



U40 4K NDI CONVERTER

USER MANUAL

Changsha KILOVIEW Electronics CO., LTD.

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1. Product Introduction

NDI® is the world's leading IP-based network video transmission technology. Utilizing the advantages of NDI IP-based interconnection and a complete product ecological chain, U40 supports bi-directional conversion of HD HDMI and NDI®, convert and output RTSP, RTMP, SRT, HLS, UDP, etc. to NDI|HX.

It features with 4K P60 input, HDMI/USB/IP to NDI®, PoE + DC Out, PTZ, Tally, cold shoe on camera. The small and exquisite U40 4K NDI encoder is equipped with all the functions you want, with only one network cable, video sources from HDMI cameras, web cameras, USB cameras and others can easily go into the NDI world and enjoy the advantages of IP-based transmission featuring ultra-high image quality and ultra-low latency.



1.1 Features

Comprehensive NDI® performance, support multiple interfaces to NDI®

- Convert 4Kp60 HDMI to full NDI®, compatible with HD resolution
- Support 3.5mm analog audio embedded in full NDI®;
- Support USB video to NDI® (customization);
- Convert IP streams such as SRT/RTMP/RTSP/UDP/HLS to NDI®|HX.

Dual Gigabit Ethernet ports, super PoE performance and PTZ Control

- Dual Gigabit Ethernet ports can be applied to two different networks simultaneously, like SRT/RTMP input via WAN which can be output to NDI®|HX via LAN;
- One Ethernet port with super PoE power supply function, it can power the device itself, and can also output DC 12V1A to power other devices;
- Built-in Tally for PVW/PGM;
- Support serial port and PTZ control, support Sony Visca/PELCO-D/PELCO-P and other protocols;

1.2 Parameters

Model	U40
Interface	HDMI 2.0
Video resolution	Up to 4K60
Ethernet port	2*1000M Ethernet port
USB interface	USB2.0
Analog audio interface	3.5mm analog audio
NDI® performance	Support HDMI to Full NDI® Support 3.5mm analog audio embedded in full NDI® Support USB to Full NDI® Support other IP streams to NDI® HX 2.0
Tally light	Built-in
PTZ control	Support Sony Visca/Visca (Laia)/Visca (Kato)/PELCO-D/PELCO-P
PoE	Support
DC output	DC 12V
Size	Φ: 90mm, H:30mm
Weight	310g (10.9oz)
Power/power consumption	DC 12V1A

2. Using guidance

2.1 Device installation and connection

Correctly connect the power supply, Ethernet and video source, then start the device.

2.2 Internet connection and configuration

The simplest way is to connect the device to the network through Ethernet, and automatically obtain the IP address and DNS without any settings on the device.

After connecting the NDI streaming to the Newtek Studio Monitor, click the gear button in the lower right corner to open the login link of the encoder's Web page (When logging in for the first time or after restoring the factory settings, you need to agree to the popping up "EULA" . Otherwise, the device cannot work normally.)

If you want to set up the network manually, use the default IP address 192.168.1.168 to log in to the corresponding Web page (default username/password: admin/admin).

2.3 NDI streaming

NDI features with an automatic discovery function. After the device is connected to the network, you can use other NDI enabled tools (such as Newtek studio monitor, OBS, vMix) to automatically discover and directly get its NDI streaming.

2.4 NDI|HX conversion

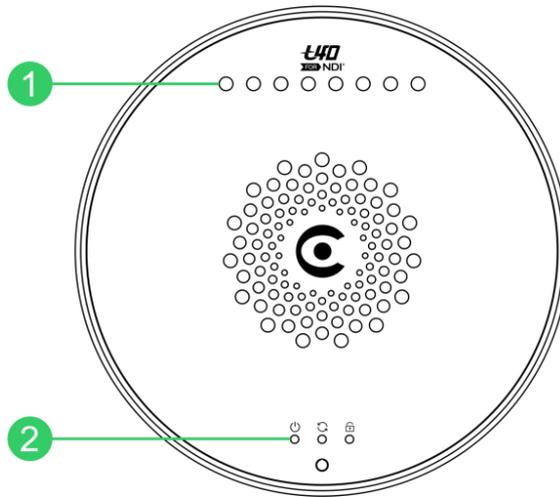
In the web page, you can switch to the NDI|HX transfer function page. It can convert multiple protocols such as RTMP/HLS/RTSP/SRT/TS-UDP, etc. to NDI|HX.

3. Packing List and Interface Description

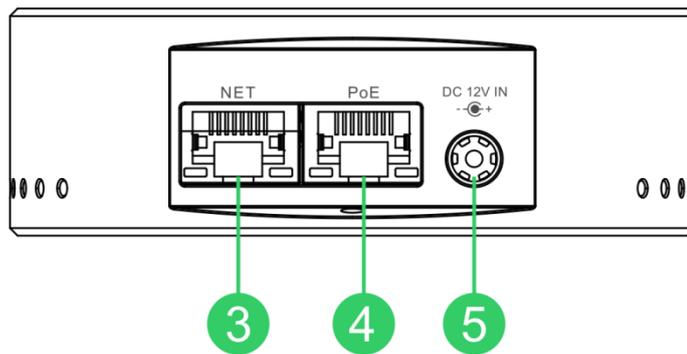
3.1 Packing List

Name	Unit	Quantity
NDI converter	PCS	1
DC 12V/1A power adapter	PCS	1
Cold shoe	PCS	1
User manual	PCS	1
Certificate/Warranty card	PCS	1

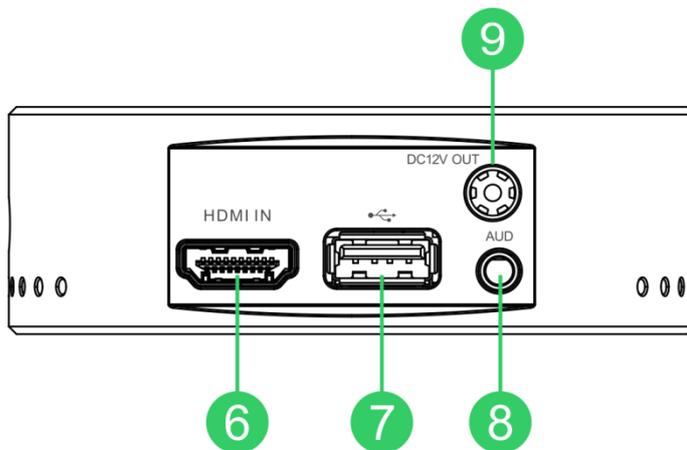
3.2 Device Interface Description



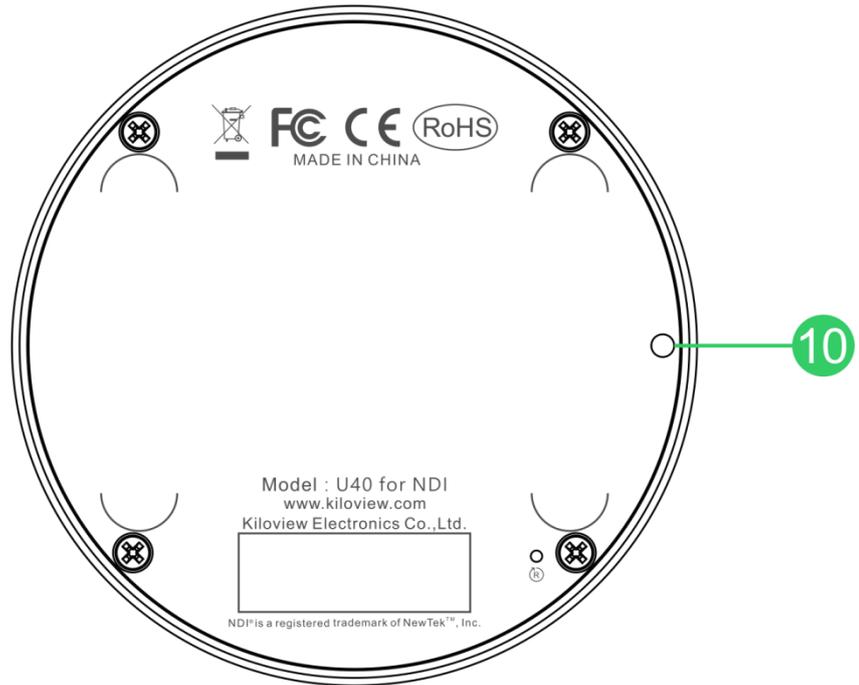
1. Tally 2. Indicators



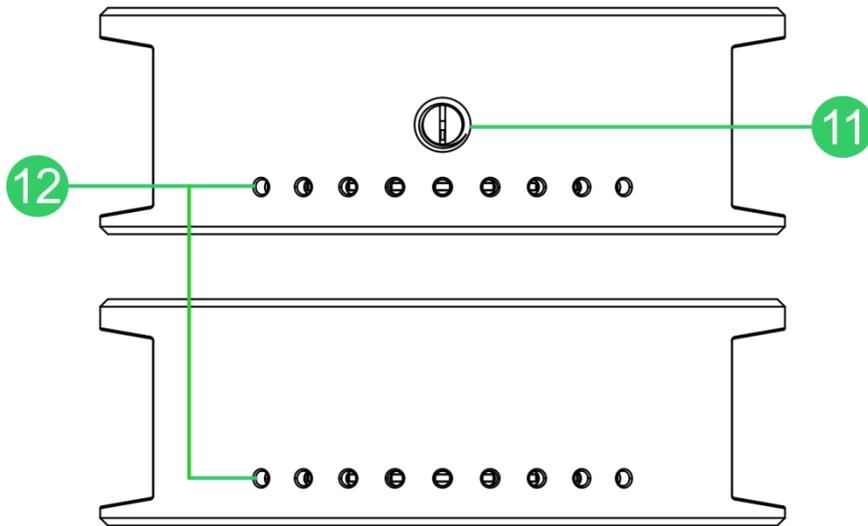
3. 1000M Ethernet 4. 1000M Ethernet (PoE) 5. Power port



