

KRAMER



USER MANUAL

MODEL:

TP-900UHD

HDMI/HDBaseT Receiver/Switcher/Scaler

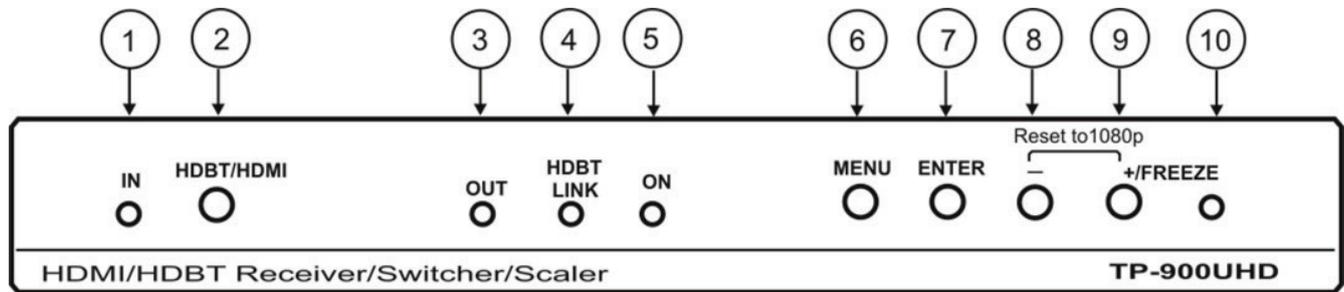
TP-900UHD QUICK START GUIDE

This guide helps you install and use your product for the first time. For more detailed information, go to <http://www.kramerav.com/manual>.

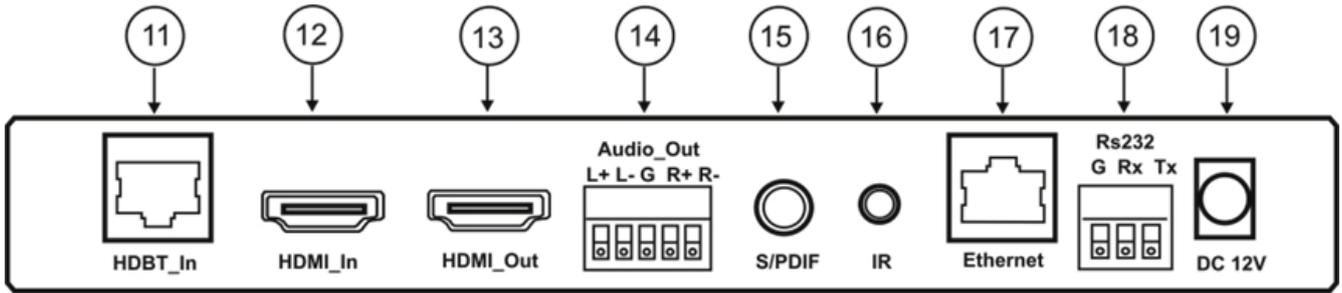
Step 1: Check what's in the box

- ✓ TP-900UHD HDMI/HDBaseT Receiver/Switcher/Scaler
 - ✓ 1 Power supply (12V DC)
- ✓ 4 Rubber feet
 - ✓ 1 Quick Start Guide

Step 2: Get to know your TP-900UHD



	Feature	Function
1	IN LED	Lights green when the HDMI input is selected and blue when HDBT is selected. It flashes if no input signal
2	HDBT/HDMI Button	Press to select remote HDBT or local HDMI source
3	HDMI output status LED	Lights green when an HDMI acceptor is connected
4	HDBT LINK status LED	Lights green when the HDBT link between transmitter and receiver is successfully established and is active
5	ON LED	Lights green when the unit is powered from local 12V DC source and lights blue when from remote HDBT
6	MENU Button	Press to enter the configuration menu. When the menu is displayed, press to exit one level up.
7	ENTER Button	When not in OSD, press ENTER to call input status. In OSD, press Enter to selects and activates a menu item or to accept a parameter value. Press and hold together with the "-" or "+" to accelerate auto increment.
8	"-" Button	When not in OSD, press and hold together with the "+" to set factory default output resolution 1080p. In OSD, press to move backward through the sub-menu list or to decrement the parameter value. Press and hold together with the "+" button to set default value
9	+/FREEZE Button	When not in OSD, press to freeze the image. Press and hold together with the "-" to set factory default output resolution 1080p. In OSD, press to move forward through the sub-menu list or to increment the parameter value. Press and hold together with the "-" button to set factory default value
10	FREEZE LED	Lights green when image is frozen



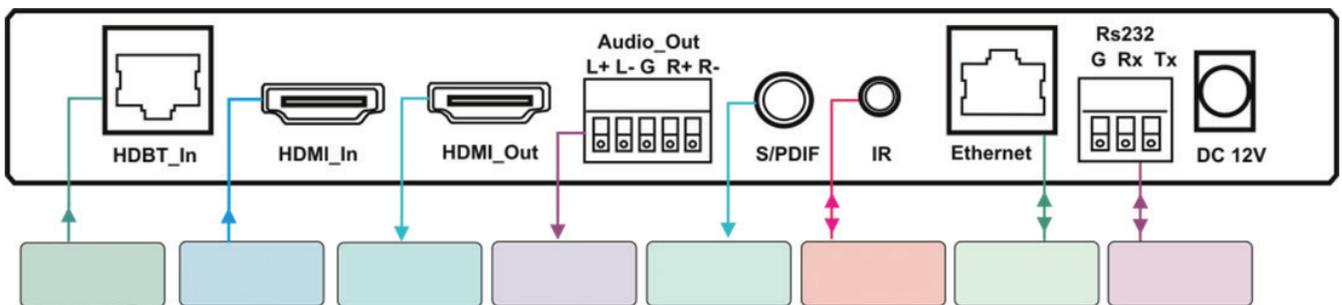
	Feature	Function
11	HDBT IN RJ-45 Connector	Connects to an HDBaseT transmitter
12	HDMI IN Connector	Connect to HDMI source
13	HDMI OUT Connector	Connects to an HDMI acceptor
14	AUDIO BALANCED OUT Terminal Block Connector	Connect the balanced stereo audio output to a balanced stereo audio acceptor
15	S/PDIF digital audio output	Connect to digital audio acceptor
16	IR input/output	Connect to IR Emitter or Sensor for the remote control of any external device
17	Ethernet RJ-45 Connector	Connect via a LAN to a PC for unit control or to any external device to establish pass-through Ethernet link between this device and another device connected to HDBT transmitter
18	RS-232 Terminal Block Connector	Connects to a controller or to any external device to establish pass-through serial link between this device and another device connected to RS-232 port of HDBT transmitter
19	12V DC	+12V DC connector for powering the unit

Step 3: Install the TP-900UHD

Attach the rubber feet and place on a table or mount the **TP-900UHD** in a rack (using an optional **RK-T2B** rack mount).

