanical loading.
- Appropriate consideration of equipment nameplate ratings should be used for avoiding overloading of the circuits.
- Reliable earthing of rack-mounted equipment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

To mount the VP-429H2 on a rack:

Mount the unit in a rack using the recommended rack adapter (see www.kramerav.com/product/VP-429H2).

To mount the VP-429H2 on a table or shelf:

- Attach the rubber feet and place the unit on a flat surface.
- Fasten a bracket (included) on each side of the unit and attach it to a flat surface.



For more information go to www.kramerav.com/downloads/VP-429H2.

Connecting VP-429H2

 Always switch off the power to each device before connecting it to your VP-429H2. After connecting your VP-429H2, connect its power and then switch on the power to each device.

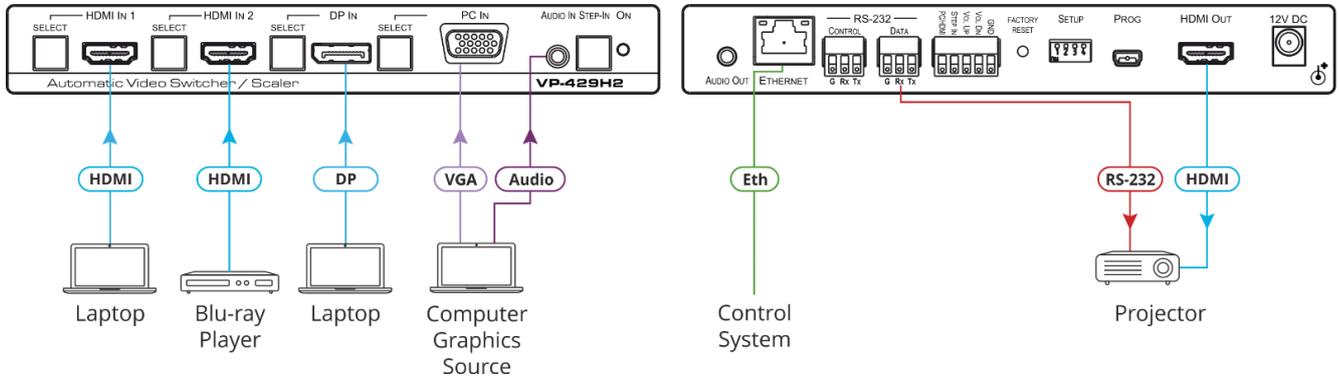


Figure 3: Connecting to the VP-429H2 Rear Panel

To connect the VP-429H2 as illustrated in the example in [Figure 3](#):

1. Connect an HDMI source (for example, a Laptop) to the HDMI IN 1 connector (2) on the front panel.
2. Connect an HDMI source (for example, a Blu-ray player) to the HDMI IN 2 connector (4) on the front panel.
3. Connect a DisplayPort source (for example, a laptop) to the DP IN connector (6) on the front panel.
4. Connect a computer graphics source (for example, a PC) to the PC IN connector (8) on the front panel.
5. Connect the audio of the computer graphics source to the AUDIO IN 3.5mm mini jack (9) on the front panel.
6. Connect the AUDIO OUT 3.5mm mini jack (12) to an unbalanced stereo audio acceptor (not shown in [Figure 3](#)).
7. Connect the HDMI OUT connector (21) to an acceptor (for example, a projector).

 To use the Step-in feature, connect the HDMI OUT connector to the input of a Step-in compatible switcher (for example, the VS-62HA), see [Performing a Step-in Operation](#) on page 11.

8. Connect the DATA RS-232 3-pin terminal block connector (15) to the acceptor (the projector in this example).
9. Connect a control system to the ETHERNET RJ-45 port (13).
10. Connect the CONTROL RS-232 3-pin terminal block connector (15) to a PC or controller to control the VP-429H2 (not shown in [Figure 3](#)).
11. Connect the power adapter to the VP-429H2 power connector (22) and to the mains electricity (not shown in [Figure 3](#)).

Connecting to VP-429H2 via RS-232

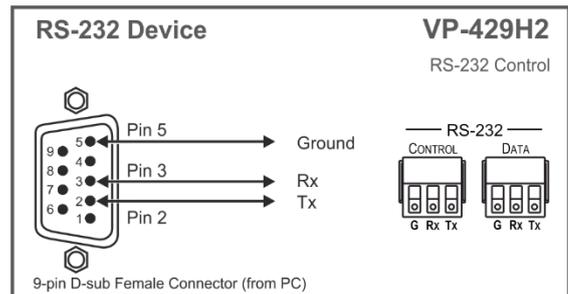
You can connect to the **VP-429H2** via an RS-232 connection using, for example, a PC.

VP-429H2 features two RS-232 3-pin terminal block connectors:

- CONTROL (14) – to control **VP-429H2** (for example, via a connected PC).
- DATA (15) – to control the acceptor on the HDMI output (by connecting, for example, to the projector on the output).

To connect a 9-pin D-sub connector to the RS-232 terminal block on the rear panel of the **VP-429H2**, connect:

- Pin 2 to the TX pin on the **VP-429H2** RS-232 terminal block.
- Pin 3 to the RX pin on the **VP-429H2** RS-232 terminal block.
- Pin 5 to the G pin on the **VP-429H2** RS-232 terminal block.



Setting the DIP-Switches

Use the 4-way DIP-switch to configure the switching mode and the audio input selection mode.

A switch that is down is on; a switch that is up is off. By default, all the switches are up (off).

Any setup changes to the input selection mode and audio setup appear immediately in the embedded web pages.

SETUP

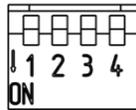


Figure 4: VP-429H2 DIP-Switches

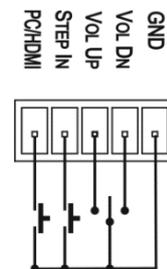
DIP 1	DIP 2	Video Input Selection Method
OFF	OFF	Last connected switching mode: The last physically-connected input has priority.
OFF	ON	Priority switching mode: When the input sync signal is lost, the input with a live signal and next in priority is selected automatically (as set in the Video & Audio Settings web page, see Defining the Video Settings on page 21).
ON	OFF	Manual input selection.
ON	ON	Manual input selection.

DIP 3	DIP 4	Audio Input Selection Method (for HDMI and DP)
OFF	OFF	Automatic audio selection: If embedded audio is detected, use it as the audio source. If embedded audio is not detected, use the analog audio input as the audio source.
OFF	ON	N/A
ON	OFF	Use the embedded audio as the audio source.
ON	ON	Use the analog audio input as the audio source.

Connecting the Remote Control Switches

Momentarily connect the desired pin to the GND pin to perform the following functions:

Pin Name	Function
PC/HDMI	Short press—Input toggle. Long press—Auto adjusts the VGA phase shift.
STEP IN	Activate Step-in.
VOL UP	Increase the volume.
VOL DN	Decrease the volume.
GND	Connect to the common side of the switches.



Operating and Controlling VP-429H2

VP-429H2 can be controlled via the front panel buttons (or remote contact closure switchers), RS-232 protocol commands (see [Protocol 3000 Commands](#) on page 39) and embedded web pages (see [Using the Embedded Web Pages](#) on page 15).

This section describes how to use the panel buttons and DIP-switches to perform the following functions:

- [Selecting an Input](#) on page 10.
- [Auto Adjusting the VGA Signal](#) on page 11.
- [Adjusting the Output Volume](#) on page 11.
- [Performing a Step-in Operation](#) on page 11.
- [Operating via Ethernet](#) on page 12.

Selecting an Input

Select an input on the VP-429H2 in any of the following ways:

- Manually
- By automatic switching

The input selection mode is set via the DIP-switches (see [Setting the DIP-Switches](#) on page 9) and the priorities are set via the web pages (see [Defining the Video Settings](#) on page 21).

Selecting an Input in the Manual Mode

In the manual mode you can select the input via SELECT buttons and/or remote input selection switches.



When switching manually, automatic switching (last connected and priority) is overridden.

To select an input to route to the output in the manual mode via the front panel buttons:

1. Verify that the SETUP DIP-switches (19) are set to manual mode (see [Setting the DIP-Switches](#) on page 9).
2. Press an input button on the front panel.

The selected input routes to the output.

To select an input to route to the output in the manual mode via the remote switches:

1. Verify that the SETUP DIP-switches (19) are set to manual mode (see [Setting the DIP-Switches](#) on page 9).
2. Momentarily press the remote PC/HDMI input switch to cycle through the inputs: HDMI IN 1 → HDMI IN 2 → DP IN → PC IN (see [Connecting the Remote Control Switches](#) on page 9).

The selected input routes to the output.

Auto Adjusting the VGA Signal

Auto adjust the VGA signal via the remote control switches (see [Connecting the Remote Control Switches](#) on page 9) or via the embedded web pages (see [Adjusting the VGA Signal](#) on page 18).

To auto adjust the VGA signal via the remote contact closure switches, on the rear panel connect the PC/HDMI pin to the GND pin for a few seconds.

Adjusting the Output Volume

Adjust the output volume via the remote control switches (see [Connecting the Remote Control Switches](#) on page 9), via the embedded web pages (see [Setting the Volume](#) on page 18) or the AUD-LVL protocol command (see [Protocol 3000 Commands](#) on page 39).

To increase/decrease the output volume via the remote contact closure switches:

- On the rear panel momentarily connect the VOL UP / VOL DN pin to the GND pin.

Performing a Step-in Operation

When connecting VP-429H2 to a Step-in compatible switcher (for example, VS-62HA), you can pass the VP-429H2 signal output to the VS-62HA input and route it to the output. Perform a Step-in operation via the front panel button via the STEP-IN button or the remote control switches (see [Connecting the Remote Control Switches](#) on page 9).

To perform a Step-in action:

1. Connect the VP-429H2 output to the input of a Step-in device (for example, VS-62HA).
2. Press **STEP-IN** (or shortly press the remote STEP-IN switch on the rear panel).

Operating via Ethernet

You can connect to the **VP-429H2** 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 12)
- 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 14).



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 **VP-429H2** 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 **VP-429H2** with the factory configured default IP address.

After connecting the **VP-429H2** 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](#).

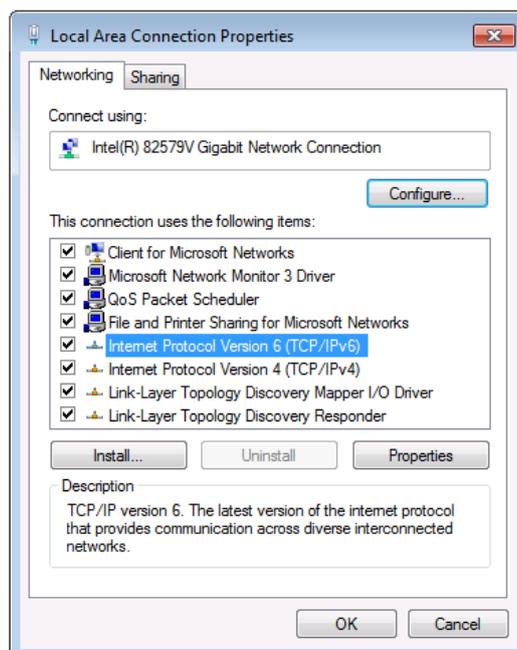


Figure 5: Local Area Connection Properties Window

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](#).

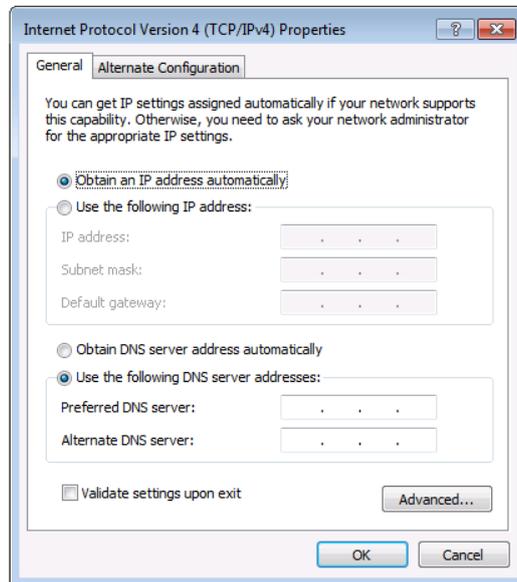


Figure 6: Internet Protocol Version 4 Properties Window

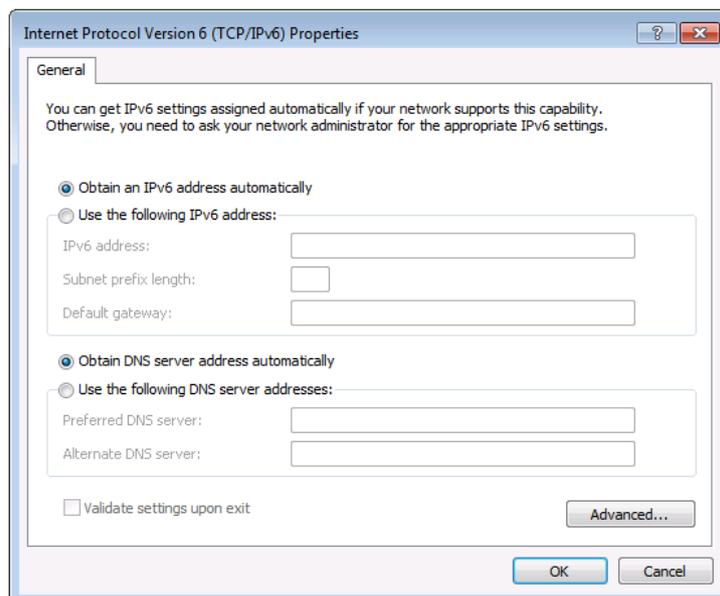


Figure 7: Internet Protocol Version 6 Properties Window

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.

