

KRAMER



USER MANUAL

MODEL:

TP-590T_{xr} HDMI Line Transmitter



TP-590Txr HDMI Line Transmitter Quick Start

This guide helps you install and use your product for the first time. For more detailed information, go to <http://www.kramerav.com/manual/TP-590Txr> to download the latest manual or scan the QR code on the left.

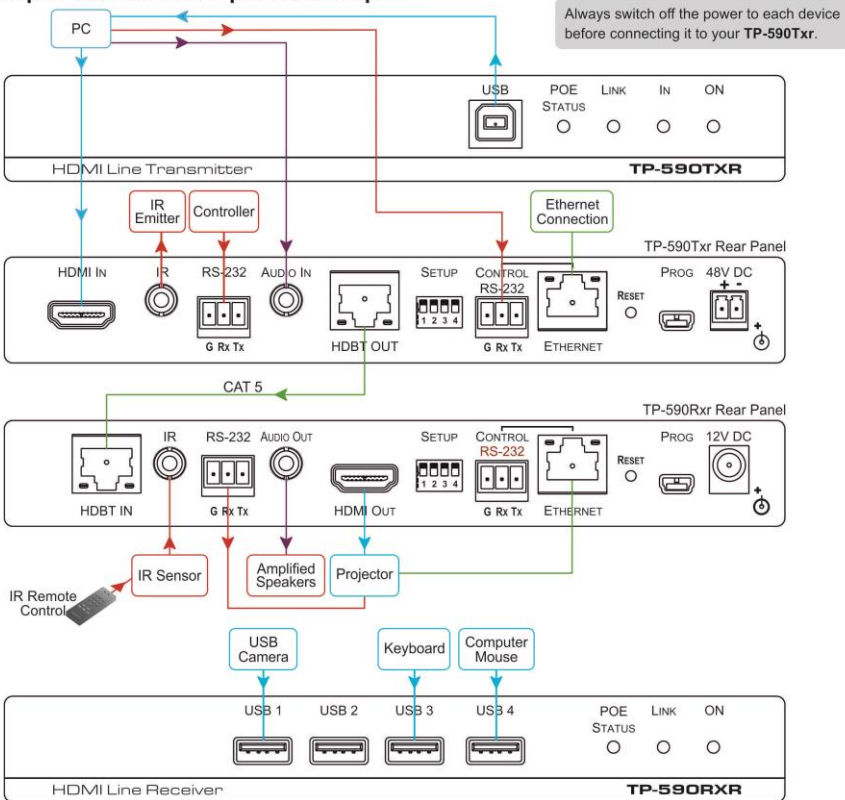
Step 1: Check what's in the box

- ✓ The TP-590Txr HDMI Line Transmitter
- ✓ 4 Rubber feet
- ✓ Bracket installation kit
- ✓ 1 Power adapter 48V DC
- ✓ 1 Quick start guide

Step 2: Install the TP-590Txr

To mount the device in a rack, use an **RK-T2B** rack adapter. Alternatively, attach the rubber feet to the underside of the device and place it on a table. A Kramer MegaTOOLS™ can also be mounted on a desk top, wall or similar area. Fasten a bracket on each side of the MegaTOOLS™ using the two M3x8 screws (supplied). Use the flat-head screws (supplied) to fix the MegaTOOLS™ to the mounting surface or enable it to slide in place.

Step 3: Connect the inputs and outputs



Step 4: Set the DIP-switches

A DIP-switch that is down is on, up is off

#	Function	Status
1	Extended range mode	Off—Enable On—Disable (factory default)
2	Audio source priority	Off—Embedded audio (factory default) On—Analog audio
3	EDID lock	Off—Automatic EDID acquisition (factory default) On—Lock
4	Audio mode selection	Off—Auto (factory default) On—Manual

Step 5: Connect the power



Connect the power adapter to the TP-590Txr and plug the adapter into the mains electricity.

Step 6: Configure the TP-590Txr

Default Parameters

Parameter	Value
Name	KRAMER_
Model	TP-590TXR
IP Address	192.168.1.39
UDP Port	50000
TCP Port	5000
Network Mask	255.255.0.0
Gateway Address	192.168.0.1
RS-232 Baud Rate	115200
Audio delay input switching on new signal	0 seconds
Audio delay input switching on signal loss (leave 5V on)	5 seconds
Audio delay input switching on cable unplug	0 seconds
Video delay power off 5V on signal loss	15 minutes
HDCP	Follow output

Default Web Pages Logon Authentication

Parameter	Values
Name	Admin
Password	Admin

Step 7: Operate the TP-590Txr

You can operate the TP-590Txr using the following methods:

- Protocol 3000 commands over RS-232 or Ethernet
- Embedded Web pages

Protocol 3000 over RS-232 and Ethernet

Command	Description	Command	Description
#	Protocol handshaking	LOCK-EDID?	Get EDID lock state
AUD-EMB?	Get audio in video embedding status	LOGIN	Set/get protocol permission
AUD-SIGNAL?	Get audio input signal status	LOGOUT	Cancel current permission level
AV-SW-MODE?	Get auto switch mode	MODEL?	Read device model
AV-SW-TIMEOUT	Set/get video auto-switch timeout	NAME	Set/get machine (DNS) name
BUILD-DATE?	Read device build date	NAME-RST	Reset machine name to factory default (DNS)
CPEDID	Copy EDID data from the output to the input	NET-DHCP	Set/get DHCP mode
DIR	List files in device	NET-GATE	Set/get gateway IP
DISPLAY?	Valid / Invalid output	NET-IP	Set/get IP address
ETH-PORT	Set/get Ethernet port protocol	NET-MAC?	Get MAC address
FACTORY	Resets the device to factory default	NET-MASK	Set/get subnet mask
FS-FREE?	Get file system free space	PASS	Set/get Password
GEDID	Read EDID data	PRIORITY?	Get priority for all channels
GET	Get file	PROT-VER?	Get device protocol version
HDCP-MOD	Set/get HDCP mode	RESET	Reset device
HDCP-STAT?	Get HDCP signal status	SECUR	Start / Stop Security
HELP	Get command list or help for specific command	SIGNAL?	Get input signal lock status
LDEDID	Write EDID data to input	SN?	Read device serial number
LDFW	Load new firmware	UPGRADE	Perform firmware upgrade
LOAD	Load new firmware	VERSION?	Read device firmware version

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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 **TP-590Txr** *HDMI Line Transmitter* which is part of the Kramer Audio Distribution System and is ideal for:

- Conference rooms, boardrooms, auditoriums, hotels, churches, classrooms and production studios
- Rental and staging



Note that the **TP-590Txr** *HDMI Line Transmitter* and the **TP-590Rxr** *HDMI Line Receiver* are purchased separately and can be connected to other HDBT-certified transmitters and receivers.

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 <http://www.kramerav.com/downloads/TP-590Txr> 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 neighboring electrical appliances that may adversely influence signal quality
- Position your **TP-590Txr HDMI Line Transmitter** 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: Disconnect the power and unplug the unit from the wall before installing

2.3 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/>.

3 Overview

The **TP-590Txr** *HDMI Line Transmitter* is a high-performance, extended range, HDBaseT-technology transmitter for HDMI, USB, audio, bidirectional RS-232, and IR signals. The **TP-590Txr** converts the HDMI, USB, audio, RS-232, and IR signals into an HDBT signal.

The **TP-590Txr** can be used together with a compatible receiver to form an extended HDMI/data-line transmission and reception system.

The **TP-590Txr** transmitter features:

- A bandwidth of up to 10.2Gbps (3.4Gbps per graphic channel) in normal mode; up to 4.95Gbps (1.65Gbps per graphic channel) in extended range mode (in which the aggregate budget on the Auxiliary Channel is halved)
- System Range—Up to 130m (430ft) in normal mode and up to 180m (590ft) in extended range mode (1080p @60Hz @24bpp) when using **BC-HDKat6a** cables



For optimum range and performance, use Kramer's **BC-HDKat6a** or equivalent cable. Note that the transmission range depends on the signal resolution, source and display used. The distance using non-Kramer CAT 6 cable may not reach these ranges.

- Up to 4K UHD @60Hz (4:2:0) support in normal range mode
- 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 **BC-HDKat6a** cables
- HDTV compatibility and HDCP compliance
- Support for HDBaseT V2
- HDMI support - HDMI (deep color, x.v.Color™, lip sync, HDMI uncompressed audio channels, Dolby TrueHD, DTS-HD, CEC, 2K, 4K, 3D)
- USB pass-through for connecting a peripheral device, such as, a mouse or a keyboard
- Support for isochronous USB cameras

- Stereo, analog audio transmission
- EDID pass through, passes EDID signals from the source to the display
- Bidirectional RS-232 interfaces—data flows in both directions allowing data transmission and control of devices
- Bidirectional infrared interface for remote control of peripheral devices (see [Section 6.4](#))
- Power over Ethernet—the transmitter can provide power over the HDBT link to a PoE compatible receiver, (for example, the **TP-588D**)
- LED status indicators for input, output, HDBT link, and PoE
- Remote control using RS-232 or an Ethernet LAN
- MegaTOOLS® enclosures of which two can be rack-mounted in a 1U rack space with the optional **RK-T2B** rack adapter

3.1 Using Twisted Pair Cable

Kramer engineers have developed special twisted pair cables to best match our digital twisted pair products; **BC-HDKat6a** (CAT 6 23 AWG cable) significantly outperforms regular CAT 5/CAT 6 cables.



We strongly recommend that you use shielded twisted pair cable.

