User's Manual

FXT-460

4K HDMI 2.0 over 1LC Fiber Optic Extender

UMA1278 Rev NC

CUSTOMER SUPPORT INFORMATION

Order toll-free in the U.S. 800-959-6439
FREE technical support, Call **714-641-6607**
Hall Research, 1163 Warner Ave. Tustin, CA 92780
www.hallresearch.com

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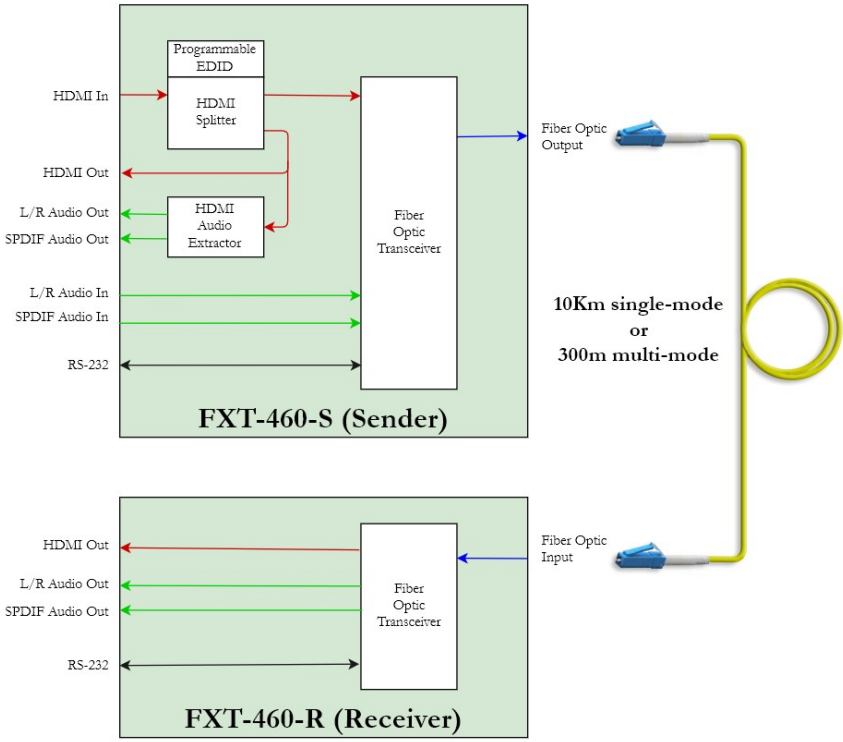
1.0 Introduction

The Hall Research FXT-460 is a compact and high-performance extender for full-bandwidth HDMI 2.0 audio/video with HDR, up to 10 Kilometers, over a single strand of LC-terminated fiber-optic cable. The product supports 18.2 Gbps of bandwidth and 600 MHz TMDS Clock frequency and can extend 4K 60 Hz video with multi-channel audio and RS232.

The system provides advanced capabilities such as embedding and de-embedding audio, 4K UHD video (4:4:4 with HDR), HDCP 2.0, bidirectional RS-232 and EDID management.



The FXT-460-S Sender provides an HDMI input with a corresponding HDMI loop output. The audio component of the HDMI input is extracted and available as both analog (L/R) and Digital SPDIF (TOSLINK) on corresponding connectors (see diagram above).

The audio that is embedded in the extended HDMI to the remote Receiver can be selected by the user to be one of the following:

- Pass-through from HDMI input (same audio content as the HDMI input)
- External analog audio from the 3.5mm audio input connector
- External digital SPDIF audio from the Optical TOSLINK input connector

EDID management allows users to control the video and audio parts of the EDID independently. The EDID presented to the source connected to the HDMI input can pass from the downstream device or emulated from internal memory. The device can also "Learn" the EDID connected to its HDMI output.

