



## User Manual

# **SY-MFS51-18G**

### **18G HDMI 2.0 5x1 Presentation Switcher**

3x HDMI, 1x DisplayPort & 1 x VGA

to

1x HDMI and 1x HDBaseT (mirrored outputs)

with powerful Output Scaling

The MFS51-18G is a 4K scaling switcher that provide 3 HDMI inputs, 1 DisplayPort input and 1 VGA input with HDMI and HDBaseT mirrored outputs. It also provides flexible audio routing with auto-mixer and auto-gain options, ensuring the main audio will always be audible and optimal. The MFS15-18G provides a number of control methods: front panel, RS232, IR, Web GUI, or external contact closures. This switcher is suitable for a wide number of applications including classrooms, lecture halls and conference rooms.

## Features

- Supports up to HDMI 2.0b 18G
- Compliant up to HDCP 2.2
- 3x HDMI inputs, 1x DisplayPort, 1x VGA
- VGA input supports RBBHV, YPbPr and CVBS
- Fast switching HDMI output – Full up/down scaler to 4K30
- HDBaseT output transmits up to 70m @ 1080p or 40m @ 4K30 (4:4:4)
- Input HDMI & DisplayPort resolutions up to 4K60 4:4:4
- Input VGA resolution up to 1920x1200 @60Hz
- HDMI/HDBaseT (mirrored) output resolutions up to 4K30 (4:4:4)
- Automatic and Manual switching modes
- EDID Management
- Extensive Audio management
- Controllable from front panel, RS232, IR, Web GUI or external pushbutton panel

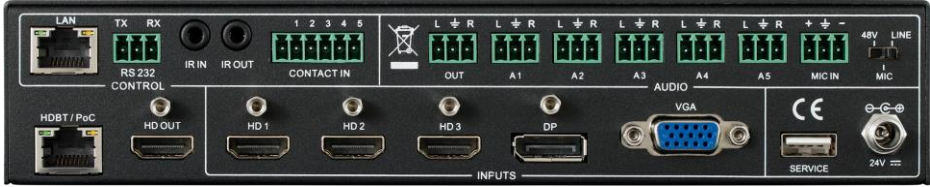
## Panel Descriptions

### Front Panel



Name	Description
<b>Power LED</b>	BLUE – Normal operation RED – Standby
<b>IR</b>	IR sensor for IR remote control
<b>Input Selection buttons</b>	For selecting the desired input, each with blue LED indicators
<b>AUTO LED</b>	Lit – Auto Switching mode active
<b>Menu / OK</b>	Enter the built-in menu system / Accept menu options
<b>Auto / Exit</b>	Toggle Auto/Manual mode / Exit the menu system
<b>VOL + / VOL -</b>	Main output volume level control
<b>MIC + / MIC -</b>	Microphone input volume level control

