KRAMER

USER MANUAL

MODELS:

VM‑4HDT 1:4 HDMI to HDBT DA

VM‑3HDT 1:3 HDBT DA/Extender

VM‑2HDT 1:2 HDBT DA/Extender

Contents

Introduction

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

Getting Started

Although this user manual describes the **VM‑4HDT** it also refers to **VM‑3HDT** and **VM‑2HDT**, unless specified otherwise.

Note that:

- **VM‑4HDT** has 4 HDBaseT outputs.
- **VM‑3HDT** has one loop output and 3 HDBaseT outputs.
- **VM‑2HDT** has one loop output and 2 HDBaseT outputs.

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/VM-4HDT to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).
- Do not secure the cables in tight bundles or roll the slack into tight coils.
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality.
- Position your Kramer **VM‑4HDT** away from moisture, excessive sunlight and dust.

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

Safety Instructions

(!) **Caution:** There are no operator serviceable parts inside the unit.

Warning: Use only the Kramer Electronics input power wall adapter that is provided with the unit.

Warning: Disconnect the power and unplug the unit from the wall before installing.

Recycling Kramer Products

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

Overview

Congratulations on purchasing your Kramer **HDMI to HDBT DA**.

VM‑4HDT is a high-quality, long-reach HDBaseT extender and distributor that takes HDMI, IR and RS-232 signals, and converts and distributes them to 4 HDBaseT outputs. The **VM‑4HDT** supports HDMI resolutions up to 4K@60 (4:2:0), and the outputs can be connected to compatible HDBaseT receivers such as the **TP-580R**.

VM‑3HDT and **VM‑2HDT** also include an HDMI LOOP output for connecting to an additional unit in a daisy chain.

VM‑4HDT provides exceptional quality and advanced and user-friendly operation.

Exceptional Quality

- High Performance Distribution – Distributes one HDMI signal to four long-reach HDBaseT extension outputs with up to 4K video resolution.

- Extension-line Distribution – Distributes a 4K@60Hz (4:2:0) 24bpp (maximum) video signal over HDBaseT extension line to a distance of up to 40m (130ft) long-reach, and even further for lower video resolutions.

- HDMI Signal Transmission – HDMI 2.0 and HDCP 1.4 compliant signal, supporting Deep Color, x.v.Color™, Lip Sync, 7.1 PCM, Dolby TrueHD, DTS-HD, 2K, 4K, and 3D. EDID and CEC (OUT 1 only) signals are passed through from the source to the display.

    (i) For **VM‑2HDT** and **VM‑3HDT**, CEC is passed from the LOOP OUT to the HDBT OUT 1 and to the display on the connected receiver.

- I-EDIDPro™ Kramer Intelligent EDID Processing™ – An intelligent EDID handling, processing and pass-through algorithm that ensures Plug and Play operation for HDMI source and display systems.

- Kramer Equalization & re-Klocking™ Technology – Rebuilds the digital signal integrity to travel longer distances.

Advanced and User-friendly Operation

- Standard Compatibility – Connects to any HDBaseT compliant extension product on the market.

- LED Indicators – Status indicators for HDMI and HDBaseT input/output connected signals and power for ease of maintenance and troubleshooting.

- Support for EDID Designer via the USB port.

- Easy Installation – Twisted-pair cables for HDBaseT signals wiring. Compact Mega TOOLS™ fan-less enclosure for over-ceiling mounting, or side-by-side rack mounting.

Installing your VM‑4HDT

Install **VM‑4HDT** using one of the following methods:

- Attach the rubber feet and place the unit on a flat surface.

- Fasten a bracket (included) on each side of the unit and attach it to a flat surface. For more information go to www.kramerav.com/downloads/VM-4HDT.

- Mount the unit in a rack using the recommended rack adapter (see www.kramerav.com/product/VM-4HDT).

The products described in this user manual are HDBaseT certified.

Typical Applications

VM‑4HDT is ideal for the following typical applications:

- Distribution of a native, extended AV signal in large rooms.

- Presentation and multimedia rich applications in large boardrooms and meeting rooms.

- Corporate, education, hospitality and government market segments.

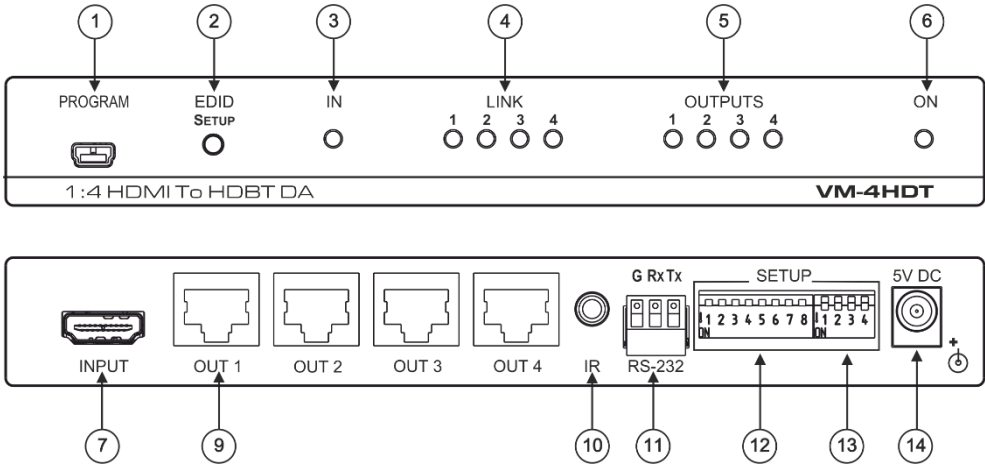# Defining the HDMI to HDBT DA

Figure 1 defines the **VM‑4HDT**.

