

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



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Introduction

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

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.



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.

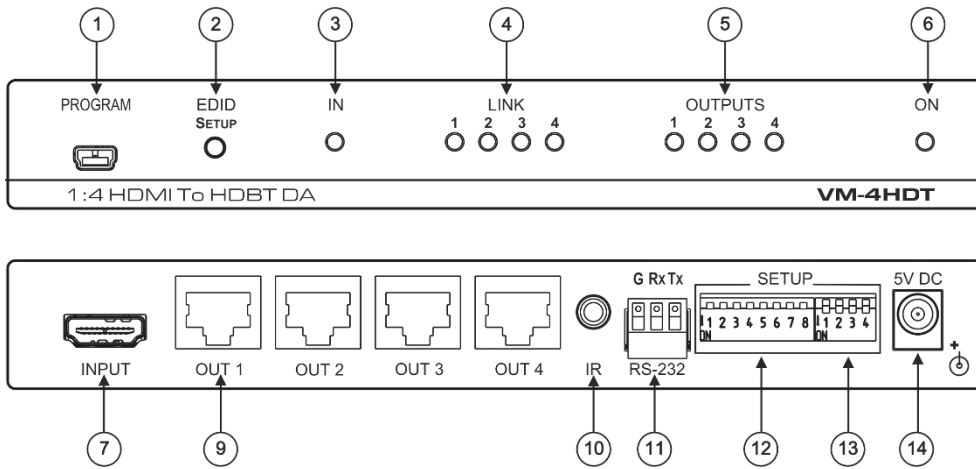


Figure 1: VM-4HDT 1:4 HDMI to HDBT DA

Figure 2 defines the VM-3HDT.

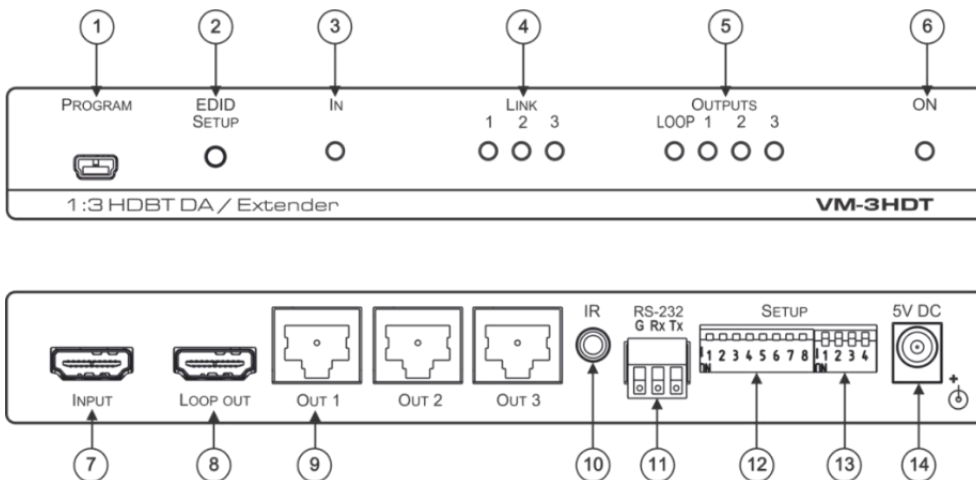


Figure 2: VM-3HDT 1:3 HDBT DA/Extender

Figure 3 defines the VM-2HDT.

