visual engineering
LIGHTWARE

Quick Start Guide

HDMI20-TPSpro-TX90AP
HDMI20-TPSpro-RX90A

Front and Rear Views of the Transmitter
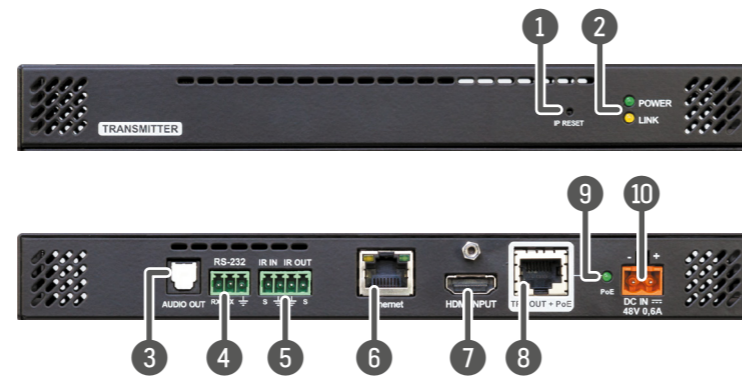
#		
1	IP reset button	Resetting the network settings to the factory default values.
2	Front panel LEDs	See the table besides.
3	TOSLINK optical audio output port	Output of the audio signal coming from the audio input port of the receiver (audio return channel over TPS).
4	RS-232 port	Serial port for bidirectional pass-through signal transmission.
5	IR input and output ports	IR ports for sending and receiving IR signals over TPS.
6	Ethernet port	RJ45 female connector for local network connection.
7	HDMI input port	HDMI 2.0a port for connecting a video source.
8	TPS output port	For HDBaseT® signal transmission - over CATx cables. Maximum extension distance is 100 m.
9	PoE status LED	See the table besides.
10	DC input connector	48V DC input for local power supply. (The adaptor provides the remote power for the receiver over the CATx cable.)

Status LEDs

POWER		
● (green)	on	The device is powered and ready to use.
○	off	The device is out of operation.

LINK		
● (yellow)	on	Video transmission is **in progress**.
◐ (yellow)	blinking	Video transmission is **not in progress**.

PoE		
● (green)	on	Power **is sent** from TX to RX.
○	off	Power **is not sent** from TX to RX.

Important Safety Instructions

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

Introduction

The HDMI20-TPSpro series contains a twisted pair HDBaseT™ transmitter and receiver providing extension of uncompressed 4K 30Hz or compressed 4K 60Hz video with embedded audio (up to eight channel PCM or HBR audio) for 100 meter over a single CATx cable. The units offer bi-directional RS-232, IR, backwards audio and Ethernet pass-through on the same CATx cable that carries the video signal. The extenders support full HDCP and EDID compliance and work on all standard AV resolutions up to 4K and 48-bit color depth handling all standard audio formats and also 120 Hz 3D signals. Remote powering is available from TX to RX device through the CATx cable. Both devices can be mounted on a rack shelf or used standalone.

Compatible Devices

However, HDMI20-TPSpro devices are based on HDBaseT™ technology, the devices can be operated only with each other and they are not compatible with other TPS products.

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Front and Rear Views of the Receiver
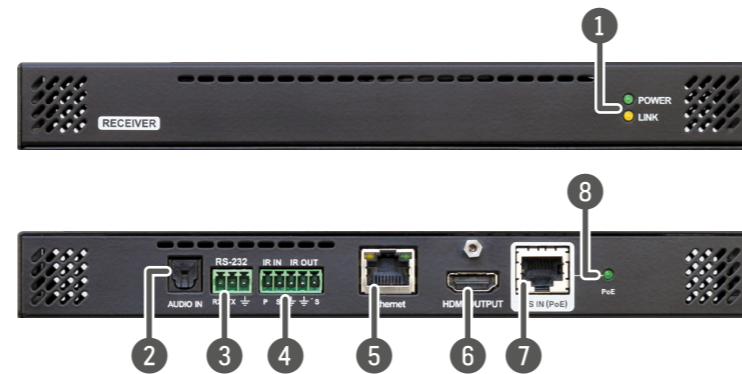
#		
1	Front panel LEDs	See the table besides.
2	TOSLINK optical audio input port	Optical input for audio signal which can be either: ▪ transmitted to the audio output port of the transmitter (audio return channel over TPS), or ▪ embedded in the HDMI stream.
3	RS-232 port	Serial port for bidirectional pass-through signal transmission.
4	IR input and output ports	IR ports for sending and receiving IR signals over TPS.
5	Ethernet port	RJ45 female connector for local network connection.
6	HDMI output port	HDMI 2.0a port for connecting a sink device.
7	TPS input port	For HDBaseT® signal transmission - over CATx cables. Maximum extension distance is 100 m.
8	PoE status LED	See the table besides.

