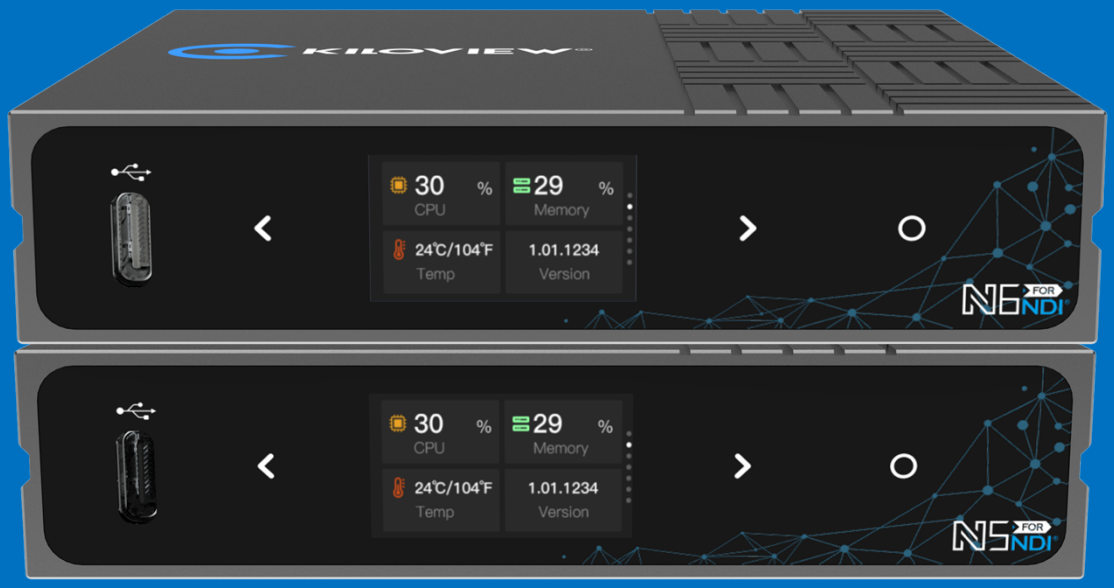
KILOVIEW®



N6/N5 for NDI

User Manuel

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Content

1 Product introduction

KILOVIEW's new generation of NDI video codec conversion (I/O) products. Adopting the world's leading FPGA technology and advanced level of AVC/HEVC codec algorithm and NDI algorithm, N6/N5 can provide both NDI and NDI|HX codec transmission capability with resolution up to 1080P60, and the resolution is backward compatible, which is a highly stable and cost-effective NDI video transmission device. Meet the user's needs for audio-visual IP-based transmission in different scenarios.

N6

N5

1.1 Product features

➢ **has NDI® encoding + decoding dual function, one machine with two uses**

- plug and play, HDMI/SDI to NDI, or NDI to screen are easily achieved;
- supports both NDI|HB and NDI|HX encoding up to 1080P60 resolution to meet the needs of different scenes;
- provides an LCD display and touch keys for easy management and configuration; the LCD display doubles as a large-format Tally display;
- supports PoE+ (IEEE 802.3AT) power supply, and also supports 12V-18V DC input.
- is equipped with HDMI/SDI input and output interfaces, which can be looped out to monitor on a monitor while encoding or output using HDMI/SDI interfaces while decoding.

➢ **supports up to 1080P60 video resolution, ensuring high quality applications**

- supports HDMI/SDI to NDI conversion (encoding mode) and NDI to HDMI/SDI

conversion (decoding mode) for resolutions up to 1080p60 (1920x1080@60Hz)

- provides a standard threaded cold shoe mount for easy mounting on the camera;
- supports the use of network or optional control cables that can control PTZ cameras including Visca/Visca over IP/Pelco protocols (special PTZ control protocols can be customized);
- supports YCbCr 4:2:0 8bit high quality video encoding video format;
- ensures video frame synchronization, as well as accurate picture and audio synchronization, through precise clocking and intelligent algorithms.

1.2 Technical parameters

Basic interfaces and base capabilities	
Video Input	1x HDMI 2.0(N6)/1x SDI 2.0(N5)
Video output	1x HDMI 2.0(N6)/1x SDI 2.0(N5)
Audio port	1* 3.5mm LINE IN/OUT
Audio Codec	NDI Audio，AAC-LC，Opus， G.711 a-Law/u-Law。other software extensible
Network Interface	1*RJ45 （PoE）， 1000Mbps
USB Interface	1x USB 3.0 Type-C
Video resolution	1080p60 HDMI input，1080p60 HDMI loop out or decode output
NDI Codec	1x NDI|HB and 1x NDI|HX（support NDI|HX2 and NDI|HX3）
NDI CODE feature	YCbCr 4:2:0 8bit high quality video encoding, typical bit rate: 80Mbps@1080p60
Front panel display and operation interface	1.14" LCD display and touch keys
Tally	Front panel uses LCD screen for Tally indication; rear panel with Tally LED indicator.
Power	PoE、DC、D-Tap
PTZ control	support
DHCP	support
Management method	Web /KiloLink Server
Overall power consumption	6W
Dimension	100x80x23mm
Weight	272g
Working temperature	-20℃~45℃（Storage temperature：-20℃~70℃）

2 USER GUIDE

- Equipment installation and connection

Correctly connect the power supply, network cable and video input source, and the device is powered on and started.

- Network connection and configuration

The easiest way is to connect the device to the network through a wired connection and automatically obtain an IP address and DNS from the network without any setup of the device. (**The first time you log in or the first time you log in after restoring factory settings, you must agree to the "License Agreement" pop-up, otherwise you will not be able to pull the device's NDI stream service properly.**)

- NDI pulling flow

NDI has an auto-discovery function. After the device is normally connected to the network, it can use other tools that support NDI (such as Newtek studio monitor, OBS, vMix) to automatically discover and pull its NDI video stream directly.

- NDI decoding

In the web page menu item, you can switch to the decoding function. The device can automatically discover NDI sources within the same network segment and select one of them to decode and output to the monitor for monitoring. You can also manually add NDI sources across network segments or non-default group names for decoding output.

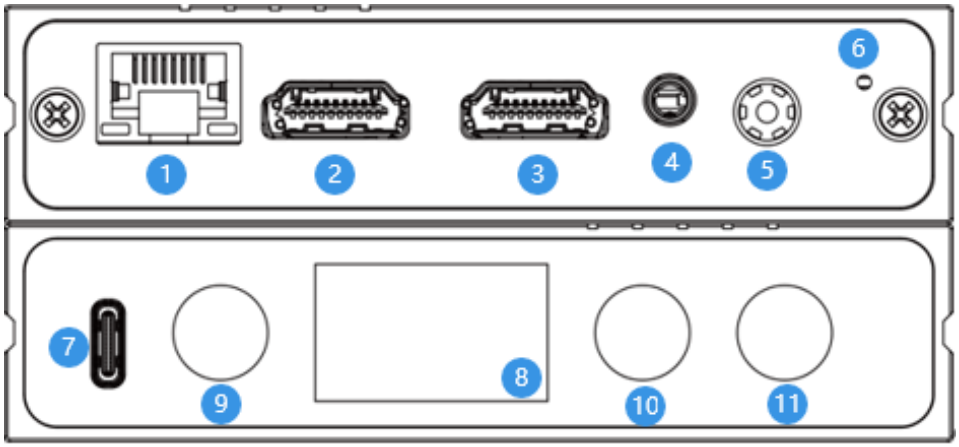
3 Packing List and Interface Description

3. 1 Packing List

Name	Unit	Quantity
N5/N6	pcs	1
DC 12V/2A power adapter	pcs	1
Certificare of Conformity/Warranty Card	pcs	1
Cold shoe screw	pcs	1
Cold show holder	pcs	1
Quick star Manual	pcs	1

3.2 Interface Description

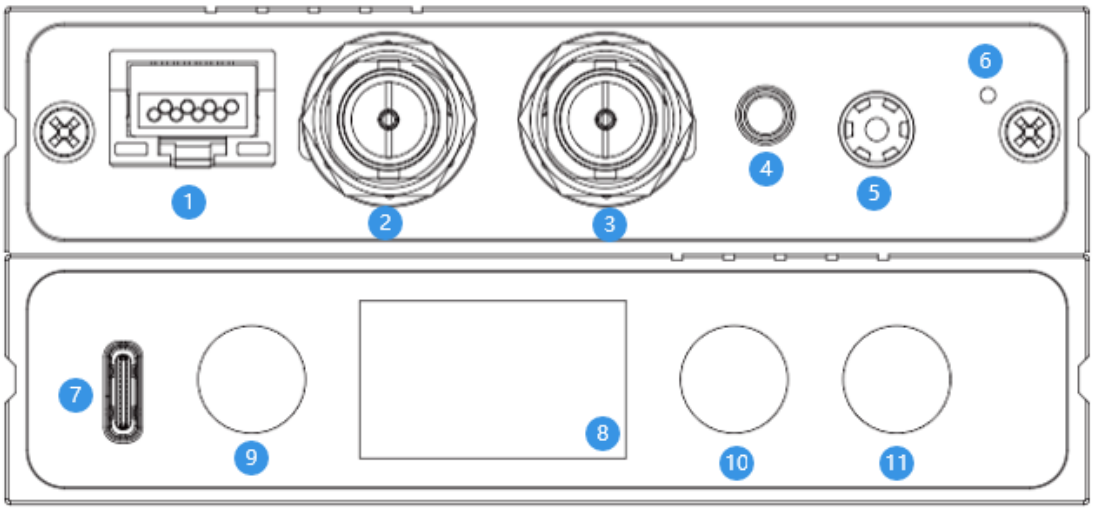
N6 interface detail：



1	1000M Ethernet port- PoE	2	HDMI IN
3	HDMI OUT	4	LINE IN/OUT
5	Power connector	6	Tally status light

