

User Manual

# 4K60 (4:4:4) 70M HDMI MATRIX RECEIVER

70 METER HDMI RECEIVER VIA HDBaseT, BUILT TO WORK WITH THE HDBaseT  
MATRICES FROM AVPRO EDGE.



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AVProEdge presents its 70m (100m HD) 18Gbps over CAT extender. Using ICT (Invisible Compression Technology) we have achieved what was thought to be impossible. The AC-EX70-444 delivers a virtually lossless, high bandwidth, 4K HDR signal with support for any signals up to 18Gbps.

## **Key benefits of using AC-EX70-444-RNE:**

***Invisible Compression Technology:*** ICT is a revolution in HDMI extension technology. This proprietary technology can compress high bandwidth HDMI signals into a manageable size in order to fit through a CAT Cable "pipe". The ICT algorithm can manage all flavors of HDR including 4:4:4, 4:2:2 and 4:2:0 as well as signals up to 18Gbps and 4K 60Hz 4:4:4. The architecture of ICT allows it to be compatible with all chroma subsampling types, color spaces and HDMI Deep Color up to 12-Bit. Our technology is unique because it is truly invisible. It is not only invisible to the human eye, it is invisible to HDMI test gear and other sink devices. With the AC-EX40-444 what comes in is what goes out. What makes ICT special is the ability to preserve HDR metadata, color information and depth in its full, original, integrity. Other compression technologies sacrifice color information and depth to save space. This will cause very visible banding, color shifting and motion artifacts in the image.

***Down Scaling:*** The AC-EX70-444 has a scaling circuit built into the transmitter. The scaler can scale down 4K (and HDR) --> 1080P. This extender can be used to scale down where you need to without reducing the entire system. For example, there may be a system with 4K distribution, but there may be one or two displays that are older. You don't have to compromise signal with the ability to downscale!. The AC-EX40-444 does the heavy lifting, eliminating the need to add additional boxes. This is an ideal choice for extension on projects requiring an 18Gbps matrix like the AC-MX1616-AUHD.

***Total EDID Management:*** The AC-EX70-444 has robust EDID control. EDID management allows control of the input device and the ability to request specific video resolutions and/or audio codecs.

***On Board Troubleshooting:*** This unit allows generation of a 1080P or 4K test pattern in order to identify external problems (source, repeater, displays, etc...). Be sure that the wiring is correct and get to the bottom of problems quickly should they arise, without having to worry if the source or sink is working properly. A test pattern may be generated from the TX or the RX so the total system infrastructure can be verified.

***Cascade:*** AC-EX70-444 features HDMI signal equalization and amplification. This allows for a "daisy chain" of AC-EX40-444 extenders for extremely long distance transmission. With our unique bi-directional power, there is no need for a power source where the Rx and Tx meet up in a daisy chain, simply power the first Tx and the second Rx. Power will be provided to the middle remotely.

***IR & RS232 Management:*** IR & RS-232 are bi-directional and can control the sources from the sinks or vice versa.

## ■ Product Overview

### ■ Model Numbers:

- **AC-EX70-444-RNE** ~ HDBaseT Receiver w/ IR, RS-232, Bi-Directional

## ■ Features











- HDMI 2.0(a/b)
- 18Gbps Bandwidth Support (Using ICT)
- Ultra Slim (.47 inch/12mm)
- Up to 4K60 4:4:4 Support
- Full HDR Support (HDR 10 & 12 Bit)
- HDR, HDR10+ and HLG Support
- 4K --> 1080P Down-scaling for mixed systems
- EDID Management and EDID emulate
- 4K & HD Test Patterns built-in to Tx and Rx for troubleshooting
- L/R Audio Extraction on Tx and Rx
- HDCP 2.2 (and all earlier versions supported)
- CEC Pass Through
- 3D Support
- 100M (330ft) on 1080P (Cat6a)
- 150M (492ft) at 1080p LONG RANGE MODE
- Up to 70m (230ft) on 4K (up to 4K60 4:4:4, HDR) (Cat6a)
- Bi-directional 48v PoH (Power Over HDBaseT, only one Power Supply Needed)
- 3-20v protection circuit built-in for safe IR transport
- Bi-Directional RS-232 transport
- LED Status, Link, Power indication lights
- Use single UTP/STP LAN cable (CAT-5E/6A) with substitute HDMI cable to achieve long distance transmission.
- Supports uncompressed PCM 2- Ch., LPCM 5.1 & 7.1, Dolby Digital, DTS, Dolby TrueHD, DTS HD-Master Audio, Atmos
- ESD protection circuitry (Inputs & Outputs) to 7KV
- Ability to cascade

## Notice

AVProEdge reserves all **rights** to make changes in the hardware, packaging and any accompanying documentation without prior written notice.

