visual engineering
LIGHTWARE

Quick Start Guide

MMX6x2-HT200
MMX6x2-HT210
MMX6x2-HT220

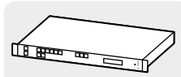
Important Safety Instructions

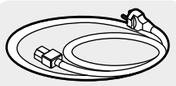
Please read the supplied safety instruction document before using the product and keep it available for future reference.

Introduction

Lightware's MMX6x2-HT family responds to a need of a practical standalone matrix switcher specifically designed for meeting room and classroom environments. The flagship of the series is the MMX6x2-HT220 matrix with 6 video inputs and 4 video outputs. The unit handles 4K video formats and 3D signals while it's fully HDCP compliant. The device has 4 audio input connectors for audio insertion and 2 audio outputs for de-embedding purposes.

Box Contents


MMX6x2 Matrix


IEC Power Cable

LAN Cross-link Cable, CAT5e type, 3 m Length

Phoenix Combicon 3-pole Connector

Phoenix Combicon 5-pole Connector

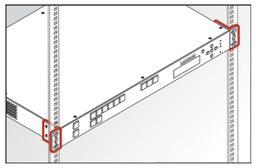
Safety and Warranty Info, Quick Start Guide

Mounting Options

⚠ ***M4x8 size is the longest allowed screw for fixing the ears to the housing. Longer screw may touch internal parts.***

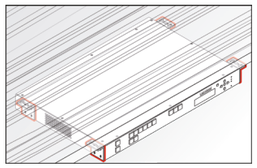
Mounting as a standard rack installation - with front rack ears

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



Under-desk Mounting - with Front and Rack Ears

ℹ *Two rack ears supplied with the product; the other two rack ears can be purchased separately.*

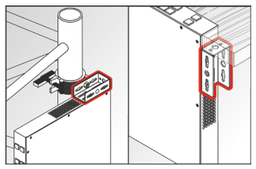


Please do the following steps:

1. Release and remove the fixing screws of both rack ears on the matrix.
2. Rotate the rack ears by 90° to the desired direction.
3. Insert the screws into the holes and fix the front ears to the matrix.
4. Fix the two other rear ears (not supplied with the product) by the screws on both sides.
5. Fix the matrix by the rack ears to the desired surface (screws not supplied).

Mounting - with Mounting Bracket V2

ℹ *Two pieces of Mounting bracket V2 is necessary which can be purchased separately.*



Please do the following steps:

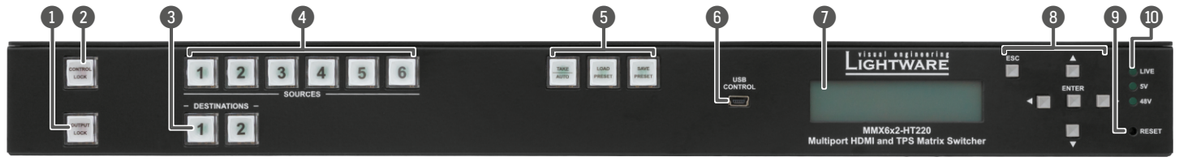
1. Prepare the desk and cut the necessary hole in the furniture. The frame size is 442 x 43.9 mm without rack ears.
2. Remove the rack ears and the fixing screws from both sides of the matrix.
3. Insert the screws into the holes and fix the mounting bracket to the matrix. Pay attention to the thickness of the desk and let enough space to the front when fixing the brackets.
4. Insert the matrix in the hole and fix the bracket by the screws to the furniture.

Ventilation

⚠ ***To ensure the correct ventilation and avoid overheating let enough free space around the appliance. Do not cover the appliance, let the ventilation holes free on both sides.***

The following picture shows the direction of the airflow:

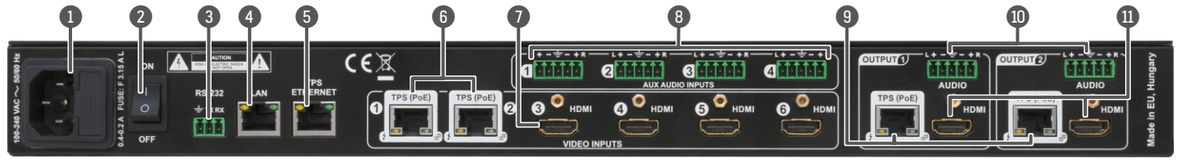
Front View



1	**Output lock**	Lock and protect one or more outputs.
2	**Control lock**	Disables or enables front panel operations. Red light means the switching and function buttons are disabled.
3	**Destinations**	Buttons to select an output or to see the state of an output.
4	**Sources**	Buttons to select an input, to select a preset number or to view the state of the selected input port.
5	**Function buttons**	Switching between working modes (Take / Autotake) and perform Preset operations.
6	**USB control**	USB connector for local control functions (e.g. Lightware Device Controller software).
7	**Display**	2x16 character LCD display for menu operations.
8	**Menu navigation**	Up, down, left, right, enter and escape buttons.
9	**Reset**	Reboots the matrix (the same as disconnecting from the power source and reconnecting again).
10	**Status LEDs**	Blinking CPU LIVE LED indicates normal operation; DC voltage indicators for internal DC power voltages.

ℹ *The front panel of the three models look the same.*

Rear View (MMX6x2-HT220)



1	**AC connector**	Standard IEC connector accepting 100-240 V, 50 or 60 Hz.
2	**On / Off switch**	The matrix can be switched on/off by the switch.
3	**RS-232 port**	3-pole Phoenix connector for RS-232 serial port.
4	**LAN**	RJ45 connector to control the matrix via LAN/Ethernet.
5	**TPS Ethernet**	RJ45 connector to supply Ethernet for the TPS lines.
6	**TPS input ports**	RJ45 connector for incoming TPS signal; PoE-compliant.
7	**HDMI input ports**	HDMI input ports for sources. Applied cable shall not be more than 20 m (22AWG) when signal resolution is 4K.
8	**Audio input ports**	5-pole Phoenix connector for balanced analog audio input.
9	**TPS output ports**	RJ45 connector for outgoing TPS signal. PoE-compliant. HDMI and TPS output ports are mirrored: the same Audio / Video content is switched on the given two ports.
10	**Audio output ports**	5-pole Phoenix connector for balanced analog audio; the signal is mirrored from the given TPS/HDMI output port.
11	**HDMI output ports**	Connect an HDMI cable between the sink and the matrix. HDMI and TPS output ports are mirrored: the same Audio / Video content is switched on the given two ports.

ℹ *MMX6x2-HT200 does not contain TPS output port. MMX6x2-HT210 contains only one TPS output port.*

Compatible Devices

The matrix is compatible with other Lightware TPS devices, matrix boards, third-party HDBaseT-extenders, displays, but not compatible with the TPS-90 extenders.

Remote Powering (PoE)

The matrix is PoE-compatible (in accordance with IEEE 802.3af standard) and able to send remote power to connected TPS devices via the TPS connection (through the CATx cable). No local power adaptor is required for the connected PoE-compatible TPS extender. The PoE feature is enabled on TPS ports as factory default.

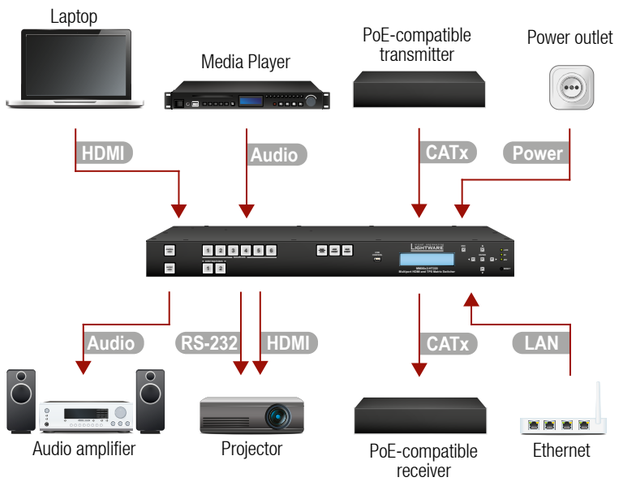
⚠ ***The remote power feature of TPS-95 extenders is not PoE-compatible. Thus, TPS-95 series cannot be powered remotely by the MMX6x2 matrices. If an RX95 or TX95 is connected to the matrix, make sure that the remote power jumper of the extender is removed or set to 'Remote power disabled' position.***

Powering On

Connect the power cord to the AC input connector. Switch on the matrix by the power switch on the rear panel. During the initial self-test and loading of the latest settings Booting... appears on the LCD screen. After the self-test, the router reloads its last configuration and it is ready to use. In case of hardware failure, an error message is displayed.