6.HDMI IN 7. USB port 8. 3.5mm Audio input 9. 5.5×2.5mm DC OUT



10.Reset button



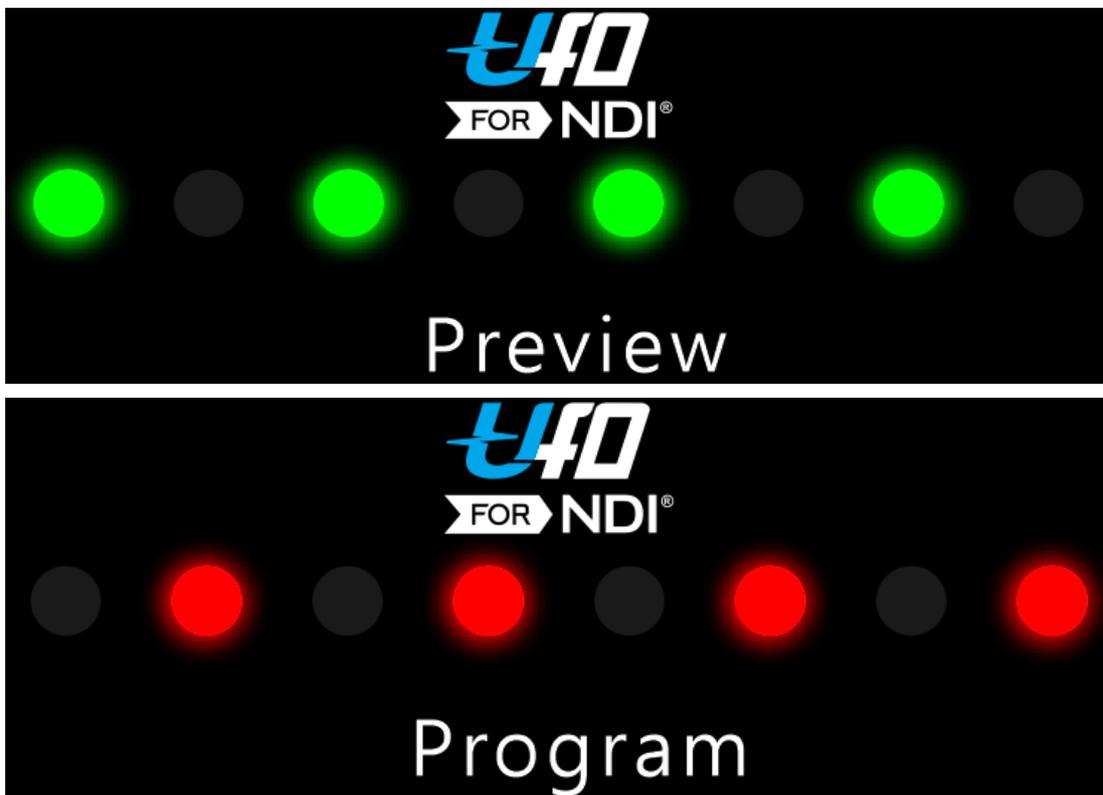
11.Cold shoe 12. Tally

3.3 LED light

Name	Color	Status	Description
POWER	White	Always on	Power connected
		Flashing	Device failure
		Off	No power supplied or device failure
RUN	White	Flashing	Device is working
		Off	The device is abnormal or not started
SIGNAL LOCK	White	Always on	Video signal inputting locked
		Flashing	Video signal outputting unlocked
		Off	Video signal is not connected or inputting is abnormal

Tally light

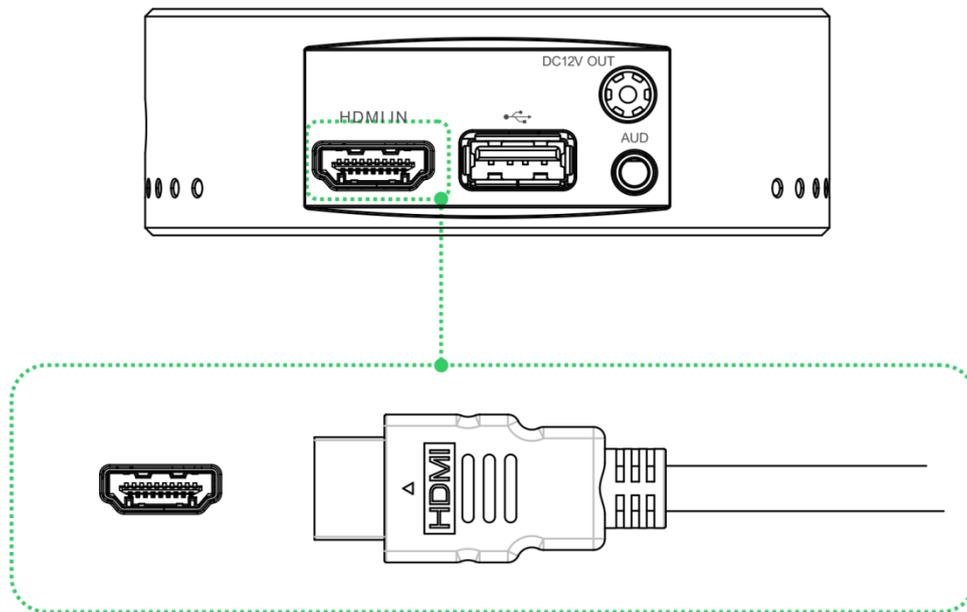
When the NDI source is output to NDI receivers (such as vMix, TriCaster, etc.) and switching Program to Preview, the receives the notification and changes the color on the "Tally", shown as below:



4. Device Installation and Connection

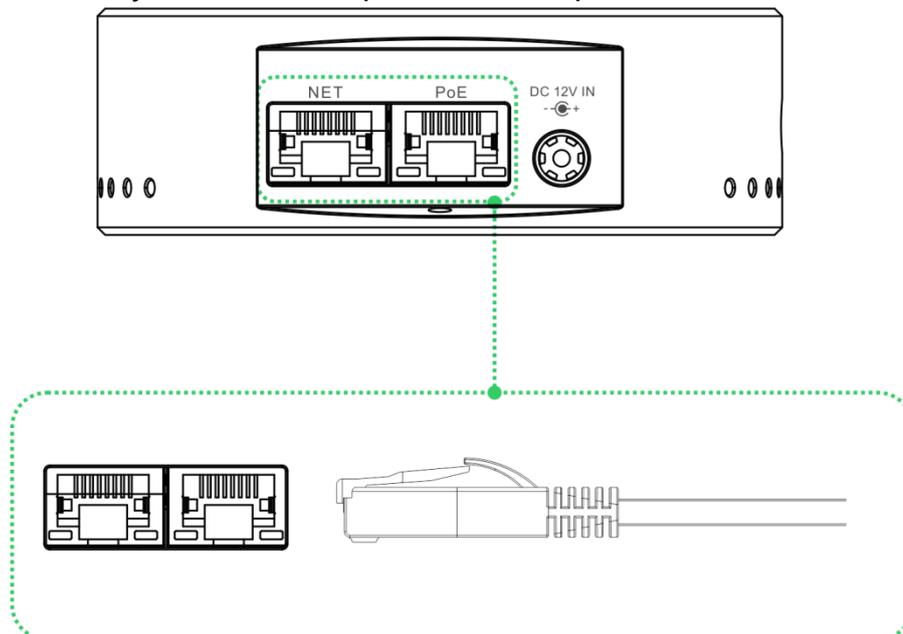
4.1 Connect video signal

Connect the HDMI video cable from a video source like a camera to the U40's HDMI input port.



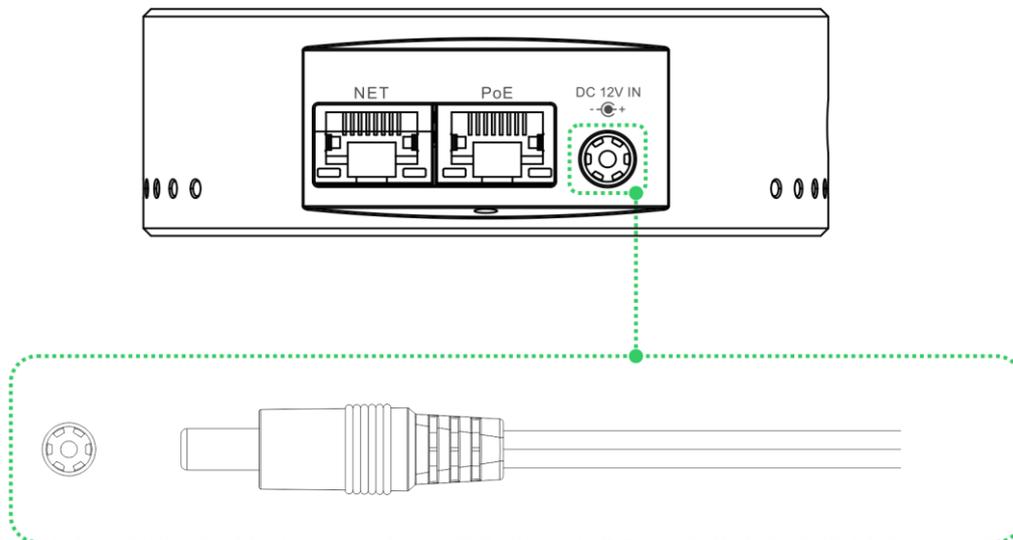
4.2 Connect network

Connect one end of a network cable to the U40's Ethernet port. The other end of the network cable is connected to your network switch or router. You can also connect directly to the network port of the computer.



4.3. Connect power supply

Connecting the equipped power adapter to U40's USB-C port. The unit boots once the power is supplied. At this moment, the power indicator lights will illuminate. Note: when network switcher provides PoE, there is no need to connect to the power supply.



