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LIGHTWARE

LIGHTWARE TPN Series Universal Transmitter Switchers

LIGHTWARE TPN Series Universal Transmitter Switchers User Guide

Contents

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Specifications

- **Model** UCX-4×3-TPN-TX20
- **Power Input** 24V DC
- **Video Resolution** Up to 4K
- **Network Requirements:** Managed network switchers supporting10 Gbpss (10GbE) line spe.ed
- **Audio Out:put** Analog Audio output port

Important Safety Instructions

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

Introduction

Lightware's universal Transmitter switchers exploit SDVoE technology and USB-C connectivity for a simplified extension of up to 100m of 4K video, audio, control signals and power from a single source to multiple destinations through 10G Ethernet networks, providing meeting participants with easy host switching, video resolution capabilities up to 4K@60Hz at 4:4:4, as well as comprehensive and secure Ethernet features. The Transmitters are featured with an audio de-embedding function via the 5-pole Phoenix® Combicon analog audio ports. Beyond the benefits of sending high-resolution video over long distances, the Transmitters are also capable of handling various connectivity standards, including bi-directional RS-232, GPIO, and OCS as well. The Gigabit Ethernet port is also a valuable addition, allowing users to connect an additional device to the network directly through the TPN extender.r
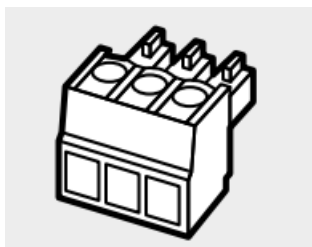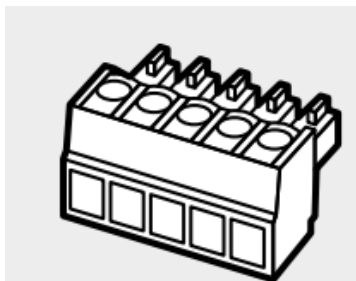
Box Contents

Transmitter device
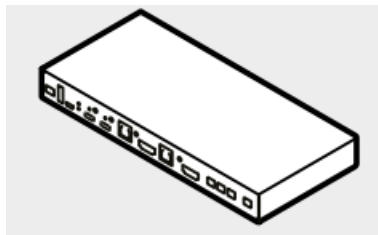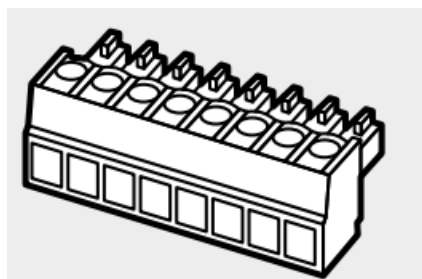

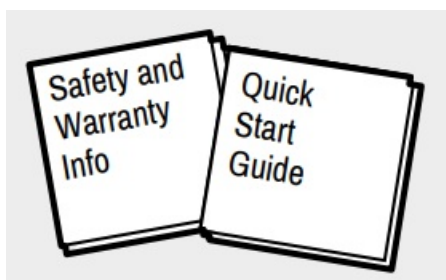**24V power adaptor with IEC power cable**
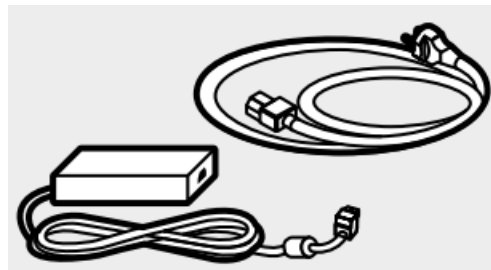
Phoenix® Combicon 3-pole connector1

Phoenix® Combicon 5-pole connector

Phoenix® Combicon 8-pole connector
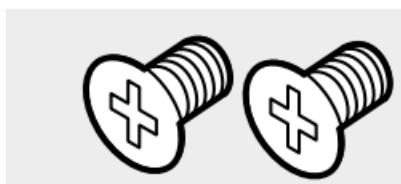
Safety & Warranty Info; Quick Start Guide

