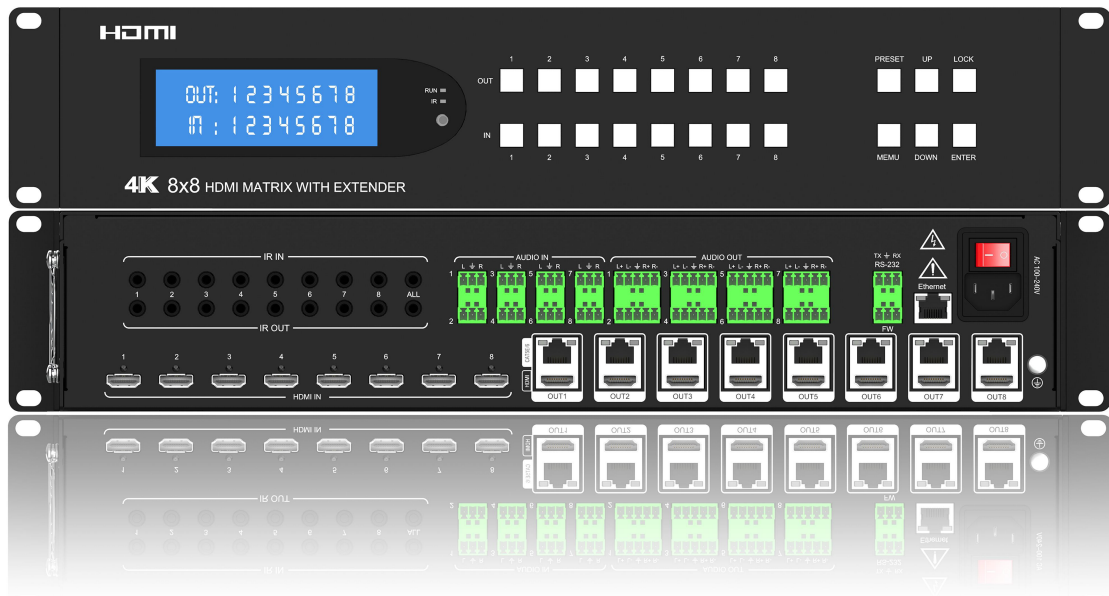


Best.nr: 20110465

65m 8x8 HDMI 2.0 Matrix Extender with 8 HDMI loop out Support 4K60hz YUV4:4:4, 18Gbps, HDR (HLG)

OPERATION MANUAL



Thank you for purchasing this product. For optimum performance and safety, please read these instructions carefully before connecting, operating or adjusting this product. Please keep this manual for future reference.

SURGE PROTECTION DEVICE RECOMMENDED

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lightning strikes, etc. Use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.

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1. Features

- 8 x HDMI input and 8 x Ethernet output with 8 x HDMI Loop out
- HDMI 2.0 version support 4K@60Hz YUV4:4:4,18G,deep color max 12bit,HD 8CH digital audio format
- Extending 4K60Hz video signal to distances up to 65m over single Cat6 Ethernet cable
- HDCP 2.2/1.4 compliant(follow input)
- Support Dolby VisionD,HDR10,HDR-HLG
- Support LPCM up to 7.1/24-bit/96 kHz, Dolby Atmos and DTS-X Atmos
- Ethernet port support Telnet,UDP,Http,TCP/IP protocol
- With wide-band Bi-Direction IR routed control(38~56KHz)
- Support 8x Analog Audio extraction (5pin phoenix port),
- Support 8x Analog Audio in (3pin phoenix port)
- Support Panel Button with LCD, IR Remote control, RS232 Control, TCP/IP Control
- Support 4K downscale to 1080p
- Support smart EDID management
- Support AC100~240V power supply,support 8 x POC power output
- Support 3Pin Phoenix terminal plug for FW updating

2. Package Contents

- 1). 1x Main Unit (HDMI Matrix Extender)
- 2). 1x AC100~240V power cable
- 3). 1x Remote control
- 4). 9xIR Transmitter cables, 9x Wide-Band IR Receiver cables
- 5). 1x CD for user manual & Command list
- 6). 8x 5Pin Phoenix terminal plug
- 7). 10x 3Pin Phoenix terminal plug
- 8). 2U rack design metal case with 2 mounting ear
- 9). 1x USB2.0 to RS232 upgrade cable

3. Specifications

Operating Temperature Range	-5 to +40°C(23 to +104 °F)
Storage Temperature Range	-10 to +60°C(-14 to +140 °F)
Operating Humidity Range	5 to 90 % RH (no condensation)
Input Video Signal	0.5-1.0 volts p-p
Input DDC Signal	5 volts p-p (TTL)
Bandwidth	18Gbit/s
Video Format Supported	4K@60Hz,YUV4:4:4 8bit 4k@30Hz/1080P/1080i/720P/576P/480P/576i/480i
HDCP Compliant	HDCP 2.2 and HDCP 1.4
Output Video	HDMI 2.0 Version
Audio Format Supported	LPCM up to 7.1/24-bit/96 kHz, Dolby Atmos and DTS-X Atmos
Maximum Transmission Distance	65m
Power Consumption	70watts (Max.)
Dimensions	Matrix: L438 x W279 x H88 mm Receiver: L110.2xW68.3xH18 mm
Mass (Main Unit)	5.38 KG

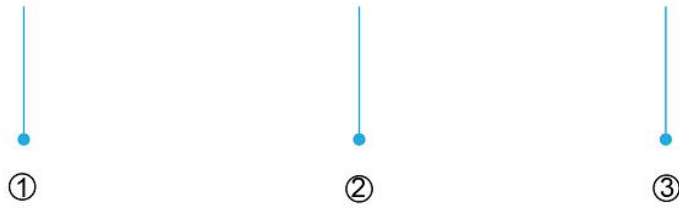
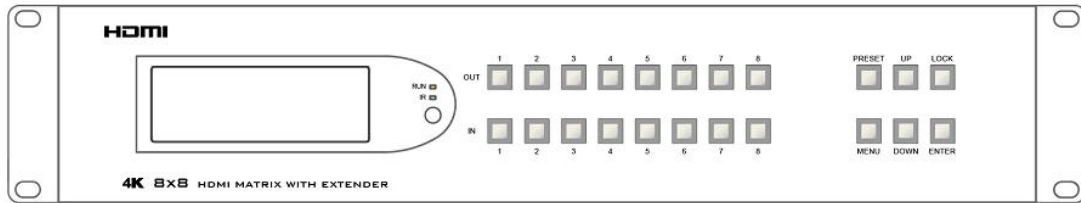
VESA Resolution List

Rate	Resolution	Supported	Mark
60Hz	640×480	√	
	800×600	√	
	1024×768	√	
	1280×768	√	
	1280×1024	√	
	1600×1200	√	
	1680×1050	√	
	1920×1080	√	
	1280×720	√	
	1360×768	√	
	1920×1200	√	
	3840×2160	√	

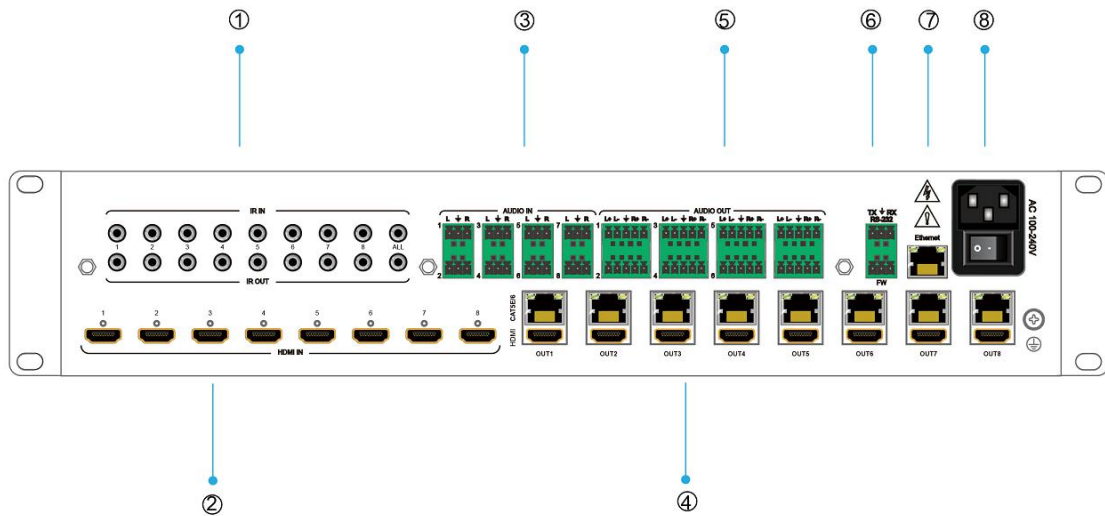
Testing Resolution List

Rate	I/P	Resolution	Supported	Mark
50Hz	I	576i	×	
	P	576P	√	
	P	720P	√	
	P	1080P	√	
	I	1080i	√	
	P	4K2K	√	
60Hz /59.94Hz	I	480i	×	
	P	480P	√	
	P	720P	√	
	P	1080P	√	
	P	4K2K	√	
30/29.97Hz	P	720P	√	
	P	1080P	√	
	P	4K2K	√	
24Hz	P	720P	√	
	P	1080P	√	
	P	4K2K	√	
25Hz	P	720P	√	
	P	1080P	√	
	P	4K2K	√	

4. Panel Descriptions



- ① LCD: Showing Matrix information
- ② Output button OUT1~8 & Input button IN1~8
- ③ Function button: PRESET; MENU; UP; DOWN; LOCK; ENTER



- ① IR input port x8 & All in & IR output port x8 & All out
- ② HDMI input x8
- ③ Analog Audio in x8
- ④ Ethernet output x8 & HDMI Loop out x8
- ⑤ Analog Audio out x8
- ⑥ RS232 port & FW update port
- ⑦ Ethernet port
- ⑧ Power On/Off



6. Input / output channel key operation

Channel	Button method
Any Key	The first operation of the button can wake up the screen and do the command
Output 1-8	Directly press the number key, such as the output channel 5, press button "5" and press it again to cancel the selection; Long press output 8 to select all channels, and long press again to cancel
Input 1-8	Directly press the number key, such as input channel 1, and select "1" to press (only when the output port is selected, the input channel number will be valid) Long press means all outputs select current input
MENU	Function Button; Short press to enter the function option or back to previous option
ENTER	Confirm Button: enter function selection mode
UP	Button for UP option
DOWN	Button for NEXT option
MUTE	Select the output port,press MUTE button to close output,press again to awaken output
LOCK	Long press to LOCK(button blue light on), Long press again to UNLOCK (button blue light off)

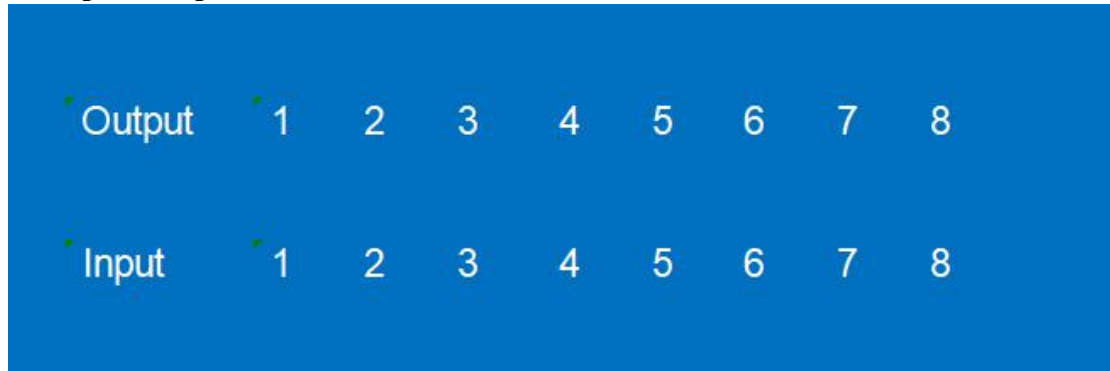
7. Video switching operation

7.1. Video switch

The signal switch includes 8 free switching channels, which can be configured as input/output according to the requirements, forming a matrix of 1 x 8 ~ 8 x 1, which can switch any input.

Signal to 1 channel output or all channel output.

