USER MANUAL

Fiber Optic Extender with 4K60 4:4:4 support uncompressed 18Gbps HDR, ARC, IR, and RS232

This is AVProEdge's flagship Fiber Optic Extender, allowing the user to extend an HDMI signal up to 300 meters using single-mode or multi-mode fiber. It solves problems for both commercial and residential markets for distributing high value 4K 18Gbps content from rack to display. These extenders go the distance, no need to find power and cascade extenders for ultra long runs. Additionally AC-EXO-UNC offers solutions for 18Gbps distribution in residential, digital entertainment centers, retail stores, AV events that require reliable and long distance distribution, suitable for Data Center, Control Rooms, Conference Rooms, Schools and Corporate Training environment.

Product Overview

Model Numbers:

- **AC-EXO-UNC-T** ~ HDBaseT Transmitter w/ Audio Extraction, IR, RS-232, EDID, and ARC

- **AC-EXO-UNC-R** ~ HDBaseT Receiver w/ Audio INPUT, IR, RS-232, and ARC

Features

- HDMI 2.0(a/b)
- 18Gbps Bandwidth Support Uncompressed
- Up to 4K60 4:4:4 Support
- Full HDR Support (HDR 10 & 12 Bit)
- HDR, HDR10+ and HLG Support
- Dolby Vision Support
- ARC Support (Toslink or HDMI)
- CEC Pass Through
- 3D Support
- 300m (1000ft) on full 4K (Multi-mode OM3)
- 300m (1000ft) on full 4K (Single-mode Fiber)
- HDCP 2.2 & Earlier
- Bi Directional IR
- Bi Directional RS232
- 3-20v protection circuit built in for safe IR transport
- LED status indicators – Power, Link, Signal and Ethernet
- Use single fiber optic cable (Multi-mode or Single-mode)
- 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
- Single LC Connector Type

What's in the Box

- AC-EXO-UNC-T (Transmitter)
- AC-EXO-UNC-R (Receiver)
- 2x 48V Power Supply
- 1 x IR Tx Unit
- 1 x IR Rx Unit
- Mounting Ears

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, DOLBY VISION
COLOR SPACE	YUV (COMPONENT), RGB (CSC: REC. 601, REC. 709, BT2020, DCI, P3 D6500)
CHROMA SUBSAMPELING	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 DIGTAL, DTS 5.1, DOLBY DIGITAL PLUS, DOLBY TRUEHD, DTS-HD MASTER AUDIO, DTS-X, DOLBY ATMOS
AUDIO FORMATS SUPPORTED EXTRACTED: TRANSMITTER (TOSLINK OUT)	PCM 2.0 CH, LPCM 5.1 & 7.1, DOLBY DIGTAL, DTS 5.1, DOLBY DIGITAL PLUS (NO DOWNMIXING) - EXTRACT LOCAL OR ARC
AUDIO FORMATS SUPPORTED: RECEIVER (TOSLINK INPUT)	PCM 2.0 CH, LPCM 5.1 & 7.1, DOLBY DIGTAL, DTS 5.1, DOLBY DIGITAL PLUS (NO DOWNMIXING) - INPUT FOR ARC
ARC (AUDIO RETURN CHANNEL)	VIA TOSLINK OR HDMI

FIBER:

TYPE	MULTIMODE (OM3 RECOMMENDED) OR SINGLEMODE
CONNECTOR	LC (LUCENT)
RECOMMEND FIBER	CLEERLINE SSF
CUSTOM OPTICAL TOSA/ROSA	300M BUILT IN.

DISTANCE:

OM3 MULTI-MODE (FULL 4K)	300M (1000 FEET)
SINGLE-MODE (FULL 4K)	300M (1000 FEET)
HDMI LEAD IN/OUT (UP TO 4K60 4:4:4)	UP TO 50 FEET (BULLET TRAIN HDMI)
HDMI LEAD IN/OUT (W/ AOC CABLE) (UP TO 4K60 4:4:4)	UP TO 130 FEET (W/ BULLET TRAIN AOC)

OTHER:

BANDWIDTH	18 GBPS
HDCP	HDCP 2.2 AND EARLIER

PORTS:

HDMI (TX & RX)	TYPE A
AUDIO (EXTRACTED/EMBEDDED) (TX & RX)	TOSLINK
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)	BARREL TYPE

ENVIRONMENTAL:

OPERATING TEMPRATURE	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 PAIR
POWER SUPPLY	INPUT: AC 100-240V ~ 50/60HZ OUTPUT: DC 12V 2A (WALL VERSION)

DIMENSIONS:

DIMENSIONS (SINGLE UNIT ONLY, TX OR RX ARE SAME) (LENGTH/WIDTH/HEIGHT) (TX OR RX EACH ALONE)	MM: 173 X 114 X 22 INCH: 6.8 X 4.48 X 0.87
DIMENSIONS (PACKAGED LENGTH/WIDTH/HEIGHT) (KIT)	MM: 305 X 178 X 77 INCH: 12 X 7 X 3
WEIGHT (UNIT) (TX OR RX EACH ALONE)	0.9LBS (0.45KG)
WEIGHT (PACKAGED)	2LBS (0.90KG)

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

Fiber Basics: Fiber Cable Types

- Single-mode - Typically used for "long hauls" - Typically used for long distance buried cable (ie. used by telecommunication companies for country-wide distribution) -Single-mode should be used in applications over 1000FT (300M).
- Multi-mode - Most common in pro/custom electronics. For shorter runs, up to 1000FT (300M). Multi-mode is used in residential/commercial applications for on premise infrastructure.

