

# User Manual

# WOXCON

## MUH88E-H2 KIT

### 4K 8x8 HDBaseT Matrix Switcher



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Version: MUH88E-H2 KIT\_2019V1.3

## 4K 8x8 HDBaseT Matrix Switcher

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### Preface

Read this user manual carefully before using the product. Pictures shown in this manual are for reference only. Different models and specifications are subject to real product.

This manual is only for operation instruction, please contact the local distributor for maintenance assistance. The functions described in this version were updated till October, 2019. In the constant effort to improve the product, we reserve the right to make functions or parameters changes without notice or obligation. Please refer to the dealers for the latest details.

### FCC Statement

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference.

Any changes or modifications not expressly approved by the manufacture would void the user's authority to operate the equipment.



## 4K 8x8 HDBaseT Matrix Switcher

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### SAFETY PRECAUTIONS

To ensure the best from the product, please read all instructions carefully before using the device. Save this manual for further reference.

- Unpack the equipment carefully and save the original box and packing material for possible future shipment.
- Follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- Do not dismantle the housing or modify the module. It may result in electrical shock or burn.
- Using supplies or parts not meeting the products' specifications may cause damage, deterioration or malfunction.
- Refer all servicing to qualified service personnel.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Do not put any heavy items on the extension cable in case of extrusion.
- Do not remove the housing of the device as opening or removing housing may expose you to dangerous voltage or other hazards.
- Install the device in a place with fine ventilation to avoid damage caused by overheat.
- Keep the module away from liquids.
- Spillage into the housing may result in fire, electrical shock, or equipment damage. If an object or liquid falls or spills on to the housing, unplug the module immediately.
- Do not twist or pull by force ends of the cable. It can cause malfunction.
- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.
- Unplug the power cord when left unused for a long period of time.
- Information on disposal for scrapped devices: do not burn or mix with general household waste, please treat them as normal electrical wastes.

## 4K 8x8 HDBaseT Matrix Switcher

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**Table of Contents**

1. Product Introduction .....	1
1.1 Features .....	1
1.2 Package List .....	2
2. Specification .....	3
2.1 Matrix Switcher .....	3
2.2 HDBaseT Receiver .....	4
3. Panel Description .....	6
3.1 Matrix Front Panel .....	6
3.2 Matrix Rear Panel .....	6
3.3 Receiver Front and Rear Panel .....	8
4. System Connection .....	9
4.1 Usage Precaution .....	9
4.2 System Diagram .....	9
5. Button Control .....	10
5.1 Signal Switching .....	10
5.2 Switching Status Inquiry .....	11
5.3 Panel Button Locking/Unlocking .....	11
5.4 Preset Setting .....	11
5.5 CLEAR Button .....	11
6. GUI Control .....	12
6.1 Switching Tab .....	13
6.2 Audio Tab .....	14
6.3 Configuration Tab .....	15
6.3.1 PoC Setting .....	15
6.3.2 EDID Copy .....	15
6.3.3 EDID Setting .....	16
6.4 CEC Tab .....	17
6.5 RS232 Tab .....	18
6.6 Interface Tab .....	20
6.7 Network Tab .....	20

**4K 8x8 HDBaseT Matrix Switcher**

---

6.8 Access Tab .....	21
6.9 GUI Upgrade .....	22
7. IR Control .....	23
7.1 IR Remote Control.....	23
7.2 IR Pass-through Control.....	24
7.2.1 Control Local Input Device from Remote .....	24
7.2.2 Control Remote Output Device from Local .....	26
8. RS232 Control .....	28
8.1 RS232 Control Connection.....	28
8.1.1 Control the Matrix Switcher from Local .....	28
8.1.2 Control the Matrix Switcher from Remote .....	28
8.1.3 Control the Remote Third-party Device from Local .....	29
8.1.4 Control the Local Third-party Device from Remote .....	31
8.2 RS232 Control Software.....	32
8.3 RS232 Commands .....	33
8.3.1 System Setting .....	33
8.3.2 Signal Switching.....	37
8.3.3 Audio Setting .....	40
8.3.4 EDID Management.....	40
8.3.5 HDCP Setting .....	42
8.3.6 Third-party Device Control .....	43
8.3.7 CEC Control .....	44
9. Firmware Upgrade .....	46
10. Panel Drawing .....	47
11. Troubleshooting and Maintenance.....	48
12. Customer Service .....	50

## 4K 8x8 HDBaseT Matrix Switcher

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### 1. Product Introduction

Thanks for choosing this 4K 8x8 HDBaseT Matrix Switcher with six Receivers! It features eight HDMI inputs, six HDBaseT outputs, two HDMI outputs and four SPDIF audio outputs. It supports video resolutions up to 4K@60Hz 4:4:4 and can transmit 4K video to distances up to 131 feet (40 meters) and 1080p video to distances up to 230 feet (70 meters) over a single CATx cable. The six HDBaseT outputs support 24V Power over Cable (PoC) feature, allowing the receivers to draw their power from the matrix over the HDBaseT cable.

The matrix switcher features comprehensive EDID management and advanced HDCP handling to ensure maximum functionality with a wide range of video sources.

The matrix switcher not only supports bi-directional IR, RS232 extension but also has IR, RS232, and TCP/IP control options.

#### 1.1 Features

- 8x8 HDBaseT matrix switcher with audio matrix.
- Eight HDMI inputs, six HDBaseT outputs and two HDMI outputs.
- Fully compliant with the HDMI 2.0 and HDCP 2.2.
- Supports HDMI resolution up to 4K@60Hz 4:4:4, HDR.
- The six HDBaseT outputs support 24V PoC, allowing the receivers to draw their power from the matrix switcher over the CATx cable.
- Transmits 4K signal to the distance up to 131 feet (40 meters) and 1080p signal to the distance up to 230 feet (70 meters) over a single CATx cable.
- Supports audio matrix. Provides four digital SPDIF audio outputs for HDMI input audio de-embedding, HDBT/HDMI output audio de-embedding or ARC audio output from receivers.
- Supports comprehensive EDID management and advanced HDCP handling.
- Controllable via front panel buttons, RS232 local and pass-through, IR local and pass-through, CEC, and TCP/IP (built-in GUI).

## 4K 8x8 HDBaseT Matrix Switcher

## 1.2 Package List

HDBaseT Matrix Switcher	<ul style="list-style-type: none"> <li>● 1x MUH88E-H2 4K 8x8 HDBaseT Matrix Switcher</li> <li>● 2x Mounting Ears with 6 Screws</li> <li>● 4x Plastic Cushions</li> <li>● 1x IR Remote</li> <li>● 7x IR Receivers</li> <li>● 8x IR Emitters</li> <li>● 1x RS232 Cable (3-pin to DB9)</li> <li>● 1x Power Cord</li> <li>● 1x Power Adapter (12V DC 10A)</li> </ul>
HDBaseT Receiver	<ul style="list-style-type: none"> <li>● 6x TPUH610SR HDBaseT Receivers</li> <li>● 12x Mounting Ears with 24 Screws</li> <li>● 24x Plastic Cushions</li> <li>● 6x 3-pin Terminal Blocks</li> </ul>
	<ul style="list-style-type: none"> <li>● 1x User Manual</li> </ul>

**Note:** Please contact your distributor immediately if any damage or defect in the components is found.

## 4K 8x8 HDBaseT Matrix Switcher

## 2. Specification

### 2.1 Matrix Switcher

<b>Video Input</b>	
Input	(8) HDMI
Input Connector	(8) Type-A female HDMI
HDMI Input Resolution	Up to 4K@60Hz 4:4:4, HDR
<b>Video Output</b>	
Output	(6) HDBT, (2) HDMI
Output Connector	(6) RJ45, (2) Type-A female HDMI
HDMI Output Resolution	Up to 4K@60Hz 4:4:4, HDR
HDBaseT Output Resolution	Up to 4K@60Hz 4:2:0
HDMI Audio Signal	LPCM 7.1 audio, Dolby Atmos®, Dolby® TrueHD, Dolby Digital® Plus, DTS:X™, and DTS-HD® Master Audio™ pass-through.
<b>Audio Output</b>	
Output	(4) Digital SPDIF audio
Output Connector	(4) Toslink connectors
Digital SPDIF Audio Format	Supports PCM, Dolby Digital, DTS, DTS-HD
Frequency Response	20Hz – 20kHz, ±1dB
Max Output Level	±0.05dBFS
THD+N	< 0.05%, 20Hz – 20kHz bandwidth, 1kHz sine at 0dBFS level (or max level)
SNR	> 90dB, 20Hz-20kHz bandwidth
Crosstalk Isolation	< -70dB, 10kHz sine at 0dBFS level (or max level before clipping)
Noise Level	-90dB
<b>Control Part</b>	
Control port	(1) FIRWARE, (6) IR IN, (1) IR ALL IN, (8) IR OUT, (1) IR ALL OUT, (1) IR EYE, (1) RS232, (1) TCP/IP
Control Connector	(1) Micro-USB, (17) 3.5mm jacks, (1) 3-pin terminal block, (1) RJ45
<b>General</b>	
Transmission Mode	HDBaseT
Transmission Distance	1080p ≤ 230 feet (70 meters), 4K@60Hz ≤ 131 feet (40 meters)
Bandwidth	18Gbps
Operation Temperature	-5°C ~ +55°C
Storage Temperature	-25°C ~ +70°C
Relative Humidity	10% ~ 90%
External Power Supply	100V~240V AC, 50/60Hz
Power Consumption	92W (Max)



**4K 8x8 HDBaseT Matrix Switcher**

Dimension (W*H*D)	436.4mm x 44mm x 385mm
Net Weight	4.87kg

**2.2 HDBaseT Receiver**

<b>Video</b>	
Input	(1) HDBT
Input Connector	(1) RJ45
Input Resolution	Up to 4K@60Hz 4:2:0
Output	(1) HDMI
Output Connector	(1) Type-A female HDMI
Output Resolution	Up to 4K@60Hz 4:4:4 8bit HDR10
<b>Audio</b>	
Input	(1) ARC Audio In
Input Connector	(1) Toslink Connector
Output	(1) Audio Breakout
Output Connector	(1) Toslink connector
Audio Format	Supports PCM, Dolby Digital, Dolby True-HD, DTS and DTS-HD.
Frequency Response	20Hz – 20kHz, $\pm 3$ dB
Max Output Level	2.0Vrms $\pm 0.5$ dB. 2V = 16dB headroom above -10dBV (316mV) nominal consumer line level signal
THD+N	< 0.05% (-80dB), 20Hz – 20kHz bandwidth, 1kHz sine at 0dBFS level (or max level)
SNR	> 85dB, 20Hz-20 kHz bandwidth
Crosstalk Isolation	> 70dB, 10kHz sine at 0dBFS level (or max level before clipping)
L-R Level Deviation	< 0.3dB, 1kHz sine at 0dBFS level (or max level before clipping)
Frequency Response Deviation	< $\pm 0.5$ dB 20Hz - 20kHz
Output Load Capability	1K $\Omega$ and higher (Supports 10x paralleled 10K $\Omega$ loads)
Stereo Channel Separation	>70dB@1kHz
<b>Control</b>	
Control Part	(1) ARC Mode button, (1) FW, (1) IR In, (1) IR Out, (1) RS232
Control Connector	(1) Micro-USB port, (2) 3.5mm jacks, (1) 3-pin terminal block
<b>General</b>	
Bandwidth	18Gbps
HDMI Standard	2.0
HDCP Version	2.2, 1.4 compliant
CEC	Pass-through

