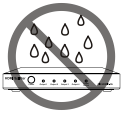
MX-0804-SCL

12 Slot Seamless Modular Matrix

User Manual

Version: V1.0.0

Important Safety Instructions



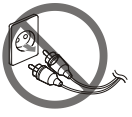
1. Do not expose this apparatus to rain, moisture, dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the apparatus.

6. Clean this apparatus only with dry cloth.

2. Do not install or place this unit in a bookcase, built-in cabinet or in another confined space. Ensure the unit is well ventilated.

7. Unplug this apparatus during lightning storms or when unused for long periods of time.

3. To prevent risk of electric shock or fire hazard due to overheating, do not obstruct the unit's ventilation openings with newspapers, tablecloths, curtains, and similar items.



8. Protect the power cord from being walked on or pinched particularly at plugs.

4. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9. Only use attachments / accessories specified by the manufacturer.

5. Do not place sources of naked flames, such as lighted candles, on the unit.

10. Refer all servicing to qualified service personnel.

Table of Contents

Introduction

Overview

This product is a 12-slot modular switching matrix which is configured to have 8x HDMI input and 4x output boards. All inputs and outputs support resolutions up to 4K@60Hz 4:4:4 8bit and compliant with HDCP 2.2. It comes with advanced EDID management to offset conflicts between screens and ensure output of highest resolution compatible to all connected displays. It also features multiple control options, including front panel buttons, IR remote, RS232 and LAN control (Telnet & Web UI).

Designed for 3U rackmount and stand-alone installation, the matrix offers all the convenience, connectivity and versatility expected for a commercial or residential AV environment.

Features

The features are based on an 8x4 matrix installed with 8x HDMI input boards and 4x HDMI output boards.

- 8x HDMI inputs and 4x HDMI outputs support resolution up to 4K@60Hz 4:4:4 8bit and HDCP 2.2.
- Independent embedded 4K full-scale scaler for each output, which can upscale the 1080P input signal to 4K@60Hz 4:4:4 8bit.
- Top-speed seamless switching between HDMI inputs and outputs.
- Support analog audio embedding on each input board
- Support analog and digital audio de-embedding on each output board.
- Advanced EDID Management.
- Multiple control options, including front panel buttons, IR, RS232 and LAN (Web UI &Telnet).

Package Contents

- 1 x Matrix
- 1 x AC Power Cord with only EU Pin
- 1 x IR Remote
- 1 x IR Receiver (38KHz)
- 1 x USB to UART Cable
- 12 x Phoenix Male Connectors (3.5mm, 5 Pins)
- 2 x Mounting Brackets

Specifications

The following specifications are based on an 8x4 matrix installed with:

- 8 x HDMI input boards
- 4 x HDMI output boards

Technical	
Input/Output Ports	• 8 x HDMI IN • 8 x AUDIO IN (Analog audio ports) • 4 x HDMI OUT • 8 x AUDIO OUT (including 4 digital and 4 analog audio ports) • 1 x LAN • 1 x RS232 • 1 x IR EXT. • 1 x EDID DIP Switch • 1 x AC IN
Input/Output Video Type	HDMI with 4K@60Hz 4:4:4 8bit, HDCP 2.2
Input Resolution Supported	VESA: 800x600[8], 1024x768[8], 1280x768[8], 1280x800[8], 1280x960[8], 1280x1024[8], 1360x768[8], 1366x768[8], 1440x900[8], 1600x900[8], 1600x1200[8], 1680x1050[8], 1920x1200[8], 2048x1152[8] SMPTE: 720x480P[7,8], 720x576P[6], 1280x720P[6,7,8], 1920x1080P[6,7,8], 3840x2160[2,3,5,8], 4096x2160[2,3,5,8] 1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = 60 Hz
Input Audio Format	• HDMI: PCM 2.0

Technical	
	• Analog Audio In: PCM 2.0
Output Resolution Supported	VESA: 1024 x 768[8], 1280 x 800[8], 1600 x 1200[8], 1920 x 1200[8] and AUTO (preferred native timing of the display). SMPTE: 1280 x 720[8], 1920 x 1080[8], 3840 x 2160[5], 3840 x 2160[8] 1 = at 23.98 Hz, 2 = at 24 Hz, 3 = at 25 Hz, 4 = at 29.97 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = 60 Hz
Output Audio Format	• HDMI: PCM 2.0 • Digital Audio Out: PCM 2.0 • Analog Audio Out: PCM 2.0
Control Method	IR control, Front panel buttons, RS232, LAN (Telnet API & Web UI)