Ways to purchase fiber cable:

- Simplex - Means a single strain of fiber optic cable. Comes in a single jacket. Any grade/type can be simplex.
- Duplex - Means two strains of fiber optic cable. Comes in a dual, fused, jacket.
- 6-Strain - Six strains of fiber, comes in a single jacket, each individual fiber will be color coded.
- 12-Strain - Twelve strains of fiber, comes in a single jacket, each individual fiber will be color coded.

OM Grades

OM grades are for multi-mode fiber (OM translates to Optical Multi-mode) only. The grade is determined by the clarity of the glass. The differences are:
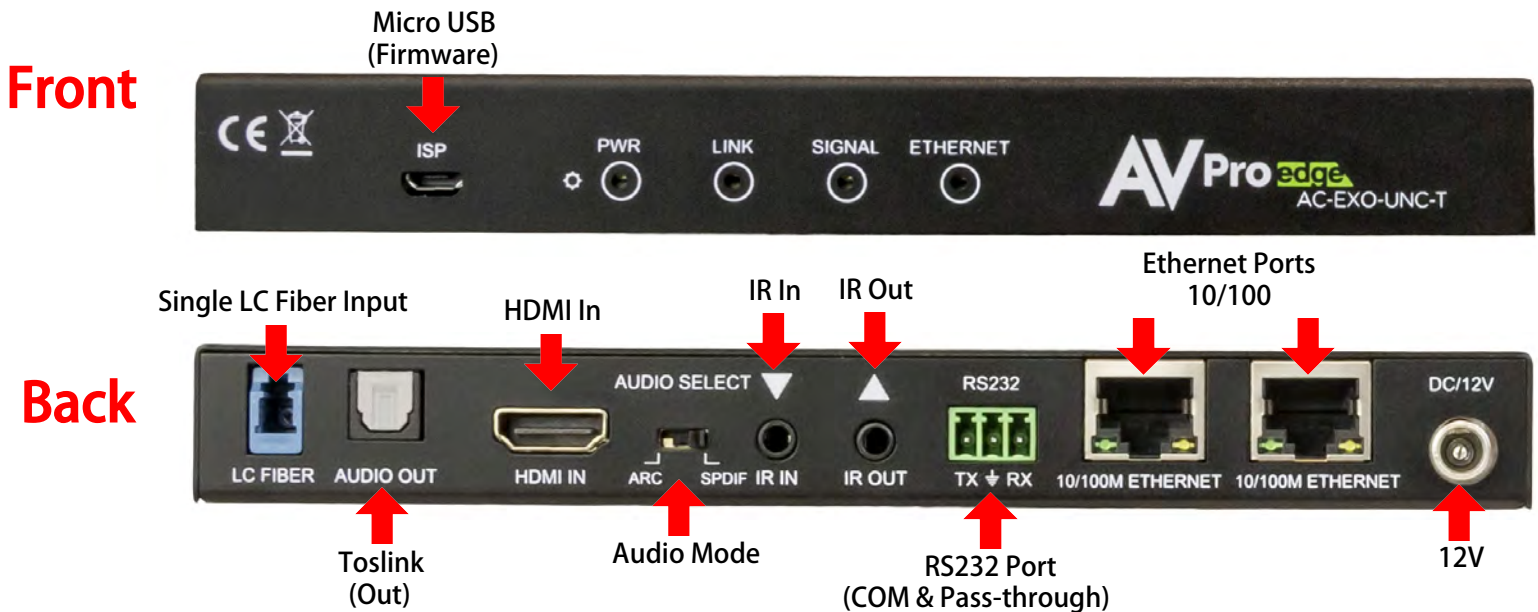
- OM1 - (Legacy Fiber) - 200MHz - Typically ORANGE jacket - is compatible with AC-EXO-UNC up to 100M.
- OM2 - 500MHz - Typically ORANGE jacket - is compatible with AC-EXO-UNC up to 150M.
- OM3 - (Most Common, Recommended) 2000MHz - Typically AQUA jacket - is compatible with AC-EXO-UNC up to 300M.
- OM4 - 4700MHz - Typically VIOLET, but can be AQUA jacket - Is compatible with AC-EXO-UNC up to 300M

OS Grades

OS grades are for single-mode fiber (OS translates to Optical Single-mode) only. The grade is determined by the clarity of the glass. For Pro AV applications the grade is of little meaning - there are two grades (OS1, OS2) OS1 is considered "legacy". If you buy Single-mode today it will be OS2. The jacket color of single-mode fiber is YELLOW. The AC-EXO-UNC.