The specific operation as follows:



Switch the input to the output

Operation format: "output channel" + "input channel"

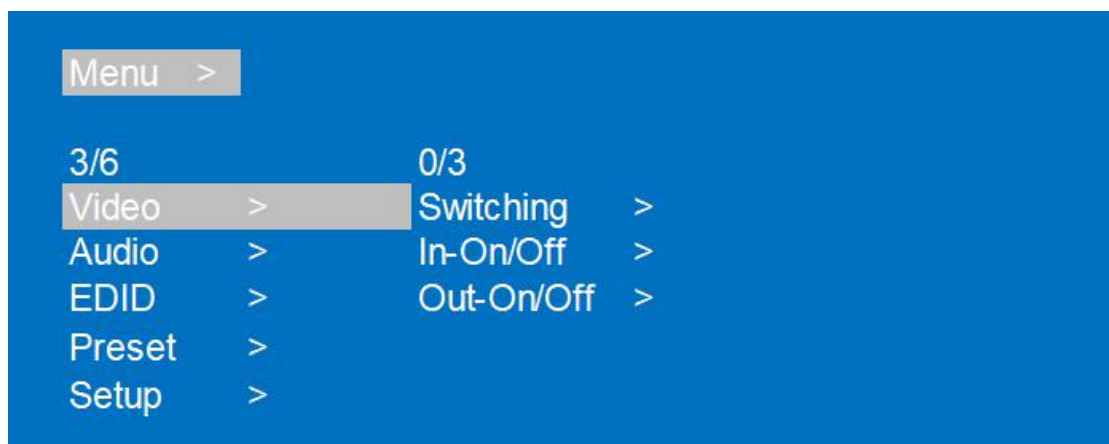
For Example: Output port 1 switch to input 5

Operation: Press OUT number "1" + IN number "5" to complete the switch

7.2. Video Control

The video interface have three sub menu

1. Video Switching
2. Video-in On/Off
3. Video-out On/Off

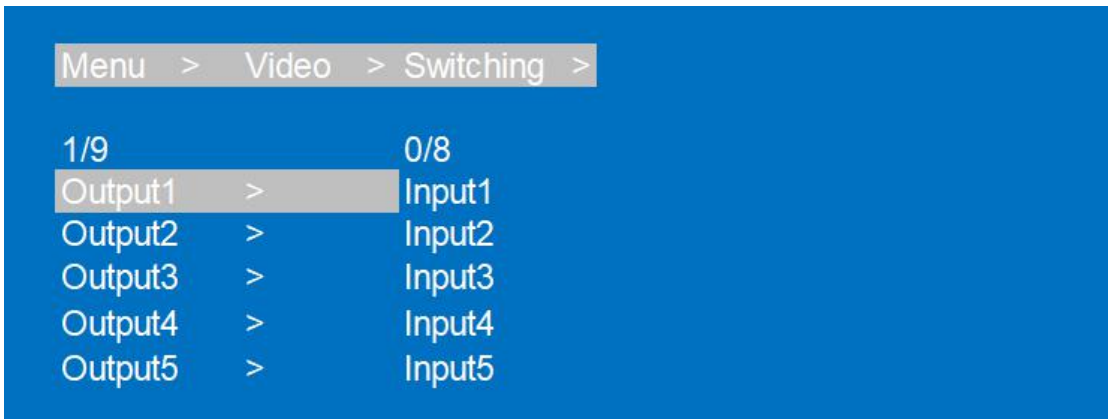
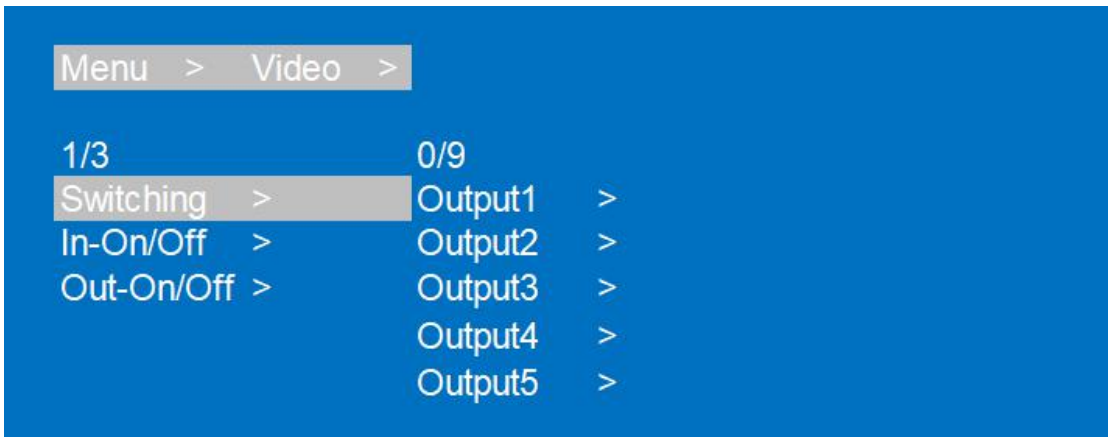


The specific operation as follows:

1.Video Switch

Switch any output to one input or all outputs to the same input, default PTP.

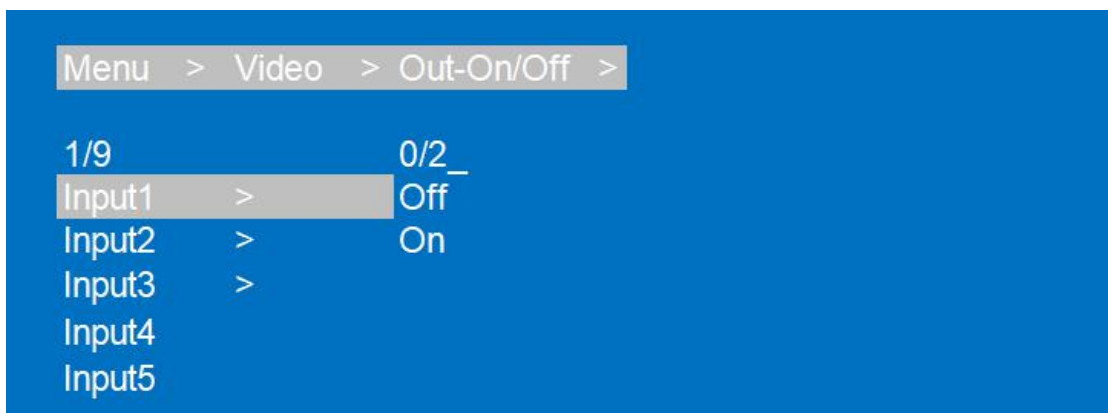
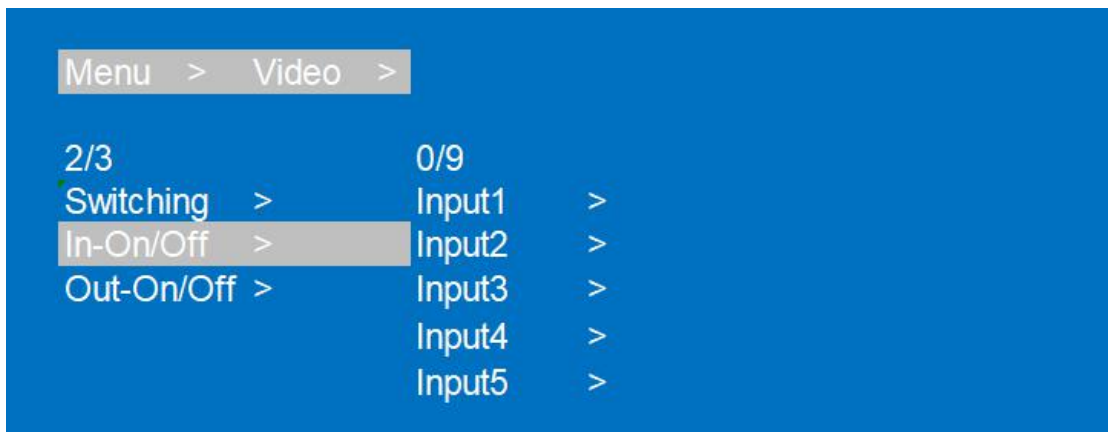
- ①Select "Video" in the menu and press "ENTER"
- ②Then use "UP" " DOWN" button to select "Switching"
- ③Press "ENTER" enter next page
- ④Press "UP" " DOWN" button to select the output (The ninth option means ALL outputs)
- ⑤Press "ENTER"
- ⑥Press "UP" " DOWN" to select the input
- ⑦Press "ENTER" , Switching Done



2.Video-in On/Off

Turn on/off any output video or all outputs video

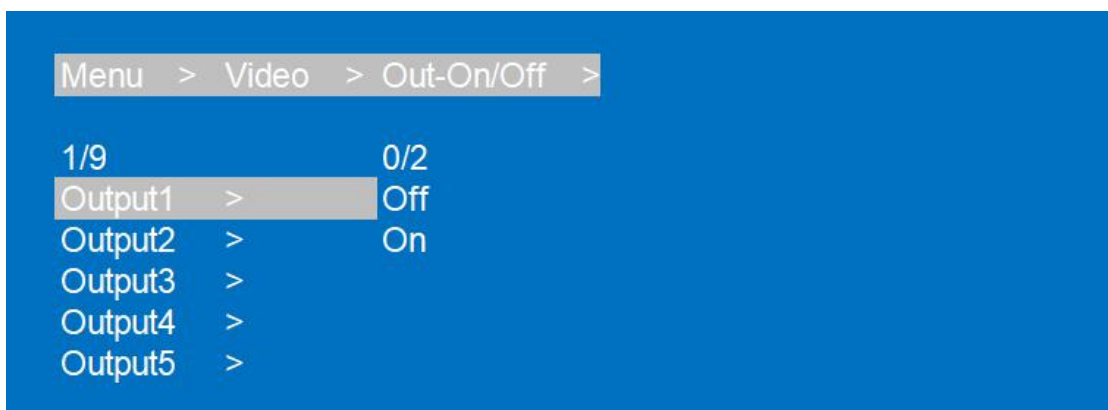
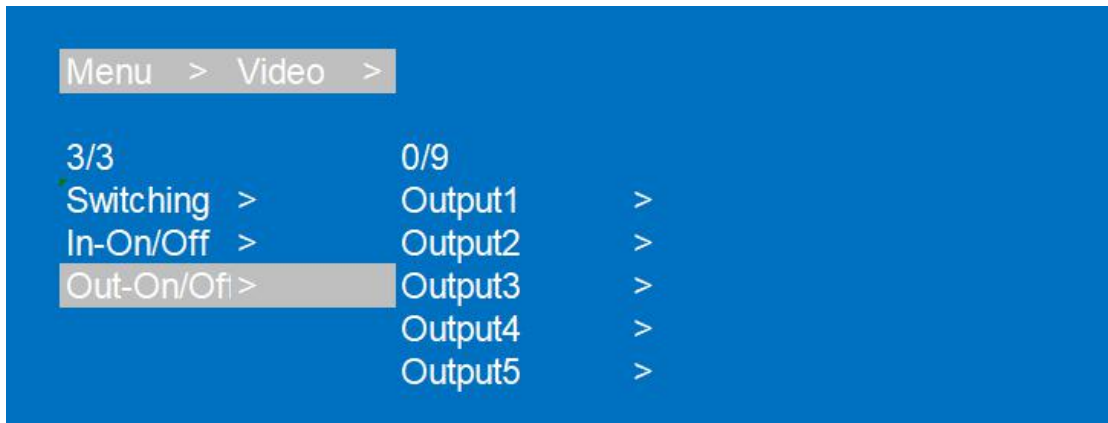
- ①Select "Video" in the menu and press "ENTER"
- ②Then use "UP" " DOWN" button to select "In On/Off"
- ③Press "ENTER" enter next page
- ④Press "UP" " DOWN" button to select the input (The 9th option means ALL inputs)
- ⑤Press "ENTER" to enter next page
- ⑥Press "UP" " DOWN" to select "On" or "Off"
- ⑦Press "ENTER" , Switching Done



3.Video-out On/Off

Turn on/off any output video or all outputs video

- ①Select "Video" in the menu and press "ENTER"
- ②Then use "UP" " DOWN" button to select "Output On/Off"
- ③Press "ENTER" enter next page
- ④Press "UP" " DOWN" button to select the output (The 9th option means ALL outputs)
- ⑤Press "ENTER" to enter next page
- ⑥Press "UP" " DOWN" to select "On" or "Off"
- ⑦Press "ENTER" , Switching Done



7.3. Audio Control

The Audio Control has three sub menu

1. Audio-Hdmi (HDMI Input Audio)
2. Audio-Embed (Analog in)
3. Audio-Analog (Analog out)



The specific operation is as follows:

1. Audio-Hdmi

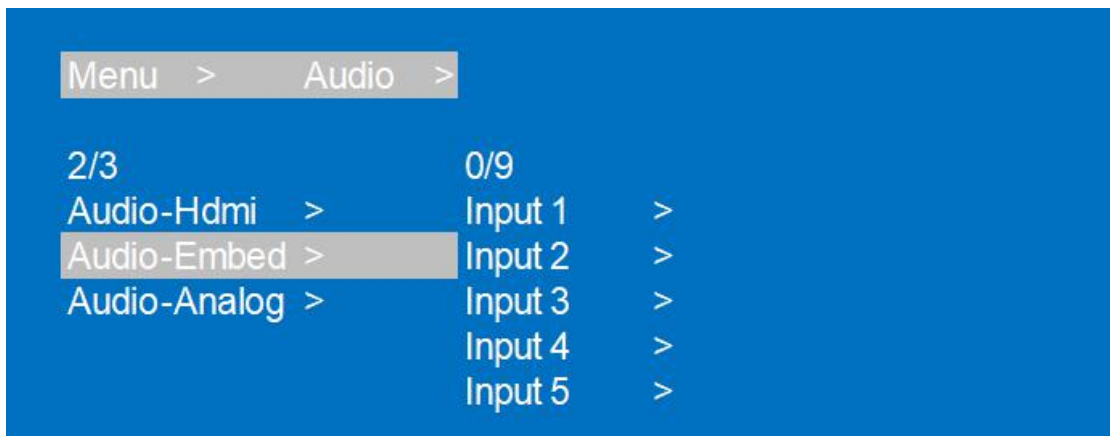
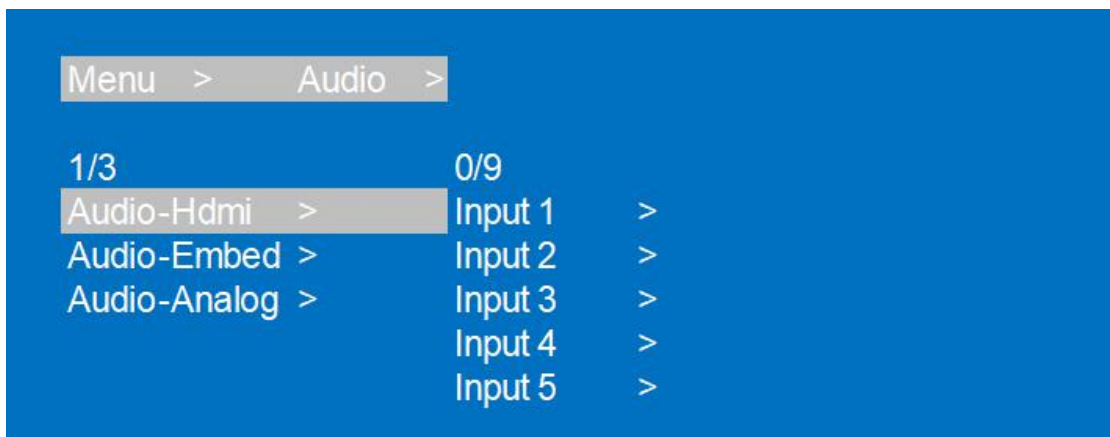
HDMI input audio switch. You can select any one of HDMI input source audio to be mute

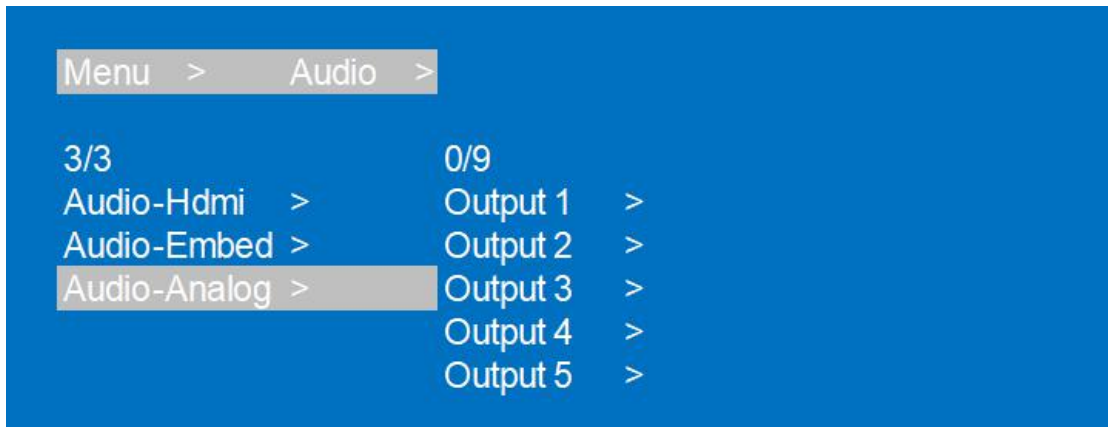
2. Audio Embed

Audio can be embedded to HDMI input. The embedded sound will cover the original sound of the signal source. You can select any one of the input to embed

3. Audio-Analog Out

Can choose any one of the Analog audio output on or off



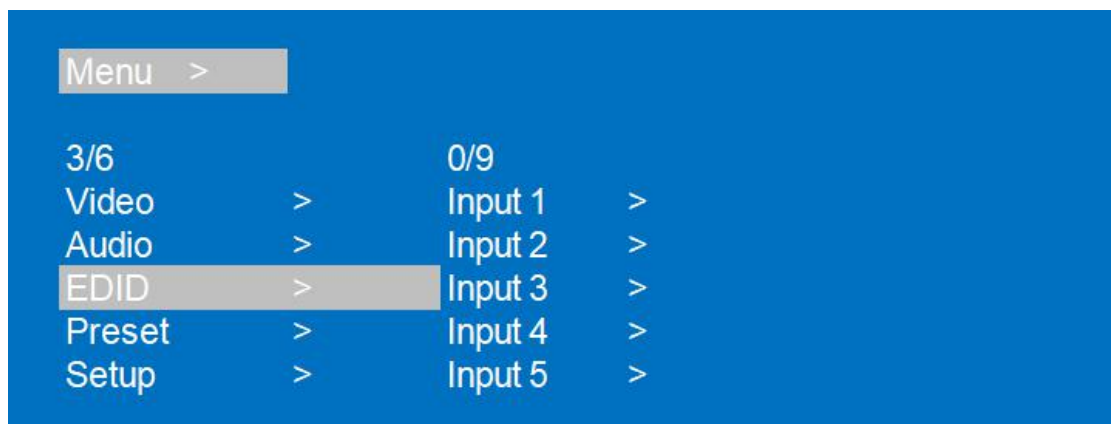


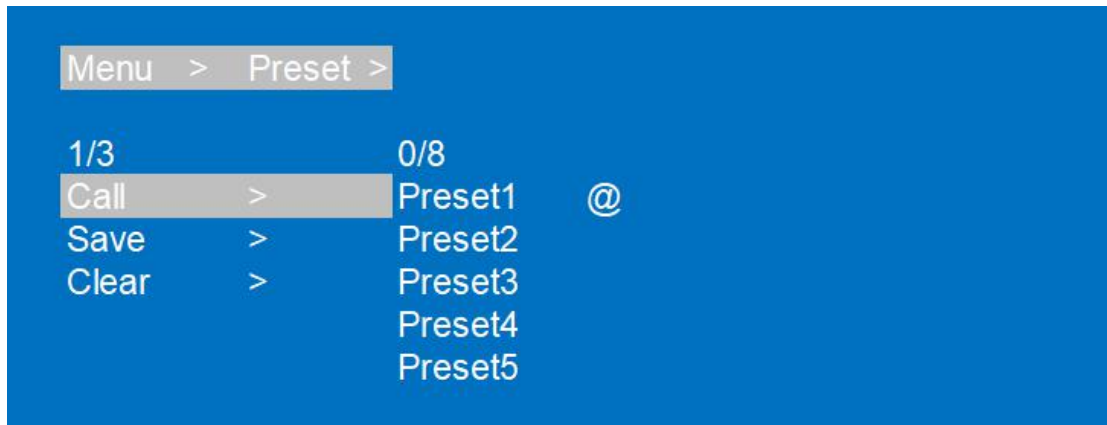
7.4. EDID Set Mode Interface

Default EDID

Default-1	1080P60hz-2.0	Default-5	4K60hz-YUV420-5.1
Default-2	1080P60hz-5.1	Default-6	4K60hz-YUV444-2.0-HDR:HLG
Default-3	1080P60hz-7.1	Default-7	4K60hz-YUV444-5.1-HDR:HLG
Default-4	4K60hz-YUV420-2.0	Default-8	4K60hz-YUV444-2.0-HDR10:HLG

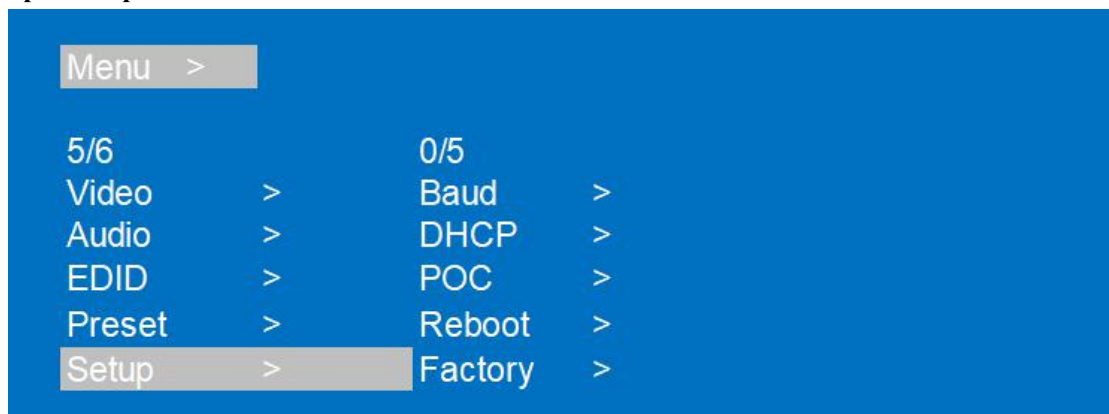
EDID Mode can set each input's EDID, Include: Default EDID; User EDID; Copy EDID; Copy UTP Remote side EDID.





7.6. SETUP mode Interface

SETUP mode can set the device's RS-232 baud rate, POC Switch, DHCP, Reboot, Factory. Specific operations are as follows

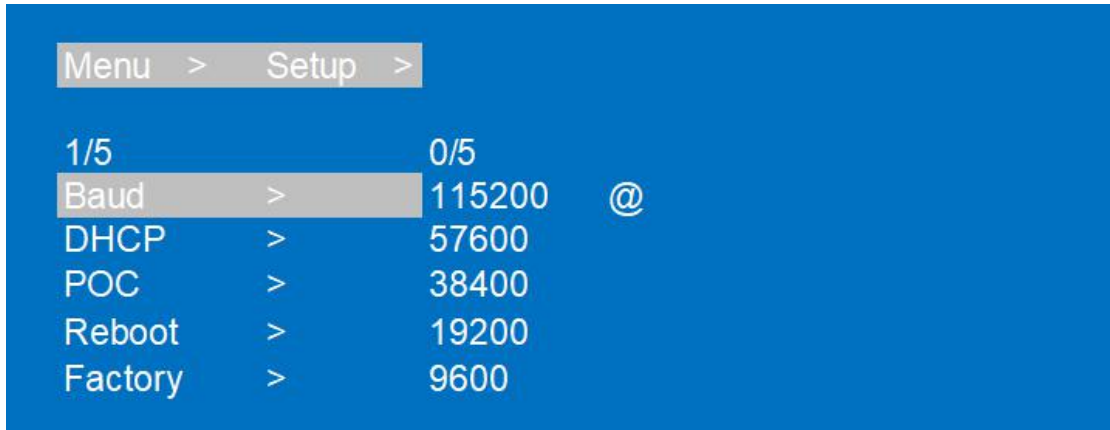


7.6.1. RS-232 Baud Rate setting

It has 5 kinds of baud rates inside the device: 9600,38400,19200,57600,115200

Default Baud Rate is: 115200

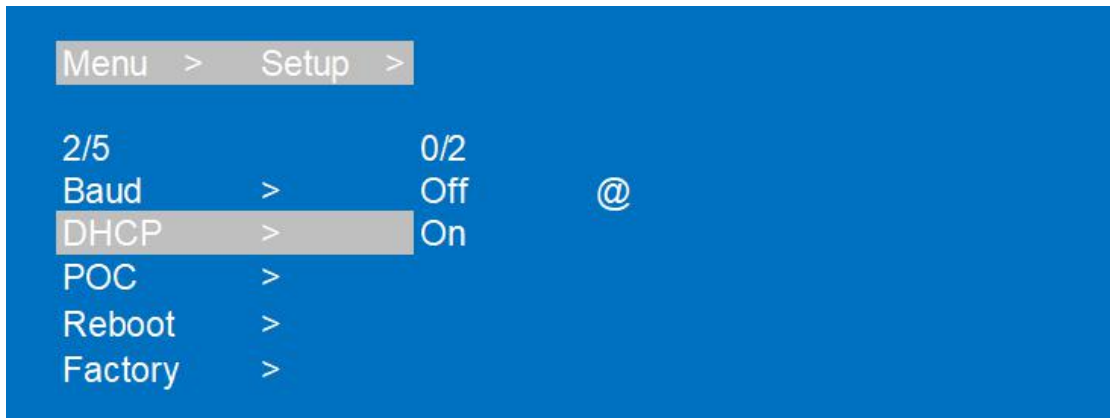
- ① Select "Setup" in the menu and press "ENTER"
- ② Then use "UP" "DOWN" button to select the "BAUD" and press "ENTER"
- ③ Press "UP" "DOWN" button to select the baud rate and press "ENTER" to confirm



