



# CHDBT-1H1CV

4K UHD+ 1 by 2 HDMI to HDBaseT and HDMI Splitter



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.
- Please completely disconnect the power when the unit is not in use to avoid wasting electricity.

## VERSION HISTORY

| REV. | DATE       | SUMMARY OF CHANGE      |
|------|------------|------------------------|
| VS1  | 2019/01/25 | Final technical review |



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## 1. INTRODUCTION

This 1 by 2 HDMI to HDMI and HDBaseT splitter can take a single 4K source and simultaneously deliver it to a local HDMI display as well as to a second HDMI display up to 100m away via HDBaseT. This unit 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. The HDMI input and output supports uncompressed 4K UHD HDMI sources, up to and including 4K@60Hz (4:4:4, 8-bit) as well as 10/12-bit sources with HDR while the HDBaseT output, despite its 10.2Gbps bandwidth limitation, is able to process and extend the same high bandwidth sources by the use of AVLC (Adaptive Visually Lossless Compression) when connected to a compatible AVLC Receiver.

Built-in EDID management functionality enables the unit to fit into every situation. The HDBaseT output of this unit can also provide 48V PoH (Power over HDBaseT) to a compatible Receiver, allowing for greater flexibility within different installation scenarios. The unit can be controlled via a front panel button and RS-232.

## 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

- 1×1 by 2 HDMI to HDBaseT and HDMI Splitter
- 1×24V/2.7A DC Power Adapter
- 1×3.5mm to IR Blaster Cable
- 1×Shockproof Feet (Set of 4)
- 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.
- HDMI receiving equipment such as an HDTV, monitor or audio amplifier.
- The use of "Premium High Speed" HDMI cables, and industry standard Cat.6, Cat.6a or Cat.7, is highly recommended.

## 5. FEATURES

- HDMI 2.0 and HDBaseT 1.0 compatible
- HDCP 1.x and HDCP 2.2 compliant
- 1 HDMI input
- 1 HDMI and 1 HDBaseT output
- Supports up to 4K UHD (18Gbps, 4K@50/60Hz 4:4:4, 8-bit) video input and output

*Note: Support of resolutions requiring bandwidth above 10.2Gbps via HDBaseT requires a compatible AVLC Receiver.*

- 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 feature support: HD Video and Audio, 100BaseT Ethernet, 48V PoH (PSE) and Control (bi-directional IR/RS-232 pass-through)
- HDBaseT output transmits video, audio and data over a single Cat.5e/6/7 cable and can reach distances up to 100m/328ft at 4K when using Cat.6a/7
- 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
- Automatic 4K to 1080p down-scaling or color space conversion (4:4:4 to 4:2:0), as necessary, based on each connected display's EDID



- Supports pass-through of many audio formats including LPCM 2.0/5.1/7.1, Bitstream, and HD Bitstream
- EDID management allows selection of an internal EDID, user EDID, or EDID copied from a connected display
- Supports standard 48V PoH from the unit to a connected HDBaseT Receiver (compatible Receivers only)

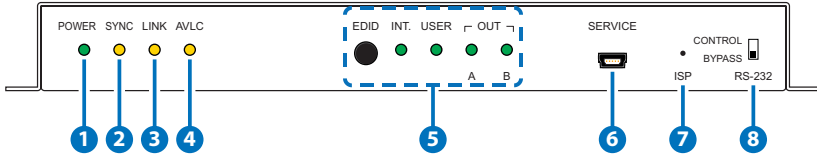
*Note: The 48V PoH function is designed for powering compatible Receiver units only. Non-PoH Receivers will need their own power supply. Receivers from other brands may not be compatible.*

