LWR LIGHTWARE
INNOVATIVE, RELIABLE, MADE IN EUROPE.

Quick Start Guide

UCX-4x3-TPN-TX20
UCX-2x1-TPN-TX20
DCX-3x1-TPN-TX10

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.
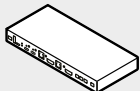
The Transmitters are featured with audio de-embedding function via the 5-pole Phoenix® Combicon analog audio ports.

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.
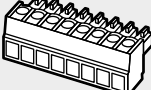
Box Contents

Transmitter device	24V power adaptor with IEC power cable	Phoenix® Combicon 3-pole connector[1]
Phoenix® Combicon 5-pole connector	Phoenix® Combicon 8-pole connector[1]	Safety & 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-4x3-TPN-TX20 and UCX-2x1-TPN-TX20 models.

Front view (UCX-4x3-TPN-TX20)

1	Configurable Ethernet port	RJ45 connector for configurable 1GBase-T Ethernet communication.
2	USB-A port	The SERVICE-labelled USB-A connector is designed for service funtions.
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	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 use of a different power source.*

Rear view (UCX-4x3-TPN-TX20)

1	DC input	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	Downstream ports for connecting USB peripherals (e.g. camera, keyboard, multitouch display).
3	TPN output port	RJ45 connector for AVX output signal transmission. See more details about the connector in the Status LEDs section.
4	HDMI output ports	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	RJ45 connectors for configurable 1GBase-T Ethernet communication.

ℹ *The overall power supply of the USB-A connectors is beyond 1.5A, which makes it possible to supply devices with higher voltage requirements.*

ℹ *Some ports are not available on certain models. See the User Manual for more information.*

Powering options

The UCX-4x3-TPN-TX20 is capable of charging a device with 100W over one USB-C port and another device with 20W over the other USB-C port, or charging with 60W over both ports.

Network Requirements

The UCX-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

Ventilation

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

Factory default settings (UCX-4x3-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)

→ ●	on	There is a valid video signal on this port.
→ ○	off	There is no valid video signal on this port.
→ ☀	blink once	The port is selected by a button press.

USB Status LED (the lower one)

○ / → ●	on	The USB Host is connected and selected.
○ / → ○	off	No USB Host or deselected port.
○ / → ☀	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.