General	
Operating Temperature/RH	0°C ~ 45°C (32°F ~ 113°F)
Storage Temperature/RH	-20°C ~ 70°C (-4°F ~ 140°F)
Humidity	10% ~ 90%, non-condensing
ESD Protection	Human-body model: ±8kV (air-gap discharge)/ ±4kV (contact discharge)
Power Supply	AC 100~240V 50/60Hz
Power Consumption (max)	135.6W
Dimensions (W x H x D)	440mm x 132.5mm x 432.7mm/17.32” x 5.22” x 17.04” (Without mounting brackets)
Weight	10.9kg/24.03lbs
Rack Space Required	3U

Transmission Distance

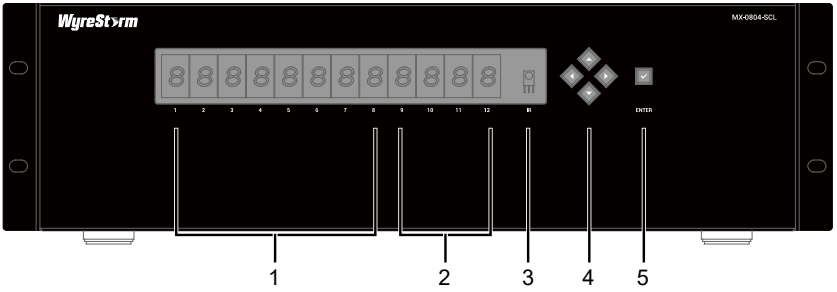
Cable Type	Range	Supported Video
HDMI	Input/Output: 15m/49ft	1080P@60Hz
	Input/Output: 10m/33ft	4K@30Hz 4:4:4 24bpp
	Input/Output: 5m/16ft	4K@60Hz 4:4:4 24bpp

Panel Description

The following panel instructions are based on an 8x4 matrix installed with:

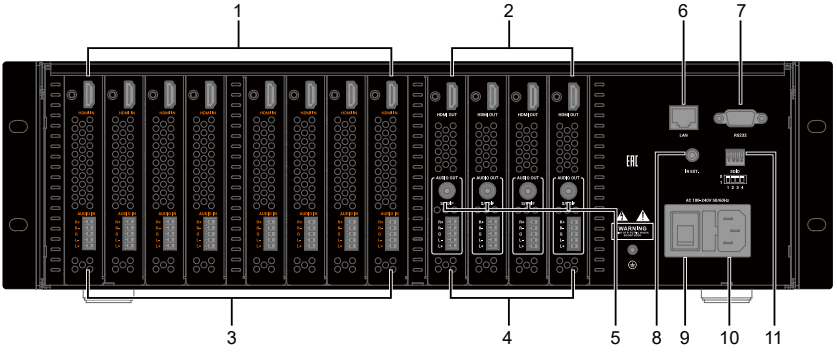
- 8 x HDMI input boards
- 4 x HDMI output boards

Front Panel



No.	Name	Description
1	Input Channel Indicator (1-8)	Indicate the inserted input board status during startup. If the input board is not installed, the corresponding indicator will show “X”, if the input board is installed, the corresponding indicator will show nothing.
2	Output Channel Indicator (9-12)	Indicate input channel selected for each output (1-4).
3	IR	Receive signal from IR Remote.
4	Selection buttons	Select the input and output channels: • **Left**/**Right:** select output channels. • **UP**/**Down:** select input channels.
5	Enter button	Press to implement the input and output selection.

Rear Panel



No.	Name	Description
1	HDMI IN	Connect to HDMI sources.
2	HDMI OUT	Connect to HDMI displays.
3	AUDIO IN	Connect this 5-pin Phoenix female connector to balanced stereo audio source for embedding with the HDMI input.
4	AUDIO OUT	Connect this 5-pin Phoenix female connector to an audio receiver for stereo audio de-embedding output from the HDMI.
5	AUDIO OUT (S/PDIF)	Connect this S/PDIF connector to an audio receiver for digital audio de-embedding output from the HDMI output.
6	LAN	Connect to a control system for Web UI or Telnet API control.
7	RS232	Connect to a control system for API command control.
8	IR EXT.	IR extension port. Connect to the IR receiver cable provided.
9	Power Switch	Press to power on or off the device.
10	Power Input	Connect this input to power supply using the power cord provided.
11	EDID	For EDID management. For more information, please see “EDID Management” section.

Installation and Wiring

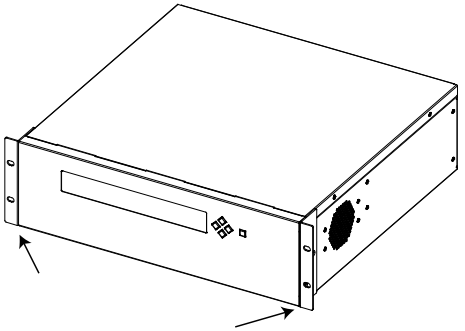
Installation

Note: Before installation, please ensure the matrix is disconnected from the power supply.

