# CYP ///

HDCP**2.2**

**C**HDBT®

**4K2K**



# PUV-1550S-RX & TX
**HDBaseT™ & 4K Dual HDMI Scaler Transmitter & Receiver**
**(4K, HDCP2.2, PoH, LAN, OAR)**
/// **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 | SUMMARY OF CHANGE |
|---|---|---|
| v1.00 | 21/06/2017 | First release |
|  |  |  |

# CONTENTS

# 1. INTRODUCTION

*Transmitter*

This HDMI to HDMI/HDBaseT Scaling Transmitter can send uncompressed audio/video along with control, Ethernet, and extra audio data over a single run of Cat.5e/6/7 cable up to 100m. Both the HDMI input and local HDMI output support video signals up to 4K@60Hz (4:4:4, 8-bit). For transmission over the HDBaseT output the signal can be converted to 4K@60Hz (4:2:0, 8-bit) or 1080p@60Hz, if necessary, in order to fit within HDBaseT bandwidth limitations.

Simple 18Gbps HDMI test patterns are also available to be output. Control of remote devices is possible via bi-directional RS-232 or IR as well as via a LAN connection. A balanced analog audio output provides users with additional audio flexibility. The 48V PoH design can power the connected Receiver (PD), eliminating the need for an extra power supply while the Transmitter itself is powered through the local 24V power supply.

*Receiver*

This HDBaseT to Dual HDMI Scaling Receiver can receive uncompressed audio/video along with control, Ethernet, and extra audio data over a single run of Cat.5e/6/7 cable up to 100m. While the HDBaseT input is limited to a maximum of 4K@60Hz (4:2:0, 8-bit), this unit can automatically convert or scale the input to output at 4K@60Hz (4:4:4, 8-bit) depending on the detected capability of the connected display.

Simple 18Gbps HDMI test patterns are also available to be output for easy testing of local equipment. Control of remote devices is possible via bi-directional RS-232 or IR as well as via a LAN connection. Digital OAR (Optical Audio Return) support at 48kHz and a balanced analog audio output provides users with additional audio flexibility. The 48V PoH design can receive power from the connected Transmitter (PSE), eliminating the need for a local power supply, however power via 5V power supply is also supported if needed.

# 2. APPLICATIONS

/// Live events needing dual output formats and signal extension

/// Hotel ballroom with extension and audio breakout

/// Long distance extension with no local power available at the Rx side

/// On-site equipment testing

# 3. PACKAGE CONTENTS

*Transmitter*

/// 1×HDMI over HDBaseT Scaling Transmitter

/// 1×IR Blaster Cable

/// 1×IR Extender Cable

/// 1×Terminal Block (3-pin)

/// 1×Terminal Block (5-pin)

/// 1×Power Cord

/// 1×24V/2.7A DC Power Adaptor

/// 1×Operation Manual

*Receiver*

/// 1×HDMI over HDBaseT Scaling Receiver

/// 1×IR Blaster Cable

/// 1×IR Extender Cable

/// 1×Terminal Block (3-pin)

/// 1×Terminal Block (5-pin)

/// 1×5V/3A DC Power Adaptor

/// 1×Operation Manual

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## 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.

/// Transmitter requires a compatible HDBaseT™ receiver with 48V PoH support. An HDBaseT™ receiver equipped with Optical Audio Return (OAR) channel support are strongly recommended.

/// Receiver requires a compatible HDBaseT™ transmitter as a video source. An HDBaseT™ transmitter equipped with Optical Audio Return (OAR) channel support and 48V PoH is strongly recommended.

*Notes:*

*When displaying 4K HDR, or an equivalent signal, an appropriate display is required in order to obtain the best image.*

*HDMI cable distance can be impacted by the materials and design of the cable used. The use of "Premium High Speed HDMI" cables is highly recommended.*

## 5. FEATURES

/// Supports the HDBaseT 1.0 specification

/// HDBaseT 5Play™ convergence: High-Definition (HD) Video and Audio, 100BaseT Ethernet, 48V PoH, and Control (Bi-directional IR/RS-232 pass-through)

/// Supports UHD resolutions up to 3840×2160@50/60Hz (YUV 4:4:4) & 4096×2160@50/60Hz (YUV 4:4:4)

/// Supports pass-through of all standard digital audio: LPCM 2.0/5.1/7.1, Bitstream & HD Bitstream

/// Supports RS-232 baud rates from 110~115200bps

/// 10/100 Ethernet network support

/// Fully compliant with HDMI 1.4, and compatible with HDMI 2.0 (4K@60Hz, YUV 4:2:0)

/// HDMI with 18Gbps (600MHz) 4K support and HDCP 2.2 compliant

/// Supports Deep Colour up to 1080p/12-bit

/// Supports DVI to HDMI conversion

/// Supports signal bypass on HDMI output (on the Transmitter)

/// Transmitter can upscale 1080p signals to 4K over HDBaseT output or downscale 4K signal to 1080p (same framerate is maintained)

/// Receiver supports signal bypass on both outputs or output B can upscale 1080p signals to 4K and output A can downscale a 4K signal to 1080p (same framerate is maintained)

/// Supports 4K UHD (4:4:4) to 4K UHD (4:2:0) conversion

/// Supports OAR (Optical Audio Return) and DAC audio balance conversion

/// Test pattern generation at select resolutions for on-site display testing

/// Integrated EDID management

/// OSD with instant I/O resolution display

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# 6. OPERATION CONTROLS AND FUNCTIONS

## 6.1 Transmitter Front Panel
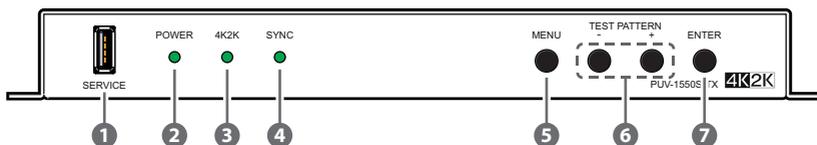


**1** **SERVICE:** This slot is reserved for firmware update use only.

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

**3** **4K2K:** This LED will illuminate to indicate the input source contains a 4K UHD signal.

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

**5** **MENU:** Press to enter the OSD menu, or to back out from menu items. Press and hold this button together with the "-" button for 3 seconds to reset the unit back to factory defaults.

