

# KRAMER



## USER MANUAL

**MODEL:**

**WP-20**

Wall Plate



# WP-20 Wall Plate Quick Start Guide

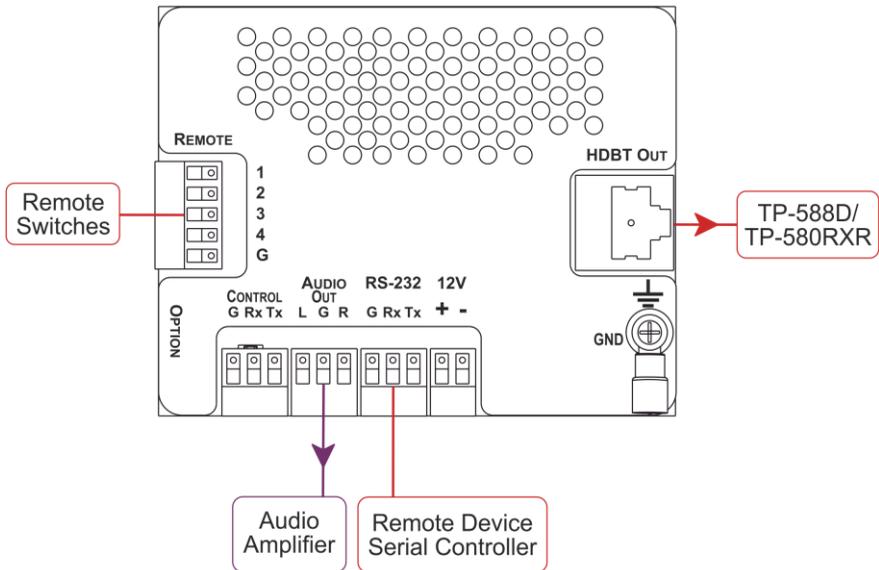
This guide helps you install and use your product for the first time. For more detailed information, go to <http://www.kramerav.com/manual/WP-20> to download the latest manual or scan the QR code on the left.

## Step 1: Check what's in the box

- ✓ The WP-20 Wall Plate
- ✓ 1 Quick start guide
- ✓ Power Adapter (12v DC)

## Step 2: Connect the outputs

Always switch off the power to 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.



**Note:** When the receiver in use does not support Ethernet, you can replace the left hand side faceplate with an optional part (WP-20-BLNK(W) P/N 68-80305099 or WP-20-BLNK(B) P/N 68-80305199) that does not have a cutout for the RJ-45 Ethernet connector.

### Step 3: Set the DIP-switches

#	Feature	Function	DIP-switch	
1	Manual/Auto Switching	Selects either manual or auto input switching	On—Manual switching Off—Auto switching	
2	Priority/Last Connected Switching	Selects either priority or last connected input switching, (DIP-switch 1 must be off)	On—Priority switching Off—Last connected switching Default video input priority is HDMI > PC	
3	Manual/Auto Audio Switching	Selects either manual or auto audio input selection	On—Manual switching Off—Auto switching	
4	Analog/HDMI Audio Priority Switching	Selects either the analog or the HDMI audio input as priority	On	DIP-switch 3 On: Analog audio input
				DIP-switch 3 Off: Analog → HDMI
			Off	DIP-switch 3 On: HDMI audio input
				DIP-switch 3 Off: HDMI → Analog

DIP-switch 2 Status	DIP-switch 1 Auto Switching (Off)	DIP-switch 1 Manual Switching (On)
Off—Last Connected	When two sources are connected the last one connected gets priority	Manual video input selection
On—Priority	When two sources are connected the active source is selected according to the pre-defined priority	Manual video input selection

### Step 4: Connect the power

Connect power adapter to the **WP-20**, (if the device is not supplied power via the HDBT PoE), and plug the adapter into the mains power.

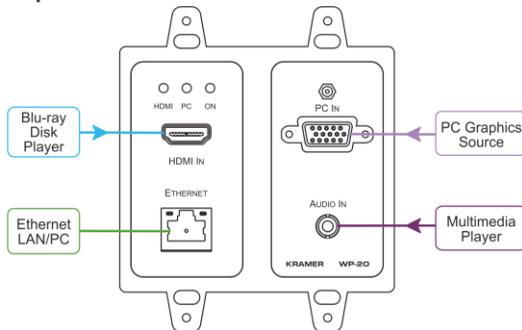


### Step 5: Install the WP-20

Mount the device in a suitable wall box.

We recommend that you open all holes in the walls of the box to assist in cooling the **WP-20**.

### Step 6: Connect the inputs



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# 1 Introduction

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

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

Congratulations on purchasing your Kramer **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.

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## 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](http://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 neighbouring 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; the Kramer **BC-HDKat6a** (CAT 6 23 AWG) HDBaseT certified, and the Kramer **BC-DGKat7a23** (CAT 7a 23 AWG) cables. These specially built 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 <http://www.kramerelectronics.com/support/recycling/>.

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## 3 Overview

The **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-588D** or the **TP-580RXR**). The **WP-20** is a PoE (Power over Ethernet) receiver and can be powered by a compatible PoE provider, (for example, the **PSE-1**).

The **WP-20** supports a range of up to 130m (430ft) at normal mode (2K), up to 100m at normal mode (4K UHD); up to 180m (590ft) ultra mode (1080p @60Hz @24bpp) when using **BC-HDKat6a** cables.



For optimum range and performance, use Kramer's **BC-HDKat6a** and **BC-DGKat7a23** shielded twisted pair (STP) cables. 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 the **WP-20** features:

- 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
- Power over Ethernet (PoE) which passes electrical power along with data over Ethernet cabling. This allows a single cable to provide both data connection and electrical power to compatible devices
- 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 reclocking of the data
- Support for digital audio formats
- 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.

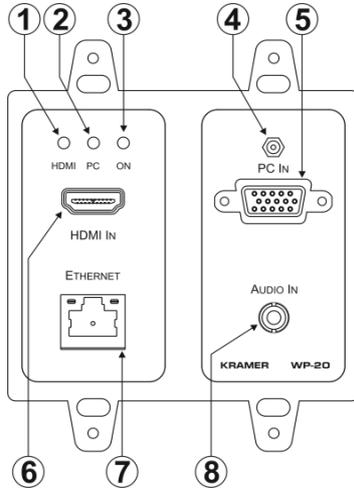


Figure 1: WP-20 Wall Plate Front Panel

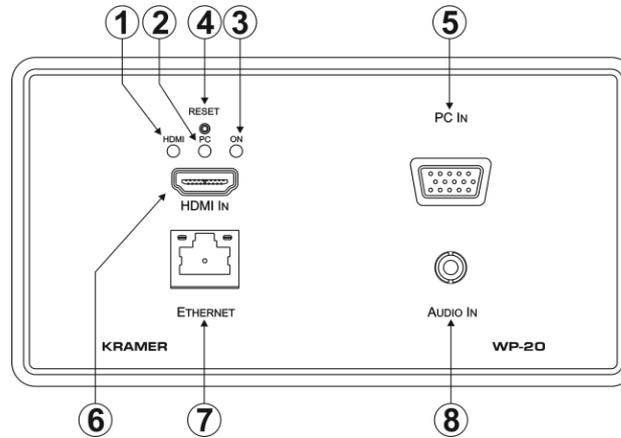


Figure 2: WP-20E Wall Plate Front Panel

#	Feature	Function
1	HDMI LED	When HDMI is selected: <ul style="list-style-type: none"> <li>• Lights orange when external audio is selected</li> <li>• Lights green when embedded audio is selected</li> <li>• When HDMI is not selected the LED does not light</li> </ul>

2	<i>PC Graphics LED</i>	When PC input is selected: <ul style="list-style-type: none"> <li>• Lights orange when external audio is selected.</li> <li>• Lights green when there is no audio</li> <li>• When the PC input is not selected the LED does not light</li> </ul>
3	<i>ON LED</i>	The LED indicates the following: <ul style="list-style-type: none"> <li>• Lights green—power is provided by a power adapter</li> <li>• Lights orange—power is provided by PoE</li> </ul>
4	Reset Button	Short press to reset the device, long press (5 seconds) to reset the device to factory default parameters
5	<i>PC IN</i> Input Connector	Connect to the PC graphics source, (for example, a laptop)
6	<i>HDMI IN</i> Input Connector	Connect to an HDMI source, (for example, a Blu-ray disk player)
7	<i>ETHERNET</i> RJ-46 Connector	Connect to the Ethernet LAN
8	<i>AUDIO IN</i> 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**.

