KRAMER

USER MANUAL

MODEL:

VP-445
Presentation Switcher/Scaler

Contents

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!

Congratulations on purchasing your Kramer **VP-445 Presentation Switcher/Scaler**. This product, which incorporates HDMI™ technology, is ideal for:

- Projection systems in conference rooms, boardrooms, hotels and churches.
- Home theater up-scaling.

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/VP-445 to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

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 Kramer **VP-445** away from moisture, excessive sunlight and dust.

Safety Instructions

Caution:

- This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.
- For products with relay terminals and GPI\O ports, please refer to the permitted rating for an external connection, located next to the terminal or in the User Manual.
- There are no operator serviceable parts inside the unit.

Warning:

- Use only the power cord that is supplied with the unit.
- Disconnect the power and unplug the unit from the wall before installing.
- Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only.
- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label which located on the bottom of the unit.

Recycling Kramer Products

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

Overview

The **VP-445** is a high-performance presentation scaler/switcher for HDMI, computer graphics and composite video signals. The unit scales the video, embeds the audio, and outputs the signal to two HDMI (with embedded audio) outputs (with S/PDIF and balanced stereo audio) simultaneously.

The **VP-445** features:

- PixPerfect™ scaling technology – Kramer's precision pixel mapping and high quality scaling technology. High-quality 3:2 and 2:2 pull down de-interlacing and full up and down scaling of all video input signals.
- HDTV compatibility.
- HDCP compliance – The HDCP (High Definition Content Protection) license agreement allows copy−protected data on the HDMI input to pass only to the HDMI outputs.
- 12 video inputs – 6 HDMI on HDMI connectors, 4 computer graphics video on 15−pin HD connectors and 2 composite video on RCA connectors.
- Two HDMI scaled outputs (mirrored).
- Up to UXGA/1080p output resolutions.
- Two microphone inputs that can be used by mixing, switching or talk-over.
- Companion AFV (Audio-Follow-Video) – stereo audio for every input (on terminal blocks).
- 12 unbalanced stereo inputs on terminal blocks as well as embedded audio for the HDMI inputs, each with individual level controls.
- Audio outputs – one S/PDIF on an RCA connector, one balanced stereo audio on a terminal block as well as embedded audio on the HDMI outputs.

- Multiple aspect ratio selections - full, best fit, over scan, under scan, letter box and pan scan.
- Powerful audio features via DSP technology including audio equalization, mixing, delay and so on.
- Built-in ProcAmp – color, hue, sharpness, noise, contrast and brightness.
- Supports 4:4:4 (RGB and YUV) as well as 4:4:2 (YUV) color sampling.
- Maintains constant output sync – there is no disruption on the output while switching between inputs and when no video is detected.
- External device control via RS-232 port
- Front panel control – audio mute and freeze frame.
- Front panel lockout.
- Non-volatile memory – saves final settings.

Control your **VP-445**:

- Directly, via the front panel push buttons.
- By RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller.
- Remotely, from the infrared remote control transmitter with OSD (on-screen display).
- Via the Ethernet with built-in Web pages.
- Via ETH using TCP.

The **VP-445** is housed in a 19” 1U rack mountable enclosure, with rack “ears” included, and is fed from a 100-240 VAC universal switching power supply.

Defining the VP-445 Presentation Switcher/Scaler

This section defines the **VP-445**.

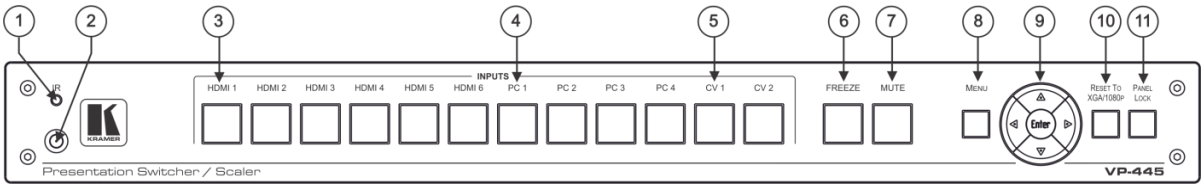


Figure 1: VP-445 Presentation Switcher/Scaler Front Panel

#	Feature		Function
1	IR LED		Lights when the unit accepts IR remote commands
2	IR Receiver		Receives signals from the remote control transmitter
3	INPUT Selector Buttons	HDMI	Press to select the HDMI input (from 1 to 6)
4		PC	Press to select the computer graphics input (from 1 to 4)
5		CV	Press to select the composite video input (from 1 to 2)
6	FREEZE Button		Press to freeze/unfreeze the output video image; audio can be programmed to MUTE when freezing the video (see MAIN MENU on page 10)
7	MUTE Button		Press to toggle between muting (blocking out the sound) and enabling the audio output
8	MENU Button		Displays the OSD menu (see Using the OSD Menu on page 9)
9	Navigation Buttons	◄	Press to decrease numerical values or select from several definitions When not within the OSD menu mode, press to decrease the output volume
		▲	Press to move up the menu list values (see Using the OSD Menu on page 9)
		►	Press to increase numerical values or select from several definitions When not within the OSD menu mode, press to increase the output volume
		▼	Press to move down the menu list (see Using the OSD Menu on page 9)
		ENTER	Press to accept changes and change the SETUP parameters (see Using the OSD Menu on page 9)
10	RESET TO XGA/1080p Button		Press to reset the video resolution to XGA or 1080p Press and hold for about 5 seconds to toggle between switching to XGA or 1080p
11	PANEL LOCK Button		Press and hold for about 5 seconds to lock/unlock the front panel buttons

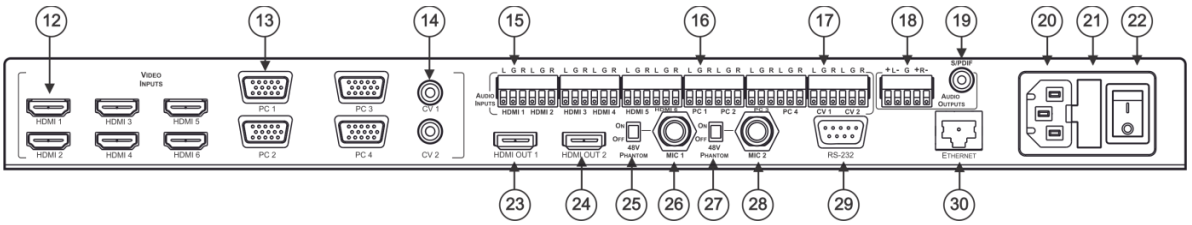


Figure 2: VP-445 Presentation Switcher/Scaler Rear Panel

#	Feature		Function
12	VIDEO INPUT Connectors	HDMI	Connects to an HDMI source (from 1 to 6)
13		PC 15-pin HD	Connects to a computer graphics source (from 1 to 4)
14		CV RCA	Connects to a composite video source (from 1 to 2)
15	AUDIO INPUT Unbalanced Stereo Terminal Blocks	HDMI	Connects to an analog audio HDMI source (from 1 to 6)
16		PC	Connects to an analog audio computer graphics source (from 1 to 4)
17		CV	Connects to an analog audio composite video source (from 1 to 2)
18	AUDIO OUTPUTS	Balanced Stereo Terminal Block	Connects to a balanced stereo analog audio acceptor
19		S/PDIF 3.5 Mini Jack Connector	Connects to a digital audio acceptor
20	Mains Socket		Connect the mains power cord
21	Mains Fuse Holder		Fuse for protecting the device
22	Power Switch		Switch for turning the unit ON or OFF
23	HDMI OUT 1		Connect to the HDMI acceptor 1
24	HDMI OUT 2		Connect to the HDMI acceptor 2
25	COND / DYN Switch for MIC 1		Move up to select a condenser type microphone; down to select a dynamic type microphone
26	MIC 1 6mm Jack		Connect to the microphone source 1
27	COND / DYN Switch for MIC 2		Move up to select a condenser type microphone; down to select a dynamic type microphone
28	MIC 2 6mm Jack		Connect to the microphone source 2
29	RS-232 9-pin D-sub Port		Connect to the PC or the remote controller
30	ETHERNET Connector		Connects to the PC or other Serial Controller through computer networking

Mounting VP-445

This section provides instructions for mounting **VP-445**. Before installing, verify that the environment is within the recommended range:

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

- **VP-445** must be placed upright in the correct horizontal position.

Caution:

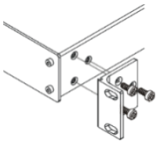
- Mount **VP-445** before connecting any cables or power.

Warning:

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

To mount the VP-445 on a rack

Attach both ear brackets by removing the screws from each side of the machine and replacing those screws through the ear brackets or place the machine on a table.



For more information go to www.kramerav.com/downloads/VP-445

Connecting the VP-445

Always switch off the power to each device before connecting it to your **VP-445**. After connecting your **VP-445**, connect its power and then switch on the power to each device.

You do not have to connect all the inputs and outputs, connect only those that are required.

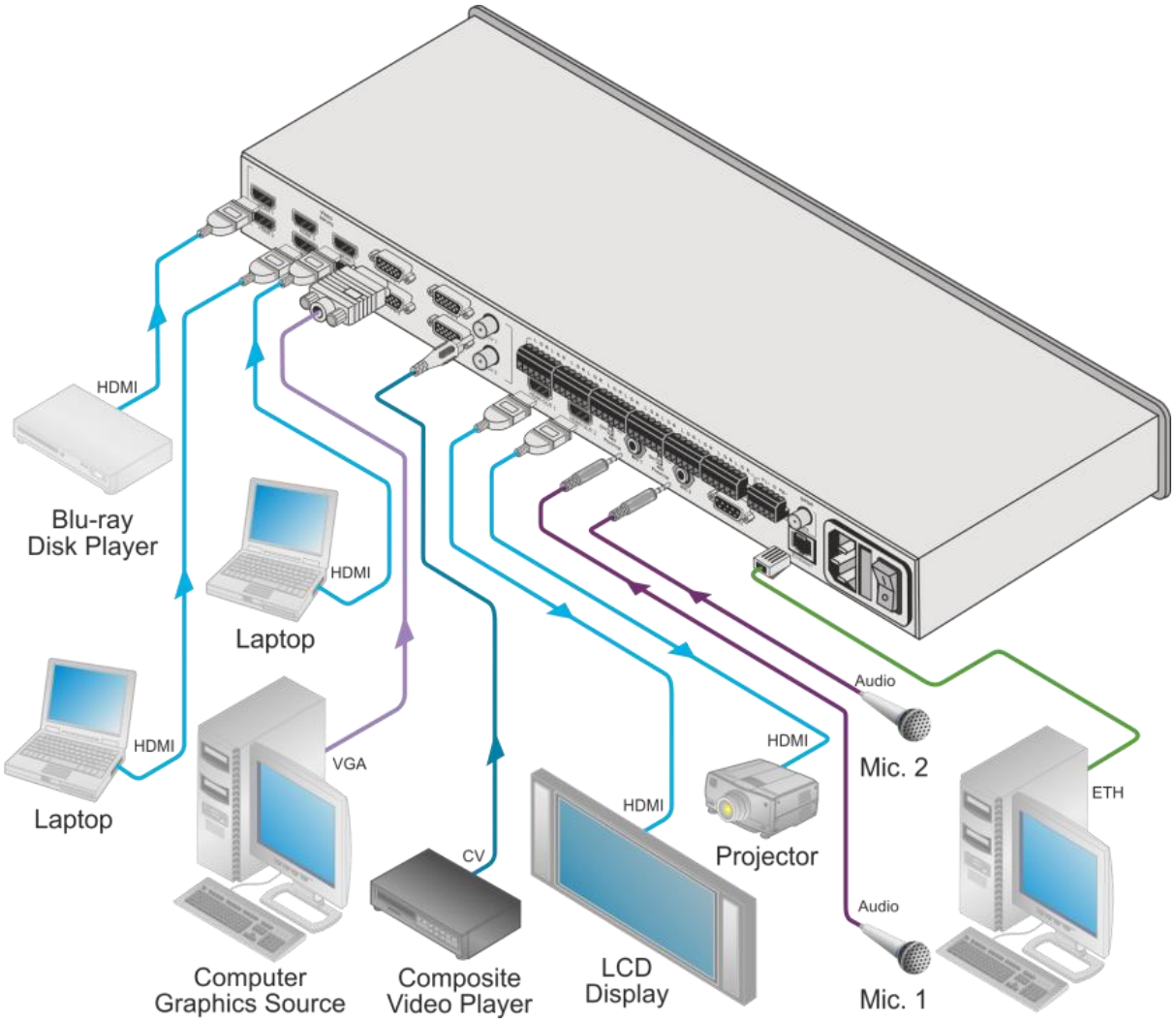


Figure 3: Connecting the VP-445 Presentation Switcher / Scaler

To connect the VP-445, as illustrated in the example in Figure 3, do the following:

1. Connect an HDMI source (for example, a Blu-ray player) to the HDMI VIDEO INPUT connector (from 1 to 6).

Alternatively, you can connect the DVI connector on the DVD player to the HDMI connector on the **VP-445** via a DVI-HDMI adapter. When using this adapter, you can connect the audio signal via the terminal block connector

2. Connect a computer graphics source to the PC 1 15-pin HD VIDEO INPUT connector (from 1 to 4).
3. Connect a composite video source to the CV 1 RCA connector (from 1 to 2).

