

## USER MANUAL

### MODEL:

VS-44DT

4x4 HDMI/HDBT Matrix Switcher



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# 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.

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## 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](http://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 GPIO 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](http://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/](http://www.kramerav.com/support/recycling/).

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## 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](http://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.

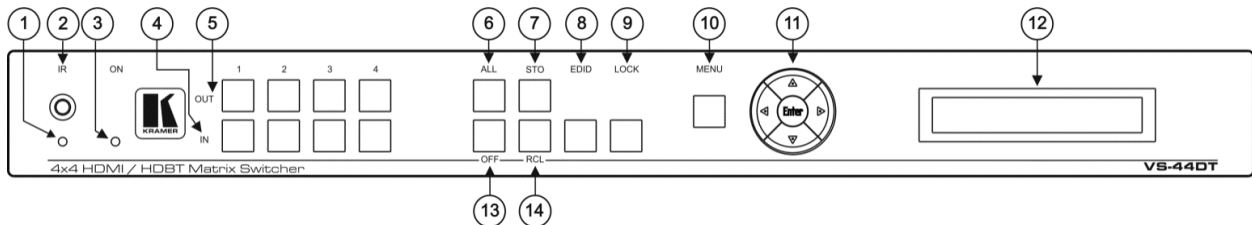


Figure 1: VS-44DT 4x4 HDMI/HDBT Matrix Switcher Front Panel

#	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 <a href="#">Switching Inputs to Outputs</a> 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 <a href="#">Disconnecting One or All Outputs</a> on page 13)
7	STO Button	Press to store a preset configuration followed by the preset number in which to save it, (see <a href="#">Storing and Recalling Preset Configurations</a> on page 12)
8	EDID Button	Press to copy the EDID from an output to an input, (see <a href="#">Acquiring an EDID</a> on page 12)
9	LOCK Button	Press and hold to lock the front panel buttons, (see <a href="#">Locking and Unlocking the Front Panel</a> 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 <a href="#">Using the Menu</a> 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 <a href="#">Using the Menu</a> 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 <a href="#">Disconnecting One or All Outputs</a> on page 13)
14	RCL Button	Press, followed by a preset number to recall the preset configuration (see <a href="#">Storing and Recalling Preset Configurations</a> on page 12)

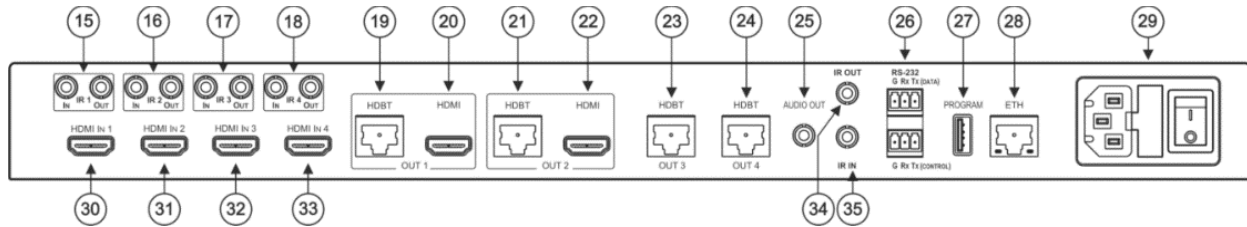


Figure 2: VS-44DT 4x4 HDMI/HDBT Matrix Switcher Rear Panel

#	Feature	Function
15	<i>IR 1</i> IN 3.5mm Mini Jack	Connect to an IR sensor. Receives IR commands and sends them over HDBT OUT 1
	<i>OUT</i> 3.5mm Mini Jack	Connect to the first IR emitter. Transmits IR commands that are sent over HDBT OUT 1
16	<i>IR 2</i> IN 3.5mm Mini Jack	Connect to an IR sensor. Receives IR commands and sends them over HDBT OUT 2
	<i>OUT</i> 3.5mm Mini Jack	Connect to the second IR emitter. Transmits IR commands that are sent over HDBT OUT 2
17	<i>IR 3</i> IN 3.5mm Mini Jack	Connect to an IR sensor. Receives IR commands and sends them over HDBT OUT 3
	<i>OUT</i> 3.5mm Mini Jack	Connect to the third IR emitter. Transmits IR commands that are sent over HDBT OUT 3
18	<i>IR 4</i> IN 3.5mm Mini Jack	Connect to an IR sensor. Receives IR commands and sends them over HDBT OUT 4
	<i>OUT</i> 3.5mm Mini Jack	Connect to the fourth IR emitter. Transmits IR commands that are sent over HDBT OUT 4
19	<i>OUT 1</i> HDBT RJ-45 Connector	Connect to the first HDBT receiver, (for example, the <b>TP-580RXR</b> )
20	HDMI Connector	Connect to the first HDMI receiver, (for example, an HDMI display)
21	<i>OUT 2</i> HDBT RJ-45 Connector	Connect to the second HDBT receiver, (for example, the <b>TP-580RXR</b> )
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 <b>TP-580RXR</b> )
24	HDBT OUT 4 RJ-45 Connector	Connect to the fourth HDBT receiver, (for example, the <b>TP-580RXR</b> )
25	<i>AUDIO OUT</i> 3.5mm Mini Jack	Connect to an audio receiver, (for example, active speakers)
26	<i>RS-232</i> DATA 3-pin Terminal Block (G,Rx,Tx)	Connect to a serial source/target
	<i>CONTROL</i> 3-pin Terminal Block (G,Rx,Tx)	Connect to a serial controller
27	<i>PROGRAM</i> 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	<i>IR OUT</i> 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	<i>IR IN</i> 3.5mm Mini Jack	Connect to an external IR receiver for controlling <b>VS-44DT</b> 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:**

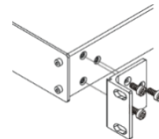
- Mount **VS-44DT** before connecting any cables or power.

**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](http://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.

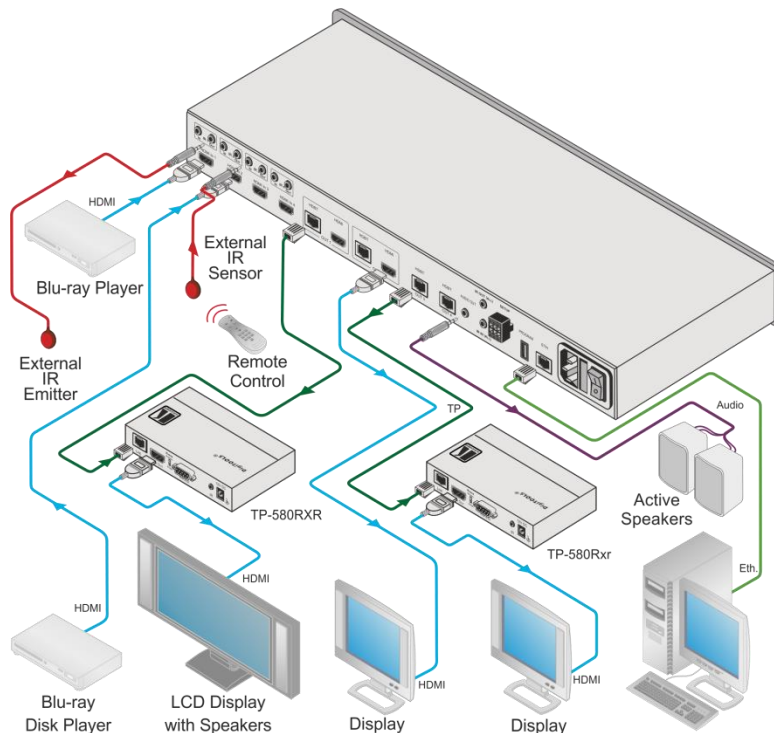


Figure 3: Connecting the VS-44DT 4x4 HDMI/HDBT Matrix Switcher

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.