The matrix occupies 3U space and can be placed on a solid and stable surface or installed on a standard equipment rack.

To install the matrix on an equipment rack:

1. Position and install the mounting brackets provided to the front panel.



2. Install the matrix in the mounting rack by using the mounting screws to affix the matrix to the rack.

Wiring

The wiring example below is based on an 8x4 matrix installed with:

- 8 x HDMI input boards
- 4 x HDMI output boards

Steps for device wiring:

1. Connect HDMI IN

   Connect the HDMI sources (e.g., PC, Blu-ray player, Apple TV, 4K media player, etc.) to the HDMI IN ports.

2. Connect AUDIO IN

   Connect audio source devices (e.g., microphone, DVD player, etc.). to

the analog AUDIO IN ports.

3. Connect HDMI OUT

   Connect HDMI display devices to the HDMI OUT ports.

4. Connect AUDIO OUT

   Connect audio receiver (e.g., amplifier & speaker system) to the digital or analog AUDIO OUT ports.

5. Connect for additional control options:
   - LAN Control (Telnet/Web UI): Connect the matrix to the same network as the control PC or control system via its LAN port.
   - IR Control: The IR Remote provided is for controlling the matrix through infrared signal. If IR extension is required, connect the IR receiver cable provided to the IR EXT port of the matrix and position the receiver eye in a place accessible to the matrix Remote.
   - RS232 Control: Connect a control PC or control system to RS232 port of the matrix.

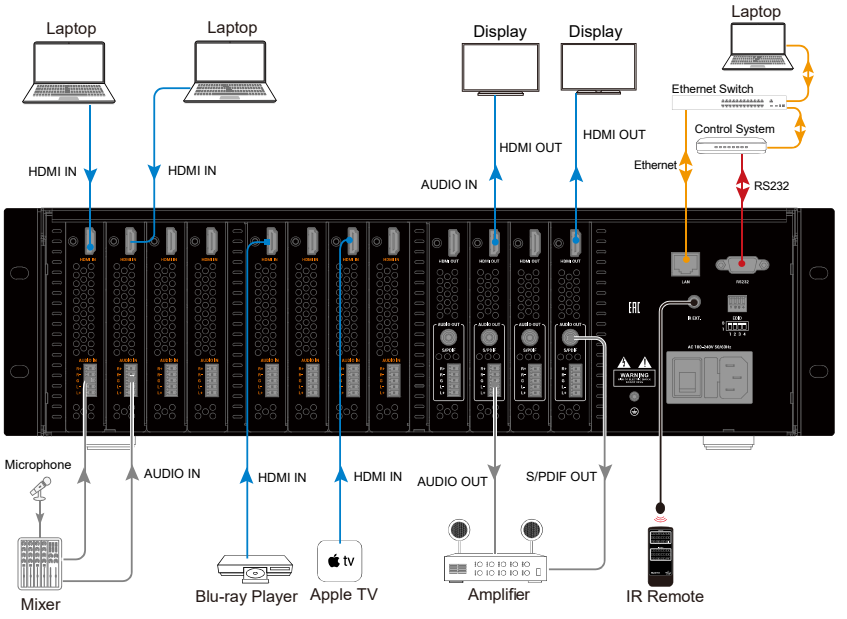
6. Power on: Connect the AC power cord provided and switch on the matrix by pressing the power button (on the rear panel). The front panel LEDs will display “MX-0804-SCL”, then show “I I I I I I I I O O O O” and “1 2 3 4 5 6 7 8 9 10 11 12” alternately.

7. Get ready for operation: When the LEDs 9-12 show the individual input 1-8 selected for each output (1-4) (Note: if the matrix is operated for the first time, the LEDs 9-12 show “1 2 3 4”, the matrix is ready for operation.

Note:

- ALWAYS power off the matrix before plugging or unplugging any cables.
- Please follow the "LAST ON FIRST OFF" rule when turning on and off the system.

Now you can switch between sources and displays by using the matrix through either IR remote, front panel, RS232 or LAN. For more information, please refer to the “Control of the Matrix” section.


Laptop
Laptop
Display
Display
Laptop
Ethernet Switch
Control System
HDMI IN
HDMI IN
HDMI OUT
HDMI OUT
AUDIO IN
Ethernet
RS232
Microphone
AUDIO IN
HDMI IN
HDMI IN
AUDIO OUT
S/PDIF OUT
Mixer
Blu-ray Player
Apple TV
Amplifier
IR Remote

Control of the Matrix

The matrix can be controlled through Front Panel, IR Remote (IR Receiver can be connected when the matrix is less accessible), LAN (Web UI or Telnet) or RS232.

