USER MANUAL

MODEL:

EXT3-H-T Transmitter / EXT3-H-R Receiver

Contents

Introduction

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

Getting Started

We recommend that you:

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

Go to www.kramerav.com/downloads/EXT3-H-T, www.kramerav.com/downloads/EXT3-H-R to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

Achieving Best Performance

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).
- Do not secure the cables in tight bundles or roll the slack into tight coils.
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality.
- Position your Kramer **EXT3-H-T/R** away from moisture, excessive sunlight and dust.

Safety Instructions

Caution:

- This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.
- For products with relay terminals and GPI\O ports, please refer to the permitted rating for an external connection, located next to the terminal or in the User Manual.
- There are no operator serviceable parts inside the unit.

Warning:

- Use only the power cord that is supplied with the unit.
- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label which is located on the bottom of the unit.

Recycling Kramer Products

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

Overview

Congratulations on purchasing your Kramer **EXT3-H-T Transmitter** and/or **EXT3-H-R Receiver**.

EXT3-H-T is a high−performance, HDBaseT 3.0 transmitter for 4K60 4:4:4 HDR HDMI, RS−232 and IR signals over twisted pair. EXT3-H-T converts the HDMI signal and outputs it to its HDBaseT and control ports. It enables extending video signals to up to 40m (130ft) over Kramer copper CAT cables at up to 4K@60Hz (4:4:4) video resolutions. It is compatible with standard HDBaseT−compliant extenders at up to 4K@60Hz 4:4:4 video resolutions.

EXT3-H-R is a high−performance, HDBaseT 3.0 receiver for 4K60 4:4:4 HDR HDMI, RS−232 and IR signals over twisted pair. EXT3-H-R converts the HDBaseT 3.0 signal and outputs it to its HDMI and control ports. It enables extending video signals to up to 40m (130ft) over Kramer copper CAT cables at up to 4K@60Hz (4:4:4) video resolutions. It is compatible with standard HDBaseT−compliant extenders at up to 4K@60Hz 4:4:4 video resolutions.

EXT3-H-T and **EXT3-H-R** extend video signals up to 40m (130ft) at 4K@60Hz (4:4:4) video resolution, up to 70m (230ft) at 4K@30Hz (4:4:4) and 1080P@60Hz.

The extenders provide exceptional quality, advanced and user-friendly operation, and flexible control.

- High Performance Standard Extender — Professional HDBaseT extender for providing signals over twisted–pair copper infrastructures. Video signals are received uncompressed with near–zero latency.
- Future–proof, Standard Extender — Standard HDBaseT extender, backwards compatible with other standard HDBT extenders. It extends uncompressed HDBaseT signals
- HDMI Signal Extension — HDR HDCP 2.3 compliant. Supports deep color, x.v.Color™, lip sync, HDMI uncompressed audio channels, Dolby TrueHD, DTS–HD, 2K, 4K, and 3D as specified in HDMI 2.0b. EDID and CEC signals are passed through from the source to the display.
- Multi–channel Audio Extension — Up to 32 channels of digital stereo uncompressed signals for supporting studio–grade surround sound.
- Bidirectional RS–232 Extension — Serial interface data flows in both directions, allowing data transmission and device control at baud rates up to 115200 bps with no need for pre configuration.

- Bidirectional Infrared Extension — IR interface data flows in both directions, allowing remote control of peripheral devices located at either or both ends of the extended line.
- Cost–Effective Maintenance — Status LED indicators for HDMI and HDBT ports facilitate easy local maintenance and troubleshooting. Local firmware upgrade via RS–232 connection ensures lasting, field–proven deployment.
- Easy Installation — Compact DigiTOOLS® fan–less enclosure for dropped–ceiling mounting, or side–by–side mounting of 3 units in a 1U rack space with the recommended rack adapter.

Typical Applications

EXT3-H-T/R is ideal for the following typical applications:

- 4K@60Hz (4:4:4) AV extension in conference rooms, boardrooms, control rooms, hotels and large church facilities
- End units for systems deploying Kramer's matrices and switchers with integrated HDBaseT 3.0 ports

Defining EXT3-H-T / EXT3-H-R

Defining EXT3-H-T

This section defines **EXT3-H-T**.