7	Type-C expansion port	8	LCD display
9	Previous page key	10	Next page key
11	Confrim button		

N5 interface detail：



1	1000M Ethernet- PoE	2	SDI IN
3	SDI OUT	4	LINE IN/OUT
5	Power connector	6	Tally status light
7	Type-C expansion port	8	LCDdisplay
9	Previous page key	10	Next page key
11	Confrim button		

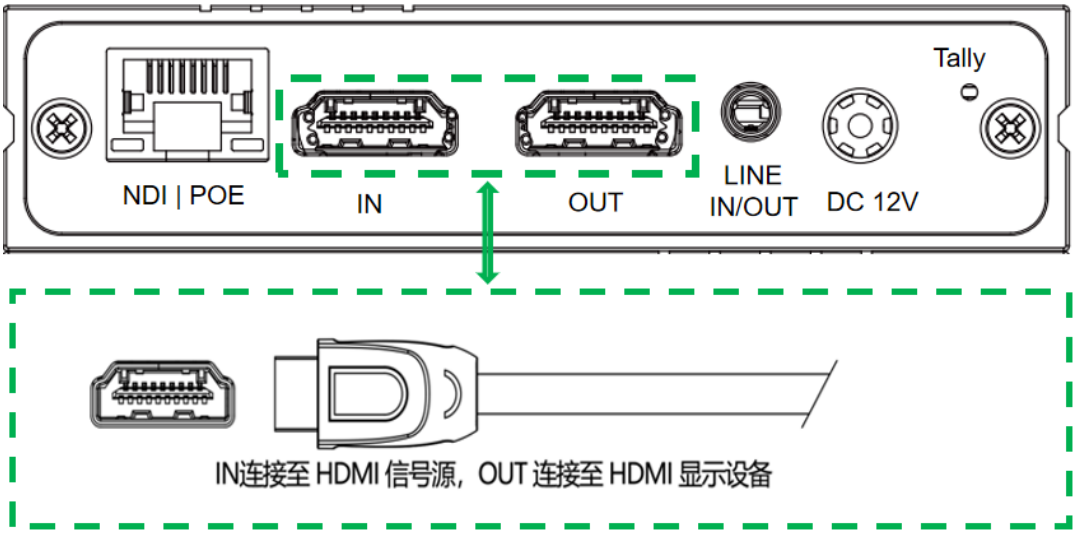
3.3 Led indicators

Tally/LCD display	**Encoding mode for indicating the status of the current video**	
	Green constant light	Indicates that the current video is in PVW pre-monitoring status
	Red constant light	Indicates that the current video is in the PGM output state

4 Installation and connection

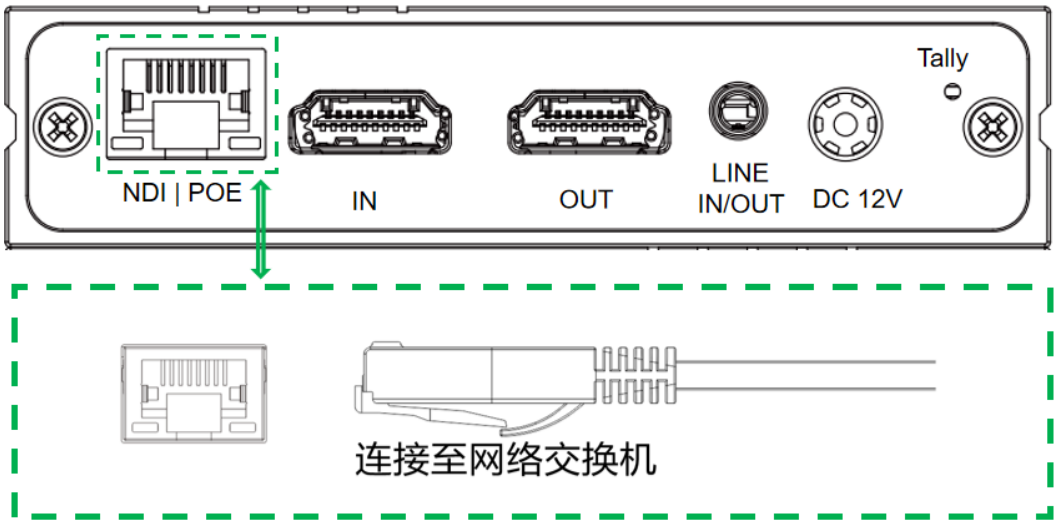
4.1 Connect Video Signal

Since the N5 and N6 are functionally different only in terms of input interface (HDMI/SDI), N6 is used here for demonstration. The HDMI signal is connected from the source (e.g. camera) to the HDMI input port of the device via a connection cable. the HDMI output is connected to the display device via an HDMI cable.



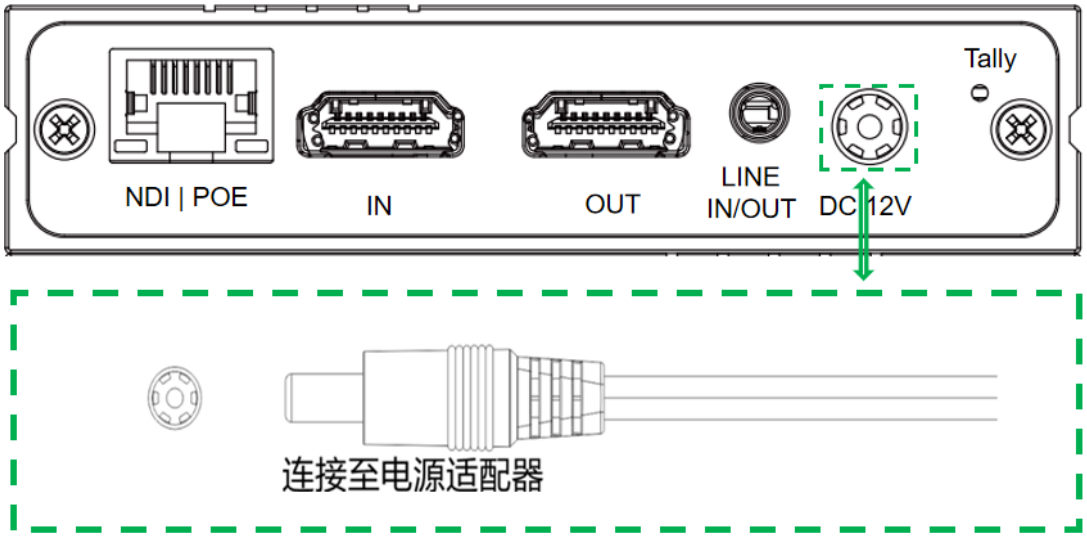
4.2 Connect Network

Connect the network cable to the RJ45 network connector of the device and the other end of the cable to the switch, which can also be connected directly to the computer's network.



4.3 Connect Power Supply

Use the standard power adapter (DC 12V/2A) to connect the device, and when the power is connected, the device power light will be on and the device will start (if POE power supply is used, there is no need to connect the power adapter).



5 Display and touch keys

The N6/N5 offers a color LCD display and touch buttons on the front panel. The N6 is used here as an example for demonstration.

The LCD display also serves as a large Tally status display. Below is an example of the N6

5. 1 Use of touch keys

Touch the button to switch the display module, press to indicate "OK", you can enter the current display module, view the working mode, view the current status of the device and restart the device and other operations.

Press to indicate the previous page;

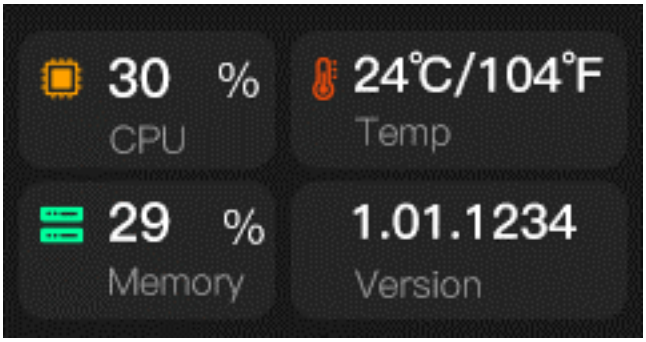
Press to indicate the next page;

Press to confirm.

5. 2 Use of the display

5. 2. 1 Equipment status

The first page of the LCD display shows the current operating status of the N6/N5, the CPU usage, the memory usage, the current temperature of the device and the current running version of the device.