☑ Installation Checkpoints

The followings help to have a successful install: check the following settings.

Connecting the Devices

○ Use CAT7 SFTP AWG23 cables for the TPS devices; pay attention to the connector pinout. Maximum extension distance is **100 m**.
○ The allowed HDMI cable length (at the input port):
   ▪ 1920x1080@60Hz: max. 30 m
   ▪ 3840x2160@30Hz: max. 10 m
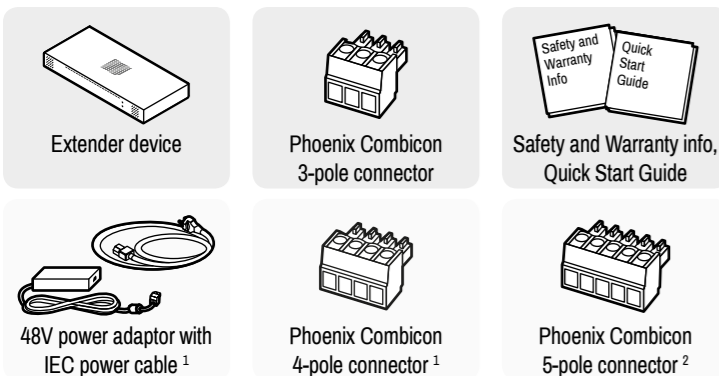   ▪ 3840x2160@60Hz: max. 5 m

Powering Options

○ The transmitter is powered by the supplied local adaptor.
○ The receiver is powered by the transmitter over the TPS connection (PoE-compatible).
○ Power on the devices as the final step of the cabling.

Ethernet Loop

○ Network problem may arise when connecting two/more TPS devices or two/more TPS ports of a device to the same network.
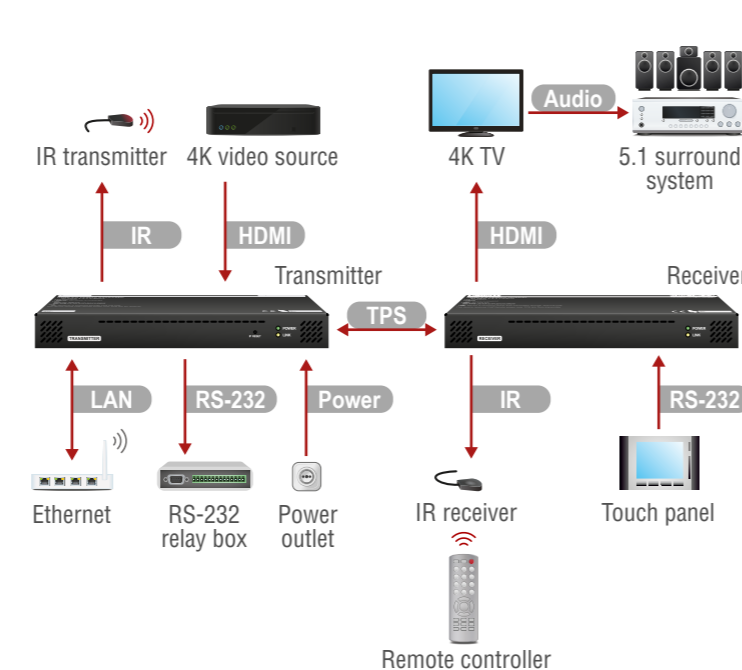

Box Contents

- Extender device
- Phoenix Combicon 3-pole connector
- Safety and Warranty info, Quick Start Guide
- 48V power adaptor with IEC power cable [1]
- Phoenix Combicon 4-pole connector [1]
- Phoenix Combicon 5-pole connector [2]

[1] Supplied with the Transmitter only.
[2] Supplied with the Receiver only.

