



COH-TX5 & COH-RX5

4K UHD+ HDMI/DP over Fiber (10GbE)
Transmitter and Receiver



Operation Manual



HDMI[®]
HIGH-DEFINITION MULTIMEDIA INTERFACE

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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.
- Please completely disconnect the power when the unit is not in use to avoid wasting electricity.

REVISION HISTORY

REV.	DATE	SUMMARY OF CHANGE
VS1	2017/11/06	Final technical review
VS2	2018/11/06	Updated diagrams (Advanced AV Extension)
VS3	2018/12/20	Added Sections 6.5, 6.6, 6.7, 8.3, 8.4, 8.5; updated Sections 6.8, 8.1, 8.2

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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 color 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.

When combined with the optional control center or control software, the functionality of the extenders expands exponentially. Multiple Transmitters and Receivers may be combined with one or more 10Gb fiber Ethernet switch and the units can be used together to form a distributed video matrix, a multi-viewer system, or a video wall system adding to their flexibility in large event installations.

2. APPLICATIONS

- Video, USB, Audio, LAN, IR, and RS-232 over fiber extension
- Hotel or convention center display multi-monitor broadcast
- Long distance data and video transmission immune to RF interference
- Distributed video matrix system
- Distributed video wall system
- 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 media players, video game consoles PCs or set-top boxes.
- HDMI receiving equipment such as HDTVs, monitors or audio amplifiers.
- Analog 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.
- PC control software or control system hardware to configure distributed matrix, video wall or multi-view systems. (Optional)

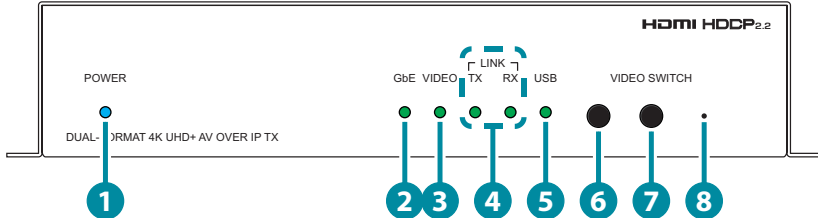


5. FEATURES

- HDMI 2.0 and DVI 1.0 compatible
- HDCP 2.2 and HDCP 1.x compliant
- IP switchable with minimum latency (requires optional control center/software)
- Ultra-light compression, lossless for most content
- Extension up to 30km (depending on the fiber module used)
- Independent breakaway A/V matrix switching (requires optional control center/software)
- Video wall generation (requires optional control center/software)
- Multi-view compositing (requires optional control center/software)
- 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
- Analog 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
- Supports the use of an external control center or control software to provide expanded functionality (Contact your authorized dealer for more information)

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Transmitter's Front Panel



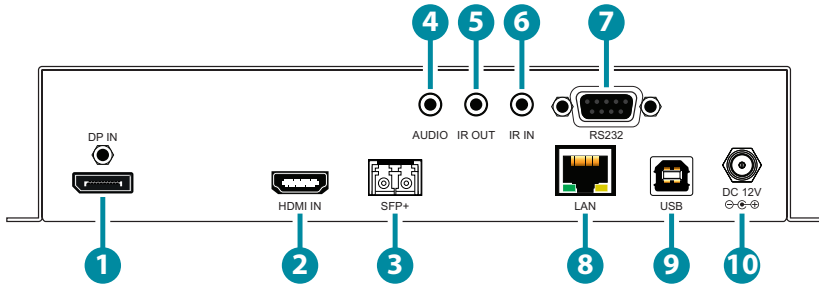
- 1 POWER LED:** This LED will illuminate to indicate the unit is on and receiving power.
- 2 GbE LED:** This LED illuminates and blinks to indicate activity on the gigabit Ethernet port.
- 3 VIDEO LED:** This LED will illuminate when the currently selected input is live. When no source is detected the 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

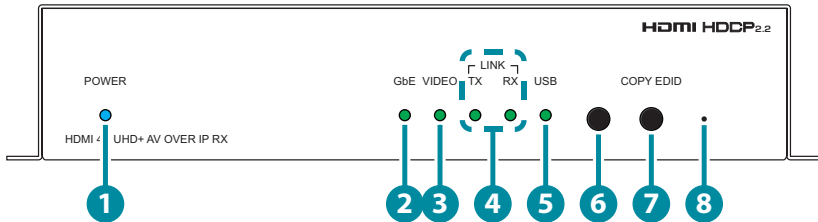


- 1 DP IN:** Connect to DisplayPort source equipment such as a PC or laptop.
- 2 HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box.
- 3 SFP+:** Connect a standard SFP+ module to allow data transmission over optical fiber to a compatible Receiver.