CPU: indicates the CPU usage;

Memory: indicates the usage of memory;

Temp: indicates the current CPU temperature;

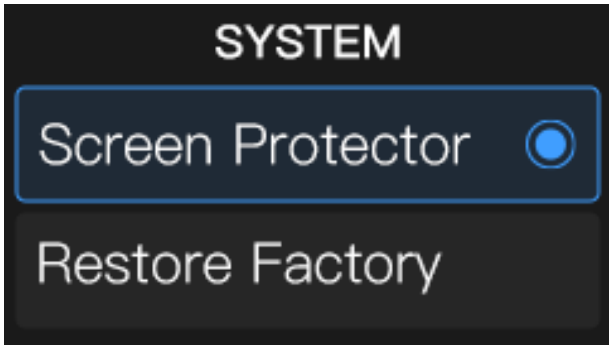
Version: Indicates the firmware version that the device is currently running.

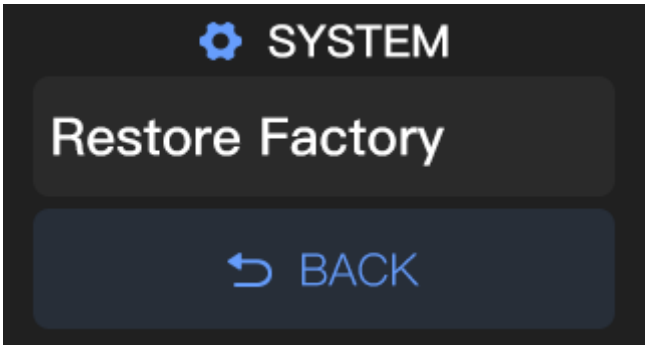
Press ⊙ on this page to enter the inside of the module, enter the option to screen protect, reboot and restore the factory settings of the device, select BACK and press ⊙ to exit the current page.

Screen Protector: indicates the time to set the screen saver;

Reboot: indicates that the device is rebooting;

Restore Factory: indicates that the device is restored to its factory settings



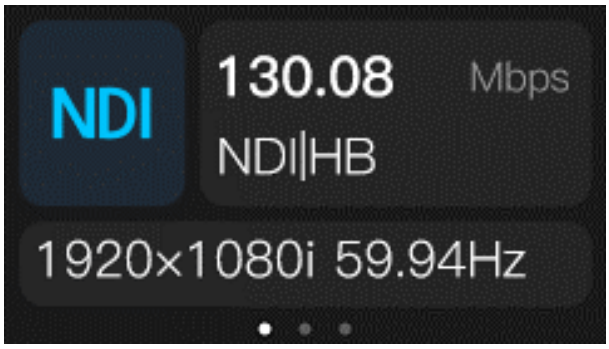


5. 2. 2 Working mode

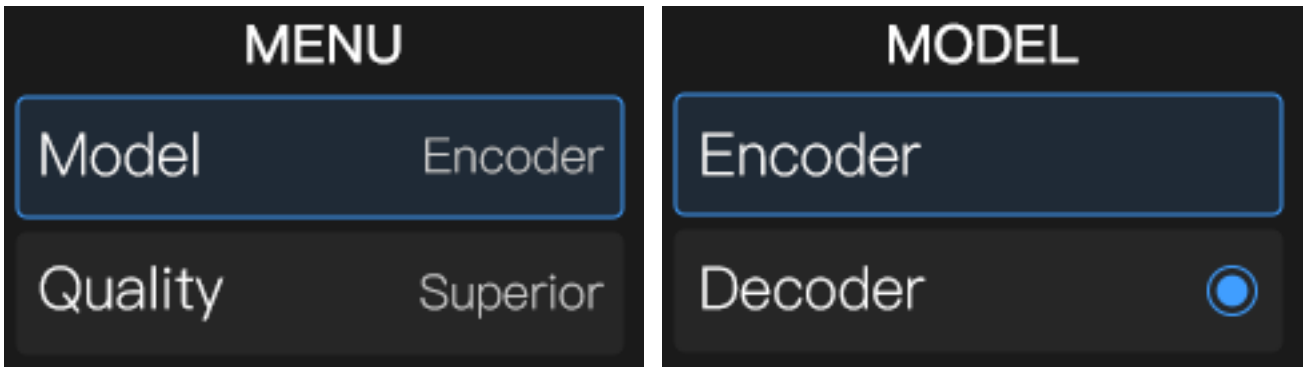
The second page of the LCD display shows the current operating mode (Encoder/Decoder) mode that the N6/N5 is in.

a.Coding mode

In encoding mode, N6/N5 displays resolution information and code rate information of the current streams of NDI|HB and NDI|HX. The following figure shows the encoding mode



After pressing  on the current page, you can enter the sub-menu. The sub-menu page supports modifying the working mode of N6/N5 by selecting Model to enter the setting and switch N6/N5 from Encoder (encoding mode) to Decoder (decoding mode). It also supports modifying encoding quality.



Quality (HX): indicates the encoding quality setting of NDI|HX.

Quality (NDI): indicates the encoding quality setting for high-bandwidth NDI|HB.

There are five levels of coding quality, which are:

Superior; indicates that the coding quality is "excellent".

High: Indicates that the encoding quality level is "high".

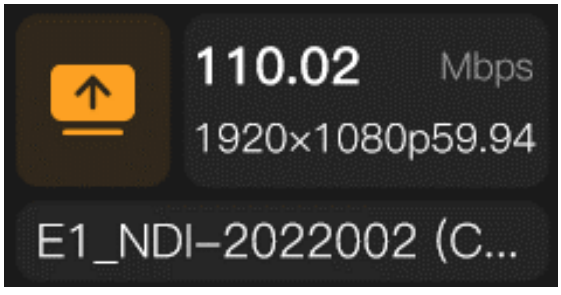
Default: indicates that the coding quality level is "default";

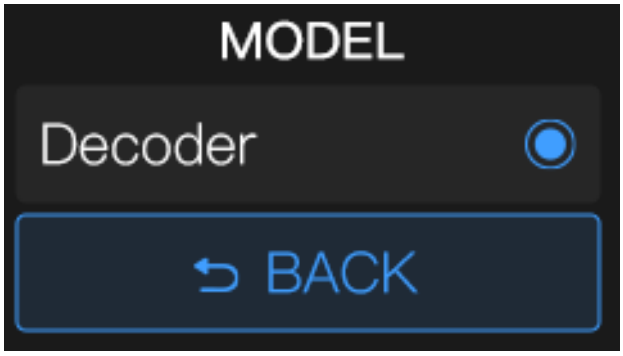
Low/Low: indicates that the coding quality level is "low";

Very Low/Poor: indicates that the coding quality level is "Very Low".

b.Decoding mode

Decoder, which indicates that the device is currently in decoding mode, N6/N5 outputs HMDI/SDI video source, and LCD displays the output resolution information and NDI code stream information. The following figure shows the decoding mode

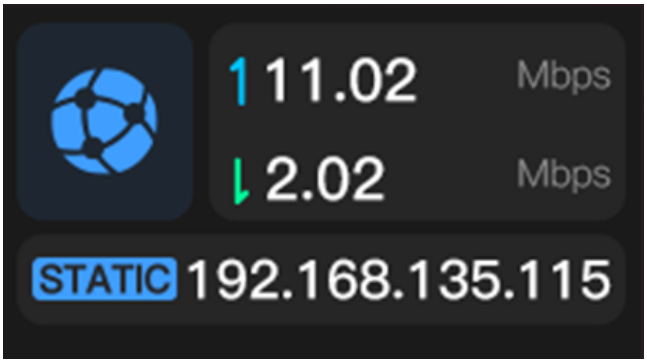




After pressing on the current page, you can enter the sub-menu. The sub-menu page supports modifying the working mode of N6/N5 and switching N6/N5 from Decoder (decoding mode) to Encoder (encoding mode).

5. 2. 3 Network Status

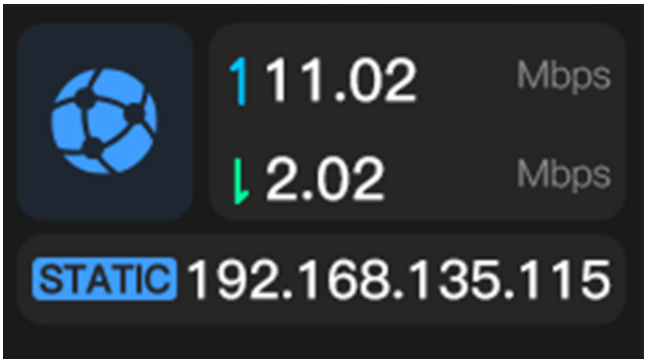
The third page of the LCD display contains the current network status of the device. The up and down arrows indicate the real-time network up and down rates, and DHCP: indicates the dynamic IP address obtained by the device.



