SDV-FTX/FRX

Ultra-HDMI (4K/60) over Fiber extender

OPERATION MANUAL

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Version 1.1 August 2011

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SAFETY PRECAUTIONS

Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply.

Please keep the following in mind as you unpack and install this equipment:

- Always follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Never spill liquid of any kind on or into this product.
- Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.
- Do not attach the power supply cabling to building surfaces.
- Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.
- Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.
- To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air to circulate around the unit.

REVISION HISTORY

VERSION NO.	DATE	SUMMARY OF CHANGE
v1.00	11/05/2018	First release
v1.01	08/02/2019	Corrections to extended functionality

CONTENTS

1. INTRODUCTION

This Transmitter and Receiver set is designed for high-quality, IP routable, AV extension with minimum latency. By using a sophisticated ultra-light compression scheme (lossless for most content) it's a great solution for extending 4K audio/video streams (HDMI or DisplayPort) and data. Advanced HDMI content such as HDR (High Dynamic Range), 10-bit colour and multi-channel HD Bitstream audio can be transmitted in pass-through mode. The use of interchangeable, field replaceable, SFP+ modules allows for transmission distances of up to 30km (Maximum transmission distance depends on the SFP+ modules used.). Multiple control and data signals may also be transmitted along with the audio and video, including IR, RS-232, USB (for KVM) and Ethernet.

2. APPLICATIONS

- Video, USB, Audio, LAN, IR, and RS-232 over fiber extension
- Long distance data and video transmission immune to RF interference
- Remote KVM control of a system

3. PACKAGE CONTENTS

Transmitter

- 1×HDMI/DP over Fiber (10GbE) Transmitter
- 1×12V/3A DC Power Adaptor
- 1×Power Cord
- 1×Operation Manual

Receiver

- 1×HDMI/DP over Fiber (10GbE) Receiver
- 1×12V/3A DC Power Adaptor
- 1×Power Cord
- 1×Operation Manual

4. SYSTEM REQUIREMENTS

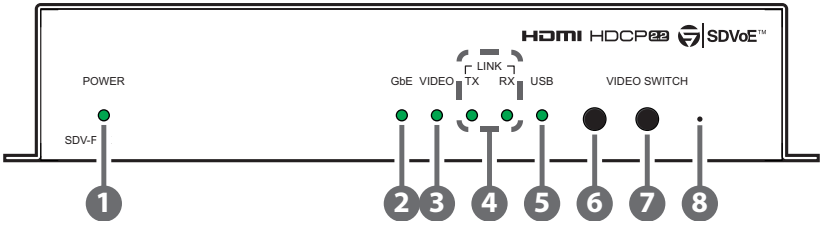
- HDMI or DisplayPort source equipment such as a media player, video game console, PC or set-top boxes.
- HDMI receiving equipment such as HDTVs, monitors or audio amplifiers.
- Analogue audio receiving equipment such as headphones, audio amplifiers or powered speakers.
- A 10 Gigabit fiber Ethernet network switch with jumbo frame and IGMP snooping support is required for distributed video systems.

5. FEATURES

- HDMI 2.0 and DVI 1.0 compatible
- HDCP 2.2 and HDCP 1.x compliant
- Ultra-light compression, lossless for most content
- Extension up to 30km (depending on the fiber module used)
- Supports pass-through of 10/12-bit HDR sources (Point-to-Point and Genlock mode only)
- Supports pass-through of audio formats including LPCM 2.0/5.1/7.1, Bitstream and HD Bitstream from HDMI or DisplayPort sources
- Analogue stereo audio extension, insertion and extraction (insertion and extraction requires optional control center/software)
- Bi-directional RS-232, IR, & USB 2.0 extension
- Data Transmission interfaces with 10 gigabit Ethernet via XFI, IEEE 802.3ae, compatible SFP+ fiber modules

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Transmitter's Front Panel



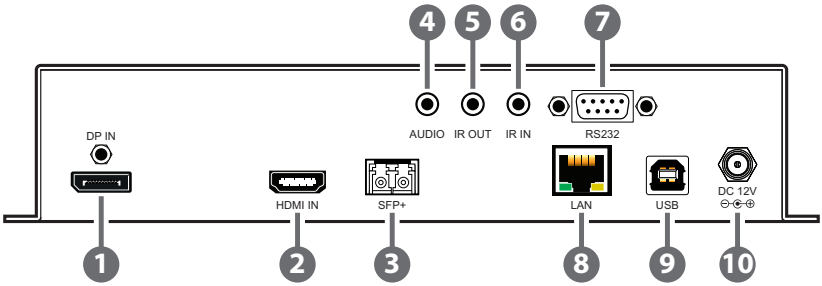
1. **POWER LED:** This LED will illuminate to indicate the unit is on and receiving power.
2. **GbE LED:** This LED illuminates and blinks to indicate activity on the gigabit Ethernet port.
3. **VIDEO LED:** This LED will illuminate when the currently selected input is live. When no source is detected the LED will remain off.
4. **LINK LEDs:** These LEDs illuminate to indicate the fiber network connection's status.