The following sections will explain the basic instructions of the above control methods and are based on an 8x4 matrix installed with:

- 8 x HDMI input boards
- 4 x HDMI output boards

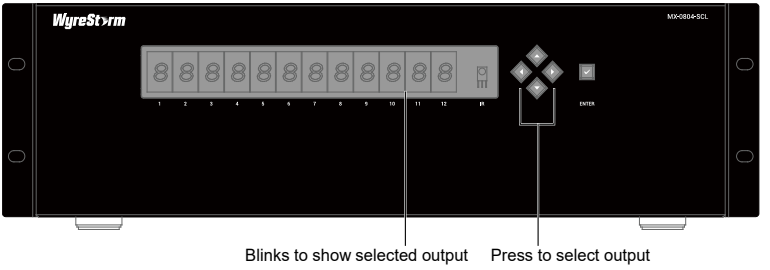
Front Panel Control

Basic switch of input sources to output displays can be achieved by using front panel controls.

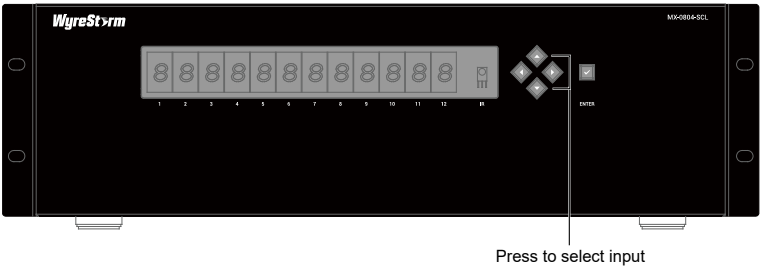
Power on the matrix and wait till the matrix is ready for operation. Now you can select input source for each output.

To select an input for each output:

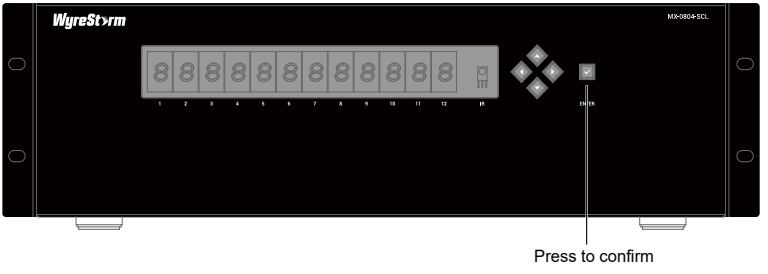
1. Press the Left (◀) or Right (▶) button to select output channel. The LED blinks to show the selected output channel.



2. Press the Up (▲) or Down (▼) button to select input channel. If the LED shows "--", the output is closed.



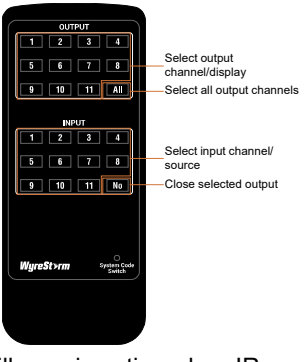
3. Press the Enter (✓) button to confirm the selection. When the selection takes effect the LED stops blinking.



IR Remote Control

The matrix can be controlled by the IR Remote provided. Point the IR Remote directly to the matrix's IR receiving window, you can select input source for each output.

If IR extension is required, connect the IR Receiver to the IR EXT. of the matrix and ensure the receiver is accessible to the Remote.



Please note the IR receiving window of the matrix will remain active when IR Receiver is connected to the matrix.

To select an input source for an output display:

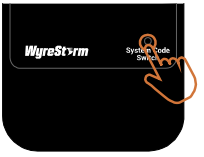
1. Select the target output channel / display from "OUTPUT" or press "All" to select all outputs. The front panel LED flashes to indicate the selected output.
2. Select the target input channel / source from "INPUT" for the selected output(s) or press "No" to turn off the output selected. The flashing LED shows the selected input or "-" in solid state.

For instance, select input 2 for output 1 (the matrix is installed with 8 x HDMI input boards, and 4 x HDMI output boards):

1) Press "1" from "OUTPUT", then the front panel LED 9 flashes.
2) Press "2" from "INPUT", the LED 9 shows "2" in solid state.

System Code Switch

The IR Remote provided with the matrix is shipped in "**00**" IR system code. In the event the Remote's IR signal interferes with other IR devices, e.g., TV, DVD player, the Remote can be switched to "**4E**" code by short-pressing the System Code Switch button. At the same time, you may redefine the IR system code of the matrix using the API commands (please refer to the separate document "*API Command Set_MX-0804-SCL*" to get detail information).



Short press to change the system code of the IR remote.

