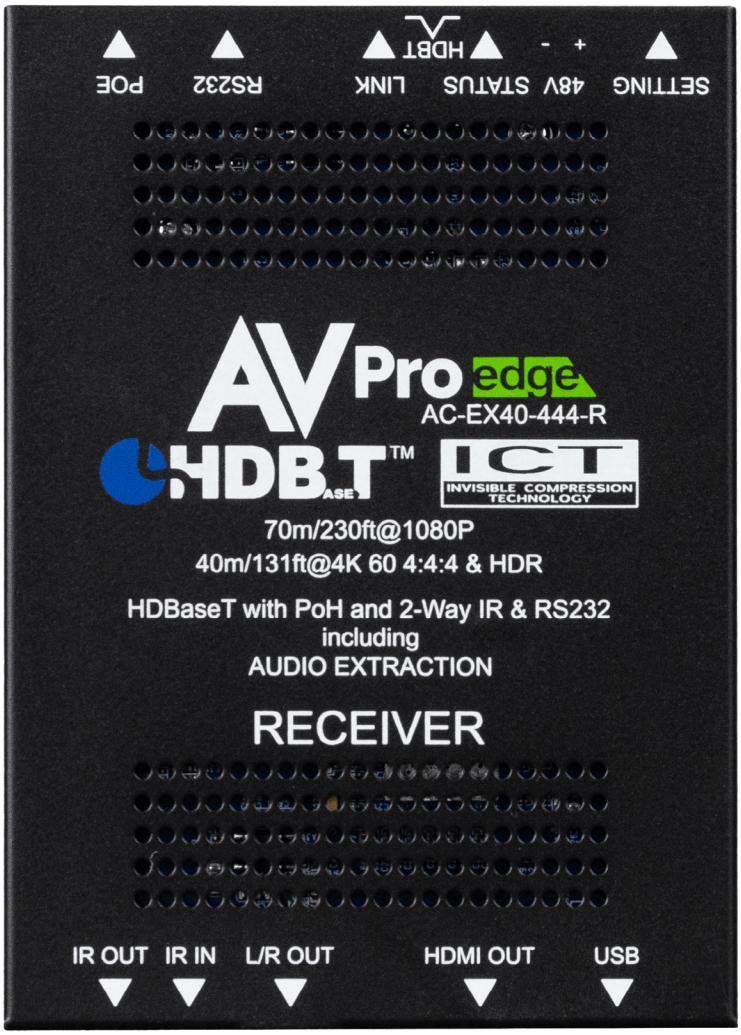
USER MANUAL

AC-EX40-444-KIT

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



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Introduction

AVPro Edge presents its first 18Gbps over copper extender. Using ICT (Invisible Compression Technology) we have achieved what was thought to be impossible. We can deliver a virtually lossless high bandwidth 4K HDR signal with support for all signals up to 18Gbps. Deep Color and HDR Metadata remain intact making the transmission free of artifacts like banding. Other similar devices will deliver a sub-par image that has very visible banding and color shifting.

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 into 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 RS232 Transport
- LED Status, Link, Power indication lights
- Use single UTP/STP LAN cable (CAT-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 on HDMI
- ESD protection circuitry (Inputs & Outputs) to 7KV
- Can Cascade

In The Box

- AC-EX40-444-T2 (Transmitter)
- AC-EX40-444-R (Receiver)
- 48V Power Supply (One supplied) Power either TX or RX
- 1 x IR TX Unit
- 1 x IR Rx Unit
- 4x 3 Pin Terminal blocks for Audio and RS232 Ports
- Mounting Brackets

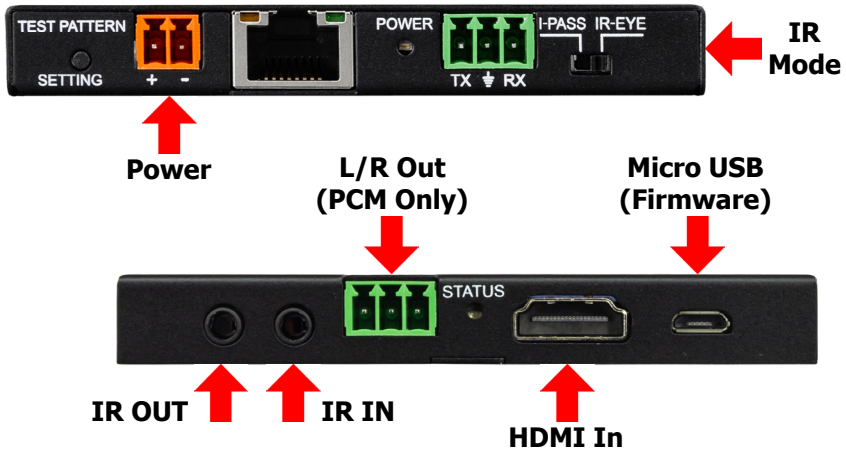
***NOTE: Optional 3Pin to Stereo Audio Cables available for purchase AC-CABLE-3PIN-2CH**