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## 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).

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## 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).

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## 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**.

- 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](#).

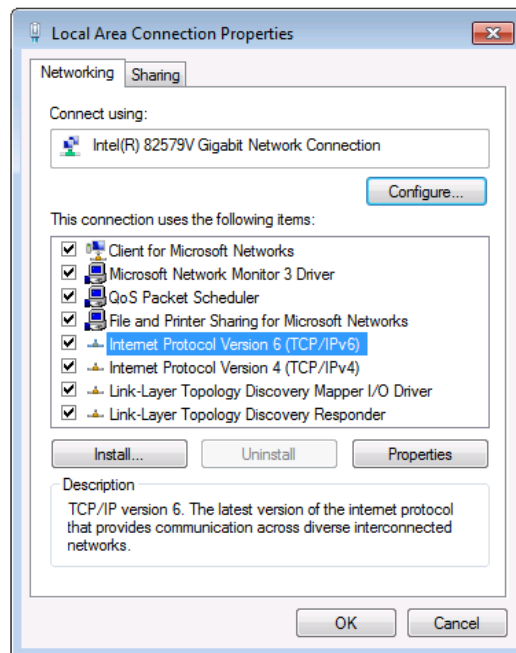


Figure 4: Local Area Connection Properties Window

- Highlight **Internet Protocol Version 4 (TCP/IPv4)**.

- Click **Properties**.

The Internet Protocol Properties window appears as shown in [Figure 5](#).

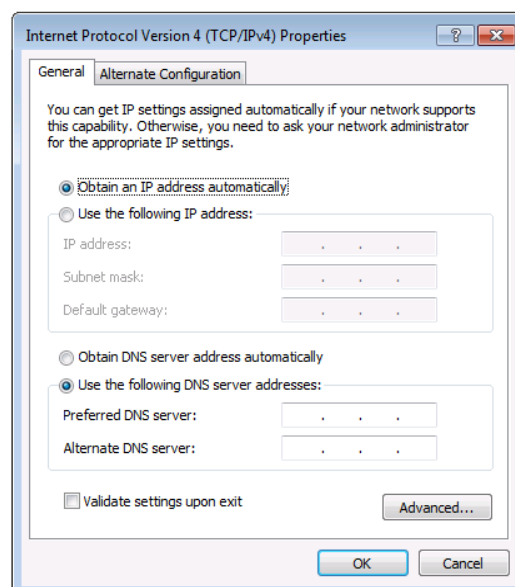


Figure 5: Internet Protocol Version 4 Properties Window

- 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.

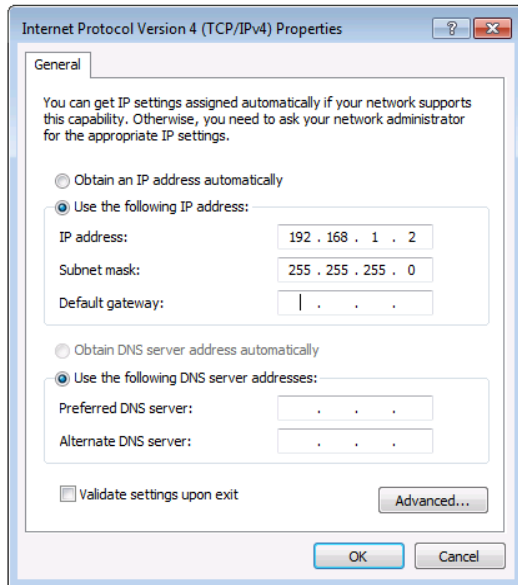


Figure 6: Internet Protocol Properties Window

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.

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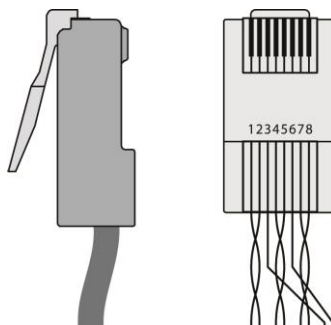
## Wiring the RJ 45 Connectors

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 <a href="#">Selecting DHCP</a> 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:

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

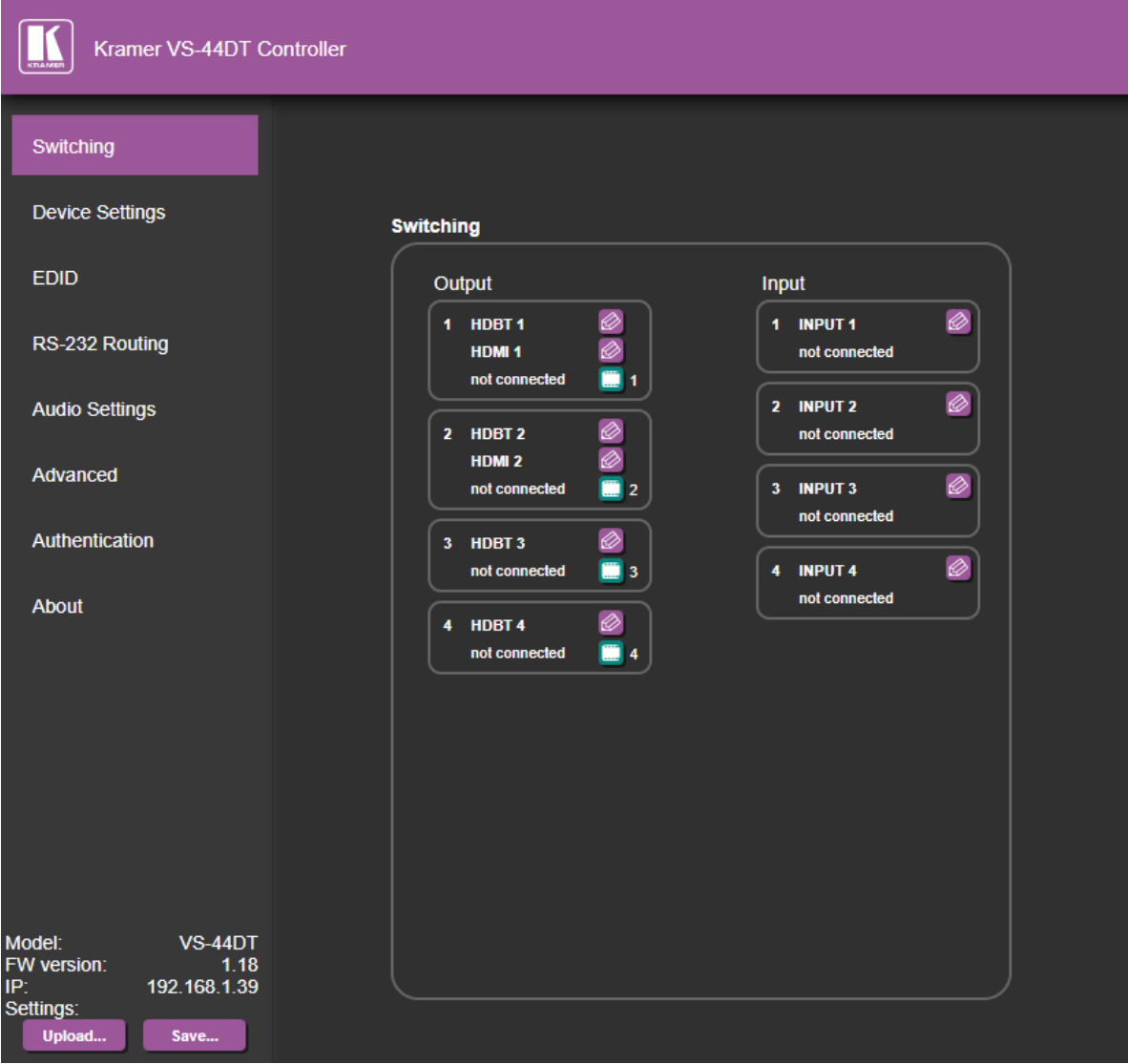


Figure 7: Switching Page

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:

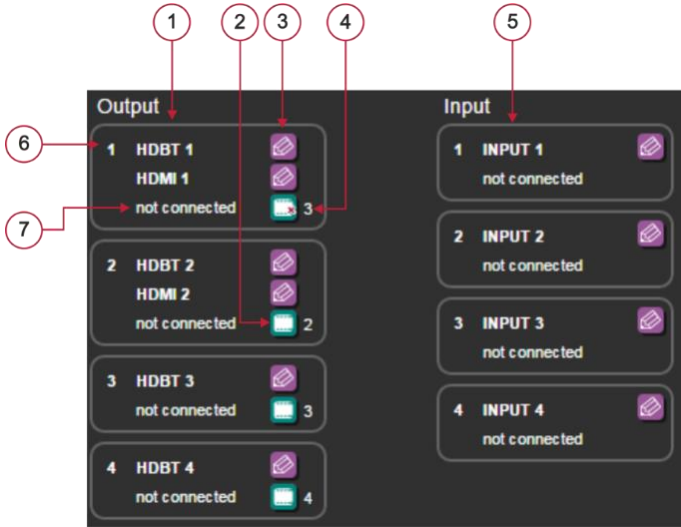


Figure 8: Switching Button Details

#	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:

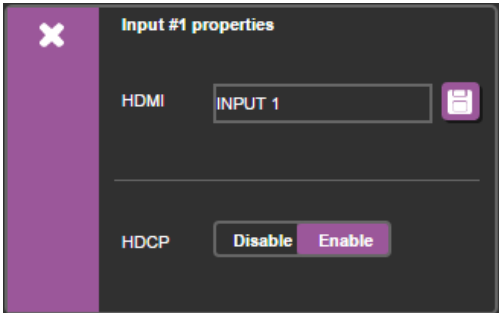


Figure 9: Input Edit Window

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.

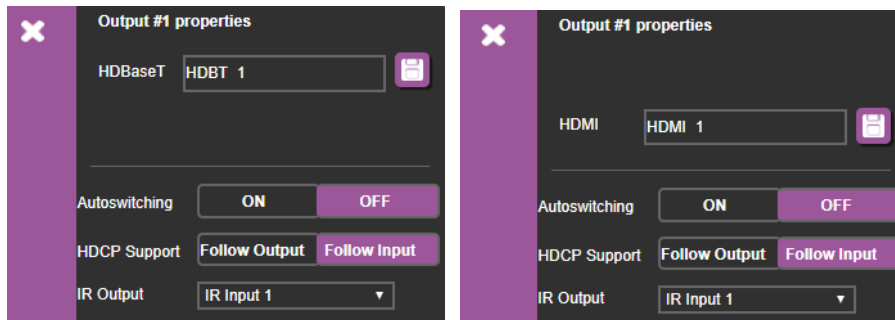



Figure 10: HDBaseT Output Properties Window

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.

The screenshot displays the 'Device Settings' page with a dark background and light text. It is divided into three main sections: Information, Firmware Upgrade, and Settings.

**Information**

Model	VS-44DT
Serial Number	12345678909999
Firmware Version	1.7
Web Version	1.0.8
MAC Address	00-1D-56-01-E2-5A