Step 4: Connect the inputs and outputs

Always switch off the power on each device before connecting it to your **TP-900UHD**.



Always use Kramer high-performance cables connecting AV equipment to the **TP-900UHD**.

Step 5: Connect the power

If the unit does not receive power via PoE, connect the 12V DC power adapter to the **TP-900UHD** and plug the adapter into the main electricity.

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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-900UHD** HDMI/HDBT Receiver/Switcher/Scaler, which is ideal for:

- Professional broadcasting and production studios
- Home theater, presentation and multimedia applications
- Post production

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> 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-900UHD** away from moisture, excessive sunlight and dust



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

2.2 Safety Instructions



Caution: There are no operator serviceable parts inside the unit.

Warning: Use only the power cord that is supplied with the unit.

Warning: Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only.

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

2.3 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.kramerav.com/support/recycling/>.

3 OVERVIEW

The **TP-900UHD** comprises HDBaseT signal receiver and additional local HDMI input and can perform CLEAN SWITCH between these two inputs. It is capable to scale the picture to match the resolution of the monitor and can maintain stable, without intermission output HDMI signal while input signal changes format or resolution. Besides that, it allows transmitting of RS-232, IR, Ethernet signals via CAT6.

In particular, the **TP-900UHD** features:

- Resolution support for up to 4K@60Hz (4:2:0) UHD
- An HDBaseT input
- A local HDMI input
- An HDMI output
- A bidirectional RS-232 port for embedding/de-embedding control commands in the HDBaseT data stream
- Infrared input and output ports for controlling devices over the HDBaseT data stream
- Audio de-embedding to the balanced stereo line out and to the S/PDIF digital out
- Maintains constant sync or optionally frozen last picture on the output, even when the input video signal is lost or interrupted
- System range up to 130m (430ft) at normal mode (2K), up to 100m at normal mode (4K); up to 180m (590ft) extra range mode (1080p @60Hz @24bpp) when using BC-UNIKAT cables
- A built-in ProcAmp for convenient signal adjustment
- An On-Screen Display (OSD) for easy setup and adjustment, accessible via the front-panel buttons
- A non-volatile memory that retains the last settings and can hold up to 16 user-definable settings.
- A freeze button

The machine is fed from an external 12V DC source or optionally from HDBT POE system, making it suitable for field operation.

You can control the **TP-900UHD** using the front panel buttons, or remotely via:

- A PC connected to the Ethernet port on the device via a LAN using the control software
- A PC connected to the Ethernet port of remote HDBT transmitter using the same control software

4 DEFINING THE TP-900UHD

Figure 1 defines the front panel of the **TP-900UHD**.

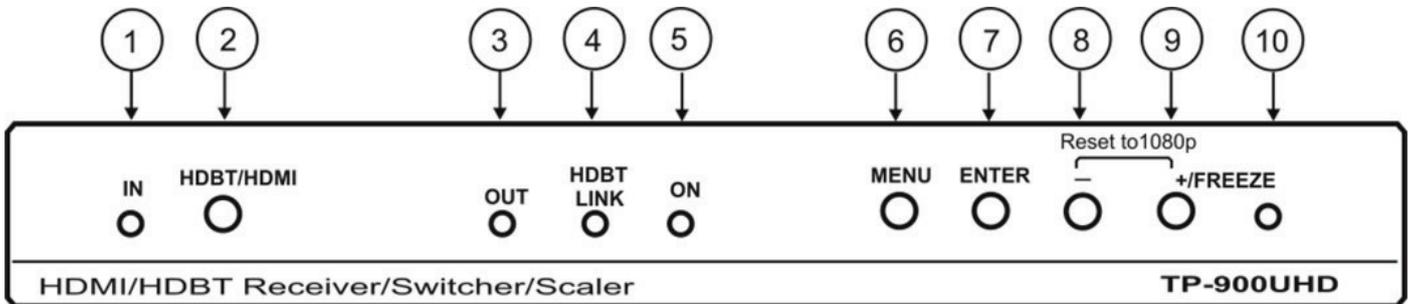


Figure 1: **TP-900UHD** HDMI/HDBaseT Receiver/Switcher/Scaler Front Panel

No	Feature	Function
1	IN LED	Lights green when the HDMI input is selected and blue when HDBT input is selected. It flashes if input signal is lost
2	HDBT/HDMI Button	Press to select remote HDBT or local HDMI source
3	HDMI output status LED	Lights green when an HDMI acceptor is connected
4	HDBT LINK status LED	Lights green when the HDBT link between transmitter and receiver is successfully established and is active
5	ON LED	Lights green when the unit is powered from local external 12V DC source and lights blue when from remote HDBT POE system
6	MENU Button	Press to enter the configuration menu. When the menu is displayed, press to exit one level
7	ENTER Button	When not in OSD, press ENTER to call input signal status menu. In OSD, press Enter to select and activates a menu item or to accept a parameter value. Press and hold together with the "-" or "+" to scroll rapidly through parameter.
8	"-" Button	When not in OSD, press and hold together with the "+" to set factory default output resolution 1080p. In OSD, press to move backward through the sub-menu list or to decrement the parameter value. Press and hold together with the "+" button to set rapidly parameter factory default value
9	+/FREEZE Button	When not in OSD, press to freeze the image. Press and hold together with the "-" to set factory default output resolution 1080p. In OSD, press to move forward through the sub-menu list or to increment the parameter value. Press and hold together with the "-" button to set rapidly parameter factory default value
10	FREEZE LED	Lights green when image is frozen

Figure 2 defines the rear panel of the TP-900UHD.

