

## USER MANUAL

### MODEL:

VS-62H

6x2 HDMI Matrix Switcher



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# Introduction

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

Congratulations on purchasing your Kramer **VS-62H 6x2 HDMI Matrix Switcher** which is ideal for the following typical applications:

- Conference rooms
- Education
- Hospitality

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## Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment.
- Review the contents of this user manual.



Go to [www.kramerav.com/downloads/VS-62H](http://www.kramerav.com/downloads/VS-62H) 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 **VS-62H** 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](http://www.kramerav.com/support/recycling).

# Overview

The **VS-62H** is a high quality, 6x2 matrix switcher for HDMI™ signals. It reclocks and equalizes the signals and can route any input to either or both outputs simultaneously.

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

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

- Up to 8.91Gbps data rate (2.97Gbps per graphics channel).  
Suitable for resolutions up to UXGA and 4K x 2K
- Support for HDCP (High Definition Digital Content Protection).
- True video clock detection.
- Automatic switching modes (last connected and priority switching).
- HDMI Support – 3D, Deep Color, x.v.Color™, Lip Sync, Dolby® TrueHD, Dolby Digital Plus, DTS-HD®, and 7.1 multi-channel audio.
- I-EDIDPro™ Kramer Intelligent EDID Processing™ – Intelligent EDID handling & processing algorithm ensures Plug and Play operation for HDMI systems.
- Programmable step-in functionality when used in conjunction with compatible step-in devices, such as the **SID-X3N** and **DIP-31** (using an HDMI cable that supports HEC, the HDMI Ethernet Channel).
- Non-volatile EDID storage.
- Kramer reKlocking™ & Equalization Technology that rebuilds the digital signal to travel longer distances.
- Static or dynamic DHCP IP addressing.
- Embedded Web pages that provide remote configuration and operation.
- A lock button to prevent unwanted tampering with the buttons on the front panel.
- Support for Kramer Protocol 3000.

You can control the **VS-62H** using the front panel buttons, or remotely via:

- RS-232 serial commands transmitted by a PC, touch screen system or other serial controller.
- The Kramer **RC-IR3** infrared, remote control transmitter.
- A PC connected via a LAN to the Ethernet port on the **VS-62H**.
- An optional, external, remote IR receiver (see [Using the IR Transmitter](#) on page [3](#)).

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## Using the IR Transmitter

You can use the **RC-IR3** IR transmitter to control the machine via the built-in IR receiver on the front panel or, instead, via an optional external IR receiver (for example, P/N C-A35M/IRR-50). The external IR receiver can be located up to 15m away from the machine.

This distance can be extended to up to 60m when used with three extension cables (for example, P/N C-A35M/A35F-50).

Before using the external IR receiver, be sure to arrange for your Kramer dealer to insert the internal IR connection cable (for example, P/N: 505-70434010-S) with the 3.5mm connector that fits into the REMOTE IR opening on the rear panel. Connect the external IR receiver to the REMOTE IR 3.5mm connector.

# Defining the VS-62H 6x2 HDMI Matrix Switcher

[Figure 1](#) defines the front panel of the VS-62H.

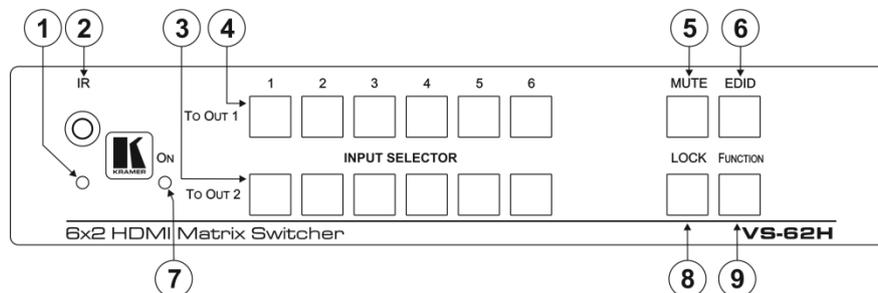


Figure 1: VS-62H 6x2 HDMI Matrix Switcher Front Panel

#	Feature	Function
1	<i>IR</i> LED	Lights yellow when receiving an IR signal.
2	<i>IR</i> Sensor	Signal receiver for the infrared remote control transmitter.
3	<i>INPUT SELECTOR</i> Buttons	<i>TO OUT 2</i> 1~6 Press one of the six inputs to switch it to Output 2 (see <a href="#">Switching an Input to an Output</a> on page 15) . Press the currently selected input button to mute the output.
4		<i>TO OUT 1</i> 1~6 Press one of the six inputs to switch it to Output 1 Press the currently selected input button to mute the output.
5	<i>MUTE</i> Button	Press to toggle mute of both output signals (see <a href="#">Muting and Unmuting the Output</a> on page 16).
6	<i>EDID</i> Button	Press to capture the EDID (see <a href="#">Acquiring an EDID</a> on page 15).
7	<i>ON</i> LED	Lights green when the device is powered on.
8	<i>LOCK</i> Button	Press and hold to lock the front panel buttons. Press and hold again to unlock (see <a href="#">Locking and Unlocking the Front Panel Buttons</a> on page 16).
9	<i>FUNCTION</i> Button	Press to activate the test pattern generator. When the generator is active, press one of the input buttons to select a test pattern.

[Figure 2](#) defines the rear panel of the **VS-62H**.

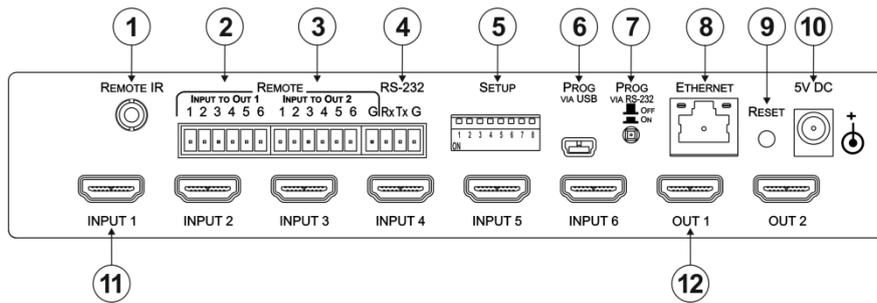


Figure 2: VS-62H 6x2 HDMI Matrix Switcher Rear Panel

#	Feature	Function
1	REMOTE IR Opening	Connect to an external IR receiver for controlling the device via an IR remote controller (see <a href="#">Using the IR Transmitter</a> on page 3). Covered by a cap. The 3.5mm mini jack at the end of the internal IR connection cable fits into this opening
2	REMOTE INPUT To OUTPUT 1 6-pin Terminal Block	Connect to up to six remote, contact-closure input selection switches for Output 1 (see <a href="#">Connecting the Remote Contact-closure Switches</a> on page 11)
3		Connect to up to six remote, contact-closure input selection switches for Output 2
4	RS-232 3-pin Terminal Block	Connect to a PC/serial controller (see <a href="#">Connecting a Serial Controller to the VS-62H via RS-232</a> on page 9)
5	SETUP 8-way DIP-switch	Sets the device configuration (see <a href="#">Setting the DIP-switch</a> on page 18)
6	PROG VIA USB Connector	Connect to a PC to upgrade the firmware (see <a href="#">Upgrading the Firmware</a> on page 19)
7	PROG VIA RS-232 Upgrade Switch	Depress to upgrade the firmware via the RS-232 port, release for normal operation
8	ETHERNET RJ-45 Connector	Connect to a PC via a LAN (see <a href="#">Connecting to the VS-62H via Ethernet</a> on page 9)
9	RESET Switch	Press while power-cycling the device to reset to factory default parameters (see <a href="#">To achieve specified</a> extension distances, use the recommended Kramer cables available at <a href="http://www.kramerav.com/product/VS-62H">www.kramerav.com/product/VS-62H</a> Default <a href="#">Communication Parameters</a> on page 28)
10	5V DC Connector	Connect to the power adapter, center pin positive
11	INPUT 1~6 HDMI Input Connectors	Connect to up to six HDMI sources (see <a href="#">Connecting the VS-62H 6x2 HDMI Matrix Switcher</a> on page 8)
12	OUTPUT 1 and OUTPUT 2 HDMI Output Connectors	Connect to up to two HDMI acceptors

# Mounting VS-62H

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



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



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

**Caution:**

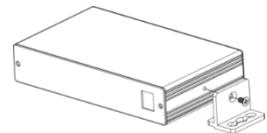
- Mount **VS-62H** before connecting any cables or power.

**Warning:**

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

**To mount the VS-62H 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/VS-62H](http://www.kramerav.com/downloads/VS-62H)

# Connecting the VS-62H 6x2 HDMI Matrix Switcher



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

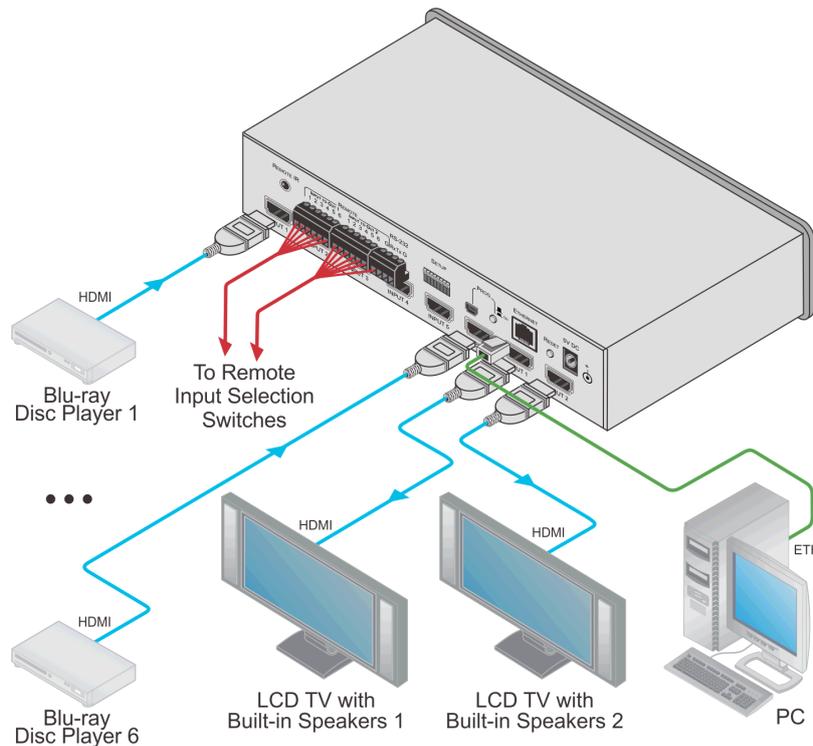


Figure 3: Connecting the VS-62H 6x2 HDMI Matrix Switcher

To connect the **VS-62H 6x2 HDMI Matrix Switcher** as illustrated in the example in [Figure 3](#):

1. Connect up to six HDMI sources, (for example, Blu-ray Disc players) to the HDMI Input connectors.
2. Connect the two OUT HDMI connectors to up to two HDMI acceptors, (for example, LCD displays with built-in speakers).
3. If required, connect a PC/controller to the RS-232 port (see [Connecting a Serial Controller to the VS-62H via RS-232](#) on page 9) and/or the Ethernet port (see [Connecting to the VS-62H via Ethernet](#) on page 9).
4. Connect the power adapter to the device and plug the power adapter into the mains electricity (not shown in [Figure 3](#)).
5. If required, acquire the EDID (see [Switching an Input to an Output](#) on page 23).

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## Connecting a Serial Controller to the VS-62H via RS-232

To connect a serial controller to the VS-62H:

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

- Pin 2 to the TX pin on the VS-62H RS-232 terminal block.
- Pin 3 to the RX pin on the VS-62H RS-232 terminal block.
- Pin 5 to the GND pin on the VS-62H RS-232 terminal block.

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## Connecting to the VS-62H via Ethernet

You can connect to the VS-62H 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 9).
- Via a network hub, switch, or router, using a straight-through cable (see [Connecting the Ethernet Port via a Network Hub](#) on page 11).

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

### Connecting the Ethernet Port Directly to a PC

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



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

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

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

The Local Area Connection Properties window for the selected network adapter appears as shown in [Figure 4](#).

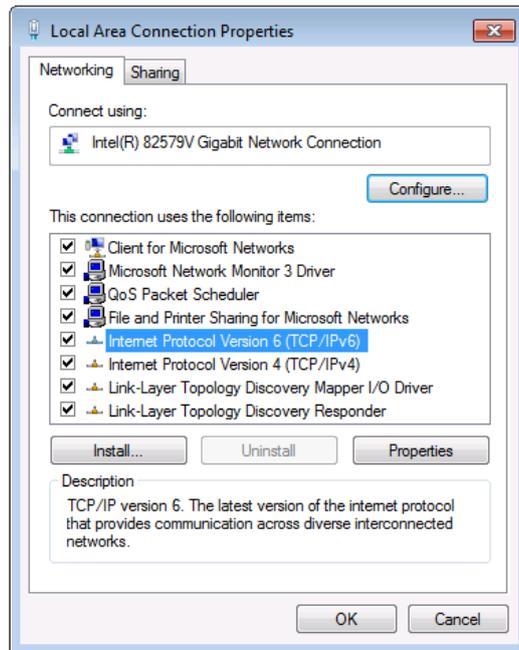


Figure 4: Local Area Connection Properties Window

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

The Internet Protocol Properties window appears as shown in [Figure 5](#).

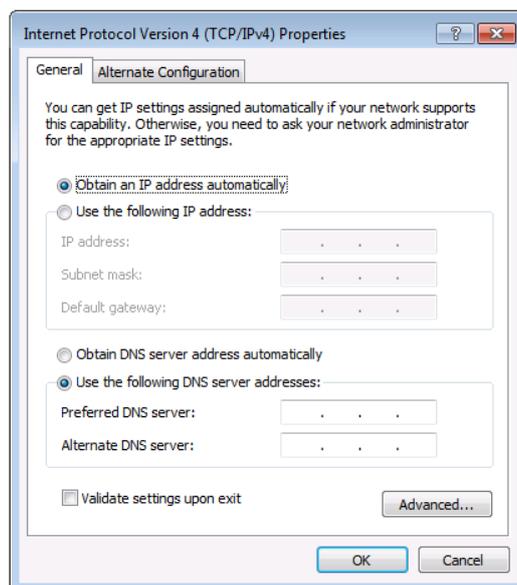


Figure 5: Internet Protocol Version 4 Properties Window

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

For TCP/IPv4 you can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.