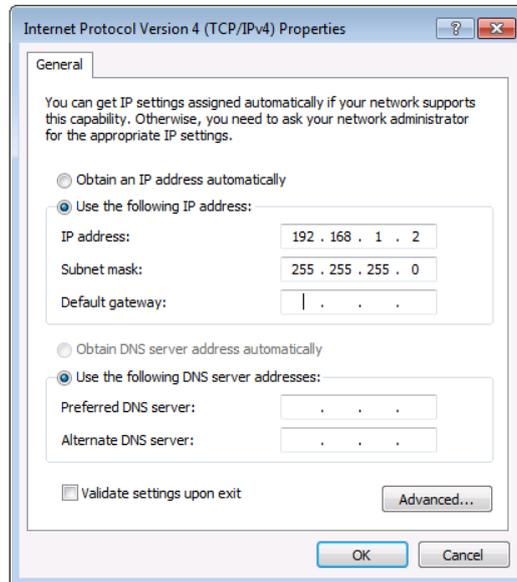


Figure 8: Internet Protocol Properties Window

7. Click **OK**.
8. Click **Close**.

Connecting the Ethernet Port via a Network Hub or Switch

You can connect the Ethernet port of the VP-429H2 to the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

Configuring the Ethernet Port

You can set the Ethernet parameters via the embedded Web pages.

Using the Embedded Web Pages

The VP-429H2 can be operated remotely using the embedded web pages. The web pages are accessed using a web browser and an Ethernet connection.

Before attempting to connect:

- Perform the procedures in [\(see Operating via Ethernet on page 12\)](#).
- Ensure that your browser is supported.

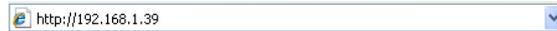
The following operating systems and Web browsers are supported:

OS	Version
Windows 7	IE
	Firefox
	Chrome
	Safari
Windows 10	IE
	Edge
	Firefox
	Chrome
Mac	Safari
iOS	Safari

Browsing VP-429H2 Web Pages

To browse the VP-429H2 Web pages:

1. Open your Internet browser.
2. Type the IP address of the device in the Address bar of your browser:



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

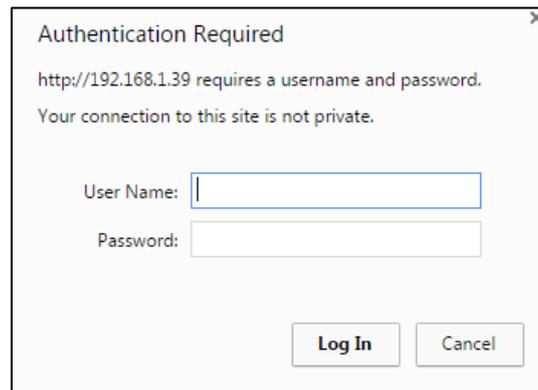


Figure 9: Using the Embedded Web Pages – The Authentication Window

3. Enter the **User Name** and **Password** (Admin, Admin) and click **OK**. The Switching web page appears (see [Figure 10](#)).

The VP-429H2 Web pages enable performing the following:

- [Switching the Inputs and Adjusting the Signal](#) on page [17](#).
- [Changing Device Settings](#) on page [18](#).
- [Triggering Commands via the DATA RS-232 Port](#) on page [19](#).
- [Defining Video and Audio Settings](#) on page [21](#).
- [Setting Web Page Access Permission](#) on page [23](#).
- [Managing EDID](#) on page [25](#).
- [Upgrading the Firmware](#) on page [29](#).
- [Viewing the About Page](#) on page [30](#).

Switching the Inputs and Adjusting the Signal

The Switching page enables performing the following functions:

- [Switching the Inputs](#) on page 17.
- [Setting the Volume](#) on page 18.
- [Adjusting the VGA Signal](#) on page 18.

Switching the Inputs

To select an input to switch to the output:

1. In the Navigation pane, click **Switching**. The Switching page appears.

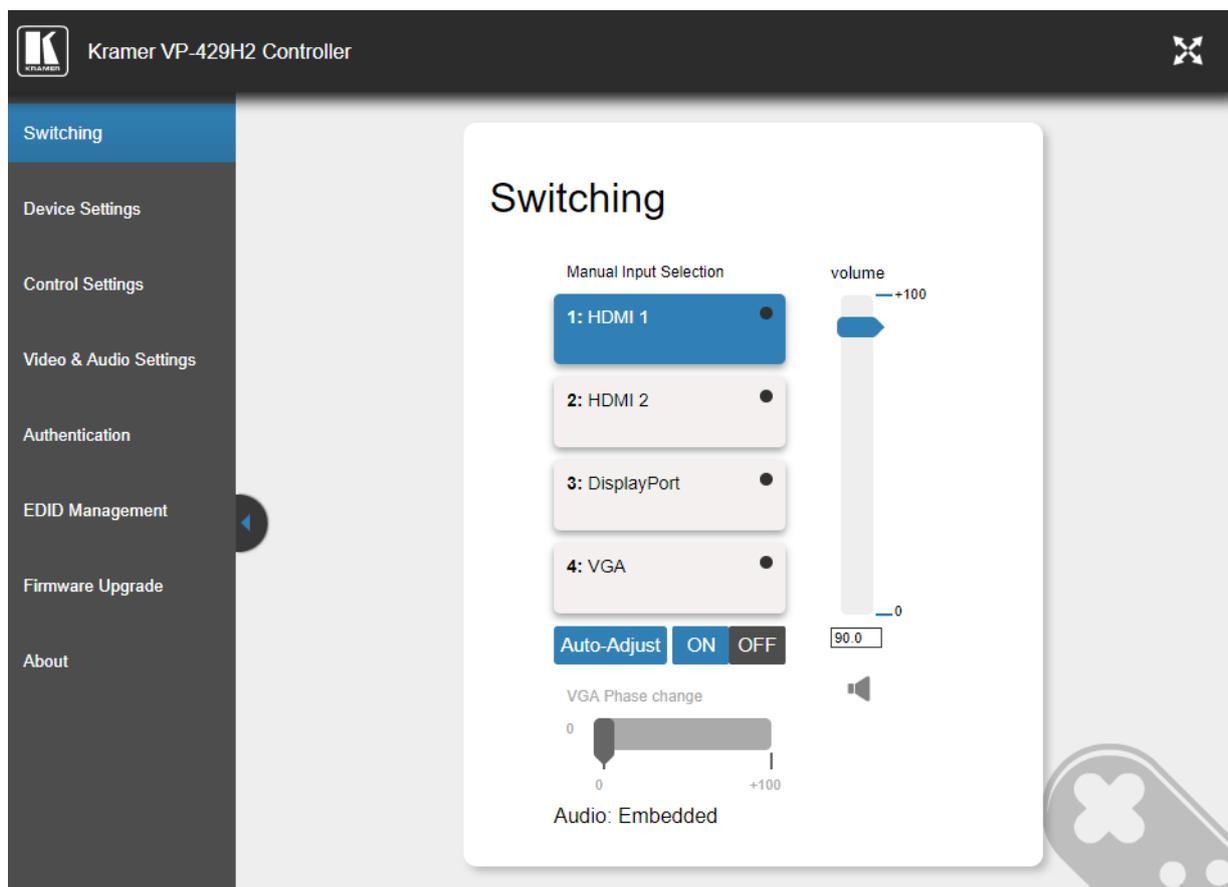


Figure 10: Switching Page with Navigation List on the Left

2. Click an input to route it to the output.



A green dot on the input button indicates that the input is connected and active.

Setting the Volume

To set the analog audio volume:

1. In the Navigation pane, click **Switching**. The Switching page appears.
2. Use the slider to set the Analog Output Volume (0dB, by default).
3. If required, click  to mute/unmute the output.

Adjusting the VGA Signal

To adjust the VGA signal

1. In the Navigation pane, click **Switching**. The Switching page appears.
2. Click **ON** to enable Auto-Adjust.
3. Click **Auto-Adjust** to automatically adjust the VGA signal.
4. Slide the **VGA Phase change** slider to finetune the adjustment.

Changing Device Settings

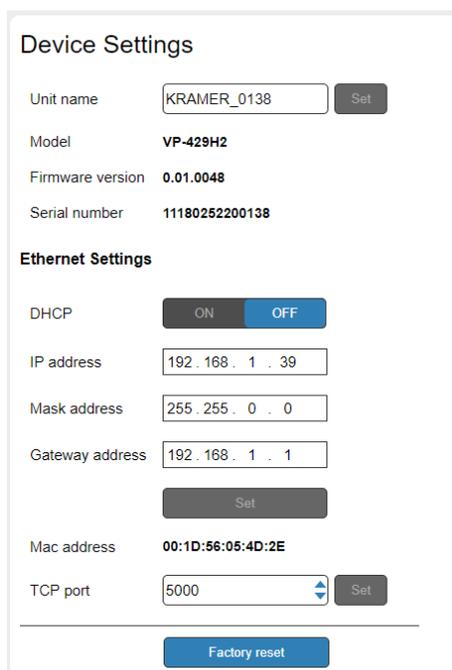
Use the Device Settings page to change the device name (click **Set**) and perform the following operations:

- [Changing the Ethernet Settings](#) on page [18](#).
- [Factory Reset](#) on page [19](#).

Changing the Ethernet Settings

To change the Ethernet settings:

1. In the Navigation pane, click **Device Settings**. The Device Settings page appears:



The screenshot shows the 'Device Settings' page with the following fields and controls:

- Unit name:** Input field containing 'KRAMER_0138' and a 'Set' button.
- Model:** 'VP-429H2'
- Firmware version:** '0.01.0048'
- Serial number:** '11180252200138'
- Ethernet Settings:**
 - DHCP:** Toggle switch set to 'ON'.
 - IP address:** Input field '192.168.1.39'
 - Mask address:** Input field '255.255.0.0'
 - Gateway address:** Input field '192.168.1.1'
 - Set:** Button below the gateway address field.
 - Mac address:** '00:1D:56:05:4D:2E'
 - TCP port:** Input field '5000' and a 'Set' button.
- Factory reset:** Button at the bottom of the page.

Figure 11: The Device Settings Page

2. Set DHCP **ON** or **OFF** (default).
3. If DHCP is **OFF**, change any of the parameters (IP Address, Netmask and/or Gateway).
4. Click **Set**.



- After changing the IP Address, or DHCP to ON, reload the Web page with the new IP address.
- After changing the Subnet mask, turn the **VP-429H2** power off and then on again.

5. if required, change the TCP port and click **Set**.

Factory Reset

To reset the device to its factory default parameters:

1. In the Navigation pane, click **Device Settings**. The Device Settings page appears.
2. Click **Factory reset** the following message appears:

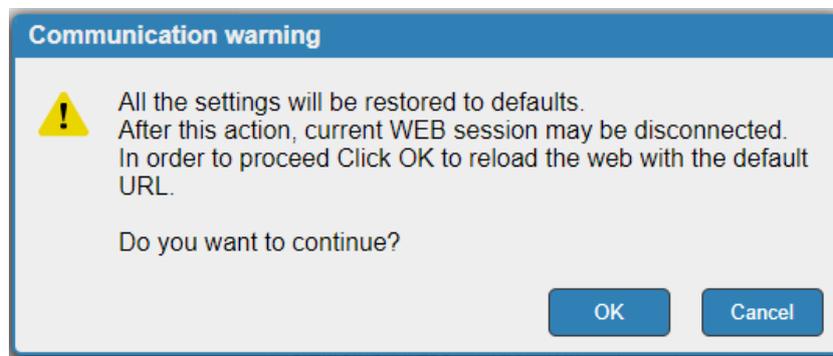


Figure 12: Device Settings Page – Factory Reset Message

3. Click **OK** and wait for the web page to reload following factory reset.



See [Default Communication Parameters](#) on page [35](#) to view other factory reset procedures.

Triggering Commands via the DATA RS-232 Port

To trigger ON/OFF commands to send to the acceptor (for example, a projector), connect the DATA RS-232 3-pin terminal block connector to the RS-232 port of the projector. In the Control Settings page configure the DATA RS-232 parameters to correspond to the projector, set the trigger definitions and enter the commands.

To control the acceptor via the DATA RS-232 port:

1. In the Navigation pane, click **Control Settings**. The Control Settings page appears.

DATA Port Settings

RS-232 configuration:

Parity: None

Data Bits: 8

Flow Control: OFF

Baud Rate: 9600

Stop Bits: 1

Apply

Trigger(ON/OFF) Definitions:

HDMI: 5V Clock Both

DP: 5V Clock Both

VGA: 5V Syncs Both

Command list:

Enable	Trigger	Delay(sec)	Command	Description	Save	Delete	Test
<input type="checkbox"/>	ON	0					
<input type="checkbox"/>	OFF	0					

Figure 13: The Control Settings Page

2. Configure the projector RS-232 parameters (Parity, Data Bits, Flow Control, Baud Rate and Stop Bits).
3. Click **Apply**.
4. Set the ON/OFF triggers per input signal.
5. Enter the projector ON/OFF commands, set the delay time and type the command description.
6. Click to save a command and to test the command.
7. Check **Enable** boxes to activate a command.



The triggers are set per signal type and are available for the input that is selected.

For example, HDMI IN 1 is selected, the 5V trigger is defined and the ON and OFF commands are enabled. If the HDMI cable is disconnected, the 5V trigger activates the OFF command and after the defined delay time, the projector OFF command is activated. Once the cable is connected, the ON command is activated.

