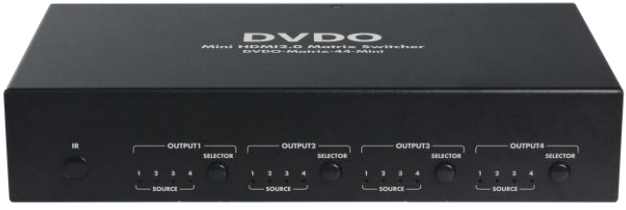
DVDO



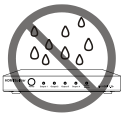
DVDO-Matrix-44-Mini

4x4 HDMI Matrix with Audio Outputs

User Manual

Version: V1.0.0

Important Safety Instructions

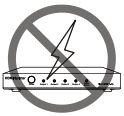


1. Do not expose this apparatus to rain, moisture, dripping or splashing. Do not place objects filled with liquids, such as vases, on the apparatus.

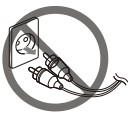
6. Clean this apparatus only with dry cloth.

2. Do not install or place this unit in a bookcase, built-in cabinet or similar 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, especially 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

The DVDO-Matrix-44-Mini is a 4x4 compact HDMI matrix switcher. In addition to basic functions such as cross-point switching and control (IR, RS-232, IP), it also features advanced functions like auto-downscaling for each HDMI output when it is connected to a 1080p display. There are SPDIF audio breakouts for each HDMI output, to provide more audio feeds to a multi-zone audio system.

Features

- 4 HDMI Inputs and 4 HDMI Outputs.
- All HDMI inputs and outputs support HDMI with HDR formats including HDR 10, HLG, DOLBY VISION up to 4K60 444.
- HDCP2.2 compliant.
- With built-in 4K-1080p downscaler for each HDMI Output, the matrix can downscale 4K 60Hz 444 to 1080p@60 444. 4K downscaler can work automatically when the matrix is connected to a 1080p display or can be set to ON/OFF by API commands.
- Each HDMI output has a SPDIF audio breakout, and supports formats up to 5CH HBR or 2CH PCM audio.
- Supports smart EDID; each input can be assigned to smart EDID mode.
- Supports EDID presets, EDID copy and EDID write. By default, each input EDID is set as 4K60 444 HDR with 5.1CH encoded audio.
- Supports audio mute; four SPDIF outputs can be muted separately by API commands.
- Supports upgrading firmware via both micro-USB and web UI (for MCU and web module).
- Rich control options, include RS-232, IR, web UI and front panel buttons.

Package Contents

Before you start the installation of the product, please check the package contents as below:

- DVDO-Matrix-44-Mini Matrix x 1
- DC 12V 2A Power Adapter (with US, UK, EU, AU Pins) x 1
- IR Remote x 1
- IR Receiver Cable x 1
- Phoenix Male Connector (3.5mm, 3-Pin) x 1
- Mounting Brackets (with Screws) x 2
- User Manual x 1

Specifications

Technical	
Input/Output Port	4 x HDMI IN, 4 x HDMI OUT, 1 x RS-232, 1 x IP Control (RJ45), 4 x SPDIF OUT (Digital), 1 x FW (Micro USB), 1 x DC 12V IN
Input/Output Signal Type	HDMI with 4K@60Hz 4:4:4, HDR 10, HLG & Dolby Vision, HDCP 2.2 **Note:** Dolby vision is not supported in downscaler mode.
Input/Output 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] **SMPTE:** 720x576P[6], 1280x720P[6,7,8], 1920x1080P[2,5,6,7,8], 3840x2160[2,3,5,6,8], 4096x2160[2,3,5,6,8] 2 = at 24 Hz, 3 = at 25 Hz, 5 = at 30 Hz, 6 = at 50 Hz, 7 = at 59.94 Hz, 8 = at 60 Hz
Audio Format	**HDMI IN/OUT:** Fully supports audio formats in HDMI 2.0 specification, including PCM 2.0/5.1/7.1, Dolby TrueHD, Dolby Atmos, DTSHD Master Audio and DTS:X **S/PDIF OUT:** Supports PCM 2.0/5.1, Dolby digital and DTS up to 5.1 Channel
Maximum Data Rate	18Gbps
Control Method	Front Panel Buttons, RS232, IR, LAN (Telnet &Web UI)