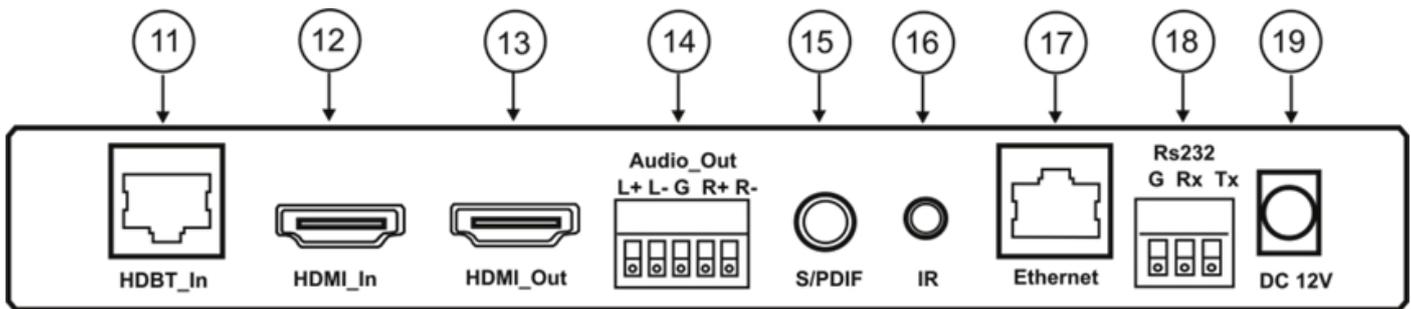


Figure 2: **TP-900UHD** HDMI/HDBaseT Receiver/Switcher/Scaler Rear Panel

No	Feature	Function
1	IN LED	Lights green when the HDMI input is selected and blue when HDBT input is selected. It flashes if input signal is lost
2	HDBT/HDMI Button	Press to select remote HDBT or local HDMI source
3	HDMI output status LED	Lights green when an HDMI acceptor is connected
4	HDBT LINK status LED	Lights green when the HDBT link between transmitter and receiver is successfully established and is active
5	ON LED	Lights green when the unit is powered from local external 12V DC source and lights blue when from remote HDBT POE system
6	MENU Button	Press to enter the configuration menu. When the menu is displayed, press to exit one level
7	ENTER Button	When not in OSD, press ENTER to call input signal status menu. In OSD, press Enter to selects and activates a menu item or to accept a parameter value. Press and hold together with the "-" or "+" to scroll rapidly through parameter.
8	"-" Button	When not in OSD, press and hold together with the "+" to set factory default output resolution 1080p. In OSD, press to move backward through the sub-menu list or to decrement the parameter value. Press and hold together with the "+" button to set rapidly parameter factory default value
9	+ / FREEZE Button	When not in OSD, press to freeze the image. Press and hold together with the "-" to set factory default output resolution 1080p. In OSD, press to move forward through the sub-menu list or to increment the parameter value. Press and hold together with the "-" button to set rapidly parameter factory default value
10	FREEZE LED	Lights green when image is frozen

5 CONNECTING THE TP-900UHD

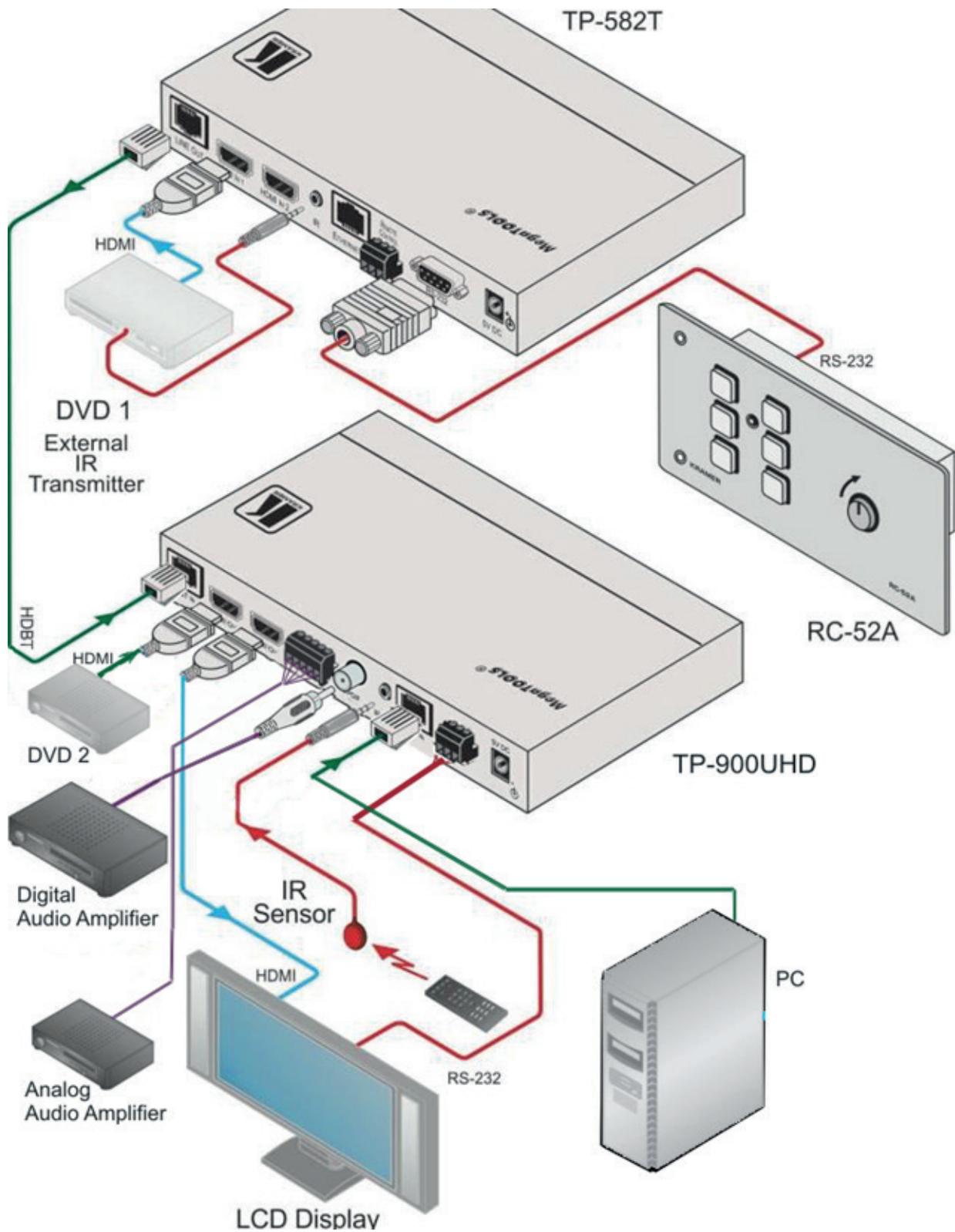


Figure 3: Connecting the **TP-900UHD** HDMI/HDBaseT Receiver/Switcher/Scaler



Always switch off the power to all devices before connecting them to your TP-900UHD. After connecting your **TP-900UHD**, connect its power and then switch on the power to each device.