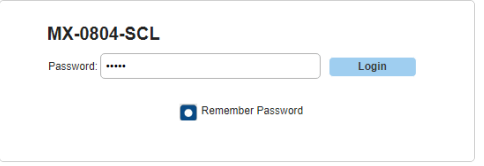
Web UI Control

The Web UI designed for the matrix allows basic controls and advanced settings of the matrix and can be accessed through a browser with latest version, e.g., Chrome, Safari, Firefox, Opera, IE10+, etc.

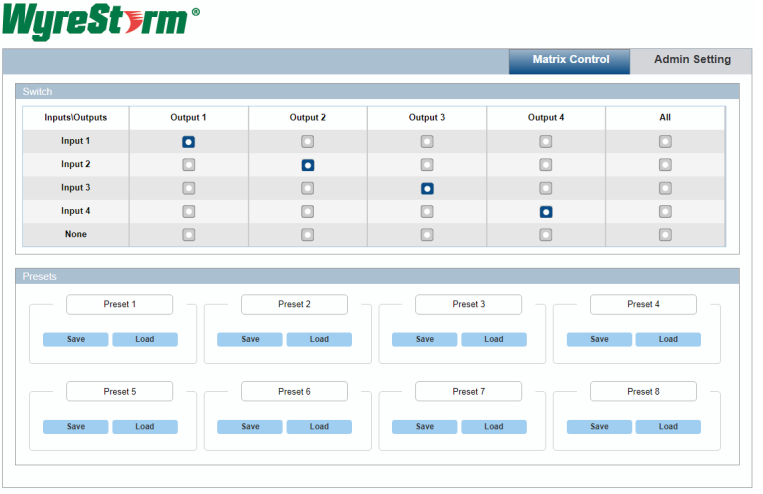
The default IP mode of the matrix is DHCP. Default login password for Web UI is "**admin**".

To get access to Web UI:

1. Connect the LAN port of the matrix to the ethernet switch with DHCP server, and connect the PC to the same ethernet switch.
2. Get the IP address through the tool “SmartSetGUI” or API Commands (see separate document “*API Command Set_MX-0804-SCL*”).
3. Input the IP address obtained in the last step in your browser and press “Enter” key on keyboard. The following page can be access in:



4. Enter password (default password: **admin**) and click Login to enter the main page of Web UI.



The Web UI main page is comprised by matrix Control and Admin Setting pages.

The matrix Control is used for basic setting of the matrix: input and output Switch and Preset save and load.

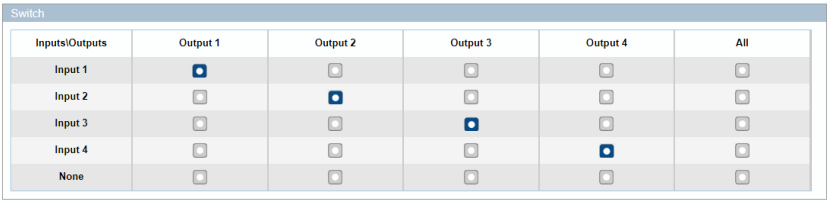
The Admin Setting is designed for advanced controls, e.g., CEC Setting, EDID Setting, Resolution Setting, Audio Input Setting, Port Naming, etc.

Matrix Control

The matrix Control page is used to perform the following functions:

- Switch
- Preset

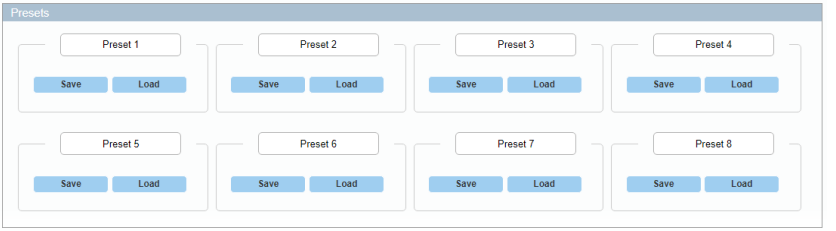
Switch



The Switch section manages distribution of input source to output displays. Click the switch button (turns to) to select the input source for the output display.

- **All:** one input is routed to all outputs.
- **None:** None input is routed to the output (or the output is turned off).

Presets



The Presets section saves or loads the input/output switch settings to or from the matrix.

- **Save:** Input/output settings in the Switch section are saved.
- **Load:** Preset already saved is loaded.

