

# 4K HDMI® EXTENDER

over single Cat5e/Cat6 Cable



**Vanco Part Number  
EV4K2006**

**4K HDMI® Extender  
over Single Category  
5e/6 Cable with POE**

**EVOLUTION**  
BY 

**www.vanco1.com • 800.626.6445**

## DEAR CUSTOMER

Thank you for purchasing this product.  
For optimum performance and safety, please  
read these instructions carefully before connecting, operating or  
adjusting this product. Please keep this manual for future reference.

This product is 100% inspected and tested in the United States to verify  
HDMI performance parameters.

## WARNING

1. Do not expose this unit to water, moisture, or excessive humidity.
2. Do not install or place this unit in a built-in cabinet, or other confined space without adequate ventilation.
3. To prevent risk of electrical shock or fire hazard, due to overheating do not obstruct unit's ventilation openings.
4. Do not install near any source of heat, including other units that may produce heat.
5. Do not place unit near flames.
6. Only clean unit with a dry cloth.
7. Unplug unit during lightening storms or when not used for an extended period of time. A surge protector is strongly recommended.
8. Protect the power cord from being walked on or pinched, particularly at the plugs.
9. Use unit only with accessories specified by the manufacturer.
10. Refer all servicing to qualified personnel.

## CAUTION

HDMI is a very complex technology requiring continuous authentication of the signal and the same video resolution and audio settings on all electronic equipment in the system. When there are multiple sources and displays, the video resolution and audio setting on all connected units must be adjusted to correspond with that of the display having the lowest video and audio capability.

# INTRODUCTION

The Evolution by Vanco EV4K2006 HDMI Extender over Single Cat5e/6 with Bi-directional IR, auto EDID/EQ, and Bi-directional PoE extends 4K ultra high definition video with HDR and audio signals, IR, and power. Extends 4K@60Hz, 4:4:4 Chroma Subsampling and HDR up to 164ft/50m, and 4K@30Hz, 4:4:4 Chroma Subsampling, and HDR up to 130ft/40m. Bi-directional Power over Ethernet (PoE) Technology transmits power over Cat5e/6, allowing either the Transmitter or Receiver to be powered without the use of a power supply. No EDID or EQ adjustments are necessary as the units automatically adjust for compatibility and gain. This extender set also features a newly redesigned slim and compact chassis for easy and flexible installations. This product fully supports DTS-HD and Dolby TrueHD audio formats and is HDCP compliant. In addition, bi-directional IR pass-through allows for source or display control. For extending HDMI over a single Cat5e/6 with IR at a long distance, with Power over Ethernet, the EV4K2006 is a great plug and play solution!

The EV4K2006 includes two units: transmitting unit (EV4K2006-TX) and receiving unit (EV4K2006-RX). The transmitting unit is used to capture the HDMI input with IR signals and carries the signals via one cost effective Cat5e/6 cable. The receiving unit is responsible for equalizing the transmitted HDMI signal and reconstructing IR signals. The EV4K2006 offers the most convenient solution for HDMI extension over a single Cat5e/6 with Power over Ethernet and is the perfect solution for any application.

## 4K HDMI® over Single Cat5e/Cat6 Cable Extender

### Part # EV4K2006

- Allows HDMI audio/video signals to be transmitted using a single Cat5e or Cat6 Cable
- Transmission Range: Extends 4K@60Hz, 4:4:4 Chroma up to 164ft/50m and 4K@30Hz, 4:4:4 Chroma and HDR up to 130ft/40m over a single Cat5e/6 cable
- Features Power over Ethernet (PoE) Technology which transmits power over Cat5e/Cat6, allowing the transmitter and receiver to be powered off of a single power supply
- Wideband Bi-directional IR system allowing for control of source or display (IR accessories included)
- Wideband IR signal from 20KHz to 60KHz
- Features Auto EDID and EQ Management for plug and play installation
- HDR10 Compatible
- Works with HDMI and HDCP compliant devices
- HDCP 2.2 compliant
- Slim and compact design
- Pure uncompressed 7.1ch digital audio
- Supports DTS-HD and Dolby TrueHD high bit rate audio
- Dimensions: 2.7" (68.58mm) W x .7" (17.78mm) H x 3.25" (82.55mm) D