   TX: This LED blinks to indicate data transmission activity.

   RX: This LED blinks to indicate data reception activity.
5. **USB LED:** This LED will illuminate when the USB port is actively paired with a Receiver's USB port.
6. **BLANK BUTTON:** Currently no assigned function.
7. **VIDEO SWITCH BUTTON:** Press this button to switch between the HDMI and DisplayPort inputs.

   Note: Press and hold the Video Switch button for 30 seconds when powering the unit on to reset the unit to the factory defaults.
8. **RESET:** Press and hold this button for 3 seconds to soft-reboot the unit.

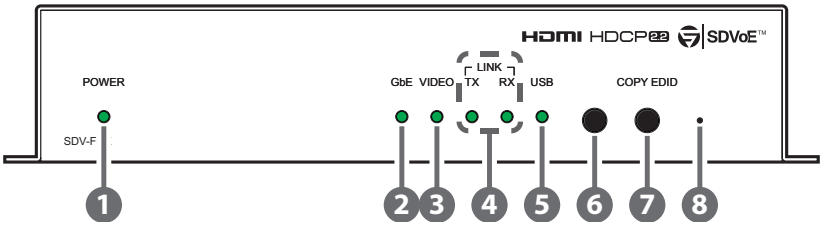
6.2 Transmitter's Rear Panel



1. **DP IN:** Connect to DisplayPort source equipment such as a PC or laptop.
2. **HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box.
3. **SFP+:** Connect a standard SFP+ module to allow data transmission over optical fiber to a compatible Receiver.

   Note: Single-mode and multi-mode support is dependent on the SFP+ modules used. Simplex SFP+ modules must use different wavelengths for each end (e.g. 1330/1270nm).
4. **AUDIO IN:** Connect to the stereo analogue output of a device such as a CD player or PC.
5. **IR OUT:** Connect to the provided IR Blaster to transmit IR signals to devices within direct line-of-sight of the IR Blaster.
6. **IR IN:** Connect to the provided IR Extender to extend the IR control range of remotely located devices. Ensure that the remote being used is within direct line-of-sight of the IR Extender.
7. **RS232:** Reserved for future use.
8. **LAN:** Connect to an Ethernet supporting device or to your local network as appropriate to extend the network between the Transmitter and Receiver.
9. **USB:** Connect directly to a PC to extend its USB functionality to the port on the connected Receiver.
10. **DC 12V:** Plug the 12V DC power adapter into this port and connect it to an AC wall outlet for power.

6.3 Receiver's Front Panel



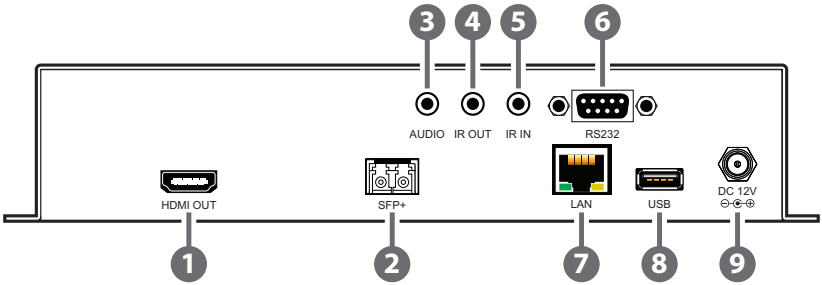
1. **POWER LED:** This LED will illuminate to indicate the unit is on and receiving power.
2. **GbE LED:** This LED illuminates and blinks to indicate activity on the gigabit Ethernet port.
3. **VIDEO LED:** This LED will illuminate when live video is being received.
4. **LINK LEDs:** These LEDs illuminate to indicate the fiber network connection's status.

   TX: This LED blinks to indicate data transmission activity.

   RX: This LED blinks to indicate data reception activity.
5. **USB LED:** This LED will illuminate when the USB port is actively paired with a Transmitter's USB port.
6. **BLANK BUTTON:** Currently no assigned function.
7. **COPY EDID BUTTON:** Press this button to copy the EDID from the connected display and send it to the connected Transmitter.

