CH-2527TXV & CH-2527RXV

4K UHD+ HDMI w/HDR over HDBaseT
Transmitter (PD) & Receiver (PSE)

HDMI HDBT AVLC

Operation Manual

DISCLAIMERS

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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
RDV1	09/03/06	Preliminary release

CONTENTS

1. INTRODUCTION

This transmitter and receiver set is a great solution for extending UHD video and audio as well as Ethernet and control via a single run of Cat.5e/6/7 cable over distances up to 100 meters. This extender set complies with the advanced HDCP 2.2 and HDMI 2.0 standards, as well as supporting the legacy HDCP 1.x and HDMI 1.x standards.

Despite HDBaseT's 10.2Gbps bandwidth limitation, 4K UHD HDMI video sources, up to and including 4K@60Hz (4:4:4, 8-bit) as well as 10/12-bit sources with HDR, are able to be processed and extended by the use of AVLC (Adaptive Visually Lossless Compression) when needed. Multiple data and control interfaces are also provided, including IR, RS-232 and LAN connections. The Transmitter (PD) is powered by PoH (Power over HDBaseT) provided by the Receiver (PSE), allowing for greater flexibility within different installation scenarios.

2. APPLICATIONS

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

3. PACKAGE CONTENTS

Transmitter

- 1×4K UHD HDMI w/HDR over HDBaseT Transmitter
- 1×48V/0.83A DC Power Adapter
- 1×Power Cord
- 1×3.5mm to IR Blaster Cable
- 1×Operation Manual

Receiver

- 1×4K UHD HDMI w/HDR over HDBaseT Receiver
- 1×3.5mm to IR Extender Cable
- 1×Operation Manua

4. SYSTEM REQUIREMENTS

- HDMI source equipment such as media players, video game consoles or set-top boxes.
- HDMI receiving equipment such as HDTVs, monitors or audio amplifiers.
- The use of "Premium High Speed" HDMI cables, and industry standard Cat.6, Cat.6a or Cat.7, is highly recommended.

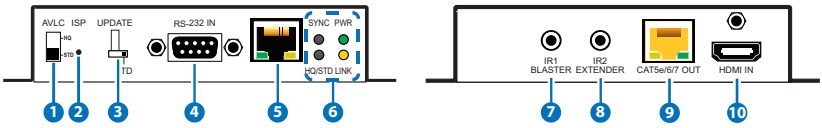
5. FEATURES

- HDMI with HDR, 3D & 4K@60Hz support, DVI 1.0 compatible
- HDCP 2.2 and HDCP 1.x compliant
- Supports up to 4K UHD (18Gbps, 4K@50/60Hz 4:4:4, 8-bit) video input and output
- Supports Deep Color input and output up to 12-bit
- Supports 10-bit and 12-bit HDR (High Dynamic Range) input/output.
- Supports CEC bypass
- HDBaseT output transmits video, audio and data over a single Cat.5e/6/7 cable and can reach distances up to 70m/230ft at 4K when using Cat.6a/7
- Supported HDBaseT feature set: HD Video & Audio, 100BaseT Ethernet, PoH, and Control (Bi-directional IR/RS-232 pass-through)
- Integrated AVLC (Adaptive Visually Lossless Compression) activates when the bandwidth requirements of the source are beyond 10.2Gbps (340MHz) allowing for support of sources up to 18Gbps (600MHz) with no loss of visual quality
- The AVLC function allows manual selection between High Quality (Full bandwidth) mode and Standard mode (Lower bandwidth, activates at a lower bandwidth threshold)
- Supports pass-through of many audio formats including 8 channel LPCM, Bitstream, and HD Bitstream
- Receiver (PSE) provides power to the Transmitter (PD) using PoH (Power over HDBaseT)

Note: The PoH function is designed for powering compatible Transmitter units only. Non-PoH Transmitters will need their own power supply. Transmitters from other brands may not be compatible.

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Transmitter's Front and Rear Panels



1. **AVLC HQ/STD Switch:** This switch allows the user to select which compression mode to use when AVLC is active.

   HQ (High Quality) mode uses the least amount of compression and provides the highest possible visual quality (perceptually identical to the original). In this mode, AVLC compression activates for any signal requiring more than 9Gbps.

   STD (Standard Quality) mode applies additional compression methods to lower the bandwidth requirements even further, improving transmission reliability at the cost of some visual fidelity. In this mode, AVLC compression activates for any signal requiring more than 7.5Gbps.