4. Connect the audio input signals to the AUDIO IN terminal block connectors, as required (not shown in Figure 3).
5. If required, connect a microphone to the MIC 1 6mm jack (from 1 to 2) and set the phantom power (48V) on or off.
6. Connect the HDMI OUT 1 connector to an HDMI acceptor (for example, an LCD display), from 1 to 2.
7. Connect the audio output signals to the OUT stereo analog audio acceptor and/or the digital audio acceptor, as required (not shown in Figure 3).
8. Connect the power cord (not shown in Figure 3).
9. If required, connect:
   - A PC via RS-232, see Connecting to the VP-445 via RS-232 on page 12
   - The ETHERNET port, see Operating via Ethernet on page 13

Connecting the Balanced Stereo Audio Output

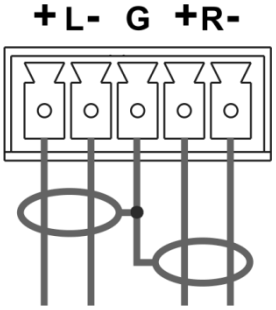


Figure 4: Connecting the Balanced Stereo Audio Output

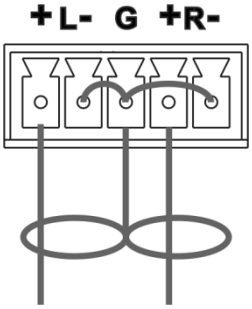


Figure 5: Connecting an Unbalanced Stereo Audio Acceptor to the Balanced Output

Microphone Pinout

The microphone 6mm jack pinout for a condenser microphone.

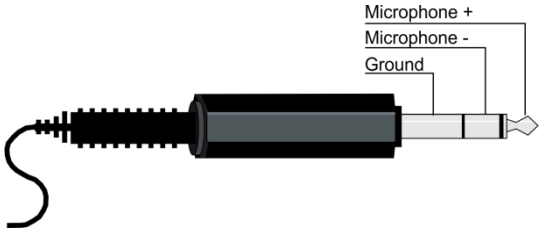


Figure 6: Condenser Microphone Pinout

The microphone 6mm jack pinout for a dynamic microphone.

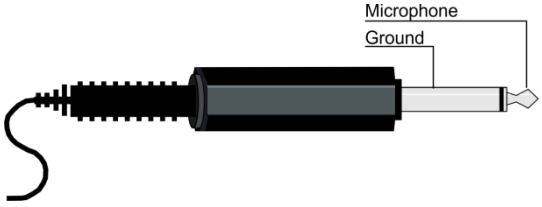


Figure 7: Dynamic Microphone Pinout

Controlling the VP-445

The **VP-445** can be controlled via:

- The front panel buttons (see Controlling via the Front Panel Buttons on page 9)
- The OSD menu (see Using the OSD Menu on page 9)
- RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller (see Connecting to the VP-445 via RS-232 on page 12)
- The Ethernet (see Operating via Ethernet on page 13)
- The infrared remote control transmitter (see Using the Infrared Remote Control Transmitter on page 16)

Controlling via the Front Panel Buttons

The **VP-445** includes the following front panel buttons:

- Input selector buttons for selecting the required input: HDMI (1 to 6), PC (1 and 4) and CV (1 to 2)
- MUTE and FREEZE buttons
- MENU, ENTER, and up, down, left and right arrow buttons
- RESET TO XGA/1080p and PANEL LOCK buttons

The Auto Adjust Feature

The auto adjust feature is implemented every time the input is switched to VGA or when the input resolution changes, via the FINETUNE menu (see MAIN MENU on page 10).

Using the OSD Menu

The control buttons let you control the **VP-445** via the OSD menu. Press the:

- MENU button to enter the menu

  The default timeout is set to 10 seconds
- ENTER button to accept changes and to change the menu settings
- Arrow buttons to move through the OSD menu, which is displayed on the video output

In the OSD menu, select EXIT to exit the menu.

MAIN MENU

<table>
<tr><th>Mode</th><th colspan="4">Function</th></tr>
<tr><td colspan="5">OUTPUT</td></tr>
<tr><td>SOURCE:</td><td colspan="4">Select the input: HDMI 1(default), HDMI 2, HDMI 3, HDMI 4, HDMI 5, HDMI 6, PC1, PC2, PC3, PC4, CV1 or CV2</td></tr>
<tr><td>SIZE:</td><td colspan="4">Select the image size: FULL, OVER SCAN, UNDER 1, UNDER 2, LETTER BOX, PANSCAN or BEST FIT (default)</td></tr>
<tr><td>RESOLUTION:</td><td colspan="4">Select the output resolution from the menu:</td></tr>
<tr><td></td><td>Output resolution:</td><td>Appears as:</td><td>Output resolution:</td><td>Appears as:</td></tr>
<tr><td></td><td>Native OUT1</td><td></td><td>1680x1050 @60Hz</td><td>1680x1050 60</td></tr>
<tr><td></td><td>Native OUT2</td><td></td><td>1600x1200 @60Hz</td><td>1600x1200 60</td></tr>
<tr><td></td><td>640x480 @60Hz</td><td>640x480 60</td><td>1920x1080 @60Hz</td><td>1920x1080 60</td></tr>
<tr><td></td><td>800x600 @60Hz</td><td>800x600 60</td><td>1920x1200 @60Hz</td><td>1920x1200 60</td></tr>
<tr><td></td><td>1024x768 @60Hz</td><td>1024x768 60</td><td>480p @60Hz</td><td>720x480P 60</td></tr>
<tr><td></td><td>1280x768 @60Hz</td><td>1280x768 60</td><td>720p @60Hz</td><td>1280x720P 60</td></tr>
<tr><td></td><td>1360x768 @60Hz</td><td>1360x768 60</td><td>1080i @60Hz</td><td>1920x1080I 60</td></tr>
<tr><td></td><td>1280x720 @60Hz</td><td>1280x720 60</td><td>1080p @60Hz</td><td>1920x1080P 60</td></tr>
<tr><td></td><td>1280x800 @60Hz</td><td>1280x800 60</td><td>576p @50Hz</td><td>720x576P 50</td></tr>
<tr><td></td><td>1280x1024 @60Hz</td><td>1280x1024 60</td><td>720p @50Hz</td><td>1280x720P 50</td></tr>
<tr><td></td><td>1440x900 @60Hz</td><td>1440x900 60</td><td>1080i @50Hz</td><td>1920x1080I 50</td></tr>
<tr><td></td><td>1400x1050 @60Hz</td><td>1400x1050 60</td><td>1080p @50Hz</td><td>1920x1080P 50</td></tr>
<tr><td></td><td colspan="4">NATIVE - Select NATIVE to select the output resolution from the EDID of the connected HDMI monitor</td></tr>
<tr><td colspan="5">PICTURE</td></tr>
<tr><td>CONTRAST:</td><td colspan="4">Set the contrast (the range and default values vary according to the input signal)</td></tr>
<tr><td>BRIGHTNESS:</td><td colspan="4">Set the brightness (the range and default values vary according to the input signal)</td></tr>
<tr><td>RED</td><td colspan="4">Set the red shade</td></tr>
<tr><td>GREEN</td><td colspan="4">Set the green shade</td></tr>
<tr><td>BLUE</td><td colspan="4">Set the blue shade</td></tr>
<tr><td>HUE</td><td colspan="4">Set the color hue (not applicable for VGA inputs)</td></tr>
<tr><td>SATURATION</td><td colspan="4">Set the color saturation (not applicable for VGA inputs)</td></tr>
<tr><td>SHARPNESS</td><td colspan="4">Set the sharpness of the picture (not applicable for VGA inputs)</td></tr>
<tr><td>NOISE REDUCTION</td><td colspan="4">Select the noise reduction: OFF (default), LOW, MID (middle) and HIGH (not applicable for VGA inputs)</td></tr>
<tr><td>FINETUNE</td><td colspan="4">Enabled for VGA: AUTO ADJUST (NO/YES), H-POSITION, V-POSITION, PHASE, CLOCK (value depends on input resolution), WXGA/XGA, RESET (NO/YES)</td></tr>
<tr><td colspan="5">AUDIO</td></tr>
<tr><td>INPUT VOLUME:</td><td colspan="4">Set the volume separately for each input: HDMI 1, HDMI 2, HDMI 3, HDMI 4, HDMI 5, HDMI 6, PC1, PC2, CV1 and CV2</td></tr>
<tr><td>OUTPUT VOLUME:</td><td colspan="4">Set the output volume</td></tr>
<tr><td>SETTINGS</td><td colspan="4">Set the BASS and TREBLE values
Set the delay to OFF, 40ms, 110ms or 150ms (default is OFF)</td></tr>
<tr><td>MUTE:</td><td colspan="4">Select the sound mute options: ON, OFF (default)</td></tr>
<tr><td>EMBEDDED AUDIO:</td><td colspan="4">Select the audio source of the HDMI 1 to HDMI 6 inputs:
AUTOMATIC: the embedded audio on the HDMI input is selected for an HDMI signal, or the analog audio input is selected if the input is not HDMI (for example, for a DVI input signal)
EMBEDDED: the embedded audio in the HDMI signal is selected</td></tr>
</table>

Mode	Function
	ANALOG: the analog audio input is selected
MIC SETTINGS	**MIC MODE** - set the mode to OFF, MIXER, TALKOVER or MIC ONLY. Set **MIC SELECT** to MIC1/MIC2 or BOTH When in **TALKOVER** mode (see Figure 8), select: **DEPTH** [%] – to determine the decrease of the audio level during microphone 1 takeover (press + to further decrease the talkover audio output level; press – to lessen the talkover output audio decrease level) **TRIGGER** [dB] – to determine the microphone 1 threshold level that triggers the audio output-level decrease. **ATTACK TIME** – to set the transition time of the audio level reduction after the signal rises above the threshold level **HOLD TIME** – to define the time period talkover remains active although the signal falls below the threshold level (for a short period of time) **RELEASE TIME** – to define the transition time for the audio level to return from its reduced level to its normal level after the Hold Time period
MIC VOLUME	Set the microphone volume for MIC1 and MIC2

