



RAV-MS-4x2HDMI/USB-C
Operational Reference

RAV-MS-4x2HDMI/USB-C

4×2 matrix conferencing auto-switcher



Restore Factory Settings

The device supports the following methods to restore factory settings:

- Click the "RESET" button through the Web UI.
- Send "RESET" API via RS232 or Telnet.
- Press and hold the Reset button for 15 seconds, all LEDs will flash 4 times quickly

LED & Buttons

LED:

- Supports 2 rows and 4 columns of video & USB indicator LEDs on the front panel.
 - 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:

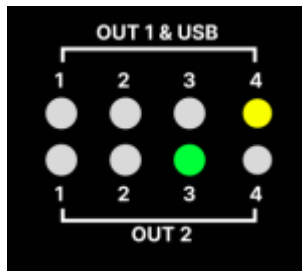
- Red: Selected USB input
- Green: Selected video/audio input
- Yellow: Selected video and USB input
- White: Unselected input

Buttons:

- Provides two buttons for video switch.
- Provides one button for audio switch.
- Note: USB does not have independent switch button. When USB follows video, USB will use the video button to switch.

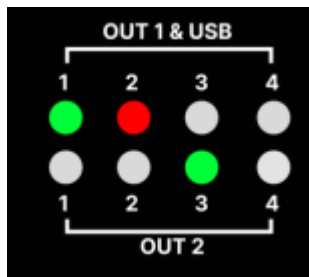
Example:

USB Follow HDMI Output1



Output 1 & USB -> USB-C Input 4
Output 2 -> USB-C Input 3

USB Independent Switching



Output 1 -> HDMI Input 1
USB -> USB Host Input 2
Output 2 -> USB-C Input 3

Presentation Switching

- Support four sets of input ports, two USB-C and two HDMI + USB-B combo ports.
- All video outputs and USB device ports can be freely switched between 4 sets of inputs.
- Video outputs and USB device ports can be switched independently and select different inputs.

Video Switch:

- Supports two independent video output ports, which can realize 4x2 matrix output.
- Video switch supports manual switching and automatic switching.
- Matrix switching can be automatically switched according to priority settings or scene configuration.
- The Video switching time is less than 3 seconds

USB Switch:

- All USB device ports can switch between any 4 input ports, including two USB-C and two USB-B (Host) ports.
- USB switch supports following video and independent switching.
 - USB follow HDMI OUT 1 (Default).
 - USB follow HDMI OUT 2.
 - USB independent switch.
- USB switch supports manual switching and automatic switching.

Audio Switch:

- The balanced audio output supports switching between two HDMI outputs.

Switch Control

The following switching methods are supported:

- Manual Switch:
 - Button.
 - API (RS232/Telnet).
 - Web UI.
- Automatic Switch:
 - Last in first out.
 - Priority settings.
 - Scene configuration.

Automatic Switching

- The default mode for automatic switching is 'Last in First Out'.
- When a new input connection is detected, it will automatically switch to the new input.
- When the input selected by the current output is disconnected, it will automatically switch to the valid input port displayed last time.
Note, the user can choose whether both outputs can select the same input.
- Video auto-switch will determine valid video signal.
- USB auto-switch will determine Vbus (5V).

Priority Settings

- To target different application scenarios, the 4x2 switcher provides custom port priority functions.
- When the user enables the PRIORITY SETTING function, the automatic switching function will follow the priority setting for port switching.
- Three sets of priority settings are provided, and can be enabled/disabled independently:
 - OUT 1 - (USB-C IN1/USB-C IN2/HDMI IN3/HDMI IN4).
 - OUT 2 - (USB-C IN1/USB-C IN2/HDMI IN3/HDMI IN4).
 - USB Device - (USB-C IN1/USB-C IN2/USB-B IN3/USB-B IN 4).
- Each input port supports 5 different priority settings:
 - Level 0 – Ignored (Will be ignored in automatic switching).
 - Level 1 - Highest priority.
 - Level 2
 - Level 3
 - Level 4 - Lowest priority.

USB-C Setting

- Provides two USB-C ports (USB-C IN 3 & USB-C IN 4) for connecting laptop devices.
- Both USB-C IN ports maximum support the USB 3.2 Gen 2x1 standard and up to 10Gbit/s data rate per lane.
- Both USB-C IN ports only support 2-lane video + 2-lane USB 3.2 data mode.

USB-C Cable Length

Note: Since the data transfer rate of USB-C is affected by the cable length, the user needs to choose the cable according to USB-C specifications:

Note: The package includes two 2m USB 3.2 Gen 1x1 5Gbit/s cables in the accessories (Easy to install in conference rooms).

