



MX-0404-SCL

4K 4x4 Seamless Matrix Switcher

## User Manual

Version: V1.0.0



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# Introduction

## Overview

This product is a full 4K 4 x 4 HDMI seamless matrix switcher. It features compact enclosure, instant switching and free scaling up to 4K@60Hz SDR and HDR. It allows four sources to be switched to four HDMI outputs, while providing both analog and digital S/PDIF audio de-embedding for outputs 1&2. The product can be easily managed and controlled, for example, through front panel buttons, IR, RS232, web UI and TCP protocols. The product is perfect for applications where 4K seamless switching is required.

## Features

- Seamless switching without seeing black screen between four HDMI inputs and outputs.
- Each HDMI input and output support video format up to 4K@60Hz SDR and HDR.
- HDCP 2.2 compliant and backward compatible.
- EDID management including EDID presets, EDID copy and custom EDID.
- Advanced video processing capabilities:
  - ✓ Supports free scaling between 480p and 4K@60Hz.
  - ✓ Supports conversion between SDR and HDR formats.
  - ✓ Supports conversion on color space, chroma and color bits.
  - ✓ Supports instant switching between sources so black screen transition is avoided.
  - ✓ Supports rich scaler processing modes, including auto

scaler, manual scaler and video bypass.

- Can be easily managed and controlled through front panel buttons, IR, RS232, web UI and TCP protocols.
- Supports firmware upgrade through web UI and Micro USB port.

## Package Contents

- 1 x Matrix Switcher
- 1 x DC 12V 3A Power Adapter
- 1 x IR Remote Controller
- 1 x IR Receiver Cable
- 1 x AC Power Cord (with US Pins)
- 1 x 3.5mm 3-Pin Phoenix Male Connector
- 2 x 3.5mm 5-Pin Phoenix Male Connector
- 2 x Mounting Brackets (with Screws)

## Specifications

| Technical                         |  |
|-----------------------------------|--|
| Input/Output Port                 | 4 x HDMI IN, 4 x HDMI OUT, 1 x RS-232, 1 x LAN (RJ45), 2 x S/PDIF OUT, 2 x Analog AUDIO OUT, 1 x FW (Micro USB), 1 x DC 12V  |
| Input/Output Signal Type          | HDMI with 4K@60Hz 4:4:4  |
| Input/Output Resolution Supported | <b>VESA:</b><br>800x600 <sup>8</sup> , 1024x768 <sup>8</sup> , 1280x768 <sup>8</sup> , 1280x800 <sup>8</sup> ,<br>1280x960 <sup>8</sup> , 1280x1024 <sup>8</sup> , 1360x768 <sup>8</sup> , 1366x768 <sup>8</sup> ,<br>1440x900 <sup>8</sup> , 1600x900 <sup>8</sup> , 1600x1200 <sup>8</sup> ,<br>1680x1050 <sup>8</sup> , 1920x1200 <sup>8</sup><br><b>SMPTE:</b><br>720x576P <sup>6</sup> , 1280x720P <sup>6,7,8</sup> , 1920x1080P <sup>2,5,6,7,8</sup> ,<br>3840x2160 <sup>2,3,5,6,8</sup> , 4096x2160 <sup>2,3,5,6,8</sup><br>2 = at 24 Hz, 3 = at 25 Hz, 5 = at 30 Hz, 6 = at 50 Hz,<br>7 = at 59.94 Hz, 8 = 60 Hz |
| Audio Format                      | • <b>HDMI IN/OUT:</b> Fully supports audio formats in HDMI 2.0 specification, including PCM 2.0/5.1/7.1,   |

| Technical         |   |
|-------------------|---|
|                   | Dolby TrueHD, Dolby Atmos, DTSHD Master Audio and DTS:X <ul style="list-style-type: none"> <li>• <b>AUDIO OUT:</b> Balance stereo audio</li> <li>• <b>S/PDIF OUT:</b> PCM 2.0/5.1, Dolby digital and DTS up to 5.1 Channel</li> </ul> |
| Maximum Data Rate | 18Gbps  |
| Control Method    | Front Panel Buttons, RS232, IR, LAN (Telnet & Web UI)   |

