KRAMER

USER MANUAL

WP-20 Quick Start Guide

This guide helps you install and use your **WP-20** for the first time.

Go to **www.kramerav.com/downloads/WP-20** to download the latest user manual and check if firmware upgrades are available.

Scan for full manual
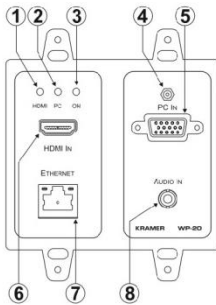
Step 1: Check what's in the box

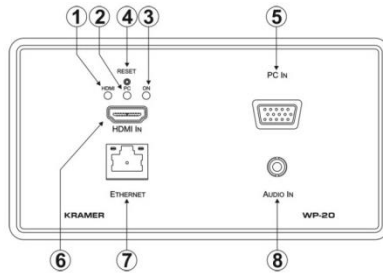☑ **WP-20** Wall plate   ☑ 1 Power supply (12V DC)   ☑ 1 Quick start guide

Step 2: Get to know your WP-20

US Version

**EU / UK Version**

| #	Feature	Function
1	*HDMI* LED	When HDMI is selected: Lights orange when external audio is selected. Lights green when embedded audio is selected. LED is off when HDMI is not selected.
2	*PC* Graphics LED	When PC input is selected: Lights orange when external audio is selected. Lights green when there is no audio. LED is off when the PC input is not selected
3	*ON* LED	The LED indicates the following: Lights green – power is provided by a power adapter. Lights orange – power is provided by PoE.
4	*RESET* Button	Short press to reset the device. Long press (5 seconds) to reset the device to factory default parameters.
5	*PC IN* Input Connector	Connect to the PC graphics source (for example, a laptop).
6	*HDMI IN* Input Connector	Connect to an HDMI source (for example, a Blu-ray disk player).
7	*ETHERNET* RJ-45 Connector	Connect to the Ethernet LAN.
8	*AUDIO IN* 3.5mm Mini Jack	Connect to the unbalanced, stereo audio source (for example, the audio output of the laptop).

US Version
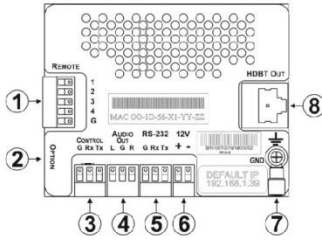
EU / UK Version
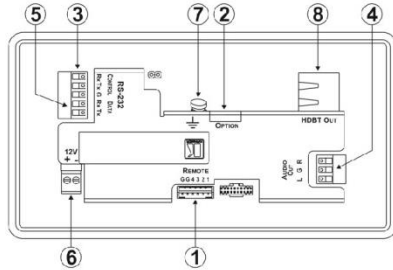
#	Feature	Function
1	*REMOTE* 5-pin Terminal Block	Connect to the remote, contact-closure switches for remote control (see Step 8).
2	*OPTION* 4-way DIP-switch	Switches for setting the device behavior (see Step 4).
3	*CONTROL* 3-pin Terminal Block	Connect to the serial controller to control the **WP-20** (for example, a PC).
4	*AUDIO OUT* 3-pin Terminal Block	Connect to the unbalanced, stereo audio acceptor (for example, amplified speakers).
5	*RS-232* 3-pin Terminal Block	Connect to the PC to transfer data via RS-232 (for example, a serial controller for a remote device).
6	*12V* DC Connector	Connect to the included power supply. Not needed on the **WP-20** if there is a PoE provider over HDBaseT.
7	*GND* Terminal	Connect to the common ground (optional).
8	*HDBT OUT* RJ-45 TP Connector	Connect to a compatible HDBT TP switcher or receiver (for example, the TP-780Rxr).

Step 3: Connect the inputs

Always switch OFF the power on each device before connecting it to your **WP-20**. For best results, we recommend that you always use Kramer high-performance cables to connect AV equipment to the **WP-20**.

RJ-45 Pinout:

For the Ethernet connector, see the wiring diagram below:
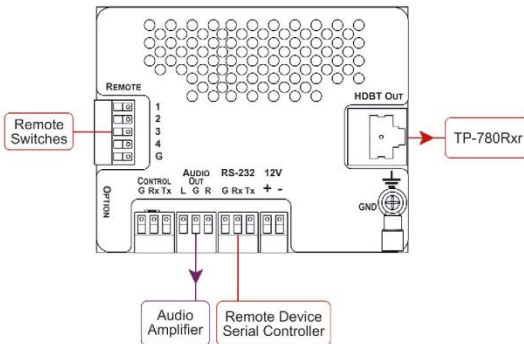
PIN EIA /TIA 568B	
PIN	**Wire Color**
1	Orange / White
2	Orange
3	Green / White
4	Blue
5	Blue / White
6	Green
7	Brown / White
8	Brown

Step 4: Set the DIP switches

Video Switching Selection

DIP-switch 1	DIP-switch 2	Video Input Selection
Off	Off	Automatic – Last connected. Where more than one source is connected, the last source has priority.
Off	On	Automatic – Priority selection. HDMI 1 → PC IN.
On	Off	Manual
On	On	Manual

Audio Switching Selection

DIP-switch 3	DIP-switch 4	Audio Input Selection
Off	Off	Automatic – Priority selection. Embedded HDMI → analog Audio In.
Off	On	Automatic – Priority selection. Analog Audio In → embedded HDMI.
On	Off	Embedded HDMI
On	On	Analog Audio In

Step 5: Connect the power

If the device is not powered via HDBT PoE, connect the 12V power supply to the **WP-20** and plug the power supply into the mains power.

Safety Instructions

Caution: There are no operator serviceable parts inside the unit.
Warning: Use only the Kramer Electronics power adapter that is provided with the unit.
Warning: Disconnect the power and unplug the unit from the wall before installing.
See www.KramerAV.com for updated safety information.

Step 6: Install the WP-20

Mount the device in a suitable wall box. We recommend opening all holes in the walls of the box to assist in cooling the **WP-20**.

Step 7: Connect the outputs
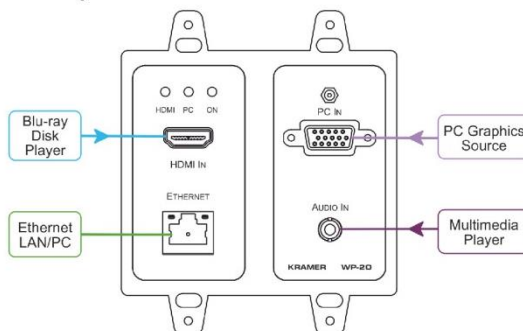
Step 8: Operate the WP-20 via:

Protocol 3000

Default IP Parameters

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

Default Logon Credentials

Parameter	Values
Name	Admin
Password	Admin

Remote contact-closure switches

#	Feature	Function
1	Input selection / VGA phase shift switch	Short press – Input toggle
		Long press – Adjusts the VGA phase shift
2	Step-in switch	Activates the step-in function if relevant
3	Analog audio output volume increase control	Short press – Increases the volume one step (0.5dB)
		Long press – Increases the volume from -83dB to +24dB in 10 seconds
4	Analog audio output volume decrease control	Short press – Decreases the volume one step (0.5dB)
		Long press – Decreases the volume from +24dB to -83dB in 10 seconds
G	Ground	Connect to the common side of the switches

Web Pages

Contents

Figures

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 **WP-20** Wall Plate. This product, which incorporates HDMI™ technology, is ideal for:

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

Note: All references in this manual to the **WP-20** in this manual also apply to the **WP-20E** European versions.

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment

- Review the contents of this user manual

Go to www.kramerav.com/downloads/WP-20 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 **WP-20** 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 DC

Caution: There are no operator serviceable parts inside the unit

Warning: Use only the Kramer Electronics power supply that is provided with the unit

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

2.3 Shielded Twisted Pair/Unshielded Twisted Pair

Kramer engineers have developed special twisted pair cables to best match our digital twisted pair products; Kramer CAT 6 HDBaseT certified and CAT 7a cables significantly outperform regular CAT 6 and CAT 7a cables.

2.4 Recycling Kramer Products

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

3   Overview

WP−20 is a 4K UHD, HDBaseT active wall plate with Step-In auto switcher for HDMI, VGA and analog audio signals that supports resolutions up to 4K@60Hz (4:2:0) UHD. The device has EDID management, various control options and audio embedding. The unit is a fully−featured auto−switcher with the installation convenience and operational simplicity of a wall plate. **WP−20** is easy to configure, can be powered remotely over Ethernet (PoE) and is designed for any size room.