The product has a video bandwidth of 18 Gbps and supports input resolutions of up to 4K @ 60 Hz 4:4:4 with HDR. It supports HDCP 2.2 as well as HDCP 1.4. All resolutions up to and including 4K @ 30Hz with 4:4:4 or 4K @ 60 Hz with 4:2:0 are extended with no compression.

The device has the ability to generate a blank HDMI output signal with audio embedded even if there is no HDMI input; often referred to as "HDMI Audio Bridging". This is a convenient means to distribute audio only signals over an HDMI network.

Features

- 4K x 2K @ 60 Hz 4:4:4 / 18.2 Gbps / HDCP 2.2
- Extends up to 33,000 ft (10 Km) over single mode or 1000 ft (300 M) Multi-Mode
- Bi-Directional RS-232 and EDID Management
- Can pass original HDMI audio or embed/substitute audio from external inputs
- "HDMI Audio Bridging"
- HDMI Loop Output on Sender
- De-embedded HDMI audio available at both ends (Sender and Receiver)
- EDID Emulation with LEARN function

2.0 Package Contents

FXT-460-S

(1) Model FXT-460-S
(1) 3 position terminal block for RS-232
(1) Power supply
(4) Power universal adapter plugs
(1) Web documentation card

FXT-460-R

(1) Model FXT-460-R
(1) 3 position terminal block for RS-232
(1) Power supply
(4) Power universal adapter plugs
(1) Web documentation card

3.0 Setup

Installation

- On both the FXT-460-S and FXT-460-R, make sure the SFP modules are fully inserted as they could have become disconnected during shipping.

- Interconnect the FXT-460-S and FXT-460-R with an LC®/PC fiber optic cable.

> **NOTE** Hall Research can provide pre-terminated LC fiber optical cable at custom lengths. You can use single mode or multimode fiber optic cable. Single mode fiber is recommended due to its 10 km range

- *Optionally,* Connect the RS-232 *TX, RX and GND* contacts to compatible controllers (e.g., PC or RS-232 controller).
  - Direction of data flow is shown in section below.
  - RS-232 passes bi-directionally between the FXT-460-S and FXT-460-R at 115200 baud only.

- **FXT-460-S**
  - *Optionally,* Connect an HDMI source to the *HDMI IN* connector and if desired a HDMI compatible sink to the HDMI OUT connector.

> **NOTE** A video source is NOT required to embed audio onto the HDMI output at the FXT-460-R. If no HDMI source signal is present, the HDMI Output at the FXT-460-R will be a black screen at 480p resolution.

  - *Optionally,* for audio extraction at the transmitter
    - Connect the *SPDIF OUT* and/or L/R OUT audio outputs to a compatible audio device. (e.g., headphones, assistive listening devices, or Audio Amplifier such as the Hall Research **AMP-4840** or **AMP-7040**).
  - *Optionally,* if you don't want to extend the original HDMI audio
    - Connect the audio to embed to the *SPDIF IN* and/or *L/R IN* connector(s).

- **FXT-460-R**

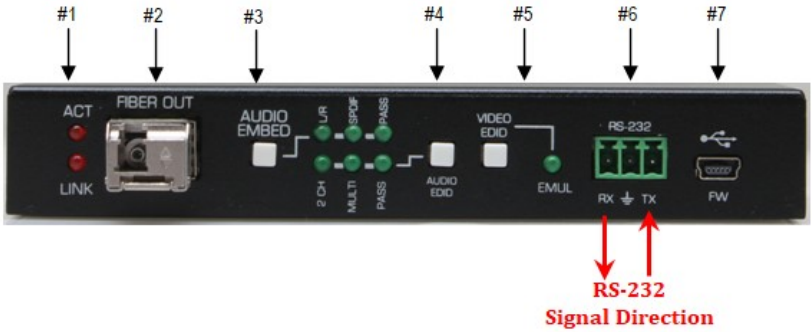
- *Optionally,* connect an HDMI compatible sink or display to the *HDMI OUT* connector.

