KRAMER

USER MANUAL

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1 Introduction

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

Our 1,000-plus different models now appear in 14 groups that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Video Products; GROUP 12: Digital Signage; GROUP 13: Audio; and GROUP 14: Collaboration.

Congratulations on purchasing your Kramer **DIP-31M** *Automatic Video Switcher* which are part of the Kramer Audio Distribution System and are ideal for:

- Display systems requiring simple, automatic input selection.
- Multimedia and presentation source selection.
- Video distribution in hotel rooms and schools.

2 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/DIP-31M to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve 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 **DIP-31M** *Automatic Video Switcher* away from moisture, excessive sunlight and dust.

This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

2.2 Safety Instructions

Caution: There are no operator serviceable parts inside the unit.

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

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

Warning: Disconnect the power and unplug the unit from the wall before installing.

2.3   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/*.

3   Overview

DIP-31M is an automatic switcher for 4K HDMI, VGA, Ethernet, data and unbalanced audio signals. The unit supports resolutions up to 4K@60Hz (4:2:0) and various modes of input selection and transmits the signal via HDMI cable to a compatible receiver (for example, VS−62H or when connecting directly to a display/projector). **DIP-31M** is a Step−in commander when connected to a matrix switcher that supports Step−in over HDMI such as the VS−62H.

DIP-31M features Maestro software that provides powerful single-trigger, room automation functions that can automatically control the lights, projectors, displays, video sources, screens, blinds HVAC and many more.

The **DIP-31M** *Automatic Video Switcher* features:

- Max. Resolution – 4K@60Hz (4:2:0) UHD and WUXGA.

- Max. Data Rate – 10.2Gbps (3.4Gbps per graphic channel).

- HDTV support.

- HDCP 1.4 compliancy – works with sources that support HDCP repeater mode.

- HDMI with Deep Color, x.v.Color™ and 3D.

- I-EDIDPro™ Kramer Intelligent EDID Processing™ – Intelligent EDID handling & processing algorithm ensures Plug and Play operation for HDMI systems.

- Automatic live input detection based on video clock presence.

- Automatic input selection based on priority selection or last connected input.

- Manual input selection.

- Step-in control when connected to a device that provides step-in support.

- Automatic analog audio detection and embedding.

- Control via Kramer Protocol 3000 and embedded Web pages over a LAN.

- A lockable EDID.

- Remote control via contact-closure switches.

- Equalization and re-clocking of the data.

- Support for digital audio formats.

- An RS-232 data port for controlling external devices.

3.1   About Maestro

DIP-31M showcases Maestro, Kramer's easy to configure, single-trigger room automation software that creates customized meeting room environments with minimal end-user intervention.

Maestro creates a series of actions based on a pre-defined event, or trigger, such as plugging in a laptop or turning a display off. These events can trigger actions such as turning on computers (via Wake-on-LAN) and turning on and off lights, projectors, displays, video sources, and HVAC.

Integrated with Kramer's dynamic database of device drivers, there is no end to the types of actions Maestro can perform. Maestro enables automated control over a variety of port types: RS-232, Ethernet, GPIO, relay, and IR.

Maestro makes meeting rooms environmentally-friendly by ensuring that lights and devices are automatically turned off. The solution turns a device or series of devices on or off based on triggers, e.g., removing inputs, time, etc. This helps create a greener workplace, and over time, saves significant energy costs.

4 Defining the DIP-31M Automatic Video Switcher

Figure 1 defines the front panel of the **DIP-31M**.
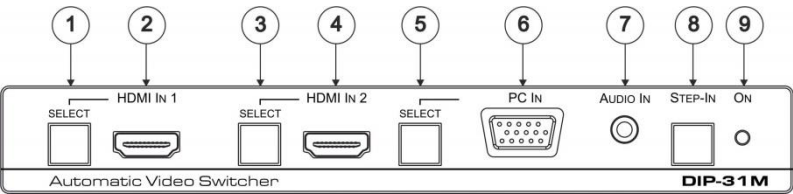
Figure 1: DIP-31M Front Panel

#	Feature		Function
1	*HDMI IN 1*	*SELECT* Button	Press to select the HDMI IN 1 input. When HDMI IN 1 is selected, the button lights and indicates the selected audio (see Section 8.1) Red – External audio from the analog Audio IN is selected Green – Embedded audio from HDMI IN 1 is selected
2		HDMI 1 Connector	Connects to the first HDMI source
3	*HDMI IN 2*	*SELECT* Button	Press to select the HDMI IN 2 input. When HDMI IN 2 is selected, the button lights and indicates the selected audio (Section 8.1) Red – External audio from the analog Audio IN is selected Green – Embedded audio from HDMI IN 2 is selected
4		HDMI 2 Connector	Connects to the second HDMI source
5	*PC IN*	*SELECT* Button	Press to select the VGA input. When PC IN is selected, the button lights and indicates the selected audio (Section 8.1) Red – External audio from the analog Audio IN is selected Green – No audio is selected (embedded audio from the HDMI inputs cannot be used with this input)
6		PC Graphics 15-pin HD Connector	Connects to the VGA source, (for example, a laptop)
7	*AUDIO IN* 3.5mm Mini Jack		Connects to the unbalanced, stereo audio source, (for example, the audio output of the laptop)
8	*Step-In* Button		Press to take control of the input that this device is connected to on a compatible switcher
9	*ON* LED		Lights green when the device is powered on

defines the rear panel of the **DIP-31M**.
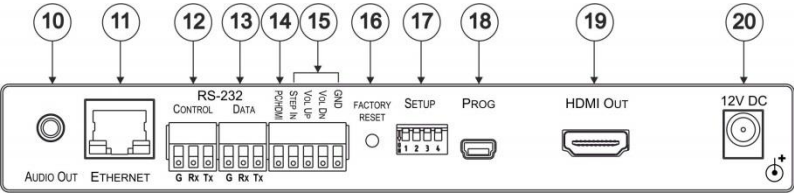
Figure 2: DIP-31M Rear Panel

#	Feature		Function
10	*AUDIO OUT* 3.5mm Mini Jack		Connect to the unbalanced, stereo audio acceptor, (for example, active speakers)
11	*ETHERNET* RJ-45 Connector & Indicator LEDs		Connect to the LAN, (Ethernet traffic or PC controller) Green LED flashing – active, orange solid – link active
12	*RS-232*	*CONTROL* 3-pin Terminal Block	Connect to a serial controller or PC
13		*DATA* 3-pin Terminal Block	Connect to a serial data source or acceptor
14	*PC/HDMI* Remote Toggle Switch Terminal Block		Connect to a remote momentary switch to toggle between the HDMI and VGA inputs. Each press cycles through the priority inputs HDMI IN 1 → HDMI IN 2 → PC IN or a different priority cycle specified on the Video & Audio Settings Web page (see Section 9.5)
15	Remote Contact-closure 4-pin Terminal Block		Connect to remote momentary switches to control step-in and audio volume (see Section 5.1)
16	*FACTORY RESET* Button		Short press to reboot, long press to reset the device to factory default parameters (see Section 7.2)
17	*SETUP* 4-way DIP-switch		Switches for setting the device behavior, (see Section 8.1)
18	*PROG* Mini USB Connector		Connect to a PC to perform a firmware upgrade (see Section 9.8)
19	*HDMI OUT* Connector		Connect to a compatible HDMI display
20	*12V* DC Connector		Connect to the supplied power adapter

5 Connecting the DIP-31M Automatic Video Switcher

> Always switch off the power to each device before connecting it to your **DIP-31M**. After connecting your **DIP-31M**, connect the power to each of them and then switch on the power to each device.
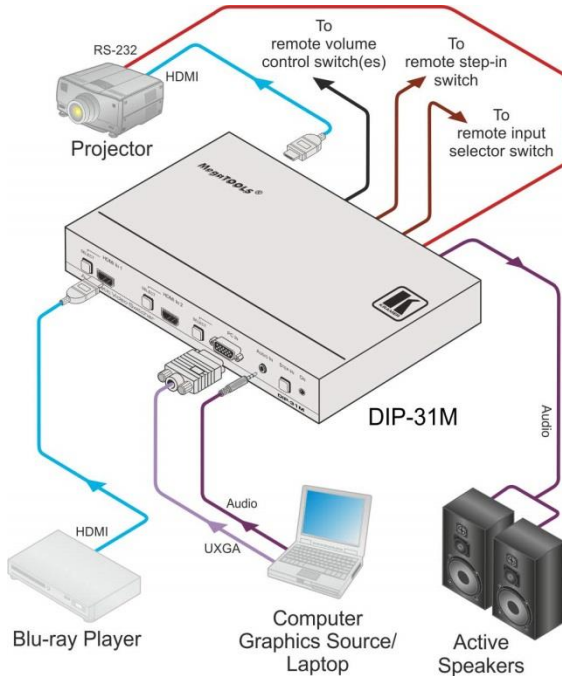
Figure 3: Connecting the DIP-31M

To connect the DIP-31M as illustrated in Figure 3**:**

1. Connect an HDMI source, (for example, a Blu-ray player) to the HDMI IN 1 input.

2. Connect a PC graphics source, (for example, a laptop) to the PC IN input.

3. Connect an unbalanced stereo audio source, (for example, the audio output from the laptop) to the AUDIO IN 3.5mm mini jack.

4. Connect the HDMI OUT connector on the rear panel of the
    DIP-31M to an HDMI compatible switcher, display or projector.

5. Connect the DATA RS-232 3-pin terminal block on the rear panel of the
    DIP-31M to an RS-232 controlled device (for example, a projector) or an
    RS-232 controller.

6. Connect the AUDIO OUT 3-pin terminal block on the rear panel of the
    DIP-31M to the unbalanced, stereo audio acceptor, (for example, active
    speakers).

7. Connect the STEP IN 2-way terminal block to a momentary, contact-closure
    switch, (see Section 5.1).

8. Connect the PC/HDMI 2-way terminal block to a momentary, contact-closure
    switch for input selection, (see Section 5.1).

9. Connect the Vol Up/Vol Down 3-pin terminal block to remote, contact-
    closure, volume control switches.

10. Connect the power adapter to the **DIP-31M** and to the mains power, (not
    shown in Figure 3).

5.1 Connecting the Remote Control Switches

You can connect remote, momentary contact-closure switches to the terminal block on the rear panel of the **DIP-31M** to control the device.

Figure 4 illustrates the connections from the terminal block to the contact-closure switches.
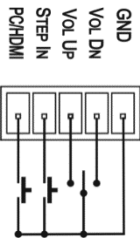
Figure 4: Remote Switches Terminal Block

#	Feature	Function
1	PC/HDMI—input selection/VGA phase shift adjustment	Short press—Input toggle Long press—Adjusts the VGA phase shift, (see Section 6.4)
2	STEP IN	Activates the step-in function if relevant
3	VOL UP—analog audio output volume increase control, (see Section 7.3)	Short press—Increases the volume one step Long press—Increases the volume from 0% to 100% in 10 seconds from making the switch or over 10 seconds
4	VOL DN—analog audio output volume decrease control, (see Section 7.3)	Short press—Decreases the volume one step Long press—Decreases the volume from 100% to 0% in 10 seconds from making the switch or over 10 seconds
G	GND	Connect to the common side of the switches

5.2 Wiring the RJ-45 Connectors

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

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

Figure 5: TP PINOUT
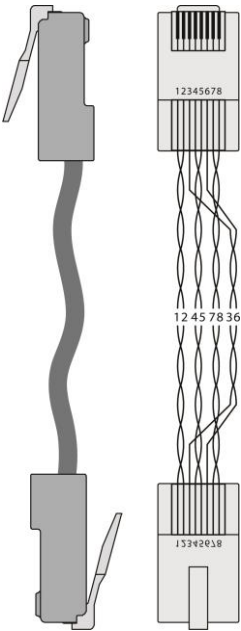
6   Principles of Operation

The **DIP-31M** selects video and audio inputs based on the rules described below.

6.1   Input Selection and Switching

The **video mode** selection is set by the DIP-switches (see <u>Section 8.1</u>) to either of the following modes:

- Manual

- Auto—Last connected or priority mode

In **manual mode** switching occurs whether or not there is a live signal present on the input. You can manually select an input using any of the following methods:

- Front panel buttons.

- Remote input selection switches.

- RS-232 control.

- Web pages.

In **auto mode**, the switching selection is performed based on either last connected or priority input.

In **last connected mode**, if the signal on the current input is lost, the **DIP-31M** automatically selects the last connected input, (the delay depending on the configurable signal-lost timeout).

In **priority mode**, when the input sync signal is lost for any reason, the input with a live signal and next in priority is selected automatically, (the delay depending on the configurable signal-lost timeout). This priority is configurable; the default setting is HDMI 1 → HDMI 2 → PC.

> In both last connected and priority modes, manually selecting an input (using the remote input selection switches or any of the above methods) overrides automatic selection.

6.2 Signal Loss and Unplugged Cable Timeouts

In both last connected and priority modes, when the input signal sync is lost (but the cable is not removed) there is a default delay (ten seconds for video, not applicable to the PC input, and five seconds for analog audio) before another input is automatically selected. When an input cable is removed, there is a delay before automatic switching takes place.

Both timeouts are configurable (see Section 9.5).

> If no display is connected, analog audio is not output.
> If a display is connected, analog audio is output even in the absence of a video signal.

6.3 Audio Signal Control

Setup DIP-switches 3 and 4 (see Section 8.1) control how audio is handled.

The following table describes which audio signal is embedded in the output.

Selected Video Input	HDMI Embedded Audio Detected	Analog Audio Detected	DIP-switch 3	DIP-switch 4	Audio on HDMI Output
VGA	N/A	Yes	N/A	N/A	Analog audio
VGA	N/A	No	N/A	N/A	No audio
HDMI	N/A	N/A	Manual	Embedded	Embedded audio
HDMI	N/A	N/A	Manual	Analog	Analog audio
HDMI	Yes	No	Auto	N/A	Embedded audio
HDMI	Yes	Yes	Auto	Embedded	Embedded audio
HDMI	Yes	Yes	Auto	Analog	Analog audio
HDMI	No	Yes	Auto	N/A	Analog audio
HDMI	No	No	Auto	N/A	No audio

When there is an audio signal but no video signal, the output is a black video pattern together with the analog audio signal.

6.4   VGA Phase Shift

To minimize phase sync misalignments on the input VGA signal, the VGA sampling phase can be shifted using the following methods:

- A long press on the PC IN select button on the front panel.
  Each long press steps the phase shift up one step, starting from 0 and going to 31. When set to 31, another long press steps the shift to 0.

- A remote, contact-closure switch connected to pins 1 and G of the remote terminal block.
  Each long press steps the phase shift up one step, starting from 0 and going to 31. When set to 31, another long press steps the shift to 0.

- Using the Web pages, (see Section 9).

- Protocol 3000 commands over RS-232 (see Section 13).

DIP-31M - Principles of Operation

7 Operating the DIP-31M

The **DIP-31M** can be operated using any of the following methods:

- Front panel buttons.

- Remote contact-closure switch, (see Section 5.1).

- Web pages, (see Section 9).

- Protocol 3000 commands, (see Section 13).

7.1 Locking the EDID

To lock the EDID and prevent the stored EDID (either default or read from a device) from being overwritten:

- Send a Protocol 3000 command, (see Section 13).

- Use the Web pages, (see Section 9.7).

7.2 Resetting the DIP-31M

The **DIP-31M** can be reset to factory default by either:

- Using the button on the rear panel.

- Using the Web pages, (see Section 9.3.2).

To perform a soft reset of the DIP-31M:

- Briefly press the Reset button.
  The device resets.