5. Device login and network configuration

5.1 Device login

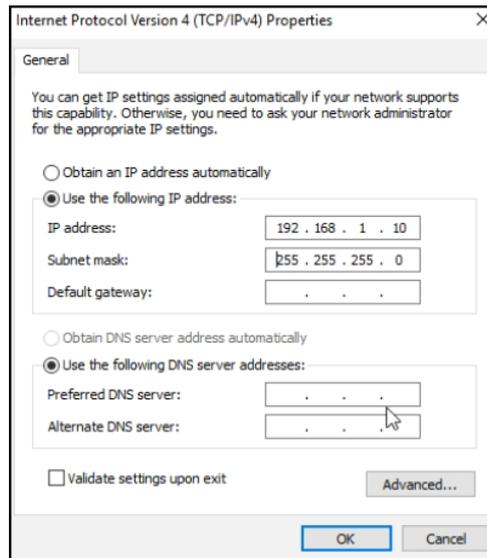
5.1.1 Device default IP address:

The default IP of the device is 192.168.1.168, mask is 255.255.255.0.

This IP address can be used for device management, it is not necessary to modify it.

5.1.2. Computer network setting

Please click the buttons on the computer as follows: "Network and Internet Settings"- "Network and Sharing Center"- "Ethernet"- "Internet Protocol Version 4"- "Use the IP address below ", then manually enter the IP address with 192.168.1.*(* refers to numbers between 1-255 except 168) and subnet mask, finally click "OK



5.1.3. WEB page login

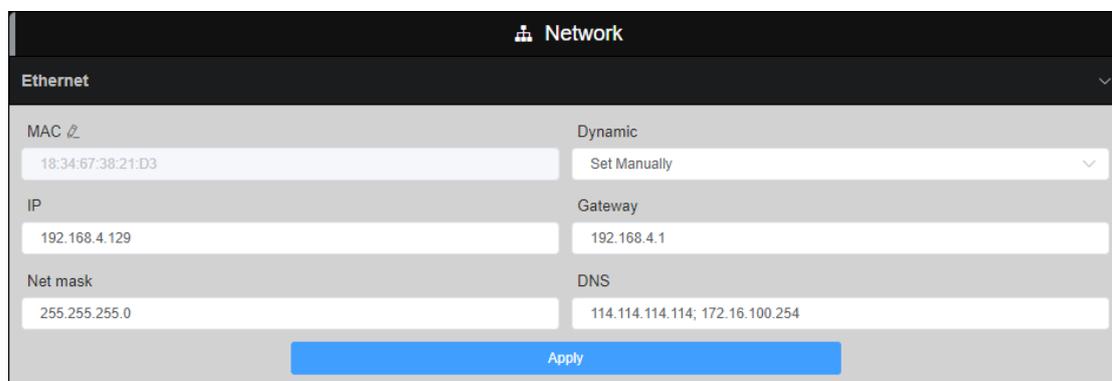
Enter 192.168.1.168 or http://192.168.1.168 on the computer browser, and login with the username and password.

Default username: admin; Password: admin.

Notes: the device Web page may be displayed abnormally due to the compatibility of the browser; it is recommended to use Chrome and Firefox. For the first login or after restoring the factory settings, you need to accept the popping up “EULA” . Otherwise, the device cannot work normally.

5.2 Network configuration

After login, you can configure the IP address manually or by DHCP (Default set is DHCP).



There are two ways to obtain an IP address, one is to obtain by DHCP, and the other is by manual setting. If by DHCP, please ensure that the router or switch enables the

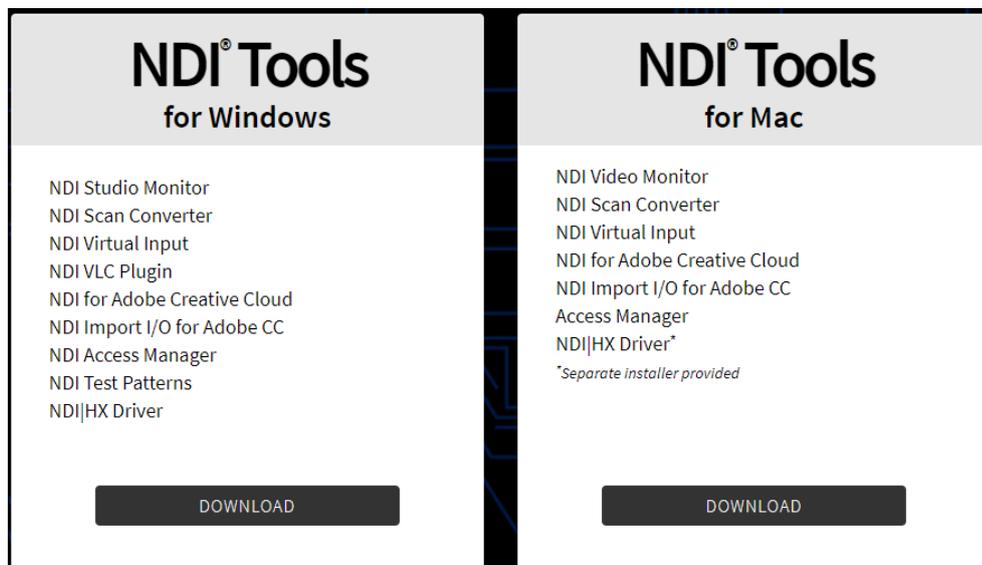
DHCP service. It is simple and convenient, but it obtains a constantly changing IP, and cannot know the IP address of the device. If by manual, it requires to input a fixed IP to the device, and the IP address will not change unless the device is restored to the factory settings. It is a stable way. Therefore, the two methods have their own advantages and can be selected according to your actual needs.

6.NDI discovery and monitoring

U40 is a professional video encoding device for NDI video production. It can compress HDMI/USB video source into FULL NDI streaming through Ethernet or convert other protocols (RTSP/RTMP/ SRT/TS-UDP) to NDI|HX for any compatible system, device or software on the network.

6.1 NDI Tools installation

Please download and install NDI Tools from NEWTEK official website: (<https://www.newtek.com/ndi/tools/#>)



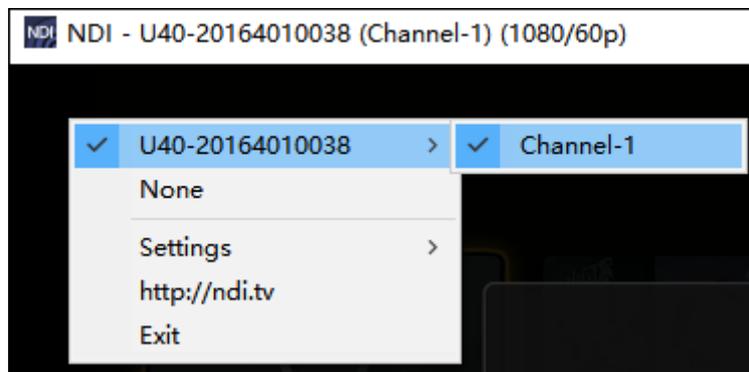
6.2 NDI discovery and connection

When the device is connected to the network, other tools supporting the NDI protocol on the PC in the same broadcast domain can automatically discover the NDI stream. Currently, the tools supporting the NDI protocol are very common.



Take NewTek Studio Monitor and VMIX as examples to introduce how to automatically discover and get NDI video streaming.

Open NewTek's Studio Monitor and click the icon in the upper left corner (or right-click) to find a list of device names discovered by the Monitor software. After the name list, all NDI streams discovered in the network will be displayed according to different device and channel names. Select the device to be connected, and then you can play the selected video streaming.

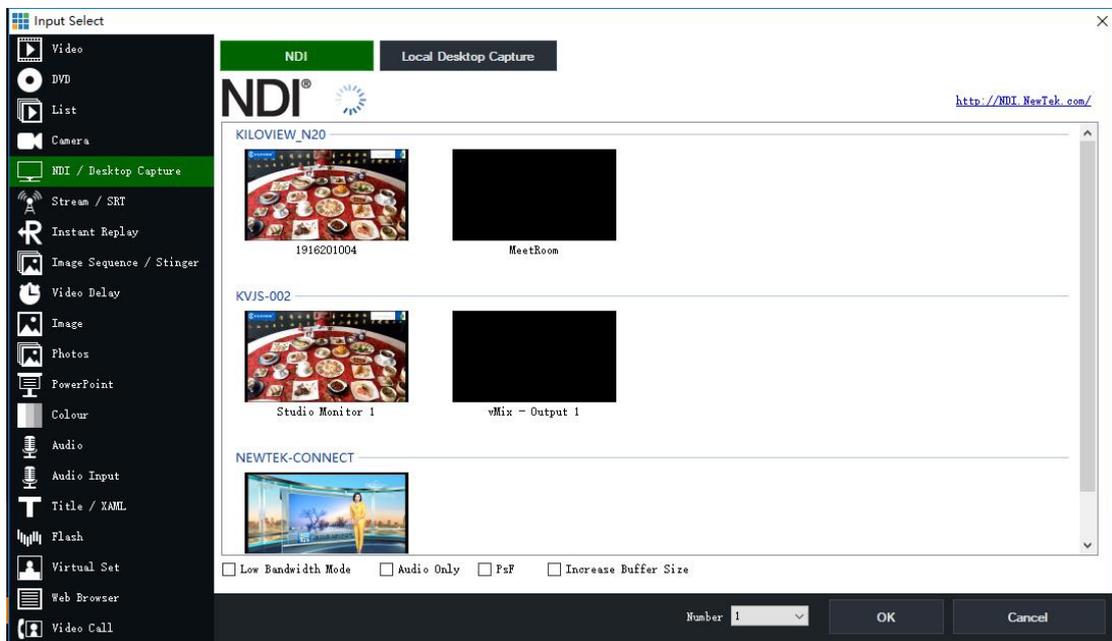


Launch Studio Monitor and click the gear icon at lower right corner to open the corresponding web page.



