visual engineering
LIGHTWARE

Quick Start Guide

UBEX-PRO20-HDMI-F100
UBEX-PRO20-HDMI-F110

Important Safety Instructions

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

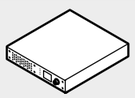
ℹ *The extender is Class 1 laser product.*

Introduction

UBEX (Ultra Bandwidth Extender) product family offers a new optical solution allowing 4K@60Hz 4:4:4 uncompressed signal extension with extra low latency for the users. We use packet-based transmission instead of the conventional method.

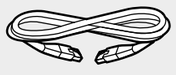
We use standard, certificated 10 Gbps SFP+ optical modules which are plug and play, so they are interchangeable by the user. There could be either duplex multimode/singlemode modules (1–1 fiber for each direction per 10 Gbps link) or bidirectional singlemode module (1 fiber for both direction per 10 Gbps link). The maximum supported cable length is 400 m with multimode modules (OM4), and 10 km with short range singlemode modules, or 80 km with long range singlemode modules. In a typical application with standard, non-blocking 10 Gbps Ethernet switch it is necessary to use both directions of the link. Therefore the number of necessary fibers depends on the link speed and the optical module: for 10 Gbps 1 or 2 fibers, for 20 Gbps 2 or 4 fibers are needed. One of the primary advantages of the new architecture is scalability.

Box Contents



UBEX endpoint device

IEC power cable



UTP patch cable (3 m)

Safety and warranty info, Quick Start Guide

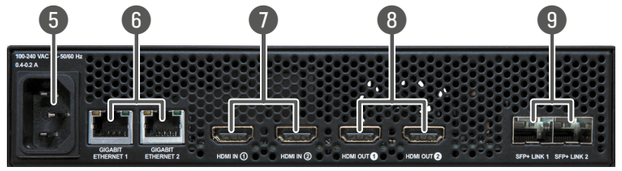
Phoenix Combicon 5-pole connector (2x) *

Phoenix Combicon 3-pole connector *

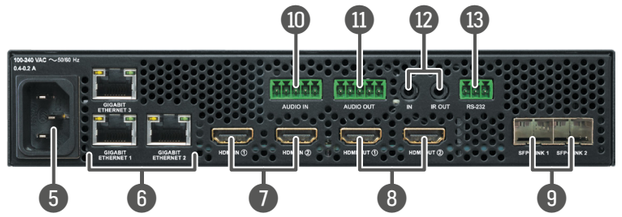
* Only for the UBEX-PRO20-HDMI-F110 model.

Front View - All Models

Rear View - UBEX-PRO20-HDMI-F100



Rear View - UBEX-PRO20-HDMI-F110



1. **Status LEDs** — The LEDs give immediate feedback about the recent status of the extender.
2. **LCD screen** — LCD screen showing the most important settings and parameters in the front panel menu.
3. **Jog dial control knob** — Easy setting and menu navigation by the jog dial control. Keep dial and click while getting feedback on the LCD.
4. **Reset button** — Reboots the device (the same as disconnecting from the power source and reconnecting again).
5. **AC connector** — Standard IEC connector accepting 100-240 V, 50 or 60 Hz.
6. **Ethernet connectors** — Standard locking RJ45 connectors for 1 Gbps Ethernet connections to control the device, for user Ethernet access, and firmware upgrade purpose.
7. **HDMI input ports** — HDMI input ports with HDMI 2.0 support for source devices.
8. **HDMI output ports** — HDMI output ports with HDMI 2.0 support for sink devices. When the device is configured as transmitter, the ports operate as local HDMI outputs.
9. **SFP+ port slots** — Optical port slots for two 10 GbE SFP+ modules or DAC cables. Ports can be used for either singlemode or multimode optical connections.
10. **Audio input port** — 5-pole Phoenix connector for balanced analog audio input. The port is available in all operation modes (TX/RX/TRX).
11. **Audio output port** — 5-pole Phoenix connector for balanced analog audio output. The port is available in all operation modes (TX/RX/TRX).
12. **Infrared connectors** — 2 x 3.5mm jack (TS/TRS) connectors for Infrared units (IR IN for the detector, IR OUT for the emitter).
13. **RS-232 connector** — 3-pole Phoenix connector for serial communication.

