LIGHTWARE HDMI-TPN-TX107 Series Point To Multipoint Extender User Guide

Contents

LIGHTWARE

LIGHTWARE HDMI-TPN-TX107 Series Point To Multipoint Extender

Specifications:

- **Model**: HDMI-TPN-TX107, HDMI-TPN-RX107, HDMI-TPN-TX207AU2K, HDMI-TPN-RX107AU2K
- **Power Input:** 48V DC adaptor with interchangeable plugs (for TX107 and RX107 models), 12V DC adaptor with interchangeable plugs (for TX207AU2K and RX107AU2K models)
- **EDID Handling Modes:** Learned, Transparent, Default, User
- **Connection Type:** Point-to-point (TPX mode), Point-multipoint (TPN mode)

Product Usage Instructions

Quick Start Guide:
Refer to the provided Quick Start Guide for initial setup and installation instructions.

Powering On/Off:
Connect the appropriate DC adaptor to the device and power it on/off using the power button.

Status LEDs:

- **POWER/LIVE:** Indicates device power status.
- **VIDEO SIGNAL:** Indicates presence of video signal on HDMI input/output port.
- **EDID STATUS:** Indicates the EDID emulation status.

EDID Button Functions:
The EDID button allows you to switch between different EDID emulation modes based on the connection type of the extender.

Point-to-Point Connection (TPX mode):

- **Short press:** Switch between transparent and stored user EDID.
- **Long press**: Learn and store EDID from the output of the receiver.

Point-Multipoint Connection (TPN mode):
Short press: Switch between default and stored user EDID.

Ventilation:
Ensure proper ventilation by keeping the top and side ventilation holes uncovered to prevent overheating.

Important Safety Instructions
Please read the supplied safety instruction document before using the product and keep it available for future reference.

Introduction

The HDMI-TPN series transmitter and receiver devices with SDVoE technology are Lightware's development allowing users to extend HDMI 2.0 signals up to 4K60 4:4:4 video resolution from a single source to multiple destinations through 10G Ethernet networks. Beyond the benefits of sending high-resolution video over long distances, the extenders are also capable of handling various connectivity standards, including a 1G user Ethernet channel over the 10G link, as well as command injection into IR and RS-232. The additional Gigabit Ethernet ports are also a valuable addition, allowing users to connect an additional device to the network directly through the TPN extender. 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, as is their connectivity and easy integration into a wide range of AV operations and with 3rd party devices, such as the Christie Terra projector. When using direct connection in point-to-point mode, both the transmitter and receiver are compatible with Lightware's TPX family of products.

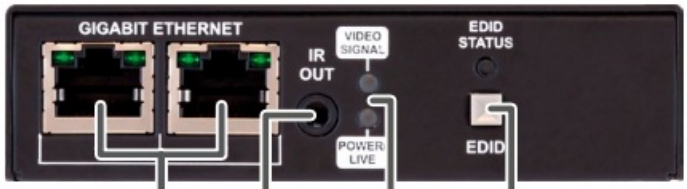
Box Contents

1. Only for the HDMI-TPN-TX107 and HDMI-TPN-RX107 models.
2. Only for the HDMI-TPN-TX207AU2K and HDMI-TPN-RX107AU2K models.

