Kramer DIP-31 4K/60 4:2:0 HDMI & Computer Graphics Automatic Video Switcher
USER MANUAL

MODEL:

DIP-31
Automatic Video Switcher
DIP-31 Quick Start Guide

This guide helps you install and use your DIP-31 for the first time. Go to http://www.kramerav.com/manual/DIP-31 to download the latest user manual (or scan the QR code) and check if firmware upgrades are available.

Step 1: Check what’s in the box

- DIP-31 Automatic Video Switcher
- 1 Power supply (12V DC)
- 4 Rubber feet
- 1 Quick start guide
- ADC-DPM/HF DisplayPort (M) to HDMI (F) adapter cable

Step 2: Install the DIP-31

To mount the DIP-31 in a rack, use an RK-T2B rack adapter. Alternatively, attach the rubber feet to the underside of the machine and place it on a table. You can use the TOOL bracket installation kit (supplied) to mount the DIP-31 on a desktop, wall or similar area. Fasten a bracket on each side of the TOOL using the two M3x8 screws (supplied). Use the flat-head screws (supplied) to fix the TOOL to the mounting surface or enable it to slide in place.

Step 3: Connect inputs and outputs

Always switch OFF the power on each device before connecting it to your DIP-31. For best results, we recommend that you always use Kramer high-performance cables to connect AV equipment to the DIP-31.
Step 4: Set the DIP-switches

**Video Switching Selection**

<table>
<thead>
<tr>
<th>DIP-switch 1</th>
<th>DIP-switch 2</th>
<th>Video Input Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off (up)</td>
<td>Off (up)</td>
<td>Automatic—Last connected. Where more than one source is connected the last one connected has priority</td>
</tr>
<tr>
<td>Off (up)</td>
<td>On (down)</td>
<td>Automatic—Priority selection. HDMI 1 → HDMI 2 → PC IN (default, high to low priority)</td>
</tr>
<tr>
<td>On (down)</td>
<td>Off (up)</td>
<td>Manual</td>
</tr>
<tr>
<td>On (down)</td>
<td>On (down)</td>
<td>Manual</td>
</tr>
</tbody>
</table>

**Audio Switching Selection**

<table>
<thead>
<tr>
<th>DIP-switch 3</th>
<th>DIP-switch 4</th>
<th>Audio Input Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off (up)</td>
<td>Off (up)</td>
<td>Automatic—Priority selection. Embedded HDMI → analog Audio In (high to low priority)</td>
</tr>
<tr>
<td>Off (up)</td>
<td>On (down)</td>
<td>Automatic—Priority selection. Analog Audio In → embedded HDMI (high to low priority)</td>
</tr>
<tr>
<td>On (down)</td>
<td>Off (up)</td>
<td>Embedded HDMI</td>
</tr>
<tr>
<td>On (down)</td>
<td>On (down)</td>
<td>Analog Audio In</td>
</tr>
</tbody>
</table>

Step 5: Connect the power

Connect the power adapter to the DIP-31, and plug the adapter into the mains power. Power on all attached devices.

Step 6: Operate the DIP-31

**Default IP Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device Name</td>
<td>Any alphanumeric string up to 14 chars (can include hyphen, but not at the beginning or end)</td>
<td>KRAMER_</td>
</tr>
<tr>
<td>DHCP ON/OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>IP Address</td>
<td>Any valid IP address</td>
<td>192.168.1.39</td>
</tr>
<tr>
<td>Mask</td>
<td>Any valid network mask</td>
<td>255.255.0.0</td>
</tr>
<tr>
<td>Gateway</td>
<td>Any valid gateway address</td>
<td>192.168.0.1</td>
</tr>
<tr>
<td>TCP Port</td>
<td>0 to 65535</td>
<td>5000</td>
</tr>
<tr>
<td>UDP Port</td>
<td>0 to 65535</td>
<td>50000</td>
</tr>
</tbody>
</table>

**Default Web Pages Logon Authentication**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Admin</td>
</tr>
<tr>
<td>Password</td>
<td>Admin</td>
</tr>
</tbody>
</table>

You can operate the DIP-31 via the front panel buttons, remote P3000 commands, or by using a Web browser to access the built in Web pages.
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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-31 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 http://www.kramerav.com/downloads/DIP-31 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-31 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 http://www.kramerav.com/support/recycling/.
Overview

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

The DIP-31 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 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
4 Defining the Automatic Video Switcher

Figure 1 defines the front panel of the DIP-31.

![Front Panel Diagram](image)

Figure 1: DIP-31 Front Panel

<table>
<thead>
<tr>
<th>#</th>
<th>Feature</th>
<th>Function</th>
</tr>
</thead>
</table>
| 1 | HDMI IN 1 SELECT Button | Press to select the HDMI In 1 input. When HDMI In 1 is selected, the button:  
   - Lights red when external audio is selected  
   - Lights green when HDMI In 1 is selected |
| 2 | HDMI 1 Connector  | Connect 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 red when external audio is selected  
   - Lights green when HDMI In 2 is selected |
| 4 | HDMI 2 Connector  | Connect to the second HDMI source                                |
| 5 | PC IN SELECT Button | Press to select the PC graphics input. When PC graphics is selected, the button:  
   - Lights red when external audio is selected  
   - Lights green when the PC input selected |
| 6 | PC Graphics 15-pin HD Connector | Connect to the PC graphics source, (for example, a laptop) |
| 7 | AUDIO IN 3.5mm Mini Jack | Connect 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                       |
**Figure 2** defines the rear panel of the DIP-31.

<table>
<thead>
<tr>
<th>#</th>
<th>Feature</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>AUDIO OUT</strong> 3.5mm Mini Jack</td>
<td>Connect to the unbalanced, stereo audio acceptor, (for example, active speakers)</td>
</tr>
<tr>
<td>2</td>
<td><strong>ETHERNET</strong> RJ-45 Connector</td>
<td>Connect to the LAN, (Ethernet traffic or PC controller)</td>
</tr>
<tr>
<td>3</td>
<td><strong>RS-232</strong> CONTROL 3-pin Terminal Block</td>
<td>Connect to a serial controller or PC</td>
</tr>
<tr>
<td>4</td>
<td><strong>DATA</strong> 3-pin Terminal Block</td>
<td>Connect to a serial data source or acceptor</td>
</tr>
<tr>
<td>5</td>
<td><strong>PC/HDMI</strong> Remote Toggle Switch Terminal Block</td>
<td>Connect to a remote momentary switch to toggle between the PC graphics and HDMI inputs</td>
</tr>
<tr>
<td>6</td>
<td>Remote Contact-closure 4-pin Terminal Block</td>
<td>Connect to remote momentary switches to control step-in and audio volume</td>
</tr>
<tr>
<td>7</td>
<td><strong>FACTORY RESET</strong> Button</td>
<td>Short press to reboot, long press to reset the device to factory default parameters</td>
</tr>
<tr>
<td>8</td>
<td><strong>SETUP</strong> 4-way DIP-switch</td>
<td>Switches for setting the device behavior, (see Section 8.1)</td>
</tr>
<tr>
<td>9</td>
<td><strong>PROG</strong> Mini USB Connector</td>
<td>Connect to a PC to perform a firmware upgrade</td>
</tr>
<tr>
<td>10</td>
<td><strong>HDMI OUT</strong> Connector</td>
<td>Connect to a compatible HDMI display</td>
</tr>
<tr>
<td>11</td>
<td><strong>12V DC</strong> Connector</td>
<td>Connect to the supplied power adapter</td>
</tr>
</tbody>
</table>

Figure 2: DIP-31 Rear Panel
5 Connecting the DIP-31 Automatic Video Switcher

Always switch off the power to each device before connecting it to your DIP-31. After connecting your DIP-31, connect the power to each of them and then switch on the power to each device.