Status LEDs

LIVE		Transmitter / Receiver / Transceiver
blinking		The device is powered and ready to use.
off		The device is not powered or out of operation.
STATUS		**Transmitter / Receiver / Transceiver**
on		All measured temperature and voltage values are within the limits.
blinking		Measured temperature or voltage value is out of the limits.
off		The device is not powered or out of operation.
LINK OK		**Transmitter / Receiver / Transceiver**
on		The connection is established on SFP+ LINK 1 and 2 and Link Aggregation is working.
blinking		The connection is established on SFP+ LINK 1 and 2 and LACP detection period is active.
off		No connection is established on one of the SFP+ links.
MMU AVAILABLE		**Transmitter / Receiver / Transceiver**
on		Matrix mode is active; the communication is live between the endpoint and the Matrix Management Unit (MMU).
blinking		Matrix mode is active; no communication between the endpoint and the MMU.
off		Extender mode is active; another endpoint is connected via the optical link.

UBEX Concept

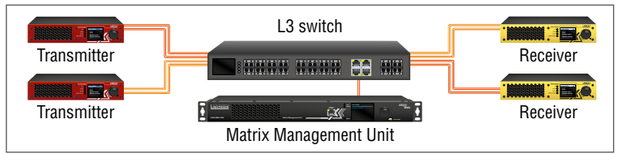
The UBEX-PRO20-HDMI-F100 and F110 are video over IP based audio/video signal extenders built with SFP+ based fiber optical interface. An endpoint device can be configured as a **Transmitter**, **Receiver**, or **Transceiver** based on the application. The device has two main application modes: **Extender** and **Matrix** mode.

Extender Mode

It means point-to-point connection between two endpoints over the SFP+ interface.

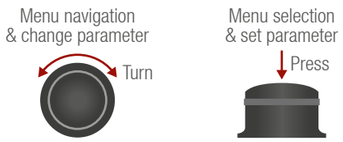
Matrix Mode

The Matrix mode allows to build almost boundless AV networks with countless endpoints. This mode requires 10 GbE network with Layer 3 (L3) switch and the UBEX-MMU-X200 Matrix Management Unit connected to the network.



Front Panel Operation

Navigation in the LCD Menu

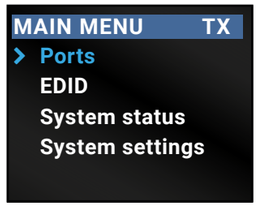


The front panel has a color LCD showing the most important settings and parameters. The jog dial control knob can be used to navigate between the menu items or change the value of a parameter (in case of TX, RX, or TRX as well). The knob can be pressed to enter a menu or edit/set a parameter.

The LCD Menu in Extender and Matrix Modes

The menu structure is different in Extender and Matrix mode. The following settings are not available in the LCD menu of the endpoint in Matrix mode but they can be set in the Matrix Management Unit:

- Video settings - TX/RX/TRX input/output settings
- EDID operations - EDID switching and saving
- Network settings - static and DHCP (dynamic) IP address settings
- Reloading factory default values



ℹ *The Extender or Matrix mode is set automatically in the endpoint device. If the device detects direct connection with another endpoint device at the other side of the connection, the mode is set to Extender mode; if the device is managed by the MMU, the mode is set to Matrix mode.*

Operation Mode Settings (only in Extender Mode)

The operation mode (TX/RX/TRX) of the unit can be changed from the LCD menu in a few steps.

1. Navigate to the **System settings / Operation mode / Switch mode...** submenu and select the required mode: **Transmitter**, **Receiver**, or **Transceiver**.
2. After the confirmation the unit resets. After booting up the device operates in the desired mode.

Set Static IP Address (only in Extender Mode)

The IP address of the endpoint can be set from the front panel:

1. Navigate to the **System settings / Network / DHCP** menu and check the current state of the DHCP. If the setting is Enabled change it to Disabled. After this navigate to **Save** and press Enter.
2. Navigate to the **System settings / Network / Static IP** menu, and select the Static IP address, Subnet mask, Static gateway options. Set the parameters by the front panel buttons according to your network requirements.
3. Navigate to **Save** and press Enter.

Set Dynamic IP Address (DHCP) (only in Extender Mode)

1. Navigate to the **System settings / Network / DHCP** menu and check the current state of the DHCP. If the setting is Disabled change it to Enabled.
2. Navigate to the **Save** submenu (the last one of the **Network** menu) and press Enter.

