

# **MONOPRICE**

**BitPath AV™ HDMI® Extender  
over Single Cat6 Cable, 120m**

P/N 16228

**User's Manual**

# SAFETY WARNINGS AND GUIDELINES

Please read this entire manual before using this device, paying extra attention to these safety warnings and guidelines. Please keep this manual in a safe place for future reference.

- This device is intended for indoor use only.
- Do not expose this device to water or moisture of any kind. Do not place drinks or other containers with moisture on or near the device. If moisture does get in or on the device, immediately unplug it from the power source and allow it to fully dry before reapplying power.
- Do not touch the device, the power cord, or any other connected cables with wet hands.
- Do not expose this device to excessively high temperatures. Do not place it in, on, or near heat sources, such as a fireplace, stove, radiator, etc. Do not leave it in direct sunlight.
- Prior to operation, check the units and power adapters for physical damage. Do not use if physical damage has occurred.
- Take care to prevent damage to the power cord. Do not allow it to become crimped, pinched, walked on, or become tangled with other cords. Ensure that the power cord does not present a tripping hazard.
- Never unplug the unit by pulling on the power cord. Always grasp the connector head or adapter body.
- Ensure that power is turned off and disconnected before making any electrical connections.
- Clean using a soft, dry cloth only. Do not use chemical cleaners, solvents, or detergents. For stubborn deposits, moisten the cloth with warm water.
- This device has no user serviceable parts. Do not attempt to open, service, or modify this device.

## INTRODUCTION

Thank you for purchasing this BitPath AV™ HDMI® Extender Kit! This extender transmits a HDMI® video signal and an analog audio signal to distances up to 394 feet (120 meters) over a single Cat6 Ethernet cable. It supports HDMI resolutions up to 1080@60Hz, uses the BitPath AV™ transmission protocol, and supports the IEEE 802.3af Power over Ethernet (PoE) feature. It also includes a dual-band IR extender, allowing you to control your video source equipment from the display end.

## FEATURES

- Transmits an HDMI signal to distances up to 394 feet (120 meters) over a single Cat6 Ethernet cable
- Supports HDMI resolutions up to 1080p@60Hz
- Supports the IEEE 802.3af Power over Ethernet (PoE) feature
- Supports up to 254 receivers and connected displays per transmitter
- Can be operated over an existing Ethernet network
- Uses the BitPath AV™ transmission protocol
- Fully supports HDCP

## CUSTOMER SERVICE

The Monoprice Customer Service department is dedicated to ensuring that your ordering, purchasing, and delivery experience is second to none. If you have any problem with your order, please give us an opportunity to make it right. You can contact a Monoprice Customer Service representative through the Live Chat link on our website **[www.monoprice.com](http://www.monoprice.com)** during normal business hours (Mon-Fri: 5am-7pm PT, Sat-Sun: 9am-6pm PT) or via email at **[support@monoprice.com](mailto:support@monoprice.com)**

## PACKAGE CONTENTS

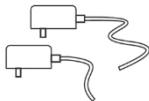
Please take an inventory of the package contents to ensure you have all the items listed below. If anything is missing or damaged, please contact Monoprice Customer Service for a replacement.



1x Transmitter



1x Receiver



2x AC Power Adapters



1x IR Transmitter



1x IR Receiver



1x User's Manual

## PRODUCT OVERVIEW

### Transmitter



1. **Reset:** Button for restarting the transmitter.
2. **HDMI Input:** HDMI® connector for connecting the video source device.
3. **IR Out:** 3.5mm jack for connecting the IR transmitter.
4. **DC 5V:** DC barrel connector for attaching the included AC power adapter.
5. **Power LED:** Illuminates when power is applied.
6. **BitPath AV™ TX:** RJ45 connector for attaching the Ethernet cable.

7. **Data Transmission LED:** The LED flashes slowly when a connection is being established, then flashes rapidly when successfully connected and transmitting data.
8. **Connection LED:** The LED illuminates when there is a solid connection with the receiver.