- Controllable via a front panel button and RS-232



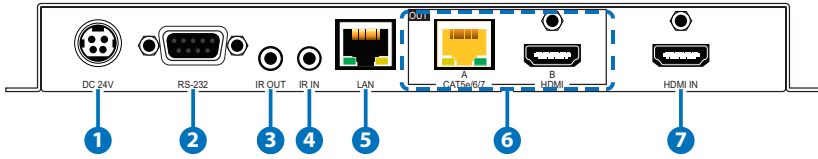
## 6. OPERATION CONTROLS AND FUNCTIONS

### 6.1 Front Panel



- 1 POWER LED:** This LED will illuminate to indicate the unit is on and receiving power.
- 2 SYNC LED:** This LED will illuminate when a live input source is detected.
- 3 LINK LED:** This LED will illuminate solidly when a live connection with a compatible Receiver is active.
- 4 AVLIC LED:** This LED will illuminate whenever the AVLIC function is active.
- 5 EDID Button & LEDs:** Press this button to sequentially switch through the available EDID sources. The LED will illuminate to indicate which EDID source is currently selected.
- 6 SERVICE Port:** This port is reserved for firmware update use only.
- 7 ISP Pinhole:** This button is reserved for factory use only.
- 8 RS-232 CONTROL/BYPASS Switch:** This switch controls the operational mode of the RS-232 port.
  - A CONTROL:** When set to "Control" the RS-232 port may be used to send commands directly to the unit.
  - B BYPASS:** When set to "Bypass", RS-232 signals will be passed to the connected Receiver.

## 6.2 Rear Panel



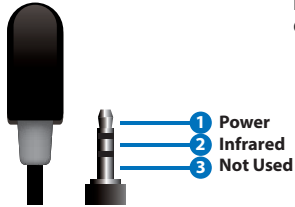
- 1 DC24V Port:** Plug the 24V DC power adapter into this port and connect it to an AC wall outlet for power.
- 2 RS-232 Port:** Connect to a PC, laptop, or serial controllable device for the extension of RS-232 signals between both ends of the HDBaseT connection or to control this unit directly.

*Note: The behavior of the RS-232 port is controlled by the front panel CONTROL/BYPASS switch.*
- 3 IR OUT 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.
- 4 IR IN 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.
- 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 OUT A (CAT5e/6/7) Port:** 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 to a connected compatible PD Receiver.

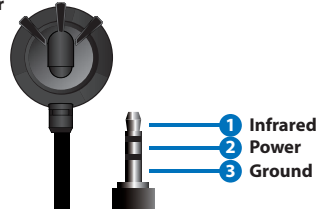
**OUT B (HDMI) Port:** Connect to an HDMI TV, monitor, or amplifier for digital video and audio output.
- 7 HDMI IN Port:** Connect to HDMI source equipment such as a media player, game console, or set-top box.

## 6.3 IR Cable Pinouts

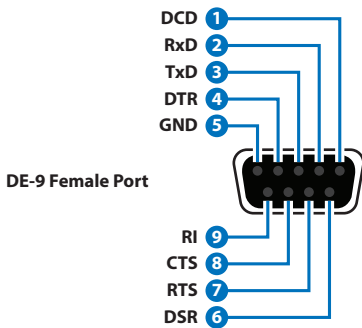
IR Blaster Cable



IR Extender Cable



## 6.4 Serial Pinout and Defaults



| Serial Port Default Settings |       |
|------------------------------|-------|
| Baud Rate                    | 19200 |
| Data Bits                    | 8     |
| Parity Bits                  | None  |
| Stop Bits                    | 1     |
| Flow Control                 | None  |



## 6.5 RS-232 Commands

### 6.5.1 System Commands

| COMMAND  |
|--|
| <b>Description and Parameters</b>  |
| <b>help</b> ↵  |
| Show the full command list.  |
| <b>help N1</b> ↵   |
| Show help details about command <b>N1</b> .<br><b>N1</b> = {Command name}  |
| <b>get model name</b> ↵  |
| Show the unit's model name.  |
| <b>get fw ver</b> ↵  |
| Show the unit's current firmware version.  |
| <b>set system reboot</b> ↵   |
| Reboot the unit.   |
| <b>set description N1</b> ↵  |
| Set the description/name of the unit.<br><b>N1</b> = {Name} [64 characters max]  |
| <b>get description</b> ↵   |
| Show the unit's current description/name.  |
| <b>set keylock N1</b> ↵  |
| Enable or disable the front panel key lock.<br>Available values for <b>N1</b> :<br>ON [Lock front panel]<br>OFF [Unlock front panel] |
| <b>get keylock</b> ↵   |
| Show the current front panel key lock status.  |
| <b>set factory default</b> ↵   |
| Reset all configuration to the factory defaults.   |

