LINK

MX44-4KUHDE

HDMI 2.0 4:4 Matrix

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.

Warnings of FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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MX44-4KUHDE is a 4x4 HDMI Matrix with resolutions supported up to 4K@60Hz 4:4:4 8bit and HDCP 2.2 compatibility. It allows four sources to be distributed or switched to four HDMI displays simultaneously. MX44-4KUHDE also provides de-embedded analog audio output from each HDMI output.

MX44-4KUHDE Matrix can be controlled by front panel buttons, IR, RS232 and LAN control with Telnet API and Web UI. Independent DIP switches are also provided for advanced EDID management.

Designed for 1U rack mount and stand-alone installation, this matrix offers an Ultra HD A/V switching and distribution solution ideal for a variety of applications, such as offices, schools, conference rooms, hotels, etc.

Features

- Includes 4 HDMI inputs and 4 HDMI outputs
- Inputs and outputs support video resolutions up to 4K@60Hz 4:4:4 8bit and HDCP 2.2
- Supports 4K HDR
- Fast switching among multiple video sources
- Supports L/R analog audio de-embedding outputs from each HDMI output
- Supports front panel buttons, IR, RS232 and LAN (Telnet API & Web UI) control options
- Supports API command control through RS232 and Telnet connection • Independent DIP switches for manual EDID management

Package Contents

- MX44-4KUHDE Matrix x 1
- IR Remote Handset x 1
- USB to UART Cable x 1
- AC Power Cord (with US Plug) x 1
- Mounting Bracket (with screws) x 2

Technical

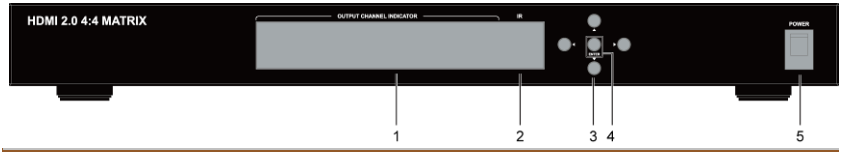
Input/Output Connections	4 x HDMI IN 4 x HDMI OUT 4 4 x AUDIO OUT 1 x IR EXT. 1 x LAN 1 x RS232 DB9 port 1 x AC IN
Input/Output Video Type	HDMI with HDR, HDCP 2.2
Input/Output Resolution Supported	800x600[8], 848x480[8], 1024x768[8], 1280x768[8], 1280x800[8], 1280x960[8], 1280x1024[8], 1360x768[8], 1366x768[8], 1440x900[8], 1600x900[8], 1600x1200[8], 1680x1050[8], 1920x1200[8], 2048x1152[8], 3840x2160[2,3,5,8], 4096x2160[2,8] 720x480[8] (480p), 720x576[6] (576p), 1280x720[6] (720p50), 1280x720[8] (720p60), 1920x1080[6] (1080p50), 1920x1080[8] (1080p60) 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
Audio Format	• **HDMI:** Fully supports HDMI audio formats in HDMI 2.0 specification; • **L/R Analog AUDIO OUT**: PCM 2.0
Control	
Control Method	Front panel button, IR, RS232, LAN (Telnet API & Web UI)

General	
Operating Temperature/RH	32°F ~ 113°F (0°C ~ 45°C) 10% ~ 90%, non-condensing
Storage Temperature/RH	-4°F ~ 158°F (-20°C ~ 70°C) 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)	1018P: 22W; 4K: 27.50W
Dimensions (W x H x D)	440mm x 300mm x 43.5mm/ 17.32" x 11.81" x 1.71"
Product Net Weight	3.58kg/7.89lb
Rack Space Required	1U
Certification	CE, FCC

Cable Specification:

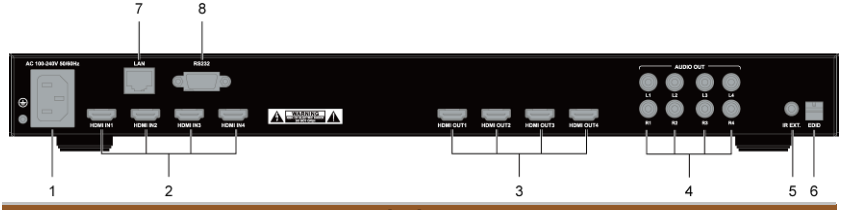
Cable Type	Range	Supported Video
HDMI	Input/Output: 49ft/15m	1080P@60Hz
	Input: 16ft/5m Output: 33ft/10m	4K@60Hz 4:2:0 8bit with HDR
	Input: 10ft/3m Output: 16ft/5m	4K@60Hz 4:4:4 8bit with HDR

Front Panel



No.	Name	Description
1	Output Channel Indicator	Indicates input for output port 1-4.
2	IR Window	Receives signals from IR Remote.
3	Selection Buttons	Selects input and output channels. • **Left/Right**: press to select output channels**.** • **UP/Down:** press to select input channels.
4	Enter Button	Press to implement the input and output selection.
5	Power Switch	Press to turn on or off the matrix.

