LIGHTWARE HDMI-OPTX Series HDMI Optical Extender User Guide

Contents

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LIGHTWARE HDMI-OPTX Series HDMI Optical Extender

Specifications

- **Model**: HDMI-OPTN-TX200AU2K
- **Technology**: SDVoE fiber extender
- **Video Compatibility**: HDMI 2.0 compliant
- **Data Transmission**: Up to 10km via fiber
- **Ethernet**: 1G user Ethernet channel
- **USB Support**: USB 2.0 devices
- **RS-232:** Command injection support
- **Additional Features**: HDCP 2.3, basic EDID management

Product Usage Instructions

Front and Rear View – Transmitter (TX)
The HDMI-OPTX-TX200AU2K variant is shown in the picture. The TX100A model does not have USB-A and USB-C connectors.

Rear View:

- **Gigabit Ethernet ports**: Connect Ethernet capable devices directly.
- **Device USB-A connectors:** Support various USB 2.0 devices.
- **Host USB-C connector:** Connects transmitter to host computer for USB data transmission.
- **USB 2.0 connectors**: Transmit signals over optical link to receiver.
- **EDID button and Status LED:**
  - **Short press:** Switch between transparent and stored user EDID.
  - **Long press:** Learn and store EDID from the output of the receiver.
  - **EDID Status** LED provides immediate feedback on the EDID status.

- **Additional Rear View Features:**
  - SFP+ port slot for OPTN input connection.
  - OPTN input/output link LED for status indication.
  - RS-232 port for bi-directional serial communication.
  - 12V DC input with locking connector for local powering.
- **Ventilation:**
  Ensure proper ventilation by not covering the top and side ventilation holes to prevent overheating.
- **Important Safety Instructions:**
  Please read the supplied safety instruction document before using the product and keep it available for future reference. The extenders are Class 1 laser products.
- **Introduction:** The HDMI-OPTN series transmitter and receiver devices are fiber extenders based on SDVoE technology, allowing users to extend HDMI 2.0 compliant video, audio, and control signals over long distances through a fiber optical link. These devices offer various connectivity options, including Ethernet, USB, and RS-232 support, making them versatile for a wide range of AV operations.

Important Safety Instructions
Please read the supplied safety instruction document before using the product and keep it available for future reference. The extenders are Class 1 laser products.

