LWR LIGHTWARE
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Quick Start Guide

UBEX-PRO20-HDMI-F130

Important Safety Instructions

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

ⓘ *The extender is Class 1 laser product.*

Introduction

Thank you for choosing Lightware UBEX F-series endpoint device. 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.

FULL 4K HDMi 4:4:4 60Hz 2.0

The UBEX-PRO20-HDMI-F130 integrates the Icron USB 2.0 extension solution into the UBEX system. The resulting product variants are able to transmit USB2.0 traffic to compatible UBEX endpoints as well as to the USB20-1GBE-DS and USB20-1GBE-HS type of standalone USB2.0 extender boxes. Reliable USB2.0 transmission is ensured by proper Ethernet QoS.

Due to the versatility of UBEX, the USB 2.0 functionality can be further enhanced by subsequent software updates. Such enhancements could include the ability to encrypt the USB 2.0 stream and to control the USB 2.0 transmission through LW3.

The F130 genre is very similar to the F120, but without IR and with full USB 2.0 support. Moreover, the USB-B type of host connector is replaced with an USB-C connector (with USB 2.0 data only support).

Box Contents

UBEX endpoint device	IEC power cable	Safety and warranty info, Quick Start Guide
Phoenix Combicon 5-pole connector (2x)	Phoenix Combicon 3-pole connector	

Optional Accessories

10G SFP+ transceiver module

ⓘ *10GbE singlemode/multimode SFP+ modules and 10GbE SFP+ to RJ45 modules can be ordered together and even separately. For the details, please contact sales@lightware.com.*

Front View

①	**Status LEDs**	The LEDs give immediate feedback about the current status of the extender. See the details about the operation of the LEDs in the *Status LEDs* section (on the right).
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. Turn and click the knob while getting feedback on the LCD.
④	**Reset button**	Reboots the device (the same as disconnecting from the power source and reconnecting again).
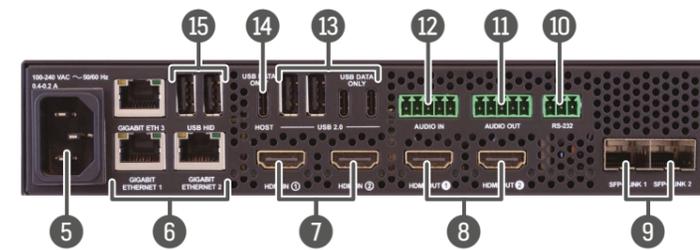
⑤	**AC connector**	Standard IEC connector accepting 100-240 V, 50 or 60 Hz.
⑥	**Ethernet connectors**	Standard locking RJ45 connectors for 1 Gbps Ethernet connections to control the device, for user Ethernet access and firmware update purpose.
⑦	**HDMI input ports**	HDMI input ports with HDMI 2.0 support for source devices. When the device is configured as a receiver or multiviewer, the ports operate as local HDMI inputs. When the device is configured as a transceiver, the HDMI in 1 is out of operation.
⑧	**HDMI output ports**	HDMI output ports with HDMI 2.0 support for sink devices. When the device is configured as a 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	**RS-232 connector**	3-pole Phoenix connector for serial communication.
⑪	**Audio output port**	5-pole Phoenix connector for balanced analog audio output. The port is available in all operation modes (TX/RX/TRX/RXMV).

Rear View

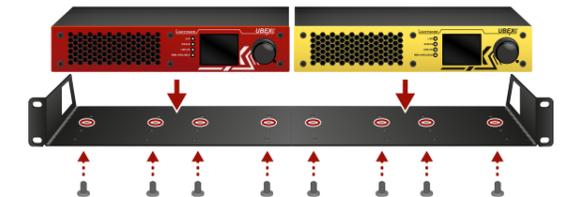|		
⑫	**Audio input port**	5-pole Phoenix connector for balanced analog audio input. The port is available in all operation modes (TX/RX/TRX/RXMV).
⑬	**USB 2.0 ports**	2x USB-A and 2x USB-C connectors with USB 2.0 support for various types of USB devices (e.g. webcam, microphone, external storage, etc). The signal is transmitted to the connected extender over the SFP+ interface.
⑭	**Host port**	USB-C connection between the extender and the host computer. The port receives **USB data only**, no AV signal transmission is accepted. It **supports USB 2.0** standard only.
⑮	**USB HID ports**	USB K+M ports for HID-compatible devices (preferably keyboard and mouse). The signal is transmitted to the receiver over the SFP+ interface.