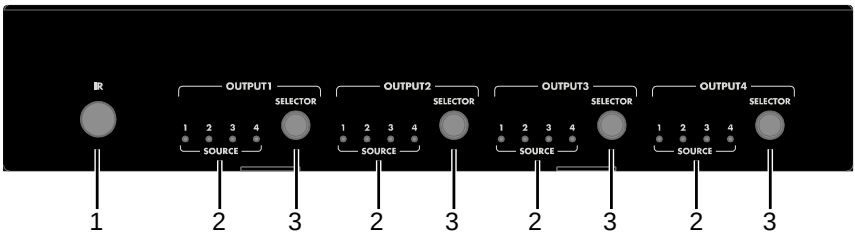
General	
Operating Temperature	0°C to 45°C (32°F to 113°F)
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Humidity	10% to 90%, non-condensing
ESD Protection	Human-body Model: ±8kV (Air-gap discharge)/ ±4kV (Contact discharge)
Power Supply	DC 12V
Power Consumption (Max)	10.8W
Device Dimension (W x H x D)	215mm x 42mm x 120.2mm / 8.46” x 1.65” x 4.73” (Without mounting brackets)”
Product Weight	0.54kg / 1.19lb

Transmission Distance

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

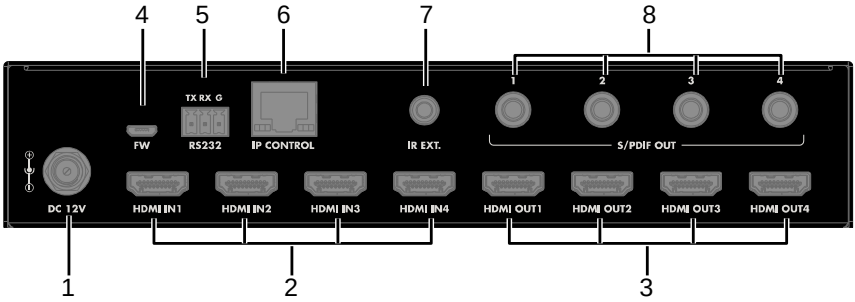
Panel Description

Front Panel



No.	Name	Description
1	IR Window	Receive IR signals.
2	INPUT LED (1-4)	**On:** The current HDMI input is selected. **Off:** The current HDMI input is not selected.
3	OUTPUT SELECTOR	Click to select input source for OUTPUT (1-4).

Rear Panel



No.	Name	Description
1	DC 12V	Connect to the DC 12V power adapter provided.
2	HDMI IN 1-4	Connect to HDMI sources such as Blu-ray Player.
3	HDMI OUT 1-4	Connect to HDMI displays.

No.	Name	Description
4	FW	For firmware upgrade.
5	RS-232	Connect to a control PC or control system for RS232 serial control.
6	IP CONTROL	Connect to local area network or a control system for telnet or Web UI control.
7	IR Ext.	Connect to the IR receiver cable provided.
8	SPDIF OUT 1-4	Connect to audio devices such as AV system for digital de-embedded audio output from HDMI OUT 1-4.

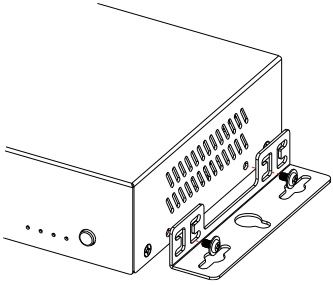
Installation and Wiring

Installation

Note: Before installation, please ensure the device is disconnected from the power source.

Steps to install the matrix on a suitable location:

1. Attach the installation bracket to the enclosure using the screws provided in the package separately.
2. The bracket is attached to the enclosure as shown.