## 6.5.2 Input Commands

| COMMAND                            |  |
|------------------------------------|--|
| Description and Parameters         |  |
| <b>get in port number</b> ↵        |  |
|                                    | Report the number of inputs supported by the unit.                 |
| <b>get in type list</b> ↵          |  |
|                                    | List the interface type supported by each input.                   |
| <b>set in 1 hdcp mode N1</b> ↵     |  |
|                                    | Set the input's HDCP mode.   |
|                                    | Available values for <b>N1</b> :                                   |
| 0                                  | [Apple mode]   |
| 1                                  | [Refer to source]  |
| 2                                  | [Refer to sink]  |
| <b>get in 1 hdcp mode</b> ↵        |  |
|                                    | Show the input's current HDCP mode.                                |
| <b>set in 1 edid N1</b> ↵          |  |
|                                    | Set the EDID for the input to use.                                 |
|                                    | Available values for <b>N1</b> :                                   |
| 1                                  | [Internal EDID FHD/8bit/LPCM 2CH]                                  |
| 2                                  | [User EDID 1]  |
| 3                                  | [Copy output A's EDID]   |
| 4                                  | [Copy output B's EDID]   |
| <b>get in 1 edid</b> ↵             |  |
|                                    | Show the EDID currently being used by the input.                   |
| <b>get in 1 edid data</b> ↵        |  |
|                                    | Show the current contents of the input's EDID as ASCII hex data.   |
| <b>get in 1 edid information</b> ↵ |  |
|                                    | Show English readable details from the EDID assigned to the input. |

### 6.5.3 Output Commands

| COMMAND   |
|---|
| Description and Parameters  |
| <p><b>get out port number↵</b></p> <p>Report the number of outputs supported by the unit.</p>   |
| <p><b>get out type list↵</b></p> <p>List the interface supported by each output.</p>  |
| <p><b>set out N1 convert N2↵</b></p> <p>Set the 4K source conversion mode to use on output <b>N1</b>.</p> <p>Available values for <b>N1</b>:</p> <p>A            [Output A]<br/>           B            [Output B]</p> <p>Available values for <b>N2</b>:</p> <p>0            [Bypass]<br/>           1            [Convert color space to YUV 4:2:0]<br/>           2            [Convert resolution to 1080p]<br/>           3            [Automatic conversion based on sink's EDID]</p> |
| <p><b>get out N1 convert↵</b></p> <p>Show the current conversion mode used by output <b>N1</b>.</p> <p>Available values for <b>N1</b>:</p> <p>A            [Output A]<br/>           B            [Output B]</p>  |
| <p><b>get out N1 edid data↵</b></p> <p>Show the current contents of output <b>N1</b>'s EDID as ASCII hex data.</p> <p>Available values for <b>N1</b>:</p> <p>A            [Output A]<br/>           B            [Output B]</p>   |