Defining Video and Audio Settings

The Video and Audio Settings page enables performing the following functions:

- [Defining the Video Settings](#) on page 21.
- [Viewing the Audio Selection Mode](#) on page 22.
- [Set HDCP Support](#) on page 22.
- [Setting Switching Timeouts for Auto Switching](#) on page 22.

Defining the Video Settings

The video selection mode shows the current switching mode: Manual, Auto – Last connected or Auto – Auto scan as set via DIP-switches 1 and 2 (see [Setting the DIP-Switches](#) on page 9).

To change the scanning priority:

1. In the Navigation pane, click **Video & Audio Settings**. The Video & Audio Settings page appears.

The screenshot shows the 'Video & Audio Settings' interface. It is organized into two main sections: Video and Audio.

Video Section:

- Video selection mode:** Set to 'Auto: Last connected'.
- Video auto switching priority:** A drag-and-drop interface with 'HIGH' and 'LOW' labels. The inputs are ordered from top to bottom: HDMI 1, HDMI 2, DisplayPort, and VGA. A note below says 'Drag to change the priority'.
- Video output resolution:** A dropdown menu set to 'T_AUTO' with a 'Set Resolution' button below it.

Audio Section:

- Audio selection mode:** Set to 'Auto: Embedded->Analog'.
- HDCP Support:** Three toggle switches for 'HDCP On Input HDMI 1', 'HDCP On Input HDMI 2', and 'HDCP On Input DisplayPort', all currently set to 'ON'.
- Timeouts:** A sub-section for 'Video' with three dropdown menus:
 - 'Delay switching upon signal loss for (when 5V is present)': 10 sec
 - 'Delay switching input upon cable unplug for (when no signal and no 5V present)': 0 sec
 - 'Delay powering off 5V on output upon signal loss for': 900 sec
 A 'Set Timeouts' button is located at the bottom of this section.

Figure 14: Video & Audio Settings Page

2. Drag and drop an input to change the priority order.

To set the resolution:

1. In the Navigation pane, click **Video & Audio Settings**. The Video & Audio Settings page appears.
2. Select the output resolution from the drop-down list.
3. Click **Set Resolution**.

Viewing the Audio Selection Mode

View the audio mode as set via the DIP-switches (see [Setting the DIP-Switches](#) on page 9).

Set HDCP Support

Select HDCP support per input (HDMI 1, HDMI 2 and DisplayPort).



Setting HDCP support to off on the HDMI input allows the source to transmit a non-HDCP signal if required (for example, when working with a Mac computer).

To Enable/disable HDCP for each input:

1. In the Navigation pane, click **Video & Audio Settings**. The Video & Audio Settings page appears.
2. Click **ON** (default)/**OFF** per input.

Setting Switching Timeouts for Auto Switching

Set the following delays:

- Switching delay when the signal is lost (5V is present).
- Switching delay when the cable is unplugged (both signal and 5V are not present).
- Powering off the 5V on the output when the signal is lost.

The following table summarizes the timeout ranges and default values:

Timeout	Range [sec]	Default [sec]	
1	Signal loss (5V on)	5 to ≤ maximum value set in 3 below	10
2	Cable unplug (5V and Signal off)	5 to ≤ maximum value set in 3 below	0
3	5V off on output upon signal loss	0 to 60,000	900

To set the delay time:

1. In the Navigation pane, click **Video & Audio Settings**. The Video & Audio Settings page appears.
2. Set the delay time.
3. Click **Set Timeouts**.

The delay time is set.

Setting Web Page Access Permission

To define access permission to the web pages in the Navigation pane, click **Authentication**. The Authentication page appears.

By default, the Web pages are secured (username and password are both **Admin**).

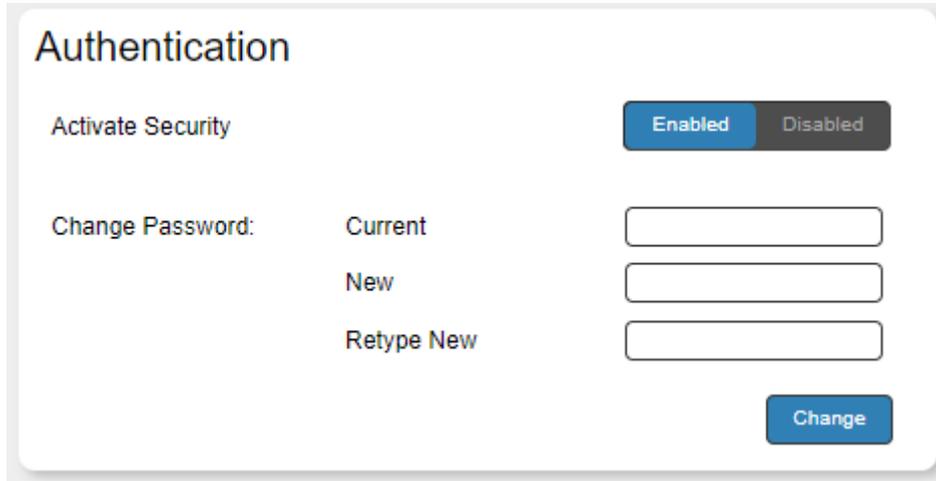


Figure 15: Authentication Page

To change the password:

1. In the Navigation pane, click **Authentication**. The Authentication page appears.
2. Type current password and then type the new password twice.
3. Click **Change** to store the new password. The following message appears:

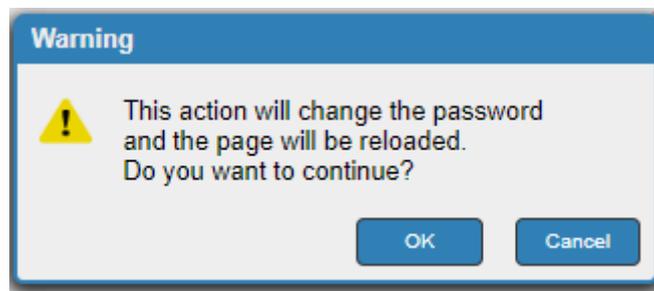


Figure 16: Authentication – Password Change Warning

A confirmation message appears.

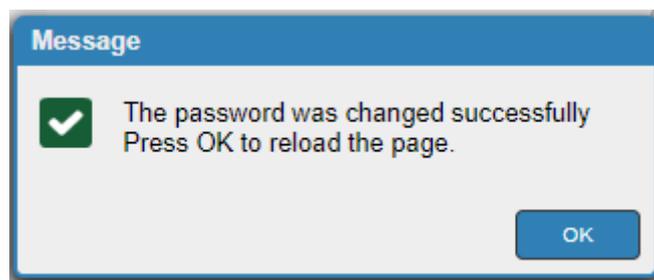


Figure 17: Authentication – Password Change Message

4. Click **OK**.

To disable security:

1. In the Navigation pane, click **Authentication**. The Authentication page appears.
2. Click **Disabled**.
3. The Confirm window appears.

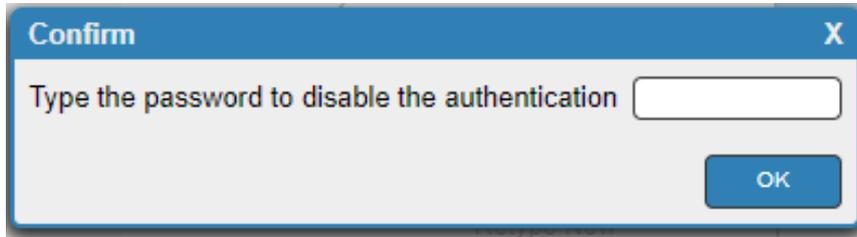


Figure 18: Authentication – Confirm Window

4. Type the password to disable the authentication.
 5. Click **OK**.
- Authentication is disabled:

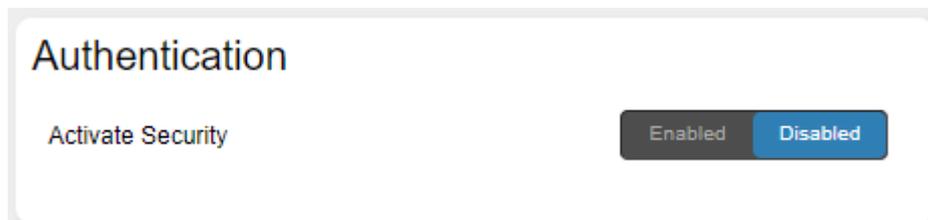


Figure 19: Authentication – Authentication Disabled

To enable security:

1. In the Navigation pane, click **Authentication**. The Authentication page appears.
 2. Click **Enabled**.
- The following message appears:

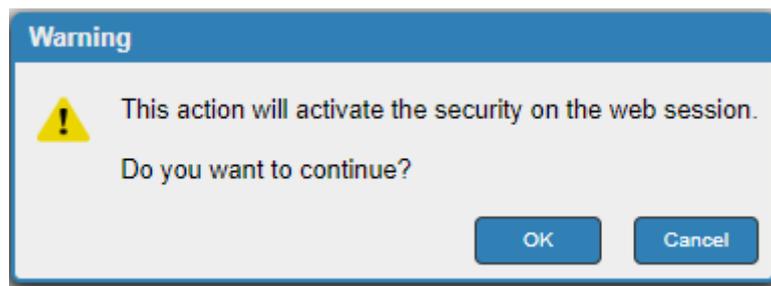


Figure 20: [Figure Caption]

3. Click **OK**.
- The page reloads, and authentication is required.

Managing EDID

Use the EDID page to read the EDID from:

- Any of the inputs.
- The output.
- The default EDID.

You can also load an external custom EDID file from your PC onto the **VP-429H2**.

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



View the currently selected EDID source Bytemap by clicking **Bytemap** on the right side.

To copy an EDID from an input (or output) to an input:

1. In the Navigation pane, click **EDID Management**. The EDID Management page appears.

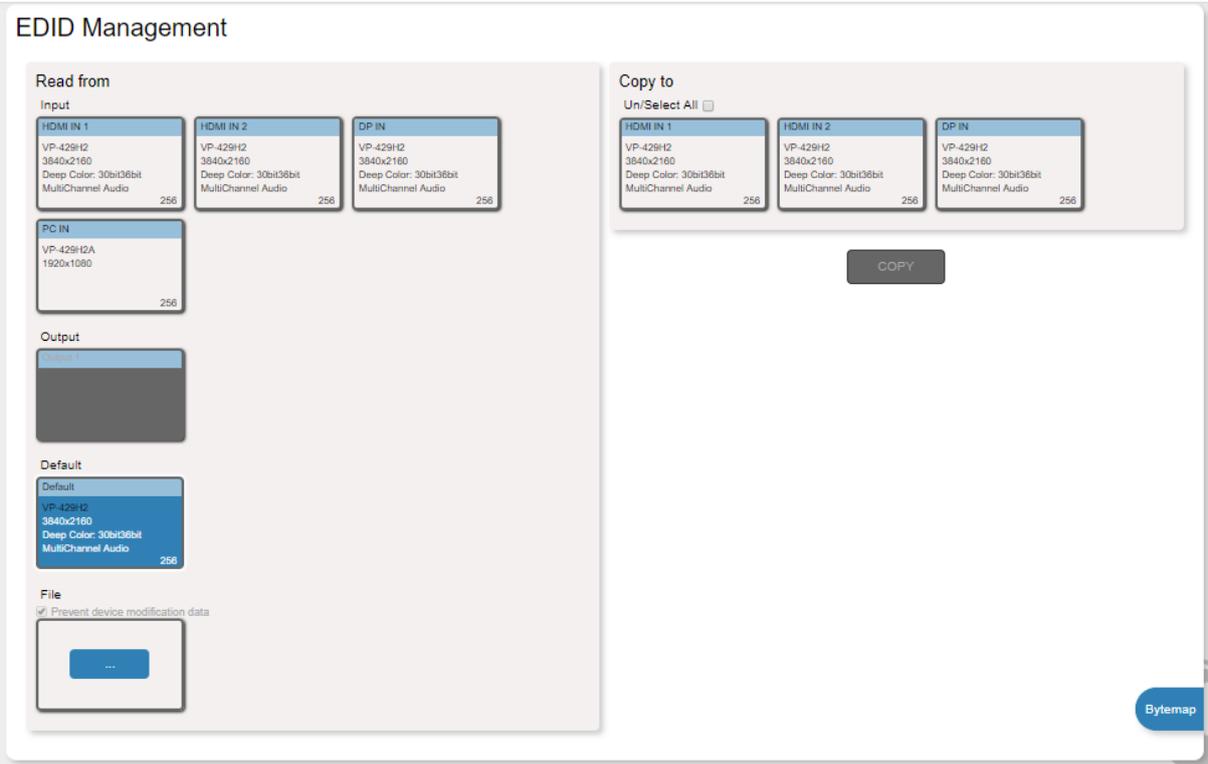


Figure 21: EDID Management Page

2. Select the EDID source (for example, one of the inputs).



If you are reading EDID from an output, make sure that that output is connected to an acceptor.