6 Device login and network configuration

6. 1 Login to the device via wired network

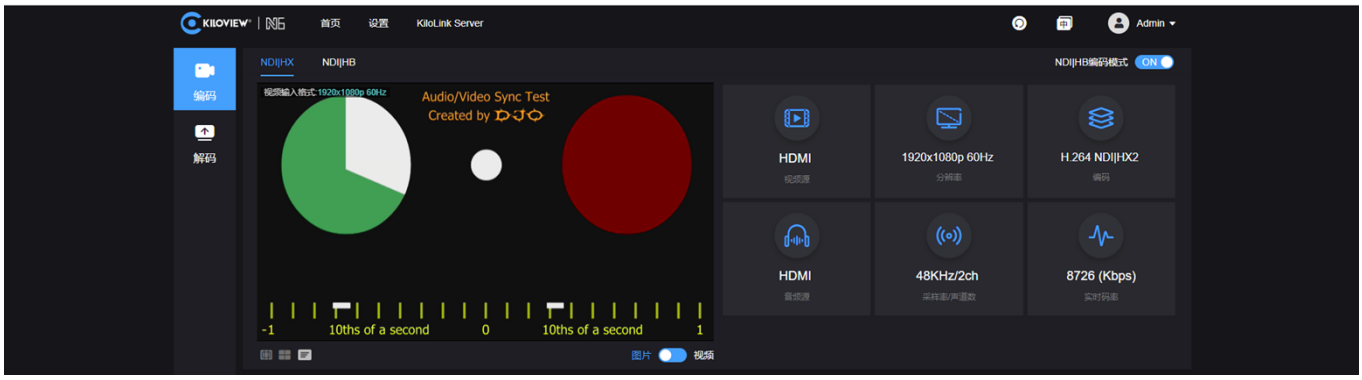
First of all, the device wired network port through the network cable switch on the N6/N5 power on the device will automatically obtain an IP address, through the LCD screen can view the current IP address of the device.



You can log in by entering the IP address in your browser to access it. The default user and password is admin/admin

⚠ *Note: Some browsers may cause the encoder page to display abnormally due to compatibility issues, so Chrome and Firefox are recommended. When you log in for the first time or after restoring factory settings, you must agree to the "License Agreement" pop-up, otherwise you will not be able to pull the device NDI streaming service properly.*

After normal login, you can set codec parameters and function parameters etc. in the device WEB management page. The device management page is shown as follows:



6. 2 Network Configuration

The device's wired network port is connected through a network cable, and this port can be configured with an IP address. The factory default for the wired port is DHCP to obtain an IP address, it will automatically get a complete IP address, gateway and DNS according to the LAN.

Ethernet has two types of address acquisition, one is DHCP dynamic IP and the other is static IP address.

Using DHCP automatic IP acquisition, the N6/N5 will get a dynamic IP address assigned by the router or switch (with DHCP service enabled) from the router or switch.

Static IP address, you need to manually enter a fixed IP to the device, and this IP address will not change if the device is not restored to factory settings.

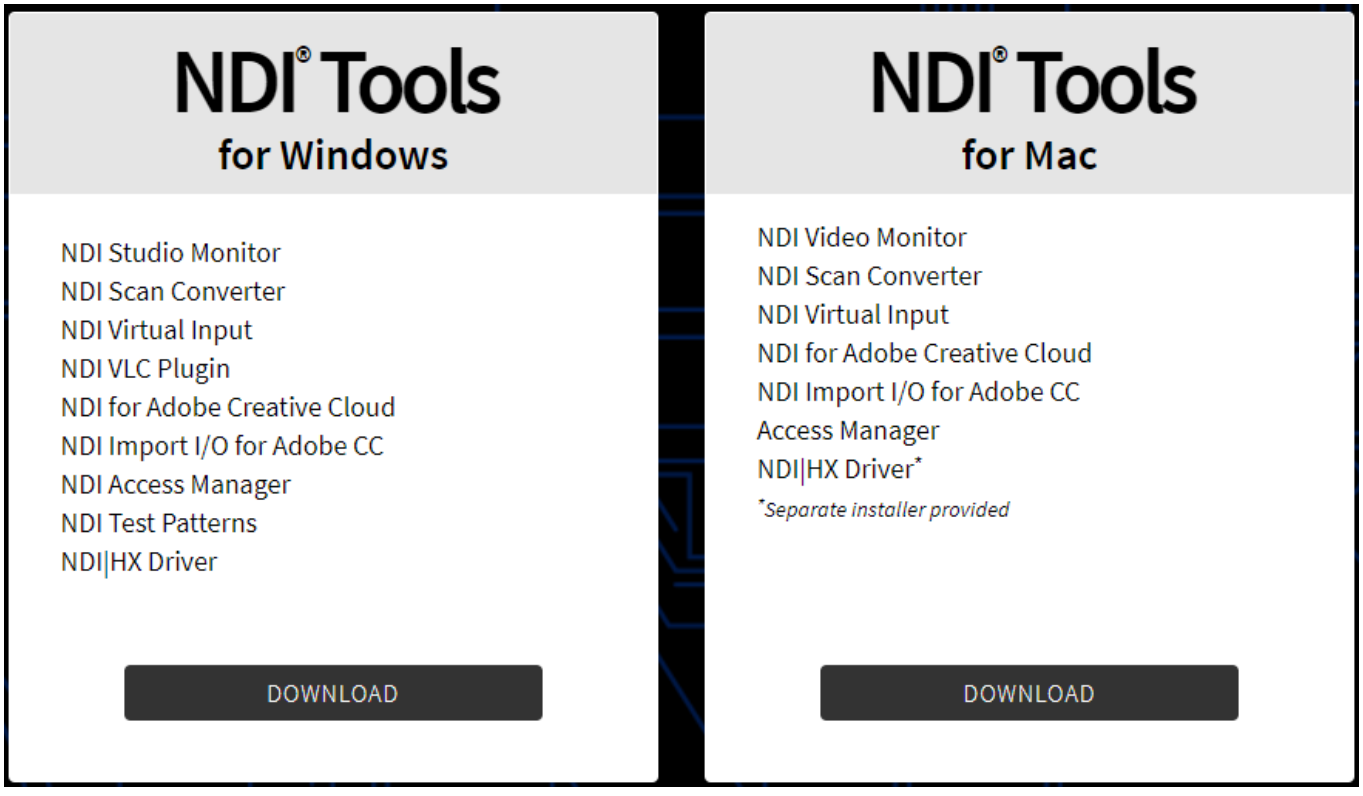
7 NDI discovery and monitoring

The N6/N5 is a specialized video codec device for NDI video production, which can encode and compress HDMI/SDI video sources into NDI protocol streams for transmission over wired networks or decode NDI stream protocols for output to any compatible system, device or software in the network.

7.1 NDI Tools Tool Installation

Download and install the NDI Tools tool program from the NEWTEK website at:

(https://www.newtek.com/ndi/tools/#)



7.2 NDI Discovery and Connectivity

When the device is connected to the network, other tools supporting NDI protocols on the PC side in the same broadcast domain can automatically discover NDI streams in the network. The tools that support the NDI protocol are now very widely available. The

following is an example of how to automatically discover and pull NDI video streams using NewTek Studio Monitor and VMIX.

Open NewTek's Studio Monitor software and click on the icon in the upper left corner (or right click) to display a list of device names that have been discovered by the Studio Monitor software. The list of names is followed by a list of all NDI streams found in the network according to different device and channel names, and you can pull and play the currently selected video stream by directly selecting the device you need to connect to.

After opening the Monitor tool to play NDI videos, click the gear-shaped button at the bottom right corner of the player to directly open the NDI device WEB management page, which is convenient for managing NDI devices directly.

Open vMix software, click "Add input" at the bottom left corner, select "more" to display various sources that can be added, click "NDI/Desktop capture" option. Click "NDI/Desktop Capture" to display the list of NDI video sources. Depending on the device name and channel name, you can select the device you want to add and click "OK" to add the selected NDI video source to the VMIX playlist.

Note: NDI discovery is implemented through multicast, so you need to place the device and other NDI devices within the same subnet, and the device is configured with the same subnet IP address and can interoperate (can automatically obtain), otherwise it may not be able to automatically discover NDI streams.

7. 3 NDI encoding code rate

Device NDI|HB encoding transmission bit rate is high, the device needs to be connected to a gigabit network, and the device NIC at the pulling end also needs a gigabit NIC, otherwise it will lead to lag or abnormal playback. The following table shows the reference bit rate for different resolution encoding:

Resolution	Encoding Output Bandwidth
1080P60	125Mbps
1080i60	100Mbps
720P60	90Mbps

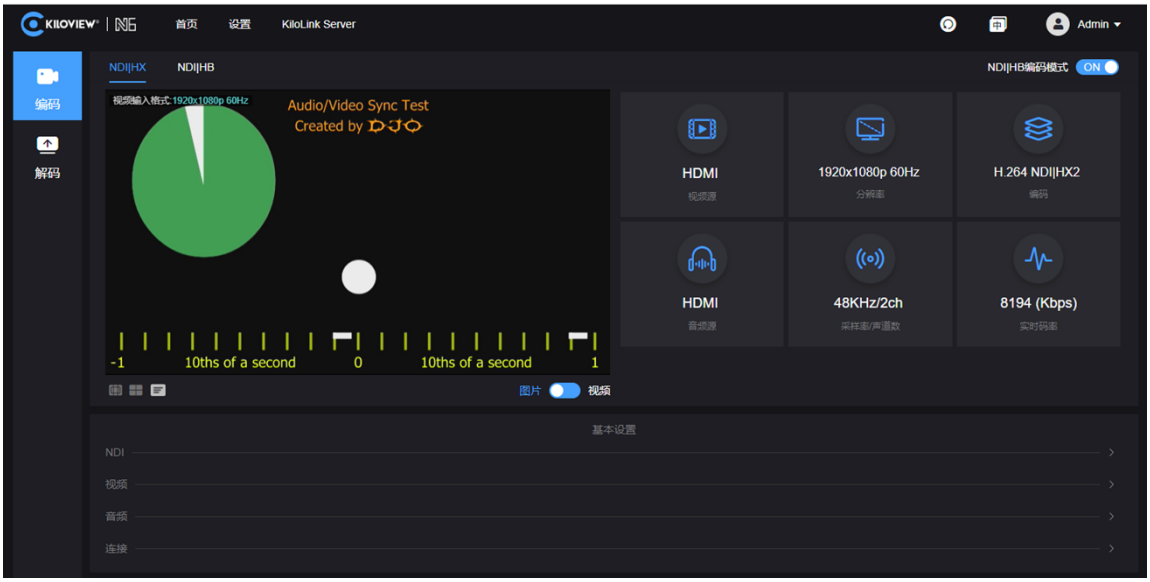
8 Encoding parameters configuration

8. 1 NDI configuration

The N6/N5 is an NDI converter based on NDI SDK 5.0, a specialized video encoding device for NDI video production that encodes HDMI/SDI video sources into NDI protocol streams for video transmission over a wired network for use by any compatible system, device or software in the network.

