



CH-1529TXV

4K UHD+ HDMI over HDBaseT Transmitter
with HDR & OAR



Operation Manual

DISCLAIMERS

The information in this manual has been carefully checked and is believed to be accurate. Cypress Technology assumes no responsibility for any infringements of patents or other rights of third parties which may result from its use.

Cypress Technology assumes no responsibility for any inaccuracies that may be contained in this document. Cypress also makes no commitment to update or to keep current the information contained in this document.

Cypress Technology reserves the right to make improvements to this document and/or product at any time and without notice.

COPYRIGHT NOTICE

No part of this document may be reproduced, transmitted, transcribed, stored in a retrieval system, or any of its part translated into any language or computer file, in any form or by any means—electronic, mechanical, magnetic, optical, chemical, manual, or otherwise—without express written permission and consent from Cypress Technology.

© Copyright 2018 by Cypress Technology.

All Rights Reserved.

TRADEMARK ACKNOWLEDGMENTS

All products or service names mentioned in this document may be trademarks of the companies with which they are associated.





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.

REVISION HISTORY

VERSION NO.	DATE	SUMMARY OF CHANGE
RDV1	02/05/18	Preliminary release
VS1	07/05/18	Final technical review
VS2	21/05/18	Updated section 6.1 & 6.5



CONTENTS

1. Introduction	1
2. Applications	1
3. Package Contents	2
4. System Requirements	2
5. Features	2
6. Operation Controls and Functions	3
6.1 Front Panel	3
6.2 Rear Panel.....	5
6.3 Right Panel.....	6
6.4 IR Cable Pinouts	6
6.5 RS-232 Control	7
6.6 RS-232 Commands.....	7
6.7 EDID Management	9
6.7.1 EDID Dipswitch Settings	9
6.7.2 EDID Management Tool.....	11
7. Connection Diagram	15
8. Specifications	16
8.1 Technical Specifications	16
8.2 Video Specifications	17
8.3 Audio Specifications	18
8.4 Cable Specifications	19
8.5 HDBaseT Features.....	19
9. Acronyms	20





1. INTRODUCTION

This HDMI over single Cat.5e/6/7 Transmitter is a great solution for extending HD audio and video as well as Ethernet and control via a single run of Cat.5e/6/7 cable over distances of up to 100 meters. Multiple data and control interfaces are provided, including IR, RS-232 and LAN connections. This Transmitter 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.Gbps 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 connected to a compatible AVLC Receiver.

Beyond video, data, and control this unit also contains useful audio features. The Optical Audio Return (OAR) feature supports transmitting optical audio back from a compatible Receiver for local playback. Rounding out the feature set is robust EDID management as well as automatic HDBaseT clock stretching and TMDS re-clocking support. This Transmitter (PSE) can provide 48V PoH (Power over HDBaseT) to a compatible Receiver (PD), allowing for greater flexibility within different installation scenarios.

2. APPLICATIONS

- 48V PoH from Transmitter (PSE) to Receiver (PD)
- 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

- 1×HDMI over HDBaseT Transmitter with HDR & OAR
- 1×48V/0.83A DC Power Adapter
- 1×Power Cord
- 1×3.5mm to IR Blaster Cable
- 1×3-pin Terminal Block to 9-pin D-sub Adapter Cable
- 1×Rackmount Ears (Set of 2)
- 1×Operation Manual

4. SYSTEM REQUIREMENTS

- HDMI source equipment such as a media player, video game console or set-top box.
- A compatible HDBaseT Receiver with AVLC and 48V PoH support is recommended.
- The use of industry standard Cat.6, Cat.6a or Cat.7 cable is highly recommended.
- The use of "Premium High Speed HDMI" cables is highly recommended.