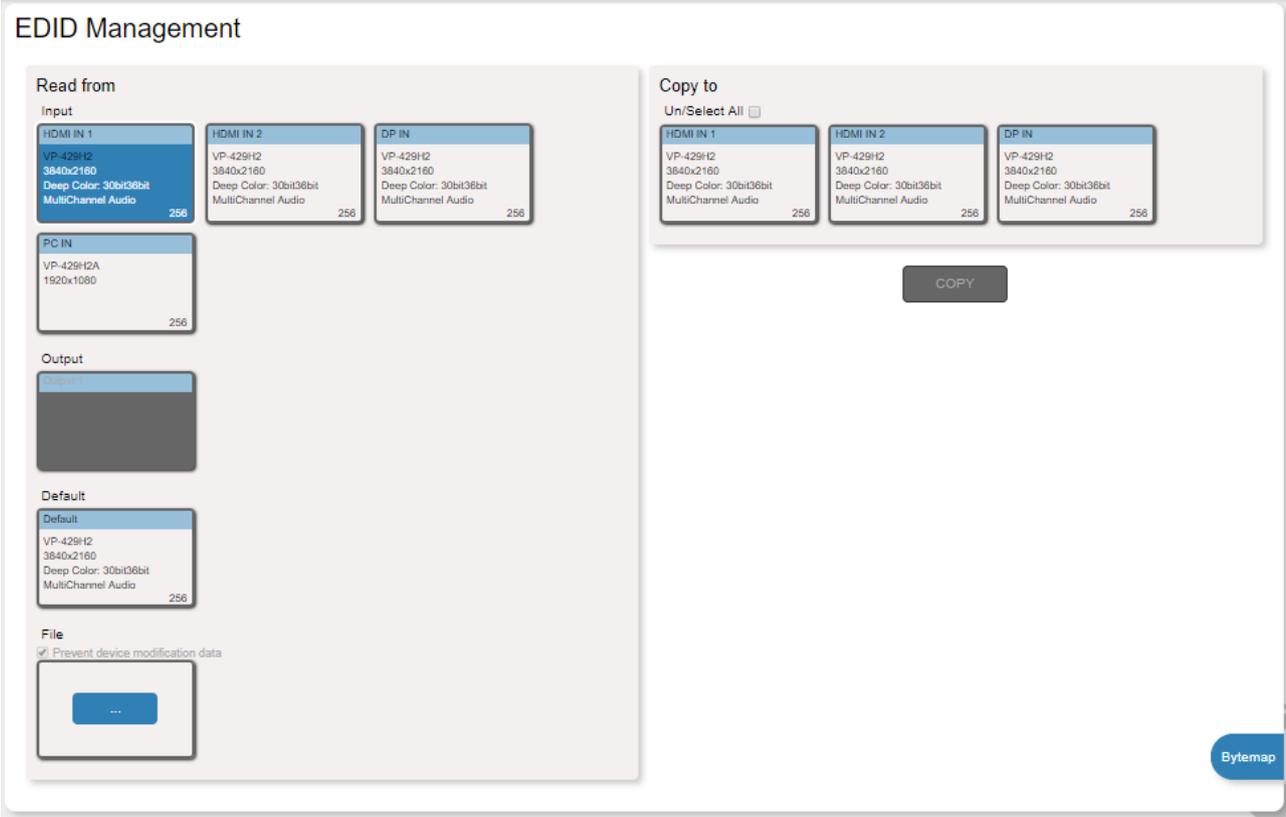


Figure 22: EDID Management Page – Select an EDID Input (Read From)

3. Select the input/s (or all the inputs) to which the EDID is copied.

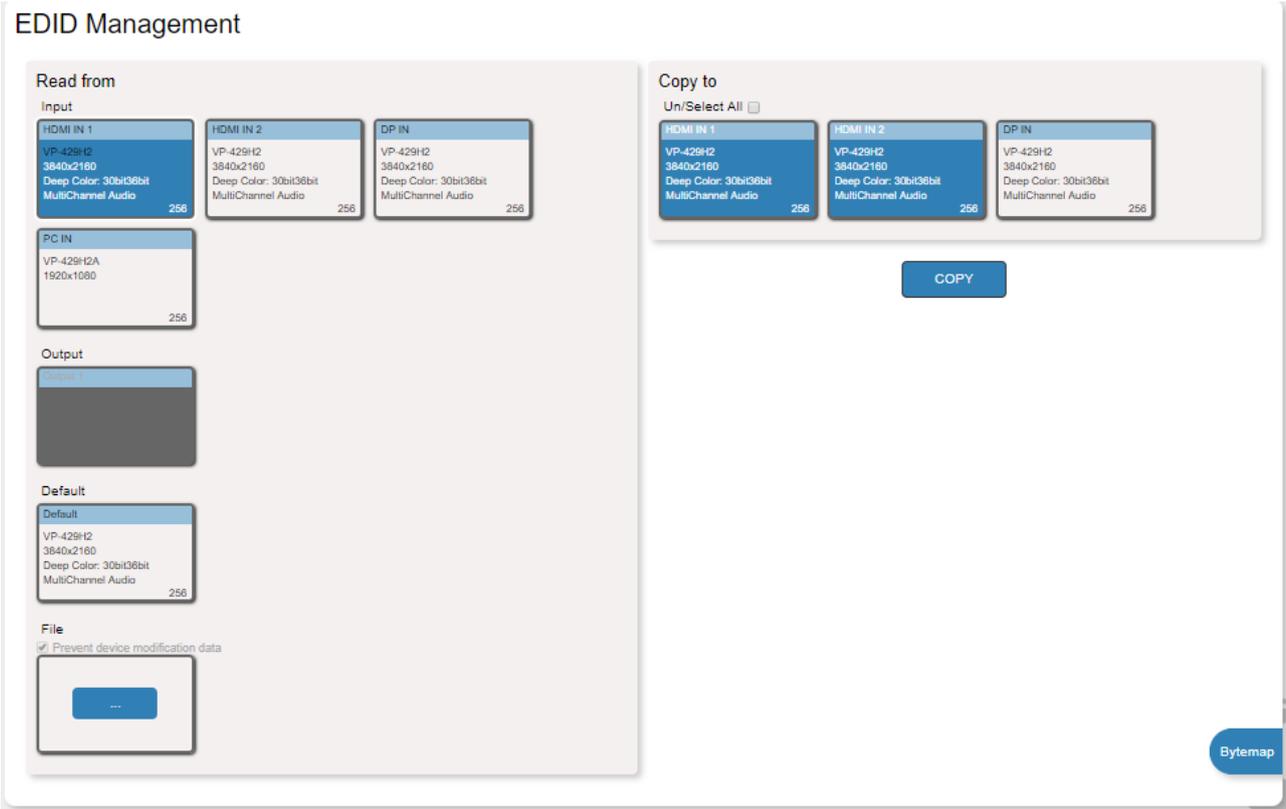


Figure 23: EDID Management Page – Select the Inputs (Copy To)

4. Click **COPY**.
The Input 2 EDID is copied to the selected inputs.

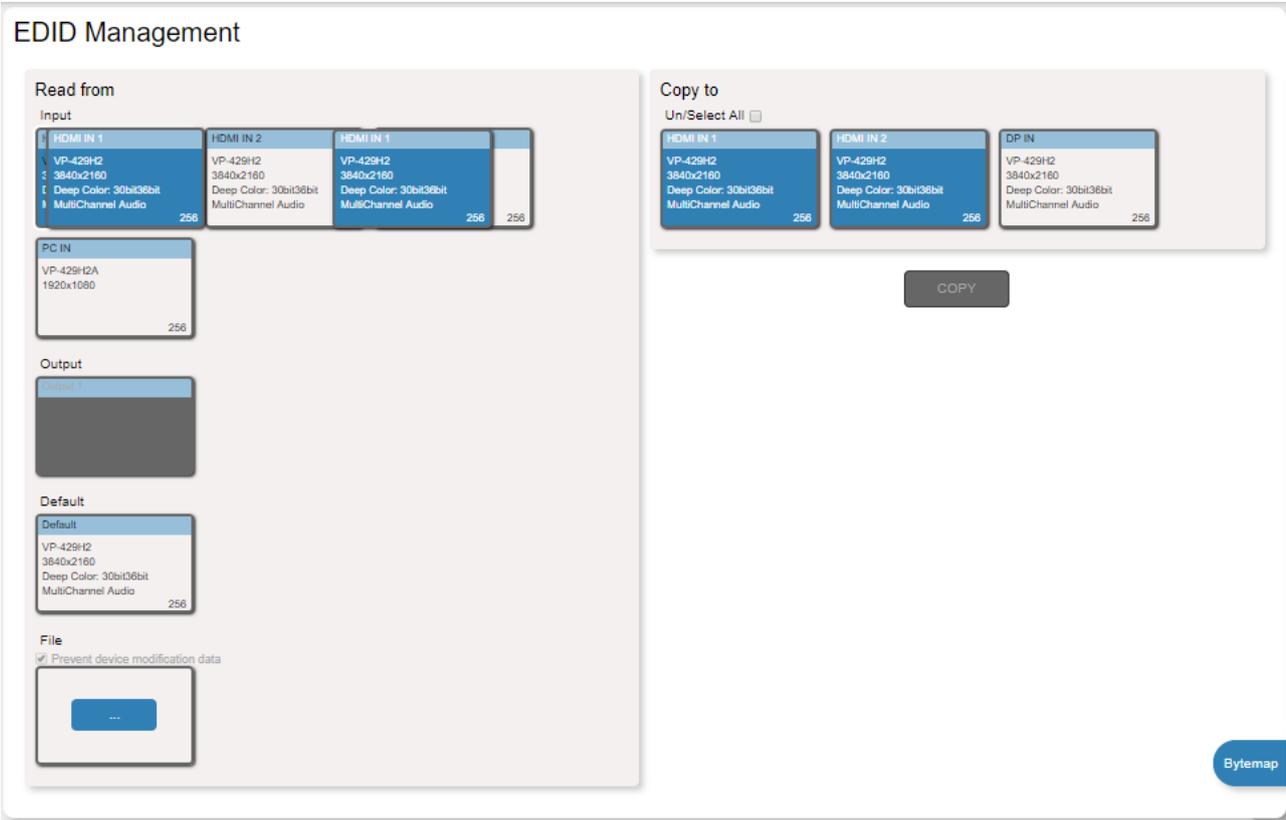


Figure 24: EDID Management Page – EDID Copied

Once the EDID is copied, a success message appears:

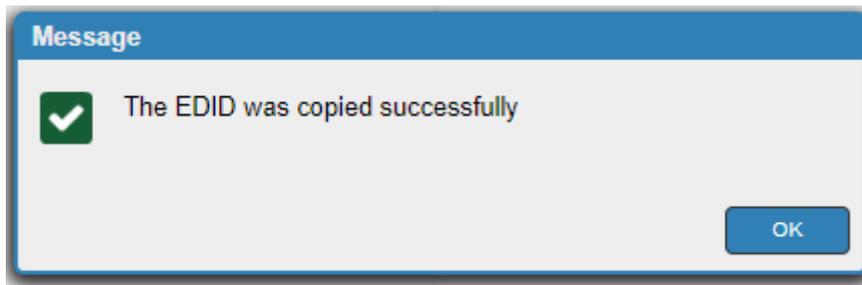


Figure 25: EDID Management Page – EDID Copied Successfully

5. Click **OK**.

To read the EDID from the default EDID:

1. In the Navigation pane, click **EDID Management**. The EDID Management page appears.
2. Click **Default**.
3. Select the input/s (or all the inputs) to which the default EDID is copied.
4. Click **Copy** and follow the instructions on-screen.

To load an external EDID file:

1. In the Navigation pane, click **EDID Management**. The EDID Management page appears.
2. In the **File** area, click ... to browse for the EDID file location.
3. Open the EDID file.
4. Select the input/s (or all the inputs) to which the EDID is copied.
5. Click **Copy** and follow the instructions on-screen.

Upgrading the Firmware

The recommended method of upgrading VP-429H2 firmware is via the mini USB port ⑳ on the rear panel (see [Upgrading the Firmware via USB Port](#) on page 31.) Alternatively, you can upgrade via the Device Settings web pages, but note that upgrading via the web is very slow. (Typically, web upgrading takes about 10 minutes, while USB upgrading takes less than a minute).

To perform firmware upgrade:

1. In the Navigation pane, click **Firmware Upgrade**. The Firmware Upgrade page appears.

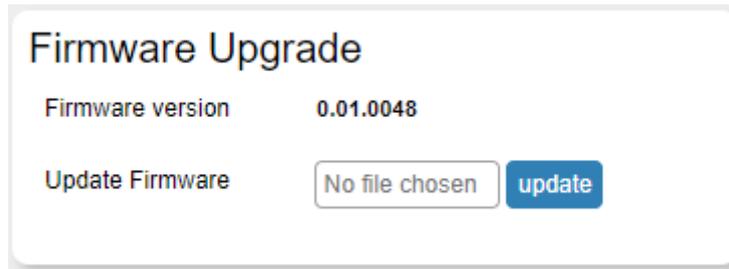


Figure 26: Firmware Upgrade Page – Selecting the New Firmware File

2. Click **No file chosen** to select the new firmware file.

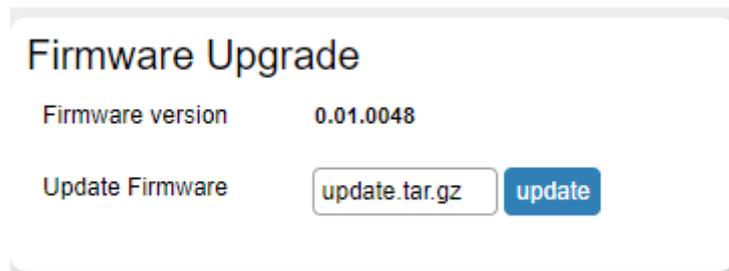


Figure 27: Firmware File Selected

3. Click **Update**.
Firmware progress is displayed
4. Click **OK**.

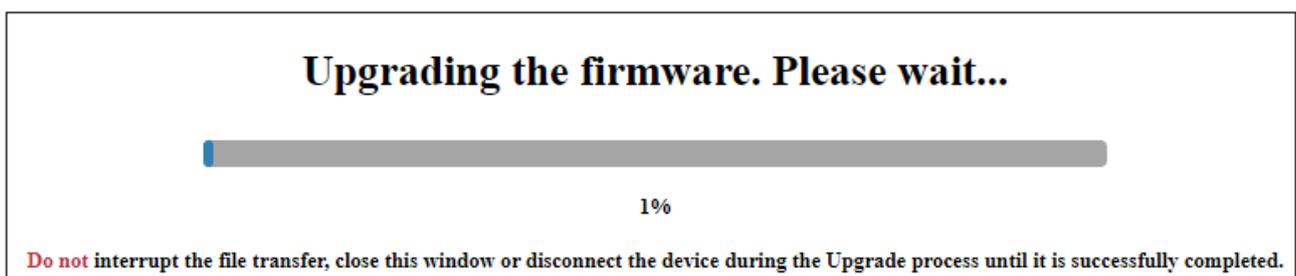


Figure 28: Firmware Upgrade Page –Firmware Upgrade Progress

Wait for the new firmware update completion

5. Once complete, the web page reloads.
6. Make sure that the new version appears in the Firmware Upgrade page.

Viewing the About Page

In the Navigation pane, click **About** to view the **VP-429H2** Web page version and Kramer Electronics Ltd details.