WP-20 accepts an HDMI and PC graphics video input, an Ethernet signal, serial data, and an unbalanced stereo audio input (which is embedded into the output signal), and transmits the signal via HDBaseT (Twisted Pair) cable to a compatible receiver (for example, the **TP-789Rxr**). **WP-20** is a PoE (Power over Ethernet) receiver and can be powered by a compatible PoE provider, (for example, **PSE-1**).

WP-20 supports a range of up to 130m (430ft) at normal mode (2K), up to 100m (330ft) at normal mode (4K @60Hz (4:2:0)); up to 180m (590ft) extended mode (1080p @60Hz @24bpp) when using **BC-UNIKAT** cables.

> For optimum range and performance, use the recommended Kramer cables available at www.kramerav.com/product/WP-20. Note that the transmission range depends on the signal resolution, graphics card and display used. The distance using non-Kramer CAT 5, CAT 6, and CAT 7 cables may not reach these ranges.

In particular **WP-20** features:

- Simple and Powerful Maestro Room Automation — Intuitive user interface enables you to fully automate your meeting room elements. Configure lights, shades, devices and more to be activated by an extensive range of triggers, including input/output connectivity, routing, and button pressing. By minimizing user intervention, Maestro room automation saves meeting prep time and minimizes human error before presentations.

- Support for 4K UHD, (data rate of up to 10.2Gbps)

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

- Manual input selection

- Automatic live input detection based on video clock presence

- Automatic analog audio detection and embedding

- Audio Only Mode – Play only audio without displaying video (shows a black screen).

- Power over Ethernet (PoE) Acceptor – Can be powered by a PoE provider. This allows a single cable to provide both a data connection and electrical power

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

- HDTV support

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

- HDCP compliancy—works with sources that support HDCP repeater mode

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

- A lockable EDID

- Remote control via contact-closure switches

- Equalization and re-clocking of the data

- Support for digital audio formats

- Local Step-In Switching – Via contact closure.

- Availability in US and European versions

3.1 About HDBaseT™ Technology

HDBaseT™ is an advanced, all-in-one connectivity technology (supported by the HDBaseT Alliance). It is particularly suitable in the ProAV – and also the home – environment as a digital networking alternative, where it enables you to replace numerous cables and connectors by a single LAN cable used to transmit, for example, uncompressed, full high-definition video, audio, IR, as well as various control signals.

The products described in this user manual are HDBaseT certified.

4 Defining the WP-20 Wall Plate

Figure 1 and Figure 2 define the front panels of the **WP-20** and the **WP-20E**.
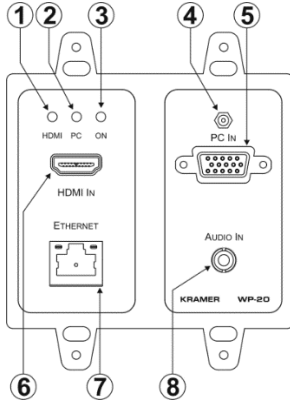
Figure 1: WP-20 Wall Plate Front Panel   Figure 2: WP-20E Wall Plate Front Panel
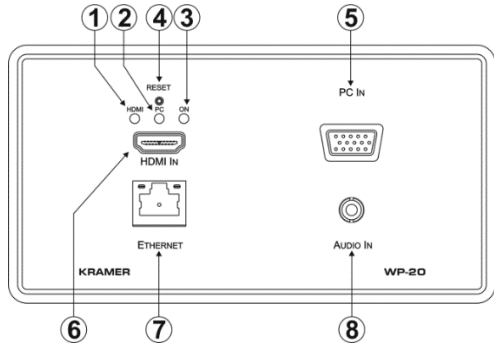
#	Feature	Function
1	*HDMI* LED	When HDMI is selected: • Lights orange when external audio is selected • Lights green when embedded audio is selected • When HDMI is not selected the LED does not light
2	*PC* Graphics LED	When PC input is selected: • Lights orange when external audio is selected. • Lights green when there is no audio • When the PC input is not selected the LED does not light
3	*ON* LED	The LED indicates the following: • Lights green—power is provided by a power adapter • Lights orange—power is provided by PoE
4	Reset Button	Short press to reset the device, long press (5 seconds) to reset the device to factory default parameters
5	*PC IN* Input Connector	Connect to the PC graphics source, (for example, a laptop)
6	*HDMI IN* Input Connector	Connect to an HDMI source, (for example, a Blu-ray disk player)
7	*ETHERNET* RJ-45 Connector	Connect to the Ethernet LAN
8	*AUDIO IN* 3.5mm Mini Jack	Connect to the unbalanced, stereo audio source, (for example, the audio output of the laptop)

[Figure 3](#) and [Figure 4](#) define the rear panels of the **WP-20** and **WP-20E**.
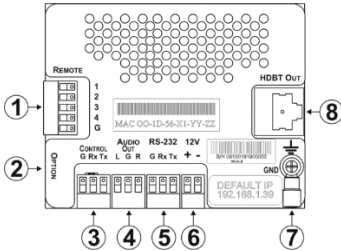
Figure 3: WP-20 Wall Plate Rear Panel
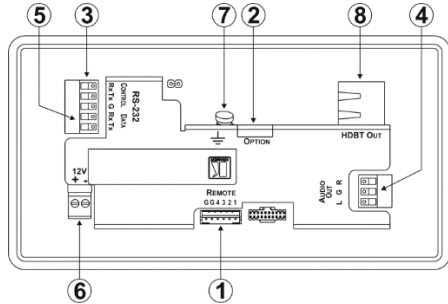
Figure 4: WP-20E Wall Plate Rear Panel

#	Feature	Function
1	*REMOTE* 5-pin Terminal Block	• Connect to the remote, contact-closure switches for remote control, (see [Section 5.1](#))
2	*OPTION* 4-way DIP-switch	• Switches for setting the device behavior, (see [Section 8.1](#))
3	*CONTROL* 3-pin Terminal Block	• Connect to the serial controller to control the WP-20, (for example, a PC)
4	*AUDIO OUT* 3-pin Terminal Block	Connect to the unbalanced, stereo audio acceptor, (for example, amplified speakers)
5	*RS-232* 3-pin Terminal Block	Connect to the PC to transfer data via RS-232, (for example, a serial controller for a remote device)
6	*12V* DC Connector	Connect to the supplied power adapter. Not needed on the WP-20 if there is a PoE provider over HDBaseT
7	Earth Terminal	Connect to the common ground (optional)
8	*HDBT OUT* RJ-45 TP Connector	Connect to a compatible HDBT TP switcher or receiver (for example, the TP-780Rxr)

5 Connecting the WP-20

Always switch off the power to each device before connecting it to your **WP-20**. After connecting your **WP-20**, connect its power and then switch on the power to each device.
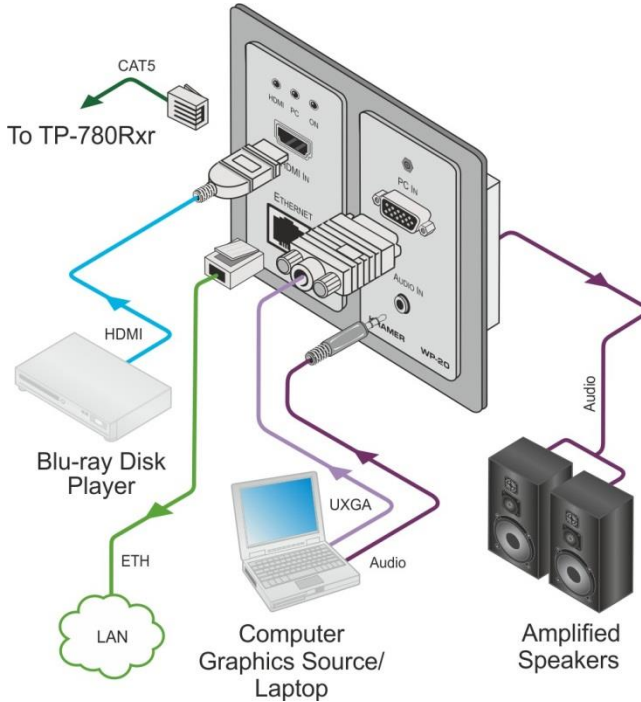
Figure 5: Connecting the WP-20 Wall Plate

Note: When the receiver in use does not support Ethernet, you can replace the left hand side faceplate with an optional part that does not have a cutout for the RJ-45 Ethernet connector.

To connect the WP-20, as illustrated in the example in <u>Figure 5</u>:

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

1. Connect a PC graphics source, (for example, a laptop) to the PC In input.

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

3. Connect the Ethernet RJ-45 connector on the front panel to the LAN.

4. Connect the HDBT OUT RJ-45 connector on the rear panel of the **WP-20** to an HDBT-compatible receiver (for example, the **TP-780Rxr**).