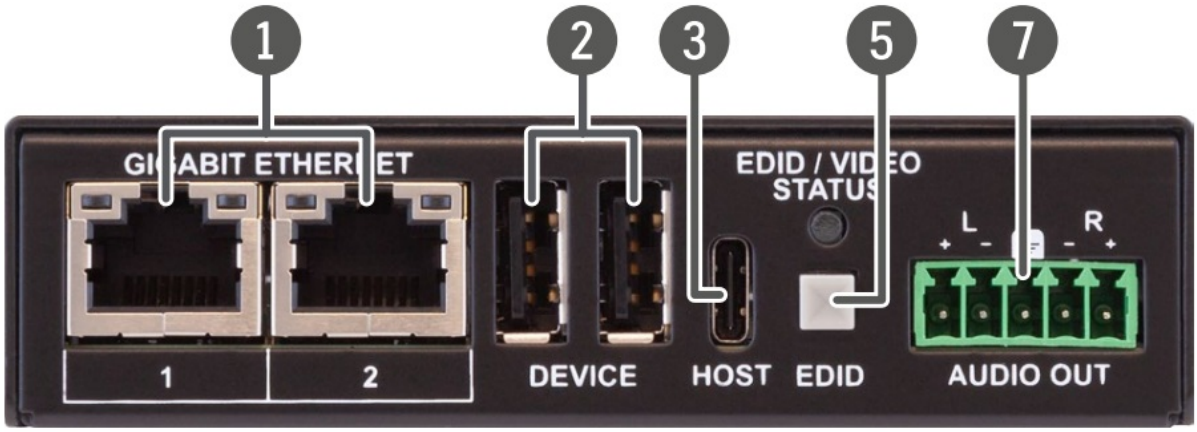
Introduction

- The HDMI-OPTN series transmitter and receiver devices are fiber extenders based on SDVoE technology and allow users to extend HDMI 2.0 compliant video, audio and control signals from a single source to multiple destinations through a fiber optical link.
- Beyond the benefits of sending high-resolution video and USB2.0 data to a distance of up to 10km via fiber, the extenders are also able to handle various connectivity standards, including a 1G user Ethernet channel over the 10G link, as well as command injection into RS-232.
- The Gigabit Ethernet ports are also valuable additions, allowing users to connect Ethernet-capable devices to the network directly through the OPTX extenders. This is particularly useful for controlling external devices like projectors and displays.
- HDCP 2.3 and basic EDID management functionality are also among the features offered by these devices, such as their connectivity and easy integration into a wide range of AV operations and with 3rd party devices, such as the Christie Terra projector.
- Composite USB2.0 transmission adds the ability to connect remote USB-HID devices to a host computer through an extender pair. Transparent USB2.0, on the other hand, provides support for various types of USB2.0 devices like webcams, microphones, touch displays just to name a few.

Front and Rear View

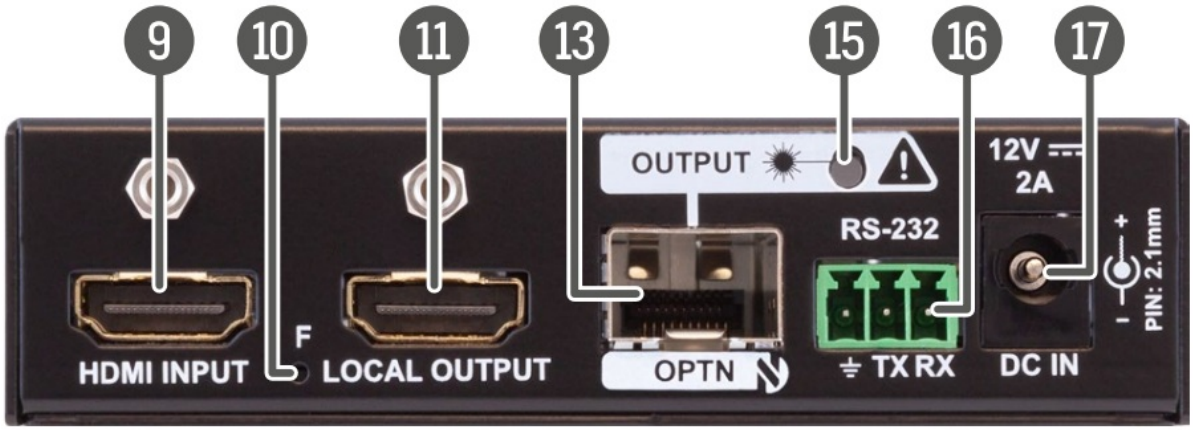
Transmitter (TX)

Front View



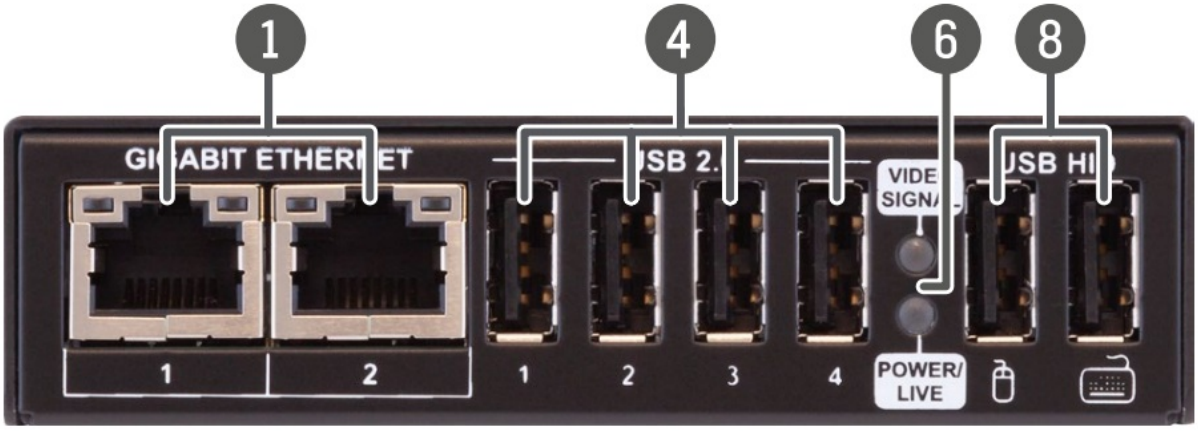
HDMI-OPTX-TX200AU2K variant can be seen on the picture. TX100A model is not built with USB-A and USB-C connectors.

