LWR LIGHTWARE
INNOVATIVE, RELIABLE, MADE IN EUROPE.

Quick Start Guide

UCX-4x3-TPX-TX20
UCX-2x1-TPX-TX20
DCX-3x1-TPX-TX10
HDMI-UCX-TPX-RX107

Important Safety Instructions

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

Introduction

Lightware's universal matrix Transmitter switcher exploits the USB-C connectivity for a simplified extension of up to 100m of 4K video, audio, control signals and power providing meeting participants with easy host switching, video resolution capabilities up to 4K@60Hz at 4:4:4, as well as comprehensive and secure Ethernet features.

The Receiver extender with AVX technology allows users to extend HDMI 2.0 signals up to 4K60 4:4:4 video resolution through a single CATx cable over distances of up to 100 meters. They also support independent USB host switching with USB 2.0, making the pair excellent for meeting room setups.
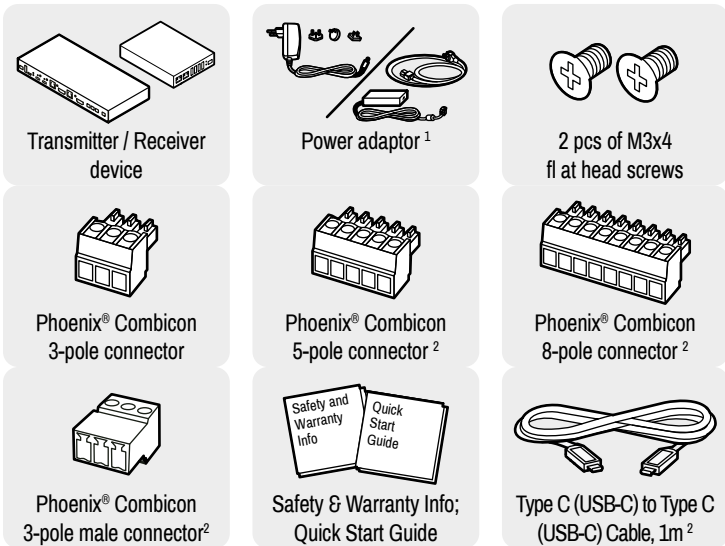
The Transmitter / Receiver pair is featured with audio de-embedding function via the 5-pole Phoenix® Combicon analog audio ports.

Beyond the benefits of sending high-resolution video over long distances, the pair is also capable of handling various connectivity standards, including bi-directional RS-232, GPIO and OCS as well.

The Gigabit Ethernet port is also a valuable addition, allowing users to connect an additional device to the network directly through the TPX extender.

The Transmitter is also capable of powering the Receiver remotely over Ethernet, as the Receiver is PoE compatible.

Box Contents

Transmitter / Receiver device	Power adaptor [1]	2 pcs of M3x4 fl at head screws
Phoenix® Combicon 3-pole connector	Phoenix® Combicon 5-pole connector [2]	Phoenix® Combicon 8-pole connector [2]
Phoenix® Combicon 3-pole male connector[2]	Safety & Warranty Info; Quick Start Guide	Type C (USB-C) to Type C (USB-C) Cable, 1m [2]

[1] 12V DC adaptor with interchangeable plugs for HDMI-UCX-TPX-RX107 and 24V adaptor with IEC power cable for UCX-4x3-TPX-TX20, UCX-2x1-TPX-TX20 and DCX-3x1-TPX-TX10.
[2] Only for the transmitter (TX) devices. DCX-3x1-TPX-TX10 model is not supplied with an 8-pole and a 3-pole Phoenix connector.