- LC (Lucent Connector) - Universal style, most common (used in networking). Can be terminated in the field, some connectors support more than one strain. AC-EXO-UNC uses this connector type.

- SC (Square Connector) - Universal, can be terminated in the field. Single strain of fiber only.

- MPO (Multi-fiber Push-On) - Mechanically terminated, for large fiber clusters. Not field friendly.

- Other Types- many other "custom" styles exist, however since there is no consistency, it is not effective in the field and becomes a single use cable.

■ *The Transmitter*

Front

Micro USB (Firmware)

ISP   PWR   LINK   SIGNAL   ETHERNET

AVPro edge
AC-EXO-UNC-T

Back

Single LC Fiber Input

HDMI In

IR In   IR Out

Ethernet Ports 10/100

AUDIO SELECT ▼   ▲   RS232   DC/12V

LC FIBER   AUDIO OUT   HDMI IN   ARC   SPDIF IR IN   IR OUT   TX ▼ RX   10/100M ETHERNET   10/100M ETHERNET

Toslink (Out)

Audio Mode

RS232 Port (COM & Pass-through)

12V

Indicator Troubleshooting Lights on the Transmitter:

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

LINK - On the front: (Blue) This indicator shows that the Transmitter and Receiver are connected. The states are:

- Light Is On (Solid) = Sync between transmitter and receiver is established
- Light Is Off = Transmitter and Receiver are not connected, check fiber ends/cable

SIGNAL - On the front: (Blue) This indicator shows source is connected. There are only two states for the light:

- Light is ON = Source device is connected
- Light is OFF = Source device is not connected

ETHERNET - On the front: (Blue) This indicator shows Ethernet status. There are two states for the light:

- Light is ON = The Transmitter is powered and connected to the Receiver
- Light is FLASHING = This light flashes randomly as data is transmitted

ETHERNET - On the back: (Green) This indicator shows

- Light is FLASHING = This light flashes randomly as data is transmitted
- Light is OFF = This indicates there is no data coming through

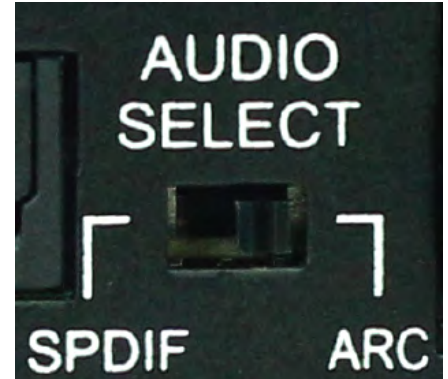**ETHERNET - On the back:** (Amber) This indicator shows

- Light Is On (Solid) = The Transmitter is powered and connected to the Receiver
- Light is FLASHING = This light flashes randomly as data is transmitted

▪ *Functions & Setup of the Transmitter and Receiver:*

Audio Select Slide Switch: (On Back) This is used to select where ARC will come from
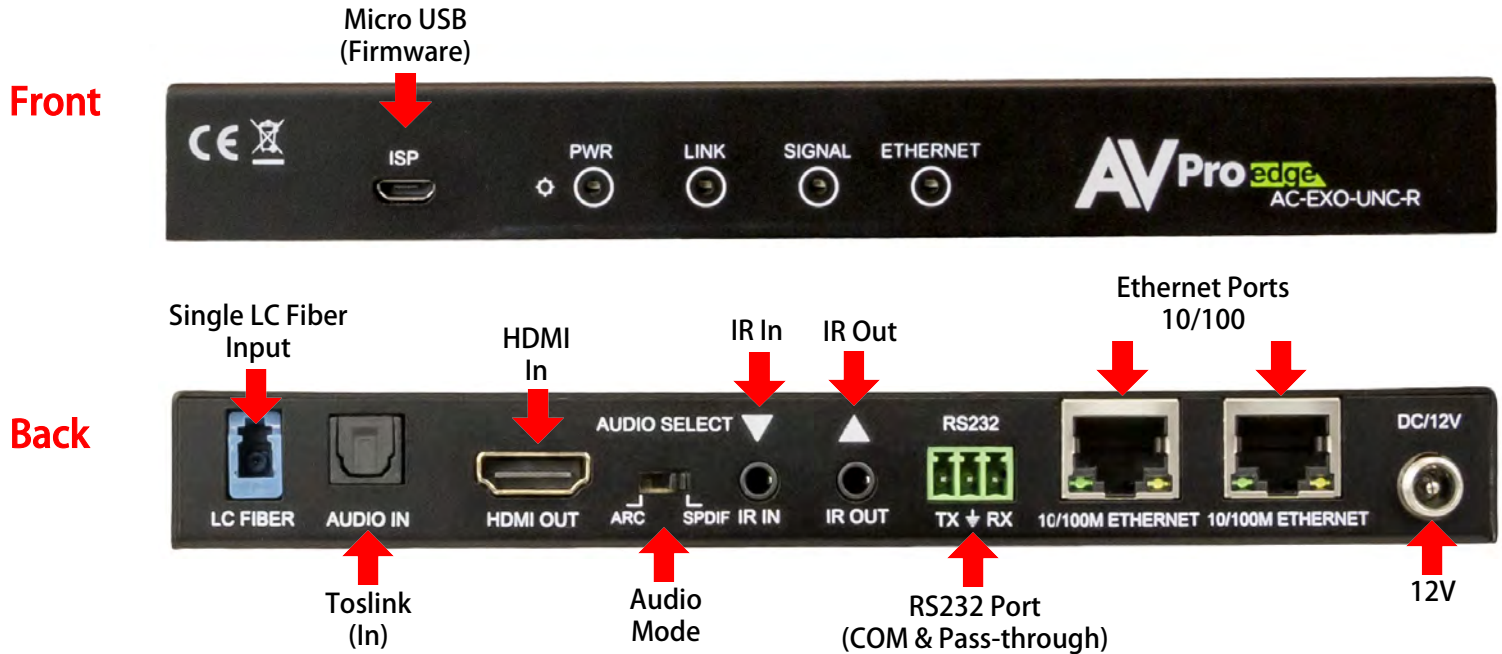
There are two modes:

- ARC (Default) - The audio sent back to the transmitter will be from the HDMI Audio Return Channel. The supported formats are 2CH PCM, 6CH/7CH LPCM, DTS 5.1, Dolby Digital, Dolby Digital Plus. No down-mix, pass through only. Please see the AC-ADM-COTO for down-mixing.
    o In this mode the SPDIF INPUT is inactive.
    o To use ARC via HDMI, make sure ARC in enabled on on AVR and Display properly.
    o The SPDIF OUTPUT on the transmitter will be active for up to DD+
    o Dolby Atmos can pass over HDMI ARC

- SPDIF (Recommended) - The audio sent back to the transmitter will be from the SPDIF INPUT. The supported formats are 2CH PCM, 6CH/7CH LPCM, DTS 5.1, Dolby Digital, Dolby Digital Plus. No down-mix, pass through only. Please see the AC-ADM-COTO for down-mixing.
    o NOTE - On the Tx, you can retrieve the signal from HDMI or SPDIF Toslink. Verify AUDIO SELECT switch is set correctly on both the Transmitter and the Receiver depending on where you are extracting.

*NOTE: See Pg. 15 & 16 for examples and switch positions.

■ *The Receiver*

Front

Micro USB (Firmware)

Back

Single LC Fiber Input

HDMI In

IR In

IR Out

Ethernet Ports 10/100

Toslink (In)

Audio Mode

RS232 Port (COM & Pass-through)

12V

Indicator Troubleshooting Lights on the Receiver:

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

LINK - On the front: (Blue) This indicator shows that the Receiver and Transmitter are connected. The states are:
- Light Is On (Solid) = Sync between Receiver and Transmitter is established
- Light Is Off = Receiver and Transmitter are not connected, check fiber ends/cable

SIGNAL - On the front: (Blue) This indicator shows source is connected. There are only two states for the light:
- Light is ON = Source device is connected
- Light is OFF = Source device is not connected

ETHERNET - On the front: (Blue) This indicator shows Ethernet status. There are two states for the light:
- Light is ON = The Receiver is powered and connected with the Transmitter
- Light is FLASHING = This light flashes randomly as data is transmitted

ETHERNET - On the back: (Green) This indicator shows
- Light is FLASHING = This light flashes randomly as data is transmitted
- Light is OFF = This indicates there is no data coming through

ETHERNET - On the back: (Amber) This indicator shows
- Light is ON = The Receiver is powered and connected with the Transmitter
- Light is FLASHING = This light flashes randomly as data is transmitted