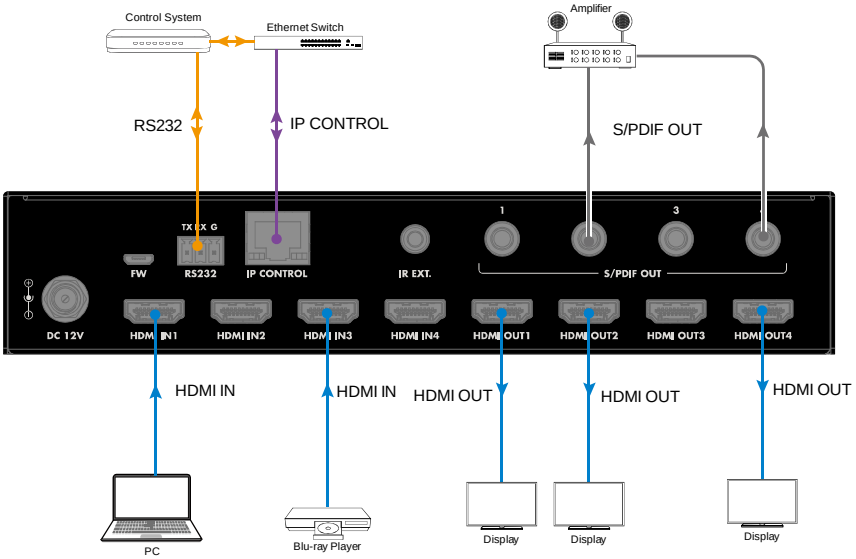
3. Repeat steps 1-2 for the other side of the unit.
4. Mount and affix the unit in the rack mount with the mounting screws.

Wiring

Steps for device wiring:

1. Connect HDMI IN
   Connect the HDMI sources (such as PC, Blu-ray player, Apple TV, 4K media player, etc) to the HDMI IN 1-4.
2. Connect HDMI OUT
   Connect HDMI display device (such as TV, projector, LED/LCD display) to the HDMI OUT 1-4.
3. Connect SPDIF OUT
   Connect audio devices to SPDIF OUT (1-4) ports, SPDIF OUT ports can output audio de-embedding from HDMI OUT 1-4.

4. Connect for additional control options:
   - RS232 control: Connect a control PC or control system to RS232 port of the Matrix.
   - IR control: The matrix can be controlled through IR signal by pointing the IR remote provided at front panel IR window directly. Alternatively, connect the IR receiver cable provided to IR Ext. of the matrix for IR extension, and have its head secured in a place accessible to the matrix remote.
   - LAN (Web UI/Telnet) Control: Connect the control PC or control system's network to the matrix through LAN port.
5. Connect the DC 12V power cord provided.
6. Power on all attached devices.