Figure 29: About Page

Upgrading the Firmware via USB Port

You can upgrade **VP-429H2** via the mini USB port (20) on the rear panel (recommended) or via the Device Settings web pages (see [Upgrading the Firmware](#) on page 29).



The latest firmware version can be downloaded from the Kramer Web site at www.kramerav.com/downloads/VP-429H2.

To upgrade the firmware via the mini USB port:

1. Download the firmware file and copy it to the root folder of a memory stick, formatted with FAT32 system.
2. Connect the memory stick to the mini USB port on the rear panel of the **VP-429H2**.
3. Press **HDMI IN 1** on the front panel of the device for more than 15 seconds and then release.
The buttons light green until firmware upgrade process is complete, the device returns to normal operation mode and the buttons no longer light.



If there is a problem with the firmware file, all front-panel buttons light red, and the firmware upgrade is aborted.

4. Disconnect the memory stick.
5. Check that the firmware was updated (see [Changing Device Settings](#) on page 18).

Technical Specifications

Inputs	2 HDMI	On female HDMI connectors
	DisplayPort	On a female DisplayPort connector
	VGA	On a 15-pin HD connector
	Stereo Analog Unbalanced Audio	On a 3.5mm mini jack
Outputs	HDMI	On a female HDMI connector
	Stereo Analog Unbalanced Audio	On a 3.5mm mini jack
Ports	Ethernet	On an RJ-45 female connector for device control
	RS-232 Control	On a 3-pin terminal block for device control
	RS-232 Data	On a 3-pin terminal block for external device control
	Remote Contact Closure Switches	On a 5-pin terminal block for input selection, Step-in activation and audio volume control
	1 USB	On a female mini USB connector for firmware upgrading
Video	Max Resolution	HDMI inputs: 4K@60Hz 4:4:4 DP input: 4K60@60Hz 4:4:4 (MST format) VGA input: 1920x1440@60Hz Output: 4K@60 4:4:4
	Compliance	HDMI and HDCP 2.2
	Resolutions	See tables below
Audio	Maximum Input Level	6.3Vpp
	Maximum Output Level	6.1Vpp
Controls	Rear Panel	DIP-switches, factory reset button, RS-232, Ethernet, remote dry-contact switches
	Front Panel	Input selection and Step-in buttons
Data RS-232	Baud Rate	9600, 19200, 38400, 57600, 115200
Supported Web Browsers	Windows 7	IE, Firefox, Chrome, Safari
	Windows 10	IE, Edge, Firefox, Chrome
	MAC	Safari
	iOS	Safari
	Android	N/A
Power	Consumption	12V DC, 1.1A
	Source	12V DC, 2A
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%, RHL non-condensing
Regulatory Compliance	Safety	CE, UL
	Environmental	FCC, RoHs, WEEE
Enclosure	Size	MegaTOOLS®
	Type	Aluminum
	Cooling	Convection ventilation
General	Net Dimensions (W, D, H)	18.8 cm x 11.5cm x 2.5cm (7.4" x 4.5" x 1")
	Shipping Dimensions (W, D, H)	34.5cm x 16.5cm x 5.2cm (13.6" x 6.5" x 2.1")
	Net Weight	0.5kg (1.1lbs)
	Shipping Weight	1.1kg (2.42lbs) approx.
Accessories	Included	Power adapter and cord, bracket set
Specifications are subject to change without notice at www.kramerav.com		

Supported Input Resolutions

Input Resolution	Scan Format	Vertical Rate [Hz]	HDMI	VGA	DP
640x350	Progressive	85	√		√
640x400	Progressive	85	√	√	√
640x480	Interlaced	30	√		
640x480	Progressive	60	√		√
640x480	Progressive	75, 85	√	√	√
720x400	Progressive	85	√		√
720x480	Interlaced	60		√	
720(1440)x480	Interlaced	60	√		
2880x480	Interlaced	60	√		
720(1440)x576	Interlaced	25, 50	√		
720x576	Interlaced	50		√	
2880x576	Interlaced	50	√		
720x576	Progressive	50, 100	√		
800x600	Progressive	60	√	√	√
800x600	Progressive	75, 85	√		√
848x480	Progressive	60		√	√
1024x768	Progressive	60, 75	√	√	√
1024x768	Progressive	70		√	
1024x768	Progressive	85	√		√
1152x864	Progressive	75		√	√
1280x720	Progressive	50	√	√	
1280x720	Progressive	60	√	√	√
1280x768	Progressive	60, 75	√	√	√
1280x768	Progressive	80		√	
1280x768	Progressive	85	√		√
1280x960	Progressive	60, 85	√		√
1280x1024	Progressive	60, 75	√	√	√
1280x1024	Progressive	85	√		√
1366x768	Progressive	60		√	√
1600x900	Progressive	60			√
1600x1024	Progressive	60	√		
1600x1200	Progressive	60	√	√	√
1600x1200	Progressive	65, 70, 75		√	√
1680x1050	Progressive	60		√	√
1792x1344	Progressive	60		√	√
1856x1392	Progressive	60		√	√
1920x1080	Interlaced	25, 30	√		
1920x1080	Interlaced	50, 60	√	√	
1920x1080	Progressive	24, 25, 30	√		√
1920x1080	Progressive	50	√		
1920x1080	Progressive	60	√	√	√
1920x1200	Progressive	60	√	√	√
2048x1152	Progressive	60			√
3840x2160	Progressive	24	√		
3840x2160	Progressive	30	√		√
3840x2160	Progressive	60	√		√(MST)

Supported Output Resolutions

Output Resolution	Scan Format	Vertical Rate [Hz]
3840x2160 (4K)	Progressive	30
3840x2160 (4K)	Progressive	50
3840x2160 (4K)	Progressive	60
1920x1200 (WUXGA)	Progressive	60
1920x1080 (1080p)	Progressive	50
1920x1080 (1080p)	Progressive	60
1680x1050	Progressive	60
1600x1200 (UXGA)	Progressive	60
1600x900 (HD+)	Progressive	60
1400x1050	Progressive	60
1440x900	Progressive	60
1366x768 (HD)	Progressive	60
1360x768	Progressive	60
1280x1024	Progressive	60
1280x800 (WXGA)	Progressive	60
1280x768 (WXGA)	Progressive	60
1280x720 (WXGA)	Progressive	50
1280x720 (WXGA)	Progressive	60
1024x768 (XGA)	Progressive	60
800x600 (SVGA)	Progressive	60

Default Communication Parameters

RS-232	
Baud Rate:	115,200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII
Example (Route video HDMI IN 2 to video HDMI OUT):	#ROUTE 1,1,2<CR>
Ethernet	
To reset the IP settings to the factory reset values go to web pages->Device Settings -> Factory reset-> click OK	
IP Address:	192.168.1.39
Subnet mask:	255.255.0.0
Default gateway:	192.168.1.1
TCP Port #:	5000
Maximum TCP Ports:	4
Full Factory Reset	
Web pages:	Device Settings -> Factory reset-> click OK
Rear panel button:	Press the Reset Button for about 5 seconds

Default EDID

Monitor

Model name..... VP-429H2
 Manufacturer..... KMR
 Plug and Play ID..... KMR070D
 Serial number..... 49
 Manufacture date..... 2018, ISO week 6
 Filter driver..... None

EDID revision..... 1.3
 Input signal type..... Digital
 Color bit depth..... Undefined
 Display type..... Monochrome/grayscale
 Screen size..... 360 x 360 mm (20.0 in)
 Power management..... Standby, Suspend
 Extension blocs..... 1 (CEA/CTA-EXT)

 DDC/CI..... Not supported

Color characteristics

Default color space..... Non-sRGB
 Display gamma..... 2.40
 Red chromaticity..... Rx 0.611 - Ry 0.329
 Green chromaticity..... Gx 0.313 - Gy 0.559
 Blue chromaticity..... Bx 0.148 - By 0.131
 White point (default).... Wx 0.320 - Wy 0.336
 Additional descriptors... None

Timing characteristics

Horizontal scan range.... 15-136kHz
 Vertical scan range..... 23-61Hz
 Video bandwidth..... 600MHz
 CVT standard..... Not supported
 GTF standard..... Not supported
 Additional descriptors... None
 Preferred timing..... Yes
 Native/preferred timing.. 3840x2160p at 60Hz (16:9)
 Modeline..... "3840x2160" 594.000 3840 4016 4104 4400 2160 2168 2178 2250 +hsync +vsync
 Detailed timing #1..... 1920x1080p at 60Hz (16:9)
 Modeline..... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync

Standard timings supported

640 x 480p at 60Hz - IBM VGA
 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
 1024 x 768p at 60Hz - VESA
 1024 x 768p at 70Hz - VESA
 1024 x 768p at 75Hz - VESA
 1280 x 1024p at 75Hz - VESA
 1600 x 1200p at 60Hz - VESA STD
 1280 x 1024p at 60Hz - VESA STD
 1400 x 1050p at 60Hz - VESA STD
 1920 x 1080p at 60Hz - VESA STD
 640 x 480p at 85Hz - VESA STD
 800 x 600p at 85Hz - VESA STD
 1024 x 768p at 85Hz - VESA STD
 1280 x 1024p at 85Hz - VESA STD

EIA/CEA/CTA-861 Information

Revision number..... 3
 IT underscan..... Supported
 Basic audio..... Supported
 YCbCr 4:4:4..... Supported
 YCbCr 4:2:2..... Supported
 Native formats..... 0
 Detailed timing #1..... 1440x900p at 60Hz (16:10)
 Modeline..... "1440x900" 106.500 1440 1520 1672 1904 900 903 909 934 -hsync +vsync
 Detailed timing #2..... 1366x768p at 60Hz (16:9)
 Modeline..... "1366x768" 85.500 1366 1436 1579 1792 768 771 774 798 +hsync +vsync
 Detailed timing #3..... 1920x1200p at 60Hz (16:10)
 Modeline..... "1920x1200" 154.000 1920 1968 2000 2080 1200 1203 1209 1235 +hsync -vsync

CE video identifiers (VICs) - timing/formats supported

1920 x 1080p at 60Hz - HDTV (16:9, 1:1)
 1920 x 1080p at 50Hz - HDTV (16:9, 1:1)
 1280 x 720p at 60Hz - HDTV (16:9, 1:1)
 1280 x 720p at 50Hz - HDTV (16:9, 1:1)
 1920 x 1080i at 60Hz - HDTV (16:9, 1:1)
 1920 x 1080i at 50Hz - HDTV (16:9, 1:1)
 720 x 480p at 60Hz - EDTV (4:3, 8:9)
 720 x 576p at 50Hz - EDTV (4:3, 16:15)
 720 x 480i at 60Hz - Doublescan (4:3, 8:9)
 720 x 576i at 50Hz - Doublescan (4:3, 16:15)
 1920 x 1080p at 30Hz - HDTV (16:9, 1:1)
 1920 x 1080p at 25Hz - HDTV (16:9, 1:1)
 1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
 1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
 1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
 1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
 1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
 1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
 NB: NTSC refresh rate = (Hz*1000)/1001

CE audio data (formats supported)

LPCM 2-channel, 16/20/24 bit depths at 32/44/48 kHz
 AC-3 6-channel, 640k max. bit rate at 32/44/48 kHz
 DTS 7-channel, 1536k max. bit rate at 32/44/48 kHz
 DTS-HD 8-channel, 16-bit at 32/44/48 kHz
 LPCM 8-channel, 16/20/24 bit depths at 32/44/48 kHz

CE speaker allocation data

Channel configuration.... 7.1
 Front left/right..... Yes
 Front LFE..... Yes
 Front center..... Yes
 Rear left/right..... Yes
 Rear center..... No
 Front left/right center.. No
 Rear left/right center... Yes
 Rear LFE..... No

CE vendor specific data (VSDB)

IEEE registration number. 0x000C03
 CEC physical address.... 2.0.0.0
 Supports AI (ACP, ISRC).. No
 Supports 48bpp..... No
 Supports 36bpp..... Yes
 Supports 30bpp..... Yes
 Supports YCbCr 4:4:4..... Yes
 Supports dual-link DVI... No
 Maximum TMDS clock..... 300MHz
 Audio/video latency (p).. n/a

