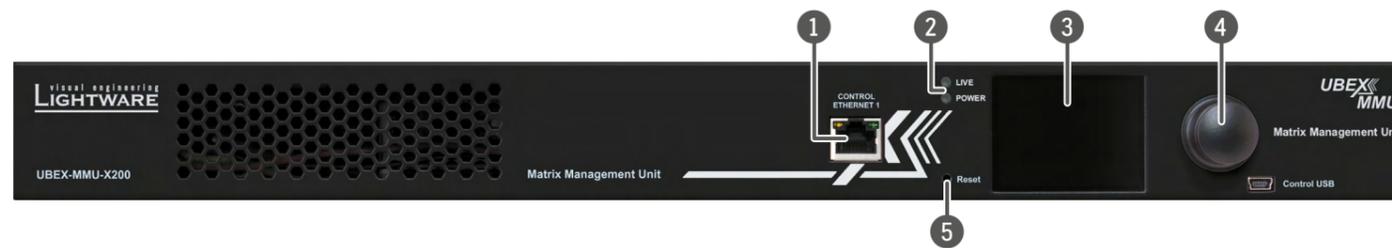




Quick Start Guide

UBEX-MMU-X200

Front View



Rear View



- 1 Control Ethernet port 1** Front panel RJ45 connector for control and firmware upgrade purposes. The port supports 100 Mbps Ethernet connection, auto-negotiation, and auto-MDI/MDIX.
- 2 Status LEDs** The LEDs give immediate feedback about the recent status of the device.
- 3 LCD screen** LCD screen showing the most important settings and parameters in the front panel menu.
- 4 Jog dial control knob** Easy setting and menu navigation by the jog dial control. Keep dial and click while getting feedback on the LCD.
- 5 Reset button** Reboots the device (the same as disconnecting from the power source and reconnecting again).
- 6 RS-232 connectors** 2x 3-pole Phoenix connector for serial communication. The connectors are for controlling the device and connection with third-party system controllers.
- 7 Control Ethernet port 2** Rear panel RJ45 connector for control and firmware upgrade purposes. The port supports 1 Gbps Ethernet connection, auto-negotiation, and auto-MDI/MDIX.
- 8 Ethernet port for UBEX network** RJ45 connector with 1 GbE support for connection to the UBEX network. Connect the MMU and the L3 switch by a CATx cable via the connector.

- 9 SFP slot for 1GbE SFP module for UBEX network** Optical port slots for a 1 GbE SFP module or DAC cable for connection to the UBEX network. Connect the MMU and the L3 switch by LC fiber optical cable or DAC cable.
- 10 AC connector** Standard IEC connector accepting 100-240 V, 50 or 60 Hz.

⚠ Use one of the UBEX network connectors (RJ45 or SFP) only in the same time to avoid the network loop!

Status LEDs

LIVE		
	blinking	The device operates normally, the core software is running.
	on	Device initialization is in progress.
	off	The device is not powered or out of operation.
POWER		
	on	The device is powered and ready to use.
	off	The device is not powered or out of operation.

Device Mounting - Standard Rack Installation with Front Rack Ears

Two rack ears are supplied with the product, which are fixed on left and right side with 8 pcs M4 screws. The default position allows mounting the device as a standard rack unit installation.

⚠ M4x8 size is the longest allowed screw for fixing the ears to the housing. Using different (e.g. longer) screws may cause damage to the device.

⚠ Pay attention to the ventilation holes when designing the system. Front and rear ventilation holes must not be covered.

i The device is rack sized width and 1U high.



i The screws for the rack frame are not supplied with the device.

Important Safety Instructions

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

i The device is Class 1 laser product.

