KRAMER

USER MANUAL

MODEL:

VP-439
Video 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 the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

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-439 to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

Achieving 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-439** 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.

Safety Instructions

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.

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−439** is a high−performance digital scaler for computer graphics video, composite and HDMI signals, including audio. It up− or down−scales the selected HDMI, CV or computer graphics video/YPbPr input and outputs it to HDMI.

The audio input source is selectable from Web pages– either from the relevant analog audio input, or de-embedded from the HDMI input. The audio output can be delayed for lip-sync compensation, and is available on the analog stereo output, as well as being embedded onto the HDMI output.

More specifically, the **VP-439** features:

- HDTV compatibility and scales to resolutions up to 1080p/WUXGA
- Clean and quiet auto-switching that searches for valid signal when the input signal is lost with no video glitches or audible clicks or noises
- Automatic detection and selection of the audio source for the HDMI input. Default selection is HDMI – if this is not present, then the machine uses the audio from the analog input
- Auto-power down if no valid input signal is detected for a period of 2 to 3 minutes, the HDMI output is shut down, and the PC output syncs are disabled
- HDCP enabling/disabling
- Analog audio inputs for the CV, PC and HDMI inputs
- Lip sync delay
- An On-Screen Display (OSD) for easy setup and adjustment, accessible via the front-panel buttons
- An OSD INFO screen showing the selected input source, input and output resolutions, HDCP status, firmware version, etc.
- A built-in ProcAmp for convenient adjustment of video parameters, such as brightness, contrast, color, sharpness and hue
- A non-volatile memory that retains the last settings used
- Convenient setup and control options – front panel buttons, OSD, Web page

Defining the VP-439 Video Scaler

Front Panel

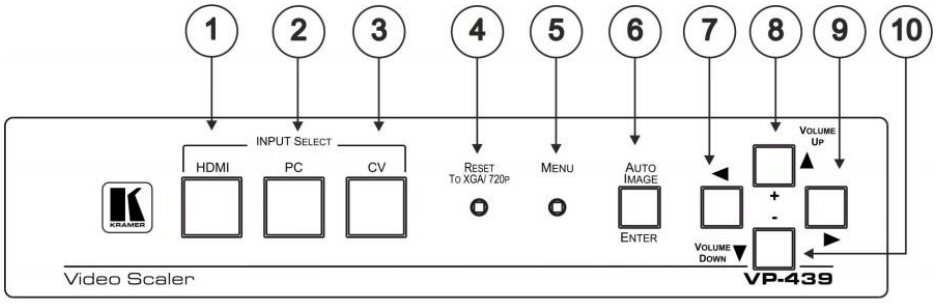


Figure 1: Front Panel VP-439 Video Scaler

#	Feature		Function
1	*INPUT SELECT* Buttons	*HDMI*	Press to select the HDMI input
2		*PC*	Press to select the PC/VGA input
3		*CV*	Press to select the composite video input
4	*RESET TO XGA/720p* Button		Toggles between reset to 720p and reset to XGA. If the button has not been pressed for more than 30 seconds, the first press resets to 720p
5	*MENU* Button		Press to activate the on-screen display (OSD). The button is recessed to prevent unwanted tampering with the unit (use a small pointed tool)
6	AUTO IMAGE/ENTER Button		Press to enter or confirm menu selections. When not in the OSD menu, press to auto-position the image on the screen.
7	◄ Button		Press to access the OSD menu, exit the OSD menu and, when in the OSD menu, move to the previous level in the OSD screen
8	▲/VOLUME UP/+ Button		Press to move up the menu list and to Increase numerical values. When not within the OSD menu mode, press to increase the output volume
9	► Button		Press to access sub-menu items and select from several settings
10	▼/*VOLUME DOWN*/– Button		Press to move down the menu list and to decrease numerical values. When not within the OSD menu mode, press to reduce the output volume

Rear Panel

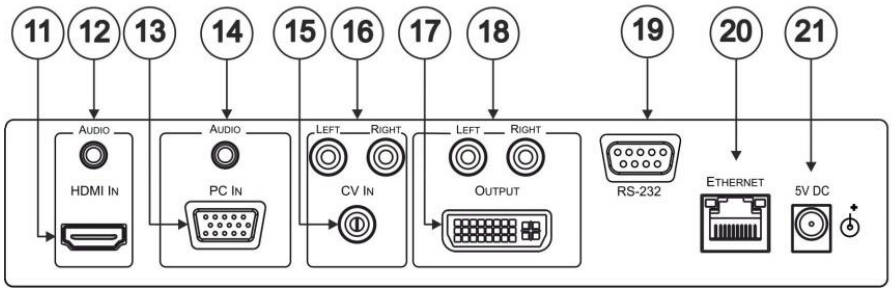


Figure 2: Rear Panel VP-439 Video Scaler

#	Feature		Function
11	HDMI	*HDMI IN* Connector	Connects to an HDMI source
12		*AUDIO* 3.5mm Mini Jack Connector	Connects to an unbalanced stereo audio source
13	VGA	*PC IN* 15-pin HD Connector	Connects to a PC graphics source
14		*AUDIO* 3.5mm Mini Jack Connector	Connects to an unbalanced stereo audio source
15	CV	*CV IN* RCA Connector	Connects to a composite video source
16		*LEFT/RIGHT* RCA Connectors	Connects to the left and right unbalanced stereo audio source
17	HDMI Output	*OUTPUT* DVI Connector	Connects to an HDMI acceptor
18		*LEFT/RIGHT* RCA Connectors	Connects to the left and right unbalanced stereo audio acceptor
19	*RS-232* 9-pin D-type Connector		Connects to the PC or other controller
20	ETHERNET RJ-45 Connector		Connects to a PC or other controller over a network
21	5V DC Connector		+5V DC connector for powering the unit

Connecting the VP-439

Always switch off the power to each device before connecting it to your **VP-439**. After connecting your **VP-439**, connect its power and then switch on the power to each device.

To connect the **VP-439** as illustrated in the example in Figure 3:

1. Connect an HDMI source (for example, from a Blu-ray player) to the *HDMI IN* HDMI connector.
2. Connect a PC graphics and unbalanced stereo audio source (for example, from a laptop PC) to the *PC IN* 15-pin HD and 3.5mm mini jack connectors.
3. Connect a composite video and unbalanced stereo audio source (for example, from a DVD payer) to the *CV IN* RCA and *LEFT/RIGHT* RCA connectors.
4. Connect the HDMI *OUTPUT* on a DVI-I connector and the *LEFT/RIGHT* unbalanced stereo audio on two RCA connectors to an HDMI acceptor (for example, to a display with speakers).
5. If desired, connect the *ETHERNET* RJ-45 connector to a control device (for example, a PC).

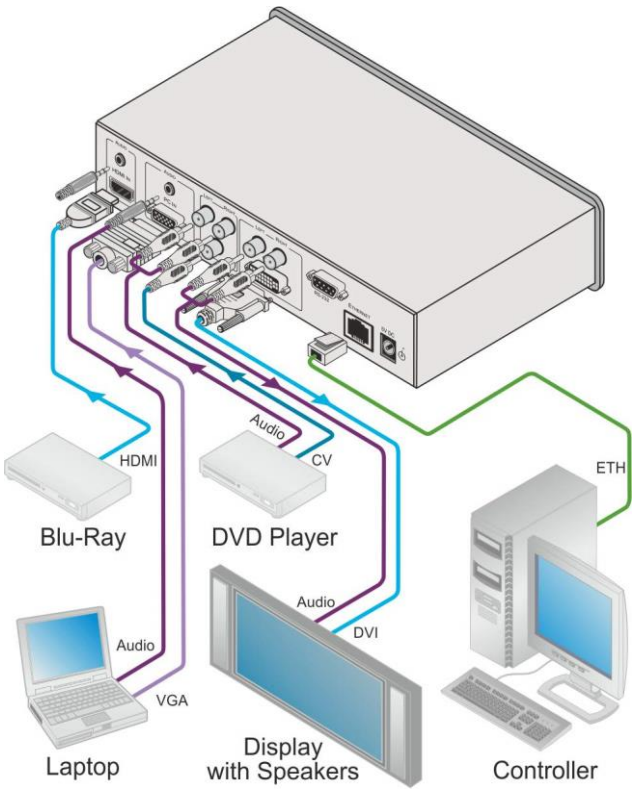


Figure 3: Connecting the **VP-439** *Video* Scaler

Operating and Controlling the VP-439

You can operate the **VP-439** directly via the front panel buttons (see Using the Front Panel Buttons on page 7), via the OSD menu (see Using the CONTROL Buttons on page 7).