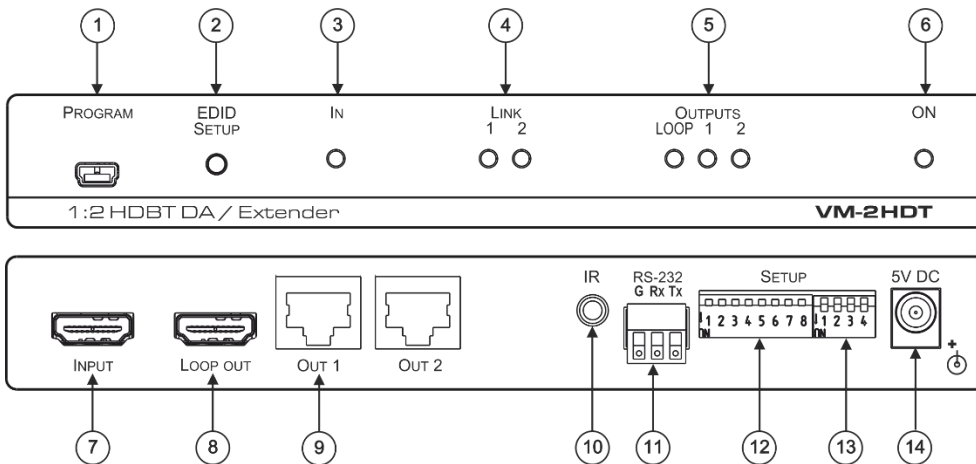



Figure 3: VM-2HDT 1:2 HDBT DA/Extender

#	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

 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](#):

 [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**).

 If a Mac computer is connected as a source, it will output an HDCP-secured signal that will not be 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.

