



**UHD+™**  
**4K HDR**  
**HDCP 2.2**



## PUV-3150TR-UEAO

**UHD+ HDMI over HDBaseT 3.0 Transceiver with USB,  
KVM, LAN with Analogue & Digital Audio Pathways**

**OPERATION MANUAL**



**HDMI**<sup>®</sup>  
HIGH-DEFINITION MULTIMEDIA INTERFACE

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Version 1.1

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## SAFETY PRECAUTIONS

Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply. Please keep the following in mind as you unpack and install this equipment:

- Always follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Never spill liquid of any kind on or into this product.
- Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.
- Do not attach the power supply cabling to building surfaces.
- Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.
- Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.
- To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air to circulate around the unit.
- Please completely disconnect the power when the unit is not in use to avoid wasting electricity.

## VERSION HISTORY

REV.	DATE	SUMMARY OF CHANGE
<b>v1.00</b>	2021/04/07	Preliminary release

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## 1. INTRODUCTION

This 4K UHD<sup>+</sup> HDMI over HDBaseT Transceiver uses HDBaseT 3.0, the newest generation of HDBaseT technology, and is the perfect solution for extending full bandwidth (18Gbps) HDMI 2.0, 4K@60Hz (4:4:4, 8-bit) video with HD audio as well as Ethernet and control via a single run of Cat.6A/7 cable over distances of up to 100 meters. This transceiver unit can be configured to function as either a transmitter or a receiver, enhancing the flexibility of any installation. Multiple control and data signals may also be transmitted along with the audio and video, including bi-directional IR, RS-232, USB 2.0, and Gigabit Ethernet.

When two of these transceivers are used together, 2 USB 2.0 host (Type-B) connections are available (1 on the transmitter, 1 on the receiver) which will connect the host to devices on up to 4 USB 2.0 (Type-A) ports (2 on the transmitter, 2 on the receiver) forming a highly flexible KVM extension configuration (Note: Only 1 USB host may be active at a time). This transceiver is ideal for use in any video extension scenario, but it excels when latency-free, uncompressed video is critical, such as medical installations, live conferences, and education. This unit is controllable via front panel buttons.

## 2. APPLICATIONS

- /// Household entertainment sharing and control
- /// Lecture room display and control
- /// Meeting room presentation and control
- /// Classroom display and control

## 3. PACKAGE CONTENTS

### 3.1 Single Unit

- /// 1× UHD<sup>+</sup> HDMI over HDBaseT Transceiver with USB KVM
- /// 1× 48V/0.83A DC Power Adapter
- /// 3× 3-pin Terminal Block
- /// 1× Operation Manual

### 3.2 Dual Unit Set

- /// 2× UHD<sup>+</sup> HDMI over HDBaseT Transceiver with USB KVM
- /// 1× 48V/0.83A DC Power Adapter
- /// 6× 3-pin Terminal Block
- /// 1× Operation Manual

## 4. SYSTEM REQUIREMENTS

- /// HDMI source equipment such a media player, video game console, or set-top box.
- /// HDMI receiving equipment such as an HDTV, monitor, or audio amplifier.
- /// The use of Premium High Speed HDMI cables, and industry standard Cat.6A or Cat.7 Ethernet cable is highly recommended.