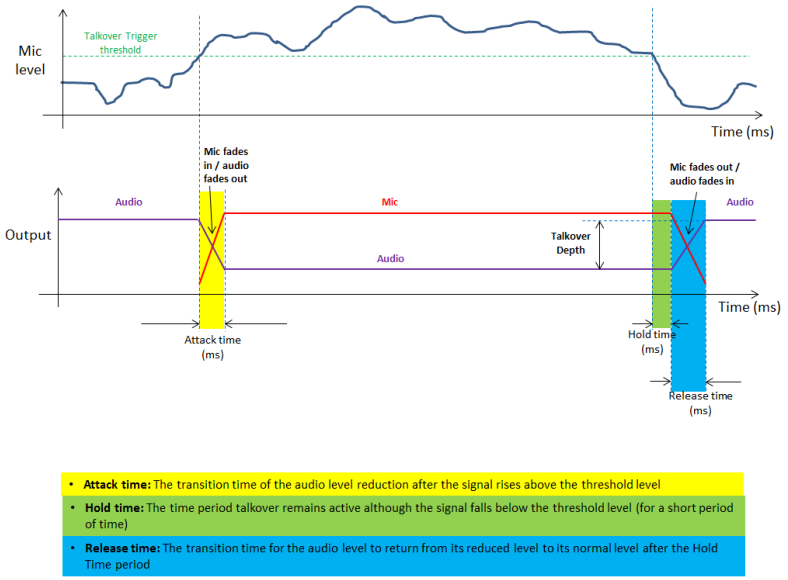


Figure 8: Talkover Mode

ADVANCED		
HDCP ON INPUT	Select the HDCP option for the HDMI input: either ON (the default) or OFF. Setting HDCP support to enabled (ON, default) on the HDMI input allows the source to transmit a non-HDCP signal if required (for example, when working with a Mac computer)	
HDCP ON OUTPUT	Set HDMI OUT1 and HDMI OUT2: Select FOLLOW INPUT or FOLLOW OUTPUT (FOLLOW OUTPUT) to define whether the HDCP will follow the input or the output When FOLLOW INPUT is selected, it changes its HDCP output setting (for the HDMI output) according to the HDCP of the input. This option is recommended when the HDMI output is connected to a splitter/switcher When FOLLOW OUTPUT is selected, the scaler matches its HDCP output to the HDCP setting of the HDMI acceptor to which it is connected	
AUTO SYNC OFF	Turn to DISABLE (default), FAST (for almost immediate shut down if no input is present – about 10 seconds) or SLOW (for shutdown after about 2 minutes). This is useful, for example, when the output is connected to a projector, and the projector automatically shuts down when it has no input	
OSD	H POSITION	Set the horizontal position of the OSD
	V POSITION	Set the vertical position of the OSD

Mode	Function	
	TIMER	Set the timeout period in seconds
	TRANSPARENCY	Set the OSD background between 100 (transparent) and 0 (opaque)
	DISPLAY	Select the information shown on the screen during operation: INFO: the information is shown for 10 seconds ON: the information is shown permanently OFF: the information is not shown
MUTE FOLLOWS FREEZE	Set to ON (default) to have MUTE follow FREEZE. Otherwise set to OFF	
MUTE BUTTON DEF:	Define the MUTE button to function as MUTE, BLANK or BLANK & MUTE	
AUTO SWITCHING	MODE	Set the auto switching mode to OFF (default), AUTO SCAN or HDMI LAST CONNECTED. PRIORITY (below) is enabled when AUTO SCAN is selected When AUTO SCAN is selected, audio is enabled only when a video signal is detected
	SCAN PRIORITY	Set to HDMI to begin scan with HDMI, PC or CV to begin scan with HDMI 1, PC1 or CV 1 respectively
ETHERNET	IP MODE	Set the IP mode to DHCP or STATIC (default)
	STATIC IP ADDRESS (when the IP MODE is STATIC, provide the following):	
	IP ADDRESS	Enter the IP address (192.168.1.39)
	SUBNET	Enter the subnet (255.255.0.0)
	GATEWAY	Enter the gateway (0.0.0.0)
	REMOTE PORT	Enter the remote port (1~65535)
	MAC ADDRESS	MAC address appears
LOCK MODE	ALL	Lock all the front panel buttons
	MENU ONLY	Lock the MENU (and navigation) front panel buttons only
	ALL & SAVE	Lock all the front panel buttons. The lock status is saved when the **VP-445** is powered down
	MENU ONLY & SAVE	Lock the MENU (and navigation) front panel buttons only. The lock status is saved when the **VP-445** is powered down
FACTORY RESET		
RESET	Select NO (default) or YES	
INFORMATION		
	Displays the INPUT and OUTPUT RESOLUTION, INPUT and OUTPUT HDCP, the firmware version and the IP ADDRESS	

Connecting to the VP-445 via RS-232

You can connect to the **VP-445** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

To connect to the **VP-445** via RS-232, connect the RS-232 9-pin D-sub rear panel port on the **VP-445** via a 9-wire straight cable (only connect pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5) to the RS-232 9-pin D-sub port on your PC.

Operating via Ethernet

You can connect to the **VP-445** via Ethernet using either of the following methods:

- Directly to the PC using a crossover cable (see Connecting the Ethernet Port Directly to a PC on page 13)
- Via a network hub, switch, or router, using a straight-through cable (see Connecting the Ethernet Port via a Network Hub or Switch on page 15)

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

Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the **VP-445** directly to the Ethernet port on your PC using a crossover cable with RJ-45 connectors.

This type of connection is recommended for identifying the **VP-445** with the factory configured default IP address.

After connecting the **VP-445** to the Ethernet port, configure your PC as follows:

1. Click **Start** > **Control Panel** > **Network and Sharing Center**.
2. Click **Change Adapter Settings**.
3. Highlight the network adapter you want to use to connect to the device and click **Change settings of this connection**.
   The Local Area Connection Properties window for the selected network adapter appears as shown in Figure 9.

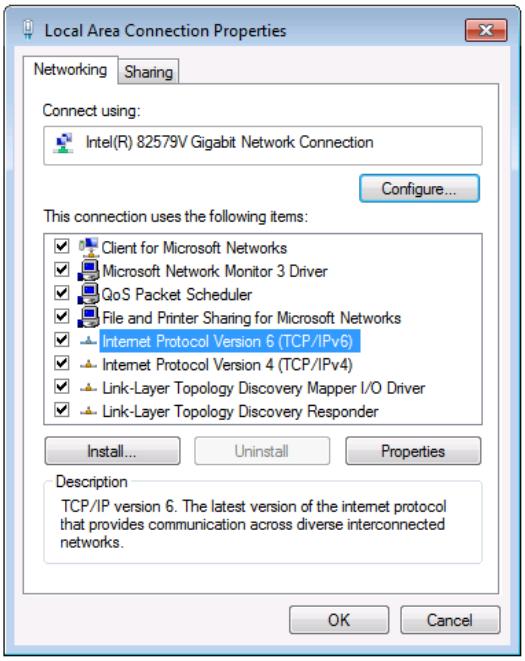


Figure 9: Local Area Connection Properties Window

4. Highlight either **Internet Protocol Version 6 (TCP/IPv6)** or **Internet Protocol Version 4 (TCP/IPv4)** depending on the requirements of your IT system.

5. Click **Properties**.
   The Internet Protocol Properties window relevant to your IT system appears as shown in Figure 10 or Figure 11.

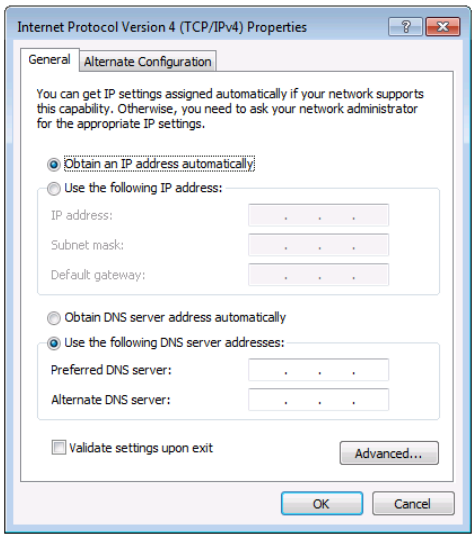


Figure 10: Internet Protocol Version 4 Properties Window

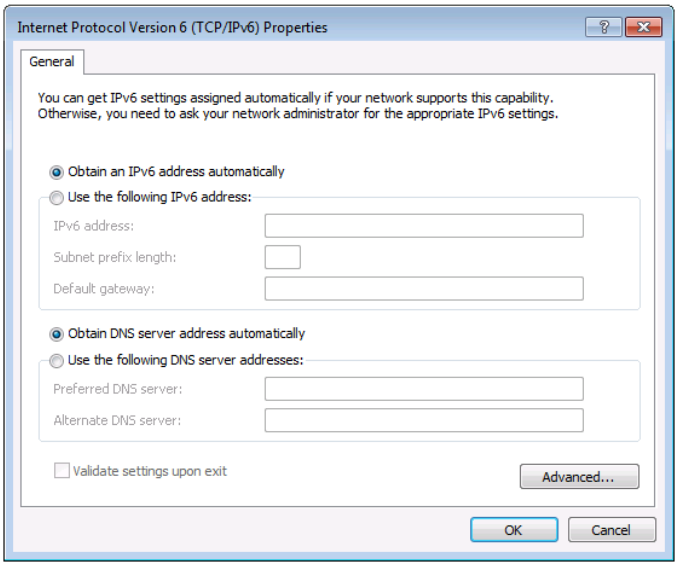


Figure 11: Internet Protocol Version 6 Properties Window

6. Select **Use the following IP Address** for static IP addressing and enter the details as shown in Figure 12.
   For TCP/IPv4 you can use any IP address between 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.

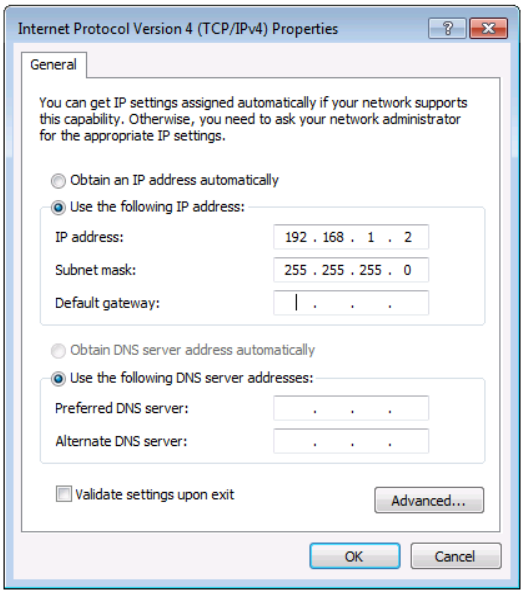


Figure 12: Internet Protocol Properties Window

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

Connecting the Ethernet Port via a Network Hub or Switch

You can connect the Ethernet port of the **VP-445** to the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

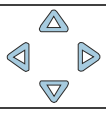
Configuring the Ethernet Port

You can set the Ethernet parameters via the embedded Web pages.

Using the Infrared Remote Control Transmitter

You can control the **VP-445** from the infrared remote control transmitter:

Figure 13: Infrared Remote Control Transmitter

Keys	Function
POWER	Toggle the power save mode ON or OFF
HDMI	Select the HDMI input (from 1 to 6)
PC	Select the PC input (from 1 to 4)
PC2	Select the CV input (from 1 to 2)
XGA Reset	Reset the resolution to XGA
1080p Reset	Reset the resolution to 1080p
	Four navigation keys When not in the OSD, the left and right arrows also control the output volume
OK	Press to accept changes Press also to auto adjust the picture (see The Auto Adjust Feature on page 9)
MENU	Enter the OSD menu
EXIT	EXIT the menu
FREEZE	Freeze/unfreeze the output video image
Panel Lock	Lock/unlock the front panel buttons
MUTE	Toggle between muting (blocking out the sound) and enabling the audio output

Using the Embedded Web Pages

The **VP-445** can be operated remotely using the embedded Web pages. The Web pages are accessed using a Web browser and an Ethernet connection.