5. FEATURES

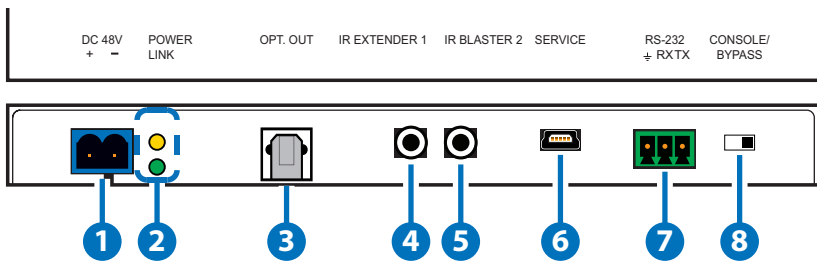
- HDMI with HDR, 3D & 4K@60Hz support, DVI 1.0 compatible
- HDCP 2.2 and HDCP 1.x compliant
- Supports up to 4K UHD (18Gbps, 4K@50/60Hz 4:4:4, 8-bit) video input and output
- Supports Deep Color input and output up to 12-bit
- Supports 10-bit and 12-bit HDR (High Dynamic Range) input/output
- Supports CEC bypass
- Simultaneous transmission of uncompressed video, audio and data over a single Cat.5e/6/7 cable up to 100m/328ft at 1080p60 and 70m/230ft at 4K
- HDBaseT feature support: HD Video and Audio, 100BaseT Ethernet, 48V PoH, and Control (bidirectional 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 sources up to 18Gbps (600MHz) to be sent to a compatible Receiver with no loss of visual quality
- The AVLC feature allows manual selection between High Quality Mode (Full bandwidth) and Standard Mode (Lower bandwidth, useful for longer cable runs with 4K sources)
- Supports the Optical Audio Return (OAR) function to transmit optical audio from a compatible Receiver to the Transmitter
- Comprehensive EDID management support including 6 pre-defined EDIDs, 9 user EDIDs and an EDID bypass mode
- PC-based EDID management software allows for the uploading of customized user EDIDs via USB
- Supports HDMI DDC bus clock stretching for improved compatibility with certain Blu-ray players
- Performs TMDS re-clocking and signal re-generation for improved signal integrity
- Ultra-thin wall plate design (16mm thickness) for convenient installation
- Supports standard 48V PoH from Transmitter (PSE) to Receiver (PD) (compatible Receivers only)

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel



- 1 **DC 48V:** Plug the 48V DC power adapter into this port and connect it to an AC wall outlet for power.

Note: Please be sure to follow the polarity labels on the unit and the adapter's wires.

- 2 **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.

- 3 **OPT. OUT:** Connect to powered speakers or an amplifier for digital audio output using an appropriate optical cable. Audio is sourced from the Optical Audio Return input on a connected compatible Receiver.

- 4 **IR EXTENDER 1:** Connect to an IR Extender to extend the IR control range of 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.

- 5 **IR BLASTER 2:** 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.

- 6 **SERVICE:** This USB port is reserved for firmware update and user EDID upload use.

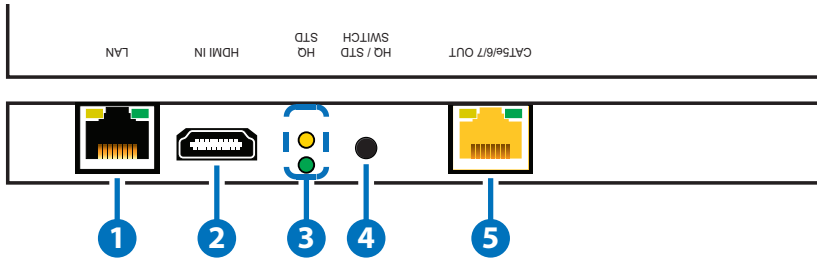
- 7 **RS-232:** Connect to a PC, laptop or other serial control device with a 3-pin adapter cable for the extension of RS-232 signals to the Receiver in "Bypass" mode, or for control this unit when in "Console" mode.

Note: Depending on the controlled device connected to the Receiver side, the Tx and Rx pins might need to be reversed.

- 8 **CONSOLE/BYPASS:** This switch controls the operational mode of the RS-232 port. When set to "Bypass", RS-232 signals will be passed to the connected Receiver. When set to "Console" the RS-232 port may be used to send commands directly to the Transmitter.

Note: RS-232 bypass requires both the Transmitter and Receiver to be set to "Bypass" mode.

6.2 Rear Panel



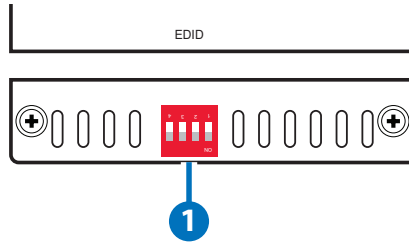
- 1 **LAN:** Connect to an Ethernet supporting device or to your local network, as appropriate, to extend the network to both ends of the HDBaseT connection.
- 2 **HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box.
- 3 **HQ & STD LEDs:** These LEDs illuminate to indicate which AVLC mode will be used when AVLC is required. The lower green LED indicates that AVLC will use HQ (High Quality) mode. The upper yellow LED indicates that AVLC will use STD (Standard) mode.
- 4 **HQ/STD SWITCH:** This switch allows the user to select which compression mode to use when AVLC is active, High Quality or Standard.