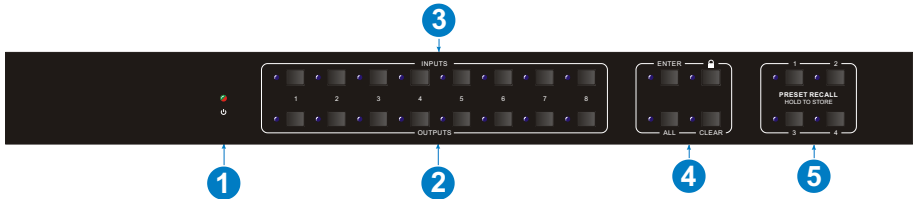
**4K 8x8 HDBaseT Matrix Switcher**

Bidirectional PoC	Supported
HDMI 2.0 Cable Length	4K@60Hz 4:4:4 ≤ 5m, 4K@60Hz 4:2:0 ≤ 15m, 1080p ≤ 20m
Transmission Standard	HDBaseT
Transmission Distance	1080p@60Hz ≤ 230 feet (70 meters), 4K@60Hz ≤ 131 feet (40 meters)
Operation Temperature	-5°C ~ +55°C
Storage Temperature	-25°C ~ +70°C
Relative Humidity	10%-90%
Power Supply	Input:100V~240V AC; Output:12V DC 10A
Power Consumption	12W (Max)
Dimension (W*H*D)	40mm x 19.5mm x 84mm
Net Weight	290g

4K 8x8 HDBaseT Matrix Switcher

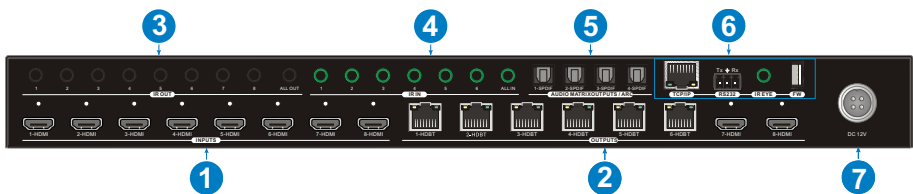
### 3. Panel Description

#### 3.1 Matrix Front Panel



- ① **Power LED:** The LED illuminates green when the device is powered on, or illuminates red when the device is in standby.
- ② **OUTPUTS:** Eight buttons and eight activity LEDs for output channel selection.
- ③ **INPUTS:** Eight buttons and eight activity LEDs for input source selection.
- ④ **Menu Buttons:**
  - ENTER: Confirm button and its activity LED.
  - LOCK: Lock or unlock the front panel buttons.
  - ALL: Select all.
  - CLEAR: Cancel.
- ⑤ **PRESET RECALL:**
  - Press and hold the button 1~4 to save the current switching status to the corresponding preset 1~4.
  - Press the button 1~4 to recall the saved preset 1~4.

#### 3.2 Matrix Rear Panel



- ① **INPUTS:** Eight type-A female HDMI input ports to connect the HDMI source devices (Blu-ray Disc™ or DVD players, gaming consoles, etc.).
- ② **OUTPUTS:**
  - **1~6-HDBT:** Six RJ45 outputs to connect the six HDBaseT receivers.

## 4K 8x8 HDBaseT Matrix Switcher

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- **7~8-HDMI:** Two type-A female HDMI output ports to connect display devices.

### ③ IR OUT:

- **1~8:** Eight 3.5mm jacks to connect eight IR emitters to send the IR signal which is received from the HDBaseT receivers.
- **ALL OUT:** 3.5mm jack to connect the IR emitter to send the IR signal which is received from all HDBaseT receivers.

### ④ IR IN:

- **1~6:** Six 3.5mm jacks to connect six IR receivers. Each IR input is associated with the respective HDBaseT output and cannot be switched separately. It makes up a bi-directional IR transmission with the IR OUT on the corresponding HDBaseT receiver.
- **ALL IN:** 3.5mm jack to connect the IR receiver to transmit the IR signal from the ALL IN port to all HDBaseT receivers.

- ⑤ **AUDIO MATRIX OUTPUTS/ARC:** Four Toslink connectors to connect speakers or amplifiers for HDMI input audio de-embedding or HDBT/HDMI output audio de-embedding, and ARC audio output from HDBaseT receivers. They can make up an audio matrix to be set by GUI or RS232 commands.

**Default:** HDBT 1-4 output audio de-embedding.

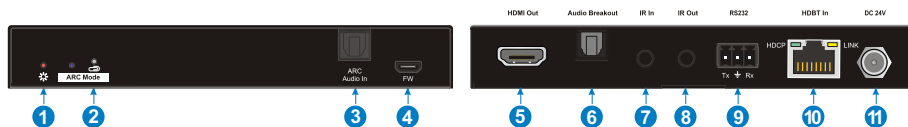
### ⑥ CONTROL:

- **TCP/IP:** RJ45 port to connect the control device (e.g. PC) to control the matrix switcher by GUI.
- **RS232:** 3-pin terminal block to connect a control device (e.g. PC) to control the matrix switcher, or connect a third-party device to be controlled by RS232 commands.
- **IR EYE:** 3.5mm jack to connect IR receiver to control the matrix switcher by the IR remote.
- **FIRMWARE:** Micro-USB port for firmware upgrade.

- ⑦ **DC 12V:** DC connector for power adapter connection.

## 4K 8x8 HDBaseT Matrix Switcher

## 3.3 Receiver Front and Rear Panel



- ① **Power LED:** The LED illuminates red when power is applied.
- ② **ARC Mode:** Press the button with paper clip or other sharp tool to enable the ARC mode, and then the left LED illuminates blue. Press it again to exit the ARC mode and the LED is off. When the ARC audio is selected as the audio source for the SPDIF output of matrix switcher, the ARC mode will be enabled automatically.
- ③ **ARC Audio In:** Toslink connector to connect ARC audio source device (e.g.TV).
- ④ **FW:** Micro-USB port for firmware upgrade.
- ⑤ **HDMI Out:** Type-A female HDMI output port to connect HDMI display (e.g.TV).
- ⑥ **Audio Breakout:** If the ARC mode is OFF, the Toslink connector is connected to speaker or amplifier for HDMI source audio de-embedding. Note that if the ARC mode is ON, this port has no audio output.
- ⑦ **IR In:** 3.5mm jack to connect the IR receiver for IR pass-through.
- ⑧ **IR Out:** 3.5mm jack to connect the IR emitter for IR pass-through.
- ⑨ **RS232:** 3-pin terminal block to connect the RS232 control device (e.g. PC) or a third-party device to be controlled.
- ⑩ **HDBT In:** RJ45 port to connect the HDBT output port of switcher/transmitter by CATx Ethernet cable. The LINK LED illuminates orange when there is a valid HDBaseT link between the switcher/transmitter and the receiver. The HDCP LED illuminates green when the video contains HDCP content.
- ⑪ **DC 24V:** DC connector for the power adapter connection. If the switcher/transmitter is connected to the power adaptor, the receiver doesn't need to connect power adaptor due to the HDBT output port of switcher/transmitter supports 24V PoC output.

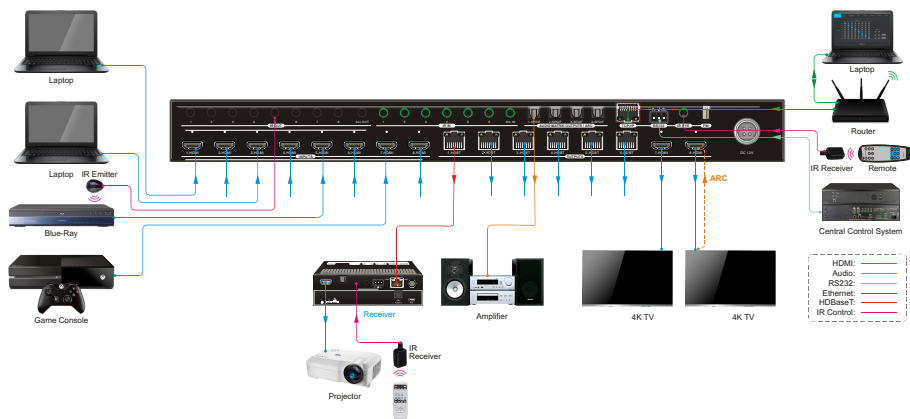
## 4K 8x8 HDBaseT Matrix Switcher

### 4. System Connection

#### 4.1 Usage Precaution

- Make sure all components and accessories included before installation.
- System should be installed in a clean environment with proper temperature and humidity.
- All of the power switches, plugs, sockets, and power cords should be insulated and safe.
- All devices should be connected before power on.

#### 4.2 System Diagram



## 5. Button Control

The matrix switcher can be controlled by using the buttons on the front panel. Whenever a command is accepted, the LEDs of all the buttons pressed will blink three times then they will go off. If there is no other action after pressing the input/output button, the LEDs will go off after eight seconds.

### 5.1 Signal Switching

- **Switch an input to an output**

Operation: INPUTS# + OUTPUTS# + ENTER

Example: Switch Input 1 to Output 2:

Press **INPUT 1** → Press **OUTPUT 2** → Press **ENTER**

- **Switch an input to several outputs**

Operation: INPUTS# + OUTPUTS# + OUTPUTS# + ... + ENTER

Example: Switch Input 1 to Output 2, 3, and 4.

Press **INPUT 1** → Press **OUTPUT 2** → Press **OUTPUT 3** → Press

**OUTPUT 4** → Press **ENTER**

- **Switch an input to all outputs**

Operation: INPUTS# + ALL + ENTER

Example: Switch Input 1 to all outputs.

Press **INPUT 1** → Press **ALL** → Press **ENTER**

## 4K 8x8 HDBaseT Matrix Switcher

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### 5.2 Switching Status Inquiry

Press the **OUTPUT#**, and then the corresponding input LED will illuminate blue. The LEDs will go off when release the **OUTPUT#** button.

### 5.3 Panel Button Locking/Unlocking

Press and hold **LOCK** button at least three seconds to lock front panel buttons, and then LED will illuminate blue. Press and hold the button again to unlock.

### 5.4 Preset Setting

Press and hold the **PRESET 1~4** at least three seconds to save the current switching status to the corresponding preset 1~4.

Press the **PRESET 1~4** to recall the saved preset 1~4.

**Note:** *The matrix switcher supports nine presets, but only preset 1~4 can be saved and recalled by button control. Please manage other preset by GUI control or RS232 control.*

### 5.5 CLEAR Button

Please press the **CLEAR** button if want to withdraw an operation before the **ENTER** button comes into effect, meanwhile, the matrix will return to the previous status.



