KRAMER

USER MANUAL

MODEL:

VS-44DT
4x4 HDMI/HDBT Matrix Switcher

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!

Congratulations on purchasing your Kramer **VS-44DT 4x4 HDMI/HDBT Matrix Switcher**. This product, which incorporates HDMI™ technology, is ideal for:

- Event rooms
- Large conference rooms
- Lecture halls
- Advertising applications

The terms HDMI, HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing Administrator, Inc.

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/VS-44DT 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 **VS-44DT** 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.

Shielded Twisted Pair/Unshielded Twisted Pair

For optimum range and performance use the recommended Kramer cables available at www.kramerav.com/product/VS-44DT.

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

VS-44DT is a 4x4 4K@60Hz (4:2:0) HDMI/HDBaseT matrix switcher that transmits video, audio, Ethernet, RS−232 and IR signals over extended distances. The **VS-44DT** accepts up to four HDMI and four IR inputs as well as Ethernet and RS−232 network and control. The inputs can be routed to any or all of the four HDBaseT outputs, the first two of which also have simultaneous HDMI outputs.
VS-44DT connects to compatible HDBaseT receivers such as, TP-780Rxr, TP-580Rxr and TP-588D. It supports resolutions of up to 4K@60Hz (4:2:0). The matrix is a PoE provider that provides power over Ethernet to compatible PoE receivers.

The **VS-44DT** features:

- Four HDMI and five IR inputs.
- Two HDMI, four HDBaseT and five IR outputs.
- PoE support on all four HDBaseT outputs – PoE provider to HDBaseT receivers such as

the **TP-588D** and **TP-780Rxr.**

- HDBaseT range up to 130m (430ft) at normal mode (2K), up to 100m at normal mode (4K); up to 180m (590ft) ultra-mode (1080p @60Hz @24bpp) when using recommended Kramer cables, available at www.kramerav.com/product/VS-44DT.
- An unbalanced, stereo audio output.
- Bandwidth up to 10.2Gbps (3.4Gbps per video channel).
- EDID capture—copies and stores the EDID from a display device.
- Hot-plug detection (HPD).
- HDCP 1.4 support.
- HDTV compatibility.
- Support for HDMI – 4Kx2K @30Hz, 3D, Deep Color, x.v.Color™, Lip Sync , Dolby® TrueHD, Dolby Digital Plus, DTS−HD® and linear PCM 7.1 surround sound.
- A non-volatile memory for matrix configuration.
- A store and recall facility for preset configurations.
- Automatic output shutdown if no input signal is detected after a configurable idle period.
- An LCD display for easy configuration and operation.
- Support for Kramer Protocol 3000.
- A lock button to prevent unwanted tampering with the settings.
- 1U height that fits a standard 19” professional rack enclosure.

You can control the **VS-44DT** using the front panel buttons, or remotely via:

- Built-in, embedded web pages using a standard web browser over Ethernet.
- RS-232 serial commands transmitted by a touch screen system, PC or other serial controller.
- The Kramer infrared remote-control transmitter.

About HDBaseT™ Technology

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

The products described in this user manual are HDBaseT certified.

Defining the VS-44DT 4x4 HDMI/HDBT Matrix Switcher

This section defines the **VS-44DT**.

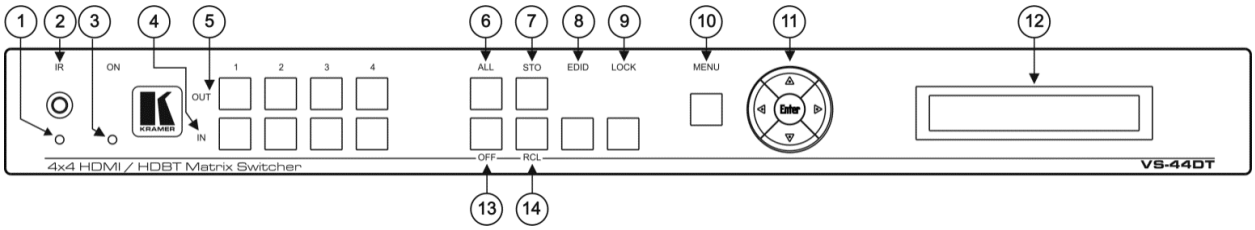


Figure 1: VS-44DT 4x4 HDMI/HDBT Matrix Switcher Front Panel

#	Feature	Function
1	IR LED	Lights yellow when receiving an IR signal
2	*IR* Sensor	IR receiver for remote control
3	*POWER* LED	Lights green when the device is powered on
4	*IN Buttons*	Press to select an input after selecting an output (from 1 to 4), see Switching Inputs to Outputs on page 11
5	*OUT Buttons*	Press to select an output followed by an input or OFF (from 1 to 4)
6	*ALL* Button	Press followed by an input to switch this input to all outputs, or press followed by the Off button to disconnect all switches, (see Disconnecting One or All Outputs on page 13)
7	*STO* Button	Press to store a preset configuration followed by the preset number in which to save it, (see Storing and Recalling Preset Configurations on page 12)
8	*EDID* Button	Press to copy the EDID from an output to an input, (see Acquiring an EDID on page 12)
9	*LOCK* Button	Press and hold to lock the front panel buttons, (see Locking and Unlocking the Front Panel on page 14). Press and hold again to unlock
10	*MENU* Button	Press to enter the configuration menu or to move up one level when inside the menu, (see Using the Menu on page 15)
11	Menu Navigation Pad	Use the Enter, up (▲), down (▼), left (◄), and right (►) buttons to navigate the menu or to modify parameters or values within the menu, (see Using the Menu on page 15)
12	LCD Readout (20 char x 2 lines)	Displays either the input/output matrix currently selected or the menu during configuration
13	*OFF* Button	Press after an output button to disconnect the currently selected outputs. Press after the All button to disconnect all currently switched outputs (see Disconnecting One or All Outputs on page 13)
14	*RCL* Button	Press, followed by a preset number to recall the preset configuration (see Storing and Recalling Preset Configurations on page 12)

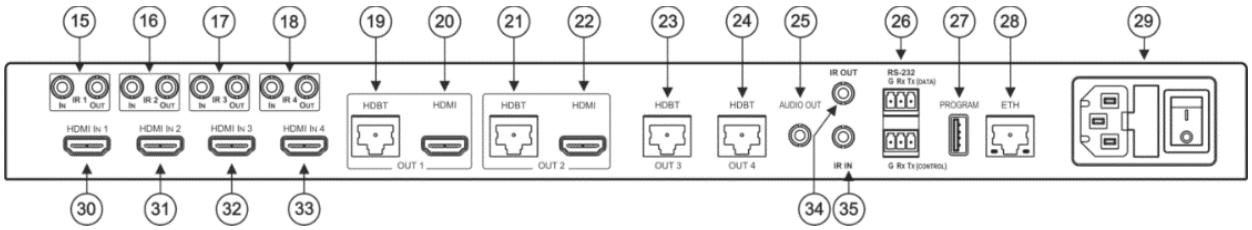


Figure 2: VS-44DT 4x4 HDMI/HDBT Matrix Switcher Rear Panel

#	Feature		Function
15	*IR 1*	*IN* 3.5mm Mini Jack	Connect to an IR sensor. Receives IR commands and sends them over HDBT OUT 1
		OUT 3.5mm Mini Jack	Connect to the first IR emitter. Transmits IR commands that are sent over HDBT OUT 1
16	*IR 2*	*IN* 3.5mm Mini Jack	Connect to an IR sensor. Receives IR commands and sends them over HDBT OUT 2
		OUT 3.5mm Mini Jack	Connect to the second IR emitter. Transmits IR commands that are sent over HDBT OUT 2
17	*IR 3*	*IN* 3.5mm Mini Jack	Connect to an IR sensor. Receives IR commands and sends them over HDBT OUT 3
		OUT 3.5mm Mini Jack	Connect to the third IR emitter. Transmits IR commands that are sent over HDBT OUT 3
18	*IR 4*	*IN* 3.5mm Mini Jack	Connect to an IR sensor. Receives IR commands and sends them over HDBT OUT 4
		OUT 3.5mm Mini Jack	Connect to the fourth IR emitter. Transmits IR commands that are sent over HDBT OUT 4
19	OUT 1	*HDBT* RJ-45 Connector	Connect to the first HDBT receiver, (for example, the **TP-580RXR**)
20		*HDMI* Connector	Connect to the first HDMI receiver, (for example, an HDMI display)
21	OUT 2	*HDBT* RJ-45 Connector	Connect to the second HDBT receiver, (for example, the **TP-580RXR**)
22		*HDMI* Connector	Connect to the second HDMI receiver, (for example, an HDMI display)
23	HDBT OUT 3 RJ-45 Connector		Connect to the third HDBT receiver, (for example, the **TP-580RXR**)
24	HDBT OUT 4 RJ-45 Connector		Connect to the fourth HDBT receiver, (for example, the **TP-580RXR**)
25	*AUDIO OUT* 3.5mm Mini Jack		Connect to an audio receiver, (for example, active speakers)
26	*RS-232*	*DATA* 3-pin Terminal Block (G,Rx,Tx)	Connect to a serial source/target
		CONTROL 3-pin Terminal Block (G,Rx,Tx)	Connect to a serial controller
27	*PROGRAM* USB Connector		Connect to a PC to perform firmware upgrades
28	ETHERNET RJ-45 Connector		Connect to a PC via a LAN
29	AC Mains	Power Socket	Connect the mains power cord
		Fuse	AC mains supply protection fuse
		Power Switch	Turns the device on and off
30	HDMI IN 1 Connector		Connect to the first HDMI source, (for example, a Blu-ray disk player)
31	HDMI IN 2 Connector		Connect to the second HDMI source, (for example, a Blu-ray disk player)
32	HDMI IN 3 Connector		Connect to the third HDMI source, (for example, a Blu-ray disk player)
33	HDMI IN 4 Connector		Connect to the fourth HDMI source, (for example, a Blu-ray disk player)
34	*IR OUT* 3.5mm Mini Jack		Connect to an IR emitter or IR receiver for receiving the combined IR signals from all HDBT port IR transmissions
35	*IR IN* 3.5mm Mini Jack		Connect to an external IR receiver for controlling **VS-44DT** via an IR remote controller

Mounting VS-44DT

This section provides instructions for mounting **VS-44DT**. 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.

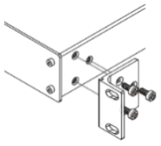
- **VS-44DT** must be placed upright in the correct horizontal position.

Caution:
- Mount **VS-44DT** 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 VS-44DT 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/VS-44DT.

Connecting the VS-44DT

Always switch off the power to each device before connecting it to your **VS-44DT**. After connecting your **VS-44DT**, connect its power and then switch on the power to each device.