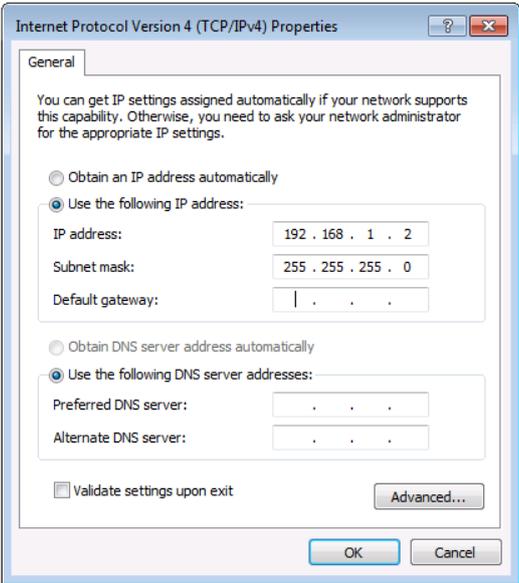


Figure 6: Internet Protocol Properties Window

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

### Connecting the Ethernet Port via a Network Hub or Switch

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

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### Connecting the Remote Contact-closure Switches

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

Both the INPUT TO OUT 1 and INPUT TO OUT TWO terminal block connectors use the ground pin that is next to the RS-232 terminal block connector.

[Figure 7](#) illustrates the wiring of the switch connections to the terminal block.

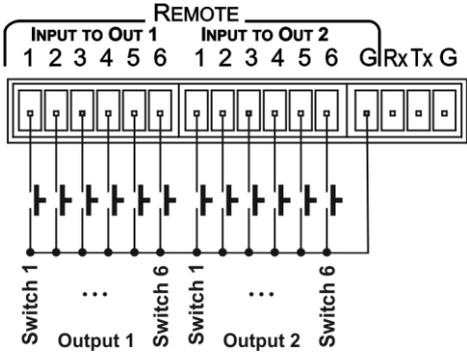


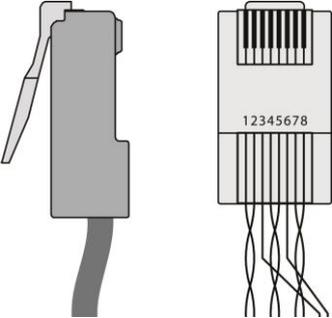
Figure 7: Remote Contact-closure Switch Connections

# Wiring the RJ 45 Connectors

This section defines the TP pinout, using a straight pin-to-pin cable with RJ 45 connectors.

 For HDBT cables, it is recommended that the cable ground shielding be connected/soldered to the connector shield.

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



# Principles of Operation

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

- Automatic signal detection (see [Automatic Signal Detection](#) on page [13](#)).
- Input switching modes (see [Input Switching Modes](#) on page [13](#)).
- EDID operation (see [EDID Operation](#) on page [14](#)).

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## Automatic Signal Detection

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

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## Input Switching Modes

### Manual Mode

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

### Automatic Mode

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

- **Input priority.** Upon detection of an active input, the input with the highest priority is automatically selected. Input priority is from the lowest input number (1) to the highest (6).
- **Last Connected.** The device automatically selects the most recently connected input. Should this source become inactive, the device automatically switches to the last connected input that was active. When turning the device on and more than one input is active, the input with the highest priority is selected.

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

## EDID Operation

The **VS-62H** has a default EDID (see [Default EDID](#) on page [30](#)) stored on all inputs. This EDID can be exchanged for either:

- A custom EDID which is uploaded to one or more inputs using Protocol 3000 commands (see [Protocol 3000 Commands](#) on page [33](#)).
- OR–
- The EDID of a display device connected to an output by using either the front panel buttons (see [Acquiring an EDID](#) on page [15](#)), a Protocol 3000 command, or the Web pages.

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

## Step-in Functionality

The **VS-62H** can function as a step-in switcher when connected to a suitable HDMI transmitter, (for example, the **SID-X3N** or the **DIP-31**), using the correct HDMI cable with HEC support.

Use the Web pages (see [Controlling a Remote Transmitter](#) on page [23](#)) to assign remote device button actions. The default button actions are shown in the following table. Up to three buttons can be active at the same time.

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

# Operating the VS-62H 6x2 HDMI Matrix Switcher

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

- [Switching an Input to an Output](#) on page [15](#).
- [Acquiring an EDID from an Output](#) on page [15](#).
- [Muting and Unmuting the Outputs](#) on page [16](#).
- [Locking and Unlocking the Front Panel Buttons](#) on page [16](#).
- [Generating a Test Pattern](#) on page [17](#).

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## Switching an Input to an Output

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

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

---

## Acquiring an EDID from an Output

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

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

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

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

2. From the To OUT 1 (top) row, press each of the Inputs to which you want to copy the EDID from Output 1.  
Each selected Input LED lights.
3. From the To OUT 2 (bottom) row, press each of the Inputs into which you want to copy the EDID from Output 2.  
Each selected Input LED lights.
4. Press the EDID button.  
The button no longer lights and the EDID changes are saved.

**To copy the default EDID to one or more Inputs:**

1. Press the EDID button to enter the EDID setting mode.  
The EDID button lights.
2. For each Input to which you want to copy the default EDID, press both the To OUT 1 and To OUT 2 buttons simultaneously.  
Both top row and bottom row Input LEDs light.
3. Press the EDID button.  
The button no longer lights and the EDID changes are saved.

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## Muting and Unmuting the Outputs

**To mute and unmute both outputs simultaneously:**

1. Press the Mute button.  
The Mute button lights and the outputs are muted.
2. Press the lit Mute button.  
The outputs are unmuted and the button no longer lights.

**To mute and unmute one output:**

1. Press the currently selected (and lit) input button.  
The output is muted and the button flashes.
2. Press the currently muted (and flashing) input button.  
The output is unmuted and the button lights solid.

---

## Locking and Unlocking the Front Panel Buttons

**To lock and unlock the front panel buttons:**

1. Press and hold the Lock button.  
The front panel buttons are locked and the button lights.
2. Press and hold the Lock button again.  
The front panel buttons are unlocked and the button no longer lights.

## Generating a Test Pattern

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

### To generate a test pattern on the outputs:

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

### To exit the test pattern generator:

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

[Figure 8](#) shows the test patterns available.

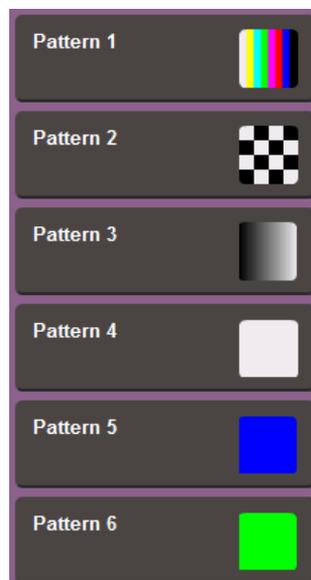


Figure 8: Available Test Patterns



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

# Configuring and Maintaining the VS-62H

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

- Setting the DIP-switches (see [Setting the DIP-switches](#) on page 18).
- Resetting the device to factory default settings (see [Resetting the VS-62H to Factory Default Settings](#) on page 18).
- Upgrading the firmware (see [Upgrading the Firmware](#) on page 19).

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## Setting the DIP-switches

The DIP-switches dictate the behavior of the VS-62H.

All DIP-switches are off by default.

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

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## Resetting the VS-62H to Factory Default Settings

To reset the device to factory default settings:

1. Power off the device.
2. Press and hold down the Reset button on the rear panel.
3. While holding down the Reset button, power on the device.
4. Wait a few seconds and release the button.  
The device is reset to its factory settings.

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## Upgrading the Firmware

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

- Mini USB
- RS-232
- Ethernet

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

# Operating the VS-62H Remotely via the Web Pages

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

Before attempting to connect:

- Perform the procedures in [Connecting to the VS-62H via Ethernet](#) on page [9](#).
- Ensure that your browser is supported (see [Technical Specifications](#) on page [28](#)).
- Ensure that JavaScript is enabled.

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## Browsing the VS-62H Web Pages

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

**To browse the VS-62H Web pages:**

1. Open your Internet browser.
2. Type the IP number of the device (see [Connecting to the VS-62H via Ethernet](#) on page [9](#)) in the Address bar of your browser.



The Loading page appears.



Figure 9: The Loading Page

Immediately after the Loading page, the General Info page appears which displays information related to the device and the Web page version.

There are six Web pages:

- General Info (see [Browsing the VS-62H Web Pages](#) on page [20](#)).
- Routing (see [Routing Page](#) on page [21](#)).
- EDID (see [EDID Page](#) on page [25](#)).
- Device Setting (see [Device Setting Page](#) on page [26](#)).
- Firmware Update (see [Firmware Upgrade Page](#) on page [27](#)).
- About Us (see [About Us Page](#) on page [27](#)).

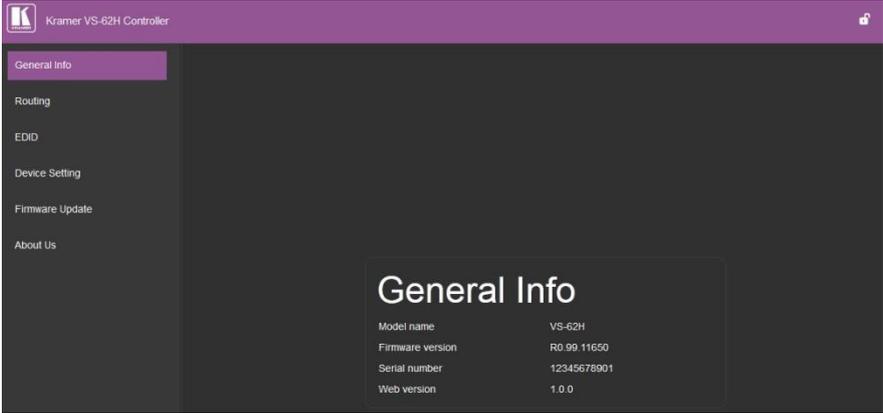


Figure 10: The General Info Page

In addition to displaying information regarding the device, the General Info page also has a button (see [Figure 11](#)) at the top right hand side of the page that allows locking and unlocking of the front panel buttons.



Figure 11: The Lock Button

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## Routing Page

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

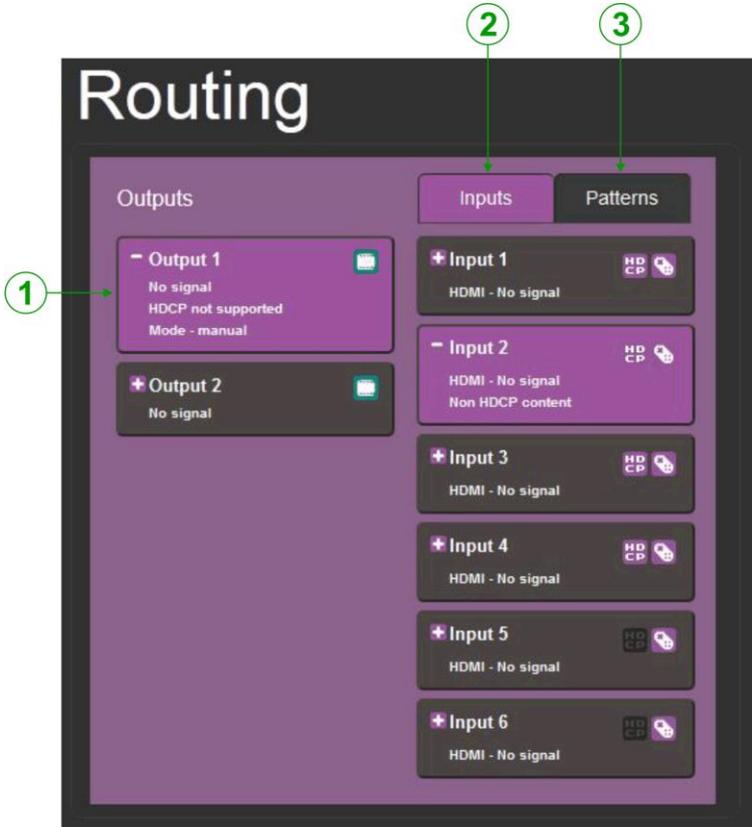


Figure 12: The Routing Page

#	Item	Description
1	Output Buttons 1 and 2	2 Buttons for output selection, signal identification, and audio and video muting (see <a href="#">Switching an Input to an Output</a> on page 23)
2	Inputs Tab	6 Buttons for input selection, and port and signal identification (see <a href="#">Switching an Input to an Output</a> on page 23)
3	Patterns Button Tab	6 Buttons for video pattern generation (see <a href="#">Using Test Patterns as Video Inputs</a> on page 24)

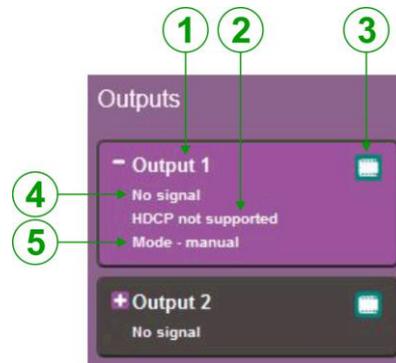


Figure 13: The Output Buttons

#	Item	Description
1	Output Button Number	Identifies the Output number
2	HDCP Indicator	Indicates whether the Output port supports HDCP
3	Video Mute Button	Click the button to mute the video
4	Signal Indicator	Indicates whether or not there is a device connected to the output
5	Mode Indicator	Indicates the switching mode currently employed

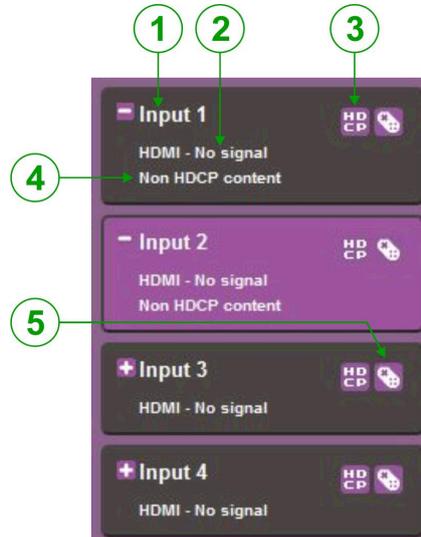


Figure 14: The Input Buttons

#	Item	Description
1	Input Button Number	Identifies the Input number
2	Input Type and Signal Indicator	Indicates the type of input and whether there is a signal present on the Input
3	HDCP Selection Button	Click the button to turn HDCP support for the Input on and off
4	HDCP Content Indicator	Indicates whether or not the Input signal is HDCP protected
5	Remote Device Control Button	Click the button to display the control window for the remote device connected to this Input (see <a href="#">Controlling a Remote Transmitter</a> on page 23)

## Switching an Input to an Output

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

1. Click on Output button 2.  
The button changes color to purple and the Output is selected.
2. Click on Input button 2.  
The button changes color to purple and the output is switched.

