



OMEGA 3

User Manual

MFS31-H

Multi-format Switcher with dual HDBaseT and a HDMI 2.0 inputs

2x HDBaseT and 1x HDMI inputs, with HDMI output

Supporting:

HDMI 2.0, Down-Scale, EDID & HDCP control, Test-Pattern,
Audio de-embed, CEC & Temperature control, Diagnostics, iPoC

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Thank you for purchasing the MFS31-H (Omega 3) Multi-format Switcher.

This product is designed with professional AV installers in mind. The many extensive features assist with system integration, validation and maintenance. Please carefully read this manual prior to installation and keep for future reference. You can download further supporting documentations from our web site (sy.co.uk)

Installation precautions

This product has special circuitry to protect it against moderate surges and static discharges. However, to ensure reliable operation and long service life, it is important to take the necessary precautions against any spikes, surges, lightening and static discharges.

Place the unit away from heat sources and allow adequate ventilation.

Shielded cables and in particular cat6, cat6a or cat7 are highly recommended. As much as possible cables should be routed away from any noisy sources and avoiding long runs in close proximity to mains cables.

The MFS31-H is an HDBaseT/HDMI switcher supporting 2 HDBaseT and 1 HDMI inputs, with HDMI output. De-embedded audio is available as both S/PDIF optical Mini-Toslink as well as analogue L/R outputs.

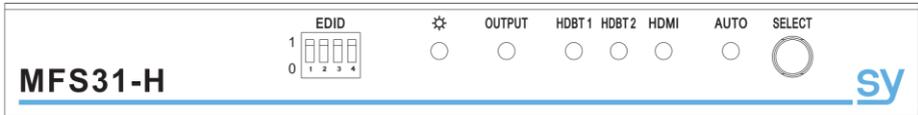
It accommodates pass-through RS232 protocol with the selected HDBaseT transmitter, as well as separate RS232 port for controlling the MFS31-H features.

Features

- Supports HDMI 2.0 (4K60 4:4:4) 18G
- HDBaseT cable length to 70m @1080p, 40m @4K
- Supports EDID and HDCP control
- Many features: Test Patterns, 4K down-scale, Video Keep Alive, CEC control, etc
- Over-temperature control and protection
- Auto / Manual Switch
- Audio extraction to Mini-Toslink and 3.5mm L/R outputs
- RS232 control as well as Pass-through RS232
- 48V power supply with iPoC - Can power the remote HDBT transmitters

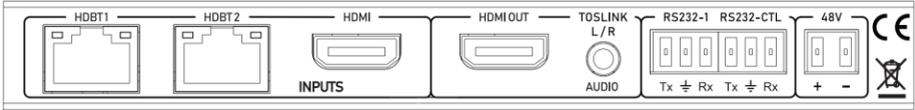
Connectors and Controls

Front



Name	Description
EDID Switch (Position 1234) (0 = down, 1 = up)	0000 – auto 0101 - 1080P60-2.0 1010 - 1680x1050
	0001 - 4K60-2.0 0110 - 1080P60-5.1 1011 - 1600x1200
	0010 - 4K60-5.1 0111 - 720P60-2.0 1100 - 1440x900
	0011 - 4K30-2.0 1000 - 1024x768 1101 - 1360x768
	0100 - 4K30-5.1 1001 - 1920x1200 1110 - Manual
	1111 - Test Pattern
Power LED	Lit when the unit is powered
OUTPUT LED	Lit when active HDMI signal on the HDMI output
HDBT 1 LED	Lit when current source HDBT 1 Selected If no signal, the LED will flash once every second
HDBT 2 LED	Lit when current source HDBT 2 Selected If no signal, the LED will flash once every second
HDMI LED	Lit when current source HDMI Selected If no signal, the LED will flash once every second
AUTO	Lit when auto source selection is activated
SELECT	Brief press: Select the input sources Long press (~ 3 seconds): Toggle between AUTO / Manual modes

Rear



Name	Description
HDBT 1	HDBaseT input 1 from upstream transmitter
HDBT 2	HDBaseT input 2 from upstream transmitter
HDMI IN	HDMI input from external source
HDMI OUT	HDMI output to display device
Audio (de-embed)	<ul style="list-style-type: none">L/R Analogue Audio Output 3.5mm Stereo Jack. 20Hz – 20kHz, 1.5Vrms maxMini- Toslink – Optical S/PDIF Audio Output
RS232-1	Pass-through RS232 commands with the selected HDBaseT transmitter
RS232-CTL	RS232 control port for controlling the MFS31-H
48V	Two way 3.5mm phoenix connector. 24 to 48V supply input

Using the MFS31-H

Connect the desired video sources (HDBaseT / HDMI) to MFS31-H input ports and connect the display device to the HDMI output port. If needed, user can also connect any optional inputs and outputs such as audio and RS232 port. Power up the device by connecting the 48V power adaptor into MFS31-H 48V port.