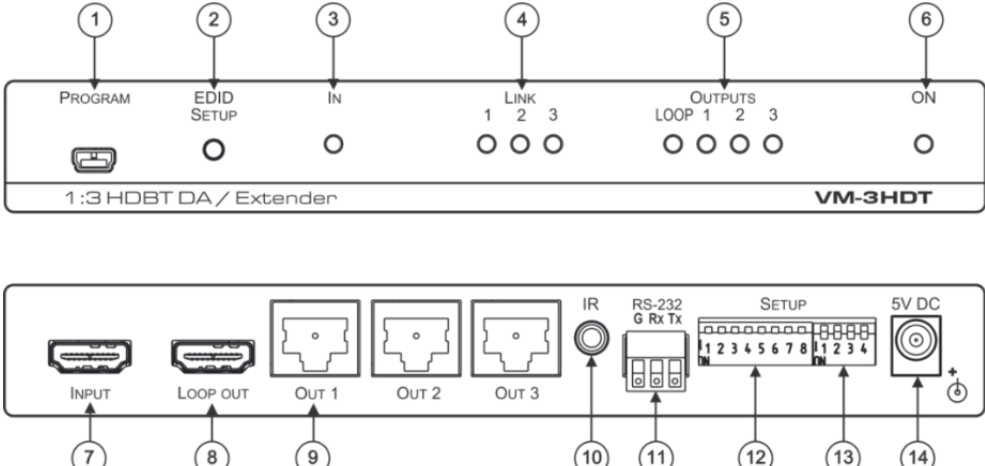Figure 1: VM‑4HDT 1:4 HDMI to HDBT DA

Figure 2 defines the **VM‑3HDT**.

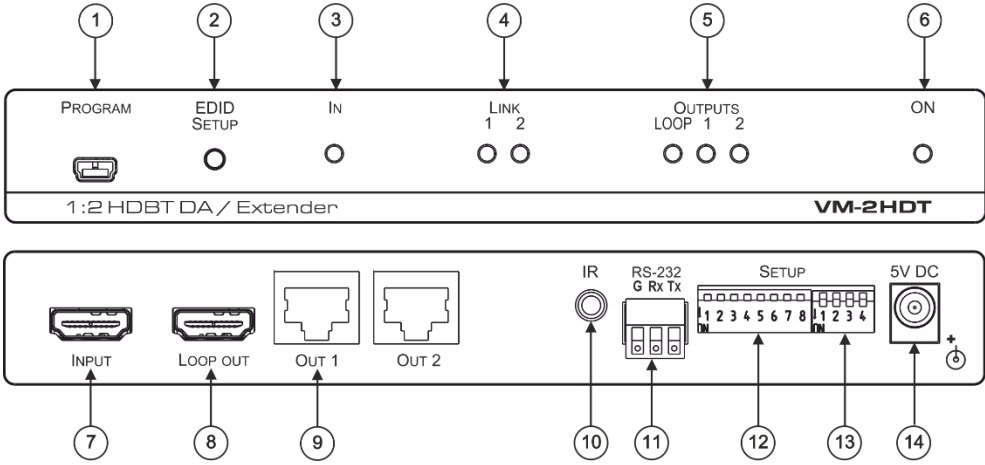Figure 2: VM‑3HDT 1:3 HDBT DA/Extender

Figure 3 defines the **VM‑2HDT**.

Figure 3: VM‑2HDT 1:2 HDBT DA/Extender

#	Feature	Function
①	PROGRAM Mini USB Connector	Use to send RS-232 Commands (see Kramer Protocol 3000 Commands on page 19). Connect to a PC to perform firmware upgrades (via K-Upload) and work with the EDID Designer. K-Upload and EDID Designer can be downloaded from our Web site at: www.kramerav.com/manual/VM-4HDT. To use the mini USB port, you need to download and the Kramer USB driver from our Web site at: www.kramerav.com/support/product_downloads.asp and install it.
②	EDID SETUP Button	Press to acquire the EDID from an output or select the default EDID (see Acquiring an EDID on page 12).
③	IN LED	Lights when an active input signal is detected.
④	LINK LEDs	Lights when a link is established with the receiver.
⑤	OUTPUT LEDs	Lights when an active output acceptor is detected.
⑥	ON LED	Lights when the unit receives power.
⑦	INPUT HDMI Connector	Connects to the HDMI source
⑧	LOOP OUT HDMI Connector (for **VM‑2HDT** and **VM‑3HDT**)	Connect to a local monitor or a daisy-chained DA, for example, **VM‑4HDT**.
⑨	HDBT OUT Connectors	Connect to an HDBT acceptor, for example **TP-580R**.
⑩	IR 3.5mm Mini Jack	Connect an IR sensor for sending IR signals to a remote device (for example, a projector connected to an HDBT receiver). **Or** Connect an IR emitter (attached to a local device) for receiving IR signals from the device's IR remote control via HDBT.
⑪	RS-232 3-pin Terminal Block	Connect to a serial controller to control a remote device that is connected to the RS-232 port of an HDbaseT receiver. **Or** Connect to a local device which is to be controlled by an RS-232 controller connected via HDBT.
⑫	SETUP 8-way DIP-switch	Used to set the IR and RS-232 commands behavior, (see Setting the DIP-Switches on page 9).
⑬	SETUP 4-way DIP-switch	Always keep all four DIP-switches UP (off).
⑭	5V DC Connector	Connects to the 5V DC power supply.

Connecting the VM‑4HDT, VM‑3HDT and VM‑2HDT

> ℹ️ Always switch off the power to each device before connecting it to your **VM‑4HDT**. After connecting your **VM‑4HDT**, connect its power and then switch on the power to each device.

To connect the VM‑4HDT as illustrated in the example in Figure 4:

> ℹ️ Figure 5 illustrates how to connect the **VM‑3HDT** (the same applies to **VM‑2HDT** that has 2 HDBT outputs).

1. Connect an HDMI input source (for example, a Blu-ray disk player) to the HDMI IN connector ⑦.

2. Connect each HDBT output ⑨ to an HDBT receiver (for example, The **TP-580R** or the **TP-588D**).

   > ℹ️ If a Mac computer is connected as a source, it will output an HDCP-secured signal that will not passed-through to any connected non-HDCP acceptors.

3. For **VM‑3HDT** and **VM‑2HDT** only, connect the LOOP HDMI connector ⑧ to an HDMI acceptor (for example, a **VM-4HDT** or a local display).

4. If required, connect the IR 3.5mm mini jack ⑩ to an IR sensor or emitter (for example, an emitter, to control, with its IR remote controller, the projector that is connected to an HDBT receiver). See IR and RS-232 Signal Routing on page 9 for further details.