If the user needs a higher USB transfer rate, please use a USB-certified cable that supports 10Gbit/s data rate, and the length is less than 1m.

USB-C Input 3 Setting

- USB-C IN 3 only supports DP SST mode.
- Maximum support output ONE 4K@60Hz video.
- When the USB-C IN 4 port enables MST mode, the USB-C IN 3 port may be unavailable (depending on the configuration).
See "USB-C IN 4 SETTING" for detail.

USB-C Input 4 Setting

- USB-C IN 4 supports DP SST (Default) and MST modes.
- Maximum support output TWO 4K@60Hz video (depending on the configuration).
- When the USB-C IN 4 port enabled MST mode:
 - USB-C IN 4 will support transmitting 2 video streams through one USB-C cable.
 - Two video streams will be output to both HDMI OUT ports.

- The resolution of the two video streams will be limited to 4K@30Hz.

Ethernet

- Provides two 1000M/100M adaptive RJ-45 ports.
- The ethernet ports support the following functions:
 - Device controlled via Ethernet (Web UI/Telnet).
 - USB to Ethernet Bridge.
 - VLAN Setting.
 - Http/Https/802.1x

IP Mode

- Supports three IP modes:
 - DHCP (Default).
 - Static IP.
- NOTE: when the device cannot be connected via ethernet or user forgets username & password, the user can restore the IP mode to DHCP mode and initialize the username and password through the following functions:
 - Send API commands via RS232 port.
 - Press and hold the RESET button for 5 seconds, all LED indicators will flash slowly 3 times.

Telnet

- Supports Telnet API for control.
- For Telnet API support functions, please refer to the Web UI section

WEB UI

- Built-in simple Web GUI for controlling KVM Switch and other settings.
- The Web UI (Telnet API/RS232 API) contains the following options:
- Control:
 - Video/USB/Audio Switch/Setting/Status.
 - Priority Settings/Scene Configuration.
 - EDID Setting.
 - CEC.
 - RS232 Setting.
 - HDCP Setting.
 - USB to Ethernet Bridge Setting.
- Configuration:
 - IP mode.
 - VLAN Setting.
 - Change username and password.
 - System Version.
 - FW Update.
 - Reboot/Reset.
- Supports modifying login username and password.

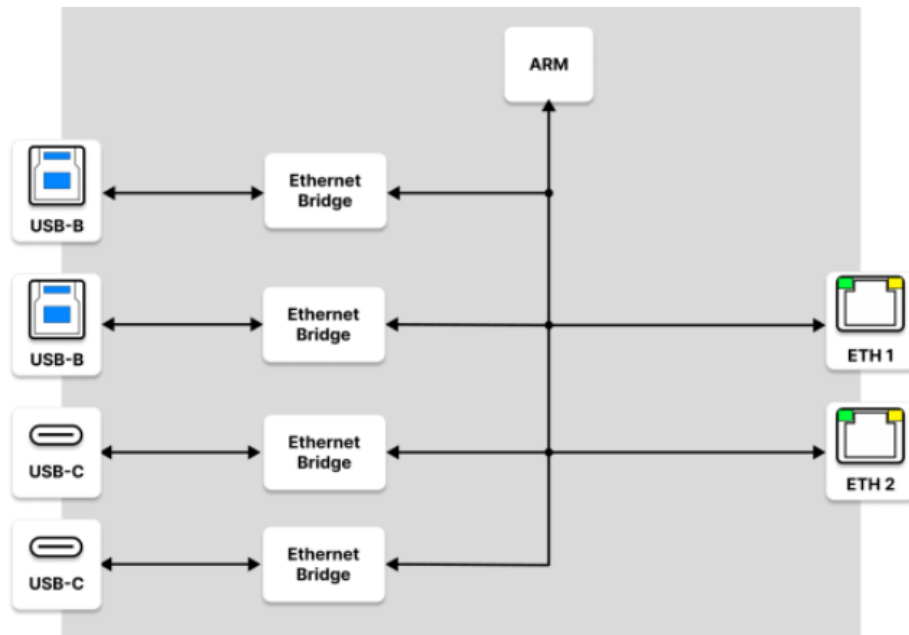
USB to Ethernet Bridge

- 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.