## Rear Panel

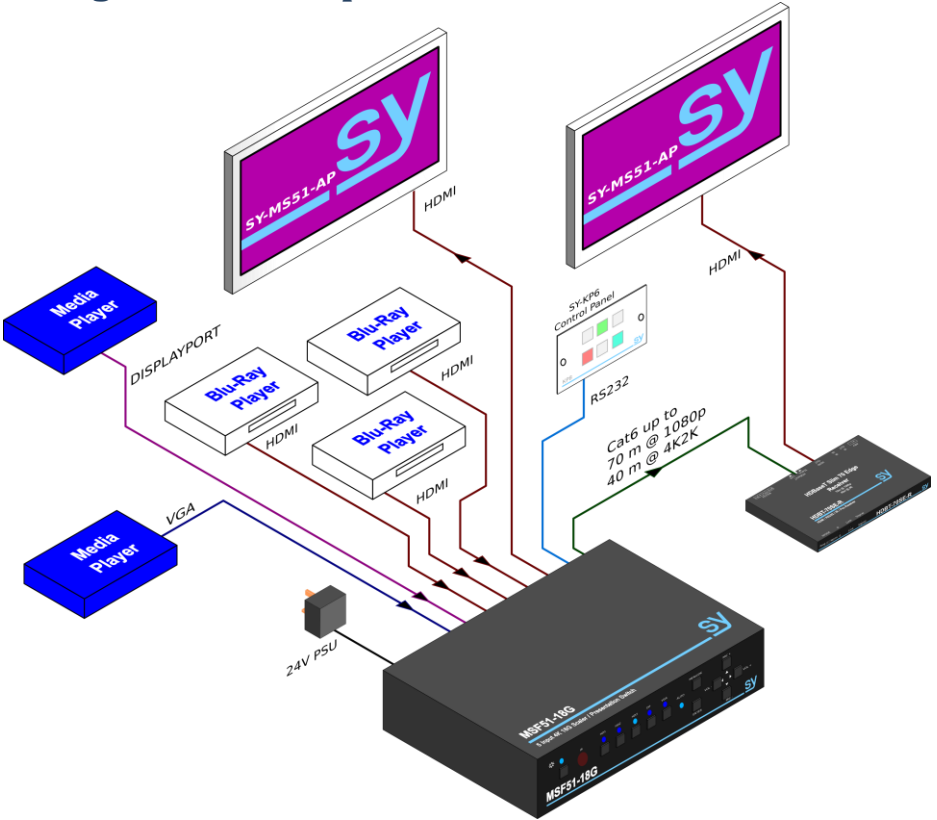


Name	Description
<b>LAN</b>	LAN port for Web GUI interface
<b>RS232 Control</b>	RS232 control port
<b>IR IN</b>	IR input to HDBaseT receiver
<b>IR OUT</b>	IR output from HDBaseT receiver
<b>Contact In</b>	External pushbutton interface for selecting the inputs
<b>Audio Output</b>	Analogue stereo audio output
<b>A1 to A5</b>	Analogue stereo audio inputs
<b>MIC IN</b>	Microphone or Line input
<b>48V / MIC / LINE Switch</b>	Selects 48V phantom power microphone, Mic Level or Line level
<b>HDBT / PoC</b>	HDBaseT output with Power over Cable (PoC)
<b>HD OUT</b>	HDMI output – mirror of HDBaseT output
<b>HD1, HD2 &amp; HD3</b>	HDMI inputs
<b>DP</b>	DisplayPort input
<b>VGA</b>	VGA input
<b>SERVICE</b>	Only for service
<b>24V DC</b>	24V DC PSU input

## Connecting to the MFS51-18G

1. Connect the desired video sources to their respective inputs.
2. Connect the HDBT output to an HDBaseT receiver using Cat6 cable.
3. If a local display is required, connect it to HD OUT.
4. Ensure that the MIC mode selection switch is set properly for the microphone being connected to the MIC input.
5. Connect the 24V DC PSU and the MFS51-18G will power on
6. Connect any external controls that are required to their respective ports: i.e. RS232, LAN or pushbutton panel.
7. Connect any analogue audio sources and amplifiers to the audio connections, as required.

# Configuration Example



## Using the MFS51-18G

The MFS51-18G can be controlled using any of the following methods:

1. Front Panel buttons
2. RS232 control commands
3. Built-In Web GUI
4. IR remote control

## Front Panel Control

The input selection buttons allow manual selection of the inputs, simply press the button for the desired input.

## Auto / Manual Switching

The auto switching mode makes the MFS51-18G automatically switch to any new input that is detected, or switch to the next available input should the current input signal disappear. To switch between manual and auto switching, press & hold the AUTO / EXIT button until the AUTO LED changes. Auto switch mode is active when this LED is lit. Manual selection is still possible while the Auto Switching mode is active.

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## Auto Switching Modes

The MFS51-18G has three Auto Switching modes that can be set using either RS232 commands or from the WebGUI interface:

- **Last Connected Mode**
  - The most recently connected input will always be selected. When the currently selected input is removed, the first available input, starting from input 1, will be selected.
- **First Connect Mode**
  - The first connected input is selected, any subsequent inputs that are connected will not be automatically selected. When the currently selected input is removed, that input will remain selected.
- **Priority Mode**
  - Any input number that is lower than the currently selected input will always be selected when it is connected. The MFS51-18G will not automatically select a newly connected input that is higher than the currently selected input. . When the currently selected input is removed, the first available input, starting from input 1, will be selected.