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

1. Connect an HDMI source, (for example, a Blu-ray disk 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.

Figure 3: Connecting the DIP-31
4. Connect the HDMI OUT connector on the rear panel of the **DIP-31** 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-31** 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-31** 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-31** and to the mains power, (not shown in Figure 3).
5.1 Connecting the Remote Control Switches

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

Figure 4 illustrates the connections from the terminal block to the contact-closure switches.

Figure 4: Remote Switches Terminal Block

<table>
<thead>
<tr>
<th>#</th>
<th>Feature</th>
<th>Function</th>
</tr>
</thead>
</table>
| 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 |
| 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 |
| 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.

<table>
<thead>
<tr>
<th>EIA / TIA 568B</th>
<th>PIN</th>
<th>Wire Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIN</td>
<td>1</td>
<td>Orange / White</td>
</tr>
<tr>
<td>PIN</td>
<td>2</td>
<td>Orange</td>
</tr>
<tr>
<td>PIN</td>
<td>3</td>
<td>Green / White</td>
</tr>
<tr>
<td>PIN</td>
<td>4</td>
<td>Blue</td>
</tr>
<tr>
<td>PIN</td>
<td>5</td>
<td>Blue / White</td>
</tr>
<tr>
<td>PIN</td>
<td>6</td>
<td>Green</td>
</tr>
<tr>
<td>PIN</td>
<td>7</td>
<td>Brown / White</td>
</tr>
<tr>
<td>PIN</td>
<td>8</td>
<td>Brown</td>
</tr>
</tbody>
</table>

Figure 5: TP PINOUT
6 Principles of Operation

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

6.1 Input Selection

The video mode selection is set by the DIP-switches (see Section 8.1) 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 select 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-31** 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 8.1).

Analog audio is not output when there is no display connected. If a display is connected analog audio is output even in the absence of a video signal.

6.3 Audio Signal Control

The Option DIP-switches 3 and 4 (see Section 8.1) control the manner in which audio is handled.

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

<table>
<thead>
<tr>
<th>Selected Video Input</th>
<th>HDMI Embedded Audio Detected</th>
<th>Analog Audio Detected</th>
<th>DIP-switch 3</th>
<th>DIP-switch 4</th>
<th>Audio on HDMI Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>VGA</td>
<td>N/A</td>
<td>Yes</td>
<td>N/A</td>
<td>N/A</td>
<td>Analog audio</td>
</tr>
<tr>
<td>VGA</td>
<td>N/A</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td>No audio</td>
</tr>
<tr>
<td>HDMI</td>
<td>N/A</td>
<td>N/A</td>
<td>Manual</td>
<td>Embedded</td>
<td>Embedded audio</td>
</tr>
<tr>
<td>HDMI</td>
<td>N/A</td>
<td>N/A</td>
<td>Manual</td>
<td>Analog</td>
<td>Analog audio</td>
</tr>
<tr>
<td>HDMI</td>
<td>Yes</td>
<td>No</td>
<td>Auto</td>
<td>N/A</td>
<td>Embedded audio</td>
</tr>
<tr>
<td>HDMI</td>
<td>Yes</td>
<td>Yes</td>
<td>Auto</td>
<td>Embedded</td>
<td>Embedded audio</td>
</tr>
<tr>
<td>HDMI</td>
<td>Yes</td>
<td>Yes</td>
<td>Auto</td>
<td>Analog</td>
<td>Analog audio</td>
</tr>
<tr>
<td>HDMI</td>
<td>No</td>
<td>Yes</td>
<td>Auto</td>
<td>N/A</td>
<td>Analog audio</td>
</tr>
<tr>
<td>HDMI</td>
<td>No</td>
<td>No</td>
<td>Auto</td>
<td>N/A</td>
<td>No audio</td>
</tr>
</tbody>
</table>

When there is an audio signal but no video signal the output is a black video pattern in conjunction with the analog audio signal.
6.4 VGA Phase Shift

To minimize phase 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 0)

- Protocol 3000 commands over RS-232 (see Section 12)
7 Operating the DIP-31

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

- Front panel buttons
- Protocol 3000 command, (see Section 12)
- Remote contact-closure switch, (see Section 5.1)
- Web pages, (see Section 9)

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 12)
- Use the Web pages, (see Section 9)

7.2 Resetting the DIP-31

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

- Using the button on the rear panel
- Using the Web pages, (see Section 9)

To perform a soft reset of the DIP-31:

- Briefly press the Reset button.
  The device resets

To reset the DIP-31 to factory default parameters:

- Press and hold the Reset button for five seconds.
  The device is reset to factory default parameters
7.3 Analog Audio Output Volume Control

The analog audio output volume can be controlled using the Web pages, (see Section 0) or via the remote, contact-closure switches connected to pins 3 and 4 of the Remote terminal block, (see Section 5.1).

The number of up/down volume steps per press is detailed in the table below.

<table>
<thead>
<tr>
<th>Ramp</th>
<th>Volume Reading</th>
<th>Volume (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>99</td>
<td>−0.5</td>
</tr>
<tr>
<td>1</td>
<td>98</td>
<td>−1.0</td>
</tr>
<tr>
<td>1</td>
<td>97</td>
<td>−1.5</td>
</tr>
<tr>
<td>1</td>
<td>96</td>
<td>−2.0</td>
</tr>
<tr>
<td>1</td>
<td>...</td>
<td>(0.5 steps)</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
<td>−44.0</td>
</tr>
<tr>
<td>1</td>
<td>11</td>
<td>−44.5</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>−45.0</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>−45.5</td>
</tr>
<tr>
<td>2</td>
<td>...</td>
<td>(2.0 steps)</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>−47.0</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>−49.0</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>−51.0</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>−53.0</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>−55.0</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>−57.0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>−59.0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>−61.0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>−63.0</td>
</tr>
</tbody>
</table>
8 Configuring the DIP-31

8.1 Setting the 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](image)

After changing a DIP-switch you must power cycle the device to implement the change.

**Video Switching Selection**

<table>
<thead>
<tr>
<th>DIP-switch 1</th>
<th>DIP-switch 2</th>
<th>Video Input Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off (up)</td>
<td>Off (up)</td>
<td>Automatic—Last connected. Where more than one source is connected the last one connected has priority</td>
</tr>
<tr>
<td>Off (up)</td>
<td>On (down)</td>
<td>Automatic—Priority selection. HDMI 1 → HDMI 2 → PC IN (default, high to low priority)</td>
</tr>
<tr>
<td>On (down)</td>
<td>Off (up)</td>
<td>Manual</td>
</tr>
<tr>
<td>On (down)</td>
<td>On (down)</td>
<td>Manual</td>
</tr>
</tbody>
</table>

**Audio Switching Selection**

<table>
<thead>
<tr>
<th>DIP-switch 3</th>
<th>DIP-switch 4</th>
<th>Audio Input Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off (up)</td>
<td>Off (up)</td>
<td>Automatic—Priority selection. Embedded HDMI → analog Audio In (high to low priority)</td>
</tr>
<tr>
<td>Off (up)</td>
<td>On (down)</td>
<td>Automatic—Priority selection. Analog Audio In → embedded HDMI (high to low priority)</td>
</tr>
<tr>
<td>On (down)</td>
<td>Off (up)</td>
<td>Embedded HDMI</td>
</tr>
<tr>
<td>On (down)</td>
<td>On (down)</td>
<td>Analog Audio In</td>
</tr>
</tbody>
</table>
8.2 Switching Timeouts

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

<table>
<thead>
<tr>
<th>Timeout</th>
<th>Minimum Value</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay switching upon signal loss (signal off, 5V power on)</td>
<td>5 seconds</td>
<td>10 seconds for video input 5 Seconds for audio input</td>
</tr>
<tr>
<td>Delay switching upon cable unplug (signal off, power off)</td>
<td>0 seconds</td>
<td>0 seconds</td>
</tr>
<tr>
<td>Delay 5V power off upon signal loss (delay must be greater than “Delay switching upon signal loss”)</td>
<td>Should at least equal the larger of the above two values (signal loss timeout and cable unplug timeout)</td>
<td>900 seconds</td>
</tr>
</tbody>
</table>

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

To be able to use the Step-in feature, you need to assign the RS-232 signal that is transmitted over the HDMI link to control, (see Section 9.2). The Step-in button on the front panel now operates in conjunction with a compatible receiver, for example, the VS-62H).
9 Operating the DIP-31 Remotely Using the Web Pages

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

Before attempting to connect:

- Ensure that your browser is supported (see Section 10)
- 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.