Audio/video latency (i).. n/a
 HDMI video capabilities.. Yes
 EDID screen size..... No additional info
 3D formats supported..... Not supported
 Data payload..... 030C002000383C20008001020304

CE vendor specific data (VSDB)
 IEEE registration number. 0xC45DD8
 CEC physical address..... 0.1.7.8
 Supports AI (ACP, ISRC).. Yes
 Supports 48bpp..... No
 Supports 36bpp..... No
 Supports 30bpp..... No
 Supports YCbCr 4:4:4..... No
 Supports dual-link DVI... No
 Maximum TMDS clock..... 35MHz

YCbCr 4:2:0 capability map data
 Data payload..... 0F000003

Report information
 Date generated..... 04/09/2019
 Software revision..... 2.91.0.1043
 Data source..... Real-time 0x1100 - NB: improperly installed
 Operating system..... 10.0.17763.2

Raw data
 00,FF,FF,FF,FF,FF,FF,00,2D,B2,0D,07,31,00,00,00,06,1C,01,03,80,24,24,8C,C2,90,20,9C,54,50,8F,26,
 21,52,56,2F,CF,00,A9,40,81,80,90,40,D1,C0,31,59,45,59,61,59,81,99,08,E8,00,30,F2,70,5A,80,B0,58,
 8A,00,BA,88,21,00,00,1E,02,3A,80,18,71,38,2D,40,58,2C,45,00,BA,88,21,00,00,1E,00,00,00,FC,00,56,
 50,2D,34,32,39,48,32,0A,20,20,20,20,00,00,00,FD,00,17,3D,0F,88,3C,00,0A,20,20,20,20,20,01,EF,
 02,03,47,F0,52,10,1F,04,13,05,14,02,11,06,15,22,21,20,5D,5E,5F,60,61,2F,09,07,07,15,07,50,3E,07,
 C0,5F,07,01,0F,07,07,83,4F,00,00,6E,03,0C,00,20,00,38,3C,20,00,80,01,02,03,04,67,D8,5D,C4,01,78,
 80,07,E4,0F,00,00,03,9A,29,A0,D0,51,84,22,30,50,98,36,00,10,0A,00,00,00,1C,66,21,56,AA,51,00,1E,
 30,46,8F,33,00,10,09,00,00,00,1E,28,3C,80,A0,70,B0,23,40,30,20,36,00,10,0A,00,00,00,1A,00,00,B5

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:**

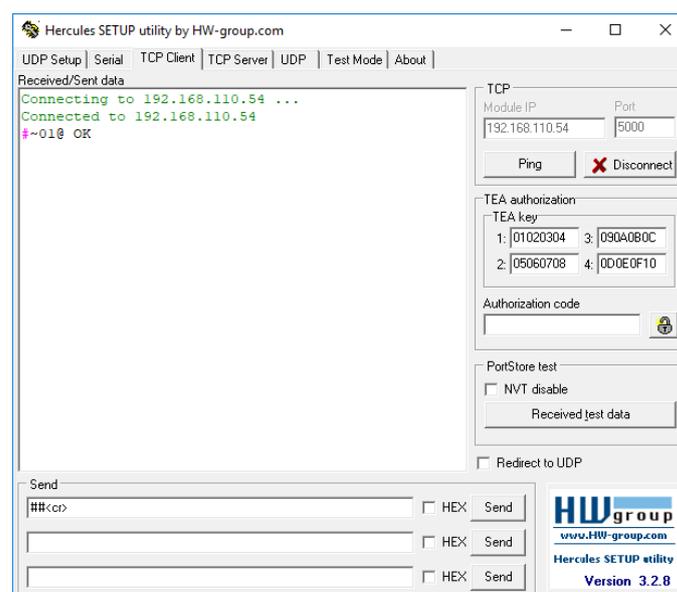
Prefix	Command Name	Constant (Space)	Parameter(s)	Suffix
#	Command	_	Parameter	<CR>

- **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. ① Validates the Protocol 3000 connection and gets the machine number. Step-in master products use this command to identify the availability of a device.	COMMAND #<CR> FEEDBACK ~nn@_OK<CR><LF>		#<CR>
AUD-EMB	Set audio in video embedding status.	COMMAND #AUD-EMB_in,out,status<CR> FEEDBACK ~nn@AUD-EMB_in,out,status<CR><LF>	in – Audio input to be embedded number: 1 – HDMI IN 1 2 – HDMI IN 2 3 – DP IN 4 – PC IN out – Video output to embed into number (1) status – Embedding status 0 – Analog 1 – Embedded 2 – Auto	Set audio in video embedding status for input 2 and output 1 to analog: #AUD-EMB_2,1,0<CR>
AUD-EMB?	Get audio in video embedding status.	COMMAND #AUD-EMB?_in,out<CR> FEEDBACK ~nn@AUD-EMB_in,out,status<CR><LF>	in – Audio input to be embedded number: 1 – HDMI IN 1 2 – HDMI IN 2 3 – DP IN 4 – PC IN out – Video output to embed into number (1) status – Embedding status 0 – Analog 1 – Embedded 2 – Auto	#AUD-EMB?_1,1<CR>
AUD-LVL	Set volume level.	COMMAND #AUD-LVL_stage,channel,volume<CR> FEEDBACK ~nn@AUD-LVL_stage,channel,volume<CR><LF>	stage – 1 (Output processing) channel – 1 (Analog audio output) volume – Volume level 0 to 100%; ++ (increase current value); -- (decrease current value)	Set AUDIO OUT level to -50dB: #AUD-LVL_1,1,-50<CR>
AUD-LVL?	Get volume level.	COMMAND #AUD-LVL?_stage,channel<CR> FEEDBACK ~nn@AUD-LVL_stage,channel,volume<CR><LF>	stage – 1 (Output processing) channel – 1 (Analog audio output) volume – Volume level 0 to 100%;	Get AUDIO OUT level #AUD-LVL?_1,1<CR>
AV-SW-MODE?	Get input auto switch mode (per output).	COMMAND #AV-SW-MODE?_layer,output_id<CR> FEEDBACK ~nn@AV-SW-MODE_layer,output_id,mode<CR><LF>	layer – Layer Enumeration 1 – Video output_id – 1 mode – 0 – manual 1 – priority switch 2 – last connected switch	Get the input audio switch mode for HDBT Out: #AV-SW-MODE?_1,1<CR>
AV-SW-TIMEOUT	Set auto switching timeout.	COMMAND #AV-SW-TIMEOUT_action,time_out<CR> FEEDBACK ~nn@AV-SW-TIMEOUT_action,time_out<CR><LF>	action – 0 – Video signal is lost. 2 – Audio signal is lost. 4 – Disable 5V on video output if no input signal detected. 5 – Video cable is unplugged. 6 – Audio cable is unplugged. time_out – Timeout in seconds 0 - 60000	Set the auto switching timeout to 5 seconds in the event of 5V disable when no input signal is detected: #AV-SW-TIMEOUT_4,5<CR>
AV-SW-TIMEOUT?	Get auto switching timeout.	COMMAND #AV-SW-TIMEOUT?_action<CR> FEEDBACK ~nn@AV-SW-TIMEOUT_action,time_out<CR><LF>	action – 0 – Video signal is lost. 2 – Audio signal is lost. 4 – Disable 5V on video output if no input signal detected. 5 – Video cable is unplugged. 6 – Audio cable is unplugged. time_out – Timeout in seconds	Get the Disable 5V on video output if no input signal detected timeout: #AV-SW-TIMEOUT?_4<CR>
BAUD	Set protocol serial port baud rate. ① The new defined baud rate is stored in the EEPROM and used when powering up. Default baud rate is 115200 (on factory reset). Only works with devices supporting this command (if ERR 002 is returned, the default baud rate is used).	COMMAND #BAUD_baud_rate<CR> FEEDBACK ~nn@BAUD_baud_rate<CR><LF> Option 1: ~nn@BAUD_current_baud_rate<CR><LF> Option 2: ~nn@BAUD_baud_rate1,baud_rate2,...<CR><LF>	baud_rate – 9600,14400,19200,28800,38400,57600,115200,230400 current_baud_rate – 9600,14400,19200,28800,38400,57600,115200,230400 baud_param – 0 - get the list of supported baud rates baud_rate1,baud_rate2,... – List of supported baud rates	Set the DATA baud rate to 9600: #BAUD_9600<CR>

Function	Description	Syntax	Parameters/Attributes	Example
BAUD?	<p>Get protocol serial port baud rate. (Option 1 - for current baud rate. Option 2 - for list of supported baud rates).</p> <p>i 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>COMMAND</p> <pre>#BAUD?_<CR></pre> <pre>#BAUD?_baud_param<CR></pre> <p>FEEDBACK</p> <pre>~nn@BAUD_baud_rate<CR><LF></pre> <p>Option 1:</p> <pre>~nn@BAUD_current_baud_rate<CR><LF></pre> <p>Option 2:</p> <pre>~nn@BAUD_baud_rate1,baud_rate2,...<CR><LF></pre>	<p>baud_rate – 9600,14400,19200,28800,38400,57600, 115200,230400</p> <p>current_baud_rate – 9600,14400,19200,28800,38400,57600, 115200,230400</p> <p>baud_param – 0 - get the list of supported baud rates</p> <p>baud_rate1,baud_rate2,... – List of supported baud rates</p>	<p>Get DATA serial port baud rate:</p> <pre>#BAUD?_<CR></pre>
BEACON-INFO?	<p>Get beacon information, including IP address, UDP control port, TCP control port, MAC address, model, name.</p> <p>i There is no Set command. Get command initiates a notification.</p>	<p>COMMAND</p> <pre>#BEACON-INFO?_port_id<CR></pre> <p>FEEDBACK</p> <pre>~nn@BEACON-INFO_port_id,ip_string,udp_port,tcp_port,mac_address,model,name<CR><LF></pre>	<p>port_id – ID of the Ethernet port</p> <p>ip_string – Dot-separated representation of the IP address</p> <p>udp_port – UDP control port</p> <p>tcp_port – TCP control port</p> <p>mac_address – Dash-separated mac address</p> <p>model – Device model</p> <p>name – Device name</p>	<p>Get beacon information:</p> <pre>#BEACON-INFO?_<CR></pre>
BTN	<p>Set module state.</p> <p>i After a SET command, LEDs show the button status:</p> <p>mute – button LED off.</p> <p>active – button LED on.</p> <p>pending – button LED flashing.</p> <p>The Step-in master uses this command to get the actual status and identify if the device is in pending Step-in request.</p> <p>In reply to the Step-in request, the Step-in master updates the button status by sending set to activate and configures the Step-in action. Other Step-in clients are set to mute.</p>	<p>COMMAND</p> <pre>#BTN_button_num,mode<CR></pre> <p>FEEDBACK</p> <pre>~nn@BTN_button_num,mode<CR><LF></pre>	<p>button_num – Button number (1)</p> <p>mode –</p> <ul style="list-style-type: none"> 0 – mute 1 – active, 255 (0xFF) - pending (request step in) (Get command only) <p>In case of ECHO notification, the mode is replaced by the input # of the Step-in client and does not mean the status of the button.</p> <p>An ECHO-ED notification happens only when a button becomes active</p>	<p>Set button 1 state to mute:</p> <pre>#BTN_2,0<CR></pre>
BTN?	<p>Get module state.</p> <p>i After a SET command, LEDs show the button status:</p> <p>mute – button LED off.</p> <p>active – button LED on.</p> <p>pending – button LED flashing.</p> <p>The Step-in master uses this command to get the actual status and identify if the device is in pending Step-in request.</p> <p>In reply to the Step-in request, the Step-in master updates the button status by sending set to activate and configures the Step-in action. Other Step-in clients are set to mute.</p>	<p>COMMAND</p> <pre>#BTN?_button_num<CR></pre> <p>FEEDBACK</p> <pre>~nn@BTN_button_num,mode<CR><LF></pre>	<p>button_num – Button number (0...n)</p> <p>mode –</p> <ul style="list-style-type: none"> 0 – mute 1 – active, 255 (0xFF) - pending (request step in) (Get command only) <p>In case of ECHO notification, the mode is replaced by the input # of the Step-in client and does not mean the status of the button.</p> <p>An ECHO-ED notification happens only when a button becomes active</p>	<p>Get button 2 state:</p> <pre>#BTN?_2<CR></pre>
BUILD-DATE?	<p>Get device build date.</p>	<p>COMMAND</p> <pre>#BUILD-DATE?_<CR></pre> <p>FEEDBACK</p> <pre>~nn@BUILD-DATE_date,time<CR><LF></pre>	<p>date – Format: YYYY/MM/DD where YYYY = Year MM = Month DD = Day</p> <p>time – Format: hh:mm:ss where hh = hours mm = minutes ss = seconds</p>	<p>Get the device build date:</p> <pre>#BUILD-DATE?<CR></pre>