**Firmware Upgrade**

Choose a file

**BROWSE...**

**START UPGRADE**

**Reset**

**FACTORY RESET**

**Settings**

DHCP: **ON** **OFF**

IP Address: 192.168.1.39

Mask: 255.255.0.0

Gateway: 0.0.0.0

TCP Port: 5000

UDP Port: 50000

**SAVE CHANGES**

Figure 11: Device Settings Page

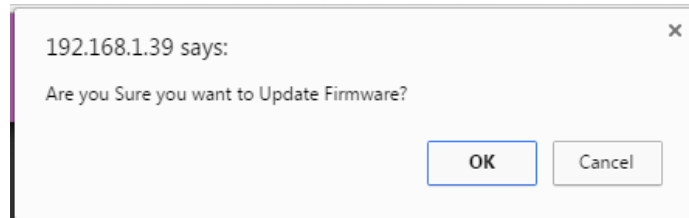
## Updating the Firmware

### 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](http://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.

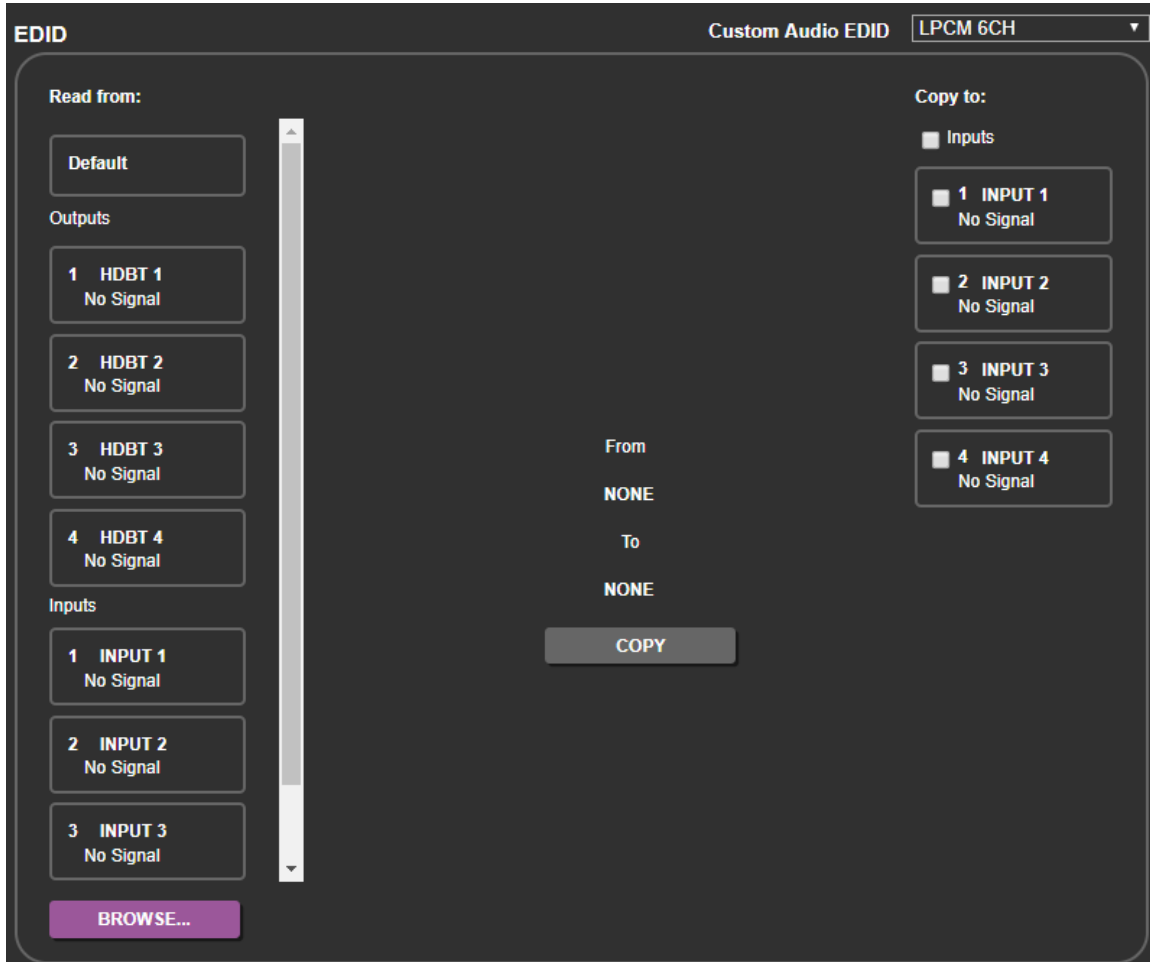


Figure 12: EDID Page



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.