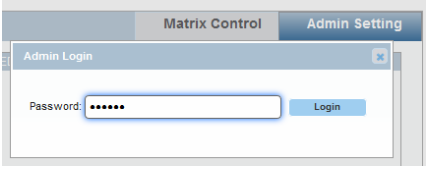
Admin Setting

The Admin Setting page is used for advanced control of the following functions:

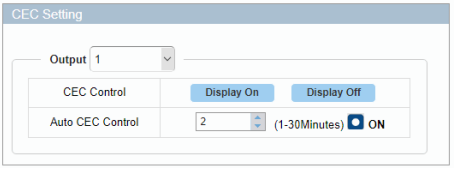
- CEC Setting
- EDID Setting
- Resolution Setting
- Audio Input Setting
- Port Naming
- Preset Name
- Network
- Change Password
- Update Web UI
- Log
- Custom Web UI Logo
- Reset All Settings to Default
- Firmware

To enter the Admin Setting page:

1. Click “Admin Setting” tab on the upper right corner of the page.
2. Enter the password (default password: **123456**).
3. You will be navigated to the main page of Admin Setting.



CEC Setting



CEC Setting allows you to control CEC-enabled devices connected to the matrix through HDMI, without the need of touching the device.

- **Output:** click the drop-down menu to select the output.
- **Display On:** click to power on the display connected to the output selected.
- **Display Off:** click to power off the display connected to the output selected.
- **Auto Control:** click the up/down arrow to set the time for the display to power off automatically when no signal is present. For example, if the time is set to 2 minutes, the output display will power off automatically when there's no signal at the display for 2 minutes.
- **ON/OFF:** click to enable or disable the CEC Auto Control.

Note:

- CEC Setting is valid only when the display connected is CEC-enabled.
- Time range for Auto Control is 0-30 minutes.

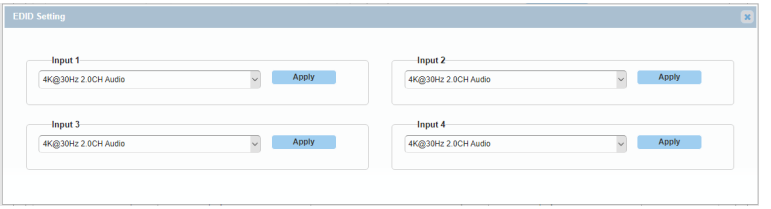
EDID Setting

Click "Enter" to access into the EDID Setting section, where you can configure EDID setting of each input.

To configure the EDID setting of any input through Web UI, please ensure the EDID DIP switch at rear panel of the matrix is set to “0000” (or up position). For more information, please refer to EDID Management Section.

To set up the EDID setting for an input channel:

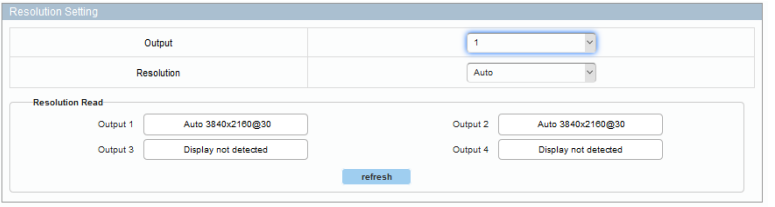
1. Click "Enter" to enter the EDID Setting section.
2. Go to the target input channel and select the settings from its drop-down menu, then click to “Apply”.



Note:

1) The EDID DIP Switch on the rear panel of the matrix must be set to "0000" (or up position). Otherwise, the EDID setting is not configurable (the "Apply" buttons will be greyed out) through the Web UI.
2) By default, the input EDID is 4K@30Hz 2.0CH Audio.

Resolution Setting



Resolution Setting is where resolution can be set for each output channel.

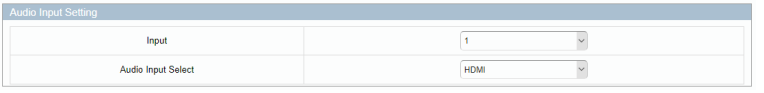
- **Output:** click the drop-down menu to select the output.
- **Resolution:** click the drop-down menu to select the desired resolution for the output.
- **Refresh:** click to refresh resolution value of each output.

Note:

The Resolution Read section shows the results of refresh:

1) If the display connected to the output supports the selected resolution, the output will show "Fix" with selected resolution value.
2) If the display connected to the output fails to be detected, the output will show "Display not detected", like Output 3.
3) If the display connected to the output fails to support the selected resolution, the output will show "Display doesn't support current resolution".
4) If the output is set to "Auto", the output will then show "Auto" with detected resolution value, like Output 1.

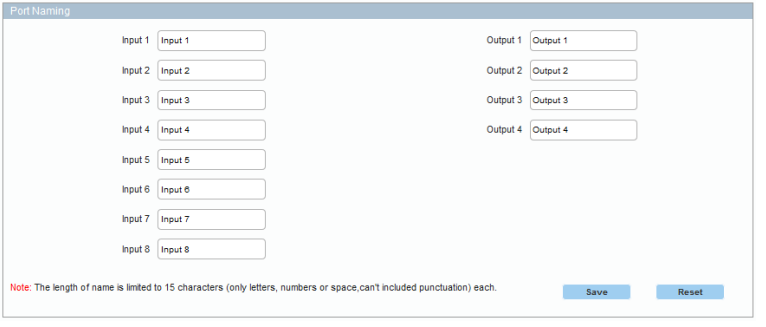
Audio Input Setting



Audio Input Setting is used to set up the audio input signal for each input.

