



RAV-MS-4x2/HDMI/USB-C & RAV-HDBT/TxRx
User Manual

4x2 matrix conferencing auto-switcher



RAV-HDBT/TxRX



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SAFETY INSTRUCTIONS



- The equipment should be operated only from the power source indicated on the product.
- To disconnect the equipment safely from power, remove the power cord from the rear of the equipment or from the power source. The plug is used as the disconnect device, the disconnect device shall remain readily operable.
- There are no user-serviceable parts inside of the unit. Removal of the cover will expose dangerous voltages. To avoid personal

injury, do not remove the cover. Do not operate the unit without the cover installed.

- The appliance must be safely connected to multimedia systems.
 - Follow instructions described in this manual.
-



- For the correct ventilation and to avoid overheating, ensure enough free space around the appliance. Do not cover the appliance, leave the ventilation holes free and never block or bypass the ventilators (if there are any).
-



- The devices shall not be exposed to dripping or splashing, and no objects filled with liquids, such as vases, shall be placed on the devices.
-

1. RAV-MS-4x2HDMI/USB-C

1.1 OVERVIEW

The **RAV-MS-4x2HDMI/USB-C** enhances and extends the possibilities of a meeting room and allows meeting participants to easily use their own devices such as laptops and preferred video conference platforms, while also utilizing the available assets of the meeting space, for example HDMI displays, room cameras and other USB peripherals.

The **RAV-MS-4x2HDMI/USB-C** is a 4x2 conference presentation switcher, it is specially designed for conference room scenarios, featuring various models and specifications to meet diverse user needs. It supports 4x2 matrix switching and optional long-distance video, audio, and USB transmission via HDBT 3.0 technology.

Equipped with dual USB-C full-featured and dual HDMI+USB 3.0 inputs, it can connect multiple laptops or desktop computers. It supports 4 local USB 3.0 device ports, enabling connection to various USB conference devices such as USB cameras, audio-bars, and USB speakers, and can extend USB connectivity over long distances via HDBT. The USB-C connectivity for a simplified transmission of 4K video, audio, control signals and power, and allows data speeds of up to 5 Gbps under the USB 3.1 Gen1 and allowing video resolution capabilities up to 4K@60Hz at 4:4:4.

The **RAV-MS-4x2HDMI/USB-C** is designed to be a centrepiece of any collaboration space and can be connected to USB peripherals via USB-A type connectors. The series allows the hosts to be connected to the system and ensures quick and easy switching between these hosts, making this universal switcher a perfect fit for small to large meeting rooms.

The **RAV-MS-4x2HDMI/USB-C** offers flexible audio configuration, allowing HDMI audio, USB audio, and Dante audio to be output through a local balanced audio output port, also with the option to output conference audio to remote Dante-supported devices through the Dante port.

It supports multiple control interfaces, including RS232, GPIO, RELAY, and Sensor interfaces, for seamless integration with various controlled devices. With complete network functionality, it provides 2 independent RJ-45 interfaces and supports USB-to-Ethernet functions. Through the VLAN division and 802.1x setting, switcher and USB networks can be separated to meet security requirements.

Audio capabilities include analogue audio de-embedding feature, as well as support for DANTE/AES67 network connection to send DANTE/AES67 audio stream directly to a dedicated audio system.

It provides multiple switching options, including automatic switching, manual switching, and configuration priority switching. It also supports HTTP and HTTPS configuration, 802.1x security, CEC and RS232 configuration, customized GPIO function, and comes with built-in Web UI and API control.

Note: Dante® is a registered trademark of Audinate Pty Ltd.

1.2 FEATURES

- **4K Video:** High bandwidth allows extension of resolutions up to 4K60Hz 4:4:4.
- **4x2 conference presentation switch,** integrating video, audio, USB, control and ethernet.
- **Dual USB-C and dual HDMI + USB Host** inputs, and all ports support cable lock connections.
- **Full-featured USB-C inputs,** supports 4K video, USB 3.2 data, USB ethernet and 60W charging. USB Type C port ensures USB-C connectivity to the source device with USB 3.1 data and DisplayPort Alternate mode for video. It provides power delivery (PD) of up to 60 W for the connected device (e.g. BYOD laptop or smartphone).

- **One USB-C input supports MST** for dual-screen conferencing applications.
- **Supports automatic switching**, USB and video independent switching, priority switching, and other switching methods. The Auto-switching feature can sense the port status on the video input and USB Host ports and select them automatically. Priority number can be set for each input port, and the feature allows to set various modes for the automatic input selection.
- **Provides four USB 3.2 device ports** for connecting conference equipment, such as cameras and speakerphone.
- **Provides one balanced audio out** for connecting audio equipment, and supports audio de-embedding, UAC, and Dante. The analogue audio can be **de-embedded** from HDMI inputs, and it can be routed to the analogue audio output.
- **Provides 100m HDBT 3.0 output** for video and USB extension applications in medium and large conference rooms.
- **Bi-directional RS232**: AV systems can also contain serial port controllers and controlled devices. Serial transmission supports any unit that works with standard RS-232.
- **GPIO, RELAY, and OCS Sensor** (Occupancy Sensor Connectors) ports to connect various control and controlled devices. Six GPIO pins operating at TTL digital signal levels that can be controlled with LW3 commands. 5V is supplied over the 7th pin constantly, up to 500 mA.
- One **USB charge-only port** is connected to the conference table to provide a charging function for mobile phones.
- Each input port provides an **independent USB to Ethernet bridge**, providing a 1G ethernet connection to the connected computer.
- **Provides two independent RJ-45 ports** for ethernet switch or VLAN Setting. help prevent unauthorised access to the ReThink device. Ensure company network and guest network are separate.
- Supports one RJ-45 port for 2x2 **Dante**.
- **Supports ethernet control**, multiple simultaneous TCP/IP connections are available with a simple ASCII-based protocol for controlling or configuring the product, or to perform a firmware update.
- **IT security**: supports HTTP and HTTPS and supports 802.1x authentication.
- **The switcher fulfils the HDCP standard**. HDCP capability on the digital video inputs can be disabled when non-protected content is used.

1.3 PACKAGE CONTENTS

- 1 x RAV-MS-4x2HDMI/USB-C
- 1 x DC 20V/10A Power Adapter
- 1 x AC Power Cord with US Pins

- 2 x USB 3.2 Type-C to Type-C Cable (L = 2m)
- 2 x USB 3.0 Type-A to Type-B Cable (L = 1.8m)
- 1 x 3.5mm 3-Pin Phoenix Male Connector
- 2 x 3.5mm 3-Pin Phoenix Male Connector (Double Layer)
- 1 x 3.5mm 5-Pin Phoenix Male Connector
- 1 x 3.5mm 6-Pin Phoenix Male Connector
- 4 x Mounting Brackets (with Screws)

1.4 SPECIFICATIONS

Model	RAV-MS-4x2HDMI/USB-C
Name	4x2 matrix conferencing auto-switcher
Input/Output Port	2 x HDMI IN, 2 x USB-C IN, 2 x HDMI OUT, 1 x HDBT, 2 x USB HOST (USB Type-B), 1 x AUDIO OUT (3.5mm, 5-pin phoenix connector), 4 x USB DEVICE (USB Type-A), 2 x RS232, 1 x GPIO (3.5mm, 6-pin phoenix connector), 2 x RELAY, 1 x SENSOR, 2 x ETHERNET (RJ45), 1 x DANTE (RJ45), 1 x DC 20V
Input/Output Signal Type	Supports HDMI 2.0 standard, up to 4K@60Hz 4:4:4 8bit or 4K@60Hz 4:2:2 12bit. Supports HDCP 2.2/1.4.
USB HOST IN 1 & 2	Supports USB 3.2 Gen 2x1 standard, up to 10Gbit/s
USB-C IN 3 & 4	USB-C IN 3: USB-C supports USB 3.2 Gen 2x1 standard, and supports: Video: DP alt mode, SST only, up to 4K@60Hz. USB data: Up to 10Gbit/s. Charging: 60W. USB-C IN 4: USB-C supports USB 3.2 Gen 2x1 standard, and supports: Video: DP alt mode, MST dual output, up to 4K@60Hz. USB data: Up to 10Gbit/s. Charging: 60W.
USB DEVICE	Maximum supports USB 3.2 Gen 2x1 standard, up to 10Gbit/s. 5V/1.5A output per port.

Input/Output Resolution Supported	VESA (60Hz): 800 x 600, 1024 x 768, 1280 x 768, 1280 x 800, 1280 x 960, 1280 x 1024, 1360 x 768, 1366 x 768, 1440 x 900, 1600 x 900, 1600 x 1200, 1680 x 1050, 1920 x 1200, 2048 x 1152, 2560 x 1440, 3440 x 1440 CTA: 1280x720P50Hz/60Hz, 1920x1080P24/25/30/48/50/60Hz , 3840x2160P24/25/30/48/50/60Hz, 4096x2160P24/25/30/48/50/60Hz
HDR	All HDR formats, including HDR 10, HLG, HDR 10+ and Dolby Vision
Audio Format	USB-C IN/HDMI IN/ HDMI OUT: Up to 7.1ch, including PCM 2.0/5.1/7.1ch, Dolby Digital, Dolby Digital Plus, Dolby TrueHD, Dolby Atmos, DTS 5.1, DTS-HD Master Audio and DTS:X. Audio de-embedding: Stereo only. Dante: Stereo only.
ETHERNET	1,000M/100M adaptive network
Maximum Data Rate	USB-C IN: 10Gbit/s (per lane) HDMI: 18Gbps USB 3.2: 10Gbit/s
Control Method	Front Panel Buttons, RS232, LAN (Telnet & Web UI)
Operating Temperature	0°C to 45°C (32°F to 113°F)
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Humidity	10% to 90%, non-condensing
ESD Protection	Human-body Model: ±8kV (Air-gap discharge)/±4kV (Contact discharge)
Power Supply	DC 20V, 10A
Power Consumption (Max)	Without USB and Charging: 13.1W With USB + Charging: 155.6W
Device Dimension (W x H x D)	325mm x 25mm x 180.2mm / 12.80" x 0.98" x 7.09" (without mounting brackets)
Product Weight	1.45kg/3.20lbs

1.5 TRANSMISSION DISTANCE

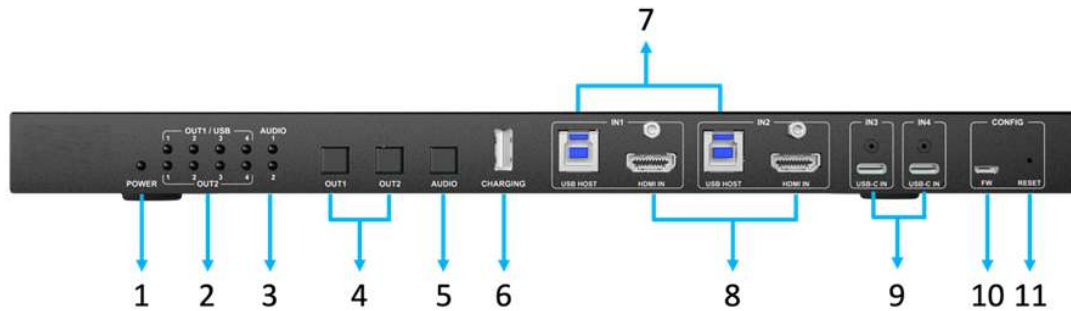
Note:

- T568B straight-through category cable is recommended.
- Please use F/FTP or U/FTP cable, and don't use UTP, F/UTP, or U/UTP cables.