1. Connect the output from an HDBaseT transmitter (for example, a **TP-582T**) to the HDBT IN RJ-45 connector.
2. Connect an HDMI video source to the HDMI IN connector.
3. Connect the HDMI OUT connector to an HDMI acceptor (for example, a display).
4. Connect the AUDIO OUT terminal block connector to a balanced stereo audio acceptor (for example, an amplifier).
5. Connect the S/PDIF connector to an acceptor of digital Audio
6. Connect an IR Sensor or Emitter to the IR 3.5mm mini jack.
7. Connect the Ethernet port to a PC
8. If required, connect the RS-232 3-pin connector to an RS-232 PC port or the Remote Controller.
9. Connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity.

5.1 Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the **TP-900UHD** directly to the Ethernet port on your PC using a cable (straight and cross are allowed) with RJ 45 connectors.



This type of connection is recommended for identifying the **TP-900UHD** with the factory configured default IP address.

After connecting the **TP-900UHD** to the Ethernet port, configure your PC as follows:

1. Click **Start > Control Panel > Network and Sharing Center**.
2. Click **Change Adapter Settings**.
3. Highlight the network adapter you want to use to connect to the device and click **Change settings of this connection**.

The Local Area Connection Properties window for the selected network adapter appears as shown in Figure 4.

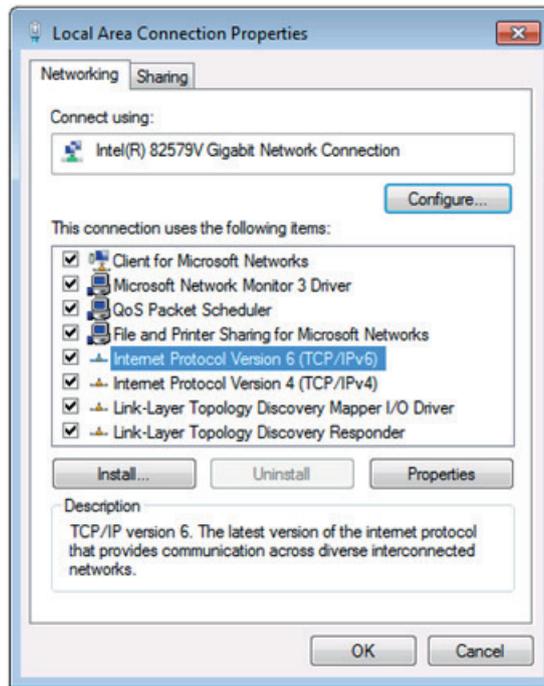


Figure 4: Local Area Connection Properties Window

4. Click on **Internet Protocol Version 4 (TCP/IPv4)** to highlight the selection.
5. Click **Properties**.

The Internet Protocol Properties window relevant to your IT system appears as shown in Figure 5.

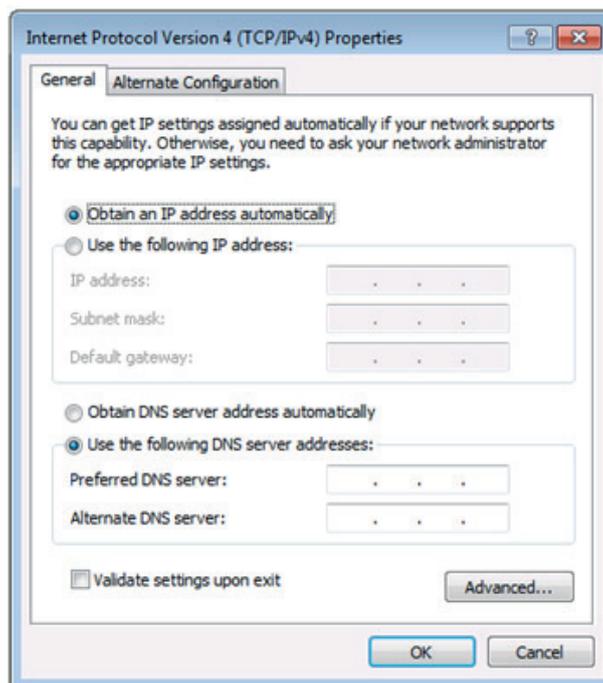


Figure 5: Internet Protocol Version 4 Properties Window

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in Figure 6.

You can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.

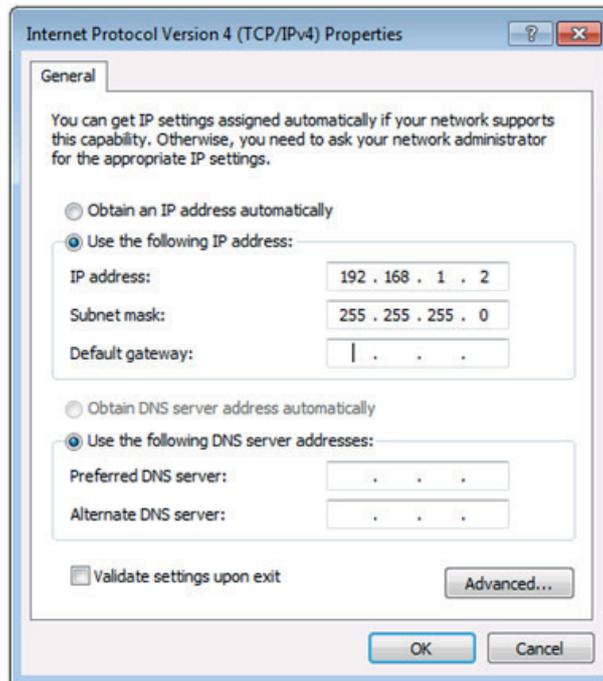


Figure 6: Internet Protocol Properties Window

7. Click **OK**.
8. Click **Close**.

5.2 Remote control of unit via HDBaseT Ethernet Link

You can connect the Ethernet port of the remote HDBaseT transmitter (if available) to the Ethernet port of a PC to obtain remote control of **TP-900UHD** via HDBaseT Link. All IP address configurations for PC must be the same as in previous 5.1 item.

