



# CPLUS-VHHE

4K UHD+ EDID Emulator  
with HDCP Converter



Operation Manual



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## SAFETY PRECAUTIONS

Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply.

Please keep the following in mind as you unpack and install this equipment:

- Always follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Never spill liquid of any kind on or into this product.
- Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.
- Do not attach the power supply cabling to building surfaces.
- Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.
- Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.
- To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air to circulate around the unit.

## REVISION HISTORY

| VERSION NO. | DATE (DD/MM/YY) | SUMMARY OF CHANGE                      |
|-------------|-----------------|--|
| VR0         | 07/09/16        | Preliminary release                    |
| VS1         | 17/03/17        | Added section 8.2 and updated diagrams |



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## 1. INTRODUCTION

This 4K UHD EDID Emulator with HDCP Converter is a handy device to include in your HDMI signal tool box. With support for full HDMI 2.0 bandwidth (up to 6Gbits per channel), HDCP analysis and conversion, EDID management, and YUV 4:2:0 color subsampling, this unit can help solve or diagnose many common HDMI issues. This unit provides a quick and easy way to view the status of an HDMI signal. Additionally, this unit provides a robust EDID management system, allowing the user to download or upload existing EDIDs, or to create a basic custom EDID from scratch for use within the unit. The unit's included hot keys and simple LED design allows the user to quickly switch between different configurations while viewing the HDMI status information.

## 2. APPLICATIONS

- Source and display signal status information
- EDID management
- HDCP verification
- 4K@50/60Hz (4:4:4) color subsampling to 4K@50/60Hz (YUV 4:2:0) for display compatibility

## 3. PACKAGE CONTENTS

- 1×EDID Emulator with HDCP Converter
- 1×5V/2.6A DC Power Adaptor
- 1×Operation Manual

## 4. SYSTEM REQUIREMENTS

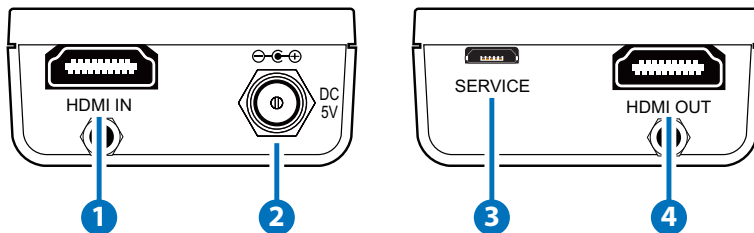
- HDMI source equipment such as media players, video game consoles or set-top boxes.
- HDMI receiving equipment such as HDTVs, monitors or audio amplifiers.
- The use of "Premium High Speed HDMI" cables is highly recommended.

## 5. FEATURES

- HDMI input and output with 18Gbps (600MHz) 4K UHD support
- DVI 1.0 compliant with the use of an HDMI-DVI adapter
- HDCP 1.4 and 2.2 compliant
- Supports HD resolutions up to 3840×2160@60Hz (4:4:4, 8-bit) & 4096×2160@60Hz (4:4:4, 8-bit)
- Supports pass-through of LPCM 2.0/5.1/7.1, Bitstream, and HD Bitstream audio formats
- Video source signal and display EDID analysis
- HDCP 2.2 to 1.4 conversion
- EDID selectable between internal, external and user's custom EDID
- PC-based EDID management tool support
- LED display with easy viewing of the current signal status
- Supports 18Gbps bandwidth bypass and 18Gbps color subsampling to 10.2Gbps (4K@50/60Hz, 4:4:4 to 4K@50/60Hz, YUV 4:2:0)
- Supports firmware updates via USB