Port	Cable Type	Range	Supported Video
HDBT 3.0	Cat 6A/7 (U/FTP, F/FTP or S/FTP)	100m/330ft	4K@60Hz (All) 4K@30Hz (All) 1080P@60Hz (All)
	Cat 5E/6	70m/230ft	4K@60Hz 4:2:0 24bpp 4K@30Hz (All) 1080P@60Hz (All)
		40m/131ft	4K@60Hz 4:4:4 24bpp 4K@60Hz 4:2:2 36bpp
USB-C	USB C to C	2m/7ft	4K@60Hz (All) 4K@30Hz (All) 1080P@60Hz (All)
HDMI	HDMI cable	Input/Output: 10m/33ft	4K@60Hz 4:2:0 24bpp 4K@30Hz (All) 1080P@60Hz (All)
		Input/Output: 5m/16ft	4K@60Hz 4:4:4 24bpp
Port	Cable Type	Range	Supported Video
			4K@60Hz 4:2:2 36bpp

1.6 PANEL DESCRIPTION

1.6.1 FRONT PANEL



ID	Name	Description
1	POWER LED	On: The device is powered on. Off: The device is powered off.
2	OUTPUT 1 / USB LEDs and OUTPUT 2 LEDs	Red: USB devices are connected to the corresponding USB host. Green: The corresponding video input is selected, or the corresponding video input and USB host are selected. Off: The corresponding input are not selected.
3	AUDIO 1&2 LEDs	On: The corresponding de-embedded audio from HDMI OUT 1/2 is selected as source. Off: The corresponding de-embedded audio from HDMI OUT 1/2 is not selected as source for AUDIO OUT.
4	OUTPUT 1&2 Selection Button	Press the button to select input source for HDMI OUT 1/2.
5	AUDIO OUT Selection Button	Press the button to switch the audio source between the de-embedded audio from HDMI OUT 1 and HDMI OUT 2 for AUDIO OUT port.
6	Charging	USB 2.0 Type-A port. 5V/2A USB charging.
7	USB HOST 1&2	USB 3.2 type-B ports. Connect to USB HOST devices. USB HOST 1 and USB HOST 2 are bound with HDMI IN 1 and HDMI IN 2 respectively. The two ports support Ethernet bridge, the laptop connected to the two ports can access the network the ETHERNET ports connected. The two USB Host ports and two USB type-C ports share 1G network.

8	HDMI IN	Connect to HDMI sources.
9	INPUT 3&4 (USB-C IN)	USB 3.2 type-C ports. Connect to USB-C sources. The two full-featured USB-C ports support the following three functions: Supports audio, video and USB signal transmission, maximum 10Gbit/s data rate. USB-C IN 3 and 4 support DP SST, one video output with 4K signal transmission. USB-C IN 4 supports DP MST, two video outputs with 4K signal of each channel transmission. Supports PD 3.0 and can supply up to 60W power for the connected device. Supports 1G network connection, the laptop connected with these ports can access the ethernet the matrix connected. The following cable are recommended to use: USB Type-C to Type-C cable (USB 3.2 Gen 1x1 or above)
10	FW	Micro-USB port. For ARM firmware upgrade.
9	RESET	Insert a tool such as a needle. Press and hold it for about 5s: Reset the IP settings, including reset the IP mode to DHCP, and reset the login password to "admin". Press and hold it for about 15s: Reset the device to factory defaults.



Push **OUT1** to select the video input for the HDMI OUT1 port.

Push **OUT2** to select the video input for the HDMI OUT2 port.

Push **OUT3** to select the video input for the HDMI OUT3 port.

Push **AUDIO** to set the audio source of the analogue audio output.

The sequence is the following (both for the video and audio switching):



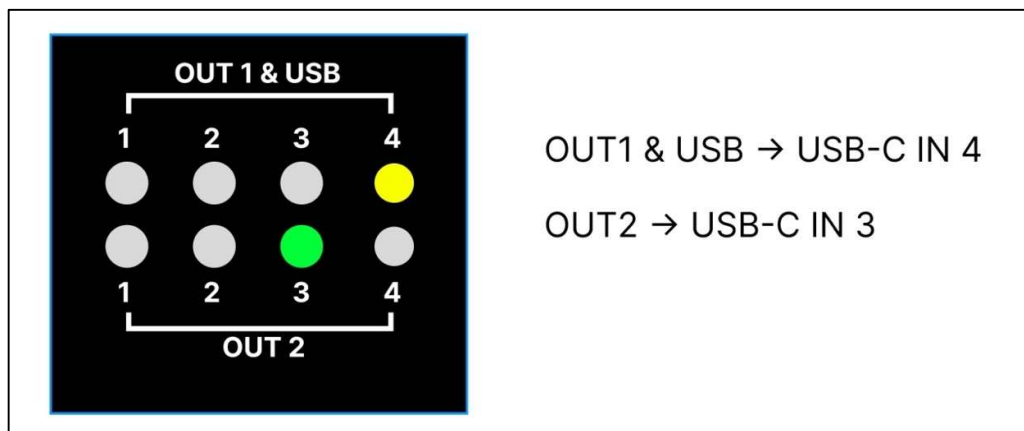
The **RAV-MS-4x2HDMI/USB-C** supports 2 rows and 4 columns of video & USB indicator LEDs on the front panel. MS42 supports 2 rows and 1 column of audio indicator LEDs on the front panel.

- All LED lights support Three colours: green, red and yellow. ➤
- The colour of the LED **indicator** is as follows:

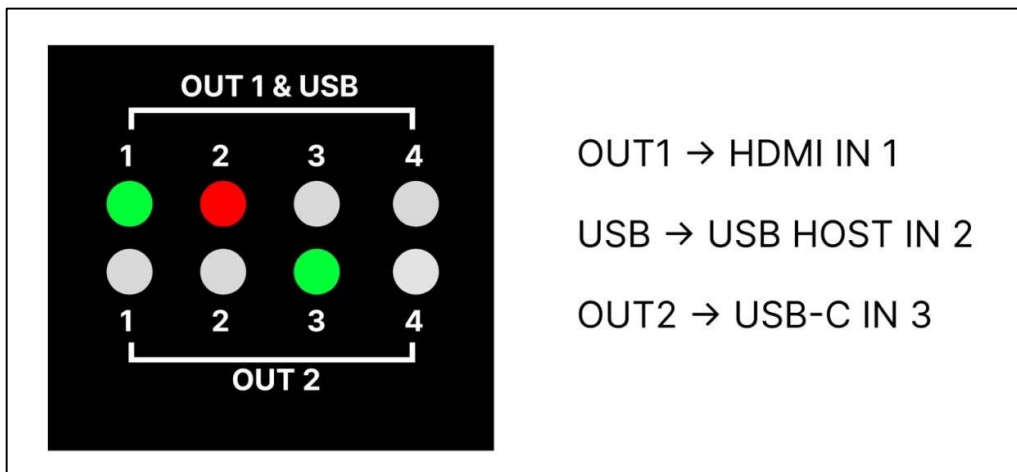
	Red: Selected USB input
	Green: Selected video/audio input
	Yellow: Selected video and USB input
	White: Unselected input

Note: USB Switch does not have independent switch button. When USB follows video, USB will use the video button to switch.

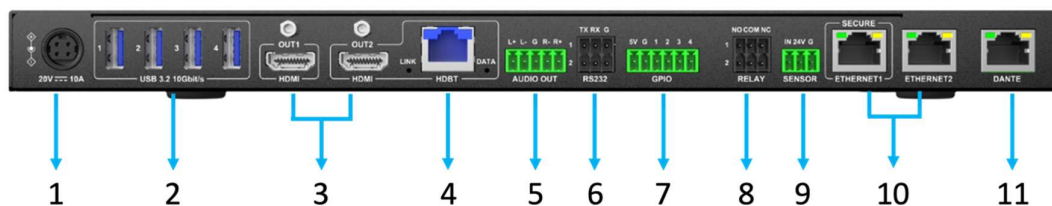
- Example 1: USB Follow HDMI OUT 1.



➤ Example 1: USB Follow HDMI OUT 1.



1.6.2 REAR PANEL



ID	Name	Description
1	20V/10A	Connect to the power adapter provided.
2	USB DEVICE	USB 3.2 type-A ports, 5V/1.5A output per port. Connect to USB devices such as camera and speakerphone.

3	HDMI OUT (1~2)	Connect to the HDMI display devices. HDMI OUT 2 is mirrored with HDBT port.
4	HDBT	Connect to an HDBT 3.0 receiver (RAV-HDBT/TXRX)
5	AUDIO OUT	Connect to an audio receiver.
6	RS232 1 & 2	RS232 1: Connect to a RS232 control device for API control or connect to a 3rd party device for RS232 routing. RS232 2: Connect to a RS232 3rd party device for RS232 routing.
7	GPIO	Connect to GPIO devices. The device supports connecting to 6 GPIO devices.
8	RELAY 1 & 2	Connect to relay devices for relay control.
9	ETHERNET 1 (SECURE) & 2	Connect to a network device (e.g., network switch, router, computer, etc.) for LAN control (Web UI & Telnet). VLAN function can be configured via API commands and web UI, please refer to the separate document "API Command Set_RAV-MS-4x2HDMI/USB-C" or "Network" part in "Web UI Control" section.
		Green (LED): - Lighting: The connection speed is 1000Mb/s. - OFF: The connection speed is 100Mb/s or 10Mb/s. Yellow (LED): - Blink: Data transmission.
7	Dante	Connect to the network for Dante audio connection.

2. RAV-HDBT/TxRx

2.1 OVERVIEW

The RAV-HDBT/TxRx is an HDBT 3.0 extender based on the new generation of HDBT 3.0 platform, which can transmit the uncompressed HDMI2.0 video signal up to 4K@60Hz 4:4:4 8-bit over 100m Cat 6a cable.