7.6.2. DHCP On/Off setting

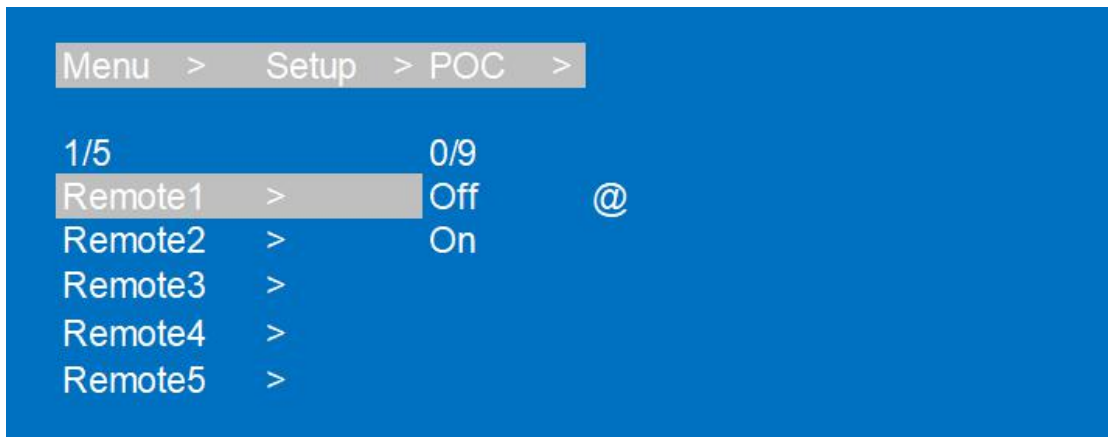
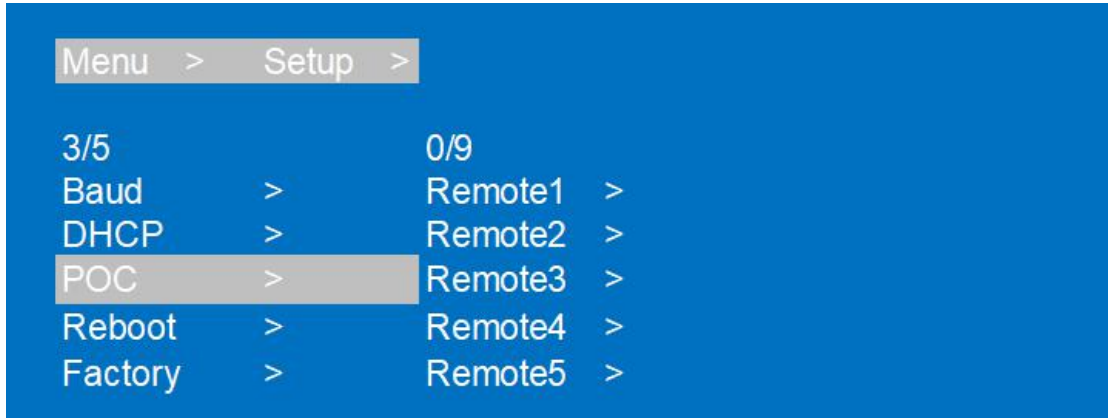
On means Dynamic; Off means Static

- ① Select "Setup" in the menu and press "ENTER"
- ② Then use "UP" "DOWN" button to select the "DHCP" and press "ENTER"
- ③ Press "UP" "DOWN" button to select "On" or "Off" and press "ENTER" to confirm

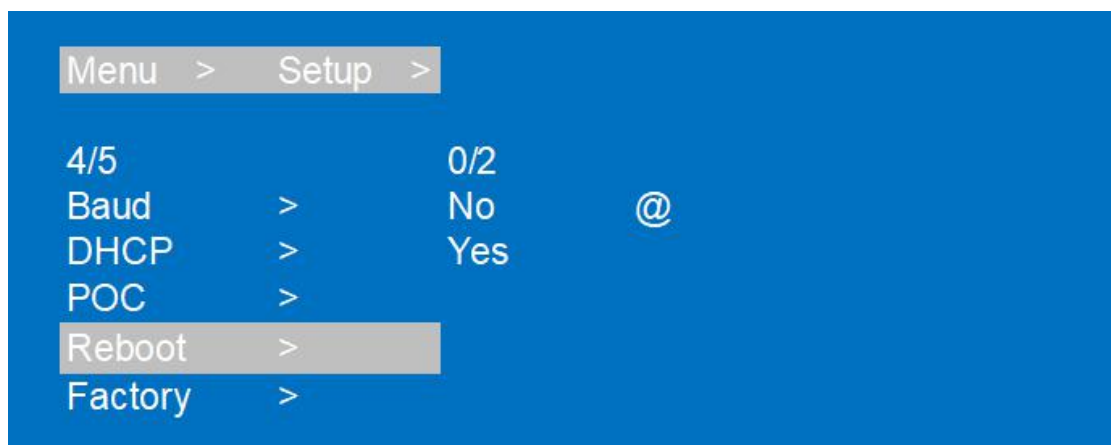


7.6.3. POC power switch

The POC interface can select a certain UTP (Remote side) output switch to control POC power supply, and the default POC is "On"



7.6.4. Reboot setting

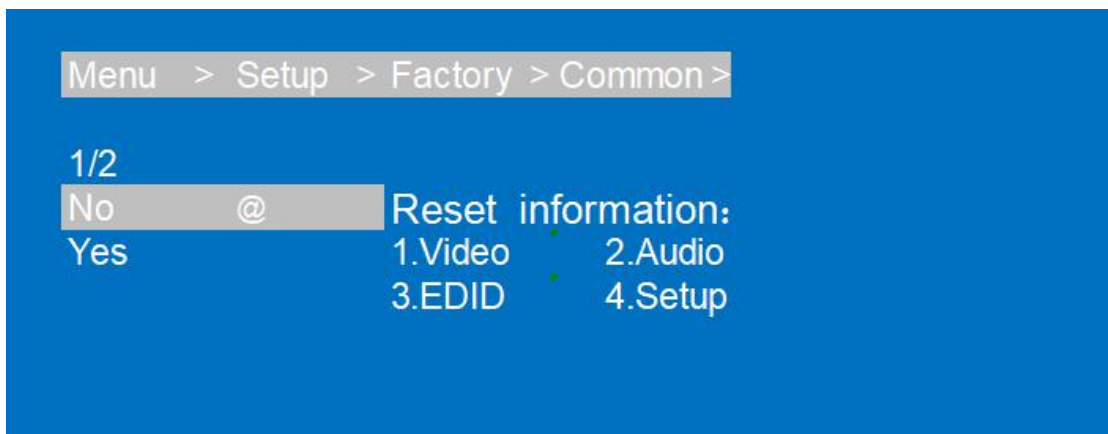
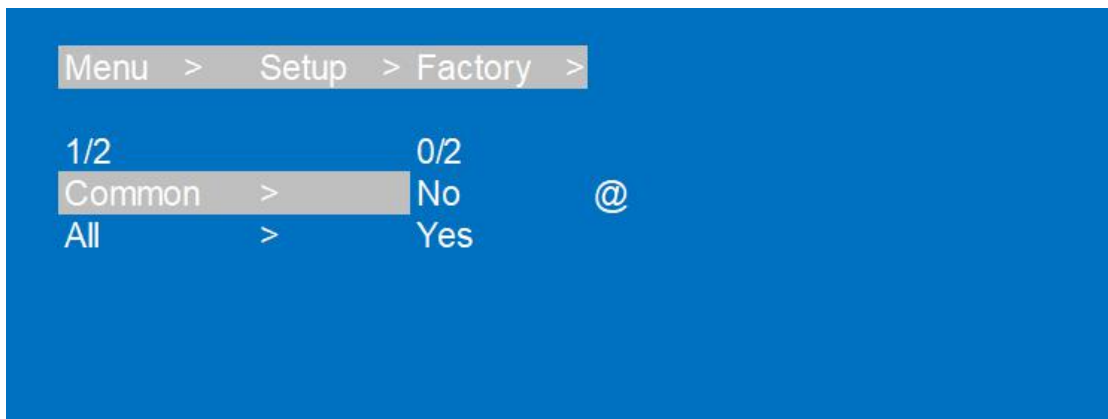


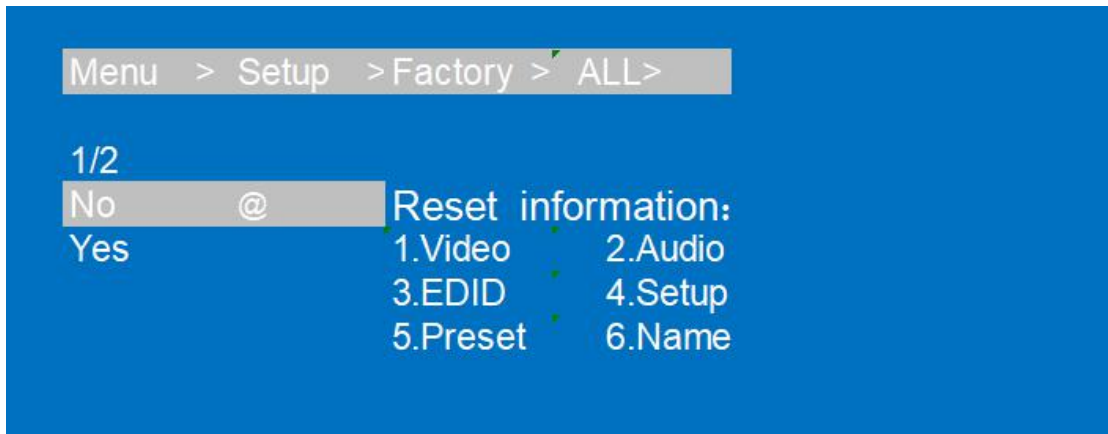
7.6.5. Factory setting

Command: to resume running data, but it cannot change the setup you already saved, such as Save

preset;

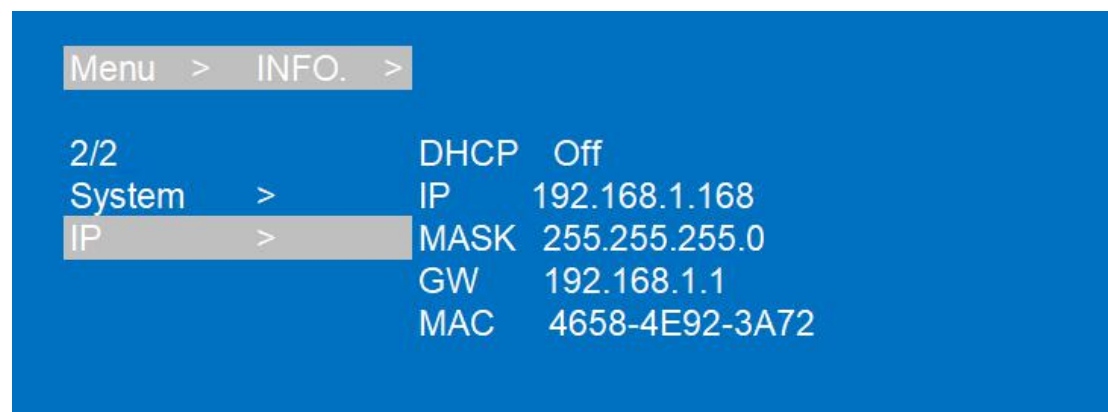
ALL: Reset all Video, Audio, EDID, Setup setting, Preset, Device name etc.