Note: HQ (High Quality) mode uses the least amount of compression and provides the highest possible visual quality (perceptually identical to the original). STD (Standard Quality) mode applies additional signal reduction methods to lower the bandwidth requirements of 4K sources further, improving transmission reliability over longer cable runs at the cost of some visual fidelity.

- 5 **CAT5e/6/7 OUT:** Connect to a compatible HDBaseT Receiver with a single Cat.5e/6/7 cable for transmission of all data signals. 48V PoH will also be supplied when connected to a compatible PD Receiver.

Note: The 48V PoH function is designed for powering compatible Receiver units only. Non-PoH Receivers will need their own power supply. Receivers from other brands may not be compatible.

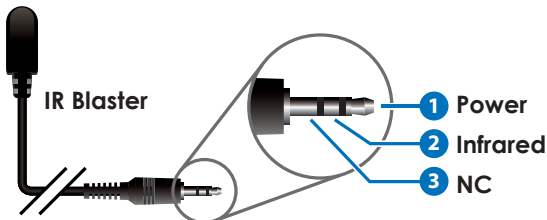
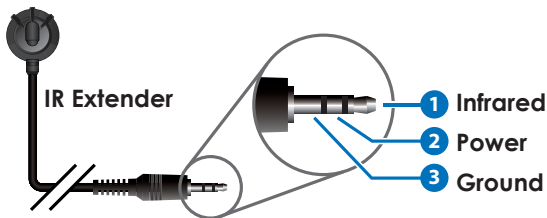
6.3 Right Panel



- 1 EDID:** The EDID dipswitch block provides a way to select the EDID to use with the connected source. By using a combination of on and off settings for the dipswitches, there are a total of 16 possible EDID selections across 3 different operation modes.

The three modes are “Internal EDID”, “User EDID” and “External EDID”. There are a total of 6 built-in internal EDIDs and 9 User EDIDs (which can be modified via USB upload). The “External EDID” setting will copy the EDID from the sink that is connected to the Receiver. (See “EDID Management” for more details.)

6.4 IR Cable Pinouts





6.5 RS-232 Control

Terminal Block	
Pin	Definition
1	GND
2	Rx
3	Tx

Controlling PC	
Pin	Definition
1	
2	Rx
3	Tx
4	
5	GND
6	
7	
8	
9	

Serial Port Settings	
Baud Rate	19200
Data Bits	8
Parity Bit	None
Stop Bits	1
Flow Control	None

6.6 RS-232 Commands

COMMAND
Description and Parameters
HELP ↵
Show the full command list.
? ↵
Show the full command list.
GET FW VER ↵
Show the unit's current firmware version.
GET MODEL NAME ↵
Show the unit's model name.
GET MODEL TYPE ↵
Show the unit's model type.
GET POWER ↵
Show the power state of the unit.

COMMAND	
Description and Parameters	
SET SYSTEM REBOOT↵	
	Reboot the unit.
GET IN 1 SYNC STATUS↵	
	Show the current input sync state.
GET OUT A SYNC STATUS↵	
	Show the current output sync state.
GET IN 1 EDID↵	
	Show the input's current EDID source.
GET IN EDID LIST↵	
	List all available EDID selections.
SET TRANSCEIVER COMPRESS RATE N1↵	
	Set the AVLC compression mode to use.
	Available values for N1:
1	[High quality]
2	[Standard quality]
GET TRANSCEIVER COMPRESS RATE↵	
	Show the current AVLC compression mode.

Note: Commands will not be executed unless followed by a carriage return. Commands are not case-sensitive.

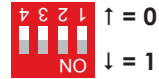
6.7 EDID Management

6.7.1 EDID Dipswitch Settings

The EDID dipswitch block provides a way to select the EDID to use with the connected source. By using a combination of on and off settings for the dipswitches, there are a total of 16 possible EDID selections across 3 different operation modes.

