

User Manual

AC-EX40-444-KIT

Ultra Slim 40m (70m HD) 4K60 4:4:4, HDR
HDBaseT Extender Audio Extraction, EDID
Management, Scaling



AVProConnect
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AVProConnect presents its first 18Gbps over CAT extender. Using ICT (Invisible Compression Technology) we have achieved what was thought to be impossible. The AC-Ex40-444 delivers a virtually lossless, high bandwidth, 4K HDR signal with support for any signals up to 18Gbps.

Key benefits of using AC-EX40-444:

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-EX40-444 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-EX40-444 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 your 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-EX40-444 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.

Long Range Extender w/ Ethernet, EDID & Control

■ Product Overview

■ Model Numbers:

- **AC-EX40-444-T** ~ HDBaseT Transmitter w/ Audio Extraction, IR, RS-232, EDID, Bi-Directional PoE and Scaler
- **AC-EX40-444-R** ~ HDBaseT Receiver w/ IR, RS-232, Bi-Directional PoE

■ 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
- 70M (230ft) on 1080P (Cat6a)
- Up to 40m (131ft) on 4K (up to 4K60 4:4:4, HDR) (Cat6a)
- Bi-directional 48v PoH (Power Over HDBaseT, only one Power Supply Needed)
- I-Pass feature for control system "pass-through"
- 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

AVProConnect 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>1. 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>6. Clean this device with a dry cloth only.</p> |
|  | <p>2. 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>7. Unplug this device during lightning storms or when unused for long periods of time.</p> |
|  | <p>3. 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>8. Protect the power cord from being walked on or pinched particularly at plugs.</p> |
|  | <p>4. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.</p> |  <p>9. Only use attachments / accessories specified by the manufacturer.</p> |
|  | <p>5. Do not place sources of naked flames, such as lighted candles, on the unit.</p> |  <p>10. Refer all servicing to qualified service personnel.</p> |

■ What's Included

Whats in the box?

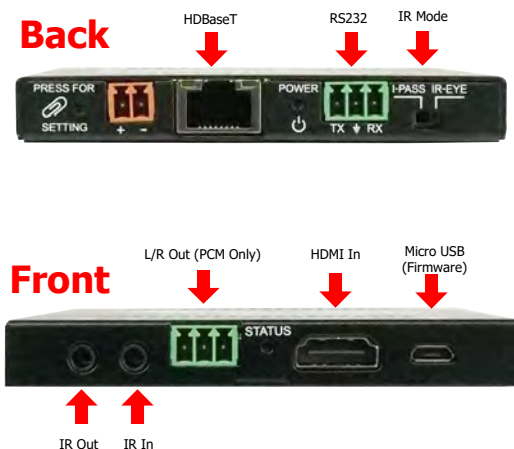
- AC-EX40-444-T (Transmitter)
- AC-EX40-444-R (Receiver)
- 48V Power Supply (One supplied)
- 1x IR Tx Unit
- 1x IR Rx Unit
- 4x 3 Pin Terminal blocks for Audio and RS232 Ports
- Mounting Ears
- Operating Instructions

*Optional 3Pin to Stereo Audio Cables available for purchase

■ Specifications

Video:	
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) HDR10, HDR10+, HLG
Color Space	YUV (Component), RGB (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)
Audio:	
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)
Distance:	
HDBaseT (CAT) Distance (4K)	40M (131 Feet)
HDBaseT (CAT) Distance (Full HD)	70M (230 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)
Other:	
Bandwidth	18 Gbps (w/ ICT)
HDCP	HDCP 2.2 and earlier
Ports:	
HDMI (Tx & Rx)	Type A
Audio (Extracted Analog) (Tx & Rx)	3 pin terminal block (unbalanced)
IR Tx (Tx & Rx)	3.5mm Mono (2 Conductor)
IR Rx (Tx & Rx)	3.5mm Stereo (3 Conductor)
RS232 (Tx & Rx)	3 pin terminal block
Power (Tx & Rx)	2 pin terminal block
Environmental:	
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)
Power:	
Power Consumption (Total)	9 Watts Max Pair
Power Supply	Input: AC 100-240V ~ 50/60Hz Output: DC 48V .5A (Wall Version)
Dimensions:	
Dimensions (Single Unit Only, Tx or Rx are same) (Length/Width/Height) (Tx or Rx each alone)	mm: 381 x 231 x 12 inch: 15 x 9.1 x .48
Dimensions (Packaged Length/Width/Height) (Kit)	mm: 138 x 165 x 91 inch: 5.5 x 6.5 x 3.6
Weight (Unit) (Tx or Rx each alone)	.3lbs (.13Kg)
Weight (Packaged)	2lbs (.90Kg)
*Specifications subject to change without notice. Mass & dimensions are approximate	

■ The Transmitter



Indicator Troubleshooting Lights on the Transmitter:

POWER - On the back by power supply input: (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...)