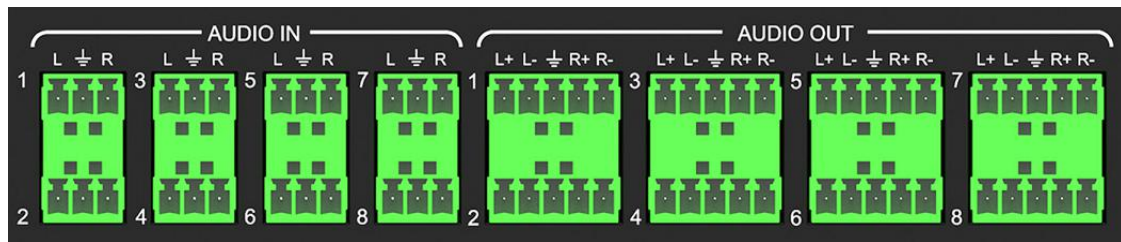


7.7. INFO mode Interface

Check the device information: IP or System information



8. Audio Embed/ Extraction



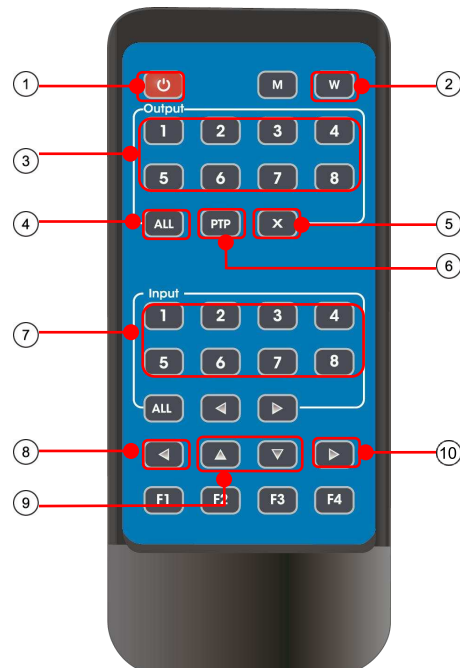
HDMI audio output supports uncompressed audio PCM, compressed audio Dolby and DTS, with a maximum support of 7.1 sound channels and a maximum sampling rate of 192KHz.

Analog audio supports PCM 2.0 channel.

9. Remote Control Description

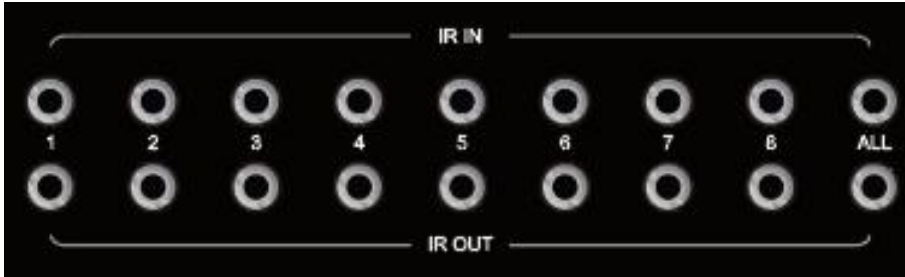
- ① Standby Mode
- ② Lock or Unlock the Panel Button
- ③ Choose output from 1-8
- ④ Choose all the outputs.
- ⑤ X: Turn on/off output port which you select
- ⑥ PTP button: Mirror all inputs and outputs
(Ex. Input 1 to output 1, input 2 to output 2, etc)
- ⑦ Choose input from 1-8
- ⑧ Menu (back to previous option) button
- ⑨ UP and DOWN button
- ⑩ Enter button

Note: When Press "Output" Button + "M" Button can turn on/off the Output's Audio



10. IR system

The matrix can pass the IR signal through the IR system to the HDMI source or pass the IR signal from the HDMI source to the HDMI sink



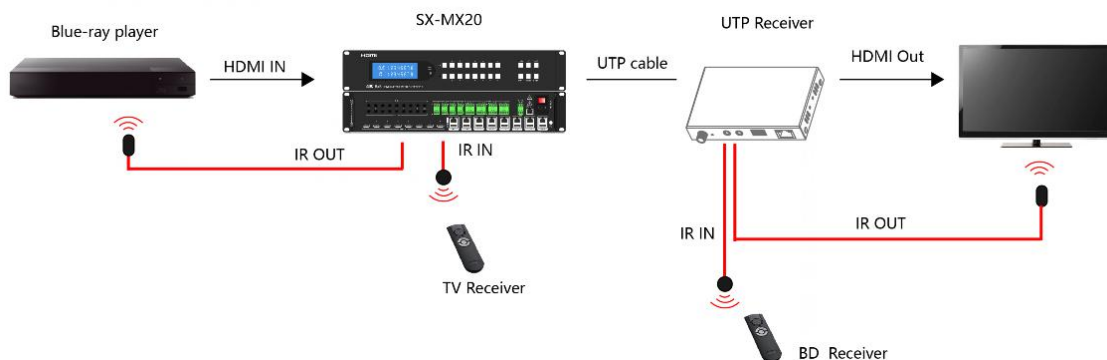
Dual way IR using:

Step1: “IR IN” is for UTP output, “IR OUT” is for input channel

Step2: “IR IN ALL” Controlled by all input IR; “IR OUT ALL” Controlled by all output IR.

Step3: Receiver support connect with IR receiver to control the Matrix by remote

Step4: Matrix IR channel “IR IN ALL” support connect with IR-RX cable to control the Matrix by remote



11. RS232 Pass Through & Command Control

Control software operation:

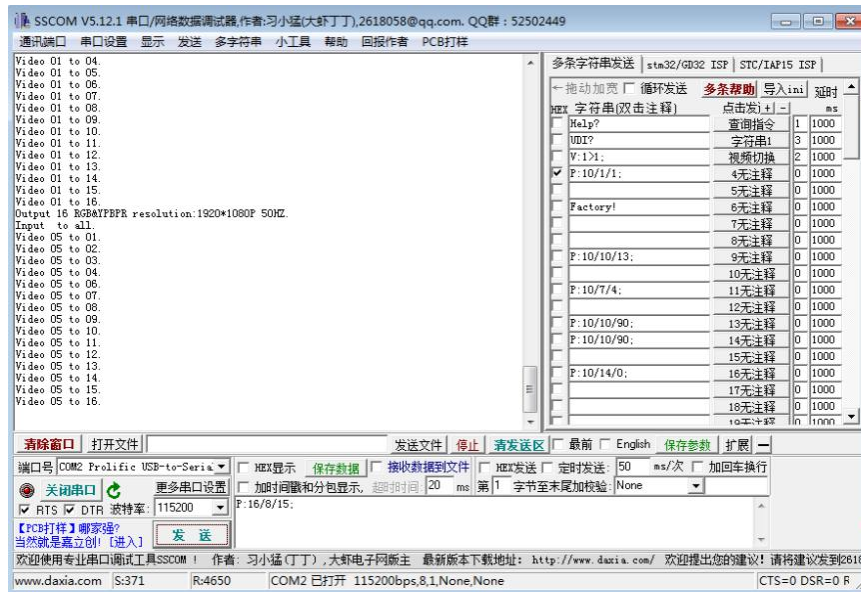
The serial control software is illustrated with SSCOM32 as an example.

Basic Settings:



Double-click the software in the installation package to run specifically (as shown in figure 1 below) and install the RS232 software on the computer.

Enter the main interface of the software, as shown in the figure below.



In the parameter configuration area, select the serial port number that the serial line connects to the PC

Baud rate: 115200 (default)

Data location: 8.

Stop bit: 1

Check bit: no

Then can input commands in the command input area to control the local or remote receiver

Instructions:

1. All commands start from “#”, command head “%c”: “d” parameters, “l” lock, “s” save.
2. The “_” in the commands cannot omit. Parameter: %d: 0 means ALL. 1-x means specified output(1~8).
3. Command head & Parameter1 & Parameter2... need to add one “SPACE”.

The following table is only an example. Please refer to the list of instructions.

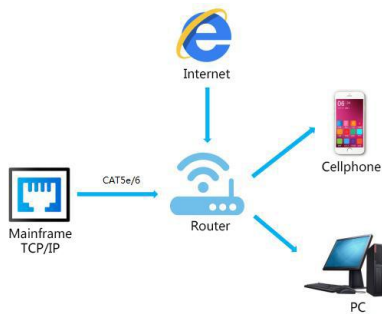
Instruction description	instruction	parameter 1	parameter 2	parameter 3
Video switch	#video_%c	out%d	in%d	matrix=%d
Audio Mode Switch	#audio_%c	in%d	/	enc=%d
EDID	#EDID_%c	In%d	cfg=%d	/

Please refer to the " Command list" for details.

Example: ALL output switches to input 4.

Operation format: #video_d out0 matrix=4

12. Web Control



- 1). Connect the Ethernet port of matrix to the Ethernet port on PC by a crossover cable with RJ45 connectors.
- 2). Configure your PC as follows:
 - ① Click **Start > Control Panel > Network and Sharing Center.**
 - ② Click **Change Adapter Settings.**
 - ③ Highlight the network adapter you want to use to connect to the device and click **Change settings of this connection.**
- 3). The local Area commotion properties window for Network selection appears as below:
- 4). Click the Highlight **Internet Protocol Version 4 (TCP/IPv4).**
- 5). Click **Properties.**
- 6). Select **Use the following IP Address** for static IP addressing and fill in the details.

For TCP/IPv4 you can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.168).

7). Click **OK.**

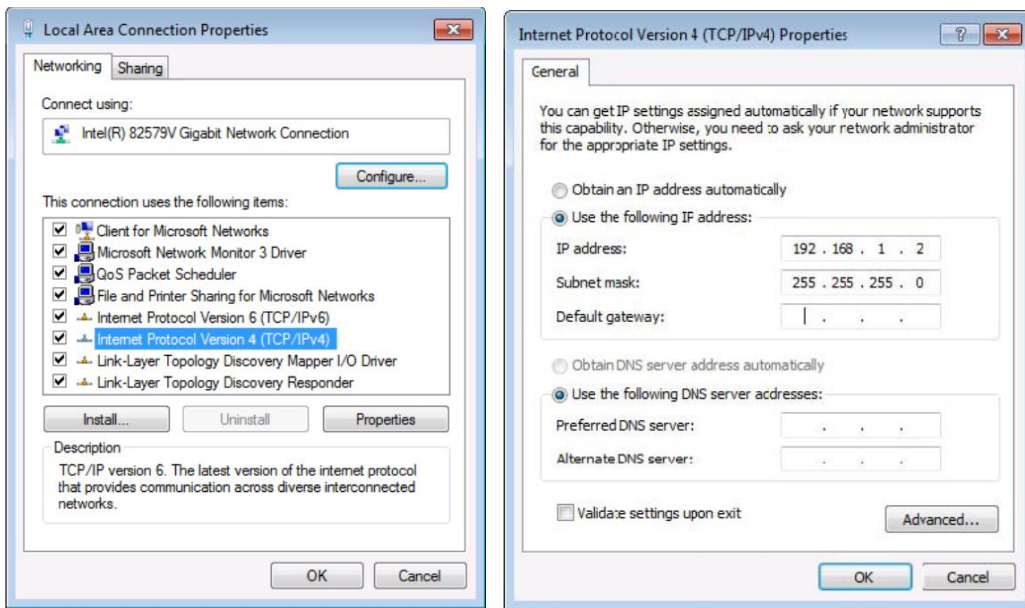
8). Click **Close.**

Default IP Address: 192.168.1.168

MASK: 255.255.255.0

Gateway:192.168.1.1

MAC:4658-4E96-406D

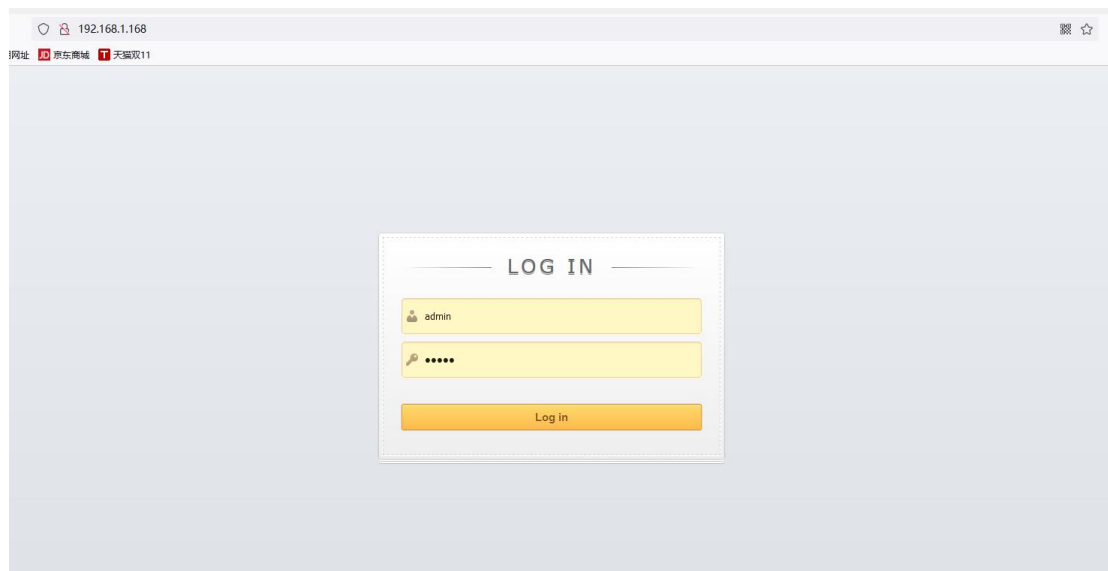


12.1. Enter Web and Control

Enter the default IP address of the matrix: 192.168.1.168

Account: admin

Password: admin



12.2. “Status” interface:

Input Info & Output Info & Device Info:

1. CONNECT: The input status display bar. After connecting with the device, it will check whether the current input terminal has access signal source.

