Connect a controller device (e.g. laptop) to the MMU with a CATx cable for Matrix Management Unit (MMU) RESET Control USB. The matrix can be created with UBEX devices connected to the IP network as input and output endpoints. The UBEX-MMU-X200 is a Matrix Management Unit (MMU) for the UBEX AV Over IP optical transmitter and receiver

Quick Start Guide

UBEX-MMU-X200

Important Safety Instructions

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

- The device is Class I laser product.

Introduction

UBEX-MMU-X200 is a Matrix Management Unit (MMU) for the UBEX AV Over IP optical extension product line. With a standard Ethernet switch installed as a switch, a network 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.

Box Contents

- UBEX-MMU-X200 device
- Phoenix Combicon 3-pole connector (2x)
- Safety and warranty info, Quick Start Guide
- IEC power cable
- CATx cable (3 m)
- USB patch cable (3 m)

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 EtherCAT-based, using 10 GbE, IGMPv2, LACP, VLAN, and IPv4 protocols.

- The UBEX extenders do not support jumbo/payload 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 crossport handling
- Network bandwidth utilization management
- EDID management
- Monitoring of the network and the endpoints
- Backup and restore
- Firmware upgrade for multiple endpoints 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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Doc. ver.: 1.1

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Set Static IP Address

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

1. Navigate to the System Settings / Network / DHCP 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.

2. Navigate to the Save (the last one of the Network menu) and press Enter.

Set Dynamic IP Address (DHCP)

The IP address of the MMU can be changed quickly on the device discovery screen and establish the connection to the device.

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 if navigate to Save and press Enter.

2. 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.

3. Navigate to Save (the last one of the Network menu) and press Enter.

Software Control – Using Lightware Device Controller (LDC)

The LDC software is to be used to control the MMU from a remote location. The user can select any device in the network and control it using the LDC software.

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.

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

2. Inserting and Cabling of SFP Module
   
   1. Put up on the handle bar.
   2. Connect the module to the SFP port slot.
   3. Connect the LC connectors to the SFP module.

   a. The SFP module has a side that is to be 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.

   b. Removing SFP Module
      
      1. Disconnect the LC connectors from the SFP module.
      2. Pull down on the handle bar.
      3. Gently slide out the SFP module from the slot.

   The Matrix Management Unit does not transmit video signal.

Port Diagram

Network settings

- IP address (static): 192.168.1.100
- Subnet mask: 255.255.254.0
- Default gateway: 192.168.1.1
- DHCP: Disabled
- LW2 command protocol port: 6337

RS-232 configuration

- Baud rate: 115200
- Databits: 8
- Parity: None

Cable Wiring Guide

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.

Hardware 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 (IGMPv2) snooping.
- IPv4 (or Layer 3) Multicast Forwarding based on IGMPv2 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, others 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. 802.3az (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 802.3ad-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.

XMP

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.