Before attempting to connect:

- Perform the procedures in ure that your browser is supported
- The following operating systems and Web browsers are supported:

Windows 7 and higher:	
Chrome version 25	Internet Explorer version 9
Firefox version 19	
Mac (PC) Yosemite 10 and higher:	
Chrome version 51	
iOS 8.0 and higher:	
Chrome version 47	Safari N/A
Android OS 5.0 and higher:	
Chrome version 50	

Browsing the VP-445 Web Pages

There are nine Web pages:

- The Input Select page (see Input Select Page on page 18)
- The Device Settings page (see Device Settings Page on page 20)
- The Output Settings page (See Output Settings Page on page 22)
- The HDCP page (see HDCP Page on page 23)
- The EDID page (see EDID Page on page 24)
- The Audio page (see Audio Page on page 26)
- The Advanced page (see Advanced Page on page 26)
- RS-232 page (see RS-232 Page on page 27)
- The About page (see About Page on page 28)

To browse the VP-445 Web pages:

1. Open your Internet browser.
2. Type the IP address of the device in the Address bar of your browser. For example, the default IP address:

The Input Select Web page appears.

Input Select Page

Figure 14 shows the Input Select page that is also the first Web page. The column on the left shows the Input Select page selected followed by a list of all the other available Web pages. The Video switching area lets you select an input to the outputs.

The model name, FW version and IP address appear on the lower left side of the main page. The lower part of the screen lets you save the settings and upload a saved setting.

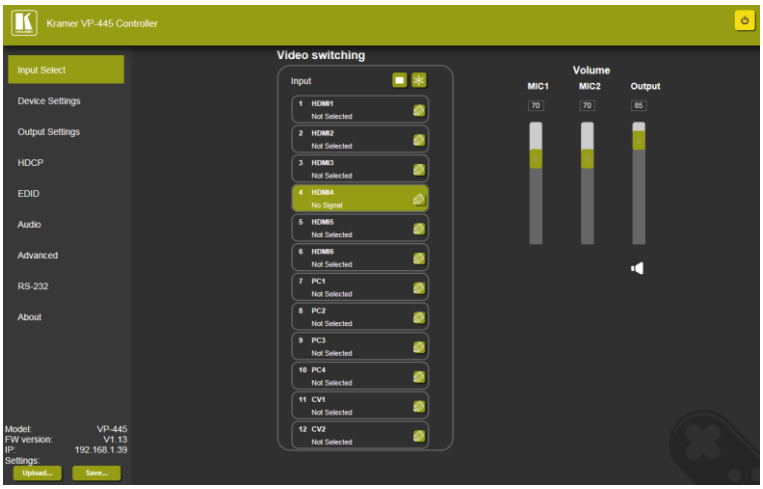


Figure 14: Input Select Page

On the right side you can set the volume of the microphones and the output. The speaker icon ( ) lets you mute ( ) or unmute the audio output level.

Use the freeze icon ( ) to freeze a selected input and the blank icon ( ) to display a blank screen.

Click the power icon on the top right-hand side to toggle between normal operation and standby mode. When in standby mode, the icon appears dim:

Figure 15: VP-445 Standby Mode

To edit an input button, select that button and click the edit icon ( ). The input edit window appears:

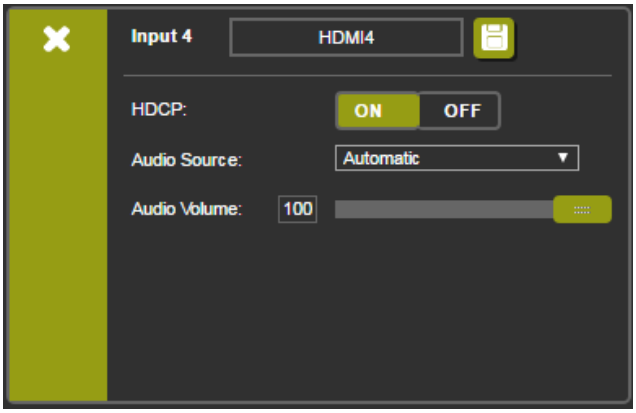


Figure 16: HDMI Input Edit Window

The input edit window lets you set the HDCP, change the name of the input as you want it to appear in the Web page (click to save the name), set the audio source and its volume. Click the exit icon ( ) to exit the window.

Figure 17 shows the PC and CV edit window. Click the exit icon ( ) to exit the window.

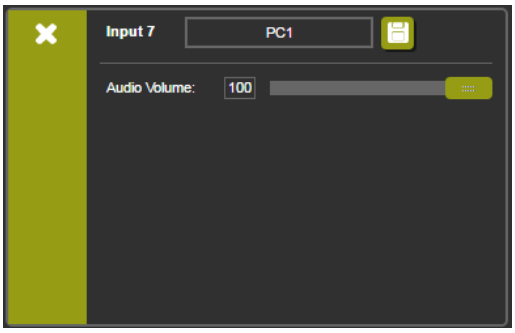


Figure 17: PC and CV Input Edit Window

Device Settings Page

The device Settings page (Figure 18) lets you upgrade the firmware and set the Ethernet parameters.

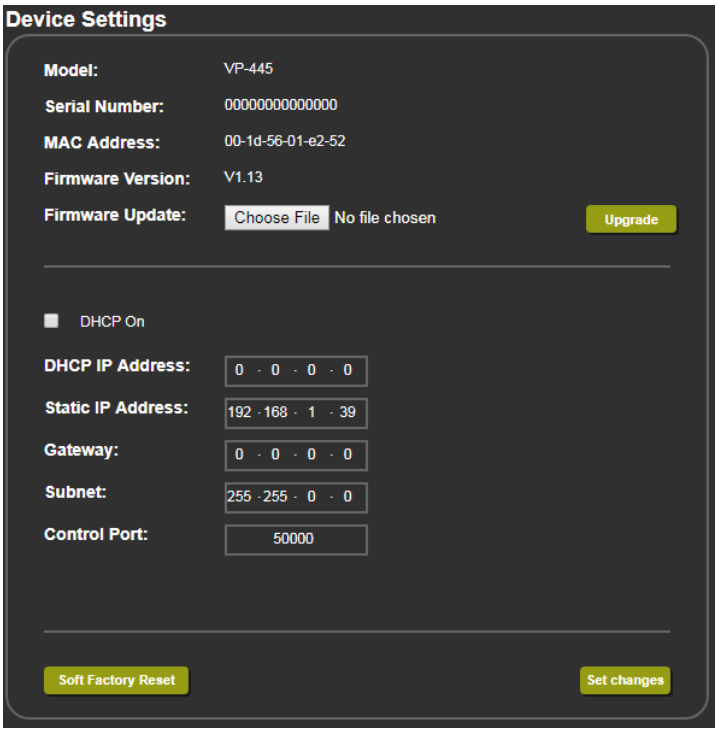


Figure 18: Device Settings Page

Any change in the device settings requires confirmation, as illustrated in the example in Figure 19.

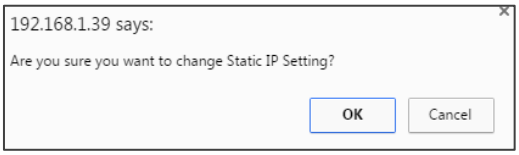


Figure 19: Device Settings Page – Static IP Confirmation.

Firmware Upgrade

To upgrade the firmware via the Device Settings page:

1. In the Firmware update field click the Choose File button to choose the firmware file.
2. Click the Upgrade button.

The new firmware is uploaded:

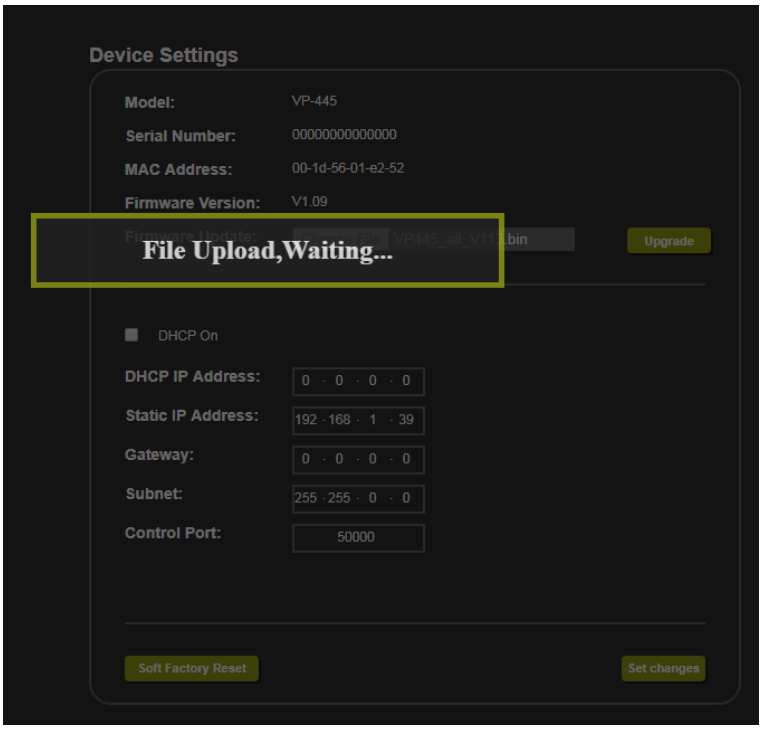


Figure 20: Device Settings Page – Uploading the New Firmware File

3. Once the file is uploaded follow the instructions on the Web page:
   The new firmware is uploaded:

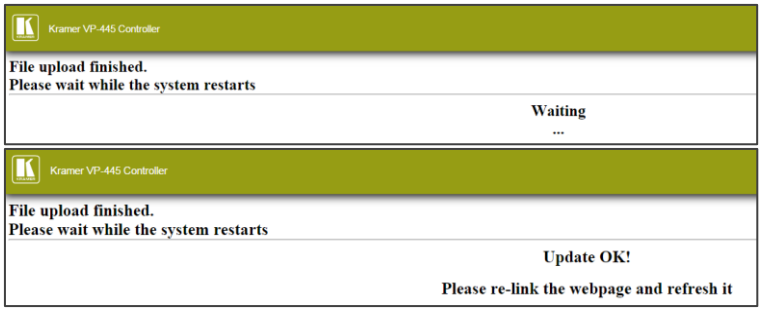


Figure 21: Device Settings Page – Uploading Process

4. After restarting the system upload the Web page once again.
5. Verify that the new version appears on the lower left corner of the Web page:

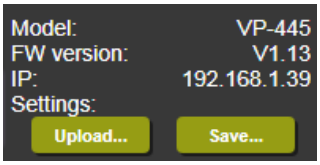


Figure 22: Device Settings Page – New Firmware Updated

Output Settings Page

Figure 23 shows the Output Settings page:

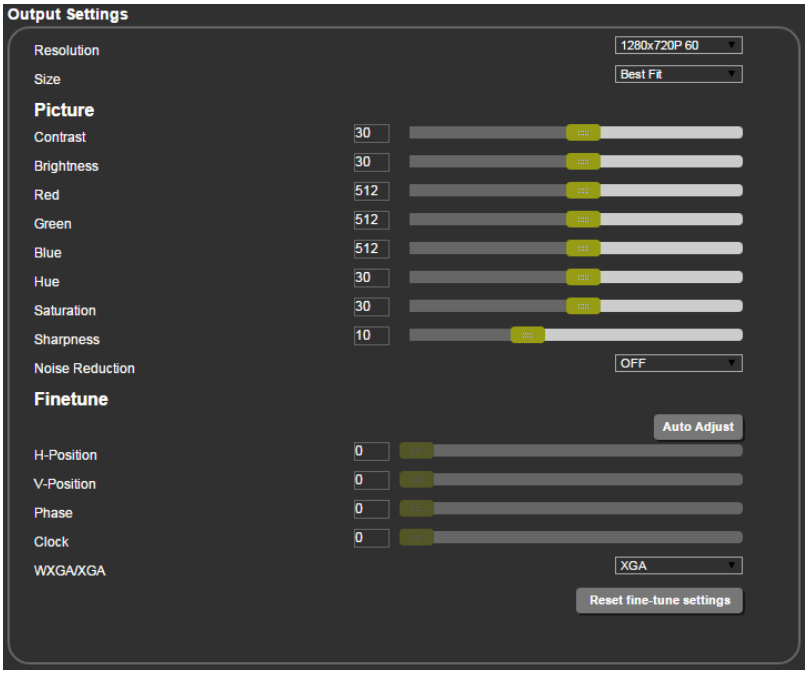


Figure 23: Output Settings Page

The output settings include the Resolution and Size of the image, the picture settings, and the Finetune items (which are enabled for VGA inputs).