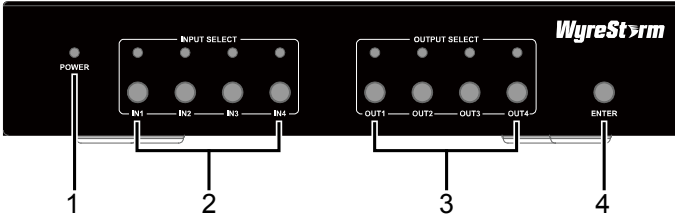
| General                      |  |
|------------------------------|--|
| Operating Temperature        | 0°C to 45°C (32°F to 113°F)  |
| Storage Temperature          | -20°C to 70°C (-4°F to 158°F)  |
| Humidity                     | 10% to 90%, non-condensing   |
| ESD Protection               | Human-body Model:<br>±8kV (Air-gap discharge)/<br>±4kV (Contact discharge) |
| Power Supply                 | DC 12V   |
| Power Consumption (Max)      | 16W  |
| Device Dimension (W x H x D) | 215mm x 42mm x 140.2mm/8.46" x 1.65" x 5.52"                               |
| Product Weight               | 1.2kg/2.64lbs  |

## Transmission Distance

| Cable Type | Range                               | Supported Video                            |
|------------|-------------------------------------|--|
| HDMI       | Input: 15m/50ft<br>Output: 10m/33ft | 1080P@60Hz 24bpp                           |
|            | Input/Output: 10m/33ft              | 4K@30Hz 4:4:4 24bpp<br>4K@60Hz 4:2:0 24bpp |
|            | Input/Output: 3m/10ft               | 4K@60Hz 4:4:4 24bpp                        |

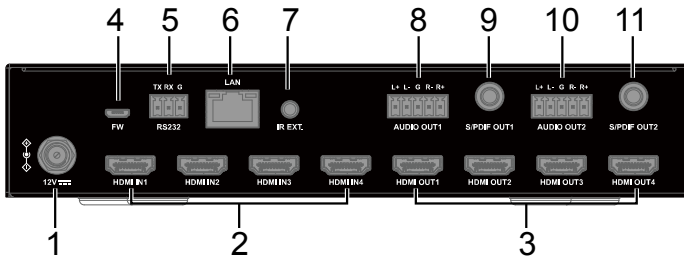
# Panel Description

## Front Panel



| ID | Name          | Description  |
|----|---------------|--|
| 1  | Power LED     | <ul style="list-style-type: none"> <li>On: The device is powered on.</li> <li>Off: The device is powered off.</li> </ul>   |
| 2  | INPUT SELECT  | <p>Input selection LEDs and buttons for input ports (1-4).</p> <ul style="list-style-type: none"> <li>LED On: The input port is selected.</li> <li>LED Blinking: The input port is routed to a specific output.</li> <li>LED Off: The input port is not selected.</li> </ul> <p>Input selection buttons (1-4): press to select specific input port.</p>                        |
| 3  | OUTPUT SELECT | <p>Output selection LEDs and buttons for output ports (1-4).</p> <ul style="list-style-type: none"> <li>LED On: The output port is selected.</li> <li>LED Blinking: The output port is routed to a specific input port.</li> <li>LED Off: The output port is not selected.</li> </ul> <p>Output selection buttons (1-4): press to select or deselect specific output port.</p> |
| 4  | ENTER         | Press this button to perform the input and output selection.   |

## Rear Panel



| ID | Name           | Description   |
|----|----------------|---|
| 1  | 12V            | Connect to the power adapter and AC power cord provided for power input.                                      |
| 2  | HDMI IN (1-4)  | Connect to the HDMI source devices.   |
| 3  | HDMI OUT (1-4) | Connect to the HDMI display devices.  |
| 4  | FW             | Connect to the PC for firmware (ARM module) upgrade.  |
| 5  | RS232          | Connect to the PC for RS232 control on this device.   |
| 6  | LAN            | Connect to a network device (e.g., network switch, router, computer, etc.) for LAN control (Web UI & Telnet). |
| 7  | IR EXT.        | IR extension port. Connect to the IR receiver cable.  |
| 8  | AUDIO OUT1     | Analog audio de-embedded output from HDMI out 1. Connect to an amplifier or a speaker.                        |
| 9  | SPDIF OUT 1    | Digital audio de-embedded output from HDMI out 1. Connect to an A/V receiver or similar.                      |
| 10 | AUDIO OUT2     | Analog audio de-embedded output from HDMI out 2. Connect to an amplifier or a speaker.                        |
| 11 | SPDIF OUT2     | Digital audio de-embedded output from HDMI out 2. Connect to an A/V receiver or similar.                      |