5. Connect the AUDIO OUT 3-pin terminal block on the rear panel of the **WP-20** to the unbalanced, stereo audio acceptor, (for example, a power amplifier with speakers).

6. Connect the REMOTE, 5-way terminal block to momentary, contact-closure switches, (see <u>Section 5.1</u>).

7. If the device is not connected to a PoE provider, connect the power adapter to the **WP-20** and to the mains power, (not shown in <u>Figure 5</u>).

Note: All LED supplies include a current limiting resistor and are designed to work with any standard LED.

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 **WP-20** to control various functions of the device.

Figure 6 illustrates the connections from the terminal block to the contact-closure switches.
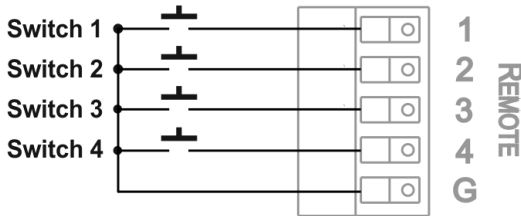
Figure 6: Remote Switches Terminal Block

#	Feature	Function
1	Input selection/VGA phase shift switch	Short press—Input toggle Long press—Adjusts the VGA phase shift, (see Section 6.4)
2	Step-In switch	Activates the Step-In function
3	Analog audio output volume increase control, (see Section 7.4)	Short press—Increases the volume one step (0.5dB) Long press—Increases the volume from -83dB to +24dB in 10 seconds
4	Analog audio output volume decrease control, (see Section 7.4)	Short press—Decreases the volume one step (0.5dB) Long press—Decreases the volume from +24dB to -83dB in 10 seconds
G	Ground	Connect to the common side of the switches

5.2 Wiring the RJ-45 Connectors

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

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

Figure 5: TP PINOUT
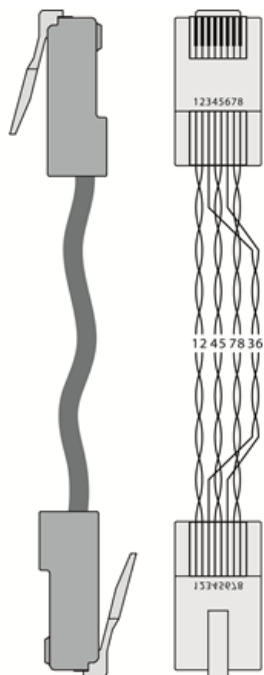
6 Principles of Operation

The **WP-20** 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 you select an input using, either the remote input selection switches, the Web-page interface, or P3000 commands, and switching occurs whether or not there is a live signal present on the input.

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

In last connected mode the **WP-20** selects the input based on which input was connected last. If the signal on this input is subsequently lost for any reason, the input with a live signal and which was also the last connected is selected automatically.

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. This priority is configurable; the default setting is HDMI > PC.

Note: In both last connected and priority modes, manually selecting an input using the remote input selection switches or the web pages (see Section 9.2) overrides the last automatic selection until the next connection event or power cycle.

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).

Note: 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.

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

When there is an audio signal but no video signal, the output is a black video screen in conjunction with the analog audio signal.

Note: The default timeout for audio switching when the input signal is lost is five seconds. This can be changed using either P3000 commands or the web pages.

6.4 VGA Phase Shift

To optimize 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 9.2)

- Protocol 3000 commands over Ethernet or RS-232 (see Section 12.3.4.1)

7 Operating the WP-20

Powering up the **WP-20** recalls the last settings from the non-volatile memory, (that is, the configuration of the device when it was powered down).

7.1 Selecting an Input Manually

Any of the following methods can be used to select an input:

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

7.2 Locking the EDID

To prevent the stored EDID (either default or read from a device) from being overwritten, you can lock the current EDID by either sending a Protocol 3000 command or by using the web pages.

Note: Do not power up the display before locking the EDID.

7.3 Resetting the WP-20

To perform a soft reset of the WP-20:

- Briefly press the Reset button.
  The device resets

To reset the WP-20 to factory default parameters:

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

7.4 Analog Audio Output Volume Control

The analog audio output volume can be controlled using remote, contact-closure switches connected to pins 3 and 4 of the Remote terminal block, (see Section 5.1). For volume control using the web pages, see Section 9 and for using P3000 commands to control the volume see Section 12.3.5.

The volume is adjustable from -83dB to +24dB in steps of 0.5dB.

8   Configuring the WP-20

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.
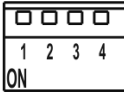
Figure 7: The Configuration DIP-switch

Note: After changing a dip-switch you must power cycle the device to implement the change.

Video Switching Selection

DIP-switch 1	DIP-switch 2	Video Input Selection
Off	Off	Automatic—Last connected. Where more than one source is connected the last one connected has priority
Off	On	Automatic—Priority selection. HDMI 1 → PC IN
On	Off	Manual
On	On	Manual

Audio Switching Selection

DIP-switch 3	DIP-switch 4	Audio Input Selection
Off	Off	Automatic—Priority selection. Embedded HDMI → analog Audio In
Off	On	Automatic—Priority selection. Analog Audio In → embedded HDMI
On	Off	Embedded HDMI
On	On	Analog Audio In

8.2 Video Switching Timeouts

When the **WP-20** is configured for auto switching, the timeouts, before a new input is automatically selected, can be changed as shown in the table below. (For the delay settings on the web page, see Section 9.4.)

Timeout	Minimum Timeout	Default Timeout
Delay switching upon signal loss (signal off, 5V power on)	5 seconds	10 seconds
Delay switching upon cable unplug (signal off, power off)	0 seconds	0 seconds
Delay 5V power off upon signal loss (delay must be greater than "Delay switching upon signal loss")	5 seconds	900 seconds

Note: For audio auto-switching, the default timeout is 5 seconds, configurable by P3K commands.

9 Operating the WP-20 Remotely Using the Embedded Web Pages

The **WP-20** 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 WP-20 Web Pages

Note: If a web page does not update correctly, clear your Web browser's cache by pressing CTRL+F5.

To browse the WP-20 web pages:

1. Open your Internet browser.

2. Type the IP number of the device (see Section 10) in the Address bar of your browser.

http://192.168.1.39

Note: If authentication is enabled, the following window appears (Figure 8) and you must enter the valid username and password to access the web pages. For default authentication details, see Section 10.
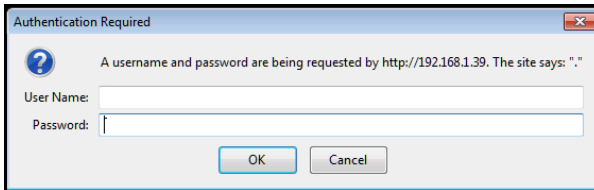
Figure 8: Entering Logon Credentials

Following a successful logon, the screen shown in Figure 9 is displayed.
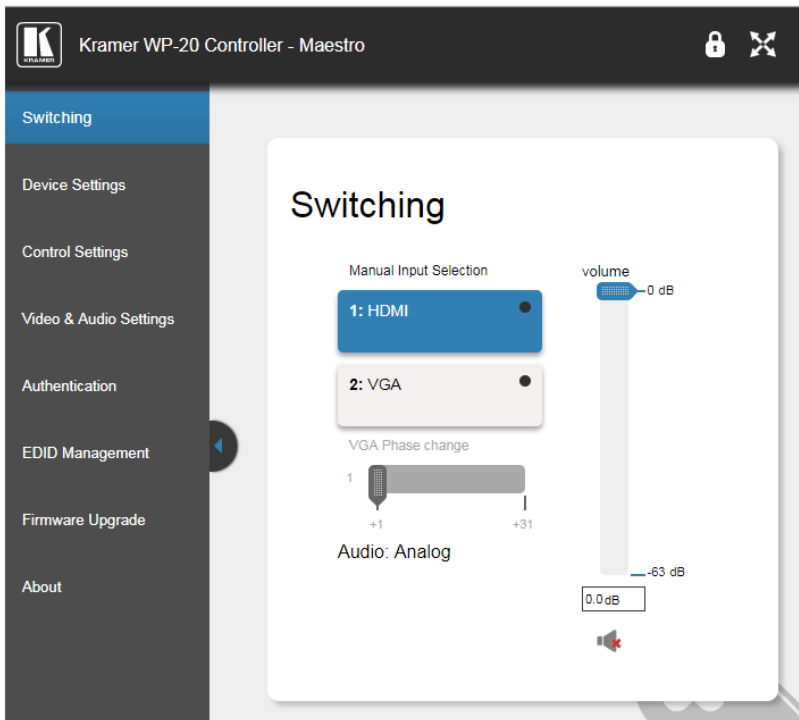
Figure 9: Default Page

The sections of the default page are described in the following table.