HDCP Page

The HDCP page lets you set the HDCP on the output (follow input or follow output) and the HDCP status for each of the HDMI inputs. Figure 24 shows the HDCP page:

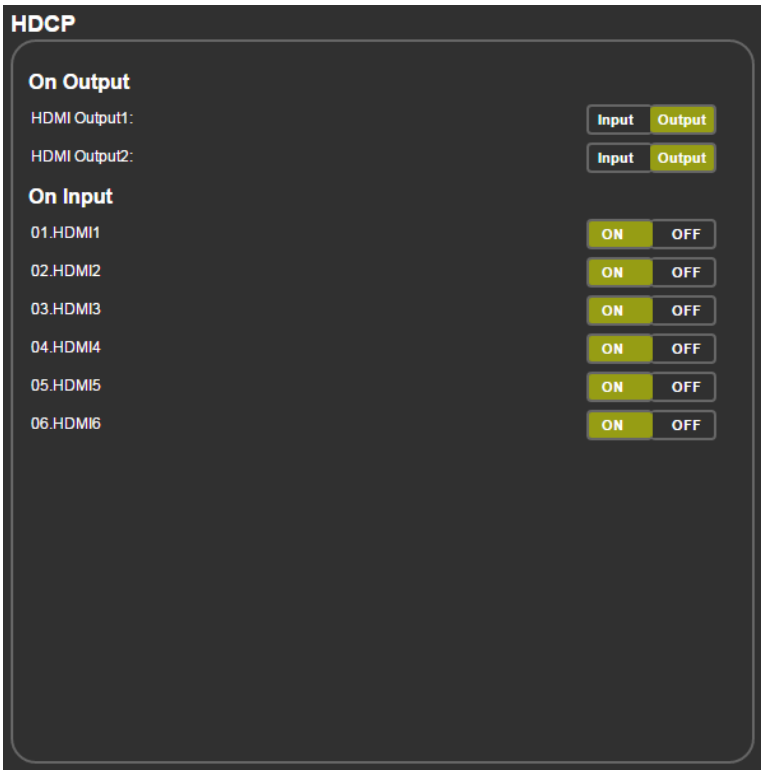


Figure 24: HDCP Page

EDID Page

The EDID page lets you copy a selected resolution (Native Timing) or the default resolution (HDMI or VGA) to one or more selected inputs.

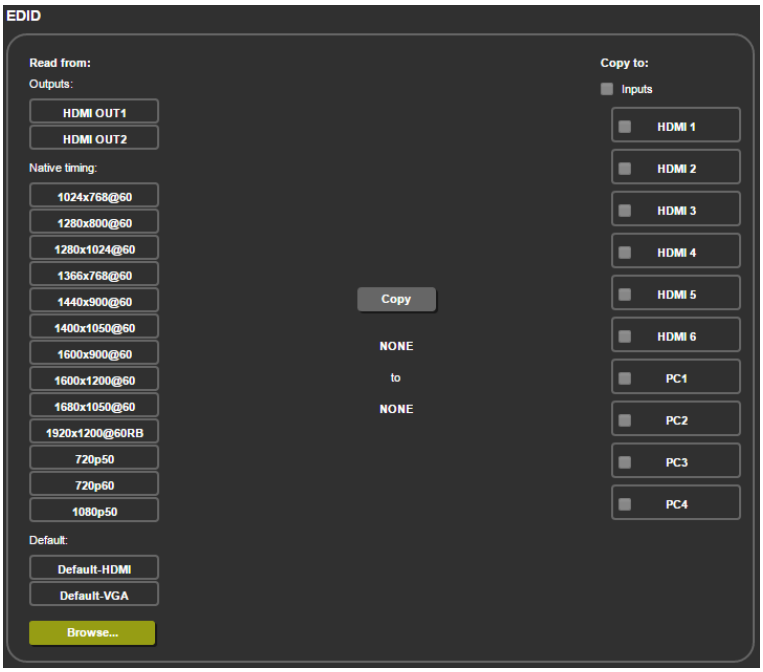


Figure 25: EDID Page

Figure 26 shows how to select a resolution from the Native Timing list and select one or more inputs. To copy, click the **Copy** button:

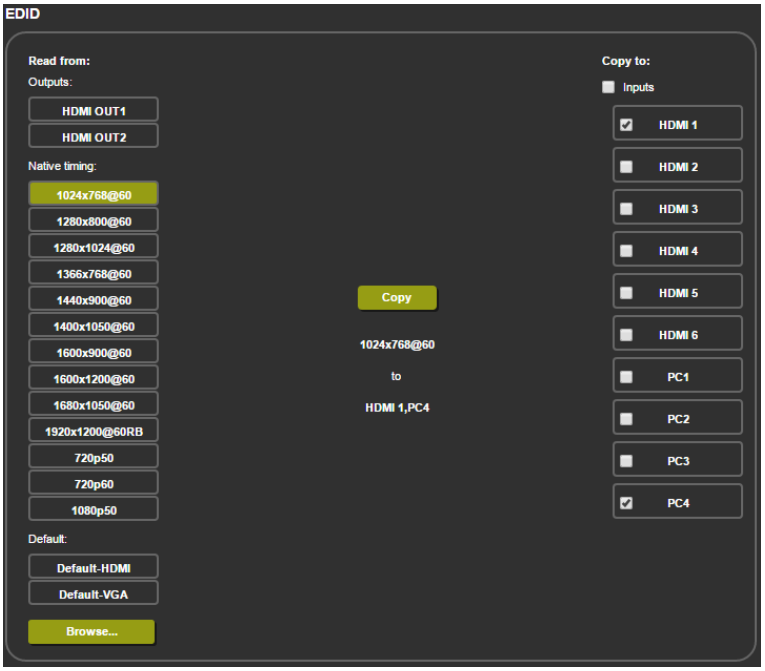


Figure 26: EDID Page – Copying a Selected Input Resolution

The EDID page displays the machine name, selected resolution, audio channels and deep color support.

After clicking **Copy**, the EDID page shows the copy EDID results:

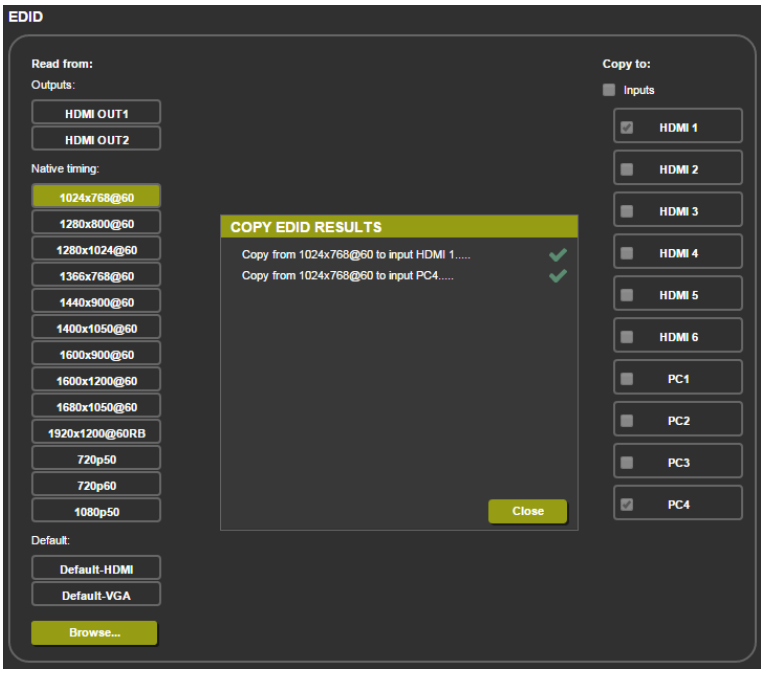


Figure 27: EDID Page – Copying EDID Results

Click Close to complete the EDID procedure.

In the same way you can read the EDID from one of the outputs. To do so, select an output and click Copy:

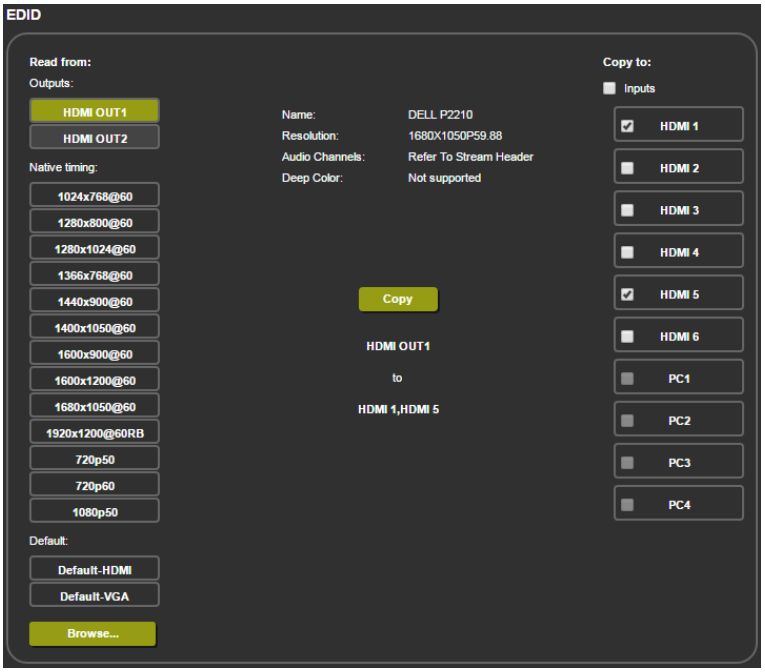


Figure 28: EDID Page – Copying EDID from an Output

Audio Page

The Audio page lets you define the audio parameters for each input separately, microphone inputs (Mic 1 and Mic 2), and outputs (1 and 2 together), as illustrated in Figure 29. You can set the DRC on or off as well as the bass treble and loudness.

The Audio page also enables you to set mute follow freeze and lip sync as well as the audio source (automatic, analog or embedded for the HDMI inputs) and volume level for each input.

Figure 29: Audio Page

Advanced Page

The Advanced page lets you set the auto sync off speed (either slow or fast) or disable it (Off), set the auto switching to Off, Auto Scan or HDMI Last connected, set the input priority to PC or HDMI (once the auto scan is enabled), and set the Lock Mode, see Figure 30.