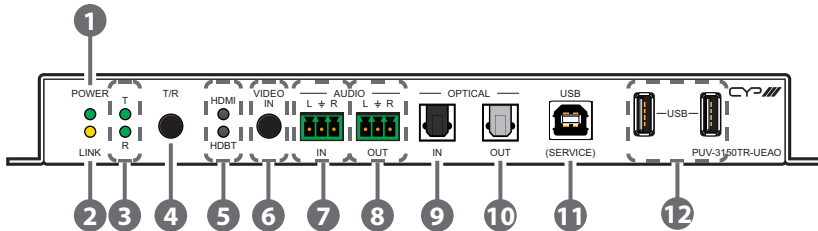
## 5. FEATURES

- /// HDMI 2.0 and DVI 1.0 compatible
- /// HDCP 2.2 and HDCP 1.x compliant
- /// HDBaseT 3.0 compliant (Backwards compatible with HDBaseT 2.0/1.0)
- /// Supports up to 4K UHD<sup>+</sup> (18Gbps, 4K@50/60Hz 4:4:4, 8-bit) video input and output over both HDMI and HDBaseT
- /// Supports Deep Colour input and output up to 12-bit
- /// Supports 10-bit and 12-bit HDR (High Dynamic Range) input/output
- /// Supports CEC bypass
- /// HDBaseT extends video, audio and data over a single Cat.6A/7 cable and can reach distances up to 100m/328ft
- /// HDBaseT feature support: HD Video and Audio, Gigabit Ethernet, Bi-directional PoH, Bi-directional audio (optical and analogue), and Control (bi-directional USB/IR/RS-232 pass-through)
- /// Selectable HDMI or HDBaseT input in receiver mode
- /// 2 USB 2.0 Type-A device ports and 1 USB 2.0 Type-B host port  
*Note: Only one host port can be active at a time. The active USB host port is automatically selected between the connected transmitter and receiver.*
- /// HDMI output functions as a local monitor when in transmitter mode
- /// Can either receive or provide power via PoH over the HDBaseT connection allowing for flexible installation options.
- /// Controllable via front panel buttons.



## 6. OPERATION CONTROLS AND FUNCTIONS

### 6.1 Front Panel



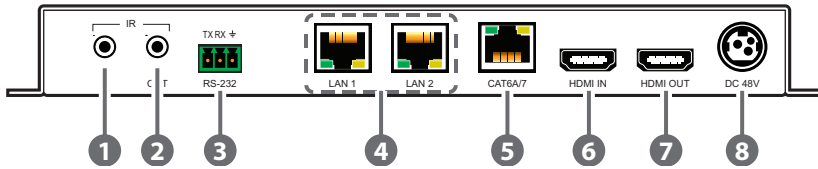
- 1 POWER LED:** This LED will illuminate to indicate the unit is on and receiving power.
- 2 LINK LED:** This LED will illuminate solidly when a live connection with a compatible transmitter/receiver is active.
- 3 T & R LEDs:** These LEDs will illuminate to indicate if the unit is in transmitter (T) or receiver (R) mode.
- 4 T/R Button:** Press this button to toggle the unit's mode between transmitter mode and receiver mode.  
*Note: The switching modes will also result in the unit rebooting.*
- 5 HDMI & HDBT LEDs:** These LEDs will illuminate to indicate which input is currently selected.  
*Note: When the unit is in the transmitter mode, only the HDMI input can be selected as a source.*
- 6 VIDEO IN Button:** Press this button to toggle between the HDMI and HDBaseT inputs when in receiver mode.  
*Note: This button has no function when the unit is in transmitter mode.*
- 7 AUDIO IN 3-pin Terminal Block:** Connect to the analogue audio output of a device such as a media player or game console using a 3-pin adapter cable. Audio is sent to the analogue audio 3-pin terminal block output on the connected compatible transmitter/receiver.
- 8 AUDIO OUT 3-pin Terminal Block:** Connect to powered speakers or an amplifier for analogue audio output using a 3-pin adapter cable. Audio is sourced from the analogue audio 3-pin terminal block input on the connected compatible transmitter/receiver.

- 9 **OPTICAL IN Port:** Connect to the optical audio output of a device such as a media player or game console using an appropriate optical cable. Audio is sent to the optical audio output on the connected compatible transmitter/receiver.
- 10 **OPTICAL OUT Port:** Connect to powered speakers or an amplifier for digital audio output using an appropriate optical cable. Audio is sourced from the optical audio input port on the connected compatible transmitter/receiver.
- 11 **USB (SERVICE) Port (Type-B):** Connect directly to a standard USB host such as a PC or laptop to extend their USB functionality to all currently connected USB devices.

*Note: Only one USB host (Type-B) port may be active at a time. If a new host is connected to another USB Type-B port, both the transmitter and receiver will automatically reboot to complete the host change.*

- 12 **USB Ports (Type-A):** Connect directly to a standard USB device such as a mouse, keyboard, or flash drive to extend their USB functionality to the currently active USB host (Type-B) port.

