MUH44E KIT

4K Home Distribution Hub

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Version: MUH44E KIT_2017V1.1

PTN

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Preface

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

This manual is only for operation instruction only. The functions described in this version are updated till August 14, 2017. In the constant effort to improve our product, we reserve the right to make functions or parameters changes without notice or obligation. Please refer to the dealers for the latest details.

Trademarks

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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.

SAFETY PRECAUTIONS

To insure 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 optical 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.

Contents

1. Introduction

1.1 Introduction to the MUH44E KIT

MUH44E KIT is a professional 4K HDBaseT Home Distribution Hub Kit, which consists of a 4K HDBaseT Matrix Switcher, 3 HDBaseT Receivers and accessories.

The 4K HDBaseT Matrix Switcher is a professional 4x4 HDBaseT Matrix Switcher that consist of the following inputs and outputs, 4 HDMI IN (4kx2K@60Hz signal at max), 3 IR IN, 1 IR EYE, 4 IR OUT, 3 HDBaseT OUT, 1 HDMI OUT, 1 SPDIF OUT, 1 L&R RCA OUT, and TCP/IP, RS232 control port via phoenix connector.

The TPHD-BYE-R is an HDBaseT Receiver that consists of the following inputs and outputs, 1 HDBaseT IN, 1 IR IN, 1 IR OUT and HDMI OUT. The receiver is powered directly by the Matrix Switcher.

All HDMI inputs can be selected by either the front panel buttons, IR, RS 232 or GUI. The selected source is delivered to HDBaseT zoned outputs 1~3 & HDMI Output.

The Matrix Switcher is capable of delivering 4K signals up to 40m, 1080p up to 70m and powering the receivers via a single CAT5e cable. It is however recommended to use good quality CAT6 cable.

The Matrix Switcher supports EDID management and is HDCP 2.2, 1.4 compliant.

Audio sources can be selected via RS232 commands and TCP/IP at the Matrix Switcher or by 3rd Party control.

1.2 Features

- Support HDMI1.4 & HDCP2.2, and compliant with lower standards, capable to transmit 4Kx2K@60Hz 4:2:0 & 1080p 3D.
- Support manual HDCP management and auto-detecting.
- Transmit 4Kx2K signal for 8m via HDMI port, 40m via HDBT port.
- Audio source selectable via RS232 command.
- 3 HDBaseT outputs, distances up to 70m at 1080p and 40m at 4Kx2K on a single CAT5e/6 cable can be achieved.
- The HDBaseT Receivers are powered by the matrix switcher 12VDC by PoC technology.
- LED indicators show real-time switching status.
- Controllable via front panel, RS232, IR and TCP/IP.
- Support bi-directional IR control.

- Built-in GUI for TCP/IP control.
- Powerful EDID management.
- Support non-volatile memory [NVM] for reliable operation.
- Support firmware upgrade through Micro USB port.
- Easy installation with rack-mounting design.

1.3 Package List

4K HDBaseT Matrix Switcher	● 1 x MUH44E KIT 4K HDBaseT Matrix Switcher ● 2 x Matrix Switcher Mounting Ears with 6 Screws ● 4 x Matrix Switcher Trapezoidal Plastic Pads ● 1 x IR Remote ● 4 x IR Receivers ● 4 x IR Emitters ● 1 x RS232 Cable (Phoenix to 9-pin D-Sub) ● 1 x Power Adapter (DC 24V 2.71A)
HDBaseT Receivers	● 3 x TPHD-BYE-R HDBaseT Receivers ● 6 x HDBaseT Receiver Mounting ears with 6 Screws ● 12 x HDBaseT Receiver Round Plastic Pads
	● 1 x User manual

Note: Confirm if the product and the accessories are all included, if not, please contact with the dealers.

2. Product Appearance

2.1 4K HDBaseT Matrix Switcher

1)   Front Panel
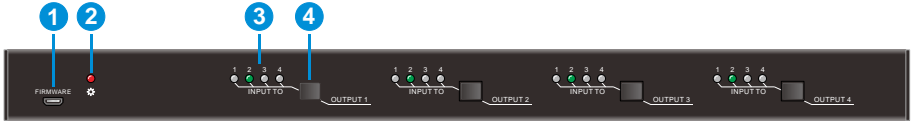
No.	Name	Description
①	FIRMWARE	Micro USB port for updating firmware
②	Power Indicator	➢ **OFF**: No power; ➢ **RED:** DC power present or Standby Mode.
③	INPUT selector Indicators	Total 4 groups, and each group is set up including 4 green indicators for 4 input sources, numbered from "1" to "4".
④	Output selector button	Total 4 output selector buttons, press the buttons to switch input cycle for the output.

2)   Rear Panel

No.	Name	Description
①	HDMI INPUTS	4 x HDMI input ports, type A female HDMI connector, connect the Source with an HDMI cable to any of the HDMI inputs.
②	IR IN	➢ 3 x IR IN: Connect with IR receiver, fixed IR input for the output, cannot be switched separately. It makes up an IR bi-directional transmission with the IR OUT on the corresponding HDBaseT receiver. ➢ 1 x IR EYE: Connect with extended IR receiver, use the IR remote to control the Matrix Switcher.
③	IR OUT(1~4)	Plug in the IR Emitter and attach to the front of the Source.

		This then emits the IR signal received from the HDBaseT Receiver. There are 4 IR OUTPUT sockets marked on IR matrix.
④	OUTPUTS	➢ **HDBaseT:** The HDBT RJ45 outputs deliver HD video, Audio and PoC to the HDBaseT Receiver up to 70m. ➢ **HDMI:** Connect an HDMI cable from the Matrix Switcher to the displayer. ➢ **SPDIF:** Digital audio output connects directly via an optic fibre cable to the Toslink input on a sound bar. ➢ **RCA (L&R):** PCM Analogue audio output sockets connect the de-embedded audio additional speakers.
⑤	Control	➢ **TCP/IP:** RJ45 port. Connect with PC for Web-based GUI control. ➢ **RS232:** Serial port for unit control, 3-pin pluggable terminal block, connects with control device (e.g. PC).
⑥	DC 24V	Connect with DC24V 2.71A power adaptor.

2.2 TPHD-BYE-R HDBaseT Receiver

1)　Front Panel
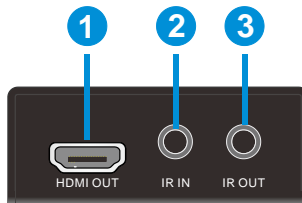
No.	Name	Description
①	HDMI OUT	Connect to HDMI display.
②	IR IN	Plug in the IR receiver, this will receive the IR signals from the RCU and send through to the Matrix Switcher and then control the desired source.
③	IR OUT	Plug in the IR emitter and attached to the fornt of the display, this will send the IR signals form the Matrix Switcher to control the display which is connected to the HDMI OUT port.