When no signal source connected, it will be displayed as "×", and when there is a normal working signal source connected, it will be displayed as "√".

2. AUDIO-EMBED: The Audio Embed status display bar. After connecting with the device, it will check whether the current HDMI output terminal has Audio Embed.

When audio is not embedded, it will be displayed as "×". When audio is embedded, it will be displayed as "√".

3. Connect (Local) and (Remote): It will be displayed as "X" when there is no display device access, and "√" when there is display device access.

4. Audio De-Embed: Indicates if Audio separation is turned on. "X": means off. "√": means on

5. Audio HDMI & UTP: Indicates if the current local (HDMI) / Remote (UTP) Audio output is available. When the HDMI/UTP Audio output is turned off, displayed as "×", and when the HDMI/UTP Audio output is turned on, displayed as "√".

6. POC (Remote): “ON” “OFF” means POC turned on or off

7. HTML Version: Current WEB Version

The screenshot shows a web browser window with the URL 192.168.1.168/index.html. The page displays the following information:

Input Info

	Connect	Signal	HDCP	Audio-HDMI	Audio-Embed
In1	×	×	×	√	×
In2	×	×	×	√	×
In3	×	×	×	√	×
In4	×	×	×	√	×
In5	×	×	×	√	×
In6	×	×	×	√	×
In7	×	×	×	√	×
In8	×	×	×	√	×

Output Info

	Connect(Local)	EDID	Audio-Analog	POC(Remote)
Out1	×	×	√	√
Out2	×	×	√	√
Out3	×	×	√	√
Out4	×	×	√	√
Out5	×	×	√	√
Out6	×	×	√	√
Out7	×	×	√	√
Out8	×	×	√	√

Device Info

Device Name:	8X16 Matrix
MCU Version:	V0.0.6
CPLD Version:	V0.0.4
HTML Version:	V0.0.6

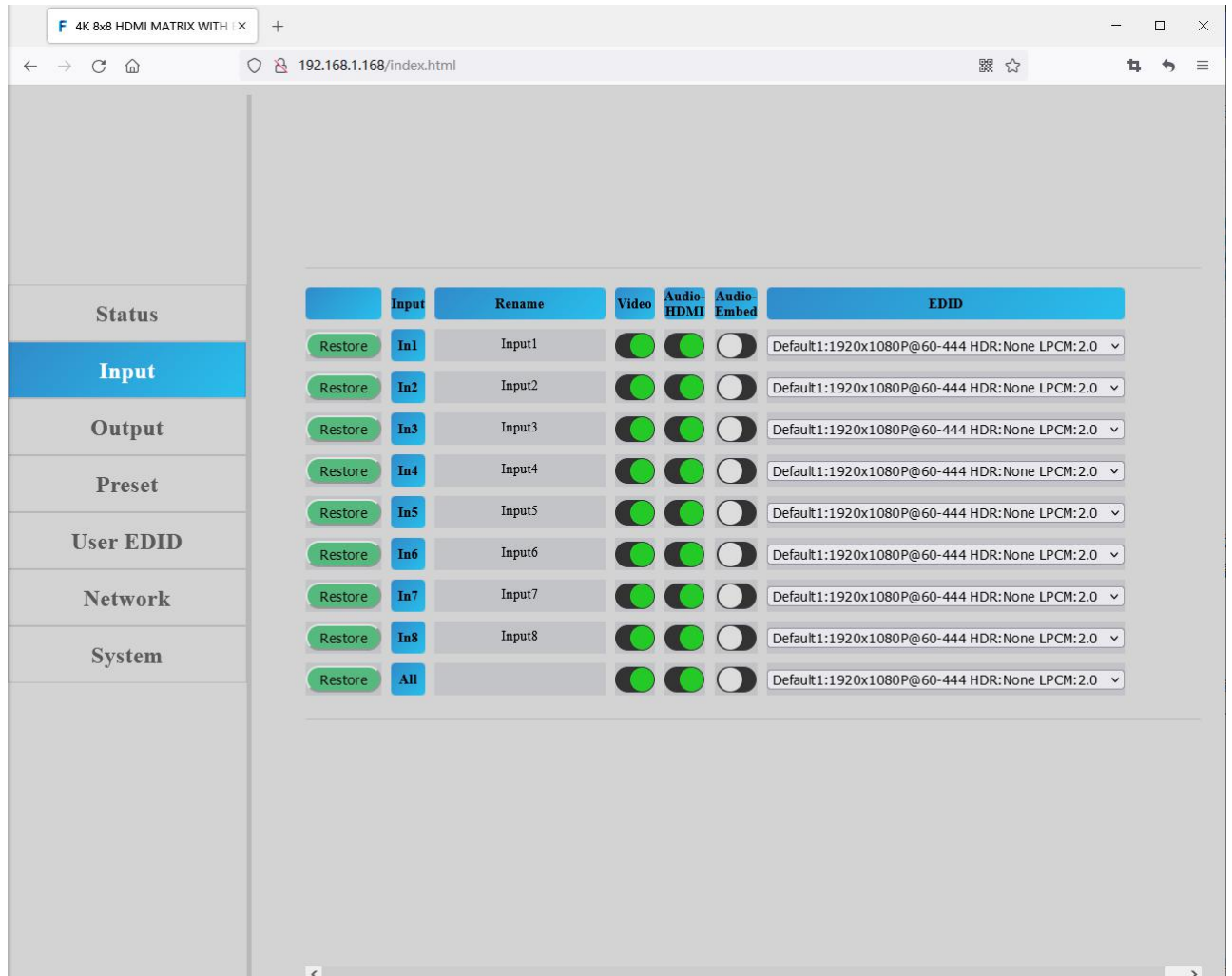
12.3. “Input” interface:

Restore: Click button to restore default status for input.

Double Click the Rename column can change the name of the ports.

Video /Audio-HDMI/Audio-Embed:turn on/off video,HDMI Audio,Audio Embed.

EDID: total 32 kinds of EDID to choose.



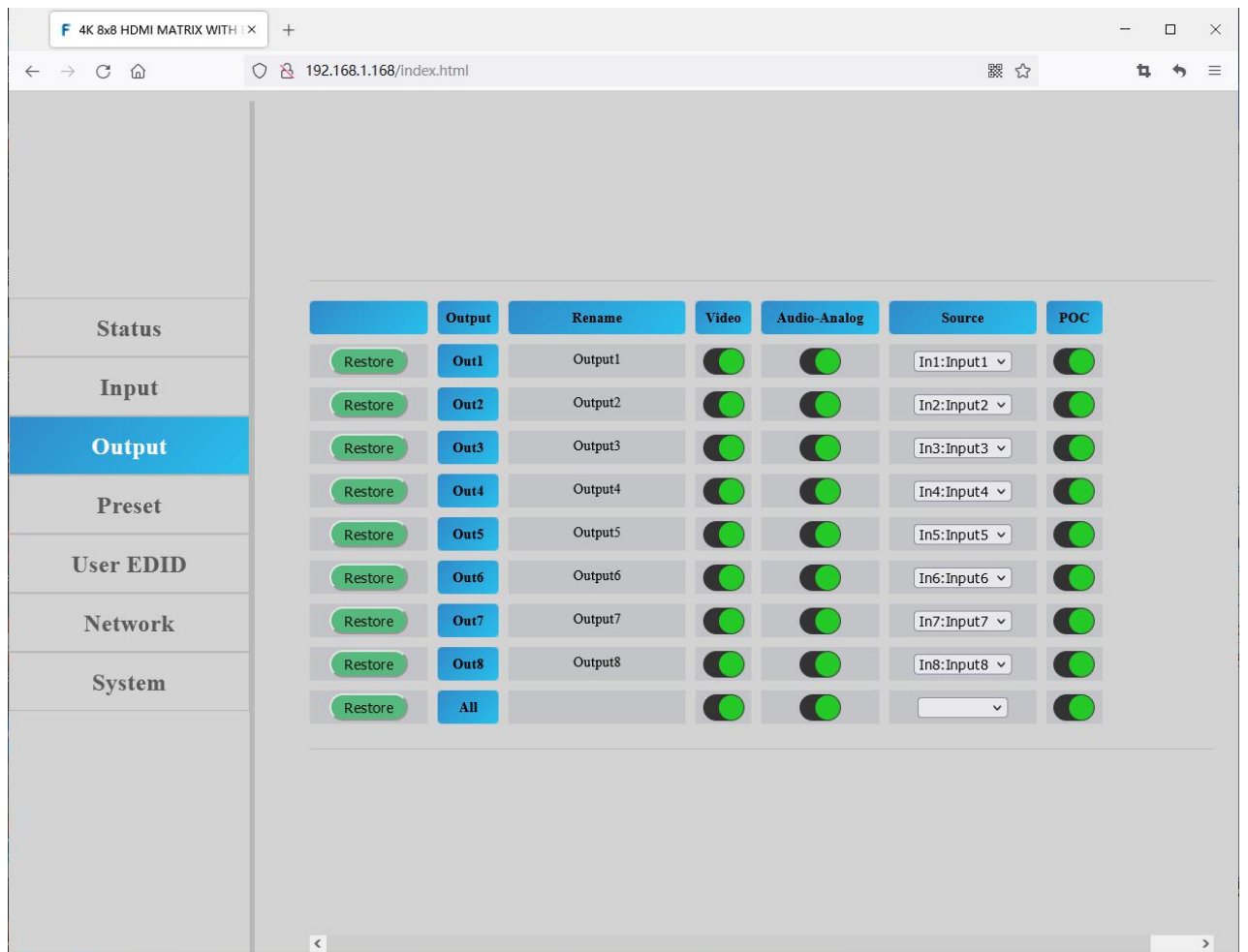
12.4. “Output” interface:

Restore: Click button to restore default status for output.

Double Click the Rename column can change the name of the ports.

Video /Audio-Analog/POC:turn on/off video,Analog Audio out,POC.

Source: can choose In1~In8.