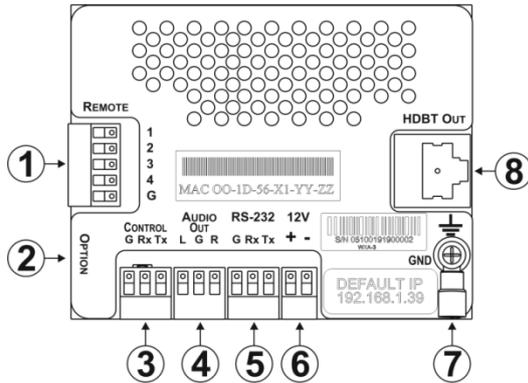


Figure 3: WP-20 Wall Plate Rear Panel

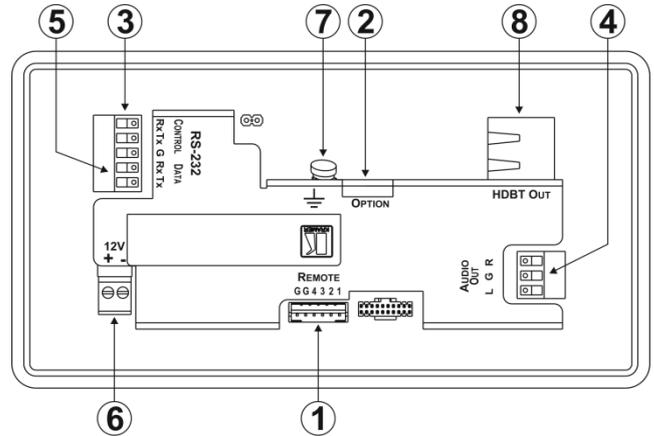


Figure 4: WP-20E Wall Plate Rear Panel

Figure 5: WP-20 Wall Plate Rear Panel

#	Feature	Function
1	REMOTE 5-pin Terminal Block	Connect to the remote, contact-closure switches for remote control, (see <a href="#">Section 5.1</a> )
2	OPTION 4-way DIP-switch	Switches for setting the device behavior, (see <a href="#">Section 8.1</a> )
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-588D/TP-580Rxr)

## 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.

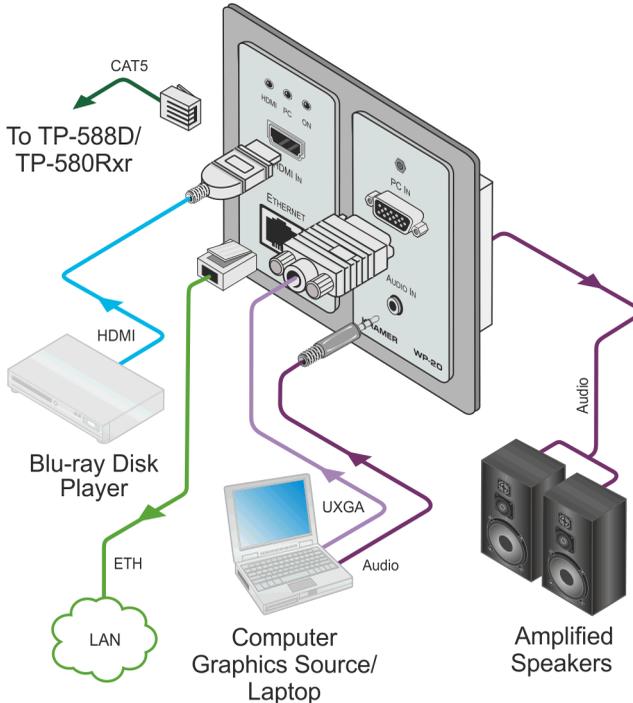


Figure 6: Connecting the WP-20 Wall Plate

**Note:** When the receiver in use does not support Ethernet, you can replace the left hand side faceplate with an optional part (**WP-20-BLNK(W)** P/N 68-80305099 or **WP-20-BLNK(B)** P/N 68-80305199) that does not have a cutout for the RJ-45 Ethernet connector.

**To connect the WP-20, as illustrated in the example in [Figure 6](#):**

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-588D** or **TP-580Rxr**).
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 [Section 5.1](#)).
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 [Figure 6](#)).

**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 7](#) illustrates the connections from the terminal block to the contact-closure switches.

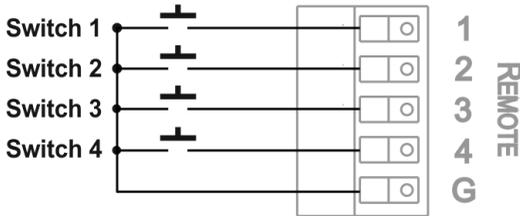


Figure 7: Remote Switches Terminal Block

#	Feature	Function
1	Input selection/VGA phase shift switch	Short press—Input toggle Long press—Adjusts the VGA phase shift, (see <a href="#">Section 6.4</a> )
2	Step-in switch	Activates the step-in function if relevant
3	Analog audio output volume increase control, (see <a href="#">Section 7.4</a> )	Short press—Increases the volume one step Long press—Increases the volume from 0% to 100% in 10 seconds
4	Analog audio output volume decrease control, (see <a href="#">Section 7.4</a> )	Short press—Decreases the volume one step Long press—Decreases the volume from 100% to 0% in 10 seconds
G	Ground	Connect to the common side of the switches

---

## 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 overrides the last-connected automatic selection.

## 6.2 Signal Loss and Unplugged Cable Timeouts

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

Both timeouts are configurable, (see [Section 8.1](#)).

**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 minimize phase on the input VGA signal, the VGA sampling phase can be shifted using 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 the phase shift is set to 31, another long press steps the shift to 0.

---

## 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 13.2](#))
- 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 9.1](#) and for using P3000 commands to control the volume see [Section 13.2](#).

The up/down volume steps per press are detailed in the table below.

Ramp	Volume Reading	Volume (dB)
1	100	0
1	99	-0.5
1	98	-1.0
1	97	-1.5
1	96	-2.0
1	...	(0.5 steps)
1	12	-44.0
1	11	-44.5
1	10	-45.0
1	9	-45.5
2	...	(2.0 steps)
2	8	-47.0
2	7	-49.0
2	6	-51.0
2	5	-53.0
2	4	-55.0
2	3	-57.0
2	2	-59.0
2	1	-61.0
2	0	-63.0

# 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 8: The Configuration DIP-switch

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

#	Feature	Function	DIP-switch	
1	Manual/Auto Switching	Selects either manual or auto input switching	On—Manual switching Off—Auto switching, (default)	
2	Priority/Last Connected Switching	Selects either priority or last connected input switching, (DIP-switch 1 must be off)	On—Priority switching Off—Last connected switching Default video input priority is HDMI > PC, (default)	
3	Manual/Auto Audio Switching	Selects either manual or auto audio input selection	On—Manual switching Off—Auto switching, (default)	
4	Analog/HDMI Audio Priority Switching	Selects either the analog or the HDMI audio input as priority	On	DIP-switch 3 On: Analog audio input
				DIP-switch 3 Off: Analog → HDMI, (default)
			Off	DIP-switch 3 On: HDMI audio input
				DIP-switch 3 Off: HDMI → Analog, (default)

The following table describes the switching priorities defined by DIP-switches 1 and 2.

DIP-switch 2 Status	DIP-switch 1 Auto Switching (Off)	DIP-switch 1 Manual Switching (On)
Off—Last Connected	When two sources are connected the last one connected gets priority	Manual video input selection
On—Priority	When two sources are connected the active source is selected according to the pre-defined priority	Manual video input selection

## 8.2 Video Switching Timeouts

When the **WP-20** is configured for auto switching, the default timeouts before a new input is automatically selected are shown in the table below. These can be changed either by sending a Protocol 3000 command or by using the Web pages.

	Signal Loss, Power Present	Signal and Power Loss
Default Timeout	10 seconds	0 seconds

**Note:** The minimum value of “Signal Loss, Power Present” is five seconds.

---

## 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:

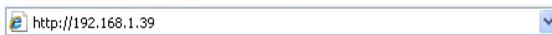
- Ensure that your browser is supported (see [Section 11](#))
- Ensure that JavaScript is enabled

### 9.1 Browsing the WP-20 Web Pages

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

**To browse the WP-20 Web pages:**

1. Open your Internet browser.
2. Type the IP number of the device (see [Section 11](#)) in the Address bar of your browser.



**Note:** If authentication is enabled, the following window appears ([Figure 9](#)) and you must enter the valid username and password to access the Web pages. For default authentication details, see [Section 11](#).

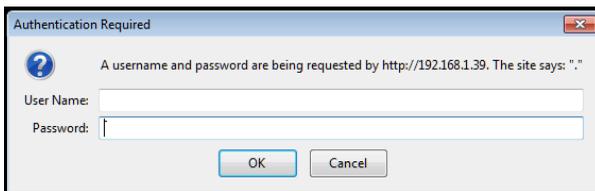


Figure 9: Entering Logon Credentials

Following a successful logon, the screen shown in [Figure 10](#) is displayed.

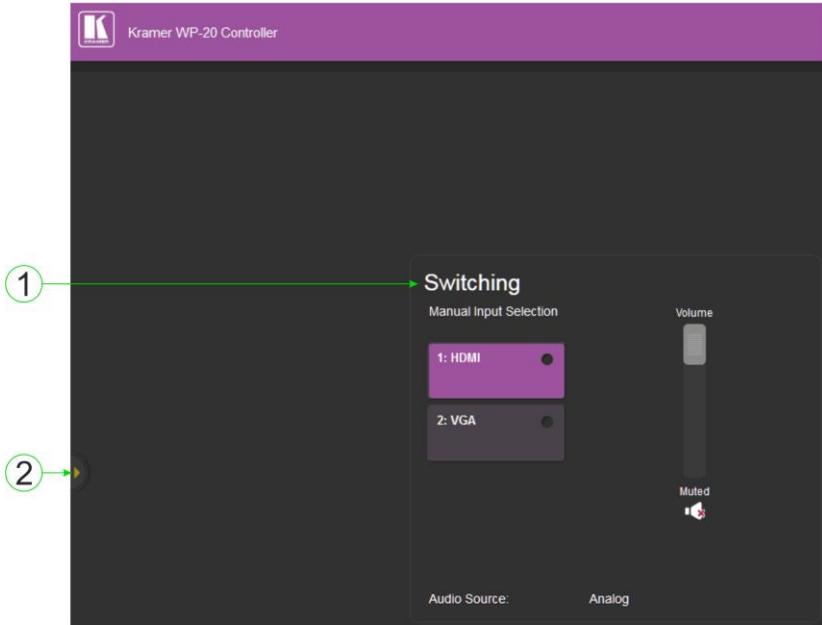


Figure 10: The Default Page

#	Item	Description
1	Switching Details	Displays the current video and audio switching status and the current audio volume
2	Left Hand Side Panel Hide/Reveal Button	Click to reveal the left hand side page panel

Click the Reveal button to open the left hand side page panel.