3.2 About the Power over Ethernet Feature

Power over Ethernet passes electrical power along with data on Ethernet cabling. This allows a single cable to provide both data connection and electrical power to compatible devices.

4 Defining the TP-590Txr HDMI Line Transmitter

[Figure 1](#) defines the front panel of the **TP-590Txr**.

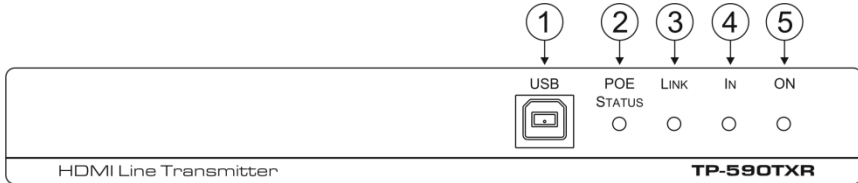


Figure 1: TP-590Txr Front Panel

#	Feature	Function
1	USB Connector	Connect to the USB host, (for example, a laptop)
2	POE STATUS LED	Lights green when power is supplied over the HDBT link
3	LINK LED	Lights green when the HDBT link is valid
4	IN LED	Lights green when an HDMI active signal device is connected
5	ON LED	Lights green when the device receives power

Figure 2 defines the rear panel of the TP-590Txr.

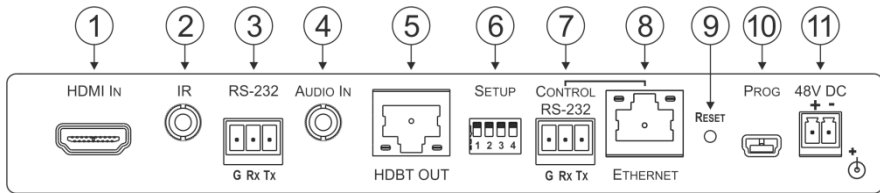


Figure 2: TP-590Txr Rear Panel

#	Feature	Function	
1	HDMI IN Connector	Connect to the HDMI source	
2	IR 3.5mm Mini Jack Connector	Connect to an external infrared transmitter or sensor	
3	RS-232 3-pin Terminal Block	Connect to an RS-232 controller, (for example, a PC to control the projector)	
4	AUDIO IN 3.5mm Mini Jack	Connect to the stereo, analog audio source	
5	HDBT OUT RJ-45 Connector	Connect to the HDBT IN RJ-45 connector on the HDBT receiver	
6	SETUP 4-way DIP-switch	Sets the device behavior, (see Section 7.1)	
7	CONTROL	RS-232 3-pin Terminal Block	Connect to the serial controller to control this device
8		ETHERNET RJ-45 Connector	Connect to the Ethernet controller to control this device or to a LAN to transfer network traffic
9	RESET Switch	Press and hold while power-cycling the device to reset to factory default parameters	
10	PROG Mini USB Connector	Connect to a PC to perform firmware upgrades	
11	48V DC Power Connector	Connect to the supplied power adapter	

5 Connecting the TP-590Txr HDMI Line Transmitter



Always switch off the power to each device before connecting it to your **TP-590Txr**. After connecting your **TP-590Txr**, connect the power to each of them and then switch on the power to each device.

You can use the **TP-590Txr HDMI Line Transmitter** and a compatible receiver, (for example, the **TP-590Rxr**) to configure an HDMI transmitter/receiver system, as shown in the example in [Figure 3](#).

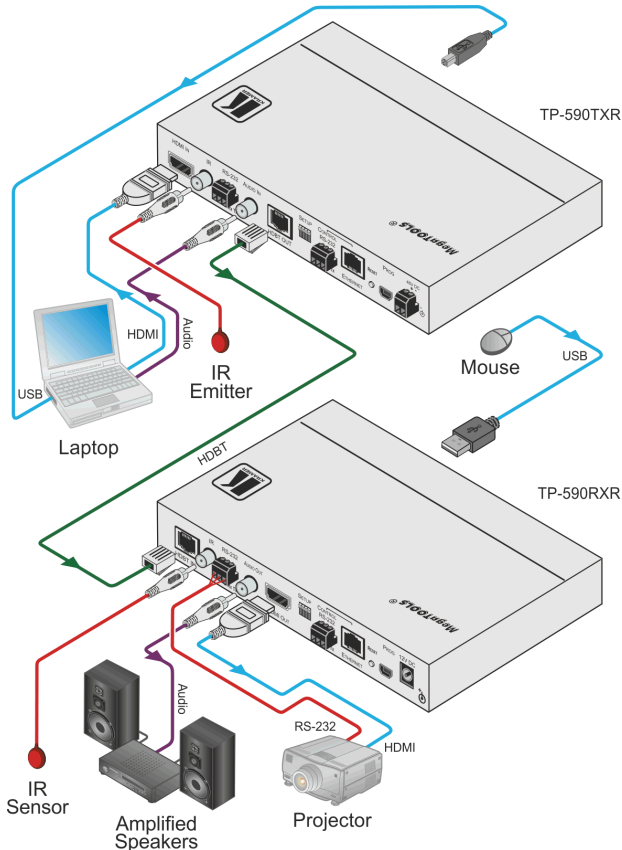


Figure 3: Connecting the TP-590Txr and TP-590Rxr

To connect the TP-590Txr HDMI Line Transmitter as shown in [Figure 3](#):

- **On the TP-590Txr transmitter:**

1. Connect the HDMI source, (for example, a laptop) to the HDMI IN connector.
2. Connect an RS-232 serial controller to the RS-232 3-pin terminal block, (for example, the serial port on a laptop) to control the projector.
3. Connect a stereo, analog audio source, (for example, the audio output of the PC) to the Audio In 3.5mm mini jack.
4. Connect the USB port on the PC to the USB port on the front panel of the **TP-590Txr**.
5. Connect an external IR emitter to the 3.5mm mini jack.
6. Connect the HDBT OUT RJ-45 connector to the HDBT IN RJ-45 connector on the **TP-590Txr** receiver.
7. Connect the supplied power adapter to the power socket and plug the adapter into the mains electricity (not shown).

- **On the TP-590Rxr receiver:**

8. Connect the HDMI OUT connector to the HDMI acceptor, (for example, a projector).
9. Connect the RS-232 3-pin terminal block to the device to be controlled, (for example, the projector that is controlled by the PC which is connected to the **TP-590Txr**).
10. Connect the IR 3.5mm mini jack to an IR sensor.
11. Connect the Audio Out 3.5mm mini jack to the audio acceptor, (for example, amplified speakers).
12. If power is not supplied by the transmitter via PoE (see [Section 3.2](#)), connect the supplied power adapter to the power socket and plug the adapter into the mains electricity (not shown in [Figure 3](#)).

6 Principles of Operation

6.1 Audio Output

The source of the audio that is output depends on the switch settings (see [Section 7.1](#)) and also on whether there is an audio signal on the input. The audio output follows the rules described in the following table.

HDMI Audio Detected	Analog Audio Detected	DIP-switch 4	DIP-switch 2	Audio Out
N/A	N/A	Manual	HDMI	HDMI
N/A	N/A	Manual	Analog	Analog
Yes	N/A	Auto	N/A	HDMI
Yes	Yes	Auto	HDMI	HDMI
Yes	Yes	Auto	Analog	Analog
No	Yes	Auto	N/A	Analog
No	No	Auto	N/A	No audio

6.2 Output Timeout

The device can automatically turn off the output after a definable interval following the loss of the input signal or unplugging of the input cable. This delay can be set using the Protocol 3000 commands, (see [Section 10.2](#)).

6.3 Output Timeout

The device can automatically turn off the output after a definable interval following the loss of the input signal or unplugging of the input cable. This delay can be set using the DIP-switches, (see [Section 7](#)) or using the Protocol 3000 commands, (see [Section 110.2](#)).

6.4 Controlling A/V Equipment via an IR Remote Control

Since the IR connection between the **TP-590Txr** transmitter and **TP-590Rxr** receiver is bidirectional, you can use a remote control transmitter (that is used for controlling a peripheral device, for example, a Blu-ray disk player) to send commands from either end of the transmitter or receiver system. To use a remote control transmitter, connect the Kramer IR sensor at one end (P/N 95-0104050)

and the Kramer IR emitter at the other end (P/N C-A35/IRE-10). Two sample cases are presented below.

The example in [Figure 4](#) illustrates how to control a Blu-ray disk player using a remote control via the **TP-590Rxr** that is connected to the **TP-590Txr**. The IR sensor is connected to the **TP-590Rxr** and an IR emitter is connected between the **TP-590Txr** and the Blu-ray disk player. The Blu-ray disk player remote control sends a command while pointed at the external IR sensor. The IR signal is passed over the HDBT link and the IR emitter to the Blu-ray disk player which responds to the command sent.