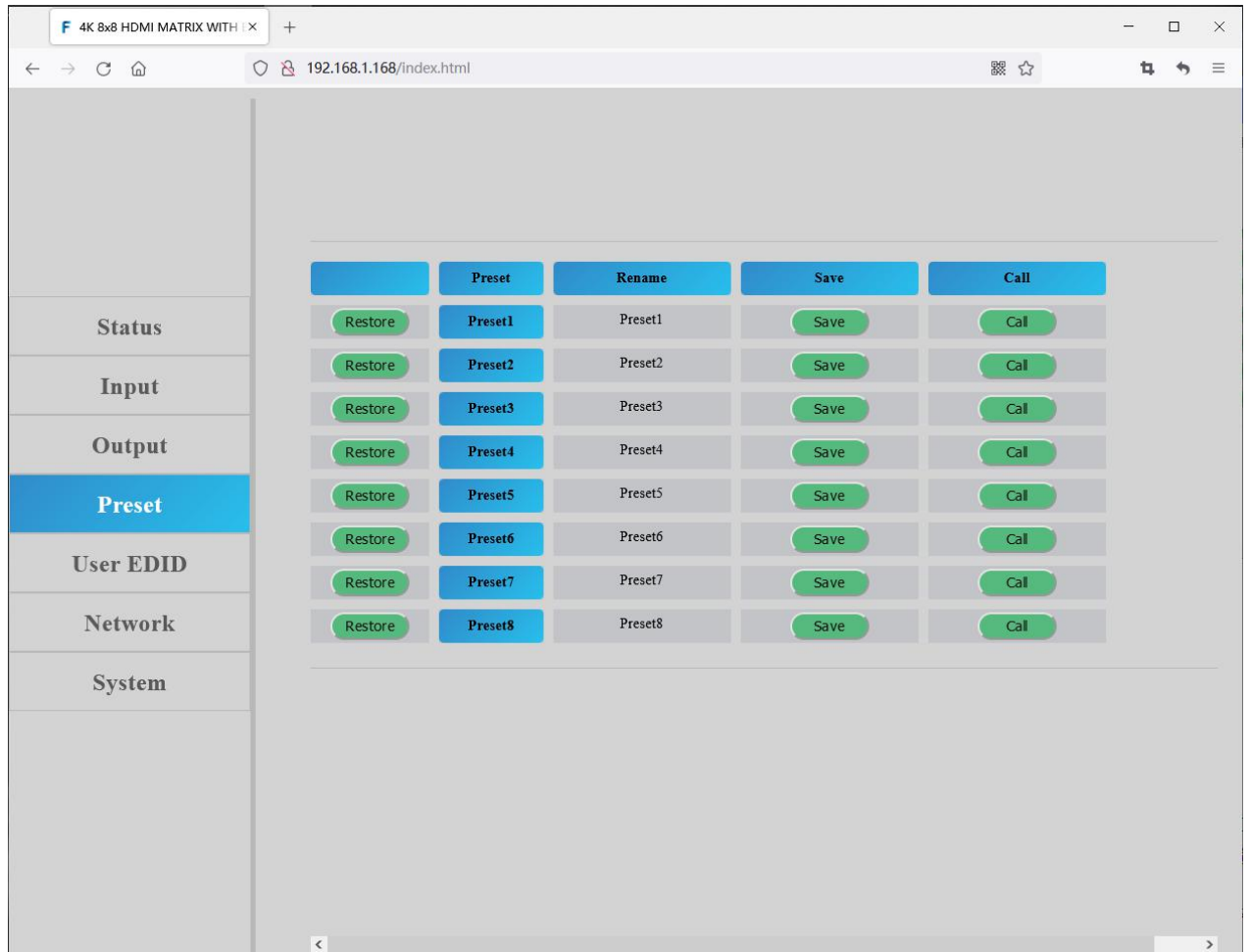


12.5. “Preset” interface:

Restore: Click button to restore default status for preset scene.

Rename: Double Click “Preset1~8” can change the name of the ports.

Save/Call: Save/Call preset.



12.6. “User EDID” interface:

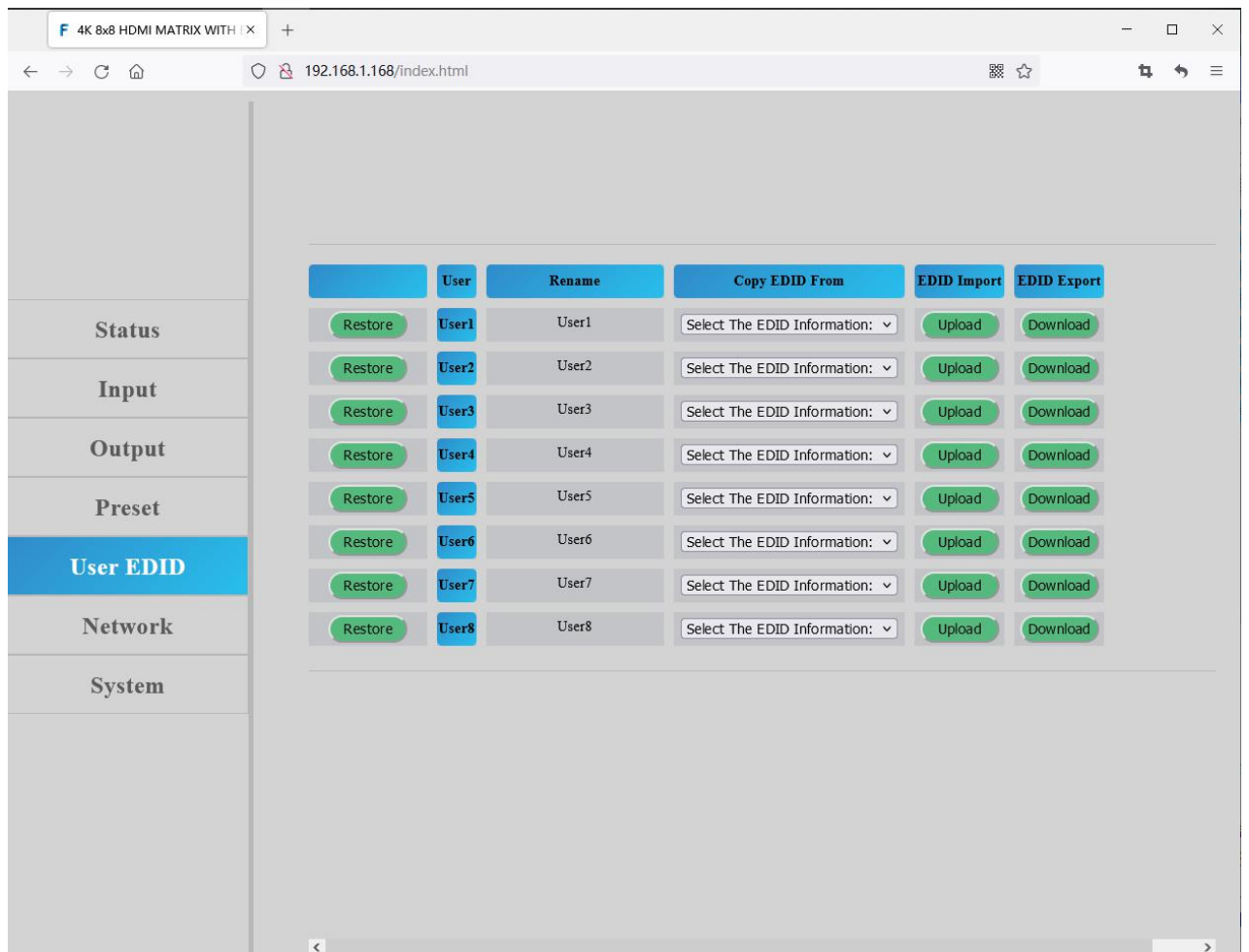
Restore: Click button to restore default status for user EDID.

Rename: Double Click “User1~8” can change the name of the ports.

Copy EDID From: can copy Local1~8, Remote1~8, total 16 kinds of EDID to user.

EDID Import: Click Upload button can upload user-defined EDID.

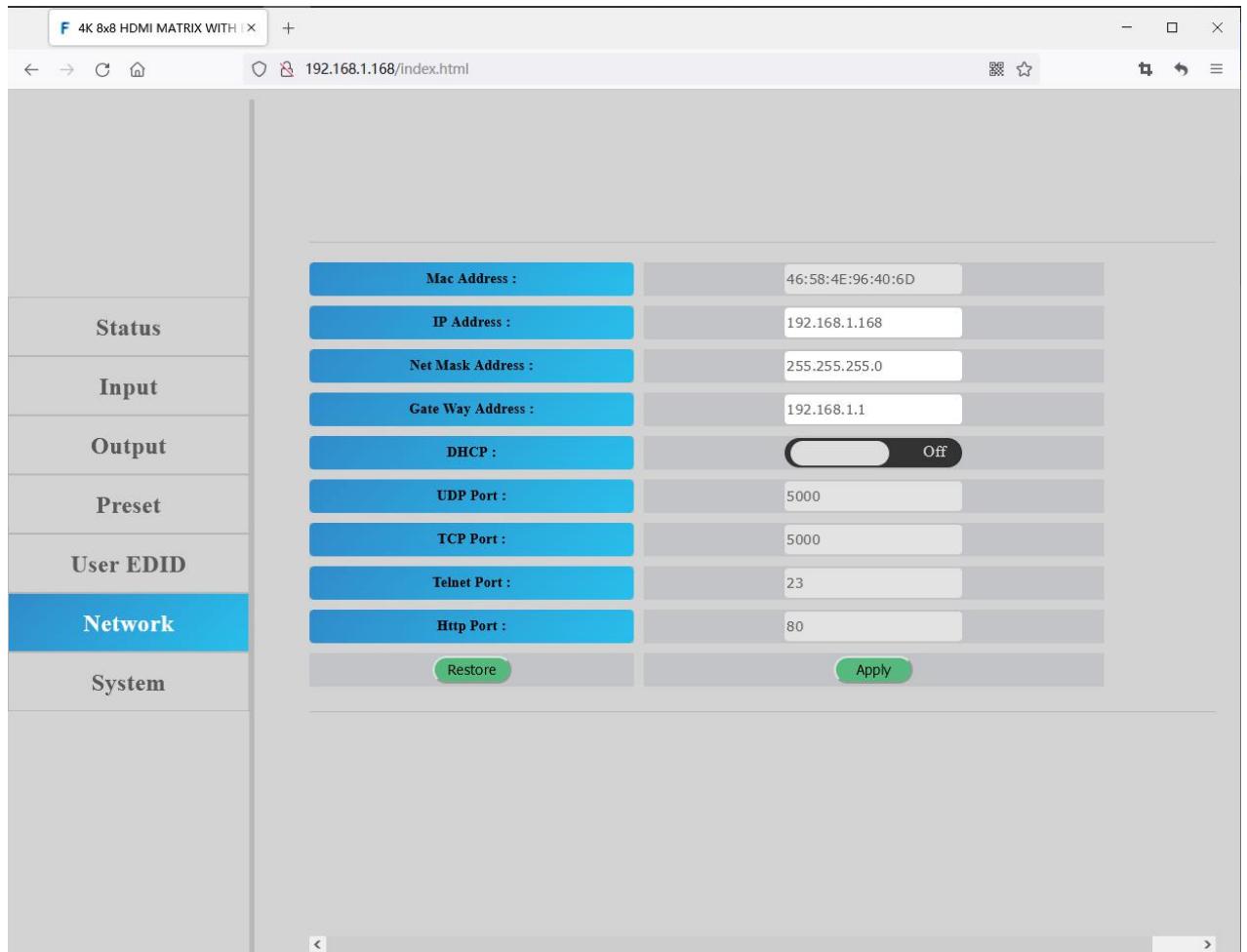
EDID Export: Click Download button can download the user-defined EDID you’ve uploaded to user.



12.7. “Network” interface:

This interface show the Mac address,IP address,MASK,Gateway.

Only when DHCP is “off”,then you can modify IP address,MASK,Gateway.



12.8. “System” interface:

1) .Generic

Baud: can change Baud rate(9600,19200,38400,57600,115200).

LCD: can set the LCD breath holding time(5s,30s,60s,90s,on)

2) .Account management

User Name:modify name of log in user.

New Password: new password to log in web interface.

Confirm the Password: type in new password again to confirm,then click “Apply”.