Rear Panel



ID	Name	Description
1	AC	Accepts AC power of 100-240V 50/60Hz. Connect the power cord provided.
2	HDMI IN 1-4	Connect to HDMI source devices.
3	HDMI OUT 1-4	Connect to HDMI display devices.

4	AUDIO OUT 1-4	For de-embedding L/R analog audio output. Connect to audio devices via RCA stereo audio cables.
5	IR EXT.	IR extension port. Connect an IR receiver cable if required.
6	EDID DIP Switch	For EDID Management.
7	LAN	RJ45 port; connect to a control system for Web UI and Telnet Control.
8	RS232	DB9 port; connect to a control system for RS232 control.

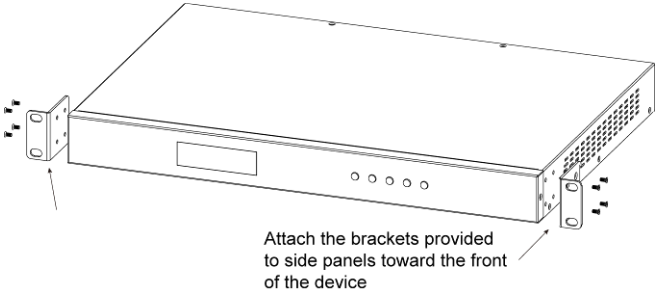
Installation

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

MX44-4KUHDE occupies 1U space and can be placed on a solid and stable surface or installed on a standard rack mount.

Steps for installing the matrix on a rack mount:

1. Position and install the mounting brackets with the mounting screws provided.



2. Mount and affix the matrix in the rack mount with the mounting screws.

Wiring

Before wiring, please ensure the unit is disconnected from power. Otherwise, circuitry damage or physical injury may occur.

Steps for device wiring:

1. Connect HDMI IN

Connect HDMI source devices to HDMI IN 1-4 of the matrix with high-quality HDMI cables (e.g. Blu-ray player, PC, game console, Apple TV, etc.)

2. Connect HDMI OUT

   Connect HDMI display devices to HDMI OUT 1-4 of the matrix (e.g. TV, projector, LED/LCD display, etc.)

3. Connect AUDIO OUT

   Connect audio devices to AUDIO OUT 1-4 of the matrix (e.g. audio amplifier) with RCA stereo cables.

4. Connect for additional control options:

   a) IR Control: The matrix can be controlled through IR signal by pointing the IR remote provided at front panel IR window directly. Alternatively, connect an IR receiver (38KHz) to IR EXT. of the matrix for IR extension, and have its head secured in a place accessible to the matrix remote.

   b) RS232 Control: Connect a control PC or control system to RS232 of the matrix.

   c) LAN (Web UI/Telnet) Control: Connect the control PC or control system's network to the matrix through LAN port.

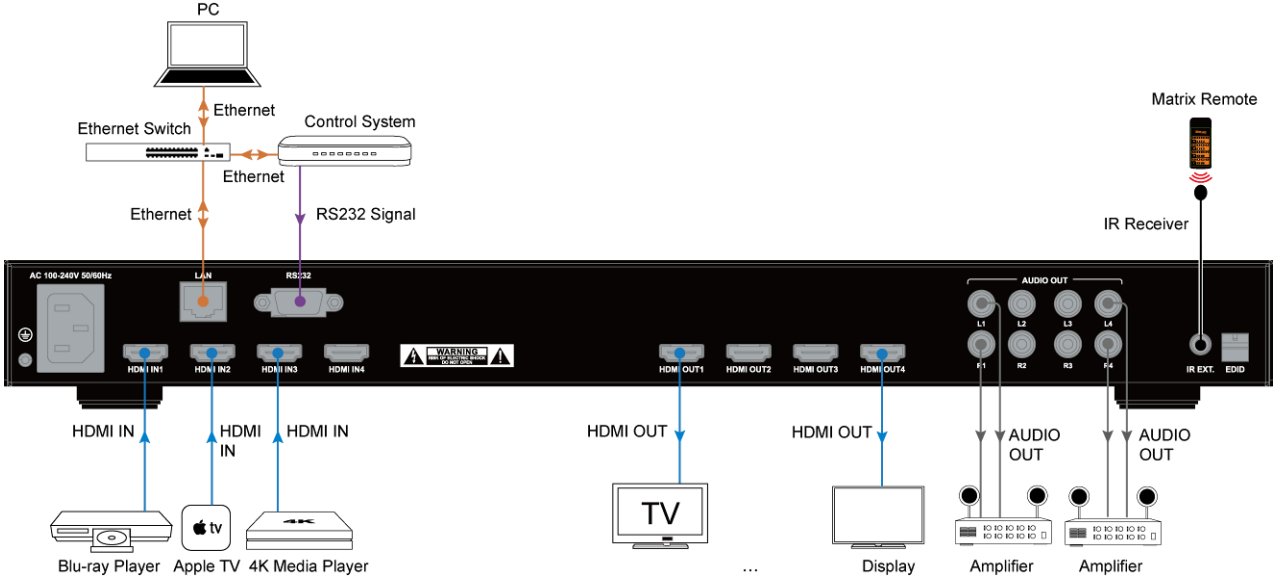
5. Connect the power

   Connect the AC power cord provided and switch on the power button.