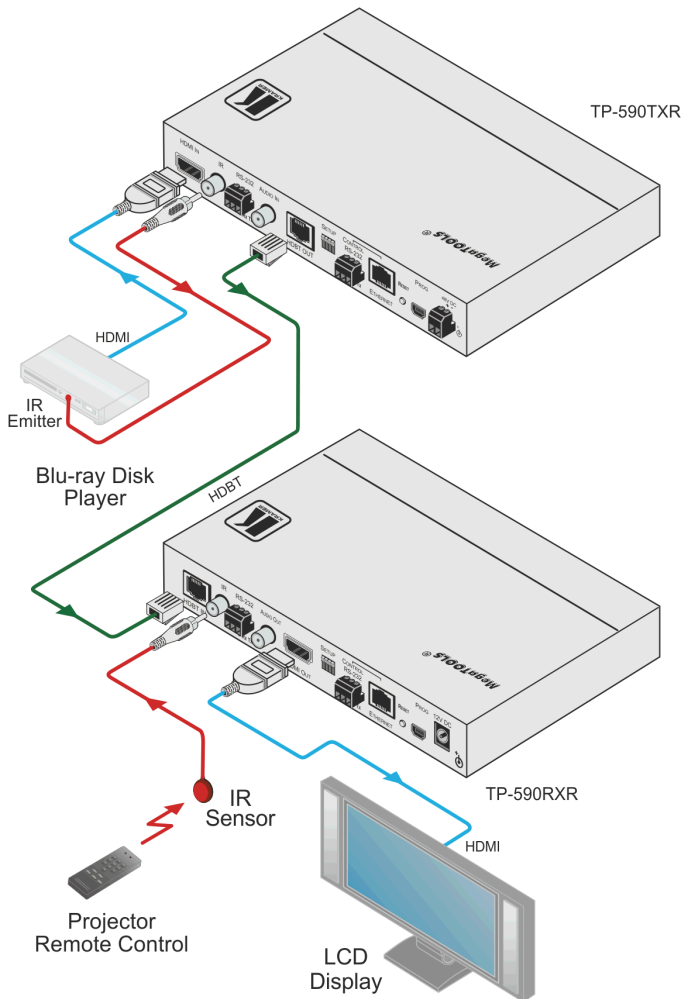


Figure 4: Controlling a Blu-ray Disk Player via the TP-590Txr

The example in [Figure 5](#) illustrates how to control the projector that is connected to **TP-590Rxr** using a remote control, via the **TP-590Txr**. The IR sensor is connected to the **TP-590Txr** and the IR output of the **TP-590Rxr** is connected between the **TP-590Txr** and the projector. The projector remote control sends a command while pointed at the external IR sensor. The IR signal is passed over the HDBT link and the IR emitter to the projector which responds to the command sent.

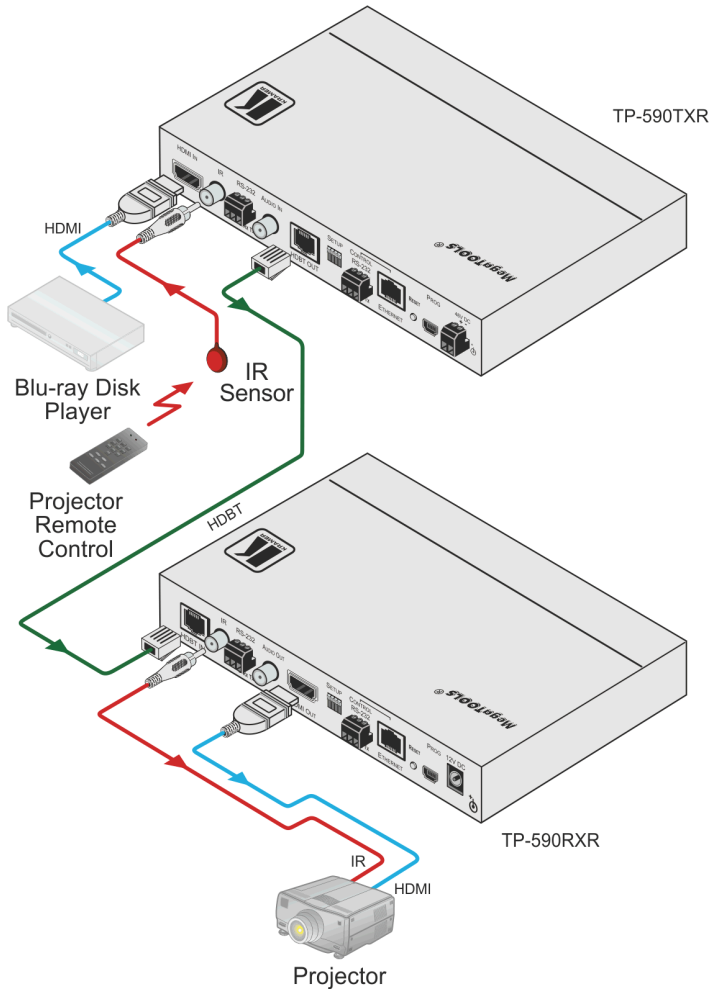


Figure 5: Controlling a Projector via the TP-590Txr

7 Configuring the TP-590Txr HDMI Line Transmitter

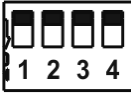


Figure 6: TP-590Txr DIP-switch

A DIP-switch that is down is on, one that is up is off.

Note: Changes to the DIP-switches only take effect on power-up. After changing a switch, reboot the device.

7.1 Setting the DIP-switch on the TP-590Txr

#	Function	Status
1	Range mode	Off—Extended range (provides increased range at a reduced bandwidth) On—Normal range (factory default)
2	Audio source priority	Off—Embedded audio (factory default) On—Analog audio
3	EDID lock	Off—Automatic EDID acquisition (factory default) On—Lock (locks the current EDID so that changes on the output do not result in changes to the EDID)
4	Audio mode selection	Off—Auto (factory default) On—Manual

8 Operating the TP-590Txr Remotely Using the Web Pages

The **TP-590Txr** 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:

- Ensure that your browser is supported (see [Section 9](#))
- Ensure that JavaScript is enabled

There are six Web pages described in the following sections:

- Video and Audio Settings (see [Section 8.2](#))
- Device Settings (see [Section 8.3](#))
- EDID Management (see [Section 8.4](#))
- Firmware Upgrade (see [Section 8.5](#))
- Authentication (see [Section 8.6](#))
- About (see [Section 8.7](#))

8.1 Browsing the TP-590Txr Web Pages

Note: In the event that a Web page does not update correctly, clear your Web browser's cache by pressing CTRL+F5.

Note: Only one instance of the Web pages can be open at a time.

To browse the TP-590Txr Web pages:

1. Open your Internet browser.
2. Type the IP number of the device (see [Section 9](#)) in the Address bar of your browser in place of the example shown below.



Note: If authentication is enabled, the following window appears ([Figure 7](#)) and you must enter the valid username and password to access the Web pages. For default logon credentials, see [Section 9](#).

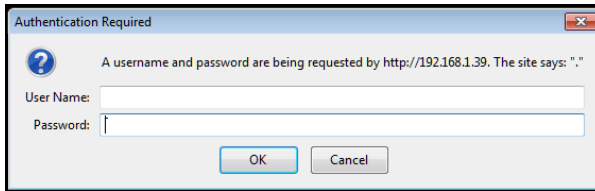


Figure 7: Entering Logon Credentials

Following a successful logon, the screen shown in [Figure 8](#) is displayed.

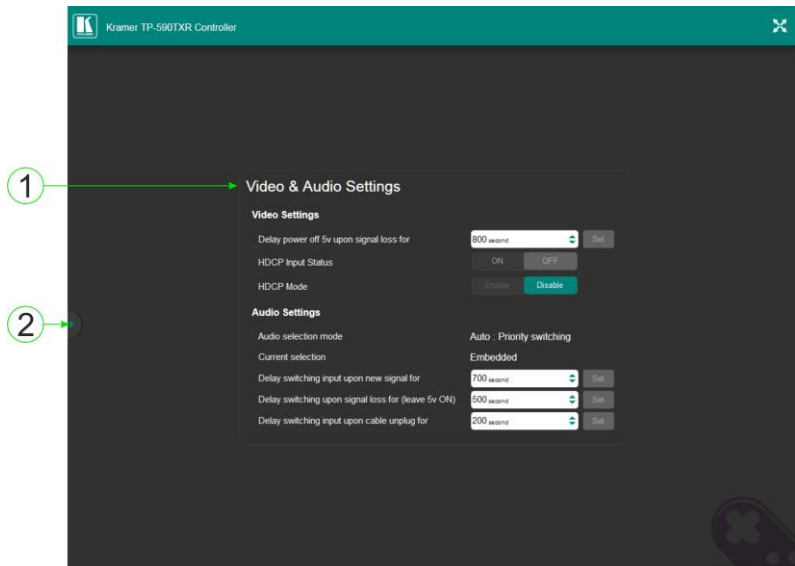


Figure 8: The Default Page

#	Item	Description
1	Video and Audio Settings	Displays the current video and audio settings, (see Section 8.2)
2	Left Hand Side Panel Hide/Reveal Button	Click to reveal the left hand side page panel

Click the Reveal button to open the left hand side page panel.

The main page appears as shown in [Figure 9](#).

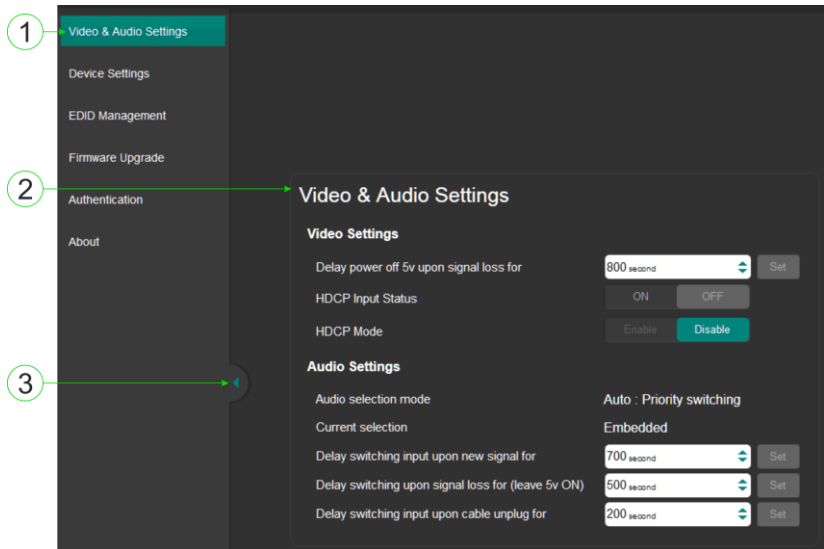


Figure 9: The Main Page

The areas of the main page are described in the following table.