## 6. OPERATION CONTROLS AND FUNCTIONS

### 6.1 Front and Rear Panels



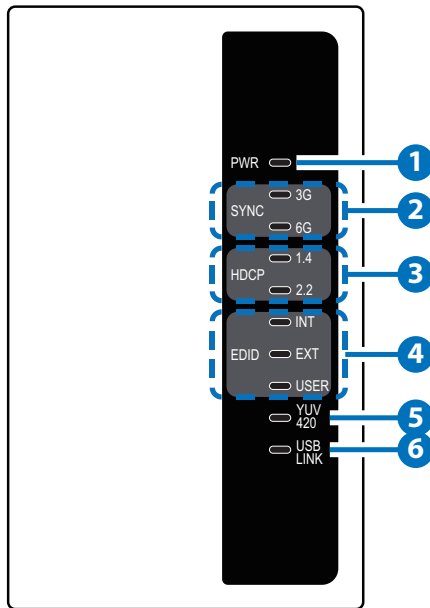
- 1 HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box. DVI sources are supported with the use of an HDMI to DVI adapter.

*Note: 4K UHD sources with HDR or equivalently high-bandwidth signals require an appropriate compatible display and HDMI cables in order to achieve the best image quality. The use of*

“Premium High Speed HDMI” cables is highly recommended.

- 2 DC 5V:** Plug the 5V DC power adapter into the unit and connect it to an AC wall outlet for power.
- 3 SERVICE:** This slot is used for PC software control, EDID upload and firmware updates (see section 6.4).
- 4 HDMI OUT:** Connect to an HDMI TV, monitor or amplifier for digital video and audio output.

## 6.2 Top Panel



- 1 PWR LED:** The LED will illuminate to indicate the unit is on and receiving power.
- 2 SYNC LEDs:** These LEDs will illuminate according to the HDMI input and output signal's current bandwidth. When the input signal is 6G, and the “YUV420” feature is active, both LEDs will illuminate. When the LED is blinking it indicates a problem with the signal.
- 3 HDCP LEDs:** These LEDs will illuminate according to the HDCP encryption status of the HDMI source signal and the reported

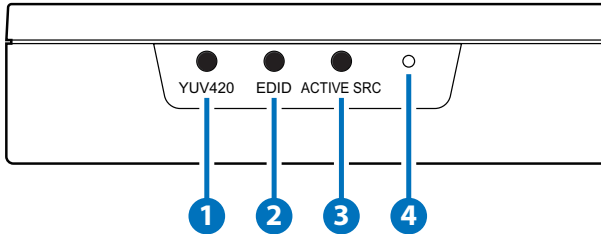


capability of the connected display. When both input and output support HDCP 2.2, the “2.2” LED will illuminate. When the input signal is HDCP 2.2 encrypted but the display only supports HDCP 1.4, both LEDs will illuminate. If an LED is blinking it indicates that the HDCP link has failed. When the LEDs are not illuminated it indicates that HDCP is not active. Please reference the chart below for more detail.

| Input's HDCP |     |     | Output's HDCP |     |     | Unit's HDCP LEDs |                 |
|--------------|-----|-----|---------------|-----|-----|------------------|-----------------|
| 1.4          | 2.2 | Non | 1.4           | 2.2 | Non | 1.4 LED          | 2.2 LED         |
| ✓            |     |     | ✓             |     |     | illuminated      | Not illuminated |
| ✓            |     |     |               | ✓   |     | illuminated      |                 |
| ✓            |     |     |               |     | ✓   | Blinking         |                 |
|              | ✓   |     | ✓             |     |     | illuminated      | illuminated     |
|              | ✓   |     |               | ✓   |     | Not illuminated  | illuminated     |
|              | ✓   |     |               |     | ✓   |                  | Blinking        |
|              |     | ✓   | ✓             |     |     | Not illuminated  | Not illuminated |
|              |     | ✓   |               | ✓   |     |                  |                 |
|              |     | ✓   |               |     | ✓   |                  |                 |

- 4 EDID LEDs:** The LED indicating the currently selected EDID source will be illuminated.
- 5 YUV420 LED:** This LED will illuminate if the YUV420 (4K (4:4:4) to 4K (YUV 4:2:0)) function is active.
- 6 USB LINK LED:** This LED will illuminate when the unit has an active connection with the PC Control Software via the Micro-USB port.