2)   Rear Panel

No.	Name	Description
①	Power Indicator	➢ **OFF**: No power; ➢ **RED:** DC power present (PoC).
②	TP IN	The RJ45 socket has two LED status indicators. Plug in the Pre-installed CAT cable in to the HDBT RJ45 socket. ➢ **HDCP**: HDCP compliant indicator ✧ OFF: No HDMI traffic (no picture) ✧ GREEN: Signals with HDCP. ✧ Blinking GREEN: Signal without HDCP ➢ **LINK**: HDBT Link status indicator. ✧ OFF: No Link ✧ YELLOW:Link Successful ✧ Blinking YELLOW: Link Error

Note: Pictures shown in this manual are for reference only, different model and specifications are subject to real product.

3. System Connection

3.1 System Applications

The new MUH44E 4K Home Distribution Hub Kit is designed for the residential market delivering HD Video, Audio to 4 zones with total control and simplicity.

Usage Precautions:

- The MUH44E 4K Home Distribution kit should be installed in a clean and dust free environment.
- Ensure that all plugs, power cords and sockets are in good condition without signs of damage.
- All devices should be connected before power on.

3.2 Connection Diagram
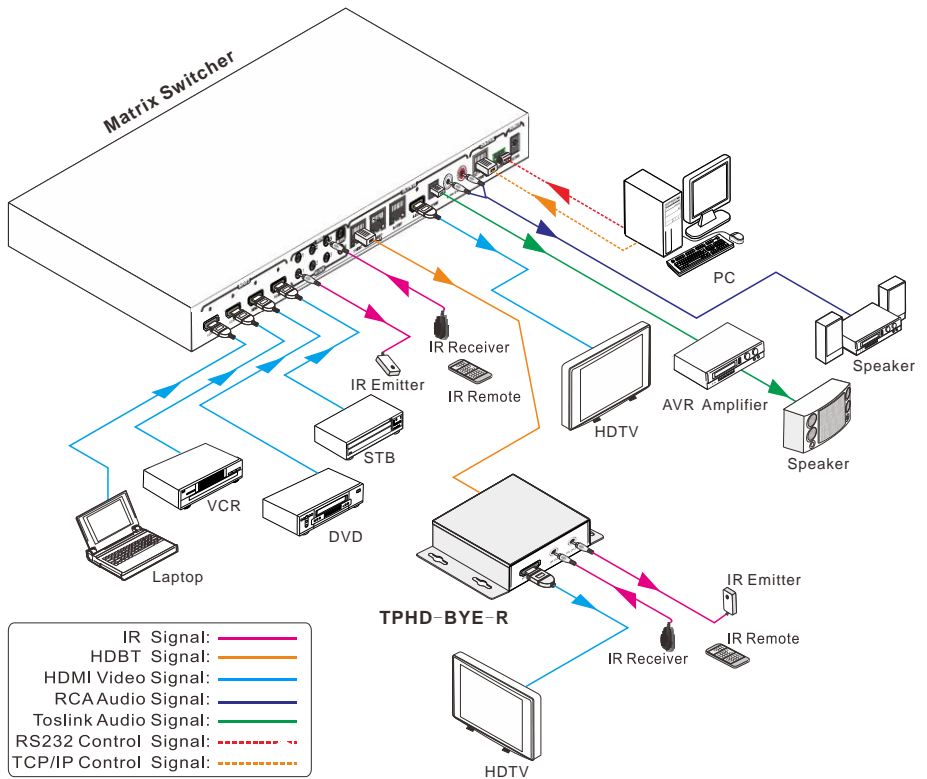
3.3 Connection Procedure

1) Connect HDMI sources (e.g. DVD) to HDMI input ports of the Matrix Switcher via good quality HDMI cables.

2) Connect the Pre-Installed CAT5e/CAT 6 cable infrastructure to Matrix Switcher and HDBaseT receivers（TPHD-BYE-R）via good quality patch leads.

3) Connect HDTV to HDMI output port via HDMI cable.

4) Plug in an HDMI cable in to each of TPHD-BYE-R and connect to the local display [HDTV].

**5)** Connect AVR amplifier to SPDIF output port or via the Toslink optic fibre cable.

6) Connect speaker to L&R (RCA) output port via audio cable.

7) Plug the IR Receivers 3.5mm jack into the IR IN sockets on TPHD-BYE-Rs and plug in the IR Emitters to the IR OUT sockets (1~4) on Matrix Switcher to make up as IR Matrix.

8) Plug the phoenix connector in to the RS232 socket on the matrix, this will enable the Matrix Switcher to be controlled via a PC.

9) Plug in a Patch lead from the router in to the Ethernet port on Matrix Switcher to control Matrix Switcher by TCP/IP protocol.

10) Plug in the Power supply adapter 24V DC and tighten to secure. Once all components have been connected and the installation is completed, switch on the mains supply at the socket.

Note:

● Connect HDBT ports of Matrix Switcher and far-end TPHD-BYE-R with straight-through cable.
● IR receivers connected to IR IN should be with carrier. If not, send command %0900. or %0901.to activate native carrier mode or force carrier mode in the IR matrix launched between Matrix Switcher and far-end TPHD-BYE-R.

3.4 Connection with HDBaseT Receiver

The Matrix Switcher has 3 HDBaseT outputs which support PoC technology. Plug in the 4 RJ45 patch leads in to the HDBT outputs and connect to the pre-installed infrastructure. Connect the TPHD-BYE-R HDBaseT Receivers to the pre-installed cabling via additional patch leads. Plug the power supply in to the power socket on the matrix, the TPHD-BYE-R will be powered by the Matrix Switcher.
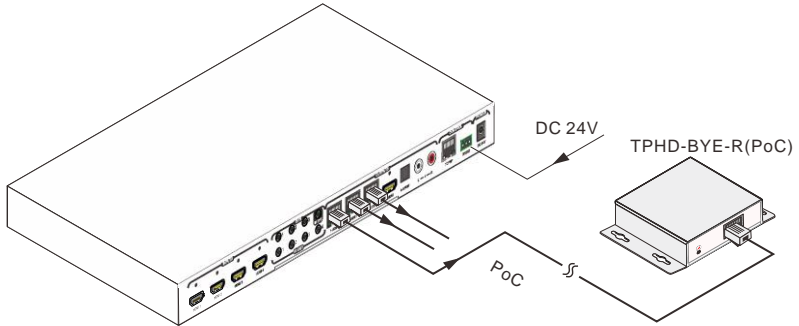
4. System Operations

4.1 IR Control

4.1.1 IR Remote

Connect an IR receiver to the **IR EYE** port of the Matrix Switcher, users can control it through the included IR remote. Here is a brief introduction to the IR remote.

① Standby button, press it to enter/ exit standby mode.

② INPUTS:
Input channel selection buttons, range from 1~4, corresponding IR signal switched synchronously when switching input channels.

③ OUTPUTS:
Output channel selection buttons.

④ Menu buttons: ALL, EDID, CLEAR and ENTER.