3) .System

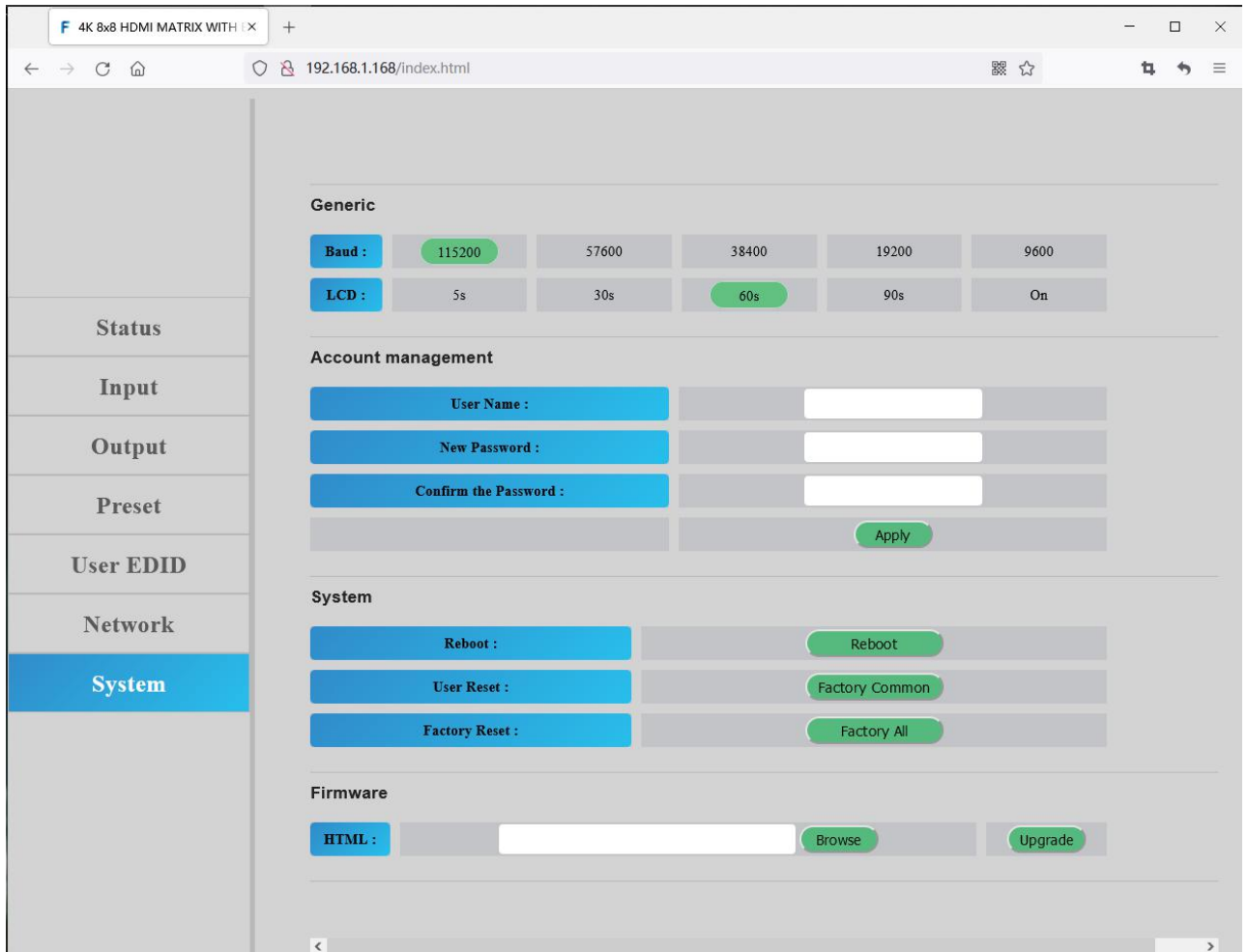
Reboot: click to reboot matrix.

User Reset(factory common): restore running info.(include video,Audio,EDID,Setup).

Factory Reset: reset all default setup functions.

4) .Firmware

Web page upgrade:click “Browse” to select the firmware,then click “Upgrade”.



13. FW UPGRADE

First upgrade MCU (layer of application) and then upgrade CPLD, finally upgrade MCU,HTML (web page), (CPLD, HTML, MCU all support to use USB Micro port for upgrading)

A1 means MCU

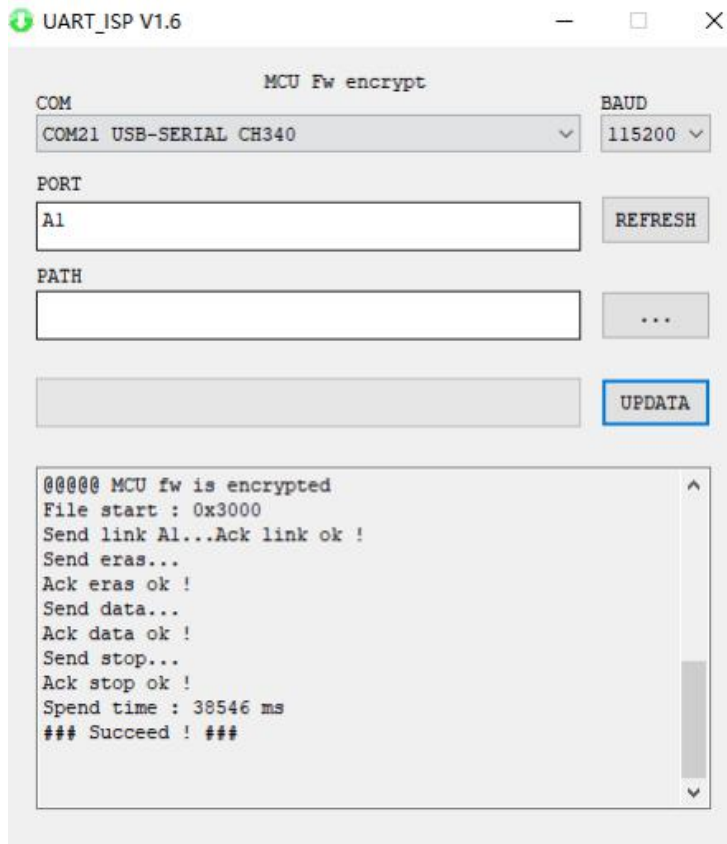
A1 01 means MCU

C0 01 means CPLD

F0 means HTML

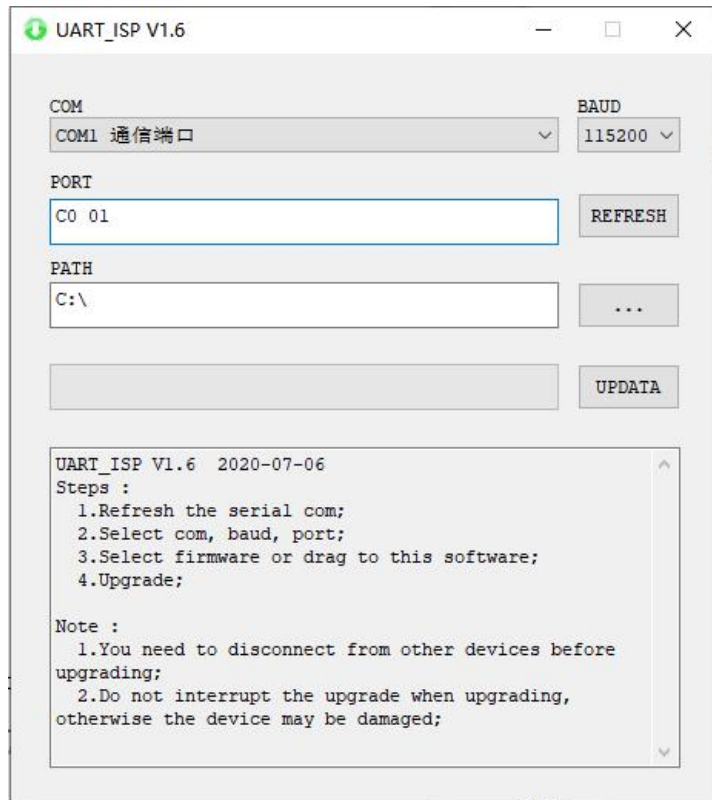
13.1. MCU Upgrade:

Open the software UART_ISP_V1.6.exe on PC, select the correct port and baud rate 115200, enter "A1" in Port, then select the path of the program in PATH (XXX. Bin), and click UPDATA to complete the upgrade



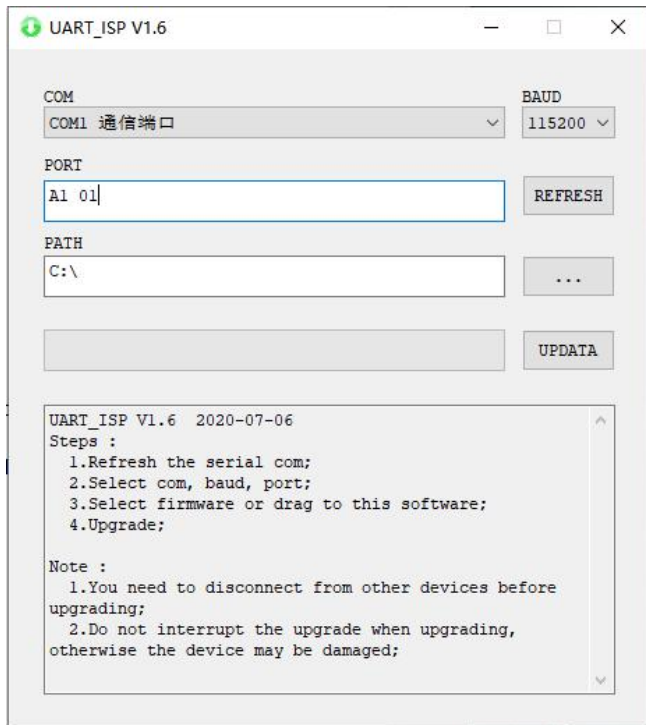
13.2. CPLD Upgrade:

Open the software UART_ISP_V1.6.exe on PC, select the correct port and baud rate 115200, enter "C0 01" in Port, then select the path of the program (XXX. VME) in PATH, and click UPDATA to complete the upgrade



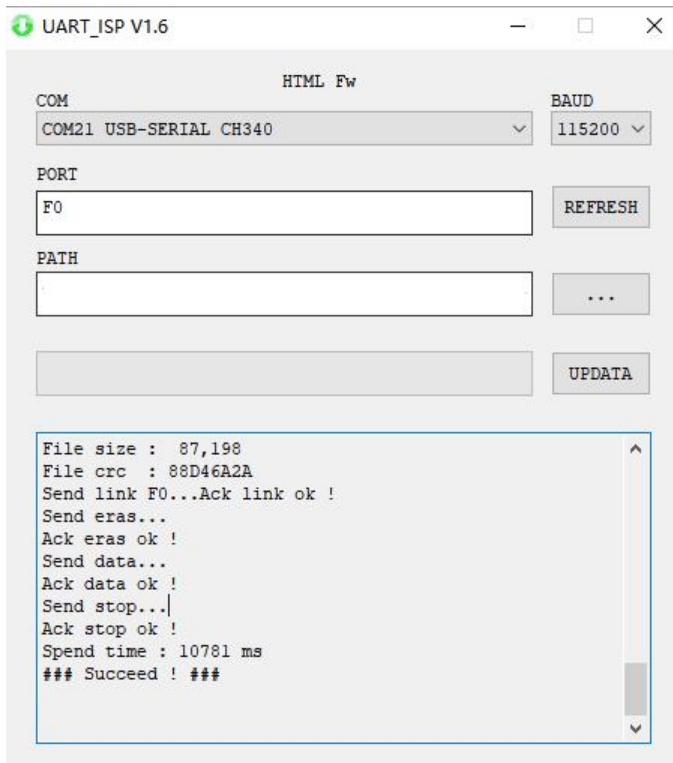
13.3. MCU Upgrade:

Open the software UART_ISP_V1.6.exe on PC, select the correct port and baud rate 115200, enter "A1 01" in Port, then select the path of the program in PATH (XXX. Bin), and click UPDATA to complete the upgrade



13.4. HTML (WEB GUI) Upgrade:

Open the software UART_ISP_V1.6.exe on PC, select the correct port and baud rate 115200, enter "F0" in Port, then select the path of the program (XXX. HTML) in PATH, and click UPDATA to complete the upgrade



MAINTENANCE

Clean this unit with a soft, dry cloth. Never use alcohol, paint thinner or benzene to clean this unit.

PRODUCT SERVICE

(1) **Damage requiring service:**

The unit should be serviced by qualified service personnel if:

- (a) The DC power supply cord or AC adaptor has been damaged;
- (b) Objects or liquids have gotten into the unit;
- (c) The unit has been exposed to rain;
- (d) The unit does not operate normally or exhibits a marked change in performance;

The unit has been dropped or the cabinet damaged.

(2) **Servicing Personnel:** Do not attempt to service the unit beyond that described in these operating instructions. Refer all other servicing to authorized servicing personnel.

(3) **Replacement parts:** When parts need replacing ensure the servicer uses parts specified by the manufacturer or parts that have the same characteristics as the original parts. Unauthorized substitutes may result in fire, electric shock, or other Hazards.

(4) **Safety check:** After repairs or service, ask the servicer to perform safety checks to confirm that the unit is in proper working condition.

WARRANTY

If your product does not work properly because of a defect in materials or workmanship, our Company (referred to as "the warrantor") will, for the length of the period indicated as below, **(Parts)2 Year, Labor(90) Days** which starts with the date of original purchase ("Limited Warranty period"), at its option either (a) repair your product with new or refurbished parts, or (b) replace it with a new or a refurbished product. The decision to repair or replace will be made by the warrantor.

During the "Labor" Limited Warranty period there will be no charge for labor.

During the "Parts" warranty period, there will be no charge for parts. You must mail-in your product during the warranty period. This Limited Warranty is extended only to the original purchaser and only covers product purchased as new. A purchase receipt or other proof of original purchase date is required for Limited Warranty service.

The logo for DIREKTRONIK is displayed in a bold, stylized font. The letters are white with a thick red outline, set against a yellow background that curves upwards from the bottom of the page.