Safety and Warranty Info

Quick Start Guide

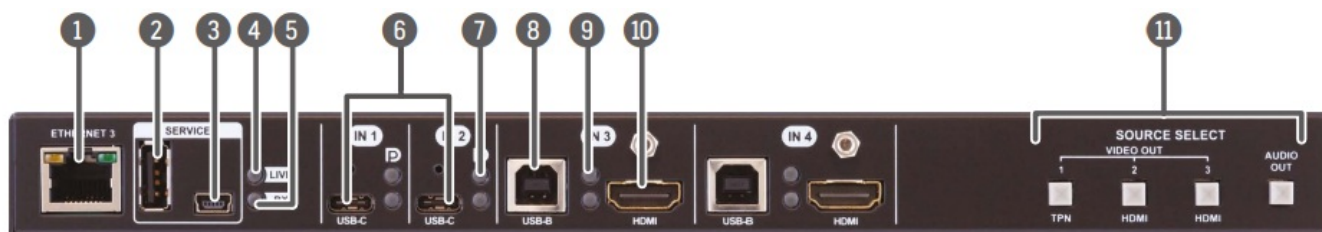**Type C (USB-C) to Type C (USB-C) Cable, 1m**
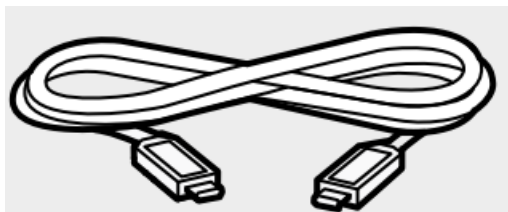
2 pcs of M3x4 flat head screws

1 Only for UCX-4×3-TPN-TX20 and UCX-2×1-TPN-TX20 models.

Front view (UCX-4×3-TPN-TX20)

1. **Configurable Ethernet** port RJ45 connector for configurable GBase-T-T Ethernet communication.
2. **USB-A port.** The SERVICE-labelled USB-A connector is designed for service functions.
3. **Micro USB port..** The SERVICE-labelled USB mini-B port is designed for service functions.
4. **LIVE LED** blinking The device is powered on and operational. off The device is not powered or out of operation.
5. **RX LED** Function will be implemented in a later release.
6. **USB-C ports** USB-C port for receiving video and audio signals, as well as USB data from the host device.
7. **Status LEDs.** For the details, see the table on the right.
8. **USB-B ports** are Upstream ports for connecting USB host devices (e.g. computer).
9. **Status LEDs.** For the details, see the table on the right.
10. **HDMI input ports** HDMI input port for receiving video and audio signals.
11. **Input selection buttons.** For more details on the button functionality, see the table on the other side. When the LEDs blink green three times after pressing the button, they show that the front panel lock is enabled.

Always use the supplied power supply. Warranty void if damage occurs due to the use of a different power source.

Rear view (UCX-4×3-TPN-TX20)

1. **DC input** for local powering. Connect the output to the 2-pole Phoenix connector. For more details, see the powering options on the next page.
2. **USB-A ports** are Downstream ports for connecting USB peripherals (e.g., camera, keyboard, multitouch

display).

3. **TPN output por**t RJ45 connector for AVX output signal transmission. See more details about the connector in the Status LEDs section.

4. **HDMI output ports** for sending video and audio signals to the receiver.

5. **Status LEDs** For more information, see the table on the right.

6. **Analog Audio output port** Audio output port (5-pole Phoenix®) for balanced analog audio output signal. The signal is de-embedded from the selected video signal.

7. **RS-232 ports** 3-pole Phoenix® connectors for bi-directional RS-232 communication.

8. **GPIO port** 8-pole Phoenix® connector for configurable general purpose. Max. input/output voltage is 5V, see the details on the next page.

9. **Configurable Ethernet ports** with RJ45 connectors for configurable 1 GBase-T Ethernet communication

The overall power supply of the USB-A connectors is beyond 1.5A, which makes it possible to supply devices with higher voltage requirements.
Some ports are not available on certain models. See the User Manual for more information.