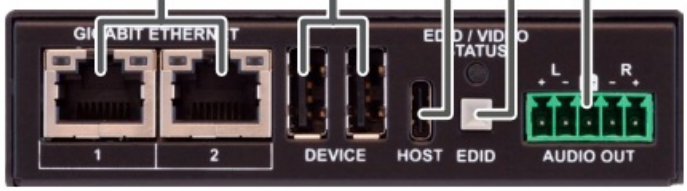
Front and Rear View – Transmitter

Front View

HDMI-TPN-TX107



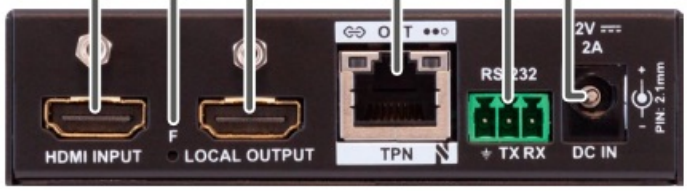
HDMI-TPN-TX207AU2K



Rear View

HDMI-TPN-TX107

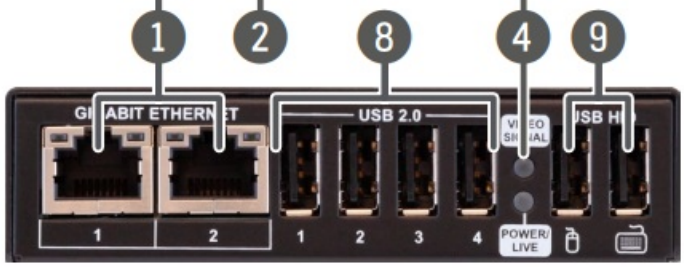
HDMI-TPN-TX207AU2K



Front and Rear View – Receiver

Front View

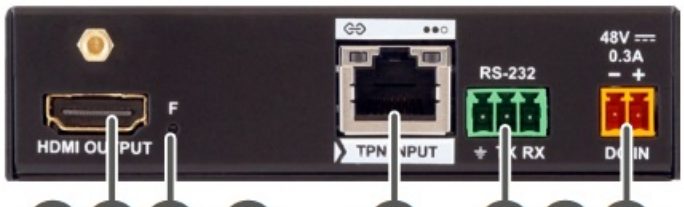
HDMI-TPN-RX107

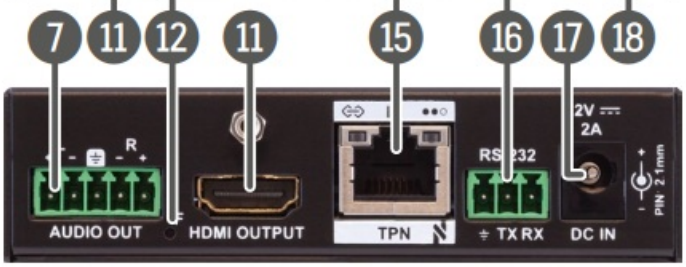


HDMI-TPN-RX107AU2K

Rear View

HDMI-TPN-RX107





HDMI-TPN-RX107AU2K

1. Gigabit Ethernet port 1GBase-T RJ45 connector for user Ethernet purpose.
2. IR out TRS (3.5mm jack) output connector for an Infrared emitter unit.
3. Device USB-A connectors USB-A connectors with USB 2.0 support for various types of USB devices.
4. Status LEDs The LEDs give immediate feedback about the current status of the extender. See the details in the Status LEDs section.
5. Host USB-C connector USB-C connection between the transmitter and the host computer. The port receives USB data only, no AV signal transmission is accepted. It supports USB 2.0 standard only.
6. EDID button & EDID Status LED The EDID handling mode depends on the connection type of the extender. See the details in the Functions of the EDID Button section. The EDID LED gives immediate feedback about the current status of the EDID emulation. See the details in the Status LEDs section.
7. Audio output 5-pole Phoenix connector for de-embedding the HDMI audio, which can be transmitted as a 2-channel balanced analog audio signal.
8. USB 2.0 connectors USB-A connectors with USB 2.0 support for various types of USB devices (e.g. webcam, microphone, external storage, etc). The signal is transmitted to the receiver over the TPN link.
9. USB HID connectors USB K+M ports for HID-compatible devices (preferably keyboard and mouse). The signal is transmitted to the receiver over the TPN link.
10. HDMI input HDMI input port with HDMI 2.0 support for source devices.
11. HDMI output HDMI output port with HDMI 2.0 support for sink devices.
12. Factory reset button Hidden button for setting the device to factory default values.
13. Local output Local HDMI output with the same AV content as the HDMI input.
14. TPN output RJ45 connector for SDVoE output signal transmission. See more details about the connector in the

Power Supply Options and the Status LEDs sections.

15. TPN input RJ45 connector for SDVoE input signal. See more details about the connector in the Power Supply Options and the Status LEDs sections.
16. RS-232 port 3-pole Phoenix connector for bi-directional serial communication.
17. 12V DC input 12V DC input with locking connector for local powering.
18. 48V DC input 48V DC input with 2-pole Phoenix connector for local powering.

Status LEDs

HDMI-TPN-TX107 / RX107

POWER/LIVE		**Transmitter / Receiver**
	off	Device is not powered.
	blinking between 50% and 100% brightness (green)	Device is powered on and operational.
VIDEO SIGNAL		**Transmitter / Receiver**
	off	No video signal present on the HDMI input (TX) or HDMI output (RX) port.
	on (green)	Video signal is present on the HDMI input (TX) or HDMI output (RX) port.
EDID STATUS		**Transmitter**
	on (green)	Default EDID is emulated on the HDMI input port.
	on (yellow)	User 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 user EDID emulation.