Front view (UCX-4x3-TPX-TX20)
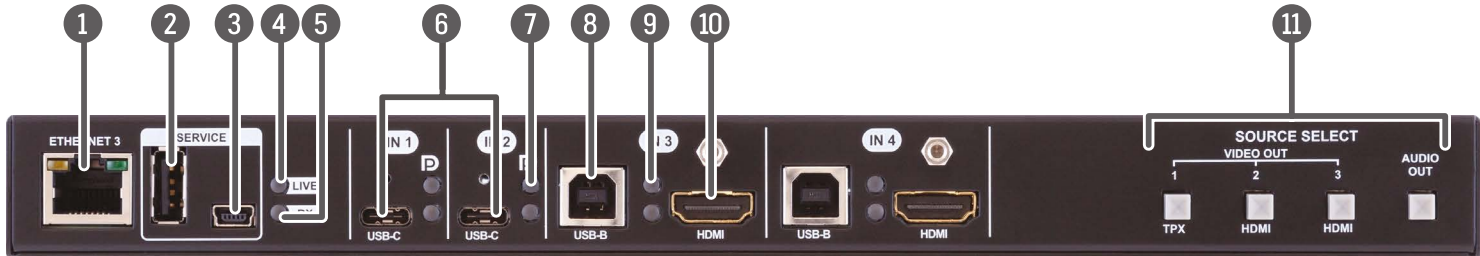
1	**Configurable Ethernet port**	RJ45 connector for configurable 1GBase-T Ethernet communication.
2	**USB-A port**	The SERVICE-labelled USB-A connector is designed for service funtions.
3	**Micro USB port**	The SERVICE-labelled USB mini-B port is designed for service functions.
4	**LIVE LED**	blinking — The device is powered on and operational. off — The device is not powered or out of operation.
5	**RX LED**	Function will be implemented in a later release.
6	**USB-C ports**	USB-C port for receiving video and audio signals, as well as USB data from the host device.
7	**Status LEDs**	For the details, see the table on the right.
8	**USB-B ports**	Upstream ports for connecting USB host devices (e.g. computer).
9	**Status LEDs**	For the details, see the table on the right.
10	**HDMI input ports**	HDMI input port for receiving video and audio signals.
11	**Input selection buttons**	For more details on the button functionality, see the table on the other side. When the LEDs blink green three times after pressing the button, they show that the front panel lock is enabled.

⚠ Always use the supplied power supply. Warranty void if damage occurs due to use of a different power source.

Rear view (UCX-4x3-TPX-TX20)

|		
1	**DC input**	DC input for local powering. Connect the output to the 2-pole Phoenix connector. For more details, see the powering options on the next page.
2	**USB-A ports**	Downstream ports for connecting USB peripherals (e.g. camera, keyboard, multitouch display).
3	**TPX output port**	RJ45 connector for AVX output signal transmission. See more details about the connector in the Power Supply Options and the Status LEDs sections.
4	**HDMI output ports**	HDMI output ports for sending video and audio signals to the receiver.
5	**Status LEDs**	For more information, see the table on the right.
6	**Analog Audio output port**	Audio output port (5-pole Phoenix®) for balanced analog audio output signal. The signal is de-embedded from the selected video signal.
7	**RS-232 ports**	3-pole Phoenix® connectors for bi-directional RS-232 communication.
8	**GPIO port**	8-pole Phoenix® connector for configurable general purpose. Max. input/output voltage is 5V, see the details on the next page.
9	**Configurable Ethernet ports**	RJ45 connectors for configurable 1GBase-T Ethernet communication.

ℹ The overall power supply of the USB-A connectors is beyond 1.5A, which makes it possible to supply devices with higher voltage requirements.

ℹ Some ports are not available on certain models. See the User Manual for more information.

Front view (HDMI-UCX-TPX-RX107)
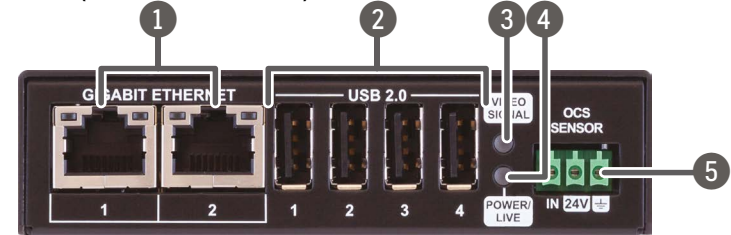
|		
1	**Gigabit Ethernet ports**	1Gbase-T RJ45 connectors for user Ethernet purpose.
2	**USB-A ports**	Downstream ports for connecting USB peripherals (e.g. camera, keyboard, multitouch display).
3	**Video signal LED**	For more information, see the table on the right.
4	**Power/LIVE LED**	off — Device is not powered. blinking between 50% and 100% brightness (green) — Device is powered on and operational.
5	**OCS sensor**	3-pole Phoenix® connector (male) for connecting an occupancy sensor. The port provides 24V output voltage (50mA).