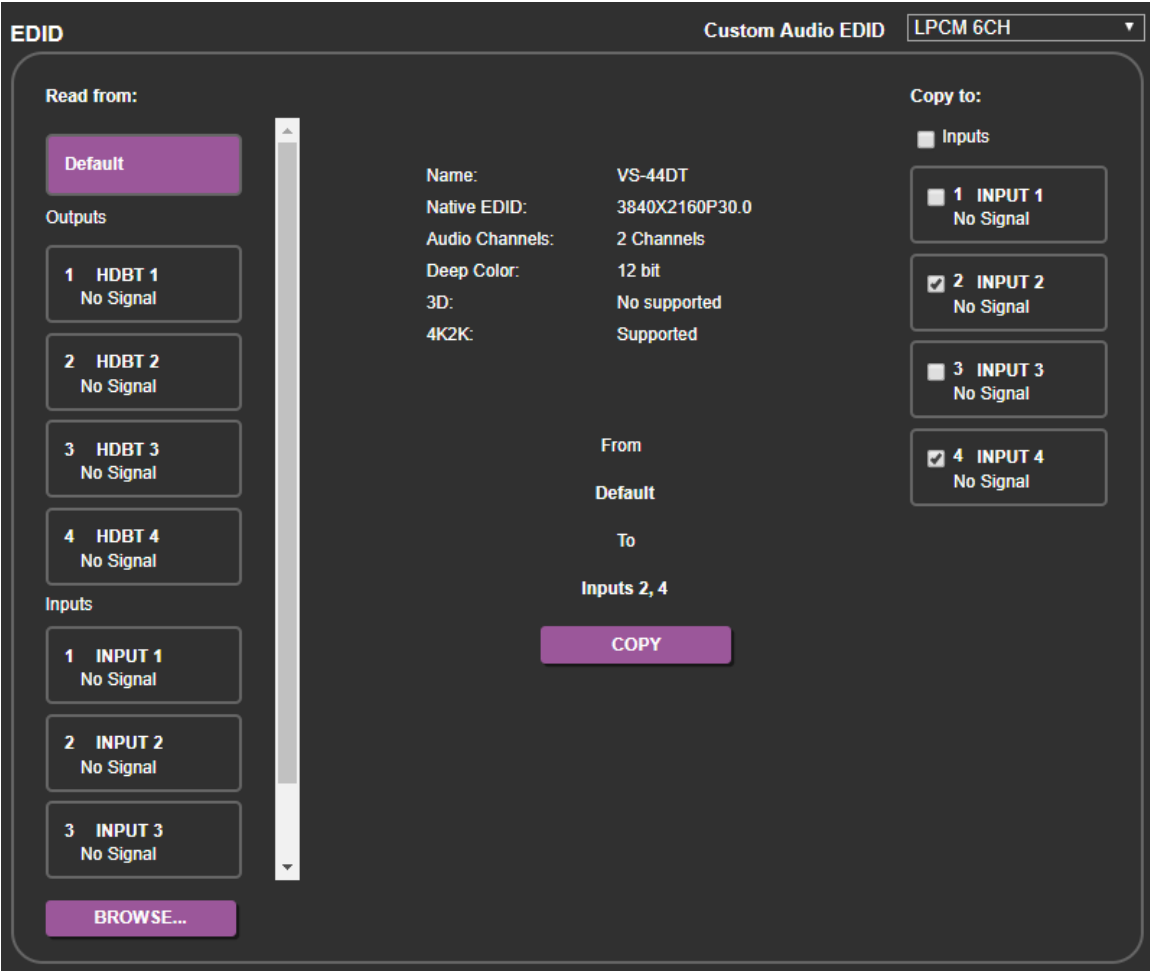


Figure 13: Copying the EDID

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

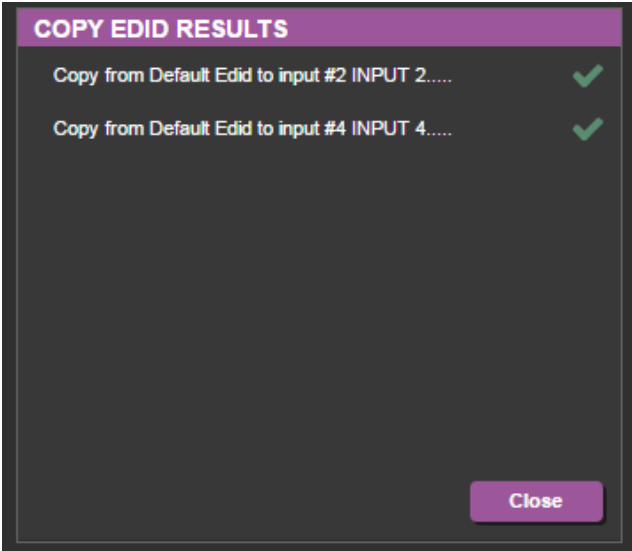


Figure 14: EDID Copied

---

## 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.

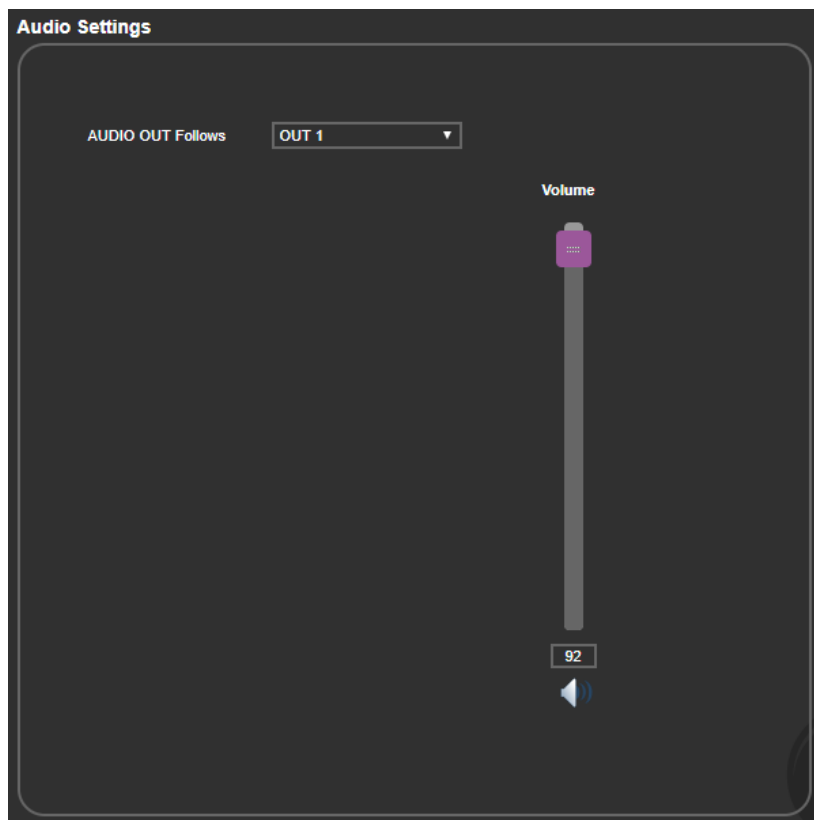


Figure 16: Audio Settings Page

## 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**.

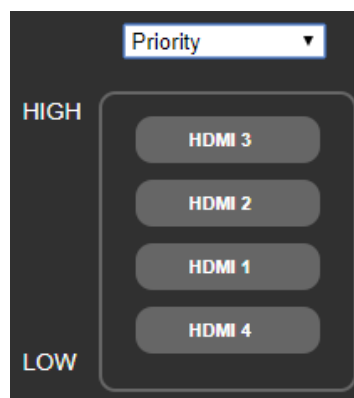


Figure 18: Priority settings

#### 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).

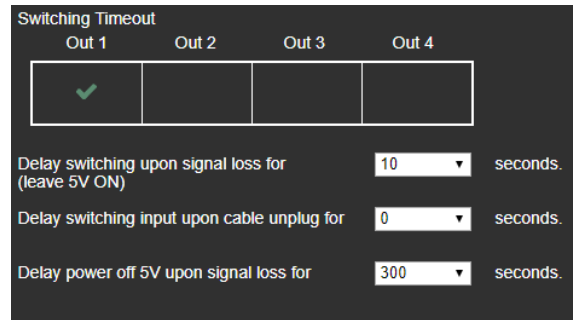


Figure 19: Switching Timeout

### 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.

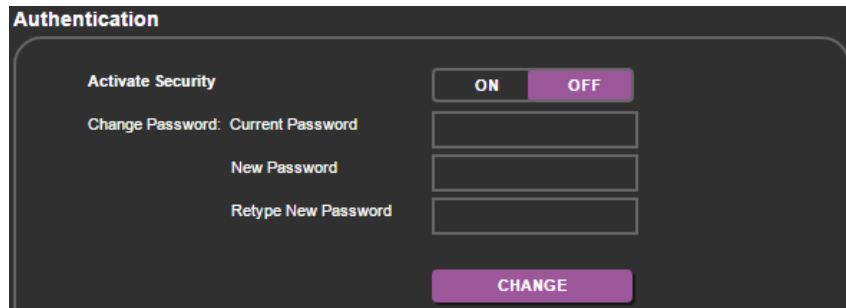


Figure 20: Authentication Page

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

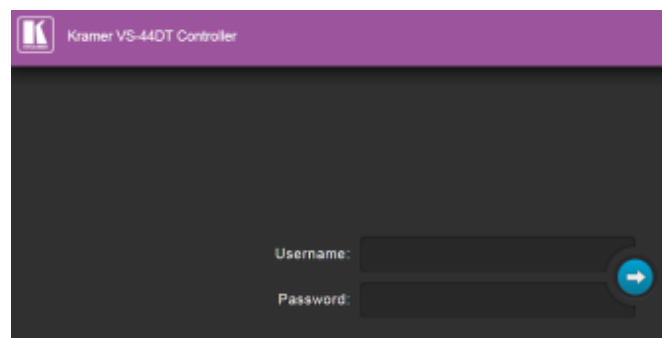


Figure 21: Login Page

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](http://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](http://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; remote control transmitter
Specifications are subject to change without notice, go to our web site at <a href="http://www.kramerav.com">www.kramerav.com</a>	

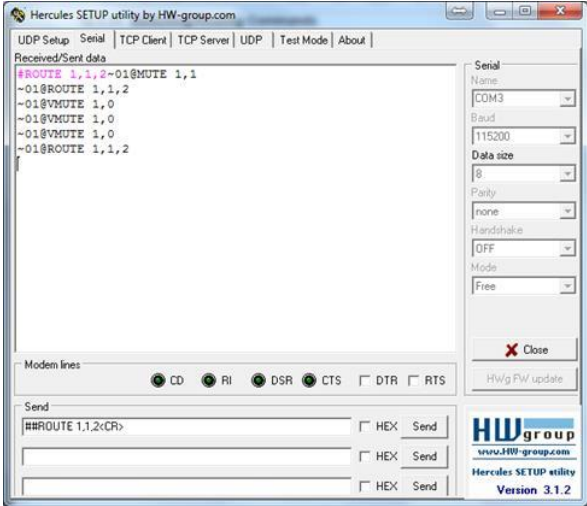
## Default IP Parameters


<b>RS-232</b>	
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>
<b>Ethernet</b>	
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
<b>Full Factory Reset</b>	
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

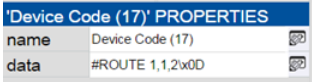
The **VS-44DT** can be operated using the Kramer Protocol 3000 serial commands. The command framing varies according to how you interface with the **VS-44DT**. For example, a basic video input switching command that routes a layer 1 video signal to HDMI out 1 from HDMI input 2 (`ROUTE 1, 1, 2`), is entered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

- Terminal communication software, such as Hercules:

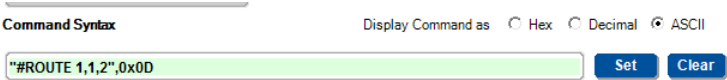



 The framing of the command varies according to the terminal communication software.