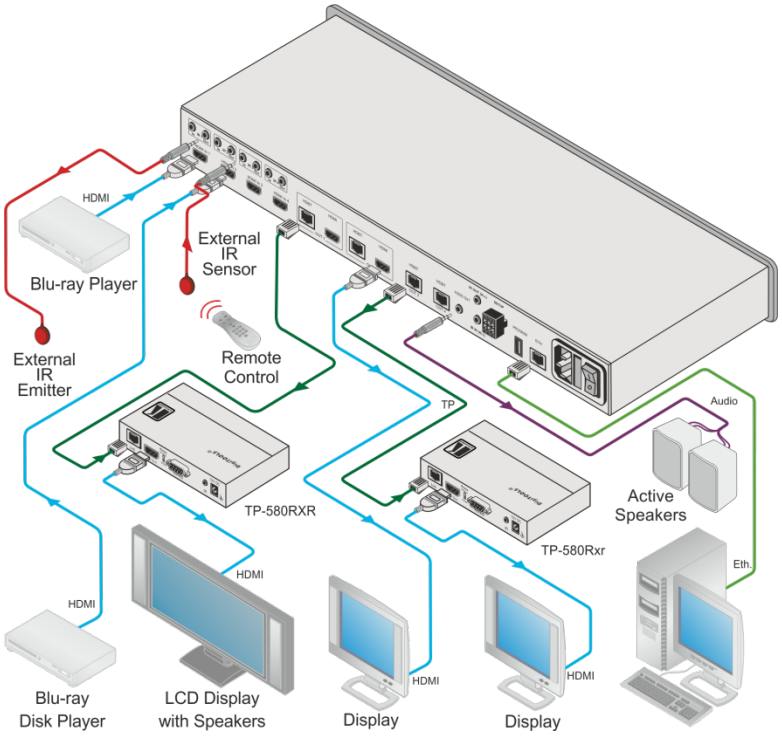


Figure 3: Connecting the VS-44DT 4x4 HDMI/HDBT Matrix Switcher

To connect the VS-44DT as illustrated in the example in Figure 3:

1. Connect the HDMI sources, (for example, Blu-ray players) to the HDMI IN 1 and IN 2 connectors.
2. Connect an external IR sensor to the IR 3 IN 3.5mm mini jack.
3. Connect the IR 1 OUT 3.5mm mini jack to an external IR emitter.
4. Connect the OUT 2 HDMI connector to an HDMI acceptor, (for example, a display).
5. Connect the OUT 1 HDBT RJ-45 connector to a compatible HDBT receiver, (for example, the **TP-580Rxr**), and connect the HDMI output of the **TP-580Rxr** to a display.
6. Connect the OUT 3 HDBT RJ-45 connector to a compatible HDBT receiver, (for example, the **TP-580Rxr**), and connect the HDMI output of the **TP-580Rxr** to a display.
7. Connect the AUDIO OUT 3.5mm mini jack to an audio acceptor, (for example, active speakers).
8. Connect a controller via either RS-232 or a LAN to the Ethernet RJ-45 connector.

Connecting the VS-44DT to a Serial Controller

You can connect the **VS-44DT** via an RS-232 connection to a serial controller, for example, a PC.

To connect the VS-44DT via RS-232 to a serial controller:

- Connect the RS-232 CONTROL 3-pin terminal block on the rear of the **VS-44DT** to the 9-pin D-sub connector on PC, (pin TX to pin 2, pin RX to pin 3, pin G to pin 5).

Connecting the VS-44DT to a Serial Data Source/Acceptor

You can connect the **VS-44DT** via an RS-232 connection to a serial data source or acceptor, for example, a PC or device to be controlled.

To connect the VS-44DT via RS-232 to a serial data controller or acceptor:

- Connect the RS-232 DATA 3-pin terminal block on the rear of the **VS-44DT** to the 9-pin D-sub connector on PC, (pin TX to pin 2, pin RX to pin 2, pin G to pin 5).

Connecting to the VS-44DT via Ethernet

You can connect to the **VS-44DT** via Ethernet using either of the following methods:

- Directly to the PC using a crossover or straight cable (see Connecting the Ethernet Port Directly to a PC on page 8).
- 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 10).

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 **VS-44DT** directly to the Ethernet port on your PC using a crossover or straight cable with RJ-45 connectors.

This type of connection is recommended for identifying the **VS-44DT** with the factory configured default IP address.

After connecting the **VS-44DT** 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.

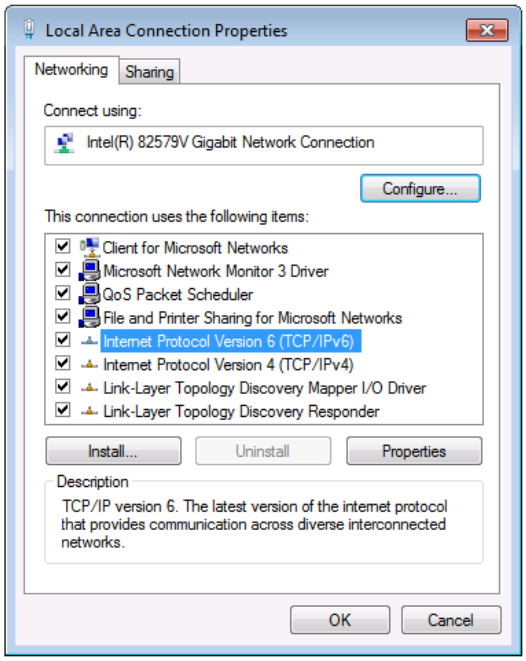


Figure 4: Local Area Connection Properties Window

4. Highlight **Internet Protocol Version 4 (TCP/IPv4)**.
5. Click **Properties**.
   The Internet Protocol Properties window appears as shown in Figure 5.

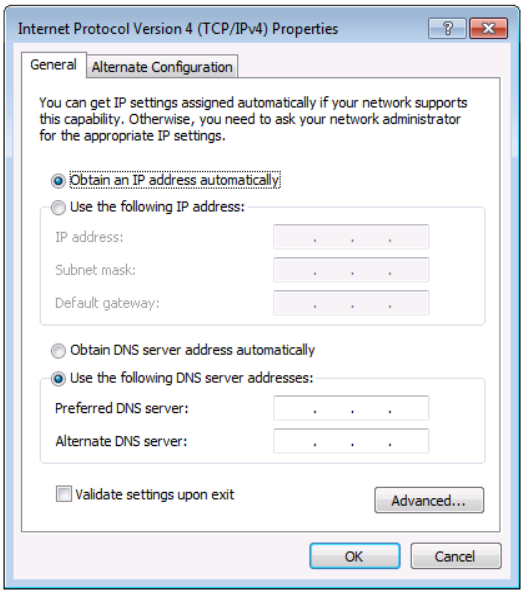


Figure 5: Internet Protocol Version 4 Properties Window

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in Figure 6.
   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.

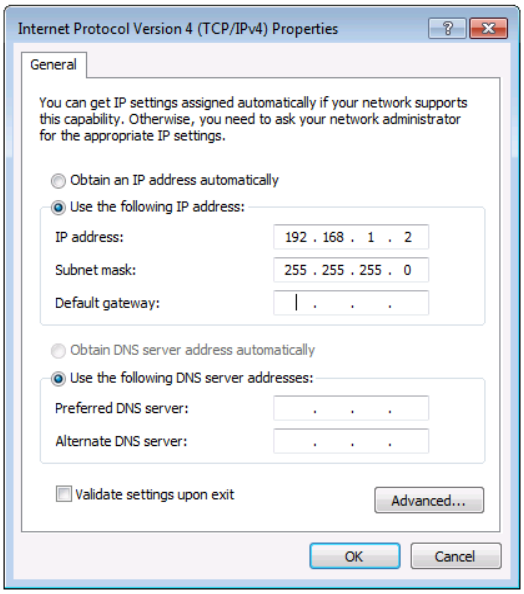


Figure 6: Internet Protocol Properties Window

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

Connecting the Ethernet Port via a Network Hub or Switch

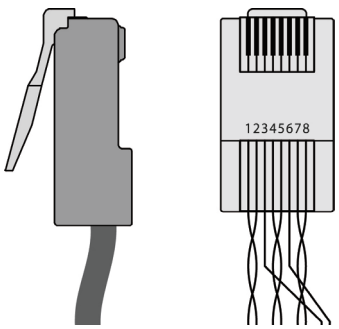
You can connect the Ethernet port of the **VS-44DT** to the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

Wiring the RJ 45 Connectors

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

For HDBT cables, it is recommended that the cable ground shielding be connected/soldered to the connector shield.

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



Operating the VS-44DT

When the **VS-44DT** is powered on, the following is displayed briefly on the LCD display:

```
KRAMER ELECTRONICS

4X4 HDMI/HDBT Matrix
```

Following the self-test the current switching configuration is displayed, an example of which is shown below. The top row indicates the output port and the bottom row indicates which input port is switched to the output port displayed directly above it. An input port showing 0 (zero) indicates that the output port has no input switched to it.

```
O:   1   2   3   4
I:   3   0   1   2
```

When operating via the front panel buttons, if there is no button activity for approximately 30 seconds, the procedure is aborted and the display reverts back to the Input / Output display.

After approximately 8 minutes of no activity, the LCD turns off.
Push any button to turn the LCD back on.

Switching Inputs to Outputs

You can switch:

- Individual inputs to individual outputs.
- One input to all outputs.

To switch an output to an input, (for example, Input 4 to Output 3):

1. Press Out 3.
   The Output button lights red.
2. Press In 4.
   The Input button lights red and the switch is executed.

To switch one input to all outputs, (for example, Input 2 to all outputs):

1. Press All.
   The All button lights red.
2. Press In 2.
   The Input 2 button lights and Input 2 is switched to all outputs.

Storing and Recalling Preset Configurations

You can store up to four preset configurations for instant recall. The bottom row of input buttons relate to presets one to four.

To store the current configuration in preset 2:

1. Press STO.
2. Press IN 2.
   The selection is displayed in the readout.
3. Press STO.
   The current configuration is stored in preset 2.

To recall preset 4:

1. Press RCL.
2. Press IN 4.
   The selection is displayed in the readout.
3. Press RCL.
   The configuration stored in preset 4 is recalled.

Acquiring an EDID

You can acquire the EDID from an output and assign it to either one or all inputs.

To acquire the EDID from an output and store it on one input, (for example, Output 3 to Input 1):

1. Press EDID.
   The button lights red.
2. Press Out 3.
3. Press In 1.
4. Press EDID.
   The button no longer lights and the EDID from Output 3 is stored in Input 1.

The default out-of-the-box EDID is 4K@30Hz. If no image appears on the monitor, it could be that the monitor cannot handle the 4K resolution.

Copy the EDID from the monitor to the appropriate input of the **VS-44DT**.

Disconnecting One or All Outputs

The Off button is used to disconnect one or all currently switched outputs.

To disconnect one currently switched output, (for example, Output 2):

1. Press Out 2.
2. Press OFF.

To disconnect all currently switched outputs:

1. Press ALL.
2. Press OFF.

Resetting the Device to Factory Default Configuration

The **VS-44DT** can be reset to factory default configuration either by sending a Protocol 3000 command or by using the front panel buttons.

To reset the device to the factory default configuration by sending a P3000 command:

1. Connect to the **VS-44DT** from a PC via the serial port using the following parameters:
   - 115200, 8, 1, none
2. Send the P3000 command to reset the device to factory default (see FACTORY on page 43).
   After a few seconds the **VS-44DT** is reset to factory default.

To reset the device to the factory default configuration using the front panel buttons:

1. Press the Menu button.
   The Menu button lights and the first option on the menu appears.
2. Use the up (▲) and down (▼) arrows on the keypad to scroll to the RESET TO DEFAULT option.
3. Press the Enter button.
   The Reset to Default No and Yes options appear.
4. Use the left (◄) and right (►) arrows on the keypad to select Yes.
5. Press Enter.
   After a few seconds the standby readout is displayed and the device is reset to factory default.

Locking and Unlocking the Front Panel

You can lock the front panel buttons to prevent unwanted key presses from changing the current configuration.

To lock the front panel:

Press and hold the Lock button.
The button lights, the Locked message is displayed briefly, and the front panel buttons are locked. Pressing any button causes the Locked message to display briefly and the Lock button to flash

To unlock the front panel:

Press and hold the Lock button.

Configuring the VS-44DT

Using the Menu

The main menu comprises seven sections:

- Audio Setting (see Setting the Audio Source and Volume on page 15).
- RS-232 Routing (see Setting RS-232 Routing on page 15).
- Auto Settings (see Setting Auto Switching on page 16).
- Network Parameters (see Setting the Network Parameters on page 16).
- Ethernet Status (see Ethernet Status Sub-menu on page 16).
- FW version display (see FW Version Display on page 16).
- Reset to Default (see Reset to Default on page 16).
- Update Firmware (see Update Firmware Sub-menu on page 16).

