



# CH-1602TX & CH-1602RX

HDMI over HDBaseT Transmitter and Receiver  
with Optical Audio Return (OAR)



Operation Manual



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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.

## REVISION HISTORY

VERSION NO.	DATE (DD/MM/YY)	SUMMARY OF CHANGE
VR0	08/06/15	Preliminary release
VR1	24/06/15	Connection Diagram
VR2	03/07/15	Connection Diagram
VS3	22/03/17	Updated text/diagrams



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## 1. INTRODUCTION

This HDBaseT 2.0 Transmitter and Receiver set can send uncompressed UHD video and audio over a single Cat.5e/6/7 cable up to 100m. It has the added benefit of extending control and communication signals through the built-in Ethernet, USB, RS-232 and IR ports. Independent external digital and analog audio transmission capability gives users the extra convenience of additional audio connections.

This system supports connecting any standard USB 2.0 host to the Transmitter, enabling the extension of the USB connection to up to 2 USB ports located on the Receiver, allowing it to act like a USB hub. The integrated 48V PoH (Power over HDBaseT) support provides power to the Receiver (PD) from the Transmitter (PSE), eliminating the need for a separate power supply for the Receiver. The ultra-thin mechanical design allows for flexibility in mounting locations, saving space and making your presentation space orderly and tidy.

## 2. APPLICATIONS

- Home theater extension and control
- Lecture hall display and control
- Showroom display and control
- Meeting room presentation and control
- Classroom display and control

## 3. PACKAGE CONTENTS

- 1×HDMI over HDBaseT Transmitter
- 1×HDMI over HDBaseT Receiver
- 1×IR Extender Cable
- 1×IR Blaster Cable
- 4×Terminal Blocks (3-pin)
- 1×48V/0.83A Power Adaptor
- 1×Power Cord
- 2×Rack Mount Ears (Set of 2)
- 1×Operation Manual

## 4. SYSTEM REQUIREMENTS

- HDMI input source equipment such as media players, video game consoles, PCs or set-top boxes.
- HDMI receiving equipment such as HDTVs, monitors or audio amplifiers.
- The use of "Premium High Speed HDMI" cables is highly recommended.
- High quality Cat.5e/6/7 cables (Cat.6 or better is recommended).

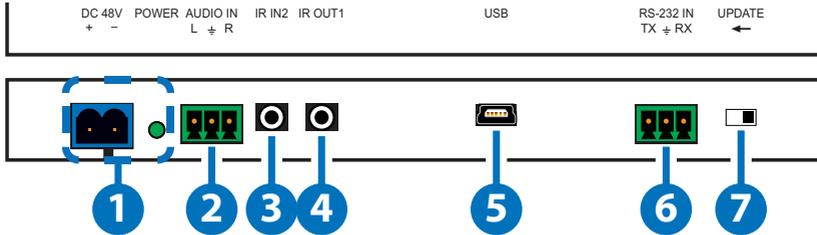
## 5. FEATURES

- Supports the HDBaseT 2.0 specification over a single Cat.6/7 cable up to 100m/328ft and Cat.5e cable up to 90m/295ft
- HDBaseT 5Play™ convergence: High-Definition (HD) Video and Audio, 100BaseT Ethernet, 48V PoH, and Control (Bi-directional IR/RS-232 pass-through)
- Receiver (PD) is powered by 48V PoH from the transmitter (PSE)
- HDMI with 3D & 4K@60Hz (YUV 4:2:0) support, DVI 1.0 compatible
- HDCP 2.2 compliant
- 1×USB 2.0 Mini-B port (on the transmitter), 2×USB 2.0 Type A ports (on the receiver)
- Supports pass-through of HD audio formats: LPCM 2.0/5.1/7.1, Bitstream, and HD Bitstream
- Supports optical audio sampling rates up to 48kHz
- Supports external analog and digital audio extension including support for ARC (Audio Return Channel)
- Supports RS-232 baud rates from 110~115200bps
- Ultra-thin mechanical design