To reset the DIP-31M to factory default parameters:

- Press and hold the Reset button for five seconds.
  The device is reset to factory default parameters.

7.3   Controlling Analog Audio Output Volume

The analog audio output volume can be controlled using the Web pages, (see Section 9.3) or via the remote, contact-closure switches connected to pins 3 and 4 of the Remote terminal block, (see Section 5.1).

The volume is adjustable from -83dB to +24dB.

8 Configuring the DIP-31M

This section explains how to configure audio and video switching.

8.1 Setting the Audio and Video Configuration DIP-switch

The 4-way DIP-switch provides the ability to configure a number of device functions. A switch that is down is on; a switch that is up is off. By default, all the switches are up (off).

Figure 6: Configuration DIP-switch

> After changing a DIP-switch you must turn the device off and on to implement the change.

Video Switching Selection

DIP-switch 1	DIP-switch 2	Video Input Selection
Off (up)	Off (up)	Automatic—Last connected. Where more than one source is connected the last one connected has priority
Off (up)	On (down)	Automatic—Priority selection. HDMI IN 1 → HDMI IN 2 → PC IN (default, high to low priority) Different priority cycles can be specified using the Video & Audio Settings Web page
On (down)	Off (up)	Manual
On (down)	On (down)	Manual

Audio Switching Selection

DIP-switch 3	DIP-switch 4	Audio Input Selection
Off (up)	Off (up)	Automatic—Priority selection. Embedded HDMI → analog Audio In (high to low priority)
Off (up)	On (down)	Automatic—Priority selection. Analog Audio In → embedded HDMI (high to low priority)
On (down)	Off (up)	Embedded HDMI
On (down)	On (down)	Analog Audio In

8.2 Using Auto Switching Delays

When the **DIP-31M** is configured for auto switching, the delay before a new input is automatically selected can be changed as shown in the table below. (For the delay settings on the Web page, see Section 9.4.) The following auto switching timeouts are only valid for HDMI and not VGA.

Timeout	Minimum Value	Default Value
Delay switching upon signal loss (signal off, 5V power on)	5 seconds	10 seconds for video input 5 Seconds for audio input
Delay switching upon cable unplug (signal off, power off)	0 seconds	0 seconds
Delay 5V power off upon signal loss (delay must be greater than "Delay switching upon signal loss")	Should at least equal the larger of the above two values (signal loss timeout and cable unplug timeout)	900 seconds

For example, if:

Delay switching upon signal loss = 15 seconds
Delay switching upon cable unplug = 30 seconds

Then:
Delay 5V power off upon signal loss must be >= 30 seconds

8.3 Using the Step-in Feature

The Step-in button on the front panel automatically operates in conjunction with a compatible step-in controller, for example, the **VS-62H**.

9 Operating the DIP-31M Remotely Using the Web Pages

The **DIP-31M** can be operated remotely using the embedded Web pages. Web pages are accessed using a Web browser and an Ethernet connection.

Before attempting to connect:

- Ensure that your browser is supported (see Section 11.1).

- Ensure that JavaScript is enabled.

> **Note**: The syntax of writing numbers with a prefix of zero is parsed as an octal number. For example, "0123" represents the decimal number 83. Using a leading zero produces what looks like an incorrect number.

> **Note:** Web pages work with a minimum resolution of 1024 x 768.

The following sections describe how to use the Web pages and their functions:

- Accessing **DIP-31M** Web Pages (see Section 9.1)

- Switching (see Section 9.2)

- Device Settings (see Section 9.3)

- Control Settings (see Section 9.4)

- Video and Audio Settings (see Section 9.5)

- Authentication (see Section 9.6)

- EDID (see Section 9.7)

- Firmware Upgrade (see Section 9.8)

- About Us (see Section 9.9)

9.1 Accessing DIP-31M Web Pages

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

To access the DIP-31M Web pages:

1. Open your Internet browser.

2. Type the IP number of the device (see Section 11.1) in the address bar of your browser. The default IP address of the **DIP-31M** is 192.168.1.39

If authentication is enabled, the following window appears (Figure 7) and you must enter the valid username (**Admin**) and password (**Admin**) to access the Web pages.
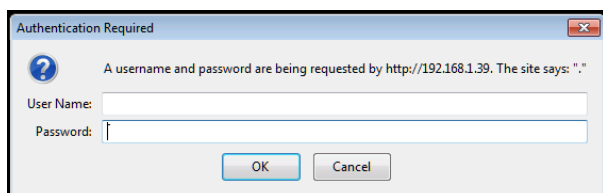
Figure 7: Entering Logon Credentials

Following a successful logon, the opening (Switching) page is displayed (Figure 8).
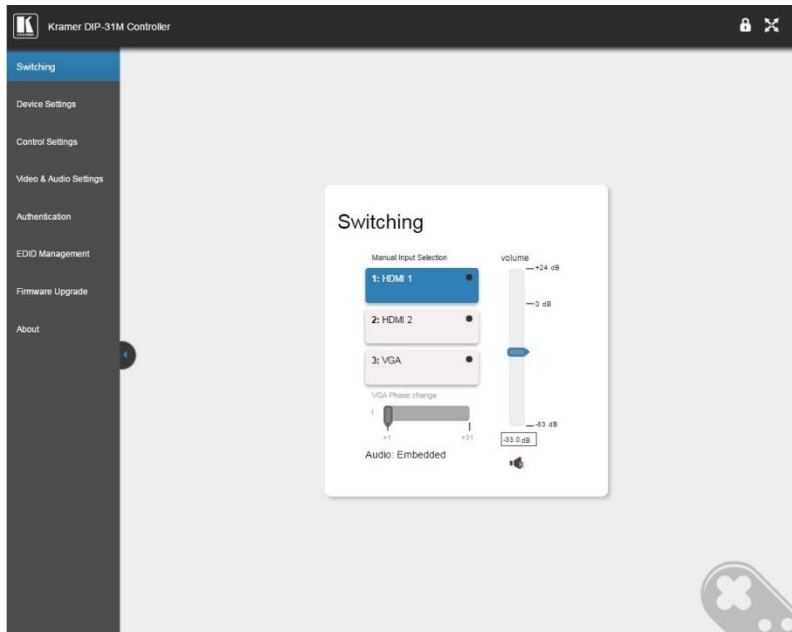
Figure 8: Opening Web Page

- To expand the left-hand side page panel, click the Reveal button ►.

- To hide the left-hand side page panel, click the Hide button ◄.

- To lock the page, click 🔒.

- To toggle in and out of full screen mode, click ✕.

9.2   Selecting Input Signals

The Switching page enables selecting a video input manually, adjusting the audio volume and changing the VGA phase.
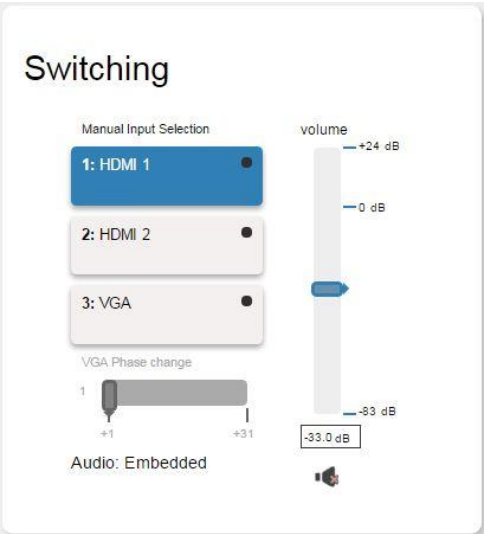
Figure 9: Switching Page

Item	Description
1: HDMI 1 Button	Click to select the HDMI 1 input. The button color indicates whether or not there is a live signal on the input
2: HDMI 2 Button	Click to select the HDMI 2 input
3: VGA Button	Click to select the VGA input
VGA Phase Change Slider	Click and slide to the left or right to adjust the VGA phase change (+1 to +31)
Volume Slider	Click and slide up and down to increase or decrease the audio output volume (-83dB to +24dB)
Mute/Unmute Button	Click to mute or unmute the output audio

9.3   Setting Device Configurations

The Device Settings page enables you to identify your **DIP-31M**:

- Set the unit name and view the model type, firmware version, serial number and MAC address.

- Edit IP settings, (for example, enable DHCP, set IP, mask and gateway addresses and set UDP or TCP ports).

- Save and load configurations.

- Reset the device to factory default settings.

Figure 10: Device Settings Page

Item	Description
Unit Name	Enter a descriptive, easy to identify name for the **DIP-31M**
Model	Displays the model of the device
Firmware version	Displays the firmware version of the device
Serial number	Displays the serial number of the device
Ethernet Settings	
DHCP ON/OFF buttons	Click ON to turn DHCP on; click OFF to turn DHCP off and use static IP addressing
IP address	The IP address of the device. To set a new IP address, enter the new valid IP address and click Set
Mask address	The network mask of the device. To set a new mask, enter the new valid mask and click Set
Gateway address	The network gateway for the device. To set a new network gateway, enter the new valid gateway and click Set
MAC address	Read-only field showing the MAC address
UDP port	The UDP port number of the device. To set a new UDP port number, enter the new valid port number or use the spin controls and click Set
TCP port	The TCP port number of the device. To set a new TCP port number, enter the new valid port number or use the spin controls and click Set
All settings	
Load & Save buttons	Click Load to retrieve a previously saved configuration, click Save to save the present configuration (see Section 9.3.1)
Factory reset button	Click to reset the device to factory default parameters. After the success message is displayed, turn the device off and on (see Section 9.3.2)

9.3.1 Loading and Saving Configurations

The **DIP-31M** enables loading and saving device setting configurations. This is especially useful when setting up multiple **DIP-31M** devices.

To load a configuration:

1. Click **Load**.
   The File Upload browser window appears.

2. Browse to the required file and click **Open**.
   The configuration is retrieved and the success message is displayed.

To save the current configuration:

1. Click **Save**.

   The Save Configuration success message is displayed.

2. Click **Download** to either open the file or save it to the required location.

   Or,

   Click **OK** to complete the procedure.

9.3.2 Resetting the Unit

To reset the DIP-31M to factory default parameters:

1. Click the **Factory Reset** button.

   A confirmation message is displayed.

   ⓘ   Clicking **Cancel** exits the reset procedure without making any changes.

2. Click **OK**.

   A progress message is displayed. Upon completion, a success message is displayed.

3. Click **OK**.

9.4 Creating Automatic Room Controls

The **DIP-31M** Control Settings page (powered by Maestro) enables you to configure single-trigger room element automation scenarios.

The following table provides examples of room automation scenarios:

Trigger	Automation Scenario
An HDMI cable is connected from a laptop to the **DIP-31M** (for an example of this scenario see Section 10)	Projection screen opens Shades close Projector turns on Lights turn off
A motion sensor detects no motion for 10 minutes	All AV devices turn off Shades open Lights turn off

Scenario configuration follows a simple 4-step process:

1. Configure the ports (Section 10.1)

2. Create commands (Section 10.2)

3. Create actions (Section 10.4)

4. Specify a trigger (Section 10.5)

This section provides general information about using the Control Settings page. For specific information about configuring room automation scenarios, see Section 10.

Clicking the Control Settings tab opens the Control Settings page:
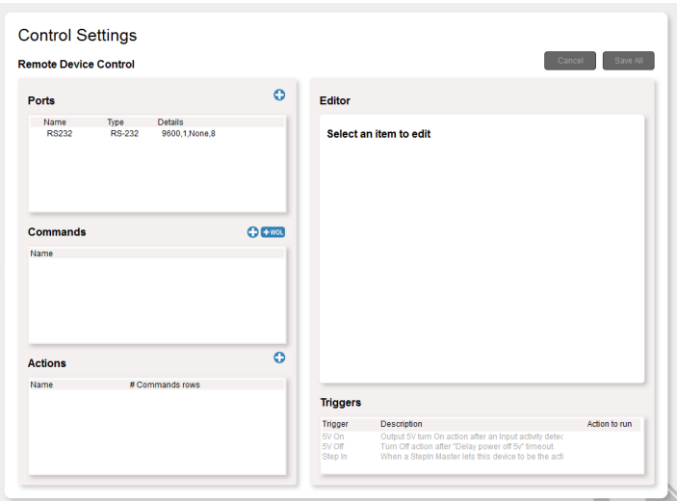
Figure 11: Control Settings Page

The Control Settings page is divided into five sections: Ports, Commands, Actions, Editor and Triggers.
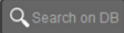
Clicking Ports, Commands, Actions, or Triggers enables you to configure that section in the Editor section.

The following table describes the elements of the Control Settings page:

Item	Description
Ports	Use this section to specify ports, port type and port description data
Commands	Use this section to create a list of commands. Enter commands manually or from an online command database
Actions	Use this section to specify actions to perform based on predefined commands
Triggers	Use this section to create trigger conditions that initiate the previously defined actions and their commands
Editor	Use this section to make changes or add information to the selected element
Cancel	Exit control settings without saving changes
Save all	Save the current configuration
➕	Add an element in the selected section
➕WOL	Add a Wake on LAN command to turn on sleeping devices
📋	Copy highlighted element
✖	Delete highlighted element
Test	Test the highlighted command or action on the specified port

The following table describes the elements that appear in the Editor section when the Command, Action, or Trigger sections are selected:

Editor Type	Item	Description
Command	Search on DB	Click to connect to a command database (for example, K-Config, supported from version 3.5.17.0 onward)
	⚙●	Click to connect to a command database. Status indication: Black - not connected Green - connected
	Data	Shows the text of the command entered or chosen from a command database
	HEX	Click to insert the hex data entered in the box at the left of the HEX button
	CR	Click to insert a carriage return character
Action	🕐	Click to add a time delay between commands
Trigger	Enabled	Click to enable operation of the trigger
	Disabled	Click to disable operation of the trigger

For a full explanation of how to use Maestro to create automated room control, see Section 10.

9.5 Setting Video and Audio Parameters

The Video and Audio Settings page lets you modify the video, audio and switching delay parameters.

Figure 12: Video and Audio Settings Page

The following table describes the elements of the Video and Audio settings page:

Item	Description
Video selection mode Indicator	Indicates the current video selection mode: manual, auto, or auto last connected
Video auto switching priority Buttons	Click and drag the buttons to the required priority level to use when in auto mode
Audio selection mode Indicator	Indicates the current audio selection: manual, auto, or auto last connected
Current selection Audio Indicator	Indicates the current audio selection: Embedded or analog

DIP-31M - Operating the DIP-31M Remotely Using the Web Pages

Item	Description
HDCP Support (on HDMI input) Buttons	Select HDCP support for HDMI 1 and HDMI 2: Disabled—HDCP encrypted content is not passed Enabled—HDCP support is dictated by the display
Delay switching upon signal loss for (leave 5V on) Box	Sets the delay for video and audio before switching (in auto mode) because of a signal loss on the currently selected input. Value in seconds (see Section 6.2)
Delay switching input upon cable unplug for Box	Sets the delay for video and audio before switching (in auto mode) because the currently selected input cable is unplugged. Value in seconds (see Section 6.2)
Delay power off 5V upon signal loss for Box	Sets the delay for turning off the 5V output because of a signal loss on the currently selected input. Value in seconds (see Section 6.2)

9.6   Setting Authentication

The Authentication page enables activating device security and defining logon authentication details. When device security is enabled, Web page access requires authentication. The default password is **Admin**.