Factory default settings (UCX-4×3-TPN-TX20)

IP address	Dynamic (DHCP is enabled)
Hostname	lightware-<serialno>
Video Crosspoint setting	I1 on O1, I2 on O2, I3 on O3
HDCP mode (in)	HDCP 2.2
HDCP mode (out)	Auto
Signal type	Auto
Emulated EDID	F47 – (Universal HDMI with PCM audio)
Audio Crosspoint setting	I1 on O4
Analog audio output levels	Volume (dB): 0.00; Balance: 0 (center)
Video Autoselect	Disabled
USB-C Power Limit	60W / 60W

DP Alternate Mode Policy	Auto
Port Power Role	Dual Role
USB Autoselect	Follow video O1
D1-D4 Power 5V Mode	Auto
RS-232 port setting	9600 BAUD, 8, N, 1
RS-232 serial over IP	Enabled
HTTP, HTTPS	Enabled
HTTP, HTTPS authentication	Disabled
LARA	Disabled

Front Panel Status LEDs

Video Input Status LED (the upper one)		
● (upper on)	on	There is a valid video signal on this port.
○ (upper off)	off	There is no valid video signal on this port.
◉ (upper blink)	blink once	The port is selected by a button press.
USB Status LED (the lower one)		
● (lower on)	on	The USB Host is connected and selected.
○ (lower off)	off	No USB Host or deselected port.
◉ (lower blink)	blink once	Port selected by a button press.
VIDEO SIGNAL		
○	off	No video signal detected on the HDMI input (TX) or HDMI output (RX) port.
●	on (green)	Video signal is detected on the HDMI input (TX) or HDMI output (RX) port.

RJ45 Port LEDs

TPN OUTPUT		⚭
☐	off	No connection is established between the transmitter and the receiver units.
▉	on (green)	Connection is established with 10G / 5G / 2.5G bandwith.
TPN OUTPUT		●●○
☐	off	No data transmission on the port.
▣	blinking (green)	Data transmission is active.
GIGABIT ETHERNET - LEFT LED		
▉	on (green)	Connection is established with 100Mbps bandwith.
▣	blinking (green)	Data transmission is active.
GIGABIT ETHERNET - RIGHT LED		
▉	on (green)	Connection is established with 1Gbps bandwith.
▣	blinking (green)	Data transmission is active.

Rear Panel LEDs

Video Output Status		
🟢	on	The video signal is present.
⚪	off	The signal is not present or muted.