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

9.1 Browsing the DIP-31 Web Pages

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

To browse the DIP-31 Web pages:

1. Open your Internet browser.

2. Type the IP number of the device (see Section 10.1) in the Address bar of your browser.

   ![IP Address](http://192.168.1.29)

   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 screen shown in Figure 8 is displayed.

![Kramer DIP-31 Controller](image)

Figure 8: Default Page

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

The Switching page appears as shown in Figure 9.
Figure 9: Main Switching Page

The areas of the main switching page are described in the following table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page Selection Panel</td>
<td>Click one of the buttons to select a page</td>
</tr>
<tr>
<td>Switching Selection</td>
<td>Switching and control section. Click one of the buttons to select a video input. Adjust the VGA phase shift. Adjust the audio volume. Select data routing mode</td>
</tr>
<tr>
<td>Hide/Reveal Button</td>
<td>Click to hide or reveal the page selection panel</td>
</tr>
<tr>
<td>Upload/Save Configuration Area</td>
<td>Click one of the buttons to save or retrieve a configuration, (see Section 9.1.1)</td>
</tr>
</tbody>
</table>
There are six Web pages described in the following sections:

- Switching (see Section 9.2)
- Device Settings (see Section 9.3)
- Video and Audio Settings (see Section 9.4)
- Authentication (see Section 9.6)
- EDID (see Section 9.7)
- About Us (see Section 9.8)

### 9.1.1 Upload/Save Configuration Facility

The Upload/Save Configuration facility (see item 4 in Figure 9) lets you retrieve and save a configuration.

To upload a configuration:

1. Click the Upload button.
   The File Upload browser window appears.

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

To save the current configuration:

1. Click the Save button.
   The Save Configuration success message is displayed.

2. Do either of the following:
   - Click Download to either open the file or save it to the required location
   - Or, click OK to complete the procedure
9.2 Switching Page

The Switching page lets you select a video input manually and adjust the audio volume.

![Switching Page]

Figure 10: Switching Page

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HDMI 1 Button</strong></td>
<td>Click to select the HDMI 1 input. The button color indicates whether or not there is a live signal on the input</td>
</tr>
<tr>
<td><strong>HDMI 2 Button</strong></td>
<td>Click to select the HDMI 2 input</td>
</tr>
<tr>
<td><strong>VGA Button</strong></td>
<td>Click to select the VGA input</td>
</tr>
<tr>
<td><strong>VGA Phase Change Slider</strong></td>
<td>Click and slide to the left or right to adjust the VGA phase change</td>
</tr>
<tr>
<td><strong>Audio Source: Indicator</strong></td>
<td>Indicates the source of the audio that is transmitted on the output</td>
</tr>
<tr>
<td><strong>Use the RS-232 port connector for:</strong> Button</td>
<td>Assigns the use of the RS-232 signal over HDMI to either data or control:</td>
</tr>
<tr>
<td></td>
<td>• <em>Data</em> for passive mode to route RS-232 traffic transparently</td>
</tr>
<tr>
<td></td>
<td>• <em>Control</em> for active mode to route RS-232 commands to the microprocessor to control the DIP-31, (mandatory when the step-in function is required)</td>
</tr>
<tr>
<td><strong>Volume Slider</strong></td>
<td>Click and slide up and down to increase or decrease the audio output volume</td>
</tr>
<tr>
<td><strong>Mute Button</strong></td>
<td>Click to mute or unmute the output audio</td>
</tr>
</tbody>
</table>
To be able to use the Step-in feature, you must assign the RS-232 signal that is transmitted over the HDMI link to Control. The Step-in button on the front panel now operates in conjunction with a compatible receiver, for example, the VS-62H.

9.3 Device Settings Page

The Device Settings page lets you:

- View some of the device characteristics, (for example, model and Web version)
- Edit IP settings, (for example, name and IP address)
- Upgrade the firmware
- Reset the device to factory default settings

After making any change to the parameters on the Device Settings page, you must power cycle the device to activate the changes.
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Section</td>
<td>Displays information regarding the device, such as, the model, serial number, and MAC address</td>
</tr>
<tr>
<td>DNS name</td>
<td>The DNS name of the device. To set a new name, enter the new alphanumeric name and click Set. (For restrictions regarding the name, see Section 10.2)</td>
</tr>
<tr>
<td>DHCP Buttons</td>
<td>Click ON to turn DHCP on; click OFF to turn DHCP off and use static IP addressing</td>
</tr>
<tr>
<td>IP address</td>
<td>The IP address of the device. To set a new IP address, enter the new valid IP address and click Set</td>
</tr>
<tr>
<td>Mask</td>
<td>The network mask of the device. To set a new mask, enter the new valid mask and click Set</td>
</tr>
<tr>
<td>Gateway</td>
<td>The network gateway for the device. To set a new network gateway, enter the new valid gateway and click Set</td>
</tr>
<tr>
<td>TCP Port</td>
<td>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</td>
</tr>
<tr>
<td>UDP Port</td>
<td>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</td>
</tr>
<tr>
<td>Firmware upgrade Section</td>
<td><strong>BROWSE button</strong> Click to open a window to browse to the new firmware file</td>
</tr>
<tr>
<td></td>
<td><strong>START UPGRADE button</strong> Click to start the upgrade process following the selection of the new firmware file</td>
</tr>
<tr>
<td>Factory Reset Button</td>
<td>Click to reset the device to factory default parameters. After the success message is displayed, power cycle the device</td>
</tr>
<tr>
<td>Set Button</td>
<td>Click to store a changed parameter.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: If you do not click the Set button, the new parameter is not stored</td>
</tr>
</tbody>
</table>

**To upgrade the firmware:**

1. Click **Browse**.
   
   The Windows Browser opens.

2. Browse to the required file.

3. Select the required file and click **Open**.
   
   The firmware file name is displayed in the Firmware Upgrade page.

4. Click **Start Upgrade**.
   
   The firmware file is loaded and a progress bar is displayed.

   ![](warning_icon.png)

   **Do not interrupt the process or the DIP-31 may be damaged.**
5. When the process is complete reboot the device.
The firmware is upgraded.

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

1. Click the **Factory Reset** button.
The confirmation message is displayed.

2. Click **OK** to continue or Cancel to exit the procedure.

3. Click **OK**.
The progress message is displayed.
On completion, the success message is displayed.

4. Click **OK**.

### 9.4 Remote Device Control Page

The RS-232 DATA port (not the control port) can be used for data, P3K control commands or external device control.