Figure 13: Authentication Page

Item		Description
Activate Security Button		Click to enable/disable security settings. When enabled, the valid username and password must be provided to allow Web page access
Change Password	*Current* Password box	Enter the current password
	New Password box	Enter the new password, (up to 15 printable ASCII characters)
	Retype New Password box	Retype the new password
CHANGE button		Click CHANGE to save the new authentication details

9.7 Managing EDID

The EDID page enables copying EDID data to one or more of the inputs from the following sources:

- Output
- Input
- Default EDID
- EDID data file

From this page you can also lock the EDID on each input independently by pressing the lock icon.
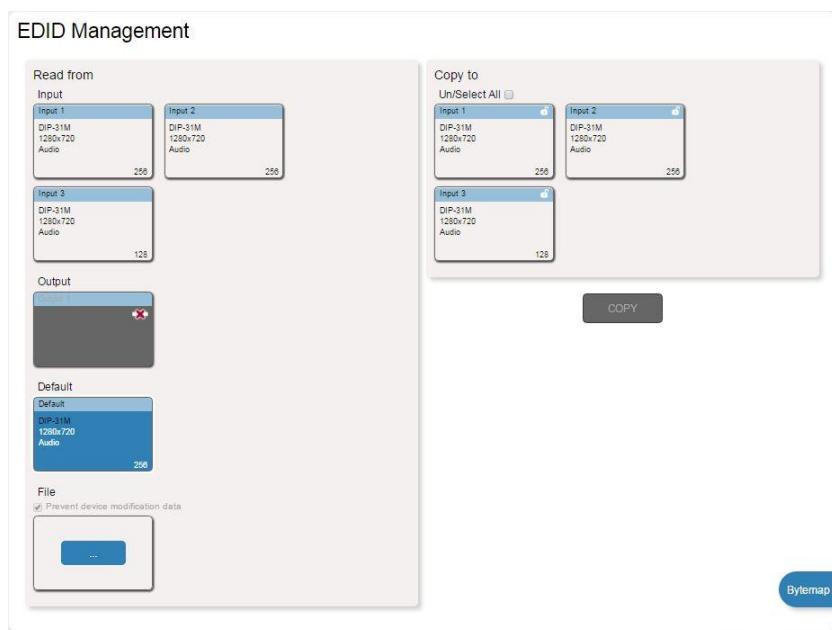
Figure 14: EDID Management Page

When the status of an EDID changes on the device (caused by outputs being exchanged), the display is not updated automatically. In the browser, click **Refresh** to update the display.

Item		Description
Read from Section	Input 1 button	Click to read the EDID from input 1 (HDMI 1)
	Input 2 button	Click to read the EDID from input 2 (HDMI 2)
	Input 3 button	Click to read the EDID from input 3 (VGA)
	Output button	Click to read the EDID from output
	DEFAULT EDID button	Click to read the default EDID
	File …	Click to open the file browser to select an EDID file on your computer
Short Summary information inside the boxes		Displays the current election of EDID source, destination, video resolution, audio availability
Copy to Section	Un/Select All selection box	Check to select or deselect all inputs
	Lock button	Locks the EDID on the currently selected input
	Input 1 button	Click to select input 1 as the destination (HDMI 1)
	Input 2 button	Click to select input 2 as the destination (HDMI 2)
	Input 3 button	Click to select input 3 as the destination (VGA)
COPY Button		Click to copy the EDID from the selected source to the selected destination
BYTEMAP Button		Click to view the hex code of the EDID

To copy EDID data from a source to one or both inputs:

1. In the *Read from* section, click a source button from which to read the EDID (default, output, input, or EDID file).
   The button changes color and the EDID summary information reflects the selection and EDID data.

2. In the *Copy to* section, click an input or select all inputs by checking the **Un/Select All** check-box.
   All selected input buttons change color and the EDID summary information reflects the selection and EDID data.

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

4. Click **OK**.

   Note: An input must be connected to the device to read the EDID from a connected output. If a video signal is not detected on the input, the output is disabled and the EDID cannot be read.

9.8 Upgrading the Firmware

As problems are fixed or features are added, new firmware versions are released for downloading on the Kramer website.

To upgrade the firmware:

1. Open the Firmware Upgrade page.
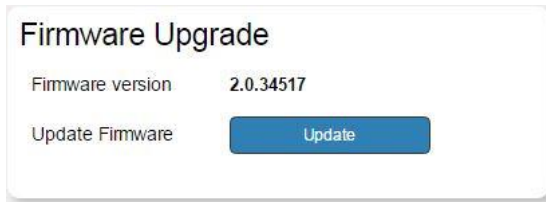
Figure 15: Firmware Upgrade Page

2. Click **Update**.
   The Windows Browser opens.

3. Browse to 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 **DIP-31M** may be damaged.

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

You can upgrade firmware for multiple **DIP-31M** devices installed in the organization via the Kramer Network.

9.9 About Us

The About Us page displays details of the Web version and Kramer contact information.

Figure 16: About Us Page

10 Using Maestro to Create Single-Trigger Control

Maestro is a powerful software tool that enables you to configure single-trigger room element automation scenarios without the need for complicated programming. Choose prepared commands from a database, drag and drop the commands to form actions and execute the actions with predefined triggers.

Maestro turns the device into a much more powerful output device controller. The following table compares the control capabilities of the non-Maestro and Maestro devices:

	Non-Maestro	Maestro
Max. Ports	1	10 (1 RS-232 + 9 Ethernet)
Max. Commands per Action	2	30
Max. Actions	2	20

Scenario configuration follows a simple 4-step process:

1. Configure the ports (Section 10.1)

2. Create commands (Section 10.2)

3. Create actions (Section 10.4)

4. Specify a trigger (Section 10.5)

To see an example scenario that shows the whole process, see Section 10.6.

10.1 Configuring Ports

The first step in defining a trigger-based room element automation scenario is to configure the ports used to control specific room devices, such as a projector.

10.1.1 Creating a New Port

To create a new port:

1. In the Ports section, click ⊕.

   A new port is displayed in the Editor:
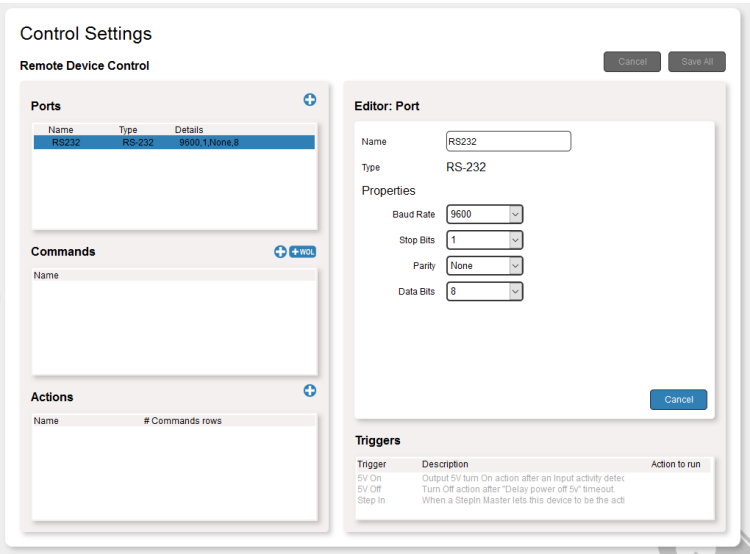
Figure 17: Configuring an RS-232 Port

2. In the Editor, name the port with an easily recognizable name such as,
   RS232_Projector.

3. Define properties by clicking the drop-down boxes and selecting or inserting
   the correct values:

   ▪ For RS-232 select baud rate, stop bits, parity and data bits (Figure 17).

   ▪ For Ethernet select Type TCP/UDP, IP address and port number
     (Figure 18).
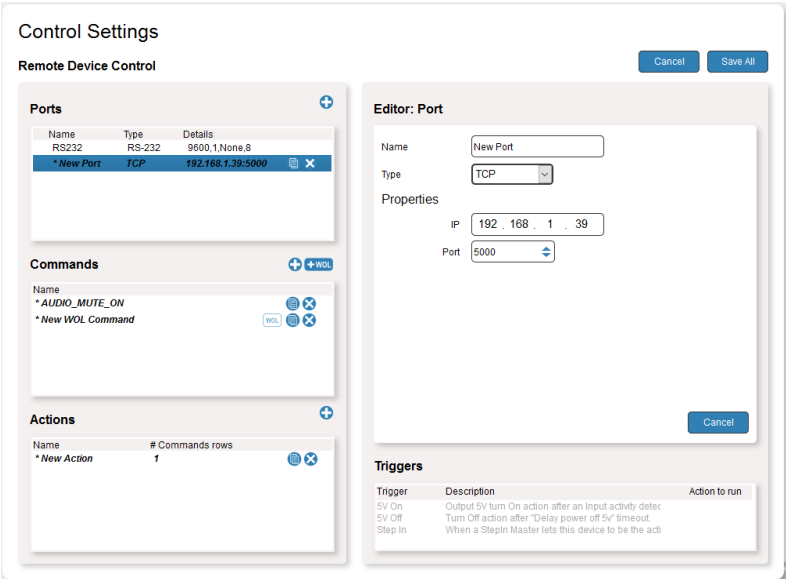
Figure 18: Configuring an Ethernet Port

4. Click **Save All**.

    The new port is created

10.1.2   Editing a Port

To edit a port:

1. In the Ports section, click a port. The port information is displayed in the Editor (Figure 18).

2. Edit the port information as necessary and click **Save All**.

DIP-31M - Using Maestro to Create Single-Trigger Control

10.2   Creating Commands

The second step in defining a trigger-based room element automation scenario is to create a group of commands that perform the automation activities. You can add commands manually by entering command code data or use ready-made commands from a database.

To create a command:

1. In the Commands section, click ⊕.
    A new command opens in the Editor.
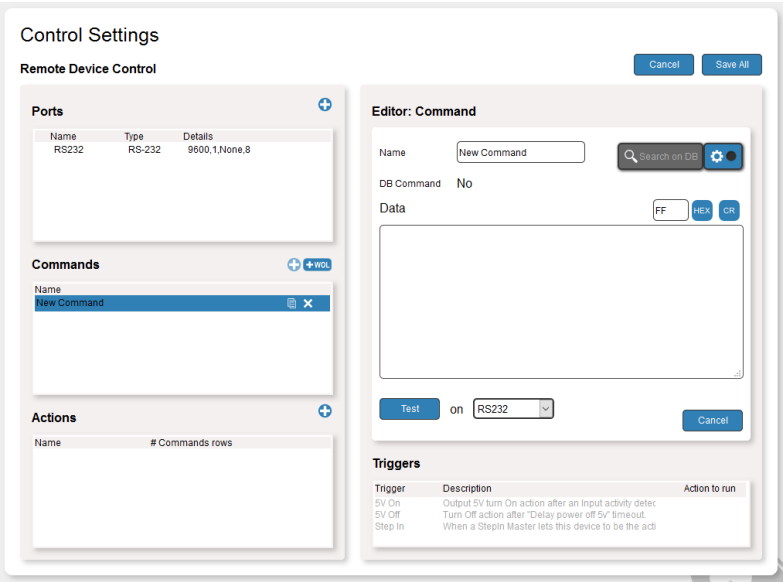
Figure 19: Creating a Command

2. Name the command using an easily recognizable name such as, Input_HDMI_1.

3. Manually enter a command in the Data box.
    Or

Enter Protocol 3000 commands (see Section 13) or device-specific commands from other manufacturers.
Or
Choose from a wide selection of prepared Kramer and non-Kramer commands from the database (see Section 10.3).

4. Optionally, test the new command: Specify the port to which the command is sent (choose from the drop-down box) and click **Test**.

5. Click **Save All**.
The new command is created.

10.3   Using a Command Database

Maestro uses a command database to easily and quickly choose prepared commands with correct syntax. You must connect to the database to use it. Download and install **K-Config 3**, version 3.5.17.0 and above that includes the drivers needed to access the database.

Find **K-Config** on the **DIP-31M** webpage:
www.kramerav.com/il/product/dip-31m#Tab_Resources

10.3.1   Connecting to a Command Database

To connect to a command database:

1. In the Editor section, click [⚙●].
The following screen appears:
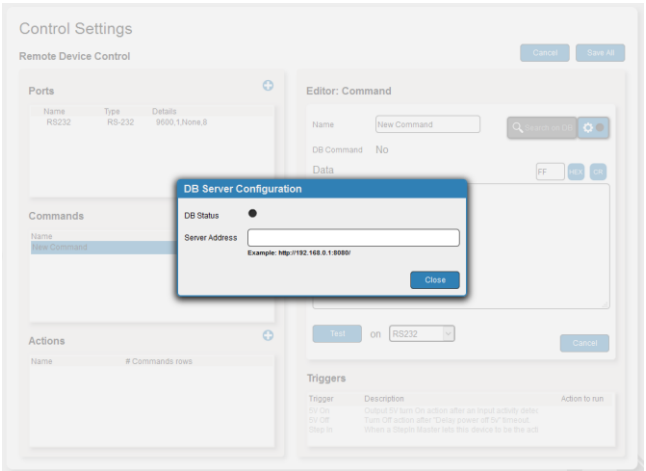
Figure 20: Entering a Command Database

2. Enter the IP address of the computer on which the database is installed.
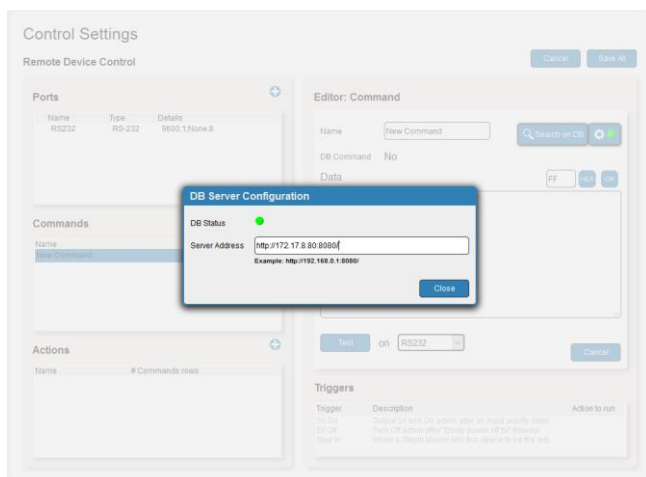
Figure 21: Connecting to a Command Database

When the server is found, the database automatically connects and the DB status indicator lights green. If a server is not found, the status indicator does not light green. Try another address or click **Close**.

