KRAMER

# USER MANUAL

**MODEL:**

## VS-44DT

4x4 HDMI/HDBT Matrix Switcher with PoE

P/N: 2900-300470 Rev 1

Scan for full manual

# VS-44DT Quick Start Guide

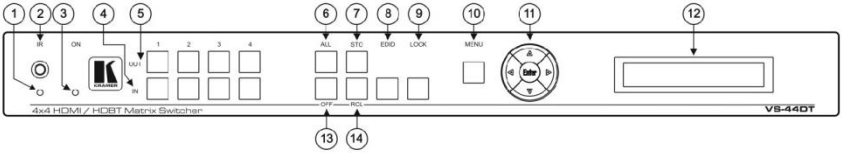
This guide helps you install and use your **VS-44DT** for the first time.

Go to **www.kramerav.com/downloads/VS-44DT** to download the latest user manual and check if firmware upgrades are available.

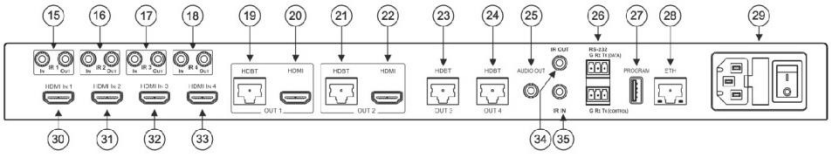
## Step 1: Check what's in the box

- ☑ **VS-44DT** 4x4 HDMI/HDBT Matrix Switcher
- ☑ IR remote control transmitter with batteries
- ☑ 1 Set of rack ears
- ☑ 1 Power cord
- ☑ 4 IR receiver cables
- ☑ 4 IR emitter cables
- ☑ 4 Rubber feet
- ☑ 1 Quick start guide

## Step 2: Get to know your VS-44DT



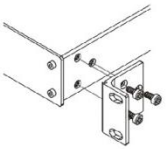

| # | Feature | Function |
|---|---|---|
| 1 | IR LED | Lights yellow when receiving an IR signal |
| 2 | IR Sensor | IR receiver for remote control |
| 3 | POWER LED | Lights green when the device is powered on |
| 4 | IN Buttons | Press to select an input after selecting an output (from 1 to 4) |
| 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 the outputs, or press, followed by the Off button to disconnect all the outputs |
| 7 | STO Button | Press to store a preset configuration followed by the preset number in which to save it |
| 8 | EDID Button | Press to copy the EDID from an output to an input |
| 9 | LOCK Button | Press and hold to lock the front panel buttons. 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 |
| 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 |
| 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 from the inputs. Press after the All button to disconnect all currently switched outputs |
| 14 | RCL Button | Press, followed by a preset number to recall the preset configuration |




| # | 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 acceptor, (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 acceptor, (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 acceptor, (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 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 |

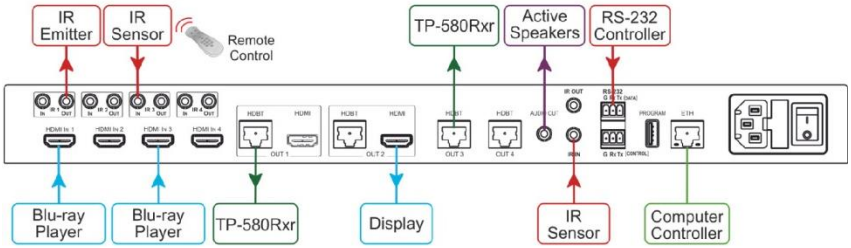
## Step 3: Install the VS-44DT

To rack mount the machine attach both ear brackets to the machine (by removing the three screws from each side of the machine and replacing those screws through the ear brackets) or place the machine on a table.



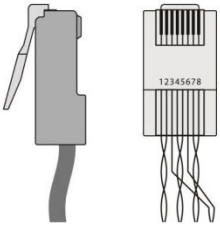
## Step 4: Connect the inputs and outputs

Always switch OFF the power on each device before connecting it to your **VS-44DT**. For best results, we recommend that you always use Kramer high-performance cables to connect AV equipment to the **VS-44DT**.




**RJ-45 Pinout:**

For the Ethernet and HDBaseT connectors, see the proper wiring diagram below




| PIN 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 |

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

## Step 5: Connect the power

Connect AC power to the rear of the **VS-44DT**, switch on its power and then switch on the power on each device.

## Step 6: Set operation parameters via the menu buttons

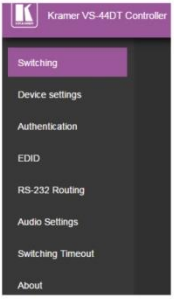
Enter the menu via the MENU button on the front panel or the IR remote control transmitter. Select a menu item and set parameters as required.

