NanoHD

4K Ultra HD video codec system

User's Manual V1.0 2024.06

Introduction / Installation Guide / Instruction

版本：V1.0（2024.06）

Disclaimer

- Please read the user's manual carefully before use. Be sure to pay attention to the warnings and understand all points completely.
- Please follow the installation steps in the manual to use this product. Our company and agent will not take legal responsibility for the damage of equipment or personnel caused by the installation and modification of users.
- This copyright of this manual belongs to Great Mainlink Tech Co., LTD. No one may make copies without written consent.

Caution

Attention to installation

1. Make sure that the voltage is within the range of use. Otherwise, it will cause damage to the device.

2. Ensure that the cable sequence of the power port is correct and securely secured. Otherwise, it will cause damage to the device.

CONTENTS

Packing list

Device ×2

Encoder

Decoder

Accessories

2Pin XT30 cable ×1	**4Pin cable** ×1
	
For Power	For DIY use
4Pin to USB-A ×1	**4Pin to Dupont thread** ×1
	
For Power/USB video streams	For the serial port, SBUS OUT, and power module connection
4Pin to Ethernet ×1	**Power conversion module** ×1
	
For network communications	Power module input 6-40V，output 5V

Overview

NanoHD is a 4K ultra HD video codec system with encoder NanoHD N1 and decoder NanoHD N6. NanoHD N1 can convert the video from HDMI interface into a network video in H.265/H.264 format, and then easily transmitted through wireless or wired network. NanoHD N6 can decode the network video in H.265/H.264 format and then restore them to full HD video, display through the HDMI interface.

NanoHD N1 supports up to 4K30fps video input and is backward compatible. Using the latest H.265 encoding algorithm, the full HD video can be compressed to very low video bit rate, which is convenient to wireless real-time video transmission application scenarios. The NanoHD N1 encoding network video can have a variety of formats like RTSP, RTMP, TS stream, etc., and it can customize the output of private video stream, support multicast, broadcast or other network transmission.

NanoHD N6 supports H.265/H.264 decoding, it has a powerful system which is supporting hardware acceleration, and it can decode two full HD video at the same time and output to the display through HDMI to achieve multi-channel video split screen display. Due to its advanced low-latency decoding algorithm, NanoHD N6 is ideal for high latency requirements applications. NanoHD N6 can decode network video like RTSP, RTMP, TS stream,etc , and it can also be customized to decode private network video streams.

NanoHD has a web configuration page, users can configure the module IP address, pull address, rate and coding parameters or other information, and also through the web to upgrade the firmware, it's easy to use.

NanoHD can be used with our wireless video transmission like M52, MK22, MK55 and MK100 to meet the needs of multi-scene video applications in the UAV industry. Videos can be obtained through Mission Planner and QGC, please refer to relevant chapters or watch video tutorials.

Features

Video interface

-HDMI

Resolution

- 4K30fps（backward compatible）

Coded format

- H.264/H.265

video stream format

- RTSP、RTMP、TS stream

Work temperature

- 40℃ ~ +70℃

Power supply

- DC 5V

Type explanation

NanoHD NX

NanoHD represent product series.

N represent product serial number。

X refers to the codec type, where 1 represents encode and 6 represents decode.

eg：NanoHD N1 represents the NanoHD series encoder, NanoHD N6 represents the NanoHD series decoder, the video input interface of the coding board is HDMI, which is the standard shipping product.