## **Warning**

### To reduce the risk of fire, electric shock or product damage:

- |  |  |
|--|--|
|  <p><b>1.</b> Do not expose this device to rain, moisture, dripping or splashing and ensure that objects filled with liquids are not placed on or near the devices.</p>                           |  <p><b>6.</b> Clean this device with a dry cloth only.</p>  |
|  <p><b>2.</b> Do not install or place this unit in a bookcase, built-in cabinet or in another confined space. Ensure the unit is well ventilated.</p>   |  <p><b>7.</b> Unplug this device during lightning storms or when unused for long periods of time.</p> |
|  <p><b>3.</b> To prevent risk of electric shock or fire hazard due to overheating, do not obstruct the unit's ventilation openings with newspapers, tablecloths, curtains, and similar items.</p> |  <p><b>8.</b> Protect the power cord from being walked on or pinched particularly at plugs.</p>       |
|  <p><b>4.</b> Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.</p>                                  |  <p><b>9.</b> Only use attachments / accessories specified by the manufacturer.</p>                 |
|  <p><b>5.</b> Do not place sources of naked flames, such as lighted candles, on the unit.</p>   |  <p><b>10.</b> Refer all servicing to qualified service personnel.</p>                              |

## ■ What's Included

Whats in the box?

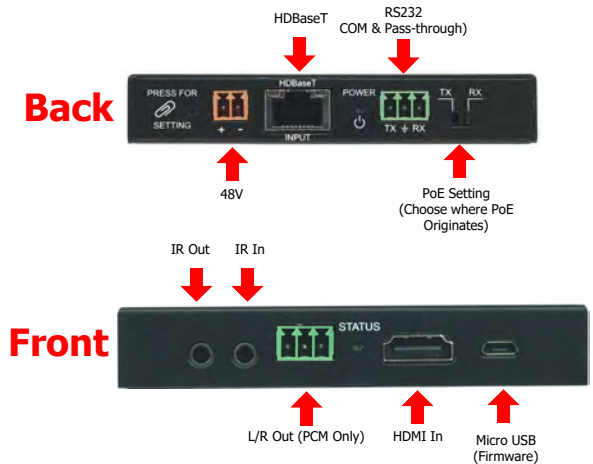
- AC-EX70-444-R (Receiver)
- 1x IR Tx Unit
- 1x IR Rx Unit
- Mounting Ears