If you cannot see any video output, verify that the display, TV, or projector is in good working order and is connected to the **VS-44DT**. Verify that the **VS-44DT** is selected as the source.

| Menu Item | Function |
|---|---|
| Audio Settings | Set the audio output to be routed to AUDIO OUT, set the volume level for each output and toggle mute (on/off) for each output |
| RS-232 Routing | Turn the RS-232 DATA serial communication routing on and off for each port. The current state is displayed when entering the RS-232 ROUTING menu, for example: ON To port-04. |
| Auto settings | Set auto switching on or off |
| Network Status | Set DHCP (on/off) IP address, netmask and gateway settings |
| Ethernet Status | Displays the following communication parameters: IP address, netmask, gateway, TCP port number, UDP port number and MAC address |
| FW Version | Displays the firmware version |
| Update firmware | Updates the firmware |

## Step 7: Operate via the front panel buttons, the remote controller and via:

**Web pages:**




**RS-232 and Ethernet:**

| **RS-232** | | | |
|---|---|---|---|
| Baud Rate: | 115,200 | Parity: | None |
| Data Bits: | 8 | Command Format: | ASCII |
| Stop Bits: | 1 | | |
| Example (route the video from HDMI In 3 to Out 1): | | | #VID 3>1<cr> |
| **TCP/IP Parameters** | | | |
| IP Address: | 192.168.1.39 | UDP Port #: | 50000 |
| Subnet mask: | 255.255.000.000 | Maximum UDP Connections: | 4 |
| Default gateway: | 000.000.000.000 | Maximum TCP Connections: | 10 |
| TCP Port #: | 5000 | | |
| **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 | | |

## Step 8: Operate the VS-44DT via front panel display using the menu buttons:

**To switch an input to an output:**

1. Press an **OUT** button (1 to 4).
2. Press an **IN** button.

**To Copy an EDID from an output to an input:**

1. Press **EDID**.
2. Press the required **OUT** button.
3. Press the required **IN** button.
4. Press **EDID**.

**To store the current configuration:**

1. Press **STO**.
2. Press the required IN button to which you want to store the configuration.
3. Press **STO**. The current configuration is stored to the selected preset number.

**To recall a preset:**

1. Press **RCL**.
2. Press the required IN button in which the configuration is stored.
3. Press **RCL**. The current configuration stored in the selected preset number is recalled.

## Technical Specifications:

| | | | |
|---|---|---|---|
| Inputs: | 4 HDMI on HDMI connectors<br>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<br>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;<br>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 (7.28lbs) 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 at www.kramerav.com | | | |

# Contents

# Figures

# 1 Introduction

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

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

Congratulations on purchasing your Kramer **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

# 2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual

Go to www.kramerav.com/downloads/VS-44DT to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

## 2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Do not secure the cables in tight bundles or roll the slack into tight coils
- Avoid interference from neighbouring electrical appliances that may adversely influence signal quality
- Position your **VS-44DT** away from moisture, excessive sunlight and dust

This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

## 2.2 Safety Instructions

| | |
|---|---|
| **Caution:** | There are no operator serviceable parts inside the unit |
| **Warning:** | Use only the power cord that is supplied with the unit |
| **Warning:** | Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only |
| **Warning:** | Disconnect the power and unplug the unit from the wall before installing |

## 2.3 Shielded Twisted Pair/Unshielded Twisted Pair

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

## 2.4 Recycling Kramer Products

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

# 3 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

## 3.1 About HDBaseT™ Technology

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

The products described in this user manual are HDBaseT certified.

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

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

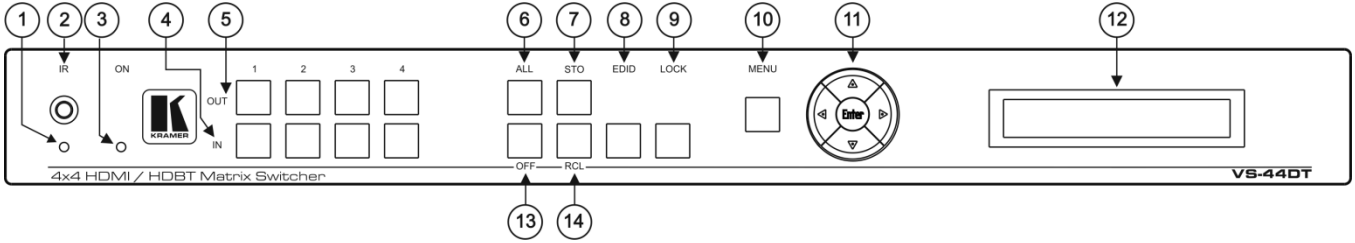



Figure 1: VS-44DT 4x4 HDMI/HDBT Matrix Switcher Front Panel

| # | 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 Section 6.1 |
| 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 Section 6.4) |
| 7 | *STO* Button | Press to store a preset configuration followed by the preset number in which to save it, (see Section 6.2) |
| 8 | *EDID* Button | Press to copy the EDID from an output to an input, (see Section 6.3) |
| 9 | *LOCK* Button | Press and hold to lock the front panel buttons, (see Section 6.6). 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 Section 7.1) |
| 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 Section 7.1) |
| 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 Section 6.4) |
| 14 | *RCL* Button | Press, followed by a preset number to recall the preset configuration (see Section 6.2) |

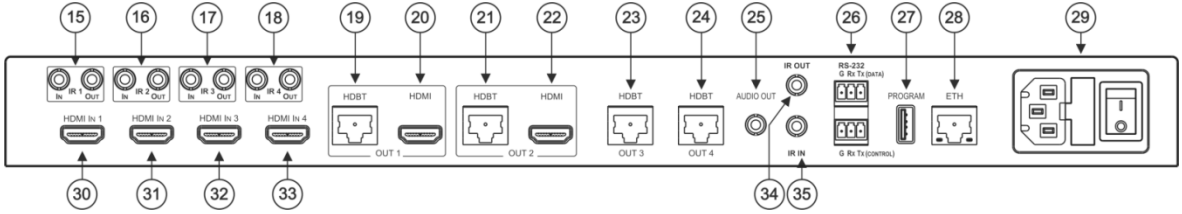



Figure 2: VS-44DT 4x4 HDMI/HDBT Matrix Switcher Rear Panel

| # | 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 |

| # | Feature | | Function |
|---|---|---|---|
| 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 |

# 4 Installing in a Rack

This section provides instructions for rack mounting the unit.