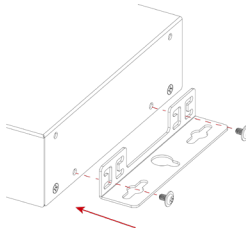
# Installation and Wiring

## Warnings:

- Before installation and wiring, disconnect power from the device.
- During wiring, connect and disconnect the cables gently.

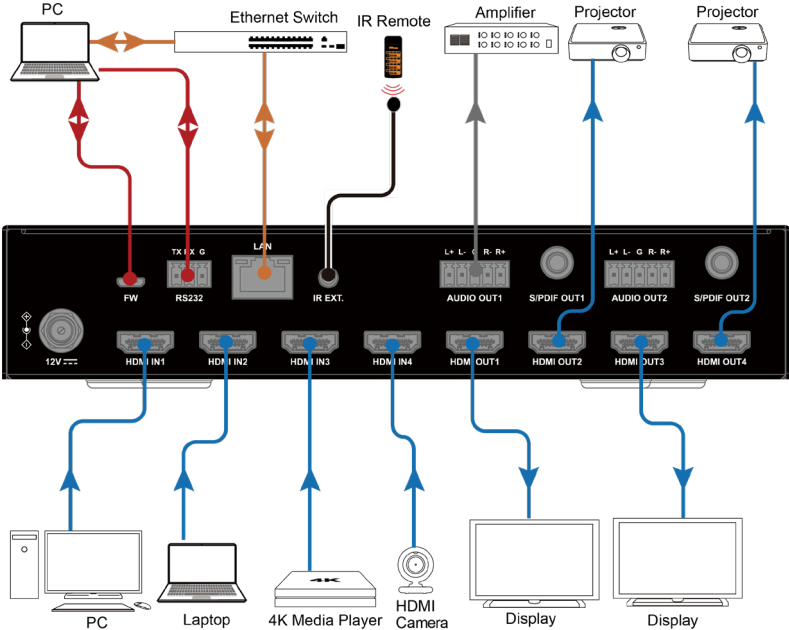
## Installation

1. Attach the bracket to one side of the enclosure using the screws provided. The bracket is attached to the enclosure as shown.



2. Repeat step 1 for the other side of the enclosure.
3. Attach the brackets to the surface or location desired using screws (not included in the package).

# Wiring



# Button Control

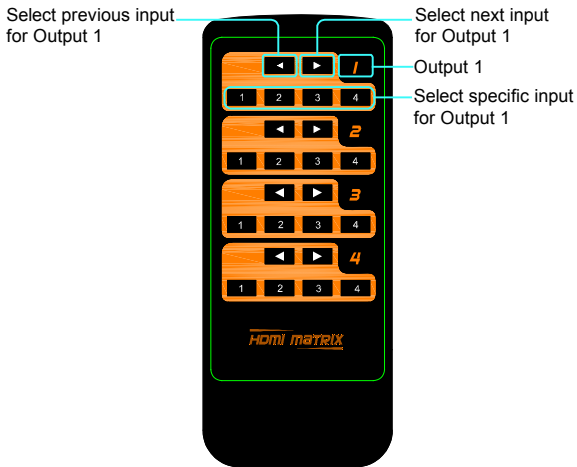
Users can perform basic switching of input sources to output displays using front panel buttons.

To select an input source for the output display:

1. Press one or multiple buttons of OUT 1-4 to select output port(s). The LED will light up once specific output port is selected.
2. Press one button of IN 1-4 to select an input port. The LED will light up once specific input port is selected.
3. Press the ENTER button to implement the selection. The selection takes effect when the LEDs are off.

# IR Control

The device can be controlled by the IR remote controller. Connect the IR receiver cable to the IR EXT. port at the rear panel of the device and ensure the receiver eye is accessible to the remote controller.