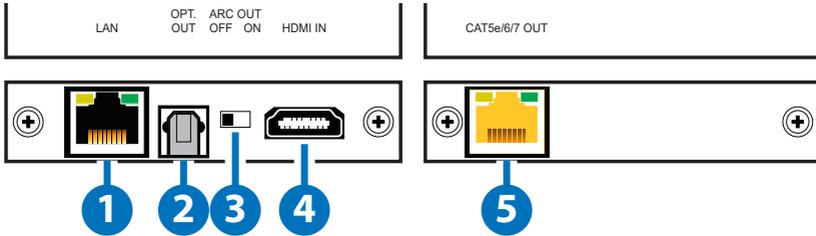
## 6. OPERATION CONTROLS AND FUNCTIONS

### 6.1 Transmitter's Front Panel



- 1 DC 48V & POWER LED:** Plug the 48V DC power adapter into this port and connect it to an AC wall outlet for power. The LED will illuminate to indicate the unit is on and receiving power.
- 2 AUDIO IN:** Connect to the stereo analog output of a device such as a CD player or PC to extend it to the Receiver's AUDIO OUT L/R port.
- 3 IR IN 2:** Connect to the provided IR Extender to extend the IR control range of remotely located devices. Ensure that the remote being used is within direct line-of-sight of the IR Extender.
- 4 IR OUT 1:** Connect to the provided IR Blaster to transmit IR signals to devices within direct line-of-sight of the IR Blaster.
- 5 USB:** Connect to a PC or Laptop to extend the USB data connection to the Receiver's USB ports.
- 6 RS-232 IN:** Connect to a PC, laptop or other serial control device with a 3-pin adapter cable for the extension of RS-232 signals to the Receiver. When receiving commands from the Receiver side, depending on your equipment's pinout, the Tx and Rx pins might need to be reversed.
- 7 UPDATE:** This is reserved for firmware update use only. During normal operation the dipswitch should be set to the right.

## 6.2 Transmitter's Side Panels

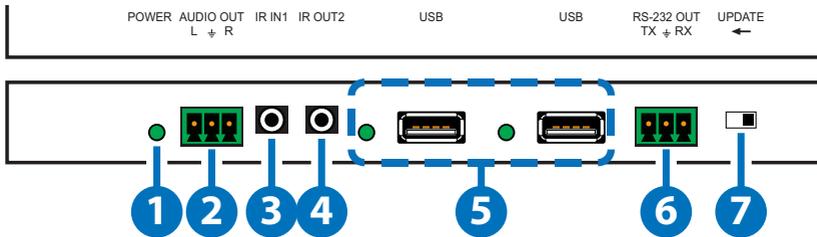


- 1 **LAN:** Connect to an Ethernet supporting device or to your local network as appropriate. The yellow LED will illuminate to indicate a successful LAN connection between the Transmitter and Receiver and will blink to indicate a data transmission. The green LED will illuminate when the connected Ethernet speed is 100Mbit/s.
- 2 **OPT. OUT:** Connect to an audio receiver or powered speaker set to reproduce the audio signal from the Receiver's OPT. IN port.
- 3 **ARC OUT ON/OFF:** Enables or disables support for ARC (Audio Return Channel) signals from the HDMI device connected to the Receiver. When switched to ON the ARC audio will be routed to both the HDMI input as well as the OPT. OUT port. When switched OFF no ARC audio will be passed.

*Note: When ARC is enabled the maximum supported HDMI cable length may vary. It is suggested to use cables under 2 meters long to ensure the best audio quality.*

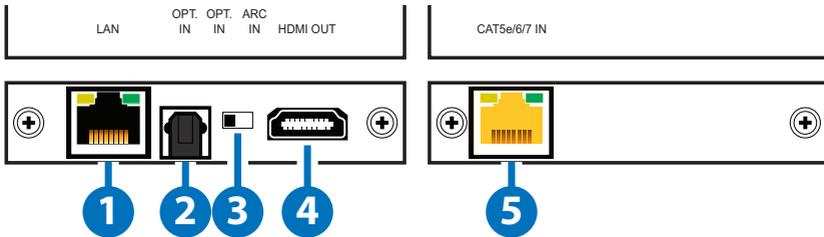
- 4 **HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box.
- 5 **CAT5e/6/7 OUT:** Connect to the Receiver unit with a single Cat.5e/6/7 cable for transmission of all data signals. The yellow LED will illuminate to indicate a successful data connection between the Transmitter and Receiver. If the yellow LED blinks irregularly it indicates a data link error. The green LED will illuminate to indicate when PoH is active.

