visual engineering LIGHTWARE

Quick Start Guide

MMX4x2-HDMI
MMX4x2-HT200

Important Safety Instructions

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

Introduction

Thank You for choosing Lightware MMX4x2 series device. The product is a uniquely mini size matrix switcher with additional Lightware developments. Audio can be de-embedded from the HDMI signal to a balanced 5-pole Phoenix (Euroblock) port and external audio signal can be embedded into the HDMI stream from another 5-pole Phoenix input port. The device has a built-in Event Manager configurable via the Lightware Device Controller software. Further control options are served by the USB, RS-232, IR (in and out) and Ethernet ports.

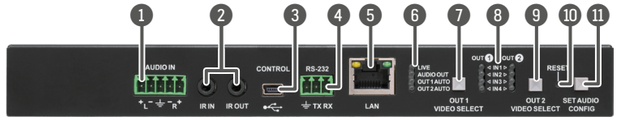
The MMX4x2-HT200 matrix is compatible with any third-party HDBaseT™ device.

HDBaseT™ and the HDBaseT Alliance logo are trademarks of the HDBaseT Alliance.

Compatible Devices

MMX4x2-HT200 matrix is compatible with other Lightware TPS devices, matrix TPS and TPS2 boards, 25G boards, as well as third-party HDBaseT-extenders, but not compatible with the phased out TPS-90 extenders.

Front View



1	**Audio input port**	5-pole Phoenix connector for balanced analog audio.
2	**Infrared connectors**	2 x 3.5mm jack (TS/TRS) connectors for Infrared units (IR IN for the detector, IR OUT for the emitter).
3	**USB connector**	USB interface for LDC connection to control and configure the device.
4	**RS-232 connector**	3-pole Phoenix connector for serial communication.
5	**Ethernet connector**	RJ45 connector for control and firmware upgrade purpose.
6	**Status LEDs**	LEDs give feedback about current status of the unit.
7	**Video select button for Output 1**	Pushing the button selects video source for Output 1.
8	**Input select LEDs**	LEDs give feedback about current crosspoint settings.
9	**Video select button for Output 2**	Pushing the button selects video source for Output 2.
10	**Reset button**	Pushing the button reboots the unit.
11	**Set Audio Config button**	Audio configuration selector and special function button.

Front Panel LEDs

LIVE

- OFF: device is not powered.
- BLINKING (slow; 1 sec): device is powered and operational.
- BLINKING (fast; 0,5 sec): device is in bootload mode.
- ON: device is powered but not operational.

AUDIO OUT

- OFF: embedded audio is not present or muted.
- BLINKING: embedded audio format is not supported for audio de-embedding.
- ON: embedded audio is present and de-embedded.

OUT 1 AUTO

- ON: Autoselect is enabled on HDMI Output 1.

OUT 2 AUTO

- ON: Autoselect is enabled on HDMI Output 2.

Crosspoint Status LEDs (OUT 1 and OUT 2)

- ON (green): input is selected, signal is present.
- BLINKING (green): input is selected, signal is not present.
- BLINKING (amber): Audio configuration #1..4 is selected, see details in *Front Panel Operation* section.

Front view is exactly the same for both models.

Rear View - MMX4x2-HT200

Rear View - MMX4x2-HDMI

1	**12V DC input connector**	12V DC input for local powering.
2	**TPS input port**	TPS input port for compatible transmitter device (extender / matrix / board).
3	**HDMI input ports**	HDMI input ports for sources. Applied cable shall not be more than 20 m (22AWG) when signal resolution is 4K.
4	**HDMI output ports**	HDMI output ports for sink devices.
5	**Audio output port**	5-pole Phoenix connector for balanced analog audio.

Rear Panel LEDs

TPS link LED - for MMX4x2-HT200 only

OFF: No TPS link.
BLINKING: Device is in low power or Ethernet fallback mode.
ON: TPS link is live.

HDMI Inputs - SIGNAL LED

- OFF: signal is not present on input.
- ON: signal is present on input.

HDMI Outputs - SIGNAL LED

- OFF: output signal is not present or muted.
- ON: signal is present.