6. Power on all devices.

Note:

- Before plug or unplug any cable, please power off the matrix firstly.
- When turning on and off the system, please follow the rule "first off, last on".


PC
Ethernet
Ethernet Switch
Control System
Ethernet
Ethernet
RS232 Signal
Matrix Remote
IR Receiver
AC 100-240V 50/60Hz
LAN
RS232
AUDIO OUT
L1
L2
L3
L4
R1
R2
R3
R4
HDMI IN1
HDMI IN2
HDMI IN3
HDMI IN4
HDMI OUT1
HDMI OUT2
HDMI OUT3
HDMI OUT4
IR EXT.
EDID
HDMI IN
HDMI IN
HDMI IN
HDMI OUT
HDMI OUT
AUDIO OUT
AUDIO OUT
TV
Blu-ray Player
Apple TV
4K Media Player
...
Display
Amplifier
Amplifier

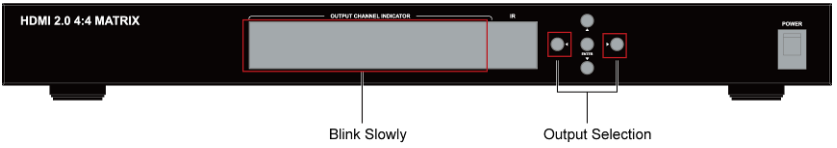
Front Panel Control

The front panel of the MX44-4KUHDE matrix features a LED screen to display the mapping status from each input to each output channel.

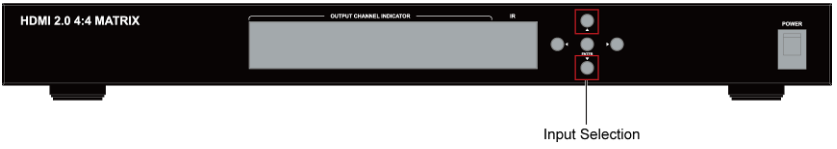
Power on the matrix and wait until the front panel LED screen shows "1234" in red. Then the matrix is ready for operation. You can select input from 1 to 4 for each output via front panel buttons.

For example, to select input source for output display:

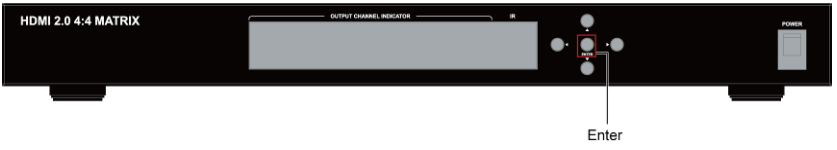
1. Press the left (◀) or right (▶) button to select output channel. Then the LED will blink slowly to show the selected output channel.



2. Press the up (▲) or down (▼) button to select input channel.



3. Press the **Enter** button to implement above selection. The LED will stop blinking when the selection takes effect.



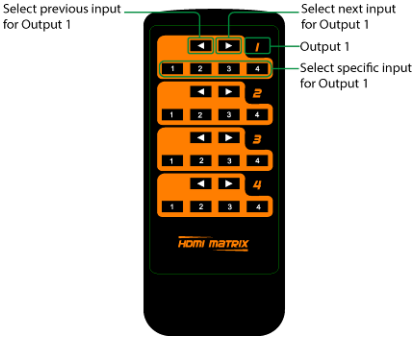
IR Remote Control

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 extension cable connected to the rear panel.

Steps for IR Remote operation:

1. Operate as shown in the diagrams below, using the IR remote.

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.



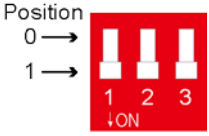
4. To cycle through multiple inputs for your target output, press the previous (◀) or next (▶) button.

EDID Management

EDID (Extended Display Identification Data) is a data structure generated by a digital display to communicate its capabilities, such as its native resolution, to the attached source device.

MX44-4KUHDE Matrix provides EDID management to output different video resolutions and audio channels for the displays based on the switch settings.

By default, the EDID DIP switch is set in **Smart EDID** position, i.e. all three switches are set to 1 or down position. When connected to multiple displays, the video with minimum resolution that ranks among the displays' maximum resolutions and 2.0ch audio will be set as input EDID.