It supports both NDI|HB and NDI|HX encoding. Modify the encoding parameters of the device by clicking the NDI|HB and NDI|HX toggle on the page. Click the page switch to turn on/off the NDI|HB encoding mode function.

8. 2 Information column



- video source: displays the source of the input video signal;
- resolution: displays the resolution of the input signal source;
- encoding: displays the encoding protocols high bandwidth (NDI|HB) and H.264 NDI|HX for the current page (HX supports multiple versions of settings configurable in the video encoding);
- audio source: displays the source of the input audio signal;
- audio sample rate/number of channels: displays the audio sample rate and number of channels of the input source;
- Real-time code rate: displays the change in real-time encoding code rate;

8. 3 Basic settings

NDI is a protocol developed by NewTek to deliver IP video streams over a LAN with high quality and low latency. The parameters of NDI can be configured through the "Basic Settings".

- group: The group name can contain alphabetic and numeric characters. Multiple group names are allowed to be configured, with English commas separating the group names, and the default group is the public group. If you do not want other devices on the network to be able to search it at will, you can set a specified group name, and other devices need to search this device by the specified group name;
- NDI channel name: when multiple NDI sources exist in the same network, modifying the channel name of the device can identify a different device;
- scaling to a specific format: the resolution of the input video source can be adjusted, with the option to turn off scaling to be consistent with the input video source;
- encoding quality: When decreasing and increasing the encoding quality, the encoding picture quality and the encoding bit rate are adjusted.
- encoding: support H.264 and H.265 encoding, NDI|HX version support NDI|HX2 and NDI|HX3, you can choose different versions according to the actual use
- color space: N6/N5 support color space: YCbCr 4:2:0 8bit.
- audio source: you can choose HDMI/SDI embedded audio or analog input, the default is HDMI/SDI embedded audio;
- volume: gain adjustment for incoming analog audio and HDMI/SDI embedded audio;

⚠ *Note: No need to save the application after modifying the device group, device name and channel name. After modifying the parameters, click the parameters anywhere else on the page to take effect.*

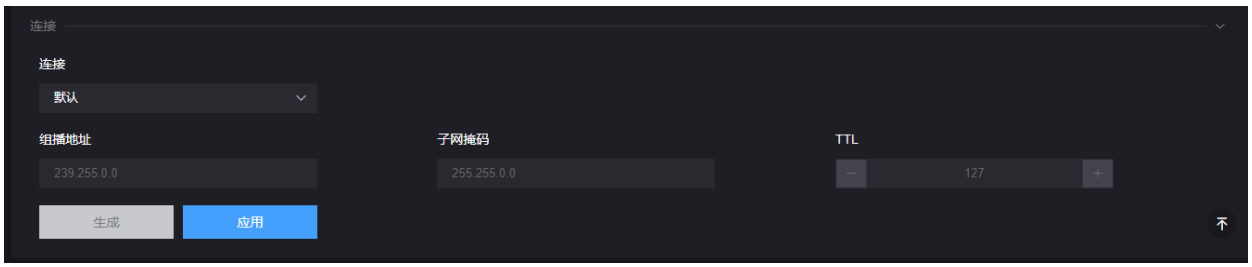
8.4 NDI connection

Multiple modes of NDI connection, with NDI connections transmitted by RUDP by default;

- "default" means that the RUDP connection is used;
- "Disable Multi-UDP" means TCP unicast connection;
- "multicast" means that the connection is made using UDP multicast.

Users can modify the connection mode of NDI according to their working requirements.

For example, if you select Multicast mode, NDI transmission will transmit audio and video in multicast mode. Click "Generate", N6/N5 will automatically generate a random multicast address, or you can manually configure the multicast address and click "Apply" to make the configuration take effect.



⚠ *Note: Due to the large code stream of NDI|HB, if you choose the multicast transmission method, please pay attention to the impact on other devices in the network.*

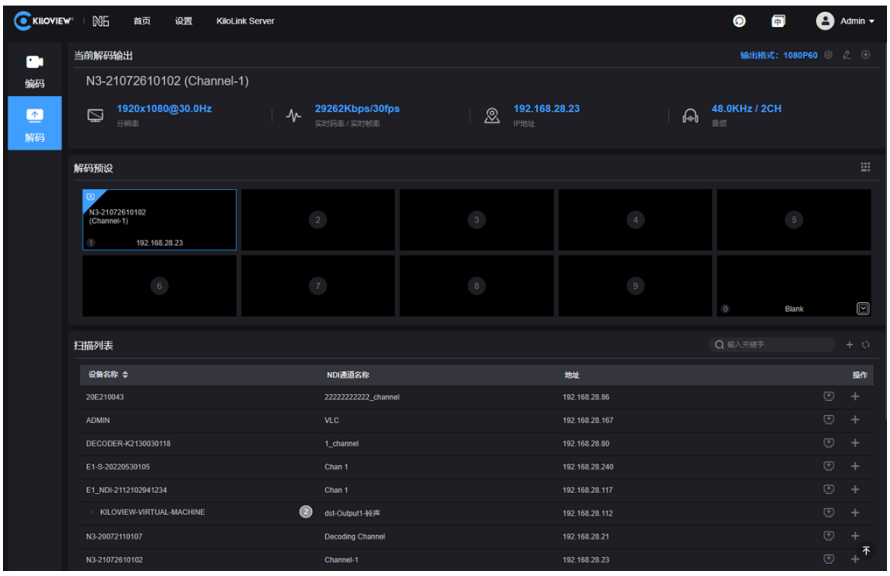
9 NDI decoding settings

You can switch to the decoding function by clicking "Decode" in the WEB page menu item of the device, or switch to the decoding mode on the LCD screen on the front panel

of the device.

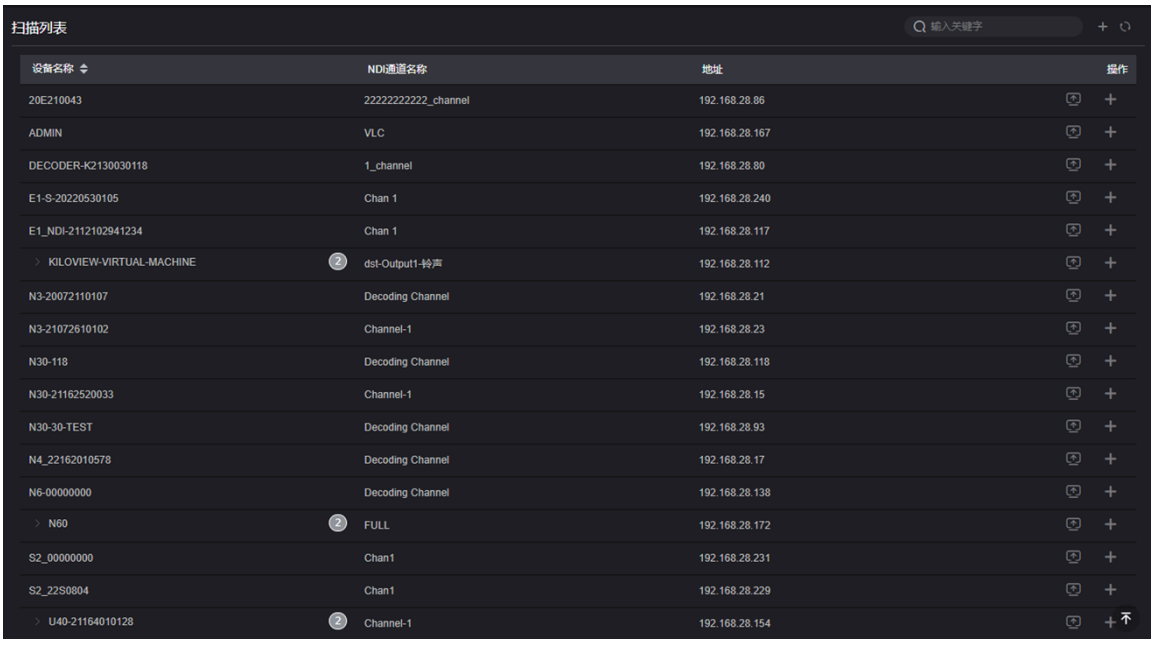
⚠ *Note: Encoding and decoding of this device cannot be performed simultaneously. When switching to the decoding function, the encoding function of the device stops working.*

Use Studio Monitor to connect to this NDI stream, and then click the gear-shaped button in the bottom right corner to jump to the device's WEB management page.



zDiscovering NDI sources

N6/N5 can automatically discover NDI sources on the same LAN and display them in the scan list, and you can click the icon to update network NDI sources in real time.