## 4K 8x8 HDBaseT Matrix Switcher

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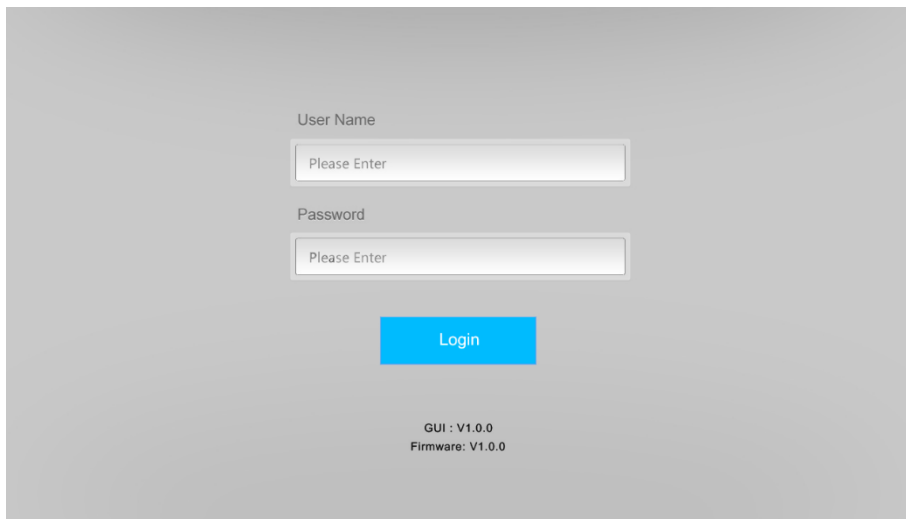
### 6. GUI Control

The matrix switcher can be controlled via TCP/IP. The default IP settings are:

IP Address: 192.168.0.178

Subnet Mask: 255.255.255.0

Type **192.168.0.178** in the internet browser, it will enter the below log-in webpage:



User Name

Password

Login

GUI : V1.0.0  
Firmware: V1.0.0

**Username:** admin

**Password:** admin

Type the user name and password, and then click **Login** to enter the section for video switching.

## 4K 8x8 HDBaseT Matrix Switcher

## 6.1 Switching Tab



Use the 8x8 button grid on the page to set which inputs are directed to which outputs. For example, clicking the button on the Input 1 row and Output 1 column, directs input 1 to output 1.

Use the 6 numbered buttons under scene area to save and load layout presets.

- To save a given layout, first click one of the numbered buttons, then click the **Save** button.
- To load a previously saved layout, first click one of the numbered buttons, then click the **Recall** button.



4K 8x8 HDBaseT Matrix Switcher

6.2 Audio Tab

12



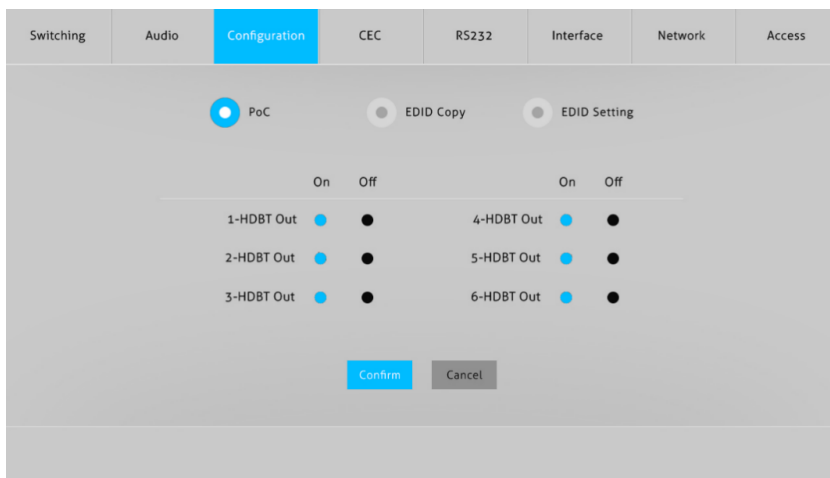
- There are twenty-two audio sources can be selected for four digital SPDIF output ports.

Audio Output Ports	Audio Sources		
	Input Breakout	Output Breakout	ARC
SPDIF 1	Audio on Input 1	Audio on Output 1	ARC on Output 1 ARC on Output 2 ARC on Output 3 ARC on Output 4 ARC on Output 5 ARC on Output 6
SPDIF 2	Audio on Input 2	Audio on Output 2	
	Audio on Input 3	Audio on Output 3	
SPDIF 3	Audio on Input 4	Audio on Output 4	
	Audio on Input 5	Audio on Output 5	
SPDIF 4	Audio on Input 6	Audio on Output 6	
	Audio on Input 7	Audio on Output 7	
	Audio on Input 8	Audio on Output 8	

## 4K 8x8 HDBaseT Matrix Switcher

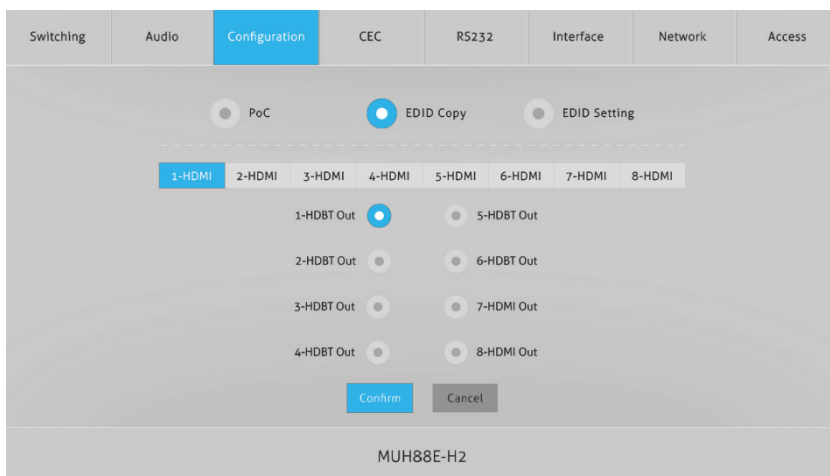
### 6.3 Configuration Tab

#### 6.3.1 PoC Setting



- Turn on or off PoC for 1-HDBT ~ 6-HDBT output port.

#### 6.3.2 EDID Copy



- Copy the EDID of the selected output device to one or more input source device.

## 4K 8x8 HDBaseT Matrix Switcher

## 6.3.3 EDID Setting

The screenshot shows the 'EDID Setting' configuration page. At the top, there are tabs for 'Switching', 'Audio', 'Configuration' (selected), 'CEC', 'RS232', 'Interface', 'Network', and 'Access'. Below the tabs, there are three radio buttons: 'PoC', 'EDID Copy', and 'EDID Setting' (selected). A dashed line separates this from a row of input source tabs: '1-HDMI' (selected), '2-HDMI', '3-HDMI', '4-HDMI', '5-HDMI', '6-HDMI', '7-HDMI', and '8-HDMI'. Under '1-HDMI', there are two columns of radio buttons for video and audio options. The 'User-defined' option is selected, and a text box contains '.bin'. An 'Apply' button is next to the text box. At the bottom, there are 'Confirm' and 'Cancel' buttons.

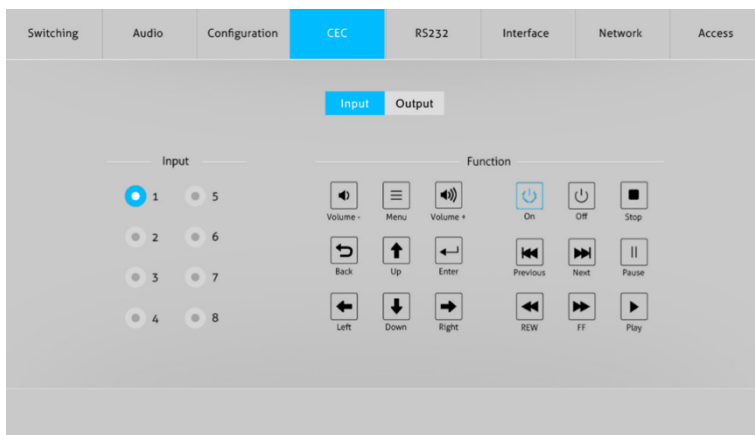
- Select the compatible built-in EDID for the selected input source.
- Upload user-defined EDID by the below steps:
  - 1) Prepare the EDID file (.bin) on the control PC.
  - 2) Select the **User-defined**.
  - 3) Click the box , and then select the EDID file (.bin) according to the tooltip.
  - 4) Click **Apply** to upload the user-defined EDID, and then click **Confirm** to save setting.

## 4K 8x8 HDBaseT Matrix Switcher

### 6.4 CEC Tab

If the input source devices, output display devices support CEC, they can be controlled via the following CEC interface.

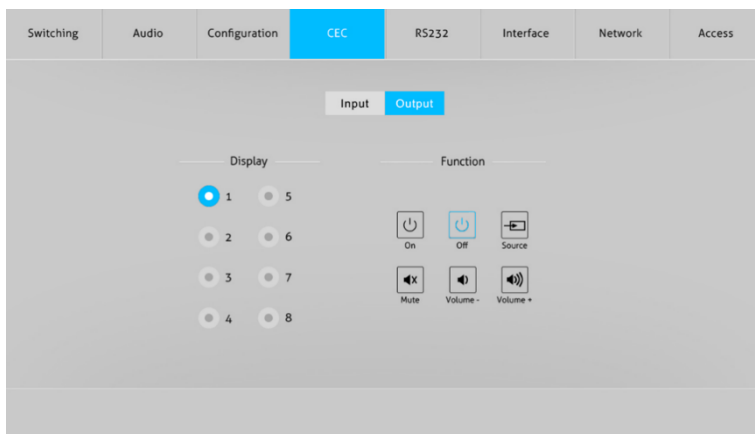
#### 1) Input Source Device Control



- Select one input source device to be controlled, and then press function buttons.

**Note:** It can not control two or more input source devices simultaneously.

#### 2) Output Display Device Control



- Select one output device to be controlled, and then press function buttons.

## 4K 8x8 HDBaseT Matrix Switcher

**Note:** It can not control two or more output devices simultaneously.

### 6.5 RS232 Tab

#### 1) Local

The screenshot shows the RS232 configuration interface. At the top, there are tabs for Switching, Audio, Configuration, CEC, RS232 (selected), Interface, Network, and Access. Below the tabs, there are two radio buttons: 'Local' (selected) and 'HDBT'. A dashed line separates the radio buttons from the configuration fields. There are two buttons: 'HEX' (selected) and 'ASCII'. Below these are three input fields: 'Baud Rate' with a dropdown menu showing '9600', 'Command Ending' with a dropdown menu showing 'NULL', and 'Command' with a text input field containing 'xxxxxx'. At the bottom, there are two buttons: 'Confirm' and 'Cancel'.

- **Local:** The RS232 port of matrix switcher.
- **Baud Rate:** 9600
- **Command Ending:** NULL, CR, LF or CR+LF can be chosen.
- **Command:** Type the command in this box to control the third-party device which is connected to the RS232 port of the matrix switcher. If click the **HEX**, the RS232 commands can be typed with hexadecimal value.