> **NOTE** A video sink is NOT required to extract audio

- *Optionally,* for audio extraction at the receiver
  - Connect the *SPDIF OUT* and/or L/R OUT audio outputs to a compatible audio device. (e.g., headphones, assistive listening devices, or Audio Amplifier such as Hall Research **AMP-4840** or **AMP-7040**).

- Connect the included power supplies to the 12 V DC connectors on both the FXT-460-S and FXT-460-R.

4.0 Connector and Indicator Functions



FXT-460-S Front

1) **Status LEDs**

   ACT – ON means HDMI Input receiving video (active)
   LINK – ON means fiber optic link to receiver is on

2) **Fiber Transmitter Module**
   a. Connects to fiber optic cable from receiver

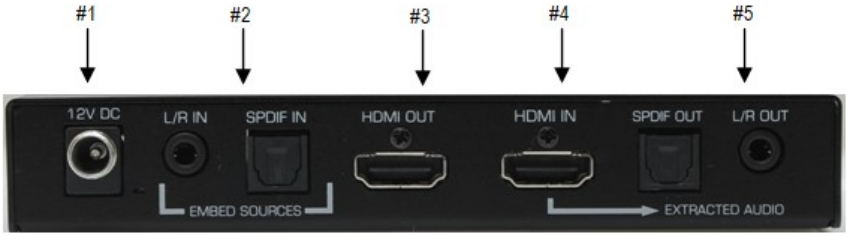
3) **AUDIO EMBED Button and LEDs**
   a. **L/R** - Audio on RX HDMI OUT connector comes from TX L/R IN connector
   b. **SPDIF** - Audio on RX HDMI OUT connector comes from TX SPDIF IN connector
   c. **Pass** - Audio on RX HDMI OUT connector comes from TX HDMI IN connector

4) **AUDIO EDID Button and LEDs**
   a. **2 CH** - Alters EDID to include only 2CH audio settings
   b. **Multi**- Alters EDID to include only Mult-Channel audio settings
   c. **Pass** - Pass EDID to source from RX Sink

5) **VIDEO EDID Button**
   a. Single button press - Toggles between EMULATED and PASSTHRU EDID modes
   b. 1 Blink - HOLD FOR 3 SECS - LEARN EDID
   c. 2 Blinks -HOLD FOR 7 SECS - FACTORY DEFAULT

   VIDEO EDID LED
   d. OFF = PASS-THRU EDID
   e. ON = EMULATED EDID
   f. This LED blinks when VIDEO EDID button is pressed AND HELD to show function selected when button is released.

6) **RS-232 Terminal Strip**
   a. Connect to external RS-232 controller. Data flows in direction shown
7) **Mini-USB Port**
   a. Used to update system firmware.

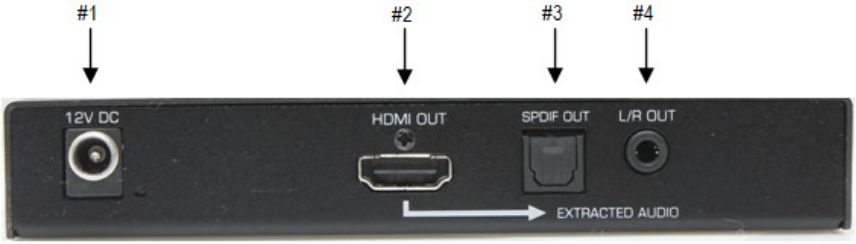


FXT-460-S Rear

1) **12V DC**
   a. Connects to the included power supply
2) **Embed Sources – L/R IN and SPDIF IN**
   a. Connect to compatible digital audio source
3) **HDMI OUT**
   a. Connect to a compatible HDMI SINK
4) **HDMI IN**
   a. Connect to a compatible HDMI Source
5) **EXTRACTED AUDIO – SPDIF Out and L/R Out**
   a. Connect to other compatible digital audio equipment.
   b. **Note:** *These audio outputs are **always** from the HDMI INPUT*

FXT-460-R Front

1) **Fiber Receiver Module**
   a. Connects to fiber optic cable from transmitter
2) **Status LEDs**
   ACT – ON means HDMI Input receiving video
   LINK – ON means fiber optic link to receiver active
3) **RS-232 Terminal Strip**
   a. Connect to external RS-232 controller. Data flows in direction shown
4) **Mini-USB Port**
   a. Used to update system firmware.



