Quick Start Guide

HDMI-TPS-TX97
HDMI-TPS-RX97
DVI-HDCP-TPS-TX97
DVI-HDCP-TPS-RX97

Introduction
TPS-TX97 and RX97 twisted pair Ethernet extenders provide extension of uncompressed 4K/UHD video with embedded audio for long distances over a single CATx cable. The extenders offers uni-directional RS-232, IR, and Ethernet pass-through on the same CATx cable that carries the video signal. The TPS extenders support full HDCP and EDID compliance and work on all standard AV resolutions and has 230 Hz DDC signals. 48V remote powering is available through the single CATx cable, but a local power supply can also be used.

Compatible Devices
TPS-97 extenders are compatible with all Lightware devices with TPS port except the TPS-95 series.

Power Supply Options
TPS-97 extenders are compatible with IEEE 802.3af standard - Power over Ethernet (PoE) - and can receive power over the TPS line. 

Mounting Options
Lightware offers three types of mounting accessory to fix the extenders:

Mounting Steps
Below layout means the transmitter is powered locally by the power injector and they are placed close to each other. The receiver is powered remotely via the TPS cable (PoE).

Connecting Leads

Status LEDs

Installation of the Extender With a Matrix
1. Power off all devices (installing with powered devices may harm them).
2. Check the RS-232 switch(es) on the extender(s); they must be in Normal position for RS-232 pass-through function.
3. Pair the extender(s) and the matrix board(s) with CATx cable(s). The transmitters’ TPS port can be set for remote powering separately.
4. Pair the extender(s) and the matrix board(s) with CATx cable(s). The transmitters’ TPS OUT with the input boards’ TPS IN and the receivers’ TPS IN with the output boards’ TPS OUT.
5. Connect the video source(s), sink(s) and the desired accessory device(s) to the matrix.
6. To supply the extender(s) with remote power supply connect the necessary power adapter to the given matrix board.
7. To supply the extenders locally connect the supplied adapter (12V 3A DC).
8. Connect the power cord of the matrix into the outlet and switch on the matrix.
9. Supply the other connected units.

Further Information
The product brief and further information of this appliance is available at www.lightware.com. See the Downloads section on the website of the product.

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The direction of the video extension is fixed from TX towards RX but the pass-through data lines are bi-directional. It means the RS-232, 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 extender has two IR channels with different directions.

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 it can be anything. The extenders support any kind of serial settings.

Toggling Between TPS Link Modes

Bi-directional Pass-through Data Lines

The TPS working mode between the transmitter and the receiver parties is determined by the selected mode on both parties. Both parties influence on the setting which determines the final TPS transmission mode. The following TPS modes are defined:

- Long reach (LR)
- Prog mode
- Power mode
- S/PDIF I/O

Long reach (LR): The 38 kHz modulation is switched on. In this case an IR emitter can be used to toggle between the LR and Prog mode.

RS-232

Infrared (IR)

One emitter and one detector is enough for remote controlling one IR sink device. If there is an IR sink device to be controlled next to the TX and the other one is next to the RX, two emitter-detector pairs are needed. The IR emitter and the detector have standard 3.5 mm TRS (jack) connectors. The emitter’s plug has two poles (pins) and the detector’s plug has three poles (stems).

TPS Link Modes

The TPS working mode between the transmitter and the receiver parties is determined by the mode set in them. Both parties influence on the setting which determines the final TPS transmission mode. The following TPS modes are defined:

- Long reach (LR): Longer CATx cable length, less bandwidth (limited resolution). The LPPF mode is not available in LR TPS link mode.
- HDbaseT™ (HDBaseT): more bandwidth (higher resolutions), shorter CATx cable length. If no video present, the units change to LPPF mode automatically.
- Low Power Partially Functional (LPPF): Only Ethernet, RS-232 and IR are extended.

Connecting Between TPS Link Modes

The toggle switch on the extenders can be used to toggle between the LR and Auto TPS modes. If both units have Auto mode set, and there is valid video signal on the transmitter the common mode will be HDbaseT. If the video signal disappears devices go into LPPF mode.

Recommended TPS working mode

The recommended TPS working mode is set by the TPS extender's TPS mode switch. The TPS mode switch has no effect.

RS-232

Application Diagram

Wiring Guide for RS-232 Data Transmission

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

Maximum Extension Distances

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Pixel clock rate</th>
<th>Cable lengths (Auto/Long reach TPS mode)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1080p/60Hz</td>
<td>56 MHz</td>
<td>CAT6: 390 m / 500 m 100 m / 145 m*</td>
</tr>
<tr>
<td>720p/60Hz</td>
<td>60 MHz</td>
<td>CAT7 SFTP: 170 m / 220 m*</td>
</tr>
</tbody>
</table>

* Long reach TPS mode supports pixel clock frequencies up to 148.5 MHz.

** AWG 26 cables are not recommended with remote powering.

Above values are valid when the extender is powered by a local adaptor, distances may decrease depending on the powering mode (local or remote) and cable quality.