If any device communication or compatibility issues occur during installation, please set the DIP switches manually using the following table:

DIP Setting			Function
0	0	0	EDID controlled by Front Panel, Web UI or API
0	0	1	Set 4K@60Hz HDR with stereo audio as EDID (Smart EDID OFF)
0	1	0	Set 4K@30Hz HDR with stereo audio as EDID (Smart EDID OFF)
0	1	1	Set 4K@30Hz 8bit HDR only with stereo audio as EDID (Smart EDID OFF)
1	0	0	Set 1080P@60Hz with stereo audio as EDID (Smart EDID OFF)
DIP Setting			**Function**
1	0	1	Reserved
1	1	0	Reserved

1	1	1	Smart EDID ON (**Default**)

For DIP setting "000", EDID can be set via front panel buttons, WEB UI and API commands.

Using front panel control, you are able to copy EDID from an HDMI Output to the desired HDMI Input. For instance, to copy EDID of HDMI Output 1 to HDMI Input 2, you should follow steps below:

1. Set the switch to position "000", then press the selection button on the front panel to select Input 2 for Output 1; the LED will blink.
2. Long press the Enter button for at least 5 seconds. When the LED window displays "OK", EDID copy setting is successful. Otherwise, "FL-2" will appear to indicate failed setting.

Note:

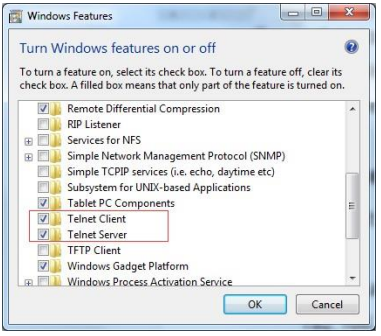
- If EDID Copy fails, a fixed 1080P@60Hz stereo EDID would be provided to the source device.
- You must reboot the matrix for EDID switch settings to take effect.

API Command Control

Advanced users may need to control the matrix through API commands. Connect a control system or PC to the LAN or RS232 port of the matrix with an Ethernet cable or the USB-to-UART cable provided. API Commands are available in separate document "***API Command Set_MX44-4KUHDE***".

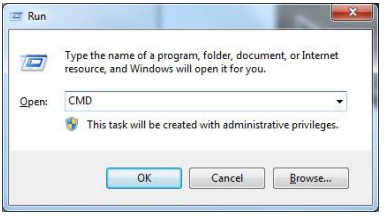
Telnet Control

1. Connect the LAN port of the matrix to your PC using a straight UTP cable.
2. Set your PC to the same network segment as the matrix, e.g. 192.168.X.X. (X ranges 2~253)
3. Ensure Telnet Client and Telnet Server features are enabled on your computer.



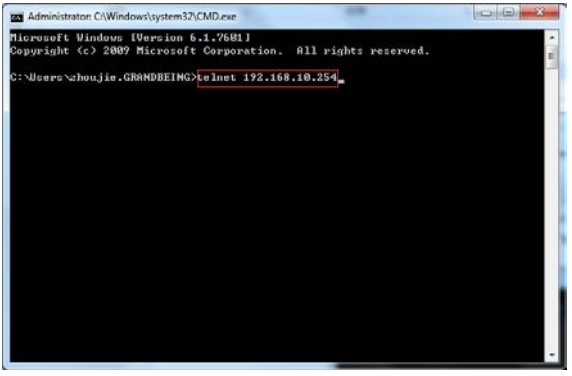
4. Connect between the control PC and matrix through telnet.

   a) Launch the Run window on your computer, enter "CMD" in the textbox, and then click "OK".



   b) The following DOS window will pop up.

   Input "telnet 192.168.10.254" and press Enter.



   c) A new window will display and show "Welcome to use matrix telnet", indicating telnet connection between the matrix and computer is

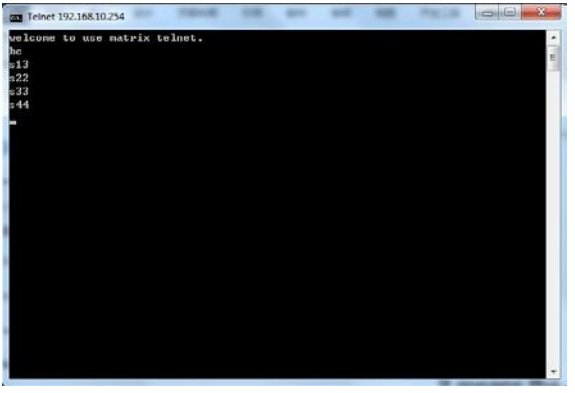
established successfully. Now you could send API command to control matrix through telnet. e.g.

Input: *bc□↵*

It will response:

s13 s22

s33 s44



"□" means to enter a space, "↵" means to enter a carriage return or a line feed.

This command is used to get the matrix mapping status from each input to each output, and the result is that Output 1 corresponds to Input 3, Output 2 corresponds to Input 2, Output 3 corresponds to Input 3, Output 4 corresponds to Input 4.