Launch the

VMIX, click "Add Input" at lower left corner, select "more" to find various sources that can be added, click the "NDI/Desktop Capture" option, you can see a list of NDI video sources. You can select the device you want to add, and click "OK" to add the selected NDI video source to the VMIX playback source list.



Note: NDI discovery is achieved by multicast, so the device and other NDI devices must be under the same subnet, and the device is configured with an accessible IP address (obtained automatically) of the same subnet, otherwise it

cannot automatically discover NDI streams.

6.3 NDI Encoding Bitrate

After encoding, it is FULL NDI transmission. The bitrate is high and needs to be connected to a gigabit network. The network card of the streaming end device also needs a gigabit network card, otherwise it will cause freezing or abnormal display. The following table is the reference bitrate of different resolutions:

Resolution	Output bandwidth
1080P60	125Mbps
1080i60	100Mbps
720P60	90Mbps

7. Encoding Parameter Configuration

7.1 Information bar



- Resolution shows the input video resolution
- Frame rate shows the input video frame rate
- Bit rate shows the real-time encoding bit rate
- Audio format shows the encoding audio sample rate format

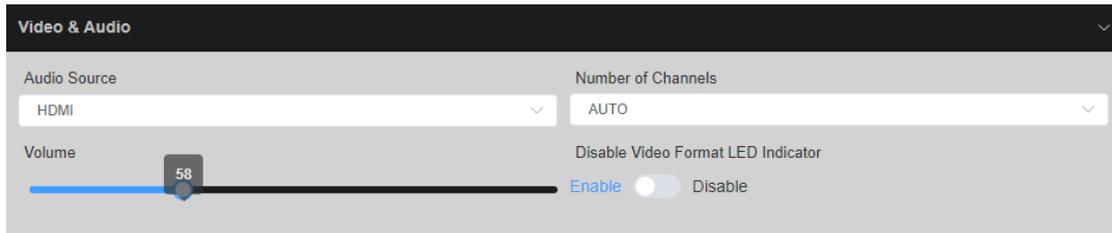
7.2 Basic settings

NDI: Configure encoding channel and encoding quality

- **Group:** The group name can be English letters and numbers. Multiple group names are allowed, separated by commas. The default group is a public group. If you don't want other devices in the network to be able to search for it, you can set a specified group name, and other devices need to search for it through the specified group name.
- **Device Name:** The device name of NDI source.
- **NDI channel name:** When there are multiple NDI sources in the same network, you can modify the channel name to identify different devices.
- **Encoding quality:** When the encoding quality is reduced/increased, the encoding quality and encoding bitrate change accordingly.

Note: It is no need to save configuration after modifying the device group, device name and channel name. After the modification, it will take effect immediately if clicking on other places on the web page.

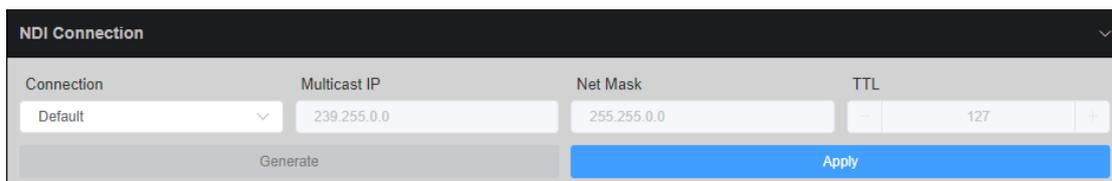
- **Video and audio:** Selection and adjustment of audio and video input.
- **Audio source:** HDMI embedded audio or analog input (LINE IN), the default is HDMI embedded audio.
- **Channels:** Default is two-channel, which can support up to 16 channels of audio encoding. The input audio only supports dual-channel input.
- **Volume:** For gain adjustment of input line-in audio or HDMI embedded audio.
- **Prohibit LED indication of video format:** When choose "allow" , tally light flashes green when input video is or lower than 4KP30, Tally light flashes red when input video is 4KP50/60. When choose "prohibit" , tally light does not flash. TALLY notification status will be displayed first when there is a TALLY notification.



7.3 Advanced settings

7.3.1 NDI Connection

NDI adopts unicast transmission by default. If choosing multicast mode, NDI transmission will be executed in multicast mode. Click “Generate” , a multicast IP will be generated randomly, or you can configure it manually and click “Apply” to take effect.

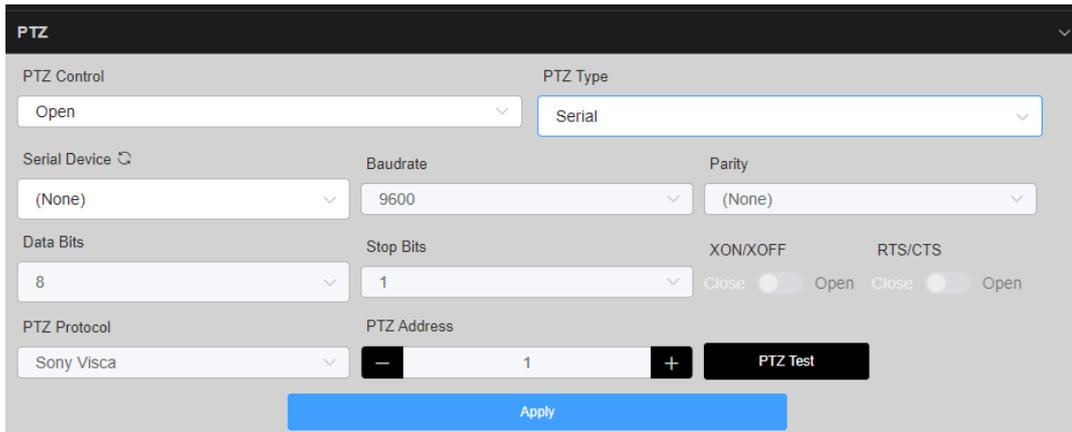


Note: Due to NDI encoding bitrate is very large, when choosing multicast transmission, please pay attention to the impact on other devices in the same network.

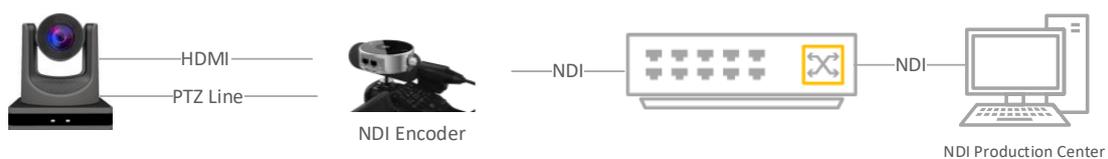
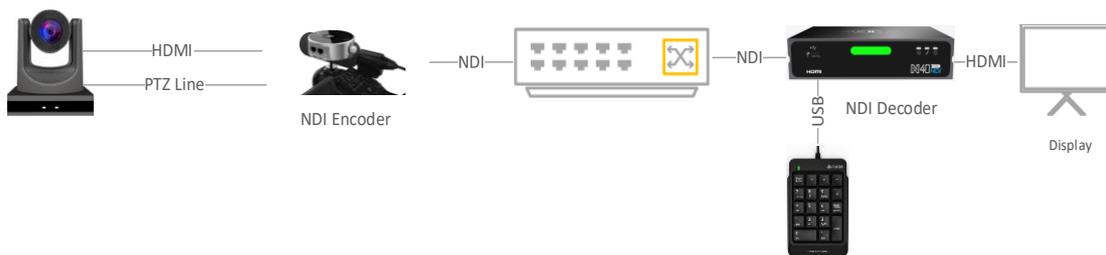
7.3.2 PTZ control

The device supports PTZ control, both protocol types of PTZ over Ethernet and serial port are supported.

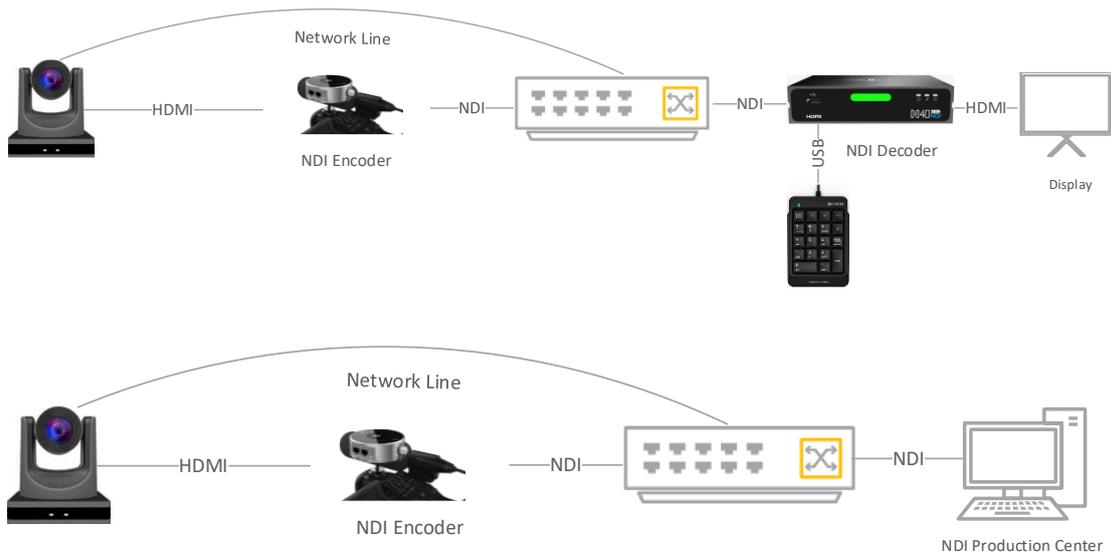
PTZ over Ethernet needs to correctly configure the protocol address and port of the connected PTZ, and specify the PTZ control protocol (Sony Visca/Visca(Laia)/Visca(Kato)/PELCO-D/PELCO-P).