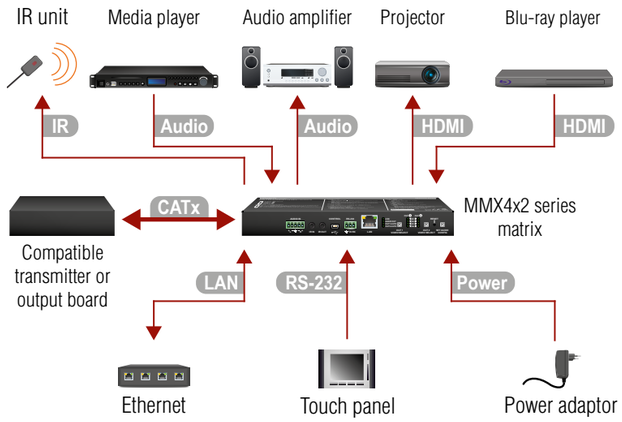
HDMI Outputs - HDCP LED

- OFF: output signal is not HDCP-encrypted.
- BLINKING: non-HDCP capable device is connected, encrypted signal is replaced with red screen.
- ON: output signal is HDCP-encrypted.

Types of IR connectors (1/8" TRS / TS)

3 pole, 2 rings: IR receiver 2 pole, 1 ring: IR transmitter

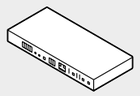
Connecting Steps

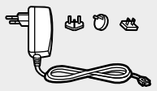


CATx	**For MMX4x2-HT200 only**: connect the matrix and the TPS transmitter by a CATx cable via the TPS connectors.
HDMI	Connect the matrix and the source devices (e.g. Blu-ray player) using the HDMI inputs and HDMI cables.
HDMI	Connect the sink devices to the HDMI output port by HDMI cables.
Audio	Optionally for analog output connect an audio device (e.g. audio amplifier) to the analog audio output port by an audio cable.
Audio	Optionally for audio extension: connect the audio source (e.g. media player) to the audio input port by an audio cable.
IR	Optionally for Infrared extension: ▪ Connect the IR emitter to the IR OUT port of the matrix, and/or ▪ Connect the IR detector to the IR IN port of the matrix.
LAN	Optionally connect the matrix to a LAN in order to control the device.
RS-232	Optionally for RS-232 extension: connect a controller/controlled device (e.g. touch panel) to the RS-232 port.
Power	Connect the power adaptor to the DC input on the matrix first, then to the AC power socket.

It is recommended not to power on the devices before the final step.

Box Contents


Matrix unit


12V DC adaptor with interchangeable plugs


Phoenix Combicon 3-pole connector


Phoenix Combicon 5-pole connector (2x)


Infrared detector unit


Infrared emitter unit


UTP patch cable (3 m)

Safety and warranty info, Quick Start Guide

Mounting

To mount the matrix Lightware supplies optional accessories for different usage. There are two kinds of mounting kits with similar fixing method. The matrix switcher has two mounting holes with inner thread on the bottom side. Fasten the device by the screws enclosed to the accessory.

Under-desk double mounting kit

1U high rack shelf

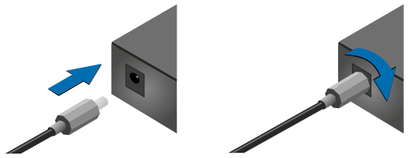
The Under-desk double mounting kit makes easy to mount a single device on any flat surface, e.g. furniture. 1U high rack shelf provides mounting holes for fastening two half-rack or four quarter-rack sized units. Pocket-sized devices can also be fastened on the shelf. To order mounting accessories please contact sales@lightware.com.

Using different (e.g. longer) screws may cause damage to the device.

The matrix is half-rack sized.