For more commands please refer to separate document "***API Command Set_MX44-4KUHDE***".

RS232 Serial Control

For RS232 serial control, professional serial interface software (e.g. UART Assist) may be needed.

Before executing API commands through serial connection, ensure the RS232 port 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

Web UI Control

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

By default, the IP address for MX44-4KUHDE is **192.168.10.254**, subnet mask is **255.255.0.0**.
Default login password for Web UI is "**admin**".

Access the Web Interface

1. Connect the LAN port of the matrix to your PC using a straight UTP cable.
2. Set your PC to the same network segment as the matrix, e.g. 192.168.X.X (X ranges 2~253)
3. Input the IP address **192.168.10.254** in your browser and press Enter. The following window will display. Enter the default password "admin" and click **Login** to enter main screen of Web UI.

The main screen includes Matrix Control, General Setting and Advanced Setting.

The Matrix Control allows for input/output switching and Presets configuration.
The General Setting allows for setting login, EDID setting, factory default setting and port naming.
The Advanced Setting allows for network and password setting, Web UI update, logo customization.

Matrix Control

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

- Switch
- Switch All
- Presets

(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).

(2) Switch All

Input 1: Click to switch to Input (1) for Output 1-4.
Input (n): Click to switch to Input (n) for Output 1-4. (n = 1, 2, 3, 4)

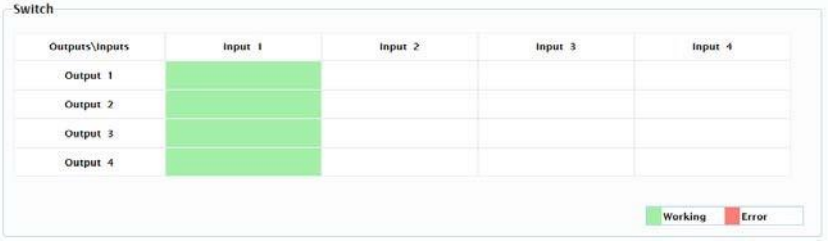
(3) Presets

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

- **Save:** To save input/output settings in the Switch/Switch All section.
- **Load:** To load input/output settings in the Switch/Switch All section.

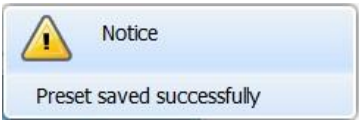
To save an input/output setting to Preset 1:

1. Complete the input and output settings in the Switch section.



2. Click "Save 1" in "Preset 1".

3. The following window will display in the upper right corner to indicate Preset 1 is saved successfully.



General Setting

General Setting is available to perform the following functions:

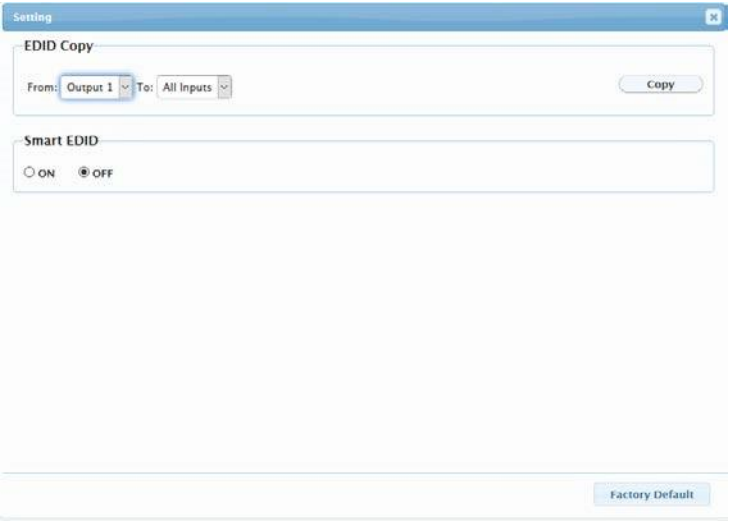
- Matrix Setting Login

- EDID Setting
- Port Naming

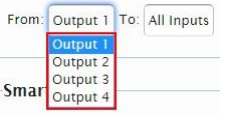
(1) Matrix Setting Login

1. Enter the default password "**123456**" for Matrix Setting Login in the password box below and Click "Login".

2. The Setting window will display as follows, including EDID Copy, Smart EDID Section and Factory Default button.

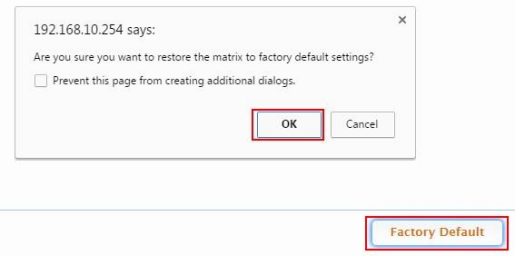


EDID Copy: Click the drop-down menu to copy EDID from the Output (1-4) to Input(s) chosen.