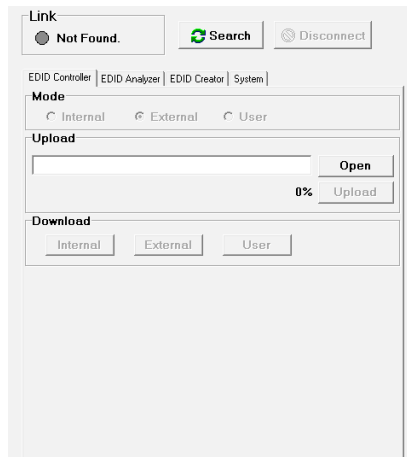
## 6.3 Side Panel



- 1 YUV420:** Press this button to enable or disable the YUV 4:2:0 color subsampling function. When enabled, a 4K (4:4:4) source will be converted to a 4K (YUV 4:2:0) output signal with the same refresh rate.
- 2 EDID:** Press this button to select the EDID to send to the HDMI source. The available choices are: Internal, External, and User. The internal EDID is set to 1080p60 with LPCM 2.0 audio. The External EDID setting passes the EDID directly from the connected display to the source. The User EDID is a customized EDID that has been uploaded to the unit from the PC software. By default, the User EDID is set to 4K@60 (YUV 4:2:0) with LPCM 2.0 audio.
- 3 ACTIVE SRC:** Press this button to force the connected HDMI display to switch to the input the unit is connected to.  
*Note: The HDMI display must support CEC in order to perform this function.*
- 4 PINHOLE:** This recessed button is reserved for factory use only.

## 6.4 EDID Management

This unit uses an EDID Manager 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 Manager software from your authorized dealer and save it in a directory where you can easily find it. Once the file has been downloaded successfully, double click to execute the application and the EDID Manager's window will pop-up.



After launching the software, power the unit on and then connect it to the PC/laptop using a USB cable. Click on the “Search” button to detect and connect to the unit. If the unit is successfully connected the “Search” button will become greyed out and the circle within the “Link” section will turn green with the connected model's name displayed next to it. When you are finished controlling the unit please press the “Disconnect” button.

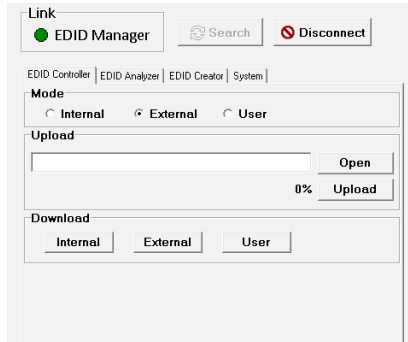
### 6.4.1 EDID Controller

Within the “EDID Controller” tab, the user may select the EDID for the unit to use (Internal, External or User). The selection will immediately occur on the unit and the unit's LED lights will change accordingly.

A stored User EDID may be uploaded from the local PC by first clicking the “Open” button to load the EDID's .bin file from your PC into the software, and then pressing the “Upload” button to upload

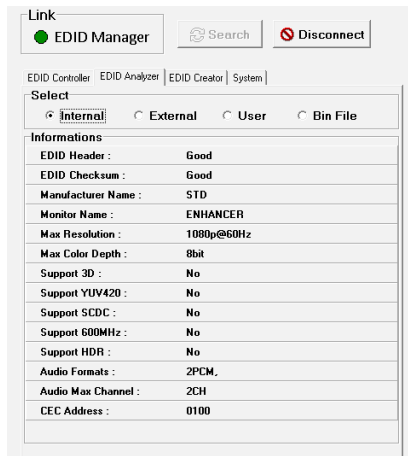
the User EDID to the connected unit. Prior to being uploaded, the software automatically verifies that the EDID's header and checksum information is correct. Once the upload is successful, the unit's EDID mode will automatically switch to User.