2.2 FEATURES

- **Transceiver design.** It can be arbitrarily set as a transmitter or a receiver and can be switched at any time, making the installation easier.
- **Uncompressed video.** It transmits 4K@60Hz 4:4:4 8-bit signal without compression and supports any HDR format, including Dolby Vision and HDR10+.
- **KVM.** Supports USB 2.0 & analogue audio pass through with variable direction.
- **HDMI loop-out.** It supports local HDMI loop-out when it is set as transmitter mode.
- **Audio de-embedding.** Supports audio de-embedding at both ends.
- **1G/100Mbps network.** Supports 1G/100M adaptive network transparent transmission.
- **Multiple signals** transmission support (e.g. IR, RS232).
- **Two-way PoC/PoH.** Supports two-way PoC/PoH function, only need to connect one power adapter at one end, making the installation more flexible.

2.3 PACKAGE CONTENT

(Note: The Rx and Tx are in one box by default.)

- 1 x RAV-HDBT/TxRx
- 1 x DC 12V Power Adapter
- 1 x AC Power Cord (with US Pins)
- 1 x IR Emitter
- 1 x Broadband IR Receiver (30kHz-50kHz)
- 2 x Phoenix Male Connectors (3.5mm, 3 Pins)
- 2 x Mounting Brackets (with Screws)

2.4 SPECIFICATIONS

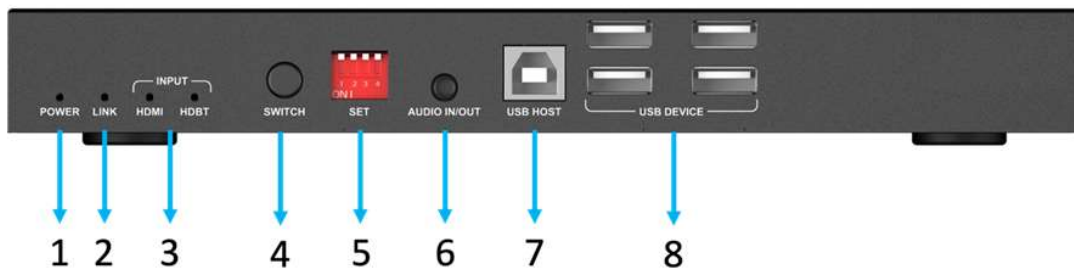
Model	RAV-HDBT/TxRx
Name	RAV-HDBT/TxRx
Video Input	Receiver mode: 1 x HDMI, 1 x HDBT Transmitter mode: 1 x HDMI
Input Video Signal	HDMI with 4K@60 YUV 4:4:4, HDCP 2.2

Video Output	Receiver: 1 x HDMI Transmitter: 1 x HDMI, 1 x HDBT
Output Video Signal	HDBT, HDMI
Input/Output Resolutions	4096 x 2160(24/30/50/59.94/60Hz, YUV 4:4:4), 3840 x 2160(24/30/60Hz, YUV 4:4:4), 2560x1600/60Hz, 2560x1440/60Hz, 1920x1200/60Hz, 1920x1080P/60Hz, 1680x1050/60Hz, 1600x1200/60Hz, 1600x900/60Hz, 1440x900/60Hz, 1366x768/60Hz, 1360x768/60Hz, 1280x1024/60Hz, 1280x960/60Hz, 1280x800/60Hz, 1280x768/60Hz, 1280x720/60Hz, 1024x768/60Hz, 800x600/60Hz.
Audio Input	1x analogue audio (pass-through)
Audio Output	1x analogue audio (pass-through) 1x analogue audio (audio de-embedding)
Audio Format	Audio In/Out: Stereo HDMI In/Out: Fully supports audio formats in HDMI 2.0 specification, including PCM 2.0/5.1/7.1, Dolby TrueHD, Dolby Atmos, DTS-HD Master Audio and DTS:X HDBT: Same as HDMI In/Out
Maximum Pixel Clock	600MHz
Maximum Data Rate	18Gbps
USB Spec	USB 2.0 and backward compatible with USB 1.1/1.0
USB Port	1x USB 2.0 host port (type-B) 4x USB 2.0 device ports (type-A)
Control Method	RS232
Transmission Distance	1080P: 100m 4K@60Hz 4:2:0: 100m 4K@60Hz 4:4:4: 100m over Cat 6a/7 cable
Operating Temperature	0°C to 45°C (32°F to 113°F)

Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Humidity	10% to 90%, non-condensing
ESD Protection	Human-body Model: ±8kV (Air-gap discharge)/±4kV (Contact discharge)
Power Supply	DC12V 3A
Power Consumption (Max)	TBD
Device Dimension (W x H x D)	215mm x 25mm x 120mm/8.46" x 0.98" x 4.72"
Product Net Weight	0.60kg/1.32lbs

2.5 PANEL DESCRIPTION

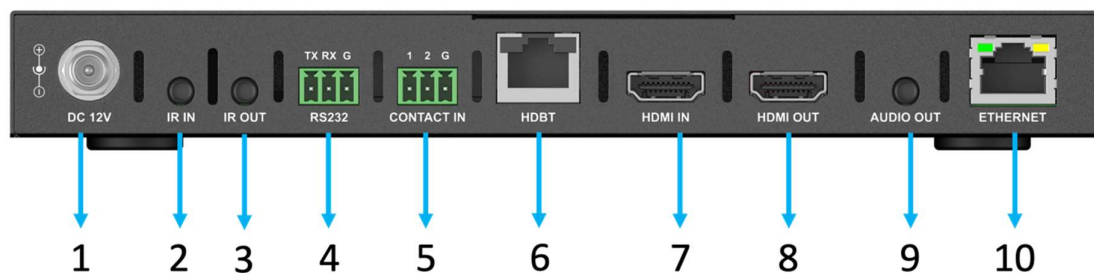
2.5.1 FRONT PANEL



ID	Name	Description
1	Power LED	On: The device is powered on. Off: The device is powered off.
2	Link LED	On: The HDBT ports between this device and another transceiver are connected. Off: The HDBT ports between this device and another transceiver are not connected.

3	Input	HDMI LED On: The HDMI In is selected as input video source. HDBT LED On: The HDBT is selected as input video source. Note: These two LED indicators indicate the input source selection status of receiver only.
4	Switch	Press this button to select the input video source between HDMI In and HDBT In for receiver.
5	Set	4-Pin DIP Switch for settings of transceiver's working mode (transmitter/receiver), USB mode (USB Host/USB Device), Audio In/Out and RS-232 working mode (RS232 pass-through, API control or firmware update). For more information, see "DIP Switch Settings" section.
6	Audio In/Out	This port can be configured as Audio Input or Audio Output port. For more information, see "DIP Switch Settings" section.
7	USB Host	USB 2.0 Type-B port. Connect to a USB host device (e.g. PC).
8	USB Device	USB 2.0 Type-A port. Connect to USB slave devices (e.g. keyboard, mouse, etc.).

2.5.2 REAR PANEL



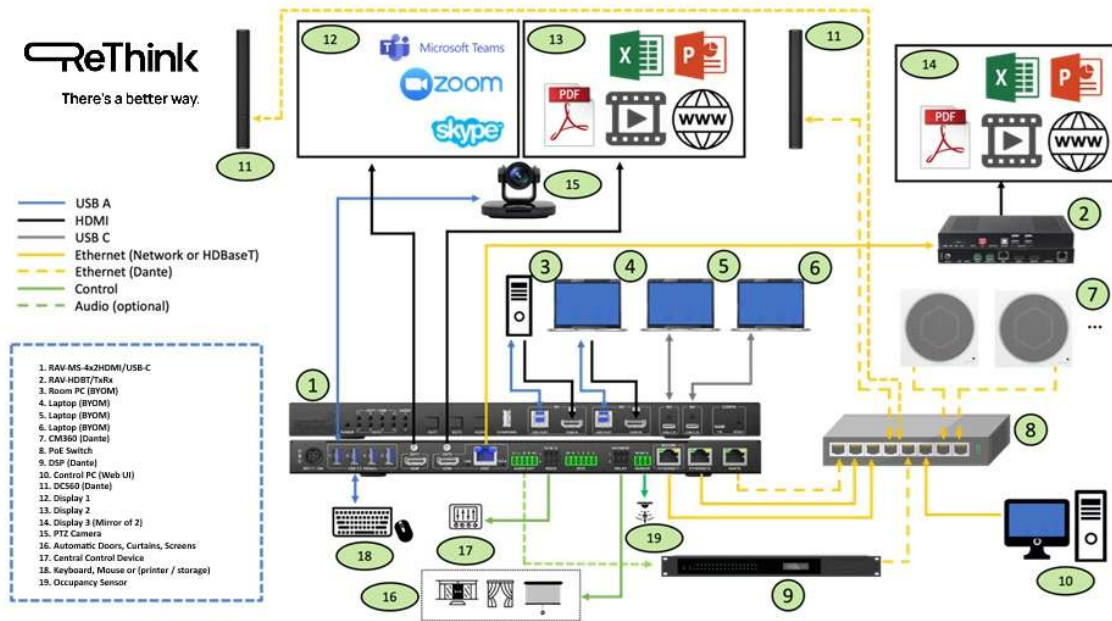
ID	Name	Description
1	DC 12V	Connect to the power adapter provided.
2	IR In	Connect to the IR receiver provided.
3	IR Out	Connect to the IR emitter provided.

4	RS232	Connect to a RS232 device for bi-directional RS232 pass-through, API control or firmware upgrade. The default baud rate of this port is 115200.
5	Contact In	Connect to a keypad or push button to select the input video source between HDMI In and HDBT In for receiver.
6	HDBT	Connect to another transceiver for HDBT transmission.
7	HDMI In	Connect to an HDMI source device.
8	HDMI Out	Connect to an HDMI display device.
9	Audio Out	Connect to an audio receiver (e.g. speaker) for audio de-embedding output.
10	Ethernet	Connect either side to the wireless router for Ethernet pass-through.

3. DIAGRAMS

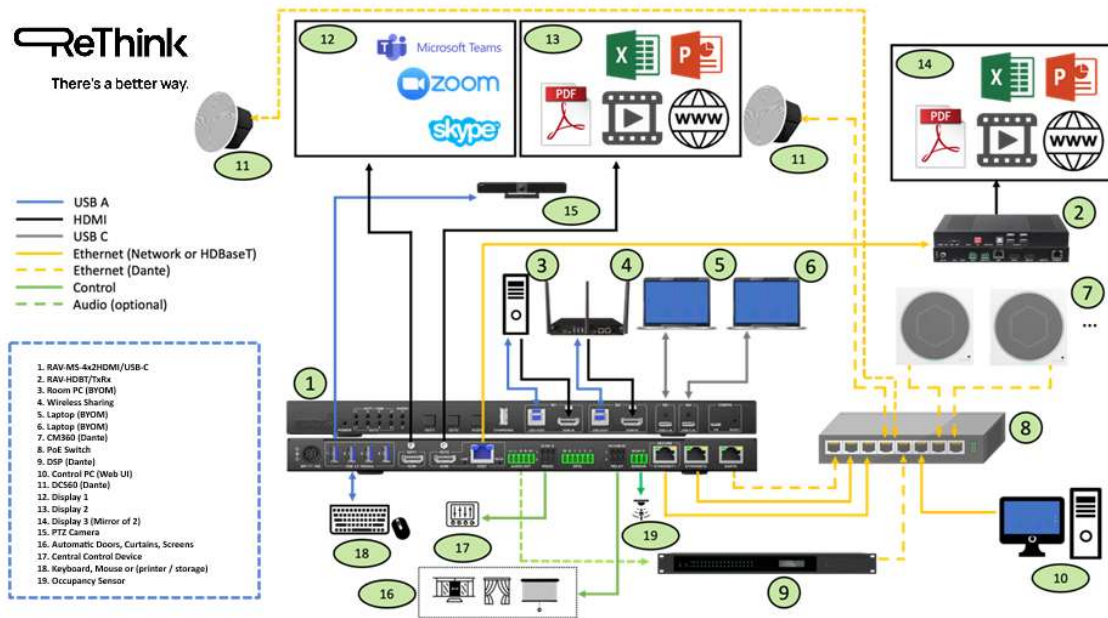
3.1 DIAGRAM #1

With Room PC, laptops, PTZ camera and Dante audio.