## SPECIFICATIONS

### TECHNICAL SPECS

HDMI Compliance .....	HDMI Deep Color 30/36/48 bit color depth, Full 3D
HDCP Compliance .....	Yes
Video Bandwidth .....	594 MHz
Video Support .....	480i/480p/720p/1080i/1080p/4Kx2K @60
Audio Support .....	Surround Sound (up to 7.1 ch) or stereo digital audio
Input TMDS Signal .....	1.2 Volts (peak to peak)
Input DDC Signal.....	5 Volts (peak to peak, TTL)
ESD protection .....	(1) Human body model +/- 6kV (air-gap discharge) & (contact discharge) (2) Core chipset - +/-8KV
PCB stack-up .....	4 layer board (impedance control - differential 100, single 50
IR pass-thru .....	Full-duplex bi-directional
Input .....	(TX) 1xHDMI; (RX) 1xRJ45 + 2x3.5mm
Output.....	(TX) 1xRJ45 + 2x3.5mm; (RX) 1xHDMI
HDMI source control .....	Controllable via IR pass-through from RX to TX and from TX to RX with IR extenders or via CEC integrated
HDMI connector .....	Type A 19 pin female
RJ-45 connector.....	WE/SS 8P8C
LED indicators .....	Video lock yellow, Power, green
3.5mm connector .....	(TX and RX) IR Receiver/ IR blaster

### MECHANICAL SPECS

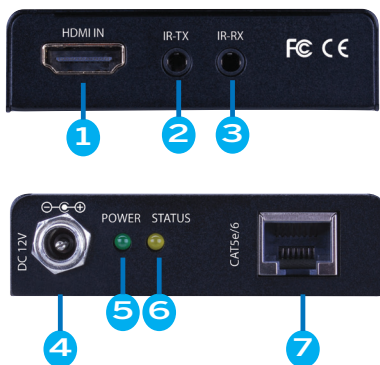
Housing .....	Metal enclosure
Power supply.....	(1)12V 2A
Power consumption.....	3.5 Watts TX, 2.5 Watts RX
Operation temperature.....	0 ~ 45 degrees Celsius
Storage temperature.....	-20~85 degrees Celsius
Relative humidity .....	20-90% RH (no condensation)

## PACKAGE CONTENTS

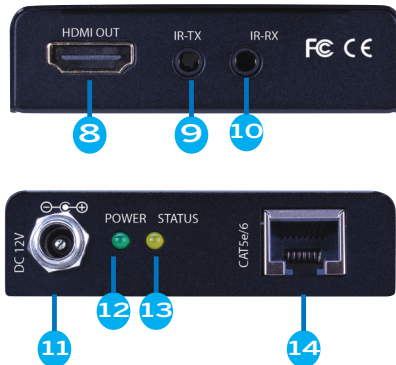
- EV4K2006 (TX & RX)
- (1) IR Blasters (TX)
- (1) IR Receivers (RX)
- (1) DC 12V in line power supply
- Product Manual