Using the Front Panel Buttons

Press the **VP-439** front panel buttons to select:

- The required INPUT (HDMI, PC or CV)
- A reset RESOLUTION (to XGA/720p)
- A control operation, using the MENU, ENTER (when in the OSD menu), + and – buttons

Using the CONTROL Buttons

The CONTROL buttons let you control the **VP-439** via the OSD menu. Press the:

- MENU button to enter the menu
  The default timeout is set to 10 seconds.
- ENTER (AUTO IMAGE) button to accept changes and to change the menu settings (a selected value parameter appears yellow and when set, changes back to blue)
  The ENTER function is active when in the OSD menu
- Arrow buttons to move through the OSD menu

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

The OSD MENU

This table illustrates the MENU features and functions.

LEVEL 1	LEVEL 2	LEVEL 3	SELECTION	
Picture	Contrast		value	
	Brightness		value	
	For the PC input	Phase	value	
		Clock	value	
		H-Position	value	
		V-Position	Off/Low/Middle/High	
	FineTune	HDMI	HUE	Sets the color hue
			SATURATION	Sets the color saturation
			SHARPNESS	Sets the sharpness of the picture
			NOISE REDUCTION	Selects the noise reduction level: OFF, HI, LOW and MID (middle)
		PC	PHASE	Sets the clock phase
			CLOCK	Sets the clock frequency
			H-POSITION	Sets the horizontal position of the picture
			V-POSITION	Sets the vertical position of the picture
		CV	HUE	Sets the color hue
			SATURATION	Sets the color saturation
			SHARPNESS	Sets the sharpness of the picture
			NOISE REDUCTION	Selects the noise reduction level: OFF, HI, LOW and MID (middle)
			H-POSITION	Sets the horizontal position of the picture
			V-POSITION	Sets the vertical position of the picture
	Color	Red	value	
		Green	value	
		Blue	value	
Input	Source		HDMI, PC/YPbPr, Video (CV)	
Output	Size		Full / Over Scan / Under Scan / Letter Box / Pan Scan /Best Fit	

LEVEL 1	LEVEL 2	LEVEL 3		SELECTION	
Output	Resolution	Select the output resolution from the menu:			
		Resolution:	**Appears as:**	**Resolution:**	**Appears as:**
		NATIVE		1600x900	1600x900
		640x480	VGA	480i	480I
		800x600	SVGA	480p	480P
		1024x768	XGA	720p60	720P60
		1280x1024	SXGA	1080i60	1080I60
		1600x1200	UXGA	1080p60	1080P60
	Resolution continued	1366x768	WXGA	576i	576I
		1680x1050	WSXGA	576p	576P
		1920x1200	WUXGA	720p50	720P50
		1280x800	1280x800	1080i50	1080I50
		1440x900	1440x900	1080p50	1080P50
		NATIVE - Select NATIVE to select the output resolution from the EDID of the connected HDMI monitor			
Audio	Output Volume			Set the output volume	
	Input Volume			Set the input volume	
	Delay			OFF/40ms/110ms/150ms/Auto	
	Input			Automatic/Analog/Embedded	
OSD	H-Position			value	
	V-Position			value	
	Timer			Off/5/6/7…/100	
	Background			Set the transparency of the OSD (100 is fully transparent)	
	Display			Info/On/Off	
Advanced	HDCP On Input			On/Off (disabled for PC and CV)	
	HDMI On Output			Input/Output	
	Auto SYNC Off			Disable/Fast/Slow	
	Auto Input Scan			Off/On/HDMI+PC/HDMI+CV/CV+PC	
	Auto Image			On/Off (disabled for HDMI and CV)	
	Freeze			Freeze+Mute/Mute Only/Freeze Only	
	Ethernet	IP Mode		DHCP/Static	
		Static IP			
		IP Address		xxx.xxx.xxx.xxx	
		Subnet Mask		xxx.xxx.xxx.xxx	
		Def. Gateway		xxx.xxx.xxx.xxx	
		UDP Port		50000	
		IP Address		xxx.xxx.xxx.xxx	
		MAC Address		xx:xx:xx:xx:xx:xx	
	Timing Shift			When ON (recommended), implements a small shift on the horizontal sync which may resolve instabilities seen on some displays working at specific resolutions	
About	Source			The input source	
	Input			The input resolution	
	Output			The output resolution	
	IP Address			xxx.xxx.xxx.xxx	
	Version			Firmware version: x.xx	
Factory	Reset			NO / YES	

Connecting to the VP-439 via RS-232

You can connect to the **VP-439** 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-439** via RS-232, connect the RS-232 9-pin D-sub rear panel port on the product unit via a 9-wire straight cable (only pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5 need to be connected) to the RS-232 9-pin D-sub port on your PC

Operating via Ethernet

You can connect to the **VP-439** 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 10)
- Via a network hub, switch, or router, using a straight-through cable (see Connecting the Ethernet Port via a Network Hub on page 12)

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

Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the **VP-439** 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-439** with the factory configured default IP address.

After connecting the **VP-439** 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 4.

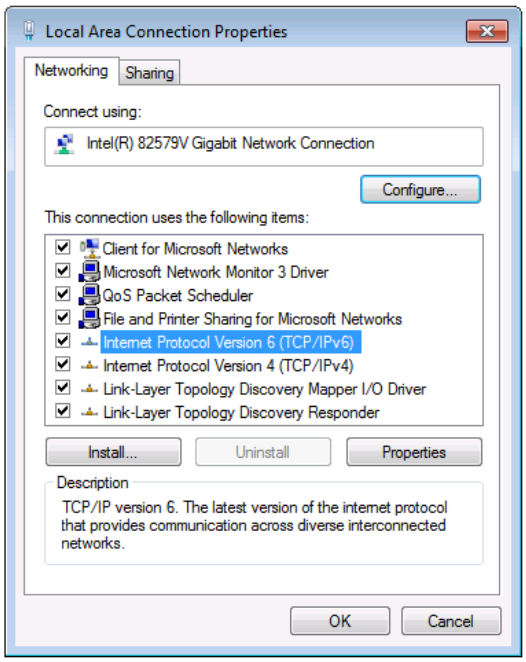


Figure 4: Local Area Connection Properties Window

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 5 or Figure 6.