5.3 Connecting the Ethernet Port via a Network Hub or Switch

You can connect the Ethernet port of the **TP-900UHD** to the Ethernet port on a network hub using a straight through cable with RJ-45 connectors.

5.4 RS-232 Control over HDBaseT

You can connect to the transmitter/receiver system via an RS-232 connection.

To make this connection active, it is necessary in SYSTEM PARAMETER submenu set parameter PORT RS232 DESTINATION: to "PASS THROUGH" option.

To connect the RS-232 9-pin D-sub serial port:

- Pin 2 to the TX pin on the **TP-900UHD** RS-232 terminal block
- Pin 3 to the RX pin on the **TP-900UHD** RS-232 terminal block
- Pin 5 to the GND pin on the **TP-900UHD** RS-232 terminal block

Figure 3 shows RS-232 bidirectional control of the LCD Display by a module RC-52 that is connected to a TP-582T.

5.5 IR Control Over HDBaseT

Since the IR signal on the TP-582T transmitter and **TP-900UHD** receiver is bidirectional, you can use a remote control transmitter (that is used for controlling a peripheral device, for example, a DVD player) to send commands (to the AV equipment) from either end of the transmitter /receiver system. To do so, you have to use the Kramer external IR sensor on one end (P/N: 95-0104050) and the Kramer IR emitter cable on the other end (P/N: C-A35/IRE-10)

Two IR Emitter Extension Cables are also available: a 15 meter cable and a 20 meter cable.

The example in Figure 3 illustrates how to control the DVD player that is connected to TP-582T using a remote control, via the **TP-900UHD**. In this example, the External IR Sensor is connected to the IR connector of the **TP-900UHD** and an IR Emitter is connected between the TP-582T and the DVD player. The DVD remote control sends a command while pointing towards the External IR Sensor. The IR signal passes through the TP cable and the IR Emitter to the DVD player, which responds to the command sent.

6 OPERATING THE TP-900UHD

6.1 Operating the TP-900UHD Using the Front Panel Buttons

During normal operation (without the OSD), the front panel buttons performs following functions:

- Pressing HDBT/HDMI alternatively select either HDBT or HDMI inputs
- Pressing MENU opens the on-screen display (OSD) (an item of main menu, for example "SETUP CONFIGURATION"), the next press closes the OSD
- Pressing ENTER (when not in OSD) opens input signal status (for example "INPUT: HDMI 1080P 60 ASPECT16:9")
- Pressing +/FREEZE freezes image, the next press unfreezes the display
- Pressing +/FREEZE and "-" buttons together reset the output resolution to 1080p60

6.2 Using the OSD

You can use the OSD to set a wide variety of parameters. When the MENU button is pressed, the main menu opens allowing access to all the device settings.

While the OSD is open, the front panel buttons perform the following functions:

- Pressing ENTER selects and activates a menu item or accepts the parameter value set. Press and hold ENTER button together with the "-" or with "+" to accelerate auto decrement or increment of parameter values.
- Pressing - or + move forward and backward through the menu items and decrement or increment the parameter values. Press and hold the "-" button together with "+" button to set rapidly parameter factory default value (only when the OSD is open).
- Pressing MENU when the OSD is open, exit menu one level hierarchy up.

As an example of setting parameters, to increase the contrast on the display:

1. From normal operation, press MENU. An item of the main OSD menu appears on the screen.
2. Press the + or - button to navigate to submenu IMAGE QUALITY ADJUSTING.

3. Press ENTER and then using buttons + or - navigate to parameter CONTRAST.
4. Press ENTER. The contrast value parameter changes to red.
5. Press the + button to increase the value (increase the contrast) or the - button to decrease the value (decrease the contrast). The value ranges for contrast from 50% to 150% (100% - factory default value).
6. Press and hold the + button or the - button to obtain auto decrement or increment of the parameter.
7. Press and hold ENTER button together with the "-" or with "+" to accelerate auto decrement or auto increment of parameter values.
8. Press ENTER to accept and store the value (the parameter value flashes).
9. To return to one level menu hierarchy up, press MENU button.

6.3 The OSD Menu Structure

Submenu	Parameter	Values	Notes
SETUP CONFIGURATION	LOAD SETUP #	1 - 16 Default 1	Load setup # into current active setup
	SAVE Current SETUP as SETUP #	1 - 16 Default 1	Save Current Setup as Setup #
	RESET Current Setup to FACTORY Default	-	Reset Current Setup to Factory Default
INPUT CONFIGURATION	INPUT SWITCH MODE	Forced by HDMI/HDBT button Auto when input signal loss Auto to last connected input	Defines the behavior of input switch engine when input signals or connections change
	INPUT HDMI HDCP CAPABILITY	YES - default NO	Assigns HDCP capability for HDMI input
	INPUT HDBT HDCP CAPABILITY	YES - default NO	Assigns HDCP capability for HDBT input
	Input SIGNAL LOSS handle mode	Blue screen - default Black screen Freeze Last Picture Turn off HDMI output	Sets the operation when input signal is not present Turn off HDMI output about 20 seconds after input loss
	EXTRA RANGE	DISABLED - default ENABLED	Option ENABLED allows to extend length of HDBT cable up to 180m (only for resolutions not higher than 1080p/60)
	SELECT EDID	UHD 4K - default 1080P	UHD 4K EDID will allow a source to output up to 4K signal, while 1080P option will limit the source to FullHD resolution