## 6.3 Receiver's Front Panel



- 1 POWER LED:** This LED will illuminate when the device is receiving power.
- 2 AUDIO OUT:** Connect to powered speakers or an amplifier for stereo analog audio output.
- 3 IR IN 1:** Connect to the provided IR Extender to extend the IR control range of remotely located devices. Ensure that the remote being used is within direct line-of-sight of the IR Extender.
- 4 IR OUT 2:** Connect to the provided IR Blaster to transmit IR signals to devices within direct line-of-sight of the IR Blaster.
- 5 USB:** Connect to USB peripheral devices such as keyboard, mouse, printer, flash drive, etc. for connection with the USB device connected to the Transmitter.
- 6 RS-232 OUT:** Connect to the device you wish to control via a 3-pin adapter cable to receive RS-232 commands from the Transmitter. When sending commands to the Transmitter side, depending on your equipment's pinout, the Tx and Rx pins might need to be reversed.
- 7 UPDATE:** This is reserved for firmware update use only. During normal operation the dipswitch should be set to the right.

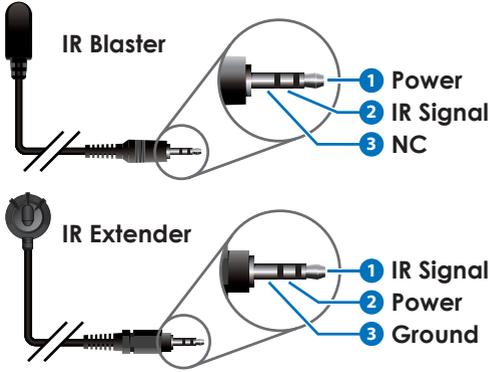
## 6.4 Receiver's Side Panels



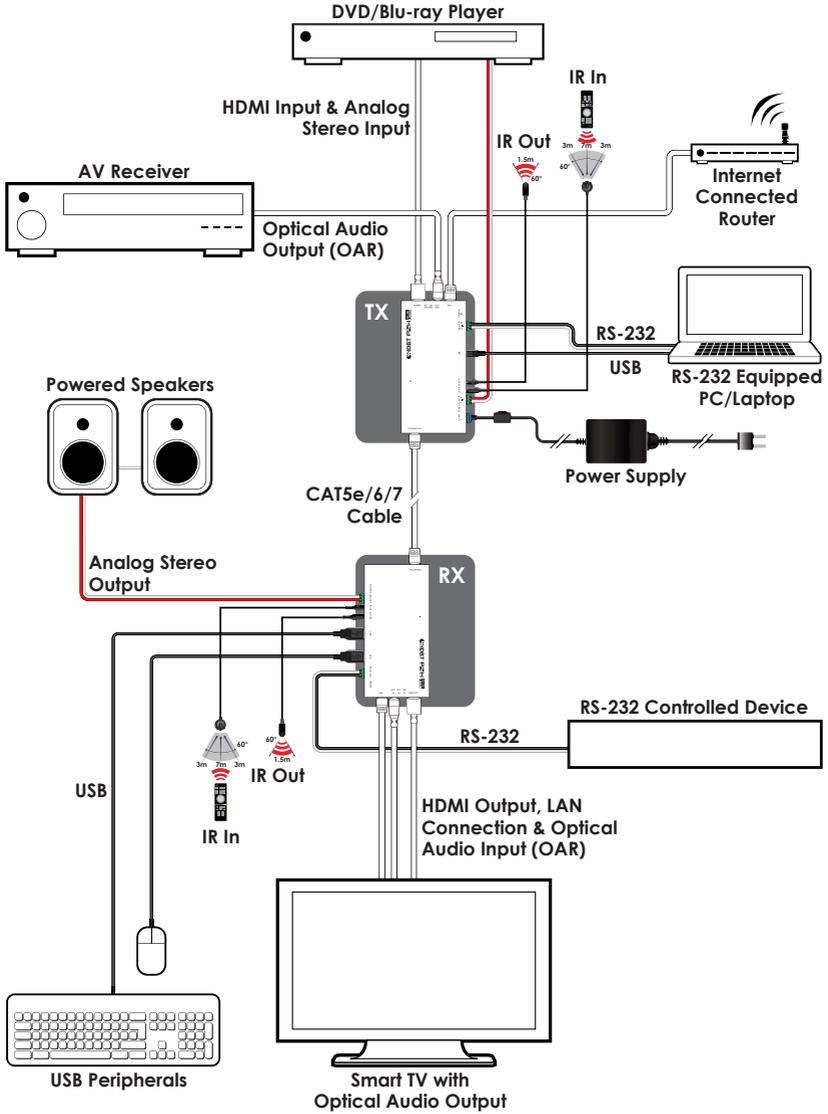
- 1 LAN:** Connect to an Ethernet supporting device or to your local network as appropriate. The yellow LED will illuminate to indicate a successful LAN connection between the Transmitter and Receiver and will blink to indicate a data transmission. The green LED will illuminate when the connected Ethernet speed is 100Mbit/s.
- 2 OPT. IN:** Connect to audio source equipment such as a media player or PC to transmit the audio signal to the Transmitter's OPT. OUT port.
- 3 ARC IN/OPT. IN:** Allows you to switch between sending audio to the Transmitter from the HDMI output's ARC channel or from the Receiver's OPT. IN port.