It is also possible to download any of the EDIDs currently stored on the unit. Simply click on the "Internal", "External" or "User" buttons and the selected EDID can be downloaded and saved to your connected PC.



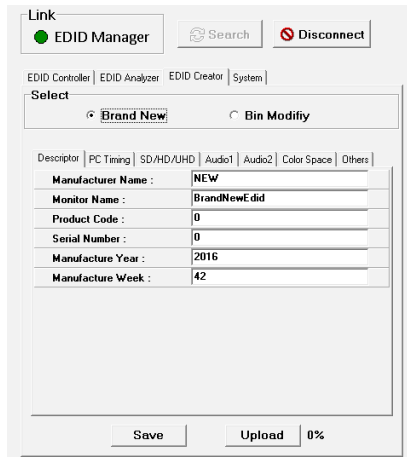
#### 6.4.2 EDID Analyzer

Click on the "EDID Analyzer" tab to view the basic EDID details of a selected EDID. Available EDIDs to view are the Internal, External, or User EDIDs stored in the unit, or you can view an EDID loaded from a \*.bin file on the PC.



### 6.4.3 EDID Creator

Click on the “EDID Creator” tab to begin designing a new EDID from scratch (select “Brand New”) or to modify an existing EDID stored on the PC as a \*.bin file (select “Bin Modify”). Selecting “Brand New” will automatically populate the various EDID fields with basic information that can be easily edited to match the user’s preferences. Selecting “Bin Modify” will open a file load window and after the file has been selected and loaded the EDID fields will be populated with the information from that file.



| Descriptor          | PC Timing | SD/HD/UHD | Audio1 | Audio2 | Color Space | Others |
|---------------------|-----------|-----------|--------|--------|-------------|--------|
| Manufacturer Name : |           |           |        |        |             |        |
| Monitor Name :      |           |           |        |        |             |        |
| Product Code :      |           |           |        |        |             |        |
| Serial Number :     |           |           |        |        |             |        |
| Manufacture Year :  |           |           |        |        |             |        |
| Manufacture Week :  |           |           |        |        |             |        |

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

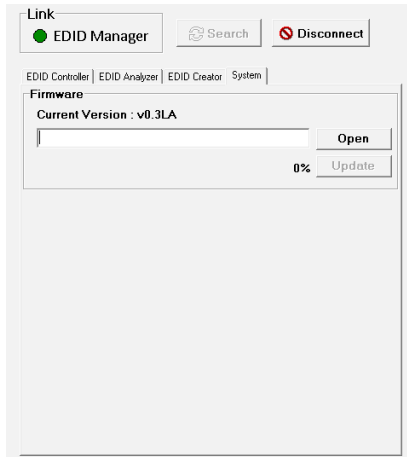
- **Descriptor:** This tab allows for the editing of various description and information fields within the EDID file such as Manufacturer Name, Monitor Name, etc.
- **PC Timing & SD/HD/UHD:** These tabs allow for the selection of the resolutions and refresh rates that the EDID will report as supported.
- **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.