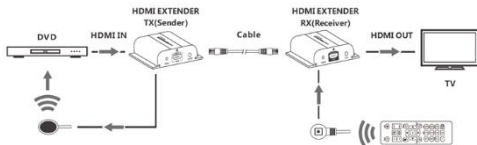
## Receiver



1. **Reset:** Button for restarting the receiver.
2. **HDMI Output:** HDMI® connector for connecting the video display.
3. **IR In:** 3.5mm jack for connecting the IR receiver.
4. **DC 5V:** DC barrel connector for attaching the included AC power adapter.
5. **Power LED:** Illuminates when power is applied.
6. **BitPath AV™ TX:** RJ45 connector for attaching the Ethernet cable.
7. **Data Transmission LED:** The LED flashes slowly when a connection is being established, then flashes rapidly when successfully connected and transmitting data.
8. **Connection LED:** The LED illuminates when there is a solid wireless connection with the transmitter.

# INSTALLATION AND OPERATION

## Point-to-Point Operation



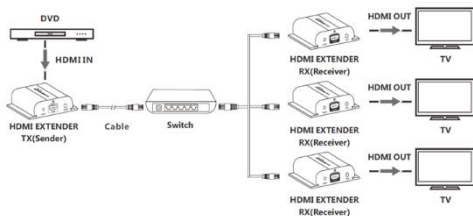
The extender can be operated in standalone mode, with a single receiver connected directly to the transmitter. In this configuration, the two included AC power adapters must be used because there is no power source for the Power over Ethernet (PoE) feature. Perform the following steps to connect the BitPath AV™ system for point-to-point operation:

1. Place or mount the transmitter and receiver in their desired locations.
2. Using a High Speed HDMI® Cable (not included), plug one end into the HDMI input on your television, then plug the other end into the **HDMI Output (2)** on the receiver.
3. Plug the included IR Receiver into the **IR In (3)** jack on the receiver, then position the IR receiver bulb in a position so that it can receive IR signals from your remote control.
4. Using a High Speed HDMI Cable (not included), plug one end into the **HDMI Input (2)** on the transmitter, then plug the other end into the HDMI output of your video source device.
5. Plug the included IR Transmitter into the **IR Out (3)** jack on the transmitter, then position the IR emitter bulb in a position where it can transmit IR signals to the video source device.
6. Using an Ethernet cable wired to the TIA/EIA-568B standard, plug one end into the **BitPath AV™ RX (6)** jack on the receiver, then plug the other end into the **BitPath AV™ TX (6)** jack on the transmitter.

7. Plug the DC barrel connector on one of the AC power adapters into the **DC 5V (4)** jack on the transmitter, then plug the adapter into a nearby AC power outlet. The **Power LED (5)** on the transmitter front panel will illuminate.
8. Plug the DC barrel connector on the other AC power adapter into the **DC 5V (4)** jack on the receiver, then plug the adapter into a nearby AC power outlet. The **Power LED (5)** on the receiver front panel will illuminate. At the same time the **Data Transmission LED (7)** on both the transmitter and receiver front panel will start flashing slowly to indicate that a connection is being established. Once the connection is completed, the **Connection LED (8)** on each unit will illuminate.
9. Start playing video content on your video source device. As data is being transmitted, the **Data Transmission LED (7)** on each device will start flashing rapidly, indicating that data is being transmitted and received. Verify that video is being displayed on each remote television.
10. Use your video source device's remote control at the remote television to verify that you can control the video source device from the remote location.

*Congratulations, your BitPath AV™ system is now installed and ready for use!*

## One-to-Many Operation



The extender can be operated in a one-to-many mode, with multiple receivers connected to an Ethernet switch, which in turn is connected to the transmitter. This mode requires the use of an Ethernet switch (not included) and can be used with the Power over Ethernet (PoE) feature, allowing you to use any of the receivers or the transmitter without using the included AC power adapters. To use the PoE feature, an

Ethernet switch with PoE support is required. It is highly recommended to use a Gigabit (1000Mbps) Ethernet switch. Perform the following steps to connect the BitPath AV™ system for one-to-many operation:

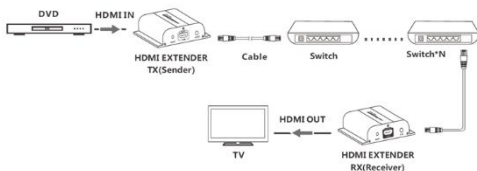
1. Place or mount the transmitter, all receivers, and your Ethernet switch (not included) in their desired locations. Note that you can use an existing Ethernet network.
2. Using a High Speed HDMI® Cable (not included), plug one end into the HDMI input on your television, then plug the other end into the **HDMI Output (2)** on the receiver. Repeat for each receiver and display pair.
3. Plug the included IR Receiver into the **IR In (3)** jack on the receiver, then position the IR receiver bulb in a position so that it can receive IR signals from your remote control. Repeat for each receiver.
4. Using a High Speed HDMI Cable (not included), plug one end into the **HDMI Input (2)** on the transmitter, then plug the other end into the HDMI output of your video source device.
5. Plug the included IR Transmitter into the **IR Out (3)** jack on the transmitter, then position the IR emitter bulb in a position where it can transmit IR signals to the video source device.
6. Using an Ethernet cable wired to the TIA/EIA-568B standard, plug one end into the **BitPath AV™ RX (6)** jack on the receiver, then plug the other end into one of the ports on the Ethernet switch (not included). Repeat for each receiver.
7. Using an Ethernet cable wired to the TIA/EIA-568B standard, plug one end into one of the ports on the Ethernet switch (not included), then plug the other end into the **BitPath AV™ RX (6)** jack on the transmitter.
8. If you are not using an Ethernet switch with PoE support or if you want to power the receiver using the included AC power adapter, plug the DC barrel connector on one of the AC power adapters into the **DC 5V (4)** jack on the receiver, then plug the adapter into a nearby AC power outlet. The **Power LED (5)** on the receiver front panel will illuminate. Repeat for each receiver as needed or desired.



9. Using the AC power adapter that came with your Ethernet switch (not included), plug the DC barrel connector into the power input jack, then plug the other end into a nearby AC power outlet.
10. If you are not using an Ethernet switch with PoE support or if you want to power the transmitter using the included AC power adapter, plug the DC barrel connector on the other AC power adapter into the **DC 5V (4)** jack on the transmitter, then plug the adapter into a nearby AC power outlet. The **Power LED (5)** on the transmitter front panel will illuminate. At the same time the **Data Transmission LED (7)** on both the transmitter and receiver front panel will start flashing slowly to indicate that a connection is being established. Once the connection is completed, the **Connection LED (8)** on each unit will illuminate.
11. Start playing video content on your video source device. As data is being transmitted, the **Data Transmission LED (2)** on each device will start flashing rapidly, indicating that data is being transmitted and received. Verify that video is being displayed on each remote television.
12. Use your video source device's remote control at the remote televisions to verify that you can control the video source device from the remote locations.

*Congratulations, your BitPath AV™ system is now installed and ready for use!*

## Unlimited Operation



The extender can be operated in "unlimited" mode, with up to 254 receivers connected to a series of multiple Ethernet switches. These switches can be cascaded or can be part of an existing Ethernet network. This mode requires the use of multiple Ethernet switches (not included) and can be used with the Power over Ethernet (PoE) feature, allowing you to use any of the receivers or the transmitter without using the included

AC power adapters. To use the PoE feature, a direct connection to an Ethernet switch with PoE support is required. It is highly recommended to use Gigabit (1000Mbps) Ethernet switches. Perform the following steps to connect the BitPath AV™ system for "unlimited" operation:

1. Place or mount the transmitter, all receivers, and all Ethernet switches (not included) in their desired locations. Note that you can use an existing Ethernet network.
2. Using a High Speed HDMI® Cable (not included), plug one end into the HDMI input on your television, then plug the other end into the **HDMI Output (2)** on the receiver. Repeat for each receiver and display pair.
3. Plug the included IR Receiver into the **IR In (3)** jack on the receiver, then position the IR receiver bulb in a position so that it can receive IR signals from your remote control. Repeat for each receiver.
4. Using a High Speed HDMI Cable (not included), plug one end into the **HDMI Input (2)** on the transmitter, then plug the other end into the HDMI output of your video source device.
5. Plug the included IR Transmitter into the **IR Out (3)** jack on the transmitter, then position the IR emitter bulb in a position where it can transmit IR signals to the video source device.
6. Using an Ethernet cable wired to the TIA/EIA-568B standard, plug one end into the **BitPath AV™ RX (6)** jack on the receiver, then plug the other end into one of the ports on the Ethernet switch (not included). Repeat for each receiver.
7. Using Ethernet cables wired to the TIA/EIA-568B standard, connect each connected switch an upstream Ethernet switch. Repeat as necessary until all receivers are connected to switches and each switch is connected to an upstream switch until you have a single Ethernet switch to connect to the transmitter.
8. Using an Ethernet cable wired to the TIA/EIA-568B standard, plug one end into one of the ports on the upstream Ethernet switch (not included), then plug the other end into the **BitPath AV™ RX (6)** jack on the transmitter.
9. If you are not using an Ethernet switch with PoE support or if you want to power the receiver using the included AC power adapter, plug the DC barrel connector