1 = Dipswitch in "on" (down) position

0 = Dipswitch in "off" (up) position



EDID Mode Number	EDID Number	Dipswitch Position
Internal EDID	1	1111
	2	1110
	3	1101
	4	1100
	5	1011
	6	1010
User EDID	1	1001
	2	1000
	3	0111
	4	0110
	5	0101
	6	0100
	7	0011
	8	0010
	9	0001
Native EDID	16	0000

Detailed EDID information:

- **Internal EDID (1–6)**

There are a total of 6 built-in internal EDID slots covering many standard display configurations. These EDIDs can't be modified. They are defined as follows:

EDID	Video Content	Audio Content
FHD/2 channel	1080p@60Hz, 8-bit	LPCM 2.0 (148MHz)
FHD/Multi-channel	1080p@60Hz, 8-bit	LPCM 7.1 + Bitstream (148MHz)
UHD/2 channel	3840×2160p@30Hz, 8-bit	LPCM 2.0 (297MHz)
UHD/Multi-channel	3840×2160p@30Hz, 8-bit	LPCM 7.1 + Bitstream (297MHz)
UHD+/2 channel	3840×2160p@60Hz, up to 12-bit	LPCM 2.0 (594MHz)
UHD+/Multi-channel	3840×2160p@60Hz, up to 12-bit	LPCM 7.1 + Bitstream (594MHz)

- **User EDID (1–9)**

There are a total of 9 User EDID slots which can be modified via USB upload. By default, these slots all contain the same standard EDID:

EDID	Video Content	Audio Content
FHD/2 channel	1080p@60Hz, 8-bit	LPCM 2.0 (148MHz)

- **Native (External) EDID**

The Native EDID setting will copy the EDID from the sink that is connected to the Receiver.

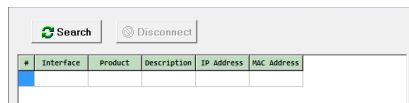
6.7.2 EDID Management Tool


This unit uses an EDID Management application which allows the user to copy the EDID from an attached display, edit an existing EDID file stored on the PC or create a basic EDID from scratch. The EDID can then be uploaded to the unit for use.

Please obtain the EDID Management software from your authorized dealer and save it in a directory where you can easily find it.

Before connecting the unit to your PC, please install the appropriate Virtual COM Port Driver depending on your Windows version. Next, install the EDID Management software.

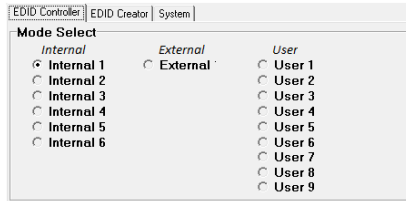
After the installation has successfully completed an icon for it will appear on the windows desktop. Launch the software by double-clicking on the icon and the EDID Management device detection window will open up on your screen.



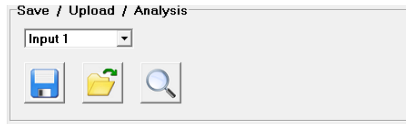
After launching the software, power the unit on and then connect it to the PC/laptop using a Mini-USB to USB cable. Click on the “Search”  button and any detected units will be displayed in the list. Clicking on a detected unit will open the EDID Commander window.





A. EDID Controller Tab

- **Mode Select:** Under the EDID Controller tab you will see the currently selected EDID slot (based on dipswitch position). The software can't change this selection, only monitor it.




- **Save/Upload/Analysis:** EDIDs may be saved, uploaded or analyzed:




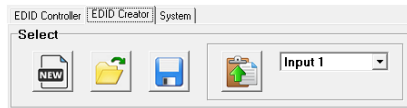
- **Save:** Any EDID from the unit or a connected HDMI display can be saved to your PC as a *.bin file by selecting the EDID source from the drop down menu and then clicking the "Save"  icon.
- **Upload:** Previously saved EDID files (*.bin format) can be re-uploaded into any of the "User" EDID slots by selecting the User EDID to replace from the dropdown and then clicking the "Upload"  icon. Before accepting the upload, the software will check and verify that the EDID's header and checksum values are acceptable.
- **Analysis:** To analyze any EDID stored within the unit, select the EDID to view from the dropdown and click on the "Analysis"  icon. From the Analyzer window it is possible to open the currently analyzed EDID in the EDID Creator by clicking the "Edit"  button.