Connecting Steps

ⓘ *Think about the order of the installation: mount the device first than do the cabling or the opposite.*

HDMI	Connect an HDMI source device (e.g. a 4K PC) to the HDMI input port of the Transmitter. Connect a compatible HDMI sink device (e.g. 4K TV) to the HDMI output port of the Receiver.
RS-232	Optionally for RS-232 serial transmission: connect the desired devices (e.g. a Touch panel, Relay box) to the RS-232 ports.
IR	Optionally for IR signal transmission: connect the desired devices (e.g. an IR transmitter and an IR receiver to the IR input and output ports of the extenders).
LAN	Optionally connect one of the extenders to a local network.
Audio	Optionally connect an audio system to the 4K TV.
TPS	Connect the transmitter and the receiver by a CATx cable.
Power	Firstly connect the power adaptor to the DC input of the power injector, then secondly connect it to the AC power socket.

IR transmitter — 4K video source — 4K TV — 5.1 surround system
Transmitter — Receiver
Ethernet — RS-232 relay box — Power outlet — IR receiver — Touch panel
Remote controller

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Typical Application Diagram
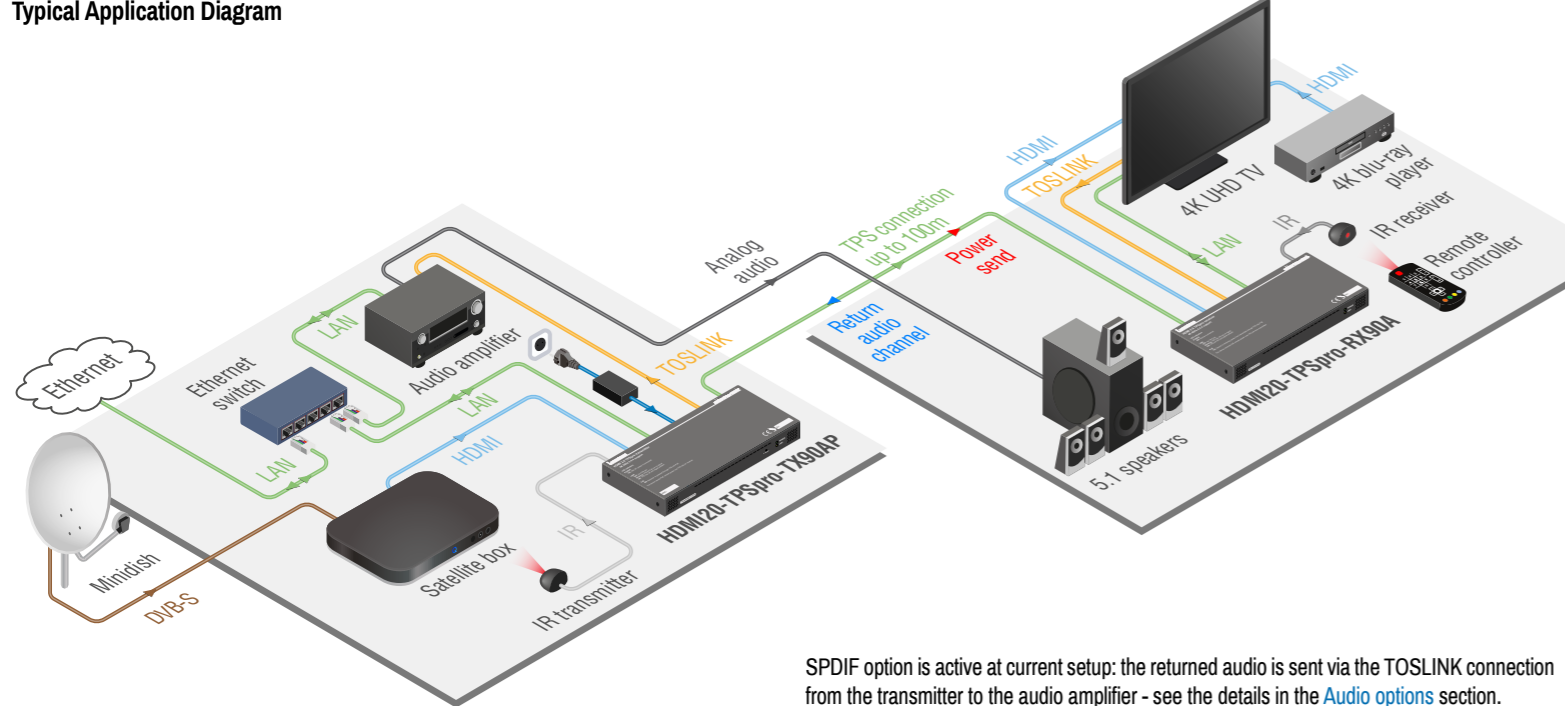
SPDIF option is active at current setup: the returned audio is sent via the TOSLINK connection from the transmitter to the audio amplifier - see the details in the Audio options section.