To select an input source for one output display:

1. Connect the IR receiver cable to the IR EXT. port at the rear panel of the device.
2. Select the target output display from the column 1-4.
3. Press the target input port number or previous (◀) / next (▶) button to select the desired input source.

## Command Control

Advanced users may need to control the device via API commands. Two methods are provided for controlling this device through API commands:

### 1. RS232.

Connect a control PC to the RS232 port of the device. Before sending API commands to control the device, ensure the serial ports between this device and PC are configured correctly. A professional RS232 serial interface software (e.g., Serial Assist) may be needed as well.

| Parameters   | Default Value |
|--------------|---------------|
| Baud Rate    | 115200 bps    |
| Data bits    | 8 bits        |
| Parity       | None          |
| Stop bits    | 1 bit         |
| Flow control | None          |

### 2. Telnet.

Connect a control PC to the LAN port of the device. Before you intend to control the device through telnet API, you shall establish connection between this device and your computer. The form of the command for telnet connection is below:

*telnet ip (port)*

- *ip*: The device's IP address.

- **port**: The device's port number, this is non-required for some Telnet control tools. Default setting is 23.

For example, if the device's IP address is 192.168.11.143, the command for telnet connection shall be the following:

*telnet 192.168.11.143*

## Obtain IP Address of the Device

To obtain the device's IP address:

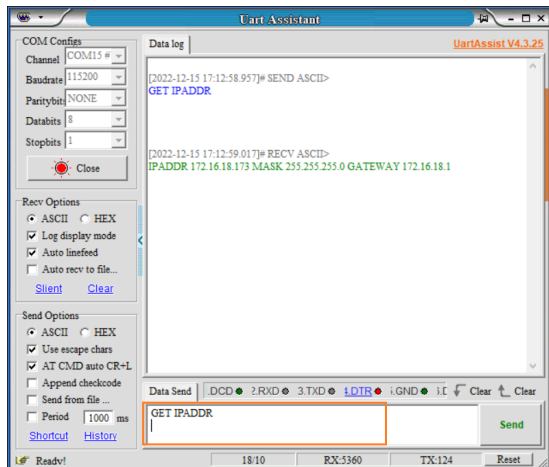
1. Connect a control PC to the RS232 port of the device.
2. Configure RS232 parameters for the PC's serial port correctly through a RS232 serial port tool, such as Serial Assist.
3. Input the command `GET IPADDR<CR><LF>` and send. You will get a response with IP address, see following:

Input:

`GET IPADDR<CR><LF>`

Response:

`IPADDR 172.16.18.173 MASK 255.255.255.0 GATEWAY 172.16.18.1`



Note: When all is configured properly, you can control the device through commands, which are available in the separate document “API Command Set\_MX0404-N301-A00”.

## Web UI

The Web UI designed for this device allows for basic controls and advanced settings. It can be accessed through a modern browser, e.g. Chrome, Safari, Firefox, IE10+, etc.

To get access the Web UI:

1. Connect the LAN port of the device to a local area network. (Ensure there’s a DHCP server in the network so that the device can obtain a valid IP address.)
2. Connect the PC to the same network as this device.
3. Input the device’s IP address in the browser and press Enter, the following window will pop up. (Refer to [Obtain IP Address of the Device](#) section to get the device’s IP address quickly).
4. The following window pops up. Input the password (default password: admin) and click **Login**.



Matrix Control Login

Password:

5. Input a new password in the dialog box and click **Apply** to enter the main page. The password shall be alphanumeric with 4 to 16 characters in length.

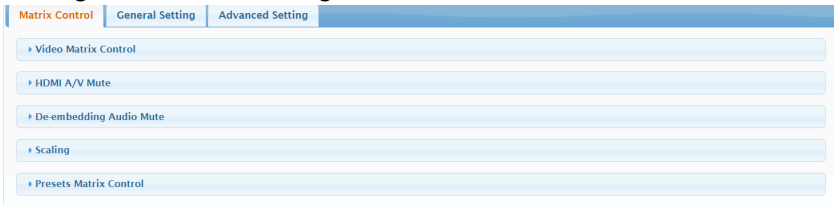
Change Password

Please change your password to continue

---

Note: Password must be 4 to 16 characters in length, alphanumeric only.