   Note: Press and hold the Copy EDID button for 30 seconds when powering the unit on to reset the unit to the factory defaults.
8. **RESET:** Press and hold this button for 3 seconds to soft-reboot the unit.

6.4 Receiver's Rear Panel

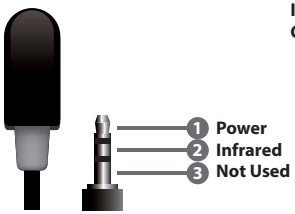


1. **HDMI OUT:** Connect to HDMI TVs, monitors or amplifiers for digital video and audio output.
2. **SFP+:** Connect a standard SFP+ module to allow data transmission over optical fiber to a compatible Receiver.

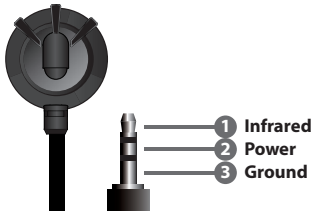
   Note: The SFP+ module must support a dual-optical fiber connection style, such as LC, or be pre-terminated dual-optical fiber cables. Single-mode and multi-mode support is dependent on the SFP+ modules used.
3. **AUDIO OUT:** Connect to powered speakers or an amplifier for stereo analogue audio output.
4. **IR OUT:** Connect to the provided IR Blaster to transmit IR signals to devices within direct line-of-sight of the IR Blaster.
5. **IR IN:** Connect to the provided IR Extender to extend the IR control range of remotely located devices. Ensure that the remote being used is within direct line-of-sight of the IR Extender.
6. **RS232:** Reserved for future use.
7. **LAN:** Connect to an Ethernet supporting device or to your local network as appropriate to extend the network between the Transmitter and Receiver.
8. **USB:** Connect directly to a standard USB peripheral such as a mouse, keyboard or flash drive to extend its USB functionality to the port on the connected Transmitter.
9. **DC 12V:** Plug the 12V DC power adapter into this port and connect it to an AC wall outlet for power.

6.5 IR Cable Pinouts

IR Blaster Cable



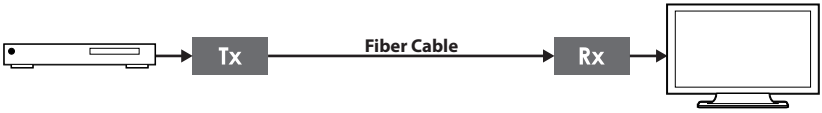
IR Extender Cable



6.6 Basic AV Extension

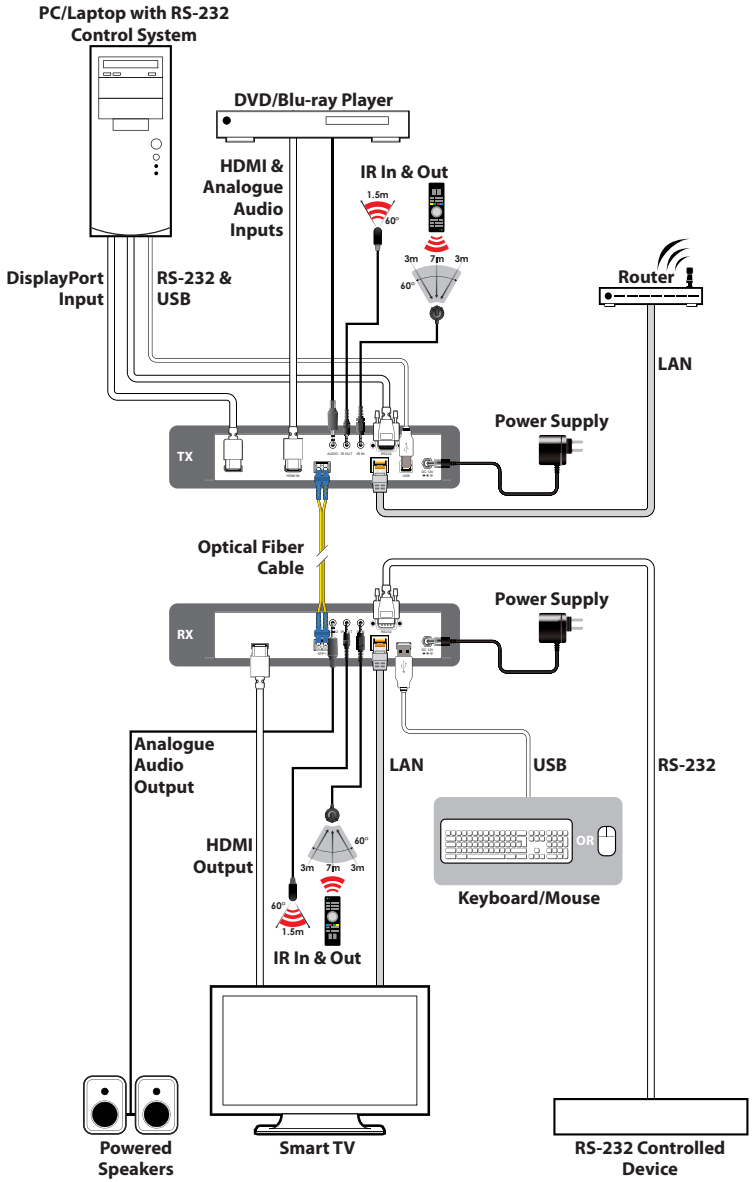
Point-to-Point Configuration & Operation