Application 1: PTZ camera supports serial port control. Connect the U40 device through the USB to RS232/RS422/RS485 adapter (cable), and receive the PTZ command converted from the device for control. Both Kiloview NDI decoder and other NDI-enabled PTZ software can be the receiver.



Application 2: Cameras that support network PTZ, connect the device and camera through HDMI cable, then connect to the same local area network through a network cable. The NDI decoder sends PTZ commands to the NDI encoder through the network, then the NDI encoder converts it into a protocol that the camera can support (such as Visca/PELCO-D/PELCO-P protocols), and send it to the PTZ camera for control.



7.4 Discovery server

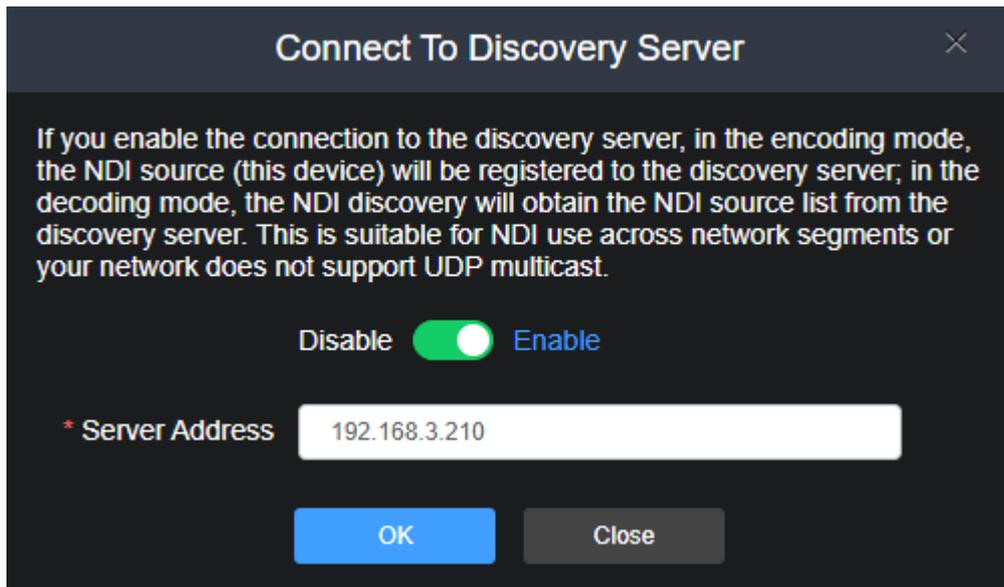
NDI discovery server can replace NDI auto discovery with server. All NDI sources are registered with server in a centralized way, and the receiving end obtains NDI source from the server. Through this, the device can also send the output video stream to the receiving end of the cross-network segment.

First, download and install the NDI SDK on a Windows computer at the receiving end. After installation, run bin/ utilities/x64/NDI discovery Service.exe.



NDI encoder

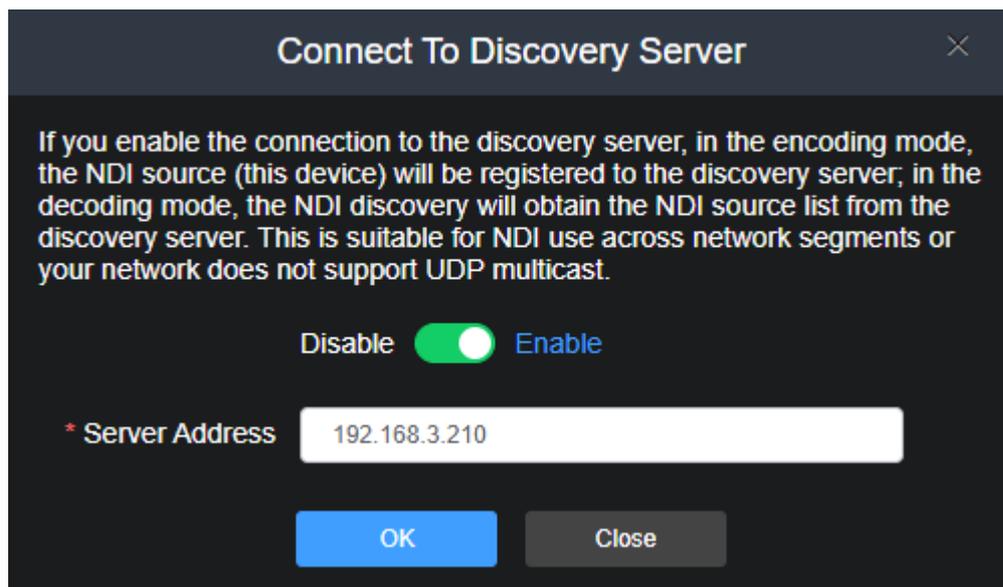
configures the receiving IP address in the discovery server, and NDI will be registered with the server. It is recommended that the receiving address should be configured as a static IP address to prevent the loss of NDI connection due to IP reallocation.



Note: After starting this function, the mDNS auto-discovery function is invalid. The U40 output video stream can only be sent to the nominated server, and the receiving end must register with the same discovery server to get the NDI stream.

7.4.1 Receiving via Kiloview NDI decoder

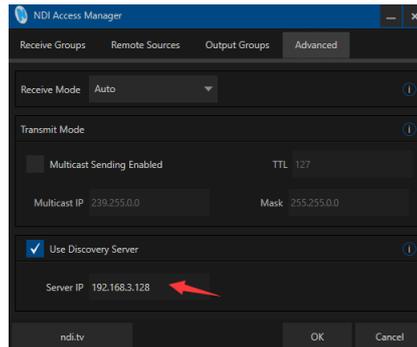
Switch the NDI device to decoding mode, click "discover server", and "Enable" it. Fill in the server address with the same registered address of the NDI encoder. Click "OK", all NDI sources registered to the discovery server can be found by scanning the list.



7.

7.4.2 Receiving via computer-based software

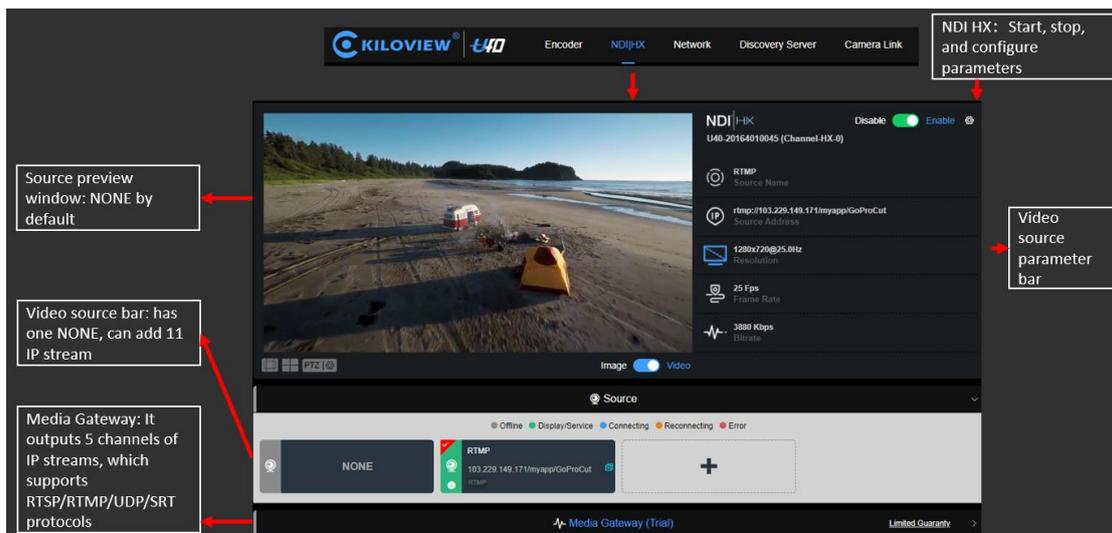
Install NDI tools on the receiving end and open “NDI access manager” . Click the "advanced", cancel the "multicast sending enabled" function, select "Use discovery server", and set the "Server IP" address to the IP address of your computer that enables the discovery server function. After configured, the receiving end can discover the NDI stream registered with the server.



8. Network IP transfer to NDI|HX

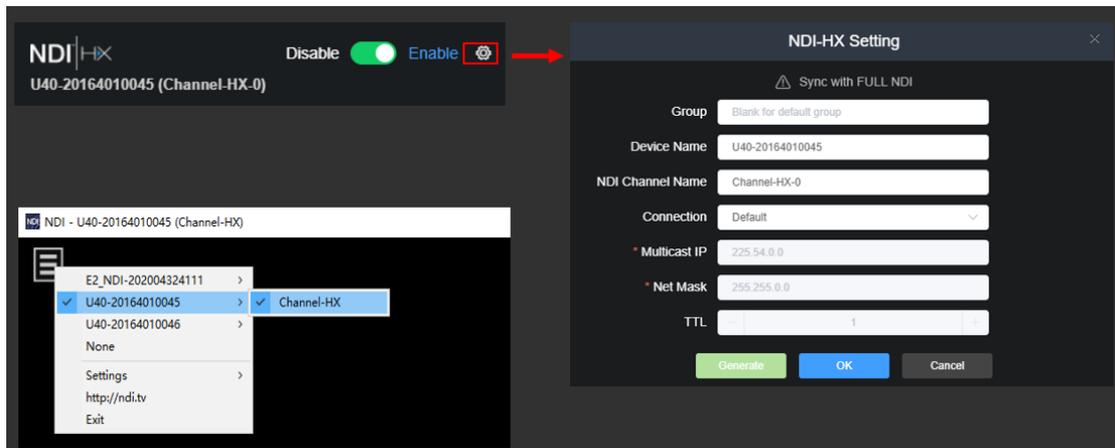
Convert RTSP, RTMP, SRT, HLS, UDP and other video streams in the network to NDI|HX and connect to the NDI production system.