## Controlling a Remote Transmitter

Compatible remote transmitters, (for example, the **SID-X3N** or the **DIP-31**) that are connected to the **VS-62H** can be controlled using the Web pages, (see [Routing Page](#) on page 21, [Figure 14](#)).

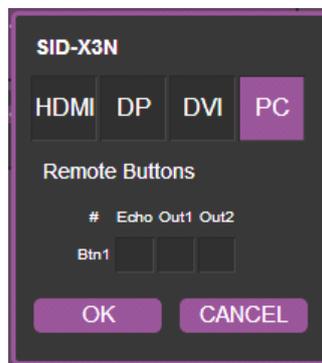


Figure 15: The Remote Device Control Window

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

- HDMI, DP, DVI, PC—selects one of the inputs
- Echo—allows a connected controller to be programmed to perform a variety of tasks triggered by the user buttons, such as, room control, (lights, screen, and so on)
- Out 1—step-in current input to output 1
- Out 2—step-in current input to output 2

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

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

## Using Test Patterns as Video Inputs

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

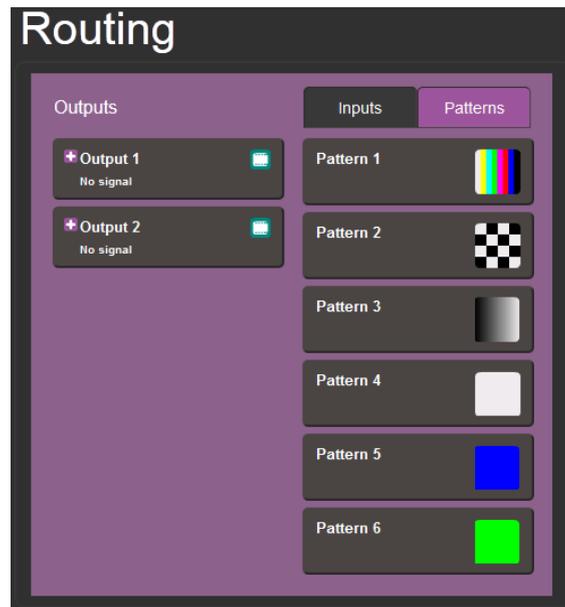


Figure 16: Test Pattern Tab

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

1. Click the Patterns tab.  
The six test pattern buttons are shown.
2. Click the required Output to select it.  
The button changes color.
3. Click the required test pattern button.  
The button changes color and the selected test pattern is switched to the Output.

## EDID Page

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

- Output
- Input
- EDID data file

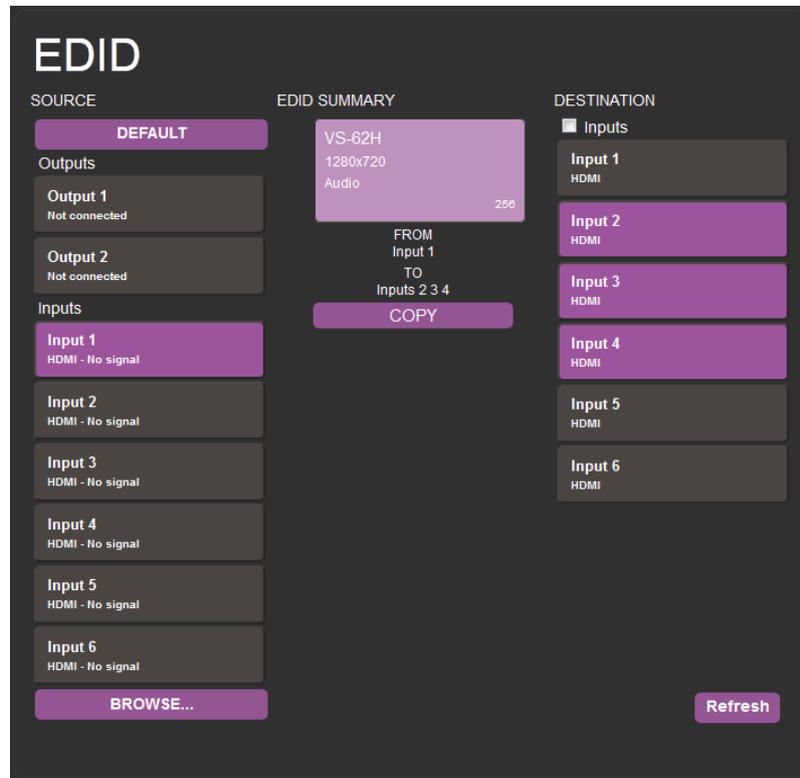


Figure 17: The EDID Page

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

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

1. Click the source button from which to copy the EDID (Output or Input).  
The button changes color and the EDID summary information reflects the EDID data.
2. Click one or more destination Inputs, or select all Inputs by checking the Inputs checkbox.  
All selected Input buttons change color and the EDID summary information reflects the Input selection(s).
3. Click the Copy button.  
The “EDID was copied” success message is displayed and the EDID data are copied to the selected Input(s).
4. Click OK.

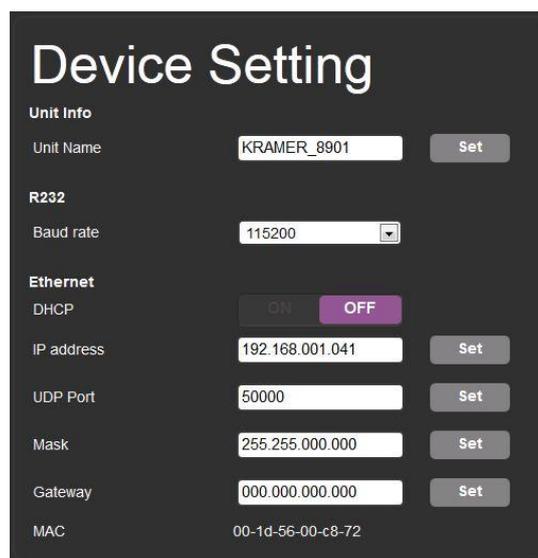
### To copy EDID data to an Input from an EDID data file:

1. Click the source Browse button.  
The Windows Browser opens.
2. Browse to the required file.
3. Select the required file and click Open.  
The EDID summary information reflects the selection.
4. Click one or more destination Inputs, or select all Inputs by checking the Inputs checkbox.  
All selected Input buttons change color and the EDID summary information reflects the Input selection(s).
5. Click the Copy button.  
The “EDID was copied” success message is displayed and the EDID data are copied to the selected Input(s).
6. Click OK.

---

## Device Setting Page

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



The screenshot shows the 'Device Setting' page with the following configuration:

Unit Info	
Unit Name	KRAMER_8901 <input type="button" value="Set"/>
R232	
Baud rate	115200 <input type="button" value="v"/>
Ethernet	
DHCP	<input type="button" value="ON"/> <input checked="" type="button" value="OFF"/>
IP address	192.168.001.041 <input type="button" value="Set"/>
UDP Port	50000 <input type="button" value="Set"/>
Mask	255.255.000.000 <input type="button" value="Set"/>
Gateway	000.000.000.000 <input type="button" value="Set"/>
MAC	00-1d-56-00-c8-72

Figure 18: The Device Setting Page

### To modify serial or Ethernet communication parameters:

1. Adjust the parameters as required, either by entering the parameters directly or by using the drop-down list.
2. Click Set.  
The changes are saved.

---

## Firmware Upgrade Page

The Firmware Upgrade page lets you perform a firmware upgrade from a firmware file.

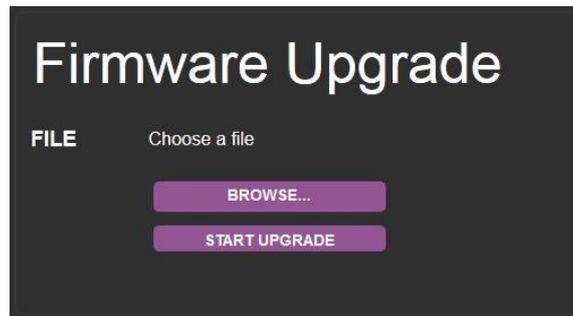


Figure 19: The Firmware Upgrade Page

### To upgrade the firmware:

1. Click the Choose File button.  
The Windows Browser opens.
2. Browse to the required file.
3. Select the required file and click Open.  
The firmware file name is displayed in the Firmware Upgrade page.
4. Click Start Upgrade.  
The firmware file is loaded and a progress bar is displayed.



Do not interrupt the process or the **VS-62H** may be damaged.

5. When the process is complete reboot the device.  
The firmware is upgraded.

---

## About Us Page

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



Figure 20: The About Us Page

# Technical Specifications

INPUTS:	6 HDMI Connectors
OUTPUTS:	2 HDMI Connectors
PORTS:	1 Ethernet on an RJ-45 connector 1 IR on a 3.5mm mini jack 12 Remote selection contact-closure switches on 13 terminal block pins 1 Serial port on a 3-pin terminal block 1 Program port on a mini USB
BANDWIDTH:	Up to 8.91Gbps data rate (2.97Gbps per graphic channel)
STANDARDS COMPLIANCE:	HDMI and HDCP
RESOLUTION:	Up to UXGA; 4K x 2K
SUPPORTED BAUD RATES:	9600, 115200bps
POWER CONSUMPTION:	5V DC 880mA
CONTROLS:	Front panel buttons, infrared remote control transmitter, RS-232, Ethernet, remote input selection switches
OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)
STORAGE TEMPERATURE:	-40° to +70°C (-40° to 158°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	21.5cm x 16.6cm x 4.4cm (8.46" x 6.54" x 1.73") W, D, H
WEIGHT:	1.0kg (2.2lbs) approx.
INCLUDED ACCESSORIES:	Power adapter, IR transmitter
OPTIONS:	External remote IR receiver cable, <b>RK-1</b> rack adapter
Specifications are subject to change without notice at <a href="http://www.kramerav.com">www.kramerav.com</a>	

To achieve specified extension distances, use the recommended Kramer cables available at [www.kramerav.com/product/VS-62H](http://www.kramerav.com/product/VS-62H)

# Default Communication Parameters

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

# Default EDID

## Monitor

Model name..... VS-62H  
 Manufacturer..... KMR  
 Plug and Play ID..... KMR0200  
 Serial number..... 1  
 Manufacture date..... 2010, ISO week 24  
 Filter driver..... None  
 -----

EDID revision..... 1.3  
 Input signal type..... Digital (DVI)  
 Color bit depth..... Undefined  
 Display type..... RGB color  
 Screen size..... 700 x 390 mm (31.5 in)  
 Power management..... Not supported  
 Extension blocs..... 1 (CEA-EXT)  
 -----

DDC/CI..... n/a

## Color characteristics

Default color space..... Non-sRGB  
 Display gamma..... 2.20  
 Red chromaticity..... Rx 0.640 - Ry 0.341  
 Green chromaticity..... Gx 0.286 - Gy 0.610  
 Blue chromaticity..... Bx 0.146 - By 0.069  
 White point (default).... Wx 0.284 - Wy 0.293  
 Additional descriptors... None

## Timing characteristics

Horizontal scan range.... 31-94kHz  
 Vertical scan range..... 50-85Hz  
 Video bandwidth..... 170MHz  
 CVT standard..... Not supported  
 GTF standard..... Not supported  
 Additional descriptors... None  
 Preferred timing..... Yes  
 Native/preferred timing.. 1280x720p at 60Hz  
 Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 746 +hsync -vsync  
 Detailed timing #1..... 1920x1080p at 60Hz (16:9)  
 Modeline..... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync

## Standard timings supported

720 x 400p at 70Hz - IBM VGA  
 720 x 400p at 88Hz - IBM XGA2  
 640 x 480p at 60Hz - IBM VGA  
 640 x 480p at 67Hz - Apple Mac II  
 640 x 480p at 72Hz - VESA  
 640 x 480p at 75Hz - VESA  
 800 x 600p at 56Hz - VESA  
 800 x 600p at 60Hz - VESA  
 800 x 600p at 72Hz - VESA  
 800 x 600p at 75Hz - VESA  
 832 x 624p at 75Hz - Apple Mac II  
 1024 x 768i at 87Hz - IBM  
 1024 x 768p at 60Hz - VESA  
 1024 x 768p at 70Hz - VESA  
 1024 x 768p at 75Hz - VESA  
 1280 x 1024p at 75Hz - VESA  
 1152 x 870p at 75Hz - Apple Mac II  
 1280 x 720p at 60Hz - VESA STD  
 1280 x 800p at 60Hz - VESA STD  
 1440 x 900p at 60Hz - VESA STD  
 1280 x 960p at 60Hz - VESA STD  
 1280 x 1024p at 60Hz - VESA STD  
 1400 x 1050p at 60Hz - VESA STD  
 1680 x 1050p at 60Hz - VESA STD  
 1600 x 1200p at 60Hz - VESA STD