Click the  Scan List bar icon to add NDI video sources from different groups or

different network segments in the same LAN.

If you want to search for devices with different group names in the same subnet, fill in the "Group" box with the specified group name (e.g. kiloview), click the Enter button, two group names will be displayed in the "Group" box, then click the Then click the "OK" button (no need to fill in the IP address) and the device will search for the NDI source of both group names at the same time. (You can also add more than one group name to search)

When you need to search for NDI sources across network segments, if the group name is a non-public group, you need to fill in the specified group name first, then fill in the specified IP address in the "IP" item, and then press "OK" to save.

9.1 Decoding output

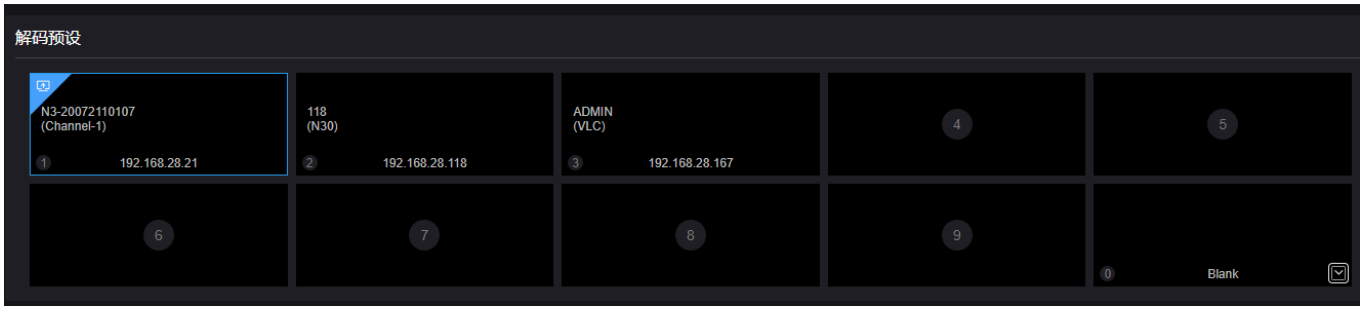
Click the icon corresponding to the NDI source to decode this video source directly to output.

9.2 Decoding presets

You can add up to 9 preset decoding sources in the decoding preset column, click the corresponding NDI source, and the device starts decoding.

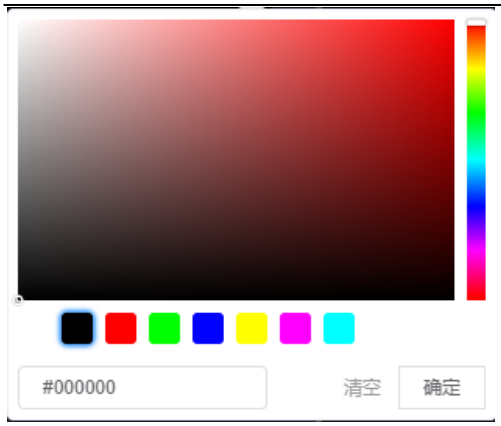
Click the icon corresponding to the NDI source to add the source to different decoding preset boxes; N6/N5 can support up to 9 preset bit settings.

After adding the desired NDI source to different preset bits, N6/N5 will immediately start decoding the corresponding NDI source in the preset bit by clicking on the preset bit, instantly switching between different NDI sources.



By clicking on different NDI sources, you can quickly switch the decoding output. In the upper right corner of the preset box NDI source, click  to delete the added source.

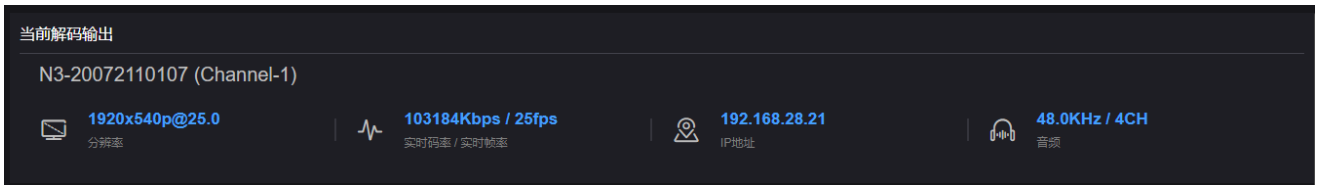
The decode preset field keeps a blank output box, and when switching to a video source with no decode output, the device outputs the color set in this box. It can also be used for test output, selecting different color areas to output different colors to the monitor.



Decoding output switching can also support USB connection to a numeric keyboard for switching. First connect the USB keyboard:

Then open the [Numlock] key on the keyboard, the light is on to indicate normal connection, and the switching operation can be performed. Select the decoding preset corresponding to 1-9 by switching the numeric keys, and 0 selects Blank.

9. 3 Decoding parameter setting

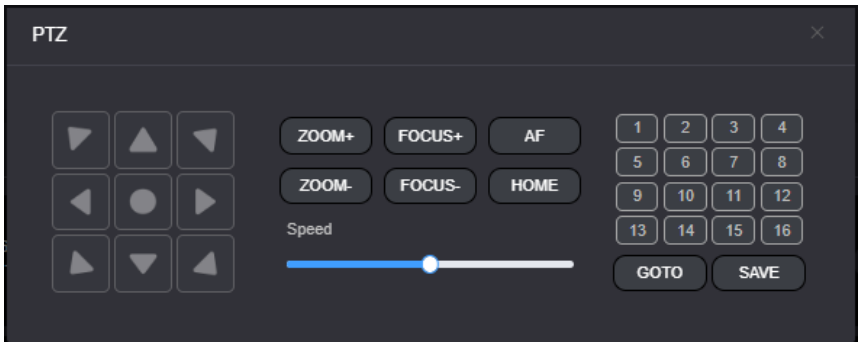


The "Current Decode Output" area displays the current decoded NDI source name, source channel name, resolution/frame rate, audio parameters, source IP address, and real-time bit rate/frame rate information.

Click the button  to open the Allow Device Discovery dialog box, and you can change the group to which this device belongs. Fill in the new name in the NDI channel name box and click OK to complete the channel name change.

Click the button  to open the Allow Device Discovery dialog box, and you can change the group to which this device belongs. Fill in the new name in the NDI channel name box and click OK to complete the channel name change.

Click the button  to open the PTZ panel for PTZ device control service.

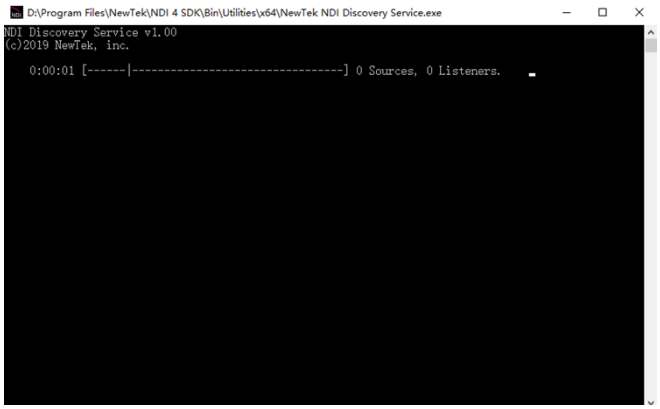


9. 4 Discovery Server

NDI Discovery Server can replace NDI auto-discovery with a server, where NDI sources are centrally registered to the server, and the receiver side gets NDI sources from the server side. This function can also be configured to send the output video stream to the

receiver side across network segments.

First, download and install the NDI SDK on the receiving end, and install it on a WINDOWS computer on the receiving end. After installation, run ***Bin\Utilities\x64\NDI Discovery Service.exe*** in the installation directory.

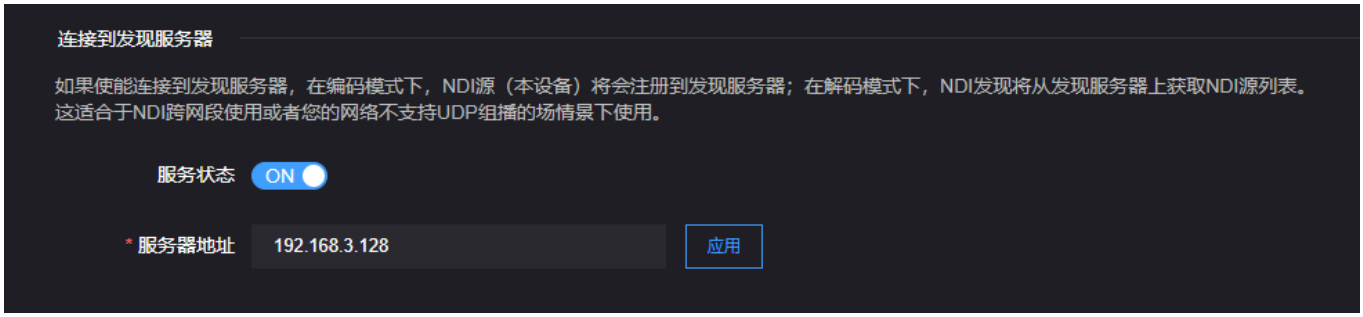


The NDI encoder configures the IP address of the receiving end in the discovery server, and the NDI will be registered to the server. It is recommended that the receiver side address be configured as a static IP address to prevent the loss of NDI connections due to IP reassignment.