Use the following keys to navigate the menu:

- Menu—Enter the Menu or exit one level when in the Menu.
- Enter—Select a parameter/value.
- Up (▲) or Down (▼)—scroll up through the parameter.
- Right (►) or Left (◄)—scroll down through the value list.

Note: If there is no button activity for approximately 20 seconds, the display reverts back to the Input/Output display.

Setting the Audio Source and Volume

The Audio Settings menu lets you define which of the audio outputs is routed to the analog audio output and set its volume.

Parameter	Description
Output 1 to 4:	Sets the audio output source (1 to 4)
Volume	Set for each output (0 to 100)
Mute	Set to ON/OFF for each output

Setting RS-232 Routing

The RS-232 Status sub-menu turns the RS-232 DATA serial communication routing on and off. The current state is displayed when entering the RS-232 ROUTING menu, for example: ON To port-04.

Parameter	Description
To Port:	Turns the RS-232 routing to each port (1 to 4) ON or OFF

Setting Auto Switching

The AUTO SETTINGS sub-menu lets you enable or disable auto switching with options for **Last Connected** or **Priority Switching** operation (see Auto Switching Mode on page 28).

Parameter	Description
AUTO SWITCH: OUT (1 to 4)	Sets auto switching ON or OFF

Setting the Network Parameters

The Network Status sub-menu controls DHCP selection and IP network parameters.

Parameter	Description
OFF, ON	Turns DHCP ON and OFF. When off, set the network parameters (see Selecting DHCP on page 17)
IP Settings	Sets the IP network address
Netmask Settings	Sets the IP netmask
Gateway Settings	Sets the IP gateway

Note: When turning DHCP on, the device performs an automatic reset.

Ethernet Status Sub-menu

The parameters in the Ethernet Status sub-menu display the TCP/IP communication parameters.

Parameter	Description	Default
IP Status:	Displays the TCP/IP address of the device	192.168.1.39
Netmask Status:	Displays the TCP/IP netmask of the device	255.255.0.0
Gateway Status:	Displays the TCP/IP gateway	192.168.0.1
TCP port	Set the TCP port number (0 to 65535)	5000
UDP Port	Set the UDP port number (0 to 65535)	50000
MAC Address:	Displays the MAC address of the device	-

FW Version Display

Displays the firmware version.

Reset to Default

Parameter	Description
RESET TO DEFAULT	Resets the device to default factory parameters (NO or YES)

Update Firmware Sub-menu

Parameter	Description
UPDATE FIRMWARE:	Updates the firmware (NO or YES)

Selecting DHCP

To select the DHCP:

1. Press the Menu button to display the menu.
   The menu is displayed.
2. Using the up (▲) or down (▼) button, move through the menu options until the Network Settings option is displayed.
3. Press Enter.
   The DHCP ON and OFF options are displayed.
4. Using the left (◄) or right (►) button, select either ON or OFF.
5. Press Enter.
   The change is saved.

Configuring the IP Network Address

To configure the IP network address:

1. Press the Menu button to display the menu.
   The menu is displayed.
2. Using the up (▲) or down (▼) button, move through the menu options until the Network Settings option is displayed.
3. Press Enter.
   The DHCP Settings option is displayed.
4. Using the up (▲) or down (▼) button, move through the menu options until the IP Settings option is displayed.
5. Press Enter.
6. Using the left (◄) or right (►) button, move the cursor to the digit you wish to change.
7. Using the up (▲) or down (▼) button, select the required digit.
8. Repeat steps 6 and 7 until the required address is displayed.
9. Press Enter.
   The change is saved.

Resetting the VS-44DT to Factory Default Configuration

To reset the VS-44DT to factory default parameters:

1. Press the Menu button to display the menu.
   The menu is displayed.
2. Using the up (▲) or down (▼) button, move through the menu options until the Reset to Default: option is displayed.

3. Press Enter.
   The NO and YES options are displayed.
4. Using the left (◄) or right (►) button, select YES.
5. Press Enter.
   The device is reset to factory default parameters and automatically reboots.

Operating the VS-44DT Remotely Using the Web Pages

The **VS-44DT** 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 Connecting to the VS-44DT via Ethernet on page 8.
- Ensure 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	

There are eight web pages:

- Switching Page (see Switching Page on page 20).
- Device Settings Page (see Device Settings Page on page 23).
- EDID Page (see EDID Page on page 25).
- RS-232 Routing Page (see RS-232 Routing Page on page 27).
- Audio Settings Page (see Audio Settings Page on page 27).
- Advanced Page (see Advanced Page on page 28).
- Authentication Page (see Authentication Page on page 32).
- About Page (see About Page on page 32).

To browse the VS-44DT 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 Switching page appears.

Switching Page

Figure 7 shows the Switching page that is also the first web page. The column on the left shows a list of all the available web pages. The Video switching area lets you select an input to switch to the outputs.

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

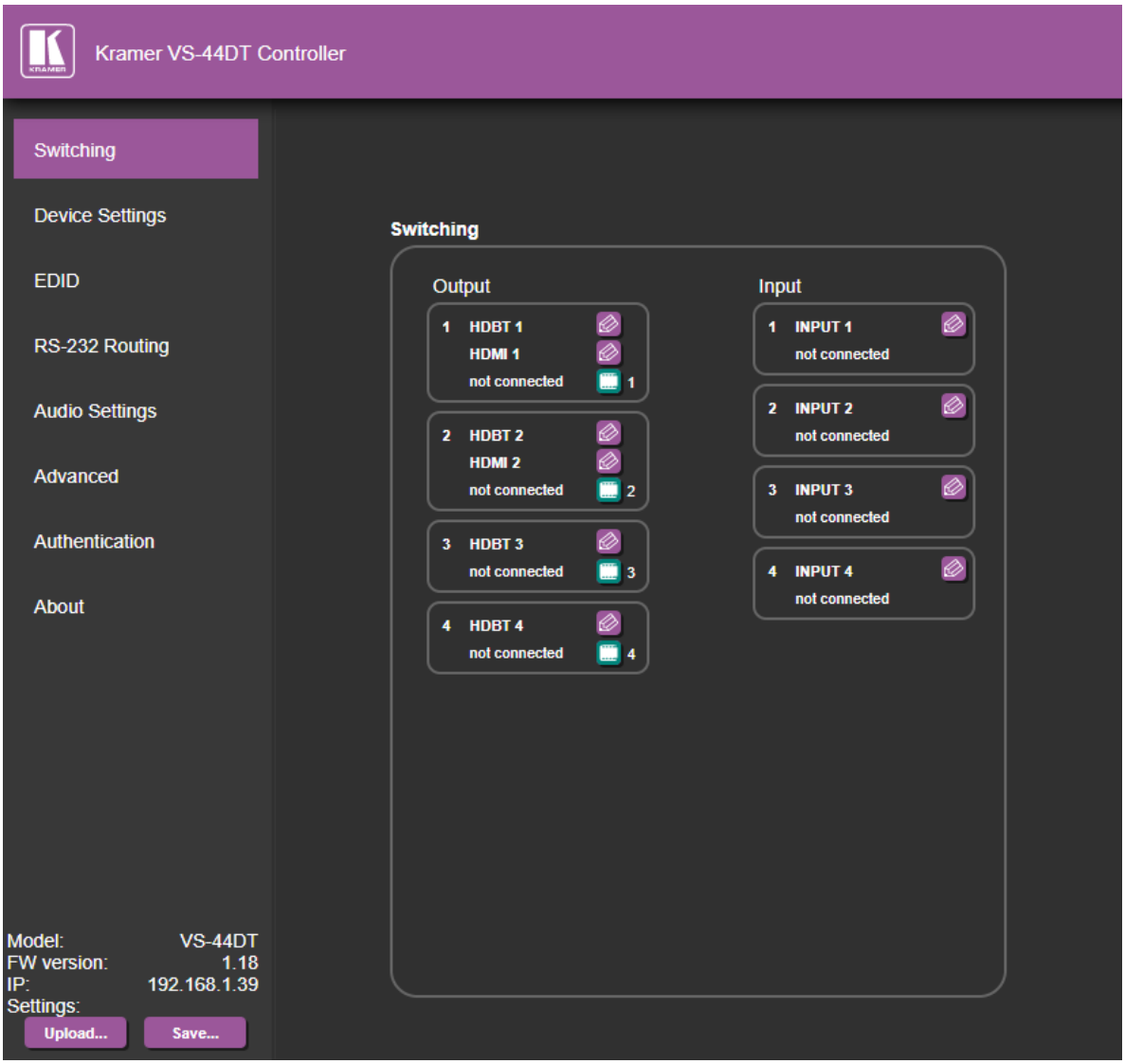


Figure 7: Switching Page

To switch an input to an output, select an output and then select the input you want to switch to that output. Figure 8 defines the Switching area:

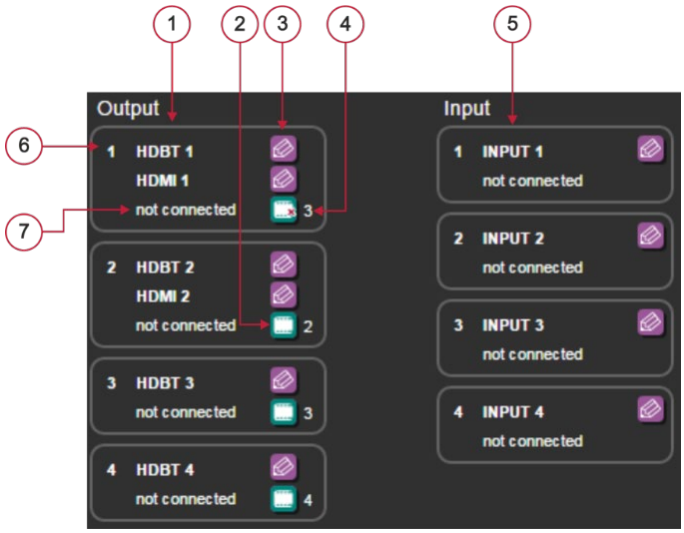


Figure 8: Switching Button Details

#	Item	Description
1	Four output buttons	Click on the button to select an output
2	Mute button	Click to mute the output. The mute output is indicated by a small red x on top of the icon
3	Edit button	Click to edit the output Properties
4	Input number	Indicates which input is switched to this output. 0 indicates that no input is connected
5	Four input buttons	Click to select an input
6	Output number	Indicates the output number
7	Signal Status	Indicates the signal status

To edit an input button, click that input's edit icon ( ). The Input Properties window appears:

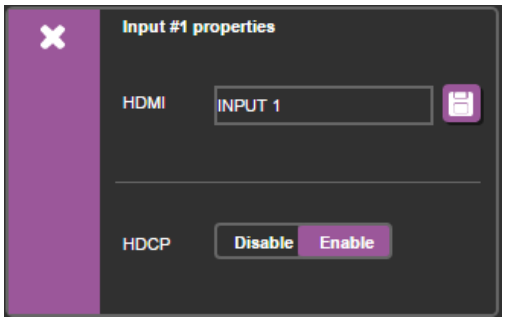


Figure 9: Input Edit Window

The Input Properties window enables you to:

- Change the name of the input as you want it to appear in the web page (click to save the name).
- Enable/Disable HDCP.

Click the exit icon ( ) to exit the window.

Figure 10 shows the HDBaseT properties window and HDMI properties window for output 1.