5. If required, connect a controller (for example, the **RC-206** control keypad) to the RS-232 3-pin terminal block connector ⑪ to control a remote display that is connected to an HDBT receiver. See IR and RS-232 Signal Routing on page 9 for further details.

6. Connect the 5V DC power adapter to the power socket unit ⑭ and then connect the adapter to the mains electricity (not shown in Figure 4).
   The ON LED ⑥ lights.
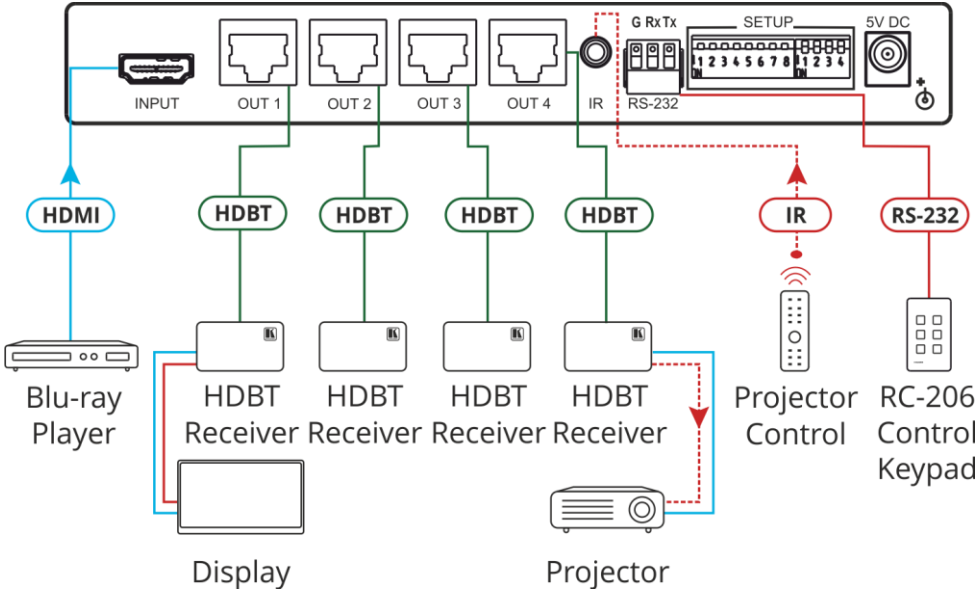
Figure 4: Connecting the VM‑4HDT
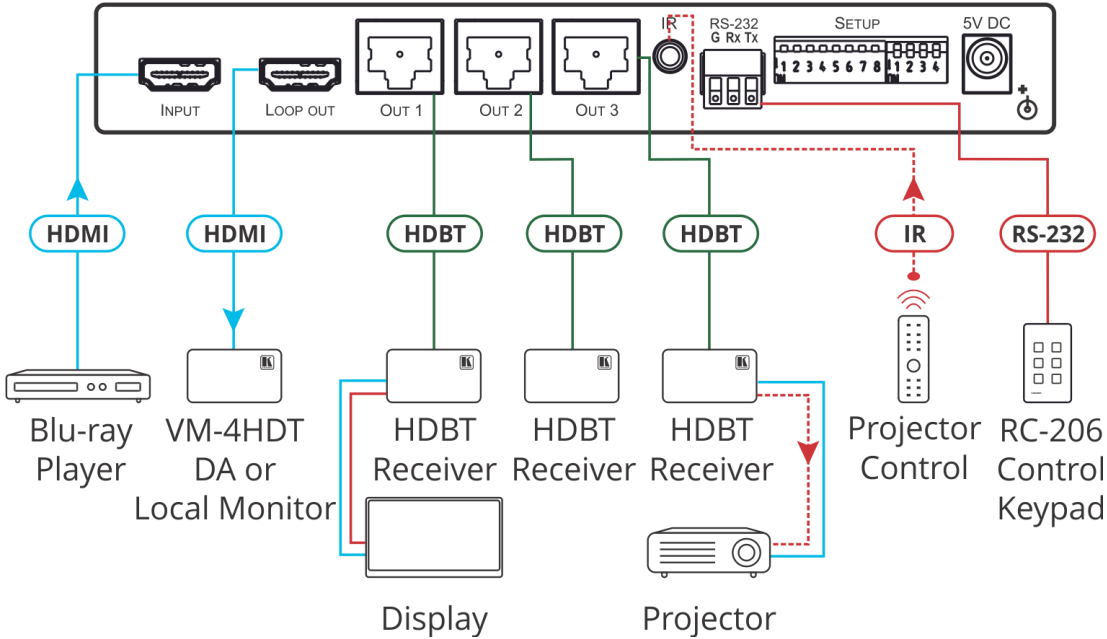
Figure 5: Connecting the VM‑3HDT / VM‑2HDT

HDBT RJ-45 Pinout

Use a straight pin-to-pin cable with RJ-45 connectors.

ⓘ We recommend that for HDBT cables, the ground shielding be connected/soldered to the connector shield.

For optimum range and performance use the recommended Kramer cables available at www.kramerav.com/product/VM-4HDT.
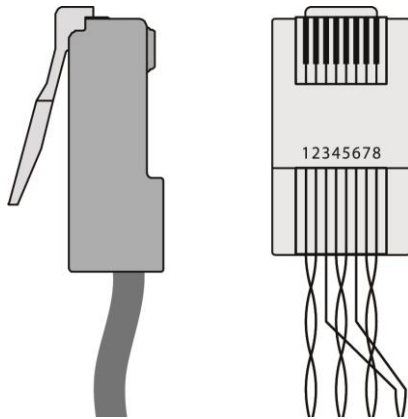
Figure 6: HDBT Connector Pinout

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

Operating the VM‑4HDT, VM‑3HDT and VM‑2HDT

This section describes the following functions

- IR and RS-232 Signal Routing on page 9.
- Acquiring an EDID on page 12.

IR and RS-232 Signal Routing

The **VM‑4HDT** can send or receive IR and RS-232 commands via the four HDBT output ports.

Each signal can pass commands from the **VM‑4HDT** to a single output, several outputs or all of the outputs or the other way around, from the output/s to the **VM‑4HDT**.

The IR/RS-232 signal routing is enabled via the SETUP DIP-switches ⑫ (see Setting the DIP-Switches on page 9).