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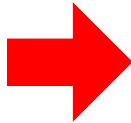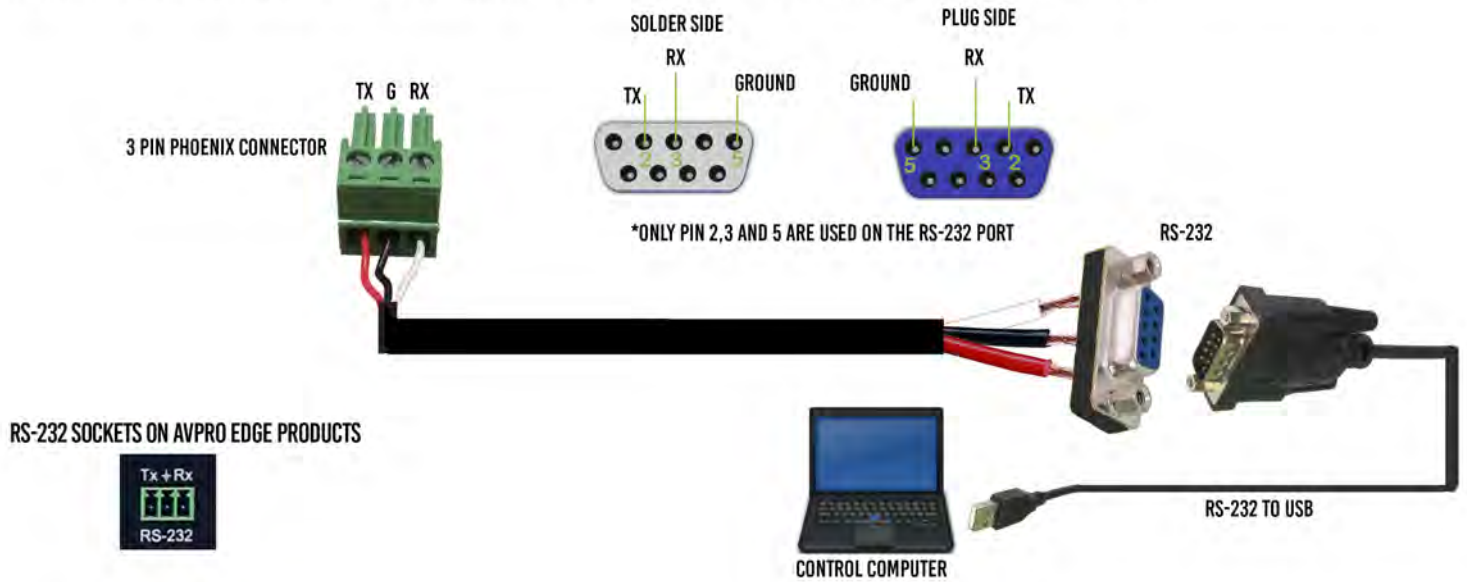
This is how the cable should look. If using the AC-CABLE-3.5-DB9F (Female) or AC-CABLE-3.5-DB9M (Male), the colors will be the same. With any other cable, please follow Tx, G, Rx as shown above. A
RS-232 cable preparation diagram is on the next page.

RS-232 Cable Prep

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

3 PIN PHOENIX CONNECTOR

SOLDER SIDE

PLUG SIDE

*ONLY PIN 2,3 AND 5 ARE USED ON THE RS-232 PORT

RS-232 SOCKETS ON AVPRO EDGE PRODUCTS

CONTROL COMPUTER

RS-232 TO USB

RS-232 Sample Application

UNC EXTENDER RS-232 CONTROL

CONTROL PROCESSOR

TRANSMITTER
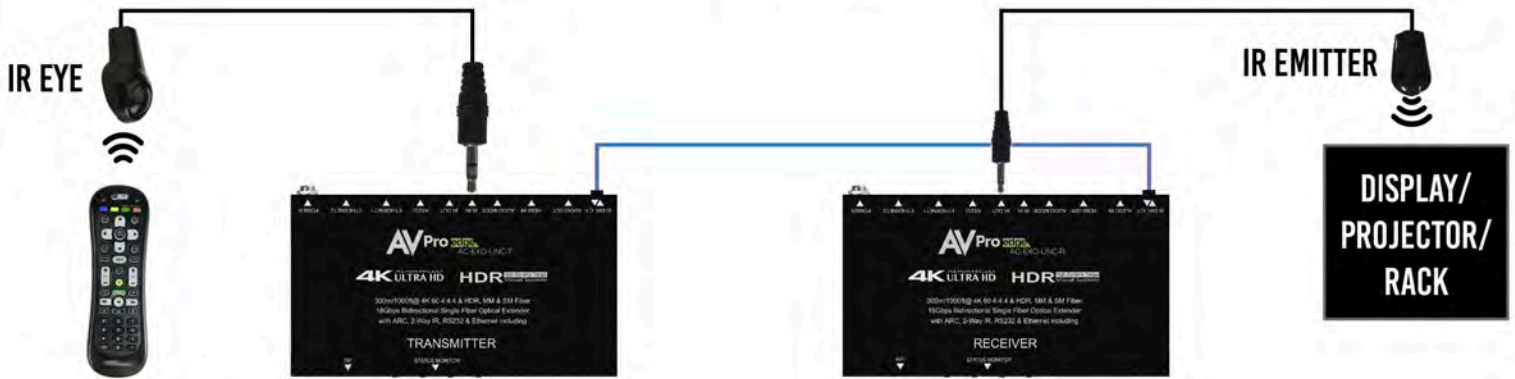
RECEIVER

DISPLAY / PROJECTOR

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

■ IR Configuration

IR can be used in two ways:

1. **From Rack (Using IR-EYE):** Plug an IR-Receiver Eye into the "IR IN" of · the AC-EXO-UNC Transmitter in order to pass infrared signals generated · from a device or IR Remote.
2. **From Remote End:** Use an IR-Receiver Eye on the AC-EXO-UNC 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