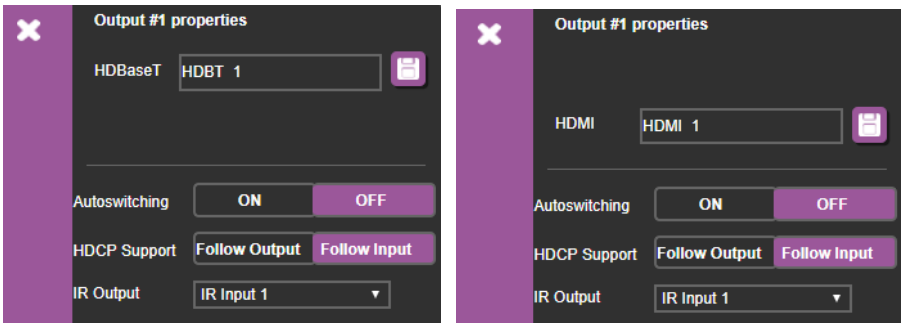


Figure 10: HDBaseT Output Properties Window

The Input Properties window enables you to:

- Change the name of the input as you want it to appear in the web page (click to save the name).
- Set the HDCP Support to follow the input or follow output.
- Set Auto switching ON to allow for:
  - Priority switching – should the input signal fail (see Auto Switching Mode on page 28).
  - Last Connected switching – should a new input signal be introduced (see Auto Switching Mode on page 28).
- Set IR Output to enable an output device to be operated remotely through this device.

Click the exit icon ( ) to exit the window.

Device Settings Page

The Device Settings page enables you to:

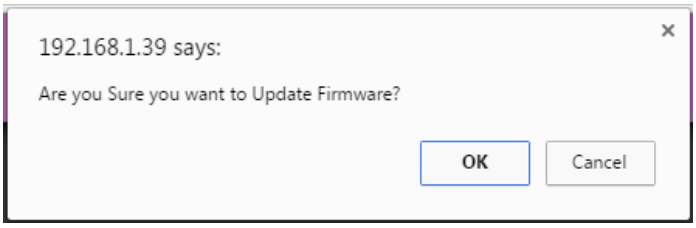
- View the device information.
- Perform firmware upgrade.
- Reset the device to its factory default settings.
- Turn DHCP on and off.
- View and edit the current IP settings.

Figure 11: Device Settings Page

Updating the Firmware

To update the firmware:

1. Click BROWSE… in the Firmware Upgrade area, and select the new firmware file (download the latest firmware file from www.kramerav.com/downloads/VS-44DT).
2. Click START UPGRADE.
   The following message appears:



3. Click OK.
   The new firmware is installed.
   Do not interrupt the procedure or the device may be rendered inoperable.
4. Wait until the device reboots automatically at the end of the procedure.

EDID Page

The EDID page enables you to copy an EDID from:

- The default EDID.
- Any HDBaseT output.
- Any input.
- An EDID stored in a file.
- One or more inputs.

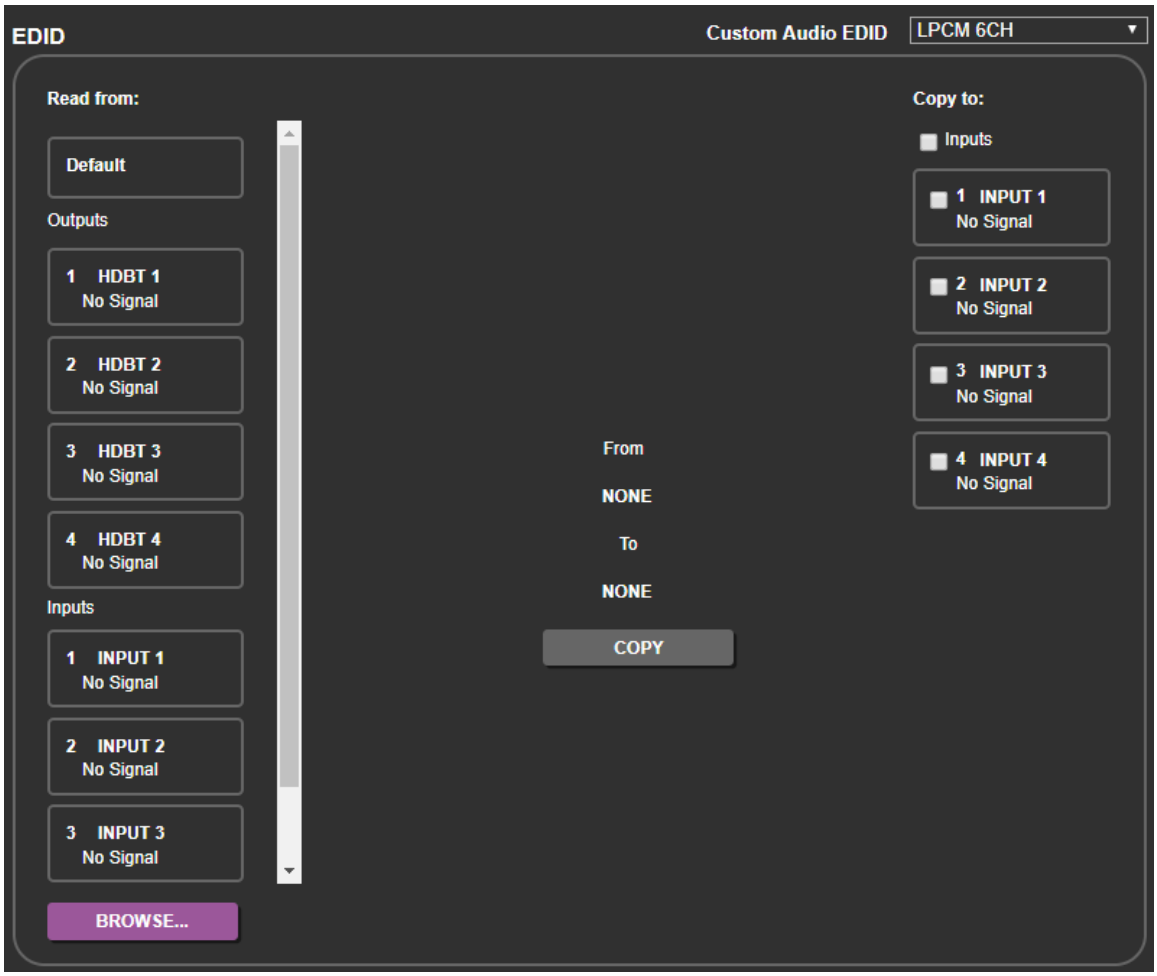


Figure 12: EDID Page

You can bypass the Audio property of the EDID copied using the Custom Audio EDID dropdown.

To copy an EDID to one or more inputs:

1. Select the source you want to read from (Default EDID in this example).
   The source details appear on the EDID page.
2. Select the input/s to which you want to copy the EDID to.

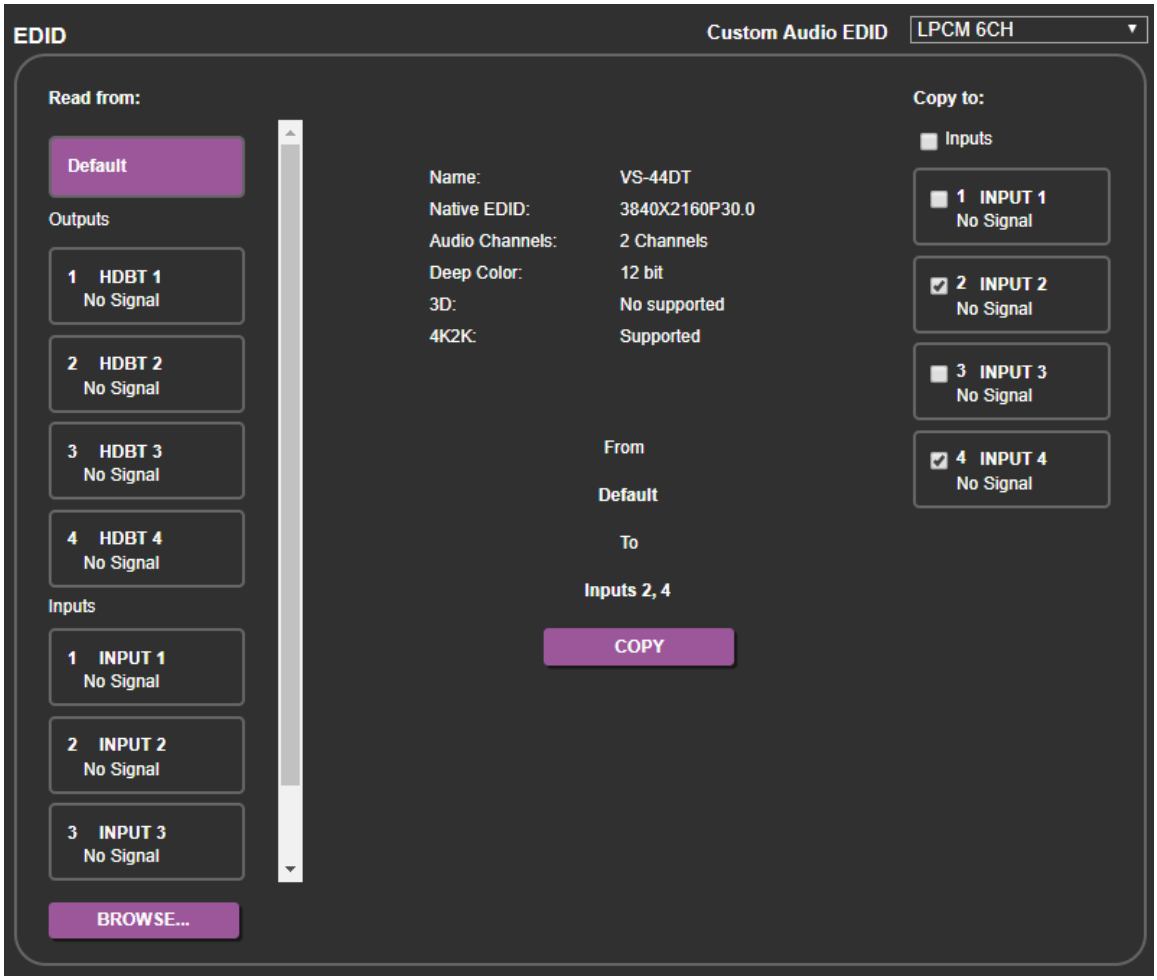


Figure 13: Copying the EDID

3. Click COPY.
   The COPY EDID RESULTS lists the actions taken.

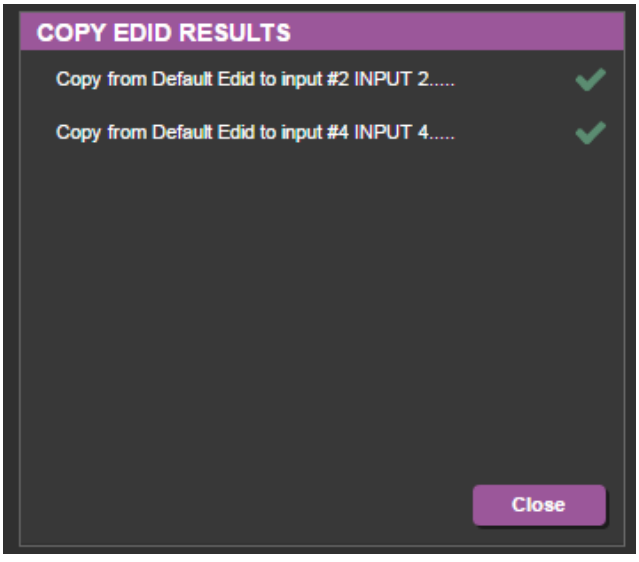


Figure 14: EDID Copied

RS-232 Routing Page

The RS-232 Routing page enables you to route RS-232 data to Out 1, Out 2, Out 3 or Out 4.

Figure 15: RS-232 Routing Page

Audio Settings Page

The Audio Settings page enables you to set the volume of the audio output or mute it.