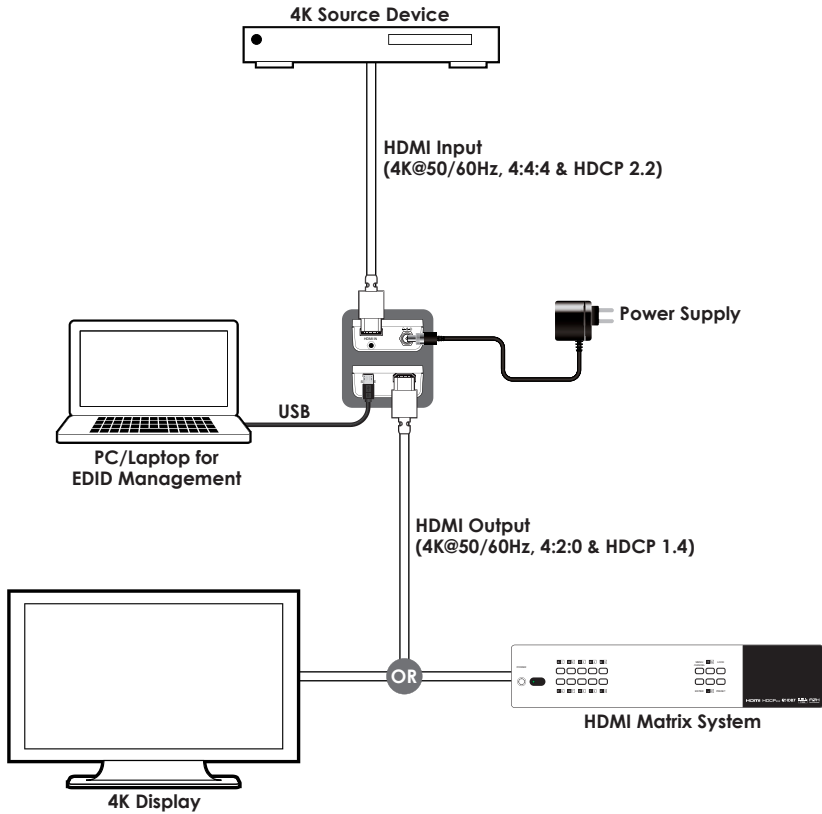
Once the user is finished editing or creating an EDID it can be saved to a \*.bin file locally or uploaded directly to the unit using the “Save” and “Upload” icons respectively.

#### 6.4.4 System

Click on the “System” tab to view the unit’s current firmware version. If a firmware update is required, please contact your authorized dealer for the appropriate update file and instructions on how to perform the update.



## 7. CONNECTION DIAGRAM





## 8. SPECIFICATIONS

### 8.1 Technical Specifications

|                              |   |
|------------------------------|---|
| <b>Video Bandwidth</b>       | 600MHz/18Gbps   |
| <b>Input Port</b>            | 1×HDMI  |
| <b>Output Port</b>           | 1×HDMI  |
| <b>Control Interface</b>     | 1×USB Micro-B   |
| <b>Supported Resolutions</b> | 480i@60Hz - 4K@60Hz (4:4:4, 8-bit)<br>VGA@60Hz - WUXGA@60Hz (RB)  |
| <b>HDMI Cable Length</b>     | 10m (1080p@60Hz, 8-bit)<br>10m (1080p@60Hz, 12-bit)<br>5m (4K@60Hz, 4:2:0, 8-bit)<br>3m (4K@60Hz, 4:4:4, 8-bit) |
| <b>Power Supply</b>          | 5V/2.6A DC (US/EU standards, CE/FCC/UL certified)   |
| <b>ESD Protection</b>        | Human Body Model:<br>±12kV (Air Discharge)<br>±8kV (Contact Discharge)  |
| <b>Dimensions</b>            | 50mm×22.5mm×85mm (W×H×D)<br>[Case Only]<br>51mm×22.5mm×97mm (W×H×D)<br>[All Inclusive]                          |
| <b>Weight</b>                | 58g   |
| <b>Chassis Material</b>      | Plastic   |
| <b>Silkscreen Color</b>      | Black   |
| <b>Operating Temperature</b> | 0°C - 40°C/32°F - 104°F   |
| <b>Storage Temperature</b>   | -20°C - 60°C/-4°F - 140°F   |
| <b>Relative Humidity</b>     | 20 - 90% RH (Non-condensing)  |
| <b>Power Consumption</b>     | 3.3W  |