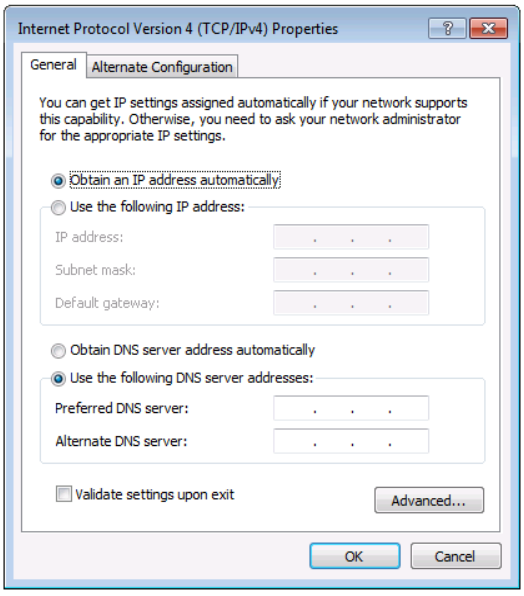


Figure 5: Internet Protocol Version 4 Properties Window

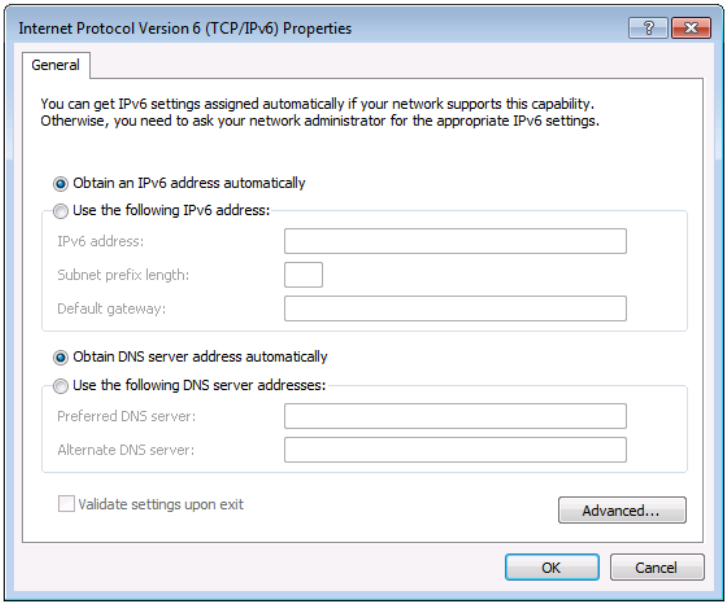


Figure 6: Internet Protocol Version 6 Properties Window

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in Figure 7.
   For TCP/IPv4 you can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.

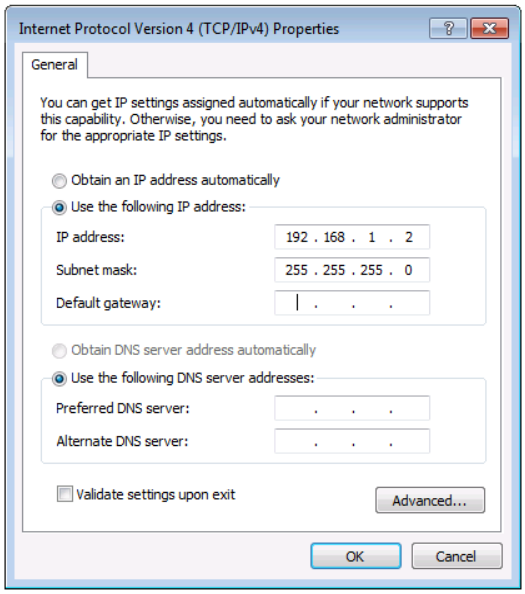


Figure 7: Internet Protocol Properties Window

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-439 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 Embedded Web Pages

The **VP-439** 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 Section Operating via Ethernet on page 10
- Ensure that your browser is supported

The following operating systems and Web browsers are supported:

Operating Systems	Applicable Browser Versions and Higher
Windows 7	Chrome: 25 Internet Explorer: 9 Firefox 19 Opera: 11
Mac (PC)	Chrome: 25 Firefox: 19 Opera: 11
iOS	Chrome: 25 Safari (depends on the IOS version) Opera: 11
Android OS	Chrome: 25 Opera: 11

Note that some features might not be supported by some cellphone operating systems.

Browsing the VP-439 Web Pages

To browse the **VP-439** Web pages:

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

The Input Select Web page appears.

There are eight Web pages:

The Input Select Page

Figure 8 shows the Input Select page that is also the first Web page. The column on the left shows the Input Select page selected and below a list of all the other available Web pages.

The model name, FW version and IP number 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.

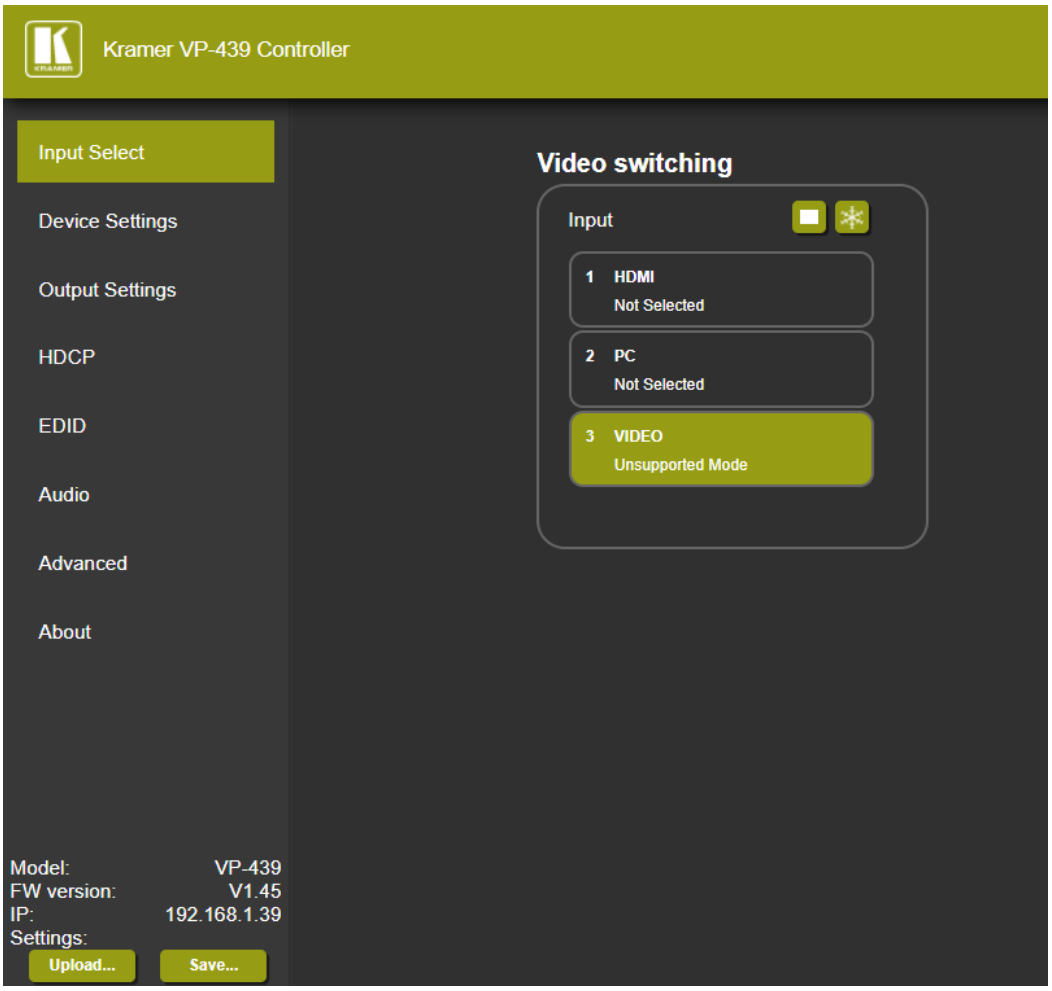


Figure 8: The Input Select Page

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

The Device Settings Page

The device Settings window (Figure 9) lets you upgrade the firmware and set the Ethernet parameters.