**6** **DOWN & UP/TEST PATTERN:** When the OSD menu is in use, press these buttons to move within the menu. Outside of the OSD, press these buttons together to instantly set the output timing to 1280×720@60Hz and display test patterns on both outputs.

**7** **ENTER:** Press to confirm a selection or to go deeper into a menu item.

## 6.2 Transmitter Rear Panel
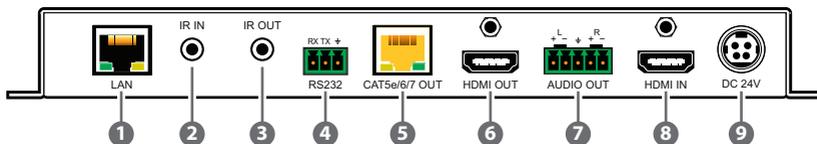


**1** **LAN:** Connect to an Ethernet supporting device or to your local network as appropriate. The yellow LED will illuminate to indicate a successful LAN connection between the Transmitter and Receiver, however, if the yellow LED blinks irregularly it indicates a data link error. The green LED will illuminate when the connected Ethernet speed is 100Mbit/s.

**2 IR IN:** 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.

**3 IR OUT:** Connect to the provided IR Blaster to transmit IR signals to devices within direct line-of-sight of the IR Blaster.

**4 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. For receiving commands from the Receiver side, depending on your equipment's pinout, the Tx and Rx pins might need to be reversed.

**5 CAT5e/6/7 OUT:** Connect to a compatible Receiver unit with a single Cat.5e/6/7 cable for transmission of all data signals. The output resolution can be different from the resolution selected for the HDMI output. A test pattern can also be displayed. 48V PoH will be provided to compatible Receivers only.

**6 HDMI OUT:** Connect to HDMI TVs, monitors or amplifiers for digital video and audio output. The output resolution can be different from the resolution selected for the HDBaseT output. A test pattern can also be displayed.

**7 AUDIO OUT:** Connect to powered speakers, an audio amplifier, mixer, or DSP for balanced stereo analog output extracted from an HDMI or OAR source with LPCM 2.0 audio. (Follows balanced audio specifications.)

**8 HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box.

**9 DC 24V:** Plug the 24V DC power adapter into the unit and connect it to an AC wall outlet for power.

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### 6.3 Receiver Front Panel
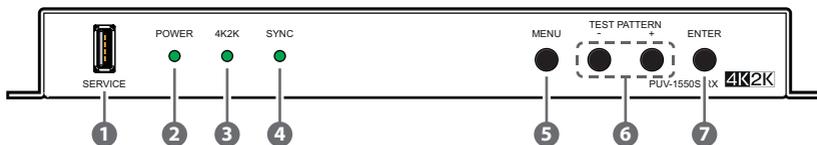


**①** **SERVICE:** This slot is reserved for firmware update use only.

**②** **POWER:** This LED will illuminate to indicate the unit is on and receiving power.

**③** **4K2K:** This LED will illuminate to indicate the input source contains a 4K UHD signal.

**④** **SYNC:** This LED will illuminate when a live input source is detected.

**⑤** **MENU:** Press to enter the OSD menu, or to back out from menu items. Once within the OSD press this button a second time to exit. Press and hold this button together with the "-" button for 3 seconds to reset the unit back to factory defaults.

**⑥** **DOWN & UP/TEST PATTERN:** When the OSD menu is in use, press these buttons to move within the menu. Outside of the OSD, press these buttons together to instantly set the output timing to 1280×720@60Hz and display test patterns on both outputs.

**⑦** **ENTER:** Press to confirm a selection or to go deeper into a menu item.

### 6.4 Receiver Rear Panel



**①** **CAT5e/6/7 IN:** Connect to a compatible 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. The green LED will illuminate to indicate when PoH is active.
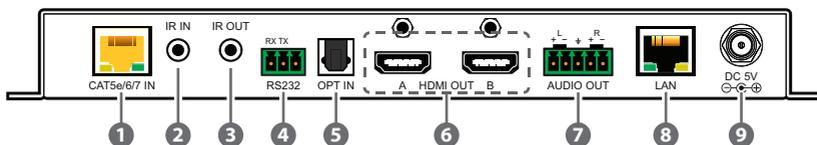
**②** **IR IN:** Connect to the provided IR Extender to extend the IR control range of remotely located devices. Ensure that the remote being used is within direct line-of-sight of the IR Extender.

**③ IR OUT:** Connect to the provided IR Blaster to transmit IR signals to devices within direct line-of-sight of the IR Blaster.

**④ RS-232:** Connect to the device you wish to control via a 3-pin adapter cable to receive RS-232 commands from the Transmitter. For sending commands to the Transmitter side, depending on your equipment's pinout, the Tx and Rx pins might need to be reversed.

**⑤ OPT. IN:** Connect to the optical audio output of a device such as a media player or game console using an appropriate optical cable. The audio will be sent back to the Transmitter via the OAR (Optical Audio Return) feature.

**⑥ HDMI OUT A~B:** Connect to HDMI TVs, monitors or amplifiers for digital video and audio output. The selected output resolution can be different for each HDMI port. A test pattern can also be displayed.