2. **ISP Pinhole:** This button is reserved for factory use only.
3. **UPDATE Switch:** This switch is reserved for factory use only. The default setting is "STD".
4. **RS-232 IN Port:** Connect to a PC, laptop, or serial controllable device for the extension of RS-232 signals between both ends of the HDBaseT connection.
5. **LAN Port:** Connect to an Ethernet supporting device or to your local network, as appropriate, to extend the network to both ends of the HDBaseT connection.

6. **SYNC LED:** This LED will illuminate when a live input source is detected.

   HQ/STD LED: This LED will illuminate whenever the AVLC function is active. A green LED indicates that AVLC is in HQ (High Quality) mode. A red LED indicates that AVLC is in STD (Standard) mode.

   POWER LED: This LED will illuminate to indicate the unit is on and receiving power.

   LINK LED: This LED will illuminate solidly when a live connection with a compatible Receiver is active. The LED will blink with a regular pattern if a Receiver is connected but there is not currently a live signal. The LED will blink with an irregular pattern if a connection error has occurred.

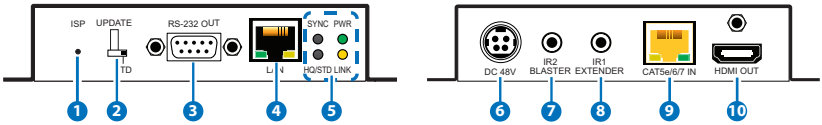
7. **IR1 BLASTER Port:** Connect to the provided IR Blaster to transmit IR signals from the other end of the HDBaseT connection to devices within direct line-of-sight of the IR Blaster.

8. **IR2 EXTENDER Port:** Connect to an IR Extender to receive 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.

9. **CAT 5e/6/7 OUT Port:** Connect to a compatible HDBaseT Receiver with a single Cat.5e/6/7 cable for transmission of all data signals. PoH will also be supplied when connected to a compatible PSE Receiver.

10. **HDMI IN Port:** Connect to HDMI source equipment such as a media player, game console, or set-top box. DVI sources are supported with the use of an HDMI to DVI adapter.

6.2 Receiver's Front and Rear Panels



1. **ISP Pinhole:** This button is reserved for factory use only.
2. **UPDATE Switch:** This switch is reserved for factory use only. The default setting is "STD".
3. **RS-232 OUT Port:** Connect to a PC, laptop, or serial controllable device for the extension of RS-232 signals between both ends of the HDBaseT connection.
4. **LAN Port:** Connect to an Ethernet supporting device or to your local network, as appropriate, to extend the network to both ends of the HDBaseT connection.
5. **SYNC LED:** This LED will illuminate when a live input source is detected.

   HQ/STD LED: This LED will illuminate whenever the AVLC function is active. A green LED indicates that AVLC is in HQ (High Quality) mode. A red LED indicates that AVLC is in STD (Standard) mode.

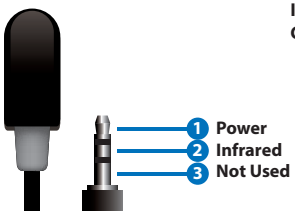
   POWER LED: This LED will illuminate to indicate the unit is on and receiving power.

   LINK LED: This LED will illuminate solidly when a live connection with a compatible Receiver is active. The LED will blink with a regular pattern if a Receiver is connected but there is not currently a live signal. The LED will blink with an irregular pattern if a connection error has occurred.

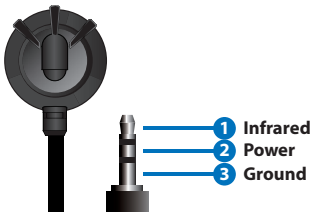
6. **DC 48V Port:** Plug the 48V DC power adapter into this port and connect it to an AC wall outlet for power.
7. **IR2 BLASTER Port:** Connect to an IR Blaster to transmit IR signals from the other end of the HDBaseT connection to devices within direct line-of-sight of the IR Blaster.
8. **IR1 EXTENDER Port:** Connect to the provided IR Extender to receive 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.
9. **CAT 5e/6/7 IN Port:** Connect to a compatible HDBaseT Transmitter with a single Cat.5e/6/7 cable for reception of all data signals. PoH will also be supplied to a connected compatible PD Transmitter.
10. **HDMI OUT Port:** Connect to an HDMI TV, monitor, or amplifier for digital video and audio output.