FROM RACK

IR EYE

IR EMITTER

DISPLAY/
PROJECTOR/
RACK

TRANSMITTER

RECEIVER

FROM REMOTE END

DISPLAY/
PROJECTOR/
RACK

TRANSMITTER

RECEIVER

■ *IR Connections to AC-EXO-UNC-T (Transmitter)*

IR OUT Emitter (Non-Flashing)

IR IN w/ Receiver Eye

SIGNAL → NC / GROUND

EMITTER

VCC (+) → IR SIGNAL

GROUND →

IR SENSOR

■ *IR Connections to AC-EXO-UNC-R (Receiver)*

IR OUT Emitter (Non-Flashing)

IR IN w/ Receiver Eye

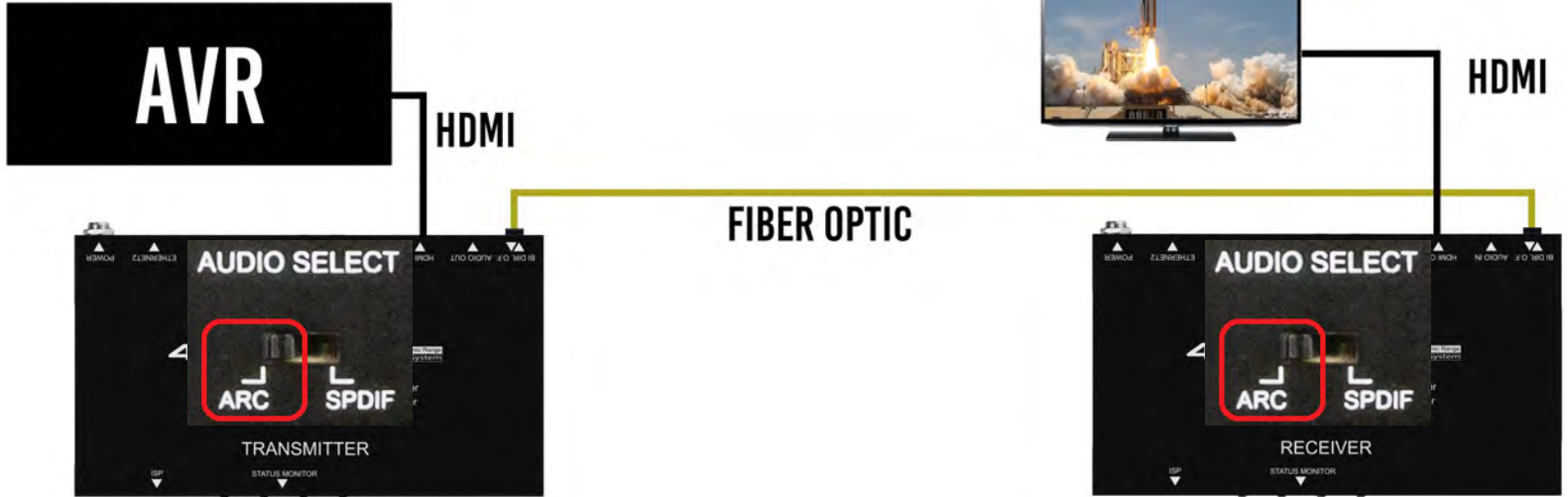SIGNAL → NC / GROUND

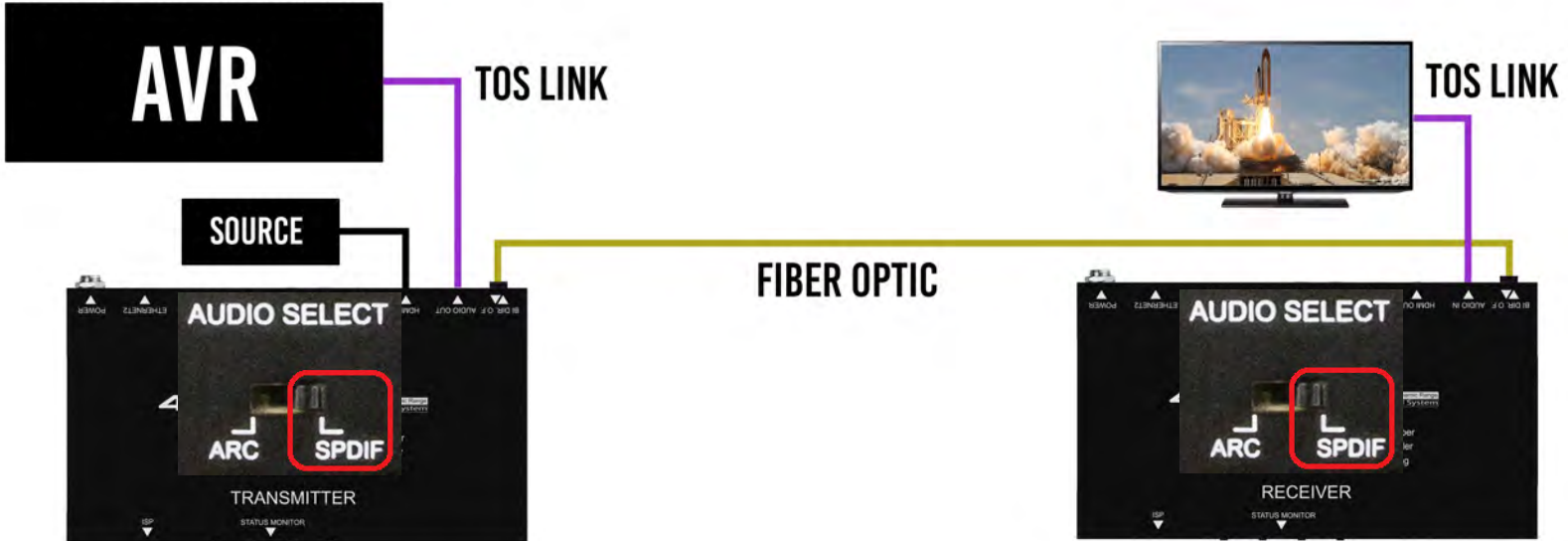EMITTER

VCC (+) → IR SIGNAL

GROUND →

IR SENSOR

- ## *ARC (Audio Return Channel)*

NOTE: When connecting via HDMI, the connected device (source and/or display) MUST SUPPORT ARC

AUDIO FROM DISPLAY VIA THE AUDIO RETURN CHANNEL (ARC)