Bi-directional Pass-through Data Lines

The direction of the video extension is fixed from TX towards RX but the pass-through data lines are bi-directional*. It means the serial, IR, Ethernet source and sink devices can be connected either to the TX or to the RX and the signal is transmitted to the other extender.
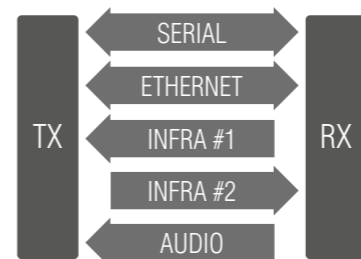
* In fact IR transmission is uni-directional but the extenders have two separated IR ports.

RS-232

Third party devices with standard RS-232 port are supported as the extenders work in **pass-through** mode. TX and RX provide 3-pole Phoenix connector. The RS-232 options – the baud rate and the parity bits – are set on the third party devices and the extenders support any kind of serial settings.

Ethernet

The Ethernet port on the RX or on TX can be connected to a LAN hub, switch or router with a LAN cable. The other side behaves as an Ethernet uplink port. The extenders support 10/100 Mbps data transfer rate. The Ethernet port has auto crossover function; it is able to recognize and handle both cable types: patch and cross TP cables.

Audio Options

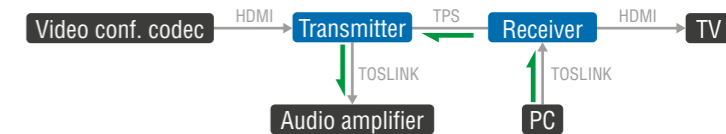The audio coming from the optical input port of the receiver can be routed as follows:

ARC mode (default)

The audio is sent over the Audio Return Channel over the HDMI cable to the HDMI source.
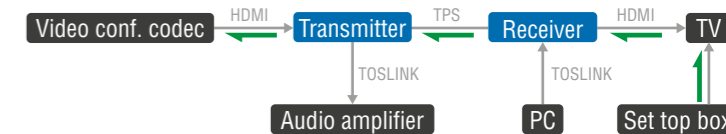
SPDIF mode

The audio is switched to the optical audio output.

→ The direction of the audio

Software Control – by Using the Built-in Web page

The simple built-in web page can be opened in a browser.

1. Type the IP address in the address line of the browser (factory default address is **192.168.0.100**) and open the login page.
2. The default user/password is **admin/admin**. After login you can change the password in the **Admin** menu.

❶ *The password is reset to 'admin' when the factory default settings are reloaded.*

Menu Structure of the Built-in Web

Home Menu

- Displaying the current firmware versions.
- Showing the internal temperature of the transmitter and the elapsed time since last boot.
- Showing the HDBaseT connection status by a 'LED'; it shows the same as the front panel LINK LED.