## 6.2 Rear Panel

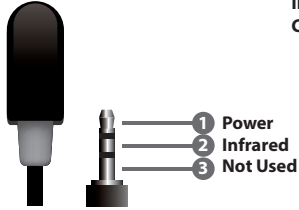


- 1 **IR IN Port:** Connect to an IR Extender to receive local IR control signals and extend them to devices connected to the other end of the HDBaseT connection. Ensure that the remote being used is within direct line-of-sight of the IR Extender.
- 2 **IR OUT Port:** Connect to an IR Blaster to transmit IR signals from the other end of the HDBaseT connection to devices within direct line-of-sight of the IR Blaster.
- 3 **RS-232 3-pin Terminal Block:** Connect to a PC, laptop, or serial controllable device with a 3-pin adapter cable for the extension of RS-232 signals between both ends of the HDBaseT connection.
- 4 **LAN 1 & 2 Ports:** Connect to Ethernet supporting devices or to your local network, as appropriate, to extend the network to both ends of the HDBaseT connection.
- 5 **CAT6/7 Port:** Connect to a compatible HDBaseT transmitter/receiver with a single Cat.6A/7 cable for extension of all data signals. PoH can also be supplied to or received from a connected compatible transmitter/receiver.
- 6 **HDMI IN Port:** Connect to HDMI source equipment such as a media player, game console, or set-top box.
- 7 **HDMI OUT port:** Connect to an HDMI TV, monitor, or amplifier for digital video and audio output.
- 8 **DC 48V Port:** Plug the 48V DC power adapter into this port and connect it to an AC wall outlet for power.

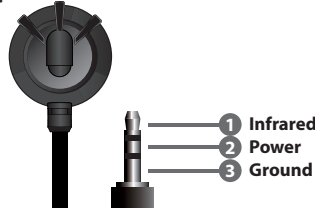
*Note: Optional, not required when powered by PoH.*