3.2 DIAGRAM #2

With Room PC, (BYOD/BYOM), laptops, camera video bar and Dante audio.



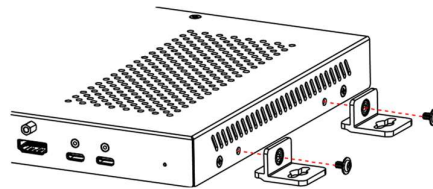
4. INSTALLATION

4.1 INSTALL RAV-MS-4x2HDMI/USB-C

Warnings:

- Before installation and wiring, disconnect power from the device.
- During wiring, connect and disconnect the cables gently.

1. Attach the bracket to one side of the enclosure using the screws provided. The bracket is attached to the enclosure as shown.



2. Repeat step 1 for the other side of the enclosure.
3. Attach the brackets to the surface or location desired using screws (not included in the package).

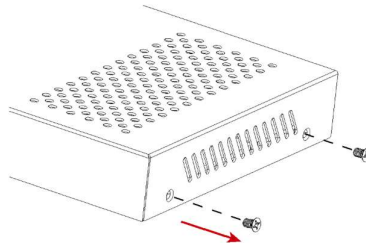
4.2 INSTALL RAV-HDBT/TxRx

Warnings:

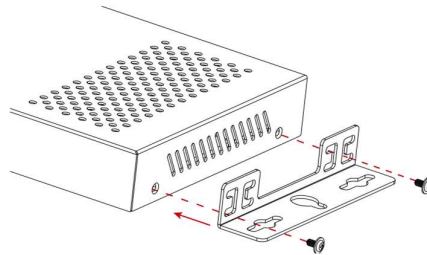
- Before installation and wiring, disconnect power from the device.
- During wiring, connect and disconnect the cables gently.

To install the device to a suitable location, perform the following:

1. Remove the two screws on one side of the enclosure.



2. Attach the installation bracket to the enclosure using the screws provided. The bracket is attached to the enclosure as shown.

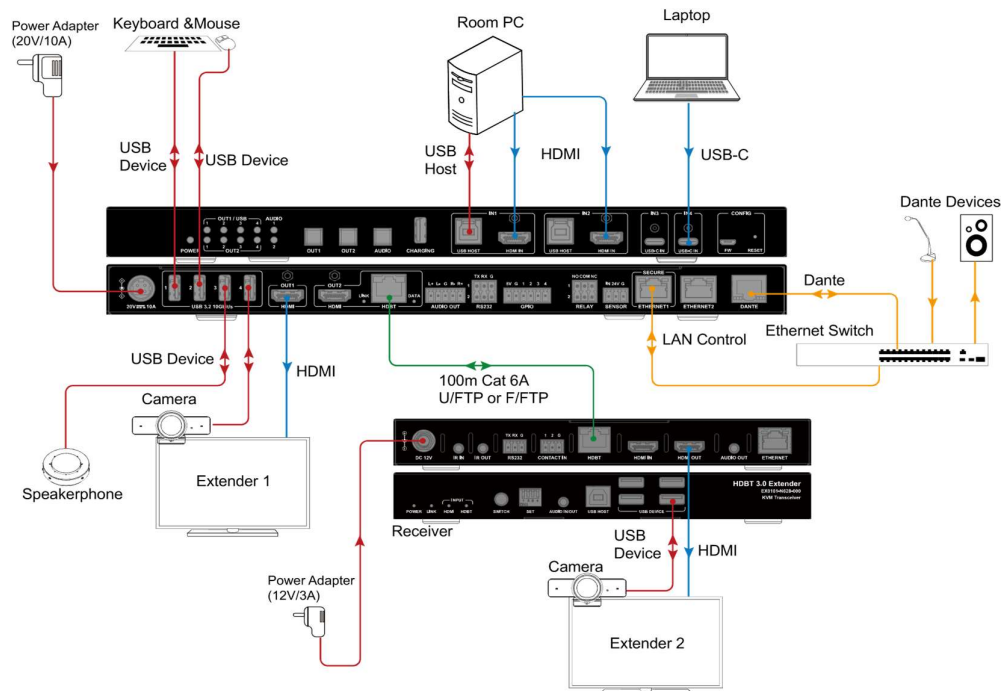


3. Repeat steps 1-2 for the other side of the device.
4. Attach the brackets to the surface you want to hold the device against using the screws (not included).

5. WIRING

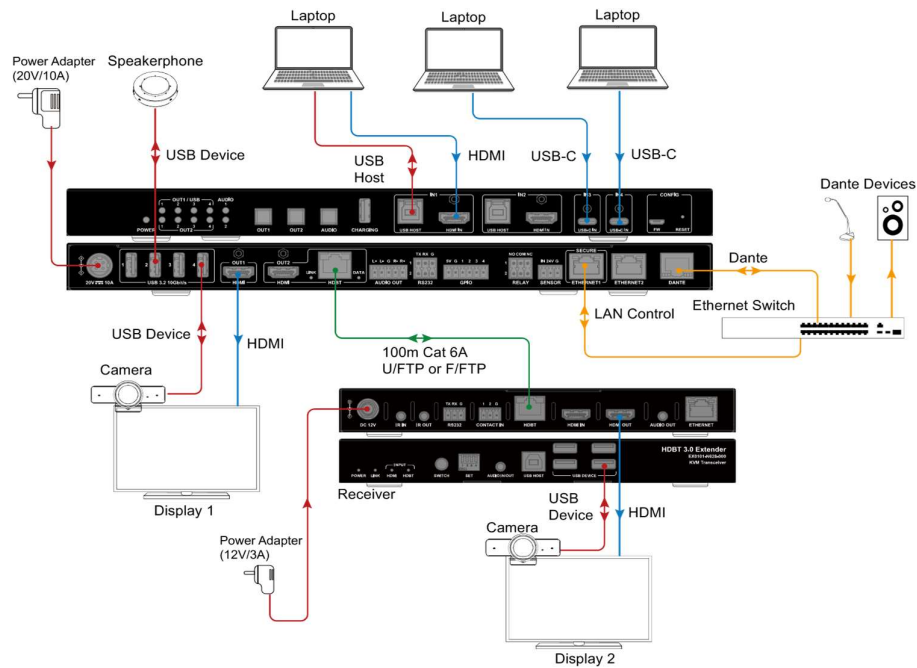
5.1 INSTALL RAV-MS-4x2HDMI/USB-C & RAV-HDBT/TxRx

Wiring 1: 4x2 Presentation Switch with Dual Screen mode



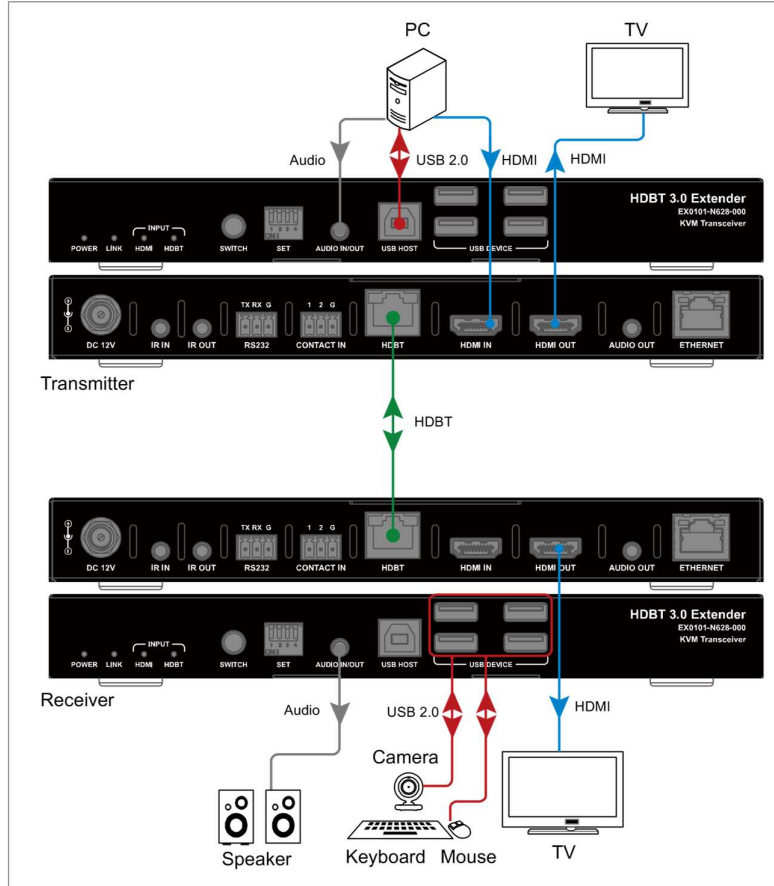
Note: In this mode, the USB-C IN 4 can transmit two video signals with 4K each to the two HDMI outputs respectively. (Only USB-C IN 4 support DP MST, no available for macOS devices).

Wiring 2: 4x2 Presentation Switch with matrix mode



5.2 INSTALL RAV-HDBT/TxRx ONLY

The RAV-HDBT/TxRx is HDMI 4K60 over HDBaseT 3.0 Transceiver, which can be used standalone as extenders.



5.3 DIP SETTINGS (RAV-HDBT/TxRx)

The **RAV-HDBT/TxRx** equips a 4-pin DIP switch for settings of working mode (transmitter/receiver), USB mode (USB Host/USB Device), Audio In/Out and RS-232 working mode (RS232 pass-through, API control or firmware update).

By default, all the four switches are set in (up, up, up, up) positions.