*LED also flashes when using the settings button described below.

STATUS - On front by HDMI Port: (Blue) This indicator shows that the HDMI source is connected. The states are:

- Light Is On (Solid) = Sync w/ HDMI source is correct and solid.
- Light Is Flashing = The light flashes during the sync process. If it is flashing continuously, a picture may not be present.

If the **BLUE HDMI STATUS LIGHT** is flashing, 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. Set the EDID to state #1 (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 source and the Transmitter, please try a different source.
5. Contact AVProConnect if these suggestions do not work.

Indicator Troubleshooting Lights on the Transmitter cont.:

LINK - Above RJ45 (HDBT) Port: (Green) This indicator shows that the AV HDBT link between the Tx and Rx is in tact. This light should ALWAYS be solid. If this light is flashing or not present attempt following:

1. Check the length. The maximum distances are 40m (131ft) on 4K and 70m (230ft) 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 AVProConnect if these suggestions do not work.

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

1. Check the length. The maximum distances are 40m (131ft) on 4K and 70m (230ft) 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 just slightly off.
5. Try powering from the Receiver instead of the Transmitter (See Receiver page for more about PoE direction).
6. Contact AVProConnect if these steps do not work.

Functions & Setup of the Transmitter:

IR Mode Slide Switch: (On Back) This is used to select a preferred IR Mode:

IR-EYE - The IR Input will be configured to operate with an IR Receiver Eye.

I-PASS - The IR Input will be configured to safely operate with a direct connection from a control system using a mono or stereo 3.5mm cable. This is protected from 3v-20v. Default mode is IR-EYE.

Using the Setting Button: (On Back) The setting button can be pressed in different combinations based on what is needed. The status light on the front will flash based on the selection. The selections are in series, meaning, for example, if you are on selection 5 (listed below), you can come back later and press it again to move you to 6, 7, 8, 1, 2, etc... An ink pen is best to press the button.

The POWER LED is the indicator LED.

EDID Management:

Quick press to select EDID

1. EDID BYPASS --- LED Flashes 1 Time (Default, from downstream device)
2. 1080P_2CH --- LED Flashes 2 Times
3. 1080P_8CH --- LED Flashes 3 Times
4. 4K60HzY420_3D_2CH --- LED Flashes 4 Times
5. 4K60HzY420_3D_8CH --- LED Flashes 5 Times
6. 4K60Hz_3D_2CH_HDR --- LED Flashes 6 Times
7. 4K60Hz_3D_8CH_HDR --- LED Flashes 7 Times
8. USER EDID --- LED Flashes 8 Times

While in the USER EDID state (8), press and hold the setting button (for 4 seconds) in order to copy the EDID from the connected display or downstream device to the user EDID and it will apply automatically.

Why do this?

This is commonly used when there is a need for a specific, known EDID that the installer may prefer. It can also be used if you want to bypass an EDID of an AVR or another connected device. (IE, Plug the extender kit directly into a display and COPY the EDID. Plug it back into an AVR that may not have a current/good EDID).

Scaler Setting:

While in ANY state besides the USER EDID state, press and hold the setting button (for 4 seconds) to toggle the scaler mode. The options are:

1. Normal Mode(ICT Mode) --- LED Flashes 1 Time
2. Down Scaler Mode (4K->2K) --- LED Flashes 2 Times

Functions & Setup of the Transmitter Cont.:

Test Pattern Generator:

Press and hold the setting button (for 4 seconds) while powering up the transmitter. You should see the color bar pattern to the right on screen. When in this mode, you can quick press to toggle the resolution.

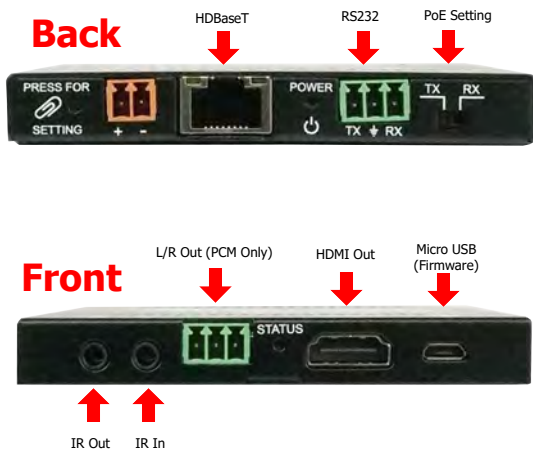
Quick press the setting button---Select the test pattern timing

- 1080P --- LED Flashes 1 Time (3 sets of color bars)
- 4K --- LED Flashes 2 Times (5 sets of color bars)

This can be useful for checking your cabling and for troubleshooting. You can also ensure you have sufficient distance based on the resolution as well.