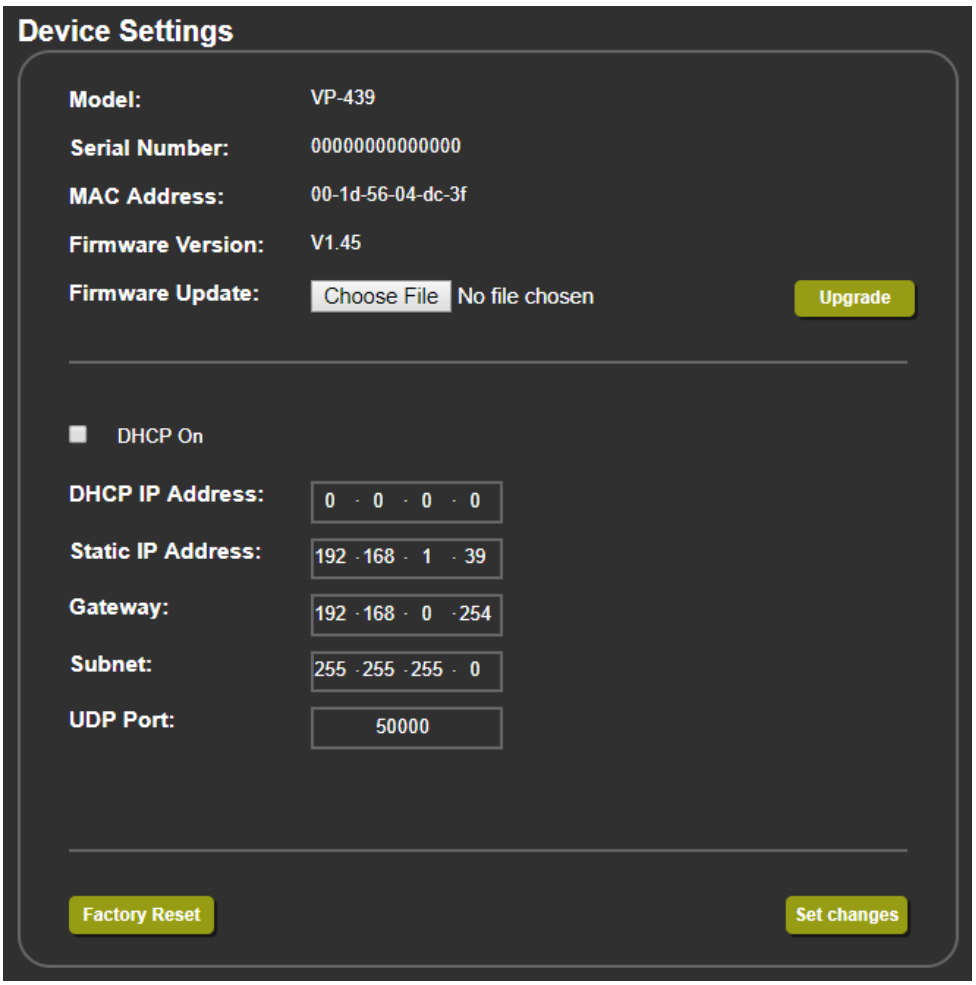


Figure 9: The Device Settings Page

Any change in the device settings requires confirmation, as illustrated in the example in Figure 10.

Figure 10: The Device Settings Page – Static IP Confirmation

Firmware Upgrade

You can upgrade the firmware via the Device Settings page. To do so:

1. Choose the firmware file by clicking the Choose File button in the Firmware upgrade line.

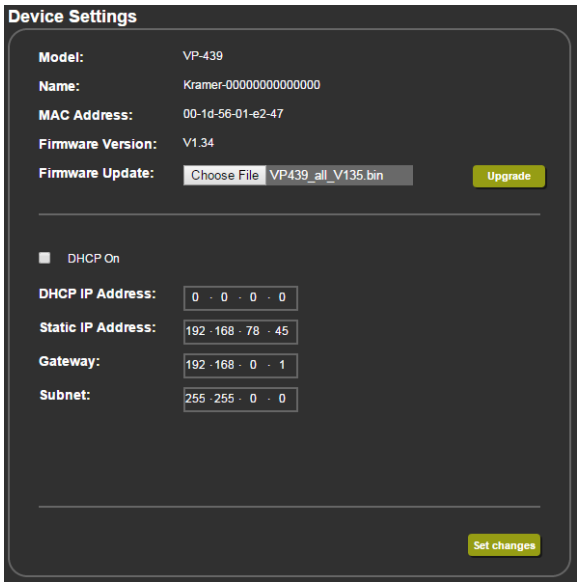


Figure 11: The Device Settings Page – Selecting the New Firmware File

2. Click the Upgrade button.
   The new firmware is uploaded:

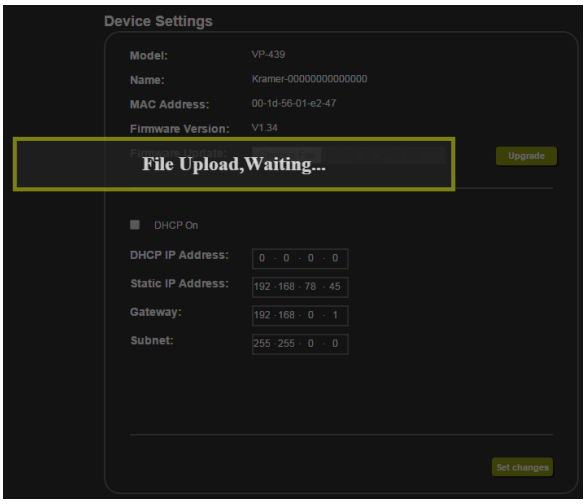
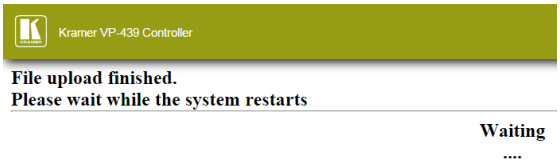


Figure 12: The Device Settings Page – Uploading the New Firmware File

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



And then:

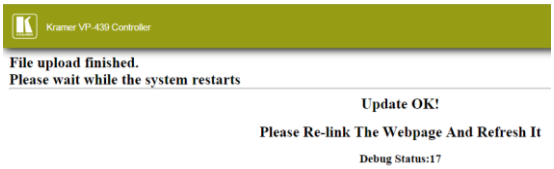


Figure 13: The Device Settings Page – Uploading the New Firmware File

4. After restarting the system you need to upload the Web page once again.
5. Make sure that the new version appears on the Web page lower left side:

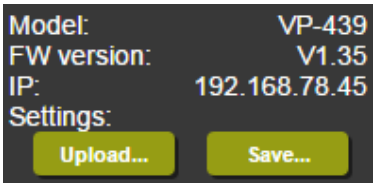
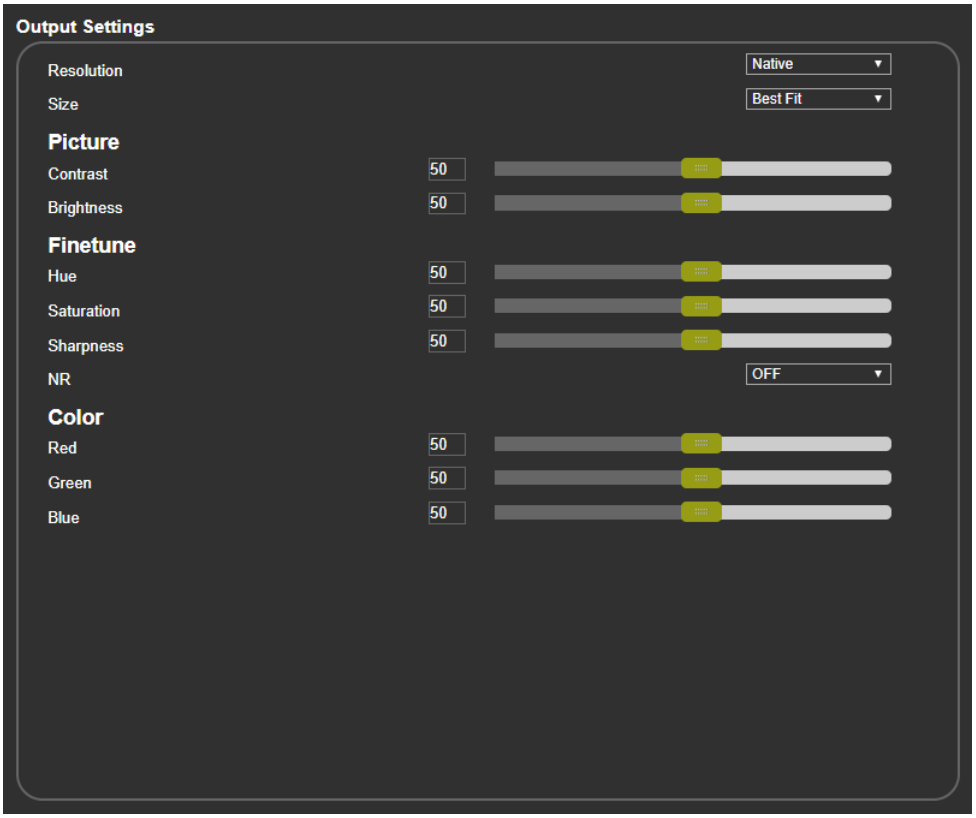