Submenu	Parameter	Values	Notes
OUTPUT CONFIGURATION	OUTPUT STANDARD	480i/60 576i/50 480p/60 576p/50 720p/50 720p/59.94 720p/60 640x480/60 640x480/72 640x480/75 640x480/85 800x600/60 800x600/72 800x600/75 800x600/85 1024x768/60 1024x768/70 1024x768/75 1024x768/85 1152x864/75 1280x768/60 RB 1280x768/60 1280x768/75 1280x800/60 1280x960/60 1280x960/85 1280x1024/60 1280x1024/75 1360x768/60 1366x768/60 1400x1050/60 RB 1400x1050/60 1400x1050/75 1440x900/60 RB 1440x900/60 1440x900/75 1440x900/85 1080i/50 1080i/59.94 1080i/60 1080psf/23.98 1080psf/24 1080psf/25 1080psf/29.97 1080psf/30 1080p/23.98 1080p/24 1080p/25 1080p/29.97 1080p/30 1080p/50 1080p/60 - DEFAULT 1600x1200/60 1680x1050/60 RB 1680x1050/60 1920x1200/60 RB 3840x2160p24	Set Standard of output Signal

Submenu	Parameter	Values	Notes
OUTPUT CONFIGURATION	OUTPUT STANDARD	3840x2160p25 3840x2160p30 3840x2160p50 3840x2160p60	
	TEST SIGNAL	NO TEST SIGNAL - default COLOR BARS100% SPLIT BARS 100% TILT LINE CROSS HATCH SPLIT CROSS HATCH MODULATED RAMPS MOVING TILT LINE	Select any TEST Signal for output instead of HDMI or HDBT input.
	OUTPUT HDMI - DVI SELECT METHOD	AUTO 1 – HDMI priority AUTO 2 – DVI priority Forced HDMI always Forced DVI always	If Sink EDID is not available, then will be selected HDMI format when AUTO 1, and DVI - when AUTO 2
	OUTPUT HDCP MODE	FOLLOW INPUT – default FOLLOW OUTPUT ALWAYS ON ALWAYS OFF	HDCP on the output depends on HDCP on the input HDCP on the output depends on HDCP capability of the Sink HDCP on the output is active always HDCP on the output is not active. If input signal contains HDCP then output signal will be muted
IMAGE QUALITY ADJUSTING	CONTRAST	50% to 150% Default 100%	Set the contrast of the image
	BRIGHTNESS	50% to 150% Default 100%	Set the brightness of the image
	COLOR	0% to 150% Default 100%	Set the color of the image
	SHARPNESS	0% to 110% Default 0%	Set the sharpness (edge contrast)
	UHD transition to HD	NO FILTER – Default SOFT FILTER ENABLED	The setting is active only while down conversion from UHD to HD. If ENABLED then the image is smoothed at the cost of sharpness
IMAGE GEOMETRY ADJUSTING	HORIZONTAL SIZE	50% to 150% Default 100%	Set Horizontal Image Size only if input Aspect Ratio is near to 16:9
	VERTICAL SIZE	50% to 150% Default 100%	Set Vertical Image Size only if input Aspect Ratio is near to 16:9
	HORIZONTAL SIZE	50% to 150% Default 100%	Set Horizontal Image Size only if input Aspect Ratio is near to 4:3
	VERTICAL SIZE	50% to 150% Default 100%	Set Vertical Image Size only if input Aspect Ratio is near to 4:3
	HORIZONTAL IMAGE POSITION	-10.0% to +10.0% Default 0%	Set Horizontal Image Position
	VERTICAL IMAGE POSITION	-10.0% to +10.0% Default 0%	Set Vertical Image Position

Submenu	Parameter	Values	Notes
SYSTEM PARAMETERS	Hardware Revision	Cannot be changed inside this menu	Read only
	Serial Number	Cannot be changed inside this menu	Read only
	MAC address	Cannot be changed inside this menu	Read only
	ETHERNET DHCP mode	OFF - default ON	If select OFF then IP address must be defined in next item of this submenu If select ON then IP address can be assigned automatically.
	ETHERNET IP Address	Any valid address Default - 192.168.1.39	Set IP address in 4 identical items for each one of 4 IP digits. If in previous item was set ON DHCP mode, then in this item will be represented automatically assigned by provider IP address
	ETHERNET NET MASK	Any valid values Default - 255.255.000.000	Set NET MASK allowed values
	ETHERNET IP GATEWAY	Any valid values Default - 0.0.0.0	Set IP Gateway
	Ethernet UDP Port Number	Default: 50000	Sets the UDP port number. One item for three lowest significant digits; second item for 2 highest significant digits
	Ethernet TCP Port Number	Default: 5000	Sets the TCP port number. One item for three lowest significant digits; second item for 2 highest significant digits
	Port RS232 destination	UNIT CONTROL - default PASS THROUGH	The option PASS THROUGH allows to establish serial Link between any external local device, connected to RS232 port of the unit and remote device, connected to HDBT transmitter

6.4 Operating the TP-900UHD Remotely

You can control the **TP-900UHD** remotely via:

- RS-232 serial commands transmitted by a serial controller.
- A PC connected to the Ethernet port on the **TP-900UHD** via a LAN using P3000 commands (see Section 10).
- A PC connected to the Ethernet port on the remote HDBT transmitter using the same P3000 commands.

6.5 The settings that are recommended to optimize CLEAN SWITCH feature

A problem arises when for OUTPUT HDCP MODE (submenu OUTPUT CONFIGURATION) is selected the option FOLLOW INPUT, and when simultaneously one of switchable input signal contains HDCP encryption, but another don't contain. This leads to the change of output HDCP encryption after every input switching and therefore leads to interruption of image on the monitor screen. To avoid this problem it is necessary to select for OUTPUT HDCP MODE – either FOLLOW OUTPUT or ALWAYS ON (submenu OUTPUT CONFIGURATION).

Besides that it is preferable to set the parameter INPUT SIGNAL LOSS HANDLE MODE to the option “FREEZE LAST PICTURE” in order to enhance the tolerance to possible long input signal intermission.

6.6 Different Modes of Inputs Switching

You can set the following mode of Input Switching between HDBT and HDMI using first item of INPUT CONFIGURATION menu:

- Forced toggling between HDBT and HDMI using input HDBT/HDMI button. The LED IN lights green when the HDMI input is selected and blue when. When selected input signal disappears, the unit remains on this input and Blue Screen or other possible variant of input Signal loss handle mode takes place. LED IN flashes repeatedly.
- Auto switch to another input signal (if it is present) when selected input signal disappears. In this case, LED IN periodically changes color to indicate that another (not selected by button) input is active. If selected input Signal is anew recovered then switcher automatically returns to initial state. In this Mode, button HDBT/HDMI imparts only higher priority to HDBT or HDMI input.
- Auto switch to last connected or anew recovered Input. In this Mode, after such input switching (if both HDBT and HDMI signal become present) if then the unit is powered OFF and then ON, switcher recovers this last connected state.