Opening the Remote Device Control page allows you to configure the RS-232 data port (parity, data bits, baud rate and stop bits). It also allows you to enable and disable power commands to a remote peripheral device as well as specifying predefined triggers (5V on – connect, 5V off – disconnect) with defined delays as illustrated:

![Remote Device Control Page](image-url)
To define trigger delays, click the pencil icon under Edit. The following window opens (also for power off):

![Edit Trigger Window]

All fields can be changed as required. Trigger delay can be specified from 0 to 60000 seconds with a default value of 10 seconds.

### 9.5 Video and Audio Settings Page

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

![Video and Audio Settings Page]

Figure 12: Video and Audio Settings Page
## 9.6 Authentication Page

The Authentication page lets you assign or change logon authentication details.

![Authentication Page](image)

**Figure 13: Authentication Page**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Video selection mode</strong>&lt;br&gt;Indicator</td>
<td>Indicates the current video selection mode; manual, auto, or auto last connected</td>
</tr>
<tr>
<td><strong>Video auto switching priority</strong>&lt;br&gt;Buttons</td>
<td>Click and drag the buttons to the required priority level to use when in auto mode</td>
</tr>
<tr>
<td><strong>Audio selection mode</strong>&lt;br&gt;Indicator</td>
<td>Indicates the current audio selection; manual, auto, or auto last connected</td>
</tr>
<tr>
<td><strong>Current selection Audio</strong>&lt;br&gt;Indicator</td>
<td>Indicates the current audio selection; Embedded or analog</td>
</tr>
<tr>
<td><strong>HDCP Support (on HDMI input)</strong>&lt;br&gt;Buttons</td>
<td>Select HDCP support for HDMI 1 and HDMI 2&lt;br&gt;Disabled—HDCP encrypted content is not passed&lt;br&gt;Enabled—HDCP support is dictated by the display</td>
</tr>
<tr>
<td><strong>Delay switching upon signal loss for (leave 5V on) Box</strong></td>
<td>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)</td>
</tr>
<tr>
<td><strong>Delay switching input upon cable unplug for Box</strong></td>
<td>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)</td>
</tr>
<tr>
<td><strong>Delay power off 5V upon signal loss for Box</strong></td>
<td>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)</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Activate Security Button</td>
<td>Click to enable/disable security settings. When enabled, the valid username and password must be provided to allow Web page access</td>
</tr>
<tr>
<td>Change Password</td>
<td></td>
</tr>
<tr>
<td>Current Password box</td>
<td>Enter the current password</td>
</tr>
<tr>
<td>New Password box</td>
<td>Enter the new password, (up to 15 printable ASCII characters)</td>
</tr>
<tr>
<td>Retype New Password box</td>
<td>Retype the new password</td>
</tr>
<tr>
<td>CHANGE button</td>
<td>Click CHANGE to save the new authentication details</td>
</tr>
</tbody>
</table>
9.7 EDID Page

The EDID page lets you copy 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.

The display is not updated automatically when the status of an EDID changes on the device caused by outputs being exchanged. Click Refresh to update the display (see final item in the following table).
To copy EDID data from a source to one or both inputs:

1. Click the 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. Click a destination input, or select all inputs by checking the Inputs checkbox.
   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**.
9.8 About Us Page

The DIP-31 About Us page displays the Web page version and Kramer Electronics Ltd company details.

Figure 15: About Us Page
### 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—works with sources that support HDCP repeater mode

**Maximum Analog Audio Levels:**
- 3.1V p-p

**THD:**
- 0.013%

**SNR:**
- 75dB

**Supported Web Browsers:**
- Windows 7 and higher:  
  - Internet Explorer (32/64 bit) version 11  
  - Firefox version 30  
  - Chrome version 35
- MAC:  
  - Chrome version 35  
  - Firefox version 27  
  - Safari version 7
- Android OS:  
  - Chrome version 35
- iOS:  
  - Chrome version 35  
  - Safari version 7

**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.
ENVIROMENTAL 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

10.1 Default IP Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device Name</td>
<td>Any alphanumeric string up to 14 chars (can include hyphen, but not at the beginning or end)</td>
<td>KRAMER_</td>
</tr>
<tr>
<td>DHCP</td>
<td>ON/OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>IP Address</td>
<td>Any valid IP address</td>
<td>192.168.1.39</td>
</tr>
<tr>
<td>Mask</td>
<td>Any valid network mask</td>
<td>255.255.0.0</td>
</tr>
<tr>
<td>Gateway</td>
<td>Any valid gateway address</td>
<td>192.168.0.1</td>
</tr>
<tr>
<td>TCP Port</td>
<td>0 to 65535</td>
<td>5000</td>
</tr>
<tr>
<td>UDP Port</td>
<td>0 to 65535</td>
<td>50000</td>
</tr>
</tbody>
</table>

10.2 Default Logon Credentials

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Admin</td>
</tr>
<tr>
<td>Password</td>
<td>Admin</td>
</tr>
</tbody>
</table>

10.3 Supported HDMI Resolutions

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Refresh Rate (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>640x480p</td>
<td>85Hz; 75Hz; 72Hz; 60Hz; 59.95Hz</td>
</tr>
<tr>
<td>720x480p</td>
<td>60Hz</td>
</tr>
<tr>
<td>720x480i</td>
<td>30Hz</td>
</tr>
<tr>
<td>720x576p</td>
<td>50Hz</td>
</tr>
<tr>
<td>800x600p</td>
<td>85Hz; 75Hz; 72Hz; 60Hz</td>
</tr>
<tr>
<td>848x480p</td>
<td>60Hz</td>
</tr>
<tr>
<td>852x480p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1024x768p</td>
<td>85Hz; 75Hz; 70Hz; 60Hz</td>
</tr>
<tr>
<td>1152x864p</td>
<td>75Hz</td>
</tr>
<tr>
<td>1280x768p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1280x800p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1280x960</td>
<td>60Hz</td>
</tr>
</tbody>
</table>
### Resolution vs. Refresh Rate

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Refresh Rate (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1280x1024p</td>
<td>75Hz; 60Hz</td>
</tr>
<tr>
<td>1360x768p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1366x768</td>
<td>60Hz; 50Hz</td>
</tr>
<tr>
<td>1400x1050p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1440x900p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1600x900p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1600x1200p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1680x1050p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1920x1080p</td>
<td>50Hz; 60Hz; 30Hz; 24Hz;</td>
</tr>
<tr>
<td>1920x1080i</td>
<td>50Hz; 60Hz;</td>
</tr>
<tr>
<td>3840x2160</td>
<td>30Hz</td>
</tr>
<tr>
<td>4096x2160</td>
<td>30Hz</td>
</tr>
</tbody>
</table>

### Supported VGA Resolutions

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Refresh Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>640x480p</td>
<td>60Hz</td>
</tr>
<tr>
<td>720x480p</td>
<td>60Hz</td>
</tr>
<tr>
<td>800x600p</td>
<td>60Hz</td>
</tr>
<tr>
<td>848x480p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1024x768p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1152x864</td>
<td>75Hz</td>
</tr>
<tr>
<td>1280x720p</td>
<td>60Hz; 50Hz</td>
</tr>
<tr>
<td>1280x768</td>
<td>60Hz</td>
</tr>
<tr>
<td>1280x800</td>
<td>60Hz</td>
</tr>
<tr>
<td>1280x960p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1280x1024p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1360x768</td>
<td>60Hz;</td>
</tr>
<tr>
<td>1366x768</td>
<td>60Hz; 50Hz</td>
</tr>
<tr>
<td>1400x1050p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1440x900</td>
<td>60Hz</td>
</tr>
<tr>
<td>1920x1080p</td>
<td>60Hz</td>
</tr>
<tr>
<td>1920x1200</td>
<td>60Hz; 50Hz</td>
</tr>
</tbody>
</table>
11 Default EDID