Setting the DIP-Switches

This section defines the SETUP DIP-Switches:

Output #	IR Routing is enabled when:	RS-232 Routing is enabled when:
OUT 1	DIP 1 – OFF	DIP 5 – OFF
OUT 2	DIP 2 – OFF	DIP 6 – OFF
OUT 3	DIP 3 – OFF	DIP 7 – OFF
OUT 4	DIP 4 – OFF	DIP 8 – OFF

Figure 7: VM‑4HDT DIP-Switches

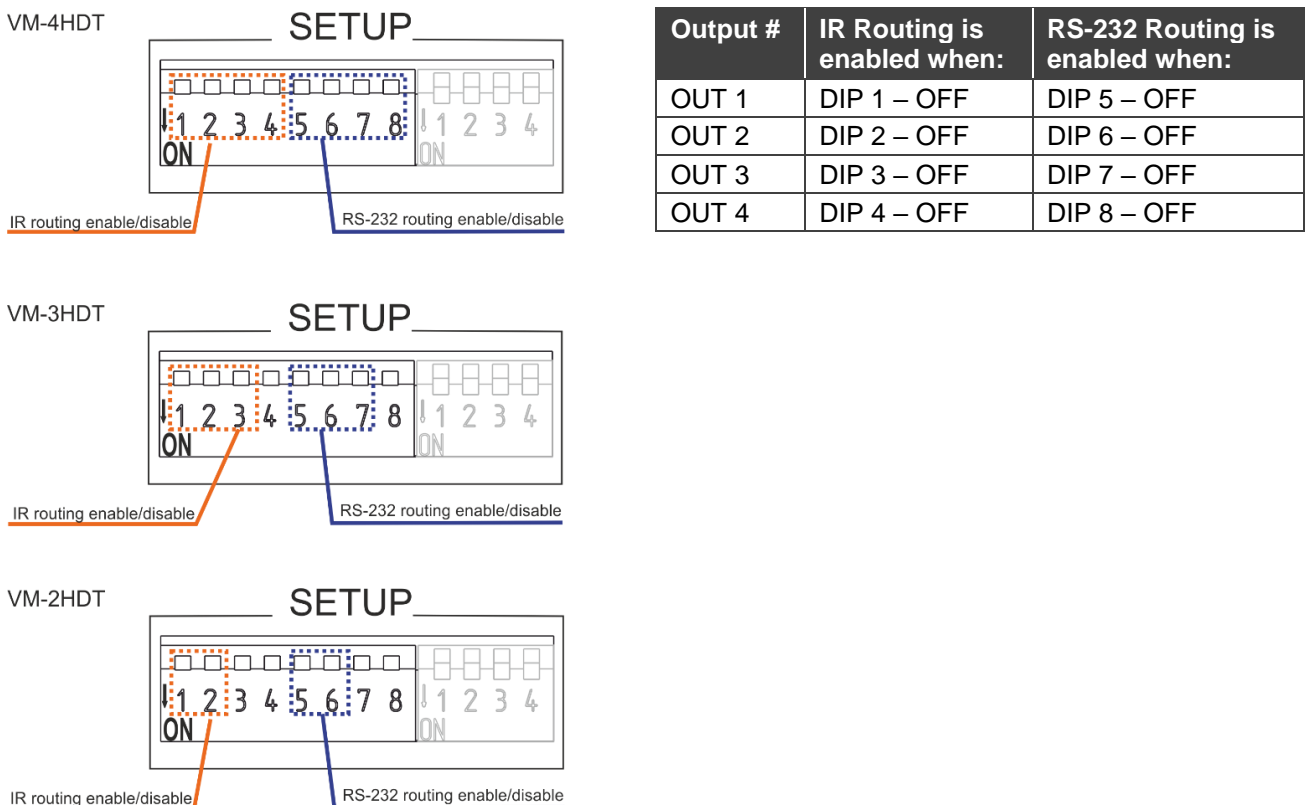For example, in the DIP-switch setup shown in Figure 8, DIPs 1, 4, 7 and 8 are set to OFF. This means that IR signals can be transferred through channels 1 and 4 and RS-232 commands can be passed via channels 3 and 4. All the other channels are set to ON and therefore their related IR and RS-232 communication is disabled.
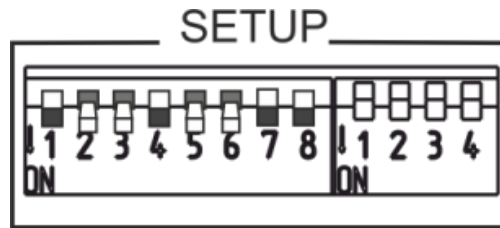

Figure 8: VM‑4HDT DIP-Switches Setup

Signal Routing

The example in Figure 9 shows the **VM‑4HDT** connected to four **TP-580R** devices. The table below summarizes the types of connections:

Output #	HDMI OUT:	INPUT	IR	RS-232
VM‑4HDT		Streamer	IR Emitter to streamer	Laptop
TP-580R (1)	Display		Streamer IR remote controller to IR Sensor	
TP-580R (2)	Display		Streamer IR remote controller to IR Sensor	
TP-580R (3)	Projector		Streamer IR remote controller to IR Sensor	Projector
TP-580R (4)	Projector		Streamer IR remote controller to IR Sensor	Projector

IR signal Routing

To route the IR signal you have to use the Kramer external IR sensor on one end and the Kramer IR emitter cable on the other end.

In this example, an IR emitter is connected to the streamer and IR sensors are connected to each **TP-580R** device. This setup lets you remotely control the streamer via any of the receiver devices using the streamer's IR remote control transmitter.

RS-232 Signal Routing

A laptop or a Kramer Control device (for example, the **SL-240C** controller) can be used to send RS-232 control commands over HDBaseT to the remote connected device.

In this example, a laptop is connected to the RS-232 terminal block connector on the **VM‑4HDT** and the RS-232 ports on **TP-580R** (3) and **TP-580R** (4) are connected to the projector. With this type of setup, you can control the projectors via the laptop.

RS-232 commands are sent to both projectors:

- When identical (for example, both are Projector A models), both respond to these commands.