\*Optional 3Pin to Stereo Audio Cables available for purchase

## ■ Specifications

|   |   |
|---|---|
| <b>Video:</b>   |   |
| Video Resolutions   | Up to 4K 60Hz 4:4:4   |
| VESA Resolutions  | Up to DCI 4K (4096x2160)  |
| HDR Formats/Resolutions   | 420, 422, 444 (10 and 12 Deep Color)<br>HDR10, HDR10+, HLG  |
| Color Space   | YUV (Component), RGB<br>(CSC: Rec. 601, Rec. 709, BT2020, DCI, P3 D6500)  |
| Chroma Subsampling  | 4:4:4, 4:2:2, 4:2:0 Supported   |
| Deep Color  | Up to 16 bit (1080), Up to 12 bit (4K)  |
| <b>Audio:</b>   |   |
| Audio Formats Supported HDMI  | PCM 2.0 Ch, LPCM 5.1 & 7.1, Dolby Digital, DTS 5.1, Dolby Digital Plus, Dolby TrueHD, DTS-HD Master Audio, DTS-X, Dolby Atmos |
| Audio Formats Supported Extracted (2CH Port)  | PCM 2 CH (No Downmix)   |
| <b>Distance:</b>  |   |
| HDBaseT (CAT) Distance (4K)   | 70M (230 Feet)  |
| HDBaseT (CAT) Distance (Full HD)  | 100M (330 Feet)   |
| HDMI Lead In/Out (up to 4K60 4:4:4)   | Up to 50 Feet (using Bullet Train HDMI)   |
| HDMI Lead In/Out (w/ AOC Cable) (up to 4K60 4:4:4)  | Up to 130 Feet (using Bullet Train AOC)   |
| <b>Other:</b>   |   |
| Bandwidth   | 18 Gbps (w/ ICT)  |
| HDCP  | HDCP 2.2 and earlier  |
| <b>Ports:</b>   |   |
| HDMI (Tx & Rx)  | Type A  |
| Audio (Extracted Analog) (Tx & Rx)  | 3 pin terminal block (unbalanced) each  |
| IR Tx (Tx & Rx)   | 3.5mm Mono (2 Conductor) each   |
| IR Rx (Tx & Rx)   | 3.5mm Stereo (3 Conductor) each   |
| RS232 (Tx & Rx)   | 3 pin terminal block each   |
| Power (Tx & Rx)   | 2 pin terminal block each   |
| Ethernet (Tx & Rx)  | 2 RJ45 connections each (10/100)  |
| <b>Environmental:</b>   |   |
| Operating Temperature   | 23 to 125°F (-5 to 51°C)  |
| Storage Temperature   | -4 to 140°F (-20 to 60°C)   |
| Humidity Range  | 5-90% RH (No Condensation)  |
| <b>Power:</b>   |   |
| Power Consumption (Total)   | 9 Watts Max Pair  |
| Power Supply  | Input: AC 100-240V ~ 50/60Hz<br>Output: DC 48V .5A (Wall Version)   |
| <b>Dimensions:</b>  |   |
| Dimensions (Single Unit Only, Tx or Rx are same)<br>(Length/Width/Height) (Tx or Rx each alone) | mm: 157 x 103 x 12<br>inch: 6.18 x 4.06 x .47   |
| Dimensions (Packaged Length/Width/Height) (Kit)   | mm: 203 x 165 x 91<br>inch: 8 x 6.5 x 3.6   |
| Weight (Unit) (Tx or Rx each alone)   | .4lbs (.13Kg)   |
| Weight (Packaged)   | 2lbs (.90Kg)  |
| *Specifications subject to change without notice. Mass & dimensions are approximate             |   |

## ■ The Receiver



### Indicator Troubleshooting Lights on the Receiver:

**POWER - On the back: (Red)** This is an indicator that the power is connected. There are only two states for light:

- Light Is On = Power supply is connected and functioning.
- Light Is Off = Power supply is not connected or there is no power present. (In order to have power: check the power supply, USP, Outlet, etc...)

**HDBaseT LINK - On the back: (Blue)** This is an indicator that that the RJ45 HDBaseT Link is stable. This light should always be SOLID.

**HDMI SIGNAL STATUS - On the front: (Blue)** This indicator shows that the HDMI Sink is connected. The states are:

- Light Is On (Solid) = Sync w/ HDMI sink is correct and solid.
- Light Is Flashing = The light flashes during the sync process. If it is flashing continuously, you may still have a picture, but it is indicating that the Rx is correcting a BE (Bit Error) to make the picture show on the display.

If the **BLUE HDMI SIGNAL STATUS LIGHT** is flashing AND you have no picture, check the following:

1. The source. Plug it directly into the display to be sure it's functioning properly.
2. Try a longer HDMI cable. Some HDMI cables do not sync well at shorter lengths.
3. Try Cascade Mode (See below).
4. If these suggestions do not work, enable the "Test Pattern" (See Below). If you see the pattern, the problem is between the Receiver and display/sink please try a different sink input or HDMI cable.
5. Contact AVProEdge if these suggestions do not work.