## EIA/CEA-861 Information

Revision number..... 3  
 IT underscan..... Not supported  
 Basic audio..... Supported  
 YCbCr 4:4:4..... Supported  
 YCbCr 4:2:2..... Supported  
 Native formats..... 1  
 Detailed timing #1..... 720x480p at 60Hz (4:3)  
 Modeline..... "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync  
 Detailed timing #2..... 1920x1080i at 60Hz (16:9)  
 Modeline..... "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync  
 Detailed timing #3..... 1920x1080i at 50Hz (16:9)  
 Modeline..... "1920x1080" 74.250 1920 2448 2492 2640 1080 1084 1094 1124 interlace +hsync +vsync

```

Detailed timing #4..... 1280x720p at 60Hz (16:9)
  Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
Detailed timing #5..... 1280x720p at 50Hz (16:9)
  Modeline..... "1280x720" 74.250 1280 1720 1760 1980 720 725 730 750 +hsync +vsync
CE video identifiers (VICs) - timing/formats supported
  720 x 576p at 50Hz - EDTV (4:3, 16:15)
  1280 x 720p at 50Hz - HDTV (16:9, 1:1)
  1920 x 1080i at 60Hz - HDTV (16:9, 1:1)
  1920 x 1080i at 50Hz - HDTV (16:9, 1:1)
  1280 x 720p at 60Hz - HDTV (16:9, 1:1) [Native]
  1920 x 1080p at 60Hz - HDTV (16:9, 1:1)
  1920 x 1080p at 50Hz - HDTV (16:9, 1:1)
  NB: NTSC refresh rate = (Hz*1000)/1001
CE audio data (formats supported)
  LPCM 3-channel, 24-bits at 44/48 kHz
CE speaker allocation data
  Channel configuration.... 3.0
  Front left/right..... Yes
  Front LFE..... No
  Front center..... Yes
  Rear left/right..... No
  Rear center..... No
  Front left/right center.. No
  Rear left/right center... No
  Rear LFE..... No
CE vendor specific data (VSDB)
  IEEE registration number. 0x000C03
  CEC physical address..... 1.0.0.0
  Maximum TMDS clock..... 165MHz
Raw data
00,FF,FF,FF,FF,FF,FF,00,2E,4D,00,02,01,00,00,00,18,14,01,03,81,46,27,78,0A,D5,7C,A3,57,49,9C,25,
11,48,4B,FF,FF,80,81,C0,81,00,95,00,81,40,81,80,90,40,B3,00,A9,40,01,1D,00,72,51,D0,1A,20,6E,28,
55,00,7E,88,42,00,00,1A,02,3A,80,18,71,38,2D,40,58,2C,45,00,C4,8E,21,00,00,1E,00,00,00,FC,00,56,
53,2D,34,32,48,4E,0A,20,20,00,00,00,00,00,00,FD,00,32,55,1F,5E,11,00,0A,20,20,20,20,20,01,7B,
02,03,1A,71,47,11,13,05,14,84,10,1F,23,0A,06,04,83,05,00,00,65,03,0C,00,10,00,8C,0A,D0,8A,20,E0,
2D,10,10,3E,96,00,58,C2,21,00,00,18,01,1D,80,18,71,1C,16,20,58,2C,25,00,C4,8E,21,00,00,9E,01,1D,
80,D0,72,1C,16,20,10,2C,25,80,C4,8E,21,00,00,9E,01,1D,00,72,51,D0,1E,20,6E,28,55,00,C4,8E,21,00,
00,1E,01,1D,00,BC,52,D0,1E,20,B8,28,55,40,C4,8E,21,00,00,1E,00,00,00,00,00,00,00,00,00,00,90

```

# Protocol 3000

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

## Understanding Protocol 3000

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

- **Command format:**

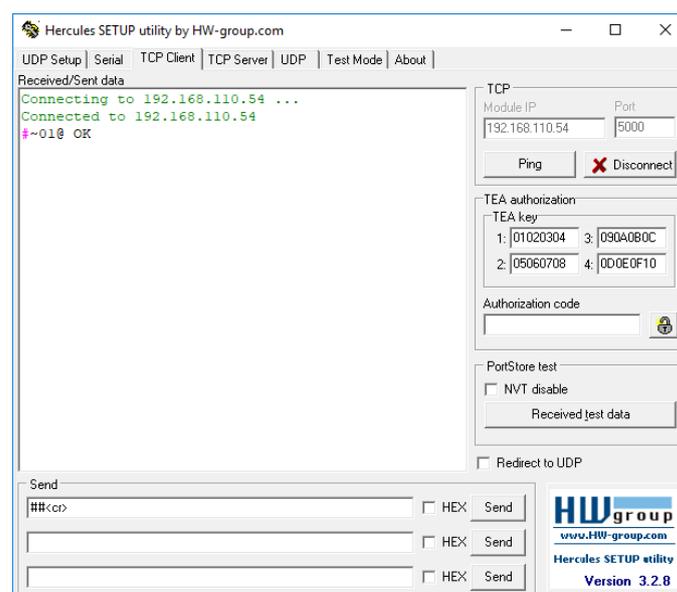
Prefix	Command Name	Constant (Space)	Parameter(s)	Suffix
#	Command	_	Parameter	<CR>

- **Feedback format:**

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

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

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



# Protocol 3000 Commands

Function	Description	Syntax	Parameters/Attributes	Example
#	<p>Protocol handshaking.</p> <p>① Validates the Protocol 3000 connection and gets the machine number.</p> <p>Step-in master products use this command to identify the availability of a device.</p>	<b>COMMAND</b> #<CR> <b>FEEDBACK</b> ~nn@_OK<CR><LF>		#<CR>
AV-SW-MODE	Set input auto switch mode (per output).	<b>COMMAND</b> #AV-SW-MODE_ <u>layer</u> , <u>output_id</u> , <u>mode</u> <CR> <b>FEEDBACK</b> ~nn@AV-SW-MODE_ <u>layer</u> , <u>output_id</u> , <u>mode</u> <CR><LF>	<b>layer</b> – Layer Enumeration 1 – Video 2 – Audio 3 – Data 4 – IR 5 – USB <b>output_id</b> – 1 to number of system outputs <b>mode</b> – 0 – manual 1 – priority switch 2 – last connected switch	#AV-SW-MODE?_ <u>1</u> , <u>2</u> <CR>
AV-SW-MODE?	Get input auto switch mode (per output).	<b>COMMAND</b> #AV-SW-MODE?_ <u>layer</u> , <u>output_id</u> <CR> <b>FEEDBACK</b> ~nn@AV-SW-MODE_ <u>layer</u> , <u>output_id</u> , <u>mode</u> <CR><LF>	<b>layer</b> – Layer Enumeration 1 – Video 2 – Audio 3 – Data 4 – IR 5 – USB <b>output_id</b> – 1 to number of system outputs <b>mode</b> – 0 – manual 1 – priority switch 2 – last connected switch	Get the input audio switch mode for HDBT Out: #AV-SW-MODE?_ <u>1</u> , <u>1</u> <CR>
BAUD	<p>Set protocol serial port baud rate.</p> <p>① 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>	<b>COMMAND</b> #BAUD_ <u>baud_rate</u> <CR> <b>FEEDBACK</b> ~nn@BAUD_ <u>baud_rate</u> <CR><LF> Option 1: ~nn@BAUD_ <u>current_baud_rate</u> <CR><LF> Option 2: ~nn@BAUD_ <u>baud_rate1</u> , <u>baud_rate2</u> ,...<CR><LF>	<b>baud_rate</b> – 9600 / 115200 / else - new baud rate to set <b>current_baud_rate</b> – 9600 / 115200 / else - current protocol serial port baud rate <b>baud_param</b> – 0 - get the list of supported baud rates <b>baud_rate1</b> , <b>baud_rate2</b> , ... – List of supported baud rates	#BTN_ <u>1</u> , <u>0</u> <CR>
BAUD?	<p>Get protocol serial port baud rate.</p> <p>(Option 1 - for current baud rate, . Option 2 - for list of supported baud rates).</p> <p>① 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>	<b>COMMAND</b> #BAUD?_ <u>1</u> <CR> #BAUD?_ <u>1</u> , <u>baud_param</u> <CR> <b>FEEDBACK</b> ~nn@BAUD_ <u>baud_rate</u> <CR><LF> Option 1: ~nn@BAUD_ <u>current_baud_rate</u> <CR><LF> Option 2: ~nn@BAUD_ <u>baud_rate1</u> , <u>baud_rate2</u> ,...<CR><LF>	<b>baud_rate</b> – 9600 / 115200 / else - new baud rate to set <b>current_baud_rate</b> – 9600 / 115200 / else - current protocol serial port baud rate <b>baud_param</b> – 0 - get the list of supported baud rates <b>baud_rate1</b> , – <b>Baud_rate2</b> , ... - list of supported baud rates	#BTN?_ <u>1</u> <CR>
BTN	<p>Set module state.</p> <p>① 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>	<b>COMMAND</b> #BTN_ <u>button_num</u> , <u>mode</u> <CR> <b>FEEDBACK</b> ~nn@BTN_ <u>button_num</u> , <u>mode</u> <CR><LF>	<b>button_num</b> – Button number (0...n) <b>mode</b> – 0 – mute 1 – active, 255 (0xFF) - pending (request step in) (Get command only) 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. An ECHO-ED notification happens only when a button becomes active	#BTN_ <u>1</u> , <u>0</u> <CR>

Function	Description	Syntax	Parameters/Attributes	Example
<b>BTN?</b>	<p>Get module state.</p> <p>① 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><b>COMMAND</b></p> <pre>#BTN?_button_num&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@BTN_button_num,mode&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>button_num</b> – Button number (0...n)</p> <p><b>mode</b> –</p> <ul style="list-style-type: none"> <li>0 – mute</li> <li>1 – active, 255 (0xFF) - pending (request step in) (Get command only)</li> </ul> <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>	<pre>#BTN?_1&lt;CR&gt;</pre>
<b>BUILD-DATE?</b>	<p>Get device build date.</p>	<p><b>COMMAND</b></p> <pre>#BUILD-DATE?_&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@BUILD-DATE_date,time&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>date</b> – Format: YYYY/MM/DD where</p> <ul style="list-style-type: none"> <li>YYYY = Year</li> <li>MM = Month</li> <li>DD = Day</li> </ul> <p><b>time</b> – Format: hh:mm:ss where</p> <ul style="list-style-type: none"> <li>hh = hours</li> <li>mm = minutes</li> <li>ss = seconds</li> </ul>	<p>Get the device build date:</p> <pre>#BUILD-DATE?&lt;CR&gt;</pre>
<b>CPEDID</b>	<p>Copy EDID data from the output to the input EEPROM.</p> <p>① Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word).</p> <p>Example: bitmap 0x0013 means inputs 1,2 and 5 are loaded with the new EDID.</p> <p>In certain products Safe_mode is an optional parameter. See the HELP command for its availability.</p>	<p><b>COMMAND</b></p> <pre>#CPEDID_src_type,src_id,dst_type,dest_bitmap&lt;CR&gt;</pre> <p>or</p> <pre>#CPEDID_src_type,src_id,dst_type,dest_bitmap,safe_mode&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@CPEDID_src_stg,src_id,dst_type,dest_bitmap&lt;CR&gt;&lt;LF&gt;</pre> <pre>~nn@CPEDID_src_stg,src_id,st_type,dest_bitmap,safe_mode&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>src_type</b> – EDID source type (usually output)</p> <ul style="list-style-type: none"> <li>0 – Input</li> <li>1 – Output</li> <li>2 – Default EDID</li> <li>3 – Custom EDID</li> </ul> <p><b>src_id</b> – Number of chosen source stage</p> <ul style="list-style-type: none"> <li>0 – Default EDID source</li> <li>1 – Output 1</li> <li>2 – Output 2</li> </ul> <p><b>dst_type</b> – EDID destination type (usually input)</p> <ul style="list-style-type: none"> <li>0 – Input</li> <li>1 – Output</li> <li>2 – Default EDID</li> <li>3 – Custom EDID</li> </ul> <p><b>dest_bitmap</b> – Bitmap representing destination IDs. Format: XXXX...X, where X is hex digit. The binary form of every hex digit represents corresponding destinations.</p> <ul style="list-style-type: none"> <li>0 – indicates that EDID data is not copied to this destination.</li> <li>1 – indicates that EDID data is copied to this destination.</li> </ul> <p><b>safe_mode</b> –</p> <ul style="list-style-type: none"> <li>0 – device accepts the EDID as is without trying to adjust</li> <li>1 – device tries to adjust the EDID (default value if no parameter is sent)</li> </ul>	<p>Copy the EDID data from the Output 1 (EDID source) to the Input:</p> <pre>#CPEDID_1,1,0,0x1&lt;CR&gt;</pre> <p>Copy the EDID data from the default EDID source to the Input:</p> <pre>#CPEDID_2,0,0,0x1&lt;CR&gt;</pre>

Function	Description	Syntax	Parameters/Attributes	Example
DEF-RES	<p>Set custom defined scaled video output resolution to ID index.</p> <p><b>i</b> If a requested custom resolution is not defined, yet is in the device, it returns ERRSP003 (out of range).</p> <p>Only indexes 100-104 are valid for custom defined resolution.</p>	<p><b>COMMAND</b></p> <pre>#DEF-RES,Table_id,Width,Height,Htotal,VTotal,HSyncW,HSyncB,ackPorch,VSyncW,VSyncBackPorch,FrRate,Interlaced&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@DEF-RES,Table_id,Width,Height,Htotal,VTotal,HSyncW,HSyncB,ackPorch,VSyncW,VSyncBackPorch,FrRate,Interlaced&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>Table_id</b> – Index in resolution table</p> <p>0=No Signal (for input) / Native – EDID (for output)</p> <p>1=640x480p@59.94Hz/60Hz</p> <p>2=720x480p@59.94Hz/60Hz</p> <p>3=720x480p@59.94Hz/60Hz</p> <p>4=1280x720p@59.94Hz/60Hz</p> <p>5=1920x1080i@59.94Hz/60Hz</p> <p>6=720(1440)x480i@59.94Hz/60Hz</p> <p>7=720(1440)x480i@59.94Hz/60Hz</p> <p>8=720(1440)x240p@59.94Hz/60Hz</p> <p>9=720(1440)x240p@59.94Hz/60Hz</p> <p>10=2880x480i@59.94Hz/60Hz</p> <p>11=2880x480i@59.94Hz/60Hz</p> <p>12=2880x240p@59.94Hz/60Hz</p> <p>13=2880x240p@59.94Hz/60Hz</p> <p>14=1440x480p@59.94Hz/60Hz</p> <p>15=1440x480p@59.94Hz/60Hz</p> <p>16=1920x1080p@59.94Hz/60Hz</p> <p>17=720x576p@50Hz</p> <p>18=720x576p@50Hz</p> <p>19=1280x720p@50Hz</p> <p>20=1920x1080i@50Hz</p> <p>21=720(1440)x576i@50Hz</p> <p>22=720(1440)x576i@50Hz</p> <p>23=720(1440)x288p@50Hz</p> <p>24=720(1440)x288p@50Hz</p> <p>25=2880x576i@50Hz</p> <p>26=2880x576i@50Hz</p> <p>27=2880x288p@50Hz</p> <p>28=2880x288p@50Hz</p> <p>29=1440x576p@50Hz</p> <p>30=1440x576p@50Hz</p> <p>31=1920x1080p@50Hz</p> <p>32=1920x1080p@23.97Hz/24Hz</p> <p>33=1920x1080p@25Hz</p> <p>34=1920x1080p@29.97Hz/30Hz</p> <p>35=2880x480p@59.94Hz/60Hz</p> <p>36=2880x480p@59.94Hz/60Hz</p> <p>37=2880x576p@50Hz</p> <p>38=2880x576p@50Hz</p> <p>39=1920x1080i@50Hz</p> <p>40=1920x1080i@100Hz</p> <p>41=1280x720p@100Hz</p> <p>42=720x576p@100Hz</p> <p>43=720x576p@100Hz</p> <p>44=720(1440)x576i@100Hz</p> <p>45=720(1440)x576i@100Hz</p> <p>46=1920x1080i@119.88/120Hz</p> <p>47=1280x720p@119.88/120Hz</p> <p>48=720x480p@119.88/120Hz</p> <p>49=720x480p@119.88/120Hz</p> <p>50=720(1440)x480i@119.88/120Hz</p> <p>51=720(1440)x480i@119.88/120Hz</p> <p>52=720x576p@200Hz</p> <p>53=720x576p@200Hz</p> <p>54=720(1440)x576i@200Hz</p> <p>55=720(1440)x576i@200Hz</p> <p>56=720x480p@239.76/240Hz</p> <p>57=720x480p@239.76/240Hz</p> <p>58=720(1440)x480i@239.76/240Hz</p> <p>59=720(1440)x480i@239.76/240Hz</p> <p>60=1280x720p@23.97Hz/24Hz</p> <p>61=1280x720p@25Hz</p> <p>62=1280x720p@29.97Hz/30Hz</p> <p>63=1920x1080p@119.88/120Hz</p> <p>64=1920x1080p@100Hz</p> <p>65=800x600p@60Hz</p> <p>66-99=(Reserved)</p> <p>100=Custom resolution 1</p> <p>101=Custom resolution 2</p> <p>102=Custom resolution 3</p> <p>103=Custom resolution 4</p> <p>104=Custom resolution 5</p> <p>105-254=(Reserved)</p> <p>*Valid indexes for SET are 100-104 only</p> <p><b>Custom</b> – Resolution parameters - by name (self-explanatory), numeric value</p> <p><b>Interlaced</b> – Interlaced/progressive according to On/Off ("ON"- I, "OFF" - P)</p> <p><b>Stage</b> – Input/Output</p> <p>0=Input</p> <p>1=Output</p> <p><b>Stage_id</b> – Number of chosen stage (1...max number of inputs/outputs)</p>	