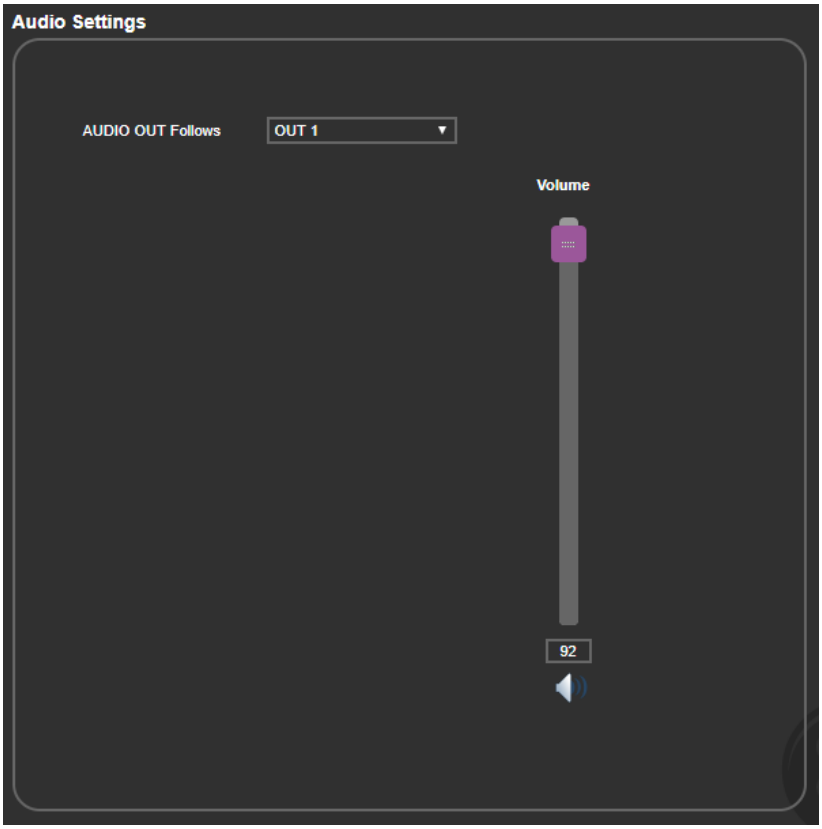


Figure 16: Audio Settings Page

Advanced Page

The Advanced page enables you to:

- Set Auto Switching Mode.
- Set Auto Switching Priority.

Figure 17: Advanced Page

Auto Switching Mode

Auto Switching makes certain that a display never remains blank due to the interruption of the designated input signal, or that a display shows the most current input signal established.

Auto Switching Mode only works for outputs in which Auto Switching is set to ON (see Switching Page on page 20). The automatic switching has 3 operation modes:

- Manual (see Setting Auto Switching to Manual on page 28).
- Priority (see Setting Auto Switching to Priority on page 29).
- Last Connected (see Setting Auto Switching to Last Connected on page 30).

Setting Auto Switching to Manual

Manual mode ignores whether Auto Switching is set to ON for any outputs (see Switching Page on page 20). If an output loses its designated input signal, one of two things can happen (depending on Switching Timeout settings):

- The output maintains a 5V signal (resulting in a blank screen until the designated input signal is restored).

  or

- The output signal stops (resulting in the display potentially entering standby mode).

See Switching Timeout on page 31 for details.

To set Auto Switching to Manual:

1. Navigate to the Advanced page.
2. Set the **Auto Switching Mode** dropdown to **Manual**.

Switch inputs manually in one of the following ways:

- Front Panel buttons (see Switching Inputs to Outputs on page 11).
- Switching Webpage (see via Switching Page on page 20).
- Protocol 3000 Command (see (see Switching Commands on page 57).

The device always keeps the routing settings regardless of trigger events (e.g., input/output connect/disconnect).

If a manual input selection is made when the device is in Automatic mode, the device goes into Manual Override mode and the input remains selected as long as the input is active. When the manually selected input becomes inactive, the device returns to Automatic mode.

Setting Auto Switching to Priority

Using the control shown in Figure 18, drag and drop the HDMI 1 through HDMI 4 inputs into the desired order of priority. If an output is set to Auto-switching ON and the input signal assigned to that output is disconnected, the output redirects to an active input signal with a lower priority. Should the input signal reconnect, the output redirects to the highest priority signal available.

To set Auto Switching to Priority:

1. Navigate to the Advanced page.
2. Set the **Auto Switching Mode** dropdown to **Priority**.

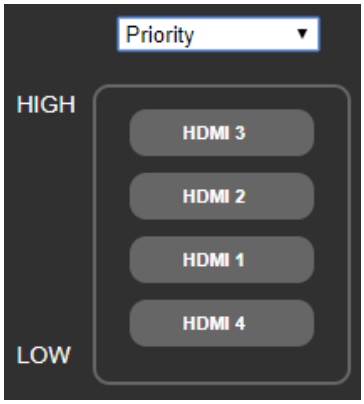


Figure 18: Priority settings

Example:

1. Output 2 is mapped to Input HDMI 2 and Auto-switching is set to ON (via Switching Page on page 20).
2. Priorities are set based on Figure 18.
3. All 4 HDMI inputs are active.

4. Input signals 1, 2, and 3 get disconnected.
   Output 2 automatically switches to Input 4.
5. Input 2 gets reconnected.
   Output 2 automatically switches to Input 2.
6. Input 1 gets reconnected.
   Nothing changes since Input 1 is below Input 2 priority.
7. Input 3 gets reconnected.
   Output 2 automatically switches to Input 3.

The switching is based on the trigger events (e.g., input/output connect/disconnect) and changes based on the order of HDMI inputs.

Setting Auto Switching to Last Connected

If an output is set to Auto-switching ON (via Switching Page on page 20), the output always uses the latest active input signal connected. If that input signal fails, the output switches to the previous active input signal that was connected. The output continues switching to any new input signal that becomes active.

To set Auto Switching to Last Connected:

1. Navigate to the Advanced page.
2. Set the **Auto Switching Mode** dropdown to **Last Connected**.

Example:

1. Output 2 is mapped to Input HDMI 2 and Auto-switching is set to ON (via Switching Page on page 20).
2. The input signals are connected in the following order (HDMI 4, HDMI 3, HDMI 2, and HDMI 1) as each input signal is connected, the output switches from 4 to 3 to 2 to 1.
3. Input signals 1 and 2 get disconnected.
   Output 2 automatically switches to Input 3.
4. Input 1 gets reconnected.
   Output 2 automatically switches to Input 1.
5. Input 4 gets disconnected and reconnected.
   Output 2 automatically switches to Input 4.

Switching Timeout

When an AV signal to a display stops or is temporarily interrupted, the display may go into standby mode. Once a display is in standby, it may require time to restart after a new AV signal is introduced. **VS-44DT** prevents the display from going into standby mode after an AV signal interruption by maintaining a 5V signal with no AV information until the AV signal is restored. The **VS-44DT** can be configured to stop the 5V signal after a delay (e.g., to enable a display to shut down automatically after an AV signal has finished).

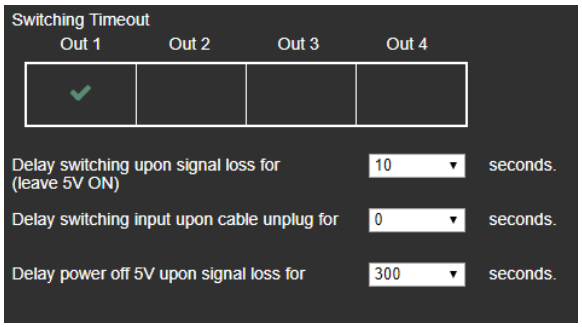


Figure 19: Switching Timeout

To enable a switching timeout for an output:

1. Select outputs (Out 1 – Out 4) shown in Figure 19.

If an output is not checked, it will continually receive a 5V signal preventing the display from ever entering standby mode.

2. Using the menu shown in Figure 19, you can set:
   - How many seconds to delay an auto-switch after detecting no AV from the input signal.
   - How many seconds to delay an auto-switch after the active input cable is unplugged.
   - How many seconds to maintain a 5V signal after detecting no AV input signal (used when Auto-Switching mode is set to Manual).

Authentication Page

The Authentication page enables you to:

- Turn web page authentication on and off.
- Set the web password.

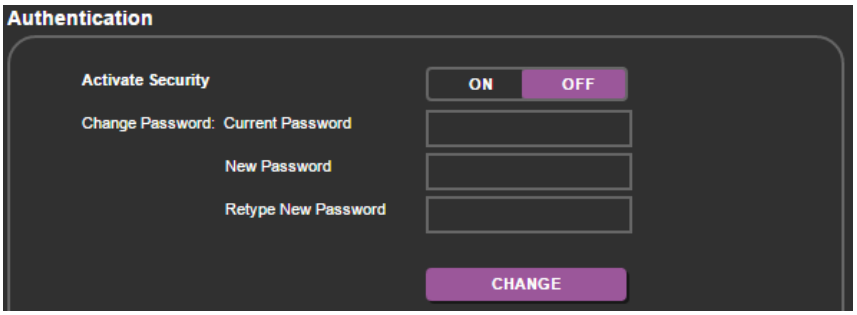


Figure 20: Authentication Page

If security is activated, you need to access the web pages using the password and then click the arrow.

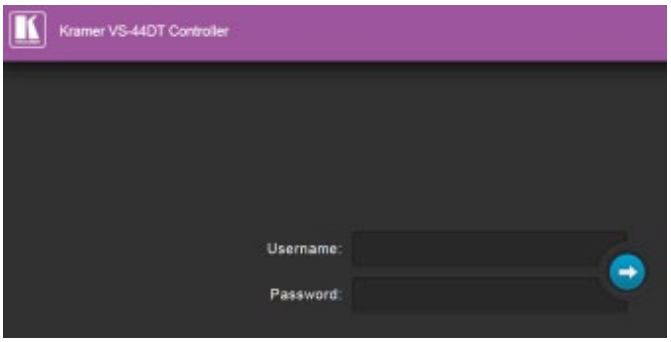


Figure 21: Login Page

If authentication is enabled, enter a valid user name (default = Admin) and password (default = Admin) and click on the arrow.

About Page

The About page displays the device firmware revision and the Kramer company details.

Figure 22: About Page

Updating the Firmware

The **VS-44DT** uses two microcontrollers that run firmware located in flash memory. The firmware for these microcontrollers may be upgraded independently.

To upgrade the main microcontroller firmware:

1. From www.kramerav.com/downloads/VS-44DT download the latest firmware file to your PC.
2. Open Windows Explorer on your PC.
3. Power off the **VS-44DT**.
4. Connect the **VS-44DT** to your PC using a USB cable.
5. Power on the **VS-44DT** while holding down the OFF button.
6. After a few seconds a removable drive is displayed in your Windows Explorer. Release the OFF button.
7. Copy the firmware file from your PC to the new removable drive.
8. After the file has been transferred, power-cycle the **VS-44DT**.
   As soon as the **VS-44DT** is ready for operation, the upgrade process is complete.

To upgrade the I/O microcontroller firmware:

1. Go to www.kramerav.com/downloads/VS-44DT and download the latest firmware file, to your PC.
2. Open Windows Explorer on your PC.
3. Power off the **VS-44DT**.
4. Connect the **VS-44DT** to your PC using a USB cable.
5. Power on the **VS-44DT** while holding down the STO, RCL and LOCK buttons.
6. Copy the firmware file from your PC to the new removable drive.
7. After the file has been transferred, power-cycle the **VS-44DT**.
   As soon as the **VS-44DT** is ready for operation, the upgrade process is complete.