#	Item	Description
1	Page Selection Panel	Click one of the buttons to select a page
2	Video & Audio Settings	Modify the audio and video parameters according to your requirements
3	Page Selection Panel Hide/Reveal Button	Click the arrow to open or close the page selection panel

8.2 The Video and Audio Settings Page

The Video and Audio Settings page lets you modify the video, audio and timeout parameters.

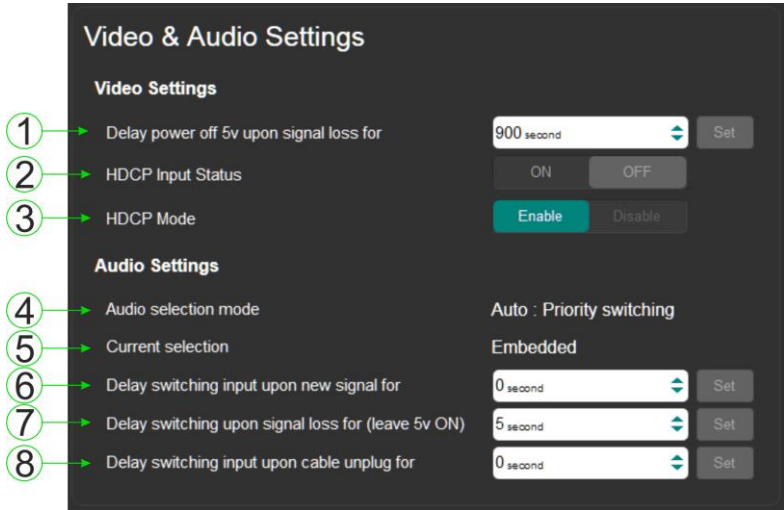


Figure 10: The Video and Audio Settings Page

#	Item	Description
1	Delay power off 5V upon signal loss for Box	Sets the delay for turning off the 5V output because of a signal loss on the currently selected input. Value in seconds
2	HDCP Input Status	Indicates whether the HDCP status of the input, on or off
3	HDCP Mode	Enables and disables HDCP
4	Audio selection mode Indicator	Indicates the current audio selection; manual or auto
5	Current selection Audio Indicator	Indicates the current audio selection
6	Delay switching input upon new signal for Box	Sets the delay for video and audio before switching (in auto mode) because a new signal is detected. Value in seconds
7	Delay switching upon signal loss for (leave 5V on) Box	Sets the delay for video and audio before switching (in auto mode) because of a signal loss on the currently selected input. Value in seconds
8	Delay switching input upon cable unplug for Box	Sets the delay for video and audio before switching (in auto mode) because the currently selected input cable is unplugged. Value in seconds

Note: You must set the HDCP preferences in at least the transmitter or receiver.

8.3 The Device Settings Page

The Device Settings page lets you:

- View some of the device characteristics, (for example, model and Web version)
- Edit IP settings, (for example, name and IP address)
- Load and save configurations
- Reset the device to factory default settings

The screenshot shows the 'Device Settings' page with the following fields and buttons:

- 1** → Unit name:
- Model:
- Firmware version:
- Serial number:
- Ethernet Settings**
- 2** → DHCP:
- 3** → IP address:
- 4** → Mask address:
- 5** → Gateway address:
- 6** → Mac address:
- 7** → UDP port:
- 8** → TCP port:
- 9** → All settings:
- 10** →

Figure 11: The Device Settings Page

#	Item	Description
1	Unit name	The DNS name of the device. To set a new name, enter the new alphanumeric name and click Set. (For restrictions regarding the name, see Section 9)
2	DHCP Buttons	Click ON to turn DHCP on; click OFF to turn DHCP off and to use static IP addressing
3	IP address	The IP address of the device. To set a new IP address, enter the new valid IP address and click Set
4	Mask address	The network mask of the device. To set a new mask, enter the new valid mask and click Set
5	Gateway address	The network gateway for the device. To set a new network gateway, enter the new valid gateway and click Set
6	MAC address	Displays the MAC address of the device
7	UDP Port	The UDP port number of the device. To set a new UDP port number, enter the new valid port number or use the spin controls and click Set
8	TCP Port	The TCP port number of the device. To set a new TCP port number, enter the new valid port number or use the spin controls and click Set
9	All settings Configuration Buttons	Click Load to retrieve a saved configuration. Click Save to save the current configuration
10	Factory reset Button	Click to reset the device to factory default parameters

Note: When saving the configuration using Internet Explorer 11 press CTRL+S.

8.3.1 Turning DHCP On and Off

By default DHCP is turned off.

To turn DHCP on:

1. Click DHCP ON.

The Communication Warning shown in [Figure 12](#) is displayed.

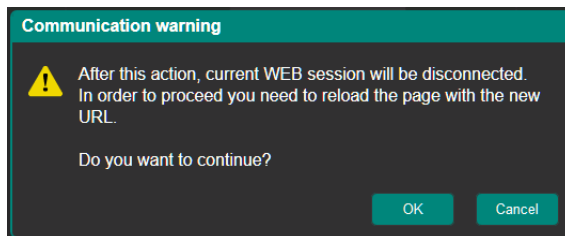


Figure 12: Turning DHCP On Warning

2. Click OK.

DHCP is turned on. The next time the **TP-590Txr** is booted you must reload the Web pages using the IP address issued to the **TP-590Txr** by the DHCP server.

To turn DHCP off:

1. Click DHCP OFF.

The DHCP OFF dialog box [Figure 13](#) is displayed.

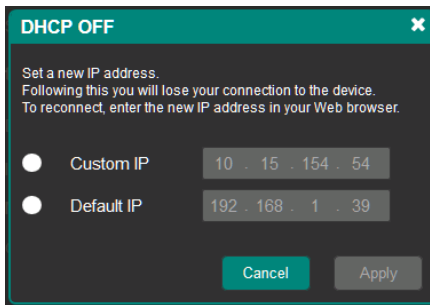


Figure 13: Turning DHCP Off Dialog Box

2. To set a custom IP address, select Custom IP and enter the required address. To set the default IP address, select Default IP.
3. Click Apply.

The IP address **TP-590Txr** is changed and the Web page reloads automatically.

8.3.2 The Load/Save Configuration Facility

The Load/Save Configuration facility (see item 4 in [Figure 9](#)) lets you retrieve and save a configuration.

To retrieve a configuration:

1. Click the Load button.

The File Load browser window appears.

2. Browse to the required file and press Open.

The configuration is retrieved and the success message is displayed.

To save the current configuration:

1. Click the Save button.

The Save Configuration success message is displayed.

2. Do either of the following:

- Click Download to either open the file or save it to the required location
—OR—
- Click OK to complete the procedure

8.3.3 Resetting to Factory Default Parameters

To reset the TP-590Txr to factory default parameters:

1. Click the Factory reset button.

The confirmation message is displayed.

2. Click OK to continue or Cancel to exit the procedure.

8.4 The EDID Management Page

The EDID Management page lets you copy EDID data to either or both of the inputs from the following sources:

- Output
- Input
- Default EDID
- EDID data file

From this page you can also lock the EDID on each input independently.

Note: Do not power up the display before locking the EDID.

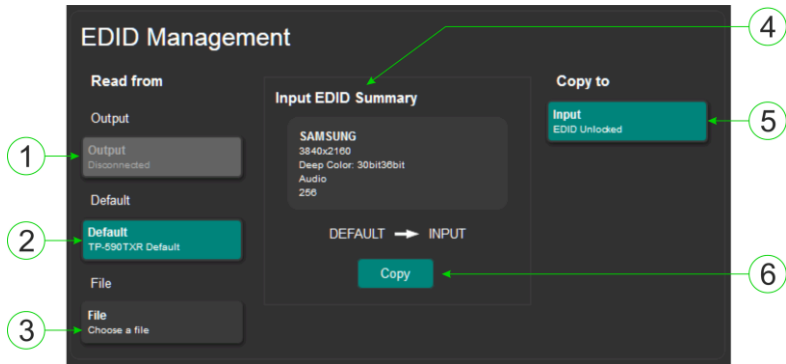


Figure 14: The EDID Management Page

Note: The display is not updated automatically when the status of an EDID changes on the device caused by outputs being exchanged. Click Refresh to update the display, (see item 11 in the following table).

#	Item	Description	
1	Read from Area	OUTPUT button	Click to read the EDID from the output
2		DEFAULT EDID button	Click to read the default EDID
3		FILE button	Click to open the file browser to select an EDID file on your computer
4	Input EDID Summary Information Area		Displays the current selection of EDID source, video resolution, audio availability, status, and so on
5	INPUT Button		Displays the current EDID in the input
6	COPY TO Button		Click to copy the selected EDID source to the input

To copy EDID data from a source to the input:

1. Click the source button from which to read the EDID (output, default, or File). The button changes color and the EDID summary information reflects the selection and EDID data.
2. Click the Copy to button. The “EDID was copied” success message is displayed and the EDID data is copied to the selected input(s).
3. Click OK.

To copy the default EDID to the input:

1. Click the Default to Input Copy button.
The “EDID was copied” success message is displayed and the EDID data is copied to the selected input(s).
2. Click OK.