HDMI-TPN-TX207AU2K / RX107AU2K

EDID / VIDEO STATUS		Transmitter
	off	Device is not powered.
	blinking (green or yellow)	No video signal present on the HDMI input port.
	on (green)	Default EDID is emulated on the HDMI input port.
	on (yellow)	User 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 user 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.

TPN and Gigabit Ethernet Status LEDs

TPN INPUT/OUTPUT		Transmitter / Receiver
	off	No connection is established between the transmitter and the receiver units.
	on (green)	Connection is established with 10G / 5G / 2.5G bandwith.
	blinking (yellow)	Link training is in progress.
TPN INPUT/OUTPUT	●●○	**Transmitter / Receiver**
	off	No data transmission on the port.
	blinking (green)	Data transmission is active.
GIGABIT ETHERNET - LEFT LED		**Transmitter / Receiver**
	on (green)	Connection is established with 100Mbps bandwith.
	blinking (green)	Data transmission is active.
GIGABIT ETHERNET - RIGHT LED		**Transmitter / Receiver**
	on (green)	Connection is established with 1Gbps bandwith.
	blinking (green)	Data transmission is active.

Functions of the EDID Button

The EDID handling mode depends on the connection type of the extender.

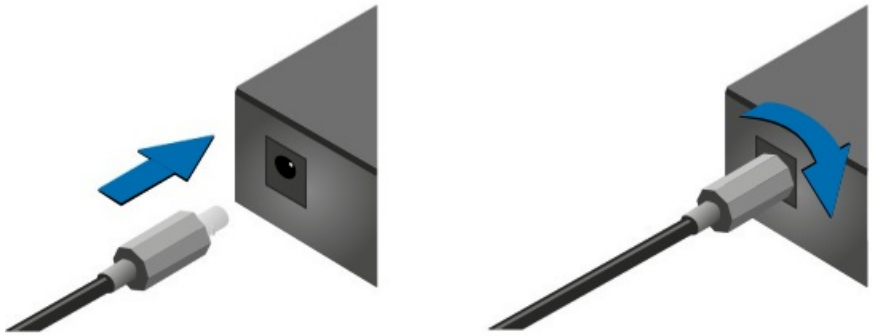
Point-to-point connection (TPX mode)
Two EDID emulation modes can be selected with the EDID button: Learned and Transparent.

- **Short press:** switch between transparent and stored user EDID.
- **Long press:** learn and store EDID from the output of the receiver.

Point-multipoint connection (TPN mode)
Two EDID emulation modes can be selected with the button: Default and User.

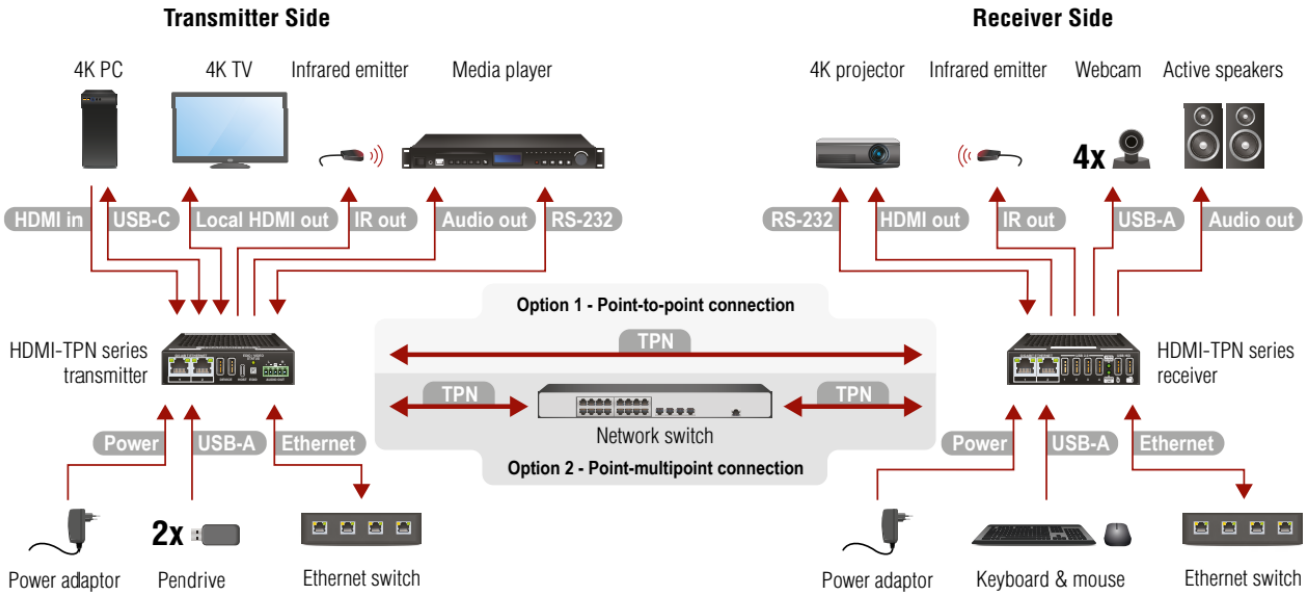
- **Short press:** switch between default and stored user EDID.