➤ **ALL**: Select all outputs.

➤ **EDID** management button: Enable input port to manually capture and learn the EDID data of output devices.

➤ **CLEAR:** Withdraw an operation like switching output channel, learning EDID data before it comes into effect. Meanwhile, the matrix will return to the previous status.

➤ **ENTER:** Confirm operation.

1) To convert one input to an output:

Example: Input 1 to Output 3

→ Press INPUTS 1 + OUTPUTS 3 + ENTER

NOTE:

Default status, on first boot up this matrix assigns the IR outputs to the corresponding HDMI input, meaning, IR out 1 is directly associated to HDMI input 1 and so on. When you switch an HDMI input to a different output, the corresponding IR OUT will be switched synchronously to allow the IR commands to be sent from the select zone back through the Matrix Switcher to the source.

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2) To convert an input to several outputs:

Example: Convert Input 2 to Output 3 and 4

→ Press INPUTS 2 + OUTPUTS 3 + OUTPUTS 4 + ENTER

3) To convert an input to all outputs:

Example: Input 1 to all Outputs

→ Press INPUTS 1 + ALL + ENTER

By using IR & HDBaseT transmission technology, the MUH44E KIT has some functions as follows:

1) Control far-end output device from local.

2) Control local input/output device remotely.

3) Control the Matrix Switcher locally/remotely.

4.1.2 Force Carrier

a)   Only if the IR receiver connected to HDBaseT receiver is with IR carrier, can the received IR signal be transferred to IR OUT port of the Matrix Switcher.

b)   Only if the IR receiver connected to the Matrix Switcher is with IR carrier, can the received IR signal be transferred to IR OUT port of the Matrix Switcher.
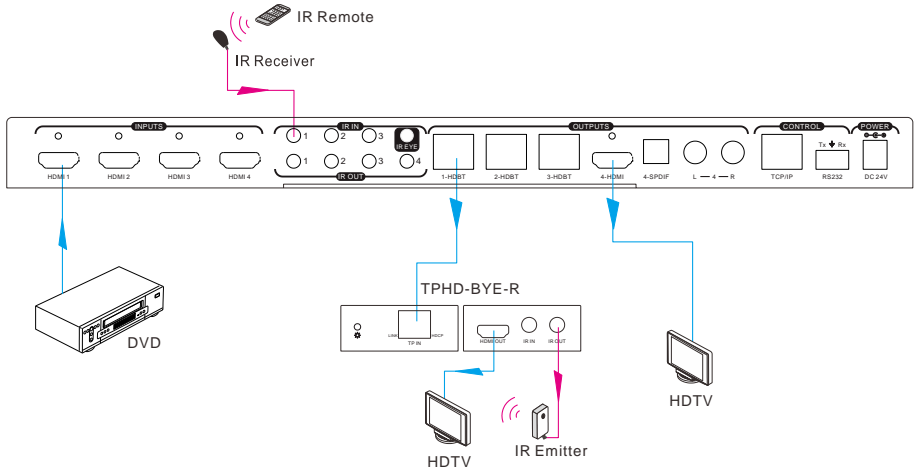
If the IR receiver connected to HDBaseT receiver or the Matrix Switcher is without an IR carrier signal, send the command "%0901." to enter infrared carrier enforcing mode, and then IR signal can be transferred to IR OUT port.

4.1.3 **Control Far-end Device locally**

Connect an IR receiver with IR carrier to the IR IN port of the Matrix Switcher; users can control far-end output displayer via its IR remote from local.

In that case, the IR signal is transferred via twisted pair. Only the corresponding IR OUT port can emit control signals to the remote display.

See the figure below:

Control far-end device from Local

Note: The IR receiver connected to **IR IN** must be with IR carrier.

4.1.4 **Control Local Device Remotely**

Connect IR receiver(s) to IR IN on far-end HDBT receiver(s), and IR Emitter(s) to IR OUT port of the switcher, and use the IR Remote of local source to control the device remotely.

● 1 to 1:

Connect an IR receiver to IR IN on far-end HDBT receiver, and an IR Emitter to IR OUT port of the switcher. Use the IR Remote of local source to control the device remotely. See below:
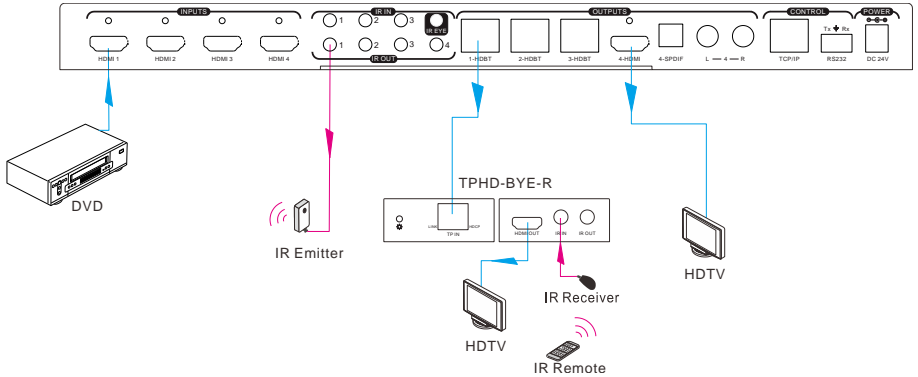
Control local device from remote

Note: Send command "%0901." to enter infrared carrier enforcing mode if the IR Receiver connected to IR IN of the receiver is not with carrier.

● Multiple to Multiple: (IR Matrix)

The 4 "IR OUT" ports and the 3 "IR IN" ports on the far-end receivers make up a 4x3 IR matrix. See as below:
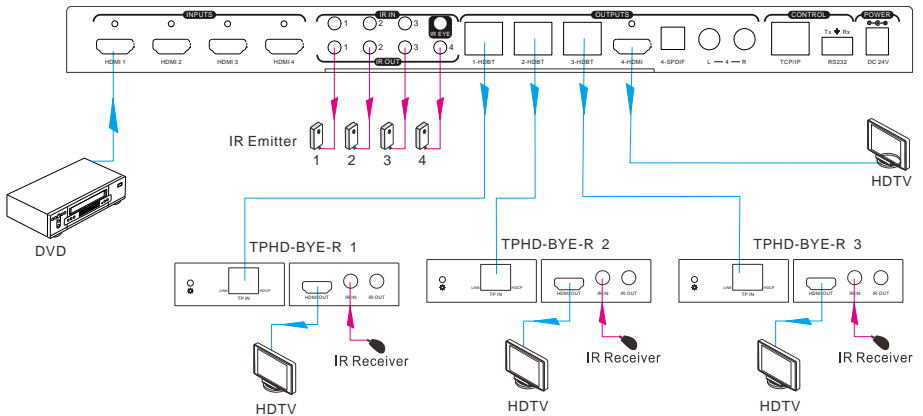
IR Matrix

The IR signal is sent by IR remote, then it is transferred to HDBaseT receiver, then to corresponding zone of the matrix through the twisted pair, finally it is transferred to IR OUT port and received by controlled device.