## Indicator Troubleshooting Lights on the Receiver cont.:

**LINK - Above RJ45 (HDBT) Port: (Green)** This indicator shows that the AV HDBT link between the Transmitter and Receiver is in tact. This light will ALWAYS be solid. If this light is flashing or not present do the following:

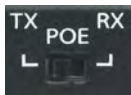
1. Check the length. The maximum distances are 70m (230ft) on 4K and 100m (330ft) on 1080P.
2. Remove any coils of cable and make sure that there is not excess cabling.
3. Bypass all patch panels and punch-down blocks.
4. Re-terminate connectors. Sometimes, even if a cable tester indicates the run is valid, something may be slightly off.
5. Contact AVProEdge if these suggestions do not work.

**STATUS- Above RJ45 (HDBT) Port: (Amber)** This indicator shows that the power is present between the Transmitter and Receiver. This light ALWAYS BLINKS steadily indicating everything is correct. If you do not see this light, try the following:

1. Check the length. The maximum distances are 70m (230ft) on 4K and 100m (330ft) on 1080P.
2. Remove any coils of cable and make sure that there is not excess cabling.
3. Bypass all patch panels and punch-down blocks.
4. Re-terminate connectors. Sometimes, even if a cable tester indicates the run is valid, something may be slightly off.
5. Try powering from the Receiver instead of the Transmitter (See Receiver page for more about PoE direction).
6. Contact AVProEdge if these suggestions do not work.

## Functions & Setup of the Receiver:

**PoE Mode Slide Switch:** (On the back) This is used to select how you want to PoE is to be directed. There are two options (you are choosing where the power is ORIGINATING from):



- **TX (Default)**= You will need to power the TRANSMITTER side, the receiver will be powered over the CAT Cable (Default).
- **RX** = You will need to power the RECEIVER, the transmitter will be powered over the CAT Cable from the receiver (This is called "Reverse Power").

**Using the Setting Button:** (On Front) The setting button can be pressed in different combinations based on what is needed. Using an ink pen is best to press the button.

The SETTING BUTTON is located just to the right of the  symbol, and the SETTING INDICATOR LED is just to the left of the symbol.

### **Cascade Mode**

This mode forces hot plug, which is useful when "daisy-chaining" extenders. It is also helpful for troubleshooting if there are sync problems with devices.

To set this mode press and hold the setting button (for 4 seconds):

- Disable --- Power LED Flashes 1 Time
- Enable --- Power LED Flashes 2 Times



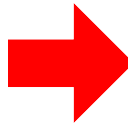


## ■ RS-232 Configuration

RS-232 can be used to pass control signals bi-directionally to & from any RS-232 compatible device. This is commonly used to route control signals in the following way:

1. Control System --> Display/Projector (ie, Power On/Off)
2. Display/Projector --> Control System (ie, Display Status, Volume Status etc...)
3. When ultra long-range serial communication is needed (think concerts, live events). Use the extender.

The unit comes with 3 pin connectors to allow for any wire an integrator would like. The pin out configuration Left=TX, Center=Ground, Right=RX and looks like this:

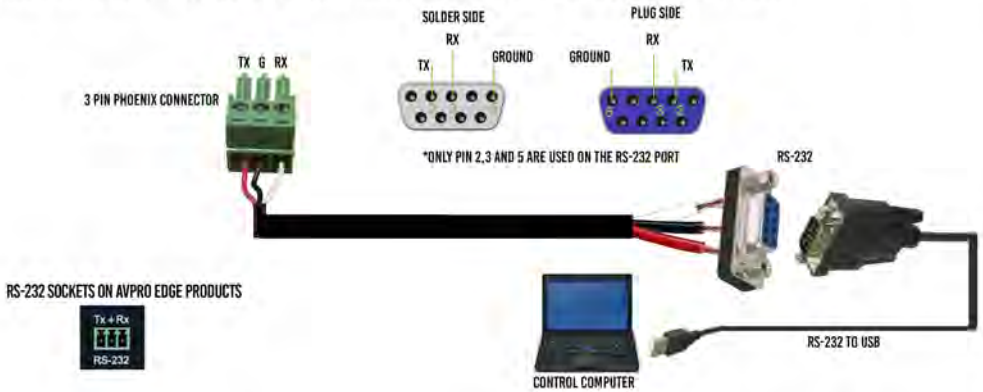


This is how the cable should look. If using the AC-CABLE-3.5-DB9F (Female) or AC-CABLE-3.5-DB9M (Male), the colors will be the same. With any other cable, please follow Tx, G, Rx as shown above. A RS-232 cable preparation diagram is on the next page.