Locking DC Plug
Twist 90° clockwise to lock. The locking DC plug is available in the TX107AU2K and RX107AU2K models only.



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

Connecting Steps



Transmitter Side	
TPN	**Option 1 - Point-to-point connection -** Connect a CATx cable between the TPN output port of the transmitter and the TPN input port of the receiver. In this case, the extender operates as a TPX device. **Option 2 - Point-multipoint connection** - Connect a CATx cable between the TPN output port of the transmitter and the RJ45 port of the 10G network switch. ⚠ ***User Ethernet is also transmitted over the TPN interface, so be sure not to create a network loop.***
HDMI in	Connect the source (e.g. media player) 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 a local loopback port in this case: the same stream received on the input port is transmitted forward. ⓘ *The port is available in the TX207AU2K 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. ⓘ *The port is available in the TX207AU2K model only.*
Ethernet	Connect the device to a LAN network. ⚠ ***User Ethernet is also transmitted over the TPN interface, so be sure not to create a network loop.***
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 TX207AU2K model only.*
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 allowed. ⓘ *The port is available in the TX207AU2K model only.*
IR out	Optionally for Infrared extension: connect an IR emitter to the IR OUT port of the transmitter (command injection is available only with 3rd-party software). ⓘ *The port is available in the TX107 model only.*
RS-232	Optionally for RS-232: connect a device (e.g. media player) to the RS-232 port.
Power	Powering on the devices is recommended to do as the final step during the installation. Please check the *Power Supply Options* section for the details.

Receiver Side	
TPN	**Option 1 - Point-to-point connection -** Connect a CATx cable between the TPN output port of the transmitter and the TPN input port of the receiver. In this case, the extender operates as a TPX device. **Option 2 - Point-multipoint connection** - Connect a CATx cable between the TPN input port of the receiver and the RJ45 port of the 10G network switch. ⚠ ***User Ethernet is also transmitted over the TPN interface, so be sure not to create a network loop.***
HDMI out	Connect the sink (e.g. 4K projector) to the HDMI output port of the receiver by a HDMI cable.
Audio out	Optionally for analog output: connect an audio device (e.g. active speakers) to the analog audio output port by an audio cable. ℹ *The ports are available in the RX107AU2K model only.*
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). ℹ *The ports are available in the RX107AU2K model only.*
Ethernet	Connect the device to a LAN network. ⚠ ***User Ethernet is also transmitted over the TPN interface, so be sure not to create a network loop.***
IR out	Optionally for Infrared extension: connect an IR emitter to the IR OUT port of the receiver (command injection is available only with 3rd-party software). ℹ *The port is available in the RX107 model only.*
RS-232	Optionally for RS-232: connect a device (e.g. 4K projector) to the RS-232 port.
Power	Powering on the devices is recommended to do as the final step during the installation. Please check the *Power Supply Options* section for the details.

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.

UD Mounting Plate F110

UD Mounting Plate F120

UD Mounting Pro P140

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.