Function	Description	Syntax	Parameters/Attributes	Example
DEF-RES?	<p>Get custom defined video resolution.</p> <p>① If a requested custom resolution is not defined, yet is in the device, it returns ERRSP003 (out of range).</p> <p>Only indexes 100-104 are valid for custom defined resolution.</p> <p>In Get command when sending:</p> <p>index 0 - device replies with detailed info of native resolution.</p> <p>index 255 - device replies with detailed info of current resolution.</p>	<p><b>COMMAND</b></p> <p>#DEF-RES?_Table_id,stage,stage_id&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@DEF-RES_Table_id,Width,Height,Htotal,VTotal,#SyncW,#SyncBackPorch,VSyncW,VSyncBackPorch,FrRate,Interlaced&lt;CR&gt;&lt;LF&gt;</p>	<p><b>Table_id</b> – Index in resolution table</p> <p>0=No Signal (for input) / Native – EDID (for output)</p> <p>1=640x480p@59.94Hz/60Hz</p> <p>2=720x480p@59.94Hz/60Hz</p> <p>3=720x480p@59.94Hz/60Hz</p> <p>4=1280x720p@59.94Hz/60Hz</p> <p>5=1920x1080i@59.94Hz/60Hz</p> <p>6=720(1440)x480i@59.94Hz/60Hz</p> <p>7=720(1440)x480i@59.94Hz/60Hz</p> <p>8=720(1440)x240p@59.94Hz/60Hz</p> <p>9=720(1440)x240p@59.94Hz/60Hz</p> <p>10=2880x480i@59.94Hz/60Hz</p> <p>11=2880x480i@59.94Hz/60Hz</p> <p>12=2880x240p@59.94Hz/60Hz</p> <p>13=2880x240p@59.94Hz/60Hz</p> <p>14=1440x480p@59.94Hz/60Hz</p> <p>15=1440x480p@59.94Hz/60Hz</p> <p>16=1920x1080p@59.94Hz/60Hz</p> <p>17=720x576p@50Hz</p> <p>18=720x576p@50Hz</p> <p>19=1280x720p@50Hz</p> <p>20=1920x1080i@50Hz</p> <p>21=720(1440)x576i@50Hz</p> <p>22=720(1440)x576i@50Hz</p> <p>23=720(1440)x288p@50Hz</p> <p>24=720(1440)x288p@50Hz</p> <p>25=2880x576i@50Hz</p> <p>26=2880x576i@50Hz</p> <p>27=2880x288p@50Hz</p> <p>28=2880x288p@50Hz</p> <p>29=1440x576p@50Hz</p> <p>30=1440x576p@50Hz</p> <p>31=1920x1080p@50Hz</p> <p>32=1920x1080p@23.97Hz/24Hz</p> <p>33=1920x1080p@25Hz</p> <p>34=1920x1080p@29.97Hz/30Hz</p> <p>35=2880x480p@59.94Hz/60Hz</p> <p>36=2880x480p@59.94Hz/60Hz</p> <p>37=2880x576p@50Hz</p> <p>38=2880x576p@50Hz</p> <p>39=1920x1080i@50Hz</p> <p>40=1920x1080i@100Hz</p> <p>41=1280x720p@100Hz</p> <p>42=720x576p@100Hz</p> <p>43=720x576p@100Hz</p> <p>44=720(1440)x576i@100Hz</p> <p>45=720(1440)x576i@100Hz</p> <p>46=1920x1080i@119.88/120Hz</p> <p>47=1280x720p@119.88/120Hz</p> <p>48=720x480p@119.88/120Hz</p> <p>49=720x480p@119.88/120Hz</p> <p>50=720(1440)x480i@119.88/120Hz</p> <p>51=720(1440)x480i@119.88/120Hz</p> <p>52=720x576p@200Hz</p> <p>53=720x576p@200Hz</p> <p>54=720(1440)x576i@200Hz</p> <p>55=720(1440)x576i@200Hz</p> <p>56=720x480p@239.76/240Hz</p> <p>57=720x480p@239.76/240Hz</p> <p>58=720(1440)x480i@239.76/240Hz</p> <p>59=720(1440)x480i@239.76/240Hz</p> <p>60=1280x720p@23.97Hz/24Hz</p> <p>61=1280x720p@25Hz</p> <p>62=1280x720p@29.97Hz/30Hz</p> <p>63=1920x1080p@119.88/120Hz</p> <p>64=1920x1080p@100Hz</p> <p>65=800x600p@60Hz</p> <p>66-99=(Reserved)</p> <p>100=Custom resolution 1</p> <p>101=Custom resolution 2</p> <p>102=Custom resolution 3</p> <p>103=Custom resolution 4</p> <p>104=Custom resolution 5</p> <p>105-254=(Reserved)</p> <p>*Valid indexes for SET are 100-104 only</p> <p><b>Custom</b> – Resolution parameters - by name (self-explanatory), numeric value</p> <p><b>Interlaced</b> – Interlaced/progressive according to On/Off ("ON"- I, "OFF" - P)</p> <p><b>Stage</b> – Input/Output</p> <p>0=Input</p> <p>1=Output</p> <p><b>Stage_id</b> – Number of chosen stage (1...max number of inputs/outputs)</p>	
DEL	Delete file.	<p><b>COMMAND</b></p> <p>#DEL_file_name&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@DEL_file_name&lt;CR&gt;&lt;LF&gt;</p>	<p><b>file_name</b> – Name of file to delete (file names are case-sensitive)</p>	Delete the Room1Config file: #DEL_Room1Config<CR>
DIR	List files in device.	<p><b>COMMAND</b></p> <p>#DIR&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>Multi-line:</p> <p>~nn@DIR&lt;CR&gt;&lt;LF&gt;</p> <p>file_name TABfile_size_bytes,ID:_file_id&lt;CR&gt;&lt;LF&gt;</p> <p>TABfree_size_bytes.&lt;CR&gt;&lt;LF&gt;</p>	<p><b>file_name</b> – Name of file</p> <p><b>file_size</b> – File size in bytes. A file can take more space on device memory</p> <p><b>file_id</b> – Internal ID for file in file system</p> <p><b>free_size</b> – Free space in bytes in device file system</p>	#DIR<CR>

Function	Description	Syntax	Parameters/Attributes	Example
DISPLAY?	Get output HPD status.	<b>COMMAND</b> #DISPLAY?_out_id<CR> <b>FEEDBACK</b> ~nn@DISPLAY_out_id,status<CR><LF>	<b>out_id</b> – Output number 1 – Output 1 2 – Output 2 <b>status</b> – HPD status according to signal validation 0 – Signal or sink is not valid 1 – Signal or sink is valid 2 – Sink and EDID is valid	Get the output HPD status of Output 1: #DISPLAY?_1<CR>
DPSW-STATUS?	Get the DIP-switch state.	<b>COMMAND</b> #DPSW-STATUS?_dp_sw_id<CR> <b>FEEDBACK</b> ~nn@DPSW-STATUS_dp_sw_id,status<CR><LF>	<b>dp_sw_id</b> – 1 to number of DIP switches <b>status</b> – Up/down 0 – up 1 – down	get the DIP-switch 2 status: #DPSW-STATUS?_2<CR>
ETH-PORT	Set Ethernet port protocol.	<b>COMMAND</b> #ETH-PORT_portType,ETHPort<CR> <b>FEEDBACK</b> ~nn@ETH-PORT_portType,ETHPort<CR><LF>	<b>portType</b> – TCP/UDP <b>ETHPort</b> – TCP/UDP port number	Set the Ethernet port protocol for TCP to port 12457: #ETH-PORT_0,12457<CR>
ETH-PORT?	Get Ethernet port protocol.	<b>COMMAND</b> #ETH-PORT?_portType<CR> <b>FEEDBACK</b> ~nn@ETH-PORT_portType,ETHPort<CR><LF>	<b>portType</b> – TCP/UDP 0 – TCP 1 – UDP <b>ETHPort</b> – TCP / UDP port number (0 – 65534)	Get the Ethernet port protocol for UDP: #ETH-PORT?_1<CR>
FACTORY	Reset device to factory default configuration. ⓘ This command deletes all user data from the device. The deletion can take some time. Your device may require powering off and powering on for the changes to take effect.	<b>COMMAND</b> #FACTORY<CR> <b>FEEDBACK</b> ~nn@FACTORY_OK<CR><LF>		Reset the device to factory default configuration: #FACTORY<CR>
FCT-MAC	Set MAC address. ⓘ To activate the change, reset the device.	<b>COMMAND</b> #FCT-MAC_mac_address<CR> <b>FEEDBACK</b> ~nn@FCT-MAC_mac_address<CR><LF>	<b>mac_address</b> – Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is a hex digit	
FCT-MODEL	Set model name. ⓘ Used where a single firmware file is adaptable for many devices, but the user needs to know (by protocol) which specific model is used.	<b>COMMAND</b> #FCT-MODEL_model_name<CR> <b>FEEDBACK</b> ~nn@FCT-MODEL_model_name<CR><LF>	<b>model_name</b> – String of printable ASCII chars (up to 19 chars)	
FCT-SN	Set serial number.	<b>COMMAND</b> #FCT-SN_serial_number<CR> <b>FEEDBACK</b> ~nn@FCT-SN_serial_number<CR><LF>	<b>serial_number</b> – 14 decimal digits	
FORMAT	Format file system. ⓘ Response could take several seconds until formatting completes.	<b>COMMAND</b> #FORMAT<CR> <b>FEEDBACK</b> ~nn@FORMAT_OK<CR><LF>		#FORMAT<CR>
FS-FREE?	Get file system free space.	<b>COMMAND</b> #FS-FREE?_<CR> <b>FEEDBACK</b> ~nn@FS_FREE_free_size<CR><LF>	<b>free_size</b> – Free size in device file system in bytes	#FS-FREE?_<CR>
GEDID	Get EDID support on certain input/output. ⓘ For old devices that do not support this command, ~nn@ERR 002<CR><LF> is received.	<b>COMMAND</b> #GEDID_stage,stage_id<CR> <b>FEEDBACK</b> ~nn@GEDID_stage,stage_id,size<CR><LF>	<b>stage</b> – Input/Output 0 – Input 1 – Output 2 – Default EDID 3 – Custom EDID <b>stage_id</b> – Number of chosen stage (1 to max number of inputs/outputs) <b>size</b> – Size of data to be sent from device, 0 means no EDID support	Get EDID support information for input 1: #GEDID_0,1<CR>
GET	Get file.	<b>COMMAND</b> #GET_file_name<CR> <b>FEEDBACK</b> Multi-line: ~nn@GET_file_name,file_size_READY<CR><LF> contents ~nn@GET_file_name_OK<CR><LF>	<b>file_name</b> – Name of file to get contents <b>contents</b> – Byte stream of file contents <b>file_size</b> – Size of file (device sends it in response to give user a chance to get ready)	#GET_file_response.dat<CR>
HDCCP-MOD	Set HDCP mode. ⓘ Set HDCP working mode on the device input. HDCP supported - HDCP_ON [default]. HDCP not supported - HDCP OFF. HDCP support changes following detected sink - MIRROR OUTPUT.	<b>COMMAND</b> #HDCCP-MOD_inp_id,mode<CR> <b>FEEDBACK</b> ~nn@HDCCP-MOD_inp_id,mode<CR><LF>	<b>inp_id</b> – Input number: 1 – IN 1 2 – IN 2 3 – IN 3 4 – IN 4 5 – IN 5 6 – IN 6 7 – IN 7 8 – IN 8 <b>mode</b> – HDCP mode: 0 – HDCP Off 1 – HDCP On	Set the input HDCP-MODE of IN 1 to Off: #HDCCP-MOD_1,0<CR>