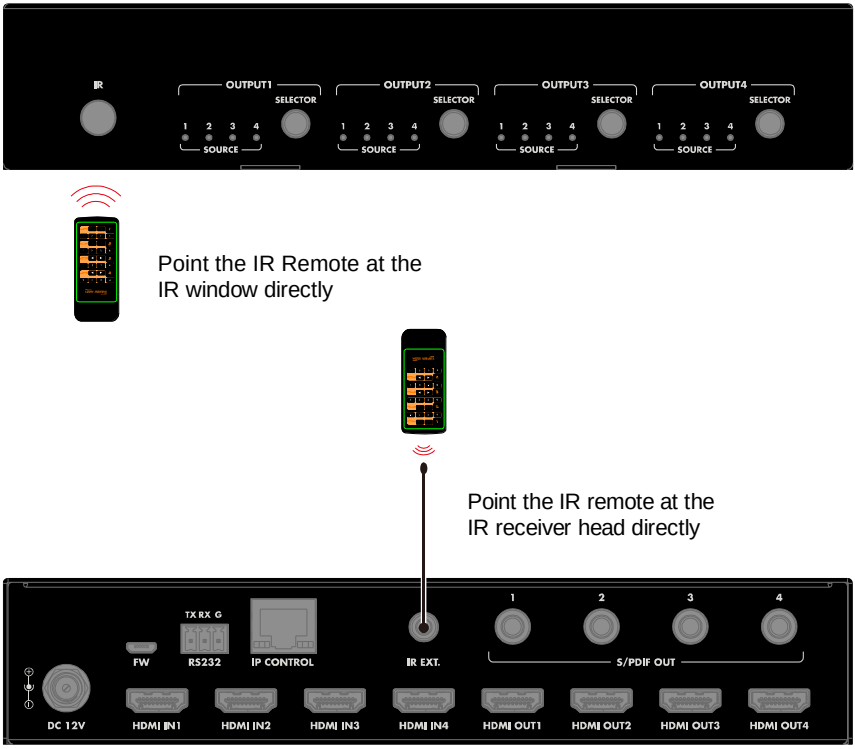


IR Remote Control

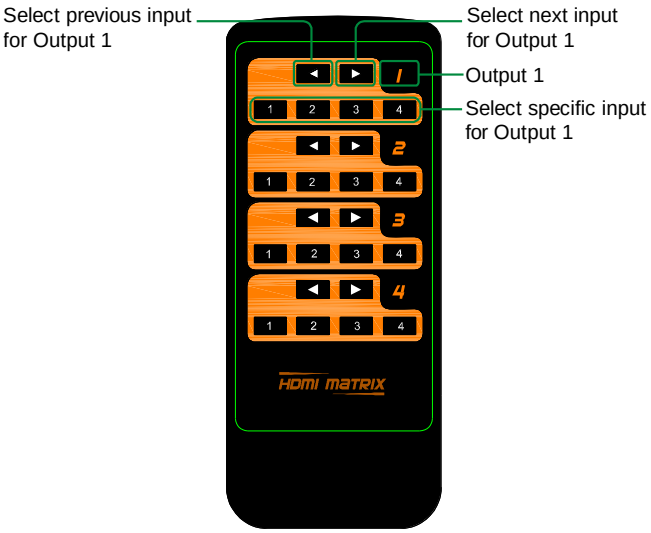
You can switch among multiple inputs for each output display by pointing the matrix IR remote directly at the IR window on the front panel or the IR receiver connected to the rear panel.

Steps for IR Remote Operation:

1. Point the matrix IR Remote directly at the IR window on front panel or at the IR receiver connected to the rear panel. As shown in the following picture:



2. Locate the target output you want to switch inputs for on the remote, numbered 1-4 vertically along the right side.
3. Press the desired input number to select the corresponding input source for your target output.



4. To cycle through multiple inputs for your target output, press the previous (◄) or next (►) button.

Virtual IR Code Supported by Default (Matrix Switching Code):

Code	IN1	IN2	IN 3	IN 4
OUT 1	0X80	0X81	0X82	0X83
OUT 2	0X90	0X91	0X92	0X93
OUT 3	0XA0	0XA1	0XA2	0XA3
OUT 4	0XB0	0XB1	0XB2	0XB3

RS232 Control

Advanced users may need to control the matrix through RS232 serial communication. Connect a control PC or control system to the RS232 port of the receiver. API commands for RS232 control are available in the separate document “API Command Set_DVDO-Matrix-44-Mini”. 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 device and the control PC are configured correctly.

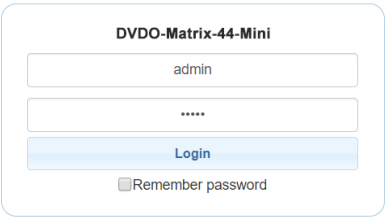
Parameters	Value
Baud Rate	115200 bps
Data Bits	8 bits
Parity	None
Stop Bits	1 bit
Flow Control	None

Web UI Control

The Web UI designed for the matrix is available for switching control, general and advanced settings. The Web UI is accessible through a browser with latest version, e.g. Chrome, Firefox, Safari, Opera, IE10+, etc.

Access the Web Interface

1. Connect the IP Control port of the matrix to the Ethernet switch, and connect your PC to the same network.
   Note: The IP mode of the matrix is DHCP, please ensure the Ethernet switch is connected to a DHCP server.
2. Use the tool such as SmartSetGUI to search the IP address of the device or send API command to get IP address (See the separate document “API Command Set_DVDO-Matrix-44-Mini”).
3. Input the IP address in your browser and press Enter to enter the login page.
4. Enter the username and password in the following login page, then click “**Login**”. The default username and password are both “**admin**”.



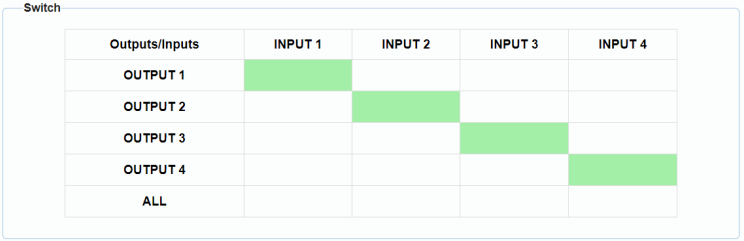
Web Interface Introduction

The main screen includes General and Advanced Setting.