## 4K 8x8 HDBaseT Matrix Switcher

## 2) HDBT

- **HDBT:** The RS232 port of far-end HDBaseT receiver.
- **Port:** Select one of HDBT ports which is connected to HDBaseT receiver which must have third-party device attached.
- **Baud Rate:** Supports 2400, 4800, 9600, 19200, 38400, 57600 or 115200.
- **Command Ending:** NULL, CR, LF or CR+LF can be chosen.
- **Command:** Typing the commands in the box to control the selected remote third-party device which is connected to HDBaseT receiver. If click the **HEX**, the RS232 commands can be typed with hexadecimal value.



## 4K 8x8 HDBaseT Matrix Switcher

### 6.6 Interface Tab

Switching Audio Configuration CEC RS232 **Interface** Network Access

Title Bar Label:

Button Labels:

Input				Output			
1:	Input 1	5:	Input 5	1:	Output 1	5:	Output 5
2:	Input 2	6:	Input 6	2:	Output 2	6:	Output 6
3:	Input 3	7:	Input 7	3:	Output 3	7:	Output 7
4:	Input 4	8:	Input 8	4:	Output 4	8:	Output 8

- Modify the title bar label.
- Modify the button labels.

### 6.7 Network Tab

Switching Audio Configuration CEC RS232 Interface **Network** Access

MAC Address: 44-33-4C-C9-35-12

DHCP  Static IP

IP Address:

Subnet Mask:

Gateway:

- Static IP or Dynamic Host Configuration Protocol (DHCP).
- Modify the static IP Address, Subnet Mask, and Gateway.

## 4K 8x8 HDBaseT Matrix Switcher

## 6.8 Access Tab

Switching Audio Configuration CEC RS232 Interface Network Access

Credentials

Password: admin Confirm

Front Panel Lock

ON OFF

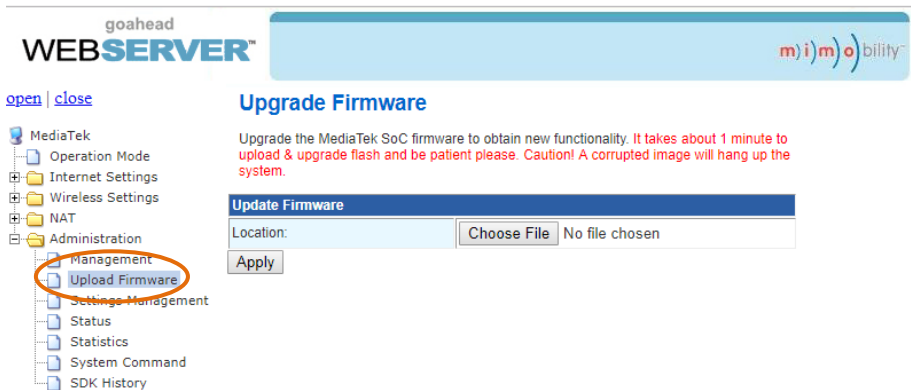
- Modify the login password.
- Lock or unlock the front panel buttons.

## 4K 8x8 HDBaseT Matrix Switcher

### 6.9 GUI Upgrade

Please visit at <http://192.168.0.178:100> for GUI online upgrade.

Type the username and password (the same as the GUI log-in setting, modified password will be available only after rebooting) to login the configuration interface. After that, click **Administration** in the source menu to get to **Upload Firmware** as shown below:



The screenshot displays the 'WEB SERVER' interface. On the left, a navigation menu is expanded to show 'Administration', with 'Upload Firmware' highlighted by a red circle. The main content area is titled 'Upgrade Firmware' and contains a red warning message: 'Upgrade the MediaTek SoC firmware to obtain new functionality. It takes about 1 minute to upload & upgrade flash and be patient please. Caution! A corrupted image will hang up the system.' Below the message is a form with a 'Location:' label, a 'Choose File' button, and the text 'No file chosen'. An 'Apply' button is located below the form.

Select the desired update file and press **Apply**, it will start upgrading then.

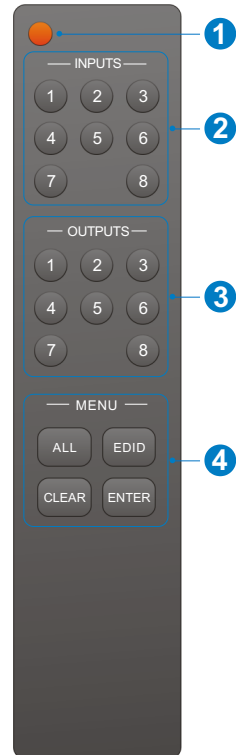
## 4K 8x8 HDBaseT Matrix Switcher

### 7. IR Control

#### 7.1 IR Remote Control

Connect IR receiver to the **IR EYE** port, the matrix can be controlled by the below IR remote.

- Press the **STANDBY (1)** button to enter or exit standby mode.
- To switch the selected input for one or more of the outputs, first press the number corresponding to the desired **INPUT (2)**, then press one or more **OUTPUTS (3)** or the **ALL (4)** button, then press the **ENTER (4)** button to execute the change.
- Examples:
  - ✓ To send input 3 to output 2, first press the **INPUTS 3** button, then press the **OUTPUTS 2** button, and finally press the **ENTER** button to execute the change.
  - ✓ To send input 1 to outputs 1 and 4, first press the **INPUTS 1** button, then press both the **OUTPUTS 1** and **4** buttons, and finally press the **ENTER** button to execute the change.
  - ✓ To send input 4 to all outputs, first press the **INPUTS 4** button, then press the **ALL** button, and finally press the **ENTER** button to execute the change.
- To set the EDID for one or more source devices to the EDID capabilities of a specific output, press the **EDID (4)** button, then press the desired **INPUTS (2)** or the **ALL (4)** button, then press the **OUTPUTS (3)** button corresponding to the desired display, finally press the **ENTER (4)** button to execute the operation.
- **CLEAR(4)**: Press the **CLEAR** button if want to withdraw an operation before the **ENTER** button comes into effect, meanwhile, the matrix will return to the previous status.



## 4K 8x8 HDBaseT Matrix Switcher

### 7.2 IR Pass-through Control

The matrix switcher supports bi-directional IR pass-through, allowing the devices can be controlled by both source and destination ends. This section provides connection and switching examples to illustrate possible configurations.

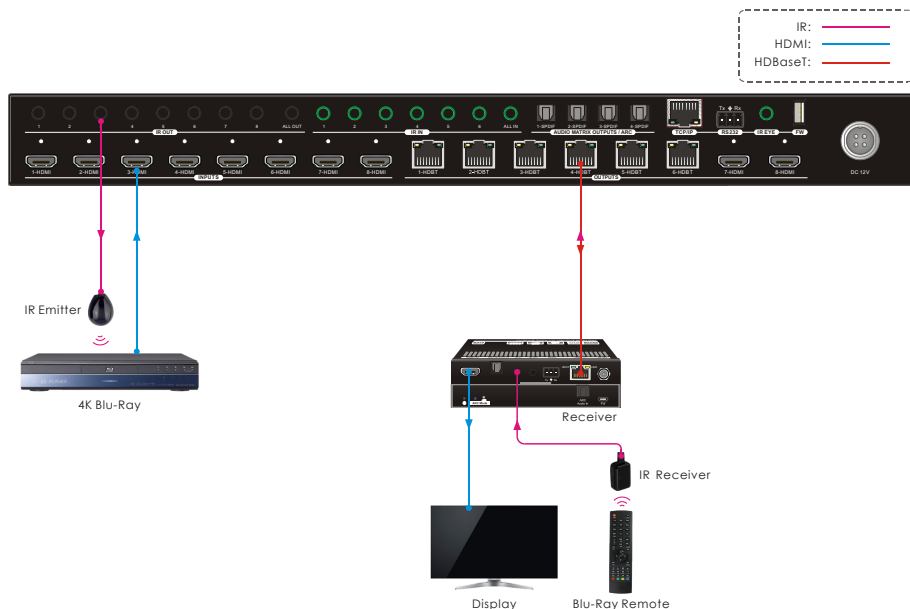
#### 7.2.1 Control Local Input Device from Remote

The local input source device can be controlled from the remote receiver location.

- **Control local input device through IR OUT port**

Example: Switch HDMI input 3 to HDBaseT output 4.

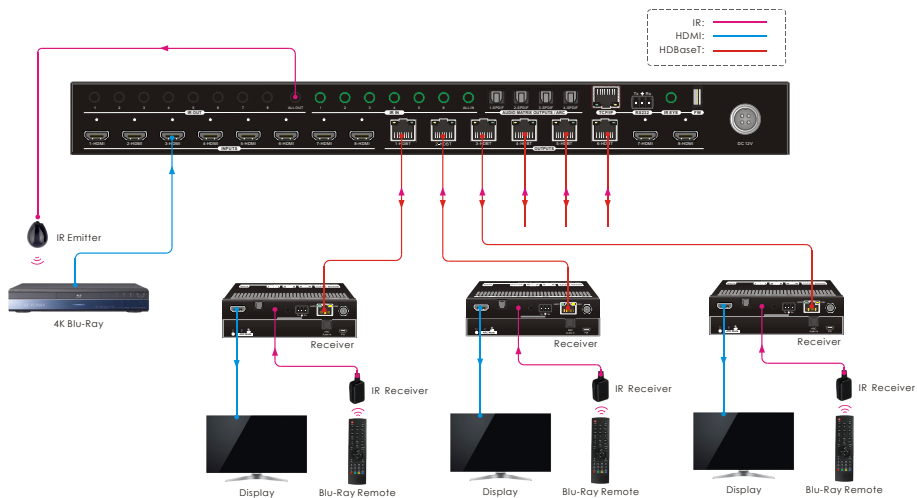
Connect an IR receiver to **IR IN** port on the receiver, then connect an IR emitter to the **IR OUT 3** on the matrix switcher. The third input source can be controlled through its corresponding IR output port. The connection diagram shown as below:



## 4K 8x8 HDBaseT Matrix Switcher

- Control local input device through IR ALL OUT port

The emitter can be connected to the **IR ALL OUT** port on matrix switcher to control all local input devices. In this case, the IR receiver must be connected to the **IR IN** port on each connected HDBaseT receiver, as shown in the diagram below:



## 4K 8x8 HDBaseT Matrix Switcher

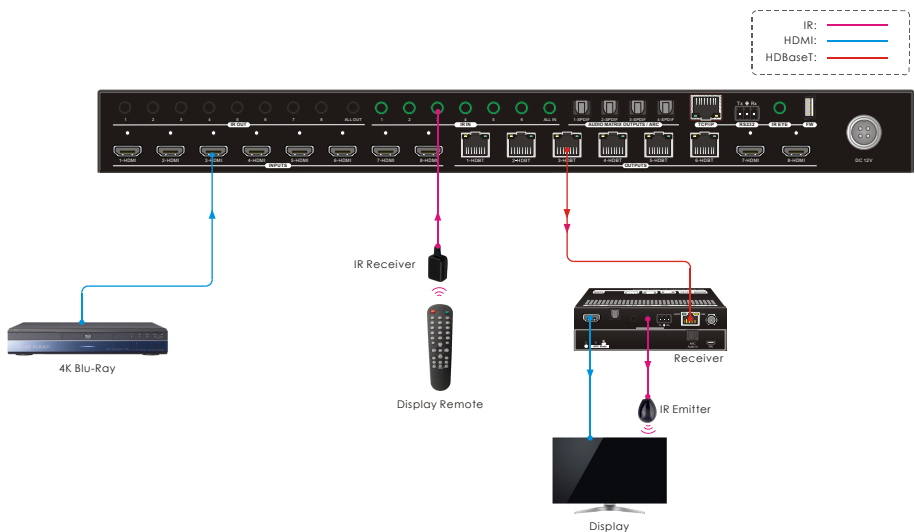
### 7.2.2 Control Remote Output Device from Local

The remote displays can be controlled from the local matrix switcher location.