The Switching page appears as shown in [Figure 11](#).

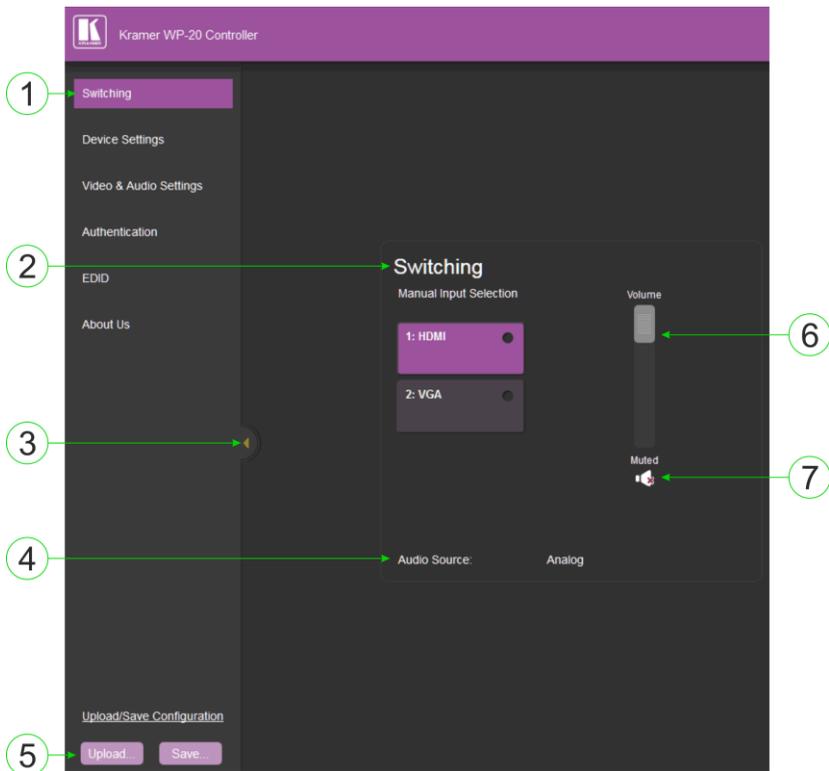


Figure 11: The Main Switching Page

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

#	Item	Description
1	Page Selection Panel	Click one of the buttons to select a page
2	Video Input Switching Selection	Click one of the buttons to select a video input
3	Page Selection Panel Hide/Reveal Button	Click the arrow to open or close the page selection panel
4	Audio Source Indication	Indicates the source of the audio that is currently on the output
5	Upload/Save Configuration Section	Click one of the buttons to save or retrieve a configuration, (see <a href="#">Section 9.1.1</a> )
6	Audio Volume Control	Use the slider to control the audio volume
7	Mute Button	Press to mute the volume. Press again to unmute the volume

**Note:** When saving the 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](#))
- Video and Audio Settings (see [Section 9.4](#))
- Authentication (see [Section 9.5](#))
- EDID (see [Section 9.6](#))
- About Us (see [Section 9.7](#))

### 9.1.1 The Upload/Save Configuration Facility

The Upload/Save Configuration facility (see item 4 in [Figure 11](#)) lets you retrieve and save a configuration.

#### **To upload a configuration:**

1. Click the Upload button.  
The File Upload browser window appears.
2. Browse to the required file and press Open.  
The configuration is retrieved and the success message is displayed.

#### **To save the current configuration:**

1. Click the Save button.  
The Save Configuration success message is displayed.
2. Do either of the following:
  - Click Download to either open the file or save it to the required location

—OR—

  - Click OK to complete the procedure

## 9.2 The Switching Page

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

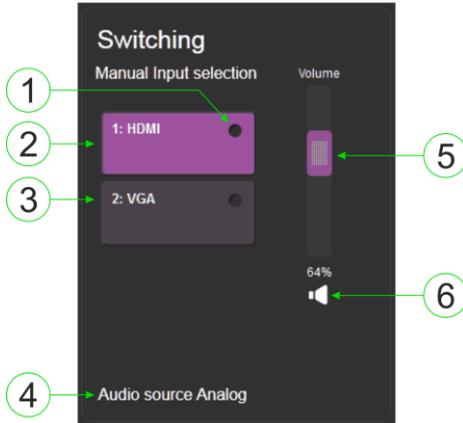


Figure 12: The Switching Page

#	Item	Description
1	Live Signal Indicator	Indicates whether or not there is a live signal on either of the inputs
2	HDMI Button	Click to select the HDMI input
3	VGA Button	Click to select the VGA input
4	Audio source Indicator	Indicates the source of the audio that is transmitted on the output
5	Volume Slider	Click and slide up and down to increase or decrease the audio output volume
6	Mute Button	Click to mute or unmute the output audio

## 9.3 The Device Settings Page

The Device Settings page lets you:

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

- Reset the device to factory default settings

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

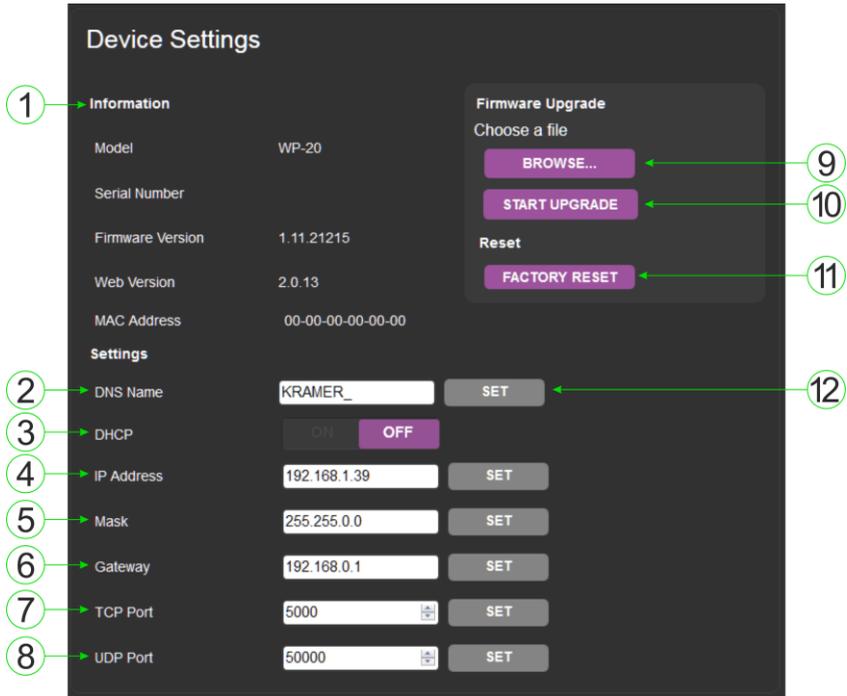


Figure 13: The Device Settings Page

#	Item	Description
1	Information Section	Displays information regarding the device, (for example, model, serial number, and MAC address)
2	DNS 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 <a href="#">Section 11.2</a> )
3	DHCP Buttons	Click ON to turn DHCP on; click OFF to turn DHCP off
4	IP Address	The IP address of the device. To set a new IP address, enter the new IP address and click Set
5	Mask	The network mask of the device. To set a new mask, enter the new mask address and click Set
6	Gateway	The network gateway for the device. To set a new network gateway, enter the new gateway address and click Set

#	Item	Description
7	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
8	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
9	Firmware upgrade Section	BROWSE button Click to open a window to browse to the new firmware file
10		START UPGRADE button Click to start the upgrade process following the selection of the new firmware file
11	Factory Reset Button	Click to reset the device to factory default parameters. After the success message is displayed, power cycle the device
12	Set Button	Click to store a changed parameter. Note: If you do not click the Set button, the new parameter is not stored

### To upgrade the firmware:

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



Do not interrupt the process or the **WP-20** may be damaged.

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

### 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 The Video and Audio Settings Page

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

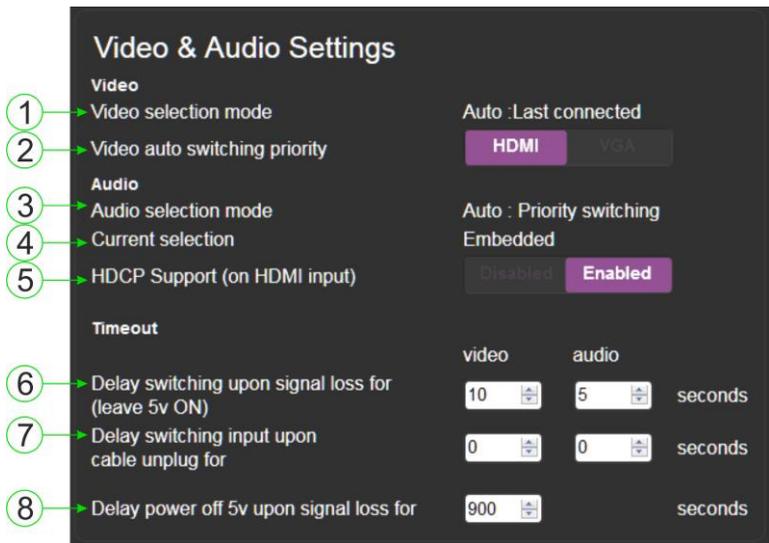


Figure 14: The Video and Audio Settings Page

#	Item	Description	
1	Video Section	Video selection mode Indicator	Indicates the current video selection mode; manual, auto, or auto last connected
2		Video auto switching priority Buttons	Click either the HDMI or VGA buttons to select the priority selection when in auto mode

#	Item	Description	
3	Audio Section	Audio selection mode Indicator	Indicates the current audio selection; manual, auto, or auto last connected
4		Current selection Audio Indicator	Indicates the current audio selection
5		HDCP Support (on HDMI input) Buttons	Not supported—HDCP encrypted content is not passed. Follow output—HDCP support is dictated by the display
6	Timeout Section	Delay switching upon signal loss for (leave 5V on) Box	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
7		Delay switching input upon cable unplug for Box	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
8		Delay power off 5V upon signal loss for Box	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 the **WP-20**.