**⑦ AUDIO OUT:** Connect to powered speakers, an audio amplifier, mixer, or DSP for balanced stereo analog output extracted from an HDMI source with LPCM 2.0 audio. (Follows balanced audio specifications.)

**⑧ 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, however, if the yellow LED blinks irregularly it indicates a data link error. The green LED will illuminate when the connected Ethernet speed is 100Mbit/s.

**⑨ DC 5V:** Plug the 5V DC power adapter into the unit and connect it to an AC wall outlet for power. (Not required if the unit is being powered by a 48V PoH Transmitter.)

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## 6.5 IR Cable Pin Assignment

**IR Blaster**

1 **Power**
2 **IR Signal**
3 **NC**

**IR Extender**

1 **IR Signal**
2 **Power**
3 **Ground**
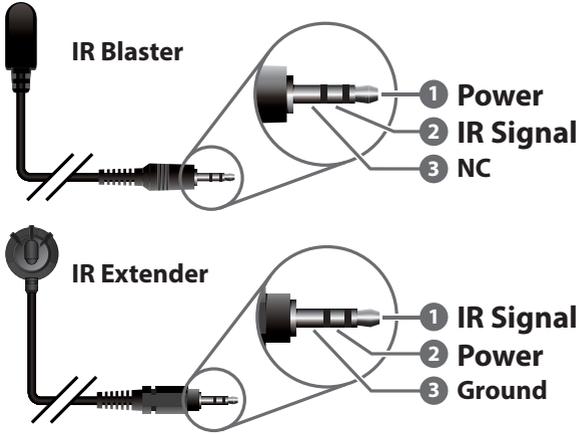
## 6.6 OSD Menu

### 6.6.1 Transmitter OSD Menu

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---------|---------|---------|---------|
| OUTPUT | OUTPUT HDBaseT | INPUT 4K2K | DOWN 1080P |
| | | | FIX 4K2K |
| | | | AUTO |
| | OUTPUT HDMI | INPUT 1080P | **PASS THROUGH** |
| | | | UP 4K2K |
| | | | UP 4K2K (YUV420) |
| | | INPUT 4K2K | **PASS THROUGH** |
| | | | FIX 4K2K (YUV420) |
| | | | FIX 8 BITS |
| AUDIO | AUDIO SOURCE | **HDMI** | |
| | | OAR | |
| EDID | INTERNAL 4K (6G-2CH) | | |
| | INTERNAL 4K (3G-2CH) | | |
| | INTERNAL 4K (420-2CH) | | |
| | INT 1080P (2CH) | | |
| | EXTERNAL HDBaseT | | |
| | EXTERNAL HDMI | | |
| | EXTERNAL HDBaseT (2CH) | | |
| | EXTERNAL HDMI (2CH) | | |
| HDCP | HDCP SUPPORT OFF | | |
| | REFER TO SOURCE | | |
| | **REFER TO DISPLAY** | | |

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---------|---------|---------|---------|
| OSD | DISPLAY INFO. | ON | |
| | | **OFF** | |
| | OSD TIME OUT | OFF | |
| | | 5 SEC. | |
| | | 10 SEC. | |
| | | 15 SEC. | |
| | | 20 SEC. | |
| | | 25 SEC. | |
| | | 30 SEC. | |
| | | 35 SEC. | |
| | | **40 SEC.** | |
| TEST PATTERN HDBaseT | MODE | **OFF** | |
| | | ON | |
| | | AUTO PATTERN | |
| | | AUTO TIMING | |
| | PATTERN | **WHITE COLOR** | |
| | | RED COLOR | |
| | | GREEN COLOR | |
| | | BLUE COLOR | |
| | | MAGENTA COLOR | |
| | | YELLOW COLOR | |
| | | CYAN COLOR | |
| | | COLOR BAR | |
| | | RAMP | |
| | | TOGGLE | |
| | RESOLUTION | 720×480P@60 | |
| | | 720×576P@50 | |
| | | 1280×720P@50 | |

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---------|---------|---------|---------|
| TEST PATTERN HDBaseT (cont.) | RESOLUTION | **1280×720P@60** | |
| | | 1920×1080P@50 | |
| | | 1920×1080P@60 | |
| | | 3840×2160P@24 | |
| | | 3840×2160P@25 | |
| | | 3840×2160P@30 | |
| | | 4096×2160P@24 | |
| | | 4096×2160P@25 | |
| | | 4096×2160P@30 | |
| | HDCP | **DISABLE** | |
| | | ENABLE | |
| | SWITCH TIME | 10 SEC. | |
| | | 20 SEC. | |
| | | 30 SEC. | |
| | | 40 SEC. | |
| | | 50 SEC. | |
| | | 1 MIN. | |
| | | 2 MIN. | |
| | | 3 MIN. | |
| | | 5 MIN. | |
| | AUTO TIMING SELECT | 720×480P@60 | |
| | | 720×576P@50 | |
| | | 1280×720P@50 | |
| | | 1280×720P@60 | |
| | | 1920×1080P@50 | |
| | | 1920×1080P@60 | |
| | | 3840×2160P@24 | |
| | | 3840×2160P@25 | |
| | | 3840×2160P@30 | |
| | | 4096×2160P@24 | |