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

11.1 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

DIP-31 - Default EDID
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,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,BF,B1,99,A9,40,61,59,45,59,31,59,71,4A,81,40,01,1D,00,72,51,0D,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,
56,53,20,33,32,20,20,20,20,20,20,20,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,01,B7,
02,03,1B,F1,23,09,07,07,48,10,05,84,03,02,07,16,01,65,03,0C,09,10,00,83,01,00,00,02,3A,80,18,71,
39,20,40,58,2C,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,
10,00,72,51,0D,1E,20,6E,28,55,00,07,44,21,00,00,1E,8C,0A,08,6A,0E,20,2D,10,19,3E,96,00,07,44,21,
00,18,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,47
11.2 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 blocks: 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) [Native]
720 x 480p at 60Hz - EDTV (16:9, 3:2:3)
720 x 480i at 60Hz - Doublescan (16:9, 3:2:3)
720 x 576i at 50Hz - Doublescan (16:9, 3:2:3)
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,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,AA,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,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,
00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,
00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,
00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,
00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,
00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,
12 Protocol 3000

The DIP-31 Automatic Video Switcher can be operated using the Kramer Protocol 3000 serial commands. The command framing varies according to how you interface with the DIP-31. 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:

```
ROUTE 1,1,2
```

The framing of the command varies according to the terminal communication software.

- K-Touch Builder (Kramer software):

```
#ROUTE 1,1,2
```

- Terminal communication software, such as Hercules:
• K-Config (Kramer configuration software):

All the examples provided in this section are based on using the K-Config software.

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-31. To enter a command 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 Section 12.1
• General syntax used for Protocol 3000 commands, see Section 12.2
• Protocol 3000 commands available for the DIP-31, see Section 12.3

12.1 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.
12.2 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:**

<table>
<thead>
<tr>
<th>Start</th>
<th>Address (optional)</th>
<th>Body</th>
<th>Delimiter</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>Device_id@</td>
<td>Message</td>
<td>CR</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Start</th>
<th>Body</th>
<th>Delimiter</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>Command SP Parameter_1,Parameter_2,…</td>
<td>CR</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Start</th>
<th>Address</th>
<th>Body</th>
<th>Delimiter</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>Device_id@</td>
<td>Command_1 Parameter1_1,Parameter1_2,…</td>
<td>CR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Command_2 Parameter2_1,Parameter2_2,…</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Command_3 Parameter3_1,Parameter3_2,…</td>
<td></td>
</tr>
</tbody>
</table>

- **Device Message Format:**

<table>
<thead>
<tr>
<th>Start</th>
<th>Address (optional)</th>
<th>Body</th>
<th>Delimiter</th>
</tr>
</thead>
<tbody>
<tr>
<td>~</td>
<td>Device_id@</td>
<td>Message</td>
<td>CR LF</td>
</tr>
</tbody>
</table>

- **Device Long Response – Echoing command:**

<table>
<thead>
<tr>
<th>Start</th>
<th>Address (optional)</th>
<th>Body</th>
<th>Delimiter</th>
</tr>
</thead>
<tbody>
<tr>
<td>~</td>
<td>Device_id@</td>
<td>Command SP [Param1,Param2,…] result</td>
<td>CR LF</td>
</tr>
</tbody>
</table>
12.3  Protocol 3000 Commands

This section includes the following commands:

- System Commands (see Section 12.3.1)
- Authentication Commands (see Section 12.3.2)
- Switching/Routing Commands (see Section 12.3.3)
- Video Commands (see Section 12.3.4)
- Audio Commands (see Section 12.3.5)
- Communication Commands (see Section 12.3.6)
- EDID Handling Commands (see Section 12.3.7)

12.3.1  System Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>Protocol handshaking (system mandatory)</td>
</tr>
<tr>
<td>BUILD-DATE</td>
<td>Get device build date (system mandatory)</td>
</tr>
<tr>
<td>FACTORY</td>
<td>Reset to factory default configuration</td>
</tr>
<tr>
<td>HELP</td>
<td>Get command list (system mandatory)</td>
</tr>
<tr>
<td>MODEL</td>
<td>Get device model (system mandatory)</td>
</tr>
<tr>
<td>PROT-VER</td>
<td>Get device protocol version (system mandatory)</td>
</tr>
<tr>
<td>RESET</td>
<td>Reset device (system mandatory)</td>
</tr>
<tr>
<td>SN</td>
<td>Get device serial number (system mandatory)</td>
</tr>
<tr>
<td>VERSION</td>
<td>Get device firmware version (system mandatory)</td>
</tr>
<tr>
<td>AV-SW-MODE</td>
<td>Set/get auto switch mode (system)</td>
</tr>
<tr>
<td>AV-SW-TIMEOUT</td>
<td>Set/get auto switching timeout (system)</td>
</tr>
<tr>
<td>DISPLAY</td>
<td>Get output HPD status (system)</td>
</tr>
<tr>
<td>DPSW-STATUS</td>
<td>Get the DIP-switch status (system)</td>
</tr>
<tr>
<td>FPGA-VER</td>
<td>Get current FPGA version (system)</td>
</tr>
<tr>
<td>HDCP-MOD</td>
<td>Set/get HDCP mode (system)</td>
</tr>
<tr>
<td>HDCP-STAT</td>
<td>Get HDCP signal status (system)</td>
</tr>
<tr>
<td>NAME</td>
<td>Set/get machine (DNS) name (system – Ethernet)</td>
</tr>
<tr>
<td>NAME-RST</td>
<td>Reset machine (DNS) name to factory default (system – Ethernet)</td>
</tr>
<tr>
<td>PRIORITY</td>
<td>Set/get priority for all channels (system)</td>
</tr>
<tr>
<td>SIGNAL</td>
<td>Get input signal lock status (system)</td>
</tr>
</tbody>
</table>
### 12.3.1.1 #

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>#</td>
<td>End User</td>
</tr>
<tr>
<td>Get:</td>
<td></td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

Protocol handshaking

**Syntax**

Set:

```
#CR
```

Get:

```
-
```

**Response**

```
~[CR]<SEP>@OK<CR><LF
```

**Parameters**

**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

**K-Config Example**

```
“#”, 0x0D
```

### 12.3.1.2 BUILD-DATE

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Get:</td>
<td>BUILD-DATE?</td>
<td>End User</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

Get device build date

**Syntax**

Set:

```
-
```

Get:

```
#BUILD-DATE?CR
```

**Response**

```
~[CR]<SEP>date<SEP>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

**Notes**

**K-Config Example**

```
“#BUILD-DATE?”, 0x0D
```
### 12.3.1.3 FACTORY

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: FACTORY</td>
<td>End User</td>
<td>Public</td>
</tr>
<tr>
<td>Get: -</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Description**

<table>
<thead>
<tr>
<th>Functions</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: Reset device to factory default configuration</td>
<td>#FACTORY CR</td>
</tr>
<tr>
<td>Get: -</td>
<td>-</td>
</tr>
</tbody>
</table>

**Response**

```plaintext
~nn@FACTORY SP OK CR 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.