### 6.3 IR Cable Pinouts

IR Blaster Cable

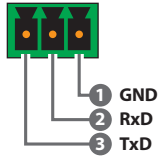


IR Extender Cable

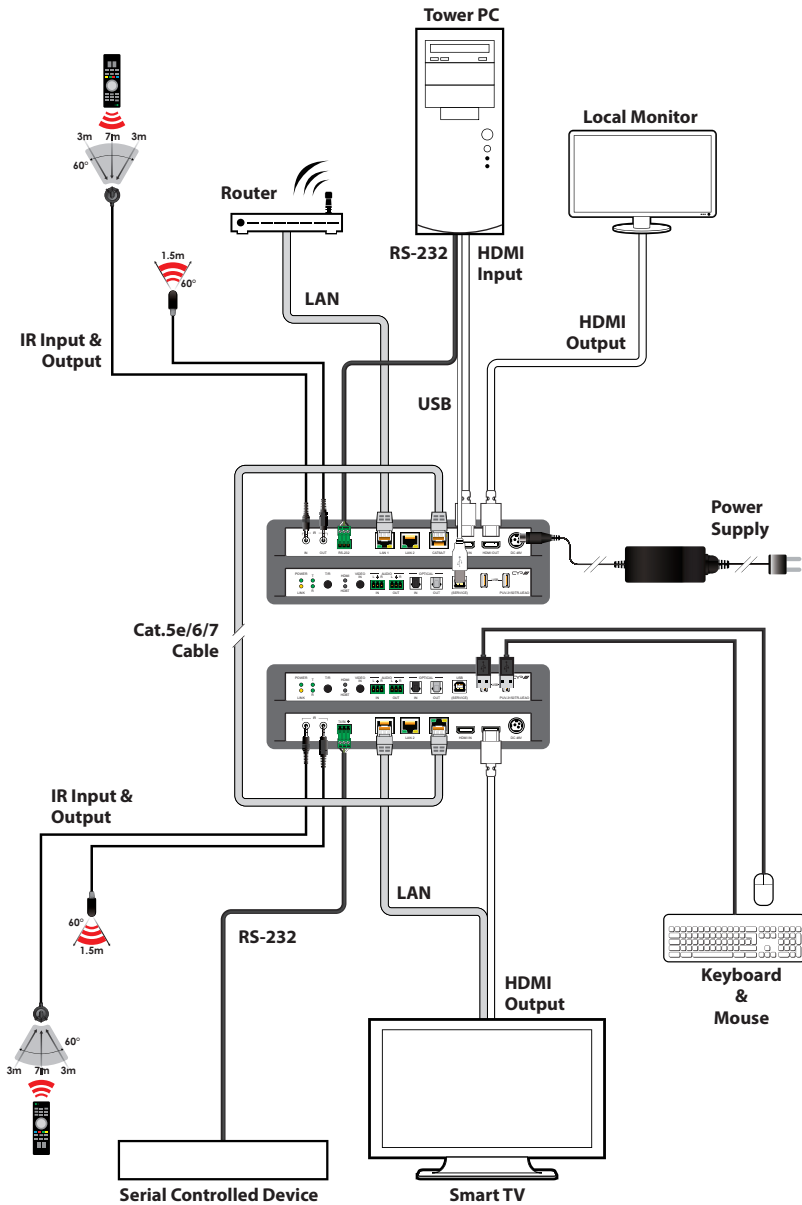


### 6.4 RS-232 Pinout

3-pin Terminal Block



# 7. CONNECTION DIAGRAM



## 8. SPECIFICATIONS

### 8.1 Technical Specifications

<b>HDMI Bandwidth</b>	18Gbps
<b>HDBaseT Bandwidth</b>	18Gbps
<b>Input Ports</b>	1×HDMI (Type-A) 1×Digital Audio (TOSLINK) 1×Analogue Audio (3-pin Terminal Block)
<b>Output Ports</b>	1×HDMI (Type-A) 1×Digital Audio (TOSLINK) 1×Analogue Audio (3-pin Terminal Block)
<b>Bi-directional Port</b>	1×HDBaseT (RJ-45)
<b>Pass-through Ports</b>	1×IR Extender (3.5mm) 1×IR Blaster (3.5mm) 1×RS-232 (3-pin Terminal Block) 2×LAN (RJ-45) 2×USB 2.0 (Type-A)
<b>Pass-through/Service Port</b>	1×USB 2.0 (Type-B)
<b>IR Frequency</b>	30~50kHz (30 ~ 60kHz under ideal conditions)
<b>Baud Rate</b>	Up to 115200
<b>Power Supply</b>	48V/0.83A DC or PoH (US/EU standards, CE/FCC/UL certified)
<b>ESD Protection (HBM)</b>	±8kV (Air Discharge) ±4kV (Contact Discharge)
<b>Dimensions (W×H×D)</b>	213.5mm×25mm×108mm [Case Only] 213.5mm×25mm×116.7mm [All Inclusive]
<b>Weight</b>	700g
<b>Chassis Material</b>	Metal (Steel)

<b>Chassis Colour</b>	Black
<b>Operating Temperature</b>	0°C – 40°C/32°F – 104°F
<b>Storage Temperature</b>	-20°C – 60°C/-4°F – 140°F
<b>Relative Humidity</b>	20 – 90% RH (Non-condensing)
<b>Power Consumption</b>	30.48W

## 8.2 Video Specifications

Supported Resolutions (Hz)	Input		Output	
	HDMI	HDBT	HDMI	HDBT
<b>720×400p@70/85</b>	✓	✓	✓	✓
<b>640×480p@60/72/75/85</b>	✓	✓	✓	✓
<b>720×480i@60</b>	✓	✓	✓	✓
<b>720×480p@60</b>	✓	✓	✓	✓
<b>720×576i@50</b>	✓	✓	✓	✓
<b>720×576p@50</b>	✓	✓	✓	✓
<b>800×600p@56/60/72/75/85</b>	✓	✓	✓	✓
<b>848×480p@60</b>	✓	✓	✓	✓
<b>1024×768p@60/70/75/85</b>	✓	✓	✓	✓
<b>1152×864p@75</b>	✓	✓	✓	✓
<b>1280×720p@50/60</b>	✓	✓	✓	✓
<b>1280×768p@60/75/85</b>	✓	✓	✓	✓
<b>1280×800p@60/75/85</b>	✓	✓	✓	✓
<b>1280×960p@60/85</b>	✓	✓	✓	✓
<b>1280×1024p@60/75/85</b>	✓	✓	✓	✓
<b>1360×768p@60</b>	✓	✓	✓	✓
<b>1366×768p@60</b>	✓	✓	✓	✓
<b>1400×1050p@60</b>	✓	✓	✓	✓
<b>1440×900p@60/75</b>	✓	✓	✓	✓
<b>1600×900p@60RB</b>	✓	✓	✓	✓
<b>1600×1200p@60</b>	✓	✓	✓	✓
<b>1680×1050p@60</b>	✓	✓	✓	✓
<b>1920×1080i@50/60</b>	✓	✓	✓	✓