Function	Description	Syntax	Parameters/Attributes	Example										
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>	<p><b>COMMAND</b></p> <pre>#HDCP-MOD?_inp_id&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@HDCP-MOD,_inp_id,mode&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>inp_id</b> – Input number:</p> <p>1 – IN 1 2 – IN 2 3 – IN 3 4 – IN 4 5 – IN 5 6 – IN 6 7 – IN 7 8 – IN 8</p> <p><b>mode</b> – HDCP mode:</p> <p>0 – HDCP Off 1 – HDCP On</p>	<p>Get the input HDCP-MODE of IN 1:</p> <pre>#HDCP-MOD?_1&lt;CR&gt;</pre>										
HDCP-STAT?	<p>Get HDCP signal status.</p> <p>① On output – sink status.</p> <p>On input – signal status.</p>	<p><b>COMMAND</b></p> <pre>#HDCP-STAT?_stage,stage_id&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@HDCP-STAT,_stage,stage_id,status&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>stage</b> – Input/Output</p> <p>0 – Input 1 – Output</p> <p><b>stage_id</b> – Number of chosen stage (1 to max number of inputs/outputs)</p> <p><b>status</b> – Signal encryption status - valid values On/Off</p> <p>0 – HDCP Off 1 – HDCP On 2 – Follow input 3 – Mirror output ("MAC mode")</p>	<p>Get the output HDCP-STATUS of IN 1:</p> <pre>#HDCP-STAT?_0,1&lt;CR&gt;</pre>										
HELP	<p>Get command list or help for specific command.</p>	<p><b>COMMAND</b></p> <pre>#HELP&lt;CR&gt;</pre> <pre>#HELP,_command_name&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <p>1. Multi-line:</p> <pre>~nn@Device,_command,_command..&lt;CR&gt;&lt;LF&gt;</pre> <p>To get help for command use: HELP (COMMAND_NAME)&lt;CR&gt;&lt;LF&gt;</p> <pre>~nn@HELP,_command:&lt;CR&gt;&lt;LF&gt;</pre> <pre>description&lt;CR&gt;&lt;LF&gt;</pre> <pre>USAGE: usage&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>command</b> – Name of a specific command</p>	<p>Get the command list:</p> <pre>#HELP&lt;CR&gt;</pre> <p>To get help for AV-SW-TIMEOUT:</p> <pre>HELP_AV-SW-TIMEOUT&lt;CR&gt;</pre>										
LDEDID	<p>Write EDID data from external application to device.</p> <p>① When the unit receives the LDEDID command it replies with READY and enters the special EDID packet wait mode. In this mode the unit can receive only packets and not regular protocol commands.</p> <p>If the unit does not receive correct packets for 30 seconds or is interrupted for more than 30 seconds before receiving all packets, it sends timeout error ~nn@LDEDID_ERR01&lt;CR&gt;&lt;LF&gt; and returns to the regular protocol mode. If the unit received data that is not a correct packet, it sends the corresponding error and returns to the regular protocol mode.</p>	<p><b>COMMAND</b></p> <p>Multi-step syntax</p> <p><b>FEEDBACK</b></p> <p>Step 1:</p> <pre>#LDEDID_dst_type,dest_bitmask,size,safe_mode&lt;CR&gt;</pre> <p>Response 1:</p> <pre>~nn@LDEDID,_dst_type,dest_bitmask,size,safe_mode_READY&lt;CR&gt;&lt;LF&gt;</pre> <p>or</p> <pre>~nn@LDEDID_ERRnn&lt;CR&gt;&lt;LF&gt;</pre> <p>Step 2: If ready was received, send EDID_DATA</p> <p>Response 2:</p> <pre>~nn@LDEDID_dst_type,dest_bitmask,size,safe_mode_OK&lt;CR&gt;&lt;LF&gt;</pre> <p>or</p> <pre>~nn@LDEDID_ERRnn&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>dst_type</b> – EDID destination type (usually input)</p> <p>0 – Input 1 – Output 2 – Default EDID 3 – Custom EDID</p> <p><b>dest_bitmask</b> – Bitmap representing destination IDs. Format: 0x*****, where * is ASCII presentation of hex digit. The binary presentation of this number is a bit mask for destinations. Setting '1' means EDID data has to be copied to this destination</p> <p><b>size</b> – EDID data size</p> <p><b>safe_mode</b> –</p> <p>0 – Device accepts the EDID as is without trying to adjust</p> <p>1 – Device tries to adjust the EDID</p> <p><b>EDID_DATA</b> – Data in protocol packets</p> <p><b>Using the Packet Protocol</b></p> <p>Send a command: LDRV, LOAD, IROUT, LDEDID</p> <p>Receive Ready or ERR###</p> <p>If Ready:</p> <ol style="list-style-type: none"> <li>Send a packet,</li> <li>Receive OK on the last packet,</li> <li>Receive OK for the command</li> </ol> <p>Packet structure:</p> <p><b>Packet ID</b> (1, 2, 3...) (2 bytes in length)</p> <p><b>Length</b> (data length + 2 for CRC) – (2 bytes in length)</p> <p><b>Data</b> (data length - 2 bytes)</p> <p><b>CRC</b> – 2 bytes</p> <table border="1"> <thead> <tr> <th>01</th> <th>02</th> <th>03</th> <th>04</th> <th>05</th> </tr> </thead> <tbody> <tr> <td>Packet ID</td> <td>Length</td> <td>Data</td> <td>CRC</td> <td></td> </tr> </tbody> </table> <p>5. Response:</p> <pre>~NNNN_OK&lt;CR&gt;&lt;LF&gt;</pre> <p>(Where <b>NNNN</b> is the received packet ID in ASCII hex digits.)</p>	01	02	03	04	05	Packet ID	Length	Data	CRC		<p>Write the EDID data from an external application to the HDMI In 1 input without adjustment attempts:</p> <pre>#LDEDID_0,0x1,2340,0&lt;CR&gt;</pre> <p>&gt;</p> <p>Write the EDID data from an external application to HDMI In 1 and PC In inputs with adjustment attempts:</p> <pre>#LDEDID_0,0x5,2340,1&lt;CR&gt;</pre> <p>&gt;</p>
01	02	03	04	05										
Packet ID	Length	Data	CRC											

Function	Description	Syntax	Parameters/Attributes	Example												
LDFPGA	Load new FPGA file.	<b>COMMAND</b> Step 1: #LDFPGA_size,CRC,fpga_id,force<CR> Step 2: If ready was received, send FPGA_DATA <b>FEEDBACK</b> Response 1: ~nn@LDFPGA_size_READY<CR><LF> or ~nn@LDFW_ERRnn<CR><LF> Response 2: ~nn@LDFPGA_size_OK<CR><LF>	size – Size of firmware data that is sent CRC – FPGA file CRC The polynomial for the 16-bit CRC is: CRC-CCITT: 0x1021 = x16 + x12 + x5 + 1 Initial value: 0000 Final XOR Value: 0 For a code example, see: <a href="http://sanity-free.org/133/crc_16_ccitt_in_csharp.html">http://sanity-free.org/133/crc_16_ccitt_in_csharp.html</a> CRC example: Data = "123456789" Result => 0x31C3 fpga_id – FPGA ID (if there are more than one). Default - 1 force – 1, ignore CRC calculation FPGA_DATA – *.rbf file in protocol packets <b>Using the Packet Protocol</b> Send a command: LDRV, LOAD, IROUT, LDEDID Receive Ready or ERR### If Ready: a. Send a packet, b. Receive OK on the last packet, c. Receive OK for the command Packet structure: Packet ID (1, 2, 3...) (2 bytes in length) Length (data length + 2 for CRC) – (2 bytes in length) Data (data length -2 bytes) CRC – 2 bytes <table border="1"> <tr> <td>01</td> <td>02</td> <td>03</td> <td>04</td> <td>05</td> <td></td> </tr> <tr> <td>Packet ID</td> <td>Length</td> <td>Data</td> <td>CRC</td> <td></td> <td></td> </tr> </table> 5. Response: ~NNNN_OK<CR><LF> (Where NNNN is the received packet ID in ASCII hex digits.)	01	02	03	04	05		Packet ID	Length	Data	CRC			
01	02	03	04	05												
Packet ID	Length	Data	CRC													
LDFW	Load new firmware file. ⓘ In most devices firmware data is saved to flash memory, but the memory does not update until receiving the "UPGRADE" command and is restarted.	<b>COMMAND</b> Step 1: #LDFW_size<CR> Step 2: If ready was received, send FIRMWARE_DATA <b>FEEDBACK</b> Response 1: ~nn@LDFW_size_READY<CR><LF> or ~nn@LDFW_ERRnn<CR><LF> Response 2: ~nn@LDFW_size_OK<CR><LF>	size – Size of firmware data that is sent FIRMWARE_DATA – HEX or KFW file in protocol packets <b>Using the Packet Protocol</b> Send a command: LDRV, LOAD, IROUT, LDEDID Receive Ready or ERR### If Ready: a. Send a packet, b. Receive OK on the last packet, c. Receive OK for the command Packet structure: Packet ID (1, 2, 3...) (2 bytes in length) Length (data length + 2 for CRC) – (2 bytes in length) Data (data length -2 bytes) CRC – 2 bytes <table border="1"> <tr> <td>01</td> <td>02</td> <td>03</td> <td>04</td> <td>05</td> <td></td> </tr> <tr> <td>Packet ID</td> <td>Length</td> <td>Data</td> <td>CRC</td> <td></td> <td></td> </tr> </table> 5. Response: ~NNNN_OK<CR><LF> (Where NNNN is the received packet ID in ASCII hex digits.)	01	02	03	04	05		Packet ID	Length	Data	CRC			
01	02	03	04	05												
Packet ID	Length	Data	CRC													
LOAD	Load file to device.	<b>COMMAND</b> #LOAD_file_name,size<CR> <b>FEEDBACK</b> Data sending negotiation: * Device - ~01@LOAD_file_name,size_READY<CR><LF> * End User (+Device)- Send file in Protocol Packets * Device - ~01@LOAD_file_name,size_OK<CR><LF>	file_name – Name of file to save on device size – Size of file data that is sent <b>Using the Packet Protocol</b> Send a command: LDRV, LOAD, IROUT, LDEDID Receive Ready or ERR### If Ready: a. Send a packet, b. Receive OK on the last packet, c. Receive OK for the command Packet structure: Packet ID (1, 2, 3...) (2 bytes in length) Length (data length + 2 for CRC) – (2 bytes in length) Data (data length -2 bytes) CRC – 2 bytes <table border="1"> <tr> <td>01</td> <td>02</td> <td>03</td> <td>04</td> <td>05</td> <td></td> </tr> <tr> <td>Packet ID</td> <td>Length</td> <td>Data</td> <td>CRC</td> <td></td> <td></td> </tr> </table> 5. Response: ~NNNN_OK<CR><LF> (Where NNNN is the received packet ID in ASCII hex digits.)	01	02	03	04	05		Packet ID	Length	Data	CRC			Load the file_response.dat file to the device: #LOAD_file_response.dat,5360<CR>
01	02	03	04	05												
Packet ID	Length	Data	CRC													
LOCK-FP	Lock the front panel. ⓘ In NT-52N, this command includes the PortNumber (1-2) parameter.	<b>COMMAND</b> #LOCK-FP_Lock/Unlock<CR> <b>FEEDBACK</b> ~nn@LOCK-FP_Lock/Unlock<CR><LF>	Lock/Unlock – On/Off 0 – Off unlocks EDID 1 – On locks EDID	Unlock front panel: #LOCK-FP_0<CR>												

Function	Description	Syntax	Parameters/Attributes	Example
LOCK-FP?	Get the front panel lock state.  ① In NT-52N, this command includes the PortNumber (1-2) parameter.	<b>COMMAND</b> #LOCK-FP?_<CR> <b>FEEDBACK</b> ~nn@LOCK-FP_<Lock/Unlock><CR><LF>	Lock/Unlock – On/Off 0 – Off unlocks EDID 1 – On locks EDID	#LOCK-FP?_<CR>
LOGIN	Set protocol permission.  ① For devices that support security, LOGIN allows to the user to run commands with an End User or Administrator permission level.  In each device, some connections allow logging in to different levels. Some do not work with security at all.  Connection may logout after timeout.  The permission system works only if security is enabled with the "SECUR" command.	<b>COMMAND</b> #LOGIN_<login_level,password><CR> <b>FEEDBACK</b> ~nn@LOGIN_<login_level,password,>OK<CR><LF> or ~nn@LOGIN_ERR_004<CR><LF> (if bad password entered)	login_level – Level of permissions required (End User or Admin) password – Predefined password (by PASS command). Default password is an empty string	Set the protocol permission level to Admin (when the password defined in the PASS command is 33333): #LOGIN_Admin,33333<CR>
LOGIN?	Get current protocol permission level.  ① For devices that support security, LOGIN allows to the user to run commands with an End User or Administrator permission level.  In each device, some connections allow logging in to different levels. Some do not work with security at all.  Connection may logout after timeout.  The permission system works only if security is enabled with the "SECUR" command.	<b>COMMAND</b> #LOGIN?_<CR> <b>FEEDBACK</b> ~nn@LOGIN_<login_level><CR><LF>	login_level – Level of permissions required (End User or Admin) password – Predefined password (by PASS command). Default password is an empty string	#LOGIN?_<CR>
LOGOUT	Cancel current permission level.  ① Logs out from End User or Administrator permission levels to Not Secure.	<b>COMMAND</b> #LOGOUT<CR> <b>FEEDBACK</b> ~nn@LOGOUT_OK<CR><LF>		#LOGOUT<CR>
MACH-NUM	Set machine number.  ① Some devices do not set the new machine number until the device is restarted.  Some devices can change the machine number only from DIP-switches.	<b>COMMAND</b> #MACH-NUM_<machine_number><CR> <b>FEEDBACK</b> ~nn@MACH-NUM_<machine_number><CR><LF>	machine_number – New device machine number	
MODEL?	Get device model.  ① This command identifies equipment connected to Step-in master products and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests.	<b>COMMAND</b> #MODEL?_<CR> <b>FEEDBACK</b> ~nn@MODEL_<model_name><CR><LF>	model_name – String of up to 19 printable ASCII chars	Get the device model: #MODEL?_<CR>
MTX-MODE	LEGACY COMMAND. Set auto-switch mode.  ① Not recommended for new devices.	<b>COMMAND</b> #MTX-MODE_<output_id,mode><CR> <b>FEEDBACK</b> ~nn@MTX-MODE_<output_id,mode><CR><LF>	output_id – 1 to number of system outputs mode – 0 – manual 1 – auto priority 2 – auto last connected	Set output to last connected: #MTX-MODE_1,2<CR>
MTX-MODE?	LEGACY COMMAND. Get auto-switch mode.  ① Not recommended for new devices.	<b>COMMAND</b> #MTX-MODE?_<output_id><CR> <b>FEEDBACK</b> ~nn@MTX-MODE_<output_id,mode><CR><LF>	output_id – 1 to number of system outputs mode – 0 – manual 1 – auto priority 2 – auto last connected	#MTX-MODE?_?<CR>