Settings Menu

- Changing the network settings.
- Setting the mode of the optical input port of the receiver:
  - **ARC** (default): the audio is sent over the Audio Return Channel (ARC) of the HDMI stream.
  - **SPDIF**: the audio is switched to the optical audio output of the transmitter.
- Resetting the factory default values.
- Blinking the Power LED of the transmitter (identifying the device).
- Changing the password for login.
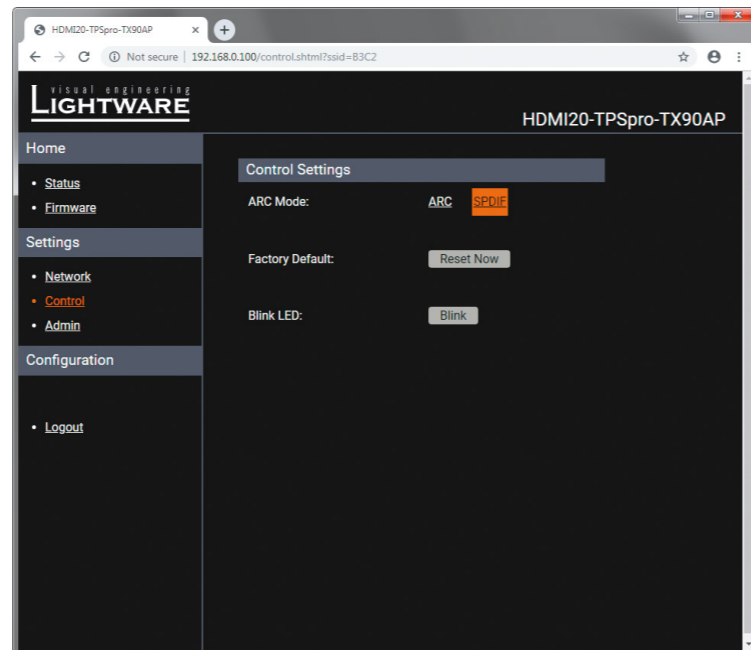
Specification

General

Compliance	CE
EMI / EMC	EN 55035:2017 / EN 55032:2015
Safety	EN 62368-1:2014
Cooling	by a cooling fan
Enclosure	1 mm steel
Dimensions (in mm)	221W x 89.5D x 26H
Dimensions (in inch)	8.7W x 3.52D x 1.02H
Weight (per device)	570 g

Digital Video Signal

Supported signal	HDMI 2.0a
Supported resolutions	3840x2160@60 Hz (24 bit color, 4:4:4)
3D support	yes
HDR support	yes
Audio Return Channel (ARC) support	yes
HDCP support	v2.2
Control over CEC	yes
EDID support	transparent

Power

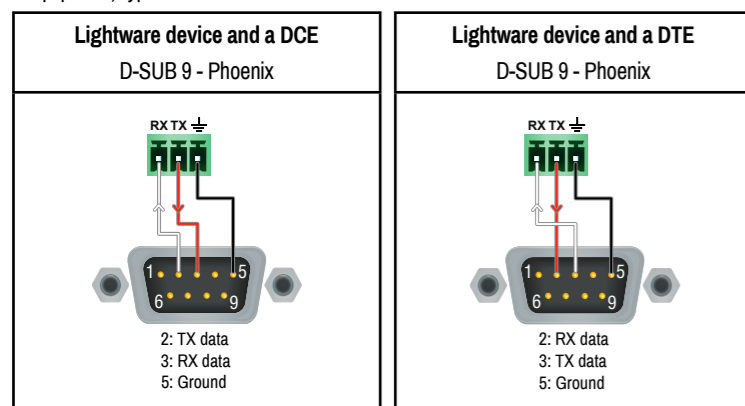|	
Power supply (TX)	external power adaptor
Power adaptor input	100-240V AC, 1A, 50-60 Hz
Power adaptor output	48V DC, 0.62A
Power consumption (TX+RX together)	14W (min) / 20.5W (max)