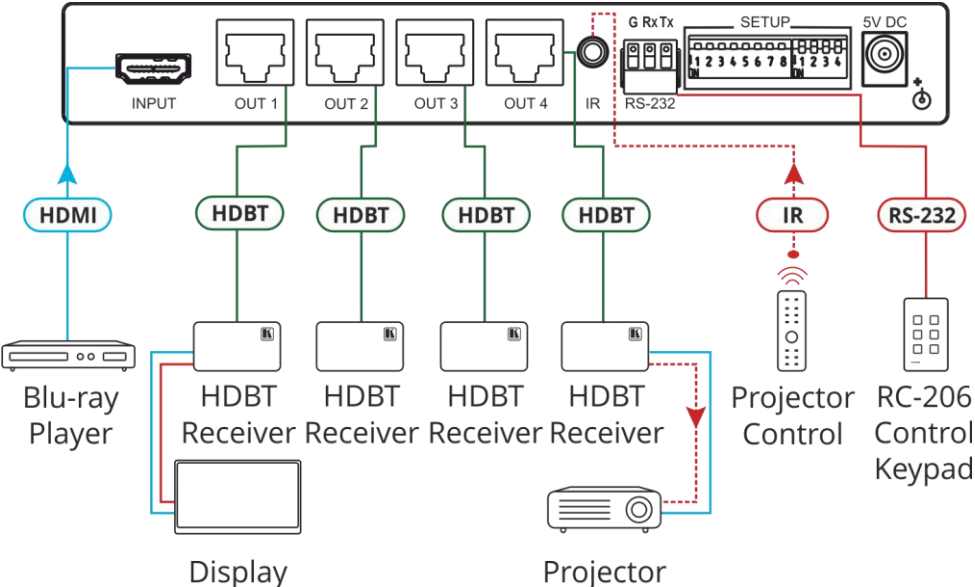


Figure 4: Connecting the VM-4HDT

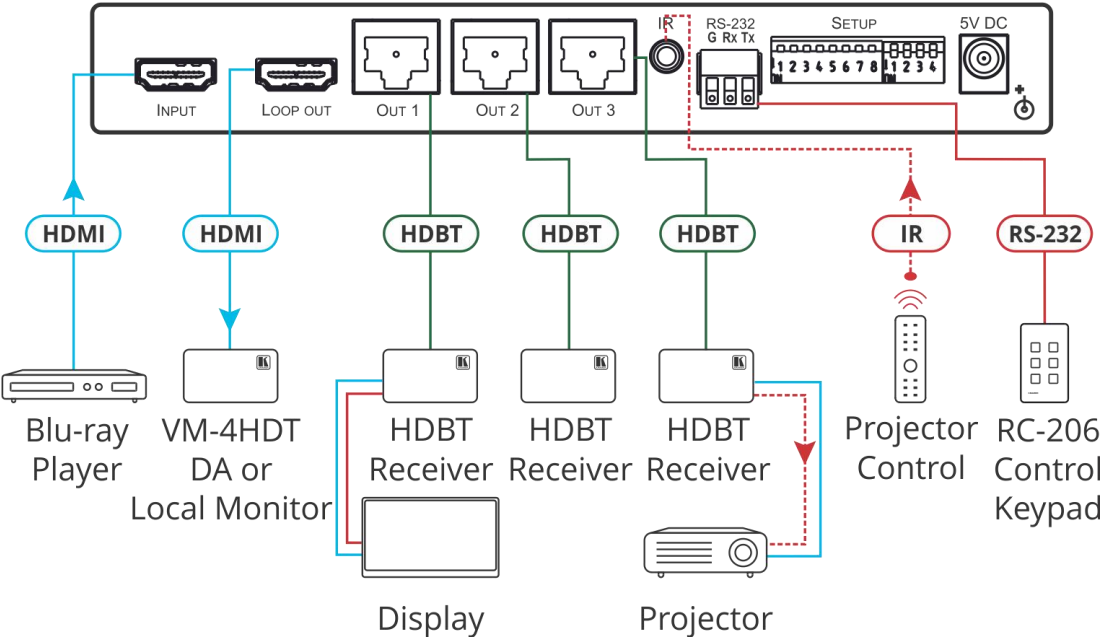


Figure 5: Connecting the VM-3HDT / VM-2HDT

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.

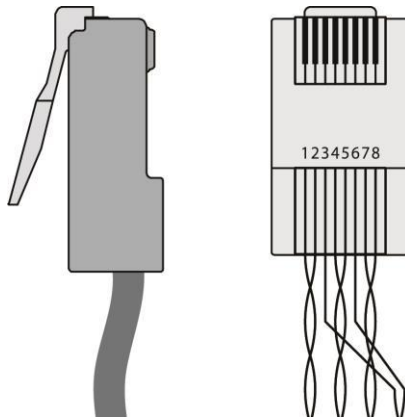


Figure 6: HDBT Connector Pinout

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:

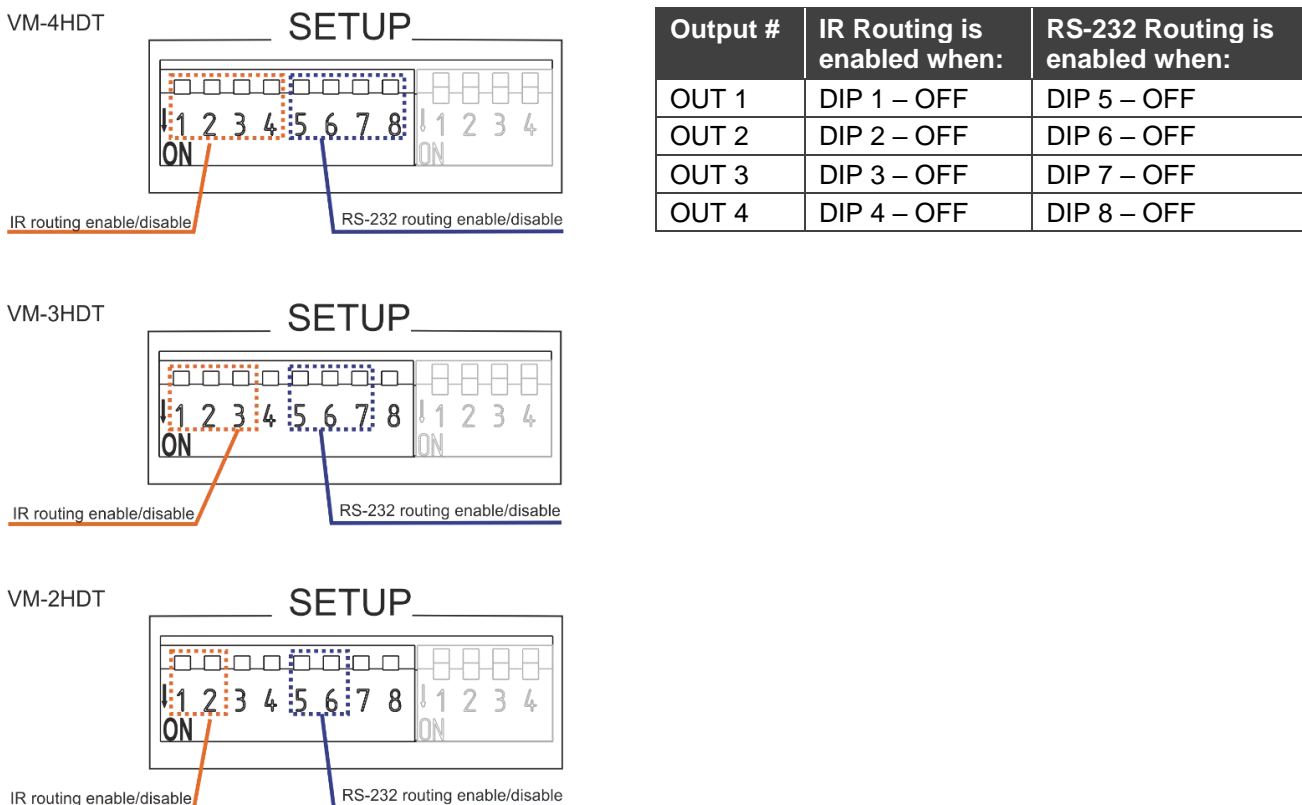


Figure 7: VM-4HDT DIP-Switches

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.

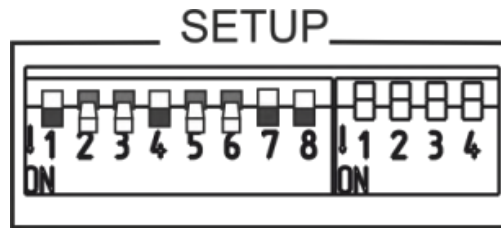


Figure 8: VM-4HDT DIP-Switches Setup

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.