Restore Factory Default Settings

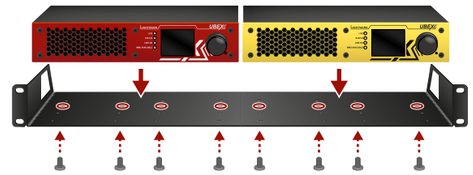
Navigate to the **System settings / Factory defaults** menu and press Enter. After the confirmation the device reboots and the factory default values are reloaded in the device.

Mounting Options

The device can be mounted in several ways, depending on the application. Besides using with rack shelf, a mounting bracket is available, which offers easy mounting on truss systems with standard clamps, or using the unit built into furniture.

1U high rack shelf provides mounting holes for fastening two half-rack sized units. Mounting bracket V2 gives allows mounting the device to any furniture surface. Fasten the bracket on the side of the unit with the provided screws and fasten it to a stand / board / furniture. To order mounting accessories please contact sales@lightware.com.

Mounting with 1U High Rack Shelf



Mounting with Mounting Bracket V2

⚠ ***M3x6 size is the longest allowed screw for fixing the accessories to the housing. Using different (e.g. longer) screws may cause damage to the device.***

Further Information

The document is valid with the following firmware version: 1.3.0
The User's manual of this appliance is available on www.lightware.com.
See the Downloads section on the dedicated product page.

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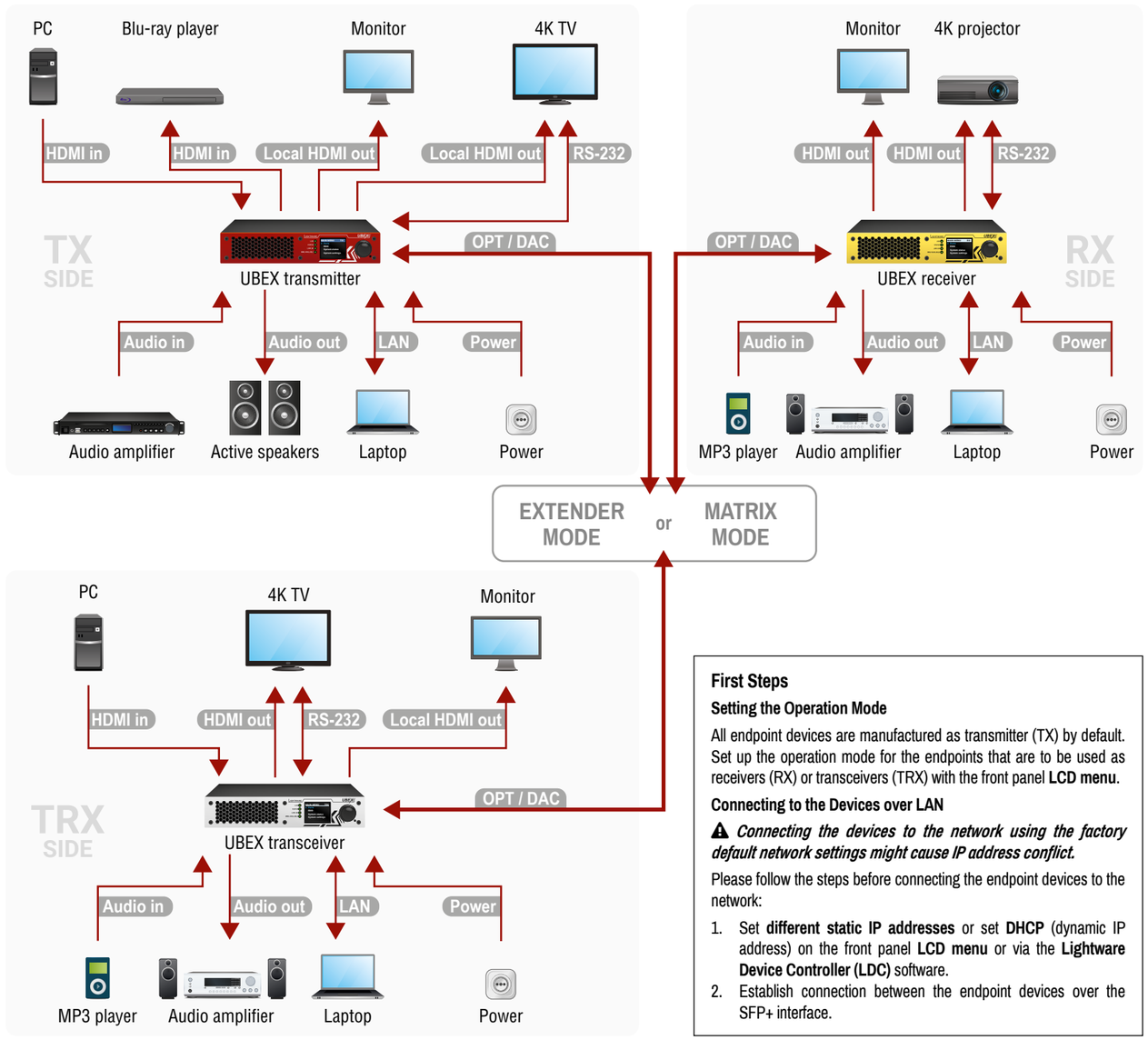
Doc. ver.: 1.2
19200128