6.5 IR Cable Pinouts

IR Blaster Cable

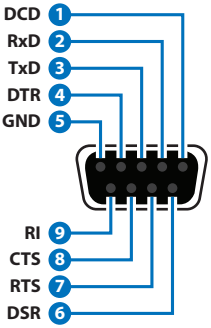


IR Extender Cable

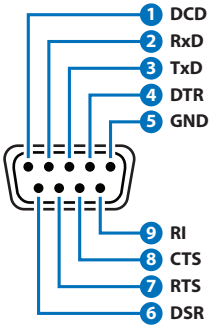


6.6 RS-232 Pinout

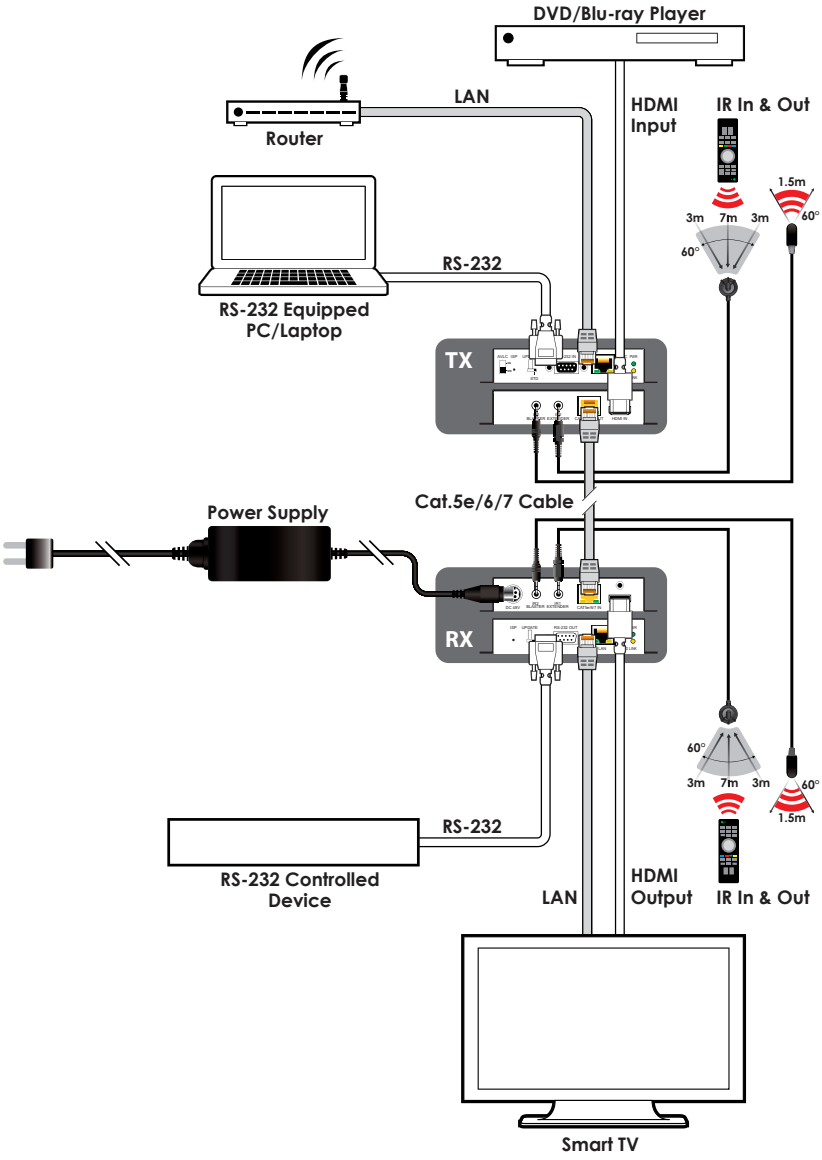
DE-9 Female Port



DE-9 Male Port



7. CONNECTION DIAGRAM



8. SPECIFICATIONS

8.1 Technical Specifications (Transmitter)

HDMI Bandwidth	600MHz/18Gbps
HDBaseT Bandwidth	340MHz/10.2Gbps
Input Ports	1×HDMI (Type-A)
Output Ports	1×HDBaseT (RJ-45)
Pass-through Ports	1×IR Extender (3.5mm) 1×IR Blaster (3.5mm) 1×RS-232 (DE-9) 1×LAN (RJ-45)
IR Frequency	30 – 50kHz (30 – 60kHz under ideal conditions)
Baud Rate	Up to 115200
Power Supply	PoH
ESD Protection (HBM)	±8kV (Air Discharge) ±4kV (Contact Discharge)
Dimensions (W×H×D)	128mm×25mm×108mm [Case Only] 128mm×25mm×117mm [All Inclusive]
Weight	385g
Chassis Material	Metal (Steel)
Silkscreen Color	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	8.3W