## 9.5 The Authentication Page

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

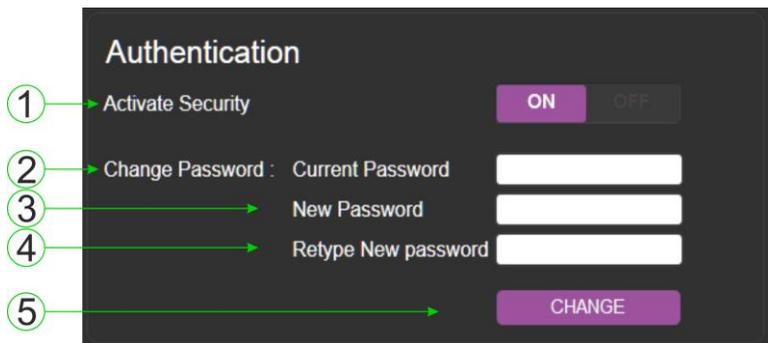


Figure 15: The Authentication Page

#	Item	Description
1	Activate Security Button	Click to enable/disable security settings. When enabled, the valid username and password must be provided to allow Web page access
2	Change Password: Section	Current Password box
3		New Password box
4		Retype New Password box
5		CHANGE button
		Enter the current password
		Enter the new password, (up to 15 printable ASCII characters)
		Retype the new password
		Click CHANGE 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.

## 9.6 The 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 16: The 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
1	Read from Section	DEFAULT EDID button
2		Output 1 button
3		Input 1 button
4		Input 2 button
5		BROWSE button
6	Short Summary Information Section	Displays the current election of EDID source, destination, video resolution, audio availability, and status
7	Copy to Section	Inputs selection box
8		Lock button
9		Input 1 button
10		Input 2 button
11	COPY Button	Click to copy the EDID from the selected source to the selected destination
12	Refresh Button	Click to refresh the display

### 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.

## 9.7 The About Us Page

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



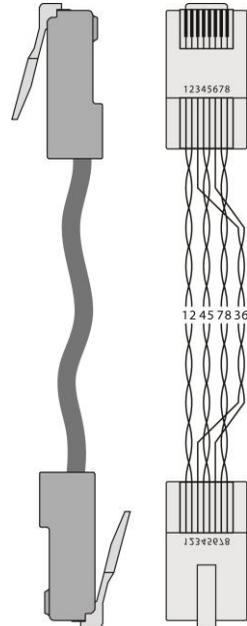
Figure 17: The About Us Page

## 10 Wiring the Twisted Pair RJ-45 Connectors

When using STP cable, connect/solder the cable shield to the RJ-45 connector shield. [Figure 18](#) 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
Pair 1	4 and 5
Pair 2	1 and 2
Pair 3	3 and 6

Figure 18: TP Pinout Wiring



# 11 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: <ul style="list-style-type: none"> <li>• Internet Explorer (32/64 bit) version 11</li> <li>• Firefox version 30</li> <li>• Chrome version 35</li> </ul> MAC: <ul style="list-style-type: none"> <li>• Chrome version 35</li> <li>• Firefox version 27</li> <li>• Safari version 7</li> </ul>	
MAXIMUM TRANSMISSION DISTANCE:	180m (590ft) up to 1080p @60Hz @24bpp in extended mode 130m (430ft) up to 1080p @60Hz @36bpp 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:	Aluminium	
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
OPTIONS:	Faceplates: WP-20-BLNK(W) P/N 68-80305099 WP-20-BLNK(B) P/N 68-80305199
WARRANTY:	7 years parts and labor

## 11.1 Default IP Parameters

Parameter	Values	Default
Device Name	Any alphanumeric string up to 14 chars (can include hyphen, but not at the beginning or end)	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

## 11.2 Default Logon Credentials

Parameter	Values
Name	Admin
Password	Admin

## 11.3 Supported Resolutions

### 11.3.1 HDMI

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

Resolution	Refresh Rate (Hz)
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

### 11.3.2 VGA

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

---

## 12 Default EDID

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

### 12.1 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  
Color encoding formats... RGB color  
Screen size..... 520 x 320 mm (24.0 in)  
Power management..... Standby, Suspend, Active off/sleep  
Extension blocs..... 1 (CEA-EXT)  
-----

DDC/CI..... n/a

#### Color characteristics

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

#### Timing characteristics

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

#### Standard timings supported

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

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

EIA/CEA-861 Information

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

CE audio data (formats supported)

LPCM 2-channel, 16/20/24 bit depths at 32/44/48 kHz

CE video identifiers (VICs) - timing/formats supported

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

CE vendor specific data (VSDB)

IEEE registration number. 0x00C03  
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..... 31/12/2014  
Software revision..... 2.60.0.972  
Data source..... File  
Operating system..... 6.1.7601.2.Service Pack 1

Raw data

00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,12,01,01,01,01,FF,18,01,04,80,34,20,78,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,FF,00,35,30,35,2D,38,30,33,30,35,30,31,30,30,00,00,00,FC,00,57,  
50,2D,35,56,48,32,00,00,00,00,00,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,01,AF,  
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,  
00,00,18,00,47

## 12.2 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..... 1.5  
Input signal type..... Analog 0.700,0.000 (0.7V p-p)  
Sync input support..... Separate, Composite, Sync-on-green  
Display type..... RGB color  
Screen size..... 520 x 320 mm (24.0 in)  
Power management..... Standby, Suspend, Active off/sleep  
Extension blocs..... None

DDC/CI..... n/a

### Color characteristics

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

### Timing characteristics

Horizontal scan range.... 30-83kHz  
Vertical scan range..... 56-76Hz  
Video bandwidth..... 170MHz  
CVT standard..... Not supported  
GTF standard..... Not supported  
Additional descriptors... None  
Preferred timing..... Yes

Native/preferred timing.. 1280x720p at 60Hz (16:10)

Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync

### Standard timings supported

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

### Raw data

00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,12,01,01,01,01,FF,18,01,04,6E,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,FF,00,35,30,35,2D,38,30,33,30,35,30,31,30,30,00,00,00,FC,00,57,  
50,2D,35,56,48,32,00,00,00,00,00,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,00,BE

---

# 13 Protocol 3000

The **WP-20** can be operated using serial commands from a PC, remote controller or touch screen using the Kramer Protocol 3000.

This section describes:

- Kramer Protocol 3000 syntax (see Section 13.1)
- Kramer Protocol 3000 commands (see Section 13.2)

## 13.1 Kramer Protocol 3000 Syntax

### 13.1.1 Host Message Format

Start	Address (optional)	Body	Delimiter
#	<i>Destination_id@</i>	<b>Message</b>	<b>CR</b>

### 13.1.2 Simple Command

Command string with only one command without addressing:

Start	Body	Delimiter
#	<b>Command</b> <b>SP</b> <i>Parameter_1,Parameter_2,...</i>	<b>CR</b>

### 13.1.3 Command String

Formal syntax with commands concatenation and addressing:

Start	Address	Body	Delimiter
#	<i>Destination_id@</i>	<b>Command_1</b> <i>Parameter1_1,Parameter1_2,...</i> <b>Command_2</b> <i>Parameter2_1,Parameter2_2,...</i> <b>Command_3</b> <i>Parameter3_1,Parameter3_2,...</i> ...	<b>CR</b>

### 13.1.4 Device Message Format

Start	Address (optional)	Body	delimiter
~	<i>Sender_id@</i>	<b>Message</b>	<b>CR</b> <b>LF</b>

### 13.1.5 Device Long Response

Echoing command:

Start	Address (optional)	Body	Delimiter
~	<i>Sender_id@</i>	<b>Command</b> <b>SP</b> [ <i>Param1 ,Param2 ...</i> ] <b>result</b>	<b>CR</b> <b>LF</b>

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

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

**SP** = Space (ASCII 32 = 0x20)

### 13.1.6 Command Terms

#### Command

A sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').

Command and 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**.

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

#### Message starting character

'#' – For host command/query

'~' – For device response

#### Device address (Optional, for K-NET)

K-NET Device ID followed by '@'

#### Query sign

'?' follows some commands to define a query request.

#### Message closing character

**CR** – For host messages; carriage return (ASCII 13)

**CRLF** – For device messages; carriage return (ASCII 13) + line-feed (ASCII 10)

#### Command chain separator character

When a message string contains more than one command, a pipe ( '|') character separates each command.

Spaces between parameters or command terms are ignored.

### 13.1.7 Entering Commands

You can directly enter all commands using a terminal with ASCII communications software, such as HyperTerminal, Hercules, etc. Connect the terminal to the serial or Ethernet port on the Kramer device. To enter **CR** press the Enter key.