Connecting steps
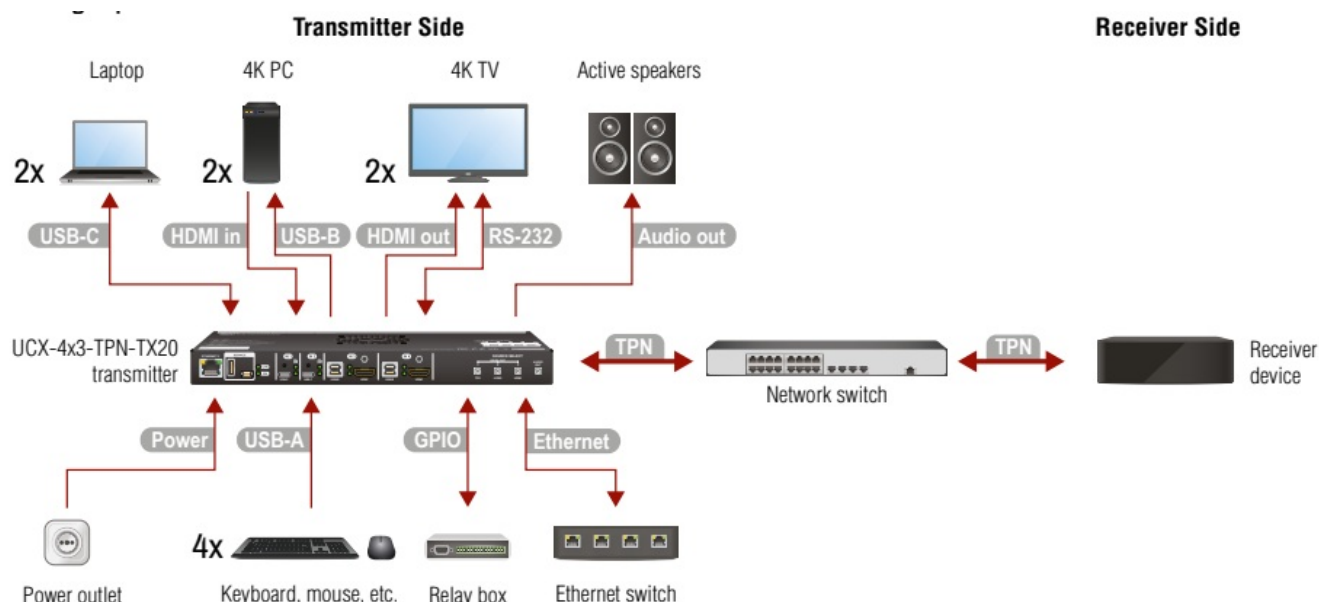
Port diagram for video / audio (UCX-4X3-TPN-TX20)
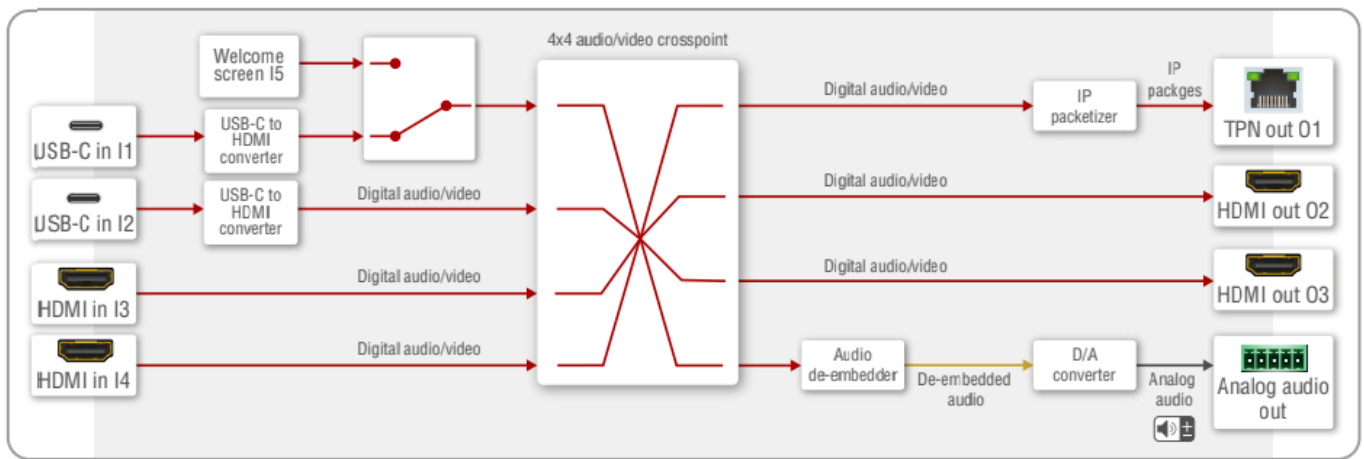
- **TPN** Connect a CAT cable between the TPN output port of the transmitter and the RJ45 port of the 10G network switch.
  A User Ethernet is also transmitted over the TPN interface, so be sure not to create a network loop.
- **USB-C** Connect a USB-C source to the USB-C input port. The applied cable shall be certified for Displayport Alternate mode HBR2 (4×5.4Gbps applications.
- **HDMI in** Connect a source to theHDMIM input port of the transmittewithby an HDMI cable
- **USB-B:** Optionally connect the USB host.
- **HDMI out:** Connect a sink to the HDMI input port of the transmitter with an HDMI cable.
- **RS-23.2** Optional, for RS-232: connect a device to the RS-232 port.
- **Audio out** Optionally for analog output: connect an audio device to the analog audio output port by an audio cable.
- **USB-A:** Optionally connect USB peripherals to the USB-A ports with USB cables.
- **GPI O** Optionally connect a controller/controlled device to the GPIO port.
- **Ethern: et** Optionally connect the device to a LAN network.
  A User Ethernet is also transmitted over the TPN interface, so be sure not to create a network loop.
- **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 detail
  A Only connect one of the devices to the LAN, to avoid creating a network loop!