FXT-460-R Rear

1) **12V DC**
   a. Connect to the included power supply.
2) **HDMI OUT**
   a. Connect to a compatible HDMI SINK
3) **EXTRACTED AUDIO – SPDIF Out**
4) **EXTRACTED AUDIO – L/R Out**
   a. Connect to other compatible digital audio equipment.
   b. **Note:** *These audio outputs can be either the HDMI INPUT Audio or Embedded Audio from Transmitter*

EDID Handling

With no SINK attached to the FXT-460-R HDMI OUT connector, the EDID presented to the SOURCE will be emulated from the current EDID stored in the system.

5.0 Troubleshooting

If you are experiencing problems getting the system to work properly, please use the following troubleshooting suggestions.

- Ensure that all connections to the device are solid. Loose connections are the number one cause of issues.
- Try resetting the system by unplugging both power supplies and the HDMI IN connector, wait 5 seconds and plug everything back in.
    - The front panel LEDs cycle several times at power up; after ~15 seconds, audio and video should be passing through the device.
- Try restoring factory defaults using the front panel VIDEO EDID button (hold for 7 seconds).
- Cycle the EDID mode with the front panel VIDEO EDID button.

Contacting Hall Research

If you determine your system is malfunctioning, do not attempt to repair the unit yourself. Instead, contact Hall Research Technical Support at 714-641-6607.

To return the unit to Hall Research you must first get a Return Authorization (RMA) number.

Package the unit carefully, if returning. We recommend that you use the original container.

6.0 Specifications

Video

Standards	DVI (single link) HDMI 1.4 and HDMI 2.0b including 12 bit color depth, 3D video and HDCP 2.2
Connectors	**FXT-460-S** (1) HDMI Input (1) HDMI Output (1) 3.5 mm L/R Audio Output (1) TOSLINK Audio Output (1) Fiber Optic Simplex LC Bidirectional SFP Transmitter **FXT-460-R** (1) HDMI Output (1) 3.5 mm L/R Audio Output (1) TOSLINK Audio Output (1) Fiber Optic SFP Simplex LC Bidirectional SFP Receiver
Resolutions	DVI signal VGA (640x480) thru WUXGA (1920x1200) HDTV signal 480p through 4K 60 Hz 4:4:4

Audio

Formats	LPCM 2 CHN Audio (32, 44.1 and 48 KHz sample rate) Digital Audio multi-channel 2.1, 5.1, 7.1

Other Signals

RS-232	(1) RX, TX and GND on Terminal Strip RS-232 Baud Rate: 115200, N, 8, 1
SPF LC Fiber	6.2 miles (10km) over single mode 9/125-micron LC simplex fiber optic cable 984 feet (300 meters) over multimode 50/125-micron OM3 LC simplex fiber optic cable

General

Power Supply	100 VAC to 240 VAC, 47-63 Hz, External; 12 VDC 1.0 ADC
Temp/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, non-condensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, non-condensing
Enclosure type	Metal (Steel)
Dimensions	Device (ea.): 0.9" H x 5.4" W x 3.1" D (23 mm H x 136 mm W x 79 mm D) Shipping: 4.0" H x 12.0" W x 10" D (102 mm H x 305 mm W x 254 mm D)
Product weight	Device (ea.) 0.75 lb (0.34 Kg) Shipping (ea.) 2.10 lb (0.95 Kg)
Safety	CE
EMI/EMC	CE, FCC Class A
MTBF	90,000 hours (estimate)

Specifications are subject to change without notice

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