Item	Description
Navigation Pane	Click one of the buttons to select a page.
Hide/Reveal Button	Click the arrow to open or close the page navigation pane.
Security Indicator (upper right corner)	Closed lock icon = password security for the web pages is enabled. Open lock icon = password security for the web pages is disabled.

Note: When saving a configuration using Internet Explorer 11 press CTRL+S.

There are six web pages described in the following sections:

- Switching (see Section 9.2)

- Device Settings (see Section 9.3)

- Control Settings (see Section 9.4)

- Video and Audio Settings (see Section 9.5)

- Authentication (see Section 9.6)

- EDID (see Section 9.7)

- Firmware Upgrade (see Section 9.8)

- About (see Section 9.9)

9.1.1 Load/Save Configuration Facility

The Load/Save buttons on the Device Settings page (see section 9.3 Device Settings Page) let you retrieve and save a configuration.

To load a configuration:

1. Click the Load button.
   A file browser window appears.

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

To save the current configuration:

1. Click the Save button.

   The Save Configuration progress is displayed.
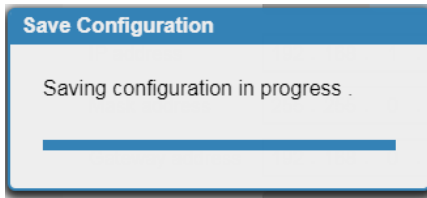
Figure 10: Save Configuration Progress

   When saving is complete, a success message appears.
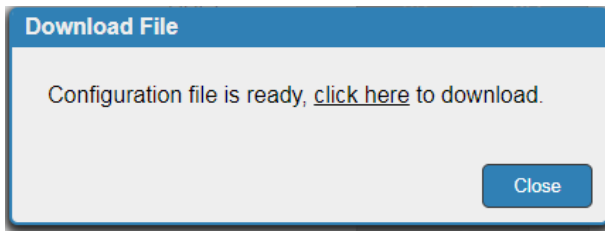
Figure 11: Save Completion Message

2. Click the message to download the configuration file to your computer

   -OR-

   Click Close to end the procedure without downloading the file.

9.2 Switching Page

The Switching page lets you select a video input manually and adjust the audio volume.
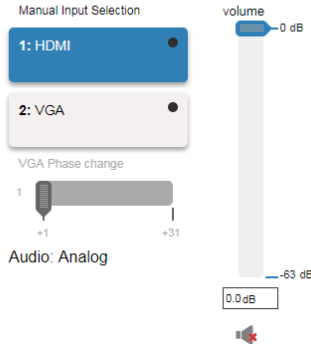
Figure 12: Switching Page
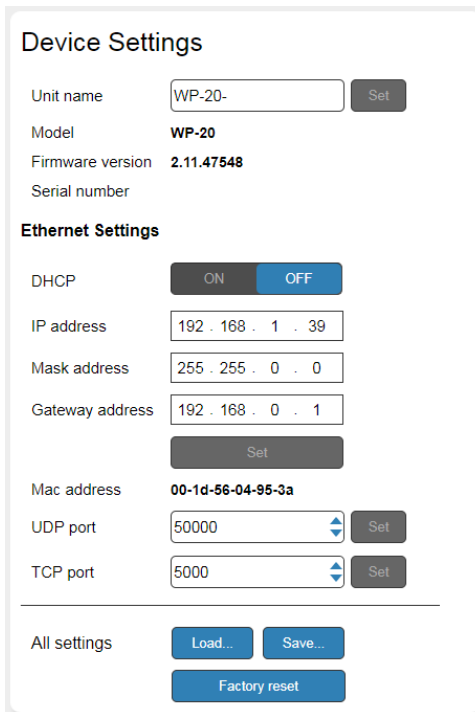
Item	Description
Live Signal Indicator (upper right corner of each input button)	Indicates whether there is a live signal on either of the inputs
HDMI Button	Click to select the HDMI input
VGA Button	Click to select the VGA input
VGA Phase change	Use the slider control to shift the VGA sampling phase
Audio Indicator	Indicates the source of the audio that is transmitted on the output
volume Slider	Click and slide up and down to increase or decrease the audio output volume
Mute Button	Click to mute or unmute the output audio

9.3 Device Settings Page

The Device Settings page lets you:

- View some of the device characteristics, (for example, model and firmware version)

- Edit IP settings, (for example, name and IP address)

- Reset the device to factory default settings

Note: After making any change to the parameters on the Device Settings page, you must power cycle the device to activate the changes.

Device Settings

Unit name	WP-20- [Set]
Model	**WP-20**
Firmware version	**2.11.47548**
Serial number	

Ethernet Settings

DHCP	ON / OFF
IP address	192 . 168 . 1 . 39
Mask address	255 . 255 . 0 . 0
Gateway address	192 . 168 . 0 . 1
	Set
Mac address	**00-1d-56-04-95-3a**
UDP port	50000 [Set]
TCP port	5000 [Set]

All settings	Load... Save...
	Factory reset

Figure 13: Device Settings Page

Item	Description
Unit Name	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 10.3)
Information Section	Displays the device model, firmware version and serial number.
DHCP buttons	Click ON to turn DHCP on; click OFF to turn DHCP off
IP address	The IP address of the device. To set a new IP address, enter the new IP address and click Set
Mask address	The network mask of the device. To set a new mask, enter the new mask address and click Set
Gateway address	The network gateway for the device. To set a new network gateway, enter the new gateway address and click Set
Mac address	Information only
UDP Port	The UDP port number of the device. To set a new UDP port number, enter the new port number or use the spin controls and click Set
TCP Port	The TCP port number of the device. To set a new TCP port number, enter the new port number or use the spin controls and click Set
Set button	Click to store a changed parameter. Note: If you do not click the Set button, the new parameter is not stored
Factory reset button	Click to reset the device to factory default parameters. After the success message is displayed, power cycle the device
Load	Click to load a saved configuration (see section 9.1.1)
Save	Click to save the current configuration (see section 9.1.1)

To reset the WP-20 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 Control Settings Page

The Control Settings page lets you:

- Configure serial communication via HDBaseT (see section 9.4.1).

- Configure Maestro automation (see section 9.4.2).

Figure 14: Control Settings Page

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9.4.1 Configuring Serial Communication via HDBaseT

To configure serial communication via the HDBaseT line:

- On the Control Settings page, in the HDBaseT Serial Settings area, select one of the following:

- **HDBaseT Tunneling from Data Port** – Route RS-232 data from the RS-232 DATA port to the HDBaseT port (pass-through mode)

- **WP-20 Control through HDBaseT** – Send a Step-In command from **WP-20** to a Step-In master over HDBaseT.

- **Remote Device Control over HDBaseT** – Send RS-232 commands over HDBaseT to turn on/off peripheral devices via a **Maestro** trigger.

9.4.2 Configuring Maestro Automation

The Remote Device Control section of the Control Settings page (Figure 14) is powered by Maestro and enables you to configure single-trigger room element automation scenarios**.**

Use the Control Settings page to access Kramer Maestro room automation. Maestro is a powerful tool that enables you to configure single-trigger room element automation scenarios without the need for complicated programming. To use room automation, you need to define triggers that, upon an event, will execute scripts which include a sequence of actions (commands, which can appear in different scenarios) that will be carried out via any defined ports.

For further details on how to use room automation, refer to the *Kramer Maestro User Manual*, available at www.kramerav.com/downloads/WP-20.

9.5 Video and Audio Settings Page

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

Figure 15: Video and Audio Settings Page

Item		Description
Video	Video selection mode	Indicates the current video selection mode: Manual, Auto, or Auto: Last connected
	Video auto switching priority	Click either the HDMI or VGA button to select the priority selection when in auto mode
Audio	Audio selection mode	Indicates the current audio selection: Manual, Auto, or Auto: Last connected
	Current selection	Indicates the current audio selection
	Audio only mode	Enables/disables audio only mode
HDCP Support	HDMI 1	Enabled – HDCP support is dictated by the display Disabled – HDCP encrypted content is not passed.
Timeout	Delay switching upon signal loss for (leave 5V on)	Sets the delay for video (0 to 900 seconds) and audio (0 to 900 seconds) before switching (in auto mode) because of a signal loss on the currently selected input
	Delay switching input upon cable unplug for	Sets the delay for video (0 to 900 seconds) and audio (0 to 900 seconds) before switching (in auto mode) because the currently selected input cable is unplugged
	Delay power off 5V upon signal loss for	Sets the delay for turning off the 5V output (0 to 60,000 seconds) because of a signal loss on the currently selected input
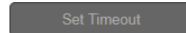
Note: When enabling or disabling HDCP, disconnect and reconnect the HDMI cable between the source and **WP-20**.

9.6   Authentication Page

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

Figure 16: Authentication Page

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

Note: If the Authentication page is left open for more than five minutes additional windows may open. After entering your logon credentials, close the other windows.