ℹ *After switching ON, the router reloads the latest settings that were used before it was turned off. The router has an internal emergency memory that stores all current settings and ties configurations. This memory is independent from presets and invisible for the user. This built-in feature helps the system to be ready immediately in case of power failure or accidental power down.*

Connecting Steps



HDMI	Connect the desired sources (e.g. laptop) to the HDMI input ports.
Audio	Optionally connect an audio source (e.g. media player) to the Audio input port which is located above the connected HDMI input port.
CATx	Optionally connect the PoE-compatible transmitter to the TPS input ports.
HDMI	Connect the sink devices (e.g. projector) to the HDMI output ports.
Audio	Optionally connect an audio device (e.g. audio amplifier) to the Phoenix Audio output port which is located above the connected HDMI output port.
CATx	Optionally connect the PoE-compatible receiver to the TPS output ports.
CATx	In order to control the matrix via Ethernet, connect the device to a LAN switch/router, and connect a controller (e.g. a Touch panel).
RS-232	Optionally connect the serial device (e.g. projector) to the RS-232 port.
Power	Connect the power cord to the AC power socket and to the matrix. It is recommended to power on the devices as the final step.

Further Information

The document is valid with the following firmware version: 1.1.4
The User's manual of this appliance is available on www.lightware.com.
See the Downloads section on the website of the product.

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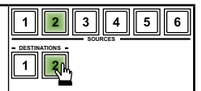
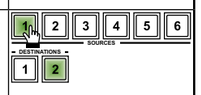
Doc. ver.: 1.1
19200102

Front Panel Controls in AUTOTAKE Mode

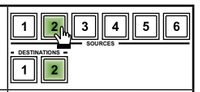
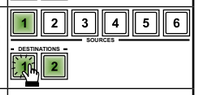
Press and hold the Take button for two seconds to change between Take and Autotake modes. When the Take button continuously illuminates green, Autotake mode is selected.

Autotake mode is useful when immediate actions must be taken or fast switching is needed between sources on a particular destination. In this mode switching occurs immediately upon pressing one of the input selector buttons.

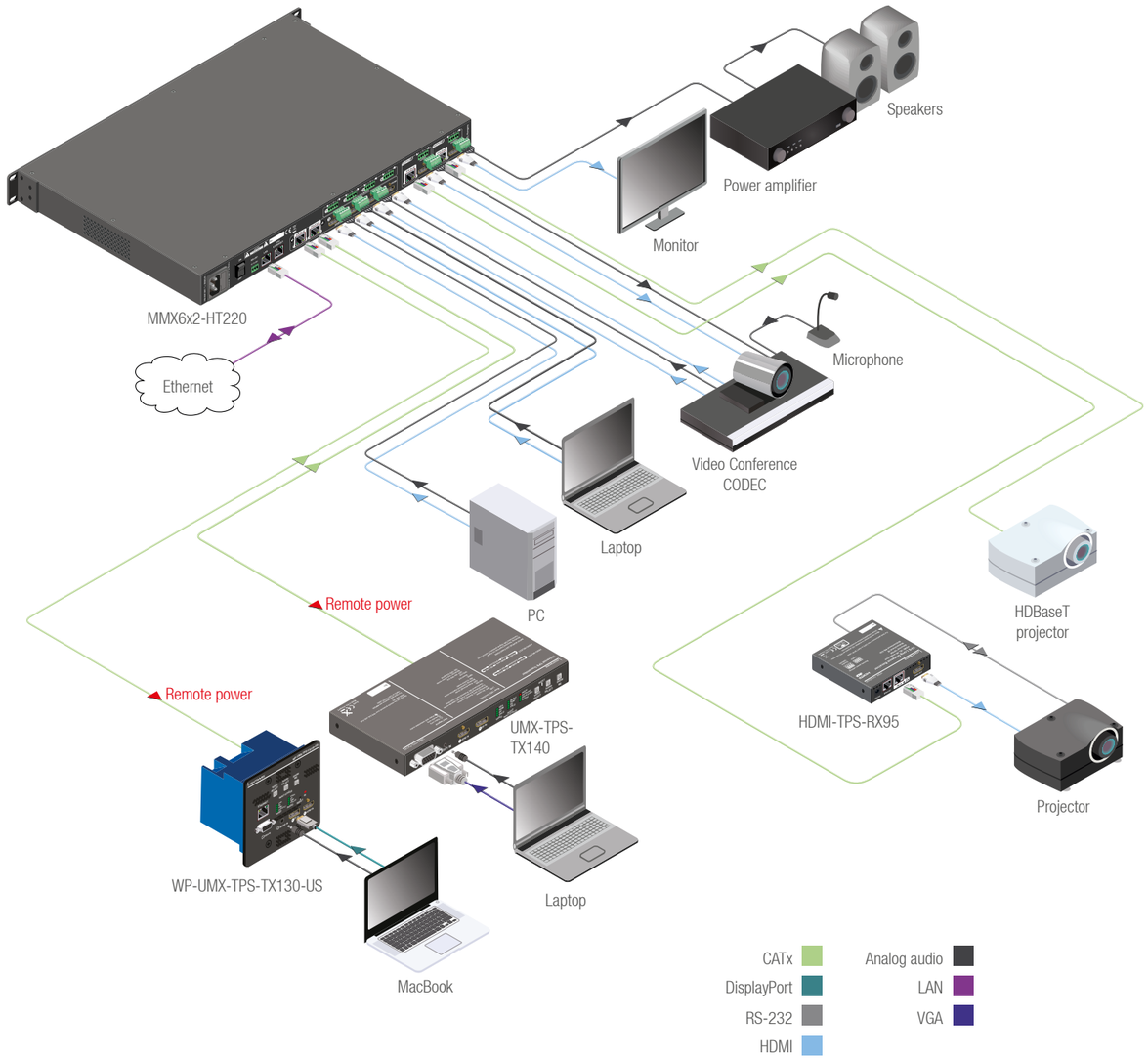
Switching operations	1. Press and release the desired **destination button**. The pressed destination button and the actually connected source button light up green. If no source is connected (the output is muted) no source button will light up.	
	2. Press and release the desired **source button**. The switch action will be executed immediately. Switching between sources to the selected destination can be done directly.	
Lock an output	1. Press and release the required **destination button**. Now the selected destination button and the currently configured source button light up (view mode).	
	2. Press and release the **Output Lock** button; it lights up in red, and lock function is activated at once. No source can be changed at the locked destination.	