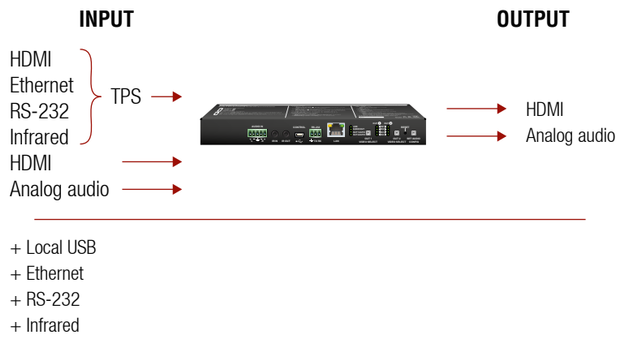
Locking DC Plug

Twist 90° clockwise to lock.



Compact Size Matrix Concept

MMX4x2 series device is a multifunctional audio/video matrix switcher with four inputs and two outputs. The HT200 model is built with HDBaseT™ (TPS) technology. The device can be controlled over various interfaces, e.g. Ethernet, USB, RS-232, and Infrared. The matrix is built with audio embedder and de-embedder functions.



Only MMX4x2-HT200 model has TPS input. MMX4x2-HDMI model has HDMI + analog audio input and HDMI + analog audio outputs.

Further Information

The document is valid with the following firmware version: 1.2.0
The product brief and further information are available on www.lightware.com.
See the Downloads section on on the dedicated product page.

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Doc. ver.: 1.2
19200101

Front Panel Operation

Video Select Buttons

Use the buttons for selecting the video input source. The sequence is the following for each device.

MMX4x2-HDMI:

→ HDMI IN ❶ → HDMI IN ❷ → HDMI IN ❸ → HDMI IN ❹ → Autoselect

MMX4x2-HT200:

→ TPS IN ❶ → HDMI IN ❷ → HDMI IN ❸ → HDMI IN ❹ → Autoselect

Set Audio Config Button

Use the button to select the audio configuration mode. The sequence is:

→ #1 → #2 → #3 → #4

#1: Copy **HDMI OUT 1** audio to HDMI OUT 2 and AUDIO OUT.

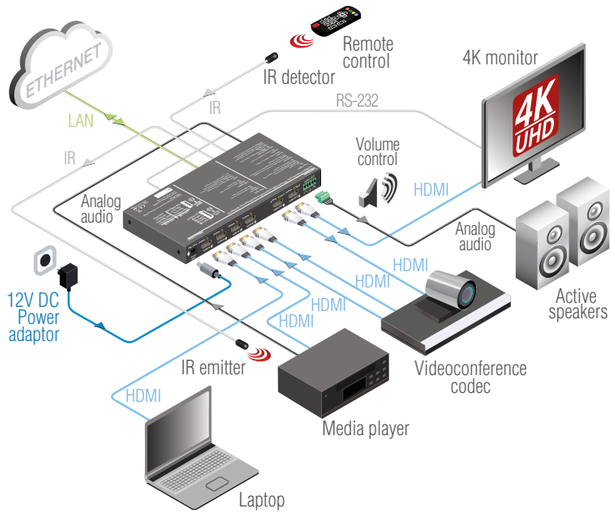
#2: Copy **HDMI OUT 2** audio to HDMI OUT 1 and AUDIO OUT.

#3: Use audio from **Analog Input** on all outputs.

#4: Keep **Original Audio** on HDMI outputs, de-embed from HDMI OUT 2 to Analog Audio Output.

Typical Application

Standalone layout - MMX4x2-HDMI



Maximum Extension Distances for MMX4x2-HT200

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

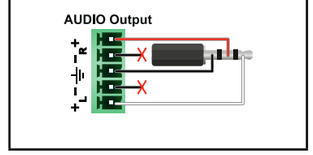
* Long reach TPS mode supports pixel clock frequencies up to 148.5 MHz.

ℹ *CAT7 SFTP AWG23 cable is always recommended.*

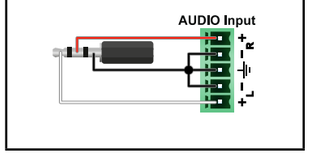
Audio Cable Wiring Guide

MMX4x2 series matrix is built with 5-pole Phoenix input and output connectors. See below a few example of the most common assembling cases.