⚠ *Note: When this feature is enabled, the mDNS auto-discovery feature is disabled. The encoder output video stream can only be sent to the specified server, and the receiver must be registered*

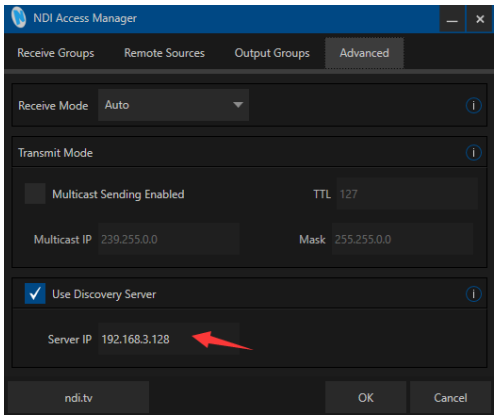
1) Receive with Thousandview NDI|HB decoder

Switch the device to decoding mode, click "Discover Server" and "Turn on" the service. Fill in the server address with the same registered address of NDI encoder. After clicking "OK" to save, all NDI sources registered to the discovery server can be found in the scan list.



2) Receive as computer software

Install NDI tools on the receiving end, and open "NDI Access Manager". Click the "Advanced" property, cancel the "Multicast Sending Enabled" function, and select "Use Discovery Server ", and set the "Server IP" address to the IP address of the computer with the discovery server function enabled. After saving the configuration, the NDI stream that has been registered to the server can be discovered by the receiving software on the computer (such as VMIX, Studio Monitor, etc.).



10 System Settings

10. 1 User Management

HTTP API Authorization can be added and removed, user passwords can be changed, and notification support can be enabled. if HTTP API Authorization is turned off, authentication will not be required for API calls, which may lead to security issues!

10. 2 Device Reboot

“ ” is used for device software reboot, which is equivalent to rebooting the device and lasts about 1 minute.

10. 3 Restore factory settings

If the user modifies parameters that cause the device to not work properly (most typically, the network address is modified so that the device cannot be accessed over the network), the factory settings of the device can be restored so that the device's configuration returns to the factory defaults.

There are two ways to restore factory settings:

① "System Settings" in WEB interface > Restore factory settings;

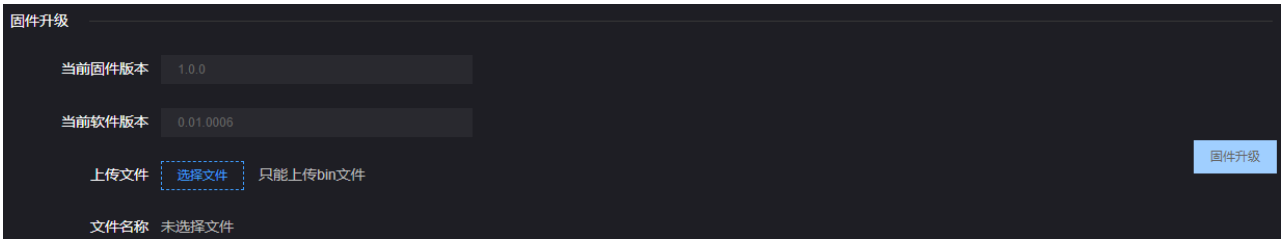
② LCD display: Enter the second page of the LCD device status by confirming

the button, select "Restore Factory" and press the scroll wheel to confirm to restore the factory settings of the device.

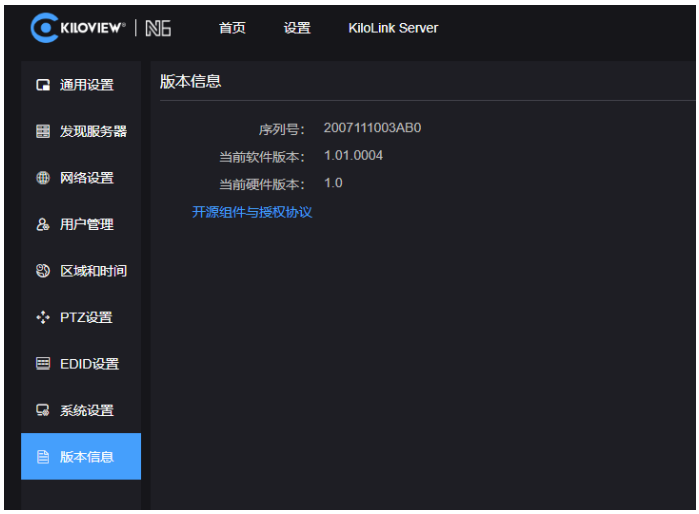
10.4 Firmware Upgrade

Every product is constantly being improved, so we are constantly upgrading the device with features and bug fixes. New features or bug fixes are supported in the form of upgrade packages for the device, please contact technical support for the upgrade package if needed.

Click "System Settings" and select "Firmware Upgrade" to enter the interface of firmware upgrade. After uploading the firmware upgrade package to the device, click the "Upgrade" button to start the upgrade. The whole upgrade process will last about 2-3 minutes (depending on the firmware size and network condition), the device will restart automatically, remember not to power off during the upgrade process, otherwise it will cause upgrade failure and device abnormality. If you need help, please contact technical support to help you complete the upgrade operation.



After the upgrade is completed, you can check the current version information on the WEB page version information to confirm whether the current software version is consistent with the latest upgrade package to ensure that the device is upgraded successfully.

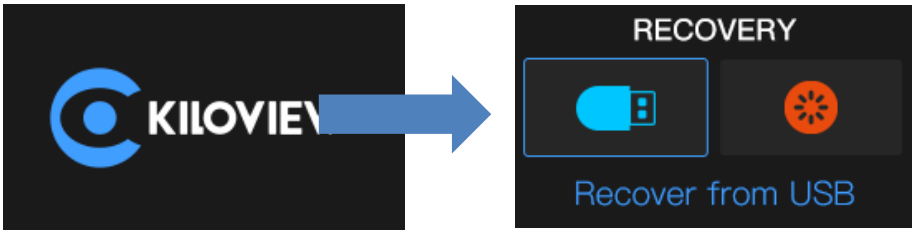


10. 5 Recovery mode to upgrade device firmware

If you cannot access the N6/N5 management background using the method described in 9.2, you can use Recovery mode to upgrade the firmware, as follows:

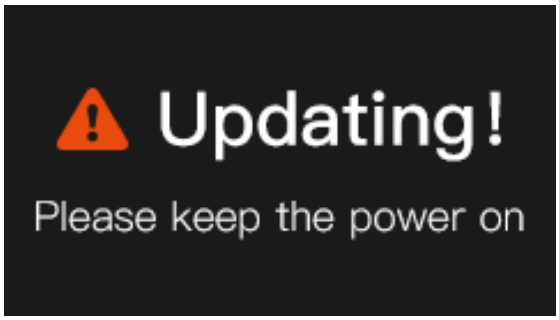
Step 1: Prepare a USB flash drive and copy the firmware file downloaded from the official website to the flash drive.

Step 2: Insert the USB flash drive into the N6/N5, after the device is powered on (about 2s), wait for the Kiloview logo to appear on the screen, long press and hold the key for more than 10s until the device enters Recovery mode.

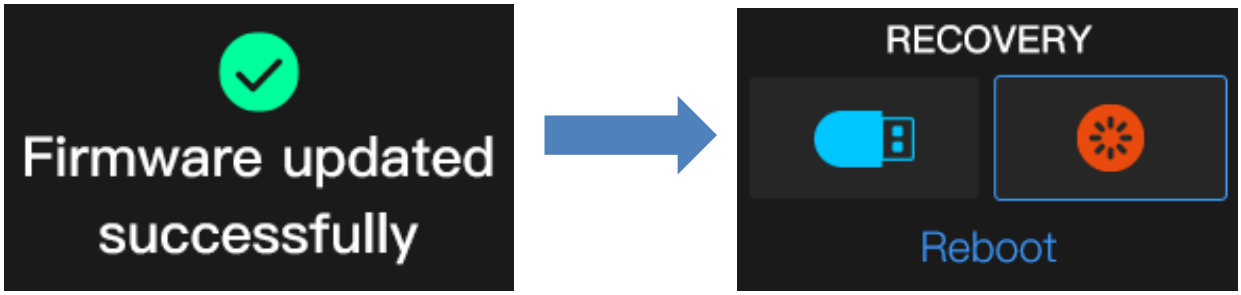


Step 3: Select "Recover from USB Device" with the directional button and press confirm to start the upgrade.

Step 4: During the N6/N5 firmware upgrade, you will be prompted with "Updating! Please keep the power on." (Do not power off).



Step 5: When the N6/N5 screen shows "Firmware updated successfully", it means the N6/N5 has completed the firmware upgrade. Return to the Recovery menu, please select Reboot to reboot the device.