**K-Config Example**

```
"#FACTORY",0x0D
```

### 12.3.1.4 HELP

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: -</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get: HELP</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

<table>
<thead>
<tr>
<th>Functions</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: -</td>
<td>-</td>
</tr>
</tbody>
</table>
| Get: Get command list or help for specific command | 1. #HELP CR  
2. #HELP SP COMMAND_NAME CR |

**Response**

1. Multi-line:

```plaintext
~nn@Device available protocol 3000 commands:CR LFcommand,SP command...
```

2. Multi-line:

```plaintext
~nn#HELP SP command: CR LFdescription: CR LFUSAGE: usage CR LF
```

**Parameters**

`COMMAND_NAME` – name of a specific command

**Response Triggers**

**Notes**

To get help for a specific command use: HELP SP COMMAND_NAME CR LF

**K-Config Example**

```
"#HELP",0x0D
```
### 12.3.1.5 MODEL

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get:</td>
<td>MODEL?</td>
<td>End User</td>
</tr>
</tbody>
</table>

**Description**

**Syntax**

**Set:**

**Get:**

Get device model

#MODEL?CR

**Response**

~nn@MODEL?spmodel_nameCR 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

**K-Config Example**

“#MODEL?”,0x0D

---

### 12.3.1.6 PROT-VER

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get:</td>
<td>PROT-VER?</td>
<td>End User</td>
</tr>
</tbody>
</table>

**Description**

**Syntax**

**Set:**

**Get:**

Get device protocol version

#PROT-VER?CR

**Response**

~nn@PROT-VER?sp3000:versionCR LF

**Parameters**

$version$ - XX.XX where X is a decimal digit

**Response Triggers**

**Notes**

**K-Config Example**

“#PROT-VER?”,0x0D
### 12.3.1.7  **RESET**

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td><strong>RESET</strong></td>
<td>Administrator</td>
</tr>
<tr>
<td>Get:</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Description**

Syntax

**Set:** Reset device

Syntax

```
#RESET
```

**Response**

```
~nn@RESET@OK@CR@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.

**K-Config Example**

```
"#RESET",0x0D
```

### 12.3.1.8  **SN**

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get:</td>
<td><strong>SN?</strong></td>
<td>End User</td>
</tr>
</tbody>
</table>

**Description**

Syntax

**Set:** -

**Get:** Get device serial number

Syntax

```
#SN?
```

**Response**

```
~nn@SN@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

**K-Config Example**

```
"#SN?",0x0D
```
### 12.3.1.9 VERSION

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get:</td>
<td>VERSION?</td>
<td>End User</td>
</tr>
</tbody>
</table>

**Description**

| Set:      | -          | -            |
| Get:      | Get firmware version number | #VERSION?CR |

**Response**

```
~nn@VERSION$firmware_version$CR
```

**Parameters**

*firmware_version = XX.XX.XXXX* where the digit groups are: major.minor.build version

**Response Triggers**

**Notes**

**K-Config Example**

```
"#VERSION?",0x0D
```

---

### 12.3.1.10 AV-SW-MODE

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get:</td>
<td>AV-SW-MODE?</td>
<td>End user</td>
</tr>
</tbody>
</table>

**Description**

| Set:      | -          | -            |
| Get:      | Get input auto switch mode (per output) | #AV-SW-MODE?$layer,output_id$CR |

**Response**

```
~nn@AV-SW-MODE$layer,output_id,mode$CR
```

**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**

**K-Config Example**

Get the input audio switch mode for HDMI Out:

```
"#AV-SW-MODE? 1,1",0x0D
```
### 12.3.1.11 AV-SW-TIMEOUT

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: AV-SW-TIMEOUT</td>
<td>End User</td>
<td>Public</td>
</tr>
<tr>
<td>Get: AV-SW-TIMEOUT?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**
- **Set:** Set auto switching timeout
- **Get:** Get auto switching timeout

**Syntax**
- **Set:** #AV-SW-TIMEOUT SP action, timeout CR
- **Get:** #AV-SW-TIMEOUT? SP action 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.

**K-Config Example**

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

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: -</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get DISPLAY?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

**Syntax**

Set:

Get:

Get output HPD status

#DISPLAY? [out_id]CR

**Response**

~nnDISPLAY[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**

**K-Config Example**

Get the output HPD status of HDMI Out:

“#DISPLAY? 1”, 0x0D
### 12.3.1.13 DPSW-STATUS

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get:</td>
<td>DPSW-STATUS?</td>
<td>End User</td>
</tr>
</tbody>
</table>

#### Description

Get: Get the DIP-switch status

#### Response

\[
\#\text{DPSW-STATUS?}^SP dp\_sw\_id^CR
\]

#### Parameters

- \(dp\_sw\_id\) – 1 (video switch), 2 (video switch), 3 (audio switch), 4 (audio switch)
- \(status\) – 0 (up / Off), 1 (down / On)

#### Notes

K-Config Example

Get the status of DIP-switch 1 (video switch):

\["\#\text{DPSW-STATUS?} 1",0x0D\]

### 12.3.1.14 FPGA-VER

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get:</td>
<td>FPGA-VER?</td>
<td>End User</td>
</tr>
</tbody>
</table>

#### Description

Get: Get current FPGA version

#### Response

\[
\#\text{FPGA-VER?}^SP id^CR
\]

#### Parameters

- \(id\) – 1 (FPGA)
- \(major\_ver\) – Major FPGA version number for current firmware
- \(minor\_ver\) – Minor FPGA version number for current firmware

#### Notes

FPGA – field programmable gate array

K-Config Example

Get the FPGA version number for the current firmware:

\["\#\text{FPGA-VER?} 1",0x0D\]
### 12.3.1.15 HDCP-MOD

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: HDCP-MOD</td>
<td>Administrator</td>
<td>Public</td>
</tr>
<tr>
<td>Get: HDCP-MOD?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

#### Description

<table>
<thead>
<tr>
<th>Set:</th>
<th>Get:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set HDCP mode</td>
<td>Get HDCP mode</td>
</tr>
</tbody>
</table>

#### Syntax

- Set: `#HDCP-MOD inp_id,mode CR`
- Get: `#HDCP-MOD? inp_id CR`

#### 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

#### K-Config Example

- Disable HDCP mode on HDMI In 2: 
  ```
  "#HDCP-MOD 2,0",0x0D
  ```
12.3.1.16 HDCP-STAT

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get: HDCP-STAT?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

**Syntax**

Set: -

Get: Get HDCP signal status

```
#HDCP-STAT? stage,stage_id CR
```

**Response**

```
~ [HDCP-STAT 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

**K-Config Example**

Get the HDCP input signal status of the source device connected to HDMI In 1:

```
"#HDCP-STAT? 0,1",0x0D
```
### NAME

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: NAME</td>
<td>Administrator</td>
<td>Public</td>
</tr>
<tr>
<td>Get: NAME?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

Set: Set machine (DNS) name

- Syntax: `#NAME machine_name CR`

Get: Get machine (DNS) name

- Syntax: `#NAME? CR`

**Response**

Set: ~nn@NAME machine_name CR LF

Get: ~nn@NAME? 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)

**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).

#### K-Config Example

Set the DNS name of the device to "room-442":

```
"#NAME room-442",0x0D
```

### NAME-RST

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: NAME-RST</td>
<td>Administrator</td>
<td>Public</td>
</tr>
<tr>
<td>Get: -</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Description**

Set: Reset machine (DNS) name to factory default

- Syntax: `#NAME-RST CR`

**Response**

~nn@NAME-RST SP OK CR LF

**Parameters**

**Notes**

Factory default of machine (DNS) name is "KRAMER_"

#### K-Config Example

Reset the DNS name of the device to the factory default:

```
"#NAME-RST",0x0D
```
### 12.3.1.19 PRIORITY

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: PRIORITY</td>
<td>Administrator</td>
<td>Public</td>
</tr>
<tr>
<td>Get: PRIORITY?</td>
<td>Administrator</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

- **Set:** Set input priority
  - Syntax: `#PRIORITY[layer, PRIORITY1, PRIORITY2, PRIORITY3]CR`
- **Get:** Get input priority
  - Syntax: `# PRIORITY?layerCR`

**Response**

```
~n#PRIORITY[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

**K-Config Example**

Set the video input priority of PC In as the highest priority:
```
"#PRIORITY 1,2,3,1",0x0D
```
### 12.3.1.20 SIGNAL

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get:</td>
<td>SIGNAL?</td>
<td>End User</td>
</tr>
</tbody>
</table>

#### Description

**Set:**

Get input signal lock status

**Get:**

Get input signal lock status

#### Syntax

<table>
<thead>
<tr>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>#SIGNAL? 5inp_id:CR</td>
</tr>
</tbody>
</table>

#### 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

~nnSIGNAL|5inp_id, status|CR LF

#### Response Triggers

- A response is sent after every change in input signal status from On to Off or from Off to On.