Audio Cable Wiring Guide
The UCX-TPN series devices are built with a 5-pole Phoenix® output connector. See a few examples below of the most common assembling cases.
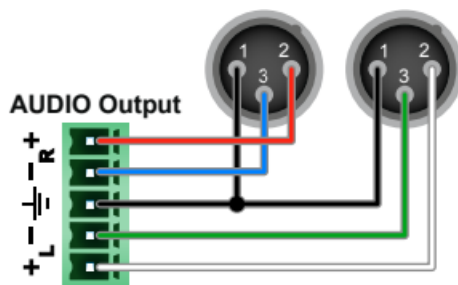
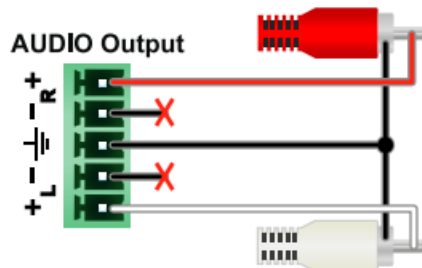**Balanced output to balanced input**
Phoenix – 2×6.3 (1/4*) TRS
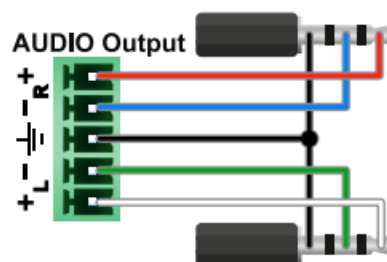
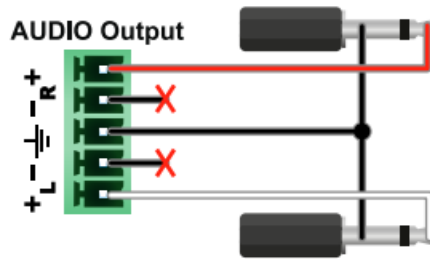
Balanced output to balanced input
Phoenix cable – 2x XLR plugs

Balanced output to unbalanced input
Phoenix – 2x RCA

Balanced output to unbalanced input
Phoenix – 2x 6.3 (1/4″) TS

GPIO (General Purpose Input/Output Ports)

The device has seven GPIO pins that operate at TTL digital signal levels and can be set to high or low levels

(Push-Pull). The direction of the pins can be input or output (adjustable). The signal levels are the following.g

	Input voltage (V)	Output voltage (VMax.	ax. current (mA)
Logic low-level	0 – 0.8	0 – 0.5	30
Logic high-level	2 -5	4.5 – 5	18

Plug pin assignment 1-6: Configurable, 7: 5V (max. 500 mA); 8: Ground. The recommended cable for the connectors is the AWG24 (0.2 mm* diameter) or the generally used 'alarm cable' with 4×0.22 mm* wires. ® The maximum total current for the six GPIO pins is 180 mA, the max. The supported input-output voltage is SV.

RS-232

The switcher provides a 3-pole Phoenix connector for bi-directional serial communication. The signal levels are the following.

	Output voltage (V)
Logic low-level	3 – 15
Logic high-level	-15 – 3

Plug pin assignment: 1: Ground, 2: TX data, 3: RX data

OCS (Occupancy) Sensor

The switcher is supplied with a -pole Phoenix* connector (male), which is for connecting an OCS sensor.

Plus nin assignment: **1**: Configurable: **2**– 24V (max. 50 mA): **3**: Ground

The signal levels for the **Pin 1**	Input voltage (V)	Max. current (mA)
Logic low level	0 – 0.8	30
Logic high level	2 -5	18

A The occupancy sensor connector and the GPIO port are not compatible with each other because of the voltage level difference, please do not connect them directly.

Minimum CAT Cable Requirement

Lightware highly recommends using CATa AWG24 or higher category 10G Ethernet cables for the TPN (SDVE) connection between the transmitter and the receiver. Usage of eg. 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.