8.5 The Firmware Upgrade Page

The Firmware Upgrade page lets you perform a firmware upgrade.

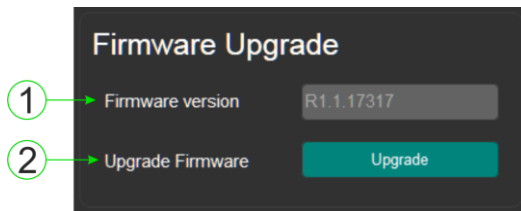


Figure 15: The Firmware Upgrade Page

#	Item	Description
1	Firmware version	Displays the current firmware version
2	Upgrade Firmware Button	Click to start the firmware upgrade process

To upgrade the firmware:

1. Click the Browse button.
The Windows Browser opens.
2. Browse to the required file.
3. Select the required file and click Open.
The firmware file name is displayed in the Firmware Upgrade page.
4. Click Start Upgrade.
The firmware file is loaded and a progress bar is displayed.



Do not interrupt the process or the **TP-590Txr** may be damaged.

- When the process is complete reboot the device.
The firmware is upgraded.

8.6 The Authentication Page

The Authentication page lets you assign or change logon authentication details.

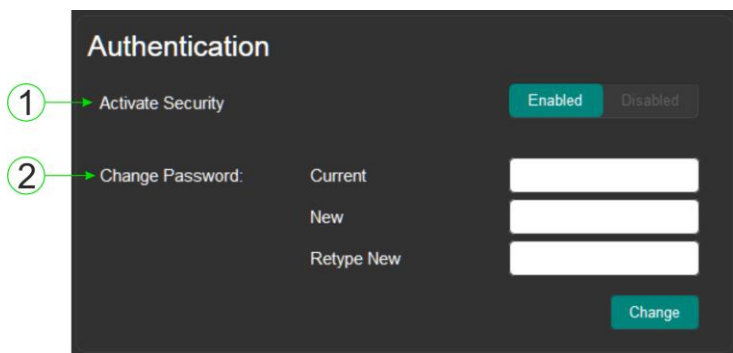


Figure 16: The Authentication Page

#	Item	Description
1	Activate Security Button	Click to enable/disable security settings. When enabled, the valid username and password must be provided to allow Web page access` 1234
2	Current Password box	Enter the current password
3	New Password box	Enter the new password, (up to 15 printable ASCII characters)
4	Retype New Password box	Retype the new password
5	CHANGE button	Click CHANGE to save the new authentication details

Note: If the Authentication page is left open for more than five minutes additional windows may open. After entering your logon credentials, close the other windows.

8.7 The About Page

The **TP-590Txr** About page displays the Web page version and Kramer Electronics Ltd company details.



Figure 17: The About Page

9 Technical Specifications

INPUTS:	1 HDMI on an HDMI connector 1 Stereo analog audio on a 3.5mm mini jack
OUTPUTS:	1 HDBT on an RJ-45 connector
PORTS:	1 IR on a 3.5mm mini jack 1 USB on a USB connector 1 RS-232 on a 3-pin terminal block for the serial link 1 RS-232 on a 3-pin terminal block for control of the transmitter 1 Ethernet on an RJ-45 connector for control of the transmitter
BANDWIDTH:	Supports up to 10.2Gbps (3.4Gbps bandwidth per graphic channel)
RS-232 BAUD RATE:	115200
COMPLIANCE WITH HDMI STANDARD:	Supports HDMI and HDCP
USB STANDARD:	1.1 and 2.0
MAXIMUM AUDIO LEVEL:	1Vrms
THD+N:	0.03%
SUPPORTED PC WEB BROWSERS	Windows 7 and higher: <ul style="list-style-type: none"> • Internet Explorer (32/64 bit) version 10 • Firefox version 30 • Chrome version 35 MAC: <ul style="list-style-type: none"> • Chrome version 35 • Firefox version 30 • Safari version 7 Note: Minimum browser window size 1024 x 768
ENCLOSURE TYPE:	Aluminium
COOLING:	Convection, vents
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
POWER SOURCE:	48V DC, 800mA
DIMENSIONS:	18.75cm x 11.5cm x 2.54cm (7.38" x 4.53" x 1.0") W, D, H
PRODUCT WEIGHT:	0.5kg (1.1lbs)
SHIPPING WEIGHT:	1.0kg (2.2lbs) approx.
VIBRATION:	ISTA 1A in carton (International Safe Transit Association)
SAFETY REGULATORY COMPLIANCE:	CE UL
ENVIRONMENTAL REGULATORY COMPLIANCE:	Complies with appropriate requirements of RoHs and WEEE
ACCESSORIES:	Power supply (48V, 1.36A)

OPTIONS:	RK-T2B 19" rack mount; Kramer external IR sensor (P/N: 95-0104050), Kramer IR emitter cable (P/N: C-A35/IRE-10), Kramer BC-HDKat6a cable Two IR Emitter Extension Cables are also available: a 15m cable and a 20m cable
Specifications are subject to change without notice. Go to our Web site at http://www.kramerelectronics.com to access the list of resolutions	

9.1 Default Parameters

Parameter	Value
Name	KRAMER_
Model	TP-590TXR
IP Address	192.168.1.39
UDP Port	50000
TCP Port	5000
Network Mask	255.255.0.0
Gateway Address	192.168.0.1
RS-232 Baud Rate	115200
Audio delay input switching on new signal	0 seconds
Audio delay input switching on signal loss (leave 5V on)	5 seconds
Audio delay input switching on cable unplug	0 seconds
Video delay power off 5V on signal loss	15 minutes
HDCP	Follow output

9.2 Default EDID

Note: For some models of NEC displays/projectors there may be no audio. To solve the issue:

- Change the revision number in the NEC EDID block from 1 to 3.
- Add the specific vendor in NEC EDID Block 1

Monitor

Model name..... TP-590TXR
Manufacturer..... KMR
Plug and Play ID..... KMR1200
Serial number..... n/a
Manufacture date..... 2015, 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..... n/a

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 (16:10)
Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync

Standard timings supported

720 x 400p at 70Hz - IBM VGA
720 x 400p at 88Hz - IBM XGA2
640 x 480p at 60Hz - IBM VGA
640 x 480p at 67Hz - Apple Mac II
640 x 480p at 72Hz - VESA
640 x 480p at 75Hz - VESA
800 x 600p at 56Hz - VESA
800 x 600p at 60Hz - VESA
800 x 600p at 72Hz - VESA
800 x 600p at 75Hz - VESA
832 x 624p at 75Hz - Apple Mac II
1024 x 768i at 87Hz - IBM
1024 x 768p at 60Hz - VESA
1024 x 768p at 70Hz - VESA
1024 x 768p at 75Hz - VESA
1280 x 1024p at 75Hz - VESA
1152 x 870p at 75Hz - Apple Mac II
1280 x 1024p at 75Hz - VESA STD

1280 x 1024p at 85Hz - VESA STD
1600 x 1200p at 60Hz - VESA STD
1024 x 768p at 85Hz - VESA STD
800 x 600p at 85Hz - VESA STD
640 x 480p at 85Hz - VESA STD
1152 x 864p at 70Hz - VESA STD
1280 x 960p at 60Hz - 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 (16:10)
 Modeline..... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
Detailed timing #2..... 1920x1080i at 60Hz (16:10)
 Modeline..... "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync
+vsync
Detailed timing #3..... 1280x720p at 60Hz (16:10)
 Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
Detailed timing #4..... 720x480p at 60Hz (16:10)
 Modeline..... "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync

CE audio data (formats supported)

LPCM 2-channel, 16/20/24 bit depths at 32/44/48 kHz

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 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..... 23/07/2015
Software revision..... 2.60.0.972
Data source..... File
Operating system..... 6.1.7601.2.Service Pack 1

Raw data

00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,12,00,00,00,00,FF,19,01,03,80,34,20,78,EA,B3,25,AC,51,30,B4,26,
10,50,54,FF,FF,80,81,8F,81,99,A9,40,61,59,45,59,31,59,71,4A,81,40,01,1D,00,72,51,D0,1E,20,6E,28,
55,00,07,44,21,00,00,1E,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,00,00,00,FC,00,54,
50,2D,35,39,30,52,58,52,20,20,20,20,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,01,28,
02,03,1B,F1,23,09,07,07,48,10,05,84,03,02,07,16,01,65,03,0C,00,10,00,83,01,00,00,02,3A,80,18,71,
38,2D,40,58,2C,45,00,07,44,21,00,00,1E,01,1D,80,18,71,1C,16,20,58,2C,25,00,07,44,21,00,00,9E,01,
1D,00,72,51,D0,1E,20,6E,28,55,00,07,44,21,00,00,1E,8C,0A,D0,8A,20,E0,2D,10,10,3E,96,00,07,44,21,
00,00,18,00,47

10 Protocol 3000

The **HDMI** Line Transmitter can be operated using serial commands from a PC, remote controller or touch screen using the Kramer Protocol 3000.

This section describes:

- Kramer Protocol 3000 syntax (see [Section 10.1](#))
- Kramer Protocol 3000 commands (see [Section 10.2](#))

10.1 Kramer Protocol 3000 Syntax

10.1.1 Host Message Format

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

10.1.1.1 Simple Command

Command string with only one command without addressing:

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

10.1.1.2 Command String

Formal syntax with commands 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

10.1.2 Device Message Format

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

10.1.2.1 Device Long Response

Echoing command:

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

CR = Carriage return (ASCII 13 = 0x0D)

LF = Line feed (ASCII 10 = 0x0A)

SP = Space (ASCII 32 = 0x20)

10.1.3 Command Terms

Command

A sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').