NanoHD Interface Description

NanoHD N1

Front view **Left view**

1. Status Indicator

Indicator light	Description
Solid blue	The device has video input
Blinking blue for 1s slowly	The device has no video input
Blue light out	The system is not started

2. Power supply /USB interface

Number	Character	Description	Input/Output
1	G	GND	I/O
2	5V	+Vcc（5V）	I
3	D-	Data minus	O
4	D+	Data plus	I

3. ETH interface

Number	Character	Description	Input/Output
1	T+	Tx+	O

2	T-	Tx -	O
3	R+	Rx+	I
4	R-	Rx-	I

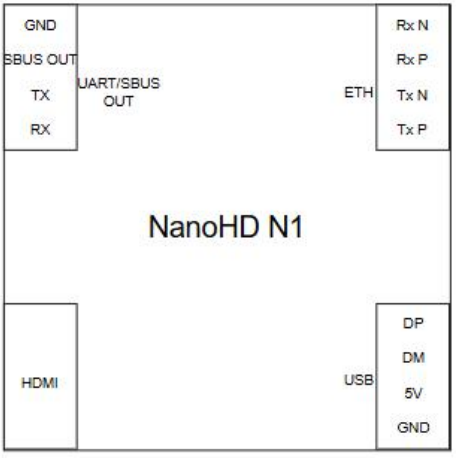
4. UART interface

Number	Character	Description	Input/Output
1	G	GND	I/O
2	S	SBUS_OUT	O
3	Tx	TXD	O
4	Rx	RXD	I

5. Type A HDMI video input interface

6. Key switch

Hold down 10s to restore factory Settings.



NanoHD N6

Right view

Left view

1. Status Indicator

Indicator light	Description
Solid blue	The device has video input
Blinking blue for 1s slowly	The device has no video input
Blue light out	The system is not started

2. Power supply /USB interface

Number	Character	Description	Input/Output
1	G	GND	I/O
2	5V	+Vcc（5V）	I
3	D-	Data minus	O
4	D+	Data plus	I

3. ETH interface

Number	Character	Description	Input/Output
1	T+	Tx+	O
2	T-	Tx -	O
3	R+	Rx+	I
4	R-	Rx-	I

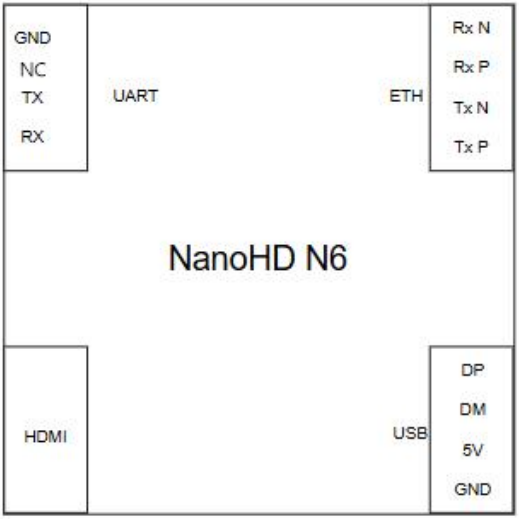
4. UART interface

Number	Character	Description	Input/Output
1	G	GND	I/O
2	NC	NC	NC
3	Tx	TXD	O
4	Rx	RXD	I

7. Type A HDMI video input interface

8. Key switch

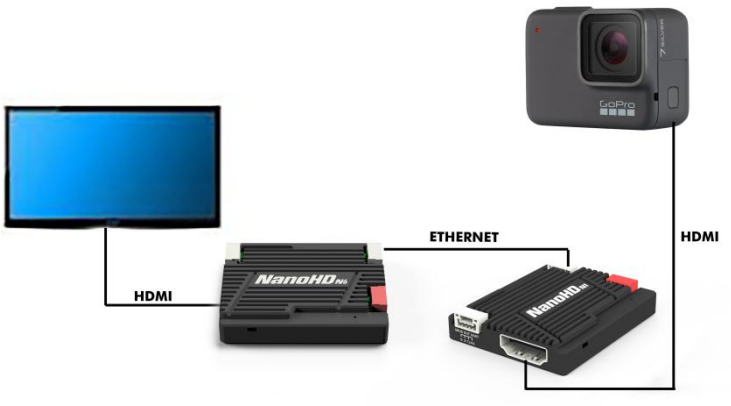
Hold down 10s to restore factory Settings.



NanoHD Instruction

Quick start

Using Gopro camera as an example to describe how to use the NanoHD codec system.