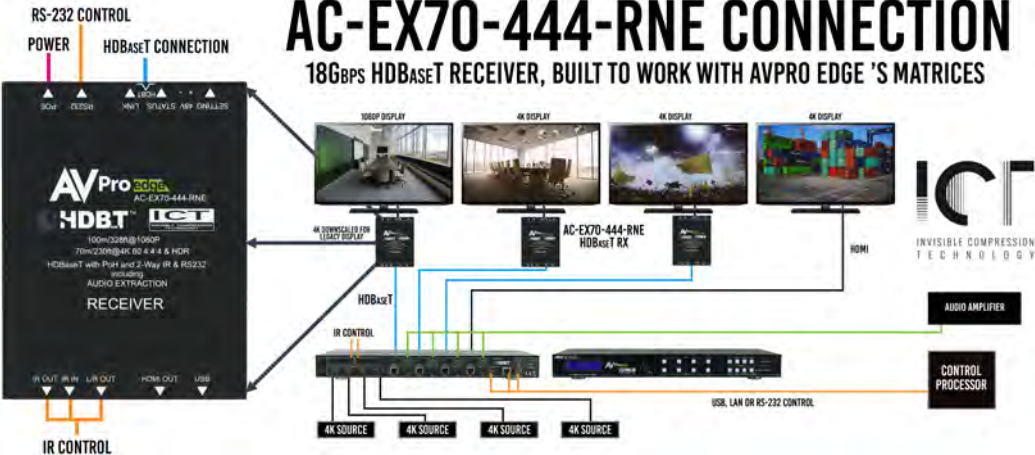
# RS-232 CABLE FOR AVPRO EDGE

IN ORDER TO CONNECT YOUR COMPTER TO THE SWITCH BY RS-232 YOU NEED TO MAKE YOUR OWN CABLE WITH ONE END A PHOENIX CONNECTOR AND THE OTHER END A RS-232 PORT. YOUR COMPUTER DOESN'T HAVE A RS-232 INPUT, GET A USB CONVERTER (AS SHOWN BELOW), AND PLUG THE USB END TO ANY COMPUTER



# AC-EX70-444-RNE CONNECTION

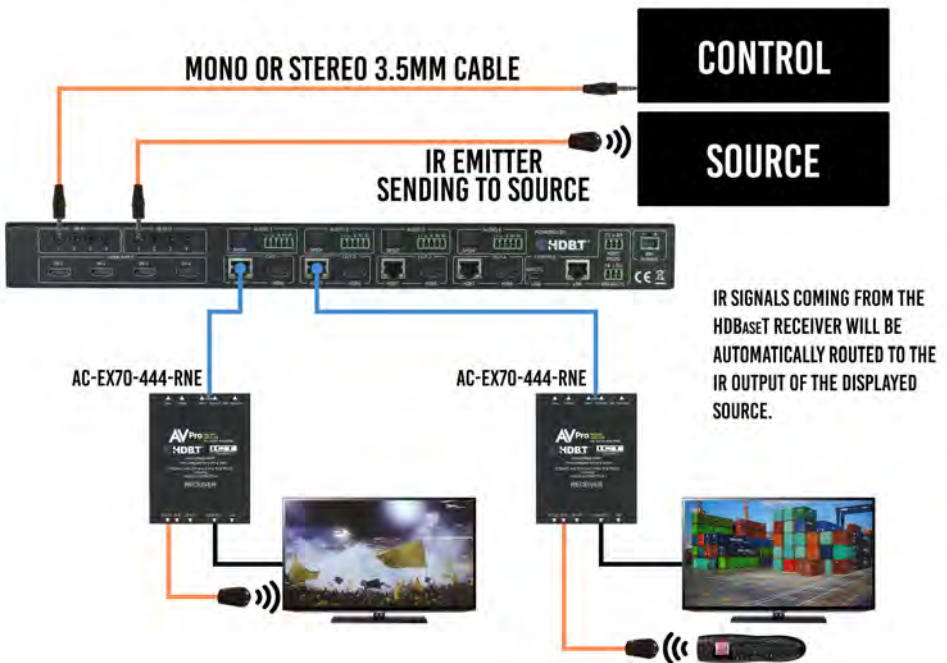
18Gbps HDBaseT RECEIVER, BUILT TO WORK WITH AVPRO EDGE 'S MATRICES