Command and 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**.

Note: 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 (Optional, for K-NET)

K-NET Device ID followed by '@'

Query sign

'?' follows some commands to define a query request.

Message closing character

CR – For host messages; carriage return (ASCII 13)

CRLF – For device messages; carriage return (ASCII 13) + line-feed (ASCII 10)

Command chain separator character

When a message string contains more than one command, a pipe ('|') character separates each command.

Spaces between parameters or command terms are ignored.

10.1.4 Entering Commands

You can directly enter all commands using a terminal with ASCII communications software, such as HyperTerminal, Hercules, etc. Connect the terminal to the serial or Ethernet port on the Kramer device. To enter **CR** press the Enter key. (**LF** is also sent but is ignored by command parser).

For commands sent from some non-Kramer controllers like Crestron, some characters require special coding (such as, /X##). Refer to the controller manual.

10.1.5 Command Forms

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

10.1.6 Chaining Commands

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 once, at the beginning of the string and at the end.

Commands in the string do not execute until the closing character is entered.

A separate response is sent for every command in the chain.

10.1.7 Maximum String Length

64 characters

10.2 Kramer Protocol 3000 Commands

Command	Description
#	Protocol handshaking
AUD-EMB?	Get audio in video embedding status
AUD-SIGNAL?	Get audio input signal status
AV-SW-MODE?	Get auto switch mode
AV-SW-TIMEOUT	Set/get video auto-switch timeout
BUILD-DATE?	Read device build date
CPEDID	Copy EDID data from the output to the input
DIR	List files in device
DISPLAY?	Valid / Invalid output
ETH-PORT	Set/get Ethernet port protocol
FACTORY	Resets the device to factory default
FS-FREE?	Get file system free space
GEDID	Read EDID data
GET	Get file
HDCP-MOD	Set/get HDCP mode
HDCP-STAT?	Get HDCP signal status
HELP	Get command list or help for specific command
LDEDID	Write EDID data to input
LDFW	Load new firmware
LOAD	Load new firmware
LOCK-EDID?	Get EDID lock state
LOGIN	Set/get protocol permission
LOGOUT	Cancel current permission level
MODEL?	Read device model
NAME	Set/get machine (DNS) name
NAME-RST	Reset machine name to factory default (DNS)
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
PASS	Set/get Password
PRIORITY?	Get priority for all channels
PROT-VER?	Get device protocol version
RESET	Reset device
SECUR	Start / Stop Security
SIGNAL?	Get input signal lock status
SN?	Read device serial number
UPGRADE	Perform firmware upgrade
VERSION?	Read device firmware version

Command - #		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	#	End User	Public
Get:	-	-	-
Description		Syntax	
Set:	Protocol handshaking	# <input type="text"/>	
Get:	-	-	
Response			
~ <input type="text"/> @ <input type="text"/> SPOK _{CR LF}			
Parameters			
Response Triggers			
Notes			
Use to validate the Protocol 3000 connection and get the machine number			

Command - AUD-EMB		Command Type - Audio	
Command Name		Permission	Transparency
Set:	AUD-EMB	End User	Public
Get:	AUD-EMB?	End User	Public
Description		Syntax	
Set:	Set audio in video embedding status	#AUD-EMB _{SP} <i>in,out,status</i> _{CR}	
Get:	Get audio in video embedding status	#AUD-EMB? _{SP} <i>in,ou</i> _{CR}	
Response			
Set/Get: ~ <input type="text"/> @AUD-EMB _{SP} <i>in,out,status</i> _{CR LF}			
Parameters			
<i>in</i> - audio input to be embedded number (1... max number of inputs) <i>out</i> - video output to embed into number (1 .. max number of outputs) <i>status</i> - embedded (ON), or not (OFF) status (see Section 10.2.1)			
Response Triggers			
Response is sent to the com port from which the Set (before execution)/Get command was received After execution, response is sent to all com ports if AUD-EMB was set by any other external control device (button press, device menu and similar)			
Notes			

Command - AUD-SIGNAL		Command Type - Audio	
Command Name		Permission	Transparency
Set:	-	-	-
Get	AUD-SIGNAL?	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get audio input signal status	# AUD-SIGNAL? _[SP] <i>inp_id</i> _[CR]	
Response			
~ <i>nn</i> @ AUD-SIGNAL _[SP] <i>inp_id</i> , <i>status</i> _[CR LF]			
Parameters			
<i>inp_id</i> - input number (1 .. max input number) <i>status</i> - 0 - OFF (no signal) 1 - ON (signal present)			
Response Triggers			
After execution, response is sent to the com port from which the Get was received Response is sent to all com ports if audio status state was changed on any input			
Notes			

Command - AV-SW-MODE		Command Type - System	
Command Name		Permission	Transparency
Set:	AV-SW-MODE	End user	Public
Get:	AV-SW-MODE?	End user	Public
Description		Syntax	
Set:	Set input auto switch mode (per output)	# AV-SW-MODE _[SP] <i>layer,output_id,mode</i> _[CR]	
Get:	Get input auto switch mode (per output)	# AV-SW-MODE? _[SP] <i>layer,output_id</i> _[CR]	
Response			
~ <i>nn</i> @ AV-SW-MODE _[SP] <i>layer,output_id,mode</i> _[CR LF]			
Parameters			
<i>layer</i> – see Section 10.2.6 <i>output_id</i> - 1...num of system outputs <i>mode</i> - 0 - manual 1 - priority switch 2 - last connected switch			
Response Triggers			
Notes			

Command - AV-SW-TIMEOUT		Command Type - System	
Command Name		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			
~ _{nl} @AV-SW-TIMEOUT _{SP} action,time_out _{CR}			
Parameters			
<i>action</i>			
<i>timeout</i> - timeout in seconds			
Response Triggers			
Notes			

Command - BUILD-DATE		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	BUILD-DATE?	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get device build date	#BUILD-DATE _{CR}	
Response			
~ _{nl} @BUILD-DATE _{SP} date _{SP} time _{CR LF}			
Parameters			
<i>date</i> - Format: YYYY/MM/DD where YYYY = Year, MM = Month, DD = Day			
<i>time</i> - Format: hh:mm:ss where hh = hours, mm = minutes, ss = seconds			
Response Triggers			
Notes			

Command - CPEDID		Command Type - System	
Command Name		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			
~hh@CPEDID _{SP} src_stg, src_id, dst_type, dest_bitmap _{CR LF}			
Parameters			
<p>src_type - EDID source type (usually output)</p> <p>src_id - number of chosen source stage (1.. max number of inputs/outputs)</p> <p>dst_type - EDID destination type (usually input) (see Section 10.2.4)</p> <p>dest_bitmap - bitmap representing destination IDs. Format: XXXX...X, where X is hex digit. The binary form of every hex digit represents corresponding destinations. Setting '1' says that EDID data has to be copied to this destination</p>			
Response Triggers			
Response is sent to the com port from which the Set was received (before execution)			
Notes			
<p>Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word)</p> <p>Example: bitmap 0x0013 means inputs 1,2 and 5 are loaded with the new EDID</p>			

Command - DIR		Command Type - File System	
Command Name		Permission	Transparency
Set:	DIR	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	List files in device	#DIR <input type="checkbox"/>	
Get:	-	-	
Response			
Multi Line:			
~ <input type="checkbox"/> <input type="checkbox"/> @DIR <input type="checkbox"/> <input type="checkbox"/>			
<i>file_name</i> <input type="checkbox"/> <input type="checkbox"/> <i>file_size</i> <input type="checkbox"/> bytes. <input type="checkbox"/> ID: <input type="checkbox"/> <i>file_id</i> <input type="checkbox"/>			
<input type="checkbox"/> <i>free_size</i> <input type="checkbox"/> bytes. <input type="checkbox"/>			
Parameters			
<i>file_name</i> - name of file			
<i>file_size</i> - file size in bytes. A file can take more space on device memory			
<i>file_id</i> - internal ID for file in file system			
<i>free_size</i> - free space in bytes in device file system			
Response Triggers			
Notes			

Command - DISPLAY?		Command Type - System	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	DISPLAY?	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get output HPD status	# DISPLAY? _[SP] _[out_id] _[CR]	
Response			
- [nr] @ DISPLAY _[SP] _[out_id,status] _[CR LF]			
Parameters			
<i>out_id</i> - output number <i>status</i> - HPD status according to signal validation			
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			
Notes			

Command - ETH-PORT		Command Type - Communication	
Command Name		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			
- [nr] @ ETH-PORT _[SP] _[portType, ETHPort] _[CR LF]			
Parameters			
<i>portType</i> - TCP/UDP <i>ETHPort</i> - TCP/UDP port number			
Response Triggers			
Notes			

Command - FACTORY		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	FACTORY	End User	Public
Get:	-	-	-
Description		Syntax	
Set:	Reset device to factory defaults configuration	# FACTORY <input type="checkbox"/>	
Get:	-	-	
Response			
~nn@ BUILD-DATE <input type="checkbox"/> _date <input type="checkbox"/> _time <input type="checkbox"/> _CR LF			
Parameters			
Response triggers			
Notes			
This command deletes all user data from the device. The deletion can take some time			

Command - FS-FREE?		Command Type - File System	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	FS-FREE?	Administrator	Public
Description		Syntax	
Set:	-	-	
Get:	Get file system free space	# FS-FREE? <input type="checkbox"/>	
Response			
~nn@ FS_FREE <input type="checkbox"/> _free_size <input type="checkbox"/> _CR LF			
Parameters			
<i>free_size</i> - free size in device file system in bytes			
Response Triggers			
Notes			