8.2 Technical Specifications (Receiver)

HDMI Bandwidth	600MHz/18Gbps
HDBaseT Bandwidth	340Hz/10.2Gbps
Input Port	1×HDBaseT (RJ-45)
Output Port	1×HDMI (Type-A)
Pass-through Ports	1×IR Extender (3.5mm) 1×IR Blaster (3.5mm) 1×RS-232 (DE-9) 1×LAN (RJ-45)
IR Frequency	30 - 50kHz (30 - 60kHz under ideal conditions)
Baud Rate	Up to 115200
Power Supply	48V/0.83A DC (US/EU standards, CE/FCC/UL certified)
ESD Protection	±8kV (Air Discharge) ±4kV (Contact Discharge)
Dimensions	128mm×25mm×108mm [Case Only] 128mm×25mm×117mm [All Inclusive]
Weight	386g
Chassis Material	Metal (Steel)
Silkscreen Color	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	12.8W

8.3 Video Specifications

Supported Resolutions (Hz)	Input		Output	
	HDMI	HDBT	HDBT	HDMI
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	✓	✓	✓	✓
1920×1080p@24/25/30	✓	✓	✓	✓
1920×1080p@50/60	✓	✓	✓	✓

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

8.4 Audio Specifications

8.4.1 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

8.5 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	10m	10m	5m	3m
HDMI Output	10m	5m	5m	3m
Ethernet Cable				
Cat.5e/6	100m		70m	
Cat.6a/7	100m		100m	

- **1080p (FHD Video)**
  - Up to 1080p@60Hz, 12-bit color
  - Data rates lower than 5.3Gbps or below 225MHz TMDS clock
- **4K30 (UHD Video)**
  - 4K@24/25/30Hz & 4K@50/60Hz (4:2:0), 8-bit color
  - 4K@50/60Hz (4:4:4, 8-bit) with AVLC active
  - Data rates higher than 5.3Gbps or above 225MHz TMDS clock but below 10.2Gbps
- **4K60 (UHD+ Video)**
  - 4K@50/60Hz (4:4:4, 8-bit), AVLC required over HDBaseT
  - 4K@50/60Hz (4:2:0, 10-bit HDR), AVLC required over HDBaseT
  - Data rates higher than 10.2Gbps

8.6 HDBaseT Features

HDBaseT Feature Set	Transmitter
Video & Audio	Supported
LAN Pass-through	Supported
Send power to Receiver	Unsupported
Accept power from Receiver	Supported
IR Pass-through	Supported
RS-232 Pass-through	Supported

HDBaseT Feature Set	Receiver
Video & Audio	Supported
LAN Pass-through	Supported
Send power to Transmitter	Supported
Accept power from Transmitter	Unsupported
IR Pass-through	Supported
RS-232 Pass-through	Supported

9. ACRONYMS

ACRONYM	COMPLETE TERM
AV	Audio/Video
AVLC	Adaptive Visually Lossless Compression
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
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
HD	High-Definition
HDBT	HDBaseT
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDR	High Dynamic Range
HDTV	High-Definition Television
IP	Internet Protocol
IR	Infrared
LAN	Local Area Network
LED	Light-Emitting Diode
LPCM	Linear Pulse-Code Modulation
PC	Personal Computer
PD	Powered Device
PoH	Power over HDBaseT
PSE	Power Sourcing Equipment
TCP	Transmission Control Protocol
THD+N	Total Harmonic Distortion plus Noise
UHD	Ultra-High-Definition

ACRONYM	COMPLETE TERM
UHD+	Ultra-High-Definition Plus
UHDTV	Ultra-High-Definition Television
VGA	Video Graphics Array
WUXGA (RB)	Widescreen Ultra Extended Graphics Array (Reduced Blanking)
XGA	Extended Graphics Array

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