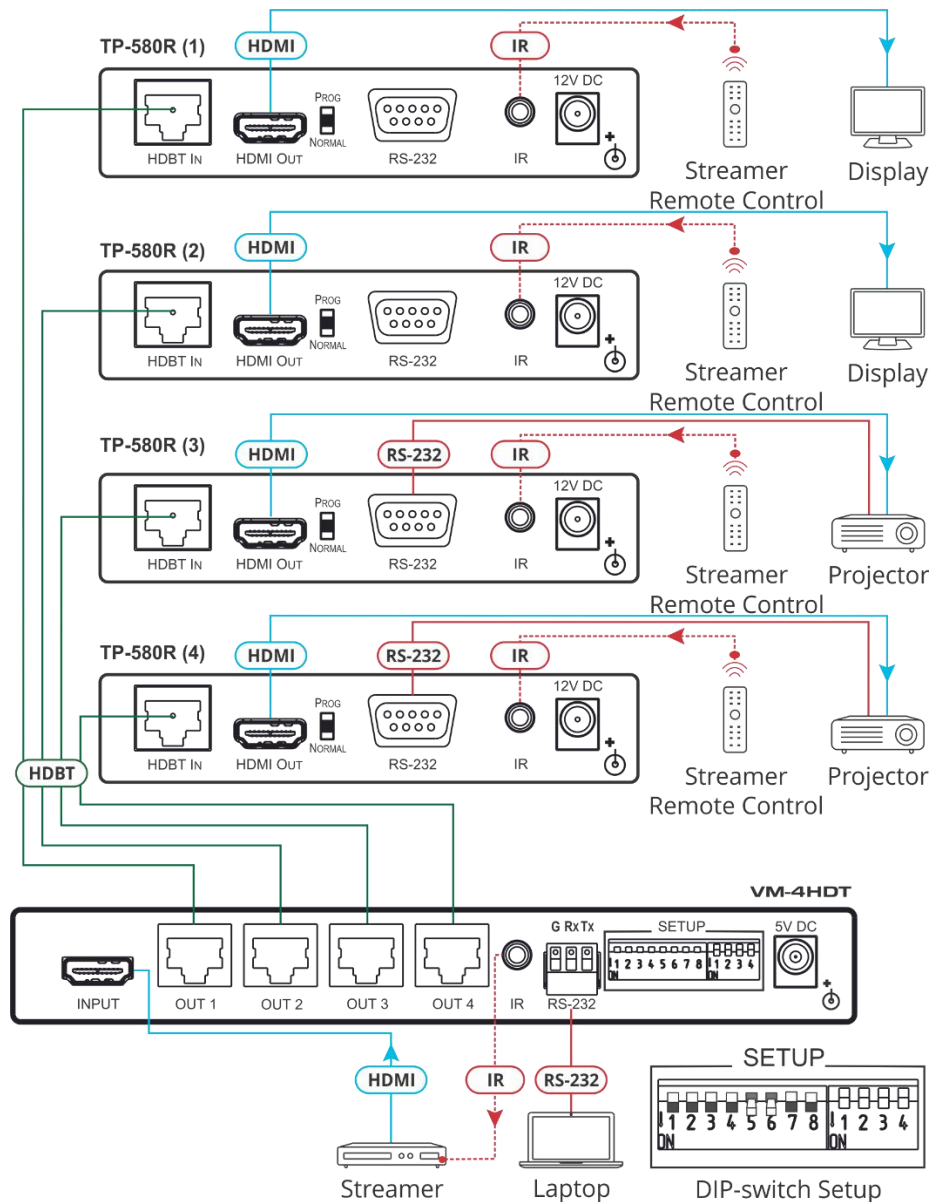


Figure 9: IR/RS-232 Routing Example

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



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)

```

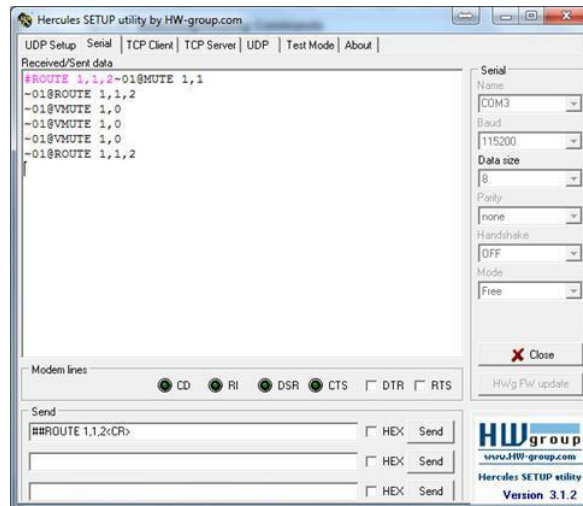
720 x 480i at 60Hz - Doublescan (16:9, 32:27)
720 x 576i at 50Hz - Doublescan (16:9, 64:45)
640 x 480p at 60Hz - Default (4:3, 1:1)
NB: NTSC refresh rate = (Hz*1000)/1001
CE audio data (formats supported)
LPCM 2-channel, 16/20/24 bit depths at 32/44/48 kHz
CE vendor specific data (VSDB)
IEEE registration 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**.

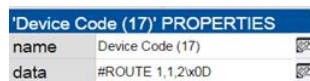
Generally, a basic video input switching command that routes a layer 1 video signal to HDMI out 1 from HDMI input 2 (`ROUTE 1, 1, 2`), is entered as follows:

- Terminal communication software, such as Hercules:

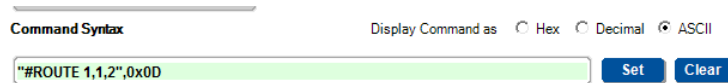


The framing of the command varies according to the terminal communication software.

- 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](#) on page [18](#).
- [Kramer Protocol 3000 Syntax](#) on page [19](#).
- [Kramer Protocol 3000 Commands](#) on page [19](#).

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

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

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

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

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

- **Device Message Format:**

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

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

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

Kramer Protocol 3000 Commands

This section includes the following commands:

- [System Commands](#) on page [19](#).
- [EDID Handling Commands](#) on page [25](#).

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	# <code>CR</code>	
Get:	-	-	
Response			
~nn@SP <code>OK</code> 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 <code>CR</code>	
Get:	-	-	
Response			
~nn@ BUILD-DATE SPdateSPtimeCR 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 <code>CR</code>	
Get:	-	-	
Response			
~nn@ FACTORY SP <code>OK</code> 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 <code>CR</code>	
Response			
Multi-line: ~ <code>nn</code> @Device available protocol 3000 commands: <code>CR LF</code> command, <code>SP</code> command... <code>CR LF</code>			
Parameters			
<i>COMMAND_NAME</i> – name of a specific command			
Notes			
To get help for a specific command use: HELP <code>SP</code> <i>COMMAND_NAME</i> <code>CR LF</code>			
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? <code>SP</code> <i>stage,stage_id</i> <code>CR</code>	
Parameters			
<i>stage</i> – input/output: 0 (Input), 1 (Output)			
<i>stage_id</i> - 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)			
<i>status</i> - signal encryption status – 0 (HDCP Off), 1 (HDCP On), 2 (Follow input)			
Response			
Set / Get: ~ <code>nn</code> @ HDCP-STAT <code>SP</code> <i>stage,stage_id,status</i> <code>CR LF</code>			
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			
<i>machine_name</i> – 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			
<i>model_name</i> – String of up to 19 printable ASCII chars			
Notes			
This command identifies equipment connected to Step-in master products and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests			
K-Config Example			