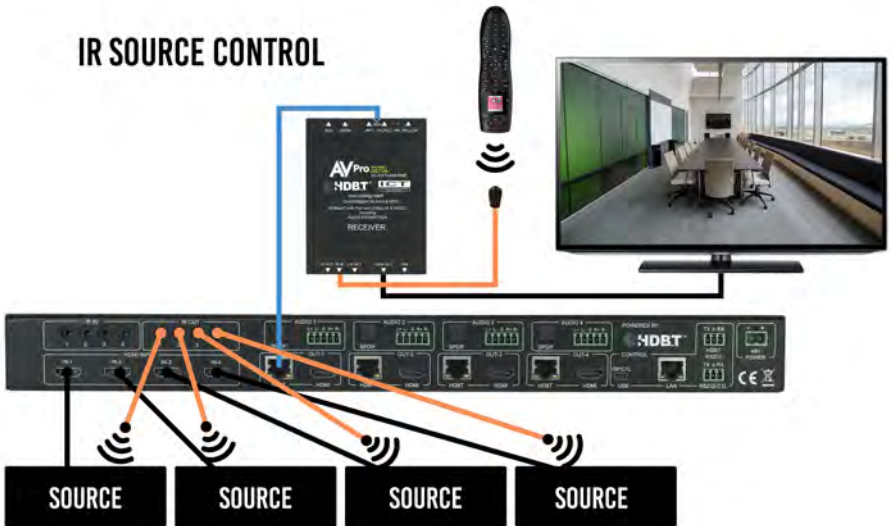
## ■ IR Configuration

IR can be used in three ways:

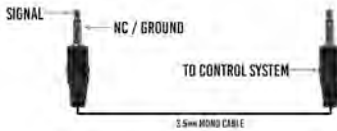
1. **From Rack (Control System Direct):** Plug a MONO 3.5mm cable into an emitter port of any control system directly into the "IR IN" port on the AC-MX44/88-AUHD-HDBT switch to pass IR signals directly to the remote end.
2. **From Rack (Using IR-EYE):** Plug an IR-Receiver Eye into the "IR IN" of the AC-MX44/88-AUHD-HDBT switch in order to pass infrared signals generated from a device or IR Remote. NOTE - Be sure the IR MODE Slide Switch is set to "IR-EYE" on the Transmitter.
3. **From Remote End:** Use an IR-Receiver Eye on the AC-EX40-444 Receiver (IR In Port) in order to send IR signals BACK to the rack and out of the switch IR Out Port with an emitter.



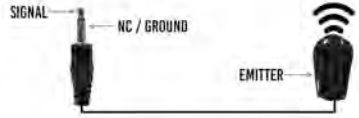
## IR SOURCE CONTROL



### IR IN Direct Connect (I-PASS)



### IR OUT Emitter (Non-Flashing)



### IR IN w/ Receiver Eye ("IR-EYE" MODE)

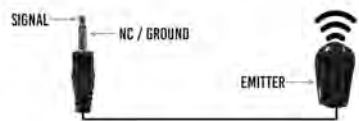


## ■ IR Connections to AC-EX/U-444-K (receiver)

### IR IN (IR-EYE Only)



### IR OUT Emitter (Non-Flashing)



## ■ Audio Extraction on AC-EX70-RNE

A feature that is always active on the AC-EX70-444 (Tx and Rx) is Audio Extraction. This feature extracts PCM Audio (2ch) from the source device in order to be run to a separate amplifier or AVR. BOTH of the audio ports are always active (on Tx & Rx). NOTE - These ports ONLY work if the source is 2ch. If downmixing is needed, check out AC-ADM-AUHD or AC-ADM-COTO.