3. Click **Close**.

10.3.2 Selecting Commands from the Database

Before you can use commands from a database, you must connect to it (see),

To select commands from the database:

1. In the Editor section, click **Search on DB**.

   The Find Command on Kramer Network Server window appears:

DIP-31M - Using Maestro to Create Single-Trigger Control
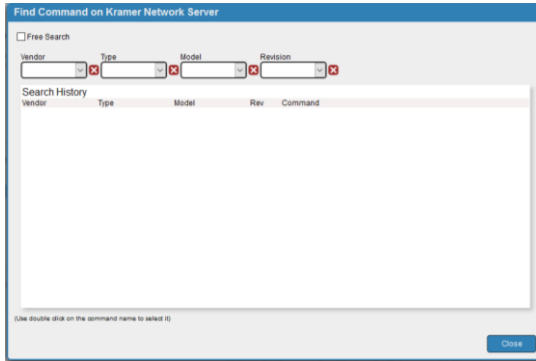
Figure 22: Find Command on Kramer Network Server Window

2. Click each drop-down box and select from the list of a vendors, types, models and revisions – if the revision is not known, select Revision **A**. When all search parameters are complete, a list of available commands appears:
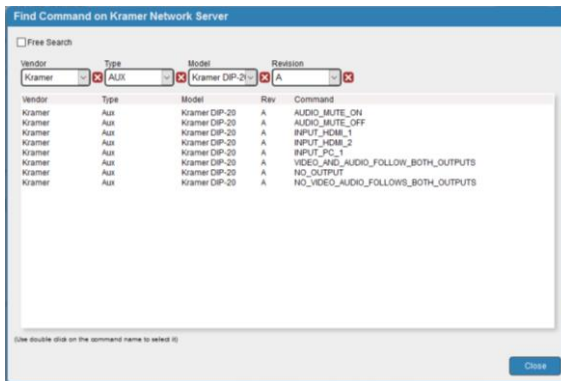
Figure 23: Device-Specific Commands Available in the Database

3. Double-click a command.

   The command appears in the Commands and Editor sections:
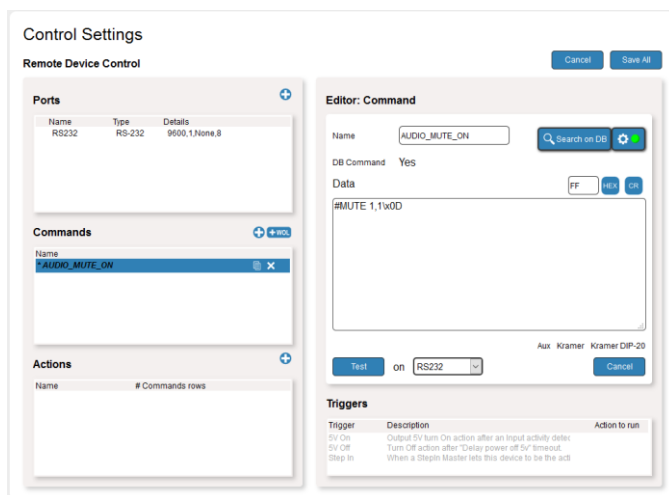
Figure 24: Adding a Command from the Database

10.3.3 Searching for a Command in the Database

If you are unsure of the exact command you need, you can search for commands in the database, by vendor, type, model, and/or revision. You can also limit the number of displayed search results.

To search for a command in the database:

1. Check the **Free Search** check-box.

2. Select values in any or all fields and set the maximum number of commands to display in the Search Limit field.

3. Click **Search**.
   The search results are displayed:

DIP-31M - Using Maestro to Create Single-Trigger Control
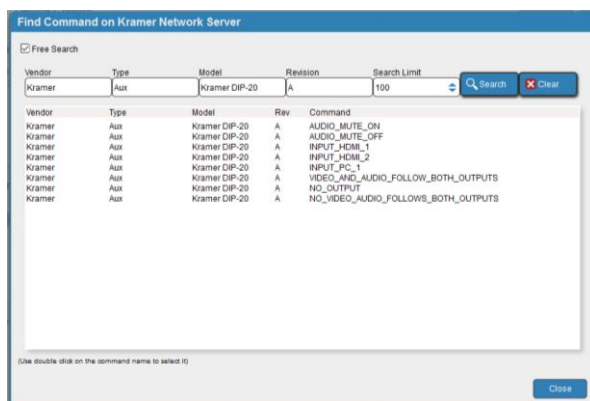
Figure 25: Free Searching in the Database

4. Double-click a command to select it or click **Clear** and enter new search criteria.

10.3.4 Adding a Wake on LAN Command

Wake on LAN (WOL) commands can be used for turning on sleeping devices.

To add a WOL command:

1. In the Commands section, click .
   A new WOL command opens in the Commands section:
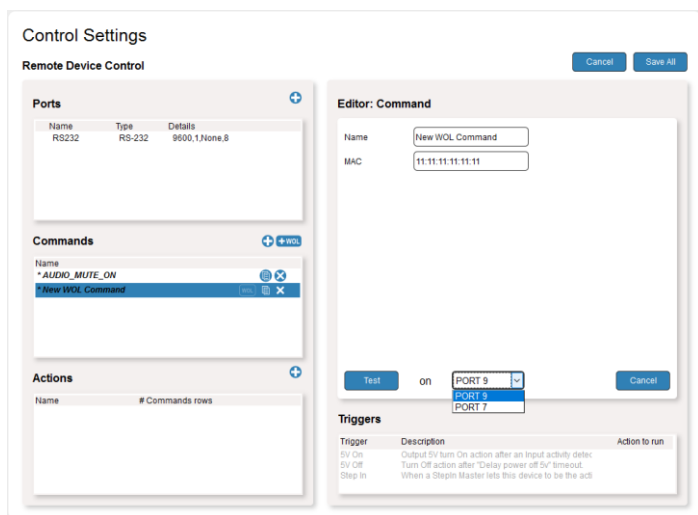
Figure 26: Adding a Wake on LAN Command

2. In the Editor section, name the command using an easily recognizable name.

3. Enter the MAC address of the device that receives the WOL command.

4. Select the port that connects to the device.

5. Click **Save All**.
   The new WOL command is created.

DIP-31M - Using Maestro to Create Single-Trigger Control

10.4   Creating Actions

The third step in defining a trigger-based room element automation scenario is to create an action. An action is a group of commands that is operated according to a trigger. The commands created in the previous steps listed in the Commands section can be dragged and dropped to the Editor section to form the action macro.

To create an action:

1. In the Actions section, click ⊕.
    A new action is opened in the Editor:
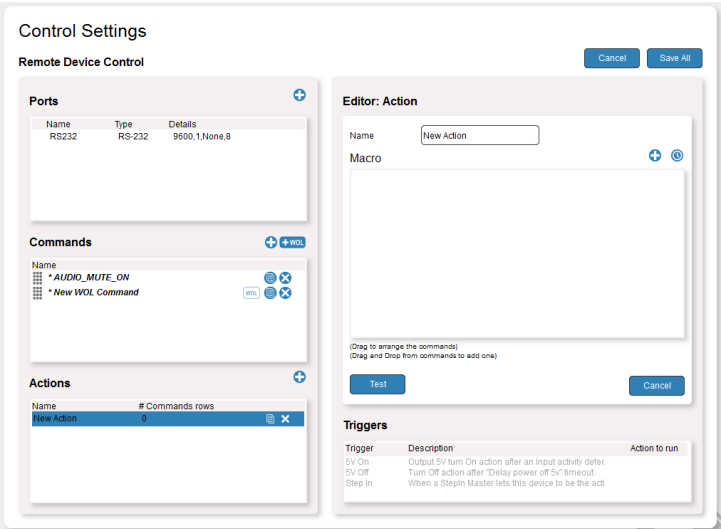
Figure 27: Dragging a Command to an Action

2. In the Editor section, name the action using an easily recognizable name such as, Mute_Audio.

3. Drag individual commands from the Commands section to the Macro box. You can change the order of the commands by dragging them up or down in the box:
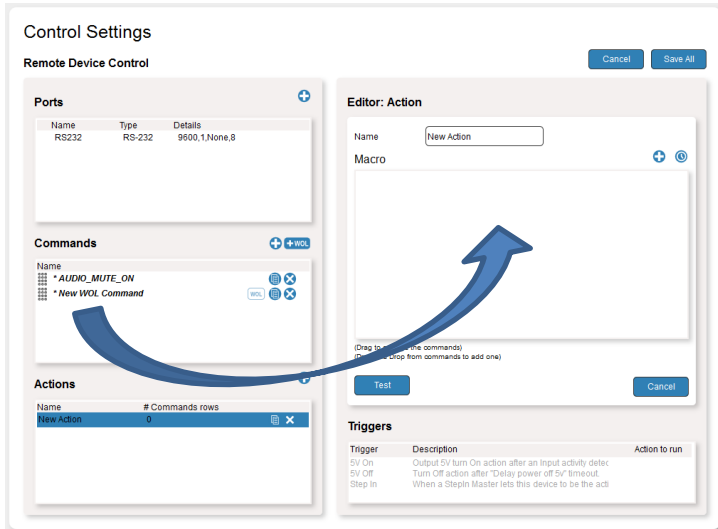
4. Optionally, click ⊙ and set the delay time between commands (from 0 to 999 seconds):
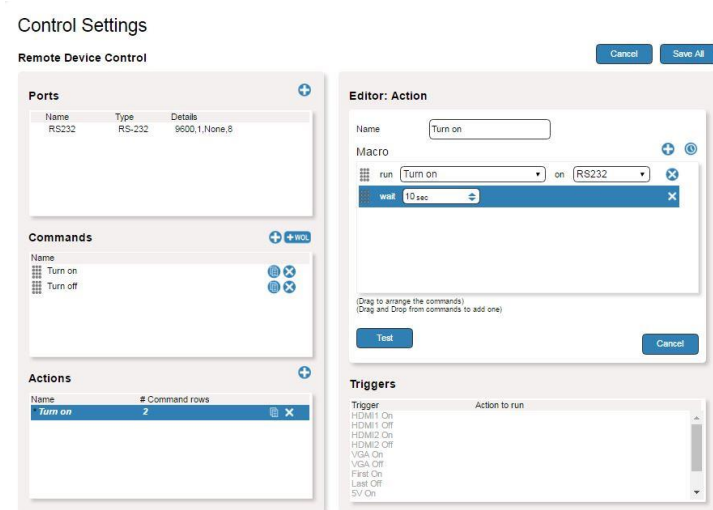
Figure 28: Adding a Delay

5. Optionally, test the new command: Specify the port to which the command is sent (choose from the drop-down box) and click **Test**..
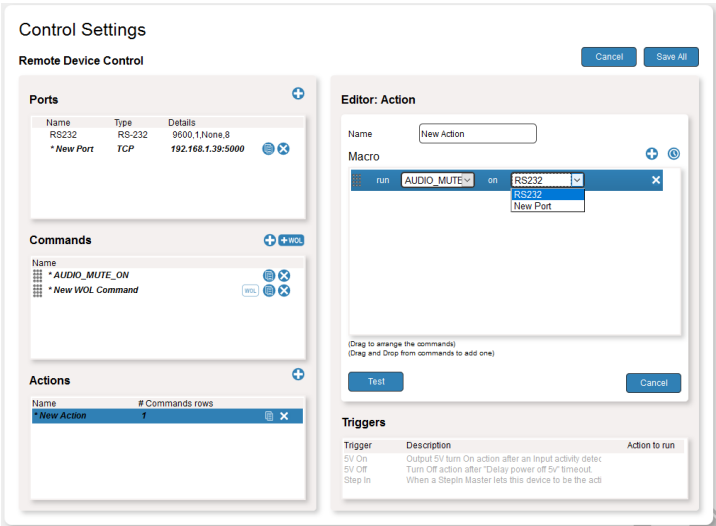
Figure 29: Testing an Action Command

6. Click **Save All**.

   The new action is created.

10.5 Setting a Trigger

The fourth and final step in defining a trigger-based room element automation scenario is to specify a trigger. Triggers are the events that cause actions (lists of commands) to run. Select a trigger and associate it with a previously defined action.

The following triggers are available:

Trigger Name	Description
HDMI1 On	When the 1st HDMI input is connected
HDMI1 Off	When the 1st HDMI input is disconnected
HDMI2 On	When the 2nd HDMI input is connected
HDMI2 Off	When the 2nd HDMI input is disconnected
VGA On	When the VGA input is connected
VGA Off	When the VGA input is disconnected
First On	When the first input is connected
Last Off	When the last input is disconnected
5V On (Input detected)	When input activity is detected

Trigger Name	Description
5V Off (No input detected)	After the "delay power off" timeout period has expired (default 900 seconds) following no input activity
Step In	When a Step-in master makes this device the active input
Power On	When the the device is powered on

To set a trigger:

1. In the Triggers section, click a trigger.

   The trigger opens in the Editor.
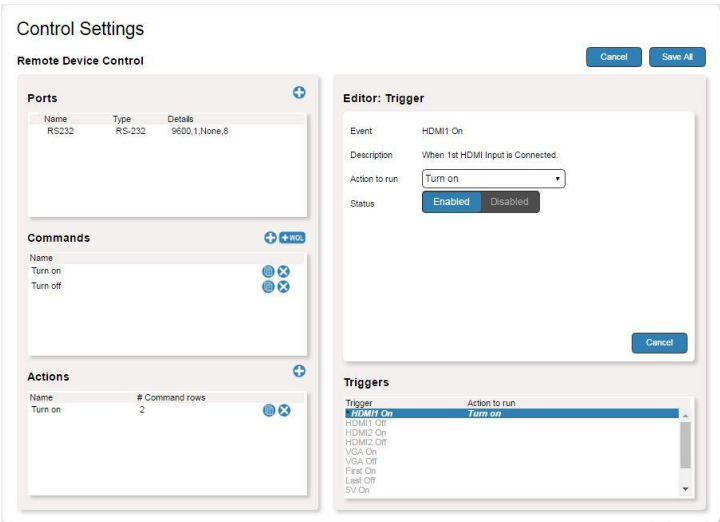
Figure 30: Setting a Trigger

2. In the Action to run dropdown box, select an action to associate to the trigger.

3. Click **Enabled** or **Disabled**.

   When a trigger is enabled, all the commands in the specified action run when the trigger condition becomes active. When the trigger is disabled, none of the specified actions take place, even if the trigger becomes active.

4. Click **Save All**.

   The trigger is defined.

10.6 Configuration Example

This section provides an example for how to configure the following typical scenario:

A meeting room is frequently used for presentations and the customer wants to automate the meeting room elements at the beginning (and ending) of the presentation upon connecting the presenter's laptop, as follows:

- Lower the screen.

- Close the room shades.

- Turn the projector on.

- Turn the room lights off.

To accomplish this, the customer has installed the following Kramer equipment in the meeting room:

- **DIP-31M** – *Automatic Video Switcher* controls the room

- **FC-7** – *LAN Gateway* controls relay-activated blinds and the projection screen

- **RB-6** – *6-Channel Power Controller* controls power to the lighting system

In addition, the meeting room also contains:

- A Barco projector.

- A relay activated, motorized projection screen.

- Relay activated, motorized room blinds.

- A room lighting system.

Figure 31 illustrates the room setup and connections.
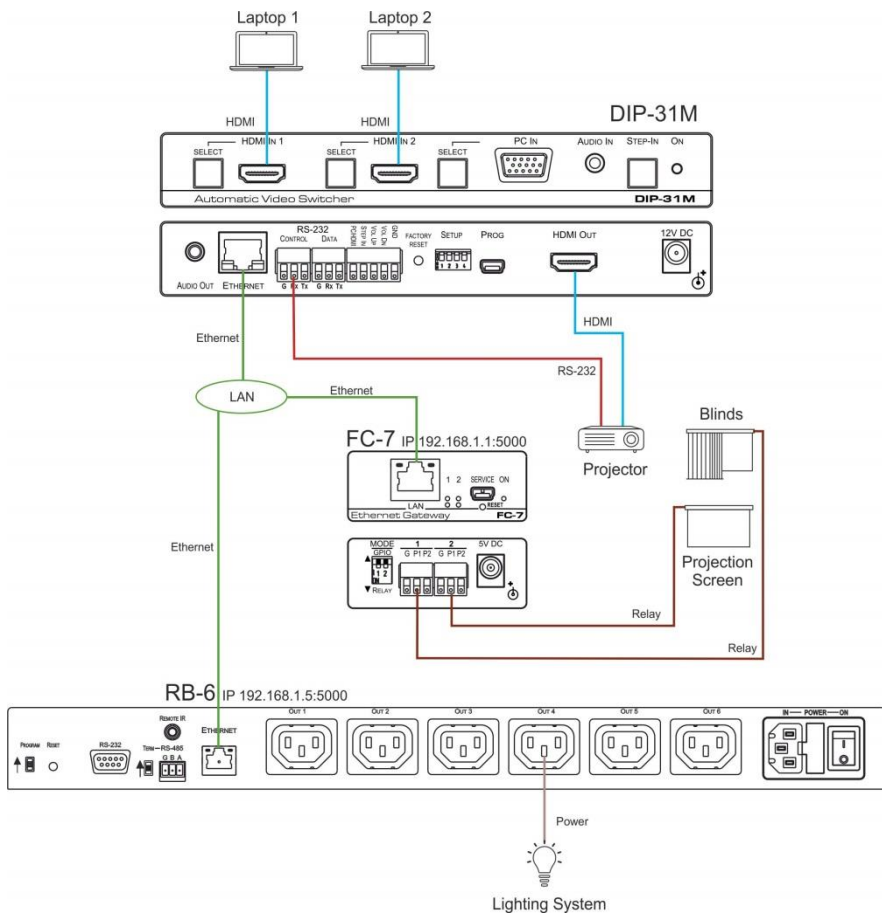
Figure 31: Example Room Control Scenario

DIP-31M - Using Maestro to Create Single-Trigger Control

10.6.1 Configuring the Ports

Click ⊕ to open each new port. Each port a has descriptive name and is configured as follows:

- The RS-232 port named *Projector* controls a Barco projector.