First Steps of Device Configuration

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), transceivers (TRX) or multiviewers (RXMV) 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.

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, TRX or RXMV as well). The knob can be pressed to enter a menu or edit/set a parameter.

Menu navigation & change parameter — Turn

Menu selection & set parameter — Press

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

```
UBEX-PRO20-...    TX
TX I1    🔧 .ıl 🔍 🎵
TX I2    🔧 .ıl 🔍 🎵
TX O1    🔧 .ıl 🔍 🎵
TX O2    🔧 .ıl 🔍 🎵
```

ⓘ *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 application mode is set to Extender mode; if the device is managed by the MMU, the application mode is set to Matrix mode.*

Operation Mode Settings (only in Extender Mode)

The operation mode (TX/RX/TRX/RXMV) 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**, **Transceiver** or **Multiviewer**.
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.

Status LEDs

LIVE		Transmitter / Receiver / Transceiver/ Multiviewer
🔆	blinking	The device is powered and ready to use.
○	off	The device is not powered or out of operation.

STATUS		Transmitter / Receiver / Transceiver/ Multiviewer
●	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/ Multiviewer
●	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/ Multiviewer
●	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.

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.

The 1U high rack shelf provides mounting holes for fastening two half-rack sized units. Mounting bracket V2 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.
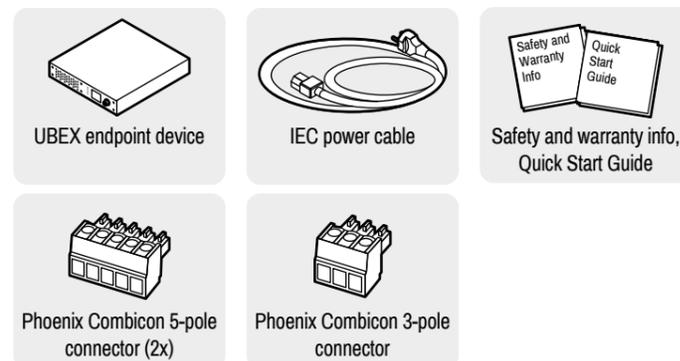
Mounting with the 1U High Rack Shelf

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.*

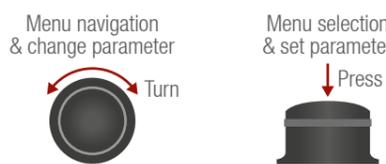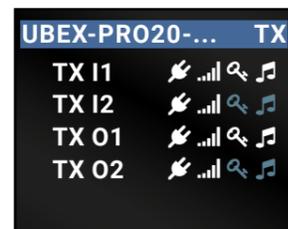The User's Manuals are also available via the QR codes below (Extender - left; Matrix - right):

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

Doc. ver.: 1.0
19210126

Connecting Steps

Transmitter (TX) Operation Mode

Keyboard / mouse — PC — Flash drive / Webcam — MP3 player — Speakers — 4K TV

USB-A | USB-C | USB-A / USB-C | Audio in | Audio out | RS-232

OPT / DAC — EXTENDER MODE or MATRIX MODE

Power | Ethernet | HDMI in | HDMI in | Local HDMI out

Power — Laptop — PC — Blu-ray player — Monitor — 4K TV
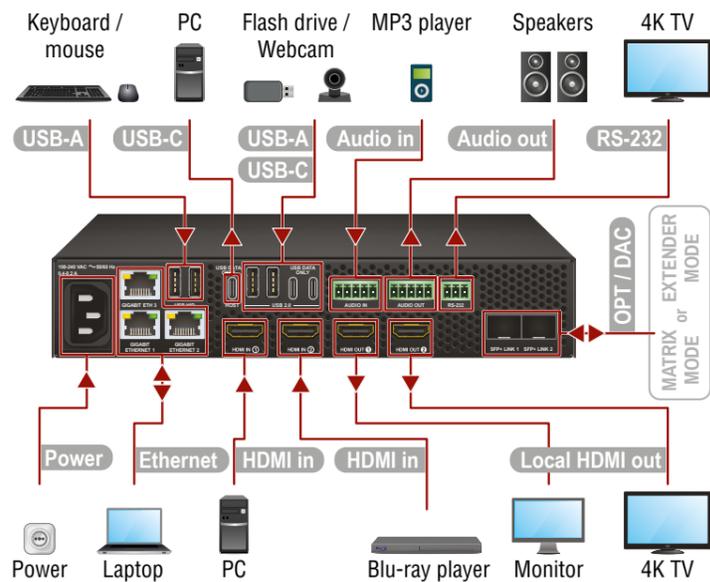
Receiver (RX) / Multiviewer (RXMV) Operation Mode