NOTE: There is no need to power either of the HDBaseT transmitters alone, as MFS31-H support iPoC function and can supply power to the remote transmitters (SY-HDBT-70-SP-T).

RS232 Commands

The ASCII commands given in this section use the following RS232-CTL port settings:

Baud Rate: 57600
Data Bits: 8
Parity: None
Stop Bits: 1

Notes:

- All commands in this section are always terminated with the ASCII carriage-return character, 0x0d. This is represented by the ↵ symbol in each command.
- All responses are always terminated with the ASCII carriage-return character, 0x0d.
- All spaces shown in the command are required. Lowercase letters are used as value placement indicators, the required value or identifier is given in the **Details** panel for each command.

HELP Command

Command Send	Command Receive
<code>GET OMEGA HELP ↵</code>	Get the current board command list

Output HDCP Commands

The following commands used to select the HDMI output HDCP modes:

Command	Details
<code>SET OMEGA HDCP-OPTION w ↵</code>	w is one of following characters FOLLOW-INPUT (default) FORCE-1.4 FORCE-2.2 FORCE-OFF
<code>GET OMEGA HDCP-OPTION ↵</code>	Get the current HDCP mode

4K Down-Scaling

Compatibility with 1080p display units is assured by down-scaling any 4K (24/25/30/50/60Hz) signal to 1080p. All 1080p or less signals are simply passed through.

For 4K display requirements, 4K60 4:4:4 (or 4K50 4:4:4) input signals can be down-scaled to 4K50/60 4:2:0, ensuring the 10.2Gbps maximum output bandwidth is not exceeded (Max. 40m). All lower bandwidth signals (< 10.2Gbps) such as 4K30 4:4:4, 1080p are just passed through.

Four options are available to allow handling of 4K HDMI signals:

- Scale down to 1080p
- Convert to 4K60-4:2:0
- Auto: the system analyses the capabilities of the displayer to decide on the best option.
- Off (default value): Pass input to output directly

The following command selects the 4K60 handling mode:

Command	Details
<code>SET OMEGA 4K-HANDLE w ↵</code>	w is one of following options: 4K60-420 1080P AUTO OFF (default)
<code>GET OMEGA 4K-HANDLE ↵</code>	Get the current 4K handling mode

Video Keep-Alive

There are 2 options to handle the condition when there is no signal from the selected input:

- Output current Test Pattern – Maintain output Video stream (Video Keep-Alive)
- No timing output (default) – No output video; hence video drop-out

The following command selects the VKA modes:

Command	Details
SET OMEGA NO-SIGNAL-HANDLE TEST-PATTERN ↵	Output Test Pattern when no input signal
SET OMEGA NO-SIGNAL-HANDLE NO-TIMING ↵	No output when no signal – VKA off (default)
GET OMEGA NO-SIGNAL-HANDLE ↵	Get the current No Signal Handling mode

Test Pattern

The test pattern mode of the MFS31-H is useful for testing the HDMI output to the display device. Two options are available and both must be specified in the command:

- Pattern
- Resolution

Command	Details
SET OMEGA TEST-PATTERN x y ↵	x is Pattern - select one of following options: BLACK, RED, GREEN, BLUE, WHITE, RED_RAMP, GREEN_RAMP, BLUE_RAMP, PRBS, RAMP, STRIPE, CHECKER-BOARD (default) y is Resolution - select one of following options: 4K60, 4K30, 4K25, 4K24, 1080P60, 720P60
GET OMEGA TEST-PATTERN ↵	Get the current Test Pattern mode

Setting Auto or Manual Switching Mode

The switching mode command sets the following options:

- Manual: Inputs can be selected by briefly pressing the “Select” button.
- Auto: Auto selects when new active input detected. When currently selected input video is lost, it will select the next available. Also, only active inputs can be selected using the “Select” button.