General

The General Page includes: Switch, EDID, EDID Read, CEC, Audio Mute, HDCP, Preset.

(1) Switch



The Switch section manages distribution of input sources to output displays.

By default, Input 1 corresponds to Output 1, Input 2 corresponds to Output 2, Input (n) corresponds to Output (n), n = 1, 2, 3, 4.

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: Click to switch INPUT (n) for all OUTPUTs.

(2) EDID

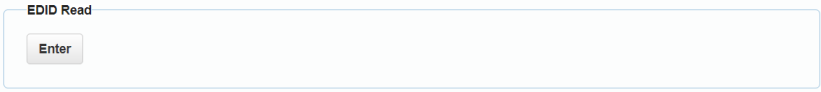
This section allows you to configure EDID settings of each input port.

Select the item from the drop-down menu, then click “Apply” to take effect.

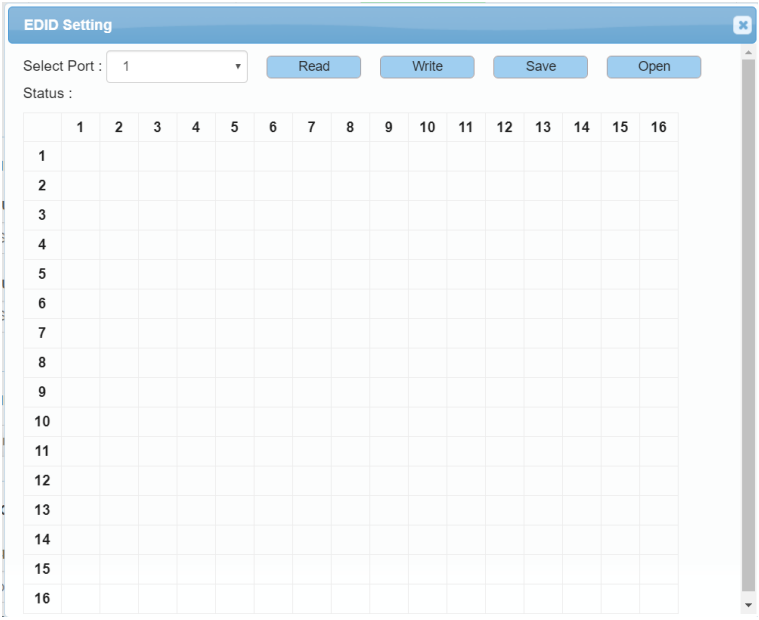
Note: If EDID copy fails, the input EDID will be 4K@30Hz 2.0ch audio.

By default, input EDID is set as 4K@60Hz 5.1ch audio With HDR.

(3) EDID Read



Click “Enter” to open the EDID Setting page.



Select Port: Click from the drop-down menu to choose an Output port (1-4) for EDID setting.

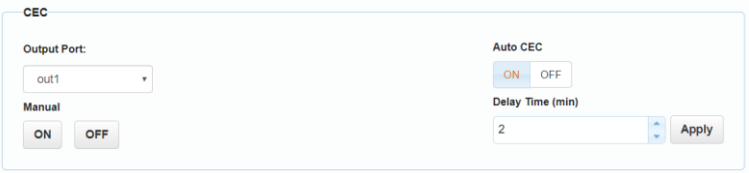
Read: Click to read the EDID of the Output port you choose.

Write: Click to write the EDID of the Output port you choose to corresponding Input.

Save: Click to save the EDID of the Output as bin file to a desired location.

Open: Click to open an EDID file. Then you can click "Write" to write the EDID information instead of Output port's EDID to corresponding Input.

(4) CEC



Output Port: Select one OUTPUT (1-4) port or all from the drop-down menu to control.

Note: When Output port is set to “all”, the Auto CEC and Delay Time (min) settings are disabled.

Manual (ON/OFF): Click “ON/OFF” button to power on/off the CEC-enabled display immediately.

Auto CEC: Click “ON/OFF” button to set Auto CEC control enable/disable.