Function	Description	Syntax	Parameters/Attributes	Example
<b>NAME</b>	Set machine (DNS) name.  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).	<b>COMMAND</b> #NAME machine_name<CR> <b>FEEDBACK</b> ~nn@NAME machine_name<CR><LF>	machine_name – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end)	Set the DNS name of the device to room-442: #NAME room-442<CR>
<b>NAME?</b>	Get machine (DNS) name.  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).	<b>COMMAND</b> #NAME?<CR> <b>FEEDBACK</b> ~nn@NAME machine_name<CR><LF>	machine_name – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end)	Get the DNS name of the device: #NAME?<CR>
<b>NAME-RST</b>	Reset machine (DNS) name to factory default.  ① Factory default of machine (DNS) name is "KRAMER_" + 4 last digits of device serial number.	<b>COMMAND</b> #NAME-RST<CR> <b>FEEDBACK</b> ~nn@NAME-RST_OK<CR><LF>		Reset the machine name (S/N last digits are 0102): #NAME-RST_KRAMER_0102<CR>
<b>NET-DHCP</b>	Set DHCP mode.  ① Only 1 is relevant for the mode value. To disable DHCP, the user must configure a static IP address for the device. .  Connecting Ethernet to devices with DHCP may take more time in some networks.  To connect with a randomly assigned IP by DHCP, specify the device DNS name (if available) using the <b>NAME</b> command. You can also get an assigned IP by direct connection to USB or RS-232 protocol port, if available.  For proper settings consult your network administrator.  ① For Backward compatibility, the <b>id</b> parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.	<b>COMMAND</b> #NET-DHCP id,mode<CR> <b>FEEDBACK</b> ~nn@NET-DHCP id,mode<CR><LF>	id – Network ID—the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3.... mode – 1 – Try to use DHCP. If unavailable.	Enable DHCP mode for port 1, if available: #NET-DHCP 1,1<CR>
<b>NET-DHCP?</b>	Get DHCP mode.  ① For Backward compatibility, the <b>id</b> parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.	<b>COMMAND</b> #NET-DHCP? id<CR> <b>FEEDBACK</b> ~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 <b>NET-IP</b> or <b>NET-CONFIG</b> command. 1 – Try to use DHCP. If unavailable, use the IP set by the factory or using the <b>NET-IP</b> or <b>NET-CONFIG</b> command.	Get DHCP mode for port 1: #NET-DHCP? 1<CR>
<b>NET-GATE</b>	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.	<b>COMMAND</b> #NET-GATE ip_address<CR> <b>FEEDBACK</b> ~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>>
<b>NET-GATE?</b>	Get gateway IP.  ① A network gateway connects the device via another network and maybe over the Internet. Be aware of security problems.	<b>COMMAND</b> #NET-GATE?<CR> <b>FEEDBACK</b> ~nn@NET-GATE ip_address<CR><LF>	ip_address – Format: xxx.xxx.xxx.xxx	Get the gateway IP address: #NET-GATE?<CR>
<b>NET-IP</b>	Set IP address.  ① For proper settings consult your network administrator.	<b>COMMAND</b> #NET-IP ip_address<CR> <b>FEEDBACK</b> ~nn@NET-IP ip_address<CR><LF>	ip_address – Format: xxx.xxx.xxx.xxx	Set the IP address to 192.168.1.39: #NET-IP 192.168.001.039<CR>

Function	Description	Syntax	Parameters/Attributes	Example
NET-IP?	Get IP address.	<b>COMMAND</b> <b>#NET-IP?_&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@NET-IP_<ip_address><CR><LF>	<b>ip_address</b> – Format: xxx.xxx.xxx.xxx	Get the IP address: <b>#NET-IP?_&lt;CR&gt;</b>
NET-MAC?	Get MAC address. ① For Backward compatibility, the <b>id</b> parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.	<b>COMMAND</b> <b>#NET-MAC?_id&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@NET-MAC_id,mac_address<CR><LF>	<b>id</b> – Network ID—the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3.... <b>mac_address</b> – Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit	<b>#NET-MAC?_id&lt;CR&gt;</b>
NET-MASK	Set subnet mask. ① For proper settings consult your network administrator.	<b>COMMAND</b> <b>#NET-MASK_net_mask&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@NET-MASK_net_mask<CR><LF>	<b>net_mask</b> – Format: xxx.xxx.xxx.xxx	Set the subnet mask to 255.255.0.0: <b>#NET-MASK_255.255.000.000&lt;CR&gt;</b>
NET-MASK?	Get subnet mask.	<b>COMMAND</b> <b>#NET-MASK?_&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@NET-MASK_net_mask<CR><LF>	<b>net_mask</b> – Format: xxx.xxx.xxx.xxx	Get the subnet mask: <b>#NET-MASK&lt;CR&gt;</b>
PASS	Set password for login level. ① The default password is an empty string.	<b>COMMAND</b> <b>#PASS_login_level,password&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@PASS_login_level,password<CR><LF>	<b>login_level</b> – Level of login to set (End User or Administrator). <b>password</b> – Password for the <b>login_level</b> . Up to 15 printable ASCII chars	Set the password for the Admin protocol permission level to 33333: <b>#PASS_Admin,33333&lt;CR&gt;</b>
PASS?	Get password for login level. ① The default password is an empty string.	<b>COMMAND</b> <b>#PASS?_login_level&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@PASS_login_level,password<CR><LF>	<b>login_level</b> – Level of login to set (End User or Administrator). <b>password</b> – Password for the <b>login_level</b> . Up to 15 printable ASCII chars	Get the password for the Admin protocol permission level: <b>#PASS?_Admin&lt;CR&gt;</b>
PRIO	Set input priority. ① The PRIO max value may vary for different devices.	<b>COMMAND</b> <b>#PRIO_input_id,prio&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@PRIO_input_id,prio<CR><LF>	<b>input_id</b> – Window number setting new source <b>prio</b> – Assigned priority (1...max priority)	<b>#PRIO_2,1&lt;CR&gt;</b>
PRIO?	Get input priority. ① The PRIO max value may vary for different devices.	<b>COMMAND</b> <b>#PRIO?_input_id&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@PRIO_input_id,prio<CR><LF>	<b>input_id</b> – Window number setting new source <b>prio</b> – Assigned priority (1...max priority)	<b>PRIO#PRIO?_!&lt;CR&gt;</b>
PROG-ACTION	Set Step-In button action bitmap. ① Programs matrix action as a response for external event (programmable button pressed).	<b>COMMAND</b> <b>#PROG-ACTION_type,&lt;direction_type&gt;.&lt;port_type&gt;.&lt;port_index&gt;,&lt;button_id&gt;,&lt;actions_bitmap&gt;&lt;CR&gt;</b> <b>FEEDBACK</b> ~nn@PROG-ACTION_port_type,<direction_type>.<port_type>.<port_index>,<button_id>,<actions_bitmap><CR><LF>	<b>port_type</b> – Input/Output 0 – Input 1 – Output <b>port_id</b> – The following attributes comprise the port ID: ▪ <b>&lt;direction_type&gt;</b> – o IN o OUT o BOTH ▪ <b>&lt;port_type&gt;</b> – o HDMI o HDBT o ANALOG_AUDIO o AMPLIFIED_AUDIO o TOS o SPDIF o MIC o RS-232 o IR o USB_A o USB_B ▪ <b>&lt;port_index&gt;</b> – The port number as printed on the front or rear panel <b>button_id</b> – External programmable button ID <b>actions_bitmap</b> – Bitmap representing actions to perform after receiving <b>button_id</b> . format: XXXX...X, where X is a hex digit. The binary form of every hex digit represents actions from the table 0 – Echo to controller 1 – Step-in out 1 2 – Step-in out 2 ... – ... N – Step-in out N Setting '1' says that the corresponding action must be executed.	Set step-in button actions on input 3: <b>#PROG-ACTION_0,3,1,0x07&lt;CR&gt;</b>

Function	Description	Syntax	Parameters/Attributes	Example
PROG-ACTION?	<p>Get step-in button action bitmap.</p> <p>① Programs matrix action as a response for external event (programmable button pressed).</p>	<p><b>COMMAND</b></p> <pre>#PROG-ACTION?,&lt;port_type&gt;,&lt;direction_type&gt;.&lt;port_index&gt;,&lt;button_id&gt;&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@PROG-ACTION,&lt;port_type&gt;,&lt;direction_type&gt;.&lt;port_index&gt;,&lt;button_id&gt;,&lt;actions_bitmap&gt;&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>port_type</b> – Input/Output</p> <ul style="list-style-type: none"> <li>0 – Input</li> <li>1 – Output</li> </ul> <p><b>port_id</b> – The following attributes comprise the port ID:</p> <ul style="list-style-type: none"> <li>▪ <b>&lt;direction_type&gt;</b> – <ul style="list-style-type: none"> <li>○ IN</li> <li>○ OUT</li> <li>○ BOTH</li> </ul> </li> <li>▪ <b>&lt;port_type&gt;</b> – <ul style="list-style-type: none"> <li>○ HDMI</li> <li>○ HDBT</li> <li>○ ANALOG_AUDIO</li> <li>○ AMPLIFIED_AUDIO</li> <li>○ TOS</li> <li>○ SPDIF</li> <li>○ MIC</li> <li>○ RS-232</li> <li>○ IR</li> <li>○ USB_A</li> <li>○ USB_B</li> </ul> </li> <li>▪ <b>&lt;port_index&gt;</b> – The port number as printed on the front or rear panel</li> </ul> <p><b>button_id</b> – External programmable button ID</p> <p><b>actions_bitmap</b> – Bitmap representing actions to perform after receiving button_id. format: XXXX...X, where X is a hex digit. The binary form of every hex digit represents actions from the table</p> <ul style="list-style-type: none"> <li>0 – Do nothing</li> <li>1 – Step-in out 1</li> <li>2 – Step-in out 2</li> <li>... - ...</li> <li>128 – Step-in out 128</li> <li>129 – Echo to controller</li> </ul> <p>Setting '1' says that the corresponding action must be executed</p>	
PROT-VER?	Get device protocol version.	<p><b>COMMAND</b></p> <pre>#PROT-VER?,&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@PROT-VER,&lt;3000&gt;:version&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>version</b> – XX.XX where X is a decimal digit</p>	Get the device protocol version: <b>#PROT-VER?,&lt;CR&gt;</b>
REMOTE-INFO?	<p>Get connected Step-in module information.</p> <p>① The matrix uses this command to notify about Step-in client changes.</p>	<p><b>COMMAND</b></p> <pre>#REMOTE-INFO?,&lt;stage&gt;,&lt;stage_id&gt;&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@REMOTE-INFO,&lt;stage&gt;,&lt;stage_id&gt;,&lt;connected&gt;,&lt;model_name&gt;,&lt;curr_input&gt;,&lt;capabilities&gt;,&lt;num_of_inputs&gt;,&lt;num_of_ctl_btn&gt;,&lt;type1&gt;,&lt;type2&gt;...&lt;typeN&gt;&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>stage</b> – Input/Output</p> <ul style="list-style-type: none"> <li>0 – Input</li> <li>1 – Output</li> </ul> <p><b>stage_id</b> – # of chosen stage (1 to max number of inputs/outputs)</p> <p><b>connected</b> – 0/1 (if module connected)</p> <p><b>model_name</b> – Model name string</p> <p><b>curr_input</b> – Input, currently chosen on module</p> <p><b>capabilities</b> –</p> <ul style="list-style-type: none"> <li>0 – module doesn't support Step-in</li> <li>1 – module supports Step-in</li> </ul> <p><b>num_of_inputs</b> – Number of inputs on module</p> <p><b>num_of_ctl_btn</b> – Number of control buttons on module</p> <p><b>type1</b>, – Type2... typeN – Input type according to num_of_inputs</p> <ul style="list-style-type: none"> <li>0 – Undefined</li> <li>1 – DVI</li> <li>2 – HDMI</li> <li>3 – DisplayPort</li> <li>4 – HDBaseT</li> <li>5 – SDI</li> <li>6 – VGA</li> <li>7 – DGKat</li> </ul>	<b>#REMOTE-INFO?,&lt;0&gt;,&lt;1&gt;&lt;CR&gt;</b>
RESET	<p>Reset device.</p> <p>① To avoid locking the port due to a USB bug in Windows, disconnect USB connections immediately after running this command. If the port was locked, disconnect and reconnect the cable to reopen the port.</p>	<p><b>COMMAND</b></p> <pre>#RESET&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@RESET,&lt;OK&gt;&lt;CR&gt;&lt;LF&gt;</pre>		Reset the device: <b>#RESET&lt;CR&gt;</b>
ROUTE	<p>Set layer routing.</p> <p>① This command replaces all other routing commands.</p>	<p><b>COMMAND</b></p> <pre>#ROUTE,&lt;layer&gt;,&lt;dest&gt;,&lt;src&gt;&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@ROUTE,&lt;layer&gt;,&lt;dest&gt;,&lt;src&gt;&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>layer</b> Layer Enumeration</p> <ul style="list-style-type: none"> <li>1 – Video</li> <li>2 – Audio</li> <li>3 – Data</li> <li>4 – IR</li> <li>5 – USB</li> </ul> <p><b>dest</b></p> <ul style="list-style-type: none"> <li>* – ALL</li> <li>x – disconnect, otherwise destination id</li> </ul> <p><b>src</b> – Source id</p>	Route video HDMI IN 2 to video HDMI OUT 8: <b>#ROUTE,&lt;1&gt;,&lt;8&gt;,&lt;2&gt;&lt;CR&gt;</b>