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

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

Doc. ver.: 1.1
19210137

Connecting steps

Transmitter Side

Laptop — 4K PC — 4K TV — Active speakers

2x Laptop
2x 4K PC
2x 4K TV
Active speakers

USB-C | HDMI in | USB-B | HDMI out | RS-232 | Audio out

UCX-4x3-TPN-TX20 transmitter

TPN — Network switch — TPN

Receiver Side

Receiver device

Power | USB-A | GPIO | Ethernet

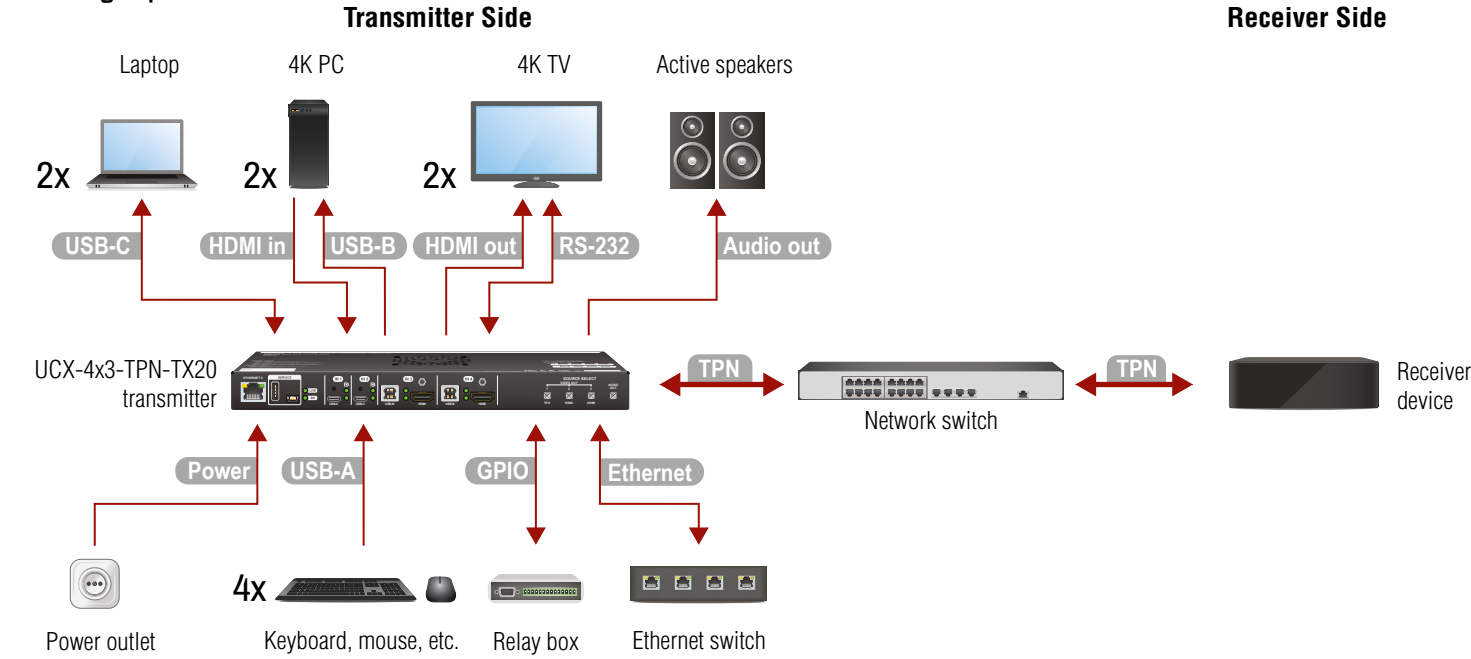Power outlet | 4x Keyboard, mouse, etc. | Relay box | Ethernet switch

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Port diagram for video / audio (UCX-4x3-TPN-TX20)

USB-C in I1 → Welcome screen I5 / USB-C to HDMI converter
USB-C in I2 → USB-C to HDMI converter → Digital audio/video
HDMI in I3 → Digital audio/video
HDMI in I4 → Digital audio/video

4x4 audio/video crosspoint

Digital audio/video → IP packetizer → IP packges → TPN out O1
Digital audio/video → HDMI out O2
Digital audio/video → HDMI out O3
Audio de-embedder → De-embedded audio → D/A converter → Analog audio → Analog audio out
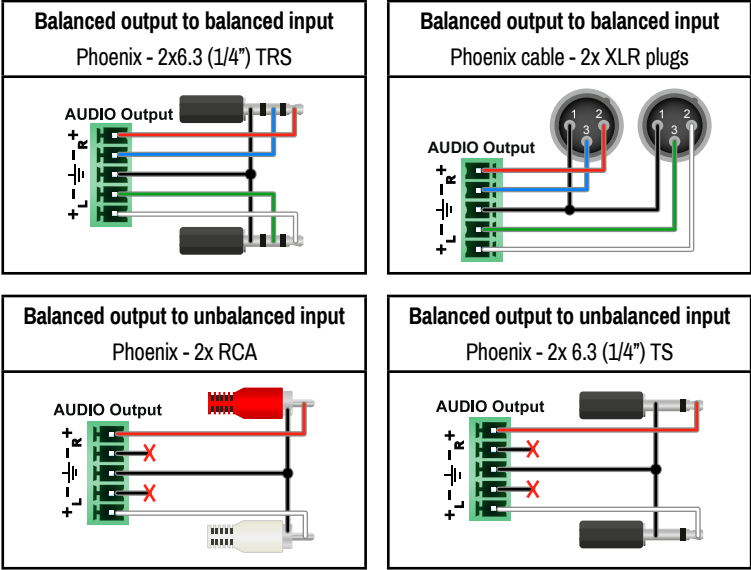

TPN	Connect a CATx cable between the TPN output port of the transmitter and the RJ45 port of the 10G network switch.	

⚠ *User Ethernet is also transmitted over the TPN interface, so be sure not to create a network loop.*

USB-C — Connect a USB-C source to the USB-C input port. The applied cable shall be certified for Displayport Alternate mode HBR2 (4x5.4Gbps) applications.

HDMI in — Connect a source to the HDMI input port of the transmitter by a HDMI cable.

USB-B — Optionally connect the USB host.