- 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
#	<i>Device_id@</i>	<b>Message</b>	<b>CR</b>

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

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

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

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

- **Device Message Format:**

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

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

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

---

## 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.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]
```

---

## Protocol 3000 Commands

This section includes the following commands:

- System Commands (see [System Commands](#) on page [42](#))
- Video Commands (see [Video Commands](#) on page [50](#))
- EDID Handling Commands (see [EDID Handling Commands](#) on page [51](#))
- Audio Commands (see [Audio Commands](#) on page [54](#))
- Switching Commands (see [Switching Commands](#) on page [57](#))
- Communication Commands (see [Communication Commands](#) on page [59](#))

# 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	# <code>CR</code>	
Get:	-	-	
Response			
~ <code>nn</code> @ <code>SP</code> <code>OK</code> <code>CR LF</code>			
Notes			
Validates the Protocol 3000 connection and gets the machine number			
K-Config Example			
`#", 0x0D			

**BUILD-DATE**

Functions		Permission	Transparency
Set:	-	-	-
Get:	<b>BUILD-DATE?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get device build date	# <b>BUILD-DATE?</b> <input type="checkbox"/> CR	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>BUILD-DATE</b> <input type="checkbox"/> SPdate <input type="checkbox"/> SPtimeCR LF			
Parameters			
<i>date</i> – Format: YYYY/MM/DD where YYYY = Year, MM = Month, DD = Day			
<i>time</i> – Format: hh:mm:ss where hh = hours, mm = minutes, ss = seconds			
K-Config Example			
`"#BUILD-DATE?", 0x0D			

**FACTORY**

Functions		Permission	Transparency
Set:	<b>FACTORY</b>	End User	Public
Get:	-	-	-
Description		Syntax	
Set:	Reset device to factory default configuration	# <b>FACTORY</b> <input type="checkbox"/> CR	
Get:	-	-	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ <b>FACTORY</b> <input type="checkbox"/> SPOKCR 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:	<b>HELP</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get command list or help for specific command	1. # <b>HELP</b> <input type="checkbox"/> CR 2. # <b>HELP</b> <input type="checkbox"/> SPCOMMAND_NAME <input type="checkbox"/> CR	
Response			
1. Multi-line: ~ <input type="checkbox"/> <input type="checkbox"/> @Device available protocol 3000 commands: <input type="checkbox"/> CR LFcommand, <input type="checkbox"/> SP command... <input type="checkbox"/> CR LF			
2. Multi-line: ~ <input type="checkbox"/> <input type="checkbox"/> @ <b>HELP</b> <input type="checkbox"/> SPcommand: <input type="checkbox"/> CR LFdescription <input type="checkbox"/> CR LFUSAGE:usage <input type="checkbox"/> CR LF			
Parameters			
COMMAND_NAME – name of a specific command			
Notes			
To get help for a specific command use: <b>HELP</b> <input type="checkbox"/> SPCOMMAND_NAME <input type="checkbox"/> CR LF			
K-Config Example			
`"#HELP", 0x0D			

**MODEL**

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

**RESET**

Functions		Permission	Transparency
Set:	<b>RESET</b>	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	Reset device	# <b>RESET</b> <code>CR</code>	
Get:	-	-	
Response			
~ <code>nn</code> @ <b>RESET</b> <code>SP</code> OK <code>CR LF</code>			
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:	<b>VERSION?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get firmware version number	# <b>VERSION?</b> <code>[CR]</code>	
Response			
~ <code>[nn]</code> @ <b>VERSION?</b> <code>[SP]</code> <i>firmware_version</i> <code>[CR LF]</code>			
Parameters			
<i>firmware_version</i> – XX.XX.XXXX where the digit groups are: major.minor.build version			
K-Config Example			
"#VERSION?", 0x0D			

## AV-SW-MODE

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

**AV-SW-TIMEOUT**

Functions		Permission	Transparency
Set:	<b>AV-SW-TIMEOUT</b>	End User	Public
Get:	<b>AV-SW-TIMEOUT?</b>	End User	Public
Description		Syntax	
Set:	Set auto switching timeout	# <b>AV-SW-TIMEOUT</b> [SP] <i>action,time_out</i> [CR]	
Get:	Get auto switching timeout	# <b>AV-SW-TIMEOUT?</b> [SP] <i>action</i> [CR]	
Response			
~nn@ <b>AV-SW-TIMEOUT</b> [SP] <i>action,time_out</i> [CR]			
Parameters			
<i>action</i> – event that triggers the auto switching timeout: 0=video out signal loss			
<i>timeout</i> – 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:	<b>DISPLAY?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get output HPD status	# <b>DISPLAY?</b> [SP] <i>out_id</i> [CR]	
Response			
~nn@ <b>DISPLAY</b> [SP] <i>out_id,status</i> [CR LF]			
Parameters			
<i>out_id</i> – Out 1=1; Out 2=2; Out 3=3; Out 4=4			
<i>status</i> – 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:	<b>HDCP-STAT?</b>	End User	Public
Description		Syntax	
Set:	None	-	
Get:	Get HDCP signal status	# <b>HDCP-STAT?</b> [SP]stage,stage_id[CR]	
Response			
Set / Get: ~[nn]@ <b>HDCP-STAT</b> [SP]stage,stage_id,status[CR LF]			
Parameters			
<i>stage</i> – 0 = Input, 1 = Output <i>stage_id</i> – number of chosen stage (1.. max number of inputs/outputs) <i>status</i> – 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	<b>SIGNAL?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get input signal status	# <b>SIGNAL?</b> [SP]inp_id[CR]	
Response			
~[nn]@ <b>SIGNAL</b> [SP]inp_id,status[CR LF]			
Parameters			
<i>inp_id</i> – input number: IN 1=1, IN 2=2, IN 3=3, IN 4=4 <i>status</i> – 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:	<b>SIGNALS-LIST?</b>	End User	Public
Description		Syntax	
Set:	–	–	
Get:	Get signal ID list of this machine	# <b>SIGNALS-LIST?</b> <code>[CR LF]</code>	
Response			
~ <code>[nn]</code> @ <b>SIGNALS-LIST</b> <code>[SP]</code> [ <i>signal_id,..</i> ] <code>[CR LF]</code>			