Introduction

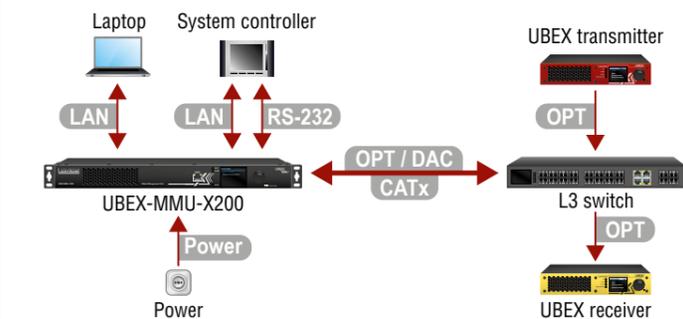
UBEX-MMU-X200 is a Matrix Management Unit (MMU) for the UBEX AV Over IP optical extender product line. With a standard Ethernet switch installed as crosspoint, a virtual matrix can be created with UBEX devices connected to the IP network as input and output endpoints. The established virtual matrix is necessary to be controlled by the MMU also connected to the Ethernet switch.

The MMU builds and constantly updates a database of the connected UBEX endpoints, displays a traditional crosspoint view of the virtual matrix in the Lightware Device Controller (LDC) software and also displays the connected, but inactive units.

Users connect and communicate directly with the MMU in matrix mode, and MMU connects to and relays communication to the endpoint UBEX units.

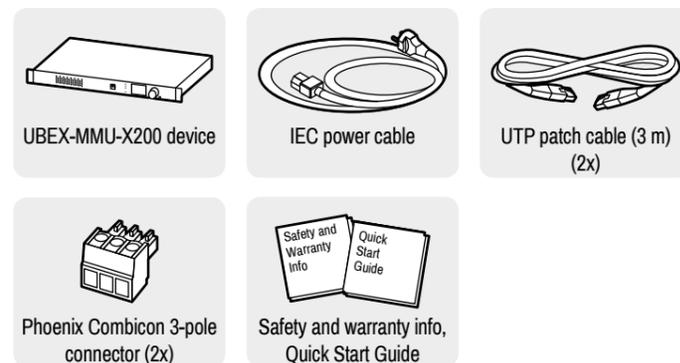
The MMU displays information about endpoints and the overall virtual AV network. Backup and restore functions are also provided to save and load the configuration.

Connecting Steps



- OPT / DAC CATx** Connect the MMU and the L3 network switch by an optical cable or DAC cable (via the SFP slot), or CATx cable (via the CATx connector).
- LAN** Connect a controller device (e.g. laptop) to the MMU with a CATx cable for the connection to the LAN.
- LAN RS-232** Optionally connect a third-party system controller with a serial cable via the RS-232 connector or with CATx cable via the Control Ethernet connector.
- Power** Connect the IEC power cable to the AC input on the MMU first, then to the AC power socket.

Box Contents



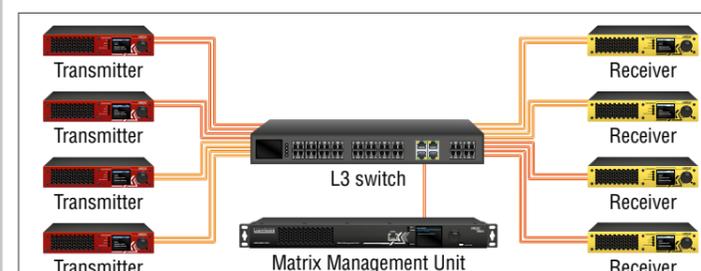
UBEX Concept

The UBEX AV system is a video over IP based audio/video signal extender built with SFP+ based fiber optical interface. The SFP+ modules are swappable and can be singlemode or multimode modules. The device is Ethernet-based, using 10 GbE, IGMPv2, LACP, VLAN, and IPv4 protocols.

i The UBEX extenders do not support jumbo/giant frames.