The most basic extension configuration available is a point-to-point system with a single Transmitter connected directly to a single Receiver. In this configuration the selected input (HDMI or DisplayPort) is transmitted to the connected Receiver without modification to the audio or video format. The analogue stereo audio port on the Transmitter functions as an input and transfers audio directly to the analogue stereo audio port on the Receiver for output. The LAN, USB, RS-232 and IR ports form direct connections between Transmitter and Receiver.



Note: No audio insertion/extraction is performed in this configuration.

7. CONNECTION DIAGRAM



8. SPECIFICATIONS

8.1 Transmitter's Technical Specifications

HDMI Bandwidth	600MHz/18Gbps
Input Ports	1×HDMI 1×DisplayPort 1×Analogue Stereo (3.5mm)
Output Port	1×10GbE LAN (SFP+)
Pass-through Ports	1×IR Blaster (3.5mm) 1×IR Extender (3.5mm) 1×RS-232 (DE-9) 1×LAN (RJ-45) 1×USB (Type-B)
IR Frequency	30 – 50kHz (30 – 60kHz under ideal conditions)
Baud Rate	Up to 115200
Power Supply	12V/3A DC (US/EU standards, CE/FCC/UL certified)
ESD Protection	Human Body Model: ±8kV (Air Discharge) ±4kV (Contact Discharge)
Dimensions	213.5mm×44mm×158mm (W×H×D) [Case Only] 215mm×47mm×153mm (W×H×D) [All Inclusive]
Weight	968g
Chassis Material	Metal
Silkscreen Colour	Black
Operating Temperature	0˚C – 40˚C/32˚F - 104˚F
Storage Temperature	–20˚C – 60˚C/–4˚F – 140˚F
Relative Humidity	20 – 90% RH (Non-condensing)
Power Consumption	12W

8.2 Receiver's Technical Specifications

HDMI Bandwidth	600MHz/18Gbps
Input Port	1×10GbE LAN (SFP+)
Output Ports	1×HDMI 1×Analogue Stereo (3.5mm)
Pass-through Ports	1×IR Blaster (3.5mm) 1×IR Extender (3.5mm) 1×RS-232 (DE-9) 1×LAN (RJ-45) 1×USB (Type-A)
IR Frequency	30 – 50kHz (30 – 60kHz under ideal conditions)
Baud Rate	Up to 115200
Power Supply	12V/3A DC (US/EU standards, CE/FCC/UL certified)
ESD Protection	Human Body Model: ±8kV (Air Discharge) ±4kV (Contact Discharge)
Dimensions	213.5mm×44mm×158mm (W×H×D) [Case Only] 215mm×47mm×153mm (W×H×D) [All Inclusive]
Weight	960g
Chassis Material	Metal
Silkscreen Colour	Black
Operating Temperature	0˚C – 40˚C/32˚F – 104˚F
Storage Temperature	–20˚C – 60˚C/–4˚F – 140˚F
Relative Humidity	20 – 90% RH (Non-condensing)
Power Consumption	14.4W