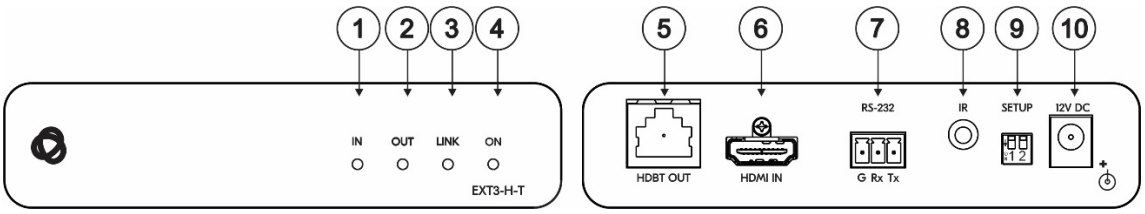


Figure 1: **EXT3-H-T** Transmitter

#	Feature	Function
1	IN LED	Lights blue when an active source device input signal is detected.
2	OUT LED	Lights blue when an active, far-end sink (acceptor) connection is detected via the HDBT link.
3	LINK LED	Lights green when an HDBT link is established with the HDBaseT receiver.
4	ON LED	Lights green when the device receives power.
5	HDBT OUT RJ-45 Connector	Connect to a receiver (for example, EXT3-H-R).
6	HDMI IN Connector	Connect to an HDMI source.
7	RS-232 (G, Rx, Tx) 3-pin Terminal Block Connector	This port has two functions selectable by the SETUP DIP-switches: 1. To send/receive RS-232 data over the HDBaseT link. 2. For FW Upgrade.
8	IR 3.5mm Mini Jack Connector	Connect to an external infrared emitter / sensor. The IR signal is sent over the HDBaseT link.
9	SETUP DIP-switches	Set the operation DIP-switches. Refer to Controlling EXT3-H-T/R on page 9.
10	12V DC Power Connector	12V DC connector for powering the unit.

Defining EXT3-H-R

This section defines **EXT3-H-R**.

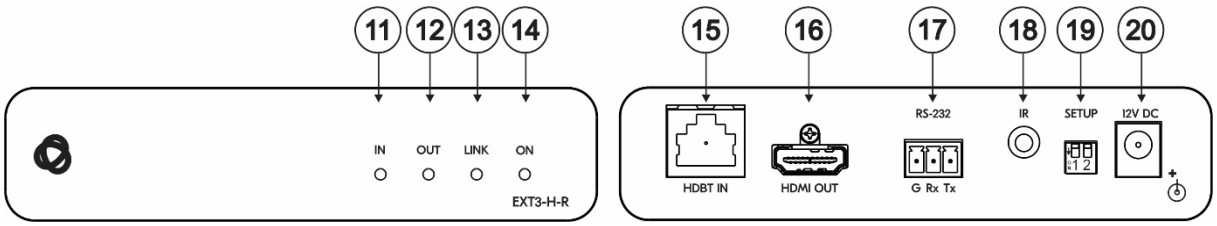


Figure 2: **EXT3-H-R** Receiver

#	Feature	Function
11	IN LED	Lights blue when an active, far-end source device input signal is detected via the HDBT link.
12	OUT LED	Lights blue when an active sink (acceptor) connection is detected.
13	LINK LED	Lights green when an HDBT link is established with the HDBaseT transmitter.
14	ON LED	Lights green when the device receives power.
15	HDBT IN RJ-45 Connector	Connect to a transmitter (for example, EXT3-H-T).
16	HDMI OUT Connector	Connect to an HDMI acceptor.
17	RS-232 (G, Rx, Tx) 3-pin Terminal Block Connector	This port has two functions selectable by the SETUP DIP-switches: 1. To send/receive RS-232 data over the HDBaseT link. 2. For FW Upgrade.
18	IR 3.5mm Mini Jack Connector	Connect to an external infrared emitter / sensor. The IR signal is passed over the HDBaseT link.
19	SETUP DIP-switches	Set the operation DIP-switches. Refer to Controlling EXT3-H-T/R on page 9.
20	12V DC Power Connector	12V DC connector for powering the unit.

Mounting EXT3-H-T/R

This section provides instructions for mounting **EXT3-H-T/R**. Before installing, verify that the environment is within the recommended range:

- Operation 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.

Caution:
- Mount **EXT3-H-T/R** before connecting any cables or power.