Technical Specifications

Inputs:	4 HDMI on HDMI connectors 5 IR on 3.5mm mini jack connectors
Outputs:	2 HDMI on HDMI connectors 4 HDBaseT on RJ-45 connectors 5 IR on 3.5mm mini jack connectors 1 Unbalanced stereo audio 1.3Vpp nominal (2Vrms max) / 100Ω on a 3.5mm mini jack connector
Ports:	1 Ethernet on an RJ-45 connector 1 Program on a USB connector 1 RS-232 control on a 3-pin terminal block 1 RS-232 data on a 3-pin terminal block
Maximum data rate:	10.2Gbps (3.4Gbps per graphic channel)
Supported Resolutions:	Up to 4K@60Hz (4:2:0)
HDMI Range:	15m (49ft) @ 8bit resolution 10m (33ft) @ 12 bit resolution
HDBaseT Range:	100m (328ft) 4K@30Hz 180m (590ft) 1080@60Hz@24bpp
Power Consumption:	100-240V AC 50/60Hz 38VA
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:	19” x 13.72” x 1U (W, D, H) rack mountable
Shipping Dimensions	54.3cm x 44.2cm x 10.7cm (21.4” x 17.4” x 4.2”) W, D, H
Weight:	3.3kg (7.27lbs) approx.
Shipping Weight:	4.1kg (9.04lbs) approx.
Included Accessories:	Rack ears, 4 IR receiver cables, 4 IR emitter cables.
Specifications are subject to change without notice, go to our web site at www.kramerav.com	

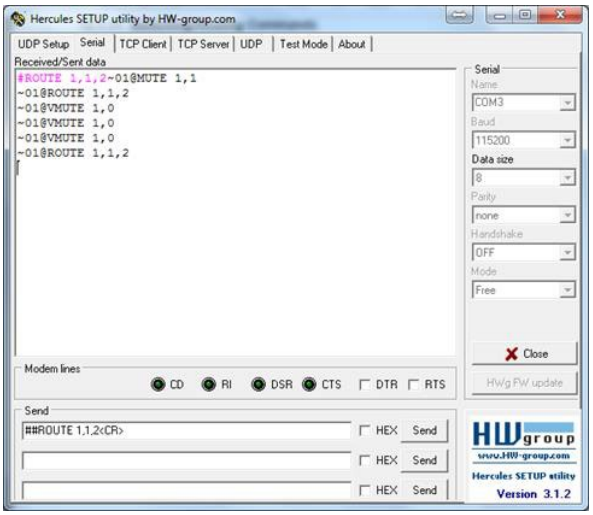
Default IP Parameters

RS-232	
Baud Rate:	115,200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII
Example (Route the video from the HDMI IN 3 to Out1):	#VID 3>1<cr>
Ethernet	
IP Address:	192.168.1.39
Subnet Mask:	255.255.0.0
Default Gateway:	192.168.0.1
TCP Port #:	5000
Default UDP Port #:	50000
Maximum TCP Ports:	4
Maximum UDP Ports:	10
Full Factory Reset	
Menu:	Menu-> RESET TO DEFAULT-> Change the option to YES and press Enter (to complete the reset process you need to turn the power off and then on again).
Web Page:	Go to the Device Settings page and click FACTORY RESET
Protocol 3000:	#factory<cr> command

Protocol 3000

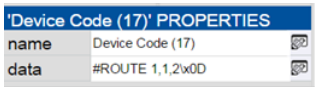
The **VS-44DT** can be operated using the Kramer Protocol 3000 serial commands. The command framing varies according to how you interface with the **VS-44DT**. For example, a basic video input switching command that routes a layer 1 video signal to HDMI out 1 from HDMI input 2 (`ROUTE 1,1,2`), is entered as follows:

- Terminal communication software, such as Hercules:



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

- K-Touch Builder (Kramer software):



- K-Config (Kramer configuration software):

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

You can enter commands directly using terminal communication software (e.g., Hercules) by connecting a PC to the serial or Ethernet port on the **VS-44DT**. 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 37
- General syntax used for Protocol 3000 commands, see Kramer Protocol 3000 Syntax

on page 37

- Protocol 3000 commands available for the **VS-44DT**, see Protocol 3000 Commands on page 41

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

Extended Protocol 3000

In addition to the standard Protocol 3000 syntax, newer Kramer products use extended syntax to improve user experience and provide easier deployment and configuration.

For products with many ports and of different types, the extended syntax describes commands and their parameters in a more intuitive, user-friendly format.

To identify devices supporting extended commands, use the `#HELP` command to list all supported commands. Commands that begin with the prefix '`X-`' use extended Protocol 3000 syntax. Extended commands use Port ID (see Port ID Format) and Signal ID (see Signal ID Format) instead of the old port naming parameters.

Port ID Format

The port ID is composed of three fields separated by a dot '.' (`<direction_type>.<port_type>.<port_index>`), where:

- `<direction_type>` – specifies the direction of the port (see Direction Types)
- `<port_type>` – identifies the port type (see Port Types)
- `<port_index>` – is a port index that always matches the port number printed on the

front or rear panel of the product

Examples:
`IN.SDI.1` (refers to SDI input port 1)
`OUT.HDMI.4` (refers to HDMI output port 4)
`BOTH.RS232.2` (refers to bidirectional RS-232 port 2)

Direction Types

The string representation is not case sensitive.

String	Meaning
IN	Input port
OUT	Output port
BOTH	Bi-directional port where the direction has no meaning

Port Types

The string representation is not case sensitive.

String	Meaning
HDMI	HDMI port
HDBT	HDBaseT port
SDI	Any serial digital SDI port
ANALOG_AUDIO	Any balanced or unbalanced audio ports
AMPLIFIED_AUDIO	Any analog outputs defined as amplified audio
MIC	Any microphone port including a balanced audio input port divided into left/right
RS232	Local control port used for data control
IR	Local IR input
USB_A	Local USB port of type-A (client)
USB_B	Local USB port of type-B (host)

Signal ID Format

The signal ID is composed of three fields separated by a dot '.' (`<port_id>.<signal_type>.<index>`), where:

- `<port_id>` – Indicates the port ID, as described in Port ID Format
- `<signal_type>` – Indicates the type of signal, as described in Extended Signal Types
- `<index>` – Indicates a specific channel number when there are multiple channels of the same type

Signal ID: <port_id>.<signal_type>.<index>
also means: <<direction_type>.<port_type>.<index>>.<signal_type>.
<channel_index>

Examples:
`IN.HDMI.1.VIDEO.1` (refers to video channel 1 of HDMI input port 1)
`OUT.HDBT.1.AUDIO.1` (refers to audio channel 1 of HDBaseT output port 1)

Extended Signal Types

The string representation is non-case sensitive.

String	Meaning
VIDEO	Video signal of the port
AUDIO	Audio signal of the port
RS232	Data signal of the port (relevant for HDBT and RS-232 ports for example)
IR	IR signal of the port (relevant for HDBT and IR ports for example)
USB	USB signal of the port (relevant for HDBT and USB_A/B ports for example)

Examples

To understand the advantages of the extended Protocol 3000 syntax, compare the standard `MUTE` and `VMUTE` command syntax with the extended `X-MUTE` command syntax.

`MUTE` and `VMUTE` are dedicated commands to mute audio and video respectively. Both commands receive the index of the output to mute as a parameter. Two separate commands are used to mute different signal types and neither command enable muting the inputs and not the outputs.

However, the `X-MUTE` command can mute audio and/or video on either inputs or outputs:

- Mute video on output 1: #X-MUTE OUT.HDMI.1.VIDEO.1
- Mute audio on output 1: #X-MUTE OUT.HDMI.1.AUDIO.1
- Mute video on input 1: #X-MUTE IN.HDMI.1.VIDEO.1
- Mute audio on input 1: #X-MUTE IN.HDMI.1.AUDIO.1

The name of the action remains the same and what it affects is included in the parameters.

In another example, the `#ROUTE` command is extended by the command `#X-ROUTE`:

- To route a video signal to HDBT output #4 from HDMI input #1:
  #X-ROUTE OUT.HDBT.4.VIDEO.1,IN.HDMI.1.VIDEO.1
  ~01@X-ROUTE OUT.HDBT.4.VIDEO.1,IN.HDMI.1.VIDEO.1
- To route an audio signal to analog output #1 from the HDMI input #1:
  #X-ROUTE OUT.ANALOG_AUDIO.1.AUDIO.1,IN.HDMI.1.AUDIO.1
  ~01@X-ROUTE OUT.ANALOG_AUDIO.1.AUDIO.1,IN.HDMI.1.AUDIO.1

Other Rules

In routing commands, first specify the target output(s), then the source input.
Example: `#X-ROUTE OUT.ANALOG_AUDIO.1.AUDIO.1,IN.HDMI.1.AUDIO.1`

Brackets '[' and ']' are reserved Protocol 3000 characters that define a list of parameters as in [a,b,c,d].
Example: to route video input 3 to outputs 1,4,6,7: **`ROUTE 1,[1,4,6,7],3<cr>`**

Example illustrating brackets and commas:
`#SIGNALS-LIST?`

```
~01@SIGNALS-LIST
[IN.SDI.1.VIDEO.1,IN.SDI.2.VIDEO.1,IN.SDI.3.VIDEO.1,IN.SDI.4.VIDEO.1,IN.SDI.5.VIDEO.1,IN.SDI.6.VIDEO.1,IN.SD
I.7.VIDEO.1,IN.SDI.8.VIDEO.1,OUT.SDI.1.VIDEO.1,OUT.SDI.2.VIDEO.1,OUT.SDI.3.VIDEO.1,OUT.SDI.4.VIDEO.1,OUT.SDI
.5.VIDEO.1,OUT.SDI.6.VIDEO.1,OUT.SDI.7.VIDEO.1,OUT.SDI.8.VIDEO.1]
```

Protocol 3000 Commands

This section includes the following commands:

Kramer Protocol 3000 Commands

The following are the detailed protocol commands

System Commands

Command	Description
#	Protocol handshaking
BUILD-DATE	Get device build date
FACTORY	Reset to factory default configuration
HELP	Get command list
MODEL	Get device model
PROT-VER	Get device protocol version
RESET	Reset device
VERSION	Get device firmware version
AV-SW-MODE	Set/get auto switch mode
AV-SW-TIMEOUT	Set/get auto switching timeout
DISPLAY	Get output HPD status
HDCP-STAT	Get HDCP signal status
SIGNAL	Get input signal lock status
SIGNALS-LIST	Get signal ID list of this machine
PRIORITY	Set/get priority for all channels
PRST-RCL	Recall saved preset list
PRST-STO	Store current connections, volumes and modes in preset
LOCK-FP	Lock the port
MACH-NUM	Set machine number

#

Functions		Permission	Transparency
Set:	**#**	End User	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Protocol handshaking	**#**CR	
Get:	-	-	
Response			
~nn@SP**OK**CR LF			
Notes			
Validates the Protocol 3000 connection and gets the machine number			
K-Config Example			
"#",0x0D			

BUILD-DATE

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

FACTORY

Functions		Permission	Transparency
Set:	**FACTORY**	End User	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Reset device to factory default configuration	#**FACTORY**CR	
Get:	-	-	
Response			
~nn@**FACTORY**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			
"#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 LFUSAGE:*usage*CR LF			
Parameters			
COMMAND_NAME – name of a specific command			
Notes			
To get help for a specific command use: HELPSP*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@**MODEL** SP *model_name* CR 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			
"#MODEL?",0x0D			

PROT-VER

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

RESET

Functions		Permission	Transparency
Set:	**RESET**	Administrator	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Reset device	#**RESET**CR	
Get:	-	-	
Response			
~nn@**RESET** SP *OK* CR 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",0x0D			

VERSION

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

AV-SW-MODE

Functions		Permission	Transparency
Set:	**AV-SW-MODE**	End user	Public
Get:	**AV-SW-MODE?**	End user	Public
Description		**Syntax**	
Set:	Set input auto switch mode (per output)	#**AV-SW-MODE**SP*layer,output_id,mode*CR	
Get:	Get input auto switch mode (per output)	#**AV-SW-MODE?**SP*layer,output_id*CR	
Response			
~nn@**AV-SW-MODE**SP*layer,output_id,mode*CR LF			
Parameters			
layer 1 - Video 2 - Audio 3 - Data 4 - IR *output_id* – 1….num of system outputs *mode* 0 - manual 1 - priority switch 2 - last connected switch			
Response Triggers			
Notes			

AV-SW-TIMEOUT

Functions		Permission	Transparency
Set:	**AV-SW-TIMEOUT**	End User	Public
Get:	**AV-SW-TIMEOUT?**	End User	Public
Description		**Syntax**	
Set:	Set auto switching timeout	#**AV-SW-TIMEOUT**SP*action,time_out*CR	
Get:	Get auto switching timeout	#**AV-SW-TIMEOUT?**SP*action*CR	

Response

~nn@**AV-SW-TIMEOUT**SP*action,time_out*CR

Parameters

action – event that triggers the auto switching timeout: 0=video out signal loss
timeout – timeout in seconds (minimum 3 seconds)

Notes

The timeout must not exceed 60000 seconds.
The timeout for video signal loss (0) event must not be less than 3 seconds.