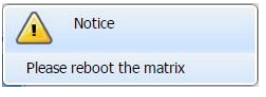


Smart EDID: Click ON or OFF to enable or disable the Smart EDID setting.

Factory Default: Click to restore the matrix to default settings, and then click "OK".



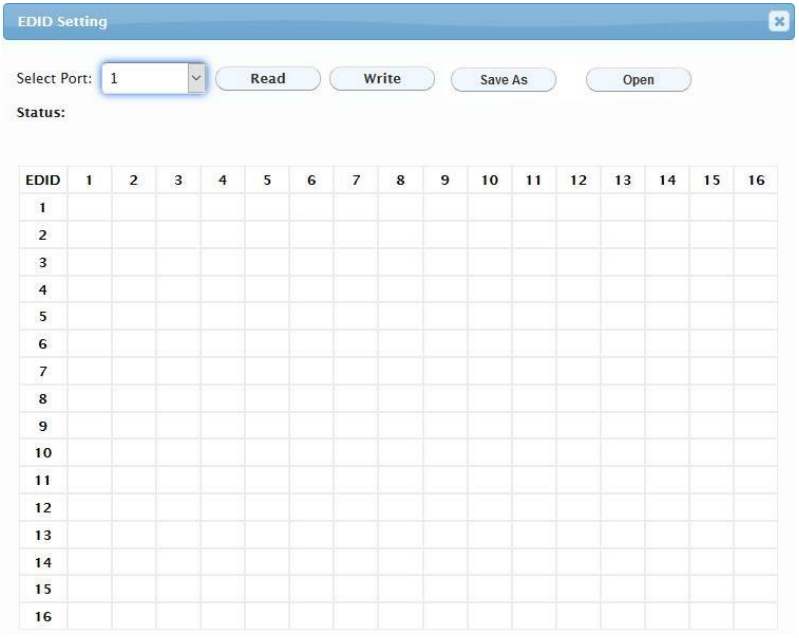
The Notice window will pop up, please reboot the matrix and wait for at least 2 minutes to re-login Web UI.



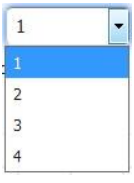
Note: To enable EDID COPY and Smart EDID function above, you must set the EDID DIP switch on rear panel to "000" position firstly.

(2) EDID Setting

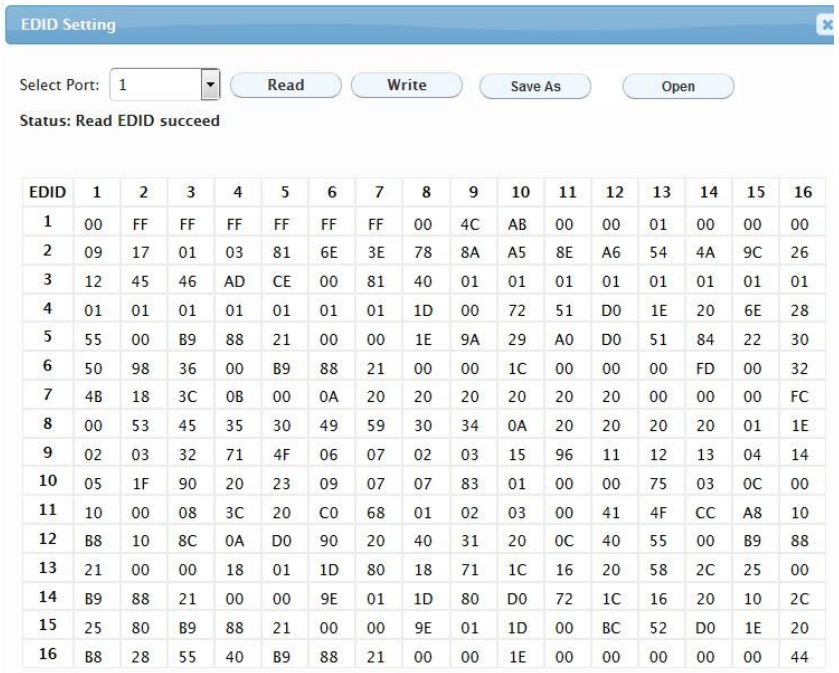
Click **Enter** to open the EDID Setting page.



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

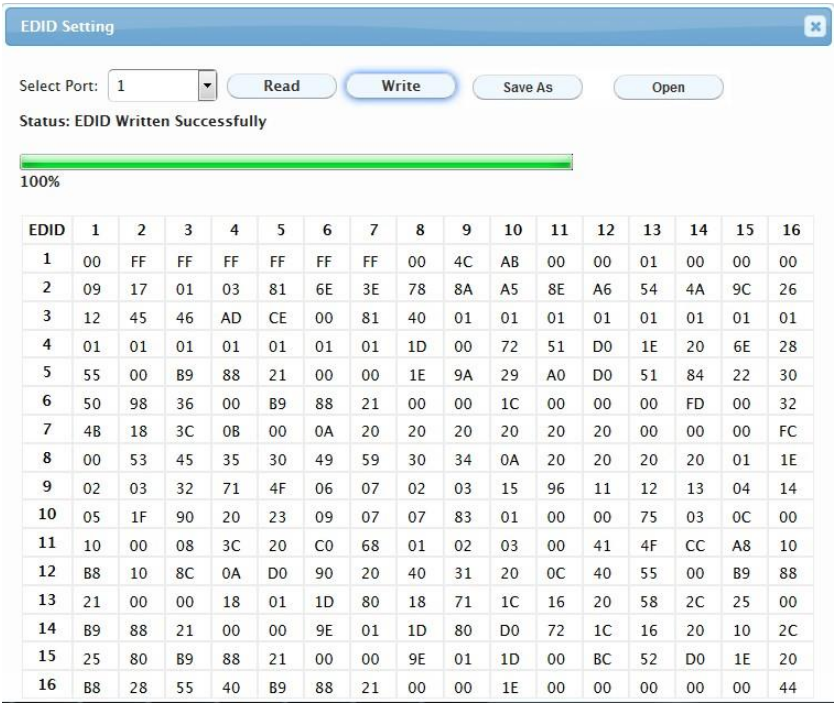


Read: Click to read the EDID of the Output port you choose. The following EDID table will appear.



EDID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	00	FF	FF	FF	FF	FF	FF	00	4C	AB	00	00	01	00	00	00
2	09	17	01	03	81	6E	3E	78	8A	A5	8E	A6	54	4A	9C	26
3	12	45	46	AD	CE	00	81	40	01	01	01	01	01	01	01	01
4	01	01	01	01	01	01	01	1D	00	72	51	D0	1E	20	6E	28
5	55	00	B9	88	21	00	00	1E	9A	29	A0	D0	51	84	22	30
6	50	98	36	00	B9	88	21	00	00	1C	00	00	00	FD	00	32
7	4B	18	3C	0B	00	0A	20	20	20	20	20	20	00	00	00	FC
8	00	53	45	35	30	49	59	30	34	0A	20	20	20	20	01	1E
9	02	03	32	71	4F	06	07	02	03	15	96	11	12	13	04	14
10	05	1F	90	20	23	09	07	07	83	01	00	00	75	03	0C	00
11	10	00	08	3C	20	C0	68	01	02	03	00	41	4F	CC	A8	10
12	B8	10	8C	0A	D0	90	20	40	31	20	0C	40	55	00	B9	88
13	21	00	00	18	01	1D	80	18	71	1C	16	20	58	2C	25	00
14	B9	88	21	00	00	9E	01	1D	80	D0	72	1C	16	20	10	2C
15	25	80	B9	88	21	00	00	9E	01	1D	00	BC	52	D0	1E	20
16	B8	28	55	40	B9	88	21	00	00	1E	00	00	00	00	00	44

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



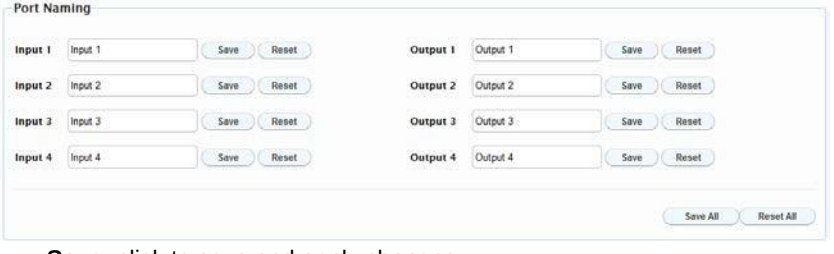
EDID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	00	FF	FF	FF	FF	FF	FF	00	4C	AB	00	00	01	00	00	00
2	09	17	01	03	81	6E	3E	78	8A	A5	8E	A6	54	4A	9C	26
3	12	45	46	AD	CE	00	81	40	01	01	01	01	01	01	01	01
4	01	01	01	01	01	01	01	1D	00	72	51	D0	1E	20	6E	28
5	55	00	B9	88	21	00	00	1E	9A	29	A0	D0	51	84	22	30
6	50	98	36	00	B9	88	21	00	00	1C	00	00	00	FD	00	32
7	4B	18	3C	0B	00	0A	20	20	20	20	20	20	00	00	00	FC
8	00	53	45	35	30	49	59	30	34	0A	20	20	20	20	01	1E
9	02	03	32	71	4F	06	07	02	03	15	96	11	12	13	04	14
10	05	1F	90	20	23	09	07	07	83	01	00	00	75	03	0C	00
11	10	00	08	3C	20	C0	68	01	02	03	00	41	4F	CC	A8	10
12	B8	10	8C	0A	D0	90	20	40	31	20	0C	40	55	00	B9	88
13	21	00	00	18	01	1D	80	18	71	1C	16	20	58	2C	25	00
14	B9	88	21	00	00	9E	01	1D	80	D0	72	1C	16	20	10	2C
15	25	80	B9	88	21	00	00	9E	01	1D	00	BC	52	D0	1E	20
16	B8	28	55	40	B9	88	21	00	00	1E	00	00	00	00	00	44

Save as: 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.