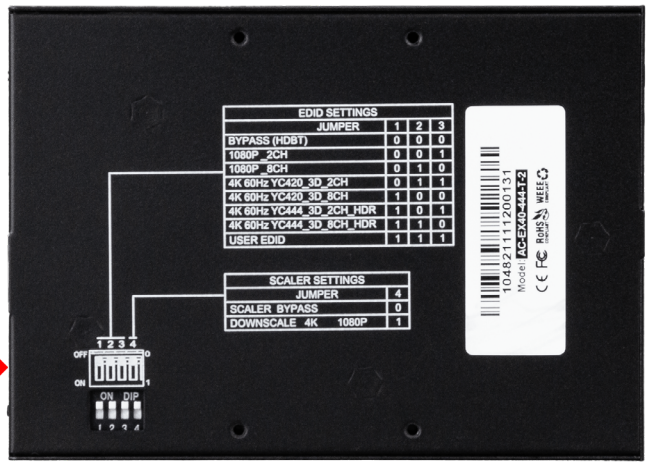
Specifications

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+, HDG, DOLBY VISION, LOW LATENCY DOLBY VISION
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)
DOWN SCALING	4K (AND HDR) DOWN TO 2K
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)	PCM 2 CH (NO DOWNMIX)
DISTANCE:	
HDBASET (CAT) DISTANCE (4K)	40 METERS / 131 FEET (CAT 6A)
HDBASET (CAT) DISTANCE (FULL HD)	70 METERS / 230 FEET (CAT 6A)
HDMI LEAD IN/OUT (4K60 4:4:4)	UP TO 50 FEET (USING BULLET TRAIN HDMI)
HDMI LEAD IN/OUT (W/ AOC CABLE) (4K60 4:4:4)	UP TO 130 FEET (USING BULLET TRAIN AOC)
OTHER:	
BANDWIDTH	18 GBPS (W/ ICT)
HDCP	HDCP 2.3 AND EARLIER
PORTS:	
HDMI (TX & RX)	TYPE A
AUDIO (EXTRACTED ANALOG)	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)	12 WATTS MAX
POWER SUPPLY - MATRIX	INPUT: AC 100-240V ~ 50/60HZ OUTPUT: DC 48V 0.5A
DIMENSIONS:	
DIMENSIONS (SINGLE UNIT ONLY, TX/RX ARE SAME) (HEIGHT/DEPTH/WIDTH) (TX/RX EACH ALONE)	MM: 129 X 92 X 12 INCH: 5.05 X 3.62 X 0.47
DIMENSIONS (PACKAGED HEIGHT/DEPTH/WIDTH) (KIT)	MM: 203 X 165 X 91 INCH: 8 X 6.5 X 3.6
WEIGHT (UNIT) (TX OR RX EACH ONLY)	0.3 LBS (0.13 KG)
WEIGHT (PACKAGED)	2 LBS (0.90 KG)

*SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE. MASS & DIMENSIONS ARE APPROXIMATE

The Transmitter





EDID/Scaler Settings
See Page(s) 7

Indicator Troubleshooting Lights - 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...)

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, a 2 meter

minimum is recommended per HDMI Specifications.

3. Set the EDID to state #1 (See Page[s] 7).
4. If these suggestions do not work, enable the "Test Pattern" (See Page[s] 8). If you see the pattern, the problem is between the source and the Transmitter, please try a different source.
5. Contact AVProEdge if these suggestions do not work.

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.
    a. Standard RJ45 ends are recommended. Pass through style types can cause interference/ crosstalk.
5. Contact AVProEdge 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-dovwn blocks.
4. Re-terminate connectors. Sometimes, even if a cable tester indicates the run is valid, something may be just slightly off.
    a. Standard RJ45 ends are recommended. Pass through style types can cause interference/ crosstalk
5. Try powering from the Receiver instead of the Transmitter (See Receiver page for more about PoE direction).
6. Contact AVProEdge if these steps do not work. Contact AVProEdge if these suggestions do not work.

Functions & Setup of the Transmitter

IR Mode Slide Switch: (On Back) This is used to select a preferred IR Mode for the IR IN port. The two options are:

- 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.