9.7 EDID Page

The EDID page lets you copy EDID data to either or both of the inputs from any of the following sources:

- Output

- Input

- Default EDID

- EDID data file

From this page you can also lock the EDID on each input independently.

Note: Do not power up the display before locking the EDID.
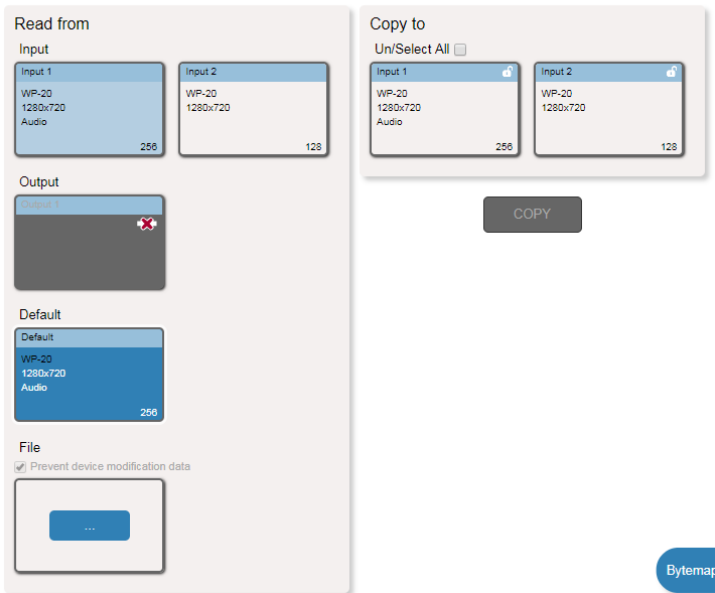
Figure 17: EDID Page

Note: 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 item 12 in the following table).

Item		Description
Read from	Input 1	Click to read the EDID from input 1 (HDMI)
	Input 2	Click to read the EDID from input 2 (VGA)
	Output	Click to read the EDID from the output
	DEFAULT	Click to read the default EDID
	File	Click to open the file browser to select an EDID file on your computer
Copy to	Un/Select All	Check to select both inputs
	Input 1 button	Click to select input 1 as the destination (HDMI)
	Input 2 button	Click to select input 2 as the destination (VGA)
COPY		Click to copy the EDID from the selected source to the selected destination
Bytemap		Click to open the bytemap

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

1. Click one of the source buttons 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 one of the destination inputs, or select both inputs by checking the Inputs check-box.
   All selected input buttons change color and the EDID summary information reflects the selection and EDID data.

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

4. Click OK.

9.8 Firmware Upgrade

The Firmware Upgrade page lets you upgrade the **WP-20** firmware.

Firmware Upgrade

Firmware version	2.11.47548
Update Firmware	[Update]

Figure 18: Firmware Upgrade Page

9.9 About Page

The **WP-20** About page displays the web page version and Kramer Electronics Ltd company details.

WEB VERSION 3.0.7

Kramer Electronics Ltd.
3 Am VeOlamo St.
Jerusalem, Israel, 9546303
Tel: +972-73-2650200
Fax: +972-2-6535369
Email: info@kramerel.com
Web: http://www.kramerelectronics.com

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Figure 19: About Page

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10   Technical Specifications

INPUTS:	Video:	1 HDMI on an HDMI connector 1 VGA on a 15-pin HD (F) connector
	Audio:	1 Unbalanced stereo audio on a 3.5mm mini jack
OUTPUTS:		1 HDBaseT on an RJ-45 connector 1 Unbalanced stereo audio on a 3.5mm mini jack
PORTS:		1 RS-232 3-pin terminal block 1 Ethernet on an RJ-45 connector
CONTROLS:		Remote switches for input switching and volume control, reset switch
STANDARDS:		HDMI with Deep Color, x.v.Color™ and 3D HDCP—works with sources that support HDCP repeater mode HDBT certified
MAXIMUM ANALOG AUDIO LEVEL:		3.1V p-p
THD:		0.013%
SNR:		−70dB
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
MAXIMUM TRANSMISSION DISTANCE:		180m (590ft) up to 1080p @60Hz @24bpp in extended mode 130m (430ft) up to 1080p @60Hz @36bpp in normal mode 100m (330ft) up to 4K @60Hz (4:2:0) in normal mode
POWER CONSUMPTION:		12V DC, 850mA
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:		2 Gang USA 11.6 cm x 5.1cm x 11.4cm (4.57" x 2.01" x 4.49") W, D, H 2 Gang EU 15.1cm x 4.7cm x 8.6cm (5.94" x 1.85" x 3.39") W, D, H
WEIGHT:		0.23kg (0.51lbs) approx.
SHIPPING WEIGHT:		0.51kg (1.12lbs) approx.
ENVIRONMENTAL REGULATORY COMPLIANCE:		Complies with appropriate requirements of RoHs and WEEE
VIBRATION:		ISTA 1A in carton (International Safe Transit Association)
COMPLIANCE STANDARDS:		CE
INCLUDED ACCESSORIES:		Power adapter
WARRANTY:		7 years parts and labor

10.1 Default IP Parameters

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

10.2 Default RS-232 Communication Parameters

Parameter	Values
Baud Rate	11520
Data Bits	1
Stop Bits	1
Parity	None
Command Format	ASCII

10.3 Default Logon Credentials

Parameter	Values
Name	Admin
Password	Admin

10.4 Supported HDMI Resolutions

Resolution	Refresh Rate (Hz)
640x480p	85Hz; 75Hz; 72Hz; 60Hz; 59.95Hz
720x480p	60Hz
720x480i	30Hz
720x576p	50Hz
800x600p	85Hz; 75Hz; 72Hz; 60Hz
848x480p	60Hz
852x480p	60Hz
1024x768p	85Hz; 75Hz; 70Hz; 60Hz
1152x864p	75Hz
1280x768p	60Hz
1280x800p	60Hz
1280x960	60Hz
1280x1024p	75Hz; 60Hz
1360x768p	60Hz
1366x768	60Hz; 50Hz
1400x1050p	60Hz
1440x900p	60Hz
1600x900p	60Hz
1600x1200p	60Hz
1680x1050p	60Hz
1920x1080p	50Hz; 60Hz; 30Hz; 24Hz;
1920x1080i	50Hz; 60Hz;
3840x2160	30Hz
4096x2160	30Hz

10.5 Supported VGA Resolutions

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

11   Default EDID

Each input on the **WP-20** is loaded with a factory default EDID.

11.1 HDMI

```
Monitor
  Model name............... WP-20
  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................... Not supported

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
  Detailed timing #1....... 1920x1080p at 60Hz (16:10)
    Modeline............... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync

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

```
1600 x 1200p at  60Hz - VESA STD
1024 x  768p at  85Hz - VESA STD
 800 x  600p at  85Hz - VESA STD
 640 x  480p at  85Hz - VESA STD
1152 x  864p at  70Hz - VESA STD
1280 x  960p at  60Hz - VESA STD
```

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

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

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

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

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

Report information
  Date generated........... 28/11/2017
  Software revision........ 2.90.0.1020
  Data source............. Real-time 0x0071
  Operating system......... 6.1.7601.2.Service Pack 1

Raw data
00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,12,00,00,00,00,FF,19,01,03,80,34,20,78,EA,B3,25,AC,51,30,B4,26,
10,50,54,FF,FF,80,81,8F,81,99,A9,40,61,59,45,59,31,59,71,4A,81,40,01,1D,00,72,51,D0,1E,20,6E,28,
55,00,07,44,21,00,00,1E,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,20,00,00,00,FC,00,57,
50,2D,32,30,0A,20,20,20,20,20,20,20,20,02,3A,80,18,71,38,2D,40,58,2C,45,00,07,44,21,00,00,1E,01,B6,
02,03,1B,F1,23,09,07,07,48,10,05,84,03,02,07,16,01,65,03,0C,00,10,00,83,01,00,00,02,3A,80,18,71,
38,2D,40,58,2C,45,00,07,44,21,00,00,1E,01,1D,80,18,71,1C,16,20,58,2C,25,00,07,44,21,00,00,9E,01,
1D,00,72,51,D0,1E,20,6E,28,55,00,07,44,21,00,00,1E,8C,0A,D0,8A,20,E0,2D,10,10,3E,96,00,07,44,21,
00,00,18,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,47
```

