



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[®]
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
v1.00	04/07/2021	Preliminary release
v1.01	27/10/2022	New IR/RS-232 Diagrams

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1. INTRODUCTION

This 4K UHD⁺ 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⁺ 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⁺ 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

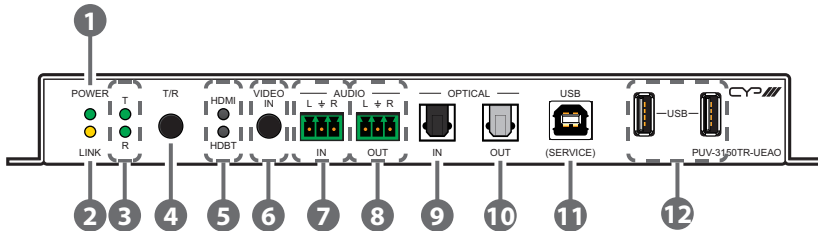
- /// HDMI source equipment such as a media player, video game console, or set-top box.
- /// HDMI receiving equipment such as an HDTV, monitor, or audio amplifier.
- /// The use of Premium High Speed HDMI cables, and industry standard Cat.6A or Cat.7 Ethernet cable is highly recommended.

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⁺ (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



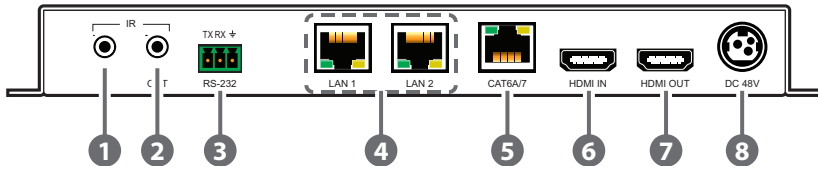
- 1 POWER LED:** This LED will illuminate to indicate the unit is on and receiving power.
- 2 LINK LED:** This LED will illuminate solidly when a live connection with a compatible transmitter/receiver is active.
- 3 T & R LEDs:** These LEDs will illuminate to indicate if the unit is in transmitter (T) 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

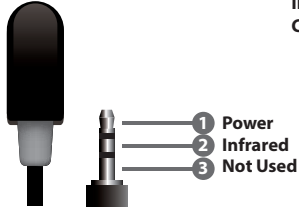


- 1 IR IN Port:** Connect to an IR Extender to receive local IR control signals and extend them to devices connected to the other end of the HDBaseT connection. Ensure that the remote being used is within direct line-of-sight of the IR Extender.
- 2 IR OUT Port:** Connect to an IR Blaster to transmit 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.

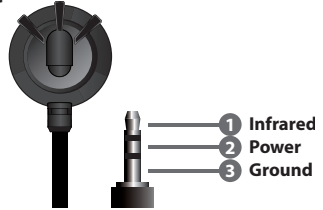
Note: Optional, not required when powered by PoH.

6.3 IR Cable Pinouts

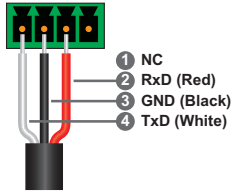
IR Blaster Cable



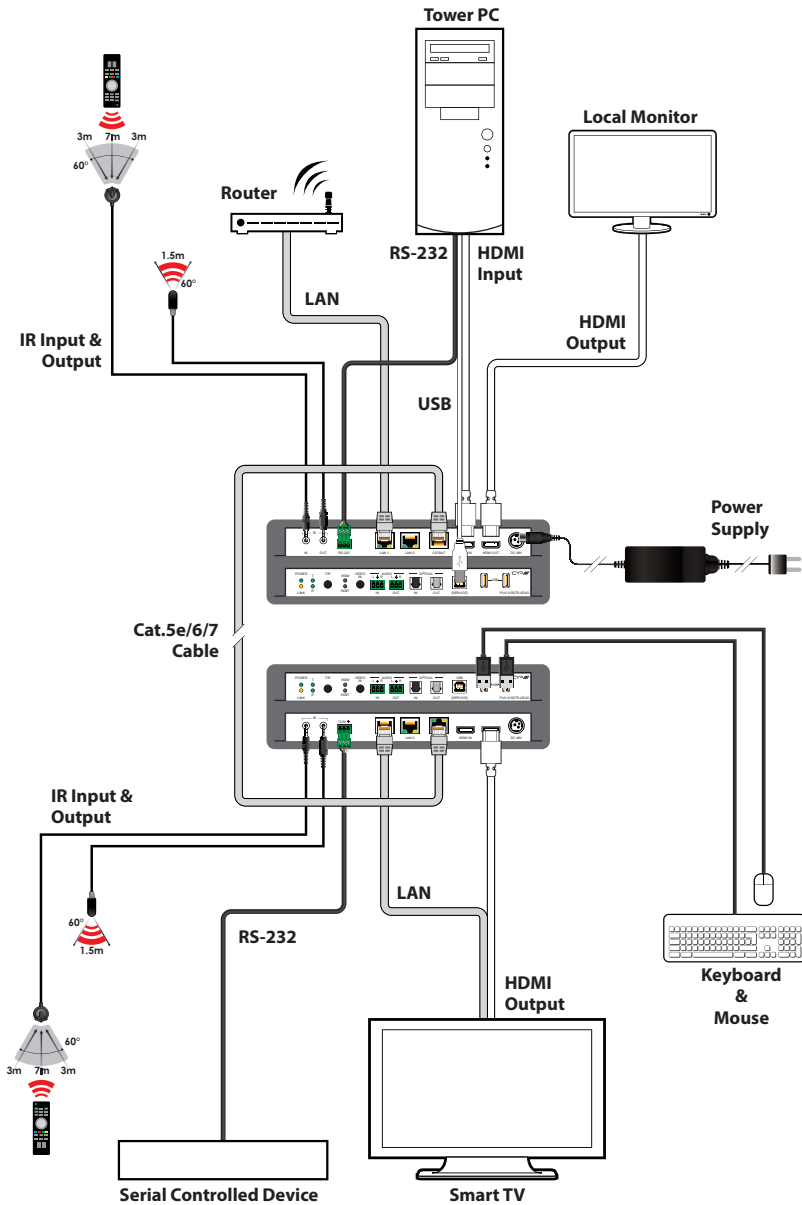
IR Extender Cable



6.4 RS-232 Pinout



7. CONNECTION DIAGRAM



8. SPECIFICATIONS

8.1 Technical Specifications

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

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

8.2 Video Specifications

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

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

8.3 Audio Specifications

8.3.1 Digital Audio

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

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

8.3.2 Analogue Audio

Analogue Input	
Max Audio Level	2Vrms
Impedance	10k Ω
Type	Unbalanced

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

8.4 Cable Specifications

Cable Length	1080p		4K30	4K60
	8-bit	12-bit	(4:4:4) 8-bit	(4:4:4) 8-bit
High Speed HDMI Cable				
HDMI Input	15m	10m	5m	3m
HDMI Output	15m	10m	5m	3m
Ethernet Cable				
Cat.5e/6	100m		70m	70m
Cat.6A/7	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⁺ 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
Video & Audio Extension	Supported
LAN Extension	Supported
Send power to Receiver	Supported (PoH)
Accept power from Receiver	Supported (PoH)
IR Extension	Supported
RS-232 Extension	Supported
USB 2.0 Extension	Supported

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

9. ACRONYMS

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

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



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