*Note: When ARC is enabled the maximum supported HDMI cable length may vary. It is suggested to use cables under 2 meters long to ensure the best audio quality.*
- 4 HDMI OUT:** Connect to HDMI TVs, monitors or amplifiers for digital video and audio output.
- 5 CAT5e/6/7 IN:** Connect to the Transmitter unit with a single Cat.5e/6/7 cable for transmission of all data signals. The yellow LED will illuminate to indicate a successful data connection between the Transmitter and Receiver. If the yellow LED blinks irregularly it indicates a data link error. The green LED will illuminate to indicate when PoH is active.

## 6.5 IR Cable Pin Assignment



## 7. CONNECTION DIAGRAM





## 8. SPECIFICATIONS

<b>Video Bandwidth</b>	340MHz/10.2Gbps
<b>Transmitter</b>	
<b>Input Ports</b>	1×HDMI, 1×USB 2.0 (Mini-B), 1×Stereo Audio (Terminal Block), 1×LAN (RJ45), 1×IR Extender (3.5mm), 1×RS-232 (Terminal Block)
<b>Output Ports</b>	1×Cat.5e/6/7, 1×Optical Audio (TOSLINK), 1×IR Blaster (3.5mm)
<b>Receiver</b>	
<b>Input Ports</b>	1×Cat.5e/6/7, 1×Optical Audio (TOSLINK), 1×IR Extender (3.5mm)
<b>Output Ports</b>	1×HDMI, 2×USB 2.0 (Type A), 1×Stereo Audio (Terminal Block), 1×LAN (RJ45), 1×IR Blaster (3.5mm), 1×RS-232 (Terminal Block)
<b>Supported Resolutions</b>	480i@60Hz - 4K@60Hz (4:2:0, 8-bit) VGA@60Hz - WUXGA@60Hz (RB)
<b>HDMI Cable Length</b>	10m (1080p@60Hz, 12-bit) 5m (4K@60Hz, 4:2:0, 8-bit)
<b>Cat.5e Cable Length</b>	100m (1080p@60Hz, 12-bit) 90m (4K@60Hz, 4:2:0, 8-bit)
<b>Cat.6/7 Cable Length</b>	100m (1080p@60Hz, 12-bit) 100m (4K@60Hz, 4:2:0, 8-bit)
<b>IR Frequency</b>	30 - 50kHz (30 - 60kHz under ideal conditions)
<b>Baud Rate</b>	Up to 115200bps
<b>Power Supply</b>	48V/0.83A DC (US/EU standards, CE/FCC/UL certified)
<b>ESD Protection</b>	Human Body Model: ±12kV (Air Discharge) ±8kV (Contact Discharge)

<b>Dimensions</b>	180mm×16mm×80mm (W×H×D) [Case Only] (Both) 180mm×16mm×80mm (W×H×D) [All Inclusive] (Both)
<b>Weight</b>	354g (TX), 356g (RX)
<b>Chassis Material</b>	Metal
<b>Silkscreen Color</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>	16.72W

## 9. ACRONYMS

ACRONYM	COMPLETE TERM
<b>ARC</b>	Audio Return Channel
<b>DVI</b>	Digital Visual Interface
<b>HDCP</b>	High-bandwidth Digital Content Protection
<b>HDMI</b>	High-Definition Multimedia Interface
<b>IR</b>	Infrared
<b>LAN</b>	Local Area Network
<b>LPCM</b>	Linear Pulse-Code Modulation
<b>PC</b>	Personal Computer
<b>PD</b>	Powered Device
<b>PoH</b>	Power over HDBaseT
<b>PSE</b>	Power Source Equipment
<b>UHD</b>	Ultra-High-Definition
<b>USB</b>	Universal Serial Bus
<b>VGA</b>	Video Graphics Array (640×480@60Hz)
<b>WUXGA</b>	Wide Ultra Extended Graphics Array (1920×1200@60Hz)



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