HDMI out — Connect a sink to the HDMI input port of the transmitter by a HDMI cable.

RS-232 — Optionally 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.

GPIO — Optionally connect a controller/controlled device to the GPIO port.

Ethernet — Optionally 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.*

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.
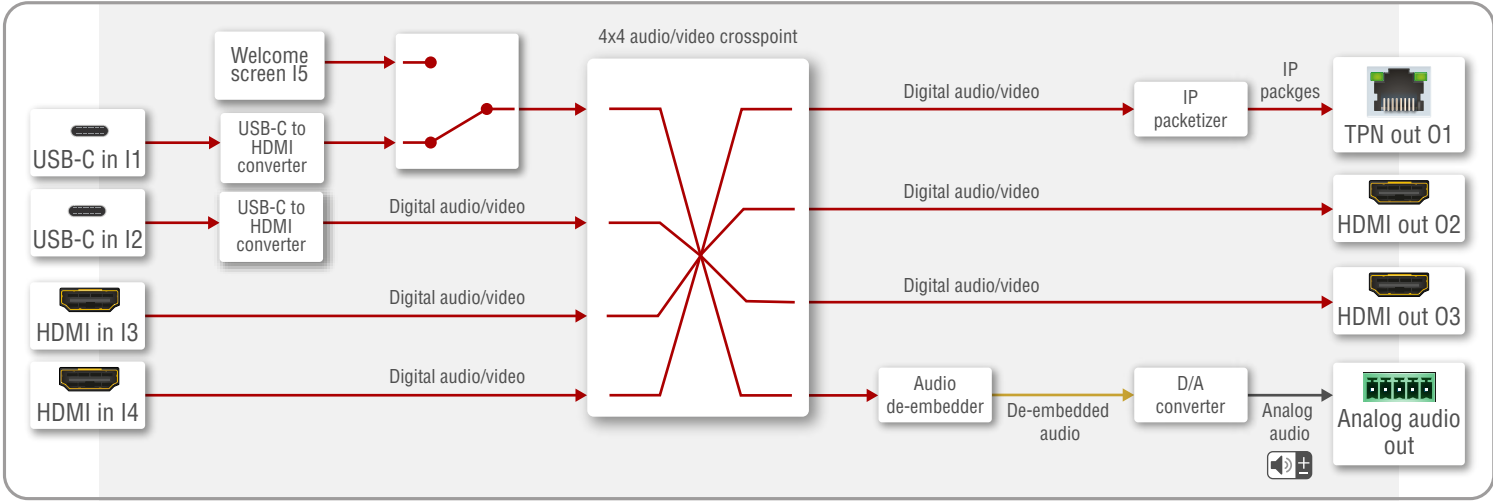
⚠ *Only connect one of the devices to the LAN, in order to avoid creating a network loop!*

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 - 2x6.3 (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 level (Push-Pull). The direction of the pins can be input or output (adjustable). The signal levels are the following:

	Input voltage (V)	Output voltage (V)	Max. 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 mm² diameter) or the generally used 'alarm cable' with 4x0.22 mm² wires.

ℹ *The maximum total current for the six GPIO pins is 180 mA, the max. supported input/output voltage is 5V.*

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

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OCS (Occupancy) Sensor

The switcher is supplied with a 3-pole Phoenix® connector (male), which is for connecting an OCS sensor.

Plug pin 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

⚠ *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 **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.

## Button functionality - Video Source Selection

UCX-4x3-TPN-TX20

Push the **OUT1** button to set the video input to the TPN 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):

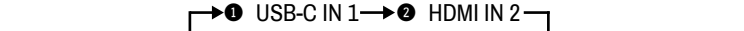➊ USB-C IN 1 → ➋ USB-C IN 2 → ➌ HDMI IN 3 → ➍ HDMI IN 4
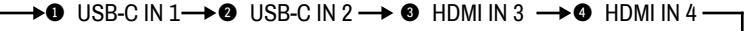
UCX-2x1-TPN-TX20

Push the **IN1** 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:

➊ USB-C IN 1 → ➋ HDMI IN 2

DCX-3x1-TPX-TX10

Push the **IN1** button to select the USB-C port as input 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 the following for the video switching:

➊ USB-C IN 1 → ➋ HDMI IN 2 → ➌ HDMI IN 3