(**LF** is also sent but is ignored by command parser).

For commands sent from some non-Kramer controllers, (for example, Crestron) some characters require special coding (such as, /X##). Refer to the controller manual.

### 13.1.8 Command Forms

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

### 13.1.9 Chaining Commands

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 once, at the beginning of the string and at the end.

Commands in the string do not execute until the closing character is entered. A separate response is sent for every command in the chain.

### 13.1.10 Maximum String Length

64 characters

## 13.2 Kramer Protocol 3000 Commands

The following table lists the Protocol 3000 commands that the **WP-20** supports. For a full description of the commands, see the *Kramer Protocol 3000* document available from <http://www.kramerelectronics.com>.

**Note:** The **WP-20** can only receive commands from a device, (for example, an HDBT transmitter) via the HDBaseT link, and only at 9600bps.

### 13.2.1 System Commands

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

Command - #		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	#	End User	Public
Get:	-	-	-
Description		Syntax	
Set:	Protocol handshaking	# <input type="text"/>	
Get:	-	-	
Response			
~ <input type="text"/> @ <input type="text"/> SPOK <sub>CR LF</sub>			
Parameters			
Response Triggers			
Notes			
Validates the Protocol 3000 connection and gets the machine number Step-in master products use this command to identify the availability of a device			

Command - BUILD-DATE		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	BUILD-DATE?	End User	Public
Description		Syntax	
Set:	Get device build date	#BUILD-DATE <input type="text"/>	
Get:	-	-	
Response			
~ <input type="text"/> @BUILD-DATE <input type="text"/> SPdate <input type="text"/> SPtime <sub>CR LF</sub>			
Parameters			
<i>date</i> - Format: YYYY/MM/DD where YYYY = Year, MM = Month, DD = Day <i>time</i> - Format: hh:mm:ss where hh = hours, mm = minutes, ss = seconds			
Response Triggers			
Notes			

Command - <b>HELP</b>		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	<b>HELP</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get command list or help for specific command	2 options: 1. <b>#HELP</b> <sub>CR</sub> 2. <b>#HELP</b> <sub>SP</sub> <i>command_name</i> <sub>CR</sub>	
Response			
1. Multi-line: <b>~nn@Device available protocol 3000 commands:</b> <sub>CR LF</sub> <i>command</i> <sub>SP</sub> <i>command...</i> <sub>CR LF</sub>			
<b>To get help for command use: HELP (COMMAND_NAME)</b> <sub>CR LF</sub>			
2. Multi-line: <b>~nn@HELP</b> <sub>SP</sub> <i>command</i> : <sub>CR LF</sub> <i>description</i> <sub>CR LF</sub> <b>USAGE:</b> <i>usage</i> <sub>CR LF</sub>			
Parameters			
Response Triggers			
Notes			

Command - <b>MODEL?</b>		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	<b>MODEL?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get device model	<b>#MODEL?</b> <sub>CR</sub>	
Response			
<b>~nn@MODEL</b> <sub>SP</sub> <i>model_name</i> <sub>CR LF</sub>			
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			

Command - <b>PROT-VER?</b>		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	<b>PROT-VER?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get device protocol version	# <b>PROT-VER?</b> <input type="checkbox"/> <input type="checkbox"/>	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>PROT-VER</b> <input type="checkbox"/> 3000:version <input type="checkbox"/> <input type="checkbox"/>			
Parameters			
Version - XX.XX where X is a decimal digit			
Response Triggers			
Notes			

Command - <b>RESET</b>		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	<b>RESET</b>	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	Reset device	# <b>RESET</b> <input type="checkbox"/> <input type="checkbox"/>	
Get:	-	-	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>RESET</b> <input type="checkbox"/> <b>OK</b> <input type="checkbox"/> <input type="checkbox"/>			
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.			

Command - <b>SN?</b>		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	<b>SN?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get device serial number	# <b>SN?</b> <sub>CR</sub>	
Response			
~ <b>nn</b> @ <b>SN</b> <sub>SP</sub> serial_number <sub>CR LF</sub>			
Parameters			
serial_number - 11 decimal digits, factory assigned			
Response Triggers			
Notes			
For new products with 14 digit serial numbers, use only the last 11 digits			

Command - <b>VERSION?</b>		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	<b>VERSION?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get firmware version number	# <b>VERSION?</b> <sub>CR</sub>	
Response			
~ <b>nn</b> @ <b>VERSION</b> <sub>SP</sub> firmware_version <sub>CR LF</sub>			
Parameters			
firmware_version - XX.XX.XXXX where the digit groups are: major.minor.build version			
Response Triggers			
Notes			

Command - AV-SW-MODE		Command Type - System	
Command Name		Permission	Transparency
Set:	AV-SW-MODE	End user	Public
Get:	AV-SW-MODE?	End user	Public
Description		Syntax	
Set:	Set input auto switch mode (per output)	# AV-SW-MODE <sub>SP</sub> layer,output_id,mode <sub>CR</sub>	
Get:	Get input auto switch mode (per output)	# AV-SW-MODE? <sub>SP</sub> layer,output_id <sub>CR</sub>	
Response			
~nn@AV-SW-MODE <sub>SP</sub> layer,output_id,mode <sub>CR LF</sub>			
Parameters			
layer (see Section 13.2.10)			
output_id - 1...num of system outputs			
mode - 0 - manual			
1 - priority switch			
2 - last connected switch			
Response Triggers			
Notes			

Command - AV-SW-TIMEOUT		Command Type - System	
Command Name		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 <sub>SP</sub> action,time_out <sub>CR</sub>	
Get:	Get auto switching timeout	#AV-SW-TIMEOUT? <sub>SP</sub> action <sub>CR</sub>	
Response			
~nn@AV-SW-TIMEOUT <sub>SP</sub> action,time_out <sub>CR</sub>			
Parameters			
action (see Section 13.2.11)			
timeout - timeout in seconds			
Response Triggers			
Notes			

Command - <b>DISPLAY?</b>		Command Type - System	
Command Name		Permission	Transparency
Set:	-	-	-
Get	<b>DISPLAY?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get output HPD status	# <b>DISPLAY?</b> <sub>SP</sub> <i>out_id</i> <sub>CR</sub>	
Response			
~ <i>nn</i> @ <b>DISPLAY</b> <sub>SP</sub> <i>out_id,status</i> <sub>CR LF</sub>			
Parameters			
<i>out_id</i> - output number			
<i>status</i> - HPD status according to signal validation			
Response Triggers			
After execution, response is sent to the com port from which the Get was received			
Response is sent after every change in output HPD status ON to OFF			
Response is sent after every change in output HPD status OFF to ON and ALL parameters (new EDID, etc.) are stable and valid			
Notes			

Command - <b>FPGA-VER?</b>		Command Type - System	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	<b>FPGA-VER?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get current FPGA version	# <b>FPGA-VER?</b> <sub>SP</sub> <i>id</i> <sub>CR</sub>	
Response			
~ <i>nn</i> @ <b>FPGA-VER</b> <sub>SP</sub> <i>id, expected_ver, actual_ver</i> <sub>CR LF</sub>			
Parameters			
<i>id</i> - FPGA id			
<i>expected_ver</i> - expected FPGA version for current firmware			
<i>actual_ver</i> - actual FPGA version			
Response Triggers			
Notes			

Command - HDCP-MOD		Command Type - System	
Command Name		Permission	Transparency
Set:	<b>HDCP-MOD</b>	Administrator	Public
Get:	<b>HDCP-MOD?</b>	End User	Public
Description		Syntax	
Set:	Set HDCP mode	#HDCP-MOD <sub>[SP]</sub> inp_id,mode <sub>[CR]</sub>	
Get:	Get HDCP mode	#HDCP-MOD? <sub>[SP]</sub> stage_id <sub>[CR]</sub>	
Response			
Set / Get: ~ <sub>[nn]</sub> @HDCP-MOD <sub>[SP]</sub> stage_id,mode <sub>[CR LF]</sub>			
Parameters			
inp_id - input number (1.. max number of inputs) mode - HDCP mode			
Response Triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received Response is sent to all com ports after execution if HDCP-MOD was set by any other external control device (button press, device menu and similar) or HDCP mode changed			
Notes			
Set HDCP working mode on the device input: HDCP supported - HDCP_ON [default] HDCP not supported - HDCP OFF HDCP support changes following detected sink - MIRROR OUTPUT			

Command - HDCP-STAT		Command Type - System	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	<b>HDCP-STAT?</b>	End User	Public
Description		Syntax	
Set:	None	-	
Get:	Get HDCP signal status	#HDCP-STAT? <input type="checkbox"/> _sp stage, stage_id <input type="checkbox"/> _cr	
Response			
Set / Get: ~ <input type="checkbox"/> _nn @HDCP-STAT <input type="checkbox"/> _sp stage, stage_id, mode <input type="checkbox"/> _cr LF			
Parameters			
<i>stage</i> – input/output <i>stage_id</i> - number of chosen stage (1.. max number of inputs/outputs) <i>actual_status</i> - signal encryption status - valid values ON/OFF			
Response Triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received Response is sent to all com ports after execution if HDCP-STAT was set by any other external control device (button press, device menu and similar) or HDCP mode changed			
Notes			
On output – sink status On input – signal status			