## Using the Built-In Menus

- The menu is activated by pressing down the MENU/OK button.
- Menu navigation and value changes are done by using the arrowed buttons.
- To accept a menu setting press the MENU/OK button
- To exit the menus press the AUTO/EXIT button repeatedly until the OSD menu screen closes.

The built-in menu also provides access to a single colour test pattern mode for White, Red, Green, Blue and Black. The test pattern can be used to confirm that a video signal can be seen on the HDMI and HDBaseT outputs.

## Adjusting Volume Levels

The MIC input level and the Audio Output level can be independently set, using the MIC+/MIC- and the VOL+/VOL- buttons as required. Volume levels can only be changed from the front panel when the OSD menu is not being displayed.

## RS232 Control

The default RS232 settings are:

**115200 baud, 8 data bits, no parity and one stop bit.**

The baud rate can be changed using the built-in menu or the WebGUI interface to one of the following settings:

**4800, 9600, 19200, 38400, 57600, or 115200.**

All commands are in lowercase and any spaces shown must always be included. Commands should be sent as a single burst as manual typing will often result in the response `invalid command !`

Every command must end with both the exclamation mark (!) and a carriage-return (0x0d). An optional line-feed character (0x0a) can be sent which will be ignored by the MFS51-18G.

Every response message will terminate with a carriage-return and line-feed (0x0d 0x0a) character sequence.

## Getting a List of Supported Commands

Send the message `help!` to get a list of the supported commands. The MFS51-18G will output a list of the supported commands where each one is enclosed in braces, e.g. `{s source 1!}`.

## Selecting the inputs

RS232 Command	Response	Input Selected
<code>s source 1!</code>	source 1	HDMI 1
<code>s source 2!</code>	source 2	HDMI 2
<code>s source 3!</code>	source 3	HDMI 3
<code>s source 4!</code>	source 4	DisplayPort
<code>s source 5!</code>	source 5	VGA

The following command returns the currently selected input:

RS232 Command	Response	Function
<code>r source!</code>	See previous table	Return the current input selection

## Setting Auto Switching Mode

RS232 Command	Response	Mode Selected
<code>s auto switch 1!</code>	auto switch 1	Last connected source
<code>s auto switch 2!</code>	auto switch 2	First connected source
<code>s auto switch 3!</code>	auto switch 3	Priority source
<code>s auto switch off!</code>	auto switch off	Auto switch is disabled

The following command returns the currently selected input:

RS232 Command	Response	Function
<code>r auto switch!</code>	See previous table	Return the current auto switching mode

## Setting the Input EDID

The following commands set the maximum resolution for the HDMI inputs, or copy EDID data from the display device connected to either the local HDMI output or the HDBaseT output.

RS232 Command	Response	EDID Setting
<code>s edid 1!</code>	edid 1.4	Set HDMI 1.4 mode (up to 4K30)
<code>s edid 2!</code>	edid 2.0	Set HDMI 2.0 mode (up to 4K60)
<code>s edid 3!</code>	edid copy HDMI	Copy EDID from local HDMI output
<code>s edid 4!</code>	edid copy HDBT	Copy EDID from HDBaseT output
<code>s edid 5!</code>	edid auto	EDID pass-through

The following command returns the currently selected output resolution setting:

RS232 Command	Response	Function
<b>r edid!</b>	See previous table	Return the current edid setting

## Setting the Output Resolution

The MFS51-18G provides a range of output resolutions that can be chosen to suit any specific requirement:

RS232 Command	Response	Output Resolution
<b>s output 1!</b>	3840x2160@30	2160p 30Hz 4:4:4
<b>s output 2!</b>	3840x2160@25	2160p 25Hz 4:4:4
<b>s output 3!</b>	1920x1080@60	1080p 60Hz 4:4:4
<b>s output 4!</b>	1920x1080@50	1080p 50Hz 4:4:4
<b>s output 5!</b>	1280x720@60	720p 30Hz 4:4:4
<b>s output 6!</b>	1280x720@50	720p 50Hz 4:4:4
<b>s output 7!</b>	1920x1200@60	1920x1200 60Hz 4:4:4
<b>s output 8!</b>	1680x1050@60	1680x1050 60Hz 4:4:4
<b>s output 9!</b>	1450x1050@60	1450x1050 60Hz 4:4:4
<b>s output 10!</b>	1360x768@60	1360x768 60Hz 4:4:4
<b>s output 11!</b>	1280x800@60	1280x800 60Hz 4:4:4
<b>s output 12!</b>	1024x768@60	1024x768 60Hz 4:4:4
<b>s output 13!</b>	output auto	Uses the native setting of the display EDID

The following command returns the currently selected output resolution setting:

RS232 Command	Response	Function
<b>r output!</b>	See previous table	Return the current output resolution

## Setting the Output Aspect Ratio

Each input can have its own aspect ratio setting to ensure that the source content will be displayed with the correct aspect ratio.

RS232 Command	Response	Aspect Ratio
<b>s aspect ratio 1!</b>	ratio 16:9	Set 16:9 format
<b>s aspect ratio 2!</b>	ratio 4:3	Set 4:3 format
<b>s aspect ratio 3!</b>	ratio 16:10	Set 16:10 format

The following command returns the currently selected output aspect ratio setting:

RS232 Command	Response	Function
<b>r aspect ratio!</b>	See previous table	Return the current edid setting

## Setting the Output HDCP Mode

RS232 Command	Response	Output HDCP Setting
<b>s hdcp 1.4!</b>	hdcp out 1.4	Force HDCP 1.4
<b>s hdcp bypass!</b>	hdcp out bypass	Use display HDCP mode

The following command returns the currently selected output HDCP setting:

RS232 Command	Response	Function
<b>r hdcp!</b>	See previous table	Return the current edid setting

## Audio System Control

The MFS51-18G has a versatile and fully controllable **audio routing** and **MIC mixing** system. These features can be controlled using either from the following RS232 commands or from the Web GUI interface.

RS232 Command	Response	Function
<b>s mixer on!</b>	mixer on	Enable the MIC mixer
<b>s mixer off!</b>	mixer off	Disable the MIC mixer
<b>s mixer auto!</b>	mixer auto	Set MIC mixer to auto volume ducking mode
<b>s out vol n!</b>	out vol n	Set the audio output volume. n = 0 to 32
<b>s out vol up n!</b>	out vol n	Increase the output volume by m steps. n = 0 to 32
<b>s out vol down n!</b>	out vol n	Decrease the output volume by m steps. n = 0 to 32
<b>s mic vol n!</b>	mic vol n	Set the microphone volume. n = 0 to 32
<b>s mic vol up n!</b>	mic vol n	Increase the microphone volume by m steps. n = 0 to 32
<b>s mic vol down n!</b>	mic vol n	Decrease the microphone volume by m steps. n = 0 to 32
<b>s audio mute on!</b>	audio mute on	Mute the source audio input
<b>s audio mute off!</b>	audio mute off	Un-mute the source audio input
<b>s mic mute on!</b>	audio mute on	Mute the microphone input
<b>s mic mute off!</b>	audio mute off	Un-mute the microphone input
<b>s mute on!</b>	mute on	Mute both the source and MIC audio inputs
<b>s mute off!</b>	mute off	Un-mute both the source and MIC audio inputs



The following commands are only valid when the Mic Mixer is in Auto mode:

RS232 Command	Response	Function
<b>s auto vol n!</b>	auto vol n	Set the MIC mixer volume level of the background audio. n = 0 to 32
<b>s fade out time n!</b>	fade out time n	Set the fade out time for the background audio. n = 0 to 5000ms.
<b>s fade in time n!</b>	fade in time n	Set the fade in time for the background audio. n = 0 to 5000ms.