Switching Operation:

Sending command (reference to *4.2 RS232 Control)*: [x1]R[x2].

- x1: Corresponding to the 4 IR OUT ports of the Matrix Switcher, the IR transmitter connected to this port can be placed at IR receiving area of output device or the Matrix Switcher itself.
- x2: Corresponding to the zone (receive IR signal from HDBaseT receiver with IR IN port connects with IR receiver) number of the Matrix Switcher.
- → Example: Send command "3R2." to transfer IR signal received from zone 2 to IR OUT port 3.
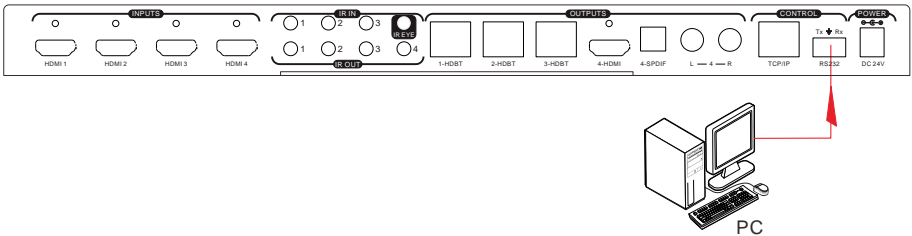
4.2 RS232 Control

4.2.1 RS232 connection

Except the front control panel, the Matrix Switcher can be controlled by far-end control system through the RS232 communication port. This RS232 communication port is a 3-pin phoenix connector. User can use the RS232 cable (Phoenix to 9-pin D-Sub) to connect the RS232 port to PC, see as below:

4.2.2 Installation/uninstallation of RS232 Control Software

- **Installation** Copy the control software file to the computer connected with the Matrix Switcher.
- **Uninstallation** Delete all the control software files in corresponding file path.

4.2.3 Basic Settings

Firstly, connect the Matrix Switcher with an input device and an output device. Then, connect it with a computer which is installed with RS232 control software. Double-click the software icon to run this software.

Here we take the software **CommWatch.exe** as example. The icon is showed as below:

CommWatch.exe

The interface of the control software is showed as below:

Parameter Configuration area

Monitoring area, indicates whether the command sent works.

Command Sending area
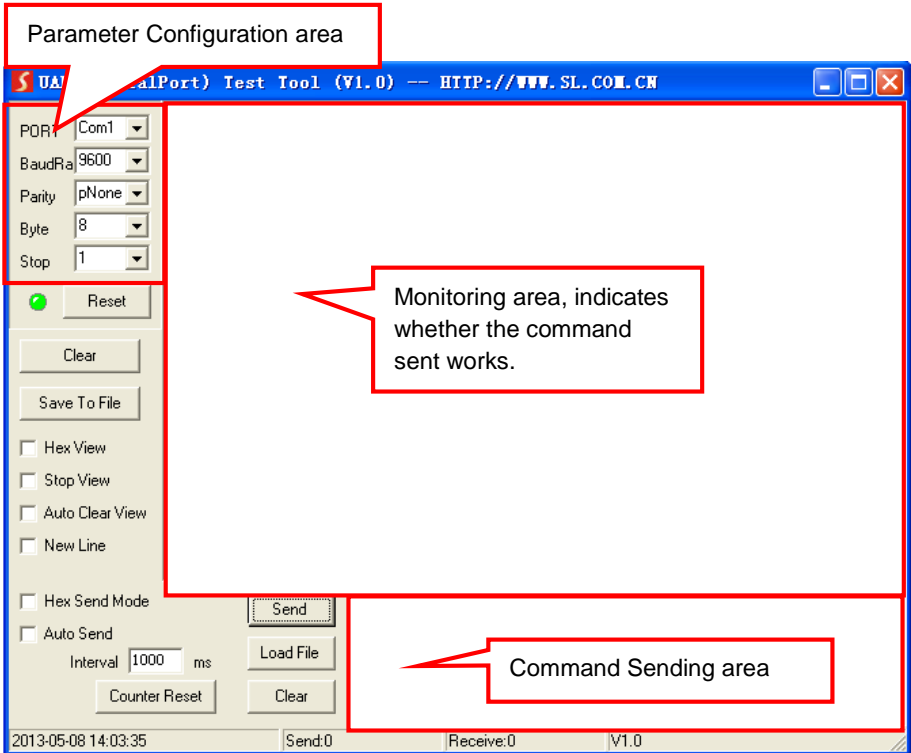
Please set the parameters of COM number, baud rate, data bit, stop bit and the parity bit correctly, only then will you be able to send command in Command Sending Area.

4.2.4 RS232 Communication Commands

Note:

1) Please disconnect all the twisted pairs before sending command EDIDUpgrade[X].
2) In above commands, "["and "]" are symbols for easy reading and do not need to be typed in actual operation.
3) Please remember to end the commands with the ending symbols "." and ";".

4) Type the command carefully, it is case-sensitive.

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

Command	Function	Feedback Example
System Commands		
/*Type;	Inquire the models information.	MUH44E KIT
/%Lock;	Lock the front panel buttons on the Matrix.	System Locked!
/%Unlock;	Unlock the front panel buttons on the Matrix.	System Unlock!
/^Version;	Inquire the version of firmware	VX.X.X
Demo.	Switch to the "demo" mode, convert input and output in turn like1B1, 1B2, …4B3, 4B4, 1B1… and so on .The switching interval is 2 seconds.	Demo Mode AV:01->01 IR:01->01 AV:01->02 IR:01->02 …… AV:04->04 IR:04->04 ……
Operation Commands		
[x]All.	Transfer signals from the input channel [x] to all output channels	X To All. (X=01~04)
All#.	Transfer all input signals to the corresponding output channels respectively like 1->1, 2->2…	All Through.
All$.	Switch off all the output channels.	All Closed.
[x]#.	Transfer signals from the input channel [x] to the output channel [x].	X Through. (X=01~04)
[x]$.	Switch off the output channel [x].	X Closed. (X=01~04)
[x]@.	Switch on the output channel [x].	X Open. (X=01~04)
All@.	Switch on all output channels.	All Open.
[x1]V[x2].	Transfer the AV signal from the input channel [x1] to one or several output channels ([x2], separate output	AV: X1-> X2 (X1/X2=01~04)