K-Config Example

Set video signal loss timeout to 6 seconds:
"#AV-SW-TIMEOUT 0,6",0x0D

DISPLAY

Functions		Permission	Transparency
Set:	-	-	-
Get	**DISPLAY?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get output HPD status	#**DISPLAY?**SP*out_id*CR	

Response

~nn@**DISPLAY**SP*out_id,status*CR LF

Parameters

out_id – Out 1=1; Out 2=2; Out 3=3; Out 4=4
status – HPD status according to signal validation : 0 (Off), 1 (On), 2 (On and all parameters are stable and valid)

Response Triggers

A response is sent to the com port from which the Get was received, after command execution and:
After every change in output HPD status from On to Off (0)
After every change in output HPD status from Off to On (1)
After every change in output HPD status form Off to On and all parameters (new EDID, etc.) are stable and valid (2)

K-Config Example

Get the output HPD status of HDMI Out:
"#DISPLAY? 1",0x0D

HDCP-STAT

Functions		Permission	Transparency
Set:	-	-	-
Get:	**HDCP-STAT?**	End User	Public
Description		**Syntax**	
Set:	None	-	
Get:	Get HDCP signal status	#**HDCP-STAT?**SP*stage*,*stage_id*CR	
Response			
Set / Get: ~nn@**HDCP-STAT**SP*stage*,*stage_id*,*status*CR LF			
Parameters			
stage – 0 = Input, 1 = Output *stage_id* – number of chosen stage (1.. max number of inputs/outputs) *status* – signal encryption status - valid values ON/OFF 0 = HDCP Off 1 = HDCP On 2 = Follow input 3 = Mirror output (“MAC mode”)			
Response Triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received Response is sent to all com ports after execution if HDCP-STAT was set by any other external control device (button press, device menu and similar) or HDCP mode changed			
Notes			
On output – sink status On input – signal status			

SIGNAL

Functions		Permission	Transparency
Set:	-	-	-
Get	**SIGNAL?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get input signal status	#**SIGNAL?**SP*inp_id*CR	
Response			
~nn@**SIGNAL**SP*inp_id*,*status*CR LF			
Parameters			
inp_id – input number: IN 1=**1**, IN 2=**2**, IN 3=**3**, IN 4=**4** *status* – signal status according to signal validation: 0 (Off), 1 (On)			
Response Triggers			
After execution, a response is sent to the com port from which the Get was received A response is sent after every change in input signal status from On to Off or from Off to On			
K-Config Example			
Get the input signal status of HDMI In: "#SIGNAL? 1",0x0D			

SIGNALS-LIST

Functions		Permission	Transparency
Set:	–	–	–
Get:	**SIGNALS-LIST?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get signal ID list of this machine	**#SIGNALS-LIST?**CR LF	
Response			
~nn@**SIGNALS-LIST**SP *[signal_id,..,]*CR LF			
Parameters			
signal_id – see Signal ID Format			
Response Triggers			
Notes			
The response is returned in one line and terminated with CR LF The response format lists signal IDs separated by commas. This is an Extended Protocol 3000 command			
Examples			
#SIGNALS-LIST? ~01@SIGNALS-LIST [IN.SDI.1.VIDEO.1,IN.SDI.2.VIDEO.1,IN.SDI.3.VIDEO.1,IN.SDI.4.VIDEO.1, IN.SDI.5.VIDEO.1,IN.SDI.6.VIDEO.1,IN.SDI.7.VIDEO.1,IN.SDI.8.VIDEO.1, OUT.SDI.1.VIDEO.1,OUT.SDI.2.VIDEO.1,OUT.SDI.3.VIDEO.1,OUT.SDI.4.VIDEO.1, OUT.SDI.5.VIDEO.1,OUT.SDI.6.VIDEO.1,OUT.SDI.7.VIDEO.1,OUT.SDI.8.VIDEO.1]			

PRIORITY

Functions		Permission	Transparency
Set:	**PRIORITY**	Administrator	Public
Get:	**PRIORITY?**	Administrator	Public
Description		**Syntax**	
Set:	Set input priority	**#PRIORITY**SP*layer,PRIORITY1,PRIORITY2… PRIORITYn*CR	
Get:	Get input priority	**#PRIORITY?**SP*layer*CR	
Response			
~nn@**PRIORITY**SP*layer,PRIORITY1,PRIORITY2… PRIORITYn*CR LF			
Parameters			
layer – 1 – Video, 2 – Audio, 3 – Data, 4 – IR *PRIORITY1* – priority of first input *PRIORITYn* – priority of input n			
Response Triggers			
Notes			
WP-577VH – layer parameter is not used			

PRST-RCL

Functions		Permission	Transparency
Set:	**PRST-RCL**	End User	Public
Get	-	-	-
Description		**Syntax**	
Set:	Recall saved preset list	#**PRST-RCL**SP*preset*CR	
Get:	-	-	
Response			
~nn@**PRST-RCL**SP*preset*CR LF			
Parameters			
preset – input number: IN 1=1, IN 2=2, IN 3=3, IN 4=4			
K-Config Example			
Recall preset 1: "#PRST-RCL 1",0x0D			

PRST-STO

Functions		Permission	Transparency
Set:	**PRST-STO**	End User	Public
Get	-	-	-
Description		**Syntax**	
Set:	Store current connections, volumes and modes in preset	#**PRST-STO**SP*preset*CR	
Get:	-	-	
Response			
~nn@**PRST-STO**SP*preset*CR LF			
Parameters			
preset – preset number: IN 1=1, IN 2=2, IN 3=3, IN 4=4			
K-Config Example			
Store preset 1: "#PRST-STO 1",0x0D			

LOCK-FP

Functions		Permission	Transparency
Set:	**LOCK-FP**	End User	Public
Get	**LOCK-FP?**	End User	Public
Description		**Syntax**	
Set:	Lock front panel	#**LOCK-FP**SP*lock_mode*CR	
Get:	Get front panel lock state	#**LOCK-FP?**	
Response			
~nn@**LOCK-FP**SP*lock_mode*SP*OK*CR LF			
Parameters			
lock_mode – unlock the front panel buttons (Off)=**0**, lock the front panel buttons (On)=**1**			
K-Config Example			
Unlock front panel: "#LOCK-FP 0",0x0D			

MACH-NUM

Functions		Permission	Transparency
Set:	**MACH-NUM**	End User	Public
Get	-	-	-
Description		**Syntax**	
Set:	Set machine number	#**MACH-NUM**SP*machine_number*CR	
Get:	-	-	
Response			
~nn@**MACH-NUM**SP*machine_number*CR LF			
Parameters			
machine_number – new device machine number			
K-Config Example			
Set new machine number to 3: "#MACH-NUM 3",0x0D			

Video Commands

Command	Description
VMUTE	Set/get video switch state

VMUTE

Functions		Permission	Transparency
Set:	**VMUTE**	End User	Public
Get:	**VMUTE?**	End User	Public
Description		**Syntax**	
Set:	Set enable/disable video on output	#**VMUTE**SP*output_id,flag*CR	
Get:	Get video on output status	#**VMUTE?**SP*output_id*CR	
Response			
~nn@**VMUTE**SP*output_id*CR			
Parameters			
output_id – the number of outputs: OUT 1=1, OUT 2=2, OUT 3=3, OUT 4=4 *flag* – disable video on output=0, enable video on output=1			
Notes			
The timeout must not exceed 60000 seconds. The timeout for video and audio signal loss events must not be less than 5 seconds.			
K-Config Example			
Enable video on OUT 1: "#VMUTE 1,1",0x0D			

EDID Handling Commands

Additional EDID data functions can be performed via the **VS-44DT** web pages or a compatible EDID management application, such as Kramer EDID Designer (see www.kramerav.com/product/VS-44DT).

Command	Description
CPEDID	Copy EDID data from the output to the input EEPROM
EDID-AUDIO	Set/get audio capabilities for EDID
GEDID	Set/get EDID data
LDEDID	Load EDID data

CPEDID

Functions		Permission	Transparency
Set:	**CPEDID**	End User	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Copy EDID data from the output to the input EEPROM	#**CPEDID**SP*src_type,src_id,dst_type, dest_bitmap*CR	
Get:	-	-	

Response

~nn@**CPEDID**SP*src_type,src_id,dst_type,dest_bitmap*CR LF

Parameters

src_type – EDID source type: IN=0, OUT=1, default EDID=2
src_id – IN=1~4, OUT=1~4
dst_type –input=0
dest_bitmap – bitmap representing destination IDs. Format: XXXX…X, where X is hex digit. The binary form of every hex digit represents corresponding destinations. Setting '1' indicates that EDID data is copied to this destination. Setting '0' indicates that EDID data is not copied to this destination.

Response Triggers

Response is sent to the com port from which the Set was received (before execution)

Notes

Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word)
Example: bitmap 0x0013 means inputs 1, 2 and 5 are loaded with the new EDID.
In this device, if the destination type is input (0), the bitmap size is 4 bits, for example bitmap 0x5 means inputs 1 and 3 are loaded with the new EDID.