Attention

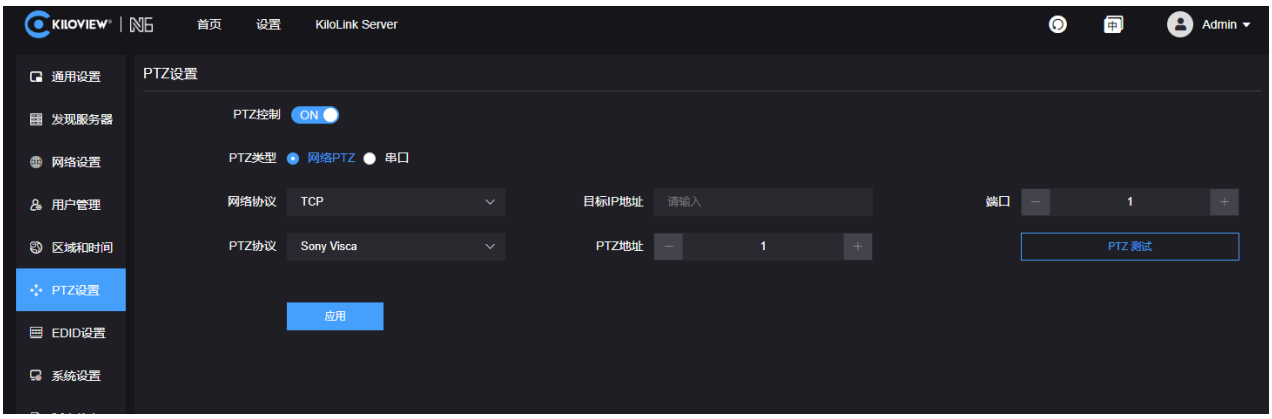
- "Press and hold down for more than 10 seconds" to enter recovery mode is only valid when the device is booted.
- The upgrade firmware is available and only stored in the root directory folder.
- does not find the firmware, the pop-up window prompts "No firmware found", operate the direction button to return to the selection interface.
- firmware upgrade process, any operation is invalid.
- If the firmware upgrade fails, it will prompt "Failed to update the firmware", please contact technical support.

10.6 PTZ control

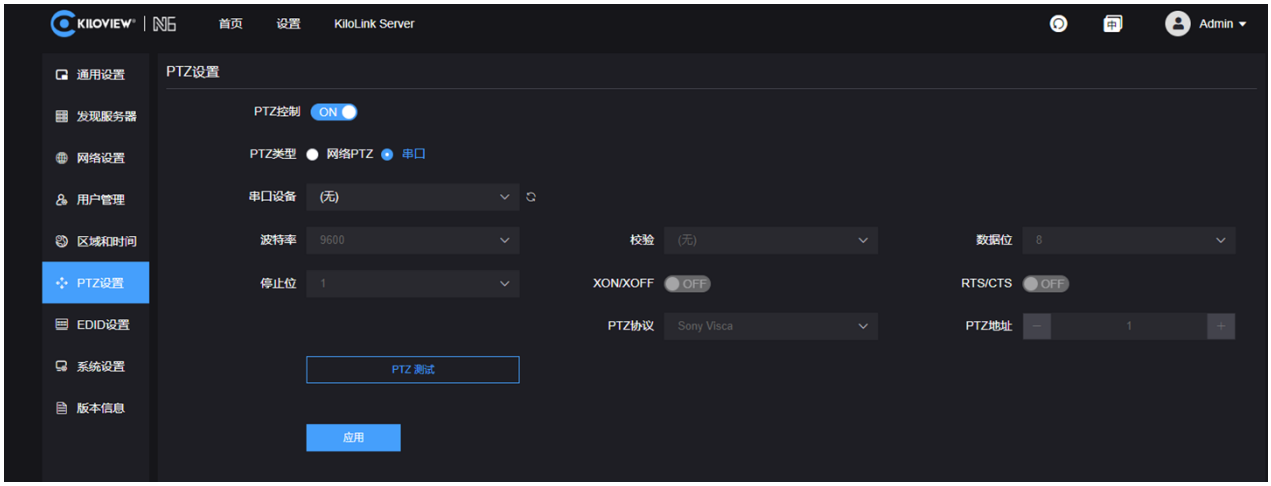
The device supports PTZ control protocol, and the protocol type supports network PTZ

and serial PTZ.

Network PTZ requires proper configuration of the connected PTZ protocol address and port, specifying the PTZ control protocol (Sony Visca, Pelco-D/P supported).



Serial PTZ needs to be converted to USB female via the device's extended TYPE-C interface, and then plugged into a USB to RS232/RS422/RS485 converter (cable) to allow the device to support serial control functions.

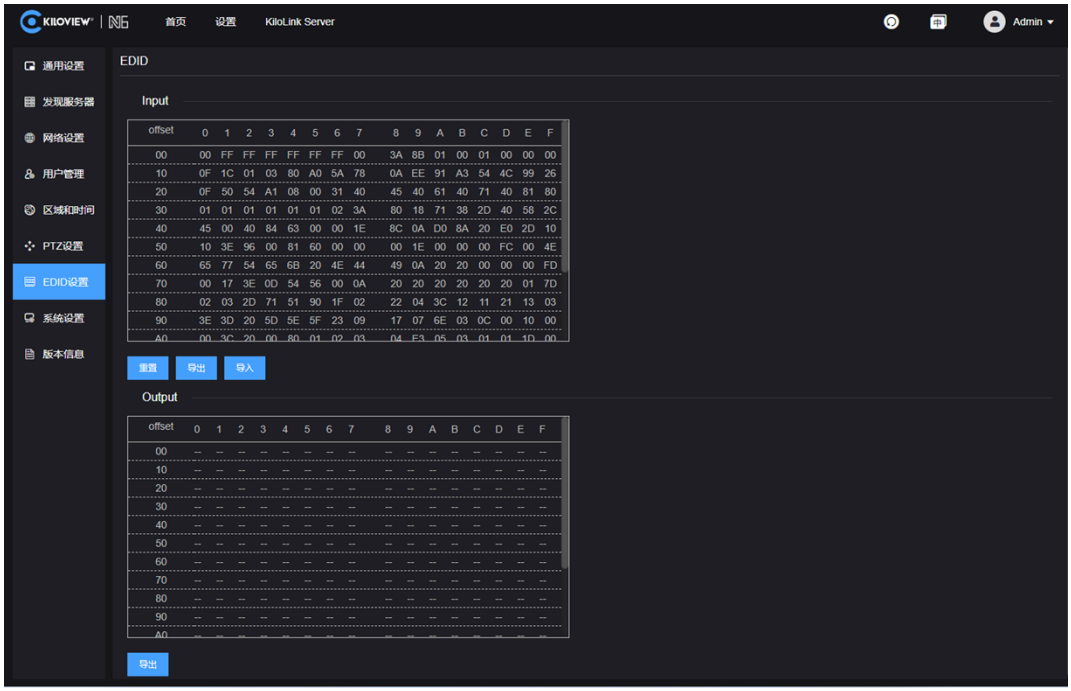


Once the control parameters are properly configured, the service can be controlled through the PTZ control panel that comes with NewTek's Studio Monitor.

10. 7 EDID Settings

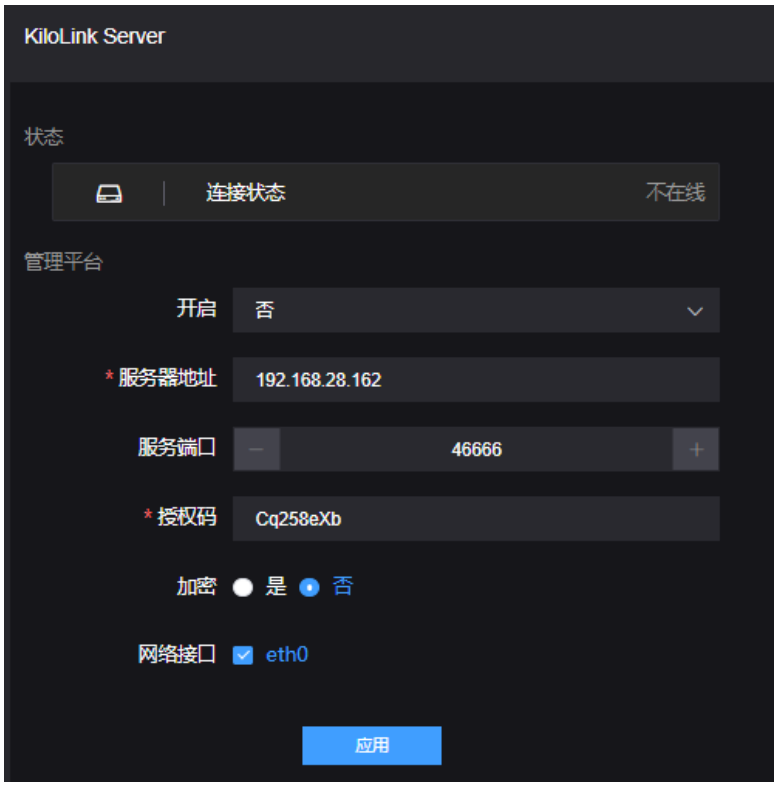
There are common video interfaces such as DVI, VGA, HDMI, Display Port, etc. The characteristics and bandwidth of each interface are different, making the EDIDs of different interfaces different. Enter the EDID setting page, you can import, export and

reset the EDID file.



10.8 KiloLink Server

Click "Kilolink Server" to enter the Kilolink Server configuration page, fill in the corresponding information devices can be connected to Kilolink Server platform to achieve unified device management.



Thank you for reading!

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