- **Control remote device through IR IN port**

Example: Switch HDMI input 3 to HDBaseT output 3.

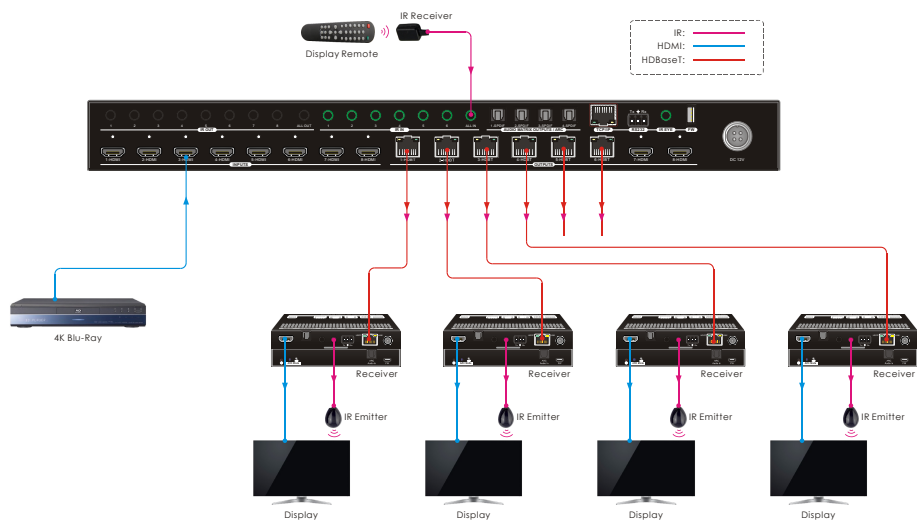
Connect an IR receiver to **IR IN 3** port on the matrix switcher, then connect an IR emitter to the **IR OUT** on the receiver, as shown in the diagram below:



## 4K 8x8 HDBaseT Matrix Switcher

- Control remote device through IR ALL IN port

The receiver can be connected to the **IR ALL IN** port on matrix switcher to control all remote output devices. In this case, the IR emitter must be connected to the **IR OUT** port on each connected HDBaseT receiver, as shown in the diagram below:





## 4K 8x8 HDBaseT Matrix Switcher

### 8. RS232 Control

#### 8.1 RS232 Control Connection

##### 8.1.1 Control the Matrix Switcher from Local

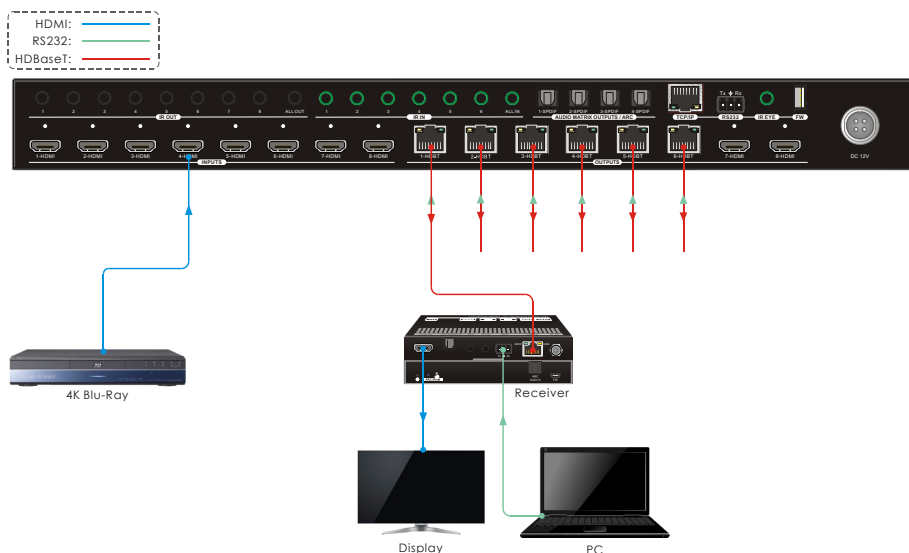
To control the matrix switcher from a local PC, the **3-pin to DB9 RS232 Cable** is used to connect between the matrix switcher and PC. The connection diagram is shown as below:



##### 8.1.2 Control the Matrix Switcher from Remote

To control the matrix switcher from remote location, please connect one or more PCs to the **RS232** ports of HDBaseT receivers with the **3-pin to DB9 RS232 Cables**. The matrix switcher can be controlled by any one of PCs, the connection diagram is shown as below:

## 4K 8x8 HDBaseT Matrix Switcher

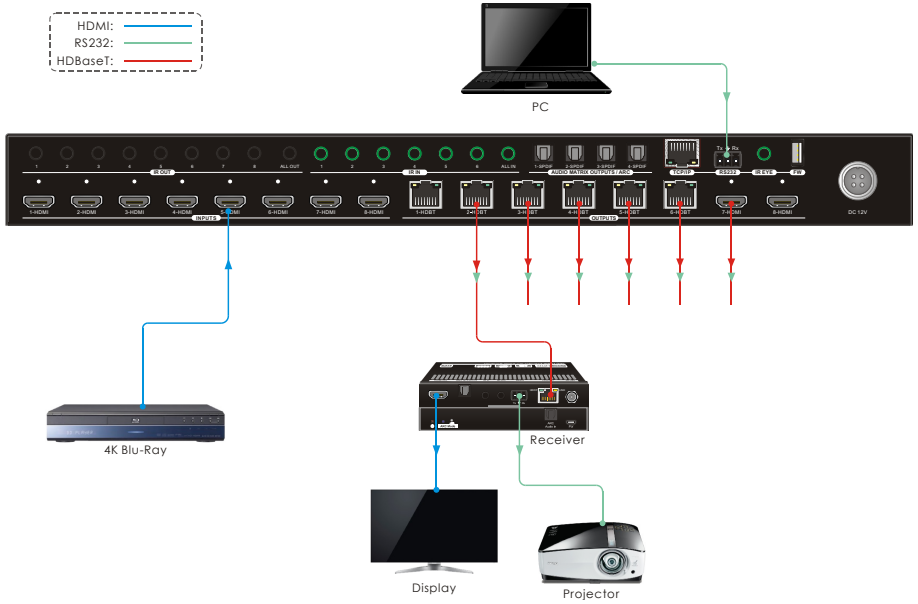


**Note:** The command “**RS232RCM[XX]ON.**” (**XX=00~06**) needs to be sent to enable or disable this control mode. For example, send the command “**RS232RCM00ON.**” to enable the remote-control mode for all HDBaseT outputs, and send the command “**RS232RCM00OFF.**” to disable the remote-control mode for all HDBaseT outputs. Please refer to the [8.3.1 System Control](#) for more details.

### 8.1.3 Control the Remote Third-party Device from Local

To control a third-party device from local, first determine which HDBaseT receiver is connected to (1 in the diagram below). Next, connect a PC to the corresponding **RS232** port of matrix switcher with **3-pin to DB9 RS232 Cable**, then connect a third-party device (e.g. projector) to the **RS232** port of the determined HDBaseT receiver. The remote third-party device can be controlled by the local PC, the connection diagram is shown as below:

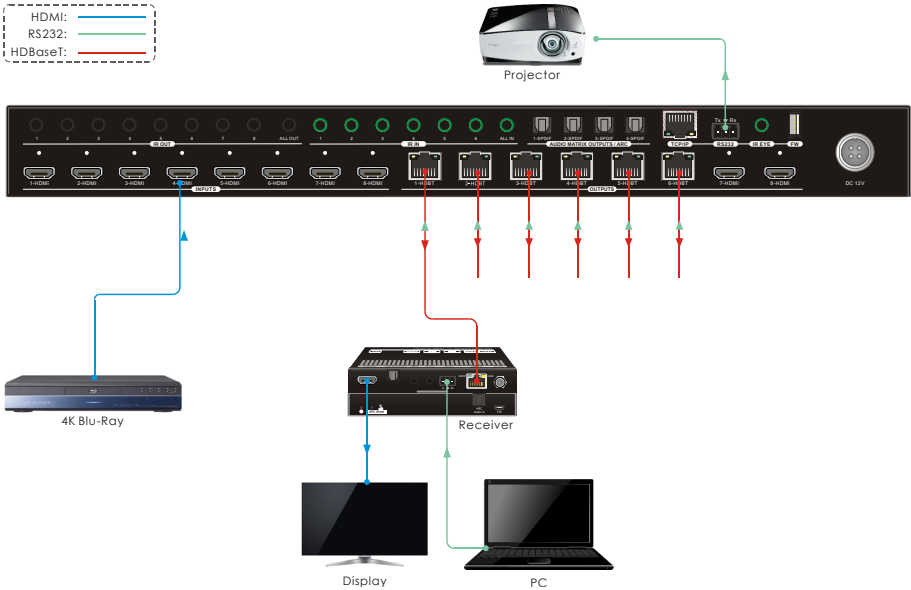
# 4K 8x8 HDBaseT Matrix Switcher



## 4K 8x8 HDBaseT Matrix Switcher

### 8.1.4 Control the Local Third-party Device from Remote

To control a third-party device from remote, first determine which HDBaseT receiver is connected to (1 in the diagram below). Next, connect a PC to the **RS232** port of HDBaseT receiver with **3-pin to DB9 RS232 Cable**, then connect a third-party device (e.g. projector) to the **RS232** port of matrix switcher. The local third-party device can be controlled by the remote PC, the connection diagram is shown as below:



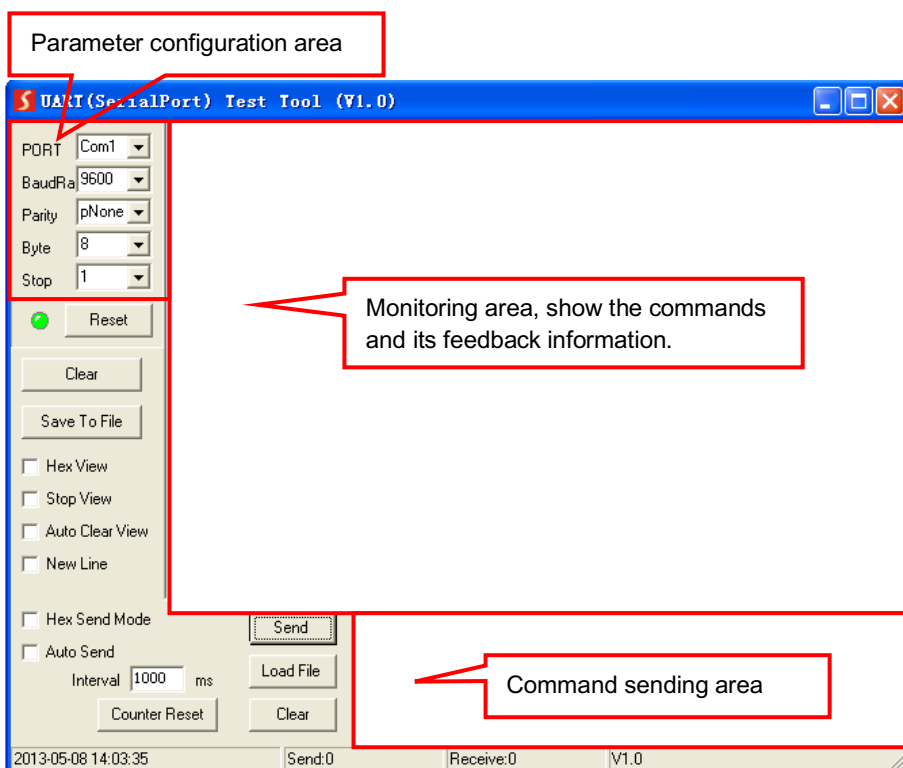
## 4K 8x8 HDBaseT Matrix Switcher

## 8.2 RS232 Control Software

If the matrix switcher and third-party devices needs to be controlled from PC by an RS232 connection, a RS232 control software should be installed in PC. Here using **CommWatch.exe** as an example. The icon is shown as below:



Double-click the icon to run, and its interface is depicted below:



Please set the parameters of COM number, bound rate, data bit, stop bit and the parity bit correctly, and then you are able to send command in command sending area.

4K 8x8 HDBaseT Matrix Switcher

8.3 RS232 Commands

When controlling the matrix, the serial port settings for all RS232 commands is:

Baud rate: 9600      Data bit: 8      Stop bit: 1      Parity bit: none

**The matrix switcher can be controlled by sending the following RS232 commands:**

**Note:**

- In the commands, “[” and “]” are symbols for easy reading and do not need to be typed in actual operation.
- Please remember to end the commands with the ending symbols “.” or “;”.
- Type the command carefully, it is case-sensitive.

8.3.1 System Setting

Command	Description	Command Example and Response
PowerON.	Power on system.	Power ON! HDBT 01 Power ON! HDBT 02 Power ON! HDBT 03 Power ON! HDBT 04 Power ON! HDBT 05 Power ON! HDBT 06 Power ON! Front Panel UnLock!
PowerOFF.	Power off system.	Power OFF!
/*Name.	Report the system name.	MUH88E-H2
/*Type.	Report system model.	HDBaseT Matrix
/^Version.	Report firmware version and video driver version.	V1.0.0 CPLD:V1.0.0 VideoDriverVersion:V1.0.0
RST.	Factory reset.	Factory Default! System Initialization..... HDBaseT Matrix MUH88E-H2 V1.0.0 Power ON! ... ..
Lock.	Lock front panel buttons.	Front Panel Locked!
Unlock.	Unlock front panel buttons.	Front Panel UnLock!

4K 8x8 HDBaseT Matrix Switcher

Command	Description	Command Example and Response
<b>GetGuiIP.</b>	Report GUI IP.	GUI_IP:192.168.0.178!
<b>SetGuiIP:xxx.xxx.xxx.xx.</b>	Set GUI IP to xxx.xxx.xxx.xxx.	SetGuiIP:192.168.0.178!
<b>Baudrate115200.</b>	Set the baud rate of switcher to 115200.	Set Local RS232 Baudrate Is 115200!
<b>Baudrate57600.</b>	Set the baud rate of switcher to 57600.	Set Local RS232 Baudrate Is 57600!
<b>Baudrate38400.</b>	Set the baud rate of switcher to 38400.	Set Local RS232 Baudrate Is 38400!
<b>Baudrate19200.</b>	Set the baud rate of switcher to 19200.	Set Local RS232 Baudrate Is 19200!
<b>Baudrate9600.</b>	Set the baud rate of switcher to 9600.	Set Local RS232 Baudrate Is 9600!
<b>IRFVON.</b>	Enable the IR switching to follow the video switching.	IR Follow Video ON!
<b>IRFVOFF.</b>	Disable the IR switching to follow the video switching.	IR Follow Video OFF!
<b>PHDBT[XX]:ON</b>	Turn on PoC for HDBT output [XX]. [XX]=00~06. The "[XX]=00" represents all HDBT outputs.	PHDBT00:ON
		HDBT 01 Power ON! HDBT 02 Power ON! HDBT 03 Power ON! HDBT 04 Power ON! HDBT 05 Power ON! HDBT 06 Power ON!
<b>PHDBT[XX]:OFF.</b>	Turn off PoC for HDBT output [XX]. [XX]=00~06. . The "[XX]=00" represents all HDBT outputs.	HDBT 01 Power OFF!
		HDBT 01 Power OFF! HDBT 02 Power OFF! HDBT 03 Power OFF! HDBT 04 Power OFF! HDBT 05 Power OFF! HDBT 06 Power OFF!
<b>STA_PHDBT.</b>	Report the PoC status of HDBT outputs.	HDBT Power ON!
<b>RS232RCM[XX]ON.</b>	Enable the RS232 remote-control mode for HDBT output [XX] that the matrix switcher can be controlled from remote PC. [XX]=00~06. The "[XX]=00" represents all HDBT outputs.	RS232RCM00ON.
		RS232 Remote 01 Control MCU ON! RS232 Remote 02 Control MCU ON!

**4K 8x8 HDBaseT Matrix Switcher**

Command	Description	Command Example and Response
		RS232 Remote 03 Control MCU ON! RS232 Remote 04 Control MCU ON! RS232 Remote 05 Control MCU ON! RS232 Remote 06 Control MCU ON!
<b>RS232RCM[XX]OFF.</b>	Disable the RS232 remote-control mode for HDBT output [XX] that the matrix switcher cannot be controlled from remote PC. [XX]=00~06. The "[XX]=00" represents all HDBT outputs.	RS232RCM00OFF. RS232 Remote 01 Control MCU OFF! RS232 Remote 02 Control MCU ON! RS232 Remote 03 Control MCU ON! RS232 Remote 04 Control MCU ON! RS232 Remote 05 Control MCU ON! RS232 Remote 06 Control MCU ON
<b>STA_RS232RCM.</b>	Report the RS232 remote-control mode status.	RS232 Remote 01 Control MCU OFF! RS232 Remote 02 Control MCU ON! RS232 Remote 03 Control MCU ON! RS232 Remote 04 Control MCU ON! RS232 Remote 05 Control MCU ON! RS232 Remote 06 Control MCU ON
<b>IRRCM[XX]ON.</b>	Enable the IR remote-control mode for HDBT output [XX] that the matrix switcher can be controlled by the IR remote at the far-end HDBaseT receivers' position.	IRRCM00ON. IR Remote 01 Control MCU ON! IR Remote 02 Control MCU ON! ... .. IR Remote 06 Control MCU ON!



4K 8x8 HDBaseT Matrix Switcher

Command	Description	Command Example and Response
	[XX]=00~06. The "[XX]=00" represents all HDBT outputs.	
<b>IRRCM[XX]OFF.</b>	Disable the IR remote-control mode for HDBT output [XX] that the matrix switcher cannot be controlled by the IR remote at the far-end HDBaseT receivers' position. [XX]=00~06. The "[XX]=00" represents all HDBT outputs.	IRRCM00OFF. IR Remote 01 Control MCU OFF! IR Remote 02 Control MCU OFF! ... .. IR Remote 06 Control MCU OFF!
<b>STA_IRRCM.</b>	Report the IR remote-control mode status.	IR Remote 01 Control MCU ON! IR Remote 02 Control MCU ON! IR Remote 03 Control MCU ON! IR Remote 04 Control MCU ON! IR Remote 05 Control MCU ON! IR Remote 06 Control MCU ON!
<b>@OUT[XX].</b>	Turn on output [XX]. [XX]=00~08. The "[XX]=00" represents all outputs.	@OUT00. Turn ON Output 01! Turn ON Output 02! Turn ON Output 03! Turn ON Output 04! Turn ON Output 05! Turn ON Output 06! Turn ON Output 07! Turn ON Output 08!
<b>\$OUT[XX].</b>	Turn off output [XX]. [XX]=00~08. The "[XX]=00" represents all outputs.	\$OUT00. Turn OFF Output 01! Turn OFF Output 02! Turn OFF Output 03! Turn OFF Output 04! Turn OFF Output 05! Turn OFF Output 06! Turn OFF Output 07! Turn OFF Output 08!
<b>STA.</b>	Report all system status.	GUI Or RS232 Query Status: HDBaseT Matrix MUH88E-H2 V1.0.0

4K 8x8 HDBaseT Matrix Switcher

Command	Description	Command Example and Response
		Power ON! .....
STA_POUT.	Report the on/off status of all outputs.	Turn ON Output 01! Turn ON Output 02! Turn ON Output 03! Turn ON Output 04! Turn ON Output 05! Turn ON Output 06! Turn ON Output 07! Turn ON Output 08!
STA_IN.	Report the connection status of all HDMI input ports.	IN 1 2 3 4 5 6 7 8 LINK Y Y Y N Y Y Y Y
STA_OUT.	Report the connection status of all HDMI and HDBT outputs.	OUT 1 2 3 4 5 6 7 8 LINK Y N Y Y Y Y Y Y

8.3.2 Signal Switching

Command	Description	Command Example and Response
OUT[XX]:[YY].	Switch video input [YY] to video output [XX]. [XX]=00~08, [YY]=01~08. The "[XX]=00" represents all outputs.	OUT01:03. Output 01 Switch To In 03! Local 03 IR Out Switch To Remote 01 IR IN!
STA_VIDEO.	Report the input channel for all outputs.	Output 01 Switch To In 01! Output 02 Switch To In 02! Output 03 Switch To In 04! Output 04 Switch To In 01! Output 05 Switch To In 03! Output 06 Switch To In 06! Output 07 Switch To In 04! Output 08 Switch To In 07!
IR[XX]:[YY].	Switch far-end IR IN [YY] to local IR OUT [XX]. [XX]=01~08, [YY]=00~06. The "[YY]=00" represents all far-end IR IN ports.	IR01:03. Local 01 IR Out Switch To Remote 03 IR IN!
STA_IR.	Report IR switching status.	IR Follow Video OFF! Local 01 IR Out Switch To Remote 01 IR IN!