- The Ethernet port named *Screen/Blinds* connects to a Kramer **FC-7** (IP address: 192.168.1.1:5000) that operates two relays to control the screen and blinds.

- The Ethernet port named *Lights* connects to a Kramer **RB-6** (IP address: 192.168.1.5:5000) that powers the lights on port 4.

Figure 32: Configuring the Lights Ethernet Port

10.6.2 Creating Commands

Click ⊕ to open each new command. Each command has a descriptive name and is configured as follows:

The *Screen Down* and *Close Blinds* commands operate the screen (relay 2) and blinds (relay 1) over the **FC-7** (see Figure 31) using the Protocol 3000 RELAY-STATE command. The data for the commands was manually entered and not chosen from the database.
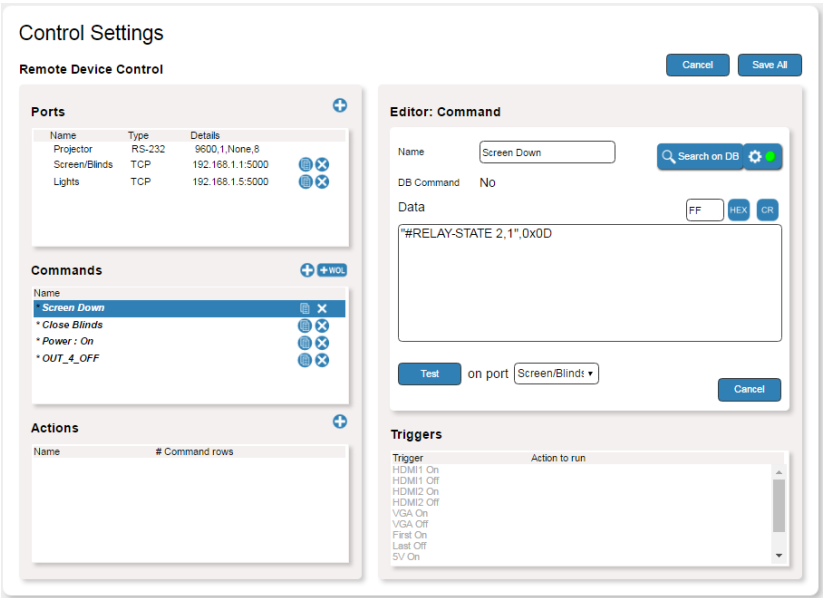
Figure 33: Screen Down Command in Protocol 3000

The *Projector* and *Lights* commands were taken from the database.

Note: To use the command database, make sure the correct version of database is installed. To connect, enter the IP of the host computer (see Section 10.3.1).

Power : On is the default command name that turns on a Barco projector. The
device-specific command was selected from the command database.
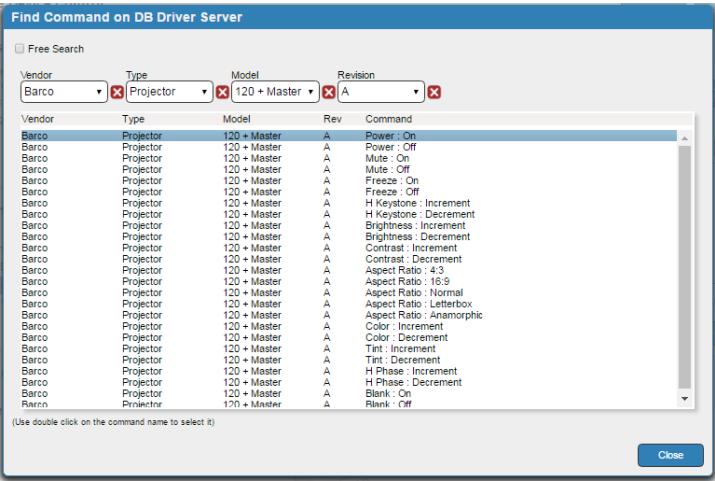
Figure 34: Barco Projector Command List

Double-click the command to add it to the list.

Note the device name in the lower-right corner of the Editor window.
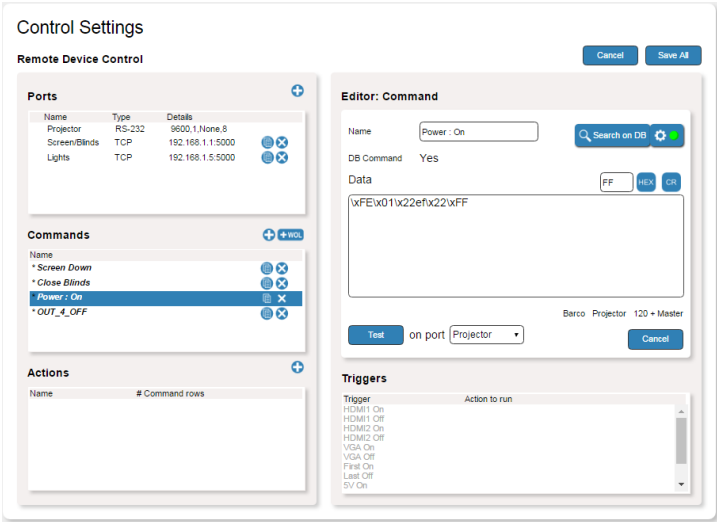
Figure 35: Projector On Command

Out_4_OFF is the default command name that **RB-6** uses to turn off the room lights. As shown in Figure 31, the lighting system is connected to output 4.
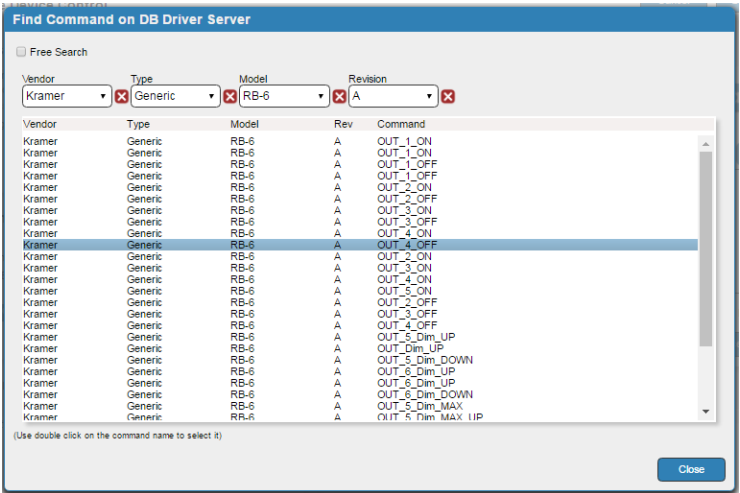
Figure 36: RB-6 Command List

Here, the command name *Out_4_OFF* was changed to *Lights Off*.
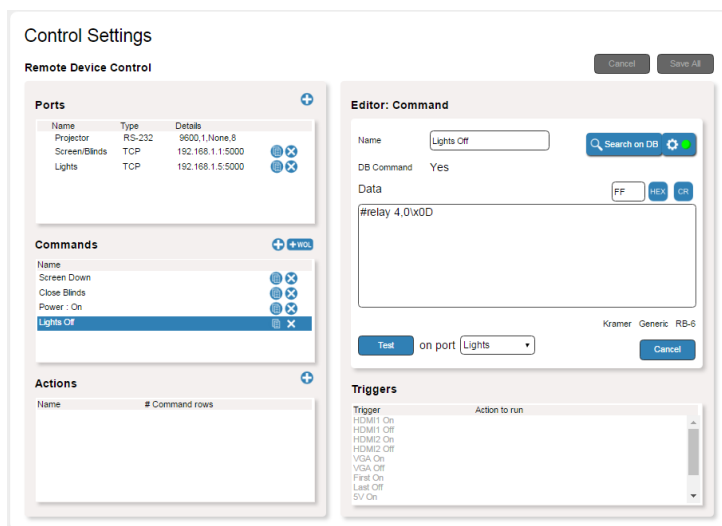
Figure 37: Lights Off Command

10.6.3 Creating Actions

Click ⊕ to open a new action. *Start Show* is the descriptive name and is configured as follows:

- Populate the macro by clicking and dragging commands from the command list to the Editor. The commands run in the order they appear in the action list.

- To change the order, click the command and drag it to a new position in the list.

- To enter a delay between commands, click the clock icon and adjust the delay time.

- Commands and ports can be changed by selecting a different item in the drop-down boxes of the command.
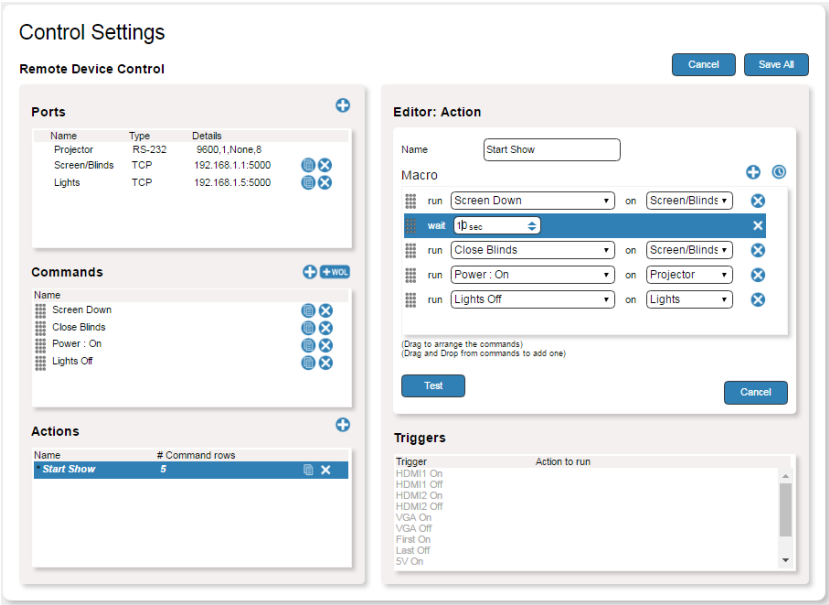
Figure 38: Adding a Delay to the Action Command List

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10.6.4 Specifying a Trigger

- Click a trigger from the trigger list.

- Select the Action to run from the drop-down box in the Editor.

- Enable or disable the trigger in the status box.
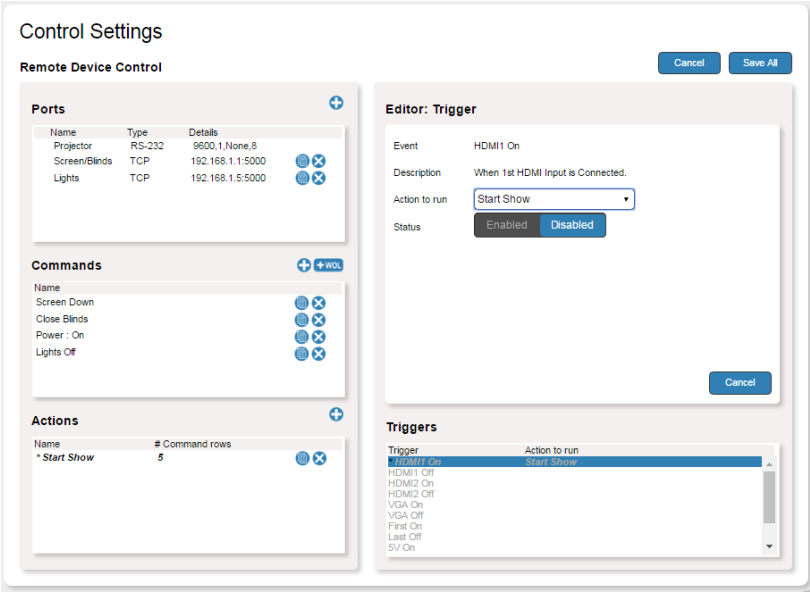
Figure 39: Specifying a Trigger for the Action

11 Technical Specifications

INPUTS:	Video:	2 HDMI on HDMI connectors 1 VGA on a 15-pin HD (F) connector
	Audio:	1 Unbalanced stereo audio 1V RMS (nominal) on a 3.5mm mini jack
OUTPUTS:	Video:	1 HDMI on an HDMI connector
	Audio:	1 Unbalanced stereo audio 1V RMS (nominal) on a 3.5mm mini jack
PORTS:		1 Ethernet on an RJ-45 connector 1 RS-232 3-pin terminal block control port 1 RS-232 3-pin terminal block data port 1 USB on mini USB connector
CONTROLS:		Remote switches for input switching, step-in, volume control, and device reset switch
STANDARDS:		HDMI with Deep Color, x.v.Color™ and 3D HDCP 1.4 works with sources that support HDCP repeater mode
MAXIMUM ANALOG AUDIO LEVELS:		3.1V p-p
THD:		0.013%
SNR:		75dB
POWER CONSUMPTION:		12V DC, 600mA
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
COOLING:		Convection
ENCLOSURE TYPE:		Aluminum
DIMENSIONS:		18.75cm x 11.5cm x 2.54cm (7.38" x 4.53" x 1.0") W, D, H
WEIGHT:		0.43kg (0.95lbs) approx.
SHIPPING DIMENSIONS:		34.5cm x 16.5cm x 5.2cm (13.6" x 6.5" x 2.0") W, D, H
SHIPPING WEIGHT:		1.03kg (2.3lbs) approx.
ENVIRONMENTAL REGULATORY COMPLIANCE:		Complies with appropriate requirements of RoHs and WEEE
INCLUDED ACCESSORIES:		Power adapter ADC-DPM/HF DisplayPort (M) to HDMI (F) adapter cable, (for connecting a DisplayPort source to the HDMI input)
OPTIONS:		Rack adapter RK-T2B
WARRANTY:		7 years parts and labor

11.1 Default IP Parameters

Parameter	Values	Default
Device Name	Any alphanumeric string up to 14 chars (can include hyphen, but not at the beginning or end)	DIP-31M-
DHCP	ON/OFF	OFF
IP Address	Any valid IP address	192.168.1.39
Mask	Any valid network mask	255.255.0.0
Gateway	Any valid gateway address	192.168.0.1
UDP Port	0 to 65535	50000
TCP Port	0 to 65535	5000

11.2 Default Logon Credentials

Parameter	Values
Name	Admin
Password	Admin

11.3 Supported HDMI Resolutions

Resolution	Refresh Rate (Hz)
640x480p	85Hz; 75Hz; 72Hz; 60Hz; 59.95Hz
720x480p	60Hz
720x480i	30Hz
720x576p	50Hz
800x600p	85Hz; 75Hz; 72Hz; 60Hz
848x480p	60Hz
852x480p	60Hz
1024x768p	85Hz; 75Hz; 70Hz; 60Hz
1152x864p	75Hz
1280x768p	60Hz
1280x800p	60Hz
1280x960	60Hz
1280x1024p	75Hz; 60Hz
1360x768p	60Hz
1366x768	60Hz; 50Hz
1400x1050p	60Hz
1440x900p	60Hz
1600x900p	60Hz
1600x1200p	60Hz
1680x1050p	60Hz
1920x1080p	50Hz; 60Hz; 30Hz; 24Hz;

Resolution	Refresh Rate (Hz)
1920x1080i	50Hz; 60Hz;
3840x2160	30Hz
4096x2160	30Hz

11.4 Supported VGA Resolutions

Resolution	Refresh Rate
640x480p	60Hz
720x480p	60Hz
800x600p	60Hz
848x480p	60Hz
1024x768p	60Hz
1152x864	75Hz
1280x720p	60Hz; 50Hz
1280x768	60Hz
1280x800	60Hz
1280x960p	60Hz
1280x1024p	60Hz
1360x768	60Hz;
1366x768	60Hz; 50Hz
1400x1050	60Hz
1440x900	60Hz
1920x1080p	60Hz
1920x1200	60Hz

DIP-31M - Technical Specifications

12   Default EDID

Each input on the **DIP-31M** is loaded with a factory default EDID.