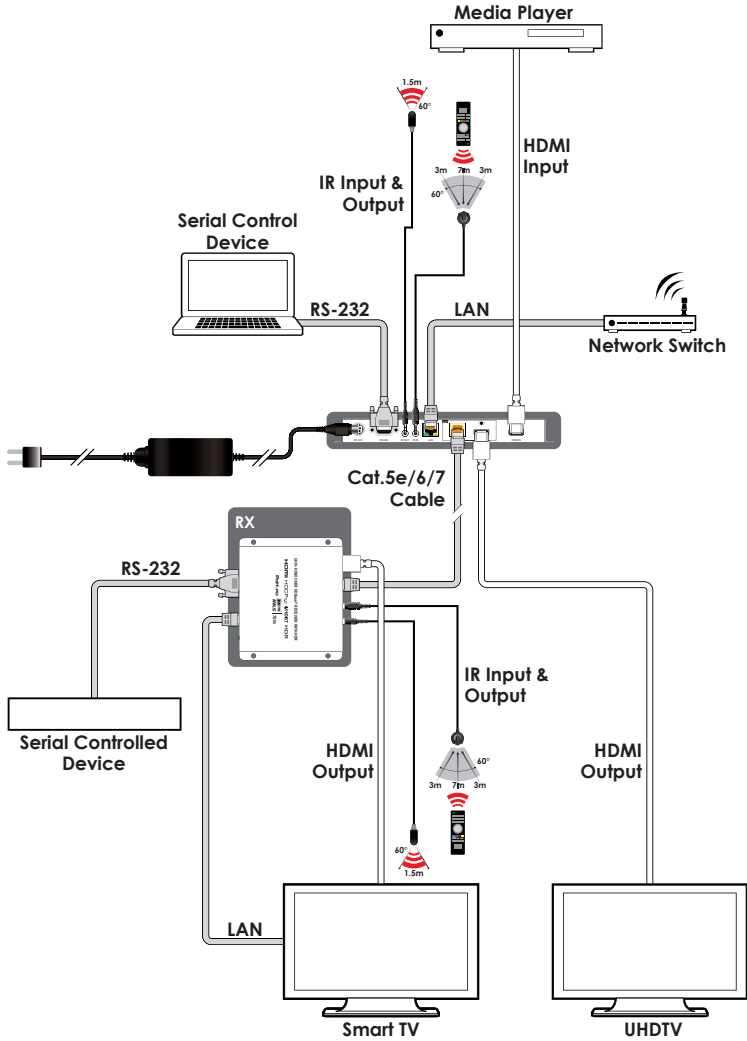
| COMMAND   |            |
|---|------------|
| Description and Parameters  |            |
| <b>get out N1 edid information</b> ↵  |            |
| Show English readable details from the EDID provided by the specified output. |            |
| Available values for <b>N1</b> :  |            |
| A   | [Output A] |
| B   | [Output B] |

#### 6.5.4 User EDID Commands

| COMMAND   |             |
|---|-------------|
| Description and Parameters  |             |
| <b>get user edid number</b> ↵                                     |             |
| Show the number of User EDIDs supported by the unit.              |             |
| <b>set user 1 edid data N1</b> ↵                                  |             |
| Upload a new EDID (in ASCII hex format) for use as the User EDID. |             |
| <b>N1</b> = {Comma delimited hex pairs}                           | [EDID data] |
| <b>get user 1 edid data</b> ↵                                     |             |
| Show the EDID used by the User EDID as ASCII hex data.            |             |
| <b>get user 1 edid information</b> ↵                              |             |
| Show English readable details from the User EDID.                 |             |

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

## 7. CONNECTION DIAGRAM





## 8. SPECIFICATIONS

### 8.1 Technical Specifications

|                                  |  |
|----------------------------------|--|
| <b>HDMI Bandwidth</b>            | 600MHz/18Gbps  |
| <b>HDBaseT Bandwidth</b>         | 340MHz/10.2Gbps  |
| <b>Input Ports</b>               | 1×HDMI   |
| <b>Output Ports</b>              | 1×HDMI<br>1×HDBaseT (RJ-45)  |
| <b>Pass-through Ports</b>        | 1×IR Extender (3.5mm)<br>1×IR Blaster (3.5mm)<br>1×LAN (RJ-45)       |
| <b>Control/Pass-through Port</b> | 1×RS-232 (DE-9)  |
| <b>Service Port</b>              | 1×USB (Mini-B)   |
| <b>IR Frequency</b>              | 30 – 50kHz (30 – 60kHz under ideal conditions)                       |
| <b>Baud Rate</b>                 | Up to 115200   |
| <b>Power Supply</b>              | 24V/2.7A DC (US/EU standards, CE/FCC/UL certified)                   |
| <b>ESD Protection (HBM)</b>      | ±8kV (Air Discharge)<br>±4kV (Contact Discharge)                     |
| <b>Dimensions (W×H×D)</b>        | 231.5mm×25mm×108mm [Case Only]<br>231.5mm×25mm×115mm [All Inclusive] |
| <b>Weight</b>                    | 656g   |
| <b>Chassis Material</b>          | Metal (Steel)  |
| <b>Chassis 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>         | 20.8W  |