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| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---------|---------|---------|---------|
| TEST PATTERN HDBaseT (cont.) | AUTO TIMING SELECT | 4096×2160P@25 | |
| | | 4096×2160P@30 | |
| | MODE | **OFF** | |
| | | ON | |
| | | AUTO PATTERN | |
| | | AUTO TIMING | |
| | PATTERN | **WHITE COLOR** | |
| | | RED COLOR | |
| | | GREEN COLOR | |
| | | BLUE COLOR | |
| | | MAGENTA COLOR | |
| | | YELLOW COLOR | |
| | | CYAN COLOR | |
| | | COLOR BAR | |
| | | RAMP | |
| | | TOGGLE | |
| | RESOLUTION | 720×480P@60 | |
| | | 720×576P@50 | |
| | | 1280×720P@50 | |
| | | 1280×720P@60 | |
| | | 1920×1080P@50 | |
| | | 1920×1080P@60 | |
| | | 3840×2160P@24 | |
| | | 3840×2160P@25 | |
| | | 3840×2160P@30 | |
| | | 4096×2160P@24 | |
| | | 4096×2160P@25 | |
| | | 4096×2160P@30 | |
| | | 3840×2160P@50 | |

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---------|---------|---------|---------|
| TEST PATTERN HDMI (cont.) | RESOLUTION | 3840×2160P@60 | |
| | | 4096×2160P@50 | |
| | | 4096×2160P@60 | |
| | HDCP | **DISABLE** | |
| | | ENABLE | |
| | SWITCH TIME | **10 SEC.** | |
| | | 20 SEC. | |
| | | 30 SEC. | |
| | | 40 SEC. | |
| | | 50 SEC. | |
| | | 1 MIN. | |
| | | 2 MIN. | |
| | | 3 MIN. | |
| | | 5 MIN. | |
| | AUTO TIMING SELECT | 720×480P@60 | |
| | | 720×576P@50 | |
| | | 1280×720P@50 | |
| | | 1280×720P@60 | |
| | | 1920×1080P@50 | |
| | | 1920×1080P@60 | |
| | | 3840×2160P@24 | |
| | | 3840×2160P@25 | |
| | | 3840×2160P@30 | |
| | | 4096×2160P@24 | |
| | | 4096×2160P@25 | |
| | | 4096×2160P@30 | |
| | | 3840×2160P@50 | |
| | | 3840×2160P@60 | |
| | | 4096×2160P@50 | |
| | | 4096×2160P@60 | |

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---|---|---|---|
| INFORMATION | RESOLUTION | INPUT | |
| | | HDBaseT OUTPUT | |
| | | HDMI OUTPUT | |
| | HDCP | HDBaseT OUTPUT | |
| | | HDMI OUTPUT | |
| | FIRMWARE | SYSTEM VERSION | |
| | | VALENS VERSION | |
| FIRMWARE UPDATE | | | |
| FACTORY SETTING | | | |

*Note:*

*Values in **Bold** are factory default settings.*

*When input timing is non-VESA compliant the OSD may be disabled. To get into the OSD menu in this case, press the hot key combination to enter into test pattern mode and operate the OSD menu while the test pattern is displaying.*

## 6.6.2 Receivers OSD Menu

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---------|---------|---------|---------|
| OUTPUT | OUTPUT A | INPUT 4K2K | **PASS THROUGH** |
| | | | DOWN 1080P |
| | | | FIX 4K2K (RGB444) |
| | | | FIX 4K2K (YUV444) |
| | | | AUTO |
| | OUTPUT B | INPUT 1080P | **PASS THROUGH** |
| | | | UP 4K2K |
| | | | UP 4K2K (YUV420) |
| | | INPUT 4K2K | **PASS THROUGH** |
| | | | FIX 4K2K (RGB444) |
| | | | FIX 4K2K (YUV444) |
| | | | 4K2K COLOR AUTO FIX |
| EDID | INTERNAL 4K (3G-2CH) | | |
| | INTERNAL 4K (420-2CH) | | |
| | INTERNAL 1080P (2CH) | | |
| | EXTERNAL OUT A | | |
| | EXTERNAL OUT B | | |
| | EXTERNAL OUT A (2CH) | | |
| | EXTERNAL OUT B (2CH) | | |
| HDCP | HDCP SUPPORT OFF | | |
| | REFER TO SOURCE | | |
| | **REFER TO DISPLAY** | | |

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---|---|---|---|
| OSD (cont.) | DISPLAY INFO. | **ON** | |
| | DISPLAY INFO. | OFF | |
| | OSD TIME OUT | OFF | |
| | | 5 SEC. | |
| | | 10 SEC. | |
| | | 15 SEC. | |
| | | 20 SEC. | |
| | | 25 SEC. | |
| | | 30 SEC. | |
| | | 35 SEC. | |
| | | **40 SEC.** | |
| TEST PATTERN A | MODE | **OFF** | |
| | | ON | |
| | | AUTO PATTERN | |
| | | AUTO TIMING | |
| | PATTERN | **WHITE COLOR** | |
| | | RED COLOR | |
| | | GREEN COLOR | |
| | | BLUE COLOR | |
| | | MAGENTA COLOR | |
| | | YELLOW COLOR | |
| | | CYAN COLOR | |
| | | COLOR BAR | |
| | | RAMP | |
| | | TOGGLE | |
| | RESOLUTION | 720×480P@60 | |
| | | 720×576P@50 | |
| | | 1280×720P@50 | |
| | | **1280×720P@60** | |
| | | 1920×1080P@50 | |