Figure 14: The Device Settings Page – New Firmware Updated

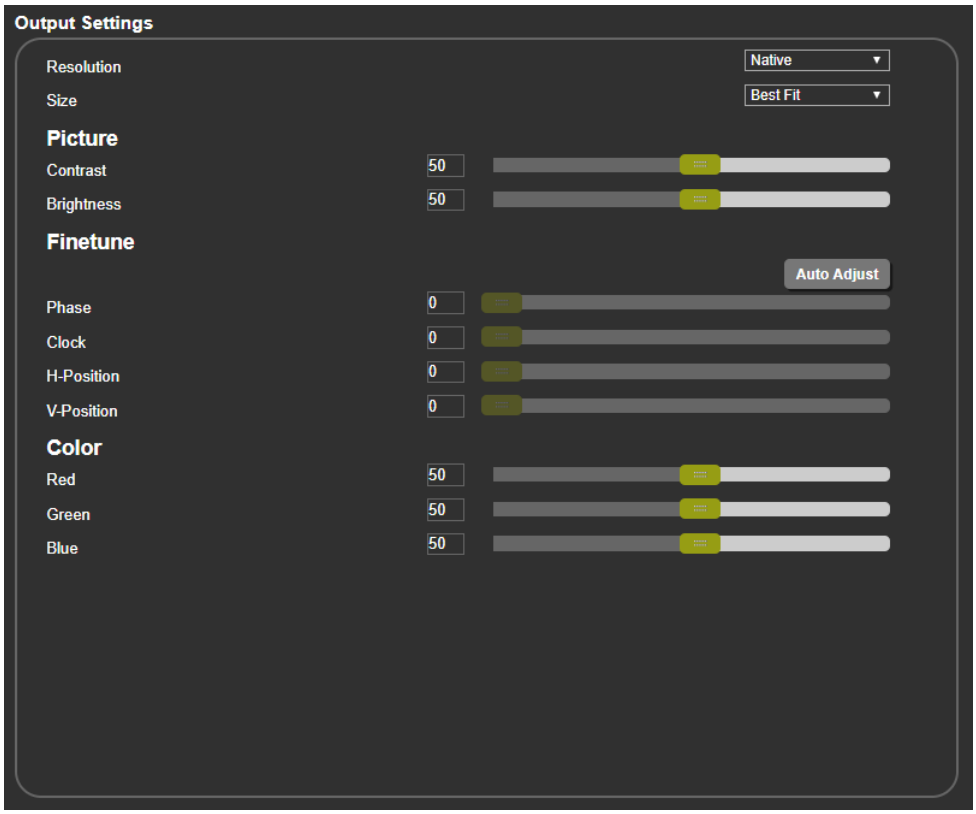
The Output Settings Page

Figure 15 shows the Output Settings page which varies for each selected input:

For the HDMI input:



For the PC input:



For the CV (Video) input:

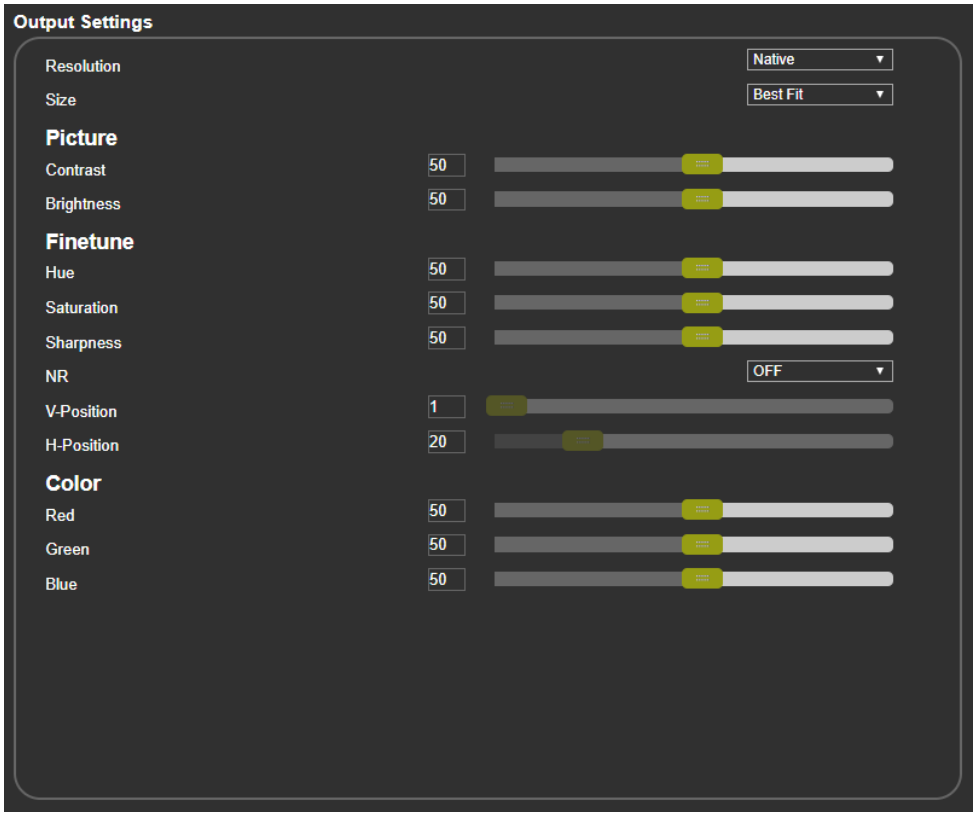


Figure 15: The Video Settings Page

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

The HDCP Page

The HDCP page lets you select the HDCP option for the HDMI input. Disabling HDCP On Input allows the source to transmit a non-HDCP signal if required (for example, when working with a Mac computer).

Figure 16: The HDCP Management Page

The EDID Management Page

The EDID page lets you copy a selected resolution from the DVI output or the default resolution (Default HDMI or Default VGA) to one or both inputs (HDMI and PC).

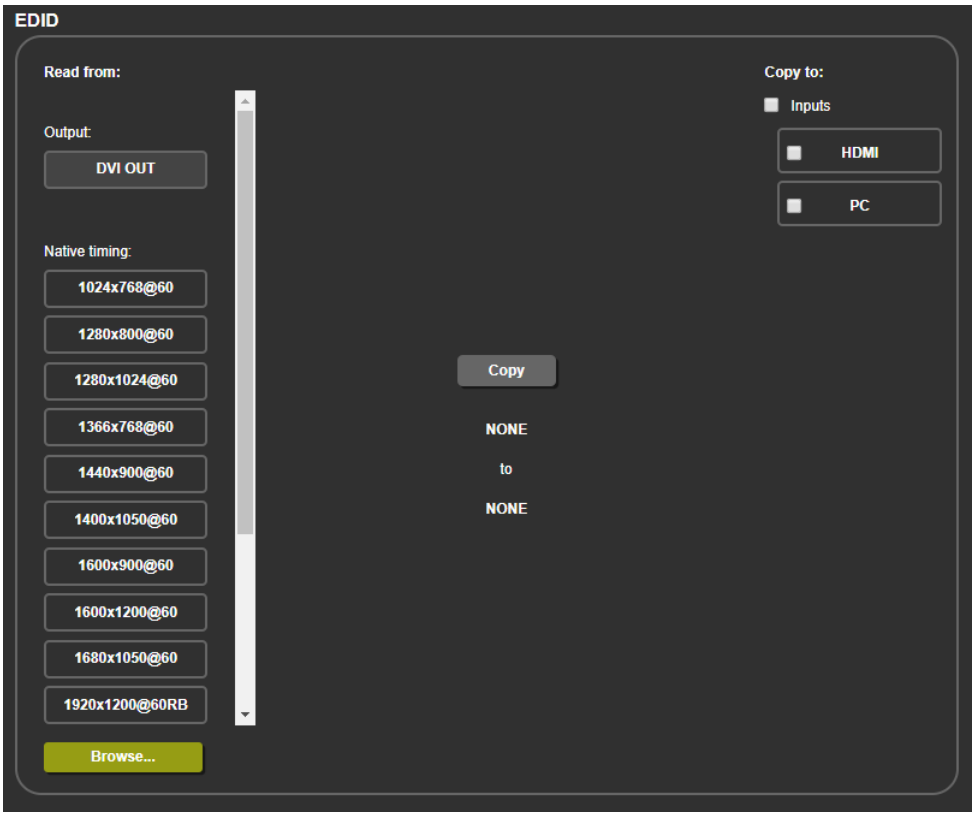


Figure 17: The EDID Page

Figure 18 shows how to select a resolution (1600x1200 in this example) and select one or both inputs. To copy, click the **Copy** button:

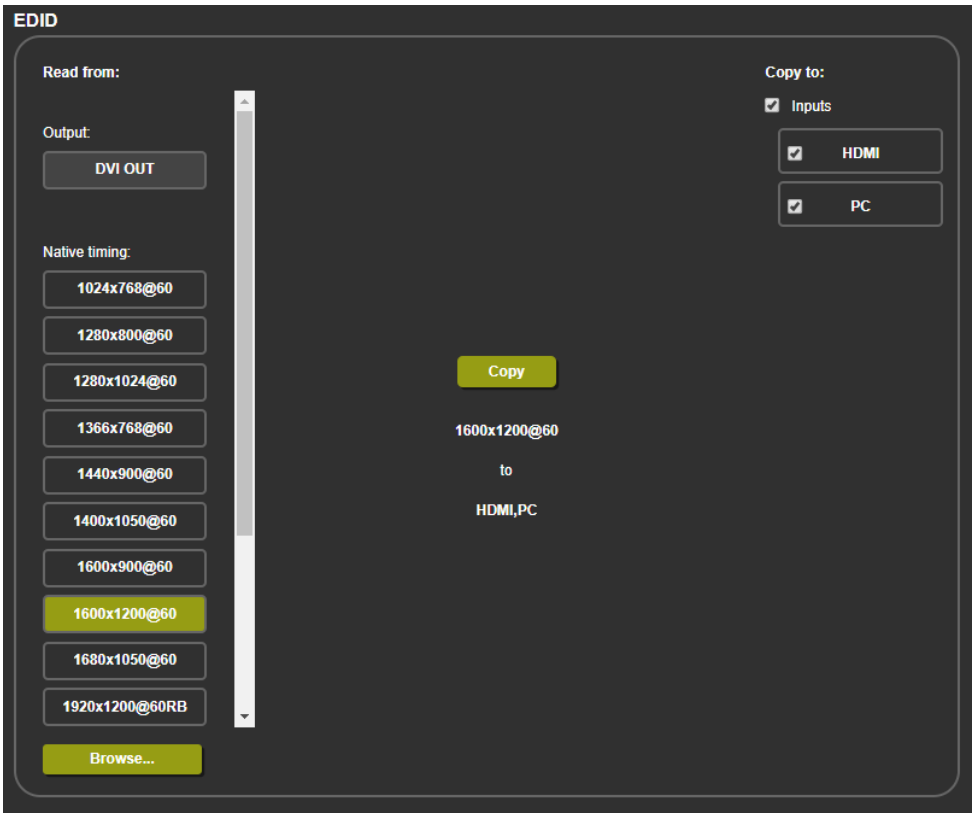


Figure 18: The EDID Page – Copying the Output

The EDID page displays the machine name, selected resolution, the audio channels and deep color support.
After clicking the **Copy** button, the EDID page shows the copy EDID results:

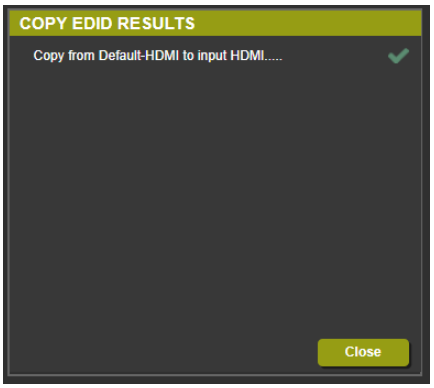


Figure 19: The EDID Page –The Copy EDID Results

Click Close to complete the EDID procedure.

In the same way you can read the default EDID:

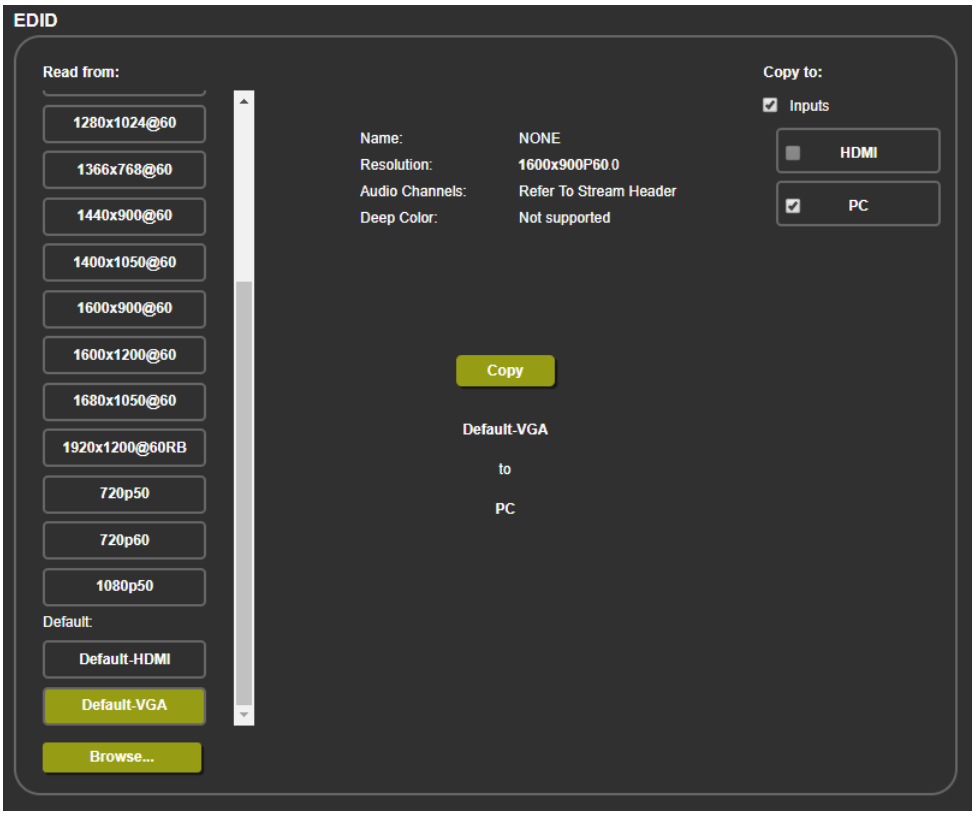


Figure 20: The EDID Page –Copying the Default EDID

The Audio Settings Page

The audio settings page lets you define the input audio level separately for each input and the output level, you can set the Freeze state, the Delay and for the HDMI input set the audio source (automatic, analog or embedded).