Supported Resolutions (Hz)	Input		Output	
	HDMI	HDBT	HDMI	HDBT
<b>1920×1080p@24/25/30</b>	✓	✓	✓	✓
<b>1920×1080p@50/60</b>	✓	✓	✓	✓
<b>1920×1200p@60RB</b>	✓	✓	✓	✓
<b>2560×1440p@60RB</b>	✓	✓	✓	✓
<b>2560×1600p@60RB</b>	✓	✓	✓	✓
<b>2048×1080p@24/25/30</b>	✓	✓	✓	✓
<b>2048×1080p@50/60</b>	✓	✓	✓	✓
<b>3840×2160p@24/25/30</b>	✓	✓	✓	✓
<b>3840×2160p@50/60 (4:2:0)</b>	✓	✓	✓	✓
<b>3840×2160p@24, HDR10</b>	✓	✓	✓	✓
<b>3840×2160p@50/60 (4:2:0),HDR10</b>	✓	✓	✓	✓
<b>3840×2160p@50/60</b>	✓	✓	✓	✓
<b>4096×2160p@24/25/30</b>	✓	✓	✓	✓
<b>4096×2160p@50/60 (4:2:0)</b>	✓	✓	✓	✓
<b>4096×2160p@24, HDR10</b>	✓	✓	✓	✓
<b>4096×2160p@50/60 (4:2:0),HDR10</b>	✓	✓	✓	✓
<b>4096×2160p@50/60</b>	✓	✓	✓	✓

## 8.3 Audio Specifications

### 8.3.1 Digital Audio

HDMI & HDBaseT Input / Output	
LPCM	
<b>Max Channels</b>	8 Channels
<b>Sampling Rate (kHz)</b>	32, 44.1, 48, 88.2, 96, 176.4, 192
Bitstream	
<b>Supported Formats</b>	Standard & High-Definition

S/PDIF Input / Output	
LPCM	
<b>Max Channels</b>	2 Channels
<b>Sampling Rate (kHz)</b>	32, 44.1, 48, 88.2, 96, 176.4, 192
Bitstream	
<b>Supported Formats</b>	Standard

### 8.3.2 Analogue Audio

Analogue Input	
<b>Max Audio Level</b>	2Vrms
<b>Impedance</b>	10k $\Omega$
<b>Type</b>	Unbalanced

Analogue Output	
<b>Max Audio Level</b>	2Vrms
<b>THD+N</b>	< -80dB@0dBFS 1kHz (A-wt)
<b>SNR</b>	> 93dB@0dBFS
<b>Frequency Response</b>	< $\pm 0.5$ dB@20Hz~20kHz
<b>Crosstalk</b>	< -71dB@10kHz
<b>Impedance</b>	500 $\Omega$
<b>Type</b>	Unbalanced

## 8.4 Cable Specifications

Cable Length	1080p		4K30	4K60
	8-bit	12-bit	(4:4:4) 8-bit	(4:4:4) 8-bit
<b>High Speed HDMI Cable</b>				
<b>HDMI Input</b>	15m	10m	5m	3m
<b>HDMI Output</b>	15m	10m	5m	3m
<b>Ethernet Cable</b>				
<b>Cat.5e/6</b>	100m		70m	70m
<b>Cat.6A/7</b>	100m		100m	100m