The main page consists of three tabs: Matrix Control, General Setting, Advanced Setting.



## Matrix Control

### Video Matrix Control

▶ Video Matrix Control
Video Details

| Zone\Source | INPUT 1 | INPUT 2 | INPUT 3 | INPUT 4 | CEC Control |
|-------------|---------|---------|---------|---------|-------------|
| OUTPUT 1    |         |         |         |         | On Off      |
| OUTPUT 2    |         |         |         |         | On Off      |
| OUTPUT 3    |         |         |         |         | On Off      |
| OUTPUT 4    |         |         |         |         | On Off      |
| ALL OUTPUTS |         |         |         |         | On Off      |

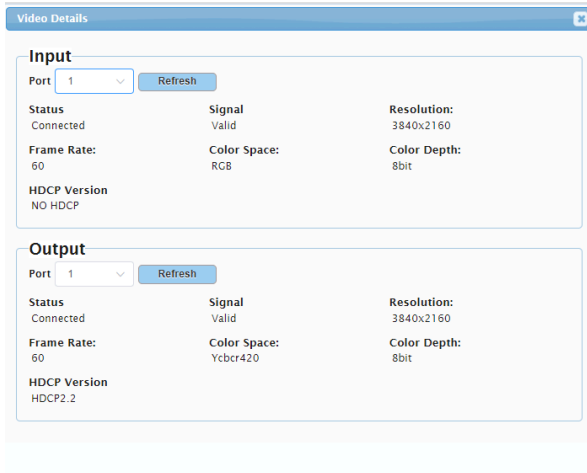
Working
  Error

This section manages distribution of input sources to output displays.

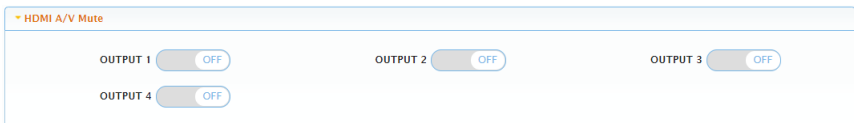
Click the button in the table to select the input for the output display (button turns from white to green once selection is done).

- **ALL OUTPUTS:** Click to route INPUT (n) for all OUTPUTs. Default setting: Input 1 is routed to Output 1, ..., Input (n) is routed to Output (n), n = 1, 2, 3, 4.

- **CEC Control:**
  - ⇒ **On:** Click to power on the display connected to the output selected through CEC.
  - ⇒ **Off:** Click to power off the display connected to the output selected through CEC.
- **Video Details:** Click to view detailed information of input and output ports including status, resolution, framerate, etc., see following:



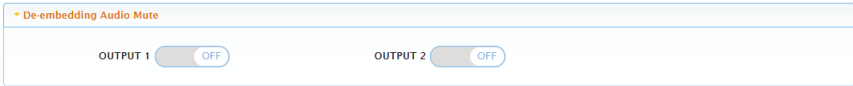
## HDMI A/V Mute



- **ON:** Select to mute video and audio for selected HDMI output port.
  - **OFF:** Select to unmute video and audio for selected HDMI output port.
- Default setting: OFF



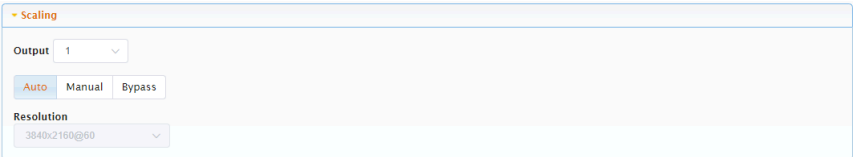
# De-embedded Audio Mute



- **ON:** Select to mute de-embedded audio for selected audio output ports.
- **OFF:** Select to unmute de-embedded audio for selected audio output ports.

Default setting: OFF

# Scaling



This section manages scaler configurations for Output 1-4. Three operation options are provided for each output scaler.

- **Auto:** Select to automatically adapt to display EDID and resolution. E.g. If the display supports up to 4K@30Hz, the device will output signal with 4K@30Hz.
- **Manual:** Select a desired output resolution from the Resolution dropdown menu for the selected output port.
- **Bypass:** Select to bypass the input video source to the selected output port. When “Bypass” is selected, black screen may occur on the display if unsupported resolutions are switched to the display.

**Note:** “Auto” and “Manual” options are available for all output ports (1 to 4), while “Bypass” is available for Output 1 and Output 2 only.

# Presets Matrix Control

Presets Matrix Control

Preset 1

Preset 2

Preset 3

This section saves or loads the settings of or to Video Matrix Control section.

- **Save:** Click to save settings of Video Matrix Control section.
- **Load:** Click to load settings to Video Matrix Control section.

To save a setting of Video Matrix to Preset 1:

1. Complete the input and output routing in Video Matrix Control section.
2. Click “Save” in “Preset 1”. Then the “Preset 1” is saved successfully.

# General Setting

## Source Naming

Source Naming

Input 1

Input 2

Input 3

Input 4

Note: The length of alias name is limited to 15 characters total.

This section allows you to change to new input ports’ names.

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

Note: The length of each new name shall not exceed 15 characters.

## Zone Naming

Zone Naming

Output 1

Output 2

Output 3

Output 4

Note: The length of alias name is limited to 15 characters total.

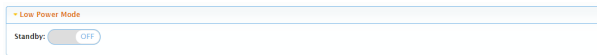
This section allows you to change to new output ports' names.

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

Note: The length of each new name shall not exceed 15 characters.

## Advanced Setting

### Lower Power Mode



This section provides setting of Lower Power Mode. In Low Power Mode, the device will shut down all video outputs and enter standby status.

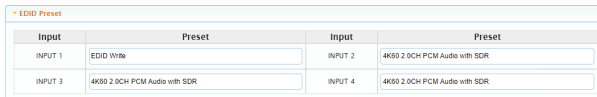
- **ON:** Select to turn on Lower Power Mode to make the device enter standby status.

Note: When on is selected, the web UI page will log out, you need to re-login to enter the main page.

- **OFF:** Select to turn off Lower Power Mode to make the device work properly.

Default setting: OFF

### EDID Presets



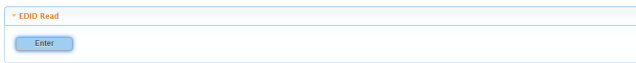
| EDID Preset |                               |         |                               |
|-------------|-------------------------------|---------|-------------------------------|
| Input       | Preset                        | Input   | Preset                        |
| INPUT 1     | EDID Write                    | INPUT 2 | 4K60 2.0CH PCM Audio with SDR |
| INPUT 3     | 4K60 2.0CH PCM Audio with SDR | INPUT 4 | 4K60 2.0CH PCM Audio with SDR |

This section allows you to configure EDID setting for each input port. Available EDID options are provided from the dropdown menu, click to select a desire option.

- Copy From Output 1
- Copy From Output 2
- Copy From Output 3

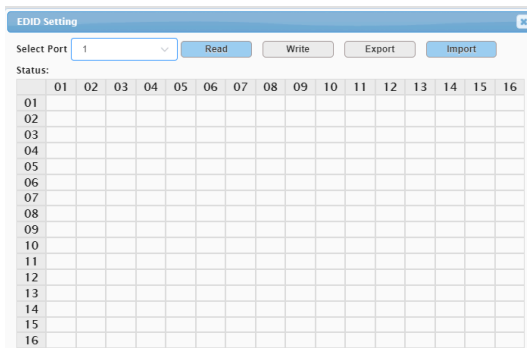
- Copy From Output 4
- 4K60 2.0CH PCM Audio with HDR
- 4K60 2.0CH PCM Audio with SDR
- 4K30 2.0CH PCM Audio with HDR
- 4K30 2.0CH PCM Audio with SDR
- 1080p@60Hz 2.0CH PCM Audio with HDR
- 1080p@60Hz 2.0CH PCM Audio with SDR
- EDID Write

## EDID Read



A dialog box titled "EDID Read" with a single "Enter" button.

Click Enter to enter EDID Setting page, select the desired HDMI output and click to “Read” its EDID information.