To use the ports:

1. Simply plug a 3 pin terminal block into the port on the Tx or Rx (both are always active) and make your own cable assembly.
2. There is an option to buy pre-made unbalanced 3-pin to RCA Female cables from [www.avprostore.com](http://www.avprostore.com)

**NOTE:** The source device needs to output PCM audio in order for the feature to work. This can be done by using the on-board EDID management or setting the source as such.

## ■ Audio Extraction Routing Diagram



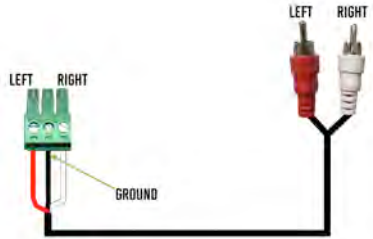
### 4K60 70M EXTENDER AUDIO EXTRACTION



# AC-EX70-444-RNE

## ■ Stereo Cable Preparation

**NOTE:** Pre-made audio cables can be purchased from [www.avprostore.com](http://www.avprostore.com). The part number is: AC-CABLE-3PIN-2CH.



## ▪ **Maintenance**

To ensure reliable operation of this product as well as protecting the safety of any person using or handling this device while powered, please observe the following instructions.

- Use the power supplies provided. If an alternate supply is required, check voltage, polarity and that it has sufficient power to supply the device it is connected to.
- Do not operate these products outside the specified temperature and humidity range given in the above specifications.
- Ensure there is adequate ventilation to allow this product to operate efficiently.
- Repair of the equipment should only be carried out by qualified professionals as these products contain sensitive components that may be damaged by any mistreatment.
- Only use this product in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with these products.
- Clean this unit with a soft, dry cloth. Never use alcohol, paint thinner or benzene to clean this unit.

## ▪ **Damage Requiring Service**

The unit should be serviced by qualified service personnel if:

- The DC power supply cord or AC adaptor has been damaged
- Objects or liquids have gotten into the unit
- The unit has been exposed to rain
- The unit does not operate normally or exhibits a marked change in performance
- The unit has been dropped or the housing damaged

## ▪ Support

Should you experience any problems while using this product, first, refer to the Troubleshooting section of this manual before contacting Technical Support.

When calling, the following information should be provided:

- Product name and model number
- Product serial number
- Details of the issue and any conditions under which the issue is occurring

## ▪ Warranty

If your product does not work properly because of a defect in materials or workmanship, AVProEdge (referred to as “the warrantor”) will, for the length of the period indicated as below, (Parts/Labor (10) Years), which starts with the date of original purchase (“Limited Warranty period”), at its option either (a) repair your product with new or refurbished parts, or (b) replace it with a new or a refurbished product. The decision to repair or replace will be made by the warrantor. During the “Labor” Limited Warranty period there will be no charge for labor. During the “Parts” warranty period, there will be no charge for parts. You must mail-in your product during the warranty period. This Limited Warranty is extended only to the original purchaser and only covers product purchased as new. A purchase receipt or other proof of original purchase date is required for Limited Warranty service.

This warranty extends to products purchased directly from AVPro or an authorized dealer. AVPro is not liable to honor this warranty if the product has been used in any application other than that for which it was intended, has been subjected to misuse, accidental damage, modification or improper installation procedures, unauthorized repairs or is outside of the warranty period. Please direct any questions or issues you may have to your local dealer before contacting AVPro.



## ▪ Troubleshooting

- Verify Power - Pg.7
  - Verify POE Switch is correct - Pg.8
- Verify Connections - Check that all cables are properly connected
  - RX Indicator Troubleshooting Lights - Pg.7 & 8
- Sync Issues - Try enabling CASCADE MODE - Pg.8
- Extracted Audio Issues - Pg.13 & 14
  - Verify Source is set to output 2ch PCM
    - **Note: This unit does NOT downmix**
- IR Issues - Verify correct connections - P.11 & 12
  - Visibly flashing Emitters may not function properly, try the IR Cables that come in the box
- Still having issues, contact us
  - Support Direct - +1-605-977-3477
  - All inquiries - +1-605-274-6055
  - Submit a support request ticket
    - <https://support.avproedge.com/hc/en-us/requests/new>



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Thank you for choosing AVProEdge!

Please contact us with any questions. We are happy to be of service!



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