AVR

HDMI - HDMI

HDMI

HDMI

FIBER OPTIC

AUDIO SELECT

ARC   SPDIF

TRANSMITTER

AUDIO SELECT

ARC   SPDIF

RECEIVER

AUDIO FROM DISPLAY VIA THE AUDIO RETURN CHANNEL (ARC)

AVR

TOS LINK - TOS LINK

TOS LINK

TOS LINK

SOURCE

FIBER OPTIC

AUDIO SELECT

ARC   SPDIF

TRANSMITTER

AUDIO SELECT

ARC   SPDIF

RECEIVER

AVPro edge

- *ARC (Audio Return Channel) Cont:*

TOSLINK - HDMI

AUDIO FROM DISPLAY VIA THE
AUDIO RETURN CHANNEL (ARC)

AVR

HDMI

TOS LINK

SOURCE

FIBER OPTIC

AUDIO SELECT
ARC | SPDIF
TRANSMITTER

AUDIO SELECT
ARC | SPDIF
RECEIVER

HDMI - TOS LINK

AUDIO SELECT
ARC | SPDIF

AUDIO SELECT
ARC | SPDIF

FIBER OPTIC
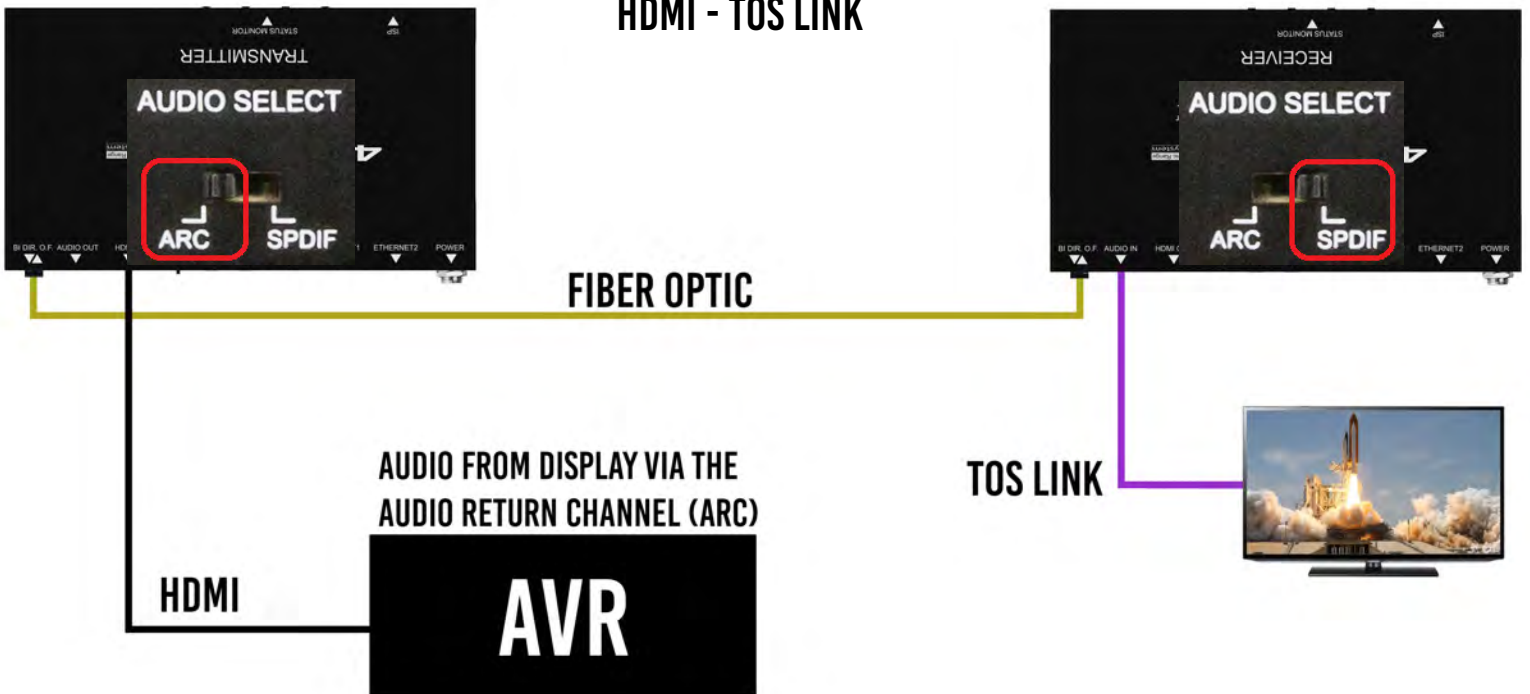
AUDIO FROM DISPLAY VIA THE
AUDIO RETURN CHANNEL (ARC)