Rear View



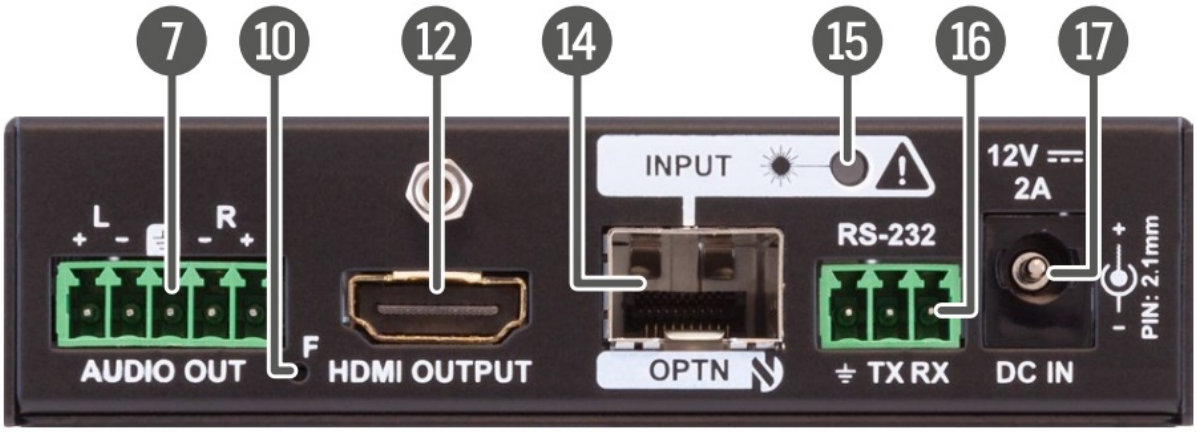
Receiver (RX)

Front View



HDMI-OPTX-RX100AU2K variant can be seen on the picture. RX100A model is not built with USB-A connectors.

Rear View

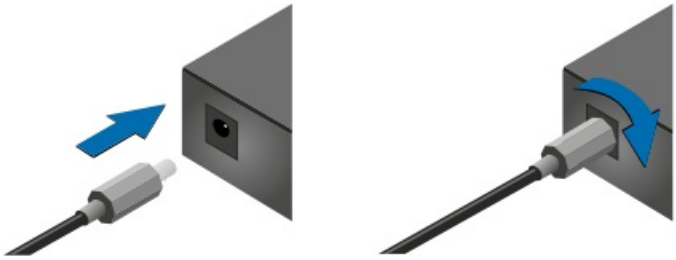


1. **Gigabit Ethernet Ports**
   Description: 1GBase-T RJ45 connectors for user Ethernet purpose.
2. **Device USB-A Connectors**
   Description: USB-A connectors with USB 2.0 support for various types of USB devices.
3. **Host USB-C Connector**
   Description: USB-C connection between the transmitter and the host computer. Receives USB data only (no AV signal). Supports USB 2.0 standard only.
4. **USB 2.0 Connectors**
   Description: USB-A connectors with USB 2.0 support for devices like webcams, microphones, external storage, etc. Signal is transmitted to the receiver over the optical link.
5. **EDID Button and Status LED**
   Description:
   1. **Short press:** Switch between Transparent and Stored EDID modes.
   2. **Long press:** Learn and store EDID from the receiver output.
      The Status LED shows current EDID emulation mode.
6. **Status LEDs**
   Description: LEDs provide real-time status feedback. (See Status LEDs section for details.)
7. **Audio Output**
   Description: 5-pole Phoenix connector for HDMI audio de-embedding, providing 2-channel balanced analog output.
8. **USB HID Connectors**
   Description: USB ports for HID-compatible devices (e.g., keyboard, mouse).
9. **HDMI Input**
   Description: HDMI input with HDMI 2.0 support for the source device.
10. **Factory Reset Button**
    Description: Hidden button for restoring the device to factory default settings.
11. **Local Output**
    Description: Local HDMI output displaying the same AV content as the HDMI input.
12. **HDMI Output**
    Description: HDMI output with HDMI 2.0 support for the sink/display device.
13. **SFP+ Port Slot for OPTN Output Connection**