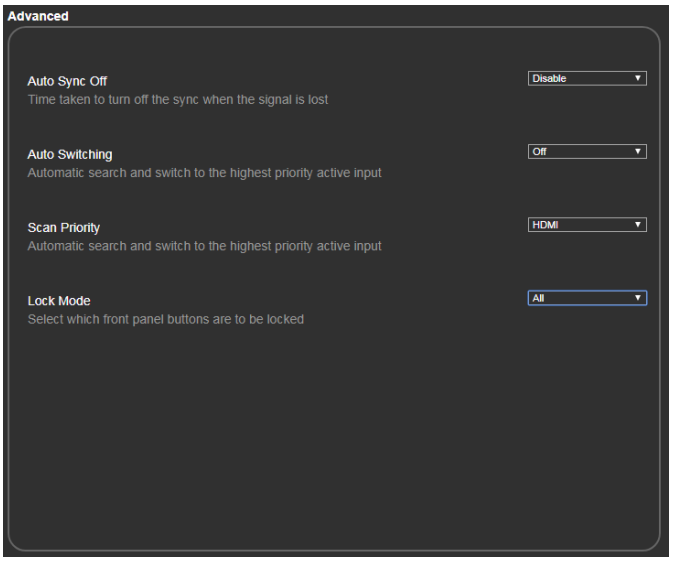


Figure 30: Advanced Page

RS-232 Page

The RS-232 lets you set RS-232 to control **VP-445** or to control an external device, for example a projector that is connected to the output or any other RS-232 controlled device.

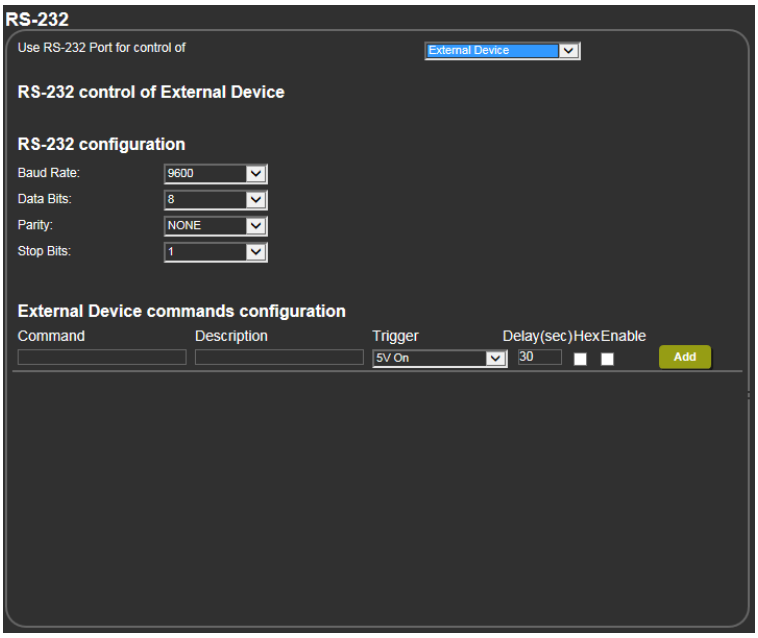


Figure 31: RS-232 Page

To control an external device via **VP-445:**

1. Connect the RS-232 port on the **VP-445 to the RS-232 port of an external device (for example, a projector connected to HDMI™ OUT 2).**
2. Open the embedded Web page (see Browsing the VP-445 Web Pages on page 17) and select the RS-232 page.
3. Set **Use RS-232 Port for control of** to External Device.
4. Set the **RS-232 configuration** of the external device.
5. Type in a projector command, description and set the trigger (when no-sync is detected for 30 seconds, the projector powers down):

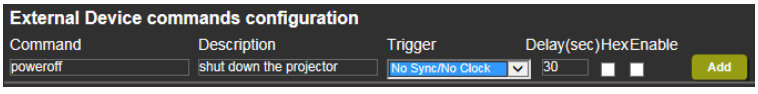


Figure 32: RS-232 Page – Writing a Command

6. Click **Add**:

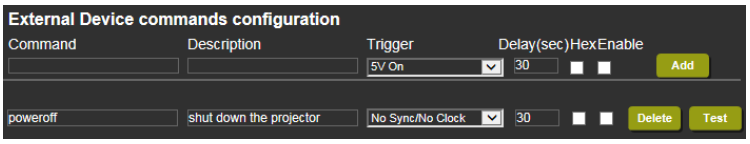


Figure 33: RS-232 Page – Adding the Command

7. Click **Test** (you can also delete the command).
8. In the same way type as many commands as required.

About Page

The **VP-445** About page lets you view the Web page version and Kramer Electronics Ltd details.

Figure 34: About Page

Technical Specifications

Inputs	6 HDMI	On female HDMI connectors (HDCP 1.4)
	4 VGA	On a 15-pin HD connector
	2 CV	On RCA connectors
	12 Unbalanced Stereo Audio	On 3-pin terminal block connectors
	2 Mic	On 6mm jack connectors (with selectable 48V phantom power)
Outputs	2 HDMI	On female HDMI connectors (HDCP 1.4)
	1 S/PDIF	On an RCA connector
	1 Balanced Stereo Audio	On a 5-pin terminal block connector
Video	Bandwidth	Up to 1080p, UXGA
	Switching Time Between Inputs	2 to 3 seconds
	Latency	Less than 2 frames
	Input Color Depth	Up to 12-bit
	Output Resolutions	Native, 640x480 @60Hz, 800x600 @60Hz, 1024x768 @60Hz, 1280x768 @60Hz, 1360x768 @60Hz, 1280x720 @60Hz, 1280x800 @60Hz, 1280x1024 @60Hz, 1440x900 @60Hz, 1400x1050 @60Hz, 1680x1050 @60Hz, 1600x1200 @60Hz, 1920x1080 @60Hz, 1920x1200 @60Hz, 480p @60Hz, 720p @60Hz, 1080i @60Hz, 1080p @60Hz, 576p @50Hz, 720p @50Hz, 1080i @50Hz, 1080p @50Hz
Audio	Input Sampling Rate	32kHz, 44.1kHz, 48kHz
	Output Sampling Rate	48kHz
User Interface	Controls	HDMI 1 to HDMI 6, PC 1 to PC 4 and CV 1 to CV 2 input selector buttons; Freeze, mute buttons; Menu and navigation buttons, Reset to XGA/1080p and lock buttons, RS-232, IR, Ethernet (OSD and Web pages)
Power	Source	100-240V AC
	Consumption	30VA max.
Environmental Conditions	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
Physical	Dimensions	19" x 7" x 1U (W, D, H) rack mountable
	Weight	1.8kg (4lbs) approx.
Accessories	Included	Power cord, rack ears, IR remote control
Specifications are subject to change without notice at www.kramerav.com		

Default Communication Parameters

RS-232	
Baud Rate:	9,600
Data Bits:	8
Stop Bits:	1
Parity:	None
Ethernet	
To reset the IP settings to the factory reset values go to: Menu-> Factory-> RESET->Change the option to YES and press Enter	
IP Address:	192.168.1.39
Subnet mask:	255.255.0.0
Default gateway:	0.0.0.0
Default TCP Port #:	5000
Full Factory Reset	
OSD	Go to: Menu-> Factory-> RESET->Change the option to YES and press Enter
RS-232/Ethernet (TCP) Command Protocol	
Command Format:	ASCII protocol 3000
Example (Route the video HDMI3 input to the output ports):	#ROUTE 1,1,3<cr>

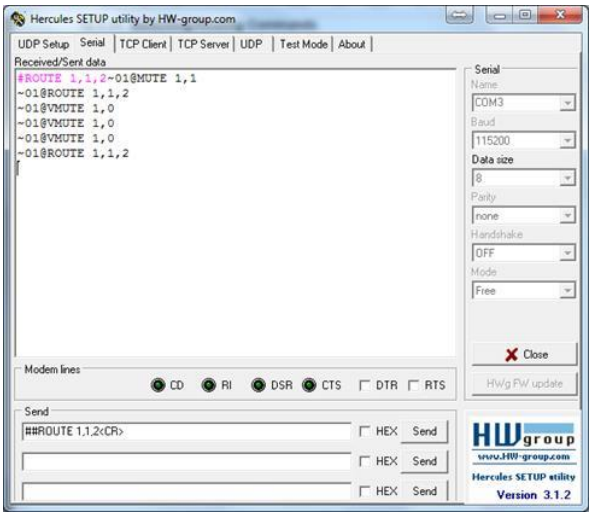
Input Resolutions

Resolution/Refresh Rate	Composite	PC	HDMI
480I/576I	Yes		
480P/576P			Yes
720P@(50/60)			Yes
1080I@(50/60)			Yes
1080P@(50/60)			Yes
1080P@(24/25/30)			Yes
VGA@(60/67/72/75/85)			Yes
SVGA@(56/60/72/75)		Yes	Yes
XGA@(60/70/75)		Yes	Yes
SXGA@(60/75)		Yes	Yes
1280X960@60		Yes	Yes
1280x720@60			Yes
1920X1080@60		Yes	Yes
UXGA@60(1600X1200)		Yes	Yes
WXGA@60(1280x800)		Yes	Yes
WXGA+@60(1440x900)		Yes	Yes
WXGA@60(1366x768)		Yes	Yes
SXGA+@60(1400x1050)		Yes	Yes
1600X900@60 RB		Yes	Yes
WSXGA@60 RB(1680x1050 RB)		Yes	Yes

The RS-232/Ethernet (TCP) Communication Protocol

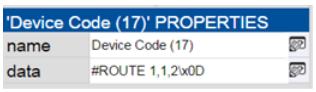
The **VP-445 Presentation Switcher/Scaler** can be operated using the Kramer Protocol 3000 serial commands. The command framing varies according to how you interface with the **VP-445**. In the following example, a basic video input switching command that routes a layer 1 video signal to HDBT out 1 from 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. This command is used for demonstration purposes only and its syntax may vary per device.

- K-Touch Builder (Kramer software):



- K-Config (Kramer configuration software):

All the examples provided in this section are based on using the Kramer 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 **VP-445**. 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 Understanding Protocol 3000 on page 32
- General syntax used for Protocol 3000 commands, see

•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.

- Kramer Protocol 3000 Syntax on page 32
- Protocol 3000 commands available for the **VP-445**, see Protocol 3000 Commands on page 33

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.

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

Protocol 3000 Commands

This section includes the following commands:

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)
DISPLAY	Get output HPD status (system)
HDCP-MOD	Set/get HDCP mode (system)
LOCK-FP	Get front panel lock state (system)

#

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

BUILD-DATE

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

FACTORY

Functions		Permission	Transparency
Set:	FACTORY	End User	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Reset device to factory defaults configuration	#FACTORY CR	
Get:	-	-	
Response			
~nn@FACTORY SP OK CR LF			
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			
Reset the device to its factory default configuration: "#FACTORY",0x0D			

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 2. #HELP SP *COMMAND_NAME* CR	
Response			
1. Multi-line: ~nn@Device available protocol 3000 commands: CR LF *command*, SP *command...* CR LF 2. Multi-line: ~nn@HELP SP *command*: CR LF *description* CR LF USAGE: *usage* CR LF			
Parameters			
COMMAND_NAME – name of a specific command			
Notes			
To get help for a specific command use: HELP SP COMMAND_NAME CR LF			
K-Config Example			
"#HELP",0x0D			

MODEL

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

PROTV-ER

Functions		Permission	Transparency
Set:	-	-	-
Get:	PROT-VER?	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get protocol version	#PROT-VER?CR	
Response			
~nn@PROT-VERSP3000:versionCR LF			
Parameters			
Version – Format: XX.XX where X is a decimal digit			
K-Config Example			
Get the protocol version: "#PROT-VER?",0x0D			

RESET

Functions		Permission	Transparency
Set:	RESET	Administrator	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Reset device	#RESETCR	
Get:	-	-	
Response			
~nn@RESETSPOKCR LF			
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 the device: "#RESET?",0x0D			