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---------|---------|---------|---------|
| TEST PATTERN A (cont.) | RESOLUTION | 1920×1080P@60 | |
| | | 3840×2160P@24 | |
| | | 3840×2160P@25 | |
| | | 3840×2160P@30 | |
| | | 4096×2160P@24 | |
| | | 4096×2160P@25 | |
| | | 4096×2160P@30 | |
| | HDCP | **DISABLE** | |
| | | ENABLE | |
| | SWITCH TIME | **10 SEC.** | |
| | | 20 SEC. | |
| | | 30 SEC. | |
| | | 40 SEC. | |
| | | 50 SEC. | |
| | | 1 MIN. | |
| | | 2 MIN. | |
| | | 3 MIN. | |
| | | 5 MIN. | |
| | AUTO TIMING SELECT | 720×480P@60 | |
| | | 720×576P@50 | |
| | | 1280×720P@50 | |
| | | 1280×720P@60 | |
| | | 1920×1080P@50 | |
| | | 1920×1080P@60 | |
| | | 3840×2160P@24 | |
| | | 3840×2160P@25 | |
| | | 3840×2160P@30 | |
| | | 4096×2160P@24 | |
| | | 4096×2160P@25 | |
| | | 4096×2160P@30 | |

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---------|---------|---------|---------|
| TEST PATTERN B (cont.) | MODE | **OFF** | |
| | | ON | |
| | | AUTO PATTERN | |
| | | AUTO TIMING | |
| | PATTERN | **WHITE COLOR** | |
| | | RED COLOR | |
| | | GREEN COLOR | |
| | | BLUE COLOR | |
| | | MAGENTA COLOR | |
| | | YELLOW COLOR | |
| | | CYAN COLOR | |
| | | COLOR BAR | |
| | | RAMP | |
| | | TOGGLE | |
| | RESOLUTION | 720×480P@60 | |
| | | 720×576P@50 | |
| | | 1280×720P@50 | |
| | | **1280×720P@60** | |
| | | 1920×1080P@50 | |
| | | 1920×1080P@60 | |
| | | 3840×2160P@24 | |
| | | 3840×2160P@25 | |
| | | 3840×2160P@30 | |
| | | 4096×2160P@24 | |
| | | 4096×2160P@25 | |
| | | 4096×2160P@30 | |
| | | 3840×2160P@50 | |
| | | 3840×2160P@60 | |
| | | 4096×2160P@50 | |

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---------|---------|---------|---------|
| TEST PATTERN B (cont.) | RESOLUTION | 4096×2160P@60 | |
| | HDCP | **DISABLE** | |
| | | ENABLE | |
| | SWITCH TIME | **10 SEC.** | |
| | | 20 SEC. | |
| | | 30 SEC. | |
| | | 40 SEC. | |
| | | 50 SEC. | |
| | | 1 MIN. | |
| | | 2 MIN. | |
| | | 3 MIN. | |
| | | 5 MIN. | |
| | AUTO TIMING SELECT | 720×480P@60 | |
| | | 720×576P@50 | |
| | | 1280×720P@50 | |
| | | 1280×720P@60 | |
| | | 1920×1080P@50 | |
| | | 1920×1080P@60 | |
| | | 3840×2160P@24 | |
| | | 3840×2160P@25 | |
| | | 3840×2160P@30 | |
| | | 4096×2160P@24 | |
| | | 4096×2160P@25 | |
| | | 4096×2160P@30 | |
| | | 3840×2160P@50 | |
| | | 3840×2160P@60 | |
| | | 4096×2160P@50 | |
| | | 4096×2160P@60 | |
| INFORMATION | RESOLUTION | INPUT | |
| | | OUTPUT A | |

| LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 |
|---------|---------|---------|---------|
| INFORMATION (cont.) | RESOLUTION | OUTPUT B | |
| | HDCP | OUTPUT A | |
| | | OUTPUT B | |
| | FIRMWARE | SYSTEM VERSION | |
| | | VALENS VERSION | |
| FIRMWARE UPDATE | | | |
| FACTORY SETTING | | | |

*Note:*

*Values in **Bold** are factory default settings.*

*When input timing is non-VESA compliant the OSD may be disabled. To get into the OSD menu in this case, press the hot key combination to enter into test pattern mode and operate the OSD menu while the test pattern is displaying.*

CYP///

## 6.6.3 Common Conversion Rules

### DOWN 1080P

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| 3840×2160p@24 | → | 1920×1080p@24 |
| 3840×2160p@25 | → | 1920×1080p@25 |
| 3840×2160p@30 | → | 1920×1080p@30 |
| 3840×2160p@50 | → | 1920×1080p@50 |
| 3840×2160p@60 | → | 1920×1080p@60 |
| 4096×2160p@24 | → | 1920×1080p@24 |
| 4096×2160p@25 | → | 1920×1080p@25 |
| 4096×2160p@30 | → | 1920×1080p@30 |
| 4096×2160p@50 | → | 1920×1080p@50 |
| 4096×2160p@60 | → | 1920×1080p@60 |

### UP 4K2K

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| 1920×1080p@24 | → | 3840×2160p@24 |
| 1920×1080p@25 | → | 3840×2160p@25 |
| 1920×1080p@30 | → | 3840×2160p@30 |
| 1920×1080p@50 | → | 3840×2160p@50 |
| 1920×1080p@60 | → | 3840×2160p@60 |

### UP 4K2K (YUV420)

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| **RGB 4:4:4 & YCbCr 4:4:4/4:2:2** | | **YCbCr 4:2:0** |
| 1920×1080p@50 | → | 3840×2160p@50 |
| 1920×1080p@60 | → | 3840×2160p@60 |

### 6.6.4 Transmitter's Conversion Rules

#### FIX 4K2K

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| **RGB 4:4:4 & YCbCr 4:4:4/4:2:2, 8/10/12/16-bit** | | **RGB 4:4:4 & YCbCr 4:4:4/4:2:2, 8-bit** |
| 3840×2160p@24 | → | 3840×2160p@24 |
| 3840×2160p@25 | → | 3840×2160p@25 |
| 3840×2160p@30 | → | 3840×2160p@30 |
| 4096×2160p@24 | → | 4096×2160p@24 |
| 4096×2160p@25 | → | 4096×2160p@25 |
| 4096×2160p@30 | → | 4096×2160p@30 |
| **RGB 4:4:4 & YCbCr 4:4:4/4:2:2/4:2:0, 8/10/12/16-bit** | | **YCbCr 4:2:0, 8-bit** |
| 3840×2160p@50 | → | 3840×2160p@50 |
| 3840×2160p@60 | → | 3840×2160p@60 |
| 4096×2160p@50 | → | 4096×2160p@50 |
| 4096×2160p@60 | → | 4096×2160p@60 |