Function	Description	Syntax	Parameters/Attributes	Example
CPEDID	<p>Copy EDID data from the output to the input EEPROM.</p> <p>i 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>	<pre> COMMAND #CPEDID_src_type,src_id,dst_type,dest_bitmap<CR> or #CPEDID_src_type,src_id,dst_type,dest_bitmap,safe_mode<CR> FEEDBACK ~nn@CPEDID_src_stg,src_id,dst_type,dest_bitmap<CR><LF> ~nn@CPEDID_src_stg,src_id,st_type,dest_bitmap,safe_mode<CR><LF> </pre>	<p>src_type – EDID source type (usually output)</p> <ul style="list-style-type: none"> 0 – Input 1 – Output 2 – Default EDID 3 – Custom EDID <p>src_id – Number of chosen source stage</p> <ul style="list-style-type: none"> 0 – Default EDID source 1 – Output 1 2 – Output 2 <p>dst_type – EDID destination type (usually input)</p> <ul style="list-style-type: none"> 0 – Input 1 – Output 2 – Default EDID 3 – Custom EDID <p>dest_bitmap – Bitmap representing destination IDs. Format: XXXX..X, where X is hex digit. The binary form of every hex digit represents corresponding destinations.</p> <ul style="list-style-type: none"> 0 – indicates that EDID data is not copied to this destination. 1 – indicates that EDID data is copied to this destination. <p>safe_mode –</p> <ul style="list-style-type: none"> 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) 	<p>Copy the EDID data from the Output 1 (EDID source) to the Input:</p> <pre>#CPEDID_1,1,0,0x1<CR></pre> <p>Copy the EDID data from the default EDID source to the Input:</p> <pre>#CPEDID_2,0,0,0x1<CR></pre>
DIR	List files in device.	<pre> COMMAND #DIR<CR> FEEDBACK Multi-line: ~nn@DIR<CR><LF> file_name TABfile_size_bytes,ID:_file_id<CR><LF> TABfree_size_bytes.<CR><LF> </pre>	<p>file_name – Name of file</p> <p>file_size – File size in bytes. A file can take more space on device memory</p> <p>file_id – Internal ID for file in file system</p> <p>free_size – Free space in bytes in device file system</p>	#DIR<CR>
DISPLAY?	Get output HPD status.	<pre> COMMAND #DISPLAY?_out_id<CR> FEEDBACK ~nn@DISPLAY_out_id,status<CR><LF> </pre>	<p>out_id – Output number</p> <ul style="list-style-type: none"> 1 – Output 1 <p>status – HPD status according to signal validation</p> <ul style="list-style-type: none"> 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:
DPSW-STATUS?	Get the DIP-switch state.	<pre> COMMAND #DPSW-STATUS?_dp_sw_id<CR> FEEDBACK ~nn@DPSW-STATUS_dp_sw_id,status<CR><LF> </pre>	<p>dp_sw_id – 1 to 4 (number of DIP switches)</p> <p>status – Up/down</p> <ul style="list-style-type: none"> 0 – Up 1 – Down 	get the DIP-switch 2 status:
ETH-PORT	<p>Set Ethernet port protocol.</p> <p>i If the port number you enter is already in use, an error is returned. The port number must be within the following range: $0-(2^{16}-1)$.</p>	<pre> COMMAND #ETH-PORT_portType,ETHPort<CR> FEEDBACK ~nn@ETH-PORT_portType,ETHPort<CR><LF> </pre>	<p>portType – TCP/UDP</p> <p>ETHPort – TCP/UDP port number (0 – 65535)</p>	Set the Ethernet port protocol for TCP to port 12457:
ETH-PORT?	Get Ethernet port protocol.	<pre> COMMAND #ETH-PORT?_portType<CR> FEEDBACK ~nn@ETH-PORT_portType,ETHPort<CR><LF> </pre>	<p>portType – TCP/UDP</p> <ul style="list-style-type: none"> 0 – TCP 1 – UDP <p>ETHPort – TCP / UDP port number (0 – 65535)</p>	Get the Ethernet port protocol for UDP:
FACTORY	<p>Reset device to factory default configuration.</p> <p>i This command deletes all user data from the device. The deletion can take some time.</p> <p>Your device may require powering off and powering on for the changes to take effect.</p>	<pre> COMMAND #FACTORY<CR> FEEDBACK ~nn@FACTORY_OK<CR><LF> </pre>		Reset the device to factory default configuration:

Function	Description	Syntax	Parameters/Attributes	Example
HDCP-MOD	<p>Set HDCP mode.</p> <p>① Set HDCP working mode on the device input:</p> <p>HDCP supported - HDCP_ON [default].</p> <p>HDCP not supported - HDCP OFF.</p> <p>HDCP support changes following detected sink - MIRROR OUTPUT.</p> <p>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.</p>	<pre> COMMAND #HDCP-MOD_ stage, inp_id, mode<CR> FEEDBACK ~nn@HDCP-MOD_ stage, inp_id, mode<CR><LF> </pre>	<p>stage – Input/Output</p> <p>0 – Input</p> <p>1 – Output</p> <p>inp_id – Input number:</p> <p>0 – HDMI IN 1</p> <p>1 – HDMI IN 2</p> <p>2 – DP</p> <p>Output number: 0</p> <p>mode – HDCP mode:</p> <p>0 – HDCP On</p> <p>1 – HDCP Off</p> <p>2 – Follow input</p> <p>3 – HDCP defined according to the connected output</p>	<p>Set the input HDCP-MODE of IN 1 to Off:</p> <pre>#HDCP-MOD_1,0<CR></pre>
HDCP-MOD?	<p>Get HDCP mode.</p> <p>① Set HDCP working mode on the device input:</p> <p>HDCP supported - HDCP_ON [default].</p> <p>HDCP not supported - HDCP OFF.</p> <p>HDCP support changes following detected sink - MIRROR OUTPUT.</p>	<pre> COMMAND #HDCP-MOD?_ inp_id<CR> FEEDBACK ~nn@HDCP-MOD_ inp_id, mode<CR><LF> </pre>	<p>inp_id – Input number:</p> <p>1 – IN 1 HDMI</p> <p>2 – IN 2 HDBT</p> <p>mode – HDCP mode:</p> <p>0 – HDCP Off</p> <p>3 – HDCP defined according to the connected output</p>	<p>Get the input HDCP-MODE of IN 1 HDMI:</p> <pre>#HDCP-MOD?_1<CR></pre>
HDCP-STAT?	<p>Get HDCP signal status.</p> <p>① Output stage (1) – get the HDCP signal status of the sink device connected to the specified output.</p> <p>Input stage (0) – get the HDCP signal status of the source device connected to the specified input.</p>	<pre> COMMAND #HDCP-STAT?_ stage, stage_id<CR> FEEDBACK ~nn@HDCP-STAT_ stage, stage_id, status<CR><LF> </pre>	<p>stage – Input/Output</p> <p>0 – Input</p> <p>1 – Output</p> <p>stage_id – Number of chosen stage for the input stage</p> <p>1 – HDMI IN 1</p> <p>2 – HDMI IN 2</p> <p>3 – DP</p> <p>4 – VGA</p> <p>For the output stage</p> <p>1 – HDMI OUT</p> <p>status – Signal encryption status - valid values On/Off</p> <p>0 – HDCP Off</p> <p>1 – HDCP On</p>	<p>Get the output HDCP-STATUS of IN 1:</p> <pre>#HDCP-STAT?_0,1<CR></pre>
HELP	<p>Get command list or help for specific command.</p>	<pre> COMMAND #HELP<CR> #HELP_ command_name<CR> FEEDBACK 1. Multi-line: ~nn@Device_ command, _command..<CR><LF> To get help for command use: HELP (COMMAND_NAME)<CR><LF> ~nn@HELP_ command:<CR><LF> description<CR><LF> USAGE: usage<CR><LF> </pre>	<p>command – Name of a specific command</p>	<p>Get the command list:</p> <pre>#HELP<CR></pre> <p>To get help for AV-SW-TIMEOUT:</p> <pre>HELP_AV-SW-TIMEOUT<CR></pre>
MODEL?	<p>Get device model.</p> <p>① This command identifies equipment connected to VP-429H2 and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests.</p>	<pre> COMMAND #MODEL?_<CR> FEEDBACK ~nn@MODEL_ model_name<CR><LF> </pre>	<p>model_name – String of up to 19 printable ASCII chars</p>	<p>Get the device model:</p> <pre>#MODEL?_<CR></pre>
MUTE	<p>Set audio mute.</p>	<pre> COMMAND #MUTE_ channel, mute_mode<CR> FEEDBACK ~nn@MUTE_ channel, mute_mode<CR><LF> </pre>	<p>channel – 1 (Audio out)</p> <p>mute_mode – On/Off</p> <p>0 – Off</p> <p>1 – On</p>	<p>Set speaker output to mute:</p> <pre>#MUTE_1,1<CR></pre>
MUTE?	<p>Get audio mute.</p>	<pre> COMMAND #MUTE?_ channel<CR> FEEDBACK ~nn@MUTE_ channel, mute_mode<CR><LF> </pre>	<p>channel – 1 (Output number)</p> <p>mute_mode – On/Off</p> <p>0 – Off</p> <p>1 – On</p>	<p>Get mute status of output 1</p> <pre>#MUTE?_1?<CR></pre>

Function	Description	Syntax	Parameters/Attributes	Example
NAME	<p>Set machine (DNS) name.</p> <p>① 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>COMMAND</p> <pre>#NAME_machine_name<CR></pre> <p>FEEDBACK</p> <pre>~nn@NAME_machine_name<CR><LF></pre>	<p>machine_name – String of up to 15 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> <pre>#NAME_room-442<CR></pre>
NAME?	<p>Get machine (DNS) name.</p> <p>① 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>COMMAND</p> <pre>#NAME?_<CR></pre> <p>FEEDBACK</p> <pre>~nn@NAME_machine_name<CR><LF></pre>	<p>machine_name – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end)</p>	<p>Get the DNS name of the device:</p> <pre>#NAME?_<CR></pre>
NAME-RST	<p>Reset machine (DNS) name to factory default.</p> <p>① Factory default of machine (DNS) name is "KRAMER_" + 4 last digits of device serial number.</p>	<p>COMMAND</p> <pre>#NAME-RST<CR></pre> <p>FEEDBACK</p> <pre>~nn@NAME-RST_OK<CR><LF></pre>		<p>Reset the machine name (S/N last digits are 0102):</p> <pre>#NAME-RST_KRAMER_0102<CR></pre>
NET-CONFIG	<p>Set a network configuration.</p> <p>① Parameters, [DNS1] and [DNS2] are optional.</p> <p>② 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.</p> <p>③ If the gateway address is not compliant to the subnet mask used for the host IP, the command will return an error. Subnet and gateway compliancy specified by RFC950.</p>	<p>COMMAND</p> <pre>#NET-CONFIG_id,ip,net_mask,gateway,[DNS1],[DNS2]<CR></pre> <p>FEEDBACK</p> <pre>~nn@NET-CONFIG_id,ip,net_mask,gateway<CR><LF></pre>	<p>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....</p> <p>ip – Network IP</p> <p>net_mask – Network mask</p> <p>gateway – Network gateway</p>	<p>Set the device network parameters to IP address 192.168.113.10, net mask 255.255.0.0, and gateway 192.168.0.1:</p> <pre>#NET-CONFIG_0,192.168.113.10,255.255.0.0,192.168.0.1<CR></pre>
NET-CONFIG?	<p>Get a network configuration.</p>	<p>COMMAND</p> <pre>#NET-CONFIG?_id<CR></pre> <p>FEEDBACK</p> <pre>~nn@NET-CONFIG_id,ip,net_mask,gateway<CR><LF></pre>	<p>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....</p> <p>ip – Network IP</p> <p>net_mask – Network mask</p> <p>gateway – Network gateway</p>	<p>Get network configuration:</p> <pre>#NET-CONFIG?_id<CR></pre>
NET-DHCP	<p>Set DHCP mode.</p> <p>① 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 NAME 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>② 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.</p>	<p>COMMAND</p> <pre>#NET-DHCP_id,mode<CR></pre> <p>FEEDBACK</p> <pre>~nn@NET-DHCP_id,mode<CR><LF></pre>	<p>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....</p> <p>mode –</p> <p>1 – Try to use DHCP. (If unavailable, use the IP address set by the factory or the NET-IP command).</p>	<p>Enable DHCP mode for port 1, if available:</p> <pre>#NET-DHCP_1,1<CR></pre>