Description: Slot for 10 GbE SFP+ module or DAC cable. Supports singlemode or multimode optical connections.

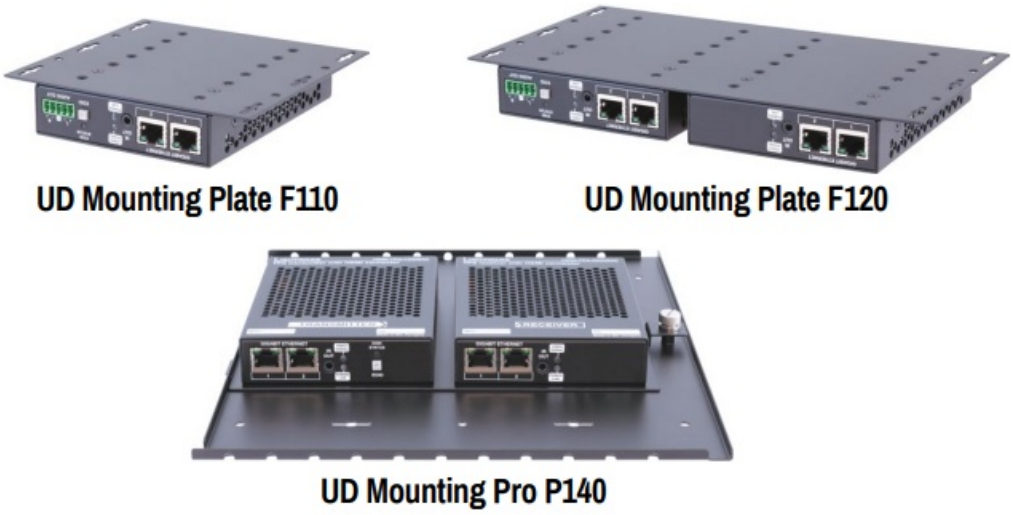
14. **SFP+ Port Slot for OPTN Input Connection**
    Description: Slot for 10 GbE SFP+ module or DAC cable. Supports singlemode or multimode optical connections.
15. **OPTN Input/Output Link LED**
    Description: LED gives real-time feedback about the optical extender link status. (See Status LEDs section.)
16. **RS-232 Port**
    Description: 3-pole Phoenix connector for bi-directional serial communication.
17. **12V DC Input**
    Description: 12V DC input with a locking connector for local power supply.

Locking DC Plug
Twist 90° clockwise to lock.



Ventilation
Pay attention to the ventilation holes when designing the system. Top and side ventilation holes must not be covered.