Each input can use any of the analogue audio inputs or its own embedded audio signal (except for VGA) for the output audio. For the following commands the **audio input number** x is as follows:

Input Type	Embedded	External Input
<b>HDMI 1 to HDMI 3</b>	x = 0	x = 1 to 5
<b>DisplayPort</b>	x = 0	x = 1 to 5
<b>VGA</b>	Not applicable	x =1 to 5

The commands to select the audio **input sources** are as follows:

RS232 Command	Response	External Input
<b>s hdmi1 audio x!</b>	hdmi1 audio x	Select audio source x for HDMI1 input. x = 1 to 5
<b>s hdmi2 audio x!</b>	Hdmi2 audio x	Select audio source x for HDMI2 input. x = 1 to 5
<b>s hdmi3 audio x!</b>	Hdmi3 audio x	Select audio source x for HDMI3 input. x = 1 to 5
<b>s dp audio x!</b>	dp audio x	Select audio source x for the DisplayPort input. x = 1 to 5
<b>s vga audio x!</b>	vga audio x	Select audio source x for the VGA input. x = 1 to 5

Use the following RS232 commands to obtain the **current status** of the desired audio function:

RS232 Command	Response	Function
<b>r mixer!</b>	Current mixer setting	Read the mixer status
<b>r auto vol!</b>	Current mixer auto volume setting	Read the volume level for the 'mixer auto' mode
<b>r fade in time!</b>	Current fade in time	Read the auto mixer fade in time
<b>r fade out time!</b>	Current fade out time	Read the auto mixer fade out time
<b>r out vol!</b>	Current output volume level	Read the output volume level

RS232 Command	Response	Function
<b>r mic vol!</b>	Current microphone volume level	Read the microphone volume level
<b>r hdmi1 audio!</b>	Current audio input for HDMI 1 input	Return the audio input source for HDMI 1
<b>r hdmi2 audio!</b>	Current audio input for HDMI 2 input	Return the audio input source for HDMI 2
<b>r hdmi3 audio!</b>	Current audio input for HDMI 3 input	Return the audio input source for HDMI 3
<b>r dp audio!</b>	Current audio input for the DisplayPort input	Return the audio input source for the DisplayPort
<b>r vga audio!</b>	Current audio input for the VGA input	Return the audio input source for the VGA

## IP Settings

The following RS232 commands allow the **IP settings** to be set to ne values:

RS232 Command	Response	Function
<b>s ip mode 1!</b>	ip mode static	Set IP mode to static
<b>s ip mode 2!</b>	ip mode DHCP	Set IP mode to DHCP
<b>s ip addr xxx.xxx.xxx.xxx!</b>	xxx.xxx.xxx.xxx	Set the IP address to xxx.xxx.xxx.xxx
<b>s subnet xxx.xxx.xxx.xxx!</b>	xxx.xxx.xxx.xxx	Set the IP subnet mask to xxx.xxx.xxx.xxx
<b>s gateway xxx.xxx.xxx.xxx!</b>	xxx.xxx.xxx.xxx	Set the IP subnet mask to xxx.xxx.xxx.xxx
<b>S port pppp!</b>	tcp/ip pppp	Set the TCP/IP port to pppp

Attempting to set the IP address, subnet mask and gateway address while DHCP is ON will return the response `DCHP ON`.

Use the following commands to obtain the current values for the IP settings:

RS232 Command	Response	Function
<b>r ip mode!</b>	ip mode static ip mode DHCP	Return the current IP mode
<b>r ip addr!</b>	xxx.xxx.xxx.xxx	Return the current IP address
<b>r subnet!</b>	xxx.xxx.xxx.xxx	Return the current subnet mask value
<b>r gateway!</b>	xxx.xxx.xxx.xxx	Return the current gateway IP address
<b>r port!</b>	tcp/ip pppp	Return the current TCP/IP port number

## System Commands

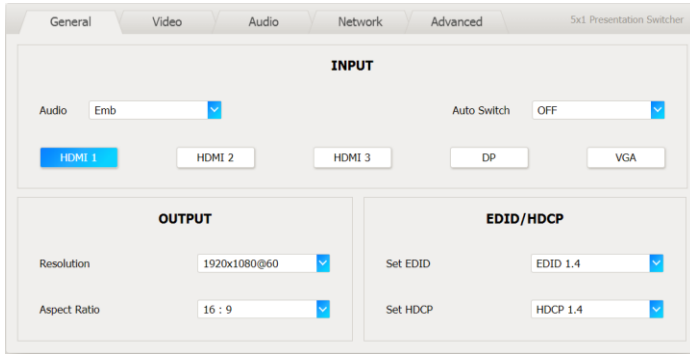
The following RS232 commands change various system parameters and should only be used when necessary.