Function	Description	Syntax	Parameters/Attributes	Example
ROUTE?	Get layer routing.  ① This command replaces all other routing commands.	<b>COMMAND</b> #ROUTE?_layer,dest<CR> <b>FEEDBACK</b> ~nn@ROUTE_layer,dest,src<CR><LF>	<b>layer</b> Layer Enumeration 1 – Video 2 – Audio 3 – Data 4 – IR 5 – USB <b>dest</b> * – ALL x – disconnect, otherwise destination id <b>src</b> – Source id	Get layer routing: #ROUTE?_1,4<CR>
SECUR	Start/stop security.  ① The permission system works only if security is enabled with the "SECUR" command.	<b>COMMAND</b> #SECUR_security_mode<CR> <b>FEEDBACK</b> ~nn@SECUR_security_mode<CR><LF>	<b>security_mode</b> – 0 – OFF (disables security) 1 – ON (enables security)	Enable the permission system: #SECUR_0<CR>
SECUR?	Get current security state.  ① The permission system works only if security is enabled with the "SECUR" command.	<b>COMMAND</b> #SECUR?_<CR> <b>FEEDBACK</b> ~nn@SECUR_security_mode<CR><LF>	<b>security_mode</b> – 0 – OFF (disables security) 1 – ON (enables security)	#SECUR?_<CR>
SIGNAL?	Get input signal status.	<b>COMMAND</b> #SIGNAL?_inp_id<CR> <b>FEEDBACK</b> ~nn@SIGNAL_inp_id,status<CR><LF>	<b>inp_id</b> – Input number 1 – Input 1 n – Input n <b>status</b> – Signal status according to signal validation: 0 – Off 1 – On	Get the input signal lock status of IN 1: #SIGNAL?_1<CR>
SN?	Get device serial number.	<b>COMMAND</b> #SN?_<CR> <b>FEEDBACK</b> ~nn@SN_serial_number<CR><LF>	<b>serial_number</b> – 14 decimal digits, factory assigned	Get the device serial number: #SN?_<CR>
TUNNEL-CTRL	LEGACY COMMAND. Send an asynchronous command to a remote Step-in equipment.	<b>COMMAND</b> #TUNNEL-CTRL_stage,stage_id,"command"<CR> <b>FEEDBACK</b> None	<b>stage</b> – Input/Output 0 – Input 1 – Output <b>stage_id</b> – Number of chosen stage (1 to max number of inputs/outputs) <b>command</b> – Command to send to the Step-in client	
UPGRADE	Perform firmware upgrade.  ① Not necessary for some devices.  Firmware usually uploads to a device via a command like LDFW.  Reset the device to complete the process.	<b>COMMAND</b> #UPGRADE<CR> <b>FEEDBACK</b> ~nn@UPGRADE_OK<CR><LF>		Perform firmware upgrade: #UPGRADE<CR>
VERSION?	Get firmware version number.	<b>COMMAND</b> #VERSION?_<CR> <b>FEEDBACK</b> ~nn@VERSION_firmware_version<CR><LF>	<b>firmware_version</b> – XX.XX.XXXX where the digit groups are: major.minor.build version	Get the device firmware version number: #VERSION?_<CR>
VID	LEGACY COMMAND. Set video switch state.  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.	<b>COMMAND</b> #VID_in>out<CR> <b>FEEDBACK</b> ~nn@VID_in>out<CR><LF>	<b>in</b> – Input number or '0' to disconnect output > – Connection character between in and out parameters <b>out</b> – Output number or '*' for all outputs	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.	<b>COMMAND</b> #VID?_out<CR> <b>FEEDBACK</b> ~nn@VID_in>out<CR><LF>	<b>in</b> – Input number or '0' to disconnect output > – Connection character between in and out parameters <b>out</b> – Output number or '*' for all outputs	Switch IN 1 to OUT 3: #VID_1>3<CR>
VID-PATTERN	Set test pattern on output.	<b>COMMAND</b> #VID-PATTERN_output_id,pattern_id<CR> <b>FEEDBACK</b> ~nn@VID-PATTERN_output_id,pattern_id<CR><LF>	<b>output_id</b> – 1 to number of system outputs <b>pattern_id</b> – 1 to number of system patterns	Switch PATTERN 1 to OUT 3: #VID-PATTERN_3,1<CR>

Function	Description	Syntax	Parameters/Attributes	Example
VID-PATTERN?	Get test pattern on output.	<b>COMMAND</b> #VID-PATTERN?_output_id<CR> <b>FEEDBACK</b> ~nn@VID-PATTERN_output_id,pattern_id<CR><LF>	output_id – 1 to number of system outputs pattern_id – 1 to number of system patterns	Switch PATTERN 1 to OUT 3: #VID-PATTERN_3,1<CR>
VID-RES	Set output resolution. ① "Set" command is only applicable for stage=Output.  "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.  "Get" command with is_native=ON returns native resolution VIC, with is_native=OFF returns current resolution. To use "custom resolutions" (entries 100-105 In View Modes), define them using the DEF-RES command.	<b>COMMAND</b> #VID-RES_stage,stage_id,is_native,resolution<CR> <b>FEEDBACK</b> ~nn@VID-RES_stage,stage_id,is_native,resolution<CR><LF>	stage – Input/Output 0 – Input 1 – Output stage_id – Number of chosen stage (1 to max number of inputs/outputs) is_native – Native resolution flag 0 – Off 1 – On resolution – Resolution index 0=No Signal (for input) / Native – EDID (for output) 1=640x480p@59.94Hz/60Hz 2=720x480p@59.94Hz/60Hz 3=720x480p@59.94Hz/60Hz 4=1280x720p@59.94Hz/60Hz 5=1920x1080i@59.94Hz/60Hz 6=720(1440)x480i@59.94Hz/60Hz 7=720(1440)x480i@59.94Hz/60Hz 8=720(1440)x240p@59.94Hz/60Hz 9=720(1440)x240p@59.94Hz/60Hz 10=2880x480i@59.94Hz/60Hz 11=2880x480i@59.94Hz/60Hz 12=2880x240p@59.94Hz/60Hz 13=2880x240p@59.94Hz/60Hz 14=1440x480p@59.94Hz/60Hz 15=1440x480p@59.94Hz/60Hz 16=1920x1080p@59.94Hz/60Hz 17=720x576p@50Hz 18=720x576p@50Hz 19=1280x720p@50Hz 20=1920x1080i@50Hz 21=720(1440)x576i@50Hz 22=720(1440)x576i@50Hz 23=720(1440)x288p@50Hz 24=720(1440)x288p@50Hz 25=2880x576i@50Hz 26=2880x576i@50Hz 27=2880x288p@50Hz 28=2880x288p@50Hz 29=1440x576p@50Hz 30=1440x576p@50Hz 31=1920x1080p@50Hz 32=1920x1080p@23.97Hz/24Hz 33=1920x1080p@25Hz 34=1920x1080p@29.97Hz/30Hz 35=2880x480p@59.94Hz/60Hz 36=2880x480p@59.94Hz/60Hz 37=2880x576p@50Hz 38=2880x576p@50Hz 39=1920x1080i@50Hz 40=1920x1080i@100Hz 41=1280x720p@100Hz 42=720x576p@100Hz 43=720x576p@100Hz 44=720(1440)x576i@100Hz 45=720(1440)x576i@100Hz 46=1920x1080i@119.88/120Hz 47=1280x720p@119.88/120Hz 48=720x480p@119.88/120Hz 49=720x480p@119.88/120Hz 50=720(1440)x480i@119.88/120Hz 51=720(1440)x480i@119.88/120Hz 52=720x576p@200Hz 53=720x576p@200Hz 54=720(1440)x576i@200Hz 55=720(1440)x576i@200Hz 56=720x480p@239.76/240Hz 57=720x480p@239.76/240Hz 58=720(1440)x480i@239.76/240Hz 59=720(1440)x480i@239.76/240Hz 60=1280x720p@23.97Hz/24Hz 61=1280x720p@25Hz 62=1280x720p@29.97Hz/30Hz 63=1920x1080p@119.88/120Hz 64=1920x1080p@100Hz 65=800x600p@60Hz 66-100=(Reserved) 100=Custom resolution 1 101=Custom resolution 2 102=Custom resolution 3 103=Custom resolution 4 104=Custom resolution 5 105-254=(Reserved)	

Function	Description	Syntax	Parameters/Attributes	Example
VID-RES?	<p>Get output 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>	<p><b>COMMAND</b></p> <p>#VID-RES?_stage,stage_id,is_native &lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@VID-RES_stage,stage_id,is_native,resolution&lt;CR&gt;&lt;LF&gt;</p>	<p><b>stage</b> – Input/Output</p> <p>0 – Input</p> <p>1 – Output</p> <p><b>stage_id</b> – Number of chosen stage (1 to max number of inputs/outputs)</p> <p><b>is_native</b> – Native resolution flag</p> <p>0 – Off</p> <p>1 – On</p> <p><b>resolution</b> – Resolution index</p> <p>0=No Signal (for input) / Native – EDID (for output)</p> <p>1=640x480p@59.94Hz/60Hz</p> <p>2=720x480p@59.94Hz/60Hz</p> <p>3=720x480p@59.94Hz/60Hz</p> <p>4=1280x720p@59.94Hz/60Hz</p> <p>5=1920x1080i@59.94Hz/60Hz</p> <p>6=720(1440)x480i@59.94Hz/60Hz</p> <p>7=720(1440)x480i@59.94Hz/60Hz</p> <p>8=720(1440)x240p@59.94Hz/60Hz</p> <p>9=720(1440)x240p@59.94Hz/60Hz</p> <p>10=2880x480i@59.94Hz/60Hz</p> <p>11=2880x480i@59.94Hz/60Hz</p> <p>12=2880x240p@59.94Hz/60Hz</p> <p>13=2880x240p@59.94Hz/60Hz</p> <p>14=1440x480p@59.94Hz/60Hz</p> <p>15=1440x480p@59.94Hz/60Hz</p> <p>16=1920x1080p@59.94Hz/60Hz</p> <p>17=720x576p@50Hz</p> <p>18=720x576p@50Hz</p> <p>19=1280x720p@50Hz</p> <p>20=1920x1080i@50Hz</p> <p>21=720(1440)x576i@50Hz</p> <p>22=720(1440)x576i@50Hz</p> <p>23=720(1440)x288p@50Hz</p> <p>24=720(1440)x288p@50Hz</p> <p>25=2880x576i@50Hz</p> <p>26=2880x576i@50Hz</p> <p>27=2880x288p@50Hz</p> <p>28=2880x288p@50Hz</p> <p>29=1440x576p@50Hz</p> <p>30=1440x576p@50Hz</p> <p>31=1920x1080p@50Hz</p> <p>32=1920x1080p@23.97Hz/24Hz</p> <p>33=1920x1080p@25Hz</p> <p>34=1920x1080p@29.97Hz/30Hz</p> <p>35=2880x480p@59.94Hz/60Hz</p> <p>36=2880x480p@59.94Hz/60Hz</p> <p>37=2880x576p@50Hz</p> <p>38=2880x576p@50Hz</p> <p>39=1920x1080i@50Hz</p> <p>40=1920x1080i@100Hz</p> <p>41=1280x720p@100Hz</p> <p>42=720x576p@100Hz</p> <p>43=720x576p@100Hz</p> <p>44=720(1440)x576i@100Hz</p> <p>45=720(1440)x576i@100Hz</p> <p>46=1920x1080i@119.88/120Hz</p> <p>47=1280x720p@119.88/120Hz</p> <p>48=720x480p@119.88/120Hz</p> <p>49=720x480p@119.88/120Hz</p> <p>50=720(1440)x480i@119.88/120Hz</p> <p>51=720(1440)x480i@119.88/120Hz</p> <p>52=720x576p@200Hz</p> <p>53=720x576p@200Hz</p> <p>54=720(1440)x576i@200Hz</p> <p>55=720(1440)x576i@200Hz</p> <p>56=720x480p@239.76/240Hz</p> <p>57=720x480p@239.76/240Hz</p> <p>58=720(1440)x480i@239.76/240Hz</p> <p>59=720(1440)x480i@239.76/240Hz</p> <p>60=1280x720p@23.97Hz/24Hz</p> <p>61=1280x720p@25Hz</p> <p>62=1280x720p@29.97Hz/30Hz</p> <p>63=1920x1080p@119.88/120Hz</p> <p>64=1920x1080p@100Hz</p> <p>65=800x600p@60Hz</p> <p>66-100=(Reserved)</p> <p>100=Custom resolution 1</p> <p>101=Custom resolution 2</p> <p>102=Custom resolution 3</p> <p>103=Custom resolution 4</p> <p>104=Custom resolution 5</p> <p>105-254=(Reserved)</p>	
VMUTE	<p>Set enable/disable video on output.</p> <p>① Video mute parameter 2 (blank picture) is not supported.</p>	<p><b>COMMAND</b></p> <p>#VMUTE_output_id,flag&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@VMUTE_output_id,flag&lt;CR&gt;&lt;LF&gt;</p>	<p><b>output_id</b> – 1 to number of system outputs</p> <p><b>flag</b> – Video Mute</p> <p>0 – Video enabled</p> <p>1 – Video disabled</p> <p>2 – Blank picture</p>	<p>Disable the video output on OUT 2:</p> <p>#VMUTE_2,0&lt;CR&gt;</p>
VMUTE?	<p>Get video on output status.</p> <p>① Video mute parameter 2 (blank picture) is not supported.</p>	<p><b>COMMAND</b></p> <p>#VMUTE?_output_id&lt;CR&gt;</p> <p><b>FEEDBACK</b></p> <p>~nn@VMUTE_output_id,flag&lt;CR&gt;&lt;LF&gt;</p>	<p><b>output_id</b> – 1 to number of system outputs</p> <p><b>flag</b> – Video Mute</p> <p>0 – Video enabled</p> <p>1 – Video disabled</p> <p>2 – Blank picture</p>	<p>Get video on output status:</p> <p>#VMUTE?_2&lt;CR&gt;</p>

## Result and Error Codes

### Syntax

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

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

### Error Codes

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

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

#### **What is Covered**

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

#### **What is Not Covered**

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product. Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

#### **How Long this Coverage Lasts**

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

1. All Kramer VIA hardware products are covered by a standard three (3) year warranty for the VIA hardware and a standard three (3) year warranty for firmware and software updates; all Kramer VIA accessories, adapters, tags, and dongles are covered by a standard one (1) year warranty.
2. Kramer fiber optic cables, adapter-size fiber optic extenders, pluggable optical modules, active cables, cable retractors, ring mounted adapters, portable power chargers, Kramer speakers, and Kramer touch panels are all 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. If a direct or similar replacement product is supplied, the original product's end warranty date remains unchanged and is transferred to the replacement product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

#### **What Kramer Electronics Will Not Do Under This Limited Warranty**

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

#### **How to Obtain a Remedy Under This Limited Warranty**

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

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

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

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P/N:



2900-300170

Rev:



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## SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

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

We welcome your questions, comments, and feedback.