EDID Management: GEN2 (pre DIP Switches)

Press the SETTINGS button to cycle through the EDIDs

4 LED lights on the board inside the chassis (see below)

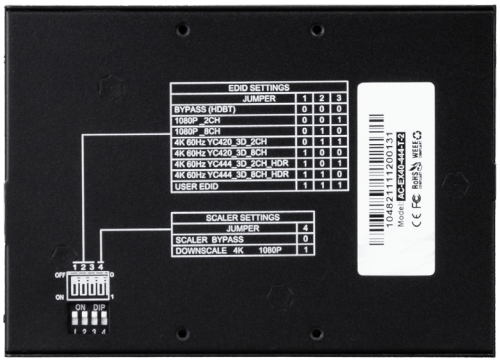
- Solid LED = ON **1**
- Flashing LED = OFF **0**

EDID SETTINGS				
JUMPER	**1**	**2**	**3**	**4**
EDID BYPASS	**1**	**0**	**0**	**0**
1080P 2CH	**0**	**1**	**0**	**0**
1080P 8CH	**1**	**1**	**0**	**0**
4K60Hz YC420 3D 2Ch	**0**	**0**	**1**	**0**
4K60Hz YC420 3D 8Ch	**1**	**0**	**1**	**0**
4K60Hz YC444 3D 2Ch HDR	**0**	**1**	**1**	**0**
4K60Hz YC444 3D 8Ch HDR	**1**	**1**	**1**	**0**
USER EDID	**0**	**0**	**0**	**1**

Copy EDID: To COPY EDID from Sink Device, press the settings button until only LED #4 is lit up (USER EDID). With the Sync Device powered on and the USER EDID Slot selected, press and hold the settings button for approximately 5 seconds to copy and save that EDID. The red POWER LED will flash confirming copy successful.

NOTE: If you press and hold the SETTINGS button in any other state besides USER EDID, this will enable/disable the 4K to 2K Down-Scaler.

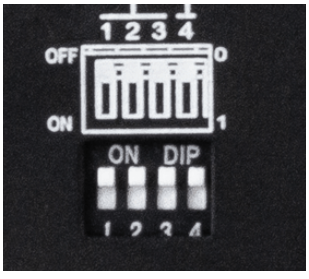
EDID Management:GEN2 (NEW FOR 2022) with DIP Switches on the bottom of the Transmitter



The first 3 are used to set the EDID

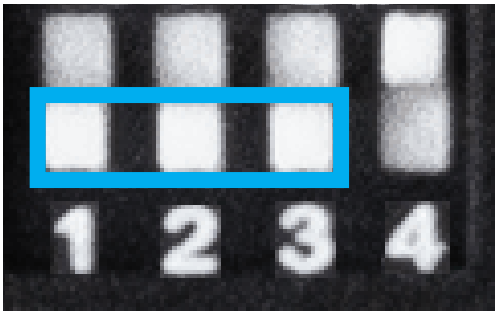
- OFF/UP/0 **0**
- ON/DOWN/1 **1**

EDID SETTINGS			
JUMPER	**1**	**2**	**3**
EDID BYPASS	**0**	**0**	**0**
1080P 2CH	**0**	**0**	**1**
1080P 8CH	**0**	**1**	**0**
4K60Hz YC420 3D 2Ch	**0**	**1**	**1**
4K60Hz YC420 3D 8Ch	**1**	**0**	**0**
4K60Hz YC444 3D 2Ch HDR	**1**	**0**	**1**
4K60Hz YC444 3D 8Ch HDR	**1**	**1**	**1**



Examle set to EDID BYPASS (Default)

Copy EDID: To COPY EDID from Sink Device move DIP Switches 1, 2, and 3 from OFF (up) to ON (down) at the same time while connected Sync is powered on. The EDID will be saved until this process is repeated (move 1, 2, and 3 all back to ON, then all 3 back to OFF).



NOTE: Moving DIP 4 does not affect the COPY EDID function. You can use a coin or other flat object to move all the dip switches together, then once copied move DIP 4 back to desired position if needed.

DIP Switch 4 is used to set the Down-Scaler

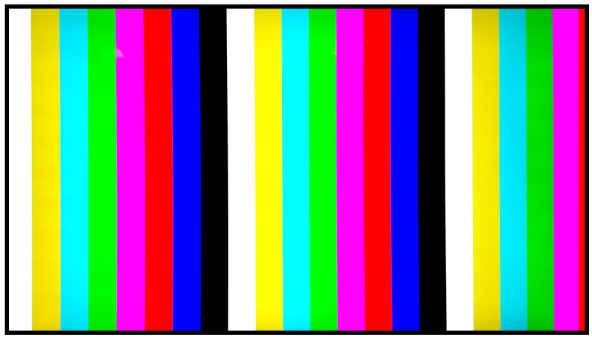
- OFF/UP/0 **0** = Scaler Bypass/OFF
- ON/DOWN/1 **1** = All 4K signals will be down-scaled to 2K

4	JUMPER
0	Scaler Bypass
1	Down-scaled 4K > 2K

Settings Button - Transmitter without Dip Switches

Use this button to Enable the built in 1080P Color Bar Test pattern.