UBEX System - Matrix Mode

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



Hardware requirements:

- Layer 3 (L3) switch
- UBEX endpoints
- UBEX-MMU-X200 Matrix Management Unit

The managed switch in the network shall offer the following capabilities:

- 10 GbE support
- IGMPv2 snooping
- Non-blocking
- VLAN support
- Link Aggregation Control Protocol (LACP)

Functions of the Matrix Management Unit:

- Dynamic crosspoint handling
- Network bandwidth utilization management
- EDID management
- Monitoring of the network and the endpoints
- Backup and restore
- Firmware upgrade for more endpoint devices in batch and parallel.
- Interface for third-party system controllers

Further Information

The document is valid with the following firmware package version: 1.0.1
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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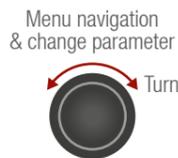
Lightware Visual Engineering LLC.
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Doc. ver.: 1.1
19200093

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. The knob can be pressed to enter a menu or edit/set a parameter.



Set Static IP Address

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

- 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 it navigate to **Save** and press Enter.
- Navigate to the **System Settings / Network** menu, and select the Static IP, Static Subnet, and Static Gateway options. Set the parameters by the front panel buttons according to your network requirements.
- Navigate to **Save** (the last one of the **Network** menu) and press Enter.

NETWORK	
IP	192.168.0.100
Subnet	255.255.255.0
Gateway	192.168.0.1
DHCP	Disabled
Static IP	192.168.0.100
Static Subnet	255.255.255.0
← Back	✓ Save

Set Dynamic IP Address (DHCP)

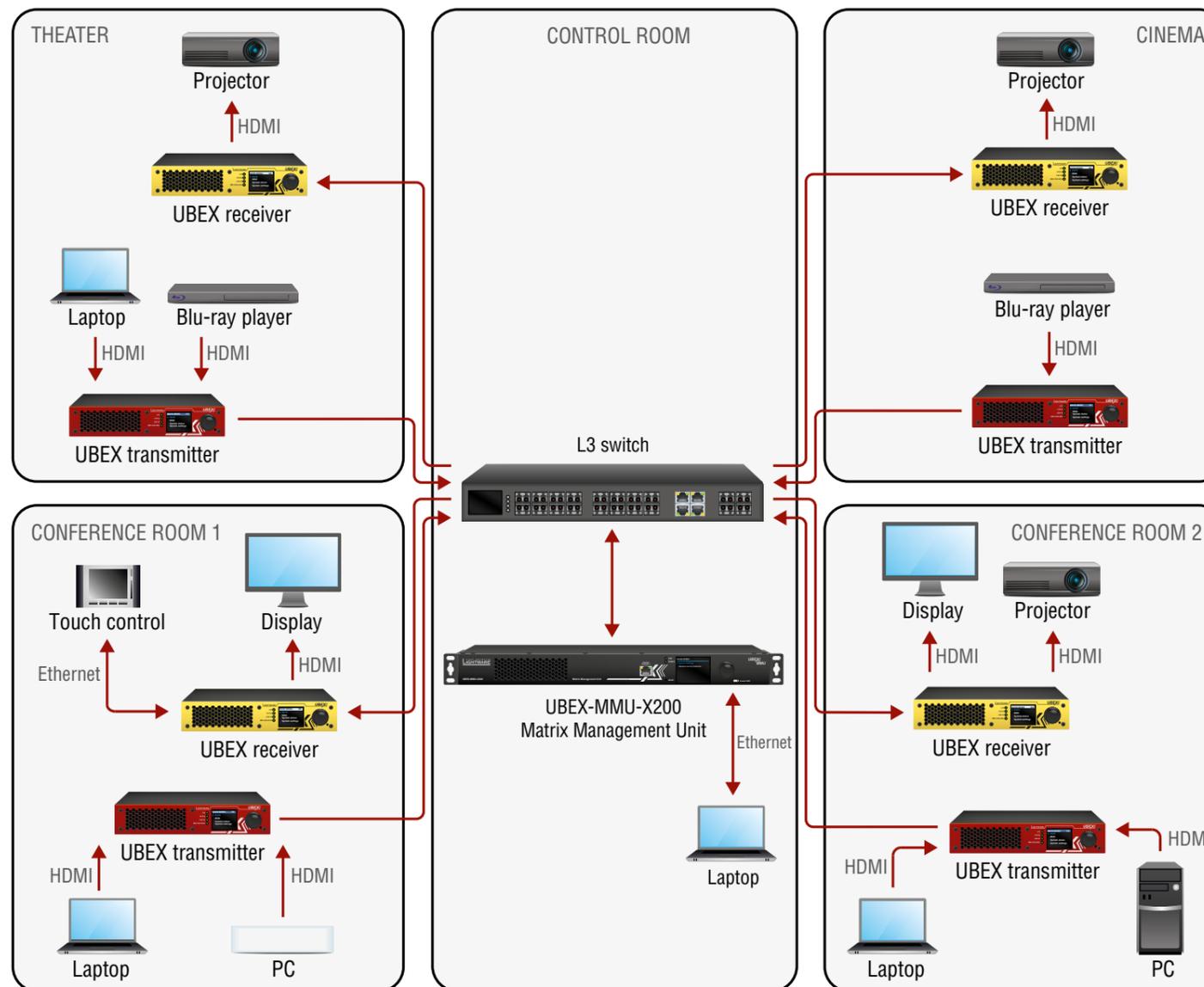
- Navigate to the **System Settings / Network / DHCP** menu and check the current state of the DHCP. If the setting is Disabled change it to **Enabled**.
- Navigate to the **Save** submenu (the last one of the **Network** menu) and press Enter.