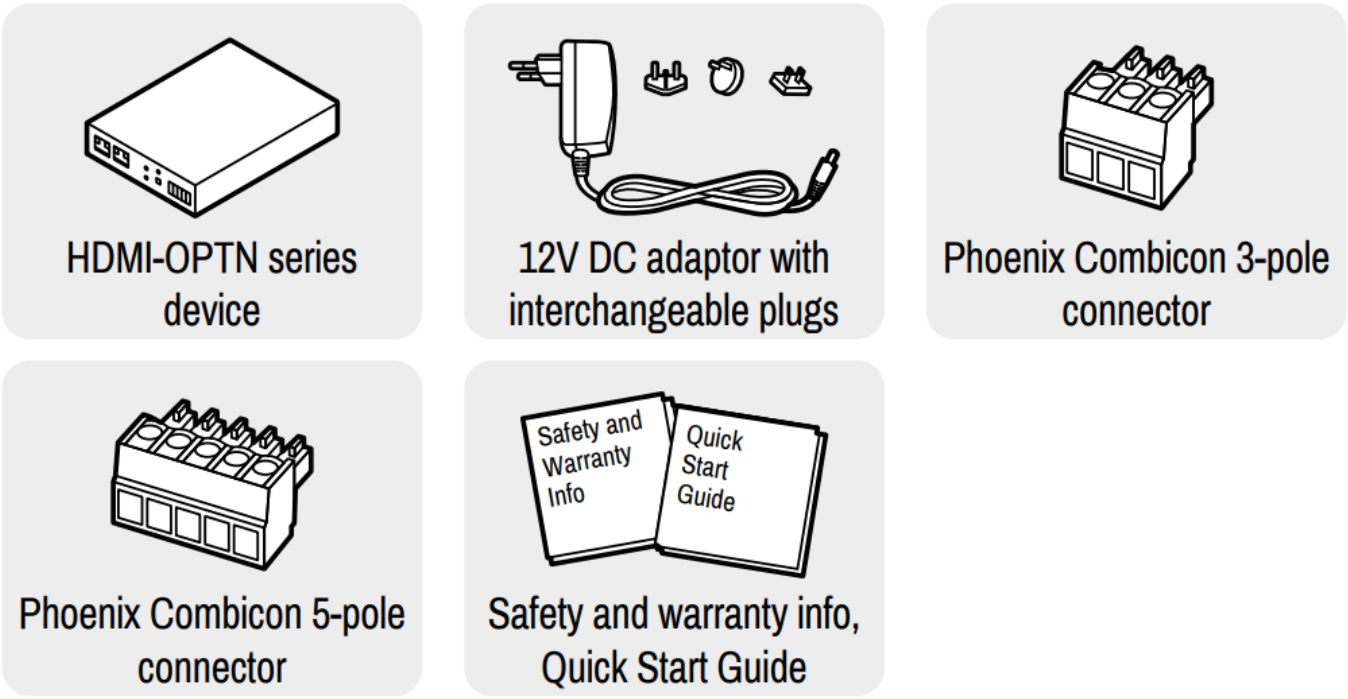
Mounting Options
For the mounting of the devices Lightware supplies optional accessories for different usages. The device has two mounting holes with inner thread on the bottom side. Fasten the device by the screws enclosed to the accessory.



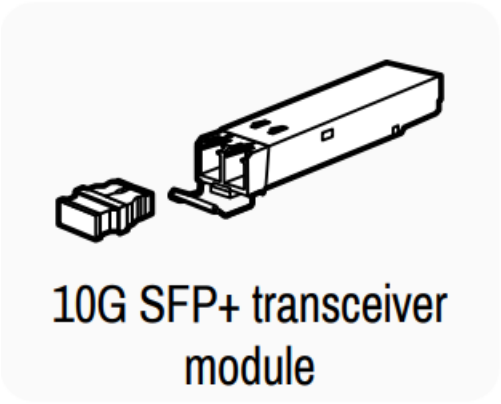
- The UD Mounting Plate F110 makes it easy to mount a single device on any flat surface, e.g. furniture. The UD Mounting Plate F120 and UD Mounting Pro P140 provide the same for one half-rack or two quarter-rack-sized units.

- Pocket-sized devices can also be fastened to them.
- The UD Mounting Pro P140 makes easy and quick changing of the extenders under the desk available. To order mounting accessories, please contact **sales@lightware.com**.
- Using different (e.g. longer) screws may cause damage to the device.
- The extenders are quarter-rack sized.

