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User Manual

SY-MUBT-44EC SET
and
SY-MUBT-88EC SET

4K HDBaseT Distribution Matrix
4 x 3+1 Matrix Switcher
8 x 7+1 Matrix Switcher

4K UHD with PoC & Bi-Directional IR Support

70m @ 1080p
40m @ 4K2K (60Hz 4:2:0)

Introduction

The SY-MUBT-44EC Set and SY-MUBT-88EC Set are professional 4K HDBaseT Distribution Matrixes (4x4 and 8x8) with HDBaseT output capabilities and are supplied with HDBaseT receivers and accessories. Only one PSU is required as all the receivers are powered over the cat6 (PoC).

The HDMI inputs can be selected by either the front panel buttons, IR, RS 232 or Web GUI. The selected source can be routed to any HDBaseT output as well as the Local HDMI Output.

The Matrix Switcher delivers 4K video up to 40m, or 1080p up to 70m and provides power to each receiver via a single cat6 cable. Good quality cat6/6a cables are recommended for best performance and sustained signal quality.

These Matrix Switchers are HDCP 1.4 and HDCP 2.2 compliant, with comprehensive EDID management.

Features

- Can handle all resolutions to 4K2K@60Hz 4:2:0 (1080p, 3D, …..) in and out
- Transmits 4K2K video for 8m on local HDMI output port
- Transmits 4K2K video HDBaseT to 40m and 1080p to 70m, using single cat6a cable
- The HDBaseT Receivers are PoC powered by the matrix switcher
- Supports HDMI1.4 & HDCP2.2, with auto detection
- Support bi-directional IR control
- LED indicators show current video switching status.
- Controllable via front panel, RS232, IR and TCP/IP (using the built in GUI)
- Powerful EDID management, with non-volatile memory for reliable operation.
- Support firmware upgrade through Micro USB port
- Easy installation with rack-mounting design

Connections	SY-MUBT-44EC	SY-MUBT-88EC
HDMI Inputs	4	8
HDMI Outputs	1	1
HDBaseT Outputs	3	7
HDBT-EC-R Receivers	3	7
IR IN	3	7
IR EYE	1	1
IR OUT	4	8
S/PDIF Out (Optical Toslink)	1	1
Stereo Analog Audio	L+R	L+R
TCP/IP Port	1	1
RS232	1	1

Product Appearance

Front Panel

Name	Description
Power Indicator	**OFF**: No power **RED**: DC power present or Standby Mode
IR	Sensor for IR control of the matrix switcher
INPUT Selection Buttons	Illuminated input selection buttons
OUTPUT Selection Buttons	Illuminated output selection buttons
Service	Micro USB port for firmware update

Rear Panel

Name	Description
HDMI INPUTS	4 / 8 x Type A female HDMI input ports
OUTPUTS	**HDBaseT:** The HDBT RJ45 outputs deliver HD video, Audio, IR and PoC to the HDBaseT Receiver up to 70m **HDMI:** Connect an HDMI cable from the Matrix Switcher to the display device **Toslink:** De-embedded digital S/PDIF audio is outputted via the Toslink optical. **RCA** (L&R): Analogue audio output sockets to connect to the de-embedded audio input of additional speakers
IR IN	**3 / 7 x IR IN:** Connect an IR receiver as required. Each IR input is associated with the respective HDBaseT output and cannot be switched separately. To use IR transmission, an IR emitter must be connected to the IR OUT on the corresponding HDBaseT receiver. **1 x IR EYE:** Connect the extended IR receiver for remote control of the Matrix Switcher.
IR OUT	**4 / 8 x IR OUT:** Plug in the IR Emitters for control of the Sources. This then emits the IR signals received from the HDBaseT Receiver.

Name	Description
Control	**RS232:** 3-pin pluggable terminal block that permits RS232 control of the matrix switcher. **TCP/IP:** RJ45 port. Connect to a PC to access the built-in web interface or to use IP control.
Power Supply	**MUHD-44EC** - 24V DC power input (2.71A max) **MUHD-88EC** – 240V AC IEC Connector

HDBaseT Receiver

Only SY-HDBT-EC-R receivers should be used with the SY-MUBT-44EC / SY- MUBT-88EC Matrix switchers. This device uses 12V PoC which may not be compatible with other devices, as such to be only used with the EC product range.

Front

Name	Description
HDMI OUT	Connect to HDMI display.
IR IN	Plug in the IR receiver, this will receive the IR signals from the RCU and send through to the Matrix Switcher to control the desired source.
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 .

Rear

| Name	Description
DC 12V	12V DC power input – not required when powered via the cat6 cable
Power Indicator	**OFF**: No power; **RED**: DC power present (PoC).
TP IN	Connect the RJ45 cable from the MUBT-44/88EC matrix switcher to this input. The RJ45 socket has two status indicators. **HDCP**: HDCP compliance indicator Solid green: HDMI signal is with HDCP Blinking green: HDMI signal is without HDCP OFF: No HDMI traffic (no picture) **LINK**: HDBT Link status indicator. OFF: No Link Solid yellow: Link Successful Blinking yellow: Link Error

Important Notice:

DO NOT connect the EC HDBaseT connections to any other network or other HDBaseT models as doing so may result in permanent damage to the receiver or network device.

The receivers must only be connected to other SY EC range of products. The EC product range uses 12V PoC which may not be compatible with other HDBaseT models.

The matrix output will work with any non-PoC HDBaseT inputs, such as on some projectors and displays.

System Connection
Connection diagram
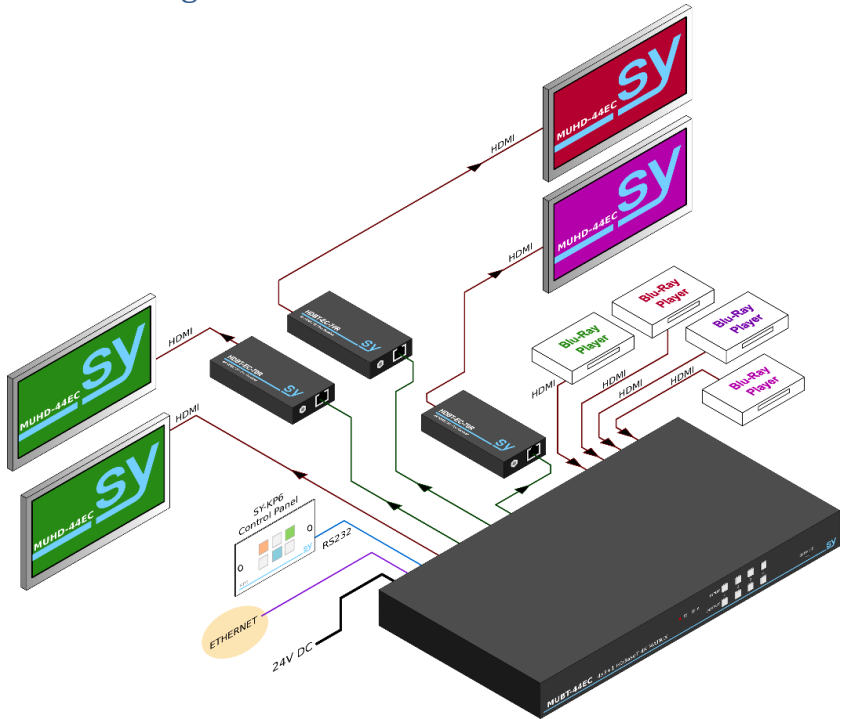
Connection Procedure

The following steps are the connections required for any installation:

1. Connect the HDMI sources to the HDMI input ports of the Matrix Switcher using good quality HDMI cables.
2. Connect the CAT6a cable to the Matrix Switcher and HDBaseT receivers. This cable must connect directly between the matrix switcher and the respective HDBaseT receiver.
3. Connect a display device to the HDMI output port on the matrix switcher using an HDMI cable.
4. Connect a display device to the HDMI output port on each of the HDBaseT receivers using an HDMI cable.
5. Connect the 24V DC power supply adapter and tighten to secure. For the MUBT-88EC an IEC mains cable is connected directly to the matrix switcher. Once all components have been connected and the installation is complete, switch on the supply.

The following steps are optional:

1. Connect an AVR amplifier to S/PDIF output port via the TOSLINK fibre optic cable.
2. Connect a stereo amplifier with speakers to the L&R (RCA) output port using audio cables.
3. Connect an IR receiver to the IR IN sockets (3.5mm jack) on the HDBaseT Receiver and connect the IR Emitters to the IR OUT sockets on the Matrix Switcher to make up as IR Matrix.
4. To control the matrix switcher from an RS232 port, connect the Matrix RS232 phoenix connector to the controller RS232.
5. To control the matrix switcher using TCP/IP, connect a Cate5 network cable from the router to the Ethernet port on Matrix Switcher.

Notes: When using IR receivers connected to IR IN, the IR carrier must be present. If it is not, then send the RS232 command %0901. to force carrier mode (38 KHz) to ensure the IR data is sent with a carrier signal between Matrix Switcher and far-end HDBaseT Receiver.

To revert to using the native carrier signal, send the RS232 command %900. to activate native carrier mode.

Native carrier mode (factory default)

This mode must have the IR carrier signal present. The IR detectors supplied with the Matrix Switcher are fully compatible with this mode setting.

Forced carrier mode

A fixed carrier of 38 KHz is forced onto the raw IR data. This mode should only be used when using an IR detector that outputs the raw IR data without the normal carrier signal.

Using the Matrix Switcher

The input signals may be routed to either a single output, or to multiple outputs using the front control panel or RS232 / Ethernet port commands or the remote controller.

Front panel enquiry/selection may be done by either pressing an input button first or by pressing an output button first.

The first time any front panel button is pressed the matrix switcher provides an inquiry mode that indicates the current port connection status. New selection can subsequently be made.

If there is no activity on the front panel button for more than 3 seconds, the matrix switcher will return to the idle mode and turn all the button LEDs off.

Pressing an Input button first

When any input button is pressed while the matrix switcher is in idle mode, the output channel buttons associated with that input light up as follows:

1. All the outputs associated with the selected input will light up
2. If no output buttons are off, then that input is not connected to any output

While in this mode:

1. The output buttons can be individually pressed to toggle the connection status for the selected input (on or off).
2. A range of output channels can be selected by pressing the two start and end button of the desired range simultaneously. For example, pressing buttons 2 and 6 will set the selected input to outputs 2, 3, 4, 5 and 6 in one go. You may repeat steps 1 & 2 as many times as required.

Pressing an Output button first

When an output button is pressed while the matrix switcher is in idle mode, the input channel button associated with that output will indicated the current connection status.

While in this mode, the input associated with the selected output may be changed by pressing another input button.

Front Panel LED Status Updates

Whenever an external selection update is made to the matrix switcher, either from the RS232 port or the LAN port, the button LEDs will light up briefly to indicate the new status.

EDID Management from Front Panel

To enter the EDID setting mode, press and hold the same input and output button pair for 2 seconds for the input that you wish to change. The EDID setting mode is indicated by a brief flash from all the input buttons and then the chosen input button will flash at a regular rate.

The output LEDs now indicate the current EDID setting for that input using output buttons 1 to 4 only.

Pressing another input button will show the current EDID setting for that input.

To change the EDID setting, toggle the LEDs so that they match with the state for the desired EDID mode in the following table.

EDID Memory	OUT 1	OUT 2	OUT3	OUT 4	EDID Setting
0	Off	Off	Off	Off	1080p 2D 2ch
1	Off	Off	Off	On	1080p 2D 6ch
2	Off	Off	On	Off	1080p 3D 2ch
3	Off	Off	On	On	1080p 3D 6ch
4	Off	On	Off	Off	4K30Hz 2D 2ch
5	Off	On	Off	On	4K30Hz 2D 6ch
6	Off	On	On	Off	4K30Hz 3D 2ch
7	Off	On	On	On	4K30Hz 3D 6ch
8	On	Off	Off	Off	4K60Hz (Y420) 2D 2ch
9	On	Off	Off	On	4K60Hz (Y420) 2D 6ch
10	On	Off	On	Off	4K60Hz (Y420) 3D 2ch
11	On	Off	On	On	4K60Hz (Y420) 3D 6ch
12	On	On	Off	Off	4K60Hz (Y420) 3D 8ch
13	On	On	Off	On	720p 60Hz 2ch
14	On	On	On	Off	1920 x 1200 60Hz 2ch
15	On	On	On	On	Programmed by Learn EDID RS232 Command

Locking / Unlocking Options

The MUBT-44EC and MUBT-88EC feature three locking methods:
1. Lock individual inputs so that it cannot be selected to any other output
2. Lock all inputs so that changes to the video selections is not possible
3. Lock the front panel so that no buttons will function

Each of the above lock options also have their corresponding unlock options.

Lock / Unlock Individual Inputs

Any input may be locked such that, at the time when the respective command is issued, that input cannot be selected to any output that was not already showing that input. However, any output that is already showing that input may switch to another input provided that the new input is also not locked. Any output that was already showing the input that is being locked will remain in an unlocked state.

This option allows any input to be made private to all outputs that were already showing that input at the time when the input lock RS232 command was issued. The commands for this option are as follows:

Input Number	Lock Command	Unlock Command
1	I-Lock1.	I-UnLock1.
2	I-Lock2.	I-UnLock2.
3	I-Lock3.	I-UnLock3.
4	I-Lock4.	I-UnLock4.
5	I-Lock5.	I-UnLock5.
6	I-Lock6.	I-UnLock6.
7	I-Lock7.	I-UnLock7.
8	I-Lock8.	I-UnLock8.

Lock / Unlock All Inputs

This option will lock all the current video selections and prevent any further changes until the Unlock All Inputs command is sent. When all the input are in the locked state, the current selections can still be viewed from the front panel as described earlier in this section.

The commands for this option are as follows:

Action	Command
Lock All Inputs	A-Lock.
Unlock All Inputs	A-UnLock.

Lock / Unlock the Front Panel

The front panel button can also be locked to prevent the buttons from being tampered with. While the front panel is locked the front panel buttons will not provide any of the feedback features described above, all that will happen is that all the button LEDs will flash once briefly.

The commands for this option are as follows:

Action	Command
Lock the Front Panel	Lock.
Unlock the Front Panel	Unlock.

Note that all the RS232 commands given in the above sections are case-sensitive and must end with the full-stop character (0x2e) as shown and must also be terminated with the carriage-return character (0x0d).

Items Supplied with the Matrix Switcher

The **MUBT-44EC-SET** consists of the following items:

1	MUHD-44EC Matrix Switcher	3	HDBT-EC-R HDBaseT Receivers
1	24V DC 2.7A PSU	1	UK Power cable
4	IR Emitters	4	IR receivers
1	IR Remote Control	1	RS232 cable
2	Mounting ears & 6 screws for the Matrix Switcher	6	Mounting ears & 6 screws for the HDBaseT receivers
4	Square self-adhesive plastic pads for the Matrix Switcher	12	Round self-adhesive plastic pads for the HDBaseT receivers

The **MUBT-88EC-SET** consists of the following items:

1	MUHD-88EC Matrix Switcher	7	HDBT-EC-R HDBaseT Receivers
1	IEC power cable	1	UK Power cable
8	IR Emitters	9	IR receivers
1	IR Remote Control	1	RS232 cable
2	Mounting ears & 6 screws for the Matrix Switcher	14	Mounting ears & 14 screws for the HDBaseT receivers
4	Square self-adhesive plastic pads for the Matrix Switcher	28	Round self-adhesive plastic pads for the HDBaseT receivers

RJ45 Wiring

Both connectors must be wired identically to the T568B standard.
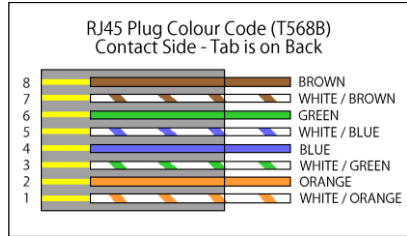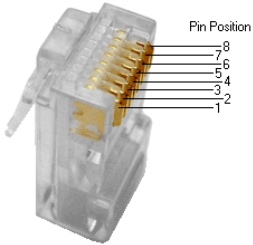
Note:

You may use cat5e, cat6 UTP (cat6 preferred) in conjunction with the HDBaseT output; however for best performance use cat6a or cat7 (particularly in electrically noisy environments). The maximum distances & transmission performance for HDMI and HDBT may be compromised by cable quality, patch panels, poor termination, wall plates, cable kinks and electrical interferences. Generally ensure the cat cable is solid copper core of 23AWG (avoid CCA type), in one straight run (avoid/minimise patches) and avoid close proximity to any noisy electrical sources.

RS232 Commands

The following RS232 commands provide control of the SY-MUBT-44EC and SY-MUBT-88EC matrix switchers from a PC, laptop or programmable control panel.

The RS232 settings are: **9600 baud, 8 bits, no parity, and 1 stop bit**.

All response values given in the following table are examples only. The actual response values will reflect the changes that the transmitted RS232 command has just made.

The RS232 commands are case-sensitive and all numerical values are in decimal only.

Any numerical value is always limited by the number of inputs and outputs that the matrix being controlled has, thus:

- For the MUBT-44EC the values range for inputs and outputs is 1 to 4
- For the MUBT-88EC the value range for inputs and outputs is 1 to 8.

A numerical value is represented in the table with square brackets, but these brackets and the text within should always be replaced with the required numerical value, for example:

Action:	Select input 1 to output 4 for both video ant IR	
Command in table:	**[x1]B[x2].**	(Only one output is being connected)
Command sent:	**1B4.**	

All the punctuation characters, except the square brackets, shown in the RS232 commands below are part of the command and must be included when sending the command.

All the RS232 commands given in the following table apply to both the MUHD-44EC and the MUHD-88EC, unless otherwise stated.

Command	Function	Feedback Example
System Commands		
/*Type;	Return the model type	XXXX
/%Lock;	Lock the front panel buttons on the matrix	System Locked!
/%Unlock;	Unlock the front panel buttons on the matrix	System Unlock!

/^Version;	Return the firmware version	VX.X.X
Demo.	Run the Demonstration mode. This mode switches through the inputs and outputs in turn. The switching interval is 2 seconds. The Demo mode will remain in effect until a new RS232 command is sent, or a manual selection is made from the front panel.	Demo Mode AV:01->01 IR:01->01 AV:01->02 IR:01->02 ...... AV:08->08 IR:08->08
Operation Commands		
[x]All.	Select input [x] to all output channels	X To All. (X=01~08)
All#.	Select all input signals to the corresponding output channels respectively (1->1, 2->2...)	All Through.
All$.	Switch off all output channels	All Closed.
[x]#.	Select input channel [x] to the corresponding output channel [x]	X Through. (X=01~08)
[x]$.	Switch off output channel [x]	X Closed. (X=01~08)
[x]@.	Switch on output channel [x]	X Open. (X=01~08)
All@.	Switch on all output channels	All Open.
[x]V[y1], [y2], [y3].	Switch the HDMI signal from input channel [x] to one or more output channels ([y1], [y2], [y3] – separate each output channel with a comma).	AV: x-> y (x and y = 01~08)
[x]B[y1], [y2], [y3].	Switch both the HDMI and IR signals from input channel [x] to one or more output channels ([y1], [y2], [y3] – separate output channels with comma)	AV: x-> y (x and y = 01~08)
[y]R[x].	Switch only the IR signal from output [y] to input [x]	IR: y-> x (x and y = 01~08)
Status[y].	Return the HDMI connection status of output [y]	AV: x-> y (x and y = 01~08)
Status.	Return the HDMI and IR connection states for each output channel one by one	AV:08->01 IR:01->01 ... ... AV:08->08 IR:08->08
Save[w].	Save the present status of the matrix to preset memory [w], ranges from 0 to 9	Save To Fw (w = 0-9)
Recall[w].	Recall the preset memory [w]	Recall From Fw (w = 0-9)
Clear[w].	Clear the preset memory [w]	Clear Fw (w = 0-9)
/^GetIPInfo;	Get the IP address, subnet mask, gateway IP, IP Port, and MAC address.	IP Address:192.168.0.178 Subnet Mask:255.255.255.0 Gateway IP:192.168.0.1 IP Port:4001 MAC Address: 08:EA:40:90:2E:9B

SetIPInfo:(IP)& (SubnetMask)& (GateWay).	Set the static IP address, subnet mask, gateway IP, IP Port, and MAC address.	IP:192.168.0.254 SM:255.255.255.0 GW:192.168.0.1
DHCPON.	Set the IP mode to DHCP.	IP Mode:DHCP IP Address:192.168.0.102 Subnet Mask:255.255.255.0 Gateway IP:192.168.0.1 DHCP:ON
Power Control Commands		
PWON.	Power up & switch to normal operating mode	PWON
PWOFF.	Enter standby mode and cut off the power supply to HDBaseT receivers. Send PWON command to return to normal operating mode	PWOFF
STANDBY.	Enter into standby mode, without cutting off the power supply to HDBaseT receivers. Pressing any button or sending another command will make the matrix exit the standby mode	STANDBY
/%I/[x]:[z].	HDCP management command for the input channels. Where [x] is the input port number, if the value of [x] is ALL, it means all ports; [z] is for HDCP compliance status, the value may be 1 (HDCP compliant) or 0 (not HDCP compliant).	/%I/[x]:[z]
/%O/[x]:[z].	HDCP management command for the output channels. Where [x] is the output port number, if the value of [x] is ALL, it means all ports; [z] is for HDCP compliance status, the value may be 1 (HDCP compliant) or 0 (not HDCP compliant)	/%O/[x]:[z]
DigitAudioON[x].	Enable HDMI audio output. • X = 1~8, enable HDMI audio output for the port x. • X = 9 (X=5 for -44EC), enable HDMI audio output for all ports.	DigitAudio ON with ALL Outputs
DigitAudioOFF[x].	Disable HDMI audio output. • X=1~8, disable HDMI audio output for the port x. • X=9 (X=5 for -44EC), disable HDMI audio output for all ports.	DigitAudio OFF with ALL Outputs
EDID commands		
EDIDH[y]B[x].	Copy the EDID from output port [y] to input port [x]. If the EDID data is available and the audio part does not support 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.	EDIDH4B3

EDIDPCM[x].	Set the audio part of input port [x] to PCM format in EDID database, [x] = 1~8	EDIDPCM1
EDIDG[y].	Get EDID data from output [y] and display the output port number, [y] = 1~8	Hexadecimal EDID data and carriage return character
EDIDMInit.	Restore the factory default EDID data of every input.	EDIDMInit
EDIDM[y]B[x].	Copy the EDID from output port [y] to input port [x]. If the EDID data is not available, then it is set to the default EDID data. Where x and y=1~8. This command does a direct copy of the EDID data and does not force the PCM mode.	EDIDM7B6
EDIDUpgrade[x].	Upgrade EDID data via the RS232. Where [x] is the input port, when the value of x is 9, it means to upgrade all input ports. When the switcher receives the command, it will show a message to prompt you to send a binary EDID file within 10 seconds of sending the **EDIDUpgrade** command. Please remove all connections of HDBaseT ports in advance.	Please send the EDID file
EDID/[x]/[w].	Set the EDID data of input port [x] to built-in EDID number [w]. [w]=0~14, correspond to the 15 embedded EDID data separately (see below)	EDID/7/1
UpgradeIntEDID[w].	Upgrade one of the15 embedded EDID data, w is the index number for the EDID data: **0**. 1080p 2D 2ch **1**. 1080p 2D 6ch **2**. 1080p 3D 2ch **3**. 080p 3D 6ch **4**. 4K30Hz 2D 2ch **5**. 4K30Hz 2D 6ch **6**. 4K30Hz 3D 2ch **7**. 4K30Hz 3D 6ch **8**. 4K60Hz (Y420) 2D 2ch **9**. 4K60Hz (Y420) 2D 6ch **10**. 4K60Hz (Y420) 3D 2ch **11**. 4K60Hz (Y420) 3D 6ch **12**. 4K60Hz (Y420) 3D 8ch **13**. 720p 60Hz 2ch **14**. 1920 x 1200 60Hz 2ch When the switcher gets the **UpgradeIntEDID** command, it will show a message requesting an EDID file (.bin file). This EDID file must be sent within 10 seconds of sending the **UpgradeIntEDID** command.	Please send the EDID file
GetInPortEDID[x].	Get the current EDID data of input [x], [x]=1~8	Hexadecimal EDID data and carriage return character

GetIntEDID[w].	Get the embedded EDID data from memory w, [w]=0~14	Hexadecimal EDID data and carriage return character
%0801.	Auto HDCP management	%0801
%0900.	Switch to carrier native mode.	Carrier native
%0901.	Switch to force carrier mode.	Force carrier
%0911.	Reset to factory default.	Factory Default
%9961.	Return the system locking status.	System Locked/ Unlock!
%9962.	Return the power status	STANDBY/PWOFF/ PWON
%9963.	Return the working mode of infrared carrier.	Carrier native/ Force carrier
%9964.	Return the IP address.	IP:192.168.0.178 (default)
%9971.	Return the connection status of the inputs.	In 01 02 03 04 Connect Y Y Y Y In 05 06 07 08 Connect Y Y Y Y
%9972.	Return the connection status of the outputs.	Out 01 02 03 04 Connect Y Y Y N Out 05 06 07 08 Connect N Y Y Y
%9973.	Return the HDCP status of the inputs.	In 01 02 03 04 HDCP Y Y Y N In 05 06 07 08 HDCP Y Y Y Y
%9974.	Return the HDCP status of the outputs.	Out 01 02 03 04 HDCP Y Y Y Y In 05 06 07 08 HDCP Y Y Y Y
%9975.	Return the I/O connection status.	Out 01 02 03 04 In 07 07 07 07 Out 05 06 07 08 In 07 07 07 07
%9976.	Return the output resolution.	Resolution Out 1 1920x1080p Out 2 1920x1080p Out 3 1920x1080p Out 4 1920x1080p Out 5 1920x1080p Out 6 1920x1080p Out 7 1920x1080p Out 8 1920x1080p
%9977.	Return the status of digital audio of output channels.	Out 1 2 3 4 Audio Y Y Y Y Out 5 6 7 8 Audio Y Y Y Y

		In 01 02 03 04 HDCPEN Y Y Y Y In 05 06 07 08 HDCPEN Y Y Y Y
%9978.	Return the HDCP compliant status of the inputs.	
I-Lock[X].	Lock the channel [X], X=1~8.	Channel[x] Lock!
I-Unlock[X].	Unlock the channel [x], X=1~8.	Channel[x] Unlock!
A-Lock.	Lock all channels.	All Channel Lock!
A-Unlock.	Unlock all channels.	All Channel Unlock!
Lock-Sta.	Return the lock status of all channels.	Channel 1->1 Unlock! Channel 2->1 Unlock! Channel 3->1 Unlock! ... Channel 8->1 Unlock! Channel 1->2 Unlock! Channel 2->2 Unlock! .... Channel 8->8 Unlock!

CEC Commands – MUHD-88EC ONLY

The binary formatted RS232 commands shown below are for controlling CEC enabled displays. The matrix outputs the CEC data on the CEC line of the HDBT-EC receiver HDMI output port.

The following CEC commands can only be sent to the RS232 control port of the MUHD-88EC matrix.

CEC commands are not supported on the MUHD-44EC.

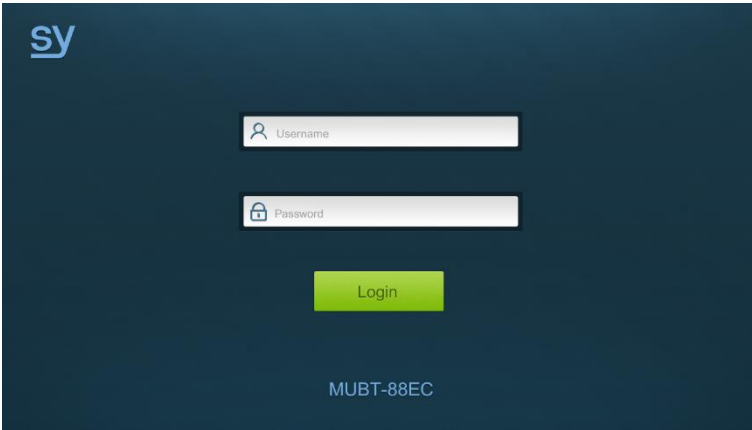|	
CEC[y][z].	**Command format:** Where [y] is the output port number in binary (0x01~0x08) and [z] is the desired CEC function command data, also in binary. Please see the manufacturer's data sheet of the CEC enabled equipment for a list of valid CEC function commands.
43 45 43 01 36 2E	Turn off the display devices on output 1. (CEC Enter Standby command)
43 45 43 01 44 6C 2E	Turn off the display devices on output 1. (CEC Power Off command)
43 45 43 01 04 2E	Turn on the display devices on output 1. (CEC Image View On command)
43 45 43 01 44 6D 2E	Turn on the display devices on output 1. (CEC Power On command)
43 45 43 01 44 41 2E	Send Volume Up command to the display devices on output 1.
43 45 43 01 44 42 2E	Send Volume Down command to the display devices on output 1.
43 45 43 01 44 43 2E	Send Volume Mute command to the display devices on output 1.

Web Control

The MUHD-44EC and MUHD-88EC can also be controlled using the built-in web interface. The default IP settings are:

IP Address:	192.168.0.178
Subnet mask:	255.255.255.0
Gateway:	192.168.0.1
IP Port:	4001

Enter the IP address into the URL bar of your browser to bring up the password interface. The default passwords are:

Username:	admin
Password:	admin

Once the Username and Password fields have been entered, the Control Interface will appear.

Control

The **Control** page allows you to change the video selections, as well as program or recall any of the nine programmable preset switch configurations, called Scene on this page. Any changes performed by either the front panel or from an RS232 command will always update this web page automatically.
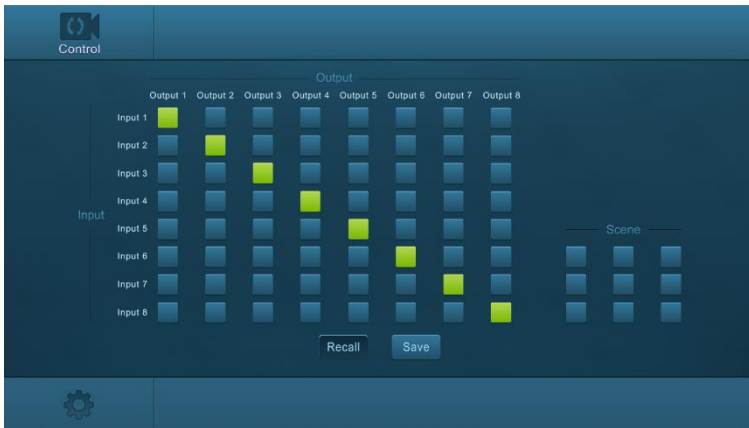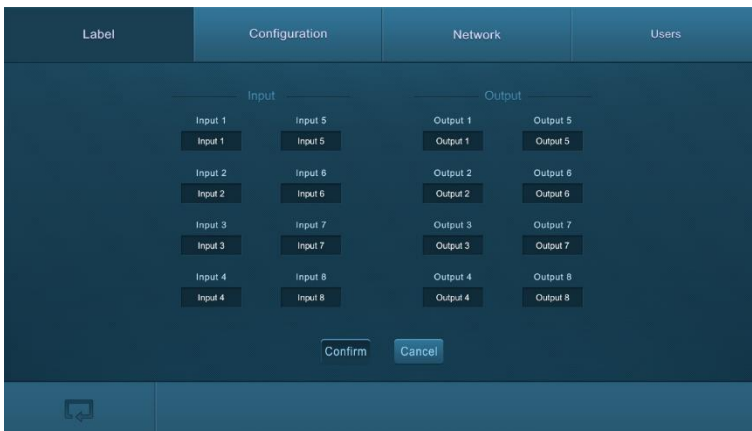

Click ⚙ on the Control Interface to enable the settings options. The Settings page has four tabs along the top to select the different interface pages:

- Label
- Configuration
- Network
- User

Label

The **Label** page allows you to change the captions for the inputs and outputs displayed by the Main page.

Configuration

The **Configuration** page allows you the set the HDCP compliance status for each input to either ON or OFF. EDID Copy management can also be performed from this page.
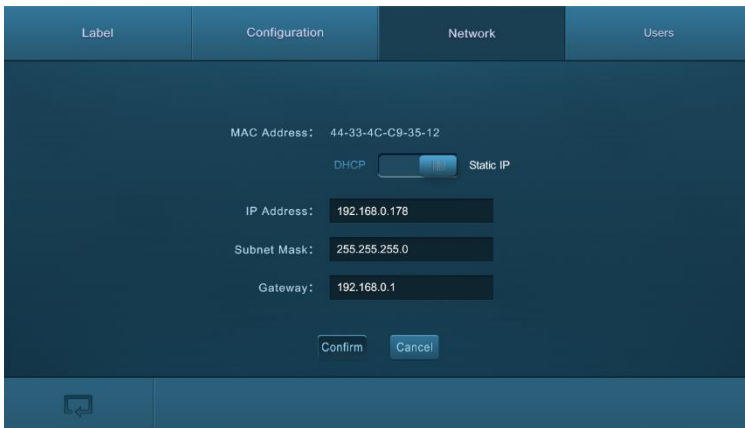

Network

The **Network** page allows you to configure the network settings for the IP address, Subnet Mask and Gateway. Any changes made on this will page will only take effect after the matrix is rebooted.


Always be certain that the IP address, subnet mask and gateway IP address given to the matrix matches with the network settings that the matrix is intended to operate on. If there is a DHCP server available on the same network, then the DHCP option may be used (The above example shows the setting for Static IP).

The actual assigned IP address can always be checked by sending the RS232 command **%9964.** to the matrix switcher.

Users

The **Users** page allows you to change the passwords for the Admin and User levels. The default passwords are:

Admin password:	admin
User password:	user
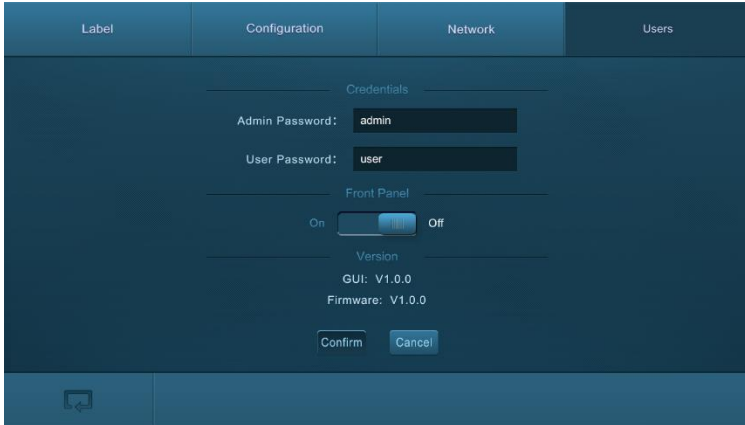
User mode level only permits the changing of the video selections and setting or recalling presets (Scenes). Access to the settings pages is not permitted in User level mode.

Admin mode level enables access to the settings pages as well as also operating with User level privileges.

Specifications

4K HDBaseT Matrix Switcher

Video Input	
Input	**MUBT-44EC:** 4x HDMI **MUBT-88EC:** 8x HDMI
Input Connector	Female HDMI Type A
HDMI Standard	Support 4K@60Hz 4:2:0 & HDCP2.2 and is backward compatible with all previous standards.

Video Output	
Output	**MUBT-44EC:** 1x HDMI & 3x HDBaseT **MUBT-88EC:** 1x HDMI & 7x HDBaseT
Output Connector	Female HDMI Type A Female RJ45(with LED indicators)
HDMI Standard	**Supports 4K@60 4:2:0 & HDCP1.4/2.2 and is backward compatible with all previous standards.**

Video General	
Video Signal	HDMI (or DVI-D)
Transmission Distance (cat6a)	1080P@60Hz ≤70m 4K2K@30Hz 4:4:4 ≤40m

Resolution Range	VESA and SMPTE 480p to 2160p (4K UHD) with 3D. (All resolutions to: 4096x2160p @60Hz 4:2:0 8bit, 3840x2160p @30Hz 4:4:4 8bit) All PC resolutions to 1920x1200
EDID Management	In-built EDID data and manual EDID management
Gain	0 dB
Bandwidth	10.2Gbit/s

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 x L+R (RCA), 1 x SPDIF optical Toslink

Control I/O	
Control Ports	**MUBT-44EC:** 4x IR OUT, 3 x IR IN, 1 x IR EYE, 1 x TCP/IP (female RJ45) , 1 x RS232 (3-pin pluggable terminal block) **MUBT-88EC:** 8 x IR OUT, 1 x IR ALL OUT, 7 x IR IN, 1 x IR EYE, 1 x TCP/IP (female RJ45) , 1 x 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 Default IP: 192.168.0.178 Default Subnet: 255.255.255.0

General	
Power Supply	**MUBT-44EC:** 24V DC 2.71A **MUBT-88EC:** AC100-240V~, 50/60Hz
Power Consumption	**MUBT-44EC:** 35W (Max) **MUBT-88EC:** 93W (Max)
Operation Temperature	0 ~ +40℃
Storage Temperature	-10 ~ +55℃
Relative Humidity	10 ~ 90%
Dimension (W*H*D)	**MUBT-44EC:** 436.4mm x 44.0mm x 236.5mm **MUBT-88EC:** 436.4mm x 44.0mm x 300.5 mm
Net weight	**MUBT-44EC:** 1.7 kg **MUBT-88EC:** 2.8 kg

HDBaseT Receiver

Input & Output	
Input	1 x HDBaseT
Input Connector	Female RJ45 (with LED indicators)
Output	1 x HDMI Type A
Output Connector	Female HDMI
IR Control	1 x IR IN & 1 x IR OUT

IR 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 HDCP1.4/2.2
Temperature	0 ~ +45℃
Humidity	10 ~ 90% non-condensing
Power Supply	Powered by 4K HDBaseT Matrix Switcher.
Dimension (W*H*D)	61mm x 24mm x 120mm
Net Weight	280g

Safety Instructions

To ensure reliable operation of this product as well as protecting the safety of any person using or handling these devices while powered, please observe the following instructions.

1. Use the power supplies provided. If an alternate supply is required, check Voltage, polarity and that it has sufficient power to supply the device it is connected to.
2. Do not operate either of these products outside the specified temperature and humidity range given in the above specifications.
3. Ensure there is adequate ventilation to allow this product to operate efficiently.
4. Repair of this equipment should only be carried out by qualified professionals as this product contains sensitive devices that may be damaged by any mistreatment.
5. Only use this product in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with this product.

After Sales Service

1. Should you experience any problems while using this product, firstly refer to the Troubleshooting section in this manual before contacting SY Technical Support.
2. When calling SY Technical Support, the following information should be provided:
   - Product name and model number
   - Product serial number
   - Details of the fault and any conditions under which the fault occurs.
3. This product has a two year standard warranty, beginning from the date of purchase as stated on the sales invoice. For full details please refer to our Terms and Conditions.
4. SY Product warranty is automatically void under any of the following conditions:
   - The product is already outside of its warranty period
   - Damage to the product due to incorrect usage or storage
   - Damage caused by unauthorised repairs
   - Damage caused by mistreatment of the product
5. Please direct any questions or problems you may have to your local dealer before contacting SY Electronics.