■ The Receiver



Indicator Troubleshooting Lights on the Receiver:

POWER - On the back by the power supply input: (Red) This indicator shows 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 no power present. - (In order to have power try checking the power supply, USP, Outlet, etc...).

*LED flashes when using the settings button described below.

STATUS - On the front by HDMI port: (Blue) This indicator shows that the HDMI Display, Projector or sink is connected. The states are:

- Light Is On (Solid) = Sync w/ HDMI source is valid 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.

Things to check if **BLUE HDMI STATUS LIGHT** is flashing AND you have no picture:

1. The display to make sure it is working properly (plug source or generator into display directly).
2. Try a different HDMI Input - Some have different functions/capabilities per display.
3. Try a longer HDMI cable. Some HDMI cables do not sync well at shorter lengths.
4. If these suggestions do not work, enable the "Test Pattern" (See Below). If you see the pattern, the problem is before the Rx, please try a different source or EDID on the Tx. You can also try to scale the TX to 1080P (see transmitter functions above).
5. Contact AVProConnect if these steps 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 40m (131ft) on 4K and 70m (230ft) 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 AVProConnect 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 40m (131ft) on 4K and 70m (230ft) 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 AVProConnect 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 = You will need to power the TRANSMITTER, 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 (This is called "Reverse Power").

Using the Setting Button: (On the back) The setting button can be pressed in different combinations based on what you want to do. The status light on the front will flash based on your selection.

The POWER LED is the indicator LED.

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

Test Pattern Generator:

Press and hold the setting button (for 4 seconds) while powering up the transmitter. The color bar pattern, as seen to the right will appear. When in this mode, you can short press to toggle the resolution.

Quick press---Select the test pattern timing

- 1080P --- LED Flashes 1 Time
- 4K --- LED Flashes 2 Time

This is useful for checking cabling and for troubleshooting. It will check the link between the Rx and the display/sink.

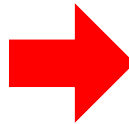


■ RS-232 Configuration

RS2-32 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 at (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:



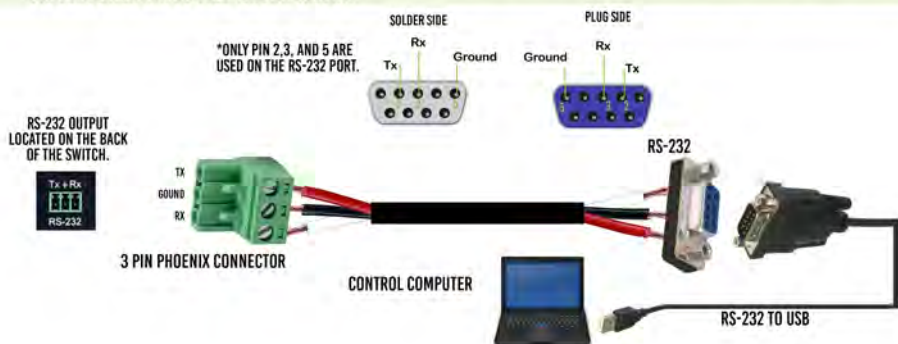
This is how the cable should look. If using the AC-CABLE-3.5-DB9F (Female) or AC-CABLE-3.5-DB9M (Male), the colors will be the same. With any other cable, please follow Tx, G, Rx as shown above. A RS-232 cable preparation diagram is on the next page.



■ RS-232 Cable Prep

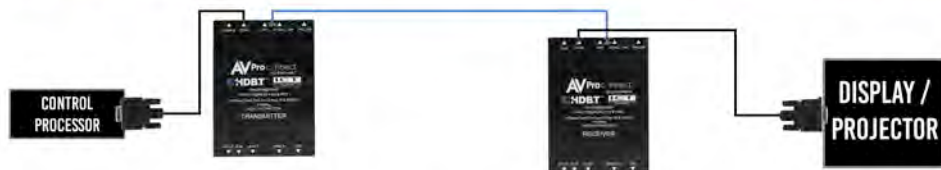
AVProconnect RS-232 CONNECTION

IN ORDER TO CONNECT A COMPUTER TO THE SWITCH VIA RS-232, A CABLE WILL NEED TO BE MADE. ONE END WILL NEED TO HAVE A PHOENIX CONNECTOR AND THE OTHER END WILL NEED TO BE A RS-232 PORT. IF THE COMPUTER DOESN'T HAVE A RS-232 INPUT, A USB CONVERTER MAY BE USED (SHOWN BELOW).