Command - <b>LDFW</b>		Command Type - System - Packets	
Command Name		Permission	Transparency
Set:	<b>LDFW</b>	Internal SW	Public
Get:	-	-	-
Description		Syntax	
Set:	Load new firmware file	Step 1: # <b>LDFW</b> <sub>SP</sub> <b>size</b> <sub>CR</sub> Step 2: If ready was received, send <b>FIRMWARE_DATA</b>	
Get:	-	-	
Response			
Response 1: ~ <b>nn</b> @ <b>LDFW</b> <sub>SP</sub> <b>size</b> <sub>SP</sub> <b>READY</b> <sub>CR LF</sub> or ~ <b>nn</b> @ <b>LDFW</b> <sub>SP</sub> <b>ERRnn</b> <sub>CR LF</sub>			
Response 2: ~ <b>nn</b> @ <b>LDFW</b> <sub>SP</sub> <b>size</b> <sub>SP</sub> <b>OK</b> <sub>CR LF</sub>			
Parameters			
<i>size</i> - size of firmware data that is sent			
<b>FIRMWARE_DATA</b> - HEX or KFW file in protocol packets (see <a href="#">Section 4</a> )			
Response Triggers			
Notes			
In most devices firmware data is saved to flash memory, but the memory does not update until receiving the "UPGRADE" command and is restarted. Use this command in dedicated SW application			

Command - <b>NAME</b>		Command Type - System (Ethernet)	
Command Name		Permission	Transparency
Set:	<b>NAME</b>	Administrator	Public
Get:	<b>NAME?</b>	End User	Public
Description		Syntax	
Set:	Set machine (DNS) name	# <b>NAME</b> <sub>SP</sub> <i>machine_name</i> <sub>CR</sub>	
Get:	Get machine (DNS) name	# <b>NAME?</b> <sub>CR</sub>	
Response			
Set: ~ <b>nn</b> @ <b>NAME</b> <sub>SP</sub> <i>machine_name</i> <sub>CR LF</sub>			
Get: ~ <b>nn</b> @ <b>NAME?</b> <sub>SP</sub> <i>machine_name</i> <sub>CR LF</sub>			
Parameters			
<i>machine_name</i> - String of up to 14 alpha-numeric chars (can include hyphen, 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)			

Command - <b>NAME-RST</b>		Command Type - System (Ethernet)	
Command Name		Permission	Transparency
Set:	<b>NAME-RST</b>	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	Reset machine (DNS) name to factory default	# <b>NAME-RST</b> <input type="checkbox"/>	
Get:	-	-	
Response			
~ <input type="checkbox"/> @ <b>NAME-RST</b> <input type="checkbox"/> OK <input type="checkbox"/>			
Parameters			
Response Triggers			
Notes			
Factory default of machine (DNS) name is "KRAMER_" + 4 last digits of device serial number			

Command - <b>PRIORITY</b>		Command Type - System	
Command Name		Permission	Transparency
Set:	<b>PRIORITY</b>	Administrator	Public
Get:	<b>PRIORITY?</b>	Administrator	Public
Description		Syntax	
Set:	Set input priority	# <b>PRIORITY</b> <input type="checkbox"/> layer,PRIORITY1, PRIORITY2... PRIORITYn <input type="checkbox"/>	
Get:	Get input priority	# <b>PRIORITY?</b> layer <input type="checkbox"/>	
Response			
~ <input type="checkbox"/> @ <b>PRIORITY</b> <input type="checkbox"/> layer,PRIORITY1, PRIORITY2... PRIORITYn <input type="checkbox"/>			
Parameters			
layer (see Section 13.2.10) PRIORITY1 - priority of first input PRIORITYn- priority of input n			
Response Triggers			
Notes			
WP-577VH – layer parameter is not used			

Command - <b>SIGNAL</b>		Command Type - System	
Command Name		Permission	Transparency
Set:	-	-	-
Get	<b>SIGNAL?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get input signal lock status	# <b>SIGNAL?</b> <input type="checkbox"/> <i>inp_id</i> <input type="checkbox"/>	
Response			
~ <input type="checkbox"/> @ <b>SIGNAL</b> <input type="checkbox"/> <i>inp_id,status</i> <input type="checkbox"/>			
Parameters			
<i>inp_id</i> - input number			
<i>status</i> - lock status according to signal validation			
Response Triggers			
After execution, a response is sent to the com port from which the Get was received			
Response is sent after every change in input signal status ON to OFF, or OFF to ON			
Notes			

### 13.2.2 File System Commands

Command	Description
DEL	Delete file
DIR	List files in device
FORMAT	Format file system
FS-FREE?	Get file system free space
GET	Get file
LOAD	Load file to device

Command - DEL		Command Type - File System	
Command Name		Permission	Transparency
Set:	<b>DEL</b>	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	Delete file	#DEL <sub>SP</sub> file_name <sub>CR</sub>	
Get:			
Response			
-nn@DEL <sub>SP</sub> file_name <sub>CR LF</sub>			
Parameters			
file_name - name of file to delete (file names are case-sensitive)			
Response Triggers			
Notes			

Command - DIR		Command Type - File System	
Command Name		Permission	Transparency
Set:	DIR	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	List files in device	#DIR <sub>CR</sub>	
Get:	-	-	
Response			
Multi Line:			
~nn@DIR <sub>CR LF</sub>			
file_name <sub>TAB</sub> file_size <sub>SP</sub> bytes <sub>SP</sub> ID: <sub>SP</sub> file_id <sub>CR LF</sub>			
<sub>TAB</sub> free_size <sub>SP</sub> bytes <sub>CR LF</sub>			
Parameters			
file_name - name of file			
file_size - file size in bytes. A file can take more space on device memory			
file_id - internal ID for file in file system			
free_size - free space in bytes in device file system			
Response Triggers			
Notes			

Command - FORMAT		Command Type - File System	
Command Name		Permission	Transparency
Set:	FORMAT	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	Format file system	#FORMAT <sub>CR</sub>	
Get:	-	-	
Response			
~nn@FORMAT <sub>SP</sub> OK <sub>CR LF</sub>			
Parameters			
Response Triggers			
Notes			
Response could take some time (seconds) until formatting completes			

Command - FS-FREE?		Command Type - File System	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	<b>FS-FREE?</b>	Administrator	Public
Description		Syntax	
Set:	-	-	
Get:	Get file system free space	#FS-FREE? <input type="checkbox"/> CR	
Response			
- <input type="checkbox"/> <input type="checkbox"/> @FS_FREE <input type="checkbox"/> free_size <input type="checkbox"/> CR LF			
Parameters			
<i>free_size</i> - free size in device file system in bytes			
Response Triggers			
Notes			

Command - GET		Command Type - File System	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	<b>GET</b>	Administrator	Public
Description		Syntax	
Set:	-	-	
Get:	Get file	#GET <input type="checkbox"/> file_name <input type="checkbox"/> CR	
Response			
Multi-line:			
- <input type="checkbox"/> <input type="checkbox"/> @GET <input type="checkbox"/> file_name, file_size <input type="checkbox"/> READY <input type="checkbox"/> CR LF			
<i>contents</i>			
- <input type="checkbox"/> <input type="checkbox"/> @GET <input type="checkbox"/> file_name <input type="checkbox"/> OK <input type="checkbox"/> CR LF			
Parameters			
<i>file_name</i> - name of file to get contents			
<i>contents</i> - byte stream of file contents			
<i>file_size</i> - size of file (device sends it in response to give user a chance to get ready)			
Response Triggers			
Notes			

Command - <b>LOAD</b>		Command Type - System - Packets	
Command Name		Permission	Transparency
Set:	<b>LOAD</b>	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	Load file to device	#LOAD <sub>SP</sub> file_name,size <sub>CR</sub>	
Get:	-	-	
Response			
Data sending negotiation:			
* Device -			
-01@LOAD <sub>SP</sub> file_name,size <sub>SP</sub> READY <sub>CR LF</sub>			
* End User (+Device)-			
Send file in Protocol Packets			
* Device -			
-01@LOAD <sub>SP</sub> file_name, size <sub>SP</sub> OK <sub>CR LF</sub>			
Parameters			
file_name - name of file to save on device			
size - size of file data that is sent.			
Response Triggers			
Notes			
See the Protocol Packet reference			

### 13.2.3 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

Command - LOGIN		Command Type - Authentication	
Command Name		Permission	Transparency
Set:	LOGIN	Not Secure	Public
Get:	LOGIN?	Not Secure	Public
Description		Syntax	
Set:	Set protocol permission	#LOGIN <sub>[SP]</sub> login_level,password <sub>[CR]</sub>	
Get:	Get current protocol permission level	#LOGIN? <sub>[CR]</sub>	
Response			
Set: ~nn@LOGIN <sub>[SP]</sub> login_level,password <sub>[SP]</sub> OK <sub>[CR LF]</sub> or ~nn@LOGIN <sub>[SP]</sub> ERR <sub>[SP]</sub> 004 <sub>[CR LF]</sub> (if bad password entered)			
Get: ~nn@LOGIN <sub>[SP]</sub> login_level <sub>[CR LF]</sub>			
Parameters			
login_level - level of permissions required (End User or Admin)			
password - predefined password (by PASS command). Default password is an empty string			
Response Triggers			
Notes			
For devices that support security, LOGIN allows to the user to run commands with an End User or Administrator permission level			
In each device, some connections can be logged in to different levels and some do not work with security at all			
Connection may logout after timeout			
The permission system works only if security is enabled with the "SECUR" command			

Command - LOGOUT		Command Type - Authentication	
Command Name		Permission	Transparency
Set:	<b>LOGOUT</b>	Not Secure	Public
Get:	-	-	-
Description		Syntax	
Set:	Cancel current permission level	# <b>LOGOUT</b> <sub>CR</sub>	
Get:	-	-	
Response			
- <b>nn</b> @ <b>LOGOUT</b> <sub>SP</sub> <b>ok</b> <sub>CR LF</sub>			
Parameters			
Response Triggers			
Notes			
Logs out from End User or Administrator permission levels to Not Secure			