Command - GEDID		Command Type - System	
Command Name		Permission	Transparency
Set:	GEDID	Administrator	Public
Get:	GEDID?	End User	Public
Description		Syntax	
Set:	Set EDID data from device	#GEDID _[SP] stage, stage_id _[CR]	
Get:	Get EDID support on certain input/output	#GEDID? _[SP] stage, stage_id _[CR]	
Response			
Set:			
Multi-line response:			
~nn@GEDID _[SP] stage,stage_id,size _[CR LF]			
EDID_data _[CR LF]			
~nn@GEDID _[SP] stage,stage_id _[SP] OK _[CR LF]			
Get:			
~nn@GEDID _[SP] stage,stage_id,size _[CR LF]			
Parameters			
stage - input/output			
stage_id - number of chosen stage (1.. max number of inputs/outputs)			
size - EDID data size. For Set, size of data to be sent from device, for Get, 0 means no EDID support			
Response Triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received			
Notes			
For Get, size=0 means EDID is not supported			
For old devices that do not support this command, ~nn@ ERR 002 _[CR LF] is received			

Command - GET		Command Type - File System	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	GET	Administrator	Public
Description		Syntax	
Set:	-	-	
Get:	Get file	#GET _{SP} file_name _{CR}	
Response			
Multi-line:			
~ _{hn} @GET _{SP} file_name, file_size _{SP} READY _{CR LF} contents			
~ _{hn} @GET _{SP} file_name _{SP} OK _{CR LF}			
Parameters			
file_name - name of file to get contents contents - byte stream of file contents file_size - size of file (device sends it in response to give user a chance to get ready)			
Response Triggers			
Notes			

Command - HDCP-MOD		Command Type - System	
Command Name		Permission	Transparency
Set:	HDCP-MOD	Administrator	Public
Get:	HDCP-MOD?	End User	Public
Description		Syntax	
Set:	Set HDCP mode	#HDCP-MOD _{SP} inp_id,mode _{CR}	
Get:	Get HDCP mode	#HDCP-MOD? _{SP} stage_id _{CR}	
Response			
Set / Get: ~ _{NN} @HDCP-MOD _{SP} stage_id,mode _{CR LF}			
Parameters			
inp_id - input number (1.. max number of inputs) mode - HDCP mode			
Response Triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received Response is sent to all com ports after execution if HDCP-MOD was set by any other external control device (button press, device menu and similar) or HDCP mode changed			
Notes			
Set HDCP working mode on the device input: HDCP supported - HDCP_ON [default] HDCP not supported - HDCP OFF HDCP support changes following detected sink - MIRROR OUTPUT			

Command - HDCP-STAT		Command Type - System	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	HDCP-STAT?	End User	Public
Description		Syntax	
Set:	None	-	
Get:	Get HDCP signal status	#HDCP-STAT? _{SP} stage,stage_id _{CR}	
Response			
Set / Get: ~ <u>nn</u> @HDCP-STAT _{SP} stage,stage_id,mode _{CR LF}			
Parameters			
<i>stage</i> – input/output <i>stage_id</i> - number of chosen stage (1.. max number of inputs/outputs) <i>actual_status</i> - signal encryption status - valid values ON/OFF			
Response Triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received Response is sent to all com ports after execution if HDCP-STAT was set by any other external control device (button press, device menu and similar) or HDCP mode changed			
Notes			
On output – sink status On input – signal status			

Command - HELP		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	HELP	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get command list or help for specific command	2 options: 1. #HELP _{CR} 2. #HELP _{SP} command_name _{CR}	
Response			
1. Multi-line: ~ _{nn} @Device available protocol 3000 commands: _{CR LF} command _{SP} command... _{CR LF}			
To get help for command use: HELP (COMMAND_NAME)_{CR LF}			
2. Multi-line: ~ _{nn} @HELP _{SP} command: _{CR LF} description _{CR LF} USAGE : usage _{CR LF}			
Parameters			
Response Triggers			
Notes			

Command - LDEDID		Command Type - System	
Command Name		Permission	Transparency
Set:	LDEDID	End User	Public
Get:	-	-	-
Description		Syntax	
Set:	Write EDID data from external application to device	Multi-step syntax (see following steps)	
Get:	None	None	
Communication Steps (Command and Response)			
<p>Step 1: #LDEDID_{SP}dst_type, dest_bitmask, size, safe_mode_{CR}</p> <p>Response 1: ~nn@LDEDID_{SP}dst_type, dest_bitmask, size, safe_mode_{SP}READY_{CR LF} or ~nn@LDEDID_{SP}ERRnn_{CR LF}</p> <p>Step 2: If ready was received, send EDID_DATA</p> <p>Response 2: ~nn@LDEDID_{SP}dst_type, dest_bitmask, size, safe_mode_{SP}OK_{CR LF} or ~nn@LDEDID_{SP}ERRnn_{CR LF}</p>			
Parameters			
<p>dst_type - EDID destination type (usually input)</p> <p>dest_bitmask - bitmap representing destination IDs. Format: 0x*****, where * is ASCII presentation of hex digit. The binary presentation of this number is a bit mask for destinations. Setting '1' means EDID data has to be copied to this destination</p> <p>size - EDID data size</p> <p>safe_mode - 0 - Device accepts the EDID as is without trying to adjust 1 - Device tries to adjust the EDID</p> <p>EDID_DATA - data in protocol packets</p>			
Response Triggers			
Response is sent to the com port from which the Set (before execution)			
Notes			
<p>When the unit receives the LDEDID command it replies with READY and enters the special EDID packet wait mode. In this mode the unit can receive only packets and not regular protocol commands. If the unit does not receive correct packets for 30 seconds or is interrupted for more than 30 seconds before receiving all packets, it sends timeout error ~nn@LDEDID_{SP}ERR01_{CR LF} and returns to the regular protocol mode. If the unit received data that is not a correct packet, it sends the corresponding error and returns to the regular protocol mode.</p>			

Command - LDFW		System - Packets	
Command Name		Permission	Transparency
Set:	LDFW	Internal SW	Public
Get:	-	-	-
Description		Syntax	
Set:	Load new firmware file	Step 1: #LDFW _{SP} size _{CR} Step 2: If ready was received, send FIRMWARE_DATA	
Get:	-	-	
Response			
Response 1: ~nn@LDFW _{SP} size _{SP} READY _{CR LF} or ~nn@LDFW _{SP} ERRnn _{CR LF}			
Response 2: ~nn@LDFW _{SP} size _{SP} OK _{CR LF}			
Parameters			
size - size of firmware data that is sent			
FIRMWARE_DATA - HEX or KFW file in protocol packets			
Response Triggers			
Notes			
In most devices firmware data is saved to flash memory, but the memory does not update until receiving the "UPGRADE" command and is restarted. Use this command in dedicated SW application			

Command - LOAD		Command Type - System - Packets	
Command Name		Permission	Transparency
Set:	LOAD	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	Load file to device	#LOAD <input type="text" value="file_name"/> <input type="text" value="size"/>	
Get:	-	-	
Response			
Data sending negotiation:			
* Device -			
~01@LOAD <input type="text" value="file_name"/> <input type="text" value="size"/> READY <input type="text" value="CR LF"/>			
* End User (+Device)-			
Send file in Protocol Packets			
* Device -			
~01@LOAD <input type="text" value="file_name"/> <input type="text" value="size"/> OK <input type="text" value="CR LF"/>			
Parameters			
<i>file_name</i> - name of file to save on device			
<i>size</i> - size of file data that is sent.			
Response Triggers			
Notes			

Command – LOCK-EDID		Command Type – EDID Handling	
Command Name		Permission	Command Name
Set:	LOCK-EDID	End User	End User
Get:	LOCK-EDID?	End User	End User
Description		Syntax	
Set:	Lock last read EDID	#LOCK-EDID <input type="text" value="input_id"/> <input type="text" value="lock_mode"/>	
Get :	Get EDID lock state	#LOCK-EDID? <input type="text" value="input_id"/>	
Response			
~nn@LOCK-EDID <input type="text" value="input_id"/> <input type="text" value="lock_mode"/> <input type="text" value="CR LF"/>			
Parameters			
stupni metsys fo mun....1 - <i>input_id</i>			
locks EDID -unlocks EDID, 1/ON -OFF /0 - <i>lock_mode</i>			
Response triggers			
Notes			

Command - LOGIN		Command Type - Authentication	
Command Name		Permission	Transparency
Set:	LOGIN	Not Secure	Public
Get:	LOGIN?	Not Secure	Public
Description		Syntax	
Set:	Set protocol permission	#LOGIN _{SP} login_level,password _{CR}	
Get:	Get current protocol permission level	#LOGIN? _{CR}	
Response			
Set:	~nn@LOGIN _{SP} login_level,password _{SP} OK _{CR LF}		
	or		
	~nn@LOGIN _{SP} ERR _{SP} 004 _{CR LF} (if bad password entered)		
Get:	~nn@LOGIN _{SP} login_level _{CR LF}		
Parameters			
<i>login_level</i> - level of permissions required (End User or Admin)			
<i>password</i> - predefined password (by PASS command). Default password is an empty string			
Response Triggers			
Notes			
For devices that support security, LOGIN allows to the user to run commands with an End User or Administrator permission level			
In each device, some connections can be logged in to different levels and some do not work with security at all			
Connection may logout after timeout			
The permission system works only if security is enabled with the "SECUR" command			