Command	Details
SET OMEGA SWITCH-MODE MANUAL ↵	Manual switching mode selected (default)
SET OMEGA SWITCH-MODE AUTO ↵	Auto switching mode selected
GET OMEGA SWITCH-MODE ↵	Get the current switch mode

Input Selection

The MFS31-H inputs can be selected with one of the following three options:

- HDMI-INPUT
- HDBT1-INPUT
- HDBT2-INPUT

Command	Details
SET OMEGA MANUAL-SWITCH-MODE w ↵	w is input, select one of following options: HDMI, HDBT1, HDBT2
GET OMEGA MANUAL-SWITCH-MODE ↵	Get the current Manual switch mode

Diagnostic Commands

Diagnostic tools such as Cable Length, Signal Error, Link/Signal Status, Test Pattern, Voltage Values, are most useful during installation, using a PC (or laptop) together with an RS232 interface (or USB to RS232 dongle).

As well as these, other diagnostic commands such as, Input HDMI signal details, Pulse HPD, Temperature values, can be invaluable for overall system fault finding and trouble shooting.

Diagnostic Commands	Details
Cable length (Currently selected HDBT input)	
<code>GET OMEGA CABLE-LENGTH</code>	<code>GET OMEGA CABLE-LENGTH wM</code> , w=20,30...70
Link/Signal Status (Currently selected HDBT input)	
<code>GET OMEGA LINK-STATUS</code>	Returns HDBT link on or link off status
<code>GET OMEGA SIGNAL-STATUS</code>	Returns HDBT signal on or signal off status
Signal Error (Currently selected HDBT input)	
<code>GET OMEGA SIGNAL-ERROR</code>	<code>GET OMEGA SIGNAL-ERROR w</code> , w=1, 2, 3...
Input Signal Details (Currently selected input)	
<code>GET OMEGA INPUT-HDMISIGNALS</code>	Get the currently selected input signals information. Resolution, Hz, Colour depth, HDR, HBR,
Pulse HPD	
<code>SET OMEGA PULL-HPD</code>	Forces HDMI HPD low for 200ms on MFS31-H
Voltage Value	
<code>GET OMEGA SUPPOC-VOLTAGE</code>	Get the current TX Supply & iPoC Voltages
Temperature Read	
<code>GET OMEGA CPU-TEMP</code>	<code>GET OMEGA CPU-TEMP wC</code> , where w is the temperature For example, <code>GET OMEGA CPU-TEMP 48C</code> means 48°C

- **Cable Length:** cat6 cable length between 20-70m is reported back
- **Link Status:** Indicates the Transmitter/Omega3 units are intercommunicating correctly.
- **Signal Status:** Indicates video signal activity on HDMI input / Output
- **Signal Error:** Indicative of cat6 signal line quality
- **Input Signal details:** Detailed information about the selected input video signals, such as: Resolution, Refresh Rate, Colour Depth, HDR Setting, Compressed Audio Setting, Audio Rate, Audio Channels, HBR and HDCP.
- **Pulse HPD:** This command forces the HDP line low for 200mS, which has a similar effect as HDMI cable disconnection/reconnection.
- **Voltage Value:** Power supply voltage level measurement is reported.
- **Temperature Read:** Internal temperature closest to the main heat source can be read. This temperature will be higher than the device surface temperature.

CEC Commands

The following group of RS232 commands are only possible with display devices that support CEC commands. Use the [Error! Reference source not found.](#) **Connection Status** RS232 command to determine the CEC capability when the display device is fully powered.

CEC commands are most useful when it is not practical to use RS232 connection to the display.

CEC Commands	Details
Display On	
<code>SET OMEGA DISPLAY-ON↵</code>	Set Display to the ON state
Display Off	
<code>SET OMEGA DISPLAY-OFF↵</code>	Set Display into the standby state
Volume Increase	
<code>SET OMEGA CEC-VOLDEC↵</code>	Increase sound volume
Volume Decrease	
<code>SET OMEGA CEC-VOLDEC↵</code>	Decrease sound volume
Volume Mute	
<code>SET OMEGA CEC-MUTE↵</code>	Mute/Unmute sound volume (Toggle)
Display Connection Status	
<code>GET OMEGA READ-DISPLAY↵</code>	Get the current Connected/Disconnected info
Display Power Status	
<code>GET OMEGA DISPLAY-POWER↵</code>	Get the current display device power on/off info

Set Safety Temperature

The following command sets the Power Off, Warning, and Re-Power temperatures. There is also a command to enable or disable this feature:

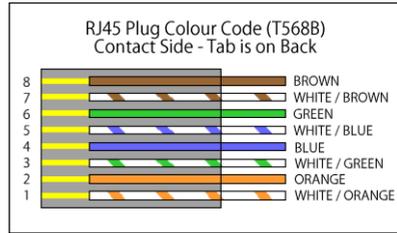
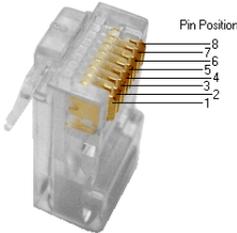
Command Send	Details
<code>SET OMEGA SAFE-TEMP-ONOFF ON↵</code>	Enable MFS31-H safety temperature handling
<code>SET OMEGA SAFE-TEMP-ONOFF OFF↵</code>	Disable MFS31-H safety temperature handling
<code>GET OMEGA SAFE-TEMP-ONOFF↵</code>	Get current OMEGA SAFE-TEMP-ONOFF state
<code>SET OMEGA SAFE-TEMP-VALUE x y z↵</code>	Set shut down temperature x Set warning temperature y Set re-power temperature z Default: x=75, y=70, z=65 (°C) x>y>z>55
<code>GET OMEGA SAFE-TEMP-VALUE↵</code>	Get the current OMEGA safety temperature values

Note:

MFT31-H is designed to power the remote transmitters (iPoC capable) using the provided 48V PSU. It can also power non iPoC transmitters by using appropriate 24V PSU. The MFT31-H can't be powered by the remote transmitters.

RJ-45 Wiring

Both connectors must be wired identically.



HDBaseT signals will NOT pass through any Ethernet device. The HDBaseT ports on this device must be connected directly to the HDBaseT port of the remote Transmitters.

Please do make sure that the Cat6 cable uses 4 pairs of 23AWG solid copper wires. Do not use inferior copper clad cables as these exhibit much higher resistances.

Specifications

General

HDMI Version	Input: HDMI 2.0 - HDR (10, 12) and HBR supported
Max Bandwidth	HDMI Input: 18 Gbps (4K60 4:4:4) HDBT input: 10.2 Gbps (4K60 4:2:0, 4K30 4:4:4) HDMI output: 18 Gbps (4K60 4:4:4)
HDCP Compliance	Input HDCP: 1.4 and 2.2 Output HDCP: Fully controlled – Pass, 1.4, 2.2, Cascade mode
RS232 (Control Commands – Tx, Rx)	57600 baud, 8 data bits, 1 stop bit, no parity
RS232 (Pass-Through – Tx, Rx)	Any baud rate to maximum of 115200.

Video and Audio

Video Formats Supported	All VESA resolutions to 4096x2160p, and all 3D formats – Examples: 4096x2160p 24/25/30/50/60Hz 3840x2160p 24/25/30/50/60Hz 2560x1440 50/60Hz 2048x1152 50/60Hz 1920x1080p 24/25/30/50/60Hz 1920x1080i 50/60Hz 1280x720p 50/60Hz
	All PC resolution including 1920x1200 – Examples: 1920x1200 60Hz 1680x1050 60Hz 1600x1200 60Hz 1440x900 60Hz 1400x1050 60Hz 1366x768 60Hz 1360x768 60Hz 1280x1024 60Hz 1280x960 60Hz 1280x800 60Hz 1024x768 60Hz
Colour space	RGB, YCbCr 4:4:4, 4:2:2, 4:2:0
Colour depth	8, 10, 12 bits
Output video Formats	Supports all video formats as per input or as set by the Scaler.
Audio Format Supported	2.0 / 5.1 / 7.1 channel LPCM, Dolby, AC3, DTS
Audio output (Analogue)	L/R 3.5mm Stereo Jack: 20Hz – 20kHz, 1.5Vrms max.
Mini-Toslink Output	Supports all de-embedded digital formats

Power Supply

Power Consumption	9W max.
Supply Voltage	48V/0.5A (supply voltage range 24-48V)

Environmental and Physical

Operating Temperature Range	0 to +40°C (+32 to +104 °F)
Operating Humidity Range	10 to 90 % RH (non-condensing)
Dimensions (L x W x H)	163 x 90 x 20 mm (excluding connectors)
Mass (Main Unit)	0.5kg

Package Contents

Item	Qty
MFS31-H unit	1
3 pin female captive screw connector	2
48V/0.5A Power Adapter With interchangeable fittings for UK, EU and US	1

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. Do not operate these products outside the specified temperature and humidity range given in the above specifications.
2. Ensure that these products are adequately ventilated to allow them to operate efficiently as these products do generate heat during normal operation.
3. 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.
4. 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 years 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.