



# User Manual

## **SY-MSU-121**

### **12 Input (10x HDMI + 2x VGA) Presentation Scaler Switch**

HDMI Input Resolutions up to: 4K30 444 or 4K60 420

The SY-MU-121 is a high-performance presentation switcher with output scaling. This switcher is designed for HDMI and computer graphics signals having 10 HDMI and 2 VGA input ports. The inputs are switched to both the outputs simultaneously (mirrored outputs). The switcher can be controlled from the front panel, RS232, LAN, IR or by contact closure.

## Features

- 10 HDMI inputs and 2 VGA inputs
- HDMI input resolutions up to 4K30
- Compliant to HDMI 1.4 and HDCP
- VGA input resolutions up to 1900x1200 60Hz
- Two scalable mirrored HDMI outputs
- Analogue audio output to 3.5mm jack and 5-way pluggable terminal connector.
- OSD menu for easy configuration

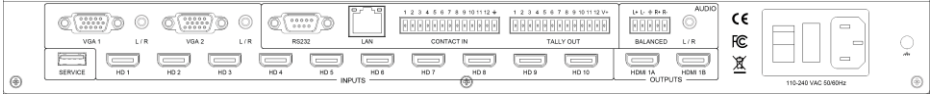
## Panel Descriptions

### Front Panel



Name	Description
<b>POWER LED</b>	Blue LED indicates that the unit is powered Red LED indicates that the unit is in standby mode
<b>IR Sensor</b>	IR input for remote control of the switcher
<b>HD1 to HD10, VGA1 and VGA2</b>	Input selection buttons
<b>MENU</b>	Opens the on-screen menu system
<b>ENTER</b>	Use in the menu to accept a change
<b>Arrow Buttons</b>	Use in the menu to navigate to the desired option
<b>LOCK</b>	Toggles the front panel LOCK/UNLOCK status

## Rear Panel



Name	Description
<b>HD1 to HD10</b>	HDMI inputs 1 to 10
<b>VGA1 and VGA 2</b>	VGA inputs with 3.5mm stereo analogue audio jack
<b>RS232</b>	RS232 control port (DE-9)
<b>LAN</b>	RJ45 for network control
<b>CONTACT IN</b>	Push button contacts for selecting the inputs
<b>TALLY OUT</b>	May be used to provide annunciator feedback for the push buttons
<b>HDMI A and HDMI B</b>	Mirrored HDMI outputs
<b>SERVICE</b>	For service personnel only.
<b>Power Input</b>	IEC power input connector (type C17)
<b>Earthing Stud</b>	Used to bond the case to a good local earthing point

## Using the SY-MSU-121

### Making Connections

- Connect and required input signal sources.
- Connect a display device to HDMI A and/or HDMI B (both will show the same image).
- Connect to a control port (RS232 and/or LAN).
- Connect the power input to a mains outlet and switch on the unit.

### Selecting Inputs

Once the SY-MSU-121 is connected up, use the front panel button to select the available inputs.

### Front Panel Lock/Unlock

The front panel may be locked to prevent accidental usage by pressing the **LOCK** button until it lights up. To unlock the front panel, press the LOCK button again until its LED goes out.

### Using the Menu System

The SY-MSU-121 has an on-screen menu system to allow configuration of the switcher. To access the menu, press the MENU button, then use any of the four arrow buttons to navigate the menu screens. Use the ENTER to accept any changes made to the currently selected option.

The following menu options are available:

Menu Item	Menu Item Options		
<b>Picture Mode</b>	Standard	Default setting	
	Dynamic User	Manual adjustment of colour, brightness and contrast	
<b>Colour Temperature</b>	Medium	Default setting	
	Cool User		
	Warm		
<b>Noise Reduction</b>	Off	Default setting	
	Low		
	Middle		
	High		
<b>Resolution</b>	1080p60	Default setting	
	720p60		
	1024x768 60Hz	1440 x 1050 60Hz	
	1280x1024 60Hz	1440 x 900 60Hz	
	1360 x768 60Hz	1600 x 1200 60Hz 1680 x 1050 60Hz	
<b>Screen</b>	Auto Adjust On/Off	Only available for VGA inputs	
	Auto Adjust		
	Horizontal Position		
	Vertical Position		
	Size Phase		
<b>HDCP</b>	Input Ports:	Only available for HDMI inputs	
	<b>On</b>		Default setting
	<b>Off</b>		
	Output Ports:		
	<b>On</b>	Default setting	
	<b>Off</b>		
	<b>Follow Input</b>		
<b>Software Update (USB)</b>	See the next section for details on how to perform a software update.		

## Upgrading the Built-In Firmware

1. Copy the **MERGE.BIN** file to the root folder of a USB stick.
2. Plug the USB stick into the **SERVICE** USB port on the rear panel.
3. Use the front panel to access the menu and select the **Software Update (USB)** item.
4. Wait for the update to complete.
5. Use the PC tool to send a **RESET** command to the SY-MSU-121 to restore the factory defaults.

### Important:

**DO NOT** power down the SY-MSU-121 during the update process.

**DO NOT** press any buttons while the update process is in progress.

# RS232 Control

The RS232 port uses the following settings:

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

Each command in the following sections are given in hexadecimal notation and only the values shown are required for each command.

## Selecting the Inputs

The following commands are used to select the individual inputs:

Input	RS232 Command
HDMI 1	7B 7B 01 02 00 01 F4 7D 7D
HDMI 2	7B 7B 01 02 01 01 F5 7D 7D
HDMI 3	7B 7B 01 02 02 01 F6 7D 7D
HDMI 4	7B 7B 01 02 03 01 F7 7D 7D
HDMI 5	7B 7B 01 02 04 01 F8 7D 7D
HDMI 6	7B 7B 01 02 05 01 F9 7D 7D
HDMI 7	7B 7B 01 02 06 01 FA 7D 7D
HDMI 8	7B 7B 01 02 07 01 FB 7D 7D
HDMI 9	7B 7B 01 02 08 01 FC 7D 7D
HDMI 10	7B 7B 01 02 09 01 FD 7D 7D
VGA 1	7B 7B 01 02 0A 01 FE 7D 7D
VGA 2	7B 7B 01 02 0B 01 FF 7D 7D

## EDID Setting Commands

The following commands set the EDID options:

EDID Option	RS232 Command
Auto	7B 7B 14 01 00 05 7D 7D
Manual	7B 7B 14 01 01 06 7D 7D
Predefined	7B 7B 14 01 02 07 7D 7D

Each of the above options provides the functions described below:

EDID Option	Description
AUTO	Copy the EDID of the display device to the HDMI/VGA inputs.
MANUAL	Select the user defined EDID, this may need to programming first using the RS232 control software.
PREDEFINED	The inputs will use the default EDID settings

## Factory Reset

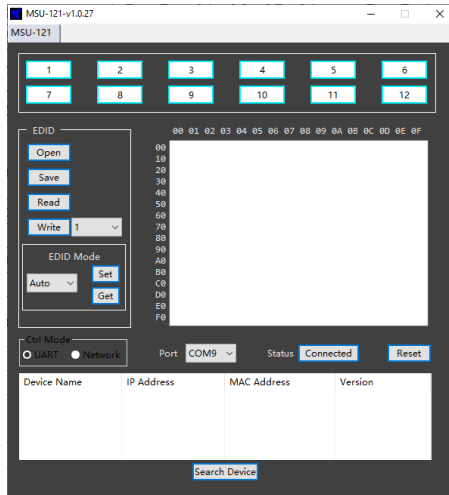
This command will reset the SY-MSU-121 back to its factory defaults.

Action	RS232 Command
Factory Reset	7B 7B AA 02 01 01 9E 7D 7D

This command should be used with extreme caution and only when absolutely necessary.

# Using the RS232 Control Software

The SY-MSU-121 may also be controlled using PC software:

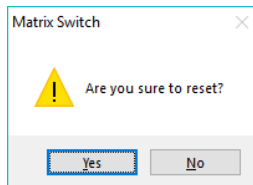


The 12 numbered buttons along the top select each of the inputs. The EDID panel allows for reading or writing EDID binary image files to or from the SY-MSU-121. One of the three EDID modes may also be set: Auto, Manual or Predefined.

The PC software permits control of the SY-MSU-121 either from the serial port or via a LAN connection. Use the **Search Device** button in **UART** mode button to obtain the IP address of the SY-MSU-121 via the RS232 connection. Once the IP address is known, Network control is possible by selecting the **Network** option.

The **Status** button shows the Connected/Disconnected status of the selected communication mode.

The **Reset** button is used to reset the SY-MSU-121 to its factory defaults. This action will only take place when the **Yes** button on the following pop-up window:

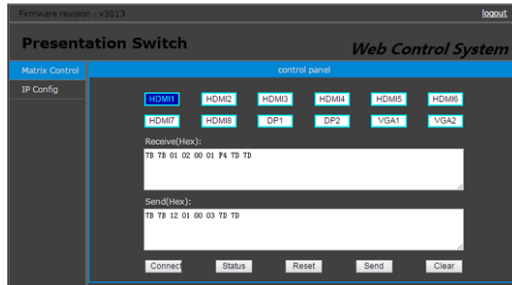


## Using the Built-In Web Interface

To open the built-in web interface, enter the IP address of the SY-MSU-121 into a web browser. The log in window should appear if logging in is required, the default credentials are as follows:

User Name: admin  
Password: admin

After successfully logging in, the following control panel should be displayed:



The 12 buttons at the top select each of the inputs.

The **Receive(hex)** and **Send(hex)** provide show the commands and their responses.

The Connect button can be used to Connect or Disconnect the communication link with the SY-MSU-121.

The **Reset** button is used to reset the SY-MSU-121 to its factory defaults. Confirmation is required before the reset action is taken.

The Send button allows an RS232-style control command to be transmitted to the SY-MSU-121. The Clear button simply clears the **Receive(hex)** and **Send(hex)** boxes.

# Specifications

## Video

<b>Video Input</b>	<p>All HDMI resolutions to 3840x2160p 30Hz 4:4:4 or 3840x2160p 60Hz 4:2:0</p> <p>4096x2160p 24/25/30 (HDMI Only)</p> <p>3840x2160p 24/25/30 (HDMI Only)</p> <p>1080p 24/25/30/50/60Hz</p> <p>1080i 50/60Hz</p> <p>1920x1200 60/65/75Hz</p> <p>1680x1050 60/75Hz</p> <p>1600x1200 60/65/70/75Hz</p> <p>1600x1024 60/75Hz</p> <p>1600x900 60/75Hz</p> <p>1440x900 60/75Hz</p> <p>1400x1050 60/75Hz</p> <p>1366x768 60Hz</p> <p>1360x768 60Hz</p> <p>1280x1024 60/72/75/85Hz</p> <p>1280x960 60/75/85Hz</p> <p>1280x800 60/75Hz</p> <p>1280x768p 50/60/75Hz</p> <p>1280x720p 25/30/50/60/75Hz</p> <p>1024x768p 60/70/75/85Hz</p> <p>800x600p 60/72/75/85Hz</p> <p>720x576p 60Hz</p> <p>640x480p 60/65/85Hz</p>
<b>Video Output</b>	<p>1920x1080p 60Hz</p> <p>1680x1050 60Hz</p> <p>1600x1200 60Hz</p> <p>1400x1050 60Hz</p> <p>1400x900 60Hz</p> <p>1360x768 60Hz</p> <p>1280x1024 60Hz</p> <p>1280x720p 60Hz</p> <p>1024x768p 60Hz</p>
<b>HDMI Version</b>	HDMI 1.4
<b>HDMI Bandwidth</b>	18Gbps
<b>HDCP Version</b>	HDCP 1.4



## Audio

<b>Audio Input</b>	L+R 3.5mm Stereo Jack. (for VGA inputs only) 20Hz – 20kHz, 1.5Vrms max.
<b>Audio Output</b>	Unbalanced L+R 3.5mm Stereo Jack. Balanced L+R 5-way pluggable terminal connector 20Hz – 20kHz, 1.5Vrms max.

## Control and Power

<b>Control Ports</b>	RS232, IR or LAN
<b>RS232 Settings</b>	57600, 8 bits, no parity, 1 stop bit
<b>Power Supply</b>	110~240V AC
<b>Power Consumption</b>	25W max. (17W Nominal)

## Environmental

<b>Operating Temperature</b>	0 to +40°C (+32 to +104°F)
<b>Operating Humidity</b>	10 to 50 % RH (non-condensing)
<b>Weight</b>	3kg

## Physical

<b>Dimensions (WxHxD)</b>	430 x 44 x 220 mm (19in 1U rack mounting)
<b>Case Material</b>	Steel chassis

## Package Contents

Item	Qty
<b>SY-MSU-121 unit</b>	1
<b>SY-MSU-121 User Manual</b>	1
<b>Rack mounting brackets</b>	2 (already fitted)
<b>5 way pluggable terminal connector</b>	1
<b>13 way pluggable terminal connector</b>	2
<b>AC Power cord (IEC 60320 C13)</b>	1

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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 this device while powered, please observe the following instructions.

1. This product is powered directly from a mains outlet. **DO NOT** open this product as doing so will increase the risk of electrical shock.
2. Do not operate either of 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 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 this product 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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