1) Enter to the web page, click “NDI/HX” to enter streams configuration page.



2) Open a NDI/HX stream which can be found and play via NDI production system or NDI player.

Configure the group name, device name and channel name through the setting button, and synchronized updating with NDI Configuration page.



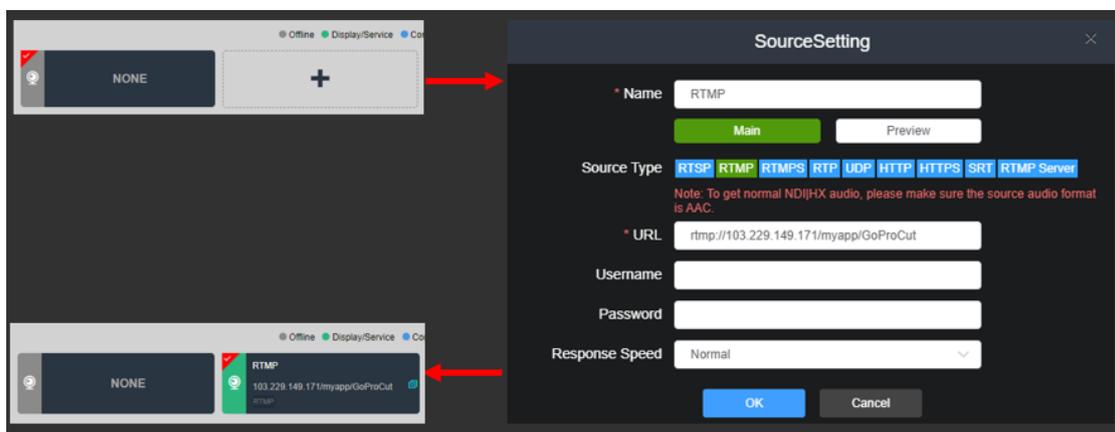
8.1 Add video source

8.1.1 RTMP convert to NDI/HX in live broadcast platform

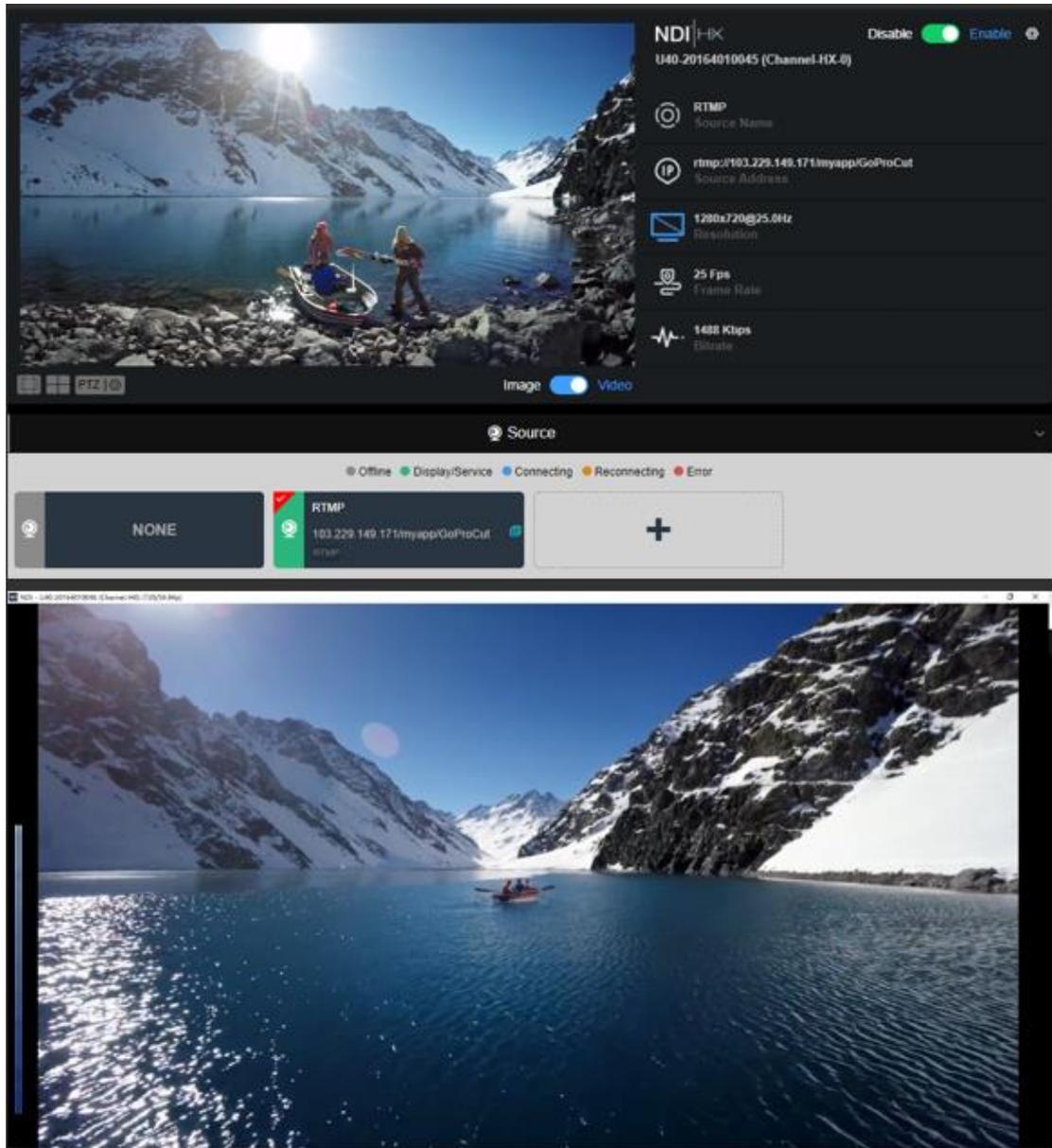
1) Obtain the correct RTMP streaming address from the live platforms, and you can use the VLC player to test whether it is effective.

2) Click the + button to add a source in the "Video Source column".

Enter the RTMP streaming address in the URL address column.



3) It shows NONE by default. Click to add RTMP source. The device converts the RTMP protocol to NDI|HX, the output images can be seen in the NDI-enabled production system (like NewTek TriCaster®) or player.

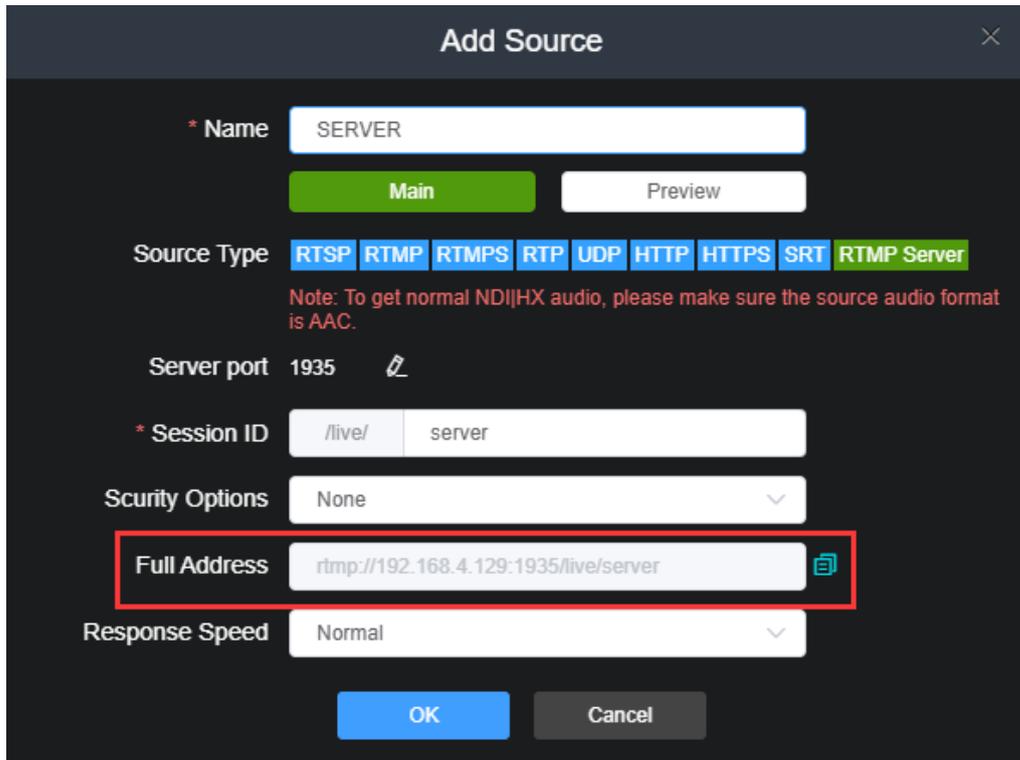


8.1.2 The RTMP service directly pushed to U40 and converted to NDI|HX

1) U40 can be used as an RTMP server to push RTMP streams from encoder to the U40 and then convert to NDI|HX.