Restore Factory Default Settings

Navigate to the **Restore Factory Defaults** menu and press Enter. After the confirmation the device reboots and the following factory default values are reloaded in the device:

Network settings	
IP address (static)	192.168.0.100
Subnet mask	255.255.255.0
Default gateway	192.168.0.1
DHCP	Disabled
LW3 command protocol port	6107
RS-232 configuration	
Baud rate	115200
Databits	8
Stopbits	1
Parity	None

Typical Application



Ethernet Switch - Detailed Requirements

In the virtual matrix architecture a third-party switch is used to transfer IP packets. In connection with this switch, the following criteria must be fulfilled:

- 10 Gbps non-blocking switch (capable of full bandwidth transmission between all ports).
- Supports IEEE Std. 802.3ad-2000 **Link Aggregation Control Protocol**, with **Link Aggregation Groups** for each endpoint.
- Supports Internet Group Management Protocol version 2 (RFC 2236) snooping.
- IPv4 (or Layer 2) Multicast Forwarding based on **IGMP v2 snooping**, with at least **16 addresses available for each endpoint**, e.g. 4096 IPv4 multicast addresses for 256 endpoints.
- Supports IEEE Std. 802.1Q **VLAN tagging: 1 VLAN (286) reserved for UBEX control and media transmission**, other(s) available for user traffic.

Optional Requirements:

- Supports IEEE Std. 802.1Q (formerly 802.1p) priority code point (**PCP**), and implements priority based queuing for at least 1 prioritized traffic class. This is required to guarantee uninterrupted media transmission regardless of the user traffic.
- Supports Link Layer Discovery Protocol (**LLDP**), in order to discover network topology.
- Supports IEEE Std. 802.1s (merged into IEEE Std. 802.1Q-2005) Multiple Spanning Tree Protocol (**MSTP**), in order to detect switching loops in VLAN's.

Ethernet Switch Configuration

Link Aggregation

Create Link Aggregation Groups (LAG's) / EtherChannels etc. for each port pair that is used. The bonding mode is dynamic: **802.3-ad** LACP has to be enabled for each group.

VLAN

The UBEX network uses 802.1Q tagged frames with the VLAN ID of 286. This VLAN has to be available from each LAG, with tagged frames. The LAG's have to be in trunk mode (multiple VLAN's are available on UBEX devices, other VLAN's may be used with tagged or untagged frames).