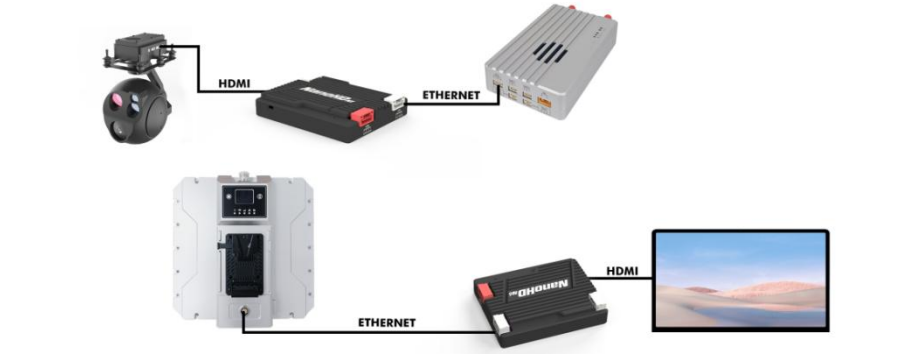


As shown, connect the HDMI port of the camera to the NanoHD N1 HDMI interface, and connect the HDMI interface of NanoHD N6 to the display. Connect the NanoHD N1 to the NanoHD N6 through the custom network cable in the accessory box.

After powering on the system, we can preview the HD video from the Gopro camera in real time.

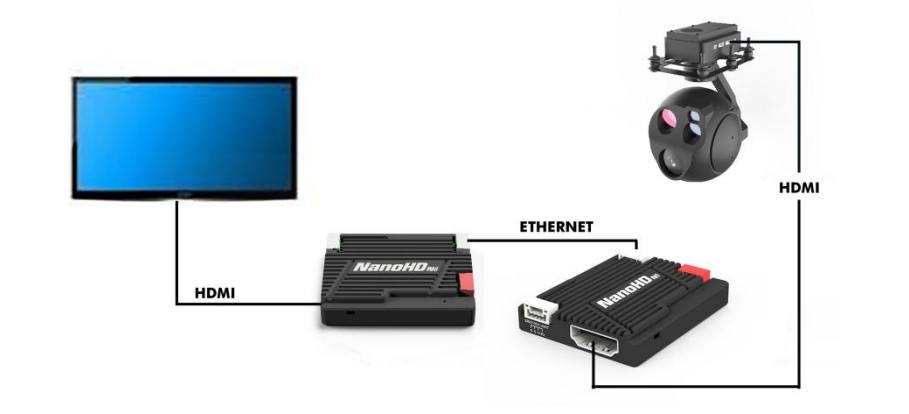
NanoHD with MK22

NanoHD can be used with our wireless video transmission MK22 to achieve wireless long-distance transmission of high-definition video. The following figure shows the connection. Please refer to the MK22 user manual for MK22 instructions.



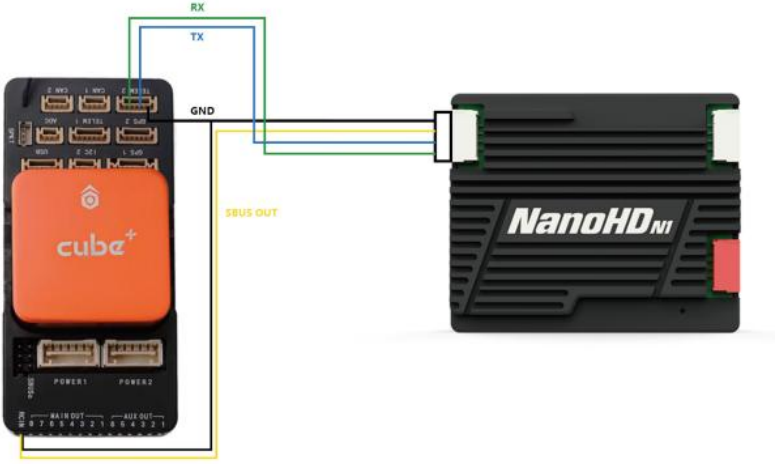
NanoHD with HDMI Pod

NanoHD can be used directly with HDMI pods to enable high-definition video transmission over the network. The following figure shows the connection details.