With the Power unplugged from the Transmitter, hold the SETTINGS button while plugging the Power back in. To Disable the built in Color Bar Test pattern power cycle the Transmitter (remove the power for 3 seconds then plug back in).



1920x108P @60Hz

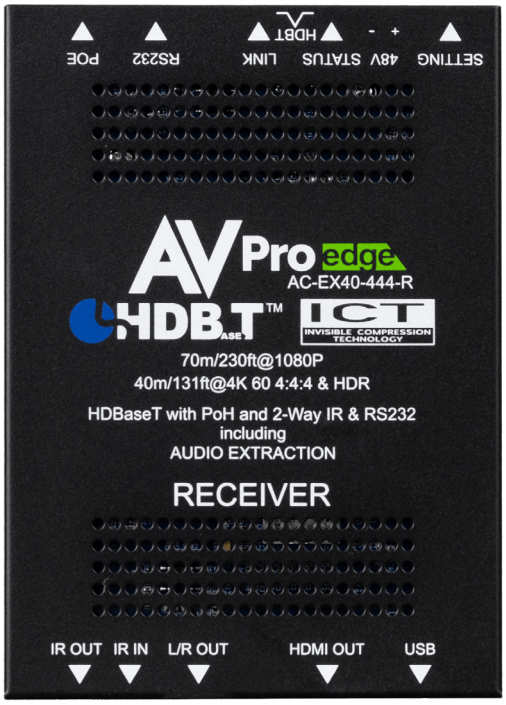
Test Pattern Button - Transmitter with Dip Switches

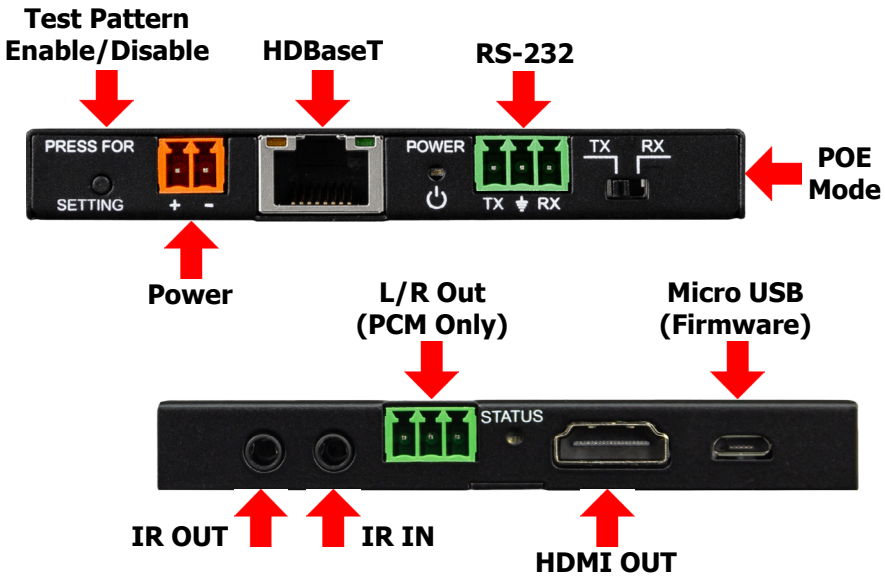
Use this button to Enable/Disable the built in 1080P Color Bar Test pattern.

Press once to Enable, press again to Disable.

NOTE: The Reciever also has built in test pattern generator. See page 10 for more details.

The Receiver





Indicator Troubleshooting Lights - Receiver

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, POE Switch on Reviver, USP, Outlet, etc...

STATUS - On front by HDMI Port: (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, a picture may not be present.

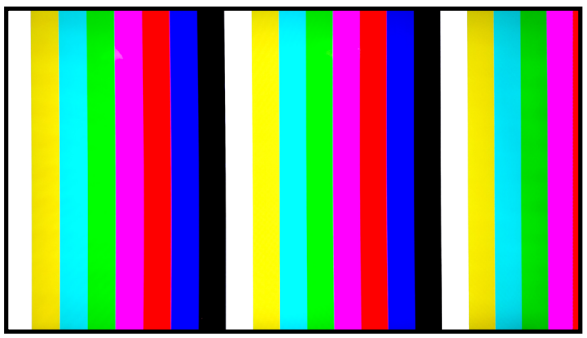
If the BLUE HDMI STATUS LIGHT is flashing, check the following:

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, a 2 meter minimum is recommended per HDMI Specifications.
3. If these suggestions do not work, enable the "Test Pattern" (See Page[s] 8). If you see the pattern, the problem is more than likely between the source and the Transmitter, please try a different source.
4. Contact AVProEdge if these suggestions do not work.