Command - PASS		Command Type - Authentication	
Command Name		Permission	Transparency
Set:	<b>PASS</b>	Administrator	Public
Get:	<b>PASS?</b>	Administrator	Public
Description		Syntax	
Set:	Set password for login level	# <b>PASS</b> <sub>SP</sub> <i>login_level, password</i> <sub>CR</sub>	
Get:	Get password for login level	# <b>PASS?</b> <sub>SP</sub> <i>login_level</i> <sub>CR</sub>	
Response			
- <b>nn</b> @ <b>PASS</b> <sub>SP</sub> <i>login_level, password</i> <sub>CR LF</sub>			
Parameters			
<i>login_level</i> - level of login to set (End User or Administrator). <i>password</i> - password for the <i>login_level</i> . Up to 15 printable ASCII chars			
Response Triggers			
Notes			
The default password is an empty string			

Command - <b>SECUR</b>		Command Type - Authentication	
Command Name		Permission	Transparency
Set:	<b>SECUR</b>	Administrator	Public
Get:	<b>SECUR?</b>	Not Secure	Public
Description		Syntax	
Set:	Start/stop security	# <b>SECUR</b> <sub>SP</sub> security_mode <sub>CR</sub>	
Get:	Get current security state	# <b>SECUR?</b> <sub>CR</sub>	
Response			
~ <sub>hh</sub> @ <b>SECUR</b> <sub>SP</sub> security_mode <sub>CR LF</sub>			
Parameters			
security_mode – 1/ON - enables security, 0/OFF - disables security			
Response Triggers			
Notes			
The permission system works only if security is enabled with the "SECUR" command			

### 13.2.4 Switching/Routing Commands

Command	Description
ROUTE	Set/get layer routing

Command - ROUTE		Command Type - Routing	
Command Name		Permission	Transparency
Set:	ROUTE	End User	Public
Get:	ROUTE?	End User	Public
Description		Syntax	
Set:	Set layer routing	#ROUTE <sub>SP</sub> /layer, dest, src <sub>CR</sub>	
Get:	Get layer routing	#ROUTE? <sub>SP</sub> /layer, dest <sub>CR</sub>	
Response			
~nn@ ROUTE <sub>SP</sub> /layer, dest, src <sub>CR LF</sub>			
Parameters			
<i>layer</i> (see Section 13.2.10) <i>dest</i> - * - ALL x - disconnect, otherwise destination id <i>src</i> - source id			
Response Triggers			
Notes			
This command replaces all other routing commands The GET command identifies input switching on Step-in clients The SET command is for remote input switching on Step-in clients (essentially via by the Web)			

### 13.2.5 Video Commands

Command	Description
VMUTE	Set/get video on output mute

Command - VMUTE		Command Type - Video	
Command Name		Permission	Transparency
Set:	<b>VMUTE</b>	End User	Public
Get:	<b>VMUTE?</b>	End User	Public
Description		Syntax	
Set:	Set enable/disable video on output	#VMUTE <sub>SP</sub> output_id, flag <sub>CR</sub>	
Get:	Get video on output status	#VMUTE? <sub>SP</sub> output_id <sub>SP</sub> <sub>CR</sub>	
Response			
Set / Get: ~ <sub>HN</sub> @ VMUTE <sub>SP</sub> output_id, flag <sub>CR LF</sub>			
Parameters			
<i>output_id</i> - 1...num of system outputs <i>flag</i> - 0 - disable video on output 1 - enable video on output 2 - blank video			
Response Triggers			
Notes			

### 13.2.6 Audio Commands

Command	Description
AUD-EMB	Set/get audio in video embedding status
AUD-LVL	Set/get audio level in specific amplifier stage
AUD-SIGNAL?	Get audio input signal status

Command - <b>AUD-EMB</b>		Command Type - Audio	
Command Name		Permission	Transparency
Set:	<b>AUD-EMB</b>	End User	Public
Get:	<b>AUD-EMB?</b>	End User	Public
Description		Syntax	
Set:	Set audio in video embedding status	#AUD-EMB <sub>SP</sub> <sub>in,out,status</sub> <sub>CR</sub>	
Get:	Get audio in video embedding status	#AUD-EMB? <sub>SP</sub> <sub>in,out</sub> <sub>CR</sub>	
Response			
Set/Get: ~ <sub>in</sub> @AUD-EMB <sub>SP</sub> <sub>in,out,status</sub> <sub>CR LF</sub>			
Parameters			
<i>in</i> - audio input to be embedded number (1... max number of inputs)			
<i>out</i> - video output to embed into number (1 .. max number of outputs)			
<i>status</i> - embedded (ON), or not (OFF) status			
Response Triggers			
Response is sent to the com port from which the Set (before execution)/Get command was received			
After execution, 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			

Command - <b>AUD-LVL</b>		Command Type - Audio	
Command Name		Permission	Transparency
Set:	<b>AUD-LVL</b>	End User	Public
Get:	<b>AUD-LVL?</b>	End User	Public
Description		Syntax	
Set:	Set audio level in specific amplifier stage	# <b>AUD-LVL</b> <sub>SP</sub> stage, channel, volume <sub>CR</sub>	
Get:	Get audio level in specific amplifier stage	# <b>AUD-LVL?</b> <sub>SP</sub> stage, channe <sub>CR</sub>	
Response			
~nn@ <b>AUD-LVL</b> <sub>SP</sub> stage, channel, volume <sub>CR LF</sub>			
Parameters			
<i>stage</i> - input/output or numeric value of present audio processing stage For example: '1' for input level, '2' for output <i>channel</i> - input or output number <i>volume</i> - audio parameter in Kramer units, minus sign precedes negative values. ++ increase current value, -- decrease current value			
Response Triggers			
Notes			
Command - <b>AUD-SIGNAL</b>		Command Type - Audio	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	<b>AUD-SIGNAL?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get audio input signal status	# <b>AUD-SIGNAL?</b> <sub>SP</sub> inp_id <sub>CR</sub>	
Response			
~nn@ <b>AUD-SIGNAL</b> <sub>SP</sub> inp_id, status <sub>CR LF</sub>			
Parameters			
<i>inp_id</i> - input number (1 .. max input number) <i>status</i> - 0 - OFF (no signal) 1 - ON (signal present)			
Response Triggers			
After execution, response is sent to the com port from which the Get was received Response is sent to all com ports if audio status state was changed on any input			
Notes			

Command - MUTE		Command Type - Audio	
Command Name		Permission	Transparency
Set:	<b>MUTE</b>	End User	Public
Get:	<b>MUTE?</b>	End User	Public
Description		Syntax	
Set:	Set audio mute	#MUTE <sub>SP</sub> channel,mute_mode <sub>CR</sub>	
Get:	Get audio mute	#MUTE? <sub>SP</sub> channel <sub>CR</sub>	
Response			
~ <sub>hh</sub> @MUTE <sub>SP</sub> channel,mute_mode <sub>CR LF</sub>			
Parameters			
<i>channel</i> - output number			
<i>mute_mode</i> - 0 or OFF / 1 or ON			
Response Triggers			
Notes			

### 13.2.7 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

Command - <b>ETH-PORT</b>		Command Type - Communication	
Command Name		Permission	Transparency
Set:	<b>ETH-PORT</b>	Administrator	Public
Get:	<b>ETH-PORT?</b>	End User	Public
Description		Syntax	
Set:	Set Ethernet port protocol	# <b>ETH-PORT</b> <sub>[SP]</sub> <i>portType</i> , <i>ETHPort</i> <sub>[CR]</sub>	
Get:	Get Ethernet port protocol	# <b>ETH-PORT?</b> <sub>[SP]</sub> <i>portType</i> <sub>[CR]</sub>	
Response			
~ <b>nn</b> @ <b>ETH-PORT</b> <sub>[SP]</sub> <i>portType</i> , <i>ETHPort</i> <sub>[CR LF]</sub>			
Parameters			
<i>portType</i> - TCP/UDP			
<i>ETHPort</i> - TCP/UDP port number			
Response Triggers			
Notes			

Command - <b>NET-DHCP</b>		Command Type - Communication	
Command Name		Permission	Transparency
Set:	<b>NET-DHCP</b>	Administrator	Public
Get:	<b>NET-DHCP?</b>	End User	Public
Description		Syntax	
Set:	Set DHCP mode	# <b>NET-DHCP</b> <sub>SP</sub> mode <sub>CR</sub>	
Get:	Get DHCP mode	# <b>NET-DHCP?</b> <sub>CR</sub>	
Response			
- <sub>nn</sub> @ <b>NET-DHCP</b> <sub>SP</sub> mode <sub>CR LF</sub>			
Parameters			
mode - 0 - Do not use DHCP. Use the IP set by the factory or using the IP set command 1 - Try to use DHCP. If unavailable, use IP as above			
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 command "NAME". You can also get an assigned IP by direct connection to USB or RS-232 protocol port if available For proper settings consult your network administrator			

Command - <b>NET-GATE</b>		Command Type - Communication	
Command Name		Permission	Transparency
Set:	<b>NET-GATE</b>	Administrator	Public
Get:	<b>NET-GATE?</b>	End User	Public
Description		Syntax	
Set:	Set gateway IP	# <b>NET-GATE</b> <sub>SP</sub> ip_address <sub>CR</sub>	
Get:	Get gateway IP	# <b>NET-GATE?</b> <sub>CR</sub>	
Response			
- <sub>nn</sub> @ <b>NET-GATE</b> <sub>SP</sub> ip_address <sub>CR LF</sub>			
Parameters			
ip_address - format: xxx.xxx.xxx.xxx			
Response Triggers			
Notes			
A network gateway connects the device via another network and maybe over the Internet. Be careful of security problems. For proper settings consult your network administrator			