The "EDID Setting" window features a "Select Port" dropdown menu set to "1", and buttons for "Read", "Write", "Export", and "Import". Below these is a "Status:" label and a 16x16 grid for EDID data.

| Status: | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 01      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 02      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 03      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 04      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 05      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 06      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 07      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 08      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 09      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 10      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 11      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 12      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 13      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 14      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 15      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 16      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

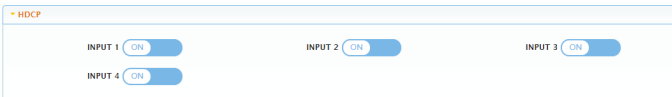
- **Read:** Click to read the selected output port's EDID information.
- **Write:** Click to write EDID information to the selected input port.
- **Export:** Click to export EDID file to your local computer.
- **Import:** Click to import EDID file from your local computer.

# CEC Control

| Output   | Manual                                    |  | On/Off                             | Auto                |
|----------|---|--|------------------------------------|---------------------|
|          | Display On                                | Display Off                                | OFF                                | Delay Time(1~30min) |
| OUTPUT 1 | <input type="button" value="Display On"/> | <input type="button" value="Display Off"/> | <input type="button" value="OFF"/> | 2                   |
| OUTPUT 2 | <input type="button" value="Display On"/> | <input type="button" value="Display Off"/> | <input type="button" value="OFF"/> | 2                   |
| OUTPUT 3 | <input type="button" value="Display On"/> | <input type="button" value="Display Off"/> | <input type="button" value="OFF"/> | 2                   |
| OUTPUT 4 | <input type="button" value="Display On"/> | <input type="button" value="Display Off"/> | <input type="button" value="OFF"/> | 2                   |

- **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 On/Off:** Select to enable or disable CEC Auto Control. Default setting: Off
- **Auto Delay Time (1~30min):** 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.

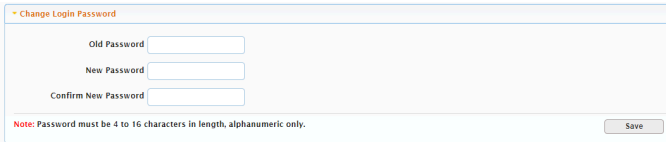
# HDCP



This section allows you to enable or disable HDCP encryption of each input port.

- **On:** Select to enable HDCP encryption for the selected input port.
- **Off:** Select to disable HDCP encryption for the selected input port. Default setting: On

## Change Login Password



Change Login Password

Old Password

New Password

Confirm New Password

Note: Password must be 4 to 16 characters in length, alphanumeric only.

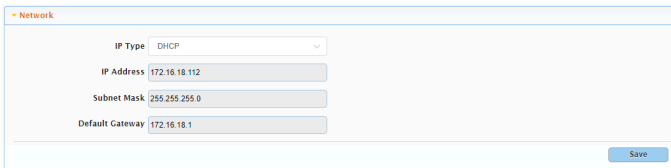
Save

This section is to change login password.

Default setting: admin

**Note:** Password must be 4 to 16 characters in length, alphanumeric only.

## Network



Network

IP Type: DHCP

IP Address: 172.16.18.112

Subnet Mask: 255.255.255.0

Default Gateway: 172.16.18.1

Save

This section is to set between the static and dynamic IP address.

- IP Type:
  - ⇒ **DHCP:** When enabled, the IP address of the Matrix is assigned automatically by the DHCP server connected.
  - ⇒ **Static:** When enabled, you need to set up the IP address manually.

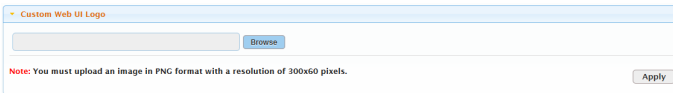
Default setting: DHCP

- **Save:** Click to save and perform the network setting, and the setting change will take effect immediately.

### Note:

- When "Static" is selected, please ensure your PC is in the same network segment as the device.

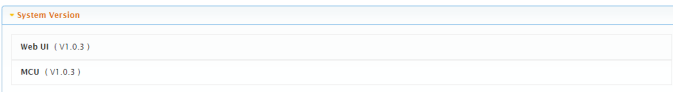
## Custom Web UI Logo



This section allows you to create your own logo for the Web UI. To create customized Web UI logo: click “Browse” for the new logo file, and choose “Apply”.