The default setting is “ON”.

Delay Time (min): Click the up/down arrow to set the time for the display to power off automatically when no signal is present. Then click “Apply” to take effect. For example, if Auto control is set as on and the time is set to 2 minutes, click “Apply”, the output display will power off automatically when there’s no signal at the display for 2 minutes.

(5) Audio Mute

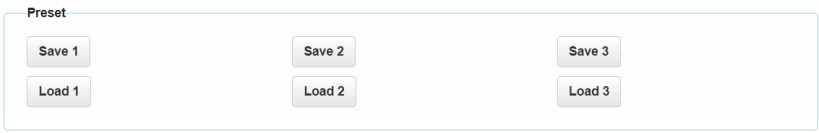
This section allows you to set Audio output (1-4) mute/unmute. The default setting is unmute.

Note: The SPDIF OUT 1-4 is following the audio output of HDMI OUT.

(6) HDCP

HDCP Support allows you to enable or disable HDCP compatibility of each input. By default, HDCP Support is switched ON at each input and content protected by HDCP standard will be received.

(7) Preset



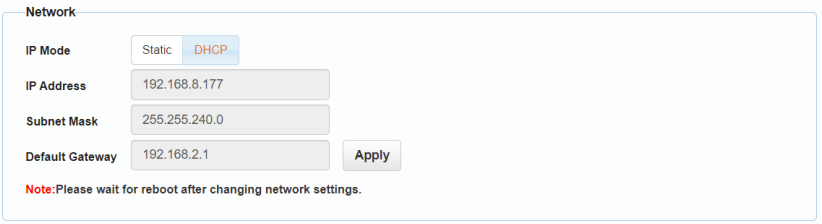
The Preset section saves or loads the General settings to or from the matrix.

Advanced

The Advanced page includes: Network, Login Password, Custom Web UI Logo, WEB Firmware Upgrade, ARM Firmware Upgrade, MCU Firmware Upgrade, System, Firmware Version.

(1) Network

Network is used to toggle between the dynamic and static IP addressing.



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.

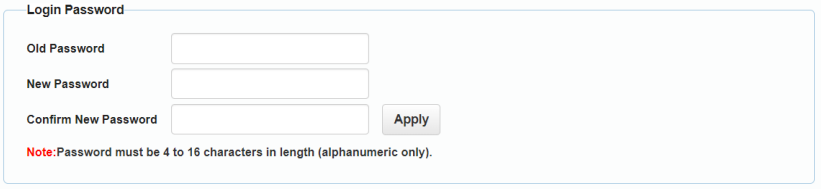
The default setting is DHCP.

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.xxx.xxx (x is suggested among 2 to 253).
- Please wait for 2-3 minutes for the Matrix’s LAN module to reboot and reconnect after the network setting is changed.

(2) Login Password

This section allows you to change login password.



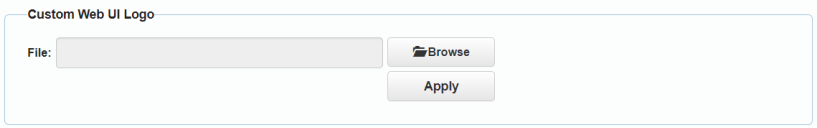
The default password is “admin”.

Apply: Click to save the changes.

Note: The new password must be 4 to 16 characters in length (alphanumeric only).

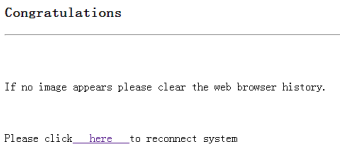
(3) Custom Web UI Logo

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



To create customized Web UI logo:

1) Click “Browse” button to browse the LOGO file.
2) Click “Apply”, the following window will appear. Click "here" to reconnect the system. When completed, the new logo will appear on the upper left corner of the screen.

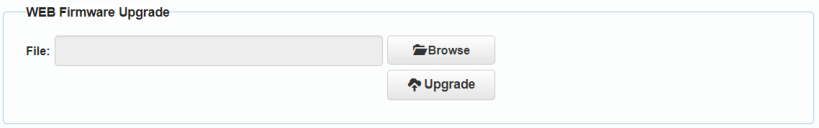


(4) WEB Firmware Upgrade

1) Click “Browse” for the update file.
2) Click "Update" to start the Web UI upgrade.