12.1   HDMI

```
Monitor
  Model name...............DIP-31
  Manufacturer............. KMR
  Plug and Play ID......... KMR1200
  Serial number............ n/a
  Manufacture date......... 2015, ISO week 255
  Filter driver............ None
  -----------------------
  EDID revision............ 1.3
  Input signal type........ Digital
  Color bit depth.......... Undefined
  Display type............. RGB color
  Screen size.............. 520 x 320 mm (24.0 in)
  Power management......... Standby, Suspend, Active off/sleep
  Extension blocs.......... 1 (CEA-EXT)
  -----------------------
  DDC/CI................... n/a

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

Timing characteristics
  Horizontal scan range.... 30-83kHz
  Vertical scan range...... 56-76Hz
  Video bandwidth.......... 170MHz
  CVT standard............. Not supported
  GTF standard............. Not supported
  Additional descriptors... None
  Preferred timing......... Yes
  Native/preferred timing.. 1280x720p at 60Hz (16:10)
    Modeline............... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync

Standard timings supported
   720 x  400p at  70Hz - IBM VGA
   720 x  400p at  88Hz - IBM XGA2
   640 x  480p at  60Hz - IBM VGA
   640 x  480p at  67Hz - Apple Mac II
   640 x  480p at  72Hz - VESA
   640 x  480p at  75Hz - VESA
   800 x  600p at  56Hz - VESA
   800 x  600p at  60Hz - VESA
   800 x  600p at  72Hz - VESA
   800 x  600p at  75Hz - VESA
   832 x  624p at  75Hz - Apple Mac II
  1024 x  768i at  87Hz - IBM
  1024 x  768p at  60Hz - VESA
  1024 x  768p at  70Hz - VESA
  1024 x  768p at  75Hz - VESA
  1280 x 1024p at  75Hz - VESA
  1152 x  870p at  75Hz - Apple Mac II
  1280 x 1024p at  75Hz - VESA STD
  1280 x 1024p at  85Hz - VESA STD
  1600 x 1200p at  60Hz - VESA STD
  1024 x  768p at  85Hz - VESA STD
```

```
800 x  600p at  85Hz - VESA STD
640 x  480p at  85Hz - VESA STD
1152 x  864p at  70Hz - VESA STD
1280 x  960p at  60Hz - VESA STD
```

EIA/CEA-861 Information
  Revision number.......... 3
  IT underscan............. Supported
  Basic audio.............. Supported
  YCbCr 4:4:4.............. Supported
  YCbCr 4:2:2.............. Supported
  Native formats........... 1
  Detailed timing #1....... 1920x1080p at 60Hz (16:10)
    Modeline.............. "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
  Detailed timing #2....... 1920x1080i at 60Hz (16:10)
    Modeline.............. "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
  Detailed timing #3....... 1280x720p at 60Hz (16:10)
    Modeline.............. "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
  Detailed timing #4....... 720x480p at 60Hz (16:10)
    Modeline.............. "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync

CE audio data (formats supported)
  LPCM   2-channel, 16/20/24 bit depths at 32/44/48 kHz

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

CE vendor specific data (VSDB)
  IEEE registration number. 0x000C03
  CEC physical address..... 1.0.0.0
  Maximum TMDS clock....... 165MHz

CE speaker allocation data
  Channel configuration.... 2.0
  Front left/right......... Yes
  Front LFE................ No
  Front center............. No
  Rear left/right.......... No
  Rear center.............. No
  Front left/right center.. No
  Rear left/right center... No
  Rear LFE................. No

Report information
  Date generated........... 09/08/2015
  Software revision........ 2.60.0.972
  Data source.............. File
  Operating system......... 6.1.7601.2.Service Pack 1

Raw data
00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,12,00,00,00,00,FF,19,01,03,80,34,20,78,EA,B3,25,AC,51,30,B4,26,
10,50,54,FF,FF,80,81,8F,81,99,A9,40,61,59,45,59,31,59,71,4A,81,40,01,1D,00,72,51,D0,1E,20,6E,28,
55,00,07,44,21,00,00,1E,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,20,00,00,00,FC,00,41,
56,53,2D,33,32,20,20,20,20,20,20,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,01,B7,
02,03,1B,F1,23,09,07,07,48,10,05,84,03,02,07,16,01,65,03,0C,00,10,00,83,01,00,00,02,3A,80,18,71,
38,2D,40,58,2C,45,00,07,44,21,00,00,1E,01,1D,80,18,71,1C,16,20,58,2C,25,00,07,44,21,00,00,9E,01,
1D,00,72,51,D0,1E,20,6E,28,55,00,07,44,21,00,00,1E,8C,0A,D0,8A,20,E0,2D,10,10,3E,96,00,07,44,21,
00,00,18,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,47

DIP-31M - Default EDID

12.2 PC-UXGA

Monitor
  Model name............... DIP-31
  Manufacturer............. KMR
  Plug and Play ID......... KMR1200
  Serial number............ n/a
  Manufacture date......... 2015, ISO week 255
  Filter driver............ None

  EDID revision............ 1.3
  Input signal type........ Analog 0.700,0.000 (0.7V p-p)
  Sync input support....... Separate, Composite, Sync-on-green
  Display type............. RGB color
  Screen size.............. 520 x 320 mm (24.0 in)
  Power management......... Standby, Suspend, Active off/sleep
  Extension blocs.......... None

  DDC/CI................... n/a

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

Timing characteristics
  Horizontal scan range.... 30-83kHz
  Vertical scan range...... 56-76Hz
  Video bandwidth.......... 170MHz
  CVT standard............. Not supported
  GTF standard............. Not supported
  Additional descriptors... None
  Preferred timing......... Yes
  Native/preferred timing.. 1280x720p at 60Hz (16:10)
    Modeline............... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync

Standard timings supported
   720 x 400p at 70Hz - IBM VGA
   720 x 400p at 88Hz - IBM XGA2
   640 x 480p at 60Hz - IBM VGA
   640 x 480p at 67Hz - Apple Mac II
   640 x 480p at 72Hz - VESA
   640 x 480p at 75Hz - VESA
   800 x 600p at 56Hz - VESA
   800 x 600p at 60Hz - VESA
   800 x 600p at 72Hz - VESA
   800 x 600p at 75Hz - VESA
   832 x 624p at 75Hz - Apple Mac II
  1024 x 768i at 87Hz - IBM
  1024 x 768p at 60Hz - VESA
  1024 x 768p at 70Hz - VESA
  1024 x 768p at 75Hz - VESA
  1280 x 1024p at 75Hz - VESA
  1152 x 870p at 75Hz - Apple Mac II
  1280 x 1024p at 75Hz - VESA STD
  1280 x 1024p at 85Hz - VESA STD
  1600 x 1200p at 60Hz - VESA STD
  1024 x 768p at 85Hz - VESA STD
   800 x 600p at 85Hz - VESA STD
   640 x 480p at 85Hz - VESA STD
  1152 x 864p at 70Hz - VESA STD
  1280 x 960p at 60Hz - VESA STD

EIA/CEA-861 Information
  Revision number.......... 3
  IT underscan............. Supported
  Basic audio.............. Supported
  YCbCr 4:4:4.............. Supported
  YCbCr 4:2:2.............. Supported
  Native formats........... 1
  Detailed timing #1....... 1920x1080p at 60Hz (16:10)
    Modeline.............. "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
  Detailed timing #2....... 1920x1080i at 60Hz (16:10)
    Modeline.............. "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
  Detailed timing #3....... 1280x720p at 60Hz (16:10)
    Modeline.............. "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
  Detailed timing #4....... 720x480p at 60Hz (16:10)
    Modeline.............. "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync

CE audio data (formats supported)
  LPCM   2-channel, 16/20/24 bit depths at 32/44/48 kHz

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

CE vendor specific data (VSDB)
  IEEE registration number. 0x000C03
  CEC physical address..... 1.0.0.0
  Maximum TMDS clock....... 165MHz

CE speaker allocation data
  Channel configuration.... 2.0
  Front left/right......... Yes
  Front LFE............... No
  Front center............ No
  Rear left/right.......... No
  Rear center.............. No
  Front left/right center.. No
  Rear left/right center... No
  Rear LFE................. No

Report information
  Date generated........... 09/08/2015
  Software revision........ 2.60.0.972
  Data source.............. File
  Operating system......... 6.1.7601.2.Service Pack 1

Raw data
00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,12,00,00,00,00,FF,19,01,03,6E,34,20,78,EE,B3,25,AC,51,30,B4,26,
10,50,54,FF,FF,80,81,8F,81,99,A9,40,61,59,45,59,31,59,71,4A,81,40,01,1D,00,72,51,D0,1E,20,6E,28,
55,00,07,44,21,00,00,1E,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,20,00,00,00,FC,00,41,
56,53,2D,33,32,20,20,20,20,20,20,20,20,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,C6,
02,03,1B,F1,23,09,07,07,48,10,05,84,03,02,07,16,01,65,03,0C,00,10,00,83,01,00,00,02,3A,80,18,71,
38,2D,40,58,2C,45,00,07,44,21,00,00,1E,01,1D,80,18,71,1C,16,20,58,2C,25,00,07,44,21,00,00,9E,01,
1D,00,72,51,D0,1E,20,6E,28,55,00,07,44,21,00,00,1E,8C,0A,D0,8A,20,E0,2D,10,10,3E,96,00,07,44,21,
00,00,18,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,47

DIP-31M - Default EDID

13 Protocol 3000

The **DIP-31M** can be operated using Kramer Protocol 3000 serial commands. Command framing varies according to how you interface with the **DIP-31M**. For example, a basic video input switching command that routes a layer 1 video signal to HDMI out 1 from HDMI input 2 (ROUTE 1,1,2), is entered as follows:

- Terminal communication software, such as Hercules:
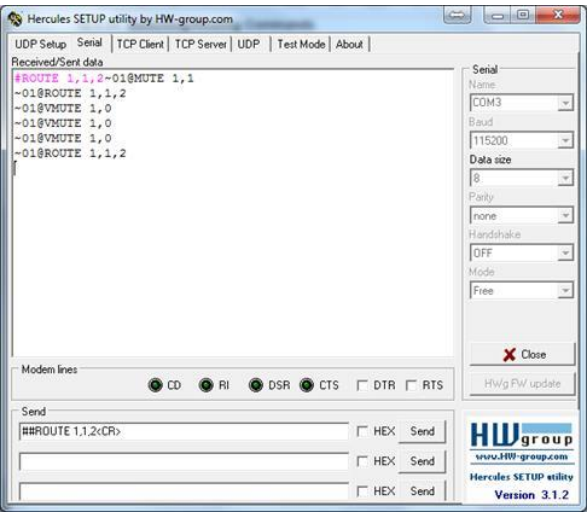
> The framing of the command varies according to the terminal communication software. (Examples in this section have K-Config framing).

- K-Touch Builder (Kramer software):

- K-Config (Kramer configuration software):

Command Syntax   Display Command as ○ Hex ○ Decimal ● ASCII

"#ROUTE 1,1,2",0x0D   [Set] [Clear]

You can enter commands directly using terminal communication software (e.g., Hercules) by connecting a PC to the serial or Ethernet port on the **DIP-31M**. To enter `CR` press the Enter key (`LF` is also sent but is ignored by the command parser).

Commands sent from various non-Kramer controllers (e.g., Crestron) may require special coding for some characters (such as, `/X##`). For more information, refer to your controller's documentation.

For more information about:

- Using Protocol 3000 commands, see <u>Section 13.1</u>

- General syntax used for Protocol 3000 commands, see <u>Section 13.2</u>

- Protocol 3000 commands available for the **DIP-31M**, see <u>Section 13.3</u>

13.1   Understanding Protocol 3000

Protocol 3000 commands are structured according to the following:

- **Command –** A sequence of ASCII letters (`A-Z`, `a-z` and `-`). A command and its parameters must be separated by at least one space.

- **Parameters –** A sequence of alphanumeric ASCII characters (`0-9`, `A-Z`, `a-z` and some special characters for specific commands). Parameters are separated by commas.

- **Message string –** Every command entered as part of a message string begins with a message starting character and ends with a message closing character.

A string can contain more than one command. Commands are separated by a pipe (|) character.

The maximum string length is 64 characters.

- **Message starting character:**
  - # – For host command/query
  - ~ – For device response

- **Device address** – K-NET Device ID followed by @ (optional, K-NET only)

- **Query sign** –? follows some commands to define a query request

- **Message closing character:**
  - CR – Carriage return for host messages (ASCII 13)
  - CR LF – Carriage return for device messages (ASCII 13) and line-feed (ASCII 10)

- **Command chain separator character –** Multiple commands can be chained in the same string. Each command is delimited by a pipe character (|). When chaining commands, enter the message starting character and the message closing character only at the beginning and end of the string.

Spaces between parameters or command terms are ignored. Commands in the string do not execute until the closing character is entered. A separate response is sent for every command in the chain.

13.2 Kramer Protocol 3000 Syntax

The Kramer Protocol 3000 syntax uses the following delimiters:

- CR = Carriage return (ASCII 13 = 0x0D)

- LF = Line feed (ASCII 10 = 0x0A)

- SP = Space (ASCII 32 = 0x20)

Some commands have short name syntax in addition to long name syntax to enable faster typing. The response is always in long syntax.