## 8.2 Video Specifications

| Supported Resolutions (Hz) | Input | Output |         |
|----------------------------|-------|--------|---------|
|                            | HDMI  | HDMI   | HDBaseT |
| 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@60RB/60/75/85    | ✓     | ✓      | ✓       |
| 1280×800p@60RB/60/75/85    | ✓     | ✓      | ✓       |
| 1280×960p@60/85            | ✓     | ✓      | ✓       |
| 1280×1024p@60/75/85        | ✓     | ✓      | ✓       |
| 1360×768p@60               | ✓     | ✓      | ✓       |
| 1366×768p@60RB/60          | ✓     | ✓      | ✓       |
| 1400×1050p@60RB/60         | ✓     | ✓      | ✓       |
| 1440×900p@60RB/60/75       | ✓     | ✓      | ✓       |
| 1600×900p@60RB             | ✓     | ✓      | ✓       |
| 1600×1200p@60              | ✓     | ✓      | ✓       |
| 1680×1050p@60RB/60         | ✓     | ✓      | ✓       |
| 1920×1080i@50/60           | ✓     | ✓      | ✓       |
| 1920×1080p@24/25/30        | ✓     | ✓      | ✓       |
| 1920×1080p@50/60           | ✓     | ✓      | ✓       |

| Supported Resolutions (Hz)      | Input | Output |         |
|---------------------------------|-------|--------|---------|
|                                 | HDMI  | HDMI   | HDBaseT |
| 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@24/25/30, HDR10      | ✓     | ✓      | AVLC    |
| 3840×2160p@50/60 (4:2:0), HDR10 | ✓     | ✓      | AVLC    |
| 3840×2160p@50/60                | ✓     | ✓      | AVLC    |
| 4096×2160p@24/25/30             | ✓     | ✓      | ✓       |
| 4096×2160p@50/60 (4:2:0)        | ✓     | ✓      | ✓       |
| 4096×2160p@24/25/30, HDR10      | ✓     | ✓      | ×       |
| 4096×2160p@50/60 (4:2:0), HDR10 | ✓     | ✓      | ×       |
| 4096×2160p@50/60                | ✓     | ✓      | ×       |

### 8.3 Audio Specifications

| HDMI 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         |

## 8.4 Cable Specifications

| Cable Length                 | 1080p |        | 4K30             | 4K60             |
|------------------------------|-------|--------|------------------|------------------|
|                              | 8-bit | 12-bit | (4:4:4)<br>8-bit | (4:4:4)<br>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              |                  |
| <b>Cat.6a/7</b>              | 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

## 8.5 HDBaseT Features

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

## 9. ACRONYMS

| ACRONYM | COMPLETE TERM                             |
|---------|---|
| ASCII   | American Standard Code for Information    |
| AV      | Audio/Video                               |
| AVLC    | Adaptive Visually Lossless Compression    |
| AVR     | Audio/Video Receiver or Recorder          |
| 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              |
| CLI     | Command-Line Interface                    |
| DHCP    | Dynamic Host Configuration Protocol       |
| 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                        |
| HDTV    | High-Definition Television                |
| IP      | Internet Protocol                         |
| IR      | Infrared                                  |
| LAN     | Local Area Network                        |
| LED     | Light-Emitting Diode                      |
| LPCM    | Linear Pulse-Code Modulation              |
| NTSC    | National Television System Committee      |
| OSD     | On-Screen Display                         |
| PAL     | Phase Alternating Line                    |
| PC      | Personal Computer                         |

| <b>ACRONYM</b>    | <b>COMPLETE TERM</b>   |
|-------------------|--|
| <b>PD</b>         | Powered Device   |
| <b>PoH</b>        | Power over HDBaseT   |
| <b>PSE</b>        | Power Sourcing Equipment                                       |
| <b>TCP</b>        | Transmission Control Protocol                                  |
| <b>UHD</b>        | Ultra-High-Definition  |
| <b>UHD+</b>       | Ultra-High-Definition Plus                                     |
| <b>UHDTV</b>      | Ultra-High-Definition Television                               |
| <b>USB</b>        | Universal Serial Bus   |
| <b>VGA</b>        | Video Graphics Array   |
| <b>WUXGA (RB)</b> | Widescreen Ultra Extended Graphics Array<br>(Reduced Blanking) |
| <b>XGA</b>        | Extended Graphics Array  |



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