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).

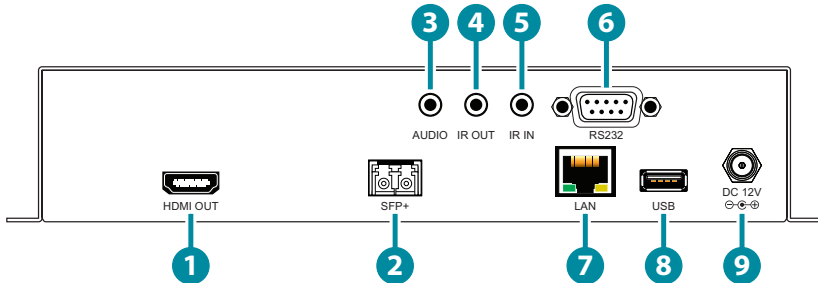
- 4 AUDIO IN:** Connect to the stereo analog output of a device such as a CD player or PC.
- 5 IR OUT:** Connect to the provided IR Blaster to transmit IR signals to devices within direct line-of-sight of the IR Blaster.
- 6 IR IN:** Connect to the provided IR Extender to extend the IR control range of remotely located devices. Ensure that the remote being used is within direct line-of-sight of the IR Extender.
- 7 RS232:** Connect to a PC, laptop or a serial controllable device for the extension of RS-232 signals.
- 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 all connected Transmitters.
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.

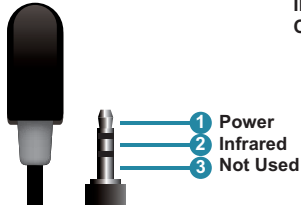
6.4 Receiver's Rear Panel



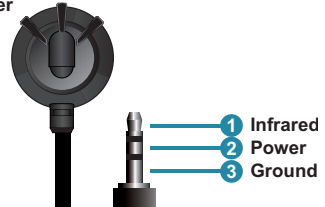
- 1 HDMI OUT:** Connect to HDMI TVs, monitors or amplifiers for digital video and audio output.
- 2 SFP+:** Connect a standard SFP+ module to allow data transmission over optical fiber to a compatible Receiver.
Note: The SFP+ module must support a dual-optical fiber connection style, such as LC, or be 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 analog 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:** Connect to a PC, laptop or a serial controllable device for the extension of RS-232 signals.
- 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

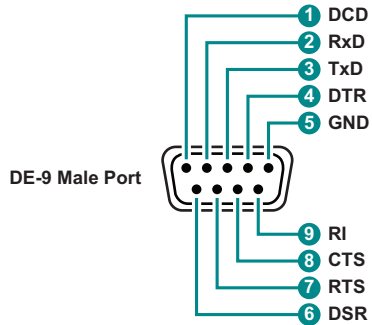
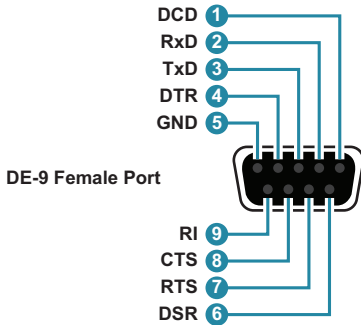
IR Blaster Cable



IR Extender Cable



6.6 RS-232 Bypass Pinout



Serial Port Default Settings

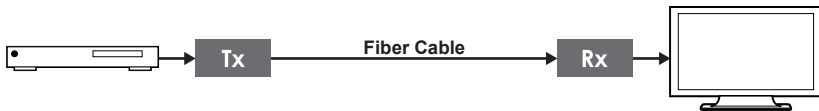
Baud Rate	57600
Data Bits	8
Parity Bits	None
Stop Bits	1
Flow Control	None

Note: The default Serial Port baud rate can only be changed by use of the optional control center or control software.

6.7 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 analog stereo audio port on the Transmitter functions as an input and transfers audio directly to the analog stereo audio port on the Receiver for output. The LAN, USB, RS-232 and IR ports form direct connections between Transmitter and Receiver.