The matrix LAN Module will update and reboot automatically when Web UI is completed. Please wait for about 3 minutes and then refresh and log in again.

Note: DO NOT disconnect the matrix during update process.

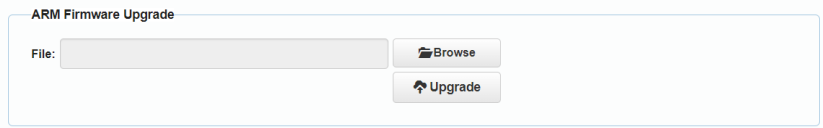


(5) ARM Firmware Upgrade

1) Click “Browse” for the update bin file.
2) Click "Upgrade" to start the ARM Firmware upgrade.

The matrix will upgrade and reboot automatically when upgrading ARM is completed. Please wait for about 3 minutes and then refresh and log in again.

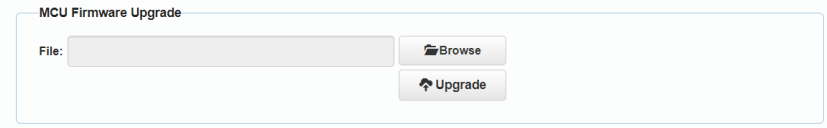
Note: Do not power off the device when upgrading.



(6) MCU Firmware Upgrade

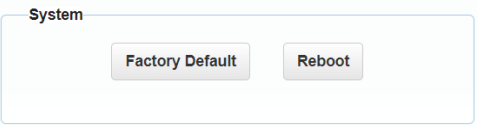
1) Click “Browse” for the update bin file.
2) Click "Upgrade" to start the MCU Firmware upgrade.
3) The matrix will upgrade and reboot automatically when upgrading MCU is completed. Please wait for about 3 minutes and then refresh and log in again.

   Note: Do not power off the device when upgrading.



(7) System

This section allows you to reset the device to factory default settings or reboot the device.



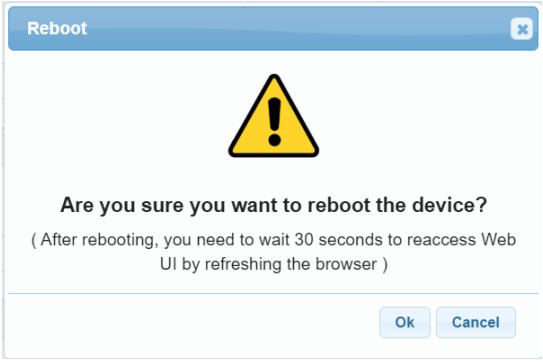
To reset the device to factory default settings:

Click the “Factory Default” icon, the following window will be popped up, click “Ok” to reset the device to factory default.

Note: Please wait about 30 seconds to re-access Web UI by refreshing the browser.

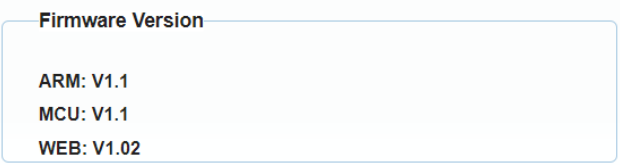
To reboot the device:

Click the “Reboot” icon, the following window will be popped up, click “Ok” to reboot the device.



Note: Please wait about 30 seconds to re-access Web UI by refreshing the browser.

(8) Firmware Version



This section allows you to obtain information of the current firmware in use.

Warranty Terms and Conditions

For the following cases we shall charge for the service(s) claimed for the products if the product is still repairable and the warranty becomes unenforceable or inapplicable.

1. The original serial number (specified by us) labeled on the product has been removed, erased, replaced, defaced or is illegible.
2. The warranty has expired.
3. The defects are caused by the product being repaired, dismantled or altered by anyone not from an authorized service partner.
4. The defects are caused by improper usage or handling, roughly or not as instructed in the applicable User Guide.
5. The defects are caused by any force majeure including but not limited to accidents, fire, earthquake, lightning, tsunami and war.
6. The service, configuration or gifts promised by sales agents only but not covered by normal contract.
7. We reserve the right for interpretation of these cases above and to make changes to them at any time without notice.

DVDO