The port where the MMU is connected is also a trunk port.

IGMP

IGMPv2 snooping has to be enabled for each LAG in this VLAN.

Optional Configuration

Enable Link Layer Discovery Protocol (LLDP) on all ports to access topology information in order to speed up your installation process.

For more details about requirements of the network switch, real-life examples and useful practices please visit our website (www.lightware.com) and download the **Installation and Network Setup Guide for UBEX**.

Software Control – Using Lightware Device Controller (LDC)

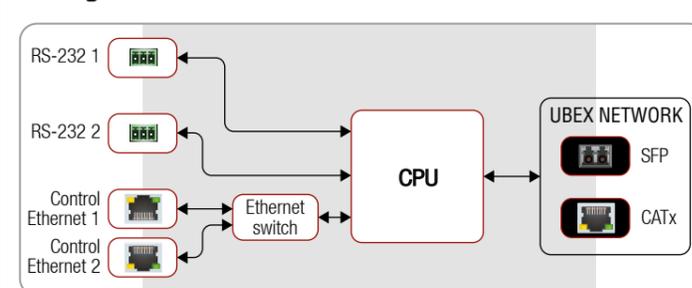
The device can be controlled from a computer through the Ethernet and RS-232 ports using Lightware Device Controller. Please download the application from www.lightware.com, install on a Windows PC or macOS and establish the connection to the device.

Remote IP Editor - How to Change the IP Address Remotely

The IP address of the MMU can be changed quickly on the device discovery screen of the LDC software. When the device discovery found your device but you cannot connect to it, you can set the required IP address by clicking the pencil icon.



Port Diagram



⚠ The Matrix Management Unit does not transmit video signal.

Installation of the SFP Module

The UBEX-MMU-X200 matrix management unit has one SFP module slot for the fiber optical connection via the network switch.

⚠ The optical port slot can handle SFP module up to 1 GbE support.

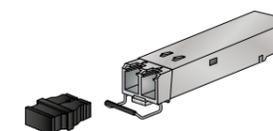
Inserting and Cabling of SFP Module

- Put up on the handle bar.
- Connect the module to the SFP port slot.
- Connect the LC connectors to the SFP module.

⚠ The SFP module has a side that clips to the connector on the port of the switch, and is designed to prevent the module from being inserted the wrong way into the port. Do NOT force module into the port.

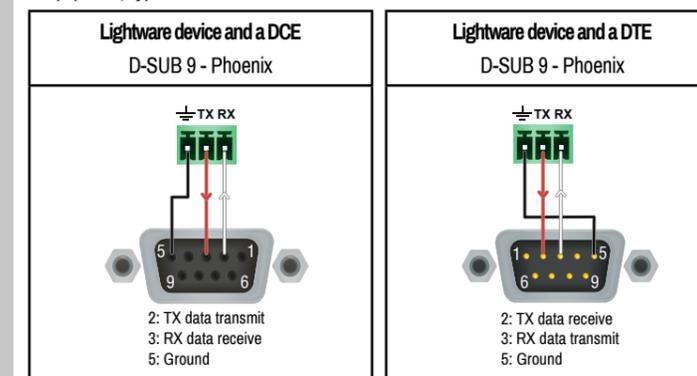
Removing SFP Module

- Disconnect the LC connectors from the SFP module.
- Pull down on the handle bar.
- Gently slide out the SFP module from the slot.



Wiring Guide for RS-232 Data Transmission

UBEX-MMU-X200 supplied with 3-pole Phoenix connector. See the examples of connecting to a DCE (Data Circuit-terminating Equipment) or a DTE (Data Terminal Equipment) type device:



For more information about the cable wiring see the user's manual of the device or **Cable Wiring Guide** on our website www.lightware.com/support/guides-and-white-papers.