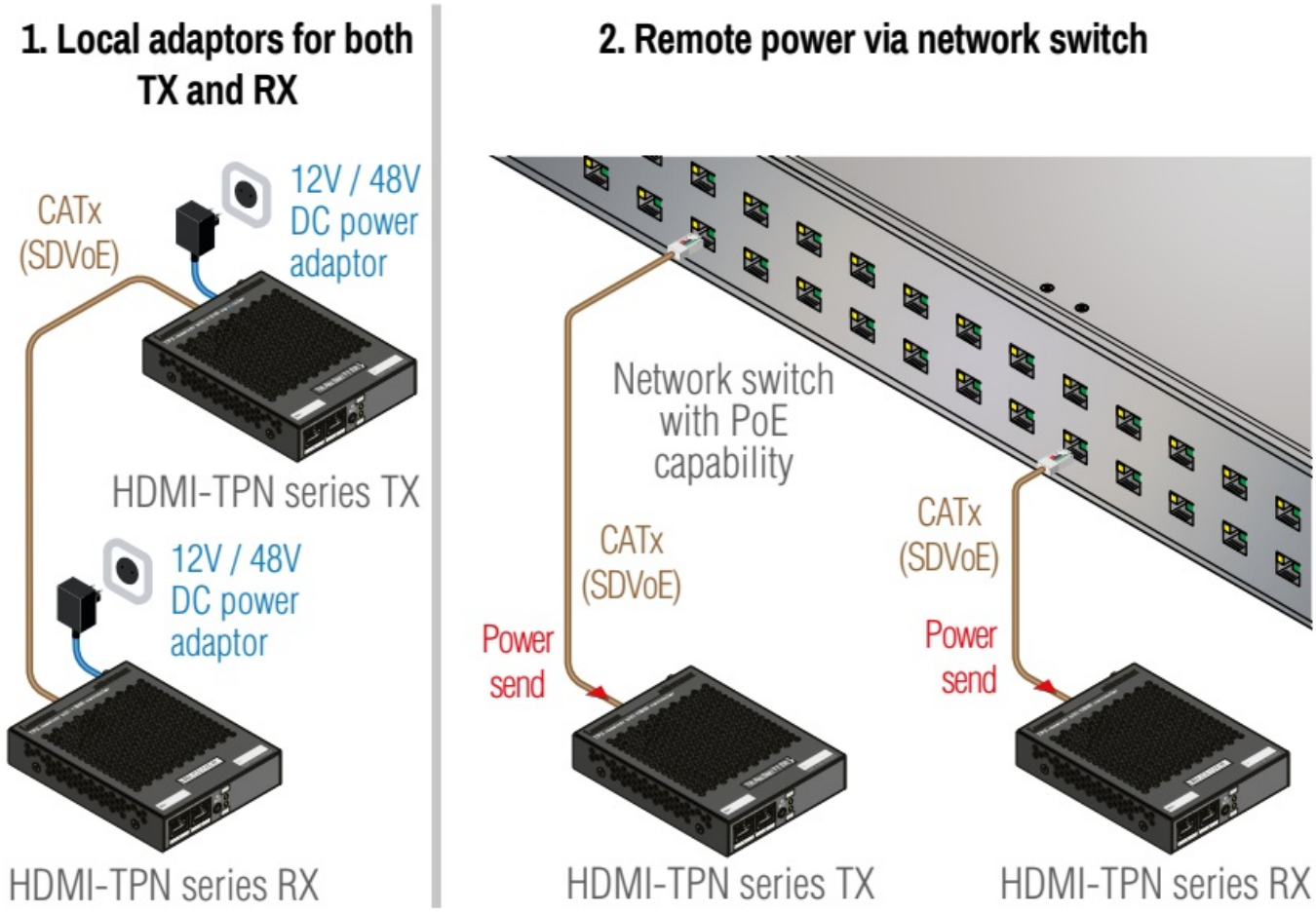
- Using different (e.g. longer) screws may cause damage to the device.
- The extenders are quarter-rack sized.

Power Supply Options

TPN series extenders fulfill the PoE PD standard, which means the TPN port can receive power over the Ethernet line.