**Button functionality – Video Source Selection**
UCX-4×3-TPN-TX20
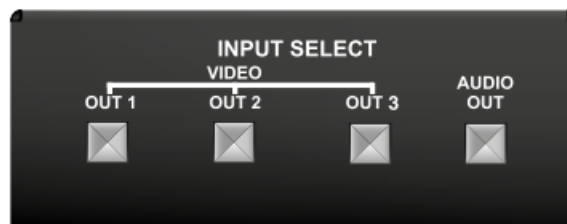
Push the OUT1 button to set the video input to the TPN INNUT BELECT OUT1 port. Push the OUT2 button to set the video input to the HDMI OUT2 port. Push the OUT3 button to set the video input to the HDMI OUT3 port. Push the AUDIO OUT button to set the audio source of the analog audio output. The sequence is the following (both for the video and audio switching)
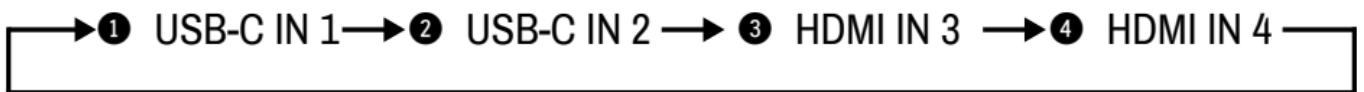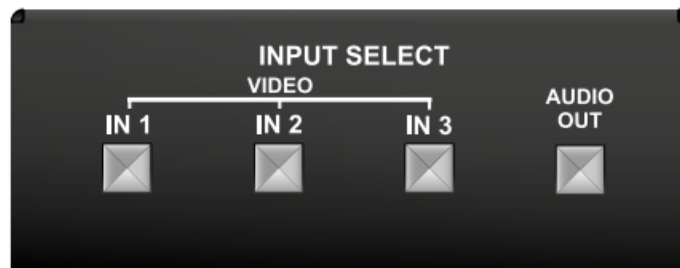

UCX-2×1-TPN-TX20

Push the INI button to select the USB-C port as input for the TPN output port.. Push the IN2 button to select the HDMI port as input for the TPN output port. Push the AUDIO OUT button to set the audio source of the analog audio output. The sequence is the following for the video switching.
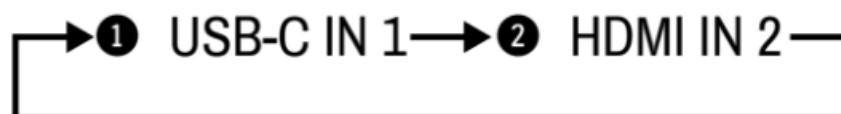

DCX-3×1-TPX-TX10
Push the IN1 button to select the USB-C port as input INPUT SELECT for the TPN output port..

Push the IN2 button to select the HDMI IN2 port as input for the TPN output port. Push the IN3 button to select the HDMI IN3 port as input for the TPN output port. Push the AUDIO OUT button to set the audio source of the analog audio output. The sequence is to ffollowtho video eniahine
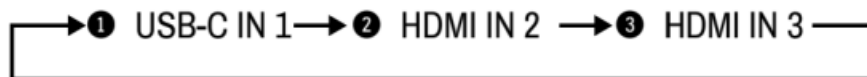
The User's Manual is also available via the QR code below.

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FAQs

- **Q: What are the network switch requirements for the UCX-TPN series extenders?**

  A: The network switches need to suppor10 Gbpsps line speed and have specific Layer 2 multicast configurations enabled. These include IGMP version 2 support, snooping, and fast leave support among others.

- **Q: How can I tell if there is a valid video signal on a port?**

  A: The Video Input Status LED will be lit when there is a valid video signal, and it will be off when there is no valid signal.

- **Q: What do the blinking LEDs indicate on the device?**

  A: Blinking LEDs indicate that the device is powered on and operational. If the LEDs are off, it means the device is either not powered or out of order.

Documents / Resources
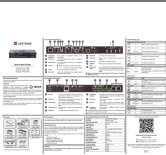
LIGHTWARE TPN Series Universal Transmitter Switchers [pdf] User Guide
UCX-4x3-TPN-TX20, UCX-2x1-TPN-TX20, DCX-3x1-TPN-TX10, UCX Series Universal Transmitter Switchers, UCX Series, UCX Series Transmitter Switchers, Universal Transmitter Switchers, Transmitter Switchers, Switchers, TPN Series Universal Transmitter Switchers, TPN Series Transmitter Switchers, TPN Series Switchers

References

- **User Manual**