Keyboard / mouse — PC — Flash drive / Webcam — MP3 player — Speakers — 4K TV

USB-A | USB-C | USB-A / USB-C | Audio in | Audio out | RS-232

OPT / DAC — EXTENDER MODE or MATRIX MODE

Power | Ethernet | Local HDMI in | HDMI out | HDMI out

Power — Laptop — PC — PC — Monitor — Projector
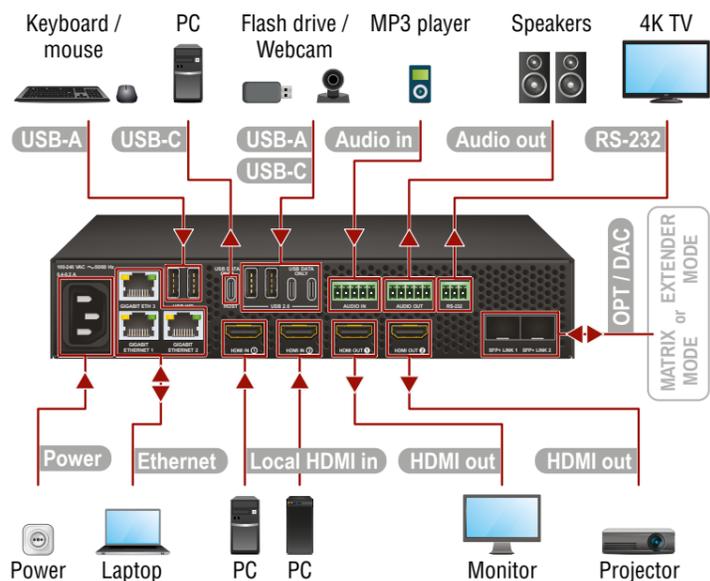
ℹ️ *In case of multiviewer (RXMV) mode, the multiview port is the HDMI out 1.*

Transceiver (TRX) Operation Mode

Keyboard / mouse — PC — Flash drive / Webcam — MP3 player — Speakers — 4K TV

USB-A | USB-C | USB-A / USB-C | Audio in | Audio out | RS-232

OPT / DAC — EXTENDER MODE or MATRIX MODE

Power | Ethernet | HDMI in | HDMI out | Local HDMI out

Power — Laptop — Blu-ray player — 4K TV — Monitor
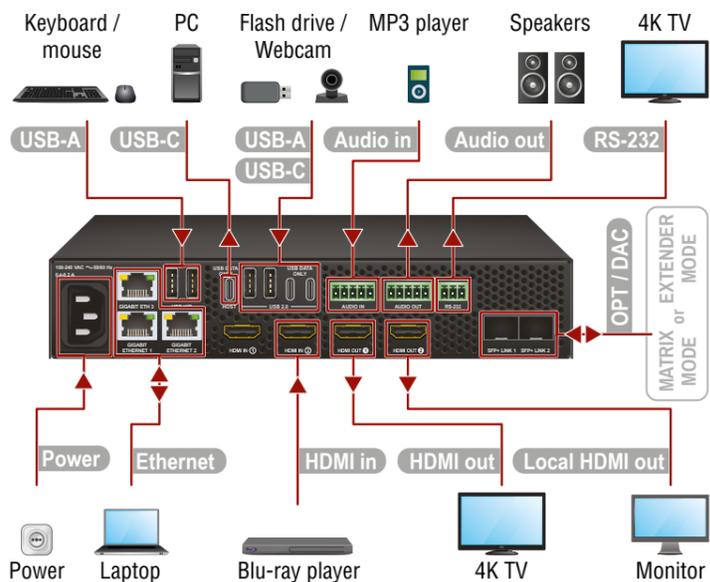
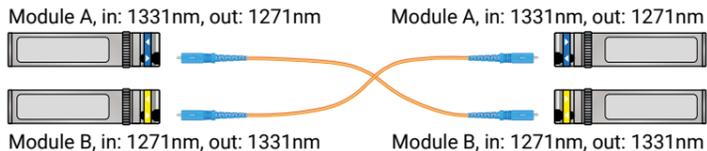ℹ️ *The HDMI in 1 port cannot accept AV signal when the device is configured as a transceiver.*