- When different (for example, Projector A and Projector B models), the Projector A commands affect only Projector A and are ignored by Projector B.

In the same way, if RS-232 is also connected to the displays on **TP-580R** (1) and
TP-580R (2) (not shown in Figure 9) they can also receive specific control commands each,
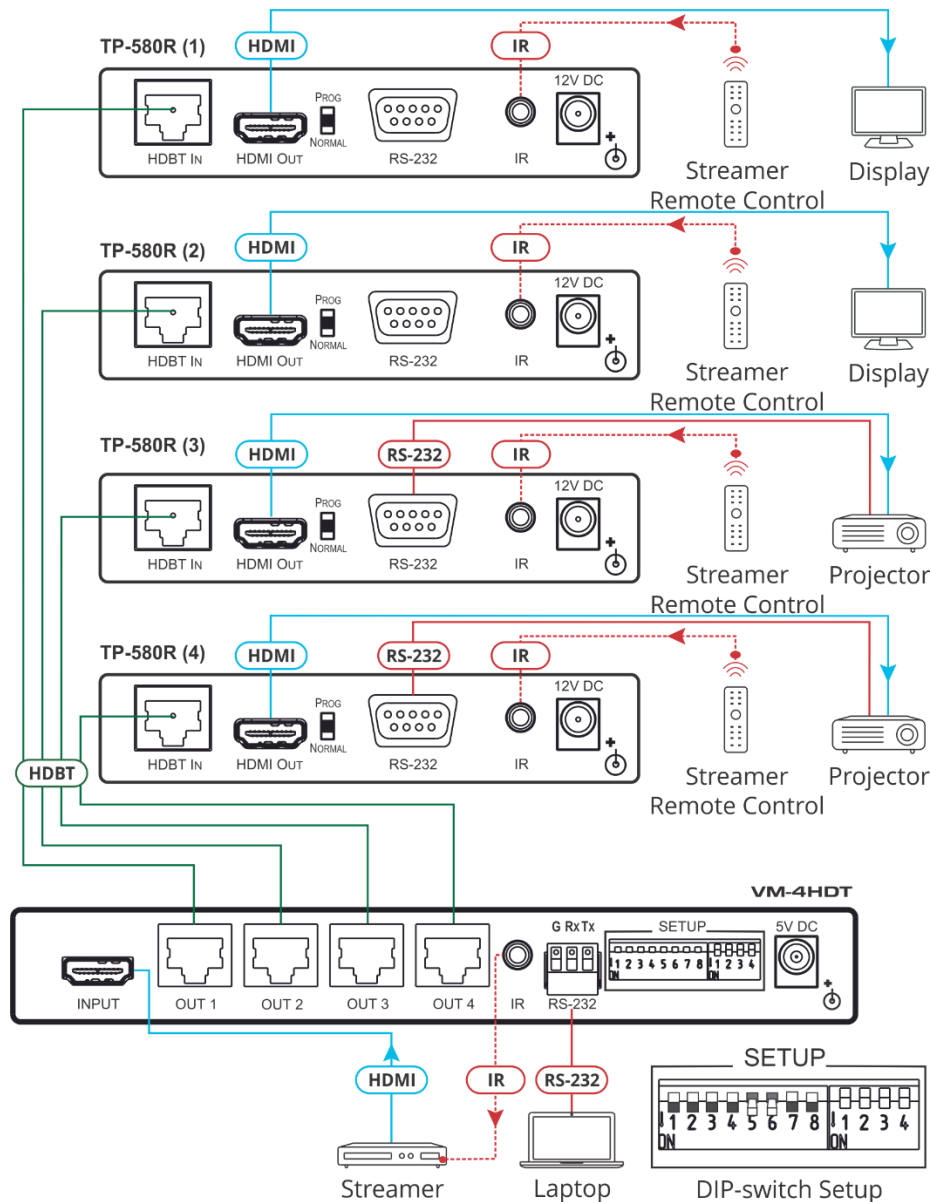which will be ignored by devices of a different model.

Figure 9: IR/RS-232 Routing Example

EDID Configuration

This section describes the following functions:

- Acquiring an EDID on page 12.
- Acquiring a Custom EDID on page 12.
- Forcing the RGB Mode on page 13.

Acquiring an EDID

Press **EDID SETUP** once to display the current EDID source: OUT 1, OUT 2, OUT 3, OUT 4, or all OUT LEDs flash (default EDID).

> For **VM‑3HDT**, OUT 1, OUT 2 and OUT 3 LEDs are valid.
>
> For **VM‑2HDT**, OUT 1 and OUT 2 LEDs are valid.

To acquire an EDID:

1. Press **EDID SETUP**. The current EDID source is displayed.

2. Press **EDID SETUP** (a second time) to enter EDID select mode.

3. Press **EDID SETUP** repeatedly to cycle through the EDID source options.
   The OUT LEDs flash in the following order:
   OUT 1 -> OUT 2 -> OUT 3 -> OUT 4 -> all output LEDs flash (default EDID).

   Stop pressing **EDID SETUP** once the required EDID source is reached.

4. Wait a few seconds, until **VM‑4HDT** acquires the EDID.
   When complete, all output LEDS return to normal operation, displaying the present output connection status.

> If an unconnected output is chosen or the connected EDID cannot be read, the **VM‑4HDT** loads the default EDID.

Acquiring a Custom EDID

You can acquire a custom EDID, using the Kramer EDID designer, via the mini USB port on the front panel.

To acquire a custom EDID:

1. Download EDID Designer to your PC from our web site at
   www.kramerav.com/downloads/VM-4HDT.

2. Connect the device to your PC via the mini USB port.

3. Follow EDID designer instructions.

> To use the mini USB port, you need to download and the Kramer USB driver from our Web site at: www.kramerav.com/support/product_downloads.asp and install it.

Forcing the RGB Mode

Normally (the default state), when acquiring the EDID, the device supports any color space that is defined in the acquired EDID parameters. In case of a color space problem, using the Force RGB mode may improve the colors of the image on the display.