NanoHD N1 with flight control

NanoHD N1 can be used with open source flight control directly to control UAV and payload. The connection mode is shown in the figure below.

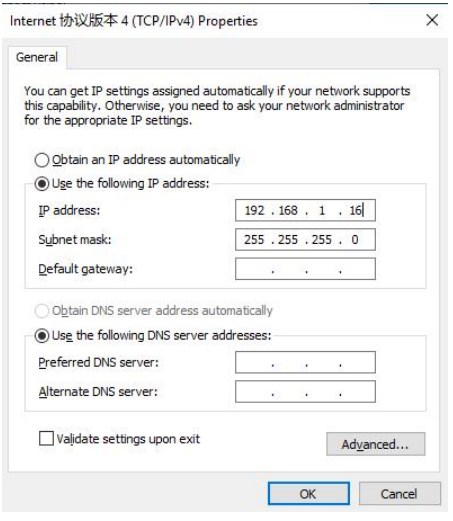


Get a video stream of NanoHD N1 through Mission Planner

The NanoHD N1 can encode HDMI HD video with H.265/H.264 compression and convert it into a standard RTSP video stream. Gopro camera as the video source, using PC as an example, as shown in the connection above, describes how to get the NanoHD N1 video stream.

1. Set PC's IP address of to the same IP segment as NanoHD N1's.

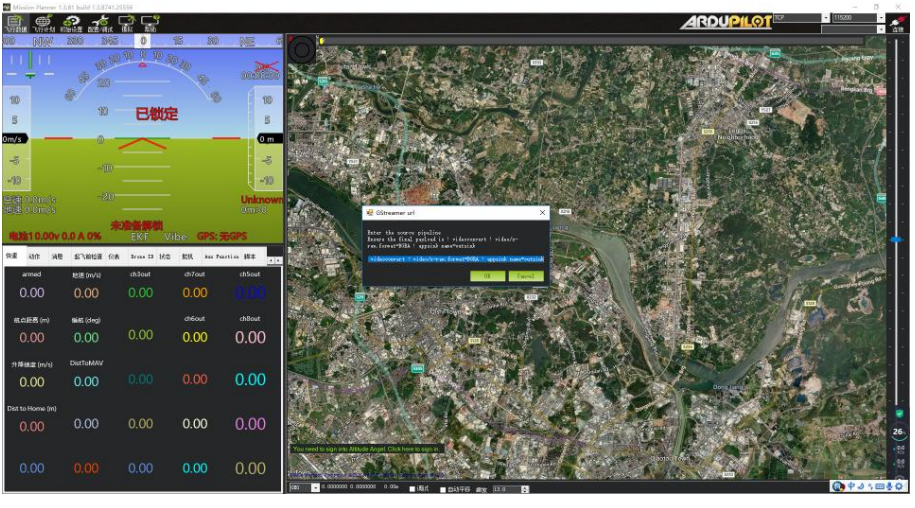
Right click on the network icon in the lower taskbar to open the "Network and Internet" Settings, change the adapter options, and right click on the Ethernet adapter corresponding to the receiver. Click properties and select the ”Internet Protocol Version 4 (TCP/IPv4)”. Set the IP address to "192.168.1.xxx" (xxx is the address value in the middle of 0 to 255, where 192.168.1.110 is the factory default IP address of NanoHD N1, if the user changes the IP address, set the PC to the same IP segment).



Note: The IP address 192.168.1.xxx is only an example. In practice, the IP address must be in the same network segment as the IP address of the video source camera.

2. Get a video stream through Mission Planner.

After connecting the device as shown above and working properly, open Mission Planner and right-click on the attitude ball interface to pop up the shortcut menu, click Video and then click SetGStreamSource, as follows:

