SY-MMU 4K Matrix Switcher Range

Installation Guide

8 x 8 Matrix Switcher
16 x 16 Matrix Switcher
32 x 32 Matrix Switcher
64 x 64 Matrix Switcher

4K HDMI, DVI, HDBT, SDI, VGA,
Component, Composite and Fibre
Mixed Input to Output Matrix

Configurable Multi-Format 4K Matrix Switchers

SY-MMU-88A / 1616 / 3232 / 6464

The SY-MMU-88A, SY-MMU-1616, SY-MMU-3232 and SY-MMU-6464 are a range of 4K matrix switchers that offer the ultimate versatility and flexibility in a single unit. Each matrix has customisable input and output signal combinations that can switch any signal source to any type of display interface. All inputs and outputs videos can be on any of the following combination: HDMI, DVI, SDI, HDBT, VGA, Component video and Composite video.

Features

- The SY-MMU range supports HDMI and HDBT video sources and displays up to 4K resolution
- Up to 8, 16, or 32 inputs (from media players, blue-ray players, … sources)
- Up to 8, 16, or 32 outputs (to displays, projectors, …)
- Multi-Format input and output combinations – HDMI, DVI, VGA, HDBT, SDI Video, …
- The input and output video cards provide connections in multiples of four for each video type
- HDMI 1.4a, DVI 1.1 compatible – HDCP compliant, supports 3D and up to 4Kx2K resolution
- Hot- pluggable Input / Output video ports
- Any Input type to any Output type
- Control from front panel, IR remote control, RS232 commands or Ethernet IP
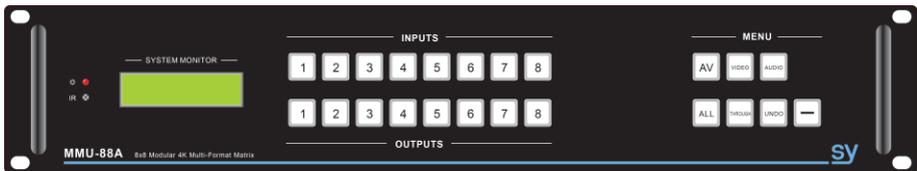- Wide-range high reliability AC supply – 100 to 240 VAC

Connectors and Controls

Front

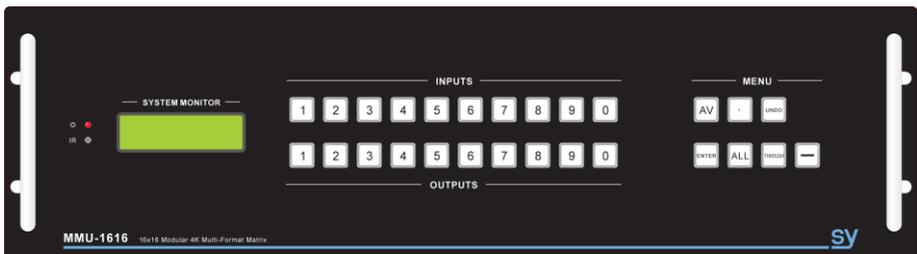

Figure 1 – SY-MMU-88A Matrix Switcher

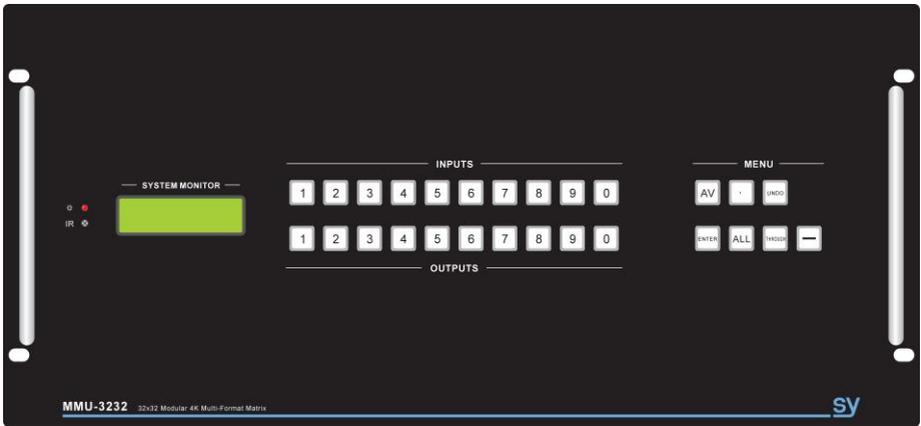Figure 2 - SY-MMU-1616 Matrix Switcher

SY-MMU-88A / 1616 / 3232 / 6464

Figure 3 - SY-MMU-3232 Matrix Switcher

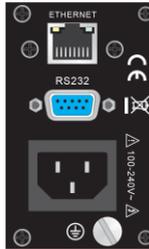| Name	Description
Power LED	Indicates power is present
IR Sensor	Receives IR commands from the remote controller
System Monitor	LCD for Command Enter and Status Information
Input Select	Selection buttons for input channels
Output Select	Selection buttons for output channels
AV Button	Starts a new Audio & Video selection sequence
Video	Starts a new Video Only selection sequence – **SY-MMU-88A only**
Audio	Starts a new Audio Only selection sequence – **SY-MMU-88A only**
Comma	Separates output selections – **SY-MMU-1616 and higher**
Enter	Completes a new command entry – **SY-MMU-1616 and higher**
All	Sends the selected input channel to all outputs simultaneously or each input channel to its corresponding output channel when used with the **Through** button
Through	Connects each input channel to its corresponding output channel and must be preceded by the **All** button
Undo	Reverts the matrix switcher to is previous configuration
← (Backspace Arrow)	Deletes last key press from current command entry

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Rear

Figure 4 - SY-MMU-88A Control and Power Input Section

Figure 5 - SY-MMU-88A Analogue Audio Input and Output Connections

Name	Description
Ethernet	Interface for network-based control commands
RS232	Interface for RS232 control commands
IEC connector	100 to 240 V AC power (mains) input
Earthing Stud	Earth (ground) bonding point
Audio Inputs	Independent audio inputs on SY-MMU-88A only

Note that the SY-MMU-88A has only one IEC mains connector, whereas all the other Matrix Switchers have two IEC connectors, see below for more details.

Note that the analogue audio switcher section on the SY-MMU-88A does not transfer any audio signals to or from the video switcher section.

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Configuring the SY-MMU Range of Matrix Switchers

The input and output cards requested at time of purchase should already be installed in the matrix switcher upon receipt. If this is not the case please contact your local dealer or SY directly to have this problem addressed.
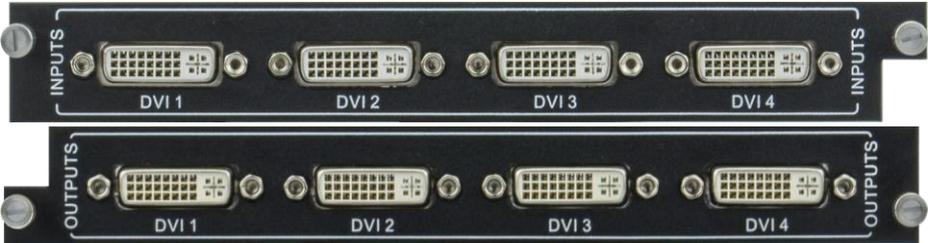

Figure 6 - DVI Input and Output Cards

The input card can either accept HDMI or DVI signals, whereas the output card will output HDMI or DVI signals from any input card.
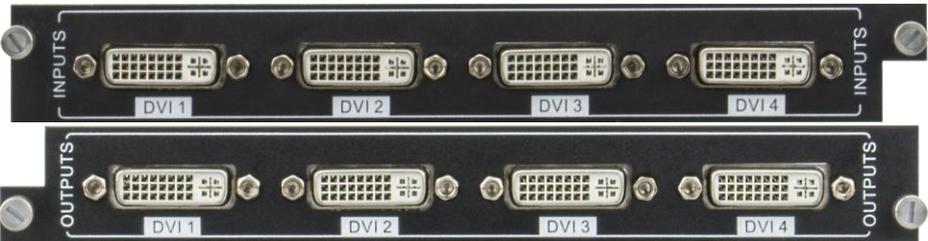

Figure 7 – Seamless DVI Input and Output Cards

The input card can either accept HDMI, DVI, VGA, YPbPr or C-Video signals, whereas the output card will output HDMI, DVI, VGA, YPbPr or C-Video signals signals from any input card. Both these card support seamless switching.

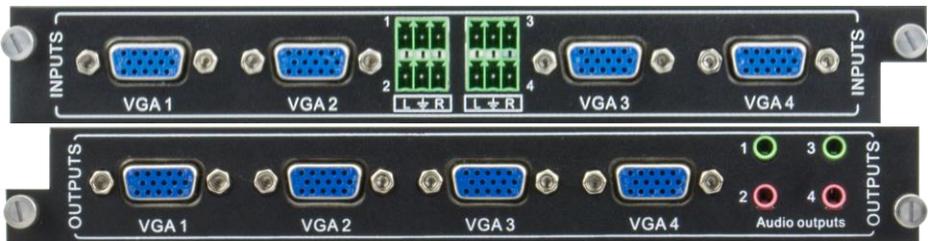
Figure 8 - VGA Input and Output Cards

The input card can only accept VGA, YPbPr, S-Video or composite video signals as well as analogue audio, whereas the output card will only output VGA video and analogue audio signals from any input card.
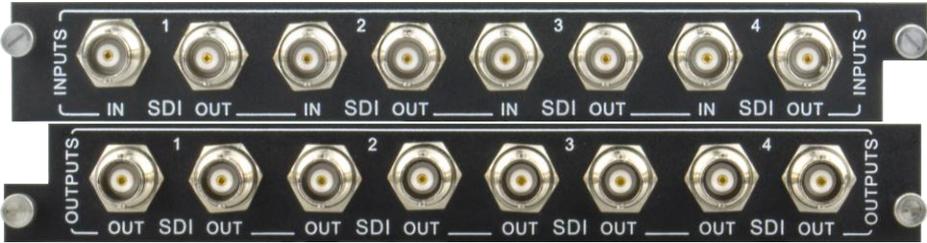
Figure 9 - SDI Video Input and Output Cards

The input card can only accept SDI video signals, whereas the output card will output SDI video signals from any input card.

4Kx2K Input and Output Cards

Any 4K input or output card can be identified by the 4K icon on the outer edge of the connector panel.

Figure 10 - HDMI Input and Output Cards

The input card can either accept HDMI or DVI signals as well as analogue audio, whereas the output card will output HDMI or DVI signals and analogue audio from any input card.
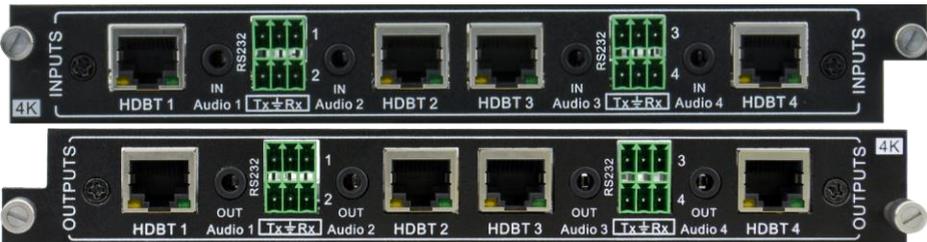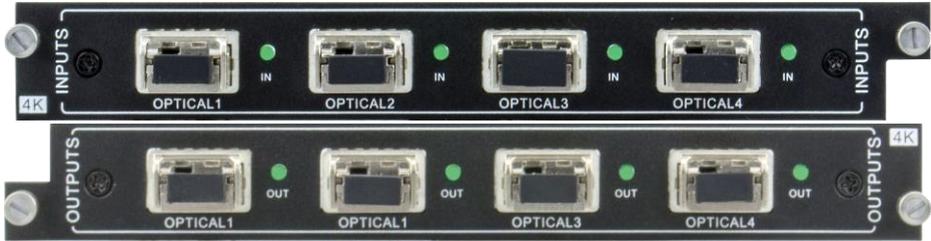

Figure 11 - HDBT Input and Output Cards

The input card accepts HDBT and analogue audio signals, whereas the output card will output HDBT and analogue audio signals from any input card.

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The input card can only accept optical fibre signals, whereas the output card will output optical fibre signals from any input card. Both these cards support single-mode or multi-mode fibre cables terminated in LC fibre connector. The transmission distance is up to 300m when used with OM3 multi-mode fibre.

Using the SY-MMU Range of Matrix Switchers

Connecting the Outputs and Inputs

Connect the input sources to their respective connectors in the INPUT groups and connect the display devices to their respective connectors in the OUPTUT groups. Connect local mains AC voltage supply to the IEC connector(s) and switch it on.

If required, connect either RJ45 Ethernet cable or a RS232 cable from the control panel or control computer to the matrix.

To ensure the safety of the operator, be sure that the earth of the AC input connector is wired to a good local earthing point. Alternatively, connect an earth bonding strap to the earthing point on the rear of the SY Matrix unit and a good local earth point.

SY-MMU-88A Audio Switcher

The SY-MMU-88A matrix switcher features an independent analogue audio switcher. The audio signals routed by this switcher are completely separate to the video switcher section and can be switched independently of the actual video selections. The front panel controls behave as follows:

- The **AV** button changes the selections for both the audio switcher and the video switcher.
- The **Audio** button only changes the routing of the audio switcher without affecting the video switcher.
- The **Video** button changes the routing of the video switcher without affecting the audio switcher.

IEC Connectors

Note that the SY-MMU-88A Matrix Switcher has only a single IEC connector, whereas all the other Matrix Switchers have two IEC connectors. Where there are two IEC connectors provided they should each be connected to different ring or spur circuits such that if one ring or spur were to fail, then the other ring or spur will continue to keep the Matrix Switcher operating.

Using the Front Panel Controls

Making Selections

AV Button

Use the following button sequence to make a video selection: input number, AV then output number or numbers. For example to select input 2 to output 4 press the following buttons: 2 AV 4, where 2 is in the INPUTS group and 4 is in the OUTPUTS group.

Video and Audio Buttons (SY-MMU-88A Only)

Note that the SY-MMU-88A Matrix switcher also has Video and Audio buttons, these can be used to independently switch only the video signal or only the audio signal where these signals are provided separately. HDMI signals have embedded audio data and therefore the HDMI audio will always switch with the video selection. The Audio button only affects analogue audio signals connected to the terminal block connections below the video input and output cards.

Operation is exactly the same as for the AV button.

Backspace, Comma and Enter Buttons

For the SY-MMU-1616 and SY-MMU-3232, there is both a comma button and an Enter button. The comma button is used to separate the output channel values when a single input is being sent to multiple outputs simultaneously in the same command.

The Backspace (←) button deletes the last key entry to allow the user to make corrections to the command being entered at the front panel, prior to pressing the Enter button.

The Enter button on these same Matrix Switchers is always used to conclude every command entry that require numerical input.

All and Through Buttons

The All button has two modes:

1. Send a single input to all outputs simultaneously: for example, **10 ALL** will route input 10 to all available outputs.
2. When combined with the Through Button the Matrix switcher will connect each input channel to its corresponding output channel, thus: input 1 goes to output 1, input 2 goes to output 2, input 3 goes to output 3, and so on. The button sequence is **All** followed by **Through**.

Undo Button

The Undo button causes the Matrix Switcher to revert to the input / output configuration it had prior to the last command sent to it.

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Using IR Remote Controls

Point the IR remote control key pad at the SY-MMU Matrix Switcher and use the key pad buttons in the same sequence as for using the front panel controls.

RS232 Control Commands

The following RS232 commands provide control of the SY-MMU range of 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.

All the punctuation characters shown in the RS232 command are part of the command and must be included when sending the command.

Action	Command	Response
Check the matrix type	`/*Type;`	Returns the SY Matrix model number
Lock the front panel buttons	`/%Lock;`	`System[spc]Locked![cr][lf]`
Unlock the front panel buttons	`/%Unlock;`	`System[spc]Unlocked![cr][lf]`
Check the software version	`/^Version;`	Returns the installed software version
Turn response messages off	`/:MessageOff;`	`Closed[cr][lf]`
Turn response messages on	`/:MessageOn;`	`Enabled[cr][lf]`
Revert to the previous switch state	`Undo.`	`Undo[cr][lf]`
Enable Demo mode	`Demo.`	`Demo[cr][lf]`
Restore the factory default EDID data	`EDIDMInit.`	`EDIDMInit[cr][lf]`
Copy the EDID data for output o to input i	`EDIDMoBi.`	`EDIDMoBi[vr][lf]`
Enable automatic HDCP management	`HDCPON.`	`HDCPON[cr][lf]`
Disable automatic HDCP management	`HDCPOFF.`	`HDCPOFF[cr][lf]`
Bring the Matrix Switcher out of standby mode	`PWON.`	`PWON[cr][lf]`
Set the Matrix Switcher to standby mode	`PWOFF.`	`PWOFF[cr][lf]`
Set all outputs to input **x** (where **x** is the input number)	`xAll.`	
Set each output to its corresponding input number	`All#.`	
Switch off all outputs	`All$.`	
Set a single output (**x**) to its corresponding input channel	`x#.`	
Switch off a single output (**y**)	`y$.`	

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Action	Command	Response
Select an Audio inputs (**x**) to a single output (**y**) (Note 3) (**x** is the input number, **y** is the output number)	`xAy.`	
Select an Audio input (**x**) to multiple outputs (**y, z**) (Note 3) (**x** is the input number, **y** and **z** are the output numbers) More outputs may be specified if required	`xAy,z.`	
Select both Audio and Video input (**x**) to a single output (**y**) (**x** is the input number, **y** is the output number) (Note 4)	`xBy.`	
Select both Audio and Video input (**x**) to multiple outputs (**y, z, …**) (**x** is the input number, **y** and **z** are the output numbers) More outputs may be specified if required, each separated by a comma. (Note 4)	`xBy,z.`	
Select Video input (**x**) to a single output (**y**) (Note 3) (**x** is the input number, **y** is the output number)	`xVy.`	
Select Video input (**x**) to multiple outputs (**y, z**) (**x** is the input number, **y** and **z** are the output numbers) More outputs may be specified if required, each separated by a comma. (Note 3)	`xVy,z.`	
Check the status of input channel **x**	`Statusx.`	
Check the status of the matrix switches	`Status.`	
List all output channel assignments for input **x**	`CheckInputx.`	
Save the current matrix settings to preset **p** (**p** is in the range 0 to 9)	`Savep.`	
Set the matrix to the setting in preset **p** (**p** is in the range 0 to 9)	`Recallp.`	
Clear the stored setting in preset **p** (**p** is in the range 0 to 9)	`Clearp.`	

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Action	Command	Response
Check the resolution for the signal at input **x**	`ResolutionGx.`	
Set the VGA card input to VGA mode for input **x**	`USER/I/x:0622%;`	`0622%[cr][lf]`
Set the VGA card input to YPbPr mode for input **x**	`USER/I/x:0623%;`	`0623%[cr][lf]`
Set the VGA card input to S-Video mode for input **x**	`USER/I/x:0624%;`	`0624%[cr][lf]`
Set the VGA card input to Composite mode for input **x**	`USER/I/x:0625%;`	`0625%[cr][lf]`
Set the VGA card input resolution to 1024 x 768 for input **x**	`USER/I/x:0626%;`	`0626%[cr][lf]`
Set the VGA card input resolution to 1080 x 720 for input **x**	`USER/I/x:0627%;`	`0627%[cr][lf]`
Set the VGA card input resolution to 1080 x 800 for input **x**	`USER/I/x:0628%;`	`0628%[cr][lf]`
Set the VGA card input resolution to 1920 x 1080 for input **x**	`USER/I/x:0629%;`	`0629%[cr][lf]`

Notes:

1. Value place holders **p, x, y** and **z** should be replaced with the actual input and/or output numbers required for the RS232 command.
2. When selecting multiple outputs for an input, each output must be separated by a comma (**,**) and may appear in any order.
3. The A command is only supported by the SY-MMU-88A Matrix Switcher.
4. The B command (Select both Audio and Video) is the only video selection command that is compatible to all matrix switchers in the SY-MMU range.
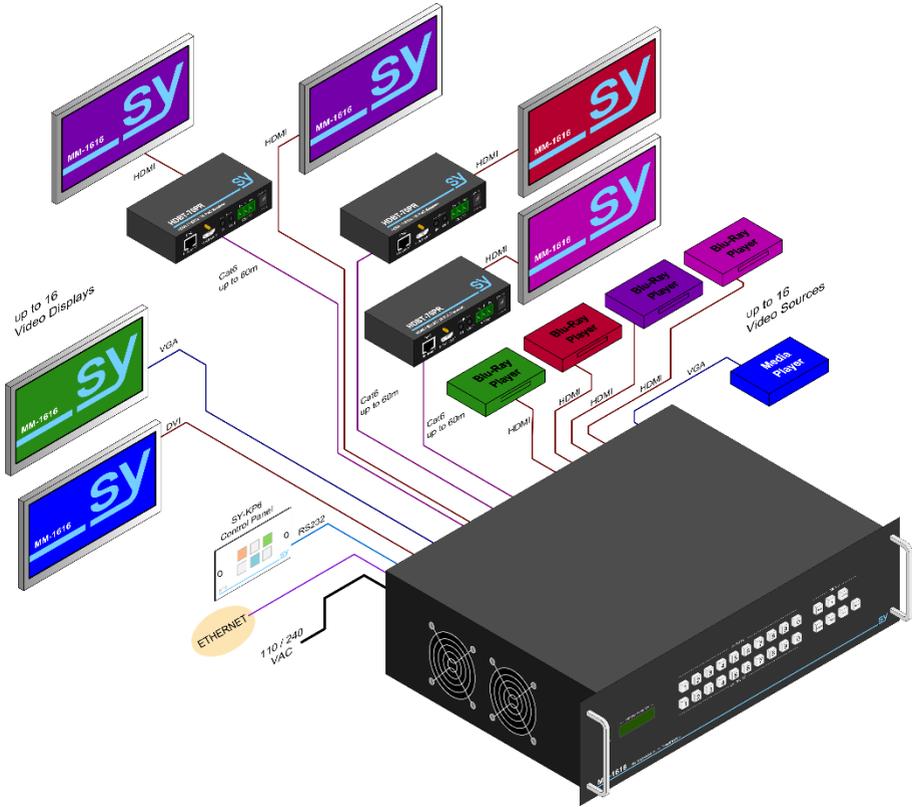
Figure 12 – SY-MMU-1616 Connection Diagram

SY-MMU-88A / 1616 / 3232 / 6464

Specifications

General

HDMI/ DVI Resolutions	480i, 480p, 720i, 720p, 1080i, 1080p, 1920 x 1200			
HDMI Standard	HDMI 1.4a – Supports 3D			
DVI Standard	DVI 1.0			
VGA Format / Resolutions	VGA-UXGA (1024 x 768 to 1920 x 1080p), RGBHV, RGBS, RGsB, RsGsBs, component video (YPbPr), S-video & composite video.			
SDI Video Resolutions	SMPTE 292M, SMPTE 259M, SMPTE 424M, ITU-RBT.601, ITU-RBT.1120			
RS232	9600, 8 data bits, 1 stop bit, no parity – No handshaking			
Power Supply	100 / 240V AC, 50 / 60 Hz			
Power Consumption	SY-MMU-88A	SY-MMU-1616	SY-MMU-3232	SY-MMU-6464
	50 W	80 W	150 W	200 W

Environmental

Operating Temperature	0 - 40 °C non condensing

Physical

All the matrix switchers in the SY-MMU range are full width 19in rack mounting with integral fixing holes and handles.

Product	SY-MMU-88A	SY-MMU-1616	SY-MMU-3232	SY-MMU-6464
Width	483 mm (19")	483 mm (19")	483 mm (19")	483 mm (19")
Height	88 mm (2U)	133 mm (3U)	219 mm (5U)	438 mm (10U)
Depth	320 mm	320 mm	320 mm	320 mm
Weight (with no input or output cards installed)	3 kg	3.5 kg	5 kg	8 kg
Weight (with All input and output cards installed)	6.5 kg	10.5 kg	19 kg	36 kg

Please note that the empty frame weight stated is significantly less than the fully loaded Matrix Switcher. With all the video input and output cards installed the total weight will increase significantly. Therefore, the SY-MMU-3232 and the SY-MMU-6464 Matrix Switchers must only be handled with proper observance of the relevant Manual Handling and Lifting Regulations for your locality.

SY-MMU-88A / 1616 / 3232 / 6464

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. Online registration of this product is required to activate the full three year extended warranty. 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.

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