4K 8x8 HDBaseT Matrix Switcher

Command	Description	Command Example and Response
		Local 01 IR Out Switch To Remote 02 IR IN! Local 01 IR Out Switch To Remote 03 IR IN! Local 01 IR Out Switch To Remote 04 IR IN! Local 01 IR Out Switch To Remote 05 IR IN! Local 01 IR Out Switch To Remote 06 IR IN!
<b>PresetSave[XX].</b>	Store the current switching status to present [XX]. XX=01~09.	PresetSave09. Preset 09 Save Success! Preset 09 Sta: Out 01 In 01! Out 02 In 04! Out 03 In 05! Out 04 In 04! Out 05 In 06! Out 06 In 03! Out 07 In 06! Out 08 In 08!
<b>PresetRecall[XX].</b>	Recall present [XX]. [XX]=01~09.	PresetRecall09. Preset 09 Recall: Output 01 Switch To In 01! Output 02 Switch To In 04! Output 03 Switch To In 05! Output 04 Switch To In 04! SPDIF Out 03 Switch To Video Out 04! Output 05 Switch To In 06! Output 06 Switch To In 03! Output 07 Switch To In 06! Output 08 Switch To In 08!
<b>PresetSta[XX].</b>	Report the preset [XX]. [XX]=01~09.	PresetSta06. Preset 06 Sta: Out 01 In 01! Out 02 In 01! Out 03 In 03!

**4K 8x8 HDBaseT Matrix Switcher**

<b>Command</b>	<b>Description</b>	<b>Command Example and Response</b>
		Out 04 In 04! Out 05 In 03! Out 06 In 03! Out 07 In 06! Out 08 In 05!

4K 8x8 HDBaseT Matrix Switcher

8.3.3 Audio Setting

Command	Description	Command Example and Response
<b>SPDIF[XX]:[YY].</b>	Select audio source [YY] for SPDIF audio output [XX]. [XX]=00~08, The "[XX]=00" represents all SPDIF audio outputs. [YY]=01~22. [YY]=01~08, Audio on Input 1~8. [YY]=09~16, Audio on Output 1~8. [YY]=17~22, ARC on Output 1~6.	SPDIF01:04.  SPDIF Out 01 Switch To Video In 04!
<b>STA_SPDIF.</b>	Report SPDIF audio status.	SPDIF Out 01 Switch To Video In 01! SPDIF Out 02 Switch To ARC 03! SPDIF Out 03 Switch To Video Out 04! SPDIF Out 04 Switch To ARC 06!

8.3.4 EDID Management

Command	Description	Command Example and Response
<b>EDIDMinit.</b>	Reset factory default EDID to all input ports.	All Input EDID Set Default!
<b>EDIDUpgrade[XX].</b>	Upgrade the EDID data of the input port [XX]. [XX]=00~08, U. [XX]=00, represents all inputs. [XX]=01~08, represents HDMI input 1~8. [XX]=U, upload a user-defined EDID. The EDID can be saved for invoking at any time.  When the command applied, system prompts to upload the EDID file (.bin). Operation will be cancelled in 10 seconds. Please disconnect HDBT connection before sending command to ensure the data can be received successfully.	EDIDUpgrade01.
		EDIDUpgradeU.  256 9600bps Input XX/User Define EDID Upgrade OK By RS232 Or GUI!
<b>EDID/[XX]/[YY].</b>		EDID/03/01.

4K 8x8 HDBaseT Matrix Switcher

Command	Description	Command Example and Response																				
	<p>The input [XX] recall the embedded EDID [YY]. [XX]=00~08. The "00" represents all inputs. [YY]=01~09.</p> <table border="1" data-bbox="356 328 741 890"> <thead> <tr> <th>[YY]</th> <th>EDID</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>1920x1080@60 8bit Stereo</td> </tr> <tr> <td>02</td> <td>1920x1080@60 8bit High Definition Audio</td> </tr> <tr> <td>03</td> <td>3840x2160@30Hz 8bit Stereo Audio</td> </tr> <tr> <td>04</td> <td>3840x2160@30Hz Deep Color High Definition Audio</td> </tr> <tr> <td>05</td> <td>3840x2160@60Hz 4:2:0 Deep Color Stereo Audio</td> </tr> <tr> <td>06</td> <td>3840x2160@60Hz Deep Color Stereo Audio</td> </tr> <tr> <td>07</td> <td>3840x2160@60Hz Deep Color High Definition Audio</td> </tr> <tr> <td>08</td> <td>3840x2160@60Hz Deep Color HDR LPCM 6CH</td> </tr> <tr> <td>09</td> <td>User-defined EDID</td> </tr> </tbody> </table>	[YY]	EDID	01	1920x1080@60 8bit Stereo	02	1920x1080@60 8bit High Definition Audio	03	3840x2160@30Hz 8bit Stereo Audio	04	3840x2160@30Hz Deep Color High Definition Audio	05	3840x2160@60Hz 4:2:0 Deep Color Stereo Audio	06	3840x2160@60Hz Deep Color Stereo Audio	07	3840x2160@60Hz Deep Color High Definition Audio	08	3840x2160@60Hz Deep Color HDR LPCM 6CH	09	User-defined EDID	<p>Input 03 EDID Upgrade OK By 01 Internal EDID!</p>
[YY]	EDID																					
01	1920x1080@60 8bit Stereo																					
02	1920x1080@60 8bit High Definition Audio																					
03	3840x2160@30Hz 8bit Stereo Audio																					
04	3840x2160@30Hz Deep Color High Definition Audio																					
05	3840x2160@60Hz 4:2:0 Deep Color Stereo Audio																					
06	3840x2160@60Hz Deep Color Stereo Audio																					
07	3840x2160@60Hz Deep Color High Definition Audio																					
08	3840x2160@60Hz Deep Color HDR LPCM 6CH																					
09	User-defined EDID																					
<p><b>EDIDGOUT[XX].</b></p>	<p>Report the EDID data from output [XX]. [XX]=01~08.</p>	<p>EDIDGOUT04. .....</p>																				
<p><b>EDIDM[XX]B[YY].</b></p>	<p>Copy the EDID data of output [XX] to input [YY]. [XX]=01~08, [YY]=00~08. [YY]=00, represents all inputs.</p>	<p>EDIDM04B01. Input 01 EDID Upgrade OK By 04 EXT EDID!</p>																				
<p><b>EDIDSTA[XX].</b></p>	<p>Report the EDID status of input [XX]. [XX]=00~08. The "[XX]=00" represents all inputs.</p>	<p>EDIDSTA00. Input 01 EDID From 01 Internal EDID! Input 02 EDID From 02 Internal EDID! ... .. Input 07 EDID From 06 Internal EDID! Input 08 EDID From User Define EDID!</p>																				

4K 8x8 HDBaseT Matrix Switcher

8.3.5 HDCP Setting

Command	Description	Command Example and Response
<p><b>HDCP[XX]MAT.</b></p>	<p>The HDCP content of output [XX] follows the HDCP version of display device. [XX]=00~08. The "[XX]=00" represents all outputs.</p>	<p>HDCP00MAT.            OUT 01 HDCP MAT Display!            OUT 02 HDCP MAT Display!            OUT 01 HDCP MAT Display!            OUT 02 HDCP MAT Display!            OUT 03 HDCP MAT Display!            OUT 04 HDCP MAT Display!            OUT 05 HDCP MAT Display!            OUT 06 HDCP MAT Display!            OUT 07 HDCP MAT Display!            OUT 08 HDCP MAT Display!</p>
<p><b>HDCP[XX]PAS.</b></p>	<p>Set the HDCP mode of output [XX] to <b>Passive</b>. The HDCP content of output [XX] automatically follows the HDCP version of source device. [XX]=00~08. The "[XX]=00" represents all outputs.</p>	<p>HDCP00pAS.            OUT 01 HDCP PASSIVE!            OUT 02 HDCP PASSIVE!            OUT 03 HDCP PASSIVE!            OUT 04 HDCP PASSIVE!            OUT 05 HDCP PASSIVE!            OUT 06 HDCP PASSIVE!            OUT 07 HDCP PASSIVE!            OUT 08 HDCP PASSIVE!</p>
<p><b>HDCP[XX]BYP.</b></p>	<p>Set the HDCP mode of output [XX] to <b>Active</b>. If the input video has HDCP content, the HDCP version of HDMI output is HDCP 1.4 for broader video solution. If the input video has no HDCP content, the HDMI output has no HDCP too. [XX]=00~08. The "[XX]=00" represents all outputs.</p>	<p>HDCP00BYP.            OUT 01 HDCP BYPASS!            OUT 02 HDCP BYPASS!            OUT 03 HDCP BYPASS!            OUT 04 HDCP BYPASS!            OUT 05 HDCP BYPASS!            OUT 06 HDCP BYPASS!            OUT 07 HDCP BYPASS!            OUT 08 HDCP BYPASS!</p>

### 4K 8x8 HDBaseT Matrix Switcher

Command	Description	Command Example and Response
<b>STA_HDCP.</b>	Report the HDCP mode of all outputs.	OUT 01 HDCP PASSIVE! OUT 02 HDCP PASSIVE! OUT 03 HDCP MAT DISPLAY! OUT 04 HDCP BYPASS! OUT 05 HDCP PASSIVE! OUT 06 HDCP PASSIVE! OUT 07 HDCP PASSIVE! OUT 08 HDCP PASSIVE!

### 8.3.6 Third-party Device Control

The matrix supports RS232 pass-through control, the third-party device which is connected to the RS232 port can be controlled by RS232 command, and the command format as shown below:

Command	Function	Command Example
<b>+[X]/[YY]:xxx.</b>	<p>Send the ASCII command “xxx” to control the far-end third-party device.</p> <ul style="list-style-type: none"> <li>• xxx: ASCII string.</li> <li>• The “[X]=1~7” represents the baud rate of third-party device. <ul style="list-style-type: none"> <li>[X]=1, the baud rate is 2400</li> <li>[X]=2, the baud rate is 4800</li> <li>[X]=3, the baud rate is 9600</li> <li>[X]=4, the baud rate is 19200</li> <li>[X]=5, the baud rate is 38400</li> <li>[X]=6, the baud rate is 57600</li> <li>[X]=7, the baud rate is 115200</li> </ul> </li> <li>• The “[YY]=00” represents all HDBT outputs.</li> <li>• The “[YY]=01~06” represents the HDBT output 1~6.</li> </ul>	<p>/+3/01:123456.</p>
		<p>Send the ASCII command “123456.” to the far-end third-party device whose baud rate is 9600.</p> <p>The third-party device is connected to the far-end HDBaseT receiver of connecting the HDBT output 1 port.</p>
<b>CMDON/+[X]/[YY]:xxx.</b>	<p>When power on the matrix switcher, automatically send ASCII command “xxx” to power on far-end third-party device.</p> <ul style="list-style-type: none"> <li>• xxx: ASCII string.</li> </ul>	<p>CMDON/+3/01:123456.</p>
		<p>When power on the matrix switcher, automatically send ASCII command “123456” to</p>



4K 8x8 HDBaseT Matrix Switcher

	<ul style="list-style-type: none"> <li>The “[X]=1~7” represents the baud rate of third-party device. [X]=1, the baud rate is 2400 [X]=2, the baud rate is 4800 [X]=3, the baud rate is 9600 [X]=4, the baud rate is 19200 [X]=5, the baud rate is 38400 [X]=6, the baud rate is 57600 [X]=7, the baud rate is 115200</li> <li>The “[YY]=00” represents all HDBT outputs.</li> <li>The “[YY]=01~06” represents the HDBT output 1~6.</li> </ul>	<p>the far-end third-party device. The third-party device is connected to the far-end HDBaseT receiver of connecting the HDBT output 1 port.</p>
<p><b>CMDOFF/+ [X]/[YY]:xx</b> x.</p>	<p>When power off the matrix switcher, automatically send ASCII command “xxx” to power off far-end third-party device.</p> <ul style="list-style-type: none"> <li>xxx: ASCII string.</li> <li>The “[X]=1~7” represents the baud rate of third-party device. [X]=1, the baud rate is 2400 [X]=2, the baud rate is 4800 [X]=3, the baud rate is 9600 [X]=4, the baud rate is 19200 [X]=5, the baud rate is 38400 [X]=6, the baud rate is 57600 [X]=7, the baud rate is 115200</li> <li>The “[YY]=00” represents all HDBT outputs.</li> <li>The “[YY]=01~06” represents the HDBT output 1~6.</li> </ul>	<p>CMDOFF/+3/01:123456.</p> <p>When power off the matrix switcher, automatically send ASCII command “123456” to the far-end third-party device. The third-party device is connected to the far-end HDBaseT receiver of connecting the HDBT output 1 port.</p>

8.3.7 CEC Control

If the input sources, HDBaseT output devices and HDMI output devices are supports CEC, they can be controlled by sending the following command instead of IR remote.