The Protocol 3000 syntax is in the following format:

- Host Message Format:

Start	Address (optional)	Body	Delimiter
#	*Device_id@*	**Message**	CR

- **Simple Command** – Command string with only one command without addressing:

Start	Body	Delimiter
#	**Command** SP *Parameter_1,Parameter_2,…*	CR

- **Command String** – Formal syntax with command concatenation and addressing:

Start	Address	Body	Delimiter
#	*Device_id@*	**Command_1** *Parameter1_1,Parameter1_2,…*| **Command_2** *Parameter2_1,Parameter2_2,…*| **Command_3** *Parameter3_1,Parameter3_2,…*|…	CR

- Device Message Format:

Start	Address (optional)	Body	Delimiter
~	*Device_id@*	**Message**	CR LF

- Device Long Response – Echoing command:

Start	Address (optional)	Body	Delimiter
~	*Device_id@*	**Command** SP *[Param1 ,Param2 …]* result	CR LF

13.3 Protocol 3000 Commands

This section includes the following commands:

- System Commands (see Section 13.3.1)

- Authentication Commands (see Section 13.3.2)

- Switching/Routing Commands (see Section 13.3.3)

- Video Commands (see Section 13.3.4)

- Audio Commands (see Section 13.3.5)

- Communication Commands (see Section 13.3.6)

- EDID Handling Commands (see Section 13.3.7)

13.3.1 System Commands

Command	Description
#	Protocol handshaking (system mandatory)
BUILD-DATE	Get device build date (system mandatory)
FACTORY	Reset to factory default configuration
HELP	Get command list (system mandatory)
MODEL	Get device model (system mandatory)
PROT-VER	Get device protocol version (system mandatory)
RESET	Reset device (system mandatory)
SN	Get device serial number (system mandatory)
VERSION	Get device firmware version (system mandatory)
AV-SW-MODE	Set/get auto switch mode (system)
AV-SW-TIMEOUT	Set/get auto switching timeout (system)
DISPLAY	Get output HPD status (system)
DPSW-STATUS	Get the DIP-switch status (system)
FPGA-VER	Get current FPGA version (system)
HDCP-MOD	Set/get HDCP mode (system)
HDCP-STAT	Get HDCP signal status (system)
NAME	Set/get machine (DNS) name (system – Ethernet)
NAME-RST	Reset machine (DNS) name to factory default (system – Ethernet)
PRIORITY	Set/get priority for all channels (system)
SIGNAL	Get input signal lock status (system)

13.3.1.1

Functions		Permission	Transparency
Set:	**#**	End User	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Protocol handshaking	#CR	
Get:	-	-	
Response			
~nn@SP**OK**CR LF			
Parameters			
Response Triggers			
Notes			
Validates the Protocol 3000 connection and gets the machine number Step-in master products use this command to identify the availability of a device			
Example			
"#",0x0D			

13.3.1.2 BUILD-DATE

Functions		Permission	Transparency
Set:	**-**	-	-
Get:	**BUILD-DATE?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get device build date	#**BUILD-DATE?**CR	
Response			
~nn@**BUILD-DATE**SP*date*SP*time*CR LF			
Parameters			
date – Format: YYYY/MM/DD where YYYY = Year, MM = Month, DD = Day *time* – Format: hh:mm:ss where hh = hours, mm = minutes, ss = seconds			
Response Triggers			
Notes			
Example			
"#BUILD-DATE?",0x0D			

13.3.1.3 FACTORY

Functions		Permission	Transparency
Set:	**FACTORY**	End User	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Reset device to factory default configuration	#**FACTORY**CR	
Get:	-	-	
Response			
~nn@**FACTORY**SPOKCR LF			
Parameters			
Response Triggers			
Notes			
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.			
Example			
"#FACTORY",0x0D			

13.3.1.4 HELP

Functions		Permission	Transparency
Set:	**-**	-	-
Get:	HELP	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get command list or help for specific command	1. #HELPCR 2. #HELPSP*COMMAND_NAME*CR	
Response			
1. Multi-line: ~nn@Device available protocol 3000 commands:CR LF*command,*SP *command...*CR LF 2. Multi-line: ~nn@HELPSP*command*:CR LF*description*CR LFUSAGE:*usage*CR LF			
Parameters			
COMMAND_NAME – name of a specific command			
Response Triggers			
Notes			
To get help for a specific command use: HELPSPCOMMAND_NAMECR LF			
Example			
"#HELP",0x0D			

13.3.1.5 MODEL

Functions		Permission	Transparency
Set:	-	-	-
Get:	`MODEL?`	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get device model	`#MODEL?`CR	
Response			
~nn@**MODEL**SP`model_name`CR LF			
Parameters			
`model_name` – String of up to 19 printable ASCII chars			
Response Triggers			
Notes			
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			
Example			
"#MODEL?",0x0D			

13.3.1.6 PROT-VER

Functions		Permission	Transparency
Set:	-	-	-
Get:	`PROT-VER?`	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get device protocol version	`#PROT-VER?`CR	
Response			
~nn@**PROT-VER**SP3000:`version`CR LF			
Parameters			
`version` - XX.XX where X is a decimal digit			
Response Triggers			
Notes			
Example			
"#PROT-VER?",0x0D			

13.3.1.7 RESET

Functions		Permission	Transparency
Set:	**RESET**	Administrator	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Reset device	#**RESET**CR	
Get:	-	-	
Response			
~nn@**RESET**SPOKCR LF			
Parameters			
Response Triggers			
Notes			
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.			
Example			
"#RESET",0x0D			

13.3.1.8 SN

Functions		Permission	Transparency
Set:	**-**	-	-
Get:	**SN?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get device serial number	#**SN?**CR	
Response			
~nn@**SN**SP*serial_number*CR LF			
Parameters			
serial_number – 11 decimal digits, factory assigned			
Response Triggers			
Notes			
This device has a 14 digit serial number, only the last 11 digits are displayed			
Example			
"#SN?",0x0D			

13.3.1.9 VERSION

Functions		Permission	Transparency
Set:	-	-	-
Get:	**VERSION?**	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get firmware version number	#**VERSION?**CR	
Response			
~nn@**VERSION**SP*firmware_version*CR LF			
Parameters			
firmware_version – XX.XX.XXXX where the digit groups are: major.minor.build version			
Response Triggers			
Notes			
Example			
"#VERSION?",0x0D			

13.3.1.10 AV-SW-MODE

Functions		Permission	Transparency
Set:	-	-	-
Get:	**AV-SW-MODE?**	End user	Public
Description		Syntax	
Set:			
Get:	Get input auto switch mode (per output)	#**AV-SW-MODE?**SP*layer,output_id*CR	
Response			
~nn@**AV-SW-MODE**SP*layer,output_id,mode*CR LF			
Parameters			
layer – 1 (video), 2 (audio) output_id – for video layer: 1 (HDMI Out), for audio layer: 1 (Audio Out) mode – 0 (manual), 1 (priority switch), 2 (last connected switch)			
Response Triggers			
Notes			
Example			
Get the input audio switch mode for HDMI Out: "#AV-SW-MODE? 1,1",0x0D			

DIP-31M - Protocol 3000

13.3.1.11 AV-SW-TIMEOUT

Functions		Permission	Transparency
Set:	`AV-SW-TIMEOUT`	End User	Public
Get:	`AV-SW-TIMEOUT?`	End User	Public

Description		Syntax
Set:	Set auto switching timeout	`#AV-SW-TIMEOUT`SP`action,time_out`CR
Get:	Get auto switching timeout	`#AV-SW-TIMEOUT?`SP`action`CR

Response

`~`nn`@AV-SW-TIMEOUT`SP`action,time_out`CR

Parameters

`action` – event that triggers the auto switching timeout:
  `0` (video signal lost)
  `2` (audio signal lost)
  `4` (disable 5V on video output if no input signal detected)
  `5` (video cable unplugged)
  `6` (audio cable unplugged)
`timeout` – timeout in seconds: `0-60000`

Response Triggers

Notes

The timeout must not exceed 60000 seconds.
The timeout for video and audio signal lost (0, 2) events must not be less than 5 seconds.
The timeout for video and audio cable unplugged (5, 6) events must not exceed the timeout for the disable 5V on video output if no input signal detected (4) event.
The timeout for the disable 5V on video output if no input signal detected (4) event must not be less than the timeout for video and audio cable unplugged (5, 6) events.
The timeout for the disable 5V on video output if no input signal detected (4) event overlaps with the timeouts for all other events (0, 2, 5, 6).
This does not apply to VGA input.

Example

Set the auto switching timeout to 5 seconds in the event of video signal lost:
`"#AV-SW-TIMEOUT 0,5",0x0D`

13.3.1.12 DISPLAY

Functions		Permission	Transparency
Set:	-	-	-
Get	**DISPLAY?**	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get output HPD status	#**DISPLAY?** SP *out_id* CR	

Response

~nn@**DISPLAY** SP *out_id,status* CR LF

Parameters

out_id – 1 (HDMI Out)
status – HPD status according to signal validation : 0 (Off), 1 (On), 2 (On and all parameters are stable and valid)

Response Triggers

A response is sent to the com port from which the Get was received, after command execution and:
After every change in output HPD status from On to Off (0)
After every change in output HPD status from Off to On (1)
After every change in output HPD status form Off to On and all parameters (new EDID, etc.) are stable and valid (2)

Notes

Example

Get the output HPD status of HDMI Out:
"#DISPLAY? 1",0x0D

13.3.1.13 DPSW-STATUS

Functions		Permission	Transparency
Set:	-	-	-
Get	**DPSW-STATUS?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get the DIP-switch status	#**DPSW-STATUS?** SP *dp_sw_id* CR	
Response			
~ nn @**DPSW-STATUS?** SP *dp_sw_id,status* CR LF			
Parameters			
Dp_sw_id – 1 (video switch), 2 (video switch), 3 (audio switch), 4 (audio switch) *status* – 0 (up / Off), 1 (down / On)			
Response Triggers			
Notes			
Example			
Get the status of DIP-switch 1 (video switch): "#DPSW-STATUS? 1",0x0D			

13.3.1.14 FPGA-VER

Functions		Permission	Transparency
Set:	**-**	-	-
Get:	**FPGA-VER?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get current FPGA version	#**FPGA-VER?** SP *id* CR	
Response			
~ nn @**FPGA-VER** SP *id,major_ver,minor_ver* CR LF			
Parameters			
id – 1 (FPGA) *major_ver* – Major FPGA version number for current firmware *minor_ver* – Minor FPGA version number for current firmware			
Response Triggers			
Notes			
FPGA – field programmable gate array			
Example			
Get the FPGA version number for the current firmware: "#FPGA-VER? 1",0x0D			

13.3.1.15 HDCP-MOD

Functions			Permission	Transparency
Set:	**HDCP-MOD**		Administrator	Public
Get:	**HDCP-MOD?**		End User	Public
Description			**Syntax**	
Set:	Set HDCP mode		#**HDCP-MOD**SP*inp_id,mode*CR	
Get:	Get HDCP mode		#**HDCP-MOD?**SP*inp_id*CR	
Response				
Set / Get: ~nn@**HDCP-MOD**SP*inp_id,mode*CR LF				
Parameters				
inp_id – input number: 1 (HDMI In 1), 2 (HDMI In 2), 3 (PC In) *mode* – HDCP mode: 0 (HDCP Off), 3 (Mirror output – MAC mode)				
Response Triggers				
A response is sent to the com port from which the set (before execution) / get command was received A response is sent to all com ports after command execution if HDCP-MOD was set by any other external control device (device button, device menu or other) or if the HDCP mode changed				
Notes				

Set HDCP working mode on the device input:
   HDCP not supported - HDCP Off
   HDCP support changes following detected sink - MIRROR OUTPUT				

Example				
Disable HDCP mode on HDMI In 2: "#HDCP-MOD 2,0",0x0D				

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13.3.1.16 HDCP-STAT

Functions		Permission	Transparency
Set:	-	-	-
Get:	`HDCP-STAT?`	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get HDCP signal status	`#HDCP-STAT?`SP`stage,stage_id`CR	
Response			
~ nn@**HDCP-STAT**SP`stage,stage_id,status`CR LF			
Parameters			
`stage` – `0` (input), `1` (output)			
`stage_id` – for input stage: `1` (HDMI In 1), `2` (HDMI In 2), `3` (PC In), for output stage: `1` (HDMI Out)			
`status` – signal encryption status: `0` (On), `1` (Off)			
Response Triggers			
A response is sent to the com port from which the Get command was received			
Notes			
Output stage (`1`) – get the HDCP signal status of the sink device connected to HDMI Out			
Input stage (`0`) – get the HDCP signal status of the source device connected to the specified input			
Example			
Get the HDCP input signal status of the source device connected to HDMI In 1:			
"`#HDCP-STAT? 0,1`",`0x0D`			

13.3.1.17 NAME

Functions		Permission	Transparency
Set:	**NAME**	Administrator	Public
Get:	**NAME?**	End User	Public
Description		**Syntax**	
Set:	Set machine (DNS) name	#**NAME** SP *machine_name* CR	
Get:	Get machine (DNS) name	#**NAME?** CR	
Response			
Set: ~nn@**NAME** SP *machine_name* CR LF Get: ~nn@**NAME?** SP *machine_name* CR LF			
Parameters			
machine_name - String of up to 14 alpha-numeric characters (can include hyphens but not at the beginning or end)			
Response Triggers			
Notes			
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).			
Example			
Set the DNS name of the device to "room-442": "#NAME room-442",0x0D			

13.3.1.18 NAME-RST

Functions		Permission	Transparency
Set:	**NAME-RST**	Administrator	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Reset machine (DNS) name to factory default	#**NAME-RST** CR	
Get:	-	-	
Response			
~nn@**NAME-RST** SP **OK** CR LF			
Parameters			
Response Triggers			
Notes			
Factory default of machine (DNS) name is "KRAMER_"			
Example			
Reset the DNS name of the device to the factory default: "#NAME-RST",0x0D			

13.3.1.19 PRIORITY

Functions		Permission	Transparency
Set:	**PRIORITY**	Administrator	Public
Get:	**PRIORITY?**	Administrator	Public
Description		**Syntax**	
Set:	Set input priority	#**PRIORITY**SP*layer,PRIORITY1,PRIORITY2, PRIORITY3*CR
Get:	Get input priority	# **PRIORITY?***layer*CR
Response			
~nn@**PRIORITY**SP*layer,PRIORITY1,PRIORITY2,PRIORITY3*CR LF			
Parameters			
layer – 1 (video): *PRIORITY1* - priority of HDMI In 1: 1 (highest priority), 2 (second priority), 3 (third priority) *PRIORITY2* - priority of HDMI In 2: 1 (highest priority), 2 (second priority), 3 (third priority) *PRIORITY3* - priority of PC In: 1 (highest priority), 2 (second priority), 3 (third priority) layer – 2 (audio): *PRIORITY1* - priority of embedded audio: 1 (highest priority), 2 (second priority) *PRIORITY2* - priority of Audio In: 1 (highest priority), 2 (second priority)			
Response Triggers			
Notes			
The number of PRIORITY parameters differs according to the selected layer 1 is the highest priority			
Example			
Set the video input priority of PC In as the highest priority: "#PRIORITY 1,2,3,1",0x0D			

13.3.1.20 SIGNAL

Functions		Permission	Transparency
Set:	-	-	-
Get	**SIGNAL?**	End User	Public

Description		Syntax	
Set:	-	-	
Get:	Get input signal lock status	#**SIGNAL?**␣*inp_id*␣CR	

Response
~*nn*@**SIGNAL**␣*inp_id,status*CR LF

Parameters
inp_id – input number: 1 (HDMI In 1), 2 (HDMI In 2), 3 (PC In)   *status* – lock status according to signal validation: 0 (Off), 1 (On)

Response Triggers
After execution, a response is sent to the com port from which the Get was received   A response is sent after every change in input signal status from On to Off or from Off to On

Notes

Example
Get the input signal lock status of HDMI In 2:   "#SIGNAL? 2",0x0D

13.3.2 Authentication Commands

Command	Description
LOGIN	Set/get protocol permission
LOGOUT	Cancel current permission level
PASS	Set/get password for login level
SECUR	Set/get current security state

13.3.2.1 LOGIN

Functions		Permission	Transparency
Set:	**LOGIN**	Not Secure	Public
Get:	**LOGIN?**	Not Secure	Public

Description		Syntax
Set:	Set protocol permission	#**LOGIN**SP*login_level,password*CR
Get:	Get current protocol permission level	#**LOGIN?**CR

Response
Set: ~nn@**LOGIN**SP*login_level,password*SP**OK**CR LF
or
~nn@**LOGIN**SPERRSP004CR LF (if bad password entered)
Get: ~nn@**LOGIN**SP*login_level*CR LF

Parameters
login_level – level of permissions required: User, Admin
password – predefined password (by PASS command). Default password is an empty string