## 11.2 PC-UXGA

Monitor
    Model name............... WP-20
    Manufacturer............. KMR
    Plug and Play ID......... KMR1200
    Serial number............ n/a
    Manufacture date......... 2015, ISO week 255
    Filter driver............ None
    ------------------------
    EDID revision............ 1.3
    Input signal type........ Analog 0.700,0.000 (0.7V p-p)
    Sync input support....... Separate, Composite, Sync-on-green
    Display type............. RGB color
    Screen size.............. 520 x 320 mm (24.0 in)
    Power management......... Standby, Suspend, Active off/sleep
    Extension blocs.......... None
    ------------------------
    DDC/CI.................. Not supported

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
    Detailed timing #1....... 1920x1080p at 60Hz (16:10)
      Modeline............... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync

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

Report information

**WP-20 - Default EDID**

Date generated........... 28/11/2017
Software revision........ 2.90.0.1020
Data source............. Real-time 0x0021
Operating system......... 6.1.7601.2.Service Pack 1

Raw data
00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,12,00,00,00,00,FF,19,01,03,6E,34,20,78,EE,B3,25,AC,51,30,B4,26,
10,50,54,FF,FF,80,81,8F,81,99,A9,40,61,59,45,59,31,59,71,4A,81,40,01,1D,00,72,51,D0,1E,20,6E,28,
55,00,07,44,21,00,00,1E,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,20,00,00,00,FC,00,57,
50,2D,32,30,0A,20,20,20,20,20,20,20,20,02,3A,80,18,71,38,2D,40,58,2C,45,00,07,44,21,00,00,1E,00,C5

**WP-20 - Default EDID**

# 12    Protocol 3000

The **WP-20** can be operated using the Kramer Protocol 3000 serial commands. The command framing varies according to how you interface with the **WP-20**. For example, a basic video input switching command that routes a layer 1 video signal to HDBT out 1 from HDMI input 2 (ROUTE 1,1,2), is entered as follows:

- Terminal communication software, such as Hercules:



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

- K-Touch Builder (Kramer software):

- 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 **WP-20**. To enter CR press the Enter key (LF is also sent but is ignored by the command parser).

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

For more information about:

- Using Protocol 3000 commands, see Section 12.1

- General syntax used for Protocol 3000 commands, see Section 12.2

- Protocol 3000 commands available for the **WP-20**, 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**:

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

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

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

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

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

- **Device Message Format**:

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

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

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

## 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

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

### 12.3.1.1  #

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

### 12.3.1.2  BUILD-DATE

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

## 12.3.1.3   FACTORY

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | **FACTORY** | End User | Public |
| Get: | - | - | - |
| **Description** | | **Syntax** | |
| Set: | Reset device to factory default configuration | #**FACTORY**CR | |
| Get: | - | - | |
| **Response** | | | |
| ~nn@**FACTORY**SPOKCR LF | | | |
| **Parameters** | | | |
| | | | |
| **Response Triggers** | | | |
| | | | |
| **Notes** | | | |
| This command deletes all user data from the device. The deletion can take some time. Your device may require powering off and powering on for the changes to take effect. | | | |
| **K-Config Example** | | | |
| "#FACTORY",0x0D | | | |

## 12.3.1.4   FEATURE-LIST

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | - | - | - |
| Get: | **FEATURE-LIST?** | End User | Public |
| **Description** | | **Syntax** | |
| Set: | - | - | |
| Get: | Get feature state according to the feature ID | #**FEATURE-LIST?**SP*id*CR | |
| **Response** | | | |
| ~nn@**FEATURE-LIST**SPid,enableCR LF | | | |
| **Parameters** | | | |
| *id* – feature id number: 1 (Maestro), 2 (Room Controller), 3 (Maestro panel) *enable* – 0 (disable), 1 (enable) | | | |
| **Response Triggers** | | | |
| | | | |
| **Notes** | | | |
| | | | |
| **K-Config Example** | | | |
| Get feature state for Maestro: "#FEATURE-LIST? 1",0x0D | | | |

## 12.3.1.5 HELP

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | - | - | - |
| Get: | `HELP` | End User | Public |
| **Description** | | **Syntax** | |
| Set: | - | - | |
| Get: | Get command list or help for specific command | 1. `#HELP`CR <br> 2. `#HELP`SP`COMMAND_NAME`CR | |

| **Response** |
|---|
| 1. Multi-line: ~`nn`@`Device available protocol 3000 commands:`CR LF`command`,SP `command`...CR LF <br> 2. Multi-line: ~`nn`@`HELP`SP`command`:CR LF`description`CR LF`USAGE:`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 |

## 12.3.1.6 MODEL

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | - | - | - |
| Get: | **`MODEL?`** | End User | Public |
| **Description** | | **Syntax** | |
| Set: | - | - | |
| Get: | Get device model | #**`MODEL?`**CR | |

| **Response** |
|---|
| ~`nn`@**`MODEL`**SP`model_name`CR LF |

| **Parameters** |
|---|
| `model_name` – String of up to 19 printable ASCII chars |

| **Response Triggers** |
|---|
| |

| **Notes** |
|---|
| This command identifies equipment connected to Step-in master products and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests |

| **K-Config Example** |
|---|
| "`#MODEL?`",0x0D |

## 12.3.1.7    PROT-VER

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | **-** | - | - |
| Get: | **PROT-VER?** | End User | Public |
| **Description** | | **Syntax** | |
| Set: | - | - | |
| Get: | Get device protocol version | #**PROT-VER?** CR | |
| **Response** | | | |
| ~ nn @**PROT-VER** SP 3000:*version* CR LF | | | |
| **Parameters** | | | |
| *version* - XX.XX where X is a decimal digit | | | |
| **Response Triggers** | | | |
| | | | |
| **Notes** | | | |
| | | | |
| **K-Config Example** | | | |
| "#PROT-VER?",0x0D | | | |

## 12.3.1.8    RESET

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | **RESET** | Administrator | Public |
| Get: | **-** | - | - |
| **Description** | | **Syntax** | |
| Set: | Reset device | #**RESET** CR | |
| Get: | - | - | |
| **Response** | | | |
| ~ nn @**RESET** SP **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 | | | |

### 12.3.1.9 SN

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

### 12.3.1.10 VERSION

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

## 12.3.1.11 AV-SW-MODE

| Functions | | | Permission | Transparency |
|---|---|---|---|---|
| Set: | | | | |
| Get: | `AV-SW-MODE?` | | End user | Public |

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

| Response |
|---|
| ~nn@**AV-SW-MODE**SP*layer,output_id,mode*CR LF |

| Parameters |
|---|
| `layer` – 1 (video), 2 (audio)<br>`output_id` – for video layer: 1 (HDBT Out), for audio layer: 1 (Audio Out)<br>`mode` – 0 (manual), 1 (priority switch), 2 (last connected switch) |

| Response Triggers |
|---|
| |

| Notes |
|---|
| |

| K-Config Example |
|---|
| Get the input audio switch mode for HDBT Out:<br>`"#AV-SW-MODE? 1,1",0x0D` |

## 12.3.1.12 AV-SW-TIMEOUT

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | `AV-SW-TIMEOUT` | End User | Public |
| Get: | `AV-SW-TIMEOUT?` | End User | Public |
| **Description** | | **Syntax** | |
| Set: | Set auto switching timeout | `#AV-SW-TIMEOUT`SP`action,time_out`CR | |
| Get: | Get auto switching timeout | `#AV-SW-TIMEOUT?`SP`action`CR | |
| **Response** | | | |
| ~`nn`@`AV-SW-TIMEOUT`SP`action,time_out`CR | | | |
| **Parameters** | | | |
| `action` – event that triggers the auto switching timeout:<br>  0 (video signal lost)<br>  2 (audio signal lost)<br>  4 (disable 5V on video output if no input signal detected)<br>  5 (video cable unplugged)<br>  6 (audio cable unplugged)<br>`timeout` – timeout in seconds: `0-60000` | | | |
| **Response Triggers** | | | |
| | | | |
| **Notes** | | | |
| The timeout must not exceed 60000 seconds.<br>The timeout for video and audio signal lost (0, 2) events must not be less than 5 seconds.<br>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.<br>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.<br>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). | | | |
| **K-Config Example** | | | |
| Set the auto switching timeout to 5 seconds in the event of video signal lost:<br>`"#AV-SW-TIMEOUT 0,5",0x0D` | | | |

## 12.3.1.13 DISPLAY

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | - | - | - |
| Get: | **DISPLAY?** | End User | Public |
| Description | | Syntax | |
| Set: | - | - | |
| Get: | Get output HPD status | #**DISPLAY?**‎SP‎*out_id*CR | |
| Response | | | |
| ~nn@**DISPLAY**‎SP‎*out_id,status*CR LF | | | |
| Parameters | | | |
| *out_id* – 1 (HDBT Out) <br> *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: <br> After every change in output HPD status from On to Off (0) <br> After every change in output HPD status from Off to On (1) <br> 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 HDBT Out: <br> "#DISPLAY? 1",0x0D | | | |