Box Contents



Optional Accessories



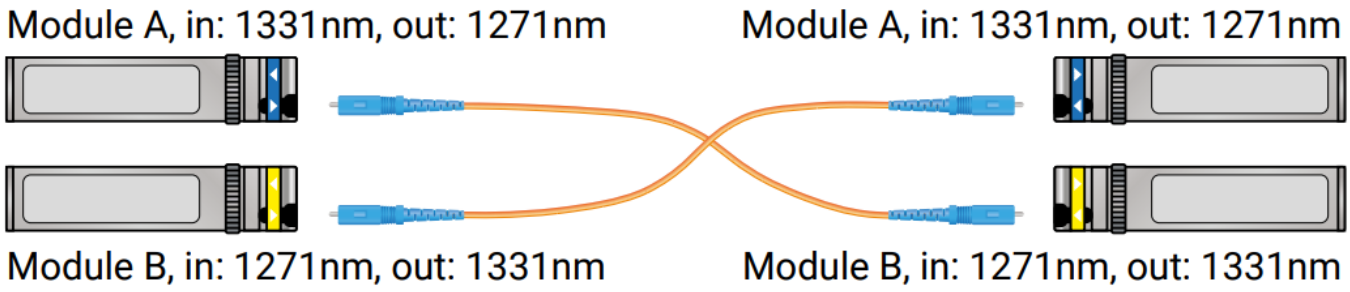
10GbE singlemode/multimode SFP+ modules can be ordered together and even separately. For the details, please contact **sales@lightware.com**.

Status LEDs

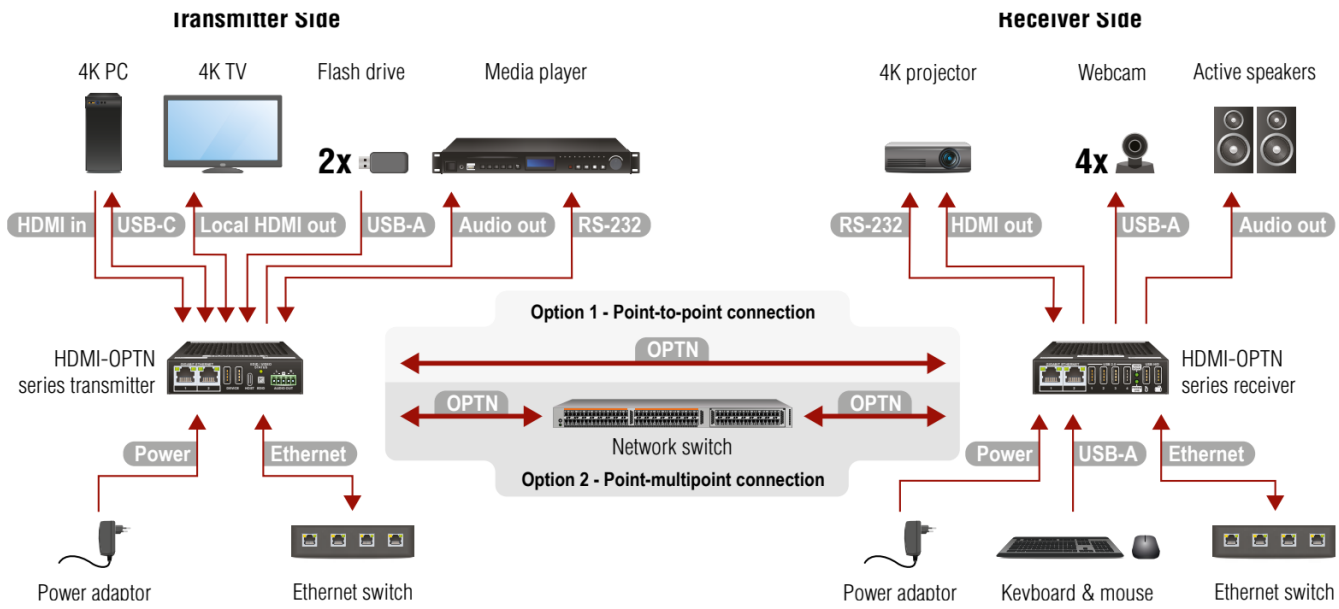
EDID / VIDEO STATUS		Transmitter
	off	Device is not powered.
	blinking (green or yellow)	No video signal present on the HDMI input port.
	on (green)	Stored EDID is emulated on the HDMI input port.
	on (yellow)	Transparent EDID is emulated on the HDMI input port.
	blinking (red)	Error occured during the EDID emulation. It may be caused by: ▪ EDID emulation cannot be set correctly. ▪ Device cannot apply transparent EDID emulation.
POWER/LIVE		**Receiver**
	off	Device is not powered.
	blinking between 50% and 100% brightness (green)	Device is powered on and operational.
VIDEO SIGNAL		**Receiver**
	off	No video signal present on the HDMI output port.
	on (green)	Video signal is present on the HDMI output port.
OPTN INPUT / OUTPUT LINK LED		**Transmitter / Receiver**
	off	Device is not powered or SFP+ transceiver module is not installed.
	on (red)	Device might emit laser radiation.
	on (green)	Optical link established.