To	Do the following:
Force the acquired EDID to support only RGB color space:	Press and hold the EDID button for few seconds until all the output LEDs flash together four times. Continue to acquire the desired EDID. This acquired EDID is then forced to support the RGB color space only.
Return to the normal EDID mode:	Press and hold the EDID button for few seconds until the output LEDs flash together once. Continue to acquire the desired EDID.
View the force RGB activation status:	Power cycle the unit. All output LEDs will flash together once when in normal EDID mode, and four times when in Force RGB mode.

Firmware Upgrade

You can upgrade the **VM‑4HDT** via USB using Kramer **K-UPLOAD** tool.

The latest firmware version and the latest version of **K-UPLOAD** and installation instructions can be downloaded from our Web site at www.kramerav.com/downloads/VM-4HDT.

To use the mini USB port, you need to download and the Kramer USB driver from our Web site at: www.kramerav.com/support/product_downloads.asp and install it.

Technical Specifications

VM‑4HDT

Input	HDMI	On a female HDMI connector
Outputs	4 HDBT	On RJ-45 female connectors

VM‑3HDT

Input	HDMI	On a female HDMI connector
Outputs	1 LOOP HDMI	On a female HDMI connector
	3 HDBT	On RJ-45 female connectors

VM‑2HDT

Input	HDMI	On a female HDMI connector
Outputs	1 LOOP HDMI	On a female HDMI connector
	2 HDBT	On RJ-45 female connectors

General

Ports	1 USB	On a mini female connector
	1 RS-232	On a 3-pin terminal block connector
	1 IR	On a 3.5mm mini jack
Maximum Extension Range	40m (130ft)	At 4K@60Hz (4:2:0)
	70m (230ft)	At full HD (1080p@60Hz 36bpp)
Video	Max. Resolution	4K@30Hz and 4K@60Hz 4:2:0
	Max. Data Rate	10.2Gbps (3.4Gbps per graphic channel)
	Compliance	Supports HDMI 2.0, HDCP 1.4 and HDBaseT 1.0
Control	Front Panel	EDID SETUP button
		IN, LINK, OUTPUT and ON indication LEDs
	Rear Panel	DIP-switches
Power	Consumption	**VM‑4HDT**:5V DC, 3.2A **VM‑3HDT**: 5V DC 2.1A **VM‑2HDT**: 5V DC, 1.6A
	Source	5V DC, 4A
Environmental Conditions	Operating Temperature	0° to +40°C (32° to 104°F)
	Storage Temperature	-40° to +70°C (-40° to 158°F)
	Humidity	10% to 90%, RH non-condensing
Regulatory Compliance	Safety	**VM‑4HDT**: CE, UL, FCC **VM‑3HDT**: CE **VM‑2HDT**: CE
	Environmental	RoHs, WEEE
Enclosure	Size	MegaTool
	Cooling	Convection ventilation
General	Net Dimensions (W, D, H)	18.8cm x 11.5 cm x 2.54cm (7.4" x 4.53" x 1.")
	Shipping Dimensions (W, D, H)	34.5cm x 16.5cm x 5.2cm (13.6" x 6.5" x 2.05")
	Net Weight	0.5kg (1.1lbs) approx.
	Shipping Weight	1.3kg (2.9lbs) approx.
Accessories	Included	Power cord and adapter

Specifications are subject to change without notice at www.kramerav.com

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

Default Communication Parameters

RS-232	
Baud Rate:	115,200
Data Bits:	8
Stop Bits:	1
Parity:	None
Factory Reset	
Protocol 3000	FACTORY command to reset to factory default configuration
RS-232	
Command Format:	ASCII protocol 3000
Example (Get the HDCP state of output 2):	#HDCP-STAT? 1,2<cr>

Default EDID

(i) The same parameters apply also to the **VM‑3HDT** and **VM‑2HDT**.

```
Model name.............. VM-4HDT
 Manufacturer............ KMR
 Plug and Play ID......... KMR0672
 Data string............. Default-EDID
 Serial number........... 2
 Manufacture date........ 2012, ISO week 255
 Filter driver........... None
 ------------------------
 EDID revision........... 1.3
 Input signal type........ Digital
 Color bit depth.......... Undefined
 Display type............ RGB color
 Screen size.............. 520 x 320 mm (24.0 in)
 Power management........ Standby, Suspend, Active off/sleep
 Extension blocs.......... 1 (CEA-EXT)
 ------------------------
 DDC/CI................... Not supported
Color characteristics
 Default color space...... Non-sRGB
 Display gamma............ 2.20
 Red chromaticity........ Rx 0.674 - Ry 0.319
 Green chromaticity....... Gx 0.188 - Gy 0.706
 Blue chromaticity........ Bx 0.148 - By 0.064
 White point (default).... Wx 0.313 - Wy 0.329
 Additional descriptors... None
Timing characteristics
 Horizontal scan range.... 30-83kHz
 Vertical scan range...... 56-76Hz
 Video bandwidth.......... 170MHz
 CVT standard............. Not supported
 GTF standard............. Not supported
 Additional descriptors... None
 Preferred timing......... Yes
 Native/preferred timing.. 1280x720p at 60Hz (16:9)
   Modeline.............. "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
Standard timings supported
   720 x  400p at  70Hz - IBM VGA
   640 x  480p at  60Hz - IBM VGA
   640 x  480p at  75Hz - VESA
   800 x  600p at  60Hz - VESA
   800 x  600p at  75Hz - VESA
   1024 x  768p at  60Hz - VESA
   1024 x  768p at  75Hz - VESA
   1280 x 1024p at  75Hz - VESA
   1280 x 1024p at  60Hz - VESA STD
   1600 x 1200p at  60Hz - VESA STD
   1152 x  864p at  75Hz - VESA STD
EIA/CEA-861 Information
 Revision number.......... 3
 IT underscan............. Supported
 Basic audio.............. Supported
 YCbCr 4:4:4.............. Supported
 YCbCr 4:2:2.............. Supported
 Native formats........... 1
 Detailed timing #1....... 1920x1080p at 60Hz (16:9)
   Modeline.............. "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
 Detailed timing #2....... 1920x1080i at 60Hz (16:9)
   Modeline.............. "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
 Detailed timing #3....... 1280x720p at 60Hz (16:9)
   Modeline.............. "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
 Detailed timing #4....... 720x480p at 60Hz (16:9)
   Modeline.............. "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync
 CE video identifiers (VICs) - timing/formats supported
   1920 x 1080p at  60Hz - HDTV (16:9, 1:1)
   1920 x 1080i at  60Hz - HDTV (16:9, 1:1)
   1280 x  720p at  60Hz - HDTV (16:9, 1:1) [Native]
   720 x  480p at  60Hz - EDTV (16:9, 32:27)
   720 x  480p at  60Hz - EDTV (4:3, 8:9)
```