The following table shows how the DIP Switch functions:

DIP Position	Function
--------------	----------

1	2	3	4	
up				Set as Transmitter
down				Set as Receiver
	up			Set as USB Host and Audio In (analogue audio pass through)
	down			Set as USB Device and Audio Out (analogue audio pass through)
		up	up	RS232 pass through
		down	up	RS232 for API and MCU update
		up	down	RS232 for HDBT update
		down	down	Reserved

When connect to **RAV-MS-4x2/HDMI/USB-C**, please set the DIP as **UP-UP-DOWN-DOWN**.

6. CONTROL

6.1 AUTO SWITCHING

The device supports automatic switching (HDMI and USB-C video and USB) and provides two modes:

- **LIFO (Last IN, First OUT) mode.**
- **Priority mode.**

This function can be enabled/disabled through Web UI or API Commands.

Note:

1. Please refer to **“Switch”** part in the **“Web UI Control”** section to get detailed configuration information.
2. Video switching to detect valid signals, and USB switching to detect VBUS.

6.2 BUTTONS CONTROL

Users can perform basic switching of input sources to outputs and audio source selection.

- **OUT 1 button:** Press the button continuously to switch the input source for HDMI 1 output. The LED will light when the corresponding source is selected. **Note:** The default mode of the USB switch is "**Follow video out 1**", using the "**OUT 1**" button will switch the video out 1 and the USB device at the same time.
- **OUT 2 button:** Press the button continuously to switch the input source for output 2, including HDMI 2 and HDBT 3.0 outputs. The LED will light when the corresponding source is selected.

AUDIO button: Select the audio de-embedding from which output, OUT 1 or OUT 2. The LED will light when the corresponding audio source is selected.

6.3 RS232 CONTROL

Provides two RS232 ports for device control or control of 3rd-party devices. Supported functions are as follows:

- **RS232-1:**
 - Device control (API).
 - Control 3rd-party device.
 - TCP to RS232 routing.
- **RS232-2:**
 - Control 3rd-party device. ➤ TCP to RS232 routing.

6.3.1 DEVICE CONTROL (RS232-1)

Users may need to control the device via API commands. Connect an RS232-enabled device (such as a PC) to the **RS232-1** port.

Before sending API commands to control the device, ensure the serial ports between this device and the PC are configured correctly. A professional RS232 serial interface software (e.g., Serial Assist) may be needed as well.

Parameters	Default Value
Baud Rate	115200 bps
Data bits	8 bits

Parity	None
Stop bits	1 bit
Flow control	None

6.3.2 CONTROL THE 3RD-PARTY DEVICES (RS232-1 & 2)

Advanced users may need to control the 3rd-party device to perform automated operations, such as automatically turning the projector on/off. The **RAV-MS-4x2HDMI/USB-C** provides "**RS232 automatic/manual control**".

RS232 automatic/manual control

RS232 control is performed by pre-stored instructions in the device. When the trigger condition is met, the configuration command is automatically sent out through the RS232 port.

Users can store the following instructions in settings:

- **Display ON/OFF.**
- **Volume MUTE/UNMUTE.**
- **Volume UP/DOWN.**
- Supports RS232 automatic sending the power on/off command.
 - Send power on command:
 - Send power off command:
- This feature is disabled by default and can be enabled via the web UI and API.
- Auto-RS232 trigger conditions:
 - When a valid input video signal is detected.
 - The user sets a GPIO port to trigger the Auto-RS232 function.

Users can set these instructions through the Web UI or API and turn on the **Auto-RS232** function to automatically execute or perform these operations by manually sending APIs.

Auto-RS232 conditions:

- **Display ON:** When any active source is connected to the device.

- **Display OFF:** When all sources are disconnected from the device and after the "**Delay Time**" set.

Please refer to the "**RS232**" part in the "**Web UI Control**" to get detailed command information.

6.3.3 TCP TO RS232 ROUTING (RS232-1 & 2)

The TCP to RS232 routing function provides a tunnel from the network to the RS232 port, which can bypass the network control commands to the RS232 port. This function makes it easier for third-party devices such as a central-control device to control other devices connected to **RAV-MS-4x2/HDMI/USB-C**.

TCP port number:

- **RS232-1:** 5000.
- **RS232-2:** 5001.
- **RS232-HDBT:** 5002.

6.4 LAN CONTROL

6.4.1 OBTAIN THE IP ADDRESS

The default IP mode: **DHCP**.

The user can obtain an IP address in the following ways:

- Send API command via RS232-1 port.
Send API command "**GET IPADDR**<CR><LF>" to get the IP address, for example:

Input:

GET IPADDR<CR><LF> **Response:**

IPADDR 172.16.18.173 MASK 255.255.255.0 GATEWAY 172.16.18.1

- Use the tool "**SmartSetGUI**" to search the IP address.
- Check the IP address in the DHCP server.

6.4.2 TELNET

Telnet port: 23.

6.5 LOG IN TO THE WEB UI

The Web UI designed for this device allows for basic controls and settings. It can be accessed through a modern browser with the latest version, e.g., Chrome, Safari, Firefox, IE10+, etc.

To get access the Web UI:

1. Connect one of the two ETHERNET ports of the device to a local area network. (Ensure there's a DHCP server in the network so that the device can obtain a valid IP address.)
Note: When VLAN is set to "Separate", please connect **ETHERNET-1** to the local area network for web UI control.
2. Connect the PC to the same network.
3. Input the device's IP address in the browser and press Enter, the following window will pop up. (Refer to [6.4.1 Obtain IP Address](#) to get the device's IP address quickly).
4. The following window pops up. Input the password (default password: **admin**) and click "Login".

The image shows a web browser window displaying the login page of the ReThink device. At the top, the ReThink logo is centered, with the tagline "There's a better way." below it. In the center of the page, there is a rounded rectangular box containing three input fields: a "Username" field, a "Password" field, and a black "Login" button.

5. Input a new password in the dialog box and click "Apply" to enter the main page. The password must be 4 to 16 characters long, alphanumeric, and include at least one uppercase letter, one lowercase letter, and one number.

Please change your username and password to continue

Old password:

New password:

Verify password:

Note: Password must be 4 to 16 characters in length and must contain upper and lower case letters and numbers.(alphanumeric only)

6.6 RESET PASSWORD AND IP ADDRESS

If users forget the login password, the following ways can be used to restore the default password:

- Hold the **“RESET”** hole on the front panel for about **5s** to reset the IP mode to DHCP and login password to **“admin”**.
- Hold the **“RESET”** hole on the front panel for about **15s** to reset the device to factory defaults, which includes resetting the password.
- Send the API command **“RESET<CR><LF>”** to reset the device to factory defaults, which includes resetting the password.

6.7 WEB UI

6.7.1 MAIN PAGE

The main page consists of five tabs: **Switch**, **General**, **Control**, **Network** and **System**.

ReThink

Switch

General

Control

Network

System

Web: V1.0.0

Video & USB

OUT \ IN	IN 1 (HDMI/USB-B)	IN 2 (HDMI/USB-B)	IN 3 (USB-C)	IN 4 (USB-C)
VIDEO OUT 1				
VIDEO OUT 2				
USB				
ALL				

USB Mode:

Independntly

Apply

6.7.2 SWITCH

This page mainly contains switching settings.

1. Switch

Switch

General

Control

Network

System

Web: V1.0.0

Video & USB

OUT \ IN	IN 1 (HDMI/USB-B)	IN 2 (HDMI/USB-B)	IN 3 (USB-C)	IN 4 (USB-C)
VIDEO OUT 1				
VIDEO OUT 2				
USB				
ALL				

USB Mode:

Follow VIDEO OUT 2

Apply

ALL		
USB Mode:	✓ Follow VIDEO OUT 1 Follow VIDEO OUT 2 Independntly	Apply

This section allows users to switch video/USB input for output and set USB modes.

- **VIDEO OUT 1/2:** Click the button in the table to switch one input source for VIDEO OUT 1 / VIDEO OUT 2 (button turns from white to green when the selection is done).
- **USB Mode:** Click to select USB-A devices switching modes in the dropdown list (**Follow VIDEO OUT 1**, **Follow VIDEO OUT 2**, and **independently**), and click **“Apply”** to take effect.
- **Default setting:** Follow VIDEO OUT1 is by default, the USB-A devices switching will always follows the VIDEO OUT 1 switching.

When set USB Mode to **“Independently”**, users can manually switch the USB host for the USB devices to be connected to by clicking the corresponding button in the table.

Switch

General

Control

Network

System

Web: V1.0.0

Video & USB

IN OUT	IN 1 (HDMI/USB-B)	IN 2 (HDMI/USB-B)	IN 3 (USB-C)	IN 4 (USB-C)
VIDEO OUT 1				
VIDEO OUT 2				
USB				
ALL				

USB Mode:

Independently

Apply

- **ALL:** Click to select one input for all Video outputs and USB-A devices.

Switch

General

Control

Network

System

Web: V1.0.0

Video & USB

IN OUT	IN 1 (HDMI/USB-B)	IN 2 (HDMI/USB-B)	IN 3 (USB-C)	IN 4 (USB-C)
VIDEO OUT 1				
VIDEO OUT 2				
USB				
ALL				

USB Mode:

Independently

Apply

2. Audio

Audio

Audio Routing

FROM \ TO	USB HOST AUDIO	AUDIO DE-EMBED	DANTE IN
AUDIO OUT / DANTE OUT			
EMBED VIDEO OUT 1&2			ON OFF
USB HOST AUDIO			ON OFF

Audio De-embed

Follow VIDEO OUT 1

Apply

Audio Mute

All:

ON OFF

HDMI OUT 1:

ON OFF

HDMI OUT 2:

ON OFF

DANTE OUT:

ON OFF

HDBT OUT 2:

ON OFF

ANALOG OUT:

ON OFF

USB HOST AUDIO:

ON OFF

Audio De-embed

Follow VIDEO OUT 1

Follow VIDEO OUT 2

Apply

This section allows users to switch audio input to output.

Note: Gray-coloured table means not applicable.

- **AUDIO OUT/DANTE OUT:** Three audio sources can be selected.
- **EMBED VIDEO OUT1&2:** the user can choose whether to embed the audio from DANTE IN into the HDMI streaming. Note that turning on this function will cause the original audio in HDMI streaming to be replaced.
- **USB HOST AUDIO:** the user can choose whether to routing the audio from DANTE IN to the USB Host port.
- **Audio De-embed:** Select the current de-embedded audio from which source in the drop-down menu (**From VIDEO OUT 1** and **From VIDEO OUT 2**) and click “Apply” to take effect. **Default setting:** From VIDEO OUT 1.
- **Audio Mute (ON/OFF):** Click to set the corresponding audio output to mute/unmute.

3. USB-C MST

What is the MST?