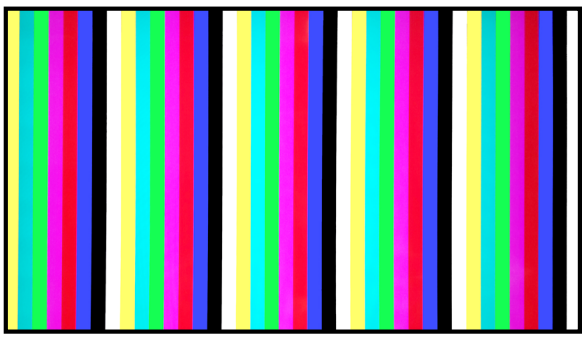
Settings Button - Receiver

Use this button to Enable/Disable the built in Color Bar Test pattern, there are three available settings.

Press once to Enable the 2k test pattern, press again to Enable the 4k test pattern, press a third time to disable.



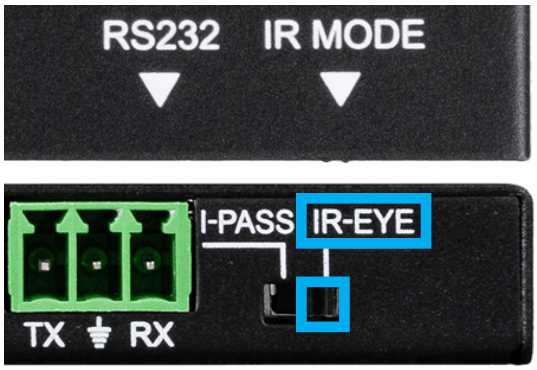
1920x1080P @60Hz



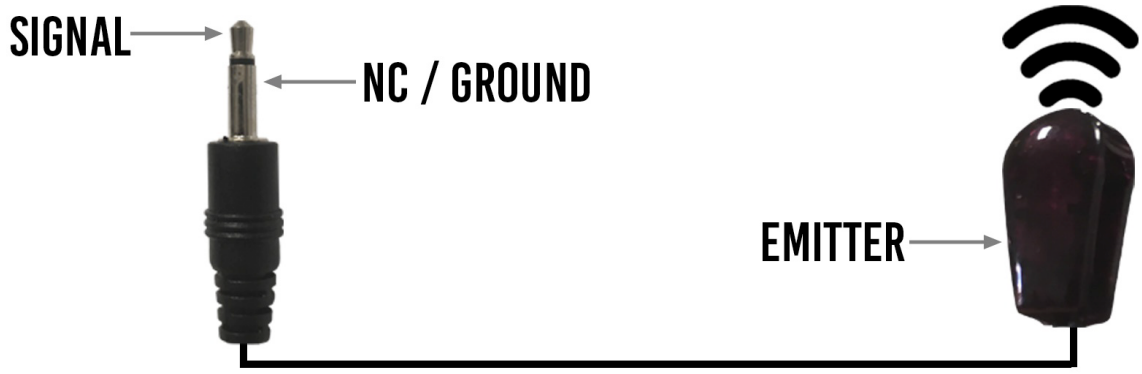
3840x2160P @30Hz

IR Configuration

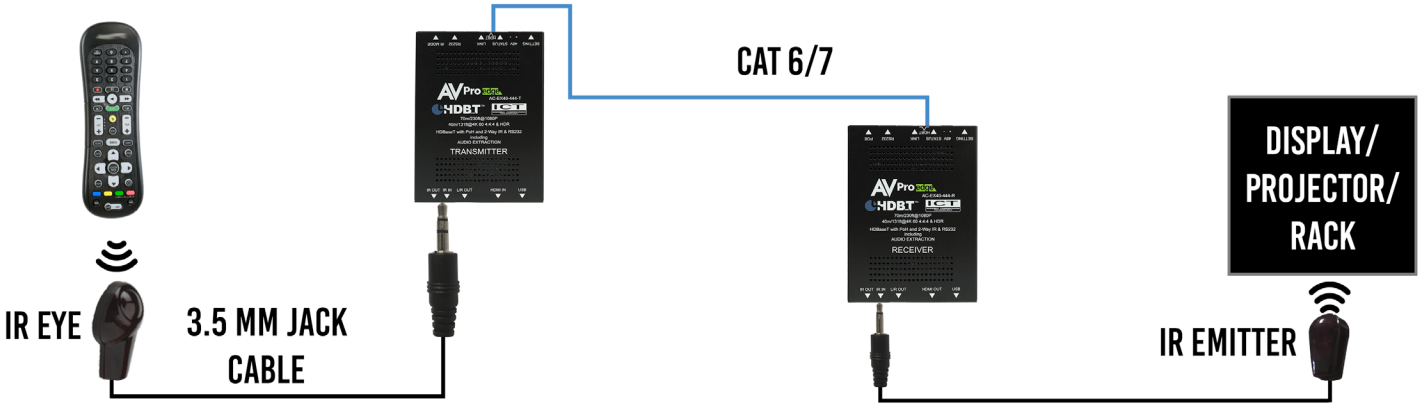
There are two different 3.5mm IR ports located on the Transmitter and Receiver. IR OUT and IR IN. There is also a IR MODE Switch for changing the behavior of the IR Input of the Transmitter. IR Eye will be when you are using an IR Receiving Eye, I-Pass is when using a direct connection to a control system. See page[s] 12 for more details.