ℹ The overall power supply of the USB-A connectors is beyond 1.5A, which makes it possible to supply devices with higher voltage requirements.

Rear view (HDMI-UCX-TPX-RX107)
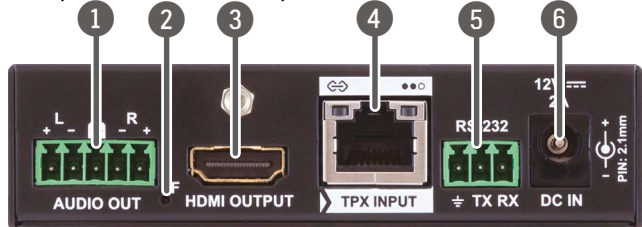
1	**Analog audio output port**	Audio output port (5-pole Phoenix®) for balanced analog audio output signal. The signal is de-embedded from the selected video signal.
2	**Factory reset button**	Hidden button for setting the device to factory default values.
3	**HDMI output port**	HDMI output ports for connecting sink devices (e.g. displays).
4	**TPX input port**	RJ45 connector for AVX input signal transmission. See more details about the connector in the Power Supply Options and the Status LEDs sections.
5	**RS-232 port**	3-pole Phoenix® connector for bi-directional RS-232 communication.
6	**DC input**	DC input for local powering. For more details, see the powering options next page.

Status LEDs

Video Input Status LED (the upper one)

	State	Description
●	on	There is a valid video signal on this port.
○	off	There is no valid video signal on this port.
☀	blink once	The port is selected by a button press.

USB Status LED (the lower one)

	State	Description
●	on	The USB Host is connected and selected.
○	off	No USB Host or deselected port.
☀	blink once	Port selected by a button press.

VIDEO SIGNAL		Transmitter / Receiver
○	off	No video signal detected on the HDMI input (TX) or HDMI output (RX) port.
●	on (green)	Video signal is detected on the HDMI input (TX) or HDMI output (RX) port.

TPX INPUT/OUTPUT	🔗	Transmitter / Receiver
☐	off	No connection is established between the transmitter and the receiver units.
☐	on (green)	Connection is established with 10G / 5G / 2.5G bandwidth.

TPX INPUT/OUTPUT	●●○	Transmitter / Receiver
☐	off	No data transmission on the port.
☀	blinking (green)	Data transmission is active.

GIGABIT ETHERNET - LEFT LED		Transmitter / Receiver
☐	on (green)	Connection is established with 100Mbps bandwith.
☀	blinking (green)	Data transmission is active.

GIGABIT ETHERNET - RIGHT LED		Transmitter / Receiver
☐	on (green)	Connection is established with 1Gbps bandwith.
☀	blinking (green)	Data transmission is active.

Rear Panel LEDs

Video Output Status		Transmitter
●	on	The video signal is present.
○	off	The signal is not present or muted.

Port diagram for video / audio (UCX-4x3-TPX-TX20)

- Welcome screen I5
- USB-C in I1 → USB-C to HDMI converter
- USB-C in I2 → USB-C to HDMI converter — Digital audio/video
- HDMI in I3 — Digital audio/video
- HDMI in I4 — Digital audio/video
- 4x4 audio/video crosspoint
- Digital audio/video → IP packetizer → IP packges → TPX out O1
- Digital audio/video → HDMI out O2
- Digital audio/video → HDMI out O3
- Audio de-embedder → De-embedded audio → D/A converter → Analog audio → Analog audio out

Port diagram for video / audio (HDMI-UCX-TPX-RX107)

- TPX input → IP de-packetizer — Digital audio/video → HDMI output
- Audio de-embedder → De-embedded audio → D/A converter → Analog audio → Analog audio out
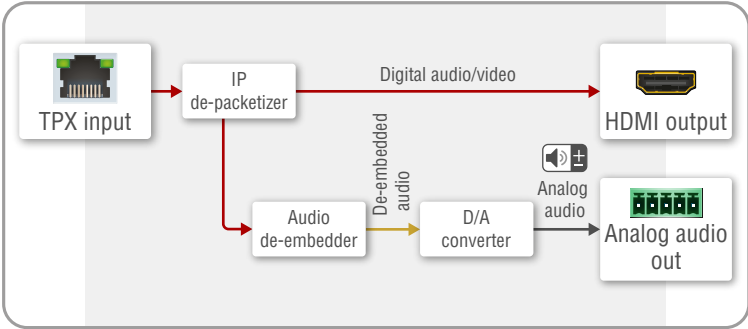
RS-232