K-Config Example

Copy the EDID data from the HDMI Out 1 output (EDID source) to the HDMI In 1 input:
"#CPEDID 1,1,0,0x1",0x0D
Copy the EDID data from the default EDID source to HDMI In 1 and HDMI In 2:
"#CPEDID 2,0,0,0x3",0x0D

EDID-AUDIO

Functions		Permission	Transparency
Set:	**EDID-AUDIO**	End User	Public
Get:	**EDID-AUDIO?**	End User	Public
Description		**Syntax**	
Set:	Set audio capabilities for EDID	#**EDID-AUDIO** SP *mode* CR	
Get :	Get audio capabilities for EDID	#**EDID-AUDIO?** CR	

Response

~nn@**EDID-AUDIO** SP *mode* CR LF

Parameters

mode – audio block added to EDID
- 0 - Auto
- 1 - LPCM 2CH
- 2 - LPCM 6CH
- 3 - LPCM 8CH
- 4 - Bitstream
- 5 - HD

Response Triggers

GEDID

Functions		Permission	Transparency
Set:	**GEDID**	Administrator	Public
Get:	**GEDID?**	End User	Public
Description		**Syntax**	
Set:	Set EDID data from device	#**GEDID** SP *stage*,*stage_id* CR	
Get:	Get EDID support on certain input/output	#**GEDID?** SP *stage*,*stage_id* CR	

Response

Set:
Multi-line response:
~nn@**GEDID** SP *stage*,*stage_id*,*size* CR LF
EDID_data CR LF
~nn@**GEDID** SP *stage*,*stage_id* SP *OK* CR LF
Get:
~nn@**GEDID** SP *stage*,*stage_id*,*size* CR LF

Parameters

stage – 0 = Input, 1 = Output
stage_id – number of chosen stage (1.. max number of inputs/outputs)
size – EDID data size. For Set, size of data to be sent from device, for Get, 0 means no EDID support

Response Triggers

Notes

For Get, size=0 means EDID is not supported
For old devices that do not support this command, ~nn@**ERR 002** CR LF is received

LDEDID

Functions		Permission	Transparency
Set:	**LDEDID**	End User	Public
Get:	–	-	-
Description		**Syntax**	
Set:	Write EDID data from external application to device	Multi-step syntax (see following steps)	
Get:	None	None	

Communication Steps (Command and Response)

Step 1: #**LDEDID** SP *dst_type,dest_bitmask,size,safe_mode* CR

Response 1: ~nn@**LDEDID** SP *dst_type,dest_bitmask,size,safe_mode* SP *READY* CR LF or

~nn@**LDEDID** SP *ERRnn* CR LF

Step 2: If ready was received, send EDID_DATA

Response 2: ~nn@**LDEDID** SP *dst_type,dest_bitmask,size,safe_mode* SP *OK* CR LF or

~nn@**LDEDID** SP *ERRnn* CR LF

Parameters

dst_type – EDID destination type (usually input)

0 - Input
1 - Output
2 - Default EDID
3 - Custom EDID

dest_bitmask – bitmap representing destination IDs. Format: 0x********, where * is ASCII presentation of hex digit. The binary presentation of this number is a bit mask for destinations. Setting '1' means EDID data has to be copied to this destination

size - EDID data size

safe_mode - 0 - Device accepts the EDID as is without trying to adjust

1 - Device tries to adjust the EDID

EDID_DATA – data in protocol packets (see Packet Protocol Structure on page 61).

Response Triggers

Response is sent to the com port from which the Set (before execution)

Notes

When the unit receives the LDEDID command it replies with READY and enters the special EDID packet wait mode. In this mode the unit can receive only packets and not regular protocol commands.

If the unit does not receive correct packets for 30 seconds or is interrupted for more than 30 seconds before receiving all packets, it sends timeout error ~nn@**LDEDID** SP *ERR01* CR LF and returns to the regular protocol mode. If the unit received data that is not a correct packet, it sends the corresponding error and returns to the regular protocol mode.

See Protocol Packet reference in see Packet Protocol Structure on page 61.

Audio Commands

Command	Description
AUD-LVL	Set/get audio-level
AUD-DEEMB	Set/get audio in video embedding status
MUTE	Set/get audio mute
VOLUME	Set/get simple audio volume

AUD-LVL

Functions		Permission	Transparency
Set:	**AUD-LVL**	End User	Public
Get:	**AUD-LVL?**	End User	Public
Description		**Syntax**	
Set:	Set volume level	**#AUD-LVL**SP*stage*,*channel*,*volume*,*mutebehavior*CR	
Get:	Get volume level	**#AUD-LVL?**SP*stage*,*channel*CR	

Response

~nn@**AUD-LVL**SP*stage*,*channel*,*volume*CR LF

Parameters

stage – 0 = Input, 1 = Output
channel – output number = 1
volume – volume level -0 to 100
++ increase current value
-- decrease current value

Response Triggers

Notes

AUD-DEEMB

Functions		Permission	Transparency
Set:	**AUD-DEEMB**	End User	Public
Get:	**AUD-DEEMB?**	End User	Public
Description		**Syntax**	
Set:	Set audio in video embedding status	**#AUD-DEEMB**SP*P1 aud_id,port_id*CR	
Get:	Get audio in video embedding status	**#AUD-DEEMB?**SP*P1 aud_id,port_id*CR	

Response

~nn@**AUD-DEEMB**SP*P1 aud_id,port_id*CR LF

Parameters

P1- P1 aud_id – 1 Could have only one value =1 . The device can take the de-embedded audio to analog output . We have 1 analog output in this device

port_id:1~4 – The device has 4 digital inputs and for outputs so it is possible to take the audio from each of them

port_dir – optional = Defines if we want the de-embedded from input port or output port

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-DEEMB was set by any other external control device (button press, device menu and similar)
'~01@AUD-DEEMB P1,P2,P3 OKCR LF

Notes

User like to have on Analog output audio from Digital input 3
So the command will be #AUD-DEEMB 1,3,0<cr>
And feedback '~01@AUD-DEEMB 1,3,0 OKCR LF

MUTE

Functions		Permission	Transparency
Set:	**MUTE**	End User	Public
Get:	**MUTE?**	End User	Public
Description		**Syntax**	
Set:	Set audio mute	#**MUTE**SP*channel,mute_mode*CR	
Get:	Get audio mute	#**MUTE?**SP*channel*CR	

Response

~nn@**MUTE**SP*channel,mute_mode*CR

Parameters

channel –OUT=1

mute_mode – mute mode off=0, mute mode on=1

K-Config Example

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

VOLUME

Functions		Permission	Transparency
Set:	**VOLUME**	End user	-
Get	**VOLUME?**	End User	public
Description		**Syntax**	
Set:	Set simple audio volume	#**VOLUME**SP*P1*,*P2*CR	
Get:	Get simple audio volume	#**VOLUME?**SP*P1*CR	
Response			
~nn@**VOLUME**SP*P1*,*P2*CR LF			
Parameters			
P1 – Out channel: OUT 1=**1**, OUT 2=**2**, OUT 3=**3**, OUT 4=**4** *P2* – Volume: **0~100**			
K-Config Example			
Set the OUT 2 audio volume to 50: "#VOLUME 2,50",0x0D			

Switching Commands

Command	Description
VID	Set/get video switch state
ROUTE	Set/get layer routing
X-ROUTE	Set/get routing status to matrix

VID

Functions		Permission	Transparency
Set:	**VID**	End User	Public
Get	**VID?**	End User	Public
Description		**Syntax**	
Set:	Set video switch state	#**VID**SP*in>out*CR	
Get:	Get video switch state	#**VID?**SP*out*CR	
Response			
Set:~nn@**VID**SP*in>out*CR LF Get:~nn@**VID**SP*in>out*CR LF			
Parameters			
in – input number or '0' to disconnect output: IN 1=**1**, IN 2=**2**, IN 3=**3**, IN 4=**4**, output disconnected=**0** *>* – connection character between IN and OUT parameters *out* – output number or '*' for all outputs: OUT 1=**1**, OUT 2=**2**, OUT 3=**3**, OUT 4=**4**			
K-Config Example			
Switch IN 1 to OUT 3: "#VID 1>3",0x0D			

ROUTE

Functions		Permission	Transparency
Set:	**ROUTE**	End User	-
Get:	**ROUTE?**	End User	Switching
Description		**Syntax**	
Set:	Set layer routing	**#ROUTE**SP***Layer,dest,src***CR	
Get:	Get layer routing	**#ROUTE?**SP***layer,dest***CR	
Response			
~ nn**@ROUTE**SP***P1,P2,P3***CR LF			
Parameters			
layer – Layer number: Video=**1**, Audio**=2**, Data=**3,**IR=4 ***dest*** – Destination: Video: All=*, Disconnect=**x**, OUT 1=**1**, OUT 2=**2**, OUT 3=**3**, OUT 4=**4** Audio: All=*; Data: All=* ***src*** – source ID: Video: IN 1=**1**, IN 2=**2**, IN 3=**3**, IN 4=**4** Audio: OUT 1=**1**, OUT 2=**2**, OUT 3=**3**, OUT 4=**4** Data: OUT 1=**1**, OUT 2=**2**, OUT 3=**3**, OUT 4=**4**			
Notes			
This command replaces all other routing commands.			
K-Config Example			
Route the video from IN 2 to all the outputs: **"#ROUTE 1,*,2",0x0D**			

X-ROUTE

Functions		Permission	Transparency
Set:	**X-ROUTE**	End User	Public
Get:			

Description		Syntax
Set:	Send routing command to matrix	**#X-ROUTE**SP*OUT_signal_id,IN_signal_id*CR LF
Get:		

Response

Set: ~nn@X-ROUTE SP *OUT_signal_id,IN_signal_id* CR LF

Parameters

OUT_signal_id (<port_id>.<signal_type>.<index>)

Port_ID

IN
OUT
BOTH

Signal_type

VIDEO - Video signal of the port
AUDIO - Audio signal of the port
RS232 - Data signal of the port (relevant for HDBT and RS-232 ports for example)
IR - IR signal of the port (relevant for HDBT and IR ports for example)
USB - USB signal of the port (relevant for HDBT and USB_A/B ports for example)
Index - channel number

Response Triggers

Notes

It is recommended to use the command #SIGNALS-LIST? to get the list of all signal IDs available in the system and which can be used in this command
Video 1 is the default port in this command and is implied even if not written:

Examples

```
##X-ROUTE OUT.HDMI.1.VIDEO.1,IN.HDMI.2.VIDEO.1
```

Communication Commands

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

ETH-PORT

Functions		Permission	Transparency
Set:	**ETH-PORT**	Administrator	Public
Get:	**ETH-PORT?**	End User	Public
Description		**Syntax**	
Set:	Set Ethernet port protocol	#**ETH-PORT**SP*portType*,*ETHPort*CR	
Get:	Get Ethernet port protocol	#**ETH-PORT?**SP*portType*CR	
Response			
~nn@**ETH-PORT**SP*portType*,*ETHPort*CR LF			
Parameters			
portType – TCP=0, UDP=1 *ETHPort* – TCP / UDP port number: 0-65565			
Notes			
If the port number you enter is already in use, an error is returned The port number must be within the following range: 0-(2^16-1)			
K-Config Example			
Set the Ethernet port protocol for TCP to port 12457: "#ETH-PORT 0,12457",0x0D			

NET-DHCP

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

NET-GATE

Functions		Permission	Transparency
Set:	**NET-GATE**	Administrator	Public
Get:	**NET-GATE?**	End User	Public
Description		**Syntax**	
Set:	Set gateway IP	#**NET-GATE**SP*ip_address*CR	
Get:	Get gateway IP	#**NET-GATE?**CR	
Response			
~nn@**NET-GATE**SP*ip_address*CR LF			
Parameters			
ip_address – gateway IP address, in the following format: xxx.xxx.xxx.xxx			
Notes			
A network gateway connects the device via another network, possibly over the Internet. Be careful of security problems. Consult your network administrator for correct settings.			
K-Config Example			
Set the gateway IP address to 192.168.0.1: "#NET-GATE 192.168.000.001",0x0D			

NET-IP

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

NET-MAC

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

NET-MASK

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

Packet Protocol Structure

The packet protocol is designed to transfer large amounts of data, such as files, IR commands, EDID data, etc.

Using the Packet Protocol

To use the packet protocol:

1. Send a command: LDRV, LOAD, IROUT, LDEDID
2. Receive Ready or ERR###
3. If Ready:
   - Send a packet
   - Receive OK on the last packet
   - Receive OK for the command
4. Packet structure:
   - Packet ID (1, 2, 3…) (2 bytes in length)
   - Length (data length + 2 for CRC) - (2 bytes in length)
   - Data (data length -2 bytes)
   - CRC - 2 bytes

01	02	03	04	**05…**	
Packet ID		Length		Data	CRC

5. Response:

~*NNNN*SP**OK**CR LF

Where *NNNN* is the received packet ID in ASCII hex digits.

Calculating the CRC

The polynomial for the 16-bit CRC is:
CRC-CCITT: 0x1021 = $x^{16} + x^{12} + x^5 + 1$
Initial value: 0000
Final XOR Value: 0

For a code example, see:
http://sanity-free.org/133/crc_16_ccitt_in_csharp.html

CRC example:
Data = “123456789”
Result => 0x31C3

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P/N: 2900-300470 Rev: 3

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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