Connectors

TX input, RX output	HDMI connector
TX output, RX input	RJ45 (TPS interface)
Ethernet	RJ45
Infrared TX / RX	4-pole Phoenix / 5-pole Phoenix
Serial port	3-pole Phoenix
Power input (TX)	2-pole Phoenix

TPS port

Ethernet pass-through	yes
RS-232 pass-through	yes
IR pass-through	yes

Wiring Guide for RS-232 Data Transmission

The extenders are built with 3-pole Phoenix connector. See the below examples of connecting to a DCE (Data Circuit-terminating Equipment) or a DTE (Data Terminal Equipment) type device:

Lightware device and a DCE	Lightware device and a DTE
D-SUB 9 - Phoenix	D-SUB 9 - Phoenix
2: TX data 3: RX data 5: Ground	2: RX data 3: TX data 5: Ground

❶ *The pinout of the RS-232 port is different than other Lightware devices, please pay attention before connecting a previously created serial cable.*

For more information about the cable wiring see the **Cable Wiring Guide** on our website www.lightware.com/support/guides-and-white-papers.
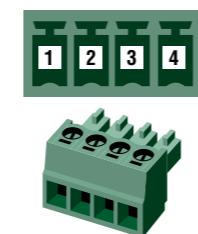
IR Port Pinout

Bi-directional IR signal transmission is available over the IR ports of the extenders. IR transmitter and receiver units can be purchased from Lightware as an optional accessory. The pinouts of the connectors are the followings:
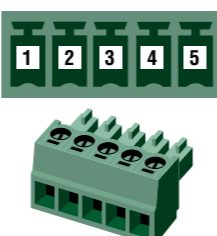
IR Port (Transmitter)

Pin nr.	IR port	Signal
1	IR input	Signal
2		Ground
3	IR output	Ground
4		Signal

IR Port (Receiver)

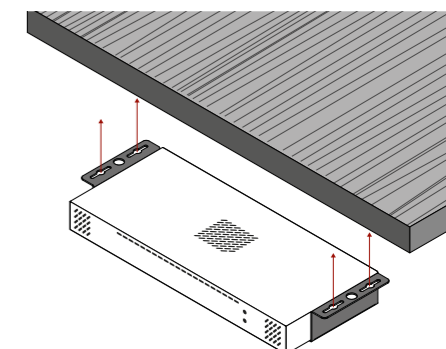| Pin nr.	IR port	Signal
1	IR input	Power
2		Signal
3		Ground
4	IR output	Ground
5		Signal

Mounting the Device (with optionally available accessories)

Below examples demonstrate the **Rack Shelf** accessory which can be used to install the device into a rack cabinet. Two devices can be fixed to the shelf:
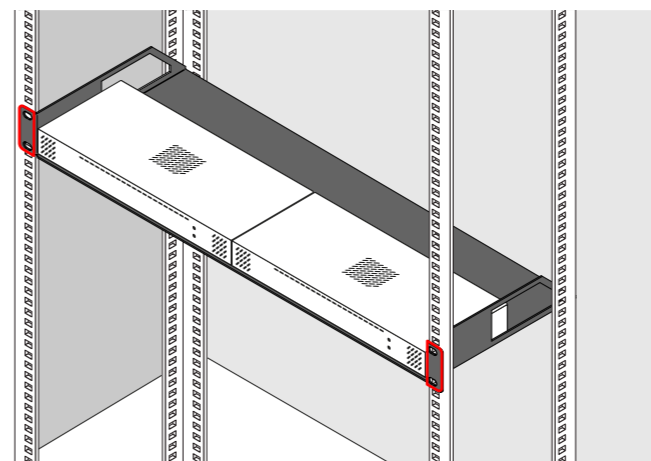
The **UD-kit double** accessory can be used to fix the device under the desk:

Ventilation

⚠ *To ensure the correct ventilation and to avoid overheating let enough free space around the appliance. Pay attention when mounting the device: let two opposite sides free at least to ensure the airflow.*