### Bandwidth Category Examples:

#### /// 1080p (FHD Video)

- Up to 1080p@60Hz, 12-bit colour
- Data rates lower than 5.3Gbps or below 225MHz TMDS clock

#### /// 4K30 (4K UHD Video)

- 4K@24/25/30Hz & 4K@50/60Hz (4:2:0), 8-bit colour
- Data rates higher than 5.3Gbps or above 225MHz TMDS clock but below 10.2Gbps

#### /// 4K60 (4K UHD<sup>+</sup> Video)

- 4K@50/60Hz (4:4:4, 8-bit)
- 4K@50/60Hz (4:2:0, 10-bit HDR)
- Data rates higher than 10.2Gbps

## 8.5 HDBaseT Features

HDBaseT Feature Set	Transmitter Mode
<b>Video &amp; Audio Extension</b>	Supported
<b>LAN Extension</b>	Supported
<b>Send power to Receiver</b>	Supported (PoH)
<b>Accept power from Receiver</b>	Supported (PoH)
<b>IR Extension</b>	Supported
<b>RS-232 Extension</b>	Supported
<b>USB 2.0 Extension</b>	Supported

HDBaseT Feature Set	Receiver Mode
<b>Video &amp; Audio Extension</b>	Supported
<b>LAN Extension</b>	Supported
<b>Send power to Transmitter</b>	Supported (PoH)
<b>Accept power from Transmitter</b>	Supported (PoH)
<b>IR Extension</b>	Supported
<b>RS-232 Extension</b>	Supported
<b>USB 2.0 Extension</b>	Supported

## 9. ACRONYMS

<b>ACRONYM</b>	<b>COMPLETE TERM</b>
<b>ADC</b>	Analogue-to-Digital Converter
<b>ASCII</b>	American Standard Code for Information Interchange
<b>Cat.5e</b>	Enhanced Category 5 cable
<b>Cat.6</b>	Category 6 cable
<b>Cat.6A</b>	Augmented Category 6 cable
<b>Cat.7</b>	Category 7 cable
<b>CEC</b>	Consumer Electronics Control
<b>DAC</b>	Digital-to-Analogue Converter
<b>dB</b>	Decibel
<b>DHCP</b>	Dynamic Host Configuration Protocol
<b>DVI</b>	Digital Visual Interface
<b>EDID</b>	Extended Display Identification Data
<b>GbE</b>	Gigabit Ethernet
<b>Gbps</b>	Gigabits per second
<b>HDBT</b>	HDBaseT
<b>HDCP</b>	High-bandwidth Digital Content Protection
<b>HDMI</b>	High-Definition Multimedia Interface
<b>HDR</b>	High Dynamic Range
<b>IP</b>	Internet Protocol
<b>IR</b>	Infrared
<b>kHz</b>	Kilohertz
<b>KVM</b>	Keyboard/Video/Mouse
<b>LAN</b>	Local Area Network
<b>LED</b>	Light-Emitting Diode

<b>ACRONYM</b>	<b>COMPLETE TERM</b>
<b>LPCM</b>	Linear Pulse-Code Modulation
<b>MHz</b>	Megahertz
<b>PD</b>	Powered Device
<b>PoH</b>	Power over HDBaseT
<b>PSE</b>	Power Sourcing Equipment
<b>S/PDIF</b>	Sony/Philips Digital Interface Format
<b>SNR</b>	Signal-to-Noise Ratio
<b>TCP</b>	Transmission Control Protocol
<b>THD+N</b>	Total Harmonic Distortion plus Noise
<b>TMDs</b>	Transition-Minimised Differential Signaling
<b>4K UHD</b>	4K Ultra-High-Definition (10.2Gbps max)
<b>4K UHD<sup>+</sup></b>	4K Ultra-High-Definition (18Gbps max)
<b>USB</b>	Universal Serial Bus
<b>VGA</b>	Video Graphics Array
<b>WUXGA (RB)</b>	Widescreen Ultra Extended Graphics Array (Reduced Blanking)
<b>XGA</b>	Extended Graphics Array
<b>Ω</b>	Ohm



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