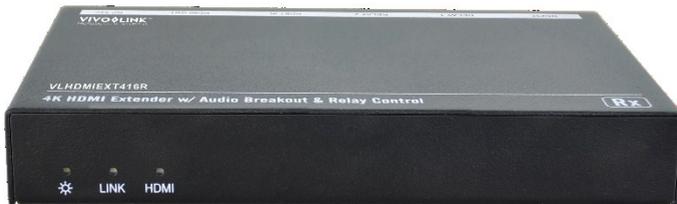
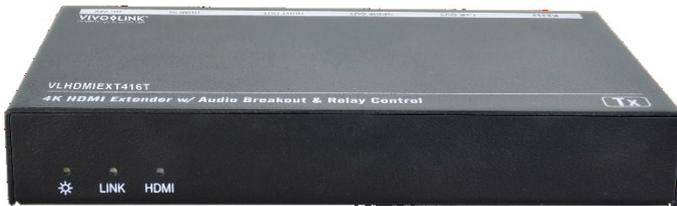


# User Manual

## VLHDMIEXT416

### 4K HDMI Extender with Audio Breakout and Relay Control



**VIVO LINK™**  
PROFESSIONAL AV SOLUTIONS

## **Statement**

Thanks for choosing this product, please read this user manual carefully before using this product. The functions described in this version are updated till April, 2019. In the constant effort to improve our product, we reserve the right to make functions or parameters changes without notice or obligation.

## **Safety Precaution**

- Do not dismantle the housing or modify the module to avoid electrical shock or burn.
- Using supplies not meeting the products' specifications may cause damage, deterioration or malfunction.
- Do not expose the unit to rain, moisture or install this product near water.
- Install the device in a place with fine ventilation.
- Do not twist or pull by force ends of the optical cable. It can cause malfunction.
- Do not use liquid or aerosol cleaners to clean this unit.
- Always unplug the power to the device before cleaning.
- Unplug the power when not used for a long period of time.
- Refer all servicing to qualified service personnel.

## **After-sales Service**

We provide limited warranty for the product within three years.

## Product Introduction

Thanks for choosing the 4K HDMI Extender which consists a transmitter and a receiver. The extender is designed to extend 4K@60Hz 4:2:0 HDMI video to distance up to 40 meters (131 feet) and 1080P@60Hz video to distances up to 70 meters (230 feet) over a single CATx cable. Bi-directional Power over Cable (PoC) feature allows the transmitter or receiver to be powered by each other without the need for a nearby AC power outlet. It supports stereo and multichannel audio on the HDMI ports. In addition to the audio embedded in the HDMI input stream, the audio is simultaneously de-embedded to an analog audio output and an S/PDIF audio output.

The extender supports RS232 pass-through to control source or display devices remotely. It also supports CEC pass-through. Moreover, it provides two RELAY ports for controlling relay device such as the rise and fall of the projector screen.

## Features

- Supports HDMI 1.4 and the HDMI video resolution up to 4K@60Hz 4:2:0.
- Supports HDCP pass-through and up to HDCP 2.2 version.
- Extends 4K@60Hz 4:2:0 signal up to 40m and 1080P@60Hz signal up to 70m via a single CATx cable.
- Supports CEC pass-through.
- Supports bi-directional PoC.
- Supports bi-directional RS232 pass-through.
- Supports RS232 relay control.
- Supports audio de-embedding.

## Packing List

- 1x Transmitter
- 2x Tx Mounting Ears with 4 Screws
- 4x Tx Plastic Cushions
- 1x Tx 3-pin Terminal Block
- 1x RS232 Cable (3-pin to DB9)
- 1x User Manual
- 1x Receiver
- 2x Rx Mounting Ears with 4 Screws
- 4x Rx Plastic Cushions
- 3x Rx 3-pin Terminal Blocks
- 1x Power Adapter (24V DC 1.25A)

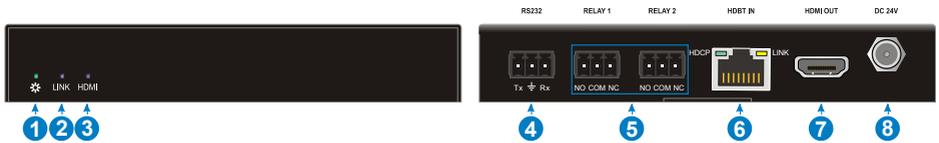
**Note:** Please contact your distributor immediately if any damage or defect in the components is found.