- **Input:** click the drop-down menu to select the input channel you desire to set up.
- **Audio Input Select:** click the drop-down menu to select the audio input source. Options include HDMI and AUDIO IN. By default, it is set to HDMI.

Port Naming

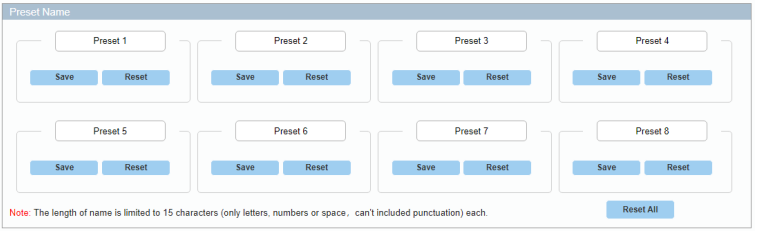


Port Naming allows you to redefine inputs and outputs to names easy to remember.

- **Save:** click to save and apply all the changes.
- **Reset:** click to reset all the changes.

Note: The length of each port name shall not exceed 15 characters and can include letters, numbers, space.

Preset Name



Preset Name allows you to change a preset name to one that is easy to identify or remember, and to apply or reset any preset selected.

- **Save**: click to save the preset name change.
- **Reset**: click to reset the preset changes.

Note: The length of each preset name shall not exceed 15 characters and can include letters, numbers, space.

Network

The Ne is used to toggle between the dynamic and static IP address.

- **DHCP:** when enabled, the IP address of the matrix is assigned automatically by the DHCP server connected.

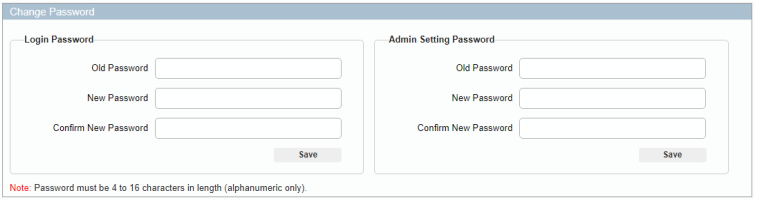
- **Static:** When enabled, set up the IP address manually.
- **Apply:** click to enable the network setting.

By default, the IP mode is set to “DHCP”.

Note:

- When "Static" is selected, please ensure your PC is in the same network segment as the matrix, i.e., the IP address of your PC should be set as 192.168.xx.xxx.
- Please wait for 2-3 minutes for the matrix’s LAN module to reboot and reconnect after the network setting is changed.

Change Password



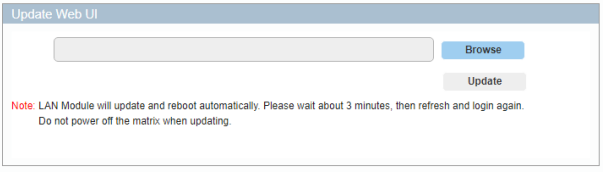
This section is where the Login password and/or Admin Setting Password to be changed. Default Login password is **admin**. Default Admin Setting password is **123456**.

- **Save:** click to save the changes made.

Note: New passwords must contain 4 to 16 characters (alphanumeric only).

Tip: If you have forgotten any of the passwords, use API command to reset the matrix to factory default settings.

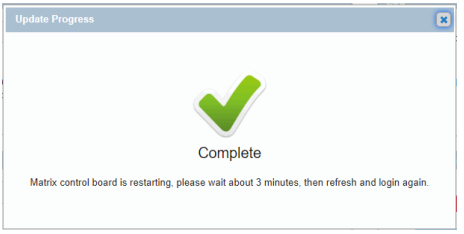
Update Web UI



This section is used to update your Web UI to the latest version. For latest version of Web UI, please contact the product manufacturer or your local dealer.

To update Web UI:

1. Click to "Browse" for the bin file.
2. Click the "Update" button to start upgrading.
3. The following window will pop up to indicate the upgrading is successful.



Note:

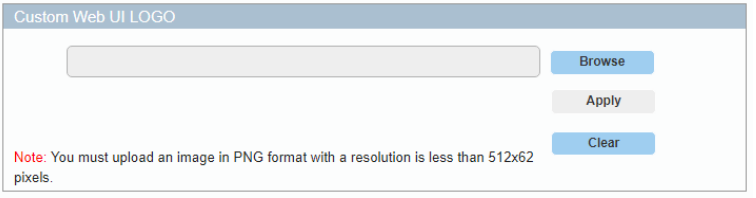
- The matrix's LAN module will update and reboot automatically when Web UI upgrading is completed. Please wait for about 2-3 minutes, then refresh and log in again.
- Please do not power off the matrix during the process of upgrading.