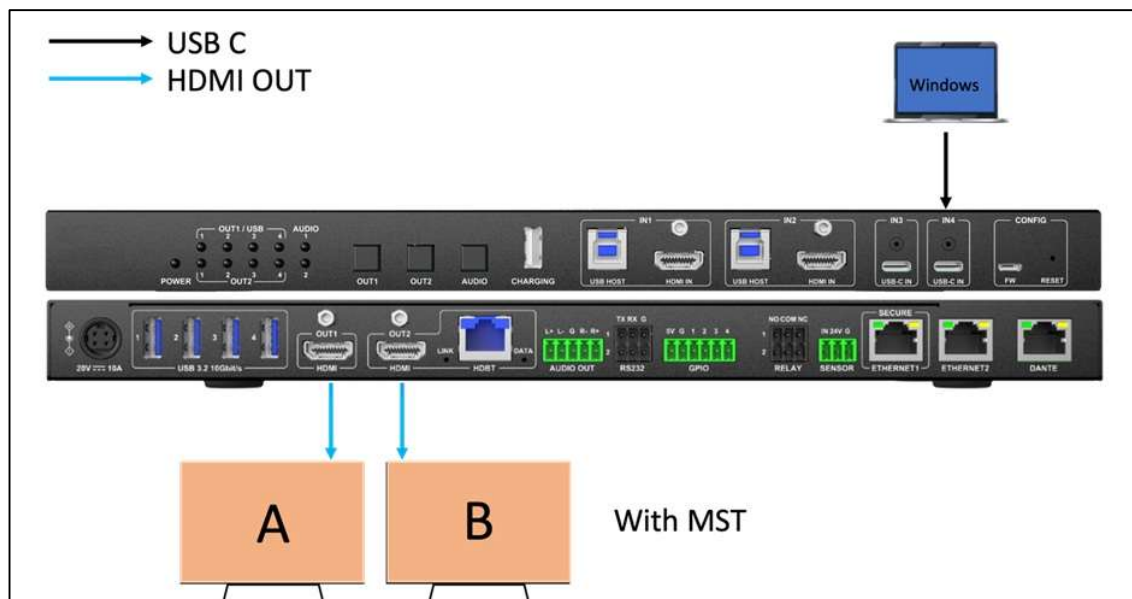
MST stands for **Multi-Stream Transport** and is based on DisplayPort Technology, allowing multiple uncompressed video streams to be delivered over a single DisplayPort connection (a process known as multiplexing). MST can be used over several different video port mediums, such as DisplayPort, Mini DisplayPort, Thunderbolt 3 or 4, and USB-C ports that support DisplayPort (Alt-Mode).

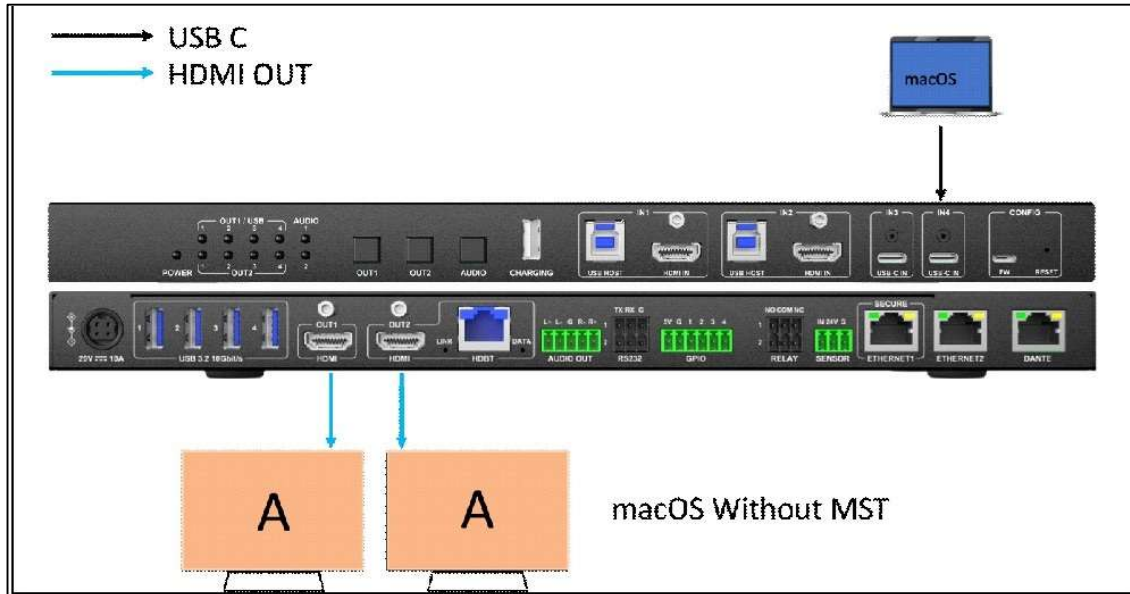
Two types of connections can be made when using MST. A “daisy-chain” connection where you can link multiple monitors together or an “MST Hub” configuration that can split one DisplayPort cable into multiple video outputs.

For MST to work in a daisy-chain or MST Hub configuration, monitors must support either DisplayPort 1.2 connection (or higher) or Thunderbolt, provide a video “out” port on the monitor, and have MST mode enabled for the monitors to work together. Note that HDMI is not supported.

In many cases, a monitor will not have a video “out” option; this is where an MST Hub will become necessary to break out the video signal to each monitor individually.

- MST is supported by Windows 11, 10, Windows 8/8.1, Windows 7, and Chrome OS.
- MST is currently not supported by macOS or Mac OS X.





USB-C MST

USB-C IN 4 MST

ON

OFF

> Only USB-C IN 4 support MST.

> Enable the USB-C IN 4 MST function will occupy another input, witch can be selected through the settings below.

☐ Disabled USB-C IN 3 Input
 ☐ Disabled HDMI IN 2 Input

This section allows users to enable the **USB-C IN4 MST** function.

- **USB-C IN 4 MST:** Click to enable the MST function of USB-C IN 4 to ON/OFF.

Default setting: OFF. When enabling this function, the USB-C IN 4 will occupy another input channel (USB C IN 3 or HDMI IN 2), check the box from the following inputs to set which input channel is occupied.

USB-C MST

USB-C IN 4 MST

ON

OFF

> Only USB-C IN 4 support MST.

> Enable the USB-C IN 4 MST function will occupy another input, witch can be selected through the settings below.

☒ Disabled USB-C IN 3 Input
 ☐ Disabled HDMI IN 2 Input

3. Auto-Switch

Auto-Switching

Auto-Switch

ON
OFF

☒ LIFO Mode
> Last in first out.

☐ Priority Mode

Priority Setting

VIDEO OUT 1: USB-C IN 3 > USB-C IN 4 > HDMI IN 1

HDMI IN 1: 3

HDMI IN 2: 0

USB-C IN 3: 1

USB-C IN 4: 3

Apply

VIDEO OUT 2: USB-C IN 4 > USB-C IN 3 > HDMI IN 2 > HDMI IN 1

HDMI IN 1: 4

HDMI IN 2: 3

USB-C IN 3: 3

USB-C IN 4: 1

Apply

USB: USB-C IN 4 > USB-C IN 3 > HDMI IN 2 > HDMI IN 1

USB-B IN 1: 4

USB-B IN 2: 4

USB-C IN 3: 4

USB-C IN 4: 4

Apply

Note: 1 – Highest priority 4 – Lowest priority 0 – Ignored

This section allows users to set the auto-switch function to ON/OFF and select auto switching mode.

Default: ON.

When the function is set to on, users can select auto switch mode between **LIFO Mode** and **Priority Mode**.

- **LIFO Mode (Default):** Last-in first-Out, when inserting a new active input, all outputs will switch to this input automatically. When removing the current selected input, all outputs will switch to the previously active input.
- **Priority Mode:** When set to this mode, users can set input switching priority for VIDEO OUT1, VIDEO OUT 2 and USB from each zone.

Note:

- "1" indicates the highest priority, "4" indicates the lowest priority, and "0" means this port will be ignored in automatic switching.
- When two inputs are set to the same priority, will follow the sequence of priority is **USB IN 4 > HDMI IN 1 > USB IN 3 > HDMI IN 2**.
- When the USB Switch mode is set to follow video out 1/2, it will follow the corresponding video output to switch.
- When the USB Switch mode is set to independently, USB device switching also follows LIFO mode, and can set priority.

6.7.3 GENERAL

This page mainly contains general settings, such as **Down-Scaler**, **EDID** and **HDCP**.

Switch **General** Control Network System Web: V1.0.0

Down-Scaler

Down-Scaler HDMI OUT 1: OFF HDMI OUT 2: Auto

HDBT OUT 2: Auto

EDID

EDID SETTING HDMI IN 1: Fixed 4K@30Hz 7.1ch

HDMI IN 2: Fixed 4K@60Hz 2.0ch

USB-C IN 3: Fixed 4K@30Hz 7.1ch

USB-C IN 4: Fixed 1080P@60Hz 7.1ch USB-C IN 4: (Secondary) Fixed 1080P@60Hz 7.1ch

Custom Read:

EDID Read

HDCP

INPUT HDCP HDMI IN 1: ON OFF HDMI IN 2: ON OFF

USB-C IN 3: ON OFF USB-C IN 4: ON OFF

1. Down-Scaler

Down-Scaler

Down-Scaler HDMI OUT 1: Auto Forced 1080P OFF HDMI OUT 2: Auto

HDBT OUT 2: OFF

- HDMI OUT 1 and HDMI OUT 2/HDBT OUT support 4K to 1080P down-scaler.
- This feature is enabled by default and can be disabled via the Web UI and API.
- Down-scaler can only support resolution conversion, not frame rate conversion.

This section allows users to set the down-scaler function for each output.

- **Down-Scaler:** Select the mode from the drop-down menu and click “Apply” to take effect.
- **Auto (Default):** Automatically convert 4K resolution to 1080P when connected to a 1080P display.

- **Forced 1080P:** Forcefully converts the input 4K resolution to 1080P regardless of the connected display's capabilities.
- **OFF:** Disabled down-scaler function.

2. EDID

EDID

EDID SETTING

HDMI IN 1:

Fixed 4K@30Hz 7.1ch

Apply

HDMI IN 2:

Fixed 4K@60Hz 2.0ch

Apply

USB-C IN 3:

Fixed 4K@30Hz 7.1ch

Apply

USB-C IN 4:

Fixed 1080P@60Hz 7.1ch

Apply

USB-C IN 4:
(Secondary)

Fixed 1080P@60Hz 7.1ch

Apply

Custom Read:

Upload

EDID Read

Read

This section allows users to set the EDID for each input and read the EDID of each output.

- **EDID Setting:** Select EDID for the input port and click “APPLY” to take effect. The default setting for all inputs: **Fixed 4K@60Hz 2.0ch**.