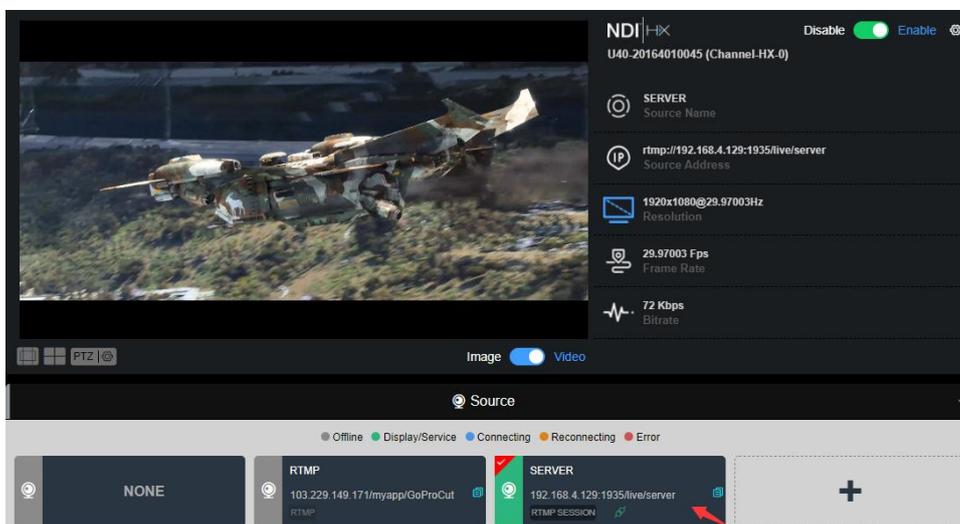
Choose "RTMP Server" as source type, fill in the session ID, it can be letters,

characters and numbers. The complete address is the pushing IP address of the encoder.



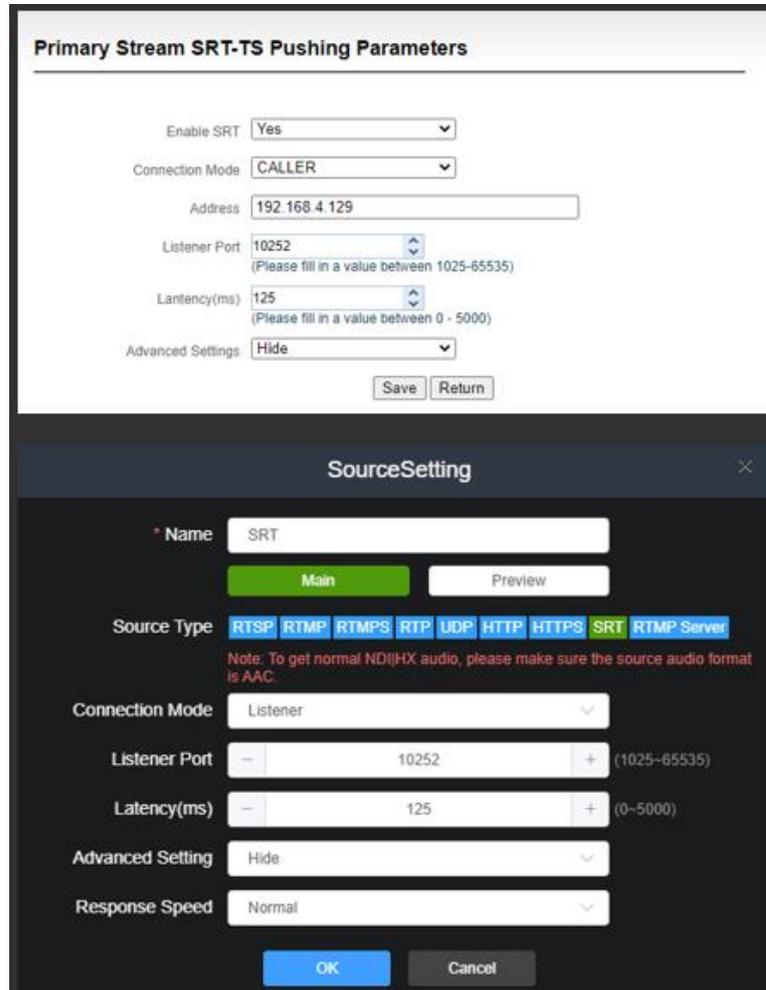
Note: When pushing RTMP from the remote Internet, the U40 needs to have a public network address, and do port forwarding to U40 in the network, and the forwarded port is 1935. The IP address format for RTMP pushing needs to be replaced with a public network address or domain name.

2) When the connection status of the added RTMP Server turns green, it means that the RTMP push service has been successfully connected. Click "Server1", and the device will directly convert the received RTMP to NDI|HX.



8.1.3 U40 convert SRT to NDI|HX

1) Choose "SRT" as source type, configure the SRT parameters and keep it.



The image shows two screenshots of a software interface for configuring SRT parameters.

The top screenshot, titled "Primary Stream SRT-TS Pushing Parameters", contains the following fields:

- Enable SRT: Yes
- Connection Mode: CALLER
- Address: 192.168.4.129
- Listener Port: 10252 (Please fill in a value between 1025-65535)
- Latency(ms): 125 (Please fill in a value between 0 - 5000)
- Advanced Settings: Hide

Buttons for "Save" and "Return" are located at the bottom right.

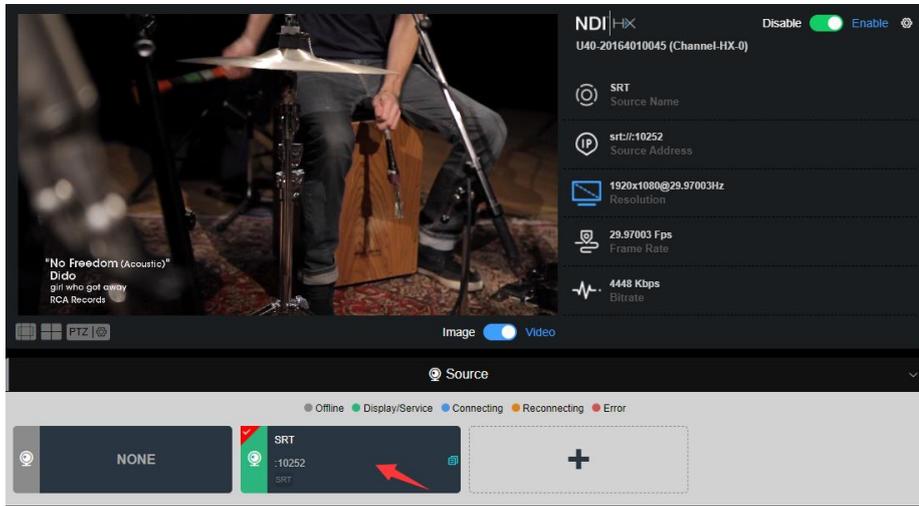
The bottom screenshot, titled "SourceSetting", shows a configuration dialog with the following fields:

- Name: SRT
- Source Type: RTSP, RTMP, RTMPS, RTP, UDP, HTTP, HTTPS, SRT, RTMP Server (SRT is selected)
- Connection Mode: Listener
- Listener Port: 10252 (1025-65535)
- Latency(ms): 125 (0-5000)
- Advanced Setting: Hide
- Response Speed: Normal

Buttons for "OK" and "Cancel" are located at the bottom.

Note: When pushing SRT from the remote Internet, either end of the encoder or U40 needs to have a public network address, and use UDP for port forwarding in a network router with a public network address. The forwarding port range is 1025-65535. For devices without a public network address, please adopt the CALLER mode, fill in the other party's public IP address and port number. The device with public network uses Listener mode, and the port is same as the device setting with CALLER mode.

2) Configure the parameters and click the added SRT sources, the device will convert received SRT to NDI/HX directly.



8.2 Media Gateway (Trial)

Limited guaranty: As a trial function, Kiloview provides a limited guaranty for this function. Kiloview has other official Media Gateway products, please contact Kiloview or Kiloview authorized distributors/resellers to get more details.

Kiloview will try the best to ensure the Media Gateway function working properly, and provide further update for this function along with subsequent firmware update of the product. But as a trial function, we do not provide 100% guarantee for its reliability. If this is going to be applied for formal scenario, an official Media Gateway product is recommended.

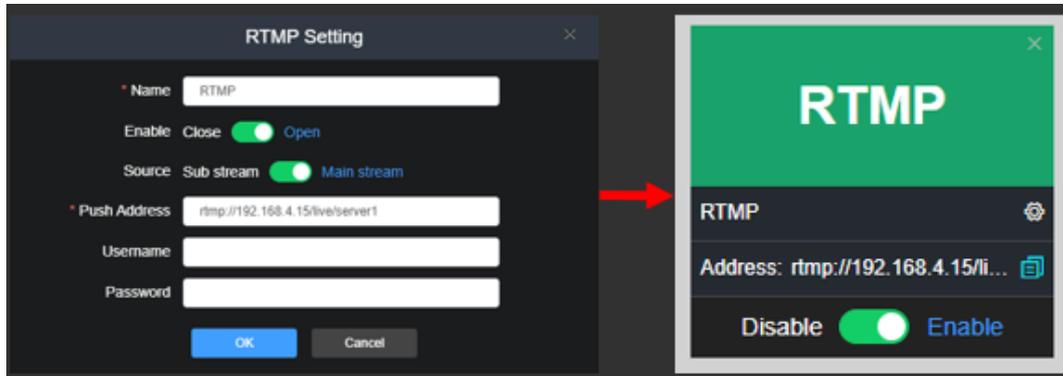
Kiloview reserves the right to make changes and adjustments to this function, including: stopping update or disabling this function, changing the scope of the functions provided, etc.

Kiloview can provide the official Media Gateway series products, please contact Kiloview sales staff or Kiloview authorized distributors/resellers to obtain the products.

Media gateway: It can convert RTMP/RTSP/TS-UDP/SRT/HLS and other protocols into RTMP/RTSP/TS-UDP/SRT protocol. To add a video source, please refer to Chapter 8.1, and then select the added source to output. When selecting a source for switch, the media gateway and NDI|HX conversion output video source are the same and cannot be selected separately.

8.2.1 RTMP streaming service

- 1) Click + button to add a streaming service, choose "RTMP" service as service type
- 2) Fill in the RTMP address obtained from live platforms.