"#MODEL?", 0x0D			

PROT-VER

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[SP]3000:version[CR LF]			
Parameters			
version - XX.XX where X is a decimal digit			
K-Config Example			
"#PROT-VER?", 0x0D			

RESET

Functions		Permission	Transparency
Set:	RESET	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	Reset device	# RESET <input type="checkbox"/> CR	
Get:	-	-	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ RESET <input type="checkbox"/> SP OK <input type="checkbox"/> 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? <input type="checkbox"/> CR	
Response			
~ <input type="checkbox"/> <input type="checkbox"/> @ SN <input type="checkbox"/> SPserial_number <input type="checkbox"/> 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? <u>SP</u> out_id <u>CR</u>	
Response			
~ <u>nn</u> @DISPLAY <u>SP</u> out_id,status <u>CR LF</u>			
Parameters			
<i>out_id</i> – 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) <i>status</i> – 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? <u>SP</u> inp_id <u>CR</u>	
Response			
~ <u>nn</u> @SIGNAL <u>SP</u> inp_id,status <u>CR LF</u>			
Parameters			
<i>inp_id</i> – input number: 1 (Input) <i>status</i> – signal status according to signal validation: 0 (Off), 1 (On)			
Response Triggers			
After execution, a response is sent to the com port from which the Get was received. A response is sent after every change in input signal status from On to Off or from Off to On.			
K-Config Example			
Get the input signal status: `#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_bitmapCR	
Get: -	-	
Response	~nn@CPEDID[SP]src_type,src_id,dst_type,dest_bitmapCR LF	
Parameters	<p><i>src_type</i> – EDID source type (usually output): 0 (Input), 1 (Output), 2 (Default EDID)</p> <p><i>src_id</i> – 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)</p> <p><i>dst_type</i> – EDID destination type (usually input): 0 (input), 1 (output), 2 (default EDID)</p> <p><i>dest_bitmap</i> – bitmap representing destination IDs. Format: XXXX...X, where X is hex digit. The binary form of every hex digit represents corresponding destinations. Setting '1' indicates that EDID data is copied to this destination. Setting '0' indicates that EDID data is not copied to this destination.</p>	
Response Triggers	Response is sent to the com port from which the Set was received (before execution).	
Notes	<p>Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word). Example: bitmap 0x0013 means inputs 1, 2 and 5 are loaded with the new EDID.</p> <p>In this device, if the destination type is input (0), the bitmap size is 1 bit, for example bitmap 0x1 means the input is loaded with the new EDID.</p>	
K-Config Example	<p>Copy the EDID data from the HDBT OUT 2 (EDID source) to HDMI INPUT: "#CPEDID 1,2,0,0x1",0x0D</p> <p>Copy the EDID data from the default EDID source to HDMI INPUT: "#CPEDID 2,0,0,0x5",0x0D</p>	

The warranty obligations of Kramer Electronics Inc. ("Kramer Electronics") for this product are limited to the terms set forth below:

What is Covered

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

What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product.

Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

How Long this Coverage Lasts

The standard limited warranty for Kramer products is seven (7) years from the date of original purchase, with the following exceptions:

1. All Kramer VIA hardware products are covered by a standard three (3) year warranty for the VIA hardware and a standard three (3) year warranty for firmware and software updates.
2. All Kramer fiber optic cables, adapter-size fiber optic extenders, active cables, cable retractors, all Kramer speakers and Kramer touch panels are covered by a standard one (1) year warranty.
3. All Kramer Cobra products, all Kramer Calibre products, all Kramer Minicom digital signage products, all HighSecLabs products, all streaming, and all wireless products are covered by a standard three (3) year warranty.
4. All Sierra Video MultiViewers are covered by a standard five (5) year warranty.
5. Sierra switchers & control panels are covered by a standard seven (7) year warranty (excluding power supplies and fans that are covered for three (3) years).
6. K-Touch software is covered by a standard one (1) year warranty for software updates.
7. All Kramer passive cables are covered by a ten (10) year warranty.

Who is Covered

Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

What Kramer Electronics Will Do

Kramer Electronics will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.
2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

What Kramer Electronics Will Not Do Under This Limited Warranty

If this product is returned to Kramer Electronics or the authorized dealer from which it was purchased or any other party authorized to repair Kramer Electronics products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. Kramer Electronics will not be responsible for any costs related to the removal or re-installation of this product from or into any installation. Kramer Electronics will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

How to Obtain a Remedy Under This Limited Warranty

To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, visit our web site at www.kramerav.com or contact the Kramer Electronics office nearest you.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required (RMA number). You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

If it is decided that this product should be returned directly to Kramer Electronics, this product should be properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization number will be refused.

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This limited warranty is void if (i) the label bearing the serial number of this product has been removed or defaced, (ii) the product is not distributed by Kramer Electronics or (iii) this product is not purchased from an authorized Kramer Electronics reseller. If you are unsure whether a reseller is an authorized Kramer Electronics reseller, visit our web site at www.kramerav.com or contact a Kramer Electronics office from the list at the end of this document.

Your rights under this limited warranty are not diminished if you do not complete and return the product registration form or complete and submit the online product registration form. Kramer Electronics thanks you for purchasing a Kramer Electronics product. We hope it will give you years of satisfaction.



P/N: 2900-300486



Rev: 4



SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

For the latest information on our products and a list of Kramer distributors, visit our Web site where updates to this user manual may be found.

We welcome your questions, comments, and feedback.