TOS LINK

HDMI

AVR
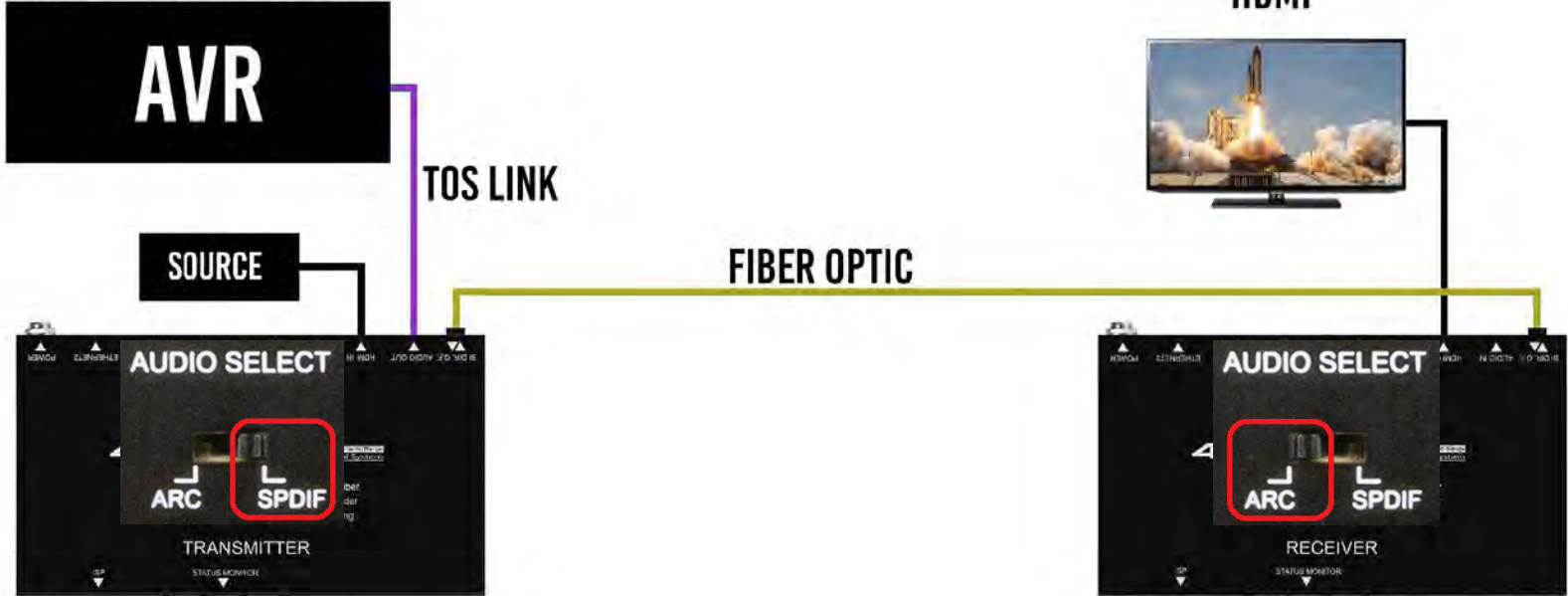
- *Maintenance*

  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.

AC-EXO-UNC-KIT

Troubleshooting

- Verify Power - Transmitter Pg. 6, Receiver Pg. 8
    - Note: Must power from both sides
- Verify Connections - Check that all cables are properly connected
    - TX Indicator Troubleshooting Lights - Pg. 6
    - RX Indicator Troubleshooting Lights - Pg. 8
- IR Issues - Verify correct connections and settings - P.11 & 12
    - Note: Visibly flashing Emitters may not function properly, try the IR Cables that come with the kit
- Extracted Audio Issues - Verify audio settings - Pg.7, examples Pg. 13-14
- Still having issues, contact us
    - Support Direct - +1-605-977-3477

      +1-605-274-6055
    - Submit a support request ticket
        - https://support.avproedge.com/hc/en-us/requests/new

Thank you for choosing AVProEdge!

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