# PANEL DESCRIPTIONS

Transmitting Unit



Receiving Unit

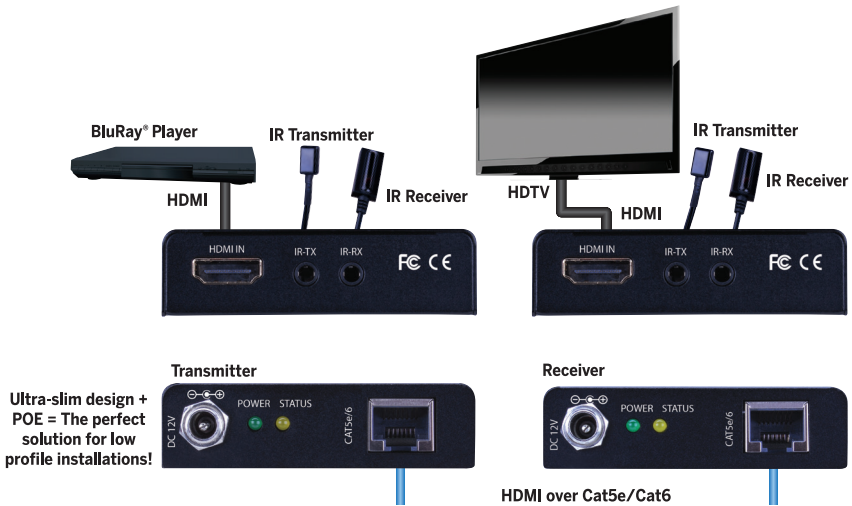


1. HDMI INPUT: Connect a source such as a Blu-ray player, cable box, computer, NVR/DVR, etc.
2. IR TX – Plug in included IR Blaster to control the source (see IR section for setup and installation)
3. IR RX – Plug in included IR Receiver to receive remote signals (see IR section for setup and installation)
4. Power input – Connect included 12V DC power supply (connect to either Transmitter or Receiver, opposite unit will be powered by PoE)
5. Power Indicator – displays indication that the Transmitter is receiving power, must show solid green
6. Status Indicator – displays indication that the Transmitter is receiving a signal from the source
7. RJ45 output – connect a single Cat5e/6 to extend signals, other end to connect to Receiving unit (home-run cable recommended, any coupling points may result in picture issues, do not use patch panels!)
8. HDMI OUTPUT – Connect an HDMI display
9. IR TX – Plug in included IR Blaster to control the display (see IR section for setup and installation)
10. IR RX – Plug in included IR Receiver to receive remote signals (see IR section for setup and installation)
11. Power input – Connect included 12V DC power supply (connect to either Transmitter or Receiver, opposite unit will be powered by PoE)
12. Power Indicator – displays indication that the Receiver is receiving power, must show solid green
13. Status Indicator – displays indication that the Receiver is receiving a signal from the Transmitter
14. RJ45 input – connect a single Cat5e/6 to extend signals, other end to connect to Transmitting unit (home-run cable recommended, any coupling points may result in picture issues, do not use patch panels!)

## EDID

The EV4K2006 is equipped with EDID management, however there is no need to adjust any dip switches or dials, the unit automatically reads the EDID from the display and saves it internally. This feature was created for the installer in mind, for a plug and play installation.

## CONNECTION DIAGRAM



## CONNECT AND OPERATE

1. Connect a source such as a Blu-Ray Player, game console, A/V Receiver, Cable or Satellite Receiver, etc. to the HDMI input on the Transmitting unit.
2. Connect a display such as an HDTV or HD Projector to the HDMI output on the Receiving unit.
3. Connect a single Category 5e/6/7 up to 164ft/50m to the UTP output of the Transmitting unit, and the other end to the UTP input of the Receiving unit.
4. For power, plug in either the Transmitting unit or Receiving unit with the included power supply, opposite unit will not have to be plugged in as it features Power over Ethernet (PoE).
5. Power on each device in the same sequence (receiver and transmitter will already be powered when either unit is plugged in)

At this point the display should show the source signal connected to the extender set. If no signal is being displayed or issues such as blinking, artifacts, etc, connect a shorter Cat5e/6 cable (jumper or patch cable), if the issue is corrected, the Cat5e/6 could be the issue. If a display is having difficulty receiving a signal, access the display's menu and adjust the resolution (lowest to highest until signal is displayed). A 24 Hz vertical refresh rate may work better than 60 Hz or higher. Use the source remote at the receiver emitter to test IR functionality. If the IR remote function is not responding, check the emitters to ensure they are placed correctly and are plugged into the correct IR jacks on the Extender set receiving and transmitting units, see IR section for setup and installation).

# IR

## IR PASS-THROUGH

The bi-directional IR system allows you to control the source that is connected to the extender unit, from the display; or the display from the source. There are two important things to note when setting up the IR system:

1. The IR Receiver (IR RX) is always what you point your remote at to send an IR signal. This pigtail is placed at the display for controlling the source; or at the source for controlling the display.
2. The IR Blaster (IR TX) is what sends the IR signal to what you are intending to control, whether it's the source or the display. This pigtail is placed at the source; either pointed at the source, or placed on the front panel of the source, see below for placement tips. Or placed at the display to control the display from the source.

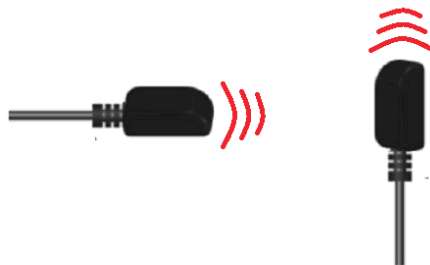
## IR BLASTER (TX)

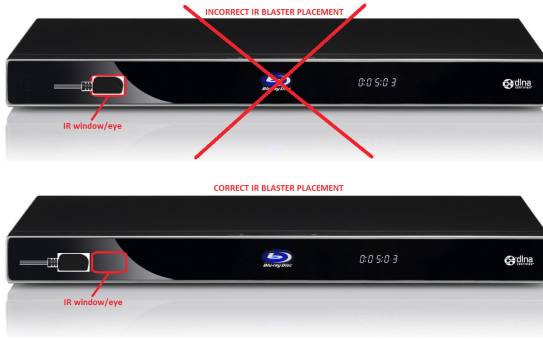
To control the source: Plug IR Blaster into IR TX port of transmitter unit (EV4K2006-TX); place blaster in front of the IR eye of the source.