720 x 480i at 60Hz - Doublescan (16:9, 32:27)
720 x 576i at 50Hz - Doublescan (16:9, 64:45)
640 x 480p at 60Hz - Default (4:3, 1:1)
NB: NTSC refresh rate = (Hz*1000)/1001
CE audio data (formats supported)
LPCM   2-channel, 16/20/24 bit depths at 32/44/48 kHz
CE vendor specific data (VSDB)
IEEE registration number. 0x000C03
CEC physical address..... 1.0.0.0
Maximum TMDS clock....... 165MHz
CE speaker allocation data
Channel configuration.... 2.0
Front left/right......... Yes
Front LFE................ No
Front center............. No
Rear left/right.......... No
Rear center.............. No
Front left/right center.. No
Rear left/right center... No
Rear LFE................. No
Report information
Date generated........... 11/11/2014
Software revision........ 2.60.0.972
Data source.............. Real-time 0x0032
Operating system......... 6.1.7601.2.Service Pack 1

Protocol 3000

The **VM‑4HDT 1:4 HDMI to HDBT DA** can be operated using the Kramer Protocol 3000 serial commands. The command framing varies according to how you interface with the **VM‑4HDT**.

Generally, 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:
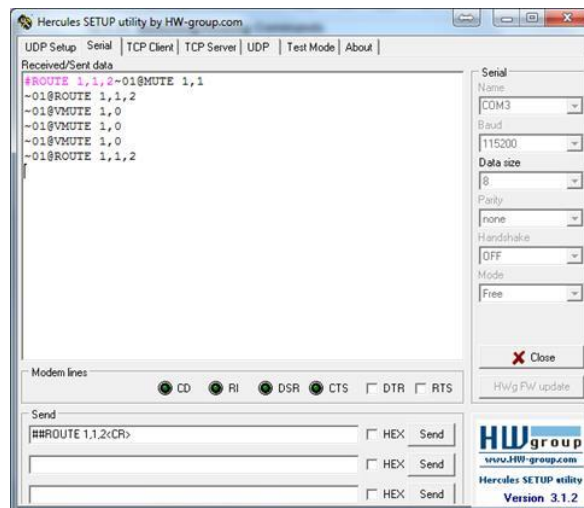
   ⓘ   The framing of the command varies according to the terminal communication software.   .

- K-Touch Builder (Kramer software):

- K-Config (Kramer configuration software):
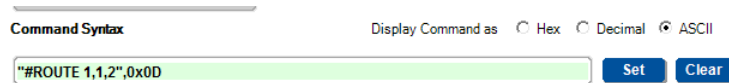
   ⓘ   All the examples provided in this section are based on using the K-Config software.

You can enter commands directly using terminal communication software (e.g., Hercules) by connecting a PC to the serial or Ethernet port on the **VM‑4HDT**. 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 Protocol 3000 commands, see:

-
-
-

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.

- **Message starting character:**

  - # – For host command/query

  - ~ – For device response

- **Device address** – K-NET Device ID followed by @ (optional, K-NET only)

- **Query sign** – ? follows some commands to define a query request

- **Message closing character:**

  - CR – Carriage return for host messages (ASCII 13)

  - CR LF – Carriage return for device messages (ASCII 13) and line-feed (ASCII 10)

- **Command chain separator character –** Multiple commands can be chained in the same string. Each command is delimited by a pipe character (|). When chaining commands, enter the message starting character and the message closing character only at the beginning and end of the string.

Spaces between parameters or command terms are ignored. Commands in the string do not execute until the closing character is entered. A separate response is sent for every command in the chain.

Kramer Protocol 3000 Syntax

The Kramer Protocol 3000 syntax uses the following delimiters:

- CR = Carriage return (ASCII 13 = 0x0D)

- LF = Line feed (ASCII 10 = 0x0A)

- SP = Space (ASCII 32 = 0x20)

Some commands have short name syntax in addition to long name syntax to enable faster typing. The response is always in long syntax.

The Protocol 3000 syntax is in the following format:

- Host Message Format:

Start	Address (optional)	Body	Delimiter
#	*Device_id@*	**Message**	CR

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

Start	Body	Delimiter
#	**Command** SP *Parameter_1,Parameter_2,…*	CR

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

Start	Address	Body	Delimiter
#	*Device_id@*	**Command_1** *Parameter1_1,Parameter1_2,…*| **Command_2** *Parameter2_1,Parameter2_2,…*| **Command_3** *Parameter3_1,Parameter3_2,…*|…	CR

- **Device Message Format:**

Start	Address (optional)	Body	Delimiter
~	*Device_id@*	**Message**	CR LF

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

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

Kramer Protocol 3000 Commands

This section includes the following commands:

System Commands

Command	Description
#	Protocol handshaking (system mandatory)
BUILD-DATE	Get device build date (system mandatory)
FACTORY	Reset to factory default configuration
HELP	Get command list (system mandatory)
HDCP-STAT	Get HDCP signal status
NAME	Set/get machine (DNS) name (system – Ethernet)
MODEL?	Get device model (system mandatory)
PROT-VER	Get device protocol version (system mandatory)

Command	Description
RESET	Reset device (system mandatory)
SN	Get device serial number (system mandatory)
DISPLAY?	Get output HPD status
SIGNAL?	Get input signal lock status (system)

#

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. Step-in master products use this command to identify the availability of a device.			
K-Config Example			
"#",0x0D			

BUILD-DATE

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

FACTORY

Function		Permission	Transparency
Set:	**FACTORY**	End User	-
Get:	-	-	-
Description		**Syntax**	
Set:	Reset device to factory defaults configuration	**#FACTORY**CR	
Get:	-	-	
Response			
~nn@**FACTORY**SP*OK*CR LF			
Notes			
This command deletes all user data from the device. The deletion can take some time. Your device may require powering off and powering on for the changes to take effect.			
K-Config Example			
"#FACTORY",0x0D			