#### FIX 4K2K (YUV420)

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| **RGB 4:4:4 & YCbCr 4:4:4/4:2:2** | | **YCbCr 4:2:0** |
| 3840×2160p@50 | → | 3840×2160p@50 |
| 3840×2160p@60 | → | 3840×2160p@60 |
| 4096×2160p@50 | → | 4096×2160p@50 |
| 4096×2160p@60 | → | 4096×2160p@60 |

**FIX 8 BITS**

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| **RGB 4:4:4 & YCbCr 4:4:4/4:2:2, 10/12/16-bit** | | **RGB 4:4:4 & YCbCr 4:4:4/4:2:2, 8-bit** |
| 3840×2160p@24 | → | 3840×2160p@24 |
| 3840×2160p@25 | → | 3840×2160p@25 |
| 3840×2160p@30 | → | 3840×2160p@30 |
| 4096×2160p@24 | → | 4096×2160p@24 |
| 4096×2160p@25 | → | 4096×2160p@25 |
| 4096×2160p@30 | → | 4096×2160p@30 |
| **YCbCr 4:2:0, 10/12/16-bit** | | **YCbCr 4:2:0, 8-bit** |
| 3840×2160p@50 | → | 3840×2160p@50 |
| 3840×2160p@60 | → | 3840×2160p@60 |
| 4096×2160p@50 | → | 4096×2160p@50 |
| 4096×2160p@60 | → | 4096×2160p@60 |

**AUTO**

Defaults to "FIX 4K2K" mode, however, if the connected sink does not support 4K then the signal will be down-scaled to 1080p.

### 6.6.5 Receiver's Conversion Rules

#### FIX 4K2K (RGB444)

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| **RGB 4:4:4 & YCbCr 4:4:4/4:2:2** | | **RGB 4:4:4** |
| 3840×2160p@24 | → | 3840×2160p@24 |
| 3840×2160p@25 | → | 3840×2160p@25 |
| 3840×2160p@30 | → | 3840×2160p@30 |
| 4096×2160p@24 | → | 4096×2160p@24 |
| 4096×2160p@25 | → | 4096×2160p@25 |
| 4096×2160p@30 | → | 4096×2160p@30 |
| **RGB 4:4:4 & YCbCr 4:4:4/4:2:2/4:2:0** | | **RGB 4:4:4** |
| 3840×2160p@50 | → | 3840×2160p@50 |
| 3840×2160p@60 | → | 3840×2160p@60 |
| 4096×2160p@50 | → | 4096×2160p@50 |
| 4096×2160p@60 | → | 4096×2160p@60 |

#### FIX 4K2K (YUV444)

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| **RGB 4:4:4 & YCbCr 4:4:4/4:2:2** | | **YCbCr 4:4:4** |
| 3840×2160p@24 | → | 3840×2160p@24 |
| 3840×2160p@25 | → | 3840×2160p@25 |
| 3840×2160p@30 | → | 3840×2160p@30 |
| 4096×2160p@24 | → | 4096×2160p@24 |
| 4096×2160p@25 | → | 4096×2160p@25 |
| 4096×2160p@30 | → | 4096×2160p@30 |
| **RGB 4:4:4 & YCbCr 4:4:4/4:2:2/4:2:0** | | **YCbCr 4:4:4** |
| 3840×2160p@50 | → | 3840×2160p@50 |
| 3840×2160p@60 | → | 3840×2160p@60 |
| 4096×2160p@50 | → | 4096×2160p@50 |
| 4096×2160p@60 | → | 4096×2160p@60 |

**AUTO**

If the input is RGB and the output supports RGB.

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| **RGB 4:4:4** | | **RGB 4:4:4** |
| 3840×2160p@24 | → | 3840×2160p@24 |
| 3840×2160p@25 | → | 3840×2160p@25 |
| 3840×2160p@30 | → | 3840×2160p@30 |
| 3840×2160p@50 | → | 3840×2160p@50 |
| 3840×2160p@60 | → | 3840×2160p@60 |
| 4096×2160p@24 | → | 4096×2160p@24 |
| 4096×2160p@25 | → | 4096×2160p@25 |
| 4096×2160p@30 | → | 4096×2160p@30 |
| 4096×2160p@50 | → | 4096×2160p@50 |
| 4096×2160p@60 | → | 4096×2160p@60 |

If the input is YUV 4:4:4, and the output can support it, then the output will be YUV 4:4:4. If the input is YUV 4:4:4, and the output can't support it, then the output will be converted to RGB 4:4:4.

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| **YCbCr 4:4:4** | | **RGB 4:4:4 & YCbCr 4:4:4** |
| 3840×2160p@24 | → | 3840×2160p@24 |
| 3840×2160p@25 | → | 3840×2160p@25 |
| 3840×2160p@30 | → | 3840×2160p@30 |
| 3840×2160p@50 | → | 3840×2160p@50 |
| 3840×2160p@60 | → | 3840×2160p@60 |
| 4096×2160p@24 | → | 4096×2160p@24 |
| 4096×2160p@25 | → | 4096×2160p@25 |
| 4096×2160p@30 | → | 4096×2160p@30 |
| 4096×2160p@50 | → | 4096×2160p@50 |
| 4096×2160p@60 | → | 4096×2160p@60 |

If the input is YUV 4:2:2, and the output can support it, then the output will be YUV 4:2:2. If the output does not support YUV 4:2:2 but does support YUV 4:4:4, then the output will be YUV 4:4:4. If the output does not support YUV 4:2:2 or 4:4:4, then the output will be RGB.