EDID Information	
EDID Header :	Good
EDID Checksum :	Good
Manufacturer Name :	STD
Monitor Name :	Emulator
Max Resolution :	2160p@30Hz
Max Color Depth :	12bit
Support 3D :	No
Support YUV420 :	No
Support SCDC :	Yes
Support 600MHz :	Yes
Support HDR :	8bit,10bit,12bit.
Audio Formats :	2PCM,
Audio Max Channel :	2CH
CEC Address :	1000



B. EDID Creator Tab

- **Select:** Click on the EDID Creator tab to begin designing a new EDID from scratch (select the “New”  icon), to modify an existing EDID stored on the PC as a *.bin file (select the “Load”  icon) or to edit an EDID copied from the unit via the EDID Analyzer's edit option.





- Selecting “New”  will automatically populate the various EDID fields with basic information that can be easily edited to match the user's preferences.
- Clicking on the “Load”  icon will open a file load window and after the *.bin file has been selected and loaded the EDID fields will be populated with the information from that file. The same will happen when the EDID is copied from the EDID Analyzer window.



- **Edit:** The following tabs provide access to a wide range of EDID information which can be edited:



Descriptor	PC Timing	SD/HD/UHD	Audio1	Audio2	Color Space	Others
Manufacturer Name : <input type="text"/>						
Monitor Name : <input type="text"/>						
Product Code : <input type="text"/>						
Serial Number : <input type="text"/>						
Manufacture Year : <input type="text"/>						
Manufacture Week : <input type="text"/>						

- **Descriptor:** This tab allows for the editing of various description and information fields within the EDID file such as Manufacturer Name, Monitor Name, etc.
- **PC Timing & SD/HD/UHD:** These tabs allow for the selection of the resolutions and refresh rates that the EDID will report as supported.
- **Audio1 & Audio2:** These tabs allow for the selection of which audio formats, audio frequencies, channels and speaker locations are supported.
- **Color Space:** This tab allows for the selection of which color formats and bit depths are supported, including BT.2020 and HDR support options.
- **Others:** This tab contains options for supporting 3D and defining the CEC Address.

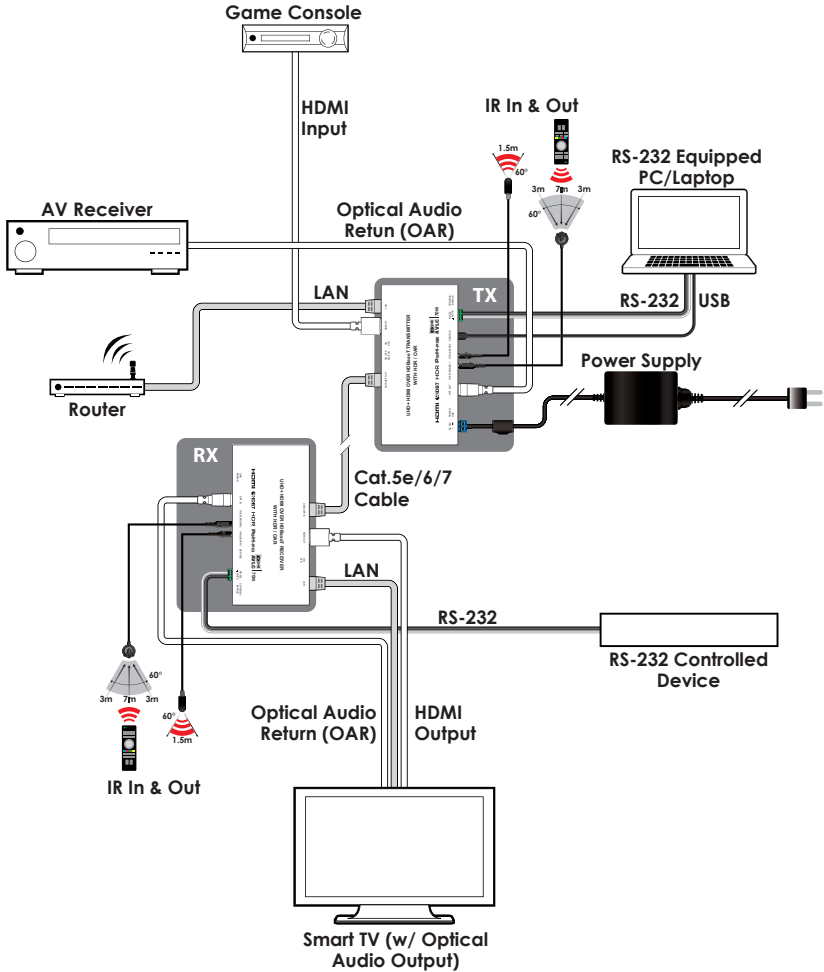
Once the user is finished editing or creating an EDID it can be saved to a *.bin file locally or uploaded directly to the unit using the “Save”  and “Upload”  icons respectively.