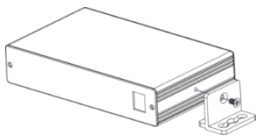
Warning:
- Ensure that the environment (e.g., maximum ambient temperature & air flow) is compatible for the device.
- Avoid uneven mechanical loading.
- Appropriate consideration of equipment nameplate ratings should be used for avoiding overloading of the circuits.
- Reliable earthing of rack-mounted equipment should be maintained.
- Maximum mounting height for the device is 2 meters.

To mount EXT3-H-T/R in a rack:

- Mount the unit in a rack using the recommended rack adapter (see www.kramerav.com/product/EXT3-H-T / R).

To mount EXT3-H-T/R on a surface using one of the following methods:

- Attach the rubber feet and place the unit on a flat surface.
- Fasten a bracket (included) on each side of the unit and attach it to a flat surface.



For more information go to (see www.kramerav.com/downloads/EXT3-H-T / http://www.kramerav.com/downloads/EXT3-H-R).

Connecting the EXT3-H-T/R

Always switch off the power to each device before connecting it to your **EXT3-H-T/R**. After connecting your units, connect its power and then switch on the power to each device.

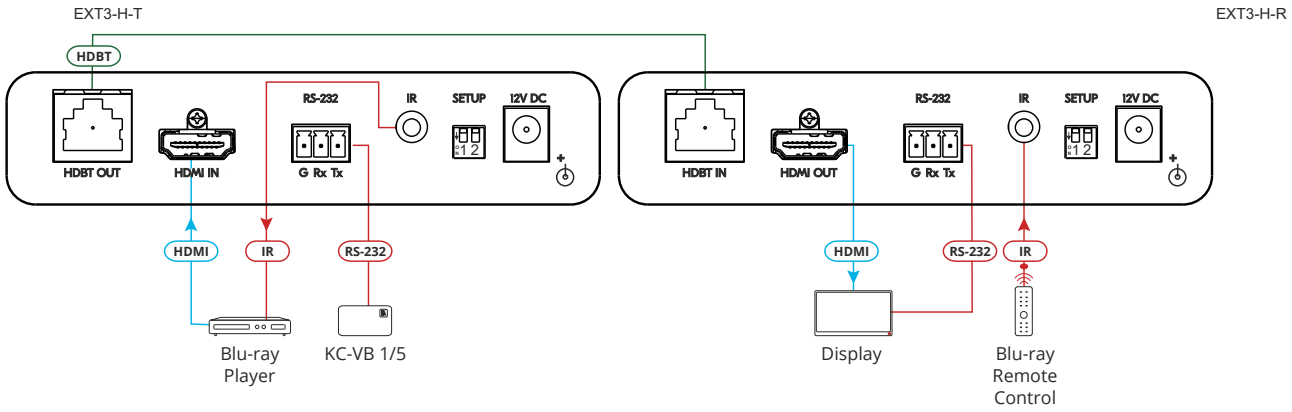


Figure 3: Connecting to the **EXT3-H-T/R**

To connect EXT3-H-T/R as illustrated in the example in Figure 3:

1. On **EXT3-H-T** connect an HDMI source (for example, a Blu-ray player) to the HDMI IN connector (6).
2. On **EXT3-H-R** connect the HDMI OUT connector (16) to an HDMI acceptor (for example, a display).
3. Connect the LINE RJ-45 (5) connector on **EXT3-H-T** to the LINE RJ-45 connector on **EXT3-H-R** (15).
4. Extend RS-232 signals (for example, control the display via a room controller on the transmitter side):
   - On **EXT3-H-T** connect a controller (for example, **KC-VB1/5** room controller) to the RS-232 3-pin terminal block connector (7).
   - On **EXT3-H-R** connect the RS-232 3-pin terminal block connector (17) to the RS-232 control port on the display.
5. Extend IR signals (for example, control the Blu-ray via its IR remote control transmitter from the receiver side).
   - On **EXT3-H-T** connect the IR 3.5mm mini jack (8) to an IR emitter cable and connect it to the Blu-ray IR sensor.
   - On **EXT3-H-R** connect the IR 3.5mm mini jack (18) to an IR sensor (receiver) cable.
6. Connect the power adapters to both extenders and to the mains electricity (not shown in Figure 3).