Command - <b>NET-IP</b>		Command Type - Communication	
Command Name		Permission	Transparency
Set:	<b>NET-IP</b>	Administrator	Public
Get:	<b>NET-IP?</b>	End User	Public
Description		Syntax	
Set:	Set IP address	# <b>NET-IP</b> <sub>SP</sub> ip_address <sub>CR</sub>	
Get:	Get IP address	# <b>NET-IP?</b> <sub>CR</sub>	
Response			
~nn@ <b>NET-IP</b> <sub>SP</sub> ip_address <sub>CR LF</sub>			
Parameters			
<i>ip_address</i> - format: xxx.xxx.xxx.xxx			
Response Triggers			
Notes			
For proper settings consult your network administrator			

Command - <b>NET-MAC?</b>		Command Type - Communication	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	<b>NET-MAC?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get MAC address	# <b>NET-MAC?</b> <sub>CR</sub>	
Response			
~nn@ <b>NET-MAC</b> <sub>SP</sub> mac_address <sub>CR LF</sub>			
Parameters			
<i>mac_address</i> - Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit			
Response Triggers			
Notes			

Command - <b>NET-MASK</b>		Command Type - Communication	
Command Name		Permission	Transparency
Set:	<b>NET-MASK</b>	Administrator	Public
Get:	<b>NET-MASK?</b>	End User	Public
Description		Syntax	
Set:	Set subnet mask	# <b>NET-MASK</b> <sub>[SP]</sub> <i>net_mask</i> <sub>[CR]</sub>	
Get:	Get subnet mask	# <b>NET-MASK?</b> <sub>[CR]</sub>	
Response			
~ <sub>[n]</sub> @ <b>NET-MASK</b> <sub>[SP]</sub> <i>net_mask</i> <sub>[CR LF]</sub>			
Parameters			
<i>net_mask</i> - format: xxx.xxx.xxx.xxx			
Response Triggers			
The subnet mask limits the Ethernet connection within the local network For proper settings consult your network administrator			
Notes			

### 13.2.8 EDID Handling Commands

Command	Description
CPEDID	Copy EDID data from the output to the input EEPROM
GEDID	Set/get EDID data
LDEDID	Load EDID data
LOCK-EDID	Lock last read EDID

Command - CPEDID		Command Type - EDID Handling	
Command Name		Permission	Transparency
Set:	CPEDID	End User	Public
Get:	-	-	-
Description		Syntax	
Set:	Copy EDID data from the output to the input EEPROM	#CPEDID <sub>SP</sub> src_type, src_id, dst_type, dest_bitmap <sub>CR</sub>	
Get:	-	-	
Response			
~nn@CPEDID <sub>SP</sub> src_stg, src_id, dst_type, dest_bitmap <sub>CR LF</sub>			
Parameters			
<p>src_type - EDID source type (usually output)</p> <p>src_id - number of chosen source stage (1.. max number of inputs/outputs)</p> <p>dst_type - EDID destination type (usually input)</p> <p>dest_bitmap - bitmap representing destination IDs. Format: XXXX...X, where X is hex digit. The binary form of every hex digit represents corresponding destinations. Setting '1' says that EDID data has to be copied to this destination</p>			
Response Triggers			
Response is sent to the com port from which the Set was received (before execution)			
Notes			
<p>Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word)</p> <p>Example: bitmap 0x0013 means inputs 1,2 and 5 are loaded with the new EDID</p>			

Command - GEDID		Command Type - EDID Handling	
Command Name		Permission	Transparency
Set:	<b>GEDID</b>	Administrator	Public
Get:	<b>GEDID?</b>	End User	Public
Description		Syntax	
Set:	Set EDID data from device	#GEDID <sub>SP</sub> stage, stage_id <sub>CR</sub>	
Get:	Get EDID support on certain input/output	#GEDID? <sub>SP</sub> stage, stage_id <sub>CR</sub>	
Response			
Set:			
Multi-line response:			
~nn@GEDID <sub>SP</sub> stage,stage_id,size <sub>CR LF</sub>			
EDID_data <sub>CR LF</sub>			
~nn@GEDID <sub>SP</sub> stage,stage_id <sub>SP</sub> OK <sub>CR LF</sub>			
Get:			
~nn@GEDID <sub>SP</sub> stage,stage_id,size <sub>CR LF</sub>			
Parameters			
stage - input/output			
stage_id - number of chosen stage (1.. max number of inputs/outputs)			
size - EDID data size. For Set, size of data to be sent from device, for Get, 0 means no EDID support			
Response Triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received			
Notes			
For Get, size=0 means EDID is not supported			
For old devices that do not support this command, ~nn@ ERR 002 <sub>CR LF</sub> is received			

Command - LDEDID		Command Type - EDID Handling	
Command Name		Permission	Transparency
Set:	LDEDID	End User	Public
Get:	-	-	-
Description		Syntax	
Set:	Write EDID data from external application to device	Multi-step syntax (see following steps)	
Get:	None	None	
Communication Steps (Command and Response)			
<p>Step 1: #LDEDID<sub>[SP]</sub>dst_type, dest_bitmask, size, safe_mode<sub>[CR]</sub></p> <p>Response 1: ~nn@LDEDID<sub>[SP]</sub>dst_type, dest_bitmask, size, safe_mode<sub>[SP]</sub>READY<sub>[CR LF]</sub> or ~nn@LDEDID<sub>[SP]</sub>ERRnn<sub>[CR LF]</sub></p> <p>Step 2: If ready was received, send EDID_DATA</p> <p>Response 2: ~nn@LDEDID<sub>[SP]</sub>dst_type, dest_bitmask, size, safe_mode<sub>[SP]</sub>OK<sub>[CR LF]</sub> or ~nn@LDEDID<sub>[SP]</sub>ERRnn<sub>[CR LF]</sub></p>			
Parameters			
<p>dst_type - EDID destination type (usually input)</p> <p>dest_bitmask - bitmap representing destination IDs. Format: 0x******, where * is ASCII presentation of hex digit. The binary presentation of this number is a bit mask for destinations. Setting '1' means EDID data has to be copied to this destination</p> <p>size - EDID data size</p> <p>safe_mode - 0 - Device accepts the EDID as is without trying to adjust 1 - Device tries to adjust the EDID</p> <p>EDID_DATA - data in protocol packets</p>			
Response Triggers			
Response is sent to the com port from which the <b>Set</b> (before execution)			
Notes			
<p>When the unit receives the LDEDID command it replies with <b>READY</b> and enters the special EDID packet wait mode. In this mode the unit can receive only packets and not regular protocol commands.</p> <p>If the unit does not receive correct packets for 30 seconds or is interrupted for more than 30 seconds before receiving all packets, it sends timeout error ~nn@LDEDID<sub>[SP]</sub>ERR01<sub>[CR LF]</sub> and returns to the regular protocol mode. If the unit received data that is not a correct packet, it sends the corresponding error and returns to the regular protocol mode.</p> <p>See Protocol Packet reference</p>			

Command – LOCK-EDID		Command Type – EDID Handling	
Command Name		Permission	Command Name
<b>Set:</b>	<b>LOCK-EDID</b>	End User	End User
<b>Get:</b>	<b>LOCK-EDID?</b>	End User	End User
<b>Description</b>		Syntax	
Set:	Lock last read EDID	# <b>LOCK-EDID</b> <sub>[SP]</sub> <i>input_id,lock_mode</i> <sub>[CR]</sub>	
Get :	Get EDID lock state	# <b>LOCK-EDID?</b> <sub>[SP]</sub> <i>input_id</i> <sub>[CR]</sub>	
<b>Response</b>			
- <b>nn</b> @ <b>LOCK-EDID</b> <sub>[SP]</sub> <i>input_id,lock_mode</i> <sub>[CR LF]</sub>			
<b>Parameters</b>			
<i>input_id</i> - 1...num of system inputs <i>lock_mode</i> - 0/OFF - unlocks EDID, 1/ON - locks EDID			
<b>Response Triggers</b>			
<b>Notes</b>			

### 13.2.9 Factory Commands

Command	Description
UPGRADE	Perform firmware upgrade

Command - UPGRADE		Command Type - System	
Command Name		Permission	Transparency
Set:	<b>UPGRADE</b>	Administrator	Internal
Get:	-	-	-
Description		Syntax	
Set:	Perform firmware upgrade	#UPGRADE <input type="checkbox"/> CR	
Get:	-	-	
Response			
~nn@UPGRADE <input type="checkbox"/> SP OK <input type="checkbox"/> CR LF			
Parameters			
Response Triggers			
Notes			
<p>Not necessary for some devices            Firmware usually uploads to a device via a command like LDFW            Reset the device to complete the process</p>			

### 13.2.10 Layer

Number	Value
1	Video
2	Audio
3	Data
4	IR
5	USB

### 13.2.11 Video/Audio Signal Changes

Number	Value
0	Video signal lost
1	New video signal detected
2	Audio signal lost
3	Audio signal detected
4	Disable 5V on video output if no input signal detected
5	Video cable unplugged
6	Audio cable unplugged

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### What is Not Covered

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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.

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# KRAMER



P/N: 2900-300386



Rev: 1



## 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.

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