The switcher provides a 3-pole Phoenix® connector for bi-directional serial communication. The signal levels are the following:

	Output voltage (V)
Logic low level	3 - 15
Logic high level	-15 - 3

Plug pin assignment: **1**: Ground, **2**: TX data, **3**: RX data

GPIO (General Purpose Input/Output Ports)

The device has seven GPIO pins that operate at TTL digital signal levels and can be set to high or low level (Push-Pull). The direction of the pins can be input or output (adjustable). The signal levels are the following:

	Input voltage (V)	Output voltage (V)	Max. current (mA)
Logic low level	0 - 0.8	0 - 0.5	30
Logic high level	2 -5	4.5 - 5	18

Plug pin assignment **1-6**: Configurable; **7**: 5V (max. 500 mA); **8**: Ground

The recommended cable for the connectors is the AWG24 (0.2 mm² diameter) or the generally used 'alarm cable' with 4x0.22 mm² wires.

ℹ *The maximum total current for the six GPIO pins is 180 mA, the max. supported input/output voltage is 5V.*

OCS (Occupancy) Sensor

The switcher is supplied with a 3-pole Phoenix® connector (male), which is for connecting an OCS sensor.

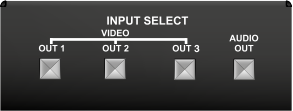Plug pin assignment: **1**: Configurable; **2**: 24V (max. 50 mA); **3**: Ground

The signal levels for the Pin 1	Input voltage (V)	Max. current (mA)
Logic low level	0 - 0.8	30
Logic high level	2 -5	18

⚠ *The occupancy sensor connector and the GPIO port are not compatible with each other because of the voltage level difference, please do not connect them directly.*

Connecting steps

Transmitter Side

- Laptop — 2x — USB-C
- 4K PC — 2x — HDMI in, USB-B
- 4K TV — 2x — HDMI out, RS-232
- Active speakers — Audio out
- UCX-4x3-TPX-TX20 transmitter
- Power, USB-A, GPIO, Ethernet
- Power outlet
- 4x Keyboard, mouse, etc.
- Relay box
- Ethernet switch

Receiver Side

- 4K projector — HDMI out, RS-232
- Audio amplifier — Audio out
- Webcam — 4x — USB-A
- HDMI-UCX-TPX-RX107 receiver
- Power, OCS, Ethernet
- Power adaptor*
- OCS sensor
- Ethernet switch
- TPX

Transmitter Side

TPX	Connect a CATx cable between the TPX output port of the transmitter and the TPX input port of the receiver.
USB-C	Connect a USB-C source to the USB-C input port. The applied cable shall be certified for Displayport Alternate mode HBR2 (4x5.4Gbps) applications.
HDMI in	Connect a source to the HDMI input port of the transmitter by a HDMI cable.
USB-B	Optionally connect the USB host.
HDMI out	Connect a sink to the HDMI input port of the transmitter by a HDMI cable.
RS-232	Optionally for RS-232: connect a device to the RS-232 port.
Audio out	Optionally for analog output: connect an audio device to the analog audio output port by an audio cable.
USB-A	Optionally connect USB peripherals to the USB-A ports with USB cables.
GPIO	Optionally connect a controller/controlled device to the GPIO port.
Ethernet	Optionally connect the device to a LAN network.
Power	Powering on the devices is recommended to do as the final step during the installation. Please check the *Power Supply Options* section for the details.

Receiver Side

TPX	Connect a CATx cable between the TPX output port of the transmitter and the TPX input port of the receiver.
HDMI out	Connect the sink to the HDMI output port of the receiver by a HDMI cable.
RS-232	Optionally for RS-232: connect a device to the RS-232 port.
Audio out	Optionally for analog output: connect an audio device to the analog audio output port by an audio cable.
USB-A	Optionally connect USB peripherals to the USB-A ports with USB cables.
OCS	Optionally connect an occupancy sensor to the OCS port.
Ethernet	Connect the device to a LAN network.
Power	Powering on the devices is recommended to do as the final step during the installation. Please check the *Power Supply Options* section for the details.