RS232 Command	Response	Function
<b>s factory reset!</b>	factory reset	Return to the default factory status
<b>r version!</b>	Vm.rr	Get the current firmware version number. m = Major version rr = Revision number.
<b>xyz!</b>		Upgrade the switch firmware from the USB port
<b>s power on!</b>	power on	Turn on the MFS51-18G
<b>s power off!</b>	power off	MFS51-18G set to Standby mode
<b>r power!</b>	Depends on power status	Return the current power setting
<b>s lock on!</b>	lock on	Lock the front panel
<b>s lock off!</b>	lock off	Unlock the front panel
<b>r lock!</b>	Depends on panel lock status	Return the current front panel lock setting
<b>s beep on!</b>	beep on	Turn on the button beep
<b>s beep off!</b>	beep off	Turn off the button beep
<b>s sleep time 1!</b> <b>s sleep time 2!</b> <b>s sleep time 3!</b> <b>s sleep time 4!</b> <b>s sleep time 5!</b> <b>s sleep time 6!</b>	Sleep time off Sleep time 15 seconds Sleep time 1 minutes Sleep time 5 minutes Sleep time 15 minutes Sleep time 60 minutes	Set the sleep time for when no input signal is detected
<b>r sleep!</b>	As above	Return the current sleep time
<b>s osd time 1!</b> <b>s osd time 2!</b> <b>s osd time 3!</b> <b>s osd time 4!</b> <b>s osd time 5!</b> <b>s osd time 6!</b>	OSD time out 5 seconds OSD time out 10 seconds OSD time out 15 seconds OSD time out 20 seconds OSD time out 25 seconds OSD time out 30 seconds	Set the ODS time out
<b>r osd time!</b>	One of the above	Get the OSD time out

# Web GUI Control

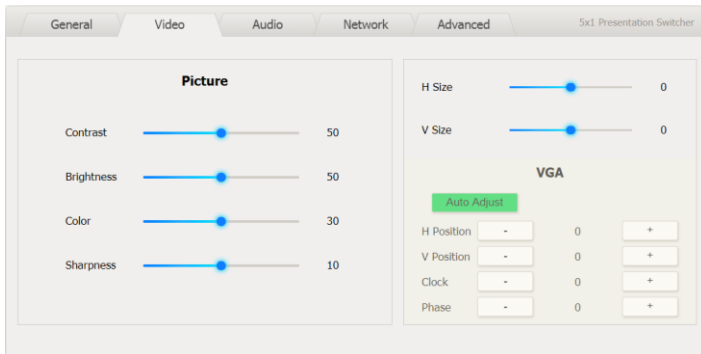
To access the Web GUI simply enter the current IP address of the SY-MFS51-18G and the following page will appear.

## General Page



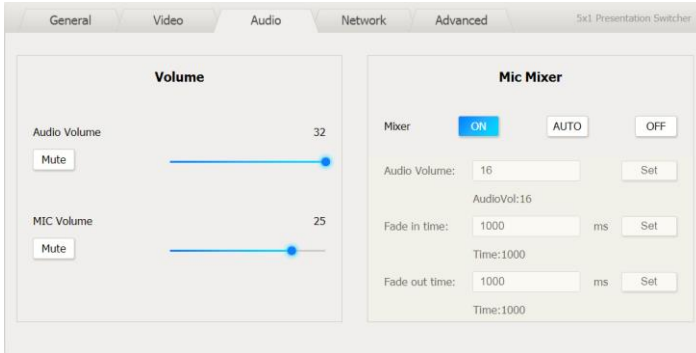
This page provides basic control of the video switcher and audio input selections. Control for output resolution, input aspect ratio, auto switching mode, EDID and HDCP settings are also provided.