Parameters			
<i>signal_id</i> – see <a href="#">Signal ID Format</a>			
Response Triggers			
Notes			
The response is returned in one line and terminated with <code>[CR LF]</code>			
The response format lists signal IDs separated by commas.			
This is an <a href="#">Extended Protocol 3000</a> command			
Examples			
# <b>SIGNALS-LIST?</b> ~01@ <b>SIGNALS-LIST</b> [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:	<b>PRIORITY</b>	Administrator	Public
Get:	<b>PRIORITY?</b>	Administrator	Public
Description		Syntax	
Set:	Set input priority	# <b>PRIORITY</b> <code>[SP]</code> <i>layer,PRIORITY1,PRIORITY2... PRIORITYn<code>[CR]</code></i>	
Get:	Get input priority	# <b>PRIORITY?</b> <code>[SP]</code> <i>layer</i> <code>[CR]</code>	
Response			
~ <code>[nn]</code> @ <b>PRIORITY</b> <code>[SP]</code> <i>layer,PRIORITY1,PRIORITY2... PRIORITYn</i> <code>[CR LF]</code>			
Parameters			
<i>layer</i> – 1 – Video, 2 – Audio, 3 – Data, 4 – IR <i>PRIORITY1</i> – priority of first input <i>PRIORITYn</i> – priority of input n			
Response Triggers			
Notes			
WP-577VH – layer parameter is not used			

**PRST-RCL**

Functions		Permission	Transparency
Set:	<b>PRST-RCL</b>	End User	Public
Get	-	-	-
Description		Syntax	
Set:	Recall saved preset list	# <b>PRST-RCL</b> [SP]preset[CR]	
Get:	-	-	
Response			
~nn@ <b>PRST-RCL</b> [SP]preset[CR LF]			
Parameters			
<i>preset</i> – 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:	<b>PRST-STO</b>	End User	Public
Get	-	-	-
Description		Syntax	
Set:	Store current connections, volumes and modes in preset	# <b>PRST-STO</b> [SP]preset[CR]	
Get:	-	-	
Response			
~nn@ <b>PRST-STO</b> [SP]preset[CR LF]			
Parameters			
<i>preset</i> – 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:	<b>LOCK-FP</b>	End User	Public
Get	<b>LOCK-FP?</b>	End User	Public
Description		Syntax	
Set:	Lock front panel	# <b>LOCK-FP</b> [SP]lock_mode[CR]	
Get:	Get front panel lock state	# <b>LOCK-FP?</b>	
Response			
~nn@ <b>LOCK-FP</b> [SP]lock_mode[SP]OK[CR LF]			
Parameters			
<i>lock_mode</i> – 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:	<b>MACH-NUM</b>	End User	Public
Get	-	-	-
Description		Syntax	
Set:	Set machine number	# <b>MACH-NUM</b> [SP] <i>machine_number</i> [CR]	
Get:	-	-	
Response			
~nn@ <b>MACH-NUM</b> [SP] <i>machine_number</i> [CR LF]			
Parameters			
<i>machine_number</i> – 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:	<b>VMUTE</b>	End User	Public
Get:	<b>VMUTE?</b>	End User	Public
Description		Syntax	
Set:	Set enable/disable video on output	# <b>VMUTE</b> [SP] <i>output_id,flag</i> [CR]	
Get:	Get video on output status	# <b>VMUTE?</b> [SP] <i>output_id</i> [CR]	
Response			
~nn@ <b>VMUTE</b> [SP] <i>output_id</i> [CR]			
Parameters			
<i>output_id</i> – the number of outputs: OUT 1=1, OUT 2=2, OUT 3=3, OUT 4=4 <i>flag</i> – 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](http://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			
<p>src_type – EDID source type: IN=0, OUT=1, default EDID=2</p> <p>src_id – IN=1~4, OUT=1~4</p> <p>dst_type – input=0</p> <p>dest_bitmap – bitmap representing destination IDs. Format: XXXX...X, where X is hex digit. The binary form of every hex digit represents corresponding destinations. Setting '1' indicates that EDID data is copied to this destination. Setting '0' indicates that EDID data is not copied to this destination.</p>			
Response Triggers			
Response is sent to the com port from which the Set was received (before execution)			
Notes			
<p>Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word)</p> <p>Example: bitmap 0x0013 means inputs 1, 2 and 5 are loaded with the new EDID.</p> <p>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.</p>			
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:	<b>EDID-AUDIO</b>	End User	Public
Get:	<b>EDID-AUDIO?</b>	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			
<i>mode</i> – 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:	<b>GEDID</b>	Administrator	Public
Get:	<b>GEDID?</b>	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			
<i>stage</i> – 0 = Input, 1 = Output <i>stage_id</i> – number of chosen stage (1.. max number of inputs/outputs) <i>size</i> – 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:	<b>LDEDID</b>	End User	Public
Get:	-	-	-
Description		Syntax	
Set:	Write EDID data from external application to device	Multi-step syntax (see following steps)	
Get:	None	None	
Communication Steps (Command and Response)			
<p>Step 1: #<b>LDEDID</b>[SP]<i>dst_type,dest_bitmask,size,safe_mode</i>[CR]</p> <p>Response 1: ~<i>nn</i>@<b>LDEDID</b>[SP]<i>dst_type,dest_bitmask,size,safe_mode</i>[SP]READY[CR LF] or ~<i>nn</i>@<b>LDEDID</b>[SP]ERR<i>nn</i>[CR LF]</p> <p>Step 2: If ready was received, send EDID_DATA</p> <p>Response 2: ~<i>nn</i>@<b>LDEDID</b>[SP]<i>dst_type,dest_bitmask,size,safe_mode</i>[SP]OK[CR LF] or ~<i>nn</i>@<b>LDEDID</b>[SP]ERR<i>nn</i>[CR LF]</p>			
Parameters			
<p><i>dst_type</i> – EDID destination type (usually input)</p> <ul style="list-style-type: none"> <li>0 - Input</li> <li>1 - Output</li> <li>2 - Default EDID</li> <li>3 - Custom EDID</li> </ul> <p><i>dest_bitmask</i> – bitmap representing destination IDs. Format: 0x*****, where * is ASCII presentation of hex digit. The binary presentation of this number is a bit mask for destinations. Setting '1' means EDID data has to be copied to this destination</p> <p><i>size</i> - EDID data size</p> <p><i>safe_mode</i> - 0 - Device accepts the EDID as is without trying to adjust</p> <ul style="list-style-type: none"> <li>1 - Device tries to adjust the EDID</li> </ul> <p>EDID_DATA – data in protocol packets (see <a href="#">Packet Protocol Structure</a> on page 61).</p>			
Response Triggers			
Response is sent to the com port from which the Set (before execution)			
Notes			
<p>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 ~<i>nn</i>@<b>LDEDID</b>[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.</p> <p>See Protocol Packet reference in see <a href="#">Packet Protocol Structure</a> on page 61.</p>			