VLAN Setting

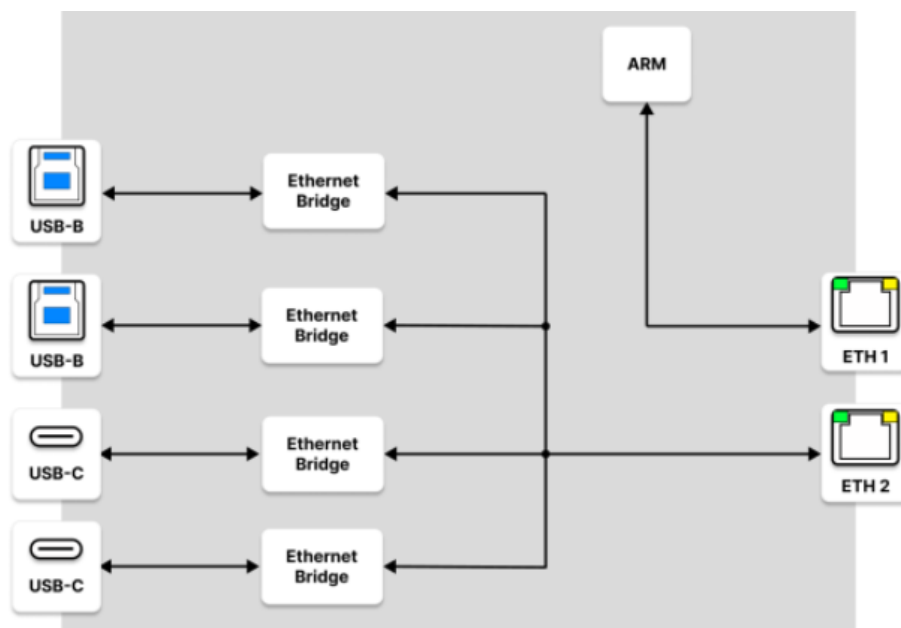
- Provides two Rj-45 ports and can provide port-based VLAN settings.
- VLAN Settings is mainly used to isolate the control network and the network provided for BYOD devices.
- Supports two VLAN settings:
 - Transparent:

this is the default mode, with a network openly used by device control and the BYOD devices.



- Separated:

the network provided for the BYOD devices is separated from the control network.



HTTP/HTTPS

- Provides two ways to log in to the Web UI through HTTP and HTTPS.
- HTTP service uses port 80, after the handshake, WS (WebSocket) protocol is used for communication.
- HTTPS service uses port 443, after the handshake, WS (WebSocket Secure) protocol is used for communication.
- HTTP connections can be closed via Web UI/API settings.

802.1x

- Provides 802.1x authentication services.
- Supports two authentication methods:
 - EAP-TLS.
 - EAP-MSCHAP V2.

Baud Rate

- RS232 port supports adjusting the baud rate:
 - 9600, 14400, 19200, 38400, 57600, 115200 (Default).

RS-232

- 2x 3-pin 3.5mm phoenix female connector, vertically.
- RS232-1 port contains three functions:
 - Device Control (API).
 - Control 3rd-party device.
 - TCP-UDP to RS232 routing.
- RS232-2 port will contain two functions:
 - Control 3rd-party device.
 - TCP-UDP to RS232 routing.

Auto RS-232

- 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.

Setting RS-232 Command

- Users can set the RS232 power on/off command through the Web UI and API.
- The command is empty by default. When the user doesn't set it, Auto-RS232 function will not send any content to the third-party device.
- RS232 power on/off can only support one command each. New command content will overwrite old command content.
- The command supports up to 48 characters or 48 HEX values

TCP-UDP to RS-232

- Support routing TCP-UDP commands through specific ports to the RS232 port.
- TCP port number: 9001 (RS232-1) and 9002 (RS232-2), 9003 (HDBT-RX).

CEC

- 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.

Relay

- 2x 3-pin 3.5mm phoenix female connector, vertically.
- Supports "LATCH" and "MOMENTARY" mode, 0-30V.

GPIO

- 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)

Sensor

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

EDID

- EDID can be adjusted via Web UI and API:
 - Fixed 4K@60Hz 2.0ch (Default).
 - Copy from the HDMI OUT 1.
 - Copy from the HDMI 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 7.1ch.
 - Custom EDID.

HDBT 3.0 Output

- The second output (OUT 2) supports HDBT 3.0 out.
- Supports up to 100m via one cat6A/7 U/FTP, F/FTP or S/FTP cable to connect to an HDBT 3.0 receiver.
- HDBT 3.0 OUT also can pass through the USB 2.0, RS232, 1G ethernet and PoH+ to connected RX.
- Detailed transmission distance information about HDBT 3.0 is listed below:

Cable Type	Range	Supported Video
Cat 5e/6	70m/230ft	4K@60Hz 4:2:0 24bpp 4K@30Hz 1080P@60Hz
	40m/131ft	4K@60Hz 4:4:4 24bpp 4K@60Hz 4:2:2 36bpp
Cat6A/7 (U/FTP, F/FTP or S/FTP)	100m/330ft	4K@60Hz 4K@30Hz 1080P@60Hz

EDID

Down-Scaler

- 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.

Power

- DC 20V/10A in.
- Mini-DIN 4-pin connector