HELP

Function		Permission	Transparency
Set:	**-**	-	-
Get:	**HELP**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get command list or help for specific command	**#HELP**`CR`	
Response			
Multi-line: ~`nn`@Device available protocol 3000 commands:`CR LF`command,`SP`command…`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			

HDCP-STAT

Function		Permission	Transparency
Set:	**-**	-	-
Get:	**HDCP-STAT?**	End User	Public
Description		**Syntax**	
Set:	None	-	
Get:	Get HDCP signal status	#**HDCP-STAT?**`SP`*stage,stage_id*`CR`	
Parameters			
stage – input/output: 0 (Input), 1 (Output)			
stage_id - number of chosen stage. For the input: 1 (Input); for the outputs: for **VM‑4HDT** : 1 (Output 1), 2 (Output 2), 3 (Output 3), 4 (Output 4); for **VM‑3HDT** and **VM‑2HDT**: 1 (Loop Output), 2 (Output 1), 3 (Output 2), 4 (Output 3)			
status - signal encryption status – 0 (HDCP Off), 1 (HDCP On), 2 (Follow input)			
Response			
Set / Get: ~`nn`@**DHCP-STAT**`SP`*stage,stage_id,status*`CR LF`			
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			
Input stage (0) – get the HDCP signal status of the source device connected to the input. Output stage (1) – get the HDCP signal status of the sink device connected to HDBT Out.			
K-Config Example			
Get the HDCP input signal status of the source device connected to the INPUT: "#HDCP-STAT? 0,1",0x0D			

NAME

Function		Permission	Transparency
Set:	**NAME**	Administrator	Public
Get:	**NAME?**	End User	Public

Description		Syntax	
Set:	Set machine (DNS) name	**#NAME**SP*machine_name*CR	
Get:	Get machine (DNS) name	**#NAME?**CR	

Response
Set: ~nn@**NAME**SP*machine_name*CR LF
Get: ~nn@**NAME?**SP*machine_name*CR LF

Parameters
machine_name – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end)

Notes
The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on)

K-Config Example
Set the DNS name of the device to "room-442": "#NAME room-442",0x0D

MODEL

Functions		Permission	Transparency
Set:	**-**	-	-
Get:	**MODEL?**	End User	Public

Description		Syntax	
Set:	-	-	
Get:	Get device model	#**MODEL?**CR	

Response
~nn@**MODEL**SP*model_name*CR LF

Parameters
model_name – String of up to 19 printable ASCII chars

Notes
This command identifies equipment connected to Step-in master products and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests

K-Config Example
"#MODEL?",0x0D

PROT-VER

Function	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

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			

SN?

Function		Permission	Transparency
Set:	**-**	-	-
Get:	**SN?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get device serial number	#**SN?**CR	
Response			
~nn@**SN**SP*serial_number*CR LF			
Parameters			
serial_number – 11 decimal digits, factory assigned			
Notes			
For new products with 14-digit serial numbers, use only the last 11 digits			
K-Config Example			
"#SN?",0x0D			

DISPLAY?

Function		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 – Output number for **VM-4HDT** : 1 (Output 1), 2 (Output 2), 3 (Output 3), 4 (Output 4); for **VM-3HDT** and **VM-2HDT**: 1 (Loop Output), 2 (Output 1), 3 (Output 2), 4 (Output 3)

status – HPD status according to signal validation: 0 (Signal or sink is not valid), 1 (Signal or sink is valid), 2 (Sink and EDID is valid)

Response Triggers

After execution, response is sent to the com port from which the Get was received
Response is sent after every change in output HPD status ON to OFF
Response is sent after every change in output HPD status OFF to ON and ALL parameters (new EDID, etc.) are stable and valid

K-Config Example

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

SIGNAL?

Functions		Permission	Transparency
Set:	-	-	-
Get	**SIGNAL?**	End User	Public

Description		Syntax
Set:	-	-
Get:	Get input signal lock status	**#**SIGNAL**?** SP inp_id CR

Response

~ nn @**SIGNAL** SP inp_id,status CR LF

Parameters

inp_id – input number: 1 (Input)

status – signal status according to signal validation: 0 (Off), 1 (On)

Response Triggers

After execution, a response is sent to the com port from which the Get was received.
A response is sent after every change in input signal status from On to Off or from Off to On.

K-Config Example

Get the input signal status:
"#SIGNAL? 1",0x0D

EDID Handling Commands

Additional EDID data functions can be performed via 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

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 (usually output): 0 (Input), 1 (Output), 2 (Default EDID)

src_id – for input source: 1 (Input), for output source: 0 (Default EDID source); for **VM‑4HDT** : 1 (Output 1), 2 (Output 2), 3 (Output 3), 4 (Output 4); for **VM‑3HDT** and **VM‑2HDT**: 1 (Loop Output), 2 (Output 1),
3 (Output 2), 4 (Output 3)

dst_type – EDID destination type (usually input): 0 (input), 1 (output), 2 (default EDID)

dest_bitmap – bitmap representing destination IDs. Format: XXXX…X, where X is hex digit. The binary form of every hex digit represents corresponding destinations. Setting '1' indicates that EDID data is copied to this destination. Setting '0' indicates that EDID data is not copied to this destination.

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

Notes

Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word).
Example: bitmap 0x0013 means inputs 1, 2 and 5 are loaded with the new EDID.
In this device, if the destination type is input (0), the bitmap size is 1 bit, for example bitmap 0x1 means the input is loaded with the new EDID.

K-Config Example

Copy the EDID data from the HDBT OUT 2 (EDID source) to HDMI INPUT:
"#CPEDID 1,2,0,0x1",0x0D
Copy the EDID data from the default EDID source to HDMI INPUT:
"#CPEDID 2,0,0,0x5",0x0D

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3. All Kramer Cobra products, all Kramer Calibre products, all Kramer Minicom digital signage products, all HighSecLabs products, all streaming, and all wireless products are covered by a standard three (3) year warranty.
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KRAMER

CE ♺ 22 PAP

P/N: 2900- 300486   Rev: 4

⚠ **SAFETY WARNING**
Disconnect the unit from the power supply before opening and servicing

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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.