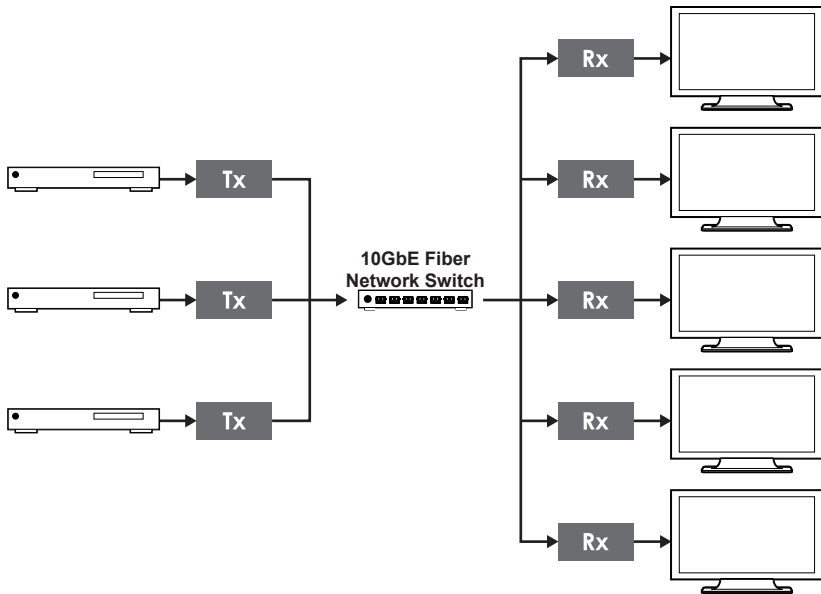
Note: This configuration does not use or require an external control center or software to function. No audio insertion/extraction is performed in this configuration. The default RS-232 bypass baud rate is 57600 and can only be changed by use of the optional control center or control software.

6.8 Advanced AV Extension

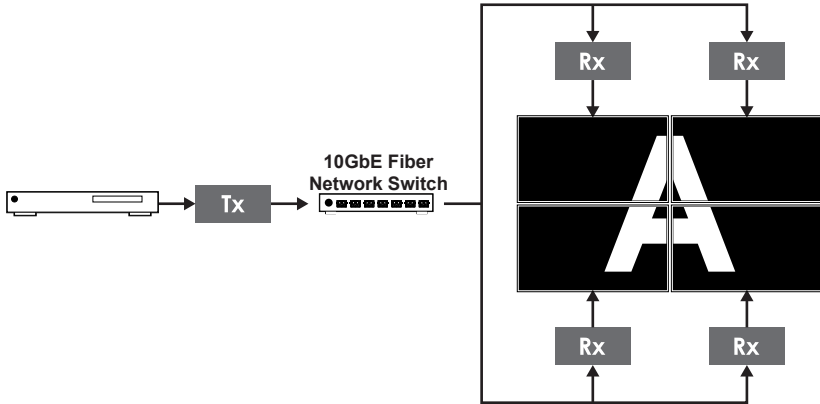
• Configuration & Control

When combined with the optional control center or control software, and a 10 gigabit Ethernet switch, this optical fiber extension system gains a large number of additional configuration options including: multi-in/multi-out matrix switching with breakaway audio, video wall creation, and multi-view composite output. Analog audio extraction and embedding is fully controllable. Additionally, control over the configuration of the analog stereo audio ports becomes available, and the audio/USB/IR/RS-232 routing can be fully controlled.

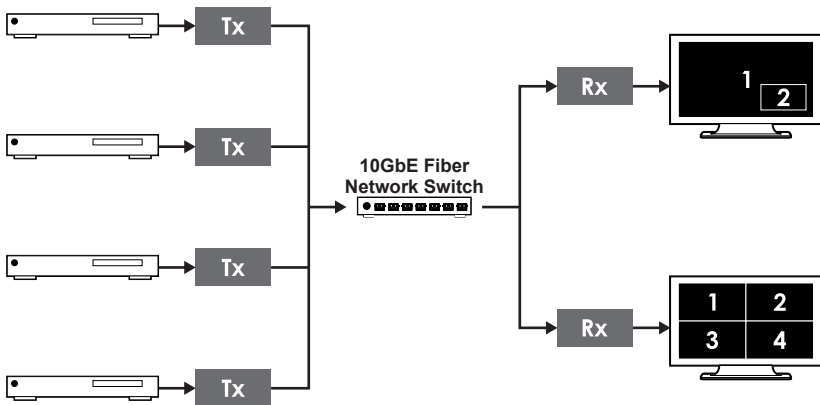
(1) Matrix Configuration



(2) Video Wall Configuration



(3) Multi-View (PiP Or Quad) Configuration



Note: The control center hardware/control software are optional components and are not included with the base Transmitter/Receiver product. Please contact your authorized dealer for more information.