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| **YCbCr 4:2:2** | | **RGB 4:4:4 & YCbCr 4:4:4/4:2:2** |
| 3840×2160p@24 | → | 3840×2160p@24 |
| 3840×2160p@25 | → | 3840×2160p@25 |
| 3840×2160p@30 | → | 3840×2160p@30 |
| 3840×2160p@50 | → | 3840×2160p@50 |
| 3840×2160p@60 | → | 3840×2160p@60 |
| 4096×2160p@24 | → | 4096×2160p@24 |
| 4096×2160p@25 | → | 4096×2160p@25 |
| 4096×2160p@30 | → | 4096×2160p@30 |
| 4096×2160p@50 | → | 4096×2160p@50 |
| 4096×2160p@60 | → | 4096×2160p@60 |

If the input is YUV 4:2:0, and the output is not 18Gbps capable, then the output will be YUV 4:2:0. If the output is 18Gbps capable and supports YUV 4:4:4, then the output will be YUV 4:4:4. If the output is 18Gbps capable, but does not support YUV 4:4:4, then the output will be RGB.

| Input Resolution (Hz) | | Output Resolution (Hz) |
|---|---|---|
| **YCbCr 4:2:0** | | **RGB 4:4:4 & YCbCr 4:4:4/4:2:0** |
| 3840×2160p@50 | → | 3840×2160p@50 |
| 3840×2160p@60 | → | 3840×2160p@60 |
| 4096×2160p@50 | → | 4096×2160p@50 |
| 4096×2160p@60 | → | 4096×2160p@60 |

# 7. CONNECTION DIAGRAM

**CYP** ///
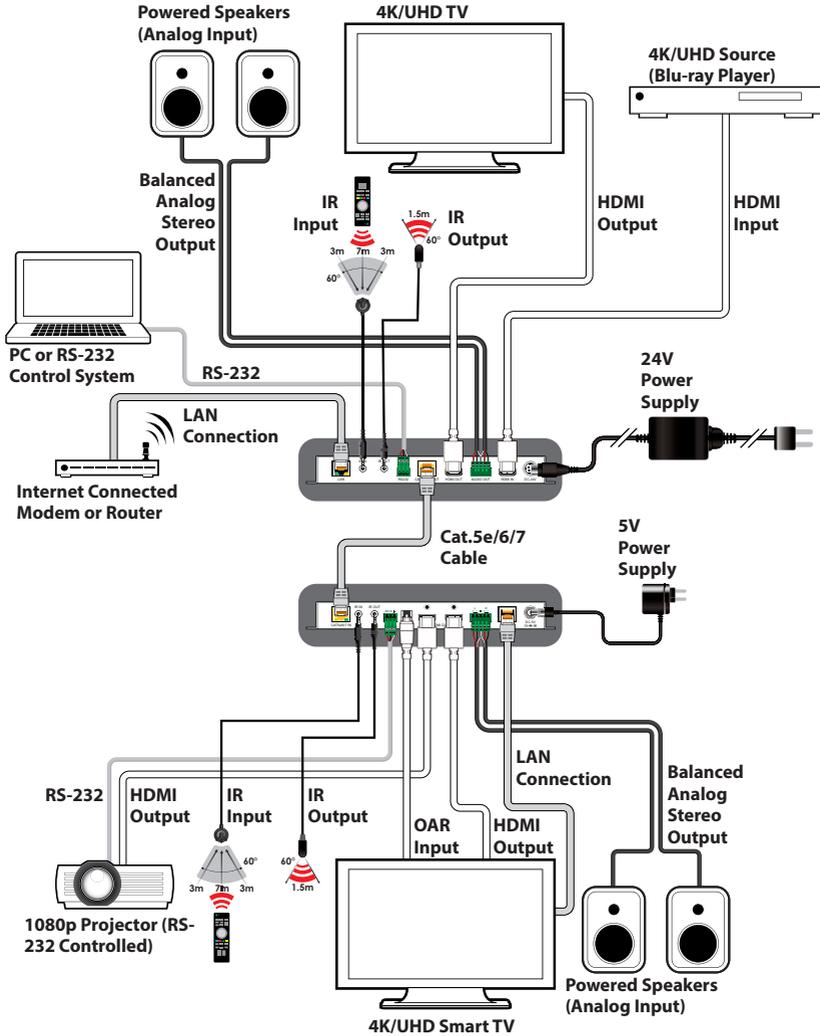
# 8. SPECIFICATIONS

## 8.1 Technical Specifications

### *Transmitter*

| | |
|---|---|
| **Video Bandwidth** | HDMI: 600MHz/18Gbps<br>HDBaseT: 340MHz/10.2Gbps |
| **Input Ports** | 1×HDMI |
| **Output Ports** | 1×HDMI, 1×Cat.5e/6/7<br>1×Balanced Stereo Audio (5-pin Terminal Block) |
| **Control Interfaces** | 1×IR Blaster (3.5mm)<br>1×IR Extender (3.5mm)<br>1×RS-232 (3-pin Terminal Block)<br>1×LAN (RJ45) |
| **HDMI Cable Length** | 10m (1080p@60Hz, 12-bit)<br>5m (4K@60Hz, 4:4:4, 8-bit) |
| **IR Frequency** | 30 - 50kHz (30 - 60kHz under ideal conditions) |
| **Baud Rate** | Up to 115200bps |
| **Power Supply** | 24V/2.7A DC (US/EU standards, CE/FCC/UL certified) |
| **ESD Protection** | Human Body Model:<br>±12kV (Air Discharge)<br>±8kV (Contact Discharge) |
| **Dimensions** | 231.5mm×25mm×108mm (W×H×D)<br>[Case Only]<br>231.5mm×25mm×117mm (W×H×D)<br>[All Inclusive] |
| **Weight** | 648g |
| **Chassis Material** | Metal |

| | |
|---|---|
| **Silkscreen 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** | 20.28W |