Connecting Steps



First Steps

Setting the Operation Mode

All endpoint devices are manufactured as transmitter (TX) by default. Set up the operation mode for the endpoints that are to be used as receivers (RX) or transceivers (TRX) with the front panel **LCD menu**.

Connecting to the Devices over LAN

⚠ ***Connecting the devices to the network using the factory default network settings might cause IP address conflict.***

Please follow the steps before connecting the endpoint devices to the network:

1. Set **different static IP addresses** or set **DHCP** (dynamic IP address) on the front panel **LCD menu** or via the **Lightware Device Controller (LDC)** software.
2. Establish connection between the endpoint devices over the SFP+ interface.

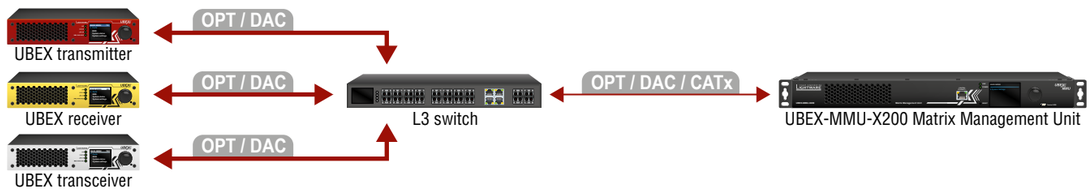
Extender Mode and Matrix Mode

Extender Mode

OPT / DAC — Connect singlemode or multimode (depends on the installed SFP+ modules) fiber optical cables or DAC cables between a UBEX transmitter and a receiver, or two transceiver devices. The Extender Mode is detected and applied automatically in the device once the connection is established successfully.

Matrix Mode

OPT / DAC — Connect singlemode or multimode (depends on the installed SFP+ modules) fiber optical cables or DAC cables between the UBEX transmitter / receiver / transceiver devices and the Layer 3 (L3) network switch. Also connect the Matrix Management Unit (MMU) to the switch by fiber optical or CATx cable to configure and control the virtual matrix. The Matrix Mode is applied automatically in the endpoint devices once the MMU claims the endpoint.



Transmitter (TX) Side

For F100 and F110 models

- **HDMI in** — Connect the UBEX transmitter and the source devices (e.g. PC, Blu-ray player) using the HDMI input 1 and 2 ports by HDMI cables.
- **Local HDMI out** — Connect the local sink devices (e.g. monitor, 4K TV) to the HDMI output 1 and 2 ports by HDMI cables. The output ports are local loopback ports in this case: the same streams received on the input ports are transmitted forward.
- **LAN** — Optionally, connect the UBEX transmitter to a LAN in order to control the device. **User Ethernet is also transmitted over the SFP+ interface so be sure not to create a network loop!**
- **Power** — Connect the power adaptor to the AC input on the transmitter first, then to the AC power socket.

For F110 model only

- **Audio in** — Connect an audio source (e.g. media player) to the audio input connector.
- **Audio out** — Connect an audio sink (e.g. active speakers) to the audio output.
- **RS-232** — Optionally for RS-232 extension: connect a controlled unit (e.g. 4K TV) to the RS-232 port of the device with a serial cable.