Cabling of the BiDi SFP+ Modules

In case of using bidirectional (BiDi) SFP+ modules in the HDMI-OPTN devices, please check the wavelength of the INPUT and OUTPUT modules. If the wavelengths are different, the cabling might be also different and the modules shall be connected across.



Connecting Steps



Transmitter Side

Transmitter Side	
OPTN	**Option 1 - Point-multipoint connection** - Connect singlemode or multimode (depends on the installed SFP+ modules) fiber optical cables or DAC cables between the OPTN output port of the transmitter and the SFP+ port of the 10G network switch. **Option 2 - Point-to-point connection -** Connect singlemode or multimode (depends on the installed SFP+ modules) fiber optical cables or DAC cables between the OPTN output port of the transmitter and the OPTN input port of the receiver. In this case, the extender operates as a OPTX device. ⚠ ***User Ethernet is also transmitted over the OPTN interface, so be sure not to create a network loop.***
USB-C	Connect the host PC to the Host port by an USB-C cable. The port supports USB 2.0 standard and receives USB data only, no AV transmission allows. ❗ *The port is available in the TX200AU2K model only.*
HDMI in	Connect the source (e.g. 4K PC) to the HDMI input port of the transmitter by a HDMI cable.
Local HDMI out	Connect the local sink devices (e.g. 4K TV) to the Local output port by an HDMI cable. The output port is local loopback port in this case: the same stream received on the input port is transmitted forward. ❗ *The port is available in the TX200AU2K model only.*
Audio out	Optionally for analog output: connect an audio device (e.g. media server) to the analog audio output port by an audio cable.
USB-A	Connect up to two USB 2.0 devices (e.g. pendrive/microphone/ webcam/etc) to the Device ports. ❗ *The ports are available in the TX200AU2K model only.*
RS-232	Optionally for RS-232: connect a device (e.g. media player) to the RS-232 port.
Ethernet	Connect the device to a LAN network.
Power	Powering on the devices is recommended to do as the final step during the installation.

User Ethernet is also transmitted over the SFP+ interface so be sure not to create a network loop!