⚠ *Only connect one of the devices to the LAN, in order to avoid creating a network loop!*

* Powering via the power adaptor is only necessary if the Receiver is not powered over the Etherenet by the Transmitter.

Powering options

The UCX-4x3-TPX-TX20 is capable of charging a device with 100W over one USB-C port and another device with 20W over the other USB-C port, or charging with 60W over both ports.

It is also capable of providing the HDMI-UCX-TPX-RX107 device with remote power through the TPX ports.

The devices can be powered in any of the following ways:

1. Local adaptor for both TX and RX

- 24V DC Power adaptor
- UCX-4x3-TPX-TX20
- 12V DC Power adaptor
- CATx (AVX)
- HDMI-UCX-TPX-RX107

2. Local adaptor for TX and remote power to RX

- 24V DC Power adaptor
- Power send
- UCX-4x3-TPX-TX20
- CATx (AVX)
- HDMI-UCX-TPX-RX107

Factory default settings (UCX-4x3-TPX-TX20)

IP address	Dynamic (DHCP is enabled)
Hostname	lightware-<serialno>
Video Crosspoint setting	I1 on O1, I2 on O2, I3 on O3
HDCP mode (in)	HDCP 2.2
HDCP mode (out)	Auto
Signal type	Auto
Emulated EDID	F47 - (Universal HDMI with PCM audio)
Audio Crosspoint setting	I1 on O4
Analog audio output levels	Volume (dB): 0.00; Balance: 0 (center)
Video Autoselect	Disabled
USB-C Power Limit	60W / 60W
DP Alternate Mode Policy	Auto
Port Power Role	Dual Role
USB Autoselect	Follow video O1
D1-D4 Power 5V Mode	Auto
RS-232 port setting (UCX-4x3-TPX-TX20)	9600 BAUD, 8, N, 1
RS-232 port setting (HDMI-UCX-TPX-RX107)	115200 BAUD, 8, N, 1
RS-232 serial over IP	Enabled
HTTP, HTTPS	Enabled
HTTP, HTTPS authentication	Disabled
LARA	Disabled

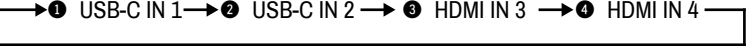## Button functionality - Video Source Selection

UCX-4x3-TPX-TX20

Push the **OUT1** button to set the video input to the TPX OUT1 port.

Push the **OUT2** button to set the video input to the HDMI OUT2 port.

Push the **OUT3** button to set the video input to the HDMI OUT3 port.

Push the **AUDIO OUT** button to set the audio source of the analog audio output.The sequence is the following (both for the video and audio switching):

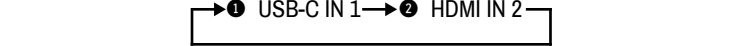❶ USB-C IN 1 → ❷ USB-C IN 2 → ❸ HDMI IN 3 → ❹ HDMI IN 4

UCX-2x1-TPX-TX20

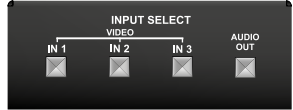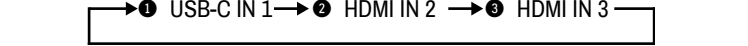Push the **IN1** button to select the USB-C port as input for the TPX output port..

Push the **IN2** button to select the HDMI port as input for the TPX output port.

Push the **AUDIO OUT** button to set the audio source of the analog audio output.The sequence is the following for the video switching:

❶ USB-C IN 1 → ❷ HDMI IN 2

DCX-3x1-TPX-TX10

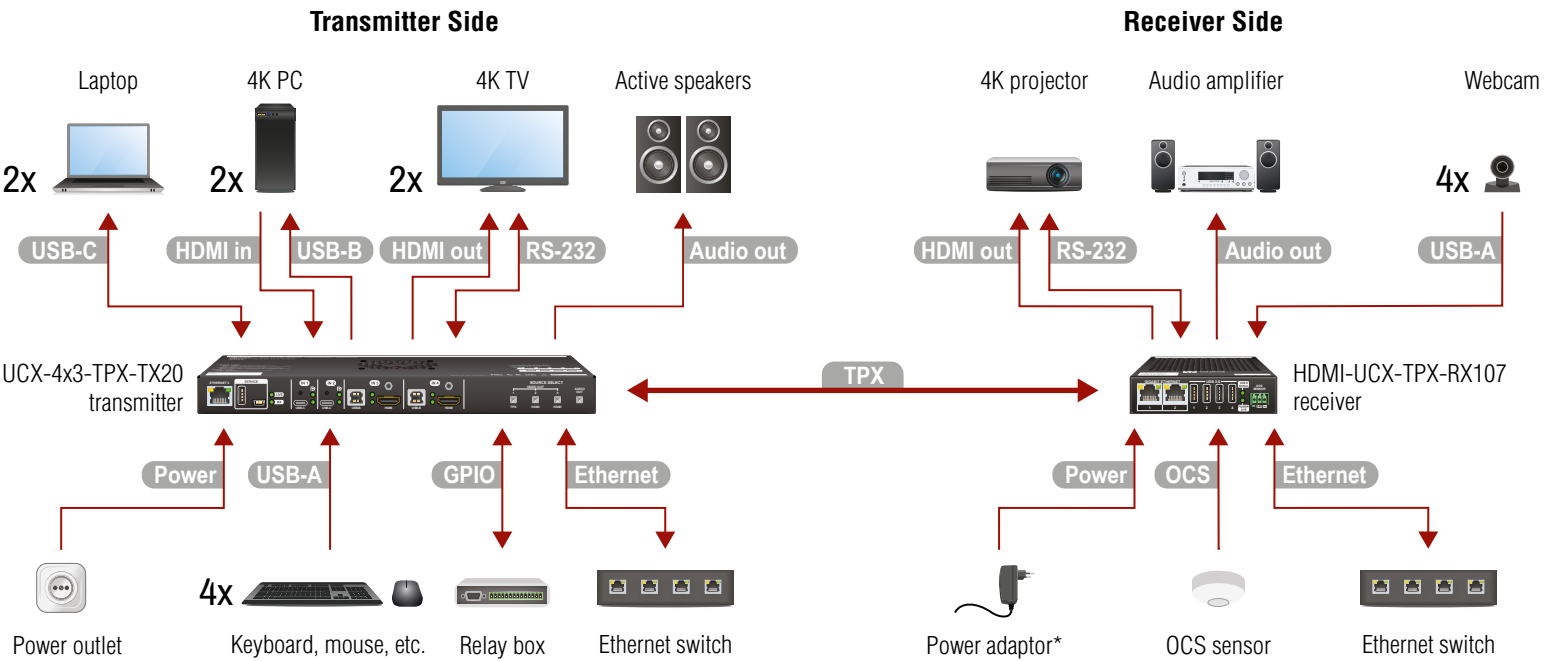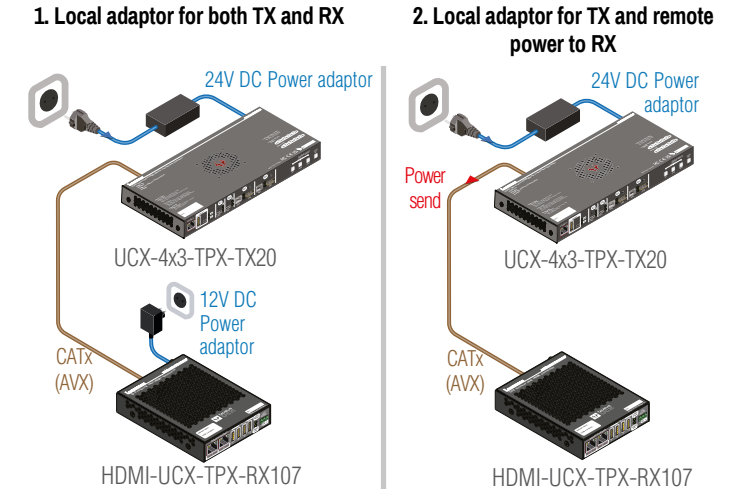Push the **IN1** button to select the USB-C port as input for the TPX output port..

Push the **IN2** button to select the HDMI IN2 port as input for the TPX output port.

Push the **IN3** button to select the HDMI IN3 port as input for the TPX output port.

Push the **AUDIO OUT** button to set the audio source of the analog audio output.The sequence is the following for the video switching:

❶ USB-C IN 1 → ❷ HDMI IN 2 → ❸ HDMI IN 3