(3) Port Naming

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



- **Save:** click to save and apply changes.

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

Advanced Setting

Advanced Setting is available to perform the following functions:

- Network
- Change Password
- Matrix Setting Password
- Update Web UI
- Log
- Customize Web UI logo

(1) Network

Network is used to set the dynamic/static IP address.

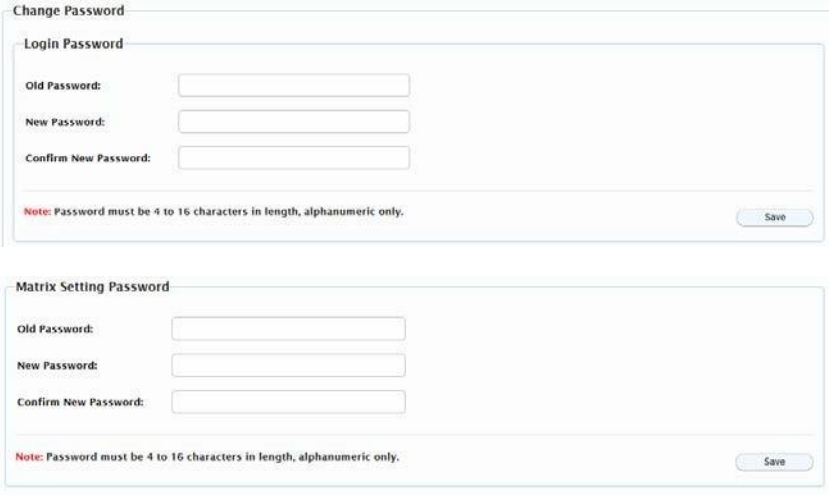
- **DHCP:** once enabled, IP address of the matrix is assigned automatically by the DHCP server connected.
- **Static:** When the matrix fails to obtain or detect an IP address from the network connected, select "Static" to set up the IP address manually. The default address of the matrix is **192.168.10.254**.
- **Apply:** click to enable the network settings.

Note:

1) When "Static" is selected, 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.x.x. (x is suggested to between 2 to 253)
2) Please wait for 2 to 3 minutes for the matrix LAN module to reboot and reconnect after the network settings are changed.

(2) Change Login/Matrix Setting Password

Default Login password is "**admin**"; default Matrix Setting password is "**123456**".



Save: click to save changes.

Note: The new password must contain 4 to 16 characters (alphanumeric only).

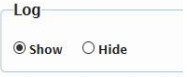
(3) Update Web UI

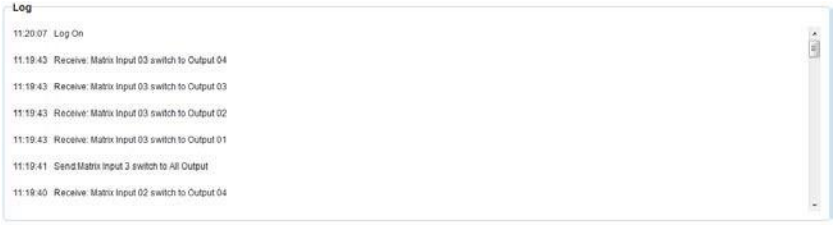
1. Click "Browse" for the update file.
2. Click "Update" to start the Web UI upgrade.
3. The matrix LAN Module will update and reboot automatically when Web UI is completed. Please wait for about 3 minutes and then refresh and log in again.

Note: DO NOT disconnect the matrix during update process.

(4) Log

Show: Click to show the Log window at the bottom of the Matrix Control and General Setting Pages.





Hide: Click to hide the Log window at the bottom of the Matrix Control and General Setting Pages.

(5) Custom Web UI LOGO

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

1. Click "Browse" to upload the new logo file. An image file in PNG format with a resolution of 234x80 pixels is suggested.

2. Click "Upload", the following window will appear. Click "here" to reconnect the system.

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

Warranty Terms and Conditions

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

1. The original serial number (specified by LINK Brand) 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 fact that the product is repaired, dismantled or altered by anyone that is not from a LINK Brand authorized service partner. The defects are caused by the fact that the product is used or handled improperly, roughly or not as instructed in the applicable User Guide.
4. The defects are caused by any superior force including but not limited to accidents, fire, earthquake, lightning, tsunami and war.
5. The service, configuration and gifts promised by salesman only but not covered by normal contract.
6. LINK Brand preserves the right for interpretation of these cases above and to make changes to them at any time without notice.

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