SN

Functions		Permission	Transparency
Set:	-	-	-
Get:	SN?	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get device serial number	#SN?CR	
Response			
~nn@SNSPserial_numberCR LF			
Parameters			
serial_number – 14 decimal digits, factory assigned			
K-Config Example			
Get device serial number: "#SN?",0x0D			

VERSION

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

DISPLAY

Functions		Permission	Transparency
Set:	-	-	-
Get	DISPLAY?	End User	System
Description		**Syntax**	
Set:	-	-	
Get:	Get output HPD status	#DISPLAY?SPP1CR	
Response			
~nn@DISPLAYSPP1CR LF			
Parameters			
P1 – Output number: 0 (HDMI 1), 1 (HDMI2)			
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			
K-Config Example			
Get the output HPD status of HDMI 1: "#DISPLAY? 1",0x0D			

HDCP-MOD

Functions		Permission	Transparency
Set:	HDCP-MOD	Administrator	Public
Get:	HDCP-MOD?	End User	System

Description		Syntax
Set:	Set HDCP mode	#HDCP-MOD SP P1,P2,P3 CR
Get:	Get HDCP mode	#HDCP-MOD? SP P1,P2 CR

Response

Set / Get: ~nn@HDCP-MOD SP P1,P2,P3 CR LF

Parameters

P1 – Input or Output: 0 (Input), 1 (Output)

P2 – Scaler for Input: 0-5 (HDMI 1 - HDMI 6) and scaler for output 0-1 (HDMI 1, HDMI 2)

P3 – status for Input: 0 (Off), 1 (On) and status for Output: 2 (Follow In), 3 (Follow Out)

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 any other external control device (button press, device menu and similar) or genlock status changed

Notes

Set HDCP working mode on device input:
HDCP supported – HDCP_ON [default]
HDCP not supported – HDCP OFF
HDCP support changes following detected sink – MIRROR OUTPUT

K-Config Example

Set HDCP mode on HDMI 1 output to Follow out:
"#HDCP-MOD 1,0,3",0x0D

LOCK-FP

Functions		Permission	Transparency
Set:	LOCK-FP	End User	-
Get:	LOCK-FP?	End User	System

Description		Syntax
Set:	Lock front panel	#LOCK-FP SP P1 CR
Get:	Get front panel lock state	#LOCK-FP? CR

Response

nn@LOCK-FP SP P1 SP OK CR LF

Parameters

P1 – 0 (No) 1 (Yes)

K-Config Example

Lock front panel:
"#LOCK-FP 1",0x0D

Switching/Routing Commands

Command	Description
ROUTE	Set/get layer routing
MENU-CMD	Set menu navigation

ROUTE

Functions		Permission	Transparency
Set:	ROUTE	End User	-
Get:	ROUTE?	End User	Switching
Description		**Syntax**	
Set:	Set layer routing	#ROUTE SP P1,P2,P3 CR	
Get:	Get layer routing	#ROUTE? SP P1,P2 CR	

Response

~nn@ROUTE SP P1,P2,P3 CR LF

Parameters

P1 – Layer number: 1 (Video)

P2 – Scaler: 1

P3 – Video inputs: 0~11 (see Port Number Key on page 57)

Notes

This command replaces all other routing commands.

K-Config Example

Select the HDMI 2 input to route to the outputs:
"#ROUTE 1,1,2",0x0D

MENU-CMD

Functions		Permission	Transparency
Set:	MENU-CMD	End User	Public
Get:		End User	
Description		**Syntax**	
Set:	Set menu navigation	#ROUTE SP Param CR	
Get:			

Response

~nn@MENU_CMD SP Param CR LF

Parameters

Param – Menu=1, Enter=2, Up=4, Down=5, Right=6, Left=7)

Notes

This command emulates menu navigation

K-Config Example

Select menu:
"#MENU-CMD 1",0x0D

Video Commands

Command	Description
VID-RES	Set/get ADC (VGA) sampling phase
VMUTE	Set/get video on output mute
VFRZ	Set/get the freeze on output
IMAGE-PROP	Set/get the image size
SCLR-PCAUTO	Set PC auto sync of scaler

VID-RES

Functions		Permission	Transparency
Set:	VID-RES	End User	Public
Get	VID-RES?	End User	Video
Description		**Syntax**	
Set:	Set video resolution	#VID-RES SP P1,P2,P3,P4 CR	
Get:	Get video resolution	#VID-RES? SP P1,P2,P3 CR	

Response

~nn@VID-RES SP P1,P2,P3,P4 CR LF

Parameters

P1 – 0 (Input), 1 (Output)

P2 – 1 (Scaler)

P3 – 0 (Off)

P4 – Select video resolutions: 200-223 (see Output Resolutions key on page 57)

Response triggers

After execution, response is sent to the com port from which the Set /Get was received
After execution, response is sent to all com ports if VID-RES was set by any other external control device (button press, device menu and similar)

Notes

"Set" command is only applicable for stage=Output
"Set" command with *is_native*=ON sets native resolution on selected output (resolution index sent = 0). Device sends as answer actual VIC ID of native resolution
"Get" command with *is_native*=ON returns native resolution VIC, with *is_native*=OFF returns current resolution
To use "custom resolutions" (entries 100-105), define them using command DEF-RES

K-Config Example

Set video resolution on output to 1360x768 @60Hz:
"#VID-RES 1,1,0,204",0x0D

VMUTE

Functions		Permission	Transparency
Set:	VMUTE	End User	Public
Get:	VMUTE?	End User	Video
Description		**Syntax**	
Set:	Set enable/disable video on output	#VMUTE SP P1,P2 CR	
Get:	Get video on output status	#VMUTE? SP P1 SP CR	
Response			
Set / Get: ~nn@VMUTE SP P1,P2 CR LF			
Parameters			
P1 – Scaler number: 1 (Scaler) P2 –video mute status: 0 (Off), 1 (On)			
K-Config Example			
Set Mute video on output to off: "#VMUTE 1,0",0x0D			

VFRZ

Functions		Permission	Transparency
Set:	VFRZ	End User	-
Get:	VFRZ?	End User	Video
Description		**Syntax**	
Set:	Set freeze video on output	#VFRZ SP P1,P2 CR	
Get:	Get freeze on output status	#VFRZ? SP P1 CR	
Response			
Set / Get: ~nn@VFR SP P1,P2 CR LF			
Parameters			
P1 – 1 (Scaler) P2 – freeze status: 0 (Off), 1 (On)			
K-Config Example			
Set freeze video output to off: "#TREBLE 1,0",0x0D			

IMAGE PROP

Functions		Permission	Transparency
Set:	IMAGE-PROP	End User	Public
Get:	IMAGE-PROP?	End User	Video
Description		**Syntax**	
Set:	Set the image size	#IMAGE-PROP SP P1 CR	
Get:	Get the image size	#IMAGE-PROP? SP P1,…,P6 CR	

Response

Set / Get: ~nn@IMAGE-PROP SP P1,P2… CR LF

Parameters

P1 – 1 (Scaler)

P2 – Image size: 0 (Over Scan), 1 (Full), 2 (Best Fit), 3 (PanScan), 4 (Letter Box), 5 (Under 2), 6 (Under1)

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 CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed

Notes

Sets the image properties of the selected scaler

K-Config Example

Set the image size to PanScan:
"#IMAGE-PROP 1,3",0x0D

SCLR-PCAUTO

Functions		Permission	Transparency
Set:	SCLR-PCAUTO	End User	Public
Get:		End User	Video
Description		**Syntax**	
Set:	Set PC auto sync of scaler	#SCLR-PCAUTO SP P1,P2 CR	
Get:			
Response			
Set / Get: ~nn@SCLR-PCAUTO SP P1,P2… CR LF			
Parameters			
P1 – 1 (Scaler) P2 – 1 (Yes)			
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 CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed			
Notes			
Sets the PC Auto sync of the selected scaler			
K-Config Example			
Set the PC auto sync of the scaler to yes: "#SCLR-PCAUTO 1,1",0x0D			

Audio Commands

Command	Description
AUD-LVL	Set/get input/output volume
MUTE	Mute the output
AUD-EMB	Set/get audio in video embedding status
BASS	Set/get the audio bass level
TREBLE	Set/get the audio treble level
LOUDNESS	Set/get the loudness
SCLR-AS	Set/get the auto sync off timer
SCLR-AUDIO-DELAY	Set/get the scaler audio delay
MIC-GAIN	Set/get the microphone gain
TLK	Set/get the talkover mode status
MIC-TLK	Set/get the microphone talkover mode status
MIC-SELECT	Select/get the microphone
STANDBY	Set/get the standby mode status

AUD-LVL

Functions		Permission	Transparency
Set:	AUD-LVL	End User	-
Get:	AUD-LVL?	End User	Audio
Description		**Syntax**	
Set:	Set audio level in specific amplifier stage	#AUD-LVL SP P1,P2,P3 CR	
Get:	Get audio level in specific amplifier stage	#AUD-LVL? SP P1,P2 CR	

Response

~nn@AUD-LVL SP P1,P2 CR LF

Parameters

P1 – Input and Output: 0 (Input), 1 (Output)

P2– 0~11 (audio inputs) see Port Number Key on page 57, 0 (Audio output)

Note that you can choose an input channel or the output, based on the selected P1.

P3 – 0-100 (audio level) minus sign precedes negative values.

++ increase current value,

-- decrease current value

K-Config Example

Set the HDMI 45 input AUD-LVL to 75:

"#AUD-LVL 0,3,75",0x0D

AUD-EMB

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

Response

Set / Get: ~nn@AUD-EMB Spin,out,statusCR LF

Parameters

in – audio input to be embedded: HDMI 1=0, HDMI 2=1, HDMI 3=2, HDMI 4=3, HDMI 5=4, HDMI 6=5

out – output=0

status – embedding status: Analog=0, Embedded=1, Automatic=2

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)

K-Config Example

Embed HDMI input 1 audio:
"#AUD-EMB 0,0,1",0x0D

MUTE

Functions		Permission	Transparency
Set:	MUTE	End User	Public
Get:	MUTE?	End User	Audio
Description		**Syntax**	
Set:	Mute the selected output	#MUTE SP P1,P2 CR	
Get:	Mute the selected output	#MUTE? SP P1 CR	

Response

Set / Get: ~ nn @MUTE SP P1,P2 CR LF

Parameters

P1 – 1 (Scaler)

P2 – mute the output: 0 (Off), 1 (On)

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 CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed

Notes

Mutes the selected audio output

K-Config Example

Mute the output:
"#MUTE 1,1",0x0D

BASS

Functions		Permission	Transparency
Set:	BASS	End User	Public
Get:	BASS?	End User	Audio
Description		**Syntax**	
Set:	Set audio bass level	#BASS SP channel,bass_level CR	
Get:	Get audio bass level	#BASS? SP channel CR	

Response

~nn@BASS SP channel,bass_level CR LF

Parameters

channel – 1 (scaler)

bass_level – 0-30 (value)

audio parameter in Kramer units, minus sign precedes negative values
++ increase current value
-- decrease current value

K-Config Example

Set the bass level to 15:
"#BASS 1,15",0x0D

TREBLE

Functions		Permission	Transparency
Set:	TREBLE	End User	Public
Get:	TREBLE?	End User	Audio
Description		**Syntax**	
Set:	Set audio treble level	#TREBLE SP channel,treble_level CR	
Get:	Get audio treble level	#TREBLE? SP channel CR	

Response

~nn@TREBLE SP channel,treble_level CR LF

Parameters

channel – 1 (scaler)

treble_level – 0-30 (value)

audio parameter in Kramer units, minus sign precedes negative values

++ increase current value

-- decrease current value

K-Config Example

Set the audio treble level to 25:

"#TREBLE 1,25",0x0D

LOUDNESS

Functions		Permission	Transparency
Set:	LOUDNESS	End User	Public
Get:	LOUDNESS?	End User	Audio
Description		**Syntax**	
Set:	Set audio loudness	#LOUDNESS? SP channel,loudness CR	
Get:	Get audio loudness	#LOUDNESS? SP channel CR	