Log

In the Log section, you can select to "Show" or "Hide" the Wed UI setting change records. When "Show" is selected, the log section will be displayed on the bottom of the web page.

By default, log part is set to Hide.

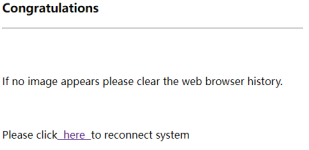
Custom Web UI Logo



Custom Web UI Logo allows you to create your own logo for the Web UI you are using.

To customize a Web UI Logo:

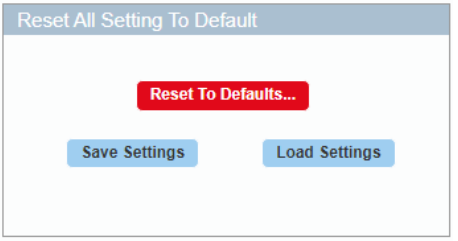
1. Click to "Browse" for the new logo file, then click to "Apply".
2. The following window will appear. Click “here” to reconnect the system.



3. When completed the new logo will appear on the upper left corner of the screen.

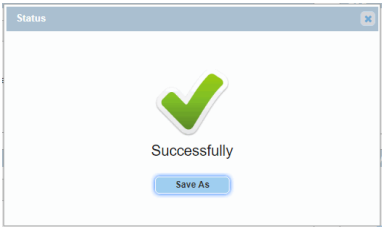
Note: The new logo should be in PNG format and less than 512x62 pixels.

Reset All Settings to Default



Reset All Settings to Default is the section where a setting can be saved to or loaded from a local PC and restore all the settings of the matrix to factory default.

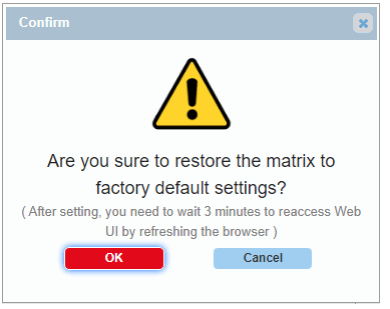
- **Save Settings:** click to save current settings. The following window will pop up, and you can click “Save As” to save the setting file to local PC.



- **Load Settings:** click to load a setting file from local PC to the matrix.

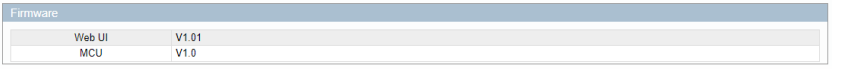
To reset the matrix to default settings:

1. Click "Reset to Defaults" highlighted in RED.
2. Click “OK” to proceed.



Note: When the reset is successful, all the matrix settings will be restored to factory default and the matrix will reboot automatically. Please wait for about 3 minutes until the reboot is done before you reconnect to Web UI.

Firmware



Firmware section is for you to obtain information of the current firmware in use.

RS232 Control

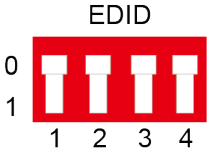
Advanced users may need to control the matrix through RS232 serial communication. A USB-UART cable is provided to connect a control PC or control system to the matrix. API command for RS232 control is available in the separate API documentation. A professional RS232 serial interface software (e.g., Serial Assist) may be needed as well.

Before executing the API command through RS232 serial connection, please ensure RS232 interface of the matrix and the control PC are configured correctly.

Parameters	Value
Baud Rate	9600 bps
Data Bits	8 bits
Parity	None
Stop Bits	1 bit
Flow Control	None

EDID Management

EDID (Extended Display Identification Data) is a data structure provided by a digital display to describe its capabilities to a video source. The matrix features an EDID management that can be used when the EDID setting's does not meet the installation requirements.



Default: 0000

By default, the EDID DIP switch (at the rear panel) is set to "0000" or up position.

Should any device communication or compatibility issues be encountered during installation, please refer to the table below and set up the DIP switches manually.

DIP				HDMI IN
0	0	0	0	EDID controlled by Web UI and API (Default)
0	0	1	0	4K@60Hz 4:4:4 8bit 2.0ch audio Without HDR
0	1	0	0	4K@30Hz 4:4:4 8bit 2.0ch audio Without HDR
0	1	1	0	1080P@60Hz 4:4:4 8bit 2.0ch audio Without HDR
Others				Reserved

Note:

- Setting of the EDID DIP switch at the rear panel applies to all inputs available.
- Setting of the EDID through Web UI or API (EDID DIP switch is set to "0000") applies only to each selected input.