Command	Function	Feedback Example
	channels with comma).	
[x1]B[x2].	Transfer the AV and IR signal from input channel [x1] to one or several output channels ([x2], separate output channels with comma).	AV: X1-> X2 (X1/X2=01~04)
[x1] R[x2].	Transfer the IR signal from output [x1] to input [x2].	IR: X1-> X2(X1、 X2=01~04)
Status[x].	Check the I/O connection status of output [x]	AV: Y-> X (X=01~04, Y=01~04)
Status.	Inquire the input channel to the output channels one by one.	AV: 01->01 … … AV: 04->04 IR: 01->01 … … IR: 04->04
Save[Y].	Save the present operation to the preset command [Y], ranges from 0 to 9.	Save To FY (Y=0-9)
Recall[Y].	Recall the preset command [Y].	Recall From FY (Y=0-9)
Clear[Y].	Clear the preset command [Y].	Clear FY (Y=0-9)
PWON.	Work in normal mode.	PWON
PWOFF.	Enter into standby mode and cut off the power supply to HDBaseT receivers.	PWOFF
STANDBY.	Enter into standby mode. (Do not cut off the power supply to HDBaseT receivers, press other buttons or send other commands to start.)	STANDBY
/%[Y]/[X]:[Z].	HDCP management command. [Y] is for input (value: I) or output (value: O); [X] is the number of the port, if the value of X is ALL, it means all ports; [Z] is for HDCP compliant status, the value may be 1 (HDCP compliant) or 0 (not HDCP compliant).	/%[Y]/[X]:[Z].
DigitAudioON[x].	Enable HDMI audio output of port x. ● X=1, 2, 3, 4, enable this port.	DigitAudio ON with [x]

Command	Function	Feedback Example
	● X=5, enable all the 4 ports.	
DigitAudioOFF[x].	Disable HDMI audio output of port x. ● X=1, 2, 3, 4, disable this port. ● X=5, disable all the 4 ports.	DigitAudio OFF with [x]
/+[Y]/[X]:******.	Set communication between PC and HDBaseT receiver. ① Y is for RS232 port (connect with RS232 port of HDBaseT receiver) Y= 1~5 or A~H, The value of Y is defined into the following meanings (in a given baud rate depended by the value of X): **a.** Y = 1~4, send this command to the corresponding HDBaseT receiver to control far-end device. **b.** Y = 5, send this command to all HDBaseT receivers to control all far-end devices. **c.** Y = A, B, C, or D **d.** Y = E, F, G, or H For items c or d, send this command, it will be saved to the matrix switcher but taken without action to corresponding HDBaseT receiver. And its command function will be effective almost at the same time when you send the command PWON (for item c) or PWOFF (for item d). Note: A & E are for port 1.　B & F are for port 2. C & G are for port 3.　D & H are for port 4. ② X is for baud rate, its value ranges from 1 to 7 (1--2400, 2--4800, 3--9600, 4--19200, 5--38400, 6—57600, 7--115200) ③ ***** is for data (max 48 Byte)	******

Command	Function	Feedback Example
EDIDH[x]B[y].	Input port [y] learns the EDID from output port [x]. If the EDID data is available and the audio part supports not only PCM mode, then force-set it to support PCM mode only. If the EDID data is not available, then set it as initialized EDID data.	EDIDH[x]B[y]
EDIDPCM[x].	Set the audio part of input port [x] to PCM format in EDID database.	EDIDPCM[x]
EDIDG[x].	Get EDID data from output [x] and display the output port number.	Hexadecimal EDID data and carriage return character
EDIDMInit.	Restore the factory default EDID data of every input.	EDIDMInit.
EDIDM[X]B[Y].	Manually EDID switching. Enable input[Y] to learn the EDID data of output[X]. If the EDID data is not available, then set it as initialized EDID data.	EDIDM[X]B[Y]
EDIDUpgrade[x].	Upgrade EDID data via the RS232 port. [x] is the input port, when the value of X is 5, it means to upgrade all input ports. When the switcher receives the command, it will show a message to prompt you to send EDID file (.bin file). Operations will be canceled after 10 seconds. Please cut off all connections of HDBaseT ports.	Please send the EDID file
EDID/[x]/[y].	Set the EDID data of input port [x] to built-in EDID No.[y]. [y]=1~5, correspond to the 5 embedded EDID data separately	EDID/[x]/[y]
UpgradeIntEDID[x].	Upgrade one of the 5 embedded EDID data, x is the serial number for EDID data: 1. 1080P 2D 2CH 2. 1080P 3D 2CH 3. 1080P 2D Multichannel	Please send the EDID file

Command	Function	Feedback Example
	4. 1080P 3D Multichannel 5. 3840x2160 2D (30Hz) When the switcher gets the command, it will show a message to send EDID file (.bin file). Operations will be invalid after 10 seconds.	
GetIntEDID[x].	Return the embedded EDID data ranked x, [x]=1~5	
GetInPortEDID[X]	Return the EDID data of input [x], [x]=1~4	
%0801.	Auto HDCP management, activate carrier native mode	%0801
%0900.	Switch to carrier native mode.	Carrier native
%0901.	Switch to force carrier mode.	Force carrier
%0911.	Reset to factory default.	Factory Default
%9951.	Check the command sent by port 1 when PWON.	Port 1:data when PWON
%9952.	Check the command sent by port 2 when PWON.	Port 2:data when PWON
%9953.	Check the command sent by port 3 when PWON.	Port 3:data when PWON
%9954.	Check the command sent by port 4 when PWON.	Port 4:data when PWON
%9955.	Check the command sent by port 1 when PWOFF.	Port 1:data when PWOFF
%9956.	Check the command sent by port 2 when PWOFF.	Port 2:data when PWOFF
%9957.	Check the command sent by port 3 when PWOFF.	Port 3:data when PWOFF
%9958.	Check the command sent by port 4 when PWOFF.	Port 4:data when PWOFF
%9961.	Check the system locking status.	System Locked/ Unlock!
%9962.	Check the power status	STANDBY/PWOFF / PWON
%9963.	Check the working mode of infrared carrier.	Carrier native/ Force carrier

Command	Function	Feedback Example
%9964.	Check the IP address.	IP:192.168.0.178 (default)
%9971.	Check the connection status of the inputs.	In 01 02 03 04 Connect Y Y Y Y
%9972.	Check the connection status of the outputs.	Out 01 02 03 04 Connect Y Y Y Y
%9973.	Check the HDCP status of the inputs.	In 1 2 3 4 HDCP N N N N
%9974.	Check the HDCP status of the outputs.	Out 1 2 3 4 HDCP N N N N
%9975.	Check the I/O connection status.	Out 01 02 03 04 In 04 04 04 04
%9976.	Check the output resolution.	Out 1 1920x1080 Out 2 1920x1080 Out 3 1920x1080 Out 4 1920x1080
%9977.	Check the status of digital audio of output channels.	Out 1 2 3 4 Audio Y Y Y Y
%9978.	Check the HDCP compliant status of the inputs.	In 01 02 03 04 HDCPEN Y Y Y Y
I-Lock[X].	Lock the channel [x], X=1~4	Channel[x] Lock!
I-UnLock[X].	Unlock the channel [x], X=1~4	Channel[x] Unlock!
A-Lock.	Lock all channels	All Channel Lock!
A-UnLock.	Unlock all channels	All Channel Unlock!
Lock-Sta.	Check the lock status of all channels.	Channel 1->1 Lock! Channel 1->2 Lock! ..... Channel 2->1 Unlock! .....

4.3 TCP/IP Control

Besides IR control, RS232 control, the Matrix Switcher boasts option TCP/IP port for IP control.

Default settings: IP: 192.168.0.178; Subnet Mast: 255.255.255.0; Gateway: 192.168.0.1; Serial Port: 4001.

IP& gateway can be changed as you need, Serial Port cannot be changed.

Connect the Ethernet port of control device and TCP/IP port of the Matrix Switcher, and set same network segment for the 2 devices, users are able to control the device via web-based GUI or designed TCP/IP communication software.

4.3.1 Control Modes

The Matrix Switcher can be controlled by PC without Ethernet access or PC(s) within a LAN.

● **Controlled by PC**

Connect a computer to the TCP/IP port of the Matrix Switcher, and set its network segment to the same as the Matrix Switcher's.
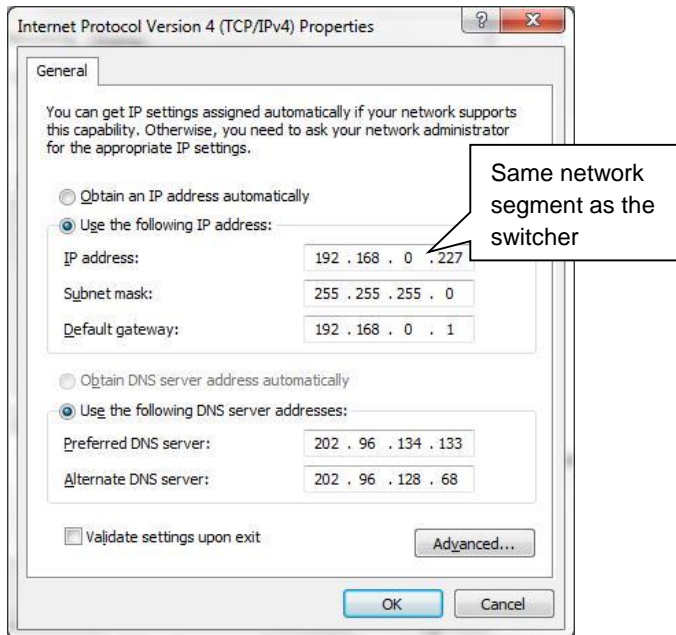
● **Controlled by PC(s) in LAN**

Connect the Matrix Switcher, a router and several PCs to setup a LAN (as shown in the following figure). Set the network segment of the Matrix Switcher to the same as the router's, then PCs within the LAN are able to control the Matrix Switcher.
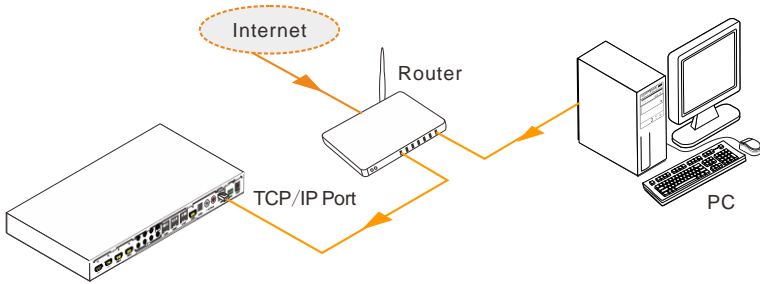
Follow these steps to connect the devices:

Step1. Connect the TCP/IP port of the Matrix Switcher to Ethernet port of PC with twisted pair.

Step2. Set the PC's network segment to the same as the Matrix Switcher's. Do please remember the PC's original network segment.

Step3. Set the Matrix Switcher's network segment to the same as the router.

Step4. Set the PC's network segment to the original ones.

Step5. Connect the Matrix Switcher and PC(s) to the router. PC(s) within the LAN is able to control the Matrix Switcher asynchronously.

Then it's able to control the device via GUI.

4.3.2 GUI for TCP/IP control

MUH44E KIT provides with built-in GUI for convenient TCP/IP control. GUI allows users to interact with MUH44E KIT through graphical icons and visual indicators.

Type 192.168.0.178 in your browser, it will enter the log-in interface shown as below:
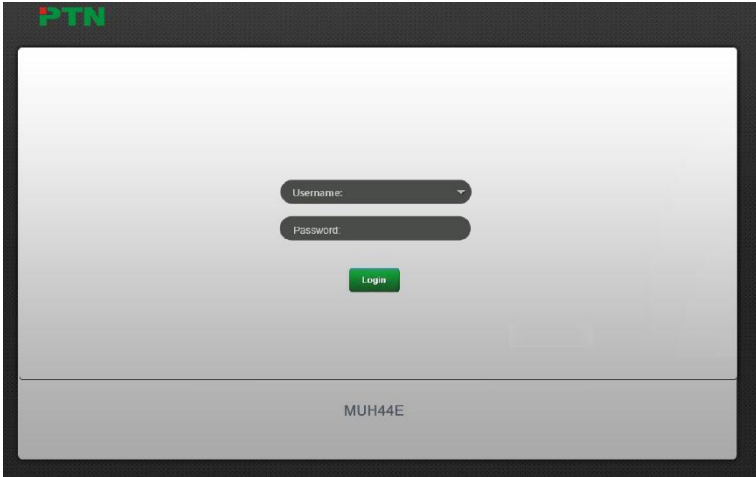
There are 2 selectable usernames – admin (default password: admin) and user (default password: user). Log in as admin can access more configuration interfaces than user. Enter username and the right password. Here is a brief introduction to the interfaces.

Main: Interface shown after logging in, provide intuitive I/O connection switching. See the screenshot below:
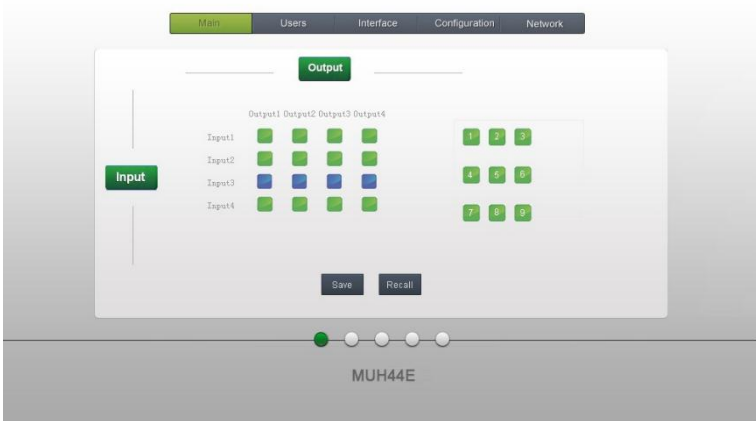
The button matrix displays every possible connection between every input and output, users can carry on the connections by clicking corresponding button.

Buttons 1~9 at the right-bottom corner provides quick saving and recall for overall connection status.

Users: Display or modify credential settings, front panel lock, and GUI version.
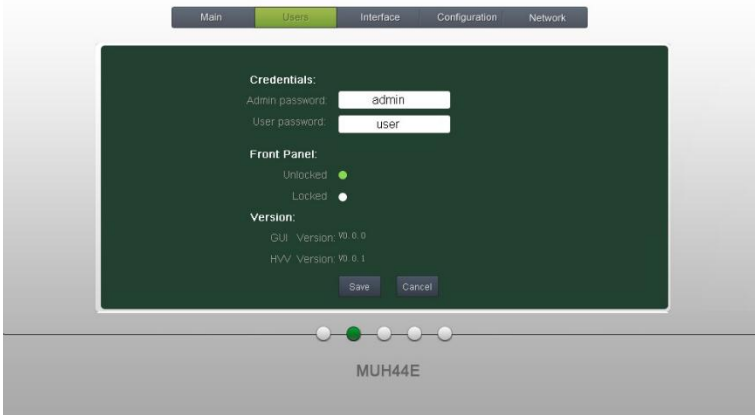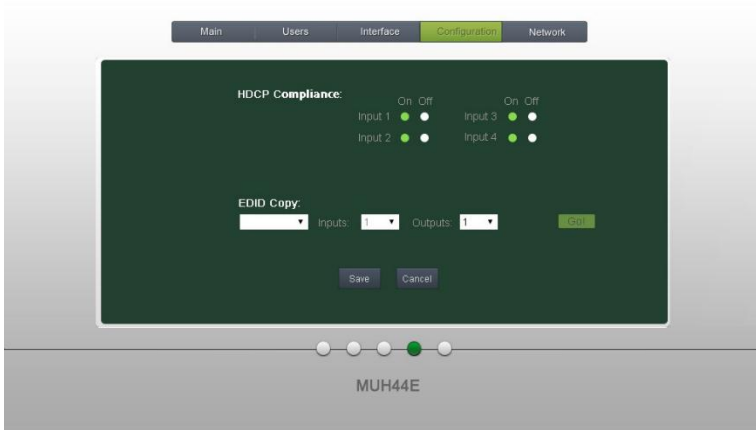

If there is any modification, press Save to restore the settings, or press Cancel to withdraw.
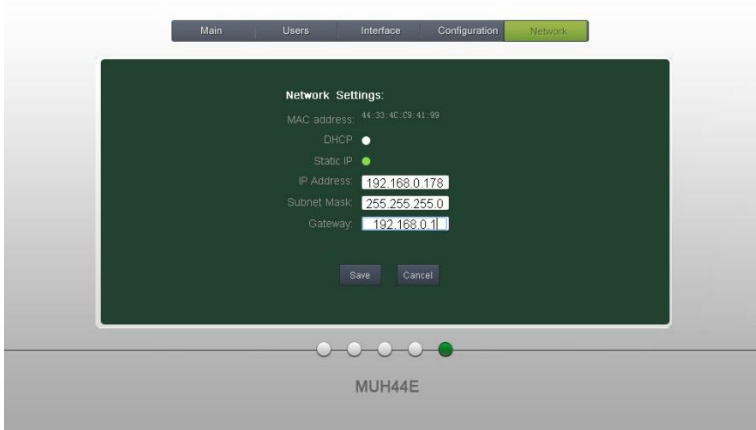
Interface: Set title bar label and button labels, press Save to save the settings

Configuration: Set HDCP Compliance status for every input, and manage EDID. See the screenshot below:


Network: Inquire and configure network settings including MAC address, IP address, subnet mask, and Gateway

Note: Log in as user access main interface only.

4.3.3 GUI Update

GUI for MUH44E KIT supports online update in http://192.168.0.178:100. Type the username and password (the same as the GUI log-in settings, modified password will be available only after rebooting) to log in the configuration interface. After that, click **Administration** at the source menu to get to **Upload Program** as shown below:
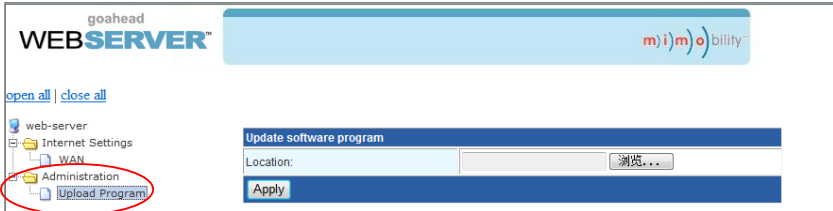
Select the desired update file and press Apply, it will start upgrading then.

4.4 EDID Management

MUH44E KIT features EDID management to maintain compatibility between all devices. It can be controlled via EDID learning and EDID invoking.

4.4.1 EDID learning

The included IR remote can be used to enable the Matrix Switcher to learn the EDID of all sink devices.

✓ **One input port learns the EDID data of one output port:**

Example: Input 2 learns EDID data from output 4

→Press EDID + INPUTS 2 + OUTPUTS 4 + ENTER

✓ **All input ports learn EDID data from one output port:**

Example: all input ports learn EDID data from output 4

→Press: EDID + ALL + OUTPUTS 4 + ENTER

4.4.2 EDID invoking

There are five types of embedded EDID data. The chart below illustrated the detailed information of the embedded EDID data:

No.	EDID Data
1	1080P 2D 2CH
2	1080P 3D 2CH
3	1080P 2D Multichannel

4	1080P 3D Multichannel
5	3840x2160 2D（30Hz）

Sending the command "UpgradeIntEDID[x]." via RS232 Control Software to upgrade the embedded EDID data, x=1~5.

4.5 Firmware Update via USB

The Matrix Switcher boasts a USB port for online firmware upgrade on the front panel. Follow these steps to upgrade firmware:

Step1. Copy the upgrade software and the latest upgrade file (.bin) to PC.

Step2. Connect the USB ports of the Matrix Switcher and the PC via USB cable.

Step3. Double-click the update software icon (see as below).

It will enter the upgrade interface shown as below:
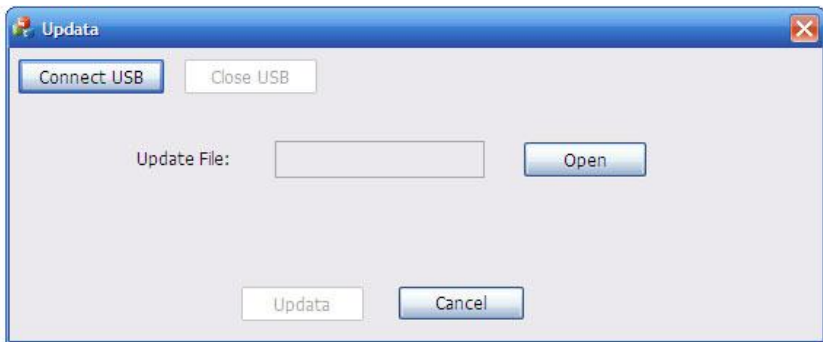
Step4. Click **Connect USB**.

Step5. Click **Open** to load the upgrade file, then click **Updata** to start firmware upgrading.

Note: To ensure available control, the COM number of the PC should be 1~9.

5. Specification

5.1 4K HDBaseT Matrix Switcher

| Video Input	
Input	4 HDMI
Input Connector	Female HDMI
Input Level	T.M.D.S. 2.9V~3.3V
Input Impedance	100Ω (Differential)
HDMI Standard	Support HDMI1.4 & HDCP2.2 and is backward compatible with all previous standards.
Video Output	
Output	1 HDMI – 3 HDBaseT
Output Connector	Female HDMI Female RJ45(with LED indicators)
Output Level	T.M.D.S. 2.9V~3.3V
Output Impedance	100Ω (Differential)
HDMI Standard	Support HDMI1.4 & HDCP1.4 and is backward compatible with all previous standards.
Video general	
Video Signal	HDMI (or DVI-D)
Transmission Distance	1080P@60Hz ≤70m 4Kx2K@60Hz ≤40m
Resolution Range	Up to 4Kx2K@60Hz
EDID Management	In-built EDID data and manual EDID management
Gain	0 dB
Bandwidth	10.2Gbit/s
Switching Speed	200ns (Max.)
Audio general	
Output Signal	Stereo audio Digital audio
Analog Audio Output	Support PCM
Digital Audio Output	Supports PCM，Dolby，DTS，DTS-HD
Frequency Response	20Hz~20KHz
Output Connector	1 L&R(RCA) 1 SPDIF
Control Parts	
Control Ports	4 IR OUT 3 IR IN 1 IR EYE

	1 TCP/IP (female RJ45)
	1 RS232 (3-pin pluggable terminal block)
Panel Control	Front panel buttons
RS232 Control	3-pin pluggable terminal block
IR	Extended IR receiver
TCP/IP Control	Web-based GUI
General	
Power Supply	Input: 100-240V~, 50/60Hz
	Output: DC 24V 2.71A
Power Consumption	35W (Max)
Temperature	0 ~ +50℃
Reference Humidity	10% ~ 90%
Dimension (W*H*D)	360mm x 28mm x 150 mm
Net weight	910g

5.2 TPHD-BYE-R HDBaseT Receiver

Input & Output	
Input	1 HDBaseT
Input Connector	Female RJ45(with LED indicators);
Output	1 HDMI
Output Connector	Female HDMI
Control	1 IR IN
	1 IR OUT
Control Connector	3.5mm mini jacks
General	
Resolution Range	Up to 4K×2K@60Hz
Transmission Mode	HDBaseT
Transmission Distance	1080P@60Hz ≤70m
	4Kx2K@60Hz ≤40m
Bandwidth	10.2Gbps
HDMI Standard	Support HDMI1.4 and HDCP1.4
Temperature	0 ~ +50℃
Humidity	10% ~ 90%
Power Supply	Powered by 4K HDBaseT Matrix Switcher.
Dimension (W*H*D)	61mm x 24mm x 120mm
Net Weight	280g

6. Panel Drawing

6.1 4K HDBaseT Matrix Switcher
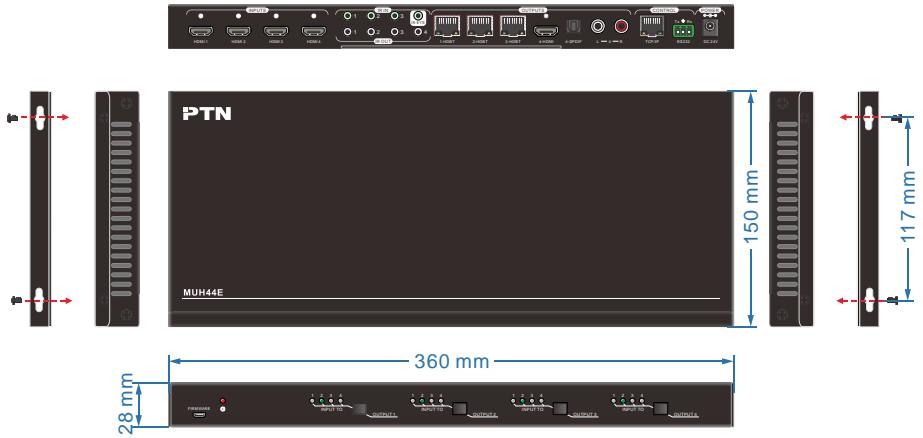
6.2 TPHD-BYE-R HDBaseT Receiver
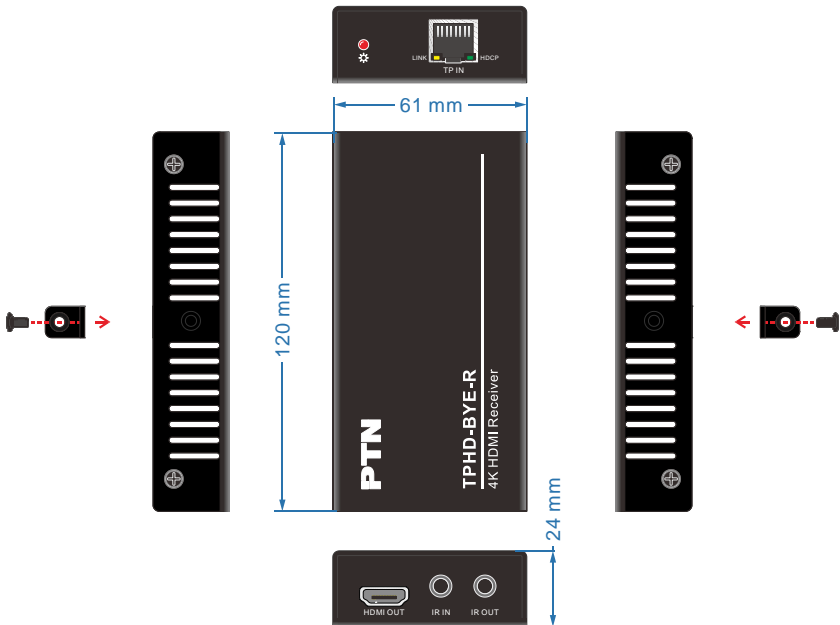
7. Troubleshooting & Maintenance

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
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.
Static becomes stronger when connecting the video connectors	Bad grounding	Check the grounding and make sure it is connected well.
Cannot control the device by RS232 / IR remote / front panel buttons	The device has already been broken.	Send it to authorized dealer for repairing.

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

8. Customer Service

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

1) **Warranty**
   The limited warranty period of the product is fixed 3 (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 Exclusions:**
   ● 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: For further assistance or solutions, please contact your local distributor.

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