Response

~nn@LOUDNESS SP channel,loudness CR LF

Parameters

channel – 1 (scaler)

loudness – 0 (Off), 1 (On)

K-Config Example

Set the Loudness off:

"#LOUDNESS 1,0",0x0D

Scaler-As

Functions		Permission	Transparency
Set:	SCLR-AS	End User	Public
Get:	SCLR-AS?	End User	Audio
Description		**Syntax**	
Set:	Set the auto sync off timer	#SCLR-AS SP P1,P2 CR	
Get:	Get the auto sync off timer definition	#SCLR-AS? SP P1 CR	

Response

Set / Get: ~nn@SCLR-AS SP P1,P2 CR LF

Parameters

P1 – Scaler=1

P2 – for setting the auto sync timer: Disable=0, Fast=1, Slow=2

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 CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed

Notes

Sets the Auto Sync features for the selected Scaler

K-Config Example

Set the auto sync off timer to slow:
"#SCLR-AS 1,2",0x0D

Scaler Audio Delay

Functions		Permission	Transparency
Set:	SCLR-AUDIO-DELAY	End User	Public
Get:	SCLR-AUDIO-DELAY?	End User	Audio
Description		**Syntax**	
Set:	Set the scaler audio delay	#SCLR-AUDIO-DELAY SP P1,P2 CR	
Get:	Get the scaler audio delay	#SCLR-AUDIO-DELAY? SP P1 CR	

Response

Set / Get: ~nn@SCLR-AUDIO-DELAY SP P1,P2 CR LF

Parameters

P1 – 1 (Scaler)

P2 – for setting the audio delay: 0 (Off), 1 (40ms), 2 (110ms), 3 (150ms)

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 CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed

Notes

Sets the audio delay for the selected audio output

K-Config Example

Set the scaler audio delay to 40ms:
"#SCLR-AUDIO-DELAY 1,1",0x0D

MIC-GAIN

Functions		Permission	Transparency
Set:	MIC-GAIN	End User	Public
Get:	MIC-GAIN?	End User	Audio
Description		**Syntax**	
Set:	Set the microphone gain	#MIC-GAIN SP P1,P2,P3 CR	
Get:	Get the microphone gain	#MIC-GAIN? SP P1 CR	

Response

Set / Get: ~ nn @MIC-GAIN SP P1,P2 CR LF

Parameters

P1 – 0

P2 – for selecting the mic: 0 (Mic 1), 1 (MIC 2)

P3 – for setting the level 0-100

++ increase current value,

-- decrease current value

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 CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed

Notes

Sets the Microphone input audio gain

K-Config Example

Set the microphone 2 gain to 45:
"#MIC-GAIN 0,2,45",0x0D

TLK

Functions		Permission	Transparency
Set:	TLK	End User	Public
Get:	TLK?	End User	Audio
Description		**Syntax**	
Set:	Set audio talkover mode status	#TLK SP channel,talkover_mode CR	
Get:	Get audio talkover mode status	#TLK? SP channel CR	

Response

~nn@TLK SP channel,talkover_mode CR LF

Parameters

channel – 1 (Scaler)

talkover_mode – 0 (Off), 1 (Mixer), 2 (Talkover), 3 (Mic only)

K-Config Example

Set the scaler audio talkover mode to Mic only:
"#TLK 1,3",0x0D

MIC-TLK

Functions		Permission	Transparency
Set:	MIC-TLK	End User	Public
Get:	MIC-TLK?	End User	Audio
Description		**Syntax**	
Set:	Set mic talkover parameters	#MIC-TLK SP channel,P1,value CR	
Get:	Get mic talkover parameters	#MIC-TLK? SP channel,P1 CR	

Response

~nn@MIC-TLK SP channel,P1,value CR LF

Parameters

P1 – 0 (channel)

P2 – for selecting the parameter: 0 (Depth), 1 (Trigger), 2 (Attack time), 3 (Hold time), 4 (Release time)

P3 – for selecting the value for each P1parameter: 0-100 (Depth, %), 0-100 (Trigger, -60dB-40dB), 0~200 (Attack/Hold/Release time, 0-2 sec)

K-Config Example

Set mic-tlk trigger to 40dB:
"#MIC-TLK 0,1,100",0x0D

MIC-SELECT

Functions		Permission	Transparency
Set:	MIC-SELECT	End User	Public
Get:	MIC- SELECT?	End User	Audio
Description		**Syntax**	
Set:	Select the microphone	#MIC- SELECT SP p1,p2 CR	
Get:	Get the microphone	#MIC- SELECT? SP P1 CR	

Response

~nn@MIC- SELECT SP p1,p2 CR LF

Parameters

P1 –scaler=1

P2 – Mic mode OFF=[], MIC1=1, MIC2=2, Both=[1, 2], [2, **1**]

K-Config Example

Select microphone 1:
"#MIC-SELECT 1,1",0x0D

STANDBY

Functions		Permission	Transparency
Set:	STANDBY	End User	Public
Get:	STANDBY?	End User	Audio
Description		**Syntax**	
Set:	Set Standby mode	#STANDBY SP on_off CR	
Get:	Get Standby mode status	#STANDBY? CR	
Response			
~nn@STANDBY SP value CR LF			
Parameters			
on_off – standby status: 0 (Off), 1 (On)			
K-Config Example			
Set standby to on "#standby 1",0x0D			

Communication Commands

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

NET-MAC

Functions		Permission	Transparency
Set:	-	-	-
Get:	NET-MAC?	End User	Communication
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.			
K-Config Example			
Get the MAC address: "#NET-MAC? XX-XX-XX-XX-XX-XX",0x0D			

NET IP

Functions		Permission	Transparency
Set:	NET-IP	Administrator	-
Get:	NET-IP?	End User	Communication
Description		**Syntax**	
Set:	Set device IP address	#NET-IP SP P1 CR	
Get:	Get device IP address	#NET-IP? CR	
Response			
Set: ~nn@NET-IP SP ip_address SP OK CRLF Get: ~nn@NET-IP SP ip_address CR LF			
Parameters			
P1 – IP address, in the following format: xxx.xxx.xxx.xxx			
Notes			
For proper settings consult your network administrator.			
K-Config Example			
Set the IP address to 192.168.1.39: "#NET-IP 192.168.001.039",0x0D			

NET-GATE

Functions		Permission	Transparency
Set:	NET-GATE	Administrator	-
Get:	NET-GATE?	End User	Communication
Description		**Syntax**	
Set:	Set Gateway IP	#NET-GATE SP P1 CR	
Get:	Get Gateway IP	#NET-GATE? CR	
Response			
Set: ~nn@NET-GATE SP P1 SP OK CR LF Get: ~nn@NET-GATE SP ip_address CR LF			
Parameters			
P1 – gateway IP address, in the following format:			
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			
K-Config Example			
Set the gateway IP address to 192.168.0.1: "#NET-GATE 192.168.000.001",0x0D			

NET-MASK

Functions		Permission	Transparency
Set:	NET-MASK	Administrator	-
Get:	NET-MASK?	End User	Communication
Description		**Syntax**	
Set:	Set device subnet mask	#NET-MASK SP net_mask CR	
Get:	Get device subnet mask	#NET-MASK? CR	

Response

Set: ~nn@NET-MASK SP P1 SP OK CR LF

Get: ~nn@NET-MASK SP net_mask CR LF

Parameters

P1 – net-mask 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.

K-Config Example

Set the subnet mask to 255.255.0.0:
"#NET-MASK 255.255.000.000",0x0D

NET-DHCP

Functions		Permission	Transparency
Set:	NET-DHCP	Administrator	-
Get:	NET-DHCP?	End User	Communication
Description		**Syntax**	
Set:	Set DHCP mode	#NET-DHCP SP P1 CR	
Get:	Get DHCP mode	#NET-DHCP? CR	

Response

Set: ~nn@NET-DHCP SP P1 SP OK CR LF

Get: ~nn@NET-DHCP SP mode CR LF

Parameters

P1 – use static IP: 0 (Static IP) or use DHCP: 1 (DHCP). If DHCP is unavailable, use the IP address set by the factory or the NET-IP command

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.

K-Config Example

Set the DHCP mode to static:
"#NET-DHCP 0",0x0D

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

Set: ~nn@ ETH-PORT SP porttype,ethport CR LF

Parameters

porttype – TCP=0

ethport – 1 to 65535

K-Config Example

Set TCP to 2:
"#ETH-PORT 0,2",0x0D

Kramer Protocol 3000 –Command Keys

This section describes the detailed commands list (see Protocol 3000 Commands on page 33) as well as the Port number key (see Port Number Key on page 57) and the video resolutions key (see Output Resolutions key on page 57).

Port Number Key

Video Input	#
HDMI 1	0
HDMI 2	1
HDMI 3	2
HDMI 4	3
HDMI 5	4
HDMI 6	5
PC 1	6
PC 2	7
PC 3	8
PC 4	9
CV 1	10
CV 2	11

Audio input	#
HDMI 1	0
HDMI 2	1
HDMI 3	2
HDMI 4	3
HDMI 5	4
HDMI 6	5
PC 1	6
PC 2	7
PC 3	8
PC 4	9
CV 1	10
CV 2	11

Video Output	#
HDMI 1	0
HDMI 2	1

Output Resolutions key

Number	Resolution	Number	Resolution
200	640x480 @60Hz	212	1920x1080 @60Hz
201	800x600 @60Hz	213	1920x1200 @60Hz
202	1024x768 @60Hz	214	480p @60Hz
203	1280x768 @60Hz	215	720p @60Hz
204	1360x768 @60Hz	216	1080i @60Hz
205	1280x720 @60Hz	217	1080p @60Hz
206	1280x800 @60Hz	218	576p @50Hz
207	1280x1024 @60Hz	219	720p @50Hz
208	1440x900 @60Hz	220	1080i @50Hz
209	1400x1050 @60Hz	221	1080p @50Hz
210	1680x1050 @60Hz	222	NATIVE OUT1
211	1600x1200 @60Hz	223	NATIVE OUT2

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

What is Covered

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

What is Not Covered

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

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

How Long this Coverage Lasts

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

1. All Kramer VIA hardware products are covered by a standard three (3) year warranty for the VIA hardware and a standard three (3) year warranty for firmware and software updates; all Kramer VIA accessories, adapters, tags, and dongles are covered by a standard one (1) year warranty.
2. All Kramer fiber optic cables, adapter-size fiber optic extenders, pluggable optical modules, active cables, cable retractors, all ring mounted adapters, all Kramer speakers and Kramer touch panels are covered by a standard one (1) year warranty.
3. All Kramer Cobra products, all Kramer Calibre products, all Kramer Minicom digital signage products, all HighSecLabs products, all streaming, and all wireless products are covered by a standard three (3) year warranty.
4. All Sierra Video MultiViewers are covered by a standard five (5) year warranty.
5. Sierra switchers & control panels are covered by a standard seven (7) year warranty (excluding power supplies and fans that are covered for three (3) years).
6. K-Touch software is covered by a standard one (1) year warranty for software updates.
7. All Kramer passive cables are covered by a ten (10) year warranty.

Who is Covered

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

What Kramer Electronics Will Do

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

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.
2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

What Kramer Electronics Will Not Do Under This Limited Warranty

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

How to Obtain a Remedy Under This Limited Warranty

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

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

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

Limitation of 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.

Exclusive Remedy

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF KRAMER ELECTRONICS CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN ALL IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT AS PROVIDED UNDER APPLICABLE LAW.

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 APPLICABLE 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, visit our web site at www.kramerav.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

P/N: 2900-300502 Rev: 4

SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

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

We welcome your questions, comments, and feedback.

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