IR OUT - This port is designed to accept an IR Emitter



In the example below an IR receiving eye is plugged into the "IR IN" port of the HDBaseT Transmitter. The IR MODE Switch is set to IR-EYE and a IR Emitter is plugged into the "IR OUT" port of the HDBaseT Receiver. This allows you to use an IR Remote control to send and IR signal from the source side (TX) down the category cable to the sink (RX) and control the display.

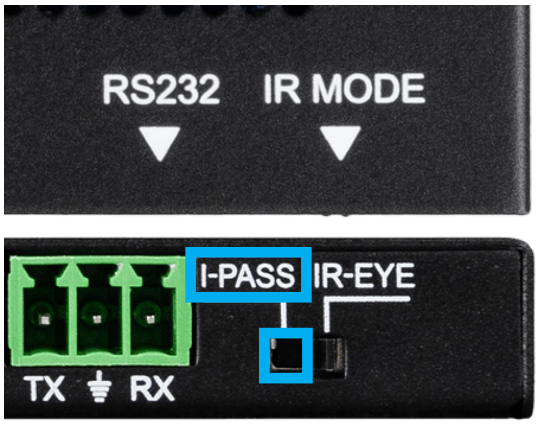


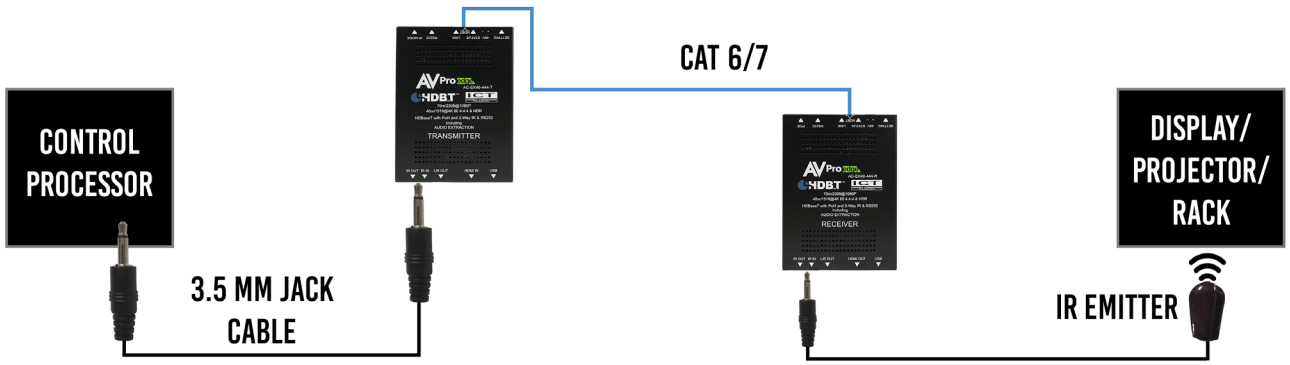
In the example below a control system is plugged into the "IR IN" port of the HDBaseT Transmitter with a 3.5mm mono cable. The IR MODE Switch is set to I-PASS and a IR Emitter is plugged into the "IR OUT" port of the HDBaseT Receiver. This allows you to send an IR signal from a control system down the category cable to the sink (RX) and control the display.