## 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:	<b>AUD-LVL</b>	End User	Public
Get:	<b>AUD-LVL?</b>	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			
<i>stage</i> – 0 = Input, 1 = Output <i>channel</i> – output number = 1 <i>volume</i> – volume level -0 to 100 ++ increase current value -- decrease current value			
Response Triggers			
Notes			



**AUD-DEEMB**

Functions		Permission	Transparency
Set:	<b>AUD-DEEMB</b>	End User	Public
Get:	<b>AUD-DEEMB?</b>	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			
<p>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</p> <p>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</p> <p>port_dir – optional = Defines if we want the de-embedded from input port or output port</p>			
Response Triggers			
<p>Response is sent to the com port from which the Set (before execution)/Get command was received</p> <p>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)</p> <p>'~01@AUD-DEEMB P1,P2,P3 OK[CR LF]</p>			
Notes			
<p>User like to have on Analog output audio from Digital input 3</p> <p>So the command will be #AUD-DEEMB 1,3,0&lt;cr&gt;</p> <p>And feedback '~01@AUD-DEEMB 1,3,0 OK[CR LF]</p>			

**MUTE**

Functions		Permission	Transparency
Set:	<b>MUTE</b>	End User	Public
Get:	<b>MUTE?</b>	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			
<p>channel –OUT=1</p> <p>mute_mode – mute mode off=0, mute mode on=1</p>			
K-Config Example			
<p>Mute the audio:</p> <pre>`#MUTE 1,1",0x0D</pre>			

**VOLUME**

Functions		Permission	Transparency
Set:	<b>VOLUME</b>	End user	-
Get	<b>VOLUME?</b>	End User	public
Description		Syntax	
Set:	Set simple audio volume	# <b>VOLUME</b> [SP] <i>P1</i> , <i>P2</i> [CR]	
Get:	Get simple audio volume	# <b>VOLUME?</b> [SP] <i>P1</i> [CR]	
Response			
~nn@ <b>VOLUME</b> [SP] <i>P1</i> , <i>P2</i> [CR LF]			
Parameters			
<i>P1</i> – Out channel: OUT 1= <b>1</b> , OUT 2= <b>2</b> , OUT 3= <b>3</b> , OUT 4= <b>4</b>			
<i>P2</i> – Volume: <b>0~100</b>			
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:	<b>VID</b>	End User	Public
Get	<b>VID?</b>	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:	<b>ROUTE</b>	End User	-
Get:	<b>ROUTE?</b>	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			
<b>layer</b> – Layer number: Video=1, Audio=2, Data=3,IR=4			
<b>dest</b> – Destination: Video: All=*, Disconnect=x, OUT 1=1, OUT 2=2, OUT 3=3, OUT 4=4 Audio: All=*; Data: All=*			
<b>src</b> – 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:	<b>X-ROUTE</b>	End User	Public
Get:			
Description		Syntax	
Set:	Send routing command to matrix	# <b>X-ROUTE</b> [SE] <i>OUT_signal_id,IN_signal_id</i> [CR LF]	
Get:			
Response			
Set:	~ <i>nn</i> @ <b>X-ROUTE</b> [SE] <i>OUT_signal_id,IN_signal_id</i> [CR LF]		
Parameters			
<i>OUT_signal_id</i> (<port_id>.<signal_type>.<index>) <i>Port_ID</i> IN OUT BOTH <i>Signal_type</i> 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			
# <b>X-ROUTE</b> 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:	<b>ETH-PORT</b>	Administrator	Public
Get:	<b>ETH-PORT?</b>	End User	Public
Description		Syntax	
Set:	Set Ethernet port protocol	# <b>ETH-PORT</b> [SP] <i>portType</i> , <i>ETHPort</i> [CR]	
Get:	Get Ethernet port protocol	# <b>ETH-PORT?</b> [SP] <i>portType</i> [CR]	
Response			
~nn@ <b>ETH-PORT</b> [SP] <i>portType</i> , <i>ETHPort</i> [CR LF]			
Parameters			
<i>portType</i> – TCP=0, UDP=1			
<i>ETHPort</i> – 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 <sup>16</sup> -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:	<b>NET-DHCP</b>	Administrator	Public
Get:	<b>NET-DHCP?</b>	End User	Public
Description		Syntax	
Set:	Set DHCP mode	# <b>NET-DHCP</b> [SP] <i>mode</i> [CR]	
Get:	Get DHCP mode	# <b>NET-DHCP?</b> [CR]	
Response			
~nn@ <b>NET-DHCP</b> [SP] <i>mode</i> [CR LF]			
Parameters			
<i>mode</i> – 0 (do not use DHCP. Use the IP address set by the factory or the <b>NET-IP</b> command), 1 (try to use DHCP. If unavailable, use the IP address set by the factory or the <b>NET-IP</b> 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 <b>NAME</b> 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:	<b>NET-GATE</b>	Administrator	Public
Get:	<b>NET-GATE?</b>	End User	Public
Description		Syntax	
Set:	Set gateway IP	# <b>NET-GATE</b> [SP] <i>ip_address</i> [CR]	
Get:	Get gateway IP	# <b>NET-GATE?</b> [CR]	
Response			
~nn@ <b>NET-GATE</b> [SP] <i>ip_address</i> [CR LF]			
Parameters			
<i>ip_address</i> – 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:	<b>NET-IP</b>	Administrator	Public
Get:	<b>NET-IP?</b>	End User	Public
Description		Syntax	
Set:	Set IP address	# <b>NET-IP</b> [SP] <i>ip_address</i> [CR]	
Get:	Get IP address	# <b>NET-IP?</b> [CR]	
Response			
~nn@ <b>NET-IP</b> [SP] <i>ip_address</i> [CR LF]			
Parameters			
<i>ip_address</i> – 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:	<b>NET-MAC?</b>	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get MAC address	# <b>NET-MAC?</b> [CR]	
Response			
~nn@ <b>NET-MAC</b> [SP] <i>mac_address</i> [CR LF]			
Parameters			
<i>mac_address</i> – 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:	<b>NET-MASK</b>	Administrator	Public
Get:	<b>NET-MASK?</b>	End User	Public
Description		Syntax	
Set:	Set subnet mask	# <b>NET-MASK</b> [SP] <i>net_mask</i> [CR]	
Get:	Get subnet mask	# <b>NET-MASK?</b> [CR]	
Response			
~nn@ <b>NET-MASK</b> [SP] <i>net_mask</i> [CR LF]			
Parameters			
<i>net_mask</i> – 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:

~NNNNSP[OKCR]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](http://sanity-free.org/133/crc_16_ccitt_in_csharp.html)

CRC example:

Data = "123456789"

Result => 0x31C3



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

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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.

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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](http://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.

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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.