## Video Page



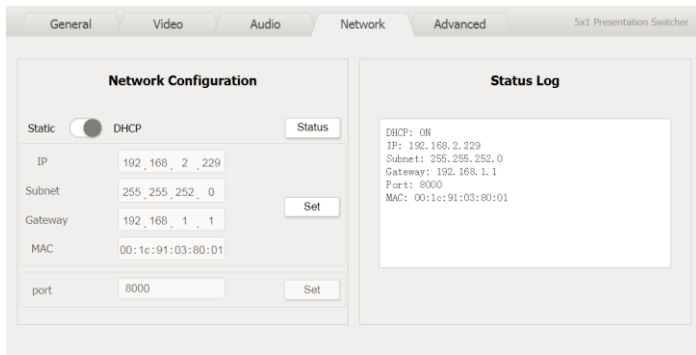
This page allows for adjustment of the output video to the HDMI OUT and HDBT OUT ports. It also permits control over adjustments for the VGA input.

## Audio Page



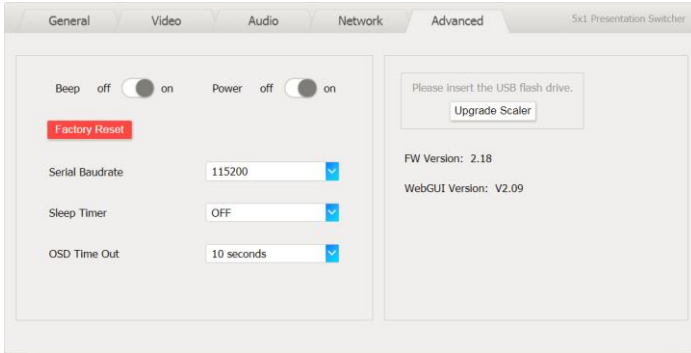
This page is for controlling the audio volume levels and the microphone mixer section. The values in the lower portion of the **Mic Mixer** block can only be changed when the **AUTO** mode is active. The Mic Mixer portion controls the automatic behaviour of the in-built audio ducking function

## Network Page



The network page provides information for the current IP settings. Note that the values in the Network Configuration section can only be changed when the IP mode is set the **Static**. To change the mode, click the sliding button to the preferred setting. Use the **Status** button to refresh to the current settings.

## Advanced Page



This page allows control of the button beep sound, power setting, baud rate, sleep, and OSD timers.

The Factory Reset button will reset the units to the factory defaults, and the Upgrade Scaler button will allow the firmware to be upgraded from the USB memory device connected to the USB port.

The MFS51-18G can always be powered on again by clicking the Power button.

The version numbers given are above illustrative only and do not in any way indicate the correct version numbers.

## Control Page

This page is used to transmit RS232 commands to the HDBaseT receiver to control 3<sup>rd</sup> party equipment.

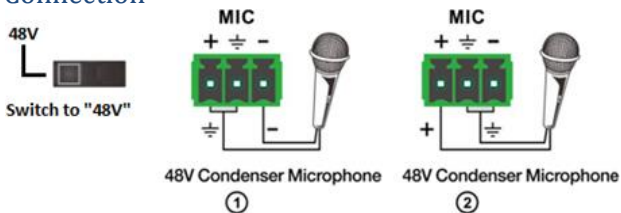
## Connecting a Microphone

The microphone input can be set to microphone level signals with or without phantom power, or for line level signals (no phantom power). Always choose the most appropriate mode for the signal input level and microphone type being connected to the MFS51-18G.

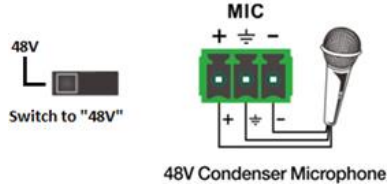
### 48V Mode

This mode provides 48V for phantom powering of condenser type microphones.