## 8.2 Video Specifications

| Supported PC Resolutions (Hz) | Input | Output |
|-------------------------------|-------|--------|
| 640×480@60/72/75/85           | ✓     | ✓      |
| 720×400@85                    | ✓     | ✓      |
| 800×600@56/60/72/75/85        | ✓     | ✓      |
| 1024×768@60/70/75/85          | ✓     | ✓      |
| 1280×720@60                   | ✓     | ✓      |
| 1280×768@60/75/85             | ✓     | ✓      |
| 1280×800@60                   | ✓     | ✓      |
| 1360×768@60                   | ✓     | ✓      |
| 1440×900@60                   | ✓     | ✓      |
| 1600×900@60                   | ✓     | ✓      |
| 1600×1200@60                  | ✓     | ✓      |
| 1920×1080@60                  | ✓     | ✓      |
| 1920×1200@60                  | ✓     | ✓      |

| Supported TV Resolutions (Hz)               | Input | Output |
|---|-------|--------|
| 720×576i@50                                 | ✓     | ✓      |
| 720×480i@59.94/60                           | ✓     | ✓      |
| 720×480p@59.94/60                           | ✓     | ✓      |
| 720×576p@50                                 | ✓     | ✓      |
| 1280×720p@50/59.94/60                       | ✓     | ✓      |
| 1920×1080i@50/59.94/60                      | ✓     | ✓      |
| 1920×1080p@23.97/24/25/29.97/30/50/59.94/60 | ✓     | ✓      |
| 3840×2160p@24/25/30/50/60 (YUV 4:4:4)       | ✓     | ✓      |
| 4096×2160p@24/25/30/50/60 (YUV 4:4:4)       | ✓     | ✓      |
| 3840×2160p@50/60 (YUV 4:2:0)                | ✓     | ✓      |
| 4096×2160p@50/60 (YUV 4:2:0)                | ✓     | ✓      |

| Resolutions (Hz)      | Input       |           | Output          |                      |
|-----------------------|-------------|-----------|-----------------|----------------------|
|                       | Color Space | Bit Depth | Bypassed Output | YUV 4:2:0 Conversion |
| <b>2160p@50/60</b>    | RGB 4:4:4   | 8-bit     | ✓               | ✓                    |
|                       |             | 10-bit    |                 |                      |
|                       |             | 12-bit    |                 |                      |
|                       | YUV 4:4:4   | 8-bit     | ✓               | ✓                    |
|                       |             | 10-bit    |                 |                      |
|                       |             | 12-bit    |                 |                      |
|                       | YUV 4:2:0   | 8-bit     | ✓               |                      |
|                       |             | 10-bit    | ✓               |                      |
|                       |             | 12-bit    | ✓               |                      |
| <b>2160p@24/25/30</b> | RGB 4:4:4   | 8-bit     | ✓               |                      |
|                       |             | 10-bit    | ✓               |                      |
|                       |             | 12-bit    | ✓               |                      |
|                       | YUV 4:4:4   | 8-bit     | ✓               |                      |
|                       |             | 10-bit    | ✓               |                      |
|                       |             | 12-bit    | ✓               |                      |

## 9. ACRONYMS

| ACRONYM      | COMPLETE TERM  |
|--------------|--|
| <b>CEC</b>   | Consumer Electronics Control                           |
| <b>DVI</b>   | Digital Visual Interface                               |
| <b>EDID</b>  | Extended Display Identification Data                   |
| <b>HD</b>    | High-Definition  |
| <b>HDCP</b>  | High-bandwidth Digital Content Protection              |
| <b>HDMI</b>  | High-Definition Multimedia Interface                   |
| <b>HDR</b>   | High Dynamic Range                                     |
| <b>LPCM</b>  | Linear Pulse-Code Modulation                           |
| <b>PC</b>    | Personal Computer                                      |
| <b>UHD</b>   | Ultra-High-Definition                                  |
| <b>USB</b>   | Universal Serial Bus                                   |
| <b>VGA</b>   | Video Graphics Array (640×480@60Hz)                    |
| <b>WUXGA</b> | Wide Ultra Extended Graphics Array<br>(1920×1200@60Hz) |



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