• Control Software

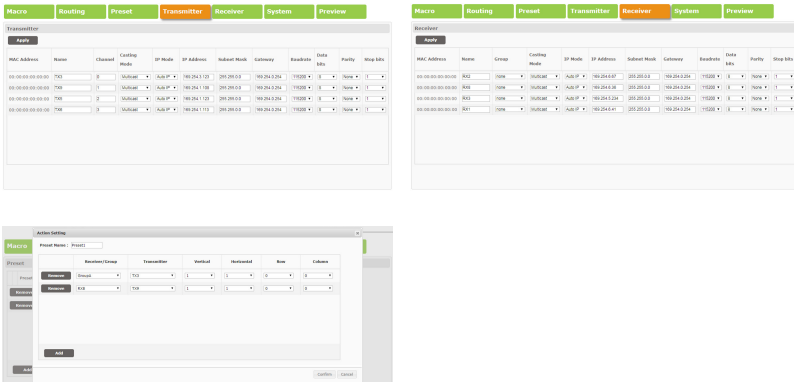
The control software is a fully software based solution for controlling multiple Transmitters and Receivers, in a variety of configurations, providing full and detailed control over the functionality of each individual unit. This software requires installation on a Windows 7 (SP1 or later), Windows 8, or Windows 10 PC/Laptop.



Note: Interface images are for example only and may differ from the delivered product.

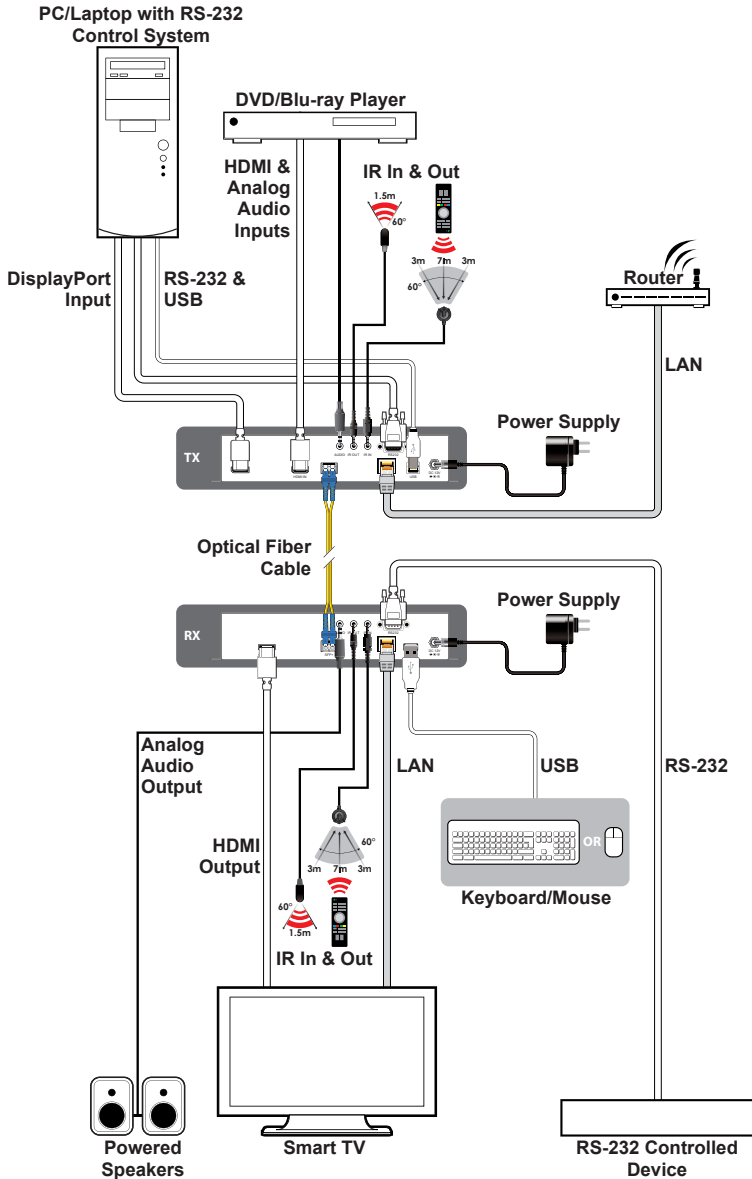
• Control Center Hardware

The Control Center is a hardware solution designed to provide a unified and easy method to access and control all of the Transmitters and Receivers in a system. It provides a user-friendly, and operating system agnostic, web-based interface allowing easy control over all of the most critical functions within a distribution system.



Note: Interface images are for example only and may differ from the delivered product.

7. CONNECTION DIAGRAM



8. SPECIFICATIONS

8.1 Transmitter's Technical Specifications

HDMI Bandwidth	600MHz/18Gbps
Input Ports	1×HDMI 1×DisplayPort 1×Analog 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 Color	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×Analog 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 Color	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	✓	✓	✓	✓
1920×1080p@50/60	✓	✓	✓	✓

Supported Resolutions (Hz)	Input		Output	10GbE
	HDMI	DP	HDMI	Fiber
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

Analog Input	
Max Audio Level	1Vrms
Impedance	10k Ω
Type	Unbalanced

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



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