#### Unbalanced Connection



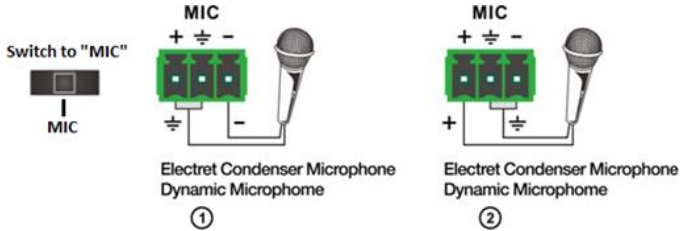
## Balanced Connection



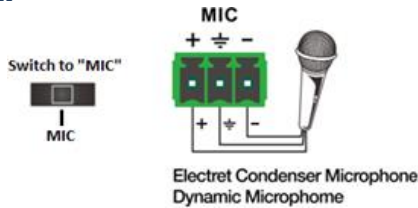
## MIC Mode

The MIC mode is used for self-powered electret condenser or dynamic microphones.

### Unbalanced Connection



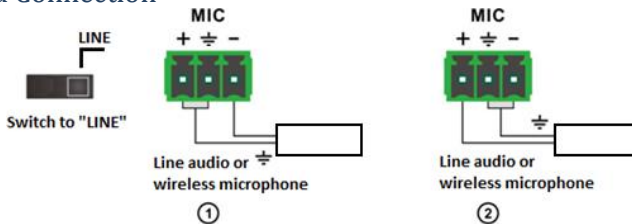
### Balanced Connection



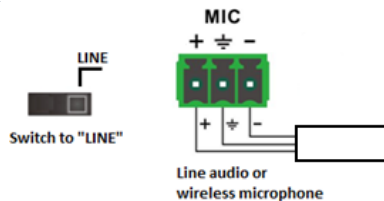
## Line Mode

The LINE mode is for line level audio signals, for example, a wireless microphone.

### Unbalanced Connection



### Balanced Connection







# Specifications

## General

<b>HDMI and DisplayPort Video Inputs</b>	VESA and SMPTE 480p to 2160p with 3D. All HDMI resolutions to 3840x2160p @60Hz 4:4:4  480p@60Hz                      576p@50Hz                      720p@60Hz 1080p@24Hz                    1080p@50Hz                    1080p@60Hz 4K@24Hz                         4K@30Hz                         4K@60Hz 4:4:4  All PC resolutions to 1920x1200 @60Hz
<b>VGA Video Input</b>	Up to 1920x1200 @60Hz
<b>Embedded Audio Format</b>	LPCM 2 channel
<b>Analogue Audio Input</b>	Stereo L+R, 3 way pluggable terminal block. 20Hz – 20kHz, 1.5Vrms max.
<b>HDMI Version</b>	2.0b
<b>DisplayPort Version</b>	1.2a
<b>HDCP Input Version</b>	1.4, 2.2
<b>HDCP Output Version</b>	1.4, 2.2, pass through
<b>HDMI Output</b>	4K2K 25/30 (4:4:4)            1080p 50/60                    720p 50/60 1920x1200 60                    1680x1050 60                    1400x1050 60 1360x768 60                      1280x800 60                    1024x768 60
<b>HDBaseT Transmission Distance (maximum)</b>	4K30 4:4:4 – 40m 1080p60 – 70m
<b>HDBaseT Bandwidth</b>	10.2 Gbps max.
<b>Control Ports</b>	RS232, IR, WebGUI and External pushbutton panel
<b>RS232 Settings</b>	Factory default: 115200, 8 bits, no parity, 1 stop bit Also provides the following baud rate settings: 4800, 9600, 19200, 38400, 57600 and 115200
<b>Control Connectors</b>	1x Built-in IR sensor, 3-pin pluggable terminal block for RS232 1x HDBaseT output with PoC
<b>Power Supply</b>	24V DC @ 1.25A max.
<b>Power Consumption</b>	9W max. (Main unit – add extra for HDBaseT receiver)

## Environmental

<b>Operating Temperature</b>	-10 to +40°C (+14 to +104°F)
<b>Operating Humidity</b>	10 to 90 % RH (non-condensing)
<b>Weight</b>	1250 g

## Physical

<b>Dimensions (WxHxD)</b>	220 x 150 x 44mm
<b>Case Material</b>	Aluminium chassis

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## 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 this product 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.