7 UPGRADING THE FIRMWARE

The firmware can be uploaded by using the K-Upload Software. The instructions for using the K-Upload Software can be found in the “Upgrading the Firmware Using the K-Upload Software” document available for download from <http://www.kramerav.com>.

8 TECHNICAL SPECIFICATIONS

INPUTS:	1 HDBaseT on an RJ-45 connector 1 HDMI on an HDMI connector
OUTPUTS:	1 HDMI on an HDMI connector 1 Analog balanced stereo audio on a 5-pin terminal block 1 S/PDIF digital audio on an RCA connector
PORTS	1 Ethernet on an RJ-45 TP connector 1 RS-232 on a 3-pin terminal block 1 IR on a 3.5mm mini jack
BANDWIDTH:	Up to 10.2Gbps data rate
MAX. VIDEO RESOLUTION:	4K@60Hz (4:2:0) 24bpp
SYSTEM RANGE FOR HDBT	Up to 130m (430ft) at normal mode (2K), up to 100m at normal mode (4K); up to 180m (590ft) extra range mode (1080p @60Hz @24bpp) when using BC-UNIKAT cables
RS-232 BAUD RATE:	Up to 115200
EXTENDED ETHERNET:	Up to 100Mbps extended line rate bandwidth
COMPLIANCE WITH HDCP STANDARD:	Supports HDCP
INDICATOR LEDs:	Input, HDMI Out, HDBT Link, Power, Freeze
SUPPORTED OUTPUT RESOLUTIONS:	480i/60, 576i/50, 480p/60, 576p/50, 720p/50, 720p/59, 720p/60, 1080i/50, 1080i/59, 1080i/60, 1080p/23, 1080p/24, 1080p/25, 1080p/29, 1080p/30, 1080p/50, 1080p/59, 1080p/60, 1080psf/23, 1080psf/24, 1080psf/25, 1080psf/29, 1080psf/30, 640x480/60, 640x480/72, 640x480/75, 640x480/85, 800x600/60, 800x600/72, 800x600/75, 800x600/85, 1024x768/60, 1024x768/70, 1024x768/75, 1024x768/85, 1152x864/75, 1280x768/60rduc-BL, 1280x768/60, 1280x768/75, 1280x800/60, 1280x960/60, 1280x768/85, 1280x1024/60, 1280x1024/75, 1360x768/60, 1366x768/60, 1400x1050/60rducBL, 1400x1050/60, 1400x1050/75, 1440x900/60rducBL, 1440x900/60, 1440x900/75, 1440x900/85, 1600x1200/60, 1680x1050/60rducBL, 1680x1050/60, 1920x1200/60rducBL, 3840x2160p/24, 3840x2160p/25, 3840x2160p/30, 3840x2160p50, 3840x2160p/60
SUPPORTED INPUT RESOLUTIONS	TSame as Output Resolutions plus the following: 4096x2160/24, 4096x2160/25, 4096x2160/30, 4096x2160/50, 4096x2160/60 (all 24bpp)
POWER CONSUMPTION:	12V DC, 850mA
CONTROLS:	Front panel buttons, RS-232, Ethernet
OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)
STORAGE TEMPERATURE:	-40°C to +70°C (-40° to 158°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	18.75cm x 14.5cm x 2.54cm (W, D, H)
WEIGHT:	0.75kg approx.
INCLUDED ACCESSORIES:	Power supply

Specifications are subject to change without notice at <http://www.kramerav.com>

9 DEFAULT COMMUNICATION PARAMETERS

RS-232	
Baud Rate:	115,200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII
Protocol example:	#VERSION?<CR>
Ethernet	
Name:	KRAMER_
Model:	TP-900UHD
IP Address:	192.168.1.39
Network Mask:	255.255.0.0
Gateway:	0.0.0.0
TCP Port #:	5000
UDP Port #:	50000

10 KRAMER PROTOCOL 3000

The **TP-900UHD** 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 12.1)
- Kramer Protocol 3000 commands (see Section 12.2)

10.1 Kramer Protocol 3000 Syntax

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 commands concatenation and addressing:

Start	Address (optional)	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
~	device_id@	Command [SP] [Param1 ,Param2 ...] result	[CR]

[CR] = Carriage return (ASCII 13 = 0x0D)

[LF] = Line feed (ASCII 10 = 0x0A)

[SP] = Space (ASCII 32 = 0x20)

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 ID (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.

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.

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.

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.

Maximum String Length

64 characters

10.2 Kramer Protocol 3000 Commands

Common Commands

Command	Description
#	Protocol handshaking
BUILD-DATE?	Read device build date
ETH-PORT	Change protocol Ethernet port
ETH-PORT?	Query protocol Ethernet port
FACTORY	Reset to factory default configuration
HELP	List of commands
MODEL?	Read device model
NAME	Set machine (DNS) name
NAME?	Query machine (DNS) name
NAME-RST	Reset machine name to factory default (DNS)
NET-DHCP	Set DHCP mode
NET-DHCP?	Query DHCP mode
NET-GATE	Set Gateway
NET-GATE?	Query Gateway
NET-IP	Set IP address
NET-IP?	Query IP address
NET-MAC?	Query MAC address
NET-MASK	Set subnet mask
NET-MASK?	Query subnet mask
PROT-VER?	Read device protocol version
RESET	Reset device
SN?	Read device serial number
UPGRADE	Execute firmware upgrade
VERSION?	Read device firmware version

Device Specific Commands

Set Command syntax

Y Control_Type=0, Function#, Param

For example:

#Y 0,212,1

Device response:

~id=01Y Control_Type=0,Function#,Param

For example:

~01@Y 0,212,1

Get Command syntax

Y Control_Type=1, Function

For example: Y 1,200

Device response:

~id=01Y Control_Type=1, Function, Param

For example: ~01@Y 1,200,3

The following table lists the TP-900UHD “Y commands”.