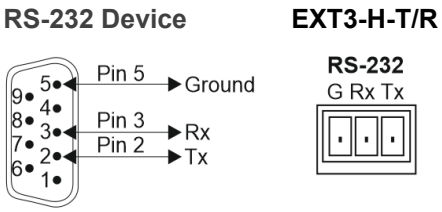
Connecting to EXT3-H-T/R via RS-232

You can extend an RS-232 signal by connecting RS-232 equipment on both sides of the HDBaseT 3.0 link

Connect the RS-232 terminal block on the rear panel of **EXT3-H-T/R** to a PC/controller, as follows:

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

- Pin 2 to the TX pin on the **EXT3-H-T/R** RS-232 terminal block
- Pin 3 to the RX pin on the **EXT3-H-T/R** RS-232 terminal block
- Pin 5 to the G pin on the **EXT3-H-T/R** RS-232 terminal block

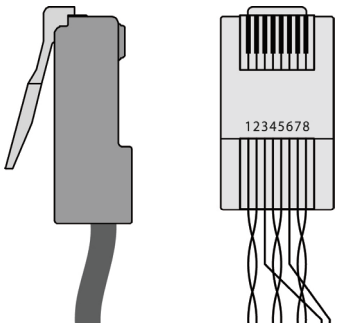


Wiring RJ-45 Connectors

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

It is recommended that the cable ground shielding be connected/soldered to the connector shield.

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



Controlling EXT3-H-T/R

The DIP-switches are used to:

- Configure the IR handling.
- Enable RS-232 signal extension.

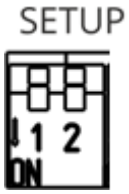


Figure 4: Dip-Switches

All the DIP-switches are set to **OFF** (up) by default.

#	Feature	DIP-switch Settings
1	IR	Off (up) – IR pass-through ON (down) – Add 38kHz modulation
2	RS-232	Off (up) – RS-232 pass-through ON (down) – Valens programming

Technical Specifications

EXT3-H-T

Input	HDMI	On a female HDMI connector
Output	HDBT 3.0	On an RJ-45 connector
Port	RS-232	On a 3-pin terminal block connector for serial link extension
	IR	On a 3.5mm mini jack connector

EXT3-H-R

Input	HDBT 3.0	On an RJ-45 connector
Output	HDMI	On a female HDMI connector
Port	RS-232	On a 3-pin terminal block connector for serial link extension
	IR	On a 3.5mm mini jack connector

General

Video	Transmitted Data Bandwidth	Up to 18Gbps (6Gbps per graphic channel)
	Max Data Rate	18Gbps bandwidth (6Gbps per graphic channel)
	Max Resolution	4K@60Hz (4:4:4) 24bpp resolution
	Compliance	HDCP 2.3, HDR 10
	HDMI Support	Deep color, x.v.Color™, lip sync, HDMI uncompressed audio channels, Dolby TrueHD, DTS–HD, 2K, 4K, and 3D as specified in HDMI 2.0b
Reach Extension	We recommend that you use Kramer shielded cables to achieve optimum extension ranges (see www.kramerav.com/product/EXT3-H-T / R).	
	Up to 40m (130ft) at 4K@60Hz (4:4:4), when using Kramer HDBaseT cables	
	Up to 70m (230ft) at up to 4K@30Hz (4:4:4), when using Kramer HDBaseT cables	
	Compliance	HDBaseT 3.0
Extended RS-232	Baud Rate	300 to 115200 baud
Extended IR	Frequency	20kHz to 100kHz
Controls	Front Panel	IN, OUT, LINK and ON LED indicators
	Rear Panel	DIP-switches
Power	Consumption	450mA
	Source	12V DC, 2A
Environmental Conditions	Operating Temperature	0° to +40°C (32° to 104°F)
	Storage Temperature	-40° to +70°C (-40° to 158°F)
	Humidity	10% to 90%, RHL non-condensing
Regulatory Compliance	Safety	CE, UL
	Environmental	RoHs, WEEE
Enclosure	Size	DigiTOOLS®
	Type	Aluminum
	Cooling	Convection ventilation
General	Net Dimensions (W, D, H), each	12.00cm x 7.15cm x 2.44cm (4.72" x 2.81" x 0.96")
	Shipping Dimensions (W, D, H)	49.00cm x 18.60cm x 58.80cm (19.29" x 7.32" x 23.15")
	Net Weight, each	0.3kg (0.6lbs) approx.
	Shipping Weight	0.7kg (1.5lbs) approx.
Accessories	Included	1 Power adapter, 1 power cord and 1bracket set per device
Specifications are subject to change without notice at www.kramerav.com		

P/N: 2900-301821 Rev: 1

SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

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

We welcome your questions, comments, and feedback.

www.kramerav.com
support@kramerav.com