C. System Tab

- **Configuration & Firmware:** Select the System tab to edit the unit's description (select the “Rename” ) , to reset the unit to factory defaults (select the “Reset” ) and to view the unit's current hardware and firmware version information.

EDID Controller	EDID Creator	System
Configuration		
Description :		 
<input type="text"/>		
Firmware		
Current :		

7. CONNECTION DIAGRAM



8. SPECIFICATIONS

8.1 Technical Specifications

HDMI Bandwidth	600MHz/18Gbps
HDBaseT Bandwidth	340MHz/10.2Gbps
Input Port	1×HDMI
Output Ports	1×HDBaseT (RJ45) 1×S/PDIF (TOSLINK)
Pass-through Ports	1×IR Extender (3.5mm) 1×IR Blaster (3.5mm) 1×LAN (RJ45)
Control Port	1×USB (Mini-B)
Pass-through/Control Port	1×RS-232 (3-pin Terminal Block)
IR Frequency	30–50kHz (30–60kHz under ideal conditions)
Baud Rate	Up to 115200bps
Power Supply	48V/0.83A DC (US/EU standards, CE/FCC/UL certified)
ESD Protection	Human Body Model: ±8kV (Air Discharge) ±4kV (Contact Discharge)
Dimensions	163mm×16mm×78mm (W×H×D) [Case Only] 183mm×16mm×81mm (W×H×D) [All Inclusive]
Weight	200g
Chassis Material	Aluminum
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	7W/14W (PoH)



8.2 Video Specifications

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

Supported TV Resolutions (Hz)		HDMI Input	HDBaseT Output
720×480i	59.94, 60	✓	✓
720×576i	50	✓	✓
720×480p	59.94, 60	✓	✓
720×576p	50	✓	✓
1280×720p	50, 59.94, 60	✓	✓
1920×1080i	50, 59.94, 60	✓	✓
1920×1080p	50, 59.94, 60	✓	✓
1920×1080p	23.97, 24, 25, 29.97, 30	✓	✓
3840×2160p	24, 25, 30	✓	✓
4096×2160p	24, 25, 30	✓	✓
3840×2160p (YUV 4:2:0)	50, 60	✓	✓
3840×2160p	24, 25, 30 (10, 12-bit HDR)	✓	✓ (AVLC)
3840×2160p (YUV 4:2:0)	50, 60 (10, 12-bit HDR)	✓	✓ (AVLC)
3840×2160p	50, 60	✓	✓ (AVLC)

8.3 Audio Specifications

Digital (S/PDIF) Output	
Sampling Rate (kHz)	32, 44.1, 48, 88.2, 96, 176.4, 192



8.4 Cable Specifications

HDMI Cable Length	1080p		4K
	8-bit	12-bit	8-bit
Input	10m	10m	5m

Cat. Cable Length	1080p	4K
Cat.5e	100m	70m
Cat.6	100m	70m
Cat.7	100m	100m

- **Full HD Video (1080p)**
 - Up to 1080p@60Hz, 12-bit color
 - Data rates lower than 5.3Gbps or below 225MHz TMDS clock
- **Ultra HD Video (4K)**
 - 4K@24/25/30Hz & 4K@50/60Hz (YUV 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

8.5 HDBaseT Features

HDBaseT Feature	Supported
Video & Audio	✓
IR Pass-through	✓
RS-232 Pass-through	✓
Accept power from Receiver	×
Send power to Receiver	✓
LAN Pass-through	✓

9. ACRONYMS

ACRONYM	COMPLETE TERM
AVLC	Adaptive Visually Lossless Compression
Cat.5e	Category 5 (enhanced) cable
Cat.6	Category 6 cable
Cat.7	Category 7 cable
CEC	Consumer Electronics Control
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
HD	High-Definition
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDR	High Dynamic Range
IR	Infrared
LAN	Local Area Network
LPCM	Linear Pulse-Code Modulation
OAR	Optical Audio Return
PC	Personal Computer
PD	Powered Device
PoH	Power over HDBaseT
PSE	Power Sourcing Equipment
S/PDIF	Sony/Philips Digital Interface Format
UHD	Ultra-High-Definition
UHDTV	Ultra-High-Definition Television
USB	Universal Serial Bus



CYPRESS TECHNOLOGY CO., LTD.

www.cypress.com.tw