Front Panel Controls in TAKE Mode

Take mode allows the user to connect or disconnect multiple outputs to an input at once. This mode is useful when time delay is not allowed between multiple switching. The commands are only realized when the **Take** button is pressed.

Switching operations	1. First press and release the desired **source button**. The pressed source button and all destination buttons which are currently connected to the source light up.	
	2. Press and release the desired **destination buttons** which have to be (dis)connected from/to the selected source. The preselected destination buttons will blink.	
	3. Press and release the **Take** button. The selected input is switched to the selected output(s).	
Lock an output	1. Press and release the **Output Lock** button. It starts to blink and all the buttons of any locked destinations light up (view state).	
	2. Press and release a **destination button**. It starts to blink (more destinations can be selected sequentially).	
	3. Press and release the **Take** button. The selected destinations are now locked.	

Typical Application



TPS Matrix Concept

MMX6x2-HT is the first stand-alone matrix switcher with HDBaseT™ (TPS) technology in Lightware's product range. The matrix gives the possibility to route many kinds of signal formats including TPS and other available interfaces.

TPS Working Modes

The following TPS modes are defined in the matrix:

- **Auto**: The TPS mode is determined automatically.
- **HDBaseT**: Ideal for high resolution signals up to 4K, maximum 100 m cable length.
- **Long reach**: Ideal for big distances up to 1080p@60Hz.
- **LPPF1***: Only RS-232 signal is transmitted (at 9600 baud).
- **LPPF2***: Only RS-232 (at 9600 baud) and Ethernet signal are transmitted.

* LPPF: Low Power Partial Functionality

Maximum Extension Distances

Resolution	Pixel clock rate	Cable lengths (Auto / Long reach TPS mode)		
		CAT5e AWG24	CAT7 AWG26	CAT7 AWG23
1024x768@60Hz	65 MHz	100 m / 130 m*	90 m / 120 m*	120 m / 170 m*
1280x720p@60Hz	73.8 MHz	100 m / 130 m*	90 m / 120 m*	120 m / 170 m*
1920x1080p@60Hz (24bpp)	148.5 MHz	100 m / 130 m*	90 m / 120 m*	120 m / 170 m*
1920x1200@60Hz	152.9 MHz	100 m / NA	90 m / NA	120 m / NA
1600x1200@60Hz	162 MHz	100 m / NA	90 m / NA	120 m / NA
1920x1080@60Hz (36bpp)	223 MHz	70 m / NA	70 m / NA	100 m / NA
3840x2160@30Hz UHD	297 MHz	70 m / NA	70 m / NA	100 m / NA
4096x2160@30Hz 4K	297 MHz	70 m / NA	70 m / NA	100 m / NA

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

Above values are valid when the connected extenders are powered by a local adaptor; distances may decrease depending on the powering mode (local or remote) and cable quality. To specify the accurate extension distances, please also check the documentation of the connected TPS device.