To control the display: Plug IR Blaster into IR TX port of receiver unit (EV4K2006-RX); place blaster in front of the IR eye of the display.

Note: Placement of the IR Blaster is important and can result in the IR system not working if improperly placed.

- First, locate the IR eye or window on the source
- If placing the IR blaster right on the front panel of the source, do not stick right on top of the IR eye or IR window. The IR signal cannot travel through the double-sided tape on the Blaster. Instead place the blaster on either side, or on the top or bottom of the IR eye or window, with the tip of the blaster facing the IR eye or window. See below for illustration of where IR signal shoots from on IR Blaster:





**IR RECEIVER (RX)**

- To control the source: Plug IR Receiver into IR RX port of receiver unit (EV4K2006-RX); place receiver at or near display.
- To control the display: Plug IR Receiver into IR RX port of transmitter unit (EV4K2006-TX); place receiver in position where it is able to receive remote signals.

**To Control the Source:**

**1. Plug the IR Blaster into the IR TX Port on the Transmitter**



**2. Plug the IR Receiver into the IR RX Port on the Receiver**



**To Control the Display:**

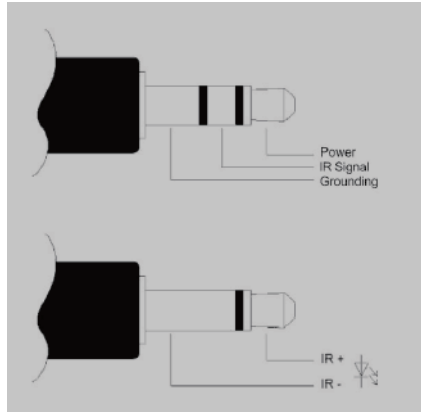
**1. Plug the IR Receiver into the IR RX Port on the Transmitter**



**2. Plug the IR Blaster into the IR TX Port on the Receiver**







## NOTICE

1. Vanco HDMI and Cat5e/6 cables are strongly recommended for use with this product to ensure best results.
2. Incorrect placement of IR Blaster and Receiver may result in the failure of the IR extenders. Please check carefully before plugging in the IR extender to the respective IR sockets.
3. The transmission length is largely affected by the type of Cat5e/6 cables utilized, the type of HDMI sources, and the type of HDMI display. The testing result shows solid UTP cables (usually in the form of 300m [1,000ft] bulk cables) can transmit a lot longer signals than stranded UTP cables (usually in the form of fixed length patch cords). Shielded STP cables are better suited than unshielded UTP cables. A solid UTP Cat5e/6 cable shows longer transmission range than stranded STP Cat-6 cable. For long extension applications, use solid UTP/STP category cables.
4. EIA/TIA-568-B termination (T568B) for Cat5e/6 cables is recommended for better performance.
5. To reduce the interference among the unshielded twisted pairs of wires in Cat5e/6 cables, one can use shielded STP cables to improve EMI problems, which worsens in long cable transmission.
6. The quality of Cat5e/6 cables can have a major effect on how long the transmission limit can achieve and quality of picture, the actual transmission range is subject to the Cat5e/6 cable utilized. For the best results, Cat6 is recommended.
7. If your HDMI display has multiple HDMI inputs, it is found that the first HDMI input [HDMI input #1] generally can produce better transmission performance among all HDMI inputs.



### Performance Guide for HDMI over Category Cable Transmission

Performance rating		Type of category cable		
Wiring	Shielding	CAT5	CAT5e	CAT6
Solid	Unshielded (UTP)	***	*****	*****
	Shielded (STP)	***	***	****
Stranded	Unshielded (UTP)	*	**	**
	Shielded (STP)	*	*	**
<b>Termination</b>		Please use EIA/TIA-568-B termination (T568B) at any time		