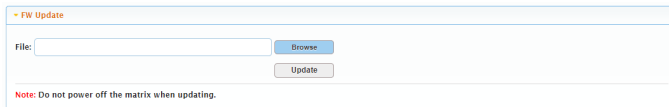
**Note:** The new logo used should be in PNG format and less than 300x60 pixels.

## System Version



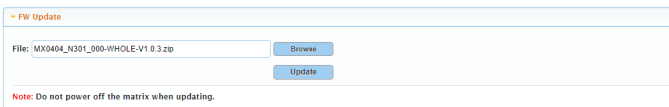
This section provides Web UI and MCU version information.

## FW Update

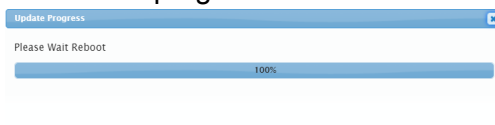


To update device’s firmware:

1. Click “Browse” for the update file.



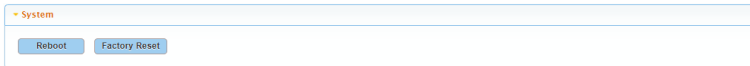
2. Click “Update” to perform upgrade. The update will be completed when the progress bar reaches 100%.



## Note:

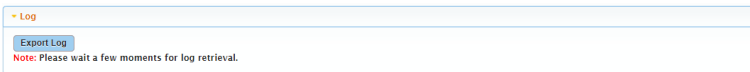
- The device will reboot automatically when firmware update is completed successfully. Please wait for about 2-3 minutes, then refresh and log in again.
- DO NOT power off the device during the updating process.

## System



- **Reboot:** Click to reboot device.
- **Factory Reset:** Click to reset the device to factory default.

## Log



This section displays system setting change records. Click “Export Log” to download the log to your local computer.



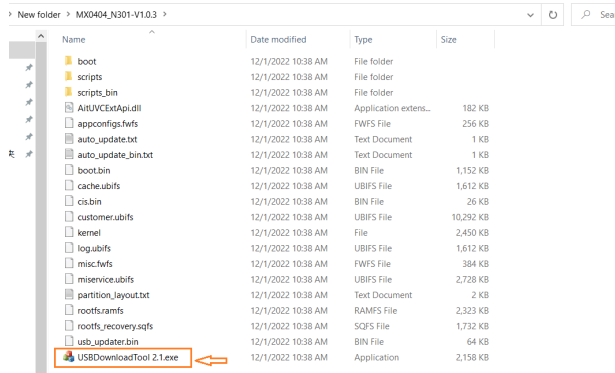
# Firmware Upgrade

The device supports firmware upgrade through web UI and micro-USB port on rear panel.

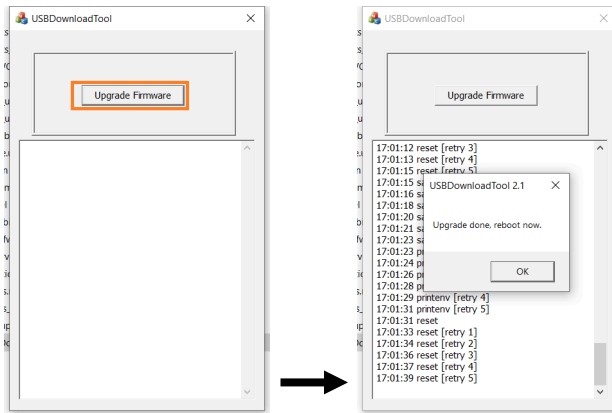
To upgrade firmware through Web UI, see [FW Update](#) section.

To upgrade firmware through micro-USB port, perform the following:

1. Download the upgrade file on your local PC.
2. Connect the device's micro-USB port to your PC. Send the command `UPG UFU<CR><LF>` to the device using a RS232 serial tool.
3. Open the upgrade file folder and launch the **USBDownloadTool2.1.exe** software.



4. Click “Upgrade Firmware” to start upgrade. A window will pop up, indicating that firmware is completed successfully.



When the upgrade process is completed, the device will reboot.

**Note:**

- Do not cut off the power during the upgrade process.