EDID

EDID SETTING

HDMI IN 1:

✓ Fixed 4K@60Hz 2.0ch

Copy from the HDMI OUT 1

Copy from the HDMI OUT 2

Copy from the HDBT OUT 2

Fixed 4K@60Hz 7.1ch

Fixed 4K@30Hz 2.0ch

Fixed 4K@30Hz 7.1ch

Fixed 1080P@60Hz 2.0ch

Fixed 1080P@60Hz 5.1ch

Fixed 1080P@60Hz 7.1ch

Custom EDID 1

Custom EDID 2

Apply

HDMI IN 2:

Apply

USB-C IN 3:

Apply

USB-C IN 4:

Apply

USB-C IN 4:
(Secondary)

Fixed 1080P@60Hz 7.1ch

Apply

Custom Read:

Upload

EDID Read

Read

- **Custom Read:** Click “Upload” to enter the following page:
 - **Custom EDID:** Select a customized EDID from the drop-down menu.
 - **Read:** Click to read the selected customized EDID. The result is shown on the table of the page.
 - **Write:** Click to write the opened EDID to the selected customized EDID space.

- **Save As:** Click to save the customized EDID to the local PC.
- **Open:** Click to select an EDID bin file from the local PC.

The screenshot shows a software interface titled "Custom Edid". On the left is a sidebar with three sections: "Down-Scaler" (containing a "Down-Scaler" button), "EDID" (containing an "EDID SETTING" button and a "Custom Read:" button which is highlighted with a blue box), and "HDCP" (containing an "INPUT HDCP" button). The main area of the interface has a "Custom Edid" dropdown menu currently set to "1". To the right of the dropdown are four buttons: "Read" (highlighted in black), "Write", "Save As", and "Open". Below these buttons is a "Status:" label followed by a 16x16 grid. The grid has columns labeled 01 through 16 and rows labeled 01 through 16. All cells in the grid are currently empty.

- **EDID Read:** Read the EDID of the output port and save it. Click "Read" button to enter the following page:
- **Select Port:** Select an output port from the drop-down menu.
- **Read:** Click to read the EDID of the selected output. The result is shown on the table of the page.
- **Save As:** Click to save the EDID as a bin file to the local PC.
- **Status:** Shows the status of reading EDID.

Down-Scaler

Down-Scaler

EDID

EDID SETTING

Custom Read:

EDID Read

HDCP

INPUT HDCP

EDID Setting

Select Port HDMI OUT1

Read

Save As

Status:

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
01																
02																
03																
04																
05																
06																
07																
08																
09																
10																
11																
12																
13																
14																
15																
16																

3. HDCP

HDCP

INPUT HDCP

HDMI IN 1:

ON

OFF

HDMI IN 2:

ON

OFF

USB-C IN 3:

ON

OFF

USB-C IN 4:

ON

OFF

This section allows users to enable/disable the HDCP capability.

6.7.4 Control

This page mainly contains control settings, such as **CEC**, **RS232**, **RELAY**, **SENSOR**, **USB device control** and **GPIO**.

Captured with Xnip

Switch
General
Control
Network
System
Web: V1.0.0

CEC

CEC port All Outputs Display ON Display OFF

Auto-CEC ON OFF Delay Time (sec): 30 Apply

> The delay time is only valid for the Display OFF command.

CEC Command Display ON: 40 04 Save Test Reset

Display OFF: 40 36 Save Test Reset

RS232

RS232 Port All Power ON Power OFF

Baud Rate 115200 Apply

Auto-RS232 ON OFF Delay Time (sec): 30 Apply

> The delay time is only valid for the Display OFF command.

RS232 Command Power ON:

☒ String ☐ HEX Save Test

Power OFF:

☒ String ☐ HEX Save Test

RELAY

RELAY Mode Latch Apply

Trigger Time (1~30 sec): 1 Apply

SENSOR

24V Power ON OFF

I/O Status High Get

USB Device Control

Device Control VBUS Mode: Always High Apply

GPIO

GPIO All

GPIO Setting I/O: Output Apply

Pull-up Resistor: Connected Apply

State: High Apply

GPIO Status:

GPIO 1:	Output	High	GPIO 2:	Output	Low	GPIO 3:	Output	Low
GPIO 4:	Output	High	GPIO 5:	Output	High	GPIO 6:	Output	High

1. CEC

CEC

CEC port

All Outputs

Display ON

Display OFF

Auto-CEC

ON

OFF

Delay Time (sec):

30

Apply

The delay time is only valid for the Display OFF command.

CEC Command

Display ON:

40 04

Save

Test

Reset

Display OFF:

40 36

Save

Test

Reset

- Support Auto-CEC trigger on all outputs. HDBT OUT and HDMI OUT 2 will trigger at the same time.
- The auto-CEC function is enabled by default and can be disabled through the Web UI and API.
- Auto-CEC trigger conditions:
 - When a valid input video signal is detected.
 - The user sets a GPIO port to trigger the Auto-CEC function.

This section allows users to control the connected CEC-enabled displays to power on/off and set the Auto-CEC function.

- **CEC port:** Select the output port to control.
- **Display ON/ Display OFF:** Click to control the corresponding CEC-enabled display to power ON or OFF.
- **Auto-CEC:** Enable/disable the auto-CEC function of the selected output.
- **Delay Time:** Delay time for CEC "Display OFF" command. When the CEC display-off conditions are met, the command will not be issued until the set time arrives. Default setting: **2 minutes**.

2. RS232

RS232

RS232 Port

All

Power ON

Power OFF

Baud Rate

115200

Apply

Auto-RS232

ON

OFF

Delay Time (sec):

30

Apply

The delay time is only valid for the Display OFF command.

RS232 Command

Power ON:

String

HEX

Save

Test

Power OFF:

String

HEX

Save

Test

This section allows users to set parameters for the RS232 port, set the **Auto-RS232** function and set the RS232 pre-stored command.

- **RS232 Port:** Select RS232 port to set from the drop-down menu.
 - **Power ON/ Power OFF:** Click to send the saved display on/off command to power on/off the 3rd device connected to the selected RS232 port.
 - **Baud Rate:** Select the baud rate from the drop-down menu and click "APPLY" to take effect. It supports **9600, 14400, 19200, 38400, 57600, Default setting: 115200.**
 - **Auto-RS232:** Enable/disable the auto-RS232 function of the selected output.
 - **Delay Time:** Delay time for CEC "**Display OFF**" command. When the CEC display-off conditions are met, the command will not be issued until the set time arrives.
Default setting: 30s. Range: 30s~1800s.
 - **RS232 Command- Power ON/OFF:** Input the Display ON/OFF commands for the 3rd party device in the corresponding field. The serial commands for displays and projectors are provided by their manufacturer and can be found in the instructional documentation.
- **String/HEX:** If the command for display on/off is only available in **Hex** format, check the "HEX" button and input the Hex command in the field, otherwise, check the "String" button.
 - **Save:** Click to save the input command to the **RAV-MS-4x2/HDMI/USB-C.**
 - **Test:** Click to send the input command to the 3rd device directly to test it.

Note: The RS232 command must be set before use, otherwise the RS232 port will not send anything.

It supports routing TCP-UDP commands through specific ports to the RS232 port. ➤

TCP port number: 9001 (RS232-1) and 9002 (RS232-2), 9003 (HDBT-RX).

3. RELAY

RELAY

RELAY Mode

Latch

Apply

Trigger Time (1~30 sec):

1

Apply

2x 3-pin 3.5mm phoenix female connector, vertically.

Supports "LATCH" and "MOMENTARY" mode, 0-30V.

This section allows users to configure the **RELAY**.

- **RELAY Mode:** Select relay mode from the drop-down menu (Latch or Momentary) and click “Apply” to take effect. **Default setting: Latch.**
 - **Latch:** Level mode.
 - **Momentary:** Pulse mode.
- **Trigger Time:** When setting relay mode to momentary, input the trigger time in this field, and click “Apply” to take effect. **Default setting: 3s. Range: 1s~30s.**

4. SENSOR

SENSOR

24V Power

ON OFF

I/O Status

High

Get

- 1x 3-pin 3.5mm phoenix female connector.
- 24V/100mA output.

This section allows users to set 24V output voltage of the sensor to on/off and get I/O status.

- **24V Power:** Enabled/disable the 24V power out for the sensor port.
- **I/O Status:** Click “Get” to get the current I/O status of the sensor port.

5. USB Device Control

USB Device Control

Device Control

VBUS Mode:

Always High

Apply

This section allows users to set VBUS mode for USB device ports.

- **VBUS Mode:** Select VBUS mode.
 - **Pass-through:** If the selected USB Host is not connected, all USB device ports will have no VBUS output.
 - **Always High:** The USB device ports always provide VBUS output.

6. GPIO

GPIO

GPIO

All

GPIO Setting

I/O:

Output

Apply

Pull-up Resistor:

Connected

Apply

State:

High

Apply

GPIO Status:

GPIO 1: Output High

GPIO 2: Output Low

GPIO 3: Output Low

GPIO 4: Output High

GPIO 5: Output High

GPIO 6: Output High

This section allows users to configure GPIO.

- **GPIO:** Select the GPIO port from the drop-down menu to configure.
- **GPIO Settings:**

I/O: Select the GPIO type between “Output” and “Input” and click “Apply” to take effect.

When select "Output": (See above picture)

➤ **Pull-up Resistor:** Enable/disable the Pull-up Resistor. ➤

State: Set GPIO output state to “High” or “Low”.

The GPIO is designed with a 6-pin 3.5mm phoenix female connector. Includes 5V, GND and 4x GPIO pins. Each GPIO can be independently set as Digital Input or Digital Output, and the default is Digital Input. GPIO output limitations:

GPIO	Voltage & Current
5V	5V/500mA
GPIO	5V/50mA (each)

When select "Input":(See below picture)

GPIO

GPIO

All

GPIO Setting

I/O:

Input

Apply

GPIO Status:

GPIO 1: Output High

GPIO 2: Output High

GPIO 3: Output Low

GPIO 4: Input Low

GPIO 5: Output High

GPIO 6: Output High

- **GPIO Status:** Shows the current GPIO type and status.

6.7.5 Network

This page mainly contains **Network Setting**, such as IP mode, **Service Capability**, **USB NIC**, **VLAN Mode** and **802.1x**.

Switch
General
Control
Network
System
Web: V1.0.0

Network Setting

IP Type: Static **DHCP**

IP Address:

Subnet Mask:

Default Gateway: **Apply**

Note: After changing network configuration, please reopen the web page with the new network settings.

Service Capability

Web Service HTTP: **ON** OFF

HTTPS: **ON**

USB NIC

USB NIC All: **ON** OFF

USB-B IN 1: **ON** OFF USB-B IN 2: **ON** OFF

USB-C IN 3: **ON** OFF USB-C IN 4: **ON** OFF

VLAN Mode

VLAN Mode: Separated **Apply**

> Transparent: Network interconnection of all devices.
> Separated: The secure network port (Ethernet 1) is only used to log in to the Web UI. Other networks are connected to Ethernet 2.