Figure 21: The Audio Settings Page

The Advanced Settings Page

The Advanced settings page lets you define the following:

- Auto Image
- Auto SYNC Off
- Auto Input Scan
- Mute follow Freeze
- Mute follow Blank

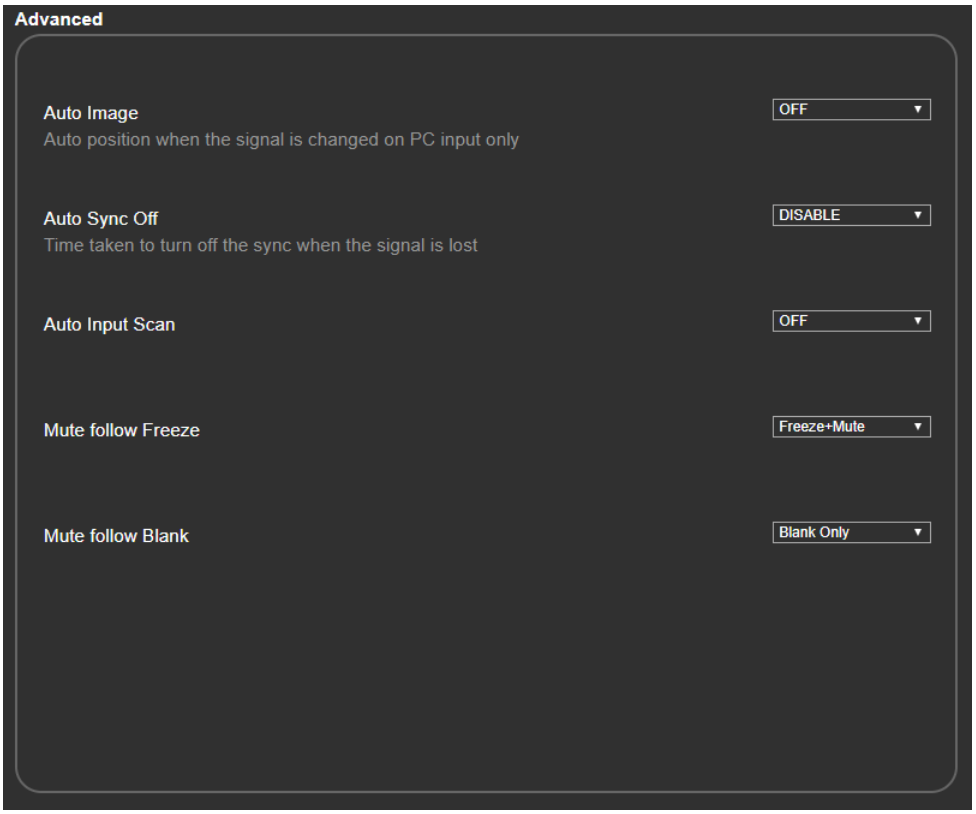


Figure 22: The Advanced Page

The About Page

The **VP-439** About page lets you view the Web page version and Kramer Electronics Ltd details.

Figure 23: The About Page

Technical Specifications

INPUTS:	1 HDMI with unbalanced stereo on a 3.5mm mini jack, 1 PC/HD (RGBHV/YPbPr) on a 15-pin HD connector with unbalanced stereo on a 3.5mm mini jack, 1 composite video on an RCA connector with unbalanced stereo on 2 RCA connectors
OUTPUTS:	1 HDMI on a DVI-I connector with unbalanced stereo on 2 RCA connectors
PORTS:	1 Ethernet on an RJ-45 connector, 1 RS-232 on a 9-pin D-sub connector
OUTPUT COLORSPACE:	RGB/YPbPr
OUTPUT RESOLUTIONS:	1080i, 1080p, 576i, 576p, 720p, 1080i, 1080p, WXGA, WSXGA, WUXGA, 1280x800, WXGA+, SXGA+, NATIVE, VGA, SVGA, XGA, SXGA, UXGA, 480i, 480p, 1600x900
OUTPUT REFRESH RATE:	60Hz for computer graphics resolutions, 50/60Hz for HDTV resolutions
PROCESSING DELAY:	30ms approx.
CONTROLS:	Front panel buttons, menu-driven OSD control, Web page
POWER CONSUMPTION:	5V DC, 1.1A
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
DIMENSIONS:	21.5cm x 16.1cm x 4.36cm (8.46” x 6.34” x 1.7”) W, D, H
WEIGHT:	1.1kg (2.43lb) approx.
INCLUDED ACCESSORIES:	Power supply
OPTIONAL ACCESSORIES:	RK-1 19” rack adapter
Specifications are subject to change without notice at http://www.kramerelectronics.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:	255.255.255.0
Default gateway:	192.168.0.254
Default UDP Port #:	50000
Maximum UDP Ports:	4
Full Factory Reset	
OSD	Go to: Menu-> Factory-> RESET->Change the option to YES and press Enter
RS-232/Ethernet (UDP) Command Protocol	
Command Format:	ASCII protocol 3000
Example (Route the video input to the output):	#ROUTE 12,1,2<cr>

The RS-232/Ethernet (UDP) Communication Protocol

The **VP-439** can be operated using serial commands from a PC, remote controller, or touch screen. The unit communicates using the default Kramer Protocol 3000.

- Kramer Protocol 3000 syntax (see Kramer Protocol 3000 Syntax on page 29)
- Kramer Protocol 3000 commands (see Kramer Protocol on page 32)
- Kramer Protocol 3000 detailed commands (See Kramer Protocol 3000 – Detailed Commands on page 33)

Kramer Protocol 3000 Syntax

Protocol 3000 communicates at a data rate of 9,600 baud, no parity, 8 data bits and 1 stop bit.

Host Message Format

Start	Address (optional)	Body	Delimiter
#	*Destination_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 commands concatenation and addressing:

Start	Address	Body	Delimiter
#	*Destination_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
~	*Sender_id@*	**Message**	**CR** **LF**

Device Long Response

Echoing command:

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

- **CR** = Carriage return (ASCII 13 = 0x0D)
- **LF** = Line feed (ASCII 10 = 0x0A)
- **SP** = Space (ASCII 32 = 0x20)

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 alphameric 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 machine 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 machine 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.

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 like Crestron, some characters require special coding (such as, /X##). Refer to the controller manual.

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.

Command Chaining

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.

Maximum String Length

64 characters

Kramer Protocol 3000 – Command List

Command	Short Form	Description
#		Protocol handshaking
#HELP		List of commands
#BUILD-DATE?		Read device build date
#FACTORY		Reset to factory default configuration
#MODEL?		Read device model
#PROT-VER?		Read device protocol version
#VERSION?		Read device firmware version
#NET-MAC?	NTMC?	Get MAC address
#NET-IP	NTIP	Set device IP address
#NET-IP?	NTIP?	Get device IP address
#NET-GATE	NTGT	Set Gateway IP
#NET-GATE?	NTGT?	Get Gateway IP
#NET-MASK	NTMSK	Set device subnet mask
#NET-MASK?	NTMSK?	Get device subnet mask
#NET-DHCP	NTDH	Set DHCP mode
#NET-DHCP?	NTDH?	Get DHCP mode
#ROUTE		Set input source
#ROUTE?		Get input source
#DISPLAY?		Get output HPD status
#HDCP-MOD		Set input HDCP
#HDCP-MOD?		Display input HDCP status
#VID-RES		Set input/output resolution
#VID-RES?		Get input/output resolution
#VFRZ		Set freeze
#VFRZ?		Display freeze status
#AUD-LVL		Set audio level
#AUD-LVL?		Get audio level
#MUTE		Set audio mute
#MUTE?		Display audio mute status
#SCLR-AS		Set auto sync mode
#SCLR-AS?		Display auto sync status
#IMAGE-PROP		Set size mode
#IMAGE-PROP?		Display size status
#SCLR-AUDIO-DELAY		Set audio delay mode
#SCLR-AUDIO-DELAY?		Display audio delay status

Kramer Protocol 3000 – Detailed Commands

This section describes the detailed commands list (see Protocol 3000 Commands on page 35) as well as the output resolutions key (see Output Resolutions Key on page 33) and the input resolutions key (see Input Resolutions Key on page 34).