■ RS-232 Sample Application

444 EXTENDER RS-232 CONTROL



RS-232 CONTROL IS BI-DIRECTIONAL SO YOU ARE ABLE TO RECEIVE FEEDBACK

■ 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-EX40-444 Transmitter to pass IR signals directly to the remote end.
NOTE - Be sure the IR MODE Slide Switch is set to "I-PASS" on the Transmitter
2. **From Rack (Using IR-EYE):** Plug an IR-Receiver Eye into the "IR IN" of the AC-EX40-444 Transmitter 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 TRANSMITTER IR Out Port with an emitter.

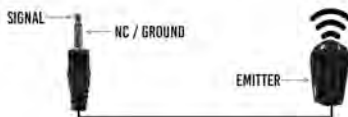
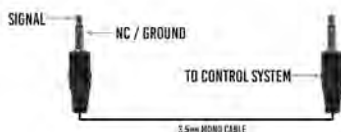
AVProconnect AC-EXD-444-KIT 444 EXTENDER I-PASS IR CONTROL



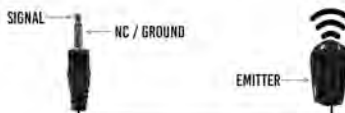
AVProconnect AC-EXD-444-KIT 444 EXTENDER IR CONTROL



■ IR Connections to AC-EX40-444-T (Transmitter)



■ IR Connections to AC-EX40-444-R (Receivers)



■ Audio Extraction on AC-EX40-444

A feature that is always active on the AC-EX40-444 (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:

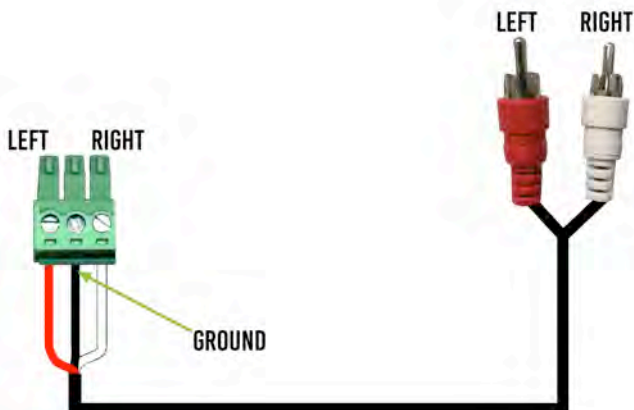
1. Simply plug a 3 pin terminal block into the port on the Tx or Rx (both are always active) and make your own cable assembly.
2. There is an option to buy pre-made unbalanced 3-pin to RCA Female cables from www.avprostore.com

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



■ Stereo Cable Preparation



NOTE: Pre-made audio cables can be purchased from www.avprostore.com. The part number is: AC-CABLE-3PIN-2CH.

■ Maintenance

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 has been damaged.

● Warranty

If this product does not work properly because of a defect in materials or workmanship, AVProConnect (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 proof of original purchase date is required for Limited Warranty service.

● Warranty Limits and Exclusions

- 1) **This Limited Warranty ONLY COVERS failures due to defects in materials or workmanship, and DOES NOT COVER normal wear and tear or cosmetic damage.** The Limited Warranty ALSO DOES NOT COVER damages which occurred during shipment, failures which are caused by products not supplied by the warrantor, failures which result from accidents, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, set-up adjustments, misadjustment of consumer controls, improper maintenance, power line surge, lightning damage, modification, service by anyone other than a Factory Service Center or other Authorized Service, or damage that is attributable to Acts of God.
- 2) **There are no express warranties except as listed under "limited warranty coverage". The warrantor is not liable for incidental or consequential damages resulting from the use of this product, or arising out of any breach of this warranty.** (This excludes damages for lost time, cost of having someone remove or re-install an installed unit if applicable, travel to and from the service location, loss of or damage to media or images, data or other recorded content. The items listed are not exclusive, but are for illustration only.)
- 3) **Parts and service, which are not covered by this limited warranty, are the user's responsibility.**



Address:

3518 N Casco Ave , Sioux Falls, SD 57104

Tel: 877-886-5112 605-274-6055

Thank you for choosing AVProConnect!

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



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