on one of the AC power adapters into the **DC 5V (4)** jack on the receiver, then plug the adapter into a nearby AC power outlet. The **Power LED (5)** on the receiver front panel will illuminate. Repeat for each receiver as needed or desired.

10. Using the AC power adapter that came with your Ethernet switches (not included), plug the DC barrel connector into the power input jacks, then plug the other end into a nearby AC power outlets.
11. If you are not using an Ethernet switch with PoE support or if you want to power the transmitter using the included AC power adapter, plug the DC barrel connector on the other AC power adapter into the **DC 5V (4)** jack on the transmitter, then plug the adapter into a nearby AC power outlet. The **Power LED (5)** on the transmitter front panel will illuminate. At the same time the **Data Transmission LED (7)** on both the transmitter and receiver front panel will start flashing slowly to indicate that a connection is being established. Once the connection is completed, the **Connection LED (8)** on each unit will illuminate.
12. Start playing video content on your video source device. As data is being transmitted, the **Data Transmission LED (2)** on each device will start flashing rapidly, indicating that data is being transmitted and received. Verify that video is being displayed on your remote televisions.
13. Use your video source device's remote control at the remote televisions to verify that you can control the video source device from the remote locations.

*Congratulations, your BitPath AV™ system is now installed and ready for use!*

## TROUBLESHOOTING

Q1: The television only shows "waiting for connection" in the bottom right corner.

A1: Verify that the AC adapters for both the transmitter and receiver are plugged in and that the **Power LED (5)** on each unit is illuminated. Try swapping out the HDMI® cable with a known good one.

Q2: The television displays "Please check the TX input signal".

A2: Verify that the video source device is playing video content. Try swapping out the HDMI® cable between the video source device and the transmitter with a known good one. Try connecting the video source device directly to the television to verify that it is transmitting video. Verify that the video resolution on the video source does not exceed the 1080p@60Hz limits of the system.

Q3: The video on the television is unstable.

A3: Press the **Reset (1)** button on each unit to allow them to reestablish a connection. Ensure that the Ethernet cable is within the length limits for its type. Try using a higher category Ethernet cable. Replace the Ethernet cable with a known good one.

## TECHNICAL SUPPORT

Monoprice is pleased to provide free, live, online technical support to assist you with any questions you may have about installation, setup, troubleshooting, or product recommendations. If you ever need assistance with your new product, please come online to talk to one of our friendly and knowledgeable Tech Support Associates.

Technical support is available through the online chat button on our website

**www.monoprice.com** during regular business hours, 7 days a week. You can also get assistance through email by sending a message to **tech@monoprice.com**

## SPECIFICATIONS

Model	16228
Video Standard	HDMI® with HDCP
Maximum Video Resolution	1080p@60Hz
Transmission Protocol	BitPath AV™
Maximum Transmission Distance	394 feet (120 meters) using Cat6 cable 328 feet (100 meters) using Cat5e cable 262 feet (80 meters) using Cat5 cable
IR Extender Bandwidth	20 ~ 60 kHz
Maximum Transmitter Power Consumption (each)	3.5 watts
Maximum Receiver Power Consumption (each)	3 watts
Power Source	5 VDC, 1A AC power adapters IEEE 802.3af Power over Ethernet (PoE)
Operating Temperature	+32 ~ +140°F (0 ~ +60°C)
Dimensions (each)	4.1" x 3.7" x 0.9" (105 x 95 x 24 mm)
Transmitter Weight	8.6 oz. (245g)
Receiver Weight	8.6 oz. (243g)

# REGULATORY COMPLIANCE

## Notice for FCC



This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Modifying the equipment without Monoprice's authorization may result in the equipment no longer complying with FCC requirements for Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## Notice for Industry Canada

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

*BitPath AV™ is a trademark of Monoprice Inc.*

*HDMI®, the HDMI Logo, and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.*