Command - LOGOUT		Command Type - Authentication	
Command Name		Permission	Transparency
Set:	LOGOUT	Not Secure	Public
Get:	-	-	-
Description		Syntax	
Set:	Cancel current permission level	#LOGOUT _{CR}	
Get:	-	-	
Response			
~nn@LOGOUT _{SP} OK _{CR LF}			
Parameters			
Response Triggers			
Notes			
Logs out from End User or Administrator permission levels to Not Secure			

Command - MODEL?		Command Type - System-mandatory	
Command Name		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			
Response Triggers			
Notes			

Command - NAME		Command Type - System (Ethernet)	
Command Name		Permission	Transparency
Set:	NAME	Administrator	Public
Get:	NAME?	End User	Public
Description		Syntax	
Set:	Set machine (DNS) name	# NAME _[SP] <i>machine_name</i> _[CR]	
Get:	Get machine (DNS) name	# NAME? _[CR]	
Response			
Set:	~ nn @ NAME _[SP] <i>machine_name</i> _[CR LF]		
Get:	~ nn @ NAME? _[SP] <i>machine_name</i> _[CR LF]		
Parameters			
<i>machine_name</i> - String of up to 14 alpha-numeric chars (can include hyphen, not at the beginning or end)			
Response Triggers			
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)			

Command - NAME-RST		Command Type - System (Ethernet)	
Command Name		Permission	Transparency
Set:	NAME-RST	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	Reset machine (DNS) name to factory default	# NAME-RST _[CR]	
Get:	-	-	
Response			
~ nn @ NAME-RST _[SP] OK _[CR LF]			
Parameters			
Response Triggers			
Notes			
Factory default of machine (DNS) name is "KRAMER_" + 4 last digits of device serial number			

Command - NET-DHCP		Command Type - Communication	
Command Name		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 set by the factory or using the IP set command 1 - Try to use DHCP. If unavailable, use IP as above			
Response Triggers			
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 command "NAME". You can also get an assigned IP by direct connection to USB or RS-232 protocol port if available For proper settings consult your network administrator			

Command - NET-GATE		Command Type - Communication	
Command Name		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 - format: xxx.xxx.xxx.xxx			
Response Triggers			
Notes			
A network gateway connects the device via another network and maybe over the Internet. Be careful of security problems. For proper settings consult your network administrator			

Command - NET-IP		Command Type - Communication	
Command Name		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 - format: xxx.xxx.xxx.xxx			
Response Triggers			
Notes			
For proper settings consult your network administrator			

Command - NET-MAC?		Command Type - Communication	
Command Name		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			
Response Triggers			
Notes			

Command - NET-MASK		Command Type - Communication	
Command Name		Permission	Transparency
Set:	NET-MASK	Administrator	Public
Get:	NET-MASK?	End User	Public
Description		Syntax	
Set:	Set subnet mask	# NET-MASK _[SP] <i>net_mask</i> _[CR]	
Get:	Get subnet mask	# NET-MASK? _[CR]	
Response			
~ nn @ NET-MASK _[SP] <i>net_mask</i> _[CR LF]			
Parameters			
<i>net_mask</i> - format: xxx.xxx.xxx.xxx			
Response Triggers			
The subnet mask limits the Ethernet connection within the local network For proper settings consult your network administrator			
Notes			

Command - PASS		Command Type - Authentication	
Command Name		Permission	Transparency
Set:	PASS	Administrator	Public
Get:	PASS?	Administrator	Public
Description		Syntax	
Set:	Set password for login level	# PASS _[SP] <i>login_level, password</i> _[CR]	
Get:	Get password for login level	# PASS? _[SP] <i>login_level</i> _[CR]	
Response			
~ nn @ PASS _[SP] <i>login_level, password</i> _[SP] OK _[CR LF]			
Parameters			
<i>login_level</i> - level of login to set (End User or Administrator). <i>password</i> - password for the <i>login_level</i> . Up to 15 printable ASCII chars			
Response Triggers			
Notes			
The default password is an empty string			

Command - PRIORITY		Command Type - System	
Command Name		Permission	Transparency
Set:	PRIORITY	Administrator	Public
Get:	PRIORITY?	Administrator	Public
Description		Syntax	
Set:	Set input priority	# PRIORITY _{SP} layer,PRIORITY1, PRIORITY2... PRIORITYn _{CR}	
Get:	Get input priority	# PRIORITY? layer _{CR}	
Response			
~nn@ PRIORITY _{SP} layer,PRIORITY1, PRIORITY2... PRIORITYn _{CR LF}			
Parameters			
layer – see Section 10.2.6 PRIORITY1 - priority of first input PRIORITYn- priority of input n			
Response Triggers			
Notes			
WP-577VH – layer parameter is not used			

Command - PROT-VER?		Command Type - System-mandatory	
Command Name		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			
Response Triggers			
Notes			

Command - RESET		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	RESET	Administrator	Public
Get:	-	-	-
Description		Syntax	
Set:	Reset device	# RESET _{CR}	
Get:	-	-	
Response			
~ nn @ RESET _{SP} OK _{CR LF}			
Parameters			
Response Triggers			
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.			

Command - SECUR		Command Type - Authentication	
Command Name		Permission	Transparency
Set:	SECUR	Administrator	Public
Get:	SECUR?	Not Secure	Public
Description		Syntax	
Set:	Start/stop security	# SECUR _{SP} <i>security_mode</i> _{CR}	
Get:	Get current security state	# SECUR? _{CR}	
Response			
Set: ~ nn @ SECUR _{SP} <i>security_mode</i> _{SP} OK _{CR LF}			
Get: ~ nn @ SECUR _{SP} <i>security_mode</i> _{CR LF}			
Parameters			
<i>security_mode</i> – 1/ON - enables security, 0/OFF - disables security			
Response Triggers			
Notes			
The permission system works only if security is enabled with the “SECUR” command			

Command - SIGNAL		Command Type - System	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	SIGNAL?	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get input signal lock status	# SIGNAL? <input type="checkbox"/> _{SP} <i>inp_id</i> <input type="checkbox"/> _{CR}	
Response			
~ <input type="checkbox"/> _{nr} @ SIGNAL? <input type="checkbox"/> _{SP} <i>inp_id,status</i> <input type="checkbox"/> _{CR LF}			
Parameters			
<i>inp_id</i> - input number <i>status</i> - lock status according to signal validation			
Response Triggers			
After execution, a response is sent to the com port from which the Get was received Response is sent after every change in input signal status ON to OFF, or OFF to ON			
Notes			

Command - SN?		Command Type - System-mandatory	
Command Name		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"/> _{nn} @ SN? <input type="checkbox"/> _{SP} <i>serial_number</i> <input type="checkbox"/> _{CR LF}			
Parameters			
<i>serial_number</i> - 11 decimal digits, factory assigned			
Response Triggers			
Notes			
For new products with 14 digit serial numbers, use only the last 11 digits			

Command - UPGRADE		Command Type - System	
Command Name		Permission	Transparency
Set:	UPGRADE	Administrator	Internal
Get:	-	-	-
Description		Syntax	
Set:	Perform firmware upgrade	#UPGRADE <input type="checkbox"/> <input type="checkbox"/>	
Get:	-	-	
Response			
- <input type="checkbox"/> @UPGRADE <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>			
Parameters			
Response Triggers			
Notes			
<p>Not necessary for some devices Firmware usually uploads to a device via a command like LDFW Reset the device to complete the process</p>			

Command - VERSION?		Command Type - System-mandatory	
Command Name		Permission	Transparency
Set:	-	-	-
Get:	VERSION?	End User	Public
Description		Syntax	
Set:	-	-	
Get:	Get firmware version number	#VERSION? <input type="checkbox"/> <input type="checkbox"/>	
Response			
- <input type="checkbox"/> @VERSION <input type="checkbox"/> <i>firmware_version</i> <input type="checkbox"/> <input type="checkbox"/>			
Parameters			
<i>firmware_version</i> - XX.XX.XXXX where the digit groups are: major.minor.build version			
Response Triggers			
Notes			

10.2.1 On/Off

Number	Value
0	Off
1	On

10.2.2 Signal Type

Number	Value
0	No signal
1	DVI
2	HDMI
3	DisplayPort
4	HDBaseT
5	SDI
6	VGA
7	Follow output
8	DGKat

10.2.3 Video/Audio Signal Changes

Number	Value
0	Video signal lost
1	New video signal detected
2	Audio signal lost
3	Audio signal detected
4	Disable 5V on video output if no input signal detected
5	Video cable unplugged
6	Audio cable unplugged

10.2.4 EDID Source

Number	Value
0	Input
1	Output
2	Default EDID

10.2.5 EDID Audio Capabilities

Number	Value
0	LPCM 2CH
1	LPCM 6CH
2	LPCM 8CH
3	Bitstream
4	HD

10.2.6 Layer Enumeration

Number	Value
1	Video
2	Audio
3	Data
4	IR
5	USB

10.2.7 Signal Validation

Number	Value
0	Signal or sink is not valid
1	Signal or sink is valid
2	Sink and EDID is valid

10.2.8 Ethernet Port Types

Number	Value
0	TCP
1	UDP

10.2.9 HDCP Types

Number	Value
0	HDCP Off
1	HDCP On
2	Follow input
3	Mirror output ("MAC mode")

LIMITED WARRANTY

The warranty obligations of 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 Does this Coverage Last

Seven years as of this printing; please check our Web site for the most current and accurate warranty information.

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, please visit our web site at www.kramerelectronics.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. 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.

Limitation on Liability

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Rev: 1



SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

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