8.3 Video Specifications

Supported Resolutions (Hz)	Input		Output	10GbE
	HDMI	DP	HDMI	Fiber
720×400p@70/85	✓	✓	✓	✓
640×480p@60/72/75/85	✓	✓	✓	✓
720×480i@60	✓	✓	✓	✓
720×480p@60	✓	✓	✓	✓
720×576i@50	✓	✓	✓	✓
720×576p@50	✓	✓	✓	✓
800×600p@56/60/72/75/85	✓	✓	✓	✓
848×480p@60	✓	✓	✓	✓
1024×768p@60/70/75/85	✓	✓	✓	✓
1152×864p@75	✓	✓	✓	✓
1280×720p@50/60	✓	✓	✓	✓
1280×768p@60RB/60/75/85	✓	✓	✓	✓
1280×800p@60RB/60/75/85	✓	✓	✓	✓
1280×960p@60/85	✓	✓	✓	✓
1280×1024p@60/75/85	✓	✓	✓	✓
1360×768p@60	✓	✓	✓	✓
1366×768p@60RB/60	✓	✓	✓	✓
1400×1050p@60RB/60	✓	✓	✓	✓
1440×900p@60RB/60/75	✓	✓	✓	✓
1600×900p@60RB	✓	✓	✓	✓
1600×1200p@60	✓	✓	✓	✓
1680×1050p@60RB/60	✓	✓	✓	✓
1920×1080i@50/60	✓	✓	✓	✓
1920×1080p@24/25/30	✓	✓	✓	✓

Supported Resolutions (Hz)	Input		Output	10GbE
	HDMI	DP	HDMI	Fiber
1920×1080p@50/60	✓	✓	✓	✓
1920×1200p@60RB	✓	✓	✓	✓
2560×1440p@60RB	✓	✓	✓	✓
2560×1600p@60RB	✓	✓	✓	✓
2048×1080p@24/25/30	✓	✓	✓	✓
2048×1080p@50/60	✓	✓	✓	✓
3840×2160p@24/25/30	✓	✓	✓	✓
3840×2160p@50/60 (4:2:0)	✓	✓	✓	✓
3840×2160p@24/25/30, HDR10	✓	✓	✓	✓
3840×2160p@50/60 (4:2:0), HDR10	✓	✓	✓	✓
3840×2160p@50/60	✓	✓	✓	✓
4096×2160p@24/25/30	✓	✓	✓	✓
4096×2160p@50/60 (4:2:0)	✓	✓	✓	✓
4096×2160p@24/25/30, HDR10	✓	✓	✓	✓
4096×2160p@50/60 (4:2:0), HDR10	✓	✓	✓	✓
4096×2160p@50/60	✓	✓	✓	✓

8.4 Audio Specifications

HDMI Input/Output	
LPCM	
Max Channels	8 Channels
Sampling Rate (kHz)	32, 44.1, 48
Bitstream	
Supported Formats	Standard & High-Definition

Analogue Input	
Max Audio Level	1Vrms
Impedance	10kΩ
Type	Unbalanced

Analogue Output	
Max Audio Level	1Vrms
THD+N	< –80dB@0dBFS 1kHz (A-wt)
SNR	> 80dB@0dBFS
Frequency Response	< ±1dB@20Hz~20kHz
Crosstalk	< –80dB@10kHz
Impedance	470Ω
Type	Unbalanced

8.5 Cable Specifications

Cable Length	1080p		4K30	4K60
	8-bit	12-bit	(4:4:4) 8-bit	(4:4:4) 8-bit
High Speed HDMI Cable				
HDMI Input	15m	10m	5m	3m
HDMI Output	15m	10m	5m	3m
DisplayPort Cable				
DisplayPort Input	15m	10m	2m	2m
Fiber Cable				
Multi-mode Fiber (OM3)	300m			
Multi-mode Fiber (OM4)	550m			
Single-mode Fiber	30km			

9. ACRONYMS

ACRONYM	COMPLETE TERM
10GbE	10 Gigabit Ethernet
ASCII	American Standard Code for Information Interchange
DHCP	Dynamic Host Configuration Protocol
DP	DisplayPort
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
GbE	Gigabit Ethernet
HD	High-Definition
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDR	High Dynamic Range
HDTV	High-Definition Television
IP	Internet Protocol
IR	Infrared
LAN	Local Area Network
LED	Light-Emitting Diode
LPCM	Linear Pulse-Code Modulation
OM	Optical Multi-mode
OSD	On-Screen Display
SNR	Signal-to-Noise Ratio
THD+N	Total Harmonic Distortion plus Noise
UHD	Ultra-High-Definition
USB	Universal Serial Bus
WUXGA (RB)	Widescreen Ultra Extended Graphics Array (Reduced Blanking)

CYP (UK) Ltd., Unit 7, Shepperton Business Park, Govett Avenue, Shepperton, Middlesex, TW17 8BA
Tel: +44 (0) 20 3137 9180 | Fax: +44 (0) 20 3137 6279
Email: sales@cypeurope.com
www.cypeurope.com
v1.01