Response Triggers

Notes
When the permission system is enabled, LOGIN enables running commands with the User or Administrator permission level
When set, login must be performed upon each connection
The permission system works only if security is enabled with the SECUR command. It is not mandatory to enable the permission system in order to use the device

Example
Set the protocol permission level to Admin (when the password defined in the PASS command is 33333):
"#LOGIN Admin,33333",0x0D

13.3.2.2 LOGOUT

Functions		Permission	Transparency
Set:	**LOGOUT**	Not Secure	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Cancel current permission level	#**LOGOUT**CR	
Get:	-	-	
Response			
~nn@**LOGOUT**SP**OK**CR LF			
Parameters			
Response Triggers			
Notes			
Logs out from User or Administrator permission levels			
Example			
"#LOGOUT",0x0D			

13.3.2.3 PASS

Functions		Permission	Transparency
Set:	**PASS**	Administrator	Public
Get:	**PASS?**	Administrator	Public
Description		**Syntax**	
Set:	Set password for login level	#**PASS**SP*login_level,password*CR	
Get:	Get password for login level	#**PASS?**SP*login_level*CR	
Response			
~nn@**PASS**SP*login_level,password*CR LF			
Parameters			
login_level – level of login to set: User, Admin *password* – password for the *login_level*. Up to 15 printable ASCII chars.			
Response Triggers			
Notes			
The default password is an empty string			
Example			
Set the password for the Admin protocol permission level to 33333: "#PASS Admin,33333",0x0D			

13.3.2.4 SECUR

Functions		Permission	Transparency
Set:	**SECUR**	Administrator	Public
Get:	**SECUR?**	Not Secure	Public
Description		**Syntax**	
Set:	Start/stop security	#**SECUR**SP*security_mode*CR	
Get:	Get current security state	#**SECUR?**CR	
Response			
~nn@**SECUR**SP*security_mode*CR LF			
Parameters			
security_mode – 1 (On / enable security), 0 (Off / disable security)			
Response Triggers			
Notes			
The permission system works only if security is enabled with the SECUR command			
Example			
Enable the permission system: "#SECUR 0",0x0D			

13.3.3 Switching/Routing Commands

Command	Description
ROUTE	Set/get layer routing

13.3.3.1 ROUTE

Functions		Permission	Transparency
Set:	**ROUTE**	End User	Public
Get:	**ROUTE?**	End User	Public
Description		Syntax	
Set:	Set layer routing	#**ROUTE**SP*layer,dest,src*CR	
Get:	Get layer routing	#**ROUTE?**SP*layer,dest*CR	

Response

~nn@**ROUTE**SP*layer,dest,src*CR LF

Parameters

layer – 1 (video)
dest – 1 (HDMI Out)
src – 1 (HDMI In 1), 2 (HDMI In 2), 3 (PC In)

Response Triggers

Notes

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)

Example

Set the remote input switching of video to HDMI Out from HDMI In 2:
"#ROUTE 1,1,2",0x0D

13.3.4   Video Commands

Command	Description
VGA-PHASE	Set/get ADC (VGA) sampling phase
VMUTE	Set/get video on output mute

13.3.4.1   VGA-PHASE

Functions		Permission	Transparency
Set:	**VGA-PHASE**	End User	Public
Get:	**VGA-PHASE?**	End User	Public
Description		**Syntax**	
Set:	Set ADC (VGA) sampling phase	#**VGA-PHASE**SP*channel,value*CR	
Get:	Get ADC (VGA) sampling phase	#**VGA-PHASE?**SP*channel*CR	
Response			
~nn@**VGA-PHASE**SP*channel,value*CR LF			
Parameters			
channel – input number: 3 (PC In) *value* – phase number in LSB units: 1-30, ++ (increase current value), –– (decrease current value)			
Response Triggers			
Notes			
Example			
Increase the current value of the ADC (VGA) sampling phase: "#VGA-PHASE 3,++",0x0D			

13.3.4.2 VMUTE

Functions		Permission	Transparency
Set:	**VMUTE**	End User	Public
Get:	**VMUTE?**	End User	Public
Description		**Syntax**	
Set:	Set enable/disable video on output	#**VMUTE**SP*output_id,flag*CR	
Get:	Get video on output status	#**VMUTE?**SP*output_id*SP CR	
Response			
Set / Get: ~nn@**VMUTE**SP*output_id,flag*CR LF			
Parameters			
output_id – 1 (HDMI Out) *flag* – 0 (disable video on output), 1 (enable video on output), 2 (blank video)			
Response Triggers			
Notes			
Example			
Disable the video output on HDMI Out: "#VMUTE 3,0", 0x0D			

13.3.5 Audio Commands

Command	Description
AUD-EMB	Get audio in video embedding status
AUD-LVL	Set/get volume for specific amplifier output
AUD-SIGNAL?	Get audio input signal status
MUTE	Set/get audio mute

13.3.5.1 AUD-EMB

Functions		Permission	Transparency
Set:			
Get:	AUD-EMB?	End User	Public
Description		**Syntax**	
Set:			
Get:	Get audio in video embedding status	#AUD-EMB?SP*in,out*CR	

Response

~nn@**AUD-EMB**SP*in,out,status*CR LF

Parameters

in – embedded audio input number: 1 (Audio In)
out – video output number in which audio is embedded: 1 (HDMI Out)
status – embedded status: 1 (On), 0 (Off)

Response Triggers

A response is sent to the com port from which the get command was received

After execution, a response is sent to all com ports if AUD-EMB was set by any other external control device (button press, device menu and similar)

Notes

Example

"#AUD-EMB? 1,1",0x0D

13.3.5.2 AUD-LVL

Functions		Permission	Transparency
Set:	`AUD-LVL`	End User	Public
Get:	`AUD-LVL?`	End User	Public
Description		**Syntax**	
Set:	Set volume for specific amplifier output	`#AUD-LVL`SP`stage,channel,volume`CR
Get:	Get volume for specific amplifier output	`#AUD-LVL?`SP`stage,channel`CR
Response			
~nn@**AUD-LVL**SP`stage,channel,volume`CR LF			
Parameters			
stage – `1` (audio output) *channel* – output channel number of selected stage: `1` (Audio Out) *volume* – audio parameter percentage: `0-100` (percent value), `++` (increase current value by 1 percent), `--` decrease current value by 1 percent			
Response Triggers			
Notes			
All values are in percentages A minus sign precedes negative values			
Example			
Set the volume of the Audio Out (1) output to 75%: `"#AUD-LVL 1,1,75",0x0D`			

13.3.5.3 AUD-SIGNAL

Functions		Permission	Transparency
Set:	-	-	-
Get:	**AUD-SIGNAL?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get audio input signal status	# **AUD-SIGNAL?**SP*inp_id*CR	
Response			
~nn@**AUD-SIGNAL**SP*inp_id,status*CR LF			
Parameters			
inp_id – audio input number: 1 (Audio In) *status* – 0 (Off / no signal), 1 (On / signal present)			
Response Triggers			
After execution, a response is sent to the com port from which the get command was received A response is sent to all com ports if the audio status was changed on any input			
Notes			
Example			
"#AUD-SIGNAL? 1",0x0D			

13.3.5.4 MUTE

Functions		Permission	Transparency
Set:	**MUTE**	End User	Public
Get:	**MUTE?**	End User	Public
Description		**Syntax**	
Set:	Set audio mute	#**MUTE**SP*channel,mute_mode*CR	
Get:	Get audio mute	#**MUTE?**SP*channel*CR	
Response			
~nn@**MUTE**SP*channel, mute_mode*CR LF			
Parameters			
channel – audio output number: 1 (Audio Out) *mute_mode* – 0 (Off), 1 (On)			
Response Triggers			
Notes			
Example			
Mute the Audio Out output: "#MUTE 1,1",0x0D			

13.3.6 Communication Commands

Command	Description
ETH-PORT	Set/get Ethernet port protocol
NET-DHCP	Set/get DHCP mode
NET-GATE	Set/get gateway IP
NET-IP	Set/get IP address
NET-MAC	Get MAC address
NET-MASK	Set/get subnet mask

13.3.6.1 ETH-PORT

Functions		Permission	Transparency
Set:	**ETH-PORT**	Administrator	Public
Get:	**ETH-PORT?**	End User	Public
Description		**Syntax**	
Set:	Set Ethernet port protocol	#**ETH-PORT**SP*portType,ETHPort*CR	
Get:	Get Ethernet port protocol	#**ETH-PORT?**SP*portType*CR	
Response			
~nn@**ETH-PORT**SP*portType,ETHPort*CR LF			
Parameters			
portType – string of 3 letters indicating the port type: TCP, UDP *ETHPort* – TCP / UDP port number: 0-65565			
Response Triggers			
Notes			
If the port number you enter is already in use, an error is returned The port number must be within the following range: 0-(2^16-1)			
Example			
Set the Ethernet port protocol for TCP to port 12457: "#ETH-PORT TCP,12457",0x0D			

13.3.6.2 NET-DHCP

Functions		Permission	Transparency
Set:	`NET-DHCP`	Administrator	Public
Get:	`NET-DHCP?`	End User	Public
Description		**Syntax**	
Set:	Set DHCP mode	#**NET-DHCP**[SP]*mode*[CR]	
Get:	Get DHCP mode	#**NET-DHCP?**[CR]	
Response			
~[nn]@**NET-DHCP**[SP]*mode*[CR LF]			
Parameters			
mode – 0 (do not use DHCP. Use the IP address set by the factory or the `NET-IP` command), 1 (try to use DHCP. If unavailable, use the IP address set by the factory or the `NET-IP` command)			
Response Triggers			
Notes			
Connecting Ethernet to devices with DHCP may take more time in some networks			
To connect with a randomly assigned IP by DHCP, specify the device DNS name (if available) using the `NAME` command. You can also get an assigned IP by direct connection to USB or RS-232 protocol port if available			
Consult your network administrator for correct settings			
Example			
Enable DHCP mode, if available: "#NET-DHCP 1",0x0D			

13.3.6.3   NET-GATE

Functions		Permission	Transparency
Set:	**NET-GATE**	Administrator	Public
Get:	**NET-GATE?**	End User	Public
Description		**Syntax**	
Set:	Set gateway IP	#**NET-GATE**⬚SP⬚ *ip_address* ⬚CR⬚
Get:	Get gateway IP	#**NET-GATE?**⬚CR⬚
Response			
~⬚nn⬚@**NET-GATE**⬚SP⬚ *ip_address* ⬚CR LF⬚			
Parameters			
ip_address – gateway IP address, in the following format: xxx.xxx.xxx.xxx			
Response Triggers			
Notes			
A network gateway connects the device via another network, possibly over the Internet. Be careful of security problems. Consult your network administrator for correct settings.			
Example			
Set the gateway IP address to 192.168.0.1: "#NET-GATE 192.168.000.001",0x0D			

13.3.6.4   NET-IP

Functions		Permission	Transparency
Set:	**NET-IP**	Administrator	Public
Get:	**NET-IP?**	End User	Public
Description		**Syntax**	
Set:	Set IP address	#**NET-IP**⬚SP⬚ *ip_address* ⬚CR⬚
Get:	Get IP address	#**NET-IP?**⬚CR⬚
Response			
~⬚nn⬚@**NET-IP**⬚SP⬚ *ip_address* ⬚CR LF⬚			
Parameters			
ip_address – IP address, in the following format: xxx.xxx.xxx.xxx			
Response Triggers			
Notes			
Consult your network administrator for correct settings			
Example			
Set the IP address to 192.168.1.39: "#NET-IP 192.168.001.039",0x0D			

13.3.6.5 NET-MAC

Functions			Permission	Transparency
Set:	-		-	-
Get:	NET-MAC?		End User	Public
Description			**Syntax**	
Set:	-		-	
Get:	Get MAC address		#NET-MAC?CR	
Response				
~nn@NET-MACSPmac_addressCR LF				
Parameters				
mac_address – unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit				
Response Triggers				
Notes				
Example				
"#NET-MAC?",0x0D				

13.3.6.6 NET-MASK

Functions		Permission	Transparency
Set:	NET-MASK	Administrator	Public
Get:	NET-MASK?	End User	Public
Description		**Syntax**	
Set:	Set subnet mask	#NET-MASKSPnet_maskCR	
Get:	Get subnet mask	#NET-MASK?CR	
Response			
~nn@NET-MASKSPnet_maskCR LF			
Parameters			
net_mask - format: xxx.xxx.xxx.xxx			
Response Triggers			
The subnet mask limits the Ethernet connection within the local network Consult your network administrator for correct settings			
Notes			
Example			
Set the subnet mask to 255.255.0.0: "#NET-MASK 255.255.000.000",0x0D			

13.3.7　EDID Handling Commands

Additional EDID data functions can be performed via the **DIP-31** web pages or a compatible EDID management application, such as Kramer EDID Designer (see www.kramerav.com/product/EDID%20Designer).

Command	Description
CPEDID	Copy EDID data from the output to the input EEPROM
LOCK-EDID	Lock last read EDID

13.3.7.1　CPEDID

Functions		Permission	Transparency
Set:	**CPEDID**	End User	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Copy EDID data from the output to the input EEPROM	#**CPEDID**SP*src_type,src_id,dst_type, dest_bitmap*CR	
Get:	-	-	

Response

~nn@**CPEDID**SP*src_type,src_id,dst_type,dest_bitmap*CR LF

Parameters

src_type – EDID source type (usually output): 0 (input), 1 (output), 2 (default EDID)
src_id – for input source: 1 (HDMI In 1), 2 (HDMI In 2), 3 (PC In), for output source: 1 (HDMI Out), for default EDID source: 0 (default EDID)
dst_type – EDID destination type (usually input): 0 (input), 1 (output), 2 (default EDID)
dest_bitmap – bitmap representing destination IDs. Format: XXXX…X, where X is hex digit. The binary form of every hex digit represents corresponding destinations. Setting '1' indicates that EDID data is copied to this destination. Setting '0' indicates that EDID data is not copied to this destination.

Response Triggers

Response is sent to the com port from which the Set was received (before execution)

Notes

Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word)
Example: bitmap 0x0013 means inputs 1, 2 and 5 are loaded with the new EDID.
In this device, if the destination type is input (0), the bitmap size is 3 bits, for example bitmap 0x5 means inputs 1 and 3 are loaded with the new EDID.

Example

Copy the EDID data from the HDMI Out output (EDID source) to the HDMI In 1 input:
"#CPEDID 1,1,0,0x1",0x0D
Copy the EDID data from the default EDID source to HDMI In 1 and PC In inputs:
"#CPEDID 2,0,0,0x5",0x0D

13.3.7.2 LOCK-EDID

Functions			Permission	Transparency
Set:	**LOCK-EDID**		End User	End User
Get:	**LOCK-EDID?**		End User	End User
Description			**Syntax**	
Set:	Lock last read EDID		#**LOCK-EDID**SP *input_id,lock_mode*CR	
Get :	Get EDID lock state		#**LOCK-EDID?**SP *input_id*CR	
Response				
~nn@**LOCK-EDID**SP *input_id,lock_mode*CR LF				
Parameters				
input_id – 1 (HDMI In 1), 2 (HDMI In 2), 3 (PC In), *lock_mode* – 0 (Off: unlocks EDID), 1 (On: locks EDID)				
Response Triggers				
Notes				
Example				
Lock the last read EDID from the HDMI In 2 input: "#LOCK-EDID 2,1",0x0D				

LIMITED WARRANTY

The warranty obligations of 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 Does this Coverage Last

Seven years as of this printing; please check our Web site for the most current and accurate warranty information.

Who is Covered

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

What Kramer Electronics will do

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

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

2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.

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

What Kramer Electronics will not do Under This Limited Warranty

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

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