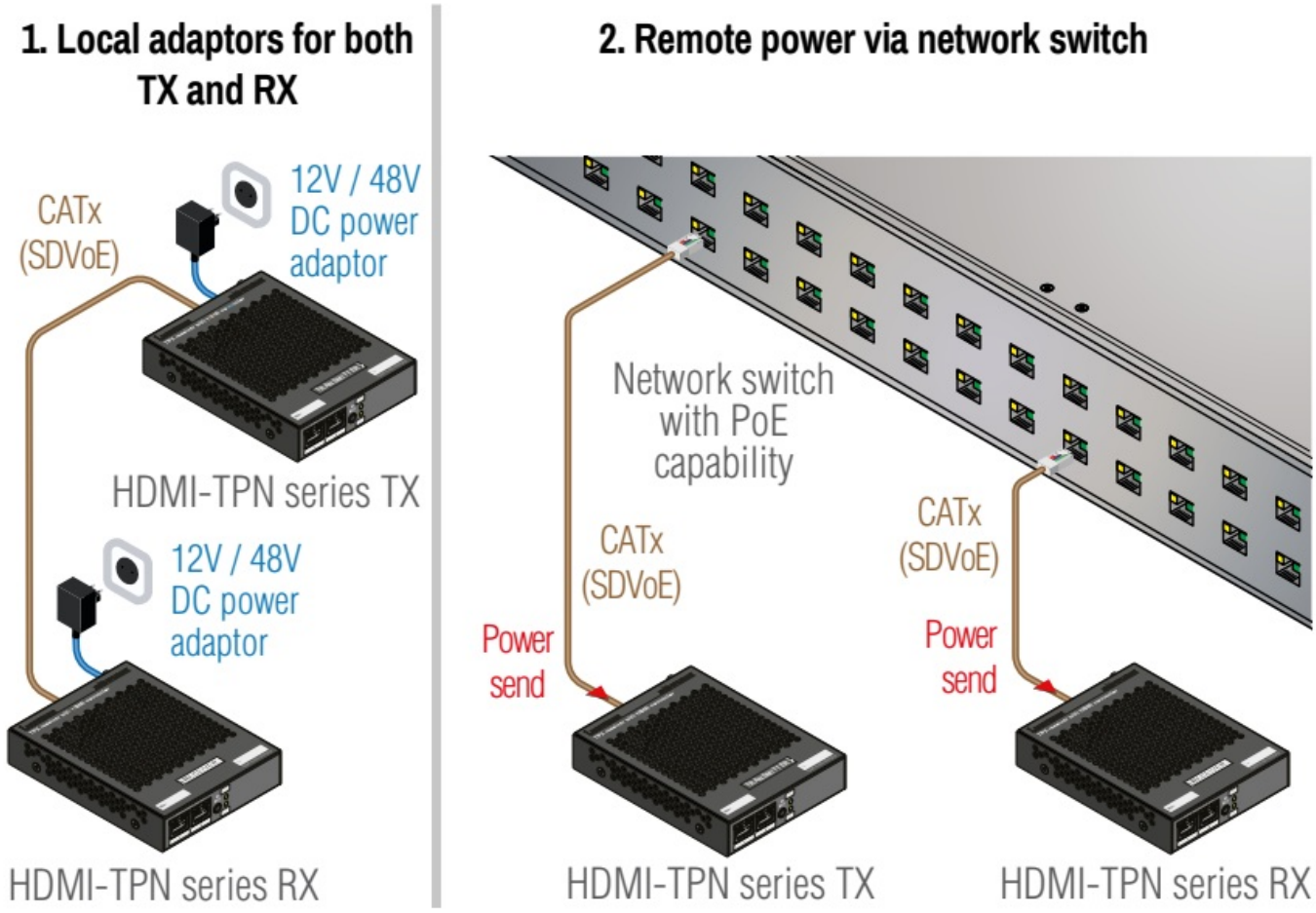
HDMI-TPN series extenders are not able to send remote power to each other.

The TPN series devices can be powered in any of the following ways:



Port Diagram

The following port diagram describes the USB signal routes of the HDMI-TPN-TX207AU2K and the HDMI-TPN-RX107AU2K models.



Network Requirements
The HDMI-TPN 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.

Minimum CAT Cable Requirement
Lightware highly recommends using CAT6a AWG24 or higher category 10G Ethernet cables for the TPN (SDVoE) connection between the transmitter and the receiver. Usage of e.g. AWG28 Ethernet cables may reduce the extension distance significantly.

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

Lightware Visual Engineering PLC.

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

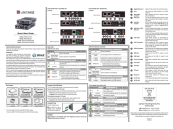
FAQ

Q: What should I do if there is no video signal present on the HDMI input/output port?
A: Check the connections, ensure proper power supply, and verify the EDID settings using the EDID button.

Q: How do I switch between different EDID emulation modes?
A: Use the EDID button to perform short or long presses based on the connection type of the extender.

Q: What is the significance of the different status LEDs?
A: The LEDs indicate device power status, video signal presence, and EDID emulation status for troubleshooting purposes.

Documents / Resources

	**LIGHTWARE HDMI-TPN-TX107 Series Point To Multipoint Extender** [pdf] User Guide HDMI-TPN-TX107 Series Point To Multi Point Extender, HDMI-TPN-TX107 Series, Point To Multi Point Extender, Multi Point Extender, Point Extender, Extender

References

- **User Manual**