## 12.3.1.14 DPSW-STATUS

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

## 12.3.1.15 FPGA-VER

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

## 12.3.1.16 HDCP-MOD

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | `HDCP-MOD` | Administrator | Public |
| Get: | `HDCP-MOD?` | End User | Public |
| **Description** | | **Syntax** | |
| Set: | Set HDCP mode | `#HDCP-MOD`SP`inp_id,mode`CR | |
| Get: | Get HDCP mode | `#HDCP-MOD?`SP`inp_id`CR | |
| **Response** | | | |
| Set / Get: ~nn@**HDCP-MOD**SP`inp_id,mode`CR LF | | | |
| **Parameters** | | | |
| `inp_id` – input number: 1 (HDMI In 1), 2 (HDMI In 2), 3 (PC In) <br> `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 <br> 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: <br>   HDCP not supported - HDCP Off <br>   HDCP support changes following detected sink - MIRROR OUTPUT | | | |
| **K-Config Example** | | | |
| Disable HDCP mode on HDMI In 2: <br> "#HDCP-MOD 2,0",0x0D | | | |

## 12.3.1.17 HDCP-STAT

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | - | - | - |
| Get: | **HDCP-STAT?** | End User | Public |
| **Description** | | **Syntax** | |
| Set: | - | - | |
| Get: | Get HDCP signal status | #**HDCP-STAT?** SP *stage,stage_id* CR | |

**Response**

~ nn @**HDCP-STAT** SP *stage,stage_id,mode* 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 (HDBT Out)
*actual_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 HDBT 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

### 12.3.1.18 NAME

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | **NAME** | Administrator | Public |
| Get: | **NAME?** | End User | Public |
| **Description** | | **Syntax** | |
| Set: | Set machine (DNS) name | #**NAME**SP*machine_name*CR | |
| Get: | Get machine (DNS) name | #**NAME?**CR | |
| **Response** | | | |
| Set: ~nn@**NAME**SP*machine_name*CR LF <br> Get: ~nn@**NAME?**SP*machine_name*CR LF | | | |
| **Parameters** | | | |
| *machine_name* - String of up to 14 alpha-numeric characters (can include hyphens but not at the beginning or end) | | | |
| **Response Triggers** | | | |
| | | | |
| **Notes** | | | |
| The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on). | | | |
| **K-Config Example** | | | |
| Set the DNS name of the device to "room-442": <br> "#NAME room-442",0x0D | | | |

### 12.3.1.19 NAME-RST

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

## 12.3.1.20 PRIORITY

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | **PRIORITY** | Administrator | Public |
| Get: | **PRIORITY?** | Administrator | Public |
| **Description** | | **Syntax** | |
| Set: | Set input priority | #**PRIORITY**SP*layer,PRIORITY1,PRIORITY2, PRIORITY3*CR | |
| Get: | Get input priority | # **PRIORITY?***layer*CR | |
| **Response** | | | |
| ~nn@**PRIORITY**SP*layer,PRIORITY1,PRIORITY2,PRIORITY3*CR LF | | | |
| **Parameters** | | | |
| layer – 1 (video):<br>*PRIORITY1* - priority of HDMI In 1: 1 (highest priority), 2 (second priority), 3 (third priority)<br>*PRIORITY2* - priority of HDMI In 2: 1 (highest priority), 2 (second priority), 3 (third priority)<br>*PRIORITY3* - priority of PC In: 1 (highest priority), 2 (second priority), 3 (third priority)<br>layer – 2 (audio):<br>*PRIORITY1* - priority of embedded audio: 1 (highest priority), 2 (second priority)<br>*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<br>1 is the highest priority | | | |
| **K-Config Example** | | | |
| Set the video input priority of PC In as the highest priority:<br>"#PRIORITY 1,2,3,1",0x0D | | | |

## 12.3.1.21 SIGNAL

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | - | - | - |
| Get: | **SIGNAL?** | End User | Public |
| **Description** | | **Syntax** | |
| Set: | - | - | |
| Get: | Get input signal lock status | #**SIGNAL?**SP*inp_id*CR | |
| **Response** | | | |
| ~nn@**SIGNAL**SP*inp_id,status*CR LF | | | |
| **Parameters** | | | |
| *inp_id* – input number: 1 (HDMI In 1), 2 (HDMI In 2), 3 (PC In) <br> *status* – lock status according to signal validation: 0 (Off), 1 (On) | | | |
| **Response Triggers** | | | |
| After execution, a response is sent to the com port from which the Get was received <br> 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: <br> "#SIGNAL? 2",0x0D | | | |

## 12.3.2 Authentication Commands

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

### 12.3.2.1 LOGIN

| Functions | | Permission | Transparency |
|-----------|--|------------|--------------|
| Set: | **LOGIN** | Not Secure | Public |
| Get: | **LOGIN?** | Not Secure | Public |
| **Description** | | **Syntax** | |
| Set: | Set protocol permission | #**LOGIN**SP*login_level,password*CR | |
| Get: | Get current protocol permission level | #**LOGIN?**CR | |
| **Response** | | | |
| Set: ~nn@**LOGIN**SP*login_level,password*SP**OK**CR LF <br>    or <br>    ~nn@**LOGIN**SPERRSP004CR LF (if bad password entered) <br> Get: ~nn@**LOGIN**SP*login_level*CR LF | | | |
| **Parameters** | | | |
| *login_level* – level of permissions required: User, Admin <br> *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 <br> When set, login must be performed upon each connection <br> 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): <br> "#LOGIN Admin,33333",0x0D | | | |

## 12.3.2.2 LOGOUT

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

## 12.3.2.3 PASS

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

### 12.3.2.4 SECUR

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

## 12.3.3 Switching/Routing Commands

| Command | Description |
|---------|-------------|
| ROUTE | Set/get layer routing |

### 12.3.3.1 ROUTE

| Functions | | Permission | Transparency |
|-----------|---|------------|--------------|
| Set: | **ROUTE** | End User | Public |
| Get: | **ROUTE?** | End User | Public |
| **Description** | | **Syntax** | |
| Set: | Set layer routing | #**ROUTE**SP*layer,dest,src*CR | |
| Get: | Get layer routing | #**ROUTE?**SP*layer,dest*CR | |
| **Response** | | | |
| ~nn@**ROUTE**SP*layer,dest,src*CR LF | | | |
| **Parameters** | | | |
| layer – 1 (video), 3 (data)<br>*dest* – for video layer: 1 (HDBT Out), for data layer: 1 (HDBT data port), 2 (**WP-20** data port), 3 (**WP-20** internal control port)<br>*src* – for video layer: 1 (HDMI In 1), 2 (PC In), for data layer: 1 (HDBT data port),<br>2 (**WP-20** data port), 3 (**WP-20** internal control port) | | | |
| **Response Triggers** | | | |
| | | | |
| **Notes** | | | |
| The get command identifies input switching on Step-in clients<br>The set command is for remote input switching on Step-in clients (essentially via by the Web) | | | |
| **K-Config Example** | | | |
| Set the remote input switching of data to control mode:<br>"#ROUTE 3,1,3",0x0D<br>Set the remote input switching of data to data mode:<br>"#ROUTE 3,1,2",0x0D | | | |

## 12.3.4 Video Commands

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

## 12.3.4.1 VGA-PHASE

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

## 12.3.4.2 VMUTE

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

## 12.3.5 Audio Commands

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

### 12.3.5.1 AUD-EMB

| Functions | | Permission | Transparency |
|-----------|--|------------|--------------|
| Set: | | | |
| Get: | AUD-EMB? | End User | Public |
| **Description** | | **Syntax** | |
| Set: | | | |
| Get: | Get audio in video embedding status | #**AUD-EMB?**SP*in,out*CR | |
| **Response** | | | |
| ~nn@**AUD-EMB**SP*in,out,status*CR LF | | | |
| **Parameters** | | | |
| *in* – embedded audio input number: 1 (Audio In)<br>*out* – video output number in which audio is embedded: 1 (HDBT Out)<br>*status* – embedded status: 1 (On), 0 (Off) | | | |
| **Response Triggers** | | | |
| A response is sent to the com port from which the get command was received<br>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

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | `AUD-LVL` | End User | Public |
| Get: | `AUD-LVL?` | End User | Public |
| **Description** | | **Syntax** | |
| Set: | Set volume for specific amplifier output | `#AUD-LVL`SP`stage,channel,volume`CR | |
| Get: | Get volume for specific amplifier output | `#AUD-LVL?`SP`stage,channel`CR | |
| **Response** | | | |
| ~nn@**AUD-LVL**SP*stage,channel,volume*CR LF | | | |
| **Parameters** | | | |
| *stage* – 1 (audio output) <br> *channel* – output channel number of selected stage: 1 (Audio Out) <br> *volume* – audio volume: -83—+24 (dB value), ++ (increase current value by 0.5dB), <br> -- (decrease current value by 0.5dB) | | | |
| **Response Triggers** | | | |
| | | | |
| **Notes** | | | |
| All values are in decibels (dB) <br> A minus sign precedes negative values | | | |
| **K-Config Example** | | | |
| Set the volume of the Audio Out (1) output to -17dB: <br> "#AUD-LVL 1,1,-17",0x0D | | | |