*Receiver*

| | |
|---|---|
| **Video Bandwidth** | HDMI: 600MHz/18Gbps<br>HDBaseT: 340MHz/10.2Gbps |
| **Input Ports** | 1×Cat.5e/6/7<br>1×S/PDIF Audio (TOSLINK) |
| **Output Ports** | 2×HDMI<br>1×Balanced Stereo Audio (5-pin Terminal Block) |
| **Control Interfaces** | 1×IR Blaster (3.5mm)<br>1×IR Extender (3.5mm)<br>1×RS-232 (3-pin Terminal Block)<br>1×LAN (RJ45) |
| **HDMI Cable Length** | 10m (1080p@60Hz, 12-bit)<br>5m (4K@60Hz, 4:4:4, 8-bit) |
| **IR Frequency** | 30 - 50kHz (30 - 60kHz under ideal conditions) |
| **Baud Rate** | Up to 115200bps |
| **Power Supply** | 5V/3A DC (US/EU standards, CE/FCC/UL certified) |
| **ESD Protection** | Human Body Model:<br>±12kV (Air Discharge)<br>±8kV (Contact Discharge) |

| Dimensions | 231.5mm×25mm×108mm (W×H×D) [Case Only] |
| --- | --- |
| | 231.5mm×25mm×117mm (W×H×D) [All Inclusive] |
| Weight | 670g |
| Chassis Material | Metal |
| Silkscreen 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 | 13.86W |

## 8.2 Video Specifications

| Supported Resolutions (Hz) | HDMI Input | HDMI Output |
| --- | :---: | :---: |
| 640×480@60 | ✓ | ✓ |
| 800×600@56/60/72/75/85 | ✓ | ✓ |
| 1024×768@60/70/75/85 | ✓ | ✓ |
| 1280×768@60/75 | ✓ | ✓ |
| 1280×800@60/75 | ✓ | ✓ |
| 1280×1024@60/75 | ✓ | ✓ |
| 1366×768@60 | ✓ | ✓ |
| 1400×1050@60/75 | ✓ | ✓ |
| 1440×900@60/75 | ✓ | ✓ |
| 1600×900@60 | ✓ | ✓ |
| 1600×1200@60 | ✓ | ✓ |
| 1680×1050@60 | ✓ | ✓ |
| 1920×1200@60 | ✓ | ✓ |
| 720×480i@60 | ✓ | ✓ |

| Supported Resolutions (Hz) | HDMI Input | HDMI Output |
|---|:---:|:---:|
| **720×480p@60** | ✓ | ✓ |
| **720×576i@50** | ✓ | ✓ |
| **720×576p@50** | ✓ | ✓ |
| **1280×720p@50/60** | ✓ | ✓ |
| **1920×1080i@50/60** | ✓ | ✓ |
| **1920×1080p@24/25/30/50/60** | ✓ | ✓ |
| **3840×2160p@24/25/30/50/60** | ✓ | ✓ |
| **4096×2160p@24/25/30/50/60** | ✓ | ✓ |

## 8.3 Audio Specifications

| Input Level/Freq. | Output Terminal | Output Level | THD+N | Frequency Response | SNR | Crosstalk |
|---|---|---|---|---|---|---|
| **HDMI** 0dBFS, 1kHz | Balanced L/R | 4Vrms±10% | < 0.1% | ±3dB | > 70dB | < −60dB |
| **Optical** 0dBFS, 1kHz | Balanced L/R | 4Vrms±10% | < 0.1% | ±3dB | > 70dB | < −60dB |

## 8.4 Cable Specifications

| Cable Type | Cable Length | Supported Video Format |
|---|---|---|
| **Cat.5e/6/6a/7** | 100 metres | Full HD video: Up to 1080p@60Hz, 12-bit colour Data rates lower than 5.3Gbps or below 225MHz TMDS clock |
| **Cat.5e/6/6a/7** | 70 metres | Ultra HD video: 4K@24/25/30Hz & 4K@50/60Hz (YUV 4:2:0), 8-bit colour Data rates higher than 5.3Gbps or above 225MHz TMDS clock |

## 8.5 HDBaseT Features

| Features | Transmitter | Receiver |
|---|:---:|:---:|
| Audio/Video | ✓ | ✓ |
| Control (IR & RS-232) | ✓ | ✓ |
| Power Source Equipment (PSE) | ✓ | |
| Powered Device (PD) | | ✓ |
| LAN | ✓ | ✓ |

# 9. ACRONYMS

| ACRONYM | COMPLETE TERM |
|---------|---------------|
| Cat.5e | Category 5 (enhanced) Cable |
| Cat.6 | Category 6 Cable |
| Cat.7 | Category 7 Cable |
| 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 |
| OSD | On-Screen Display |
| PD | Powered Device |
| PoH | Power over HDBaseT |
| PSE | Power Sourcing Equipment |
| S/PDIF | Sony/Philips Digital Interface Format |
| UHD | Ultra-High-Definition |
| USB | Universal Serial Bus |
| VGA | Video Graphics Array (640×480@60Hz) |
| WUXGA | Wide Ultra Extended Graphics Array (1920×1200@60Hz) |