**CEC[I/O][AA][BB][CC][DD].**

- The “[I]” represents the input port. The “[O]” represents the output port.

**4K 8x8 HDBaseT Matrix Switcher**

- The “[AA]” represents the port number. The HDMI input ports are 01~08. The HDBaseT output ports are 01~06 and the local HDMI output ports are 07~08.
- The “[AA]” is “FF” for sending command to all input or output ports.
- The “[BB]” represents the device type (e.g. TV: 40/20/80; Blu-ray DVD: 04/08).
- The “[CC]” represents the function type (e.g. “44”: Remote control).
- The “[DD]” represents the specific command from the table below.

✓ **Control the input source:**

Command	Description	Command Example and Response
CECI[AA][BB][CC]00.	Confirm operation (Enter).	CECI02044400
		CEC Input 02 Send Success!
CECI[AA][BB][CC]01.	UP direction.	CECI01044401.
		CEC Input 01 Send Success!
CECI[AA][BB][CC]02.	DOWN direction.	CECI01044402.
		CEC Input 01 Send Success!
CECI[AA][BB][CC]03.	LEFT direction.	CECI03044403.
		CEC Input 03 Send Success!
CECI[AA][BB][CC]04.	RIGHT direction.	CECI03044404.
		CEC Input 03 Send Success!
CECI[AA][BB][CC]09.	Back to submenu.	CECI03044409.
		CEC Input 03 Send Success!
CECI[AA][BB][CC]0A.	Enter main menu.	CECI0304440A.
		CEC Input 03 Send Success!
CECI[AA][BB][CC]0D.	Exit menu.	CECI0204440D.
		CEC Input 02 Send Success!
CECI[AA][BB][CC]6D.	Power on.	CECI0204446D.
		CEC Input 02 Send Success!
CECI[AA][BB][CC]6C.	Power off.	CECI0204446C.
		CEC Input 02 Send Success!

✓ **Control the output display device:**

Command	Description	Command Example and Response
CECO[AA][BB][CC]41.	Volume up.	CECO05404441.
		CEC Output 05 Send Success!

## 4K 8x8 HDBaseT Matrix Switcher

CECO[AA][BB][CC]42.	Volume down.	CECO05404442.
		CEC Output 05 Send Success!
CECO[AA][BB][CC]43.	Mute	CECO05404443.
		CEC Output 05 Send Success!
CECO[AA][BB]04.	Power on.	CECO038004.
		CEC Output 03 Send Success!
CECO[AA][BB]36.	Power off.	CECO038036.
		CEC Output 03 Send Success!
CECO[AA][BB]36.	Input source selection	CECO05804434

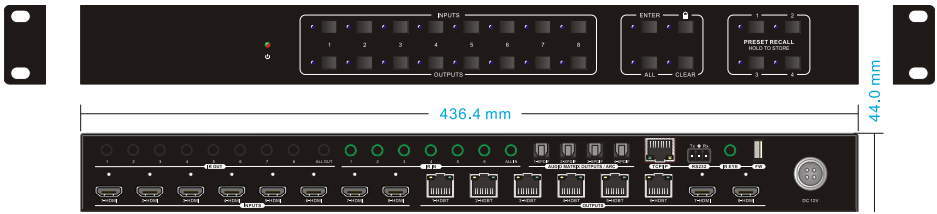
## 9. Firmware Upgrade

Please follow the steps as below to upgrade firmware by the **FIRMWARE** port on the rear panel:

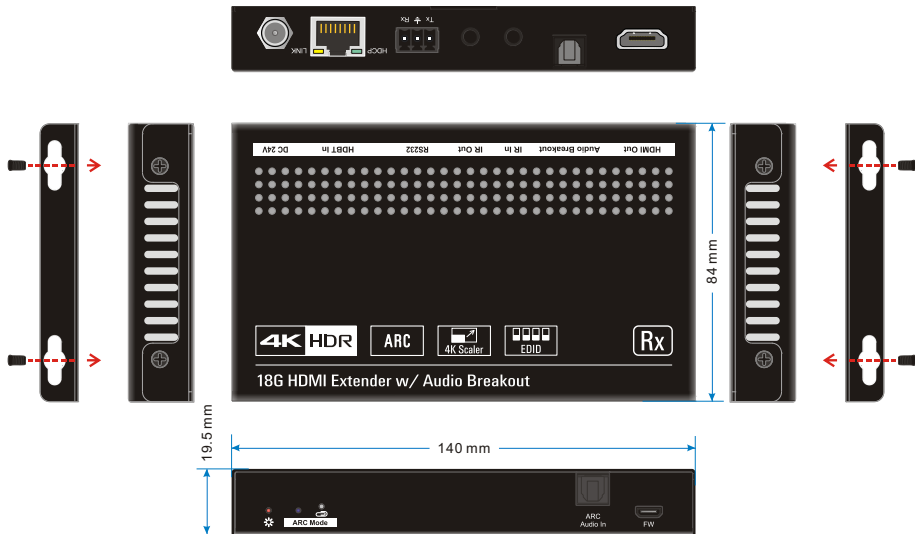
- 1) Prepare the latest upgrade file and rename it as "08010000.APP" on PC.
- 2) Power off the switcher, and connect the **FIRMWARE** port of switcher to the PC with USB cable.
- 3) Power on the switcher, and then the PC will automatically detect a U-disk named of "BOOTDISK".
- 4) Double-click the U-disk, a file named of "READY.TXT" would be showed.
- 5) Directly copy the latest upgrade file 08010000.APP (.bin) to the "BOOTDISK" U-disk.
- 6) Reopen the U-disk to check the filename "READY.TXT" whether automatically becomes "SUCCESS.TXT", if yes, the firmware was updated successfully, otherwise, the firmware updating is fail, the name of upgrade file (.bin) should be confirm again, and then follow the above steps to update again.
- 7) Remove the USB cable after firmware upgrade.
- 8) After firmware upgrade, the switcher should be restored to factory default by sending command.

4K 8x8 HDBaseT Matrix Switcher

10. Panel Drawing



MUH88E-H2 HDBaseT Matrix Switcher



TPUH610SR HDBaseT Receiver

4K 8x8 HDBaseT Matrix Switcher

**11. Troubleshooting and Maintenance**

Problems	Potential Causes	Solutions
Color losing or no video signal output	The connecting cables may not be connected correctly or it may be broken.	Check whether the cables are connected correctly and in working condition.
	Fail or loose connection.	Make sure the connection is good
No output image when switching	No signal at the input / output end.	Check with oscilloscope or multimeter if there is any signal at the input/ output end.
	Fail or loose connection.	Make sure the connection is good.
	Input source is with HDCP while the HDCP compliance is switched off.	Send command /%[Y]/[X]:1. or change HDCP compliance status in GUI.
	The display doesn't support the input resolution.	Switch for another input source or enable the display to learn the EDID data of the input.
Cannot control the device via front panel buttons	Front panel buttons are locked.	Send command /%Unlock; or select unlock in GUI interface to unlock.
Cannot control the device via IR remote	The battery has run off.	Change for new battery.
	The IR remote is broken.	Send it to authorized dealer for repairing.
	Beyond the effective range of the IR signal or not pointing at the IR receiver.	Adjust the distance and angle and point right at the IR receiver.
	The IR receiver connected to IR IN port is not with carrier.	Change for an IR receiver with carrier.
Power Indicator remains off when powered on	Fail or loose power connection.	Check whether the cables are connected correctly.

4K 8x8 HDBaseT Matrix Switcher

EDID management does not work normally	The HDMI cable is broken at the output end.	Change for another HDMI cable which is in good working condition.
There is a blank screen on the display when switching	The display does not support the resolution of the video source.	Switch again.
		Manage the EDID data manually to make the resolution of the video source automatically compliant with the output resolution.
Cannot control the device by control device (e.g. a PC) through RS232 port	Wrong connection.	Check to ensure the connection between the control device and the unit
	Wrong RS232 communication parameters.	Type in correct RS232 communication parameters: Baud rate:9600; Data bit: 8; Stop bit: 1; Parity bit: none
	Broken RS232 port.	Send it to authorized dealer for checking.

**Note:** If your problem persists after following the above troubleshooting steps, seek further help from authorized dealer or our technical support.

## 12. Customer Service

The return of a product to our Customer Service implies the full agreement of the terms and conditions hereinafter. These terms and conditions may be changed without prior notice.

### 1) Warranty

The limited warranty period of the product is fixed three years.

### 2) Scope

These terms and conditions of Customer Service apply to the customer service provided for the products or any other items sold by authorized distributor only.

### 3) Warranty Exclusion

- Warranty expiration.
- Factory applied serial number has been altered or removed from the product.
- Damage, deterioration or malfunction caused by:
  - ✓ Normal wear and tear.
  - ✓ Use of supplies or parts not meeting our specifications.
  - ✓ No certificate or invoice as the proof of warranty.
  - ✓ The product model showed on the warranty card does not match with the model of the product for repairing or had been altered.
  - ✓ Damage caused by force majeure.
  - ✓ Servicing not authorized by distributor.
  - ✓ Any other causes which does not relate to a product defect.
- Shipping fees, installation or labor charges for installation or setup of the product.

### 4) Documentation

Customer Service will accept defective product(s) in the scope of warranty coverage at the sole condition that the defeat has been clearly defined, and upon reception of the documents or copy of invoice, indicating the date of purchase, the type of product, the serial number, and the name of distributor.

**Remarks:** Please contact your local distributor for further assistance or solutions.