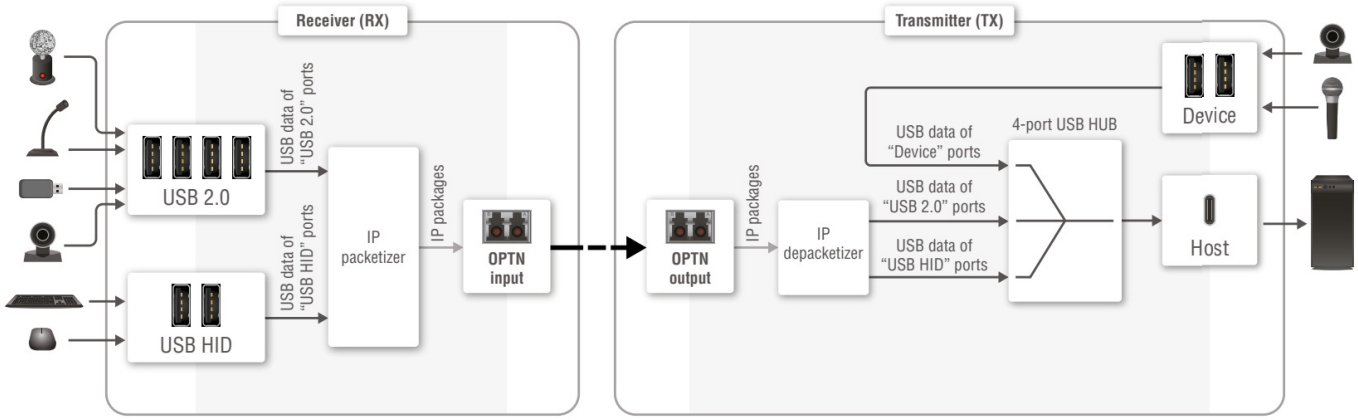
Receiver Side

Receiver Side	
OPTN	**Option 1 - Point-multipoint connection** - Connect singlemode or multimode (depends on the installed SFP+ modules) fiber optical cables or DAC cables between the OPTN input port of the receiver and the SFP+ port of the 10G network switch. **Option 2 - Point-to-point connection** - Connect singlemode or multimode (depends on the installed SFP+ modules) fiber optical cables or DAC cables between the OPTN input port of the receiver and the OPTN output port of the transmitter. In this case, the extender operates as a OPTX device. ⚠ ***User Ethernet is also transmitted over the OPTN interface, so be sure not to create a network loop.***
HDMI out	Connect the sinks (e.g. 4K display and 4K projector) to the HDMI output ports of the receiver by the HDMI cables.
Audio out	Optionally for analog output: connect an audio device (e.g. active speakers) to the analog audio output port by an audio cable.
USB-A	USB 2.0 ports: connect up to four USB 2.0 devices (e.g. pendrive/ microphone/webcam/etc) to the receiver. USB HID ports: connect up to two USB HID devices to the receiver (preferably mouse and keyboard). ❗ *The ports are available in the RX100AU2K model only.*
RS-232	Optionally for RS-232: connect a device (e.g. 4K projector) to the RS-232 port.
Ethernet	Connect the device to a LAN network.
Power	Powering on the devices is recommended to do as the final step during the installation.

User Ethernet is also transmitted over the SFP+ interface so be sure not to create a network loop!

Port Diagram

The following port diagram describes the USB signal routes of the HDMI-OPTN-TX200AU2K and the HDMI-OPTN-RX100AU2K models.



Network Requirements

The HDMI-OPTN series extenders require managed network switches that support 10Gbps (10GbE) line speed. BlueRiver technology transmits uncompressed or lightly compressed video of up to 4K along with other AV signals such as audio and control signals.

Network Switch Requirements

The following are the Layer 2 multicast configurations that are required on all the network switches:

- IGMP version 2 supported
- IGMP version 2 snooping enabled
- Filter/Drop unregistered multicast traffic
- Disable unregistered multicast flooding
- Enable fast leave support

Applied Ports

Protocol	Port Number	Description
TCP	6970	Used for communications between control software and BlueRiver Control Server.

Firmware Upgrade

Lightware Device Updater (LDU2) is an easy and comfortable way to keep your device up to date. Establish the connection via Gigabit Ethernet port. Download and install LDU2 software from the company's website, **www.lightware.com**, where you can find the latest firmware package as well.

The User's Manual is also available via the QR code below:

Lightware Visual Engineering PLC. Budapest, Hungary

- **sales@lightware.com**
- +36 1 255 3800
- **support@lightware.com**
- +36 1 255 3810

Further information on the device is available at **www.lightware.com**.

Doc. ver.: 1.0 19210127

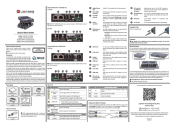
FAQ

Q: Can I connect multiple destinations with a single source using these extenders?
A: Yes, these extenders allow you to extend signals from a single source to multiple destinations over a fiber-optic link.

Q: What is the maximum distance these extenders support?
A: The extenders support data transmission of up to 10km via fiber optic cables.

Q: How do I switch between different EDID emulation modes?
A: Use the EDID button on the transmitter. Short press to switch between transparent and stored user EDID, and long press to learn and store EDID from the receiver's output.

Documents / Resources

	**LIGHTWARE HDMI-OPTX Series HDMI Optical Extender** [pdf] User Guide HDMI-OPTX-TX100A, HDMI-OPTX-RX100A, HDMI-OPTX-TX200AU2K, HDMI-OPTX-RX100A U2K, HDMI-OPTX Series HDMI Optical Extender, HDMI-OPTX Series, HDMI Optical Extender, Optical Extender, Extender

References

- **User Manual**