Output Resolutions Key

Resolution	Key	Resolution	Key	Resolution	Key
640x480	200	1440x900	208	1080i60	216
800x600	201	1400x1050	209	1080p60	217
1024x768	202	1680x1050	210	576p	218
1280x768	203	1600x1200	211	720p50	219
1360x768	204	1920x1080	212	1080i50	220
1280x720	205	1920x1200	213	1080p50	221
1280x800	206	480p	214	Native	222
1280x1024	207	720p60	215		

Input Resolutions Key

Resolution	CV	PC	HDMI	YPbPr	Key
NTSC	✓				0
PAL	✓				1
640x480 @60Hz (VGA)		✓	✓		6
640x480 @72Hz (VGA)		✓	✓		8
640x480 @75Hz (VGA)		✓	✓		9
800x600 @56Hz (SVGA)		✓	✓		11
800x600 @60Hz (SVGA)		✓	✓		12
800x600 @72Hz (SVGA)		✓	✓		14
800x600 @75Hz (SVGA)		✓	✓		15
1024x768 @60Hz (XGA)		✓	✓		20
1024x768 @70Hz (XGA)		✓	✓		21
1024*768 @75Hz (XGA)		✓	✓		23
1152x864 @75Hz (XGA+)		✓	✓		27
1280x720 @60Hz		✓	✓		30
1280x768 @60Hz		✓	✓		33
1280x960 @60Hz		✓	✓		36
1280x1024 @60Hz		✓	✓		40
1280x1024 @75Hz		✓	✓		41
1360x768 @60Hz		✓	✓		43
1400x1050 @60Hz (SXGA+)		✓	✓		48
1440x900 @60Hz (WXGA+)		✓	✓		51
1600x1200 @60Hz (UXGA)		✓	✓		56
1680x1050 RB @60Hz (WSXGA)		✓	✓		61
1920x1080 @60Hz		✓	✓		65
1920x1200 RB @60Hz		✓	✓		66
1280x800 @60Hz		✓	✓		70
480I			✓	✓	74
576I			✓	✓	76
480P			✓	✓	75
576P			✓	✓	77
720P@50Hz			✓	✓	78
720P@60Hz			✓	✓	79
1080I@50Hz			✓	✓	80
1080I@60Hz			✓	✓	81
1080P@24Hz			✓		82
1080P@30Hz			✓		87
1080P@50Hz			✓	✓	84
1080P@60Hz			✓	✓	85

Protocol 3000 Commands

This section includes the following commands:

HELP

Functions		Permission	Transparency
Set:	-	-	-
Get:	**HELP**	End User	-
Description		**Syntax**	
Set:	-	-	
Get:	Get command list or help for specific command	2 options: 1. #**HELP**CR 2. #**HELP**SP command_name CR	

BUILD-DATE

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

FACTORY

Functions		Permission	Transparency
Set:	**FACTORY**	End User	-
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.			

MODEL?

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

PROT-VER?

Functions		Permission	Transparency
Set:	-	-	-
Get:	**PROT-VER?**	End User	-
Description		**Syntax**	
Set:	-	-	
Get:	Get protocol version	#PROT-VER?CR	
Response			
~nn@**PROT-VER**SP3000:*version*CR LF			
Parameters			
Version – Format: XX.XX where X is a decimal digit			

VERSION?

Functions		Permission	Transparency
Set:	-	-	-
Get:	**VERSION?**	End User	-
Description		**Syntax**	
Set:	-	-	
Get:	Get version number	#VERSION?CR	
Response			
~nn@**VERSION**SPfirmware_versionCR LF			
Parameters			
firmware_version – Format: XX.XX.XXXX where the digits group are: major.minor.build version			

NET-MAC?

Functions		Permission	Transparency
Set:	-	-	-
Get:	**NET-MAC?**	End User	-
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.			

NET-IP

Functions		Permission	Transparency
Set:	**NET-IP**	Administrator	-
Get:	**NET-IP?**	End User	-
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** CR LF			
Get: ~nn@ **NET-IP** SP *ip_address* CR LF			
Parameters			
P1 (valid IP address)= xxx.xxx.xxx.xxx			
Notes			
For proper settings consult your network administrator.			

NET-GATE

Functions		Permission	Transparency
Set:	**NET-GATE**	Administrator	-
Get:	**NET-GATE?**	End User	-
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 (valid IP address)=xxx.xxx.xxx.xxx			
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			

NET-MASK

Functions		Permission	Transparency
Set:	**NET-MASK**	Administrator	-
Get:	**NET-MASK?**	End User	-
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 (valid IP address)=xxx.xxx.xxx.xxx			
Response triggers			
The subnet mask limits the Ethernet connection within the local network. For proper settings consult your network administrator.			

NET-DHCP

Functions		Permission	Transparency
Set:	**NET-DHCP**	Administrator	-
Get:	**NET-DHCP?**	End User	-
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 – 0=Static IP; 1=DHCP
0 – Use static IP.
1 – Use DHCP. If unavailable, use IP as above.

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.

ROUTE

Functions		Permission	Transparency
Set:	**ROUTE**	End User	-
Get:	**ROUTE?**	End User	-
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) –12=Video+Audio
P2 – 1=Scaler
P3 – video inputs (0~2) – 0=HDMI; 1=PC; 2=Video (CV);

Notes

This command replaces all other routing commands.

DISPLAY?

Functions		Permission	Transparency
Set:	-	-	-
Get:	**DISPLAY?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get output HPD status	**#DISPLAY?** SP P1 CR	
Response			
~ nn **@DISPLAY** SP P1 CR LF			
Parameters			
P1 (Output number) – 0=DVI			
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			

HDCP-MOD

Functions		Permission	Transparency
Set:	**HDCP-MOD**	Administrator	Public
Get:	**HDCP-MOD?**	End User	Public
Description		**Syntax**	
Set:	Set HDCP mode	#**HDCP-MOD** SP 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/Output) – 0=Input P2 (Scaler number) –0=HDMI P3 (Status) – Input: 0=Off; 1=On			
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			

VID-RES

Functions		Permission	Transparency
Set:	**VID-RES**	End User	Public
Get:	**VID-RES?**	End User	Public
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 P4 - video resolutions – see output resolutions in Output Resolutions Key on page 33 and input resolutions in Input Resolutions Key on page 34			
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			

VFRZ

Functions		Permission	Transparency
Set:	**VFRZ**	End User	Public
Get:	**VFRZ?**	End User	Public
Description		**Syntax**	
Set:	Set freeze on selected output	#**VFRZ** SP *P1,P2* CR	
Get:	Get output freeze status	#**VFRZ?** SP *P1* CR	
Response			
~nn@**VFRZ** SP *P1, P2* CR LF			
Parameters			
P1 – 1=Scaler P2 – 0=Off; 1=On			
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 VFRZ was set by any other external control device (button press, device menu and similar)			

AUD-LVL

Functions		Permission	Transparency
Set:	**AUD-LVL**	End User	-
Get:	**AUD-LVL?**	End User	-
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/Output)– 0=Input; 1=Output P2 N/A P3 – Input=0 to 100, ++/--; Output=0 to 110, ++/--			

MUTE

Functions		Permission	Transparency
Set:	**MUTE**	End User	Public
Get:	**MUTE?**	End User	Public
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 – 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			

SCLR-AS?

Functions		Permission	Transparency
Set:	**SCLR-AS**	End User	Public
Get:	**SCLR-AS?**	End User	Public
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 Number) –1=Scaler P2 (Off/On) – 0=Off; 1=Fast; 2=Slow			
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			

IMAGE-PROP

Functions		Permission	Transparency
Set:	**IMAGE-PROP**	End User	Public
Get:	**IMAGE-PROP?**	End User	Public
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 (Scaler number) – 1=Scaler P2 (Status) – 0=Full; 1=Over Scan; 2=Under Scan; 3=Letter Box; 4=PanScan; 5=Best Fit			
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			

SCLR-AUDIO-DELAY

Functions		Permission	Transparency
Set:	**SCLR-AUDIO-DELAY**	End User	Public
Get:	**SCLR-AUDIO-DELAY?**	End User	Public
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 (Audio output number) –1=Scaler
P2 (Level selection) – 0=Off; 1=40ms; 2=110ms; 3=150ms; 4=Auto

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

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.
2. All Kramer fiber optic cables, adapter-size fiber optic extenders, active cables, cable retractors, 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: 2900-300415 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.

www.KramerAV.com
info@KramerAV.com