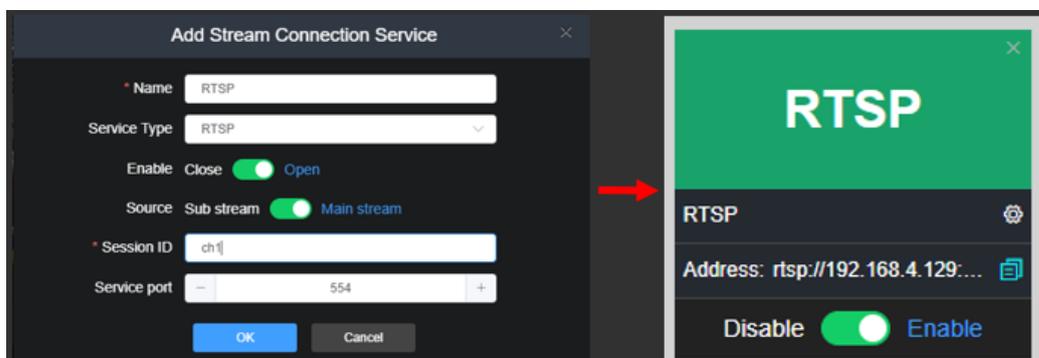
Source selection: You can select the main bitrate or sub bitrate from the added source list for streaming.

Stream URL: Fill in the RTMP address provided by live broadcast platform, such as rtmp://192.168.4.15/live/server1. When the platform address is divided into RTMP address and live broadcast code, use "/" to separate RTMP and live broadcast code, and fill in the address together.

Username/password: configured based on RTMP streaming service platform requests.

8.2.2 RTSP service

- 1) Click + button to add a streaming service, choose "RTSP" service as service type
- 2) Fill in the session ID, it can be numbers and letters, the default RTSP port is 554.

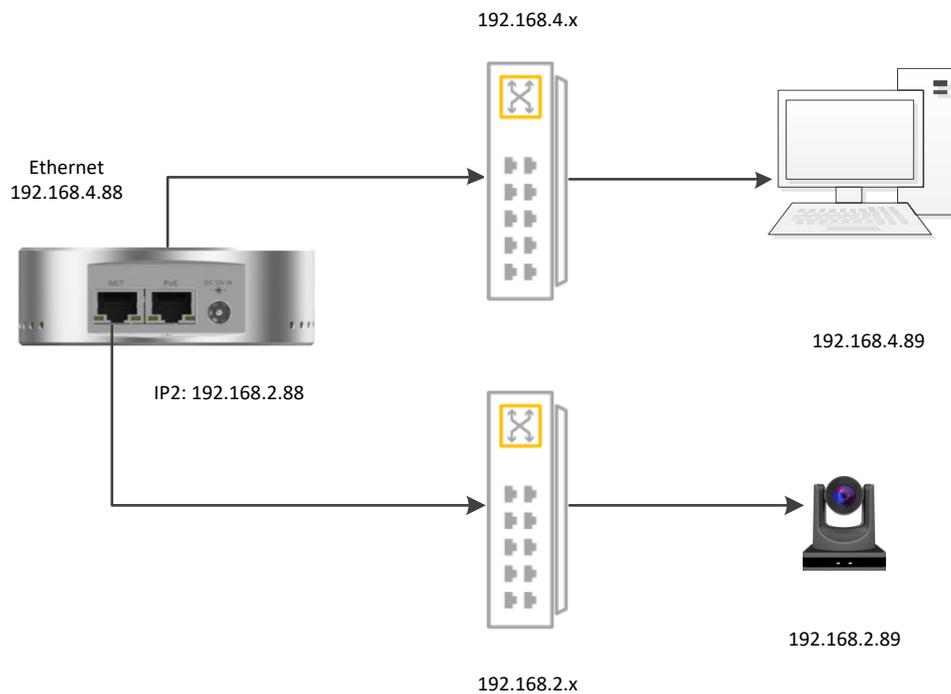


After configuration, it will generate an address, which can be streamed by the backend. This IP address is the address of the current device. Only one RTSP service can be added, while other streams can be up to 5 stream services in total.

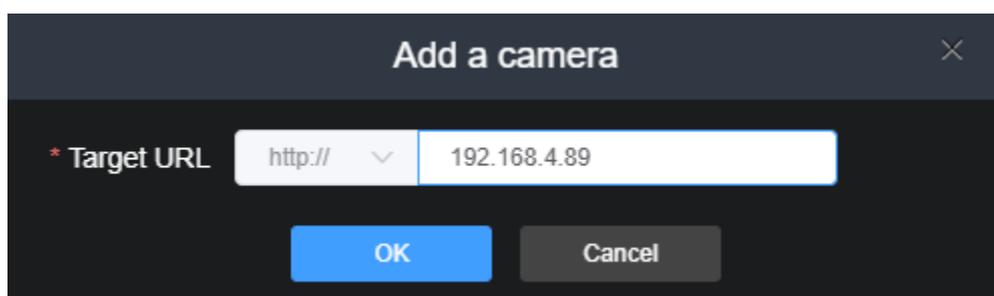
8.2.3 Camera Link

When the computer can access to U40 device, but cannot access to camera or other encoding devices in another network. Connecting the two network ports of the U40 to different networks and configuring the IP address, the computer can enter the management page of the camera or encoding device through U40's web page.

Instructions as below:



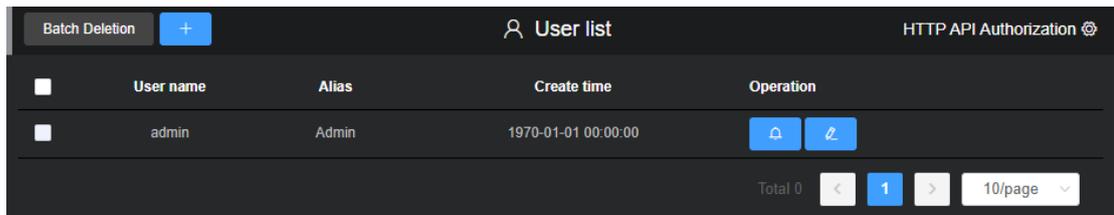
As shown in the above figure, the computer cannot access the camera web page of the other network when the two network ports of the device are connected to different networks. After configuring two IP addresses for U40, your computer can log in to the camera (192.168.2.89) web page through the Camera link function in Web page of U40.



9. Settings

9.1 User Management

You can add and delete users, modify user passwords, etc.



HTTP API Authorization: It is enabled by default. If disabled, identity authentication is not required to call the API.

9.2 Quick Reset

"Quick reset" is used to reset the coding service. It is usually applied after the parameters modifications to take effect immediately or abnormal encoding/decoding. It takes about 3 seconds and current coding service will be interrupted.

9.3 Reboot

"Reboot" is used to restart device software, it takes about 1 minute.

9.4 Restore Factory Settings

If the device can't work properly after parameters modification (typical case is after modifying the IP address which makes network not accessible to the device), you can restore the factory settings to restore the device configuration to the default parameters.

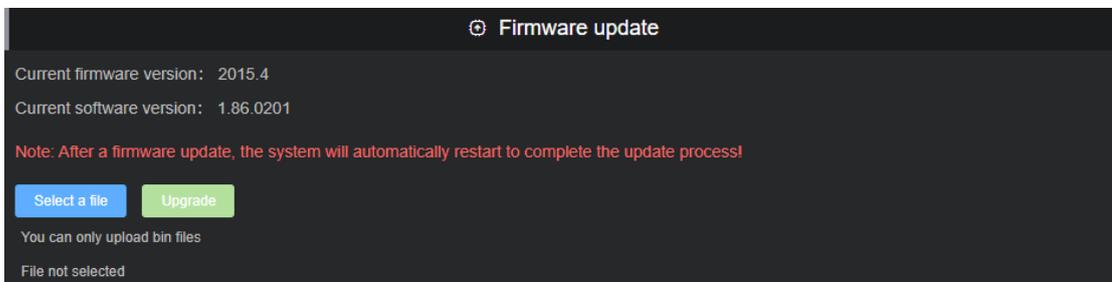
Two Ways of Restore Factory Settings:

- 1) In Web page, select "System Setup" > "Restore"
- 2) RESET Button: Press the reset button at the bottom of the device and hold for more than 5 seconds. The device will be restored to the factory settings. Restoring the factory settings will lead to a hard reboot and the reboot process will take approximately 1 minute.

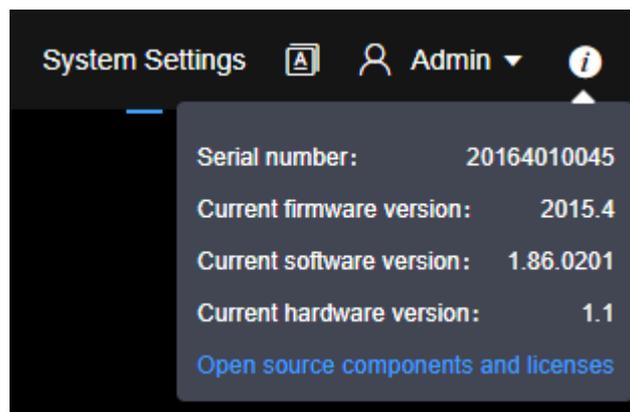
9.5 Firmware Upgrade

Our product will be constantly improved, so we will continue to upgrade the device for bug fixing. Please contact our technical support to obtain the upgrade package or download it on our website.

Click "System Setup" , select "Firmware" go to the firmware upgrade interface. After uploading the firmware to the device, click "Upgrade" to start. The entire upgrade process will last for 2-3 minutes (depending on the firmware size and network conditions). The device will automatically restart, remember not to power off during the upgrade process, otherwise the upgrade may fail and the device will be abnormal. If you need help, please contact our technical support to complete the upgrade.



After upgrading, click at the upper right corner of the WEB page to confirm whether the current software version is in accordance with the latest upgrade firmware, to ensure the device upgrading is successful.



Note: It is recommended to select the WINDOWS system when upgrading, and use Google or Firefox to log in to complete the upgrade.

Thank you for reading!

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