**Before installing in a rack**, be sure that the environment is within the recommended range:

| | |
|---|---|
| OPERATING TEMPERATURE: | 0º to +40ºC (32º to 104ºF) |
| STORAGE TEMPERATURE: | -40º to +70ºC (-40º to 158ºF) |
| HUMIDITY: | 10% to 90%, RHL non-condensing |

## CAUTION!

When installing on a 19" rack, avoid hazards by taking care that:

**1**. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.

**2**. Once rack mounted, enough air will still flow around the machine.

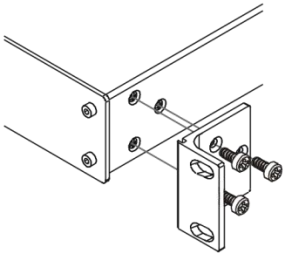
**3**. The machine is placed straight in the correct horizontal position.

**4**. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.

**5**. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

**To rack-mount a machine:**

**1**. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



**2**. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from our Web site

# 5 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.

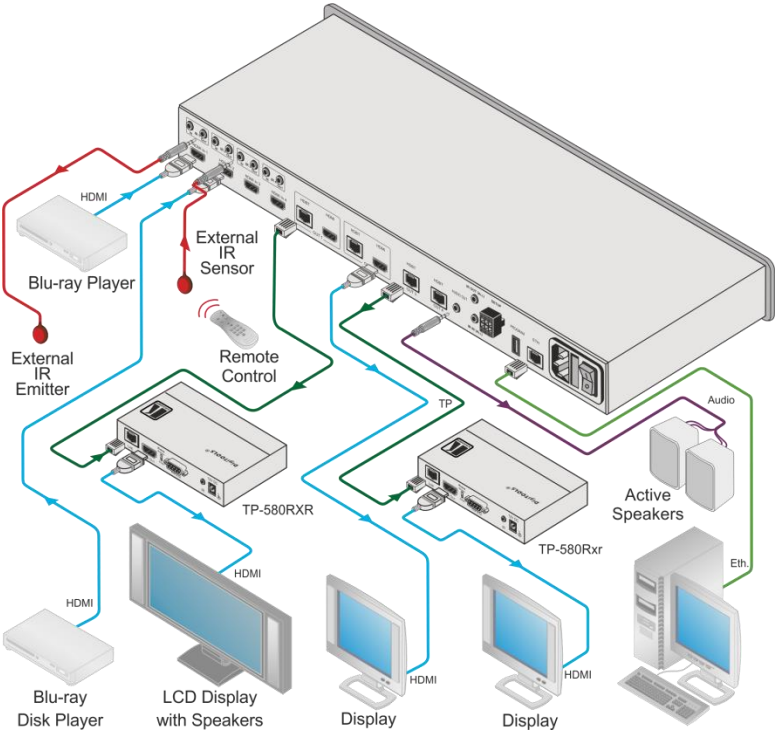



Figure 3: Connecting the VS-44DT 4x4 HDMI/HDBT Matrix Switcher

**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.

## 5.1 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)

## 5.2 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)

## 5.3 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 Section 5.3.1)
- Via a network hub, switch, or router, using a straight-through cable (see Section 5.3.2)

**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.

### 5.3.1 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.

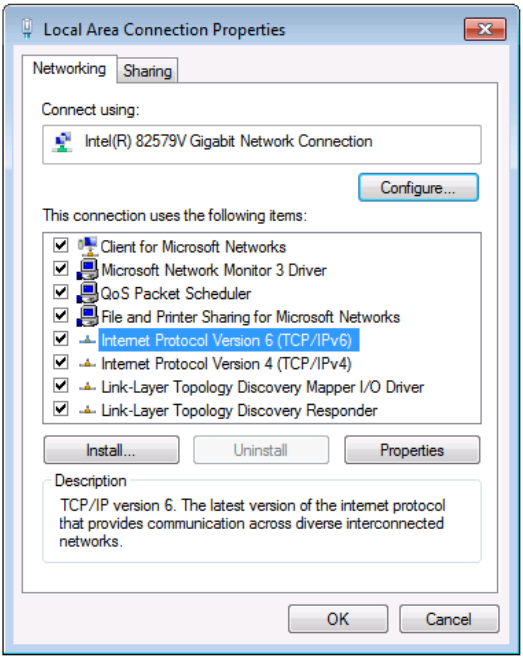



Figure 4: Local Area Connection Properties Window

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

5. Click **Properties**.

   The Internet Protocol Properties window appears as shown in Figure 5.