## TROUBLE-SHOOTING

1. Best results are usually achieved when the source and display resolutions are the same. If resolutions differ, the extenders will try to adjust the signal to match the resolution of the HDTV with the lowest resolution. This will result in a picture with a lower resolution on the other HDTV sets.
2. If you do not get audio and video, access the "setup" menu on the TV to adjust the audio and video settings. If the HDMI control circuit cannot establish a handshake, then there usually will be no audio or video in addition to a blue or black screen with a statement similar to "this protocol not supported" or "weak signal".
3. If the above mentioned messages display, reset the receiver by disconnecting the power supply. You can also disconnect all of the HDMI and power cables, wait 15 minutes for any voltages to decay and then reconnect all of the cables.
4. If you are still encountering issues, attempt the "hot-plug concept. With all of the HDMI cables disconnected, turn on the source and plug in the HDMI cable into it's output, then power up the Vanco unit and plug the HDMI cable into it's input, finally turn on the display and plug the HDMI cable from the receiver into it. This activates all of the devices in corresponding order and results in a signal being plugged into a device that is on and will attempt to connect the signal.
5. Most of the major source and display manufacturers employ a proprietary control channel to communicate between devices from the same manufacturer. Sometimes this can interfere with the HDMI control circuit or the authentication of the signal. Call the manufacturer if you experience this issue. Sometimes a player, an audio/video receiver, or a cable/satellite box may not have the latest software update, usually this can be downloaded from the manufacturer's website.
6. If you have problems with the IR control circuit, make sure that the IR RX pigtail is plugged into extender receiver and pointed at the display, and the IR TX pigtail is attached to the extender sender and pointed at the source.

### SAFETY AND NOTICE

The EV4K2006 HDMI Extender over Single Cat5e/6 with Bi-directional IR, been tested for conformance to safety regulations and requirements, and has been certified for international use. However, like all electronic equipments, the EV4K2006 should be used with care. Please read and follow the safety instructions to protect yourself from possible injury and to minimize the risk of damage to the unit.

- Follow all instructions and warnings marked on this unit.
- Do not attempt to service this unit yourself, except where explained in this manual.
- Provide proper ventilation and air circulation and do not use near water.
- Keep objects that might damage the device and assure that the placement of this unit is on a stable surface.
- Use only the power adapter and power cords and connection cables designed for this unit.
- Do not use liquid or aerosol cleaners to clean this unit.
- Always unplug the power to the device before cleaning.

## LIMITED WARRANTY

With the exceptions noted in the next paragraph, Vanco warrants to the original purchaser that the equipment it manufactures or sells will be free from defects in materials and workmanship for a period of two years from the date of purchase. Should this product, in Vanco's opinion, prove defective within this warranty period, Vanco, at its option, will repair or replace this product without charge. Any defective parts replaced become the property of Vanco. This warranty does not apply to those products which have been damaged due to accident, unauthorized alterations, improper repair, modifications, inadequate maintenance and care, or use in any manner for which the product was not originally intended.

Items integrated into Vanco products that are made by other manufacturers, notably computer hard drives and liquid crystal display panels, are limited to the term of the warranty offered by the respective manufacturers. Such specific warranties are available upon request to Vanco. A surge protector, power conditioner unit, or an uninterruptible power supply must be installed in the electrical circuit to protect against power surges.

If repairs are needed during the warranty period the purchaser will be required to provide a sales receipt/sales invoice or other acceptable proof of purchase to the seller of this equipment. The seller will then contact Vanco regarding warranty repair or replacement.

## TECHNICAL SUPPORT

In case of problems, please contact Vanco Technical Support by dialing 1-800-626-6445. You can also email technical support issues to [techsupport@vanco1.com](mailto:techsupport@vanco1.com).

When calling, please have the Model Number, Serial Number (affixed to the bottom of the unit) and Invoice available for reference during the call.

Please read this Instruction Manual prior to calling or installing this unit, since it will familiarize you with the capabilities of this product and its proper installation.

All active electronic products are 100% inspected and tested to insure highest product quality and trouble-free installation and operation. The testing process utilizes the types of high-definition sources and displays typically installed for entertainment and home theater applications.

For additional information, such as helpful installation videos, etc. please visit [www.vanco1.com](http://www.vanco1.com)

## LIABILITY STATEMENT

Every effort has been made to ensure that this product is free of defects. The manufacturer of this product cannot be held liable for the use of this hardware or any direct or indirect consequential damages arising from its use. It is the responsibility of the user and installer of the hardware to check that it is suitable for their requirements and that it is installed correctly. All rights are reserved. No parts of this manual may be reproduced or transmitted by any form or means electronic or mechanical, including photocopying, recording or by any information storage or retrieval system without the written consent of the publisher.

Manufacturer reserves the right to revise any of its hardware and software following its policy to modify and/or improve its products where necessary or desirable. This statement does not affect the legal rights of the user in any way.



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