802.1x

802.1x: **ON** OFF

Authentication Method: EAP-TLS

Username: *

Client Certificate:* **Browse**

Private Key:* **Browse**

Private Key Password:*

Serve Certificate: **ON** OFF

CA Certificate:* **Browse**

Apply

1. Network Setting

Network Setting

IP Type

Static

DHCP

IP Address

192.168.1.4

Subnet Mask

255.255.255.0

Default Gateway

0.0.0.0

Apply

Note: After changing network configuration, please reopen the web page with the new network settings.

The network is used to set the IP mode.

Note:

- When "**Static**" is selected, please ensure your PC is in the same network segment as the RAV-MS-4x2/HDMI/USB-C.
- Please wait for 2-3 minutes for the LAN module to reboot and reconnect after the network setting is changed.

2. Service Capability

Service Capability

Web Service

HTTP:

ON

OFF

HTTPS:

ON

This section allows users to set HTTP and HTTPS.

- **HTTP:** Enable/disable the HTTP connection.
- **HTTPS:** HTTPS is supported, and CAN NOT disabled.

3. USB NIC

USB NIC

USB NIC

All:

ON

OFF

USB-B IN 1:

ON

OFF

USB-C IN 3:

ON

OFF

USB-B IN 2:

ON

OFF

USB-C IN 4:

ON

OFF

What is USB NIC?

USB NIC refers to the USB Network Interface Controller, that provide network connections through a device plugged into the USB port. By this function all PCs connected to USB-B and USB C ports of the **RAV-MS-4x2/HDMI/USB-C** will have ethernet access without need to connect other ethernet cables or WiFi connections.

The **RAV-MS-4x2/HDMI/USB-C** provides four USB network cards on USB-C and USB-B ports. This section allows users to enable/disable the USB NIC function for each port.

The **RAV-MS-4x2/HDMI/USB-C** provides four USB to Ethernet Bridge modules.

- Computers connected to USB-C/USB-B ports can connect to the network via the USB to Ethernet Bridge.
- Each USB to Ethernet Bridge can be enabled/disabled independently.
- Four USB to Ethernet Bridge share 1G network bandwidth.

4. VLAN

VLAN Mode

VLAN Mode

Transparent

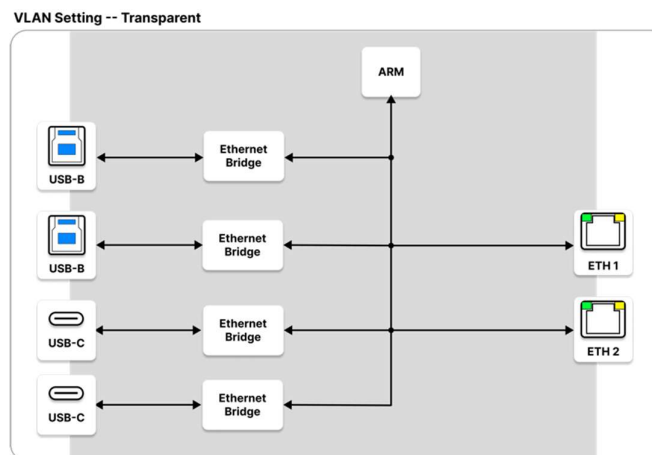
Apply

> Transparent: Network interconnection of all devices.
> Separated: The secure network port (Ethernet 1) is only used to log in to the Web UI. Other networks are connected to Ethernet 2.

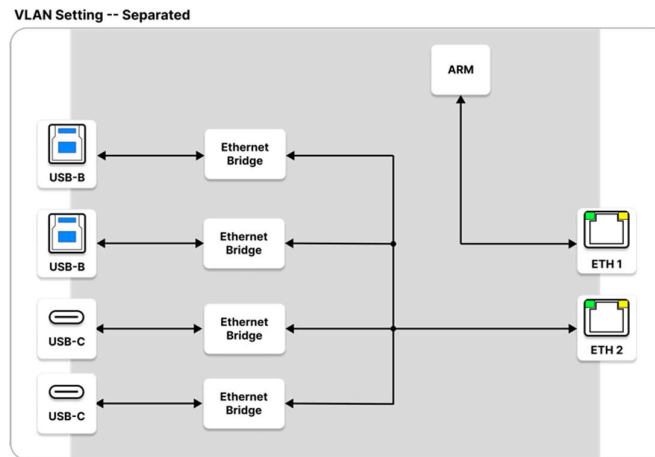
VLAN settings can help administrators isolate the internal network and the guest network to protect the network security.

The **RAV-MS-4x2/HDMI/USB-C** provides TWO Ethernet ports, which can be used for VLAN settings.

- **VLAN Mode:** Select VLAN mode from the drop-down menu and click “Apply” to take effect.
- **Transparent:** Network interconnection of all devices. See below diagram.



- **Separated:** Isolate the device network from the USB NIC network. Only the secure network port, Ethernet 1, can access the device's Web UI. Other USB NIC devices are connected to Ethernet 2. See below diagram.



5. 802.1x

802.1x

802.1x

ON

OFF

Authentication Method:

EAP-TLS

Username: *

Client Certificate:*

Browse

Private Key:*

Browse

Private Key Password:*

Serve Certificate:

ON

OFF

CA Certificate:*

Browse

Apply

- **802.1x:** Click to enable/disable 802.1x Authentication service. supports "EAP-TLS" and "EAP-MSCHAP V2" two mode.

6.7.6 System

This page mainly contains system settings such as **Login Password**, **FW Update**, **Configuration import and export**, **Restore Factory**, **Log**.

Switch	General	Control	Network	System	Web: V1.0.0
--------	---------	---------	---------	--------	-------------

Login Password

Old UserName	
Old Password	
New UserName	
New Password	
Confirm New Password	Apply

Note: Password must be 4 to 16 characters in length and must contain upper and lower case letters and numbers.(alphanumeric only)

FW Update

File:

Configuration import and export

Restore Factory

Version

ARM: V1.0.0	USB-C VIDEO: V1.3.0	CPLD: V1.9.0
Main: V1.1.0	HDMI: V1.4.0	
USB-C CC: V1.2.0	HDBT 3.0: V1.6.0	

Log

Note: Please wait a few moments for log retrieval.

```

14:49:59 Receive : HDBT_3 V1.6.0
14:49:59 Receive : USB_C_VIDEO V1.3.0
14:49:59 Receive : MAIN V1.1.0
14:41:50 Receive : USBNIC all on
14:34:39 Receive : USBNIC IN4 OFF
14:34:39 Receive : USBNIC IN2 OFF
14:34:39 Receive : VLAN_ENABLE On
14:34:39 Receive : IP MODE dhcp
          
```

1. Login Password

Login Password

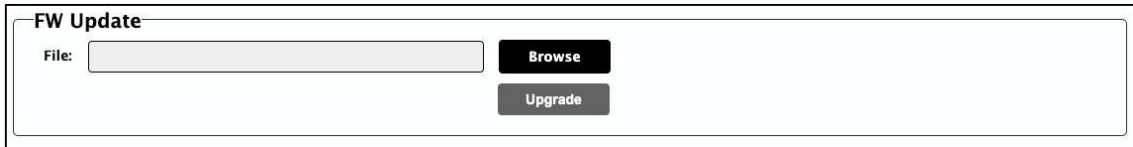
Old UserName	
Old Password	
New UserName	
New Password	
Confirm New Password	Apply

Note: Password must be 4 to 16 characters in length and must contain upper and lower case letters and numbers.(alphanumeric only)

Default Username & Password: "admin"

Note: The password must be 4 to 16 characters long, alphanumeric, and include at least one uppercase letter, one lowercase letter, and one number.

2. FW Update



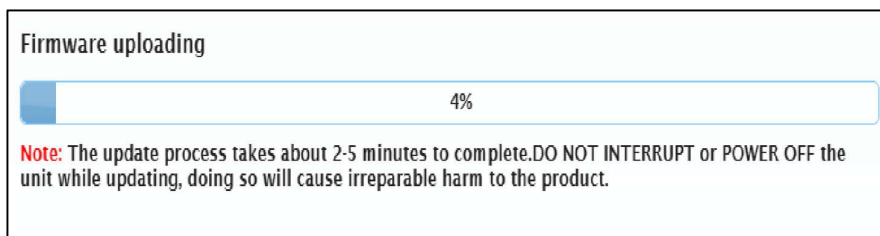
FW Update

File:

Browse

Upgrade

- Click **“Browse”** to select the update file from local PC.
- Click **“Upgrade”** to start the upgrading.



Firmware uploading

4%

Note: The update process takes about 2-5 minutes to complete. DO NOT INTERRUPT or POWER OFF the unit while updating, doing so will cause irreparable harm to the product.

- When the upgrade is successful, the following window pops up. Click **“OK”** and refresh the web page to re-login web UI.





Upgrade complete, please reopen the web page!

OK

Note: DO NOT power off the device during the updating process.

3. Configuration import and export

Configuration import and export

Export Settings
Import Settings

- **Export Settings:** Click to export the settings file to the local PC.
- **Import Settings:** Click to import the settings file from the local PC and apply the imported settings.

4. Restore Factory

Restore Factory

Factory Default
Reboot

Version

ARM: V1.0.0	USB-C VIDEO: V1.3.0	CPLD: V1.9.0
Main: V1.1.0	HDMI: V1.4.0	
USB-C CC: V1.2.0	HDBT 3.0: V1.6.0	

Factory Default: Click to set the device to factory defaults. **Reboot:** Click to reboot the device.

5. Version

Version

ARM: V1.0.6	USB-C VIDEO: V1.3.0	CPLD: V1.0.3
Main: V1.0.6	HDMI: V3.3.4	
USB-C CC: V1.0.2	HDBT 3.0: V0.0.0	

This section shows the device's firmware version information.

6. LOG

Log

Export Log

Note: Please wait a few moments for log retrieval.

```

14:49:59 Receive : HDBT_3 V1.6.0
14:49:59 Receive : USB_C_VIDEO V1.3.0
14:49:59 Receive : MAIN V1.1.0
14:41:50 Receive : USBNIC all on
14:34:39 Receive : USBNIC IN4 OFF
14:34:39 Receive : USBNIC IN2 OFF
14:34:39 Receive : VLAN_ENABLE On
14:34:39 Receive : IP MODE dhcp

```

This section displays system setting change records.

- **Export Log:** Click to download the log file to the local PC. **Note:** Please wait for a few moments for log retrieval.

7. Dante

The **RAV-MS04x2/HDMI/USB-C** supports a 2x2 Dante audio transmission.

Before using the Dante function, please:

- Connect all Dante devices to the same network.
- Use "**Dante Controller**" to pair Dante devices.
- To download Dante Controller software or user manual, please visit Audinate website: <https://www.audinate.com/products/software/dante-controller>

Note: Some network switches may cause "Dante controller" to be unable to recognize Dante devices. Please replace the switch.