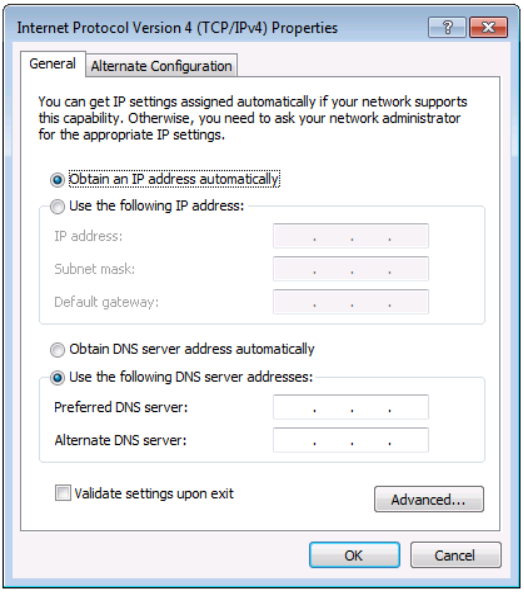



Figure 5: Internet Protocol Version 4 Properties Window

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.

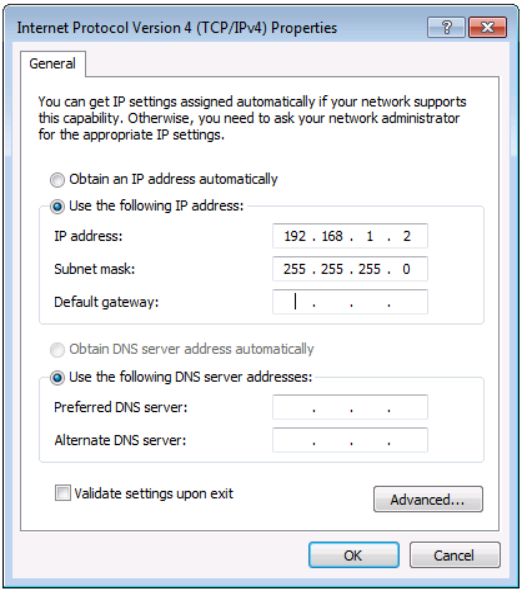



Figure 6: Internet Protocol Properties Window

7. Click **OK**.

8. Click **Close**.

### 5.3.2 Connecting the Ethernet Port via a Network Hub or Switch

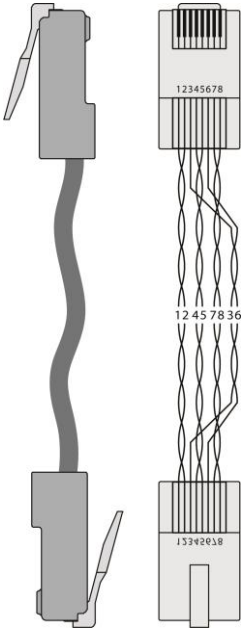
You can connect the Ethernet port of the **VS-44DT** to the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

## 5.4 Wiring the RJ-45 Connectors

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

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

Figure 7: TP PINOUT



# 6 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.

## 6.1 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.

## 6.2 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.

## 6.3 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.

## 6.4 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.

## 6.5 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 Section 11.4.1.3).
   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.

## 6.6 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.

# 7 Configuring the VS-44DT

## 7.1 Using the Menu

The main menu comprises seven sections:

- Audio Setting (see Section 7.1.1)
- RS-232 Routing (see Section 7.1.2)
- Auto Settings (see Section 7.1.3)
- Network Parameters (see Section 7.1.4)
- Ethernet Status (see Section 7.1.5)
- FW version display (see Section 7.1.6)
- Reset to Default (see Section 7.1.7)
- Update Firmware (see Section 7.1.8)

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.

### 7.1.1 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 |

### 7.1.2 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 |

### 7.1.3 Setting Auto Switching

The AUTO SETTINGS sub-menu lets you enable or disable auto switching.

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

### 7.1.4 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 Section 7.2) |
| 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.

### 7.1.5 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 | - |

### 7.1.6 FW Version Display

Displays the firmware version.

### 7.1.7 Reset to Default

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

### 7.1.8 Update Firmware Sub-menu

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

## 7.2 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.

## 7.3 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.

## 7.4 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.

# 8 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 Section 5.3.
- 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:

- The Switching page (see Section 8.1)
- The Device Settings page (see Section 8.2)
- The Authentication page (See Section 8.3)
- The EDID page (see Section 8.4)
- The RS-232 Routing page (see Section 8.5)
- The Audio Settings page (see Section 8.6)
- The Switching Timeout page (see Section 8.7)
- The About page (see Section 8.8)

**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.

## 8.1 Switching Page

Figure 8 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 on the lower left side of the main page. The lower part of the screen lets you save the settings and upload a saved setting.

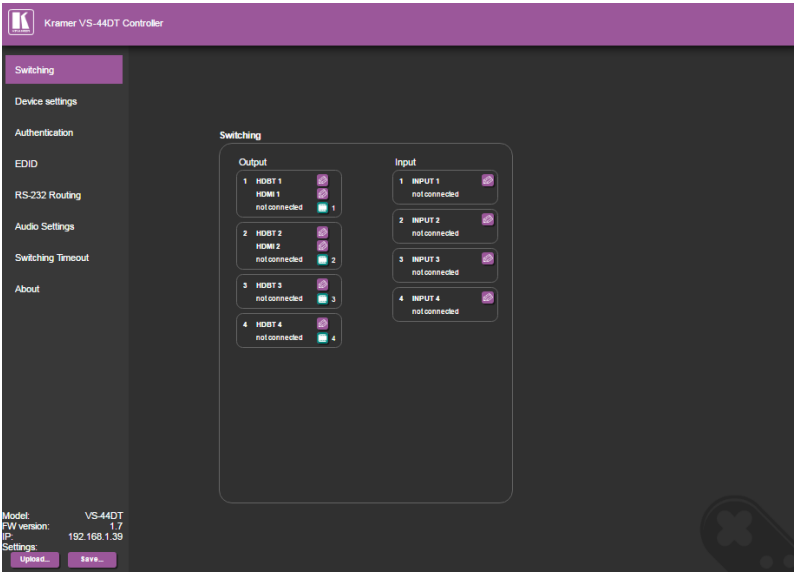



Figure 8: Switching Page

To switch an input to an output, select an output and then select the input you want to switch to that output. Figure 9 defines the Switching area:

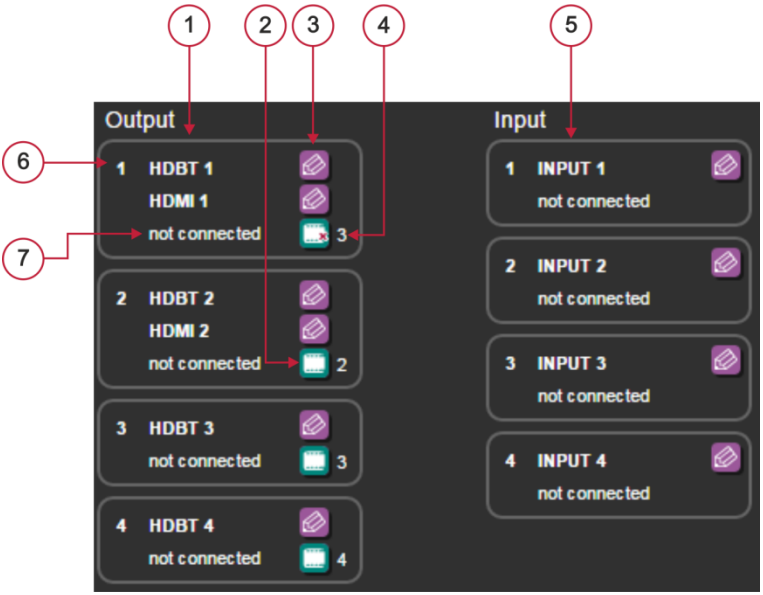



Figure 9: Switching Button Details

| # | 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.<br>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:

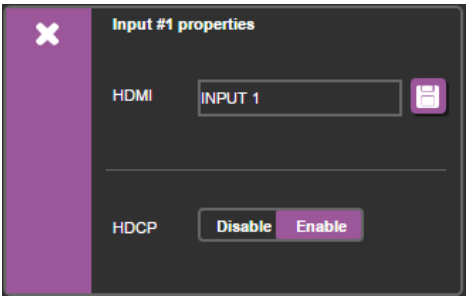



Figure 10: Input Edit Window

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 11 shows the HDBaseT properties window for output 1 and Figure 12 shows the HDMI properties window for output 1.

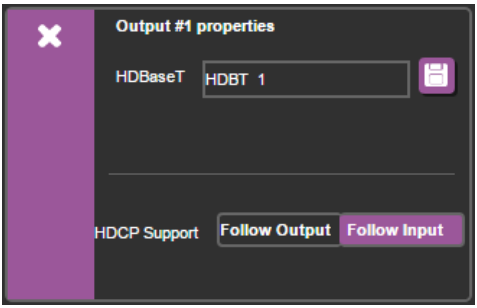



Figure 11: HDBaseT Output Properties Window

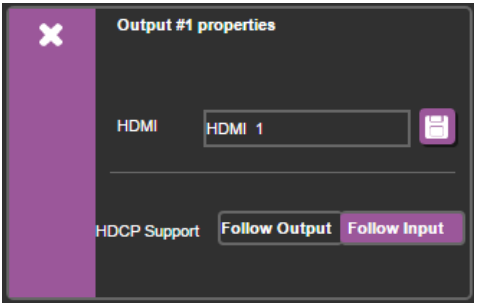



Figure 12: HDMI Output Properties Window

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.

Click the exit icon ( ) to exit the window.

## 8.2 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

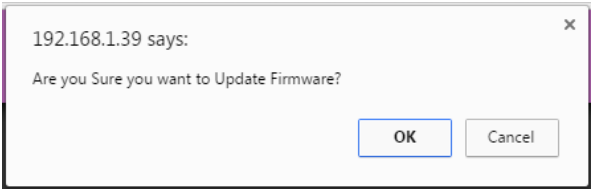

Figure 13: Device Settings Page

### 8.2.1 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.

## 8.3 Authentication Page

The Authentication page enables you to:

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

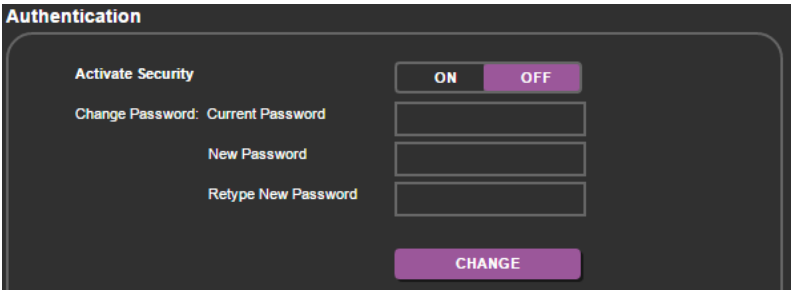



Figure 14: Authentication Page

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

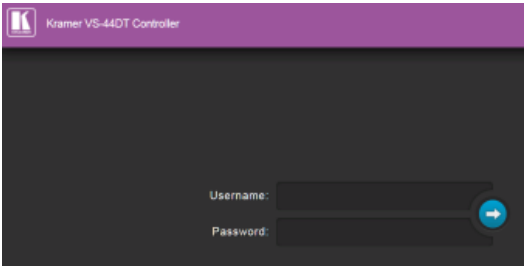



Figure 15: Login Page

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

## 8.4 EDID Page

The EDID page allows you to:

- Copy an EDID from:
  - The default EDID
  - Any HDBaseT output
  - Any input
  - An EDID stored in a file
- Copy an EDID to one or more inputs

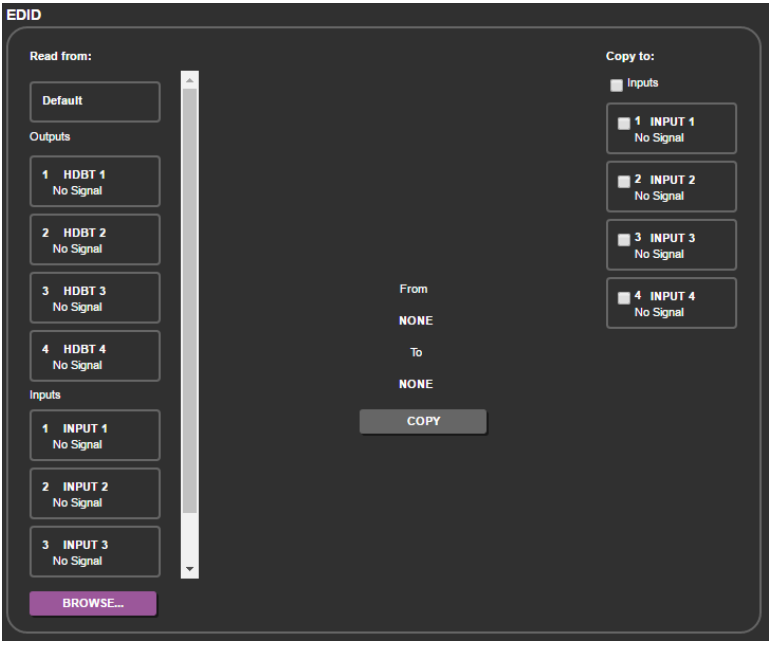



Figure 16: EDID Page

**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.

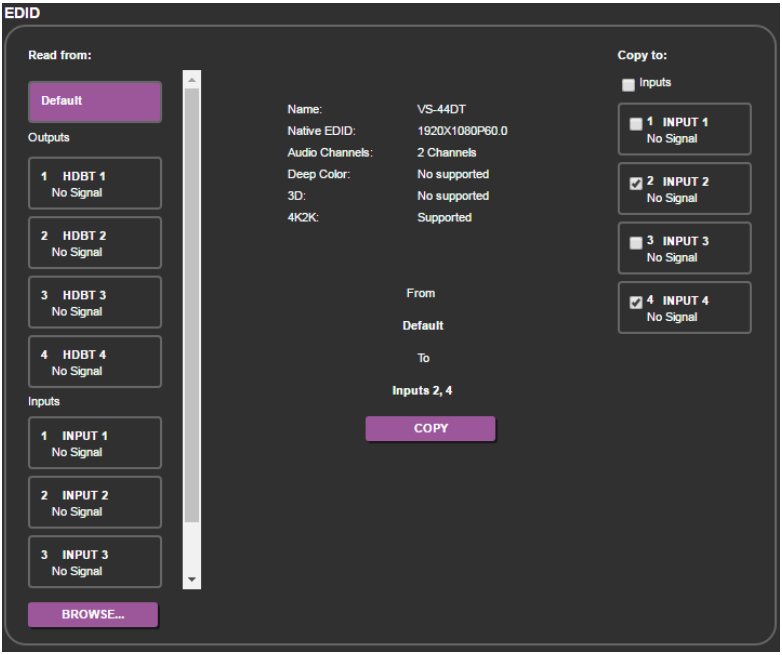



Figure 17: Copying the EDID

3. Click COPY.

   The COPY EDID RESULTS lists the actions taken.

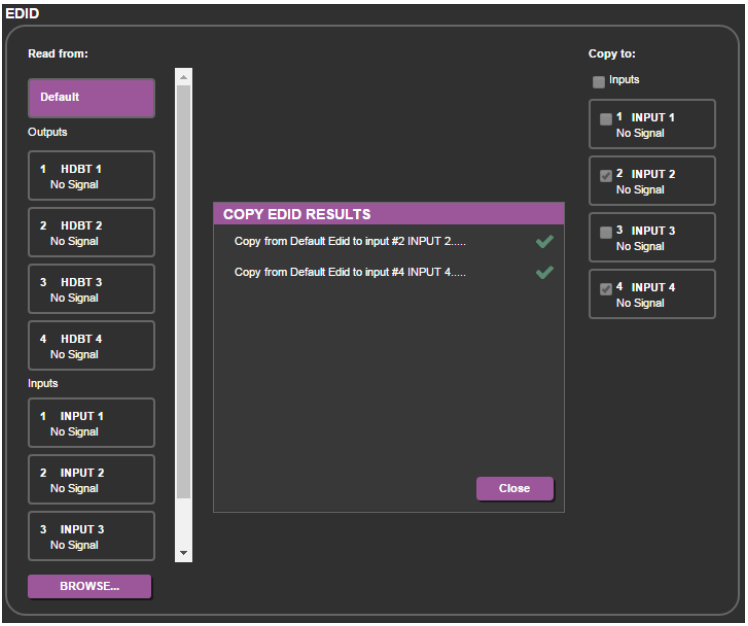



Figure 18: EDID Copied

## 8.5 RS-232 Routing Page

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


Figure 19: RS-232 Routing Page

## 8.6 Audio Settings Page

The Audio Settings page allows you to:

- Set the volume of the audio output or mute it
- Select the audio signal from one of the four HDBT outputs to be routed to the unbalanced stereo output

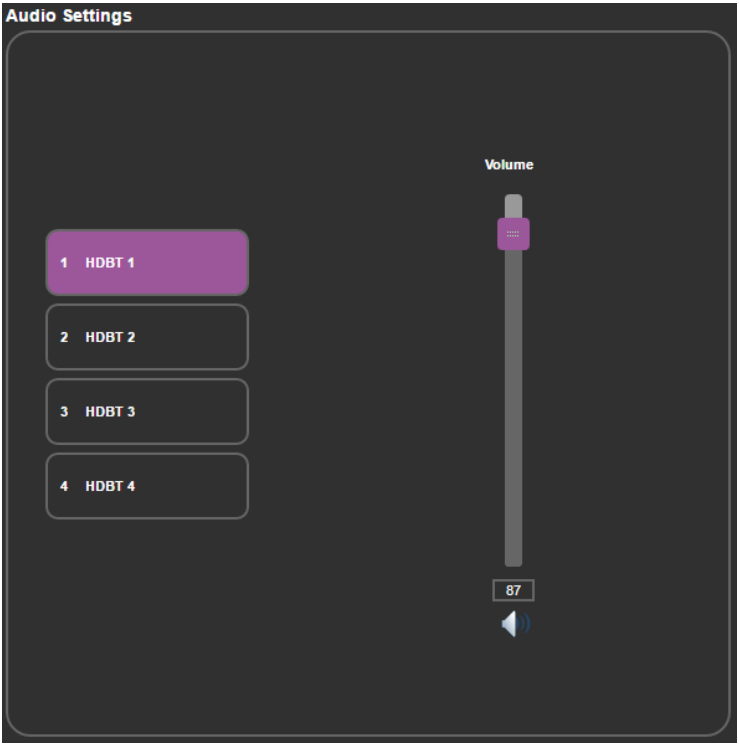



Figure 20: Audio Settings Page

## 8.7 Switching Timeout Page

The switching timeout page allows you to:

- Delay the switching upon signal loss (5V is on)
- Delay the switching upon unplugging the cable
- Delay 5V of when signal is lost


Figure 21: Switching Timeout Page

## 8.8 About Page

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


Figure 22: About Page

# 9 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.

# 10 Technical Specifications

| | |
|---|---|
| Inputs: | 4 HDMI on HDMI connectors<br>5 IR on 3.5mm mini jack connectors |
| Outputs: | 2 HDMI on HDMI connectors<br>4 HDBaseT on RJ-45 connectors<br>5 IR on 3.5mm mini jack connectors<br>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<br>1 Program on a USB connector<br>1 RS-232 control on a 3-pin terminal block<br>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<br>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 www.kramerav.com | |

## 10.1 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> |

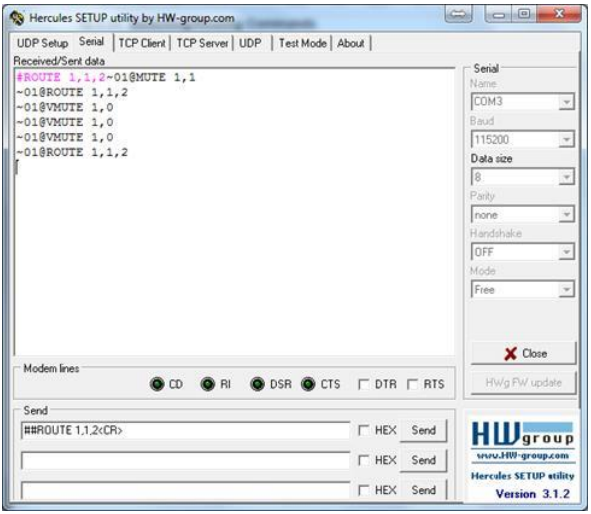
| Ethernet | |
|---|---|
| IP Address: | 192.168.1.39 |
| Subnet Mask: | 255.255.0.0 |
| Default Gateway: | 192.168.0.1 |
| TCP Port #: | 5000 |
| Default UDP Port #: | 50000 |
| Maximum TCP Ports: | 4 |
| Maximum UDP Ports: | 10 |

| 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 |

# 11 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):

| 'Device Code (17)' PROPERTIES | |
|---|---|
| name | Device Code (17) |
| data | #ROUTE 1,1,2\x0D |

- 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 Section 11.1
- General syntax used for Protocol 3000 commands, see Section 11.2
- Protocol 3000 commands available for the **VS-44DT**, see Section 11.3