# Transmitter Panel Description



1. **Power LED:** The LED illuminates green when power is applied and is off when no power is present.
2. **LINK LED:** The LED illuminates blue when there is a valid HDBaseT connection with the receiver. The LED is off when there is no valid link.
3. **HDMI LED:** The LED illuminates blue when there is HDMI video input with HDCP. It will blink blue when there is HDMI video input without HDCP and will be off when there is no HDMI video traffic.
4. **RS232:** 3-pin terminal block for bi-directional RS232 pass-through or RS232 relay control.
5. **L+R OUT:** 3-pin terminal block to connect an audio play device (e.g. amplifier) for audio de-embedding from HDMI input stream.
6. **SPDIF OUT:** Toslink connector to connect an audio play device (e.g. amplifier) for audio de-embedding from HDMI input stream.
7. **HDBT OUT:** RJ45 port to connect the **HDBT IN** port of receiver by CATx cable. The HDCP LED illuminates green when the video contains HDCP content, or blinks green when the video has no HDCP content. The LINK LED illuminates orange when there is a valid HDBaseT link between the transmitter and the receiver.
8. **HDMI IN:** Type-A female HDMI input port to connect an HDMI source device.
9. **DC 24V:** Locking power port for 24V DC power adapter connection.

# Receiver Panel Description



1. **Power LED:** The LED illuminates green when power is applied and is off when no power is present.
2. **LINK LED:** The LED illuminates blue when there is a valid HDBaseT connection with the transmitter. The LED is off when there is no valid link.
3. **HDMI LED:** The LED illuminates blue when the display device (e.g. HDTV) is connected to the HDMI output port.
4. **RS232:** 3-pin terminal block for bi-directional RS232 pass-through or RS232 relay control. The baud rate is fixed 9600.
5. **RELAY 1&RELAY 2:** Two 3-pin terminal block to connect relay device (e.g. projector screen) for relay control. Please refer to the chapter **RS232 Relay Control** for more details.
6. **HDBT IN:** RJ45 port to connect the **HDBT OUT** port of transmitter by CATx cable. The HDCP LED illuminates green when the video contains HDCP content, or blinks green when the video has no HDCP content. The LINK LED illuminates orange when there is a valid HDBaseT link between the transmitter and the receiver.
7. **HDMI OUT:** Type-A female HDMI output port to connect an HDMI display device.
8. **DC 24V:** Locking power port for 24V DC power adapter connection.

## RS232 Relay Control

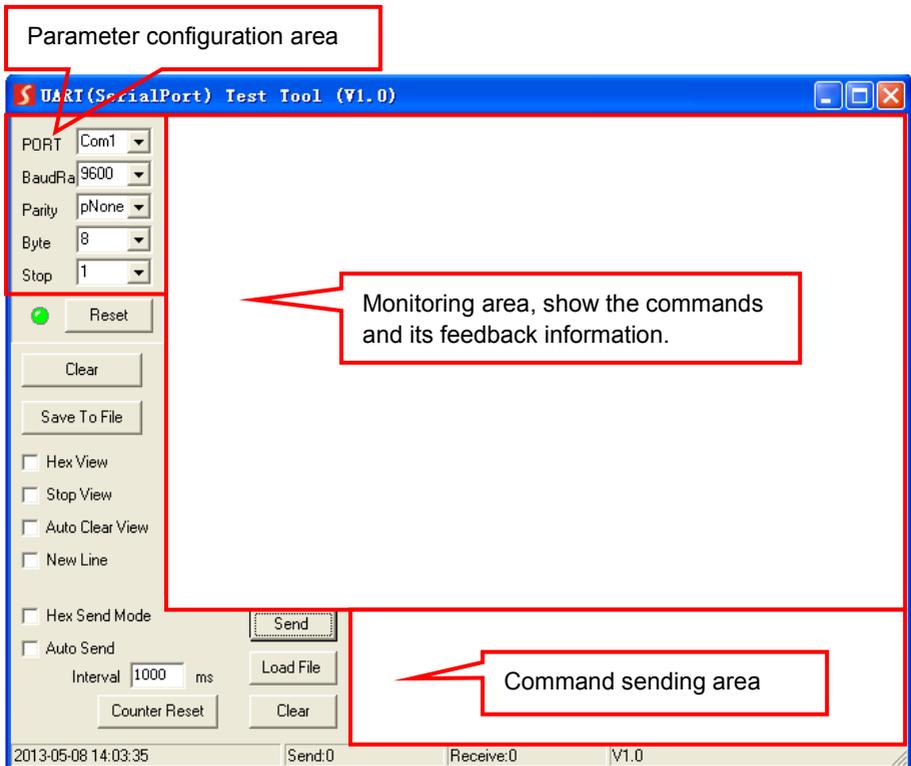
In addition to bi-directional RS232 pass-through, the two RS232 ports of the transmitter and receiver can be used for controlling relay device.

Connect any RS232 port to the control device (e.g. PC) with RS232 cable, and then install RS232 control software. The relay device can be controlled by sending RS232 commands. Here take the software **CommWatch.exe** as example:



Double-click the software icon to run this software.

The main view is shown as below:



Baud rate: 9600; Data bit: 8; Stop bit: 1; Parity bit: none.