Description	Function #	Value	Notes
Input Switch Mode	114	0	Input Switch Mode forced by Input Source parameter (see next item - function 115) or by Input HDBT/HDMI button (default)
		1	Auto Input Switch Mode when signal loss
		2	Auto Input Switch Mode to last connected input
Input Source	115	0	HDMI input active
		1	HDBT input active
HDMI Input HDCP capability	116	0	YES - there is HDCP capability
		1	NO - input is HDCP non-capable
HDBT Input HDCP capability	117	0	YES - there is HDCP capability
		1	NO - input is HDCP non-capable
Input SIGNAL LOSS handle mode	118	0	Blue screen - default
		1	Black screen
		2	Freeze Last Picture
		3	Turn off HDMI output 20 sec after signal loss
Output Video Resolution	200	0	480i/60
		1	576i/50
		2	720p/50
		3	720p/59
		4	720p/60
		5	1080i/50
		6	1080i/59
		7	1080i/60
		8	1080p/23
		9	1080p/24
		10	1080p/25
		11	1080p/29
		12	1080p/30
		13	1080p/50
		14	1080p/59
		15	1080p/60 - DEFAULT
		16	1080sf/23
17	1080sf/24		

Description	Function #	Value	Notes
Output Video Resolution	200	18	1080sf/25
		19	1080sf/29
		20	1080sf/30
		21	640x480/60
		22	640x480/72
		23	640x480/75
		24	640x480/85
		25	800x600/60
		26	800x600/72
		27	800x600/75
		28	800x600/85
		29	1024x768/60
		30	1024x768/70
		31	1024x768/75
		32	1024x768/85
		33	1152x864/75
		34	1280x768/60 reduced blanking
		35	1280x768/60
		36	1280x768/75
		37	1280x800/60
		38	1280x960/60
		39	1280x960/85
		40	1280x1024/60
		41	1280x1024/75
		42	1360x768/60
		43	1366x768/60
		44	1400x1050/60 reduced blanking
		45	1400x1050/60
		46	1400x1050/75
		47	1440x900/60 reduced blanking
		48	1440x900/60
		49	1440x900/75
		50	1440x900/85
		51	1600x1200/60
		52	1680x1050/60 reduced blanking
		53	1680x1050/60
		54	1920x1200/60 reduced blanking
		55	480p/60
		56	576p/50
		57	3840x2160p/24
		58	3840x2160p/25
		59	3840x2160p/30
		60	3840x2160p/50
		61	3840x2160p/60

Description	Function #	Value	Notes
TEST SIGNAL	201	0	NO TEST SIGNAL - default
		1	COLOR BARS100%
		2	SPLIT BARS 100%
		3	TILT LINE
		4	CROSS HATCH
		5	SPLIT CROSS HATCH
		6	MODULATED RAMPS
		7	MOVING TILT LINE
Output FORMAT select method	202	0	AUTO 1 - HDMI priority
		1	AUTO 2 - DVI priority
		2	Forced HDMI always
		3	Forced DVI always
UHD transition to HD filter	203	0	NO FILTER - Default
		1	SOFT FILTER ENABLED
FREEZE	204	0	Unfreeze image
		1	Freeze image
Output HDCP mode	205	0	FOLLOW INPUT - default
		1	FOLLOW OUTPUT
		2	ALWAYS ON
		3	ALWAYS OFF
PORT RS232 DESTINATION	206	0	Unit control
		1	Pass through
EXTRA RANGE	207	0	Normal
		1	Extra Range (only for resolutions not higher than 1080p/60)
SELECT EDID	208	0	UHD 4K - default
		1	1080P - limit the source to FullHD resolution
Input Resolution (READ ONLY)	301	0	480i/60
		1	576i/50
		2	720p/50
		3	720p/59
		4	720p/60
		5	1080i/50
		6	1080i/59
		7	1080i/60
		8	1080p/23
		9	1080p/24
		10	1080p/25
		11	1080p/29
		12	1080p/30
		13	1080p/50
		14	1080p/59
		15	1080p/60
16	1080sf/23		

Description	Function #	Value	Notes
Input Resolution (READ ONLY)	301	17	1080sf/24
		18	1080sf/25
		19	1080sf/29
		20	1080sf/30
		21	640x480/60
		22	640x480/72
		23	640x480/75
		24	640x480/85
		25	800x600/60
		26	800x600/72
		27	800x600/75
		28	800x600/85
		29	1024x768/60
		30	1024x768/70
		31	1024x768/75
		32	1024x768/85
		33	1152x864/75
		34	1280x768/60 reduced blanking
		35	1280x768/60
		36	1280x768/75
		37	1280x800/60
		38	1280x960/60
		39	1280x960/85
		40	1280x1024/60
		41	1280x1024/75
		42	1360x768/60
		43	1366x768/60
		44	1400x1050/60 reduced blanking
		45	1400x1050/60
		46	1400x1050/75
		47	1440x900/60 reduced blanking
		48	1440x900/60
		49	1440x900/75
		50	1440x900/85
		51	1600x1200/60
		52	1680x1050/60 reduced blanking
		53	1680x1050/60
		54	1920x1200/60 reduced blanking
		55	480p/60
		56	576p/50
57	3840x2160p/24		
58	3840x2160p/25		
59	3840x2160p/30		
60	3840x2160p/50		

Description	Function #	Value	Notes
Input Resolution (READ ONLY)	301	61	3840x2160p/60
		99	UNIDENTIFIED INPUT SIGNAL
		100	NO INPUT SIGNAL
Image brightness	319	[-50:50]	If parameter = 0 then default brightness (100%)
Image contrast	320	[-50:50]	If parameter = 0 then default contrast (100%)
Image color	321	[-100:50]	If parameter = 0 then default color(100%). If parameter = 0 - no sharpness,
Image sharpness	322	[0:11]	if = 11, then max sharpness 110% Step = 10%
Horizontal image size (for aspect 16:9)	323	[-50:50]	If parameter = 0 then image is fitted to the screen
Vertical image size (for aspect 16:9)	324	[-50:50]	If parameter = 0 then image is fitted to the screen
Horizontal image size (for aspect 4:3)	325	[-50:50]	If parameter = 0 then image is fitted to the screen
Vertical image size (for aspect 4:3)	326	[-50:50]	If parameter = 0 then image is fitted to the screen
Horizontal image position	327	[-100:100]	If parameter = 0 then image is fitted to the screen without horizontal shift. Step 0.1%
Vertical image position	328	[-100:100]	If parameter = 0 then image is fitted to the screen without vertical shift. Step 0.1%

Limited Warranty

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 and adapters, 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.

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