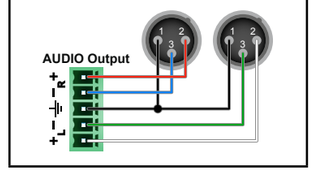
From balanced output to unbalanced input
Phoenix - 3.5 (1/8") TRS



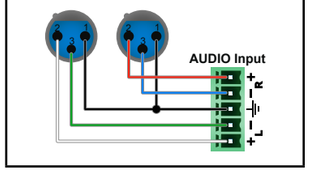
From unbalanced output to balanced input
3.5 (1/8") TRS - Phoenix



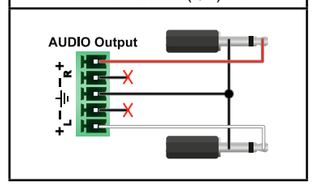
From balanced output to balanced input
Phoenix - 2 x XLR



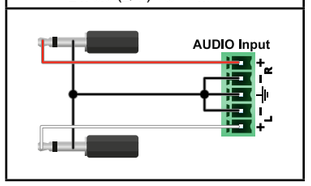
From balanced output to balanced input
2 x XLR - Phoenix



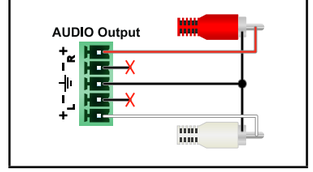
From balanced output to unbalanced input
Phoenix - 2 x 6.3 (1/4") TS



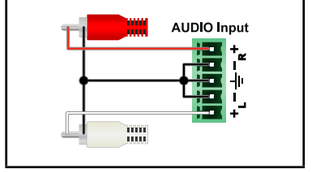
From unbalanced output to balanced input
2 x 6.3 (1/4") TS - Phoenix



From balanced output to unbalanced input
Phoenix - 2 x RCA



From unbalanced output to balanced input
2 x RCA - Phoenix



For more information about audio cable wiring see the user's manual of the device or the Audio Cable Wiring Guide on our website www.lightware.com.

Software Control – Using Lightware Device Controller (LDC)

The device can be controlled from a computer through the Ethernet, RS-232, and USB 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.

ℹ *The default IP address of the device is: 192.168.0.100, DHCP is disabled.*

Set Dynamic IP Address (DHCP)

1. Keep the Set Audio Config button pressed for 5 seconds; all front panel LEDs start to blink.
2. Release the button, then press it 3 times quickly. DHCP is now enabled.

Restore Factory Default Settings

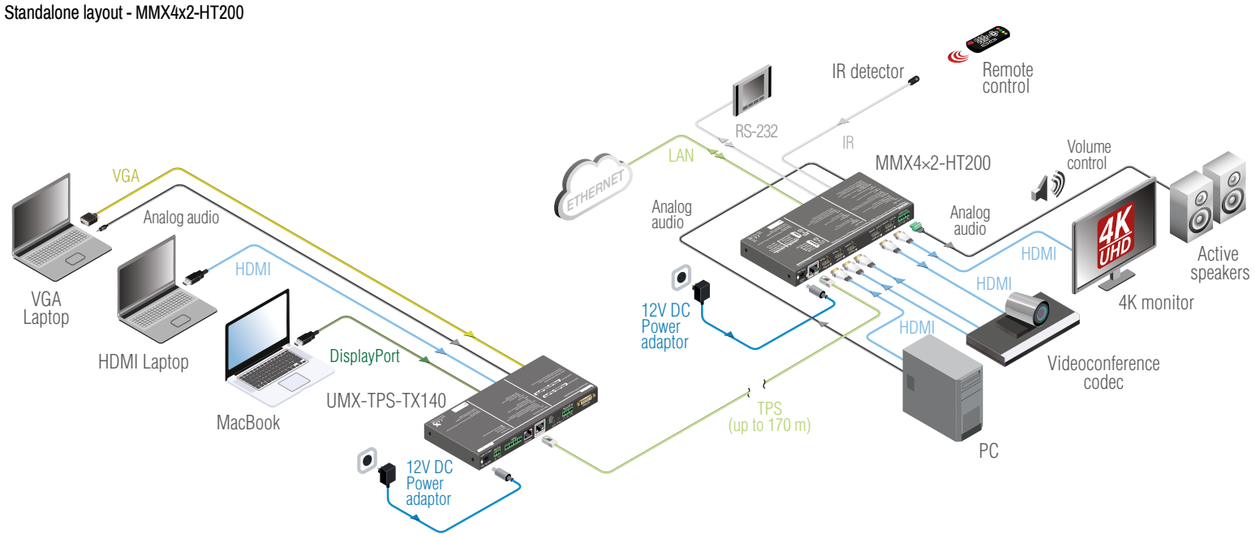
1. Keep the Set Audio Config button pressed for 10 seconds; after 5 seconds front panel LEDs start to blink but keep the button pressed; the LEDs start to blink faster 5 seconds later.
2. Release the button, then press it 3 times quickly; factory default settings are restored:

Network settings	
IP address (static)	192.168.0.100
Subnet mask	255.255.255.0
Static gateway	192.168.0.1
DHCP	Disabled
TCP/IP port nr. LW2 / LW3	10001 / 6107

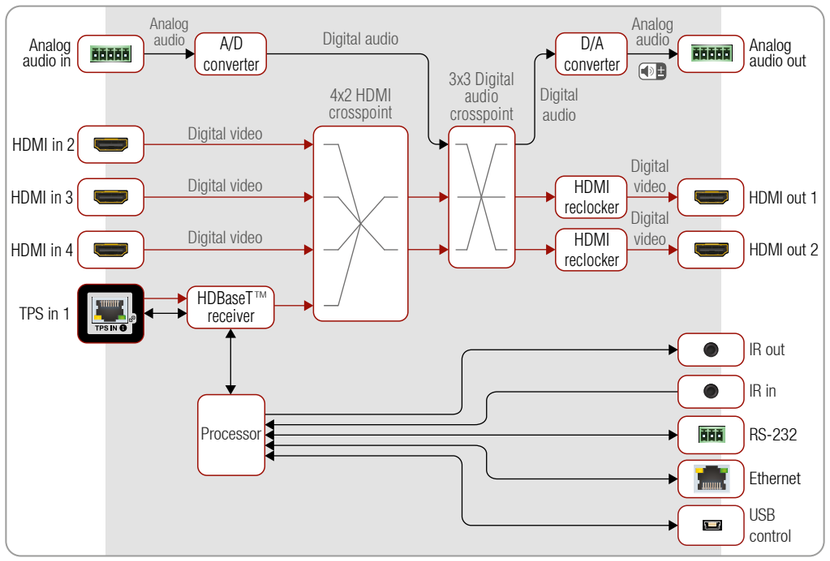
Video crosspoint settings	
O1 (HDMI out 1) - MMX4x2-HDMI	I1 (HDMI in 1)
O1 (HDMI out 2) - MMX4x2-HT200	I1 (TPS in 1)
O2 (HDMI out 2) - for both models	I2 (HDMI in 2)
Audio crosspoint settings	
O1 (HDMI out 1)	A1 (original HDMI embedded audio)
O2 (HDMI out 2)	A2 (original HDMI embedded audio)
O3 (Audio out)	A3 (analog audio input)
Port properties	
Autoselect	Disabled
Input TPS mode	Auto
Emulated EDID on all four inputs	Factory #47: Universal HDMI PCM
RS-232 settings	
RS-232 mode	Control
Control protocol	LW2
Port setting	57600 BAUD, 8, N, 1
Command injection port (local/link)	8001 / 8002

Typical Application

Standalone layout - MMX4x2-HT200



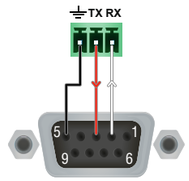
MMX4x2-HT200 Port Diagram



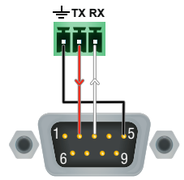
Wiring Guide for RS-232 Data Transmission

MMX4x2 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



Lightware device and a DTE
D-SUB 9 - Phoenix



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.