Function	Description	Syntax	Parameters/Attributes	Example
NET-DHCP?	Get DHCP mode. ① For Backward compatibility, the id parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.	COMMAND #NET-DHCP?_id<CR> FEEDBACK ~nn@NET-DHCP_id,mode<CR><LF>	id – Network ID—the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3.... mode – 0 – Do not use DHCP. Use the IP set by the factory or using the NET-IP or NET-CONFIG command. 1 – Try to use DHCP. If unavailable, use the IP set by the factory or using the NET-IP or NET-CONFIG command.	Get DHCP mode for port 1: #NET-DHCP?_1<CR>
NET-GATE	Set gateway IP. ① A network gateway connects the device via another network and maybe over the Internet. Be careful of security issues. For proper settings consult your network administrator.	COMMAND #NET-GATE_ip_address<CR> FEEDBACK ~nn@NET-GATE_ip_address<CR><LF>	ip_address – Format: xxx.xxx.xxx.xxx	Set the gateway IP address to 192.168.0.1: #NET-GATE_192.168.000.001<CR>
NET-GATE?	Get gateway IP. ① A network gateway connects the device via another network and maybe over the Internet. Be aware of security problems.	COMMAND #NET-GATE?_<CR> FEEDBACK ~nn@NET-GATE_ip_address<CR><LF>	ip_address – Format: xxx.xxx.xxx.xxx	Get the gateway IP address: #NET-GATE?_<CR>
NET-IP	Set IP address. ① For proper settings consult your network administrator.	COMMAND #NET-IP_ip_address<CR> FEEDBACK ~nn@NET-IP_ip_address<CR><LF>	ip_address – 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.	COMMAND #NET-IP?_<CR> FEEDBACK ~nn@NET-IP_ip_address<CR><LF>	ip_address – Format: xxx.xxx.xxx.xxx	Get the IP address: #NET-IP?_<CR>
NET-MAC?	Get MAC address. ① For backward compatibility, the id parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.	COMMAND #NET-MAC?_id<CR> FEEDBACK ~nn@NET-MAC_id,mac_address<CR><LF>	id – Network ID—the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3.... mac_address – Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit	#NET-MAC?_id<CR>
NET-MASK	Set subnet mask. ① For proper settings consult your network administrator.	COMMAND #NET-MASK_net_mask<CR> FEEDBACK ~nn@NET-MASK_net_mask<CR><LF>	net_mask – Format: xxx.xxx.xxx.xxx	Set the subnet mask to 255.255.0.0: #NET-MASK_255.255.000.000<CR>
NET-MASK?	Get subnet mask.	COMMAND #NET-MASK?_<CR> FEEDBACK ~nn@NET-MASK_net_mask<CR><LF>	net_mask – Format: xxx.xxx.xxx.xxx	Get the subnet mask: #NET-MASK?<CR>
PASS	Set password for login level. ① The default password is an empty string.	COMMAND #PASS_login_level,password<CR> FEEDBACK ~nn@PASS_login_level,password<CR><LF>	login_level – Level of login to set (End User or Administrator). password – Password for the login_level . Up to 15 printable ASCII chars	Set the password for the Admin protocol permission level to 33333: #PASS_Admin,33333<CR>
PRIORITY	Set input priority. ① WP-577VH – layer parameter is not used.	COMMAND #PRIORITY_layer,PRIORITY1,PRIORITY2...PRIORITYn<CR> FEEDBACK ~nn@PRIORITY_layer,PRIORITY1,PRIORITY2...PRIORITYn<CR><LF>	layer – Layer Enumeration 1 – Video PRIORITY1 – first priority input PRIORITYn – 4 th priority input	Set the video input priority of PC In (4) as the highest priority: #PRIORITY_1,4,2,3,1<CR>
PRIORITY?	Get input priority.	COMMAND #PRIORITY?layer<CR> FEEDBACK ~nn@PRIORITY_layer,PRIORITY1,PRIORITY2...PRIORITYn<CR><LF>	layer – Layer Enumeration 1 – Video PRIORITY1 – first priority input PRIORITYn – 4th priority input	Get video input priority: #PRIORITY?1<CR>
PROT-VER?	Get device protocol version.	COMMAND #PROT-VER?_<CR> FEEDBACK ~nn@PROT-VER_3000:version<CR><LF>	version – XX.XX where X is a decimal digit	Get the device protocol version: #PROT-VER?_<CR>
ROUTE	Set layer routing. ① This command replaces all other routing commands.	COMMAND #ROUTE_layer,dest,src<CR> FEEDBACK ~nn@ROUTE_layer,dest,src<CR><LF>	layer Layer Enumeration 1 – Video dest 1 – HDMI OUT src – Source id 1 – HDMI IN 1 2 – HDMI IN 2 3 – DP 4 – VGA	Route video HDMI IN 2 to video HDMI OUT: #ROUTE_1,1,2<CR>

Function	Description	Syntax	Parameters/Attributes	Example
ROUTE?	Get layer routing. ① This command replaces all other routing commands.	COMMAND #ROUTE?_layer,dest<CR> FEEDBACK ~nn@ROUTE_layer,dest,src<CR><LF>	layer Layer Enumeration 1 – Video Dest 1 – HDMI OUT src – Source id 1 – HDMI IN 1 2 – HDMI IN 2 3 – DP 4 – VGA	Get the layer routing: #ROUTE?_layer,dest<CR>
SIGNAL?	Get input signal status.	COMMAND #SIGNAL?_inp_id<CR> FEEDBACK ~nn@SIGNAL_inp_id,status<CR><LF>	inp_id – Input number 1 – HDMI IN 1 2 – HDMI IN 2 3 – DP 4 – VGA status – Signal status according to signal validation: 0 – Off 1 – On	Get the input signal lock status of IN 1: #SIGNAL?_1<CR>
SN?	Get device serial number.	COMMAND #SN?_<CR> FEEDBACK ~nn@SN_serial_number<CR><LF>	serial_number – 14 decimal digits, factory assigned	Get the device serial number: #SN?_<CR>
STEPIN-CP?	Get module Step-in capabilities. ① If a module does not support Step-in it might respond with an error "command not supported".	COMMAND #STEPIN-CP?_<CR> FEEDBACK ~nn@STEPIN-CP_capabilities,num_of_inputs,num_of_cntl_btn<CR><LF>	capabilities – 0 – module doesn't support Step-in 1 – module supports Step-in num_of_inputs – Number of video inputs for remote switching num_of_cntl_btn – Number of control buttons to program in master device type1,type2...typeN – Input type according to num_of_inputs 2 – HDMI 3 – DisplayPort 6 – VGA	Get module Step-in capabilities: #STEPIN-CP?_<CR>
VERSION?	Get firmware version number.	COMMAND #VERSION?_<CR> FEEDBACK ~nn@VERSION_firmware_version<CR><LF>	firmware_version – XX.XX.XXXX where the digit groups are: major.minor.build version	Get the device firmware version number: #VERSION?_<CR>
VGA-PHASE	Set ADC (VGA) sampling phase. ① Response answers with absolute value after decreasing or increasing value.	COMMAND #VGA-PHASE_channel,value<CR> FEEDBACK ~nn@VGA-PHASE_channel,value<CR><LF>	channel – 4 (Input number) value – Phase parameter in LSB units ++ increase current value – decrease current value	Increase the current value of the ADC (VGA) sampling phase: #VGA-PHASE_3,++<CR>
VGA-PHASE?	Get ADC (VGA) sampling phase. ① Response answers with absolute value after decreasing or increasing value.	COMMAND #VGA-PHASE?_channel<CR> FEEDBACK ~nn@VGA-PHASE_channel,value<CR><LF>	channel – Input number value – Phase parameter in LSB units ++ increase current value – decrease current value	Get ADC (VGA) sampling phase: #VGA-PHASE?_2<CR>
VID	LEGACY COMMAND. Set video switch state. ① The GET command identifies input switching on Step-in clients. The SET command is for remote input switching on Step-in clients (essentially via by the Web). This is a legacy command. New Step-in modules support the ROUTE command.	COMMAND #VID_in>out<CR> FEEDBACK ~nn@VID_in>out<CR><LF>	in – Input number 1 – HDMI IN 1 2 – HDMI IN 2 3 – DP 4 – VGA > – Connection character between in and out parameters out – 1 (Output number)	Switch IN 1 to OUT 3: #VID_1>3<CR>
VID?	LEGACY COMMAND. Get video switch state. ① The GET command identifies input switching on Step-in clients. The SET command is for remote input switching on Step-in clients (essentially via by the Web). This is a legacy command. New Step-in modules support the ROUTE command.	COMMAND #VID?_out<CR> FEEDBACK ~nn@VID_in>out<CR><LF>	in – Input number 1 – HDMI IN 1 2 – HDMI IN 2 3 – DP 4 – VGA > – Connection character between in and out parameters out – 1 (Output number)	Get video switch state: #VID?_<CR>

Function	Description	Syntax	Parameters/Attributes	Example
VID-RES	<p>Set output resolution.</p> <p>① "Set" command is only applicable for stage=Output.</p> <p>"Set" command with is_native=ON sets native resolution on selected output (resolution index sent = 0). Device sends as answer actual VIC ID of native resolution.</p> <p>"Get" command with is_native=ON returns native resolution VIC, with is_native=OFF returns current resolution.</p> <p>To use "custom resolutions" (entries 100-105 In View Modes), define them using the DEF-RES command.</p>	<pre> COMMAND #VID-RES_<stage>,<stage_id>,<is_native>,<resolution><CR> FEEDBACK ~nn@VID-RES_<stage>,<stage_id>,<is_native>,<resolution><CR><LF> </pre>	<pre> stage - 1 (Output) stage_id - 1 (out 1) is_native - Native resolution flag 0 - Off resolution - Resolution index 0= native resolution 1=3840x2160@60 2=3840x2160@30 3=1920x1080@60 4=1920x1200@60 5=1366x768@60 6=800x600@60 7=1024x768@60 8=1280x800@60 9=1280x720@60 10=1280x768@60 11=1440x900@60 12=1600x900@60 13=1600x1200@60 14=1280x720@50 15=1920x1080@50 16=1360x768@60 17=1280x1024@60 18=1400x1050@60 19=1680x1050@60 20=3840x2160@50 </pre>	<p>Set the output resolution to 3840x2160@30:</p> <pre>#VID-RES_1,1,0,2<CR></pre>
VID-RES?	<p>Set output resolution.</p> <p>① "Get" command is only applicable for stage=Output.</p> <p>"Set" command with is_native=ON sets native resolution on selected output (resolution index sent = 0). Device sends as answer actual VIC ID of native resolution.</p> <p>"Get" command with is_native=ON returns native resolution VIC, with is_native=OFF returns current resolution.</p> <p>To use "custom resolutions" (entries 100-105 In View Modes), define them using the DEF-RES command.</p>	<pre> COMMAND #VID-RES?_<stage>,<stage_id>,<is_native><CR> FEEDBACK ~nn@VID-RES?_<stage>,<stage_id>,<is_native>,<resolution><CR><LF> </pre>	<pre> stage - 1 (Output) stage_id - 1 (out 1) is_native - Native resolution flag 0 - Off resolution - Resolution index 0= native resolution 1=3840x2160@60 2=3840x2160@30 3=1920x1080@60 4=1920x1200@60 5=1366x768@60 6=800x600@60 7=1024x768@60 8=1280x800@60 9=1280x720@60 10=1280x768@60 11=1440x900@60 12=1600x900@60 13=1600x1200@60 14=1280x720@50 15=1920x1080@50 16=1360x768@60 17=1280x1024@60 18=1400x1050@60 19=1680x1050@60 20=3840x2160@50 </pre>	<p>Set output resolution:</p> <pre>#VID-RES?_1,1,1,<CR></pre>
VMUTE	<p>Set enable/disable video on output.</p> <p>① Video mute parameter 2 (blank picture) is not supported.</p>	<pre> COMMAND #VMUTE_<output_id>,<flag><CR> FEEDBACK ~nn@VMUTE_<output_id>,<flag><CR><LF> </pre>	<pre> output_id - 1 (Output) flag - Video Mute 0 - Video enabled 1 - Video disabled 2 - Blank picture </pre>	<p>Disable the video output:</p> <pre>#VMUTE_1,0<CR></pre>
VMUTE?	<p>Get video on output status.</p> <p>① Video mute parameter 2 (blank picture) is not supported.</p>	<pre> COMMAND #VMUTE?_<output_id> <CR> FEEDBACK ~nn@VMUTE_<output_id>,<flag><CR><LF> </pre>	<pre> output_id - 1 (Output) outputs flag - Video Mute 0 - Video enabled 1 - Video disabled 2 - Blank picture </pre>	<p>Get video on output status:</p> <pre>#VMUTE?_1,<CR></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_TIMEDOUT	8	Timeout
ERR_RESERVED	9	(Reserved)
ERR_FW_NOT_ENOUGH_SPACE	10	Not enough space for data (firmware, FPGA...)
ERR_FS_NOT_ENOUGH_SPACE	11	Not enough space – file system
ERR_FS_FILE_NOT_EXISTS	12	File does not exist
ERR_FS_FILE_CANT_CREATED	13	File can't be created
ERR_FS_FILE_CANT_OPEN	14	File can't open
ERR_FEATURE_NOT_SUPPORTED	15	Feature is not supported
ERR_RESERVED_2	16	(Reserved)
ERR_RESERVED_3	17	(Reserved)
ERR_RESERVED_4	18	(Reserved)
ERR_RESERVED_5	19	(Reserved)
ERR_RESERVED_6	20	(Reserved)
ERR_PACKET_CRC	21	Packet CRC error
ERR_PACKET_MISSED	22	Packet number isn't expected (missing packet)
ERR_PACKET_SIZE	23	Packet size is wrong
ERR_RESERVED_7	24	(Reserved)
ERR_RESERVED_8	25	(Reserved)
ERR_RESERVED_9	26	(Reserved)
ERR_RESERVED_10	27	(Reserved)
ERR_RESERVED_11	28	(Reserved)
ERR_RESERVED_12	29	(Reserved)
ERR_EDID_CORRUPTED	30	EDID corrupted
ERR_NON_LISTED	31	Device specific errors
ERR_SAME_CRC	32	File has the same CRC – no changed
ERR_WRONG_MODE	33	Wrong operation mode
ERR_NOT_CONFIGURED	34	Device/chip was not initialized

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

What is Covered

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

What is Not Covered

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

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

How Long this Coverage Lasts

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

1. All Kramer VIA hardware products are covered by a standard three (3) year warranty for the VIA hardware and a standard three (3) year warranty for firmware and software updates; all Kramer VIA accessories, adapters, tags, and dongles are covered by a standard one (1) year warranty.
2. All Kramer fiber optic cables, adapter-size fiber optic extenders, pluggable optical modules, active cables, cable retractors, all ring mounted adapters, all Kramer speakers and Kramer touch panels are covered by a standard one (1) year warranty.
3. All Kramer Cobra products, 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 ten (10) year 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.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

What Kramer Electronics Will Not Do Under This Limited Warranty

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

How to Obtain a Remedy Under This Limited Warranty

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

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

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

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 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.



SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

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

We welcome your questions, comments, and feedback.

The terms HDMI, HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing Administrator, Inc. All brand names, product names, and trademarks are the property of their respective owners.