CAT7 SFTP AWG23 cable is always recommended.

CONTROL LOCK

If the button illuminates in **red** the switching- and function buttons are disabled. Press and hold the **Control lock** button for three seconds to toggle the state.

When the front panel buttons are locked, remote control (RS-232, USB, Ethernet) is still available.

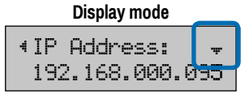
LCD Menu - Navigation

Front panel LCD has 2 lines and 16 characters in each line. The name of the menu item is always displayed in the first line.

▲ **(up)**	toggle between menu items	▶ **(right)**	move the cursor
▼ **(down)**	toggle between menu items	◆ **(enter)**	execute changes or enter
◀ **(left)**	move the cursor or step back to previous menu	● **(escape)**	step back to previous menu and/or cancel the operation

The parameters are displayed in two modes on the LCD as follows:

Display mode



Edit mode

In **Display mode** the value cannot be changed; the **up** and **down** buttons can be used to step between the submenu items. In **Edit mode** the values can be changed with the **up** and **down** buttons. Select the desired parameter and press **enter** to select the **Edit mode**. After the value is set and stored, the LCD mode is switched back to **Display mode**.

Factory Default Settings

The settings and parameters can be set to factory default as follows:

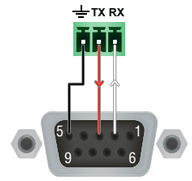
1. Navigate to **Settings / Fact. defaults** submenu and press the enter.
2. Press the **enter** button to load the factory default settings, which are the followings:

IP address (static)	192.168.0.100
Subnet mask	255.255.255.0
Static gateway	192.168.0.1
DHCP	disabled
TCP/IP port no. for LW2 / LW3 control protocol	10001 / 6107
Crosspoint setting	HDMI I3 on O1 and O3, HDMI I4 on O2 and O4
Audio source	embedded audio
Emulated EDID	F47 - Factory (1920x1080@60Hz HDMI)
Autoselect	disabled
Output TPS mode	auto
PoE feature (on TPS ports)	enabled
RS-232 mode and protocol	pass-through, LW2 protocol
RS-232 port setting	57600 BAUD, 8, N, 1
RS-232 command injection port number (Local / TPSIN1 / TPSIN2 / TPSOUT1 / TPSOUT2)	8001 / 8002 / 8003 / 8004 / 8005

Wiring Guide for RS-232 Data Transmission

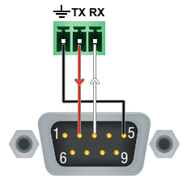
MMX6x2 series devices are built with 3-pole Phoenix connector. See the below examples of connecting to a DCE (Data Circuit-terminating Equipment) or a DTE (Data Terminal Equipment) type device:

Lightware device and a DCE
D-SUB 9 - Phoenix



2: TX data transmit
3: RX data receive
5: Ground

Lightware device and a DTE
D-SUB 9 - Phoenix



2: TX data receive
3: RX data transmit
5: Ground

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.

Software Control – Using Lightware Device Controller (LDC)

The device can be controlled from a computer using the Lightware Device Controller software. The application is available at www.lightware.com (Support / Downloads section), install it on a Windows PC or a macOS and connect to the device. The following ways are available to connect to the device directly:

Local USB Port

Connect a USB cable (with mini B-type connector) between the matrix and the computer and start the LDC. The device is displayed under the **USB devices** section; press **Connect**.

Local RS-232 Port

Connect a serial cable between the matrix and the computer and start the LDC. Press the **Query** button of the connected COM port to list the device and press **Connect**. See the **Factory default settings** table for the RS-232 port parameters. The local RS-232 port settings are available in the front panel menu. Navigate to **Settings / Control RS232** submenu. The following parameters can be set: Baud rate, Data Bits, Stop Bits and Parity.

LAN Port

Connect the supplied LAN cross-link cable between the matrix and the computer for direct connection or connect to an Ethernet. The default network settings are listed in above table which can be changed via the front panel menu.