### 12.3.5.1 AUD-LVL-RANGE

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | `AUD-LVL-RANGE` | End User | Public |
| Get: | `AUD-LVL-RANGE?` | End User | Public |
| **Description** | | **Syntax** | |
| Set: | Set audio level min and max range | `#AUD-LVL-RANGE`SP `stage,channel,min_val,max_val`CR | |
| Get: | Get audio level min and max range | `#AUD-LVL-RANGE?`SP`stage,channel`CR | |
| **Response** | | | |
| ~nn@**AUD-LVL-RANGE**SP`stage,channel,min_val,max_val`CR LF | | | |
| **Parameters** | | | |
| *stage* – 1 (audio output) <br> *channel* – output channel number of selected stage: 1 (Audio Out) <br> *min_val* – minimum available audio level: range = -83 to +24 <br> *max_val* – maximum available audio level: range = -83 to +24 | | | |
| **Response Triggers** | | | |
| | | | |
| **Notes** | | | |
| All values are in decibels (dB) <br> A minus sign precedes negative values | | | |
| **K-Config Example** | | | |
| Set the audio level to a minimum of -17Db and a maximum of +15Db: <br> `"#AUD-LVL-RANGE 1,1,-17,15",0x0D` | | | |

### 12.3.5.2 AUD-ONLY

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | `AUD-ONLY` | End User | Public |
| Get: | `AUD-ONLY?` | End User | Public |
| **Description** | | **Syntax** | |
| Set: | Enable/Disable audio only mode | `#AUD-ONLY`SP`channel,mode`CR | |
| Get: | Get audio only mode status | `#AUD-ONLY?`CR | |
| **Response** | | | |
| ~nn@**AUD-ONLY**SP`channel,mode`CR LF | | | |
| **Parameters** | | | |
| *channel* – output channel number of selected stage: 1 (Audio Out) <br> *mode* – audio only status: 0 (disabled), 1 (enabled) | | | |
| **Response Triggers** | | | |
| | | | |
| **Notes** | | | |
| | | | |
| **K-Config Example** | | | |
| Enable audio only mode: <br> `"#AUD-ONLY 1,1,0x0D` | | | |

### 12.3.5.3 AUD-SIGNAL

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | - | - | - |
| Get | `AUD-SIGNAL?` | End User | Public |
| **Description** | | **Syntax** | |
| Set: | - | - | |
| Get: | Get audio input signal status | # `AUD-SIGNAL?` SP *inp_id* CR | |
| **Response** | | | |
| ~ nn @ **AUD-SIGNAL** SP *inp_id,status* CR LF | | | |
| **Parameters** | | | |
| *inp_id* – audio input number: 1 (Audio In) <br> *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 <br> 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

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

## 12.3.6　Communication Commands

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

## 12.3.6.1　ETH-PORT

| Functions | | Permission | Transparency |
|-----------|---|------------|--------------|
| Set: | **ETH-PORT** | Administrator | Public |
| Get: | **ETH-PORT?** | End User | Public |
| **Description** | | **Syntax** | |
| Set: | Set Ethernet port protocol | #**ETH-PORT**SP*portType,ETHPort*CR | |
| Get: | Get Ethernet port protocol | #**ETH-PORT?**SP*portType*CR | |
| **Response** | | | |
| ~nn@**ETH-PORT**SP*portType,ETHPort*CR LF | | | |
| **Parameters** | | | |
| *portType* – string of 3 letters indicating the port type: TCP, UDP<br>*ETHPort* – TCP / UDP port number: 0-65565 | | | |
| **Response Triggers** | | | |
| | | | |
| **Notes** | | | |
| If the port number you enter is already in use, an error is returned<br>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:<br>"#ETH-PORT TCP,12457",0x0D | | | |

## 12.3.6.2 NET-DHCP

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

### 12.3.6.3 NET-GATE

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

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

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

### 12.3.6.6  NET-MASK

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

## 12.3.7 EDID Handling Commands

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

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

## 12.3.7.1 CPEDID

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | **CPEDID** | End User | Public |
| Get: | - | - | - |
| **Description** | | **Syntax** | |
| Set: | Copy EDID data from the output to the input EEPROM | #**CPEDID**SP*src_type,src_id,dst_type, dest_bitmap*CR | |
| Get: | - | - | |
| **Response** | | | |
| ~nn@**CPEDID**SP*src_type,src_id,dst_type,dest_bitmap*CR LF | | | |
| **Parameters** | | | |
| *src_type* – EDID source type (usually output): 0 (input), 1 (output), 2 (default EDID) *src_id* – for input source: 1 (HDMI In 1), 2 (HDMI In 2), 3 (PC In), for output source: 1 (HDBT Out), for default EDID source: 0 (default EDID) *dst_type* – EDID destination type (usually input): 0 (input), 1 (output), 2 (default EDID) *dest_bitmap* – bitmap representing destination IDs. Format: XXXX…X, where X is hex digit. The binary form of every hex digit represents corresponding destinations. Setting '1' indicates that EDID data is copied to this destination. Setting '0' indicates that EDID data is not copied to this destination. | | | |
| **Response Triggers** | | | |
| Response is sent to the com port from which the Set was received (before execution) | | | |
| **Notes** | | | |
| Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word) Example: bitmap 0x0013 means inputs 1, 2 and 5 are loaded with the new EDID. In this device, if the destination type is input (0), the bitmap size is 3 bits, for example bitmap 0x5 means inputs 1 and 3 are loaded with the new EDID. | | | |
| **K-Config Example** | | | |
| Copy the EDID data from the HDBT 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

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | `LOCK-EDID` | End User | End User |
| Get: | `LOCK-EDID?` | End User | End User |
| **Description** | | **Syntax** | |
| Set: | Lock last read EDID | #**LOCK-EDID**[SP]*input_id,lock_mode*[CR] | |
| Get : | Get EDID lock state | #**LOCK-EDID?**[SP]*input_id*[CR] | |
| **Response** | | | |
| ~*nn*@**LOCK-EDID**[SP]*input_id,lock_mode*[CR LF] | | | |
| **Parameters** | | | |
| *input_id* – 1 (HDMI In 1), 2 (HDMI In 2), 3 (PC In), <br> *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: <br> "#LOCK-EDID 2,1",0x0D | | | |

## LIMITED WARRANTY

The warranty obligations of Kramer Electronics for this product are limited to the terms set forth below:

### What is Covered

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

### What is Not Covered

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

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

### How Long Does this Coverage Last

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

### Who is Covered

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

### What Kramer Electronics will do

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

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

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

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

### What Kramer Electronics will not do Under This Limited Warranty

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

### How to Obtain a Remedy under this Limited Warranty

To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, 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 from Kramer Electronics, will 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.

### Limitation on Liability

THE MAXIMUM LIABILITY OF KRAMER ELECTRONICS UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

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IF ANY PRODUCT TO WHICH THIS LIMITED WARRANTY APPLIES IS A "CONSUMER PRODUCT" UNDER THE MAGNUSON-MOSS WARRANTY ACT (15 U.S.C.A. §2301, ET SEQ.) OR OTHER APPICABLE LAW, THE FOREGOING DISCLAIMER OF IMPLIED WARRANTIES SHALL NOT APPLY TO YOU, AND ALL IMPLIED WARRANTIES ON THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE, SHALL APPLY AS PROVIDED UNDER APPLICABLE LAW.

### Other Conditions

This limited warranty gives you specific legal rights, and you may have other rights which vary from country to country or state to state.

This limited warranty is void if (i) the label bearing the serial number of this product has been removed or defaced, (ii) the product is not distributed by Kramer Electronics or (iii) this product is not purchased from an authorized Kramer Electronics reseller. If you are unsure whether a reseller is an authorized Kramer Electronics reseller, please visit our Web site at www.kramerelectronics.com or contact a Kramer Electronics office from the list at the end of this document.

Your rights under this limited warranty are not diminished if you do not complete and return the product registration form or complete and submit the online product registration form. Kramer Electronics thanks you for purchasing a Kramer Electronics product. We hope it will give you years of satisfaction.

# KRAMER



CE  ⚠ 22 PAP

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

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

We welcome your questions, comments, and feedback.

**www.KramerAV.com**
**info@KramerAV.com**