Please set the parameters of COM number, bound rate, data bit, stop bit and the parity

bit correctly, and then you are able to send the below commands in command sending area.

Command	Description	Command and Feedback Example
<b>Relay1Wot:[xxx].</b>	Set the RELAY 1 working time to [xxx]. xxx=0~655s. After sending the command, the Relay 1 port will perform the below actions: 1) <i>The <b>NO</b> connection closes, and <b>NC</b> connection opens.</i> 2) <i>When the working time is up, the <b>NO</b> connection opens, and <b>NC</b> connection closes.</i>	Relay1Wot:10.
		Set the relay1 to work for 10 seconds! 1 2 3 4 ... 8 9 10
<b>Relay2Wot:[xxx].</b>	Set the RELAY 2 working time to [xxx]. xxx=0~655s. After sending the command, the Relay 2 port will perform the below actions: 1) <i>The <b>NO</b> connection closes, and <b>NC</b> connection opens.</i> 2) <i>When the working time is up, the <b>NO</b> connection opens, and <b>NC</b> connection closes.</i>	Relay2Wot:10.
		Set the relay2 to work for 10 seconds! 1 2 3 4 ... 8 9 10
<b>Relay1Stop.</b>	Immediately stop the work process of relay 1.	Stop relay1 operation!
<b>Relay2Stop.</b>	Immediately stop the work process of relay 2.	Stop relay2 operation!
<b>Relay1Puls.</b>	Relay 1 closes for one second, and then opens.	Set the relay1 to work for 1 seconds! Instruction completion
<b>Relay2Puls.</b>	Relay 2 closes for one second, and then opens.	Set the relay2 to work for 1 seconds! Instruction completion
<b>Relay1On.</b>	Relay 1 remains closed.	Keep relay 1 closed
<b>Relay2On.</b>	Relay 2 remains closed.	Keep relay 2 closed

**Note:** When using RS232 pass-through to control the third-party device, the beginning and end of control commands must be respectively added “@” and “@+”. The format is: “@.....@+”.

## Technical Specification

<b>VLHDMIEXT416T</b>	
Video Input	(1) HDMI
Video Input Connector	(1) Type-A female HDMI
Video Output	(1) HDBT
Video Output Connector	(1) RJ45
Audio Output	(1) L+R OUT, (1) SPDIF OUT,
Audio Output Connector	(1) 3-pin terminal block, (1) Toslink connector
Control	(1) RS232
Control Connector	(1) 3-pin terminal block
<b>VLHDMIEXT416R</b>	
Video Input	(1) HDBT
Video Input Connector	(1) RJ45
Video Output	(1) HDMI
Video Output Connector	(1) Type-A female HDMI
Control	(1) RS232, (2) RELAY (1&2)
Control Connector	(3) 3-pin terminal block
<b>General</b>	
Video Resolution	Up to 4K@60Hz 4:2:0
HDMI Audio Format	LPCM 7.1 audio, Dolby Atmos®, Dolby® TrueHD, Dolby Digital® Plus, DTS:X™, and DTS-HD® Master Audio™ pass-through.
Analog (L+R) Audio Format	PCM
SPDIF Audio Format	PCM, Dolby Digital, DTS, DTS-HD
Frequency Response	20Hz–20KHz, ±3dB
THD+N	<0.05%, 20Hz – 20KHz bandwidth, 1KHz sine at 0dBFS level (or max level)
SNR	>90dB, 20Hz-20KHz bandwidth
Crosstalk Isolation	<-70dB, 10KHz sine at 0dBFS level (or max level before clipping)
Noise Level	-90dB
Max Output Level	2.0Vrms ± 0.5dB. 2V = 16dB headroom above -10dBV (316mV) nominal consumer line level signal
L-R Level Deviation	<0.05dB, 1KHz sine at 0dBFS level (or max level before clipping)
Output Load Capability	1KΩ and higher (Supports 10x paralleled 10KΩ loads)
Bandwidth	10.2Gbps
HDMI Standard	1.4
HDCP Version	2.2, 1.4 compliant. Pass-through

CEC	Pass-through
EDID	Pass-through
Bidirectional PoC	Supported
Transmission Standard	HDBaseT
Transmission Distance	4K@60Hz 4:2:0 ≤ 40 meters (131 feet), 1080P@60Hz ≤70 meters (230 feet)
Operation Temperature	-5~ +55°C
Storage Temperature	-25 ~ +70°C
Relative Humidity	10%-90%
Power Supply	Input:100V~240V AC; Output:24V DC 1.25A
Power Consumption	9W (Max)
Dimension (W*H*D)	Tx/Rx: 130mm x 19.5mm x 84.4mm
Net weight	Tx: 260g, Rx:270g

## System Connection

The following diagram illustrates the typical input and output connection of the extender:

