



Installation Guide

SY-MSUHD-88

8x8 HDMI 2.0 4K60 (18 Gbps) Matrix

The MSUHD-88 is an 8x8 true 4K60 HDMI matrix switcher that is capable of switching HDMI signals up to 18Gbps. HDMI 2.0, HDCP 2.2 and video resolutions up to 4K are all fully supported. It allows any source (BluRay player, HD DVD player, satellite receiver, game station, etc.) to be shown on any of the displays simultaneously, no matter whether the source is HDCP compliant or not.

The MSUHD-88 offers a solution for digital entertainment centres, HDTV retail, show sites, data centre control, information distribution, conference room presentation, school and corporate training environments.

Features

- Advanced EQ and amplification of outputs for smooth switching
- 1080p to 4K up scaling and 4K to 1080p down scaling on each output
- Scaling allows the displaying of the same input image on displays with different native resolutions
- Advanced EDID management
- Allows up to 8 HDMI source devices to be independently switched to 8 HDMI monitors, HDTVs, or projectors
- The outputs can show the same or different sources at the same time no matter whether the source is HDCP compliant or not
- Supports high definition resolutions 4K60 4:4:4, 4K30, 1080P, 1080i, 720P and standard video or PC formats
- Four control mode options: front panel buttons, RS232 commands, LAN control, and IR control either locally or by using the IR extension kit
- Full HDR support
- HDMI 2.0 compliant
- HDCP 2.2 compliant

Connectors and Controls

Front



Rear



Installation

- 1) Connect the HDMI input sources to the SY-MSUHD-88
- 2) Connect the HDMI outputs to the SY-MSUHD-88
- 3) Power on the input sources you want to show
- 4) Connect the power supply into the SY-MSUHD-88 and turn on the displays you want to view
- 5) Use the remote control or the front panel push buttons to make input to output source selections

Insert and remove HDMI cables carefully to avoid damaging the HDMI connectors on the matrix switcher.

Operation

Please note, whenever the LCD is off the first button press will only turn on the LCD and does not perform any action. Press the button again to initiate the desired action.

Whenever the LCD shows an N in the top row, this indicates that the output at that position is turned off and is not showing an image. Use either of the two video selection methods to select and input to that output.

Video Selections

The SY-MSUHD-88 front panel controls allow for the selection of the inputs to the various outputs. There are two methods by which video selections can be made:

1. Press a button on the OUTPUT row to choose the output number to change, then press a button on the INPUT row to select the input signal for the selected output.
2. Press a button on the INPUT row to see all the outputs that input is currently routed to. This is indicated by the button LEDs on the OUTPUT row. The top row of the display will indicate **Y** on for all current video routings for that input where the output signal is on. Where there is an **N** in the top row of the display, this indicates that the chosen input is routed to the output number shown, but that the output signal is switched off.

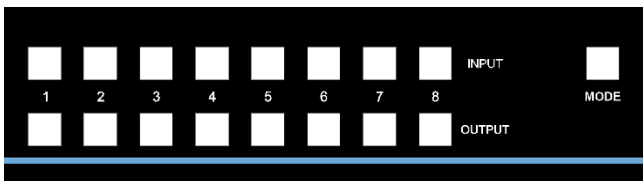


Figure 1 - MUHD-88 Front Panel Controls

Mode Button

The mode button provides three additional selectable options:

1. Scaler Mode (first press of MODE)
2. EDID Management (second press of MODE)
3. Display IP Settings (third press of MODE)

Scaler Mode

Pressing the MODE button once will make all the output buttons light up, pressing any of the output buttons will display the current scaler setting for that output on the LCD. Press the respective output button to toggle between 1080p > 4K scaling and 4K > 1080p scaling. Holding the output button down for three seconds will activate the new scaler setting for that output, the LCD displays OK to confirm the change.

EDID Setting

The matrix switcher has 30 built-in factory defined EDID settings, and three user programmable EDID memories. The user EDID memories are independent to each input and can therefore be set differently for each input. Each input can also be set to use the EDID information from any of the output display devices, via the front panel or RS232 command.

To change the EDID setting, press the MODE button twice and then press the INPUT number you wish to change. The LCD display will now show the current EDID setting for that input channel.

The factory default EDID is 1080p 2CH (PCM) for all eight inputs. The EDID setting for each input can be set to any one of the following:

- 0: 1080P 2CH (PCM)
- 1: 1080P 6CH
- 2: 1080P 8CH
- 3: 1080P 3D 2CH (PCM)
- 4: 1080P 3D 6CH
- 5: 1080P 3D 8CH
- 6: 4K30Hz 3D 2CH (PCM)
- 7: 4K30Hz 3D 6CH
- 8: 4K30Hz 3D 8CH
- 9: 4K60Hz (Y420) 3D 2CH (PCM)
- 10: 4K60Hz (Y420) 3D 6CH
- 11: 4K60Hz (Y420) 3D 8CH
- 12: 4K30Hz 3D 2CH (PCM)
- 13: 4K30Hz 3D 6CH
- 14: 4K30Hz 3D 8CH
- 15: 1080P 2CH (PCM) HDR
- 16: 1080P 6CH HDR
- 17: 1080P 8CH HDR
- 18: 1080P 3D 2CH (PCM) HDR
- 19: 1080P 3D 6CH HDR

- 20: 1080P 3D 8CH HDR
- 21: 4K30Hz 3D 2CH (PCM) HDR
- 22: 4K30Hz 3D 6CH HDR
- 23: 4K30Hz 3D 8CH HDR
- 24: 4K60Hz (Y420) 3D 2CH (PCM) HDR
- 25: 4K60Hz (Y420) 3D 6CH HDR
- 26: 4K60Hz (Y420) 3D 8CH HDR
- 27: 4K60Hz 3D 2CH (PCM) HDR
- 28: 4K60Hz 3D 6CH HDR
- 29: 4K60Hz 3D 8CH HDR
- 30: USER EDID 1
- 31: USER EDID 2
- 32: USER EDID 3
- Copy EDID from Output 1
- Copy EDID from Output 2
- Copy EDID from Output 3
- Copy EDID from Output 4
- Copy EDID from Output 5
- Copy EDID from Output 6
- Copy EDID from Output 7
- Copy EDID from Output 8

The first 30 EDID settings (0 to 29) are factory set and cannot be altered. The three USER EDID memories (30 to 32) can only be programmed using RS232 commands. Each input independently presents its currently selected EDID setting to the HDMI source device

The following is an example of how to change the EDID setting for input 6:

User Action
Press Input 6 button to view the current EDID setting for input 6.
Press Input 6 button to step to the next EDID setting, or Press Output 6 button to step to the previous EDID setting. Repeat until the desired EDID setting is displayed.
Press and hold Input 6 button for 3 seconds to save the setting.

When the LCD shows **COPY FROM OUT 6**, or similar, then pressing and holding the respective input button for three seconds will make the matrix switcher read the EDID from the display device connected to the selected HDMI output and save it to the selected input (6 in this example).

Please always be aware that the EDID setting of each input is independent and that each input may need to be programmed separately.

Display IP Information

From the normal operating mode, press MODE button three times to display the current IP settings. The screen will change every three seconds to display the next IP setting, but will always begin with the current IP address of the matrix:

HOST IP:
192.168.001.239

In order to prevent potential IP problems, most of the IP settings can only be programmed using RS232 commands.

The factory default IP settings are:

Host IP: 192.168.1.239
Router IP: 192.168.1.1
Subnet: 255.255.255.0
TCP/IP Port: 23
DHCP: Off

The IP settings can be used to either gain access to the built-in web interface or as a control input for sending the same commands as given for the RS232 port through an IP v4 connection. Please note that the carriage-return character is still required for every command sent over IP to the SY-MSUHD-88.

Local IR Control

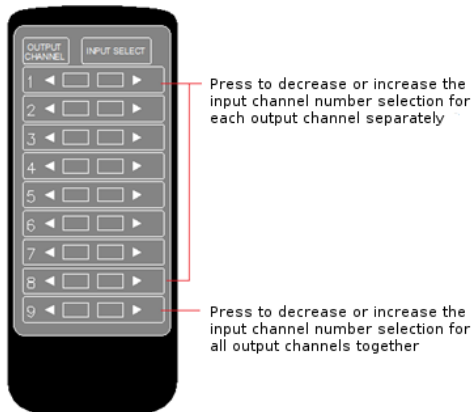


Figure 2 - MSUHD-88 IR Control

The user can control the HDMI routing of the matrix by using the IR remote supplied with the product.

The left arrow button selects the next lowest numbered input port, and the right arrow selects the next highest numbered input port.

The IR remote control for the SY-MSUHD-88 allows the user to increase or decrease all eight of the inputs source selections simultaneously with a single button press.



The supplied IR receiver cable can be used to provide a different receiver position. Simply plug the cable into the IR Ext socket on the rear of the matrix switcher.

RS232 Commands

The SY-MSUHD-88 switcher can also be controlled using RS232 commands. The following tables lists all the available commands that can be used to control or configure the SY-MSUHD-88 switcher.

The baud rate settings are: 57600,n,8,1 (57.6K, no parity, 8 bits, 1 stop) with no handshaking (Tx, Rx only).

In all of the commands given in the table below, all the indicated characters are required and the `\r` character represents the carriage-return character, 0x0d.

A number of the commands given the following tables output a large amount of ASCII encoded information that can be too much for systems with a small amount of available memory as this data can be several kilobytes long. The **H** and **STA** commands should be avoided whenever possible as the GET Commands can provide the same information as **STA**, but only for a specific feature without any additional information to process that is not relevant to the status of the desired feature. The **H** command merely provides a list of all the available commands with a brief description included for each one.

System Information

Command	Description
H\r	Output help pages
STA\r	Output the global system status information
SET ADDR xx\r	Set the system address to xx , where xx is in the range 00-99. 00 is the default address and should always be set when there is only one MSUHD-88 being addressed
GET ADDR\r	Get the system address
GET STA\r	Get the system status

Video Settings

The following table gives the commands for video selection and various other video options:

Command	Description
SET OUTx VS INy↓	Set output x to input y
SET OUTx HDCPy↓	Set the HDCP status for output x , where y is: 0 = AUTO 1 = BYPASS 2 = Disable 3 = HDCP 1.4 mode 4 = HDCP 2.2 mode
SET OUTx VIDEO0↓	Set output x to auto scaling mode. If x = 0, then apply to all outputs
SET OUTx VIDEO1↓	Set output x to bypass mode. If x = 0, then apply to all outputs
SET OUTx VIDEO2↓	Set output x to 4K to 1080p scaling mode. If x = 0, then apply to all outputs
SET OUTx VIDEO3↓	Set output x to 1080p to 4K scaling mode. If x = 0, then apply to all outputs
SET OUTx VIDEO4↓	Set output x to HDBT C scaling mode. If x = 0, then apply to all outputs
SET OUTx IMAGE ENH 0↓	Set 1080p to 4K video enhancement mode to bypass
SET OUTx IMAGE ENH 1↓	Set 1080p to 4K video enhancement mode to weak
SET OUTx IMAGE ENH 2↓	Set 1080p to 4K video enhancement mode to medium
SET OUTx IMAGE ENH 3↓	Set 1080p to 4K video enhancement mode to strong
GET OUTx VS↓	Get the video selection for output x (use x = 0 to get all output selections)
GET OUTx HDCP↓	Get the HDCP status for output x (use x = 0 to get all output selections)
GET OUTx VIDEO↓	Get the video scaler mode for output x (use x = 0 to get all output scaler selections)

Audio Settings

The following two commands provide an analogue audio mute function only when the analogue de-embedded audio outputs are being used. This mute function does not affect the embedded HDMI output in any way.

Command	Description
SET OUTx EXA EN↓	Enable analogue audio de-embedding for output x (Mute Off)
SET OUTx EXA DIS↓	Disable analogue audio de-embedding for output x (Mute On)

EDID Settings

When using these commands, please note that there are 30 default EDID settings, and 3 User programmable EDID memories per video input.

For the default EDID memories, the x value must be in the range 0 to 29 inclusive (leading zeros are not required). For the User EDID memories, the value x must be one of 30, 31 or 32. The full list of EDID settings is given on page 4 and the first column indicates the zz value for the `SET IN y EDID zz` command stated below.

Command	Description
<code>SET INy EDID zz</code>	Set input y EDID to EDID setting zz Where zz is 00 to 29 one of the 30 built-in EDID settings, or 30, 31, 32 for the three User defined modes.
<code>SET INx EDID Cy OUTy</code>	Copy the EDID from output y to input x
<code>SET INx EDID Uz DATA XX, ...</code>	Write an EDID data block to input x , see below
<code>GET INx EDID</code>	Get the EDID setting for input x (if $x = 0$ then the EDID states for all eight inputs will be returned)

For the `SET IN x EDID U z DATA XX, ...` command, the data block, {XX, ...}, must contain 128 or 256 hexadecimal values respectively. Each of the hexadecimal values must be represented by two ASCII characters and separated by spaces, for example:

```
SET IN1 EDID U1 DATA 00 FF FF FF FF FF FF 00 4C 2D BE 0B 01 00 00 00
 02 18 01 03 80 59 32 78 0A EE 91 A3 54 4C 99 26
0F 50 54 BD EF 80 71 4F 81 C0 81 00 81 80 95 00
A9 C0 B3 00 01 01 04 74 00 30 F2 70 5A 80 B0 58
8A 00 50 1D 74 00 00 1E 02 3A 80 18 71 38 2D 40
58 2C 45 00 50 1D 74 00 00 1E 00 00 00 FD 00 18
4B 0F 87 3C 00 0A 20 20 20 20 20 20 00 00 00 FC
00 53 41 4D 53 55 4E 47 0A 20 20 20 20 20 01 9A
02 03 3A F1 57 61 10 1F 04 13 05 14 20 21 22 5D
5E 5F 60 65 66 62 63 64 07 16 03 12 23 09 07 07
83 01 00 00 E2 00 0F 6E 03 0C 00 40 00 88 1E 21
00 80 01 02 03 04 E3 0F 01 E0 01 1D 80 D0 72 1C
16 20 10 2C 25 80 50 1D 74 00 00 9E 66 21 56 AA
51 00 1E 30 46 8F 33 00 50 1D 74 00 00 1E 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 67
```

Ideally, the above example would be placed into a text file and then sent to the SY-MSUHD-88 switcher using a serial emulation program. The data given above is only an example and may not be compatible with the display devices connected to the SY-MSUHD-88 switcher.

Network Settings

These RS232 commands allow setting or retrieving the network settings:

Command	Description
SET DHCP 0↵	Disable DHCP mode
SET DHCP 1↵	Enable DHCP mode
SET HIP xxx.xxx.xxx.xxx↵	Set (4K Switcher) Host IP address to xxx.xxx.xxx.xxx
SET NMK xxx.xxx.xxx.xxx↵	Set (4K Switcher) Subnet Mask to xxx.xxx.xxx.xxx
SET RIP xxx.xxx.xxx.xxx↵	Set Default Gateway IP address to xxx.xxx.xxx.xxx
SET TIP zzzz↵	Set TCP/IP port to zzzz
GET DHCP↵	Get the DHCP setting
GET HIP↵	Get the Host IP address
GET NMK↵	Get the subnet mask
GET RIP↵	Get the Default Gateway IP address
GET TIP↵	Get the TCP/IP value
GET MAC↵	Get the MAC address

When shipped from SY, the default IP settings are:

Host IP Address	192.168.1.239
Subnet Mask	255.255.255.0
Default Gateway IP Address	192.168.1.1
TCP/IP Port	23
DHCP	Off

The IP settings can be used to either gain access to the built-in web interface or as a control input for sending the same commands as given for the RS232 port through an IP v4 connection. Please note that the carriage-return character is still required for every command sent over IP to the SY-MSUHD-88.

Specifications

General

Parameter	
HDMI Inputs	8
HDMI Outputs	8
Analogue audio outputs (Stereo)	8
S/PDIF coax digital audio outputs	2
Video Format Supported (in & out)	Supports all HDMI resolutions up to 4K60 4:4:4, as well as all PC resolutions
HDCP compliance	HDCP 2.2 and 1.4 (see Video Settings)
Audio Formats Supported	L-PCM, DTS-HD, Dolby TrueHD
Maximum Transmission Distance	Less than 15m
Communication Ports	RS232, Ethernet, IR
RS232 Settings	Baud rate: 57600,n,8,1
Default IP Settings	IP Address: 192.168.1.239 Subnet: 255.255.255.0
Supply Voltage	12V DC
Power Consumption	15W (max.)

Environmental

Operating Temperature Range	0 to +35°C (32 to +95°F)
Operating Humidity Range	10 to 90% RH (non-condensing)

Physical

Dimensions	L 440 x W 256 x H 42 mm 19" Rack height: 1U
Weight	2.4 kg

Package Contents

- 1x Main unit
- 1x 12V DC PSU
- 1x User manual
- 1x UK or EU to IEC 60320 Type C7 (figure-of-eight) cable
- 1x IR remote control
- 1x IR receiver (eye) with self-adhesive pad
- 1x Pair 19" rack mounting brackets
- 6x M3 x 8 screws for the mounting brackets
- 9x Three-Way pluggable screw terminal connectors

Safety Instructions

To ensure reliable operation of these 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 the equipment should only be carried out by qualified professionals as these products contain sensitive devices that may be damaged by any mistreatment.
5. Only use these products in a dry environment. Do not allow any liquids or harmful chemicals to come into contact with these products.
6. Due to the weight and physical size of some of these matrix switchers, correct Manual Handling and Lifting procedures should be observed at all times while handling these products in order to minimise the risk of injury.

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.