Transmitter (TX) Mode

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.
Ethernet	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.
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.
USB-A / USB-C	2x USB-A and 2x USB-C connectors with USB 2.0 support for various types of USB devices (e.g. flash drive, webcam, etc).
USB-C	USB-C connection between the extender and the host computer. The port receives **USB data only**, no AV signal transmission is accepted. It **supports USB 2.0** standard only.
USB-A	Optionally for USB HID extension: connect the USB HID devices to the transmitter (preferably mouse and keyboard).

Transceiver (TRX) Mode

HDMI in	Connect the UBEX transceiver and 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.
Ethernet	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.
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.
USB-A / USB-C	2x USB-A and 2x USB-C connectors with USB 2.0 support for various types of USB devices (e.g. flash drive, webcam, etc).
USB-C	USB-C connection between the extender and the host computer. The port receives **USB data only**, no AV signal transmission is accepted. It **supports USB 2.0** standard only.
USB-A	Optionally for USB HID extension: connect the USB HID devices to the transmitter (preferably mouse and keyboard).

Receiver (RX) / Multiviewer (RXMV) Mode

Local HDMI in	**Connect** the UBEX receiver/multiviewer and the local source devices (e.g. PCs) using the HDMI input 1 and 2 ports by HDMI cables.
HDMI out	Connect the sink devices (e.g. monitor, projector) to the HDMI output 1 and 2 ports by HDMI cables. In case of multiviewer (RXMV) mode the multiview port is the HDMI out 1.
Ethernet	Optionally, connect the UBEX receiver/multiviewer 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.
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 with a serial cable.
USB-A / USB-C	2x USB-A and 2x USB-C connectors with USB 2.0 support for various types of USB devices (e.g. flash drive, webcam, etc).
USB-C	USB-C connection between the extender and the host computer. The port receives **USB data only**, no AV signal transmission is accepted. It **supports USB 2.0** standard only.
USB-A	Optionally for USB HID extension: connect the USB HID devices to the extender (preferably mouse and keyboard).

Cabling of the BiDi SFP+ Modules

In case of using bidirectional (BiDi) SFP+ modules in the UBEX endpoint devices, please check the **wavelength** of the INPUT and OUTPUT modules. If the wavelengths are different, the cabling might also be different and the modules shall be connected **across**.

Module A, in: 1331nm, out: 1271nm Module A, in: 1331nm, out: 1271nm

Module B, in: 1271nm, out: 1331nm Module B, in: 1271nm, out: 1331nm

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.

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 / TRX mode	192.168.0.101
Static IP address - RX / RXMV mode	192.168.0.102
Subnet mask	255.255.255.0
Default gateway	192.168.0.1
DHCP	Disabled
LW3 protocol command port	6107

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

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

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

HDMI PORT SETTINGS - MULTIVIEWER (RXMV) MODE	
HDMI output port properties	
Scaler mode - HDMI out 2	Pass-through
Color depth setting - HDMI out 1 and 2	No conversion
Color space converter - HDMI out 2	No conversion
Timing mode	Free run
HDCP mode	Auto

Extender and Matrix Application Modes

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/multiviewer, or two transceiver devices. The Extender Mode is detected and applied automatically in the device once the connection is established successfully.

OPT / DAC

UBEX transmitter — UBEX receiver

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 / multiviewer 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.

UBEX transmitter — OPT / DAC

UBEX receiver — OPT / DAC — L3 switch — OPT / DAC / CATx — UBEX-MMU-X200 Matrix Management Unit

UBEX transceiver — OPT / DAC