## 11.1 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.

## 11.2 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,…*\|<br>**Command_2** *Parameter2_1,Parameter2_2,…*\|<br>**Command_3**<br>*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 |

## 11.3 Protocol 3000 Commands

This section includes the following commands:

- System Commands (see Section 11.4.1)
- Video Commands (see Section 11.4.2)
- EDID Handling Commands (see Section 11.4.3)
- Audio Commands (see Section 11.4.4)
- Switching Commands (see Section 11.4.5)
- Communication Commands (see Section 11.4.6)

## 11.4 Kramer Protocol 3000 Commands

The following are the detailed protocol commands

### 11.4.1 System Commands

| Command | Description |
|---|---|
| # | Protocol handshaking |
| BUILD-DATE | Get device build date |
| FACTORY | Reset to factory default configuration |
| HELP | Get command list |
| MODEL | Get device model |
| PROT-VER | Get device protocol version |
| RESET | Reset device |
| VERSION | Get device firmware version |
| AV-SW-TIMEOUT | Set/get auto switching timeout |
| DISPLAY | Get output HPD status |
| SIGNAL | Get input signal lock status |
| 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 |

#### 11.4.1.1 #

| 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 | | | |

### 11.4.1.2 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<br>*time* – Format: hh:mm:ss where hh = hours, mm = minutes, ss = seconds | | | |
| **K-Config Example** | | | |
| "#BUILD-DATE?",0x0D | | | |

### 11.4.1.3 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.<br>Your device may require powering off and powering on for the changes to take effect. | | | |
| **K-Config Example** | | | |
| "#FACTORY",0x0D | | | |

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

### 11.4.1.5 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 | | | |

### 11.4.1.6 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**SP3000:*version*CR LF | | | |
| **Parameters** | | | |
| *version* - XX.XX where X is a decimal digit | | | |
| **K-Config Example** | | | |
| "#PROT-VER?",0x0D | | | |

### 11.4.1.7 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 | | | |

### 11.4.1.8 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 | | | |

### 11.4.1.9 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

### 11.4.1.10 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

### 11.4.1.11 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<br>*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<br>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:<br>"#SIGNAL? 1",0x0D | | | |

### 11.4.1.12 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:<br>"#PRST-RCL 1",0x0D | | | |

### 11.4.1.13 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:<br>"#PRST-STO 1",0x0D | | | |

### 11.4.1.14 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:<br>"#LOCK-FP 0",0x0D | | | |

### 11.4.1.15 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:<br>"#MACH-NUM 3",0x0D | | | |

## 11.4.2 Video Commands

| Command | Description |
|---|---|
| VMUTE | Set/get video switch state |

### 11.4.2.1 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<br>*flag* – disable video on output=0, enable video on output=1 | | | |
| **Notes** | | | |
| The timeout must not exceed 60000 seconds.<br>The timeout for video and audio signal loss events must not be less than 5 seconds. | | | |
| **K-Config Example** | | | |
| Enable video on OUT 1:<br>"#VMUTE 1,1",0x0D | | | |

### 11.4.3 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/EDID%20Designer).

| Command | Description |
|---|---|
| CPEDID | Copy EDID data from the output to the input EEPROM |

#### 11.4.3.1 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<br>*src_id* – IN=1~4, OUT=1~4<br>*dst_type* –input=0<br>*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)<br>Example: bitmap 0x0013 means inputs 1, 2 and 5 are loaded with the new EDID.<br>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:<br>"#CPEDID 1,1,0,0x1",0x0D<br>Copy the EDID data from the default EDID source to HDMI In 1 and HDMI In 2:<br>"#CPEDID 2,0,0,0x3",0x0D | | | |

### 11.4.4 Audio Commands

| Command | Description |
|---|---|
| MUTE | Set/get audio mute |
| VOLUME | Set/get simple audio volume |

#### 11.4.4.1 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<br>*mute_mode* – mute mode off=0, mute mode on=1 | | | |
| **K-Config Example** | | | |
| Mute the audio:<br>"#MUTE 1,1",0x0D | | | |

#### 11.4.4.1 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<br>*P2* – Volume: 0~100 | | | |
| **K-Config Example** | | | |
| Set the OUT 2 audio volume to 50:<br>"#VOLUME 2,50",0x0D | | | |

### 11.4.5 Switching Commands

| Command | Description |
|---|---|
| VID | Set/get video switch state |
| ROUTE | Set/get layer routing |

#### 11.4.5.1 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

#### 11.4.5.2 ROUTE

| Functions | | Permission | Transparency |
|---|---|---|---|
| Set: | ROUTE | End User | - |
| Get: | ROUTE? | End User | Switching |
| **Description** | | **Syntax** | |
| Set: | Set layer routing | #ROUTESPLayer,dest,srcCR | |
| Get: | Get layer routing | #ROUTE?SPlayer,destCR | |

**Response**

~ nn@ROUTESP**P1,P2,P3**CR LF

**Parameters**

layer – Layer number: Video=1, Audio=2, Data=3
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

### 11.4.6 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 |

#### 11.4.6.1 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

### 11.4.6.2 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

### 11.4.6.3 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

### 11.4.6.4 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:<br>"#NET-IP 192.168.001.039",0x0D | | | |

### 11.4.6.5 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 | | | |

### 11.4.6.6 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
```

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**SAFETY WARNING**

Disconnect the unit from the power supply before opening and servicing

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