#### Notes

K-Config Example

Get the input signal lock status of HDMI In 2:

```
"#SIGNAL? 2",0x0D
```
12.3.2 Authentication Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOGIN</td>
<td>Set/get protocol permission</td>
</tr>
<tr>
<td>LOGOUT</td>
<td>Cancel current permission level</td>
</tr>
<tr>
<td>PASS</td>
<td>Set/get password for login level</td>
</tr>
<tr>
<td>SECUR</td>
<td>Set/get current security state</td>
</tr>
</tbody>
</table>

### 12.3.2.1 LOGIN

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: LOGIN</td>
<td>Not Secure</td>
<td>Public</td>
</tr>
<tr>
<td>Get: LOGIN?</td>
<td>Not Secure</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

- **Set:** Set protocol permission
  
  ```
  #LOGIN login_level,password
  ```

- **Get:** Get current protocol permission level
  
  ```
  #LOGIN?
  ```

**Response**

- **Set:**
  
  ```
  ~nn@LOGIN SP login_level,password SP OK CR LF
  ```
  
  or
  
  ```
  ~nn@LOGIN SP ERR SP 004 CR 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.

**K-Config Example**

Set the protocol permission level to Admin (when the password defined in the PASS command is 33333):

```
"#LOGIN Admin,33333",0x0D
```
### 12.3.2.2 LOGOUT

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: LOGOUT</td>
<td>Not Secure</td>
<td>Public</td>
</tr>
<tr>
<td>Get: -</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Description**

Set: Cancel current permission level
Get: -

**Response**

```
~nn@LOGOUT@CR\nOK\nCR\nLF
```

**Parameters**

| login_level | level of login to set: User, Admin |
| password | password for the login_level. Up to 15 printable ASCII chars. |

**Notes**

Logs out from User or Administrator permission levels

**K-Config Example**

```
“#LOGOUT”,0x0D
```

### 12.3.2.3 PASS

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: PASS</td>
<td>Administrator</td>
<td>Public</td>
</tr>
<tr>
<td>Get: PASS?</td>
<td>Administrator</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

Set: Set password for login level
Get: Get password for login level

**Response**

```
~nn@PASS@SP@login_level,password@CR\nLF
```

**Parameters**

- `login_level`: level of login to set: User, Admin
- `password`: password for the login_level. Up to 15 printable ASCII chars.

**Notes**

The default password is an empty string

**K-Config Example**

Set the password for the Admin protocol permission level to 33333:

```
“#PASS Admin,33333”,0x0D
```
## 12.3.2.4 SECUR

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: SECUR</td>
<td>Administrator</td>
<td>Public</td>
</tr>
<tr>
<td>Get: SECUR?</td>
<td>Not Secure</td>
<td>Public</td>
</tr>
</tbody>
</table>

### Description
- **Set:** Start/stop security
- **Get:** Get current security state

### Syntax
- **Set:** Start/stop security
  - `#SECUR security_mode
  CR`
- **Get:** Get current security state
  - `#SECUR?
  CR`

### 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

### K-Config Example
- Enable the permission system:
  - `"#SECUR 0",0x0D`
### 12.3.3 Switching/Routing Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROUTE</td>
<td>Set/get layer routing</td>
</tr>
</tbody>
</table>

#### 12.3.3.1 ROUTE

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: ROUTE</td>
<td>End User</td>
<td>Public</td>
</tr>
<tr>
<td>Get: ROUTE?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: Set layer routing</td>
<td>#ROUTE[layer,dest,src]CR</td>
</tr>
<tr>
<td>Get: Get layer routing</td>
<td>#ROUTE?[layer,dest]CR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>~nn\ROUTE[layer,dest,src]CR LF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>layer = 1 (video)</td>
</tr>
<tr>
<td>dest = 1 (HDMI Out)</td>
</tr>
<tr>
<td>src = 1 (HDMI In 1), 2 (HDMI In 2), 3 (PC In)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response Triggers</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The get command identifies input switching on Step-in clients</td>
</tr>
<tr>
<td>The set command is for remote input switching on Step-in clients (essentially via the Web)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>K-Config Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set the remote input switching of video to HDMI Out from HDMI In 2:</td>
</tr>
<tr>
<td>“#ROUTE 1,1,2”,0x0D</td>
</tr>
</tbody>
</table>

---

DIP-31 - Protocol 3000
### 12.3.4 Video Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VGA-PHASE</td>
<td>Set/get ADC (VGA) sampling phase</td>
</tr>
<tr>
<td>VMUTE</td>
<td>Set/get video on output mute</td>
</tr>
</tbody>
</table>

#### 12.3.4.1 VGA-PHASE

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>VGA-PHASE</td>
<td>End User</td>
</tr>
<tr>
<td>Get:</td>
<td>VGA-PHASE?</td>
<td>End User</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>Set ADC (VGA) sampling phase #VGA-PHASE[B]channel,[H]value[CR]</td>
</tr>
<tr>
<td>Get:</td>
<td>Get ADC (VGA) sampling phase #VGA-PHASE?[B]channel[CR]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response</th>
<th>Parameters</th>
<th>Response Triggers</th>
</tr>
</thead>
<tbody>
<tr>
<td>~[CR][VGA-PHASE[B]channel,[H]value[CR] [LF]</td>
<td>channel – input number: 3 (PC In)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>value – phase number in LSB units: 1-30, ++ (increase current value), -- (decrease current value)</td>
<td>-</td>
</tr>
</tbody>
</table>

**Notes**

**K-Config Example**

Increase the current value of the ADC (VGA) sampling phase:

```
"#VGA-PHASE 3,++",0x0D
```
### Functions

<table>
<thead>
<tr>
<th>Set:</th>
<th>VMUTE</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get:</td>
<td>VMUTE?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

### Description

- **Set:** Set enable/disable video on output
  
  Syntax: 
  
  ```
  VMUTE output_id,flag CR
  ```

- **Get:** Get video on output status
  
  Syntax: 
  
  ```
  VMUTE? output_id SP CR
  ```

### Parameters

- `output_id` - 1 (HDMI Out)
- `flag` - 0 (disable video on output), 1 (enable video on output), 2 (blank video)

### Response Triggers

- `~nnVMUTE output_id,flag CR LF`

### Notes

**K-Config Example**

Disable the video output on HDMI Out:

```
"#VMUTE 3,0",0x0D
```
## 12.3.5 Audio Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUD-EMB</td>
<td>Get audio in video embedding status</td>
</tr>
<tr>
<td>AUD-LVL</td>
<td>Set/get volume for specific amplifier output</td>
</tr>
<tr>
<td>AUD-SIGNAL?</td>
<td>Get audio input signal status</td>
</tr>
<tr>
<td>MUTE</td>
<td>Set/get audio mute</td>
</tr>
</tbody>
</table>

### 12.3.5.1 AUD-EMB

#### Functions

<table>
<thead>
<tr>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

#### Description

**Set:**

Get:  **AUD-EMB?**  

**Get:**  Get audio in video embedding status  

**Syntax**  

Set:  

Get:  

**Response**  

\(~\text{nn}~\text{AUD-EMB} \text{sp} \text{in}, \text{out}, \text{status} \text{cr} \text{lf}\)  

#### 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

#### K-Config Example

```
"#AUD-EMB? 1,1",0x0D
```
### 12.3.5.2 AUD-LVL

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: AUD-LVL</td>
<td>End User</td>
<td>Public</td>
</tr>
<tr>
<td>Get: AUD-LVL?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**
Set: Set volume for specific amplifier output

**Syntax**

```
Set:
#AUD-LVL stage,channel,volume

Get:
#AUD-LVL? stage,channel
```

**Response**

```
~nn#AUD-LVL stage,channel,volume
```

**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**

All values are in percentages
A minus sign precedes negative values

**K-Config Example**

Set the volume of the Audio Out (1) output to 75%:

```
"#AUD-LVL 1,1,75",0x0D
```
### 12.3.5.3 AUD-SIGNAL

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: -</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get: AUD-SIGNAL?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

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**

K-Config Example

```
“#AUD-SIGNAL? 1”,0x0D
```

### 12.3.5.4 MUTE

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: MUTE</td>
<td>End User</td>
<td>Public</td>
</tr>
<tr>
<td>Get: MUTE?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

Set:

Get: Get audio mute

```
#MUTE SP channel, mute_mode CR
#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**

K-Config Example

Mute the Audio Out output:

```
“#MUTE 1,1”,0x0D
```
### 12.3.6 Communication Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETH-PORT</td>
<td>Set/get Ethernet port protocol</td>
</tr>
<tr>
<td>NET-DHCP</td>
<td>Set/get DHCP mode</td>
</tr>
<tr>
<td>NET-GATE</td>
<td>Set/get gateway IP</td>
</tr>
<tr>
<td>NET-IP</td>
<td>Set/get IP address</td>
</tr>
<tr>
<td>NET-MAC</td>
<td>Get MAC address</td>
</tr>
<tr>
<td>NET-MASK</td>
<td>Set/get subnet mask</td>
</tr>
</tbody>
</table>

#### 12.3.6.1 ETH-PORT

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: ETH-PORT</td>
<td>Administrator</td>
<td>Public</td>
</tr>
<tr>
<td>Get: ETH-PORT?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>Set Ethernet port protocol</td>
</tr>
<tr>
<td>Get:</td>
<td>Get Ethernet port protocol</td>
</tr>
</tbody>
</table>

**Response**

```
~\r\n#ETH-PORT\sp\sp\spportType,ETHPort\cr
```

**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)

**K-Config Example**

Set the Ethernet port protocol for TCP to port 12457:

```
“#ETH-PORT TCP,12457”,0xD
```
12.3.6.2 NET-DHCP

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: NET-DHCP</td>
<td>Administrator</td>
<td>Public</td>
</tr>
<tr>
<td>Get: NET-DHCP?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

**Syntax**

**Set:** Set DHCP mode

```
#NET-DHCP\$Pmode\$R
```

**Get:** Get DHCP mode

```
#NET-DHCP?\$R
```

**Response**

```
~\$R\$P\$mode\$R\$L
```

**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.

**K-Config Example**

Enable DHCP mode, if available:

```
"#NET-DHCP 1", 0x0D
```
### 12.3.6.3 NET-GATE

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: NET-GATE</td>
<td>Administrator</td>
<td>Public</td>
</tr>
<tr>
<td>Get: NET-GATE?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

Set: Set gateway IP  
Get: Get gateway IP

**Syntax**

- Set: `#NET-GATE SP ip_address CR`
- Get: `#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.

**K-Config Example**

Set the gateway IP address to `192.168.0.1`:

```
"#NET-GATE 192.168.000.001",0x0D
```

### 12.3.6.4 NET-IP

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: NET-IP</td>
<td>Administrator</td>
<td>Public</td>
</tr>
<tr>
<td>Get: NET-IP?</td>
<td>End User</td>
<td>Public</td>
</tr>
</tbody>
</table>

**Description**

Set: Set IP address  
Get: Get IP address

**Syntax**

- Set: `#NET-IP SP ip_address CR`
- Get: `#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

**K-Config Example**

Set the IP address to `192.168.1.39`:

```
"#NET-IP 192.168.001.039",0x0D
```
### 12.3.6.5 NET-MAC

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Get:</td>
<td>NET-MAC?</td>
<td>End User</td>
</tr>
</tbody>
</table>

**Description**

- **Set:**
  - Description: Set subnet mask
  - Syntax: `#NET-MASK SP net_mask CR`
  - Parameters:
    - net_mask - format: xxx.xxx.xxx.xxx
  - Response:
    - NT@NET-MASK SP net_mask CR LF
  - Response Triggers
    - The subnet mask limits the Ethernet connection within the local network
    - Consult your network administrator for correct settings
  - Notes
  - K-Config Example
    - Set the subnet mask to 255.255.0.0:
      - "#NET-MASK 255.255.000.000",0x0D

### 12.3.6.6 NET-MASK

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>NET-MASK</td>
<td>Administrator</td>
</tr>
<tr>
<td>Get:</td>
<td>NET-MASK?</td>
<td>End User</td>
</tr>
</tbody>
</table>

**Description**

- **Set:**
  - Description: Get MAC address
  - Syntax: `#NET-MAC? CR`
  - Parameters:
    - mac_address - unique MAC address. Format: XX-XX-XX-XX-XX-XX where x is hex digit
  - Response:
    - ~nt@NET-MAC SP mac_address CR LF
  - Response Triggers
  - Notes
  - K-Config Example
    - “#NET-MAC?”,0x0D
12.3.7 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 http://www.kramerav.com/product/EDID%20Designer).

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPEDID</td>
<td>Copy EDID data from the output to the input EEPROM</td>
</tr>
<tr>
<td>LOCK-EDID</td>
<td>Lock last read EDID</td>
</tr>
</tbody>
</table>

### 12.3.7.1 CPEDID

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set:</td>
<td>CPEDID</td>
<td>End User</td>
</tr>
<tr>
<td>Get:</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Description

Set: Copy EDID data from the output to the input EEPROM

Set Syntax:

```
#CPEDID src_type,src_id,dst_type,dest_bitmap CR LF
```

Get Syntax:

```
-
```

#### 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

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.

#### K-Config 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
```
## 12.3.7.2 LOCK-EDID

<table>
<thead>
<tr>
<th>Functions</th>
<th>Permission</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set: LOCK-EDID</td>
<td>End User</td>
<td>End User</td>
</tr>
<tr>
<td>Get: LOCK-EDID?</td>
<td>End User</td>
<td>End User</td>
</tr>
</tbody>
</table>

### Description

#### Syntax

**Set:**

```
Lock last read EDID
#LOCK-EDID input_id,lock_mode CR
```

**Get:**

```
Get EDID lock state
#LOCK-EDID? SP input_id CR
```

### Response

```
~nn#LOCK-EDID 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

### K-Config 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 installations dealing with this product, and 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. To 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. To 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. To issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time the remedy is sought under this limited warranty.

What Kramer Electronics Will Not Do Under This Limited Warranty

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

How To Obtain A Remedy Under This Limited Warranty

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

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

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

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

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