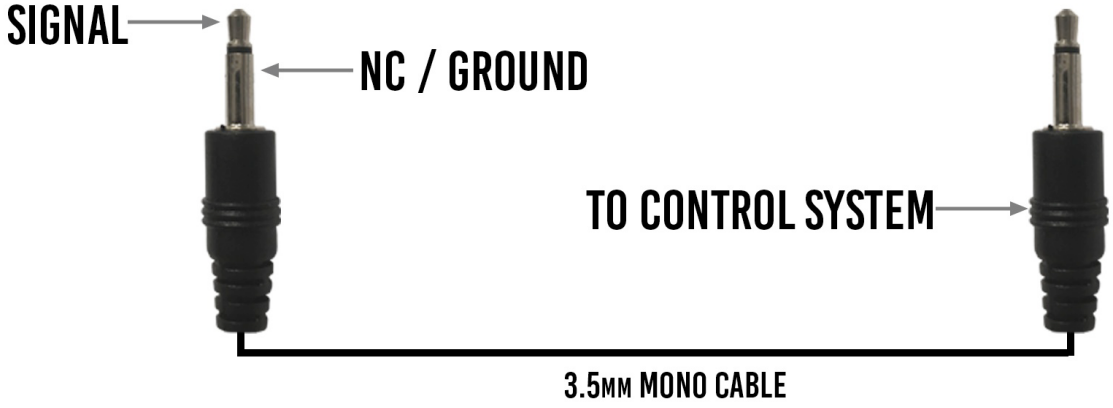
IPASS - This port is designed to be directly connected to a control system via a 3.5mm Mono cable

NOTE: IPASS is only an INPUT. So you can go IPASS in from a control system to IR OUT.
Control System > IPASS (TX) ------IR OUT (RX)

See example below







Extracted Audio - L/R OUT

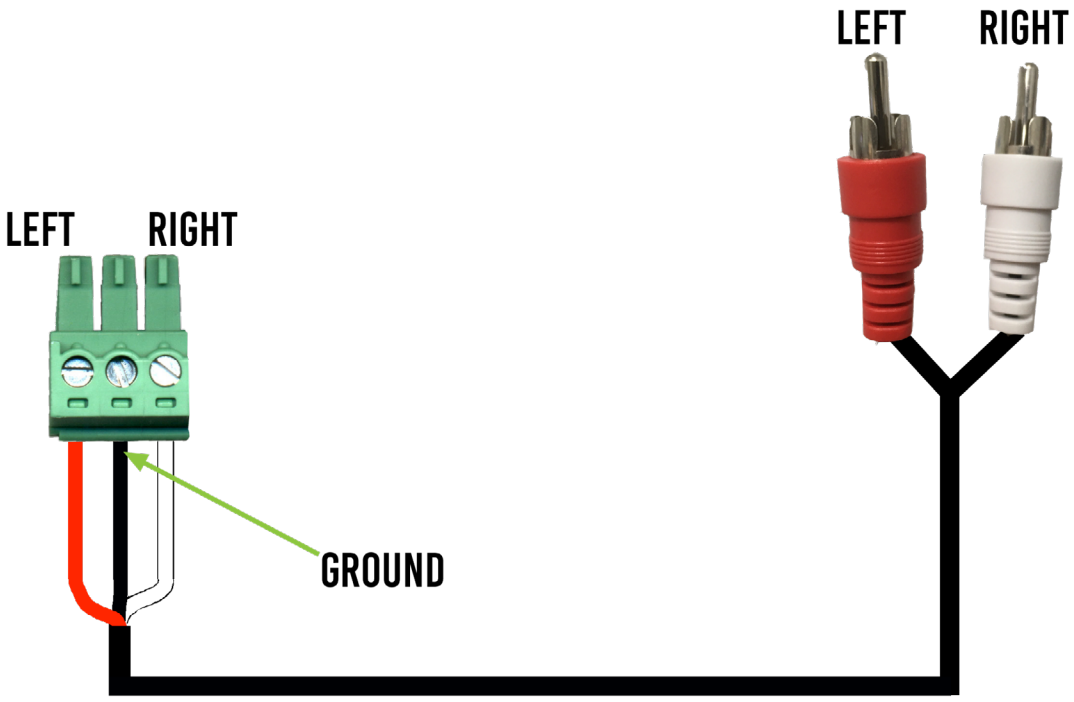
A feature that is always active on the AC-EX40-444 (TX and Rx) is Audio Extraction. This feature extracts PCM Audio (2ch) from the source device in order to be run to a separate amplifier or AVR. BOTH of the audio ports are always active (on TX & Rx).

NOTE - These ports ONLY work if the source is 2Ch.
If down-mixing is needed, check out AC-AVDM-AUHD.

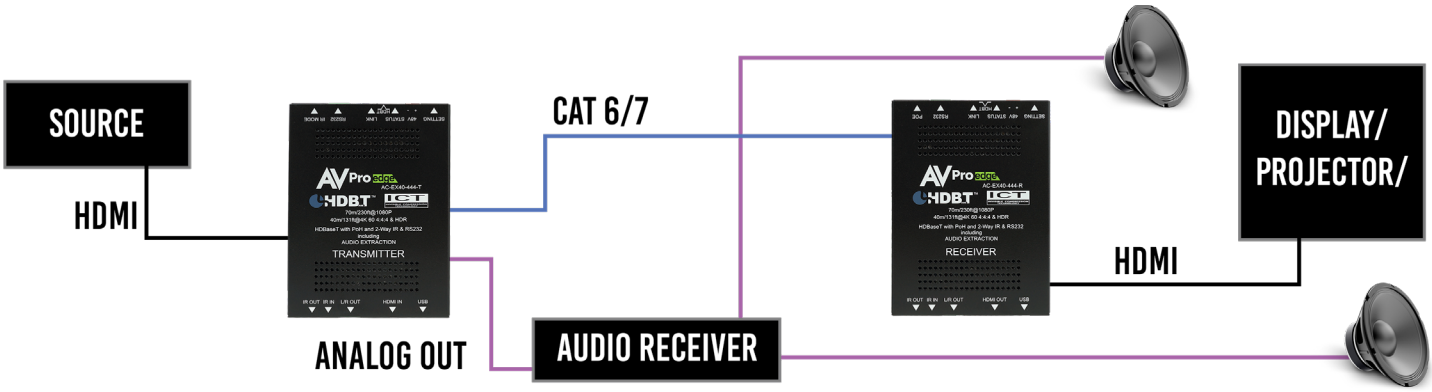
To use the ports:

- 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.
- There is an option to buy pre-made unbalanced 3-pin to RCA Female cables (AC-CABLE-3PIN-2CH) see image below.

AC-CABLE-3PIN-2CH



Audio Extraction Example



Troubleshooting

- Verify Power - Check that the power supply is properly connected and on an active circuit. The RX not receiving power (when powering from TX through the Category cable), bring the RX to the TX and try a different Category cable to verify functionality.
- Verify Connections - Check that all cables are properly connected.
- TX/RX Indicator Troubleshooting Lights - Pg. 5-6
- IR Issues - Verify correct connections - P. 11-12
  Note: Visibly flashing Emitters may not function properly, if you are experiencing issue try the IR Cables that come in the box.
- Lights indicate everything is good but still not getting a picture, this may be a bandwidth limitation. See Bandwidth Chart below to verify the signal is not exceeding the bandwidth of the Extender kit (limited to 17.82Gbps).

Bandwidth Chart

TYPE	RESOLUTION	FRAME RATE (FPS)	COLOUR COMPRESSION	DEEP COLOUR BIT DEPTH	HDR	WIDE COLOR GAMUT (BT2020)	HDMI VERSION	DATA RATE	444 SERIES
HD	1920x1080	24	4:2:2	8 BIT	NO	NO	1.4	0.75 Gbps	YES
HD	1920x1080	60	4:2:2	8 BIT	NO	NO	1.4	4.45 Gbps	YES
HD	1920x1080	60	4:4:4	16 BIT	NO	NO	1.4	5.91 Gbps	YES
UHD	3840x2160	24	4:2:0	8 BIT	NO	NO	1.4	8.91 Gbps	YES
UHD	3840x2160	24	4:4:4	8 BIT	NO	NO	1.4	8.91 Gbps	YES
4K	4096x2160	24	4:4:4	8 BIT	NO	NO	1.4	8.91 Gbps	YES
UHD OR 4K	3840x2160	60	4:2:0	8 BIT	NO	NO	1.4/2.0	8.91 Gbps	YES
UHD OR 4K	3840x2160	24	4:2:0	10 BIT	YES	YES	2.0(A/B)	8.91 Gbps	YES
UHD OR 4K	3840x2160	24	4:2:2	12 BIT	YES	YES	2.0(A/B)	11.14 Gbps	YES
UHD OR 4K	3840x2160	24	4:4:4	10 BIT	YES	YES	2.0(A/B)	11.14 Gbps	YES
UHD OR 4K	3840x2160	24	4:4:4	12 BIT	YES	YES	2.0(A/B)	13.37 Gbps	YES
UHD OR 4K	3840x2160	60	4:2:0	10 BIT	YES	YES	2.0(A/B)	11.14 Gbps	YES
UHD OR 4K	3840x2160	60	4:2:0	12 BIT	YES	YES	2.0(A/B)	13.37 Gbps	YES
UHD OR 4K	3840x2160	60	4:2:2	12 BIT	YES	YES	2.0(A/B)	17.82 Gbps	YES
UHD OR 4K	3840x2160	60	4:4:4	8 BIT	YES	YES	2.0(A/B)	17.82 Gbps	YES

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 adapter 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
- Clean this unit with a soft, dry cloth. Never use alcohol, paint thinner or benzene to clean this unit.

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.

Thank you for choosing AVProEdge!

Please contact us with any questions, we are happily at your service!

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