Receiver (RX) Side

For F100 and F110 models

- **HDMI out** — Connect the sink devices (e.g. monitor, projector) to the HDMI output 1 and 2 ports by HDMI cables.
- **LAN** — Optionally, connect the UBEX receiver to a LAN in order to control the device. **User Ethernet is also transmitted over the SFP+ interface so be sure not to create a network loop!**
- **Power** — Connect the power adaptor to the AC input on the receiver first, then to the AC power socket.

For F110 model only

- **Audio in** — Connect an audio source (e.g. MP3 player) to the audio input connector.
- **Audio out** — Connect an audio sink (e.g. audio amplifier) to the audio output.
- **RS-232** — Optionally for RS-232 extension: connect a controlled unit (e.g. projector) to the RS-232 port of the device with a serial cable.

Transceiver (TRX) Side

For F100 and F110 models

- **HDMI in** — Connect the UBEX transceiver and a source devices (e.g. PC) using the HDMI input 2 port by an HDMI cable.
- **HDMI out** — Connect a sink device (e.g. 4K TV) to the HDMI output 1 port by a HDMI cable.
- **Local HDMI out** — Connect a local sink (e.g. monitor) to the HDMI output 2 by an HDMI cable. The output port is a local loopback port in this case: the same stream received on the HDMI input 2 port is transmitted forward.
- **LAN** — Optionally, connect the UBEX transceiver to a LAN in order to control the device. **User Ethernet is also transmitted over the SFP+ interface so be sure not to create a network loop!**
- **Power** — Connect the power adaptor to the AC input on the transceiver first, then to the AC power socket.

For F110 model only

- **Audio in** — Connect an audio source (e.g. media player) to the audio input connector.
- **Audio out** — Connect an audio sink (e.g. audio amplifier) to the audio output.
- **RS-232** — Optionally for RS-232 extension: connect a controlled unit (e.g. 4K TV) to the RS-232 port of the device with a serial cable.

Factory Default Settings

The following settings are applied in the device once the factory default settings are recalled:

GENERAL SETTINGS	
System settings	
Application mode (Extender / Matrix)	Auto (the endpoint detects automatically the actual application mode)
Network settings	
Static IP address - TX mode	192.168.0.101
Static IP address - RX mode	192.168.0.102
Static IP address - TRX mode	192.168.0.101
Subnet mask	255.255.255.0
Default gateway	192.168.0.1
DHCP	Disabled
LW3 command protocol port	6107
HTTP port	80
RS-232 port settings *	
Operation mode	Command injection
TCP port	8001
Baud rate	57600
Data bits	8
Parity	None
Stop bits	1

ANALOG AUDIO PORT PROPERTIES *	
Analog audio input port properties	
Volume	0.00 dB (100%)
Balance	0 (center)
Gain	0.00 dB
Analog audio output port properties	
Volume	0.00 dB (100%)
Balance	0 (center)

HDMI PORT SETTINGS - TRANSMITTER MODE	
HDMI input port properties	
Scaler mode - HDMI in 1	Pass-through
FRC mode - HDMI in 2	Pass-through
Color space converter - HDMI in 1 and 2	No conversion
HDCP setting - HDMI in 1 and 2	Enabled

HDMI PORT SETTINGS - RECEIVER MODE	
HDMI output port properties	
Scaler mode - HDMI out 1	Pass-through
FRC mode - HDMI out 1 and 2	Pass-through
Color space converter - HDMI out 1 and 2	No conversion
Timing mode - HDMI out 1 and 2	Free run
HDCP mode - HDMI out 1 and 2	Auto

HDMI PORT SETTINGS - TRANSCEIVER MODE	
HDMI input 2 port properties	
FRC mode	Pass-through
Color space converter	No conversion
HDCP setting	Enabled
HDMI output 1 port properties	
Scaler mode	Pass-through
FRC mode	Pass-through
Color space converter	No conversion
Timing mode	Free run
HDCP mode	Auto

* Only for the UBEX-PRO20-HDMI-F110 model.

Software Control – Using Lightware Device Controller (LDC)

The device can be controlled from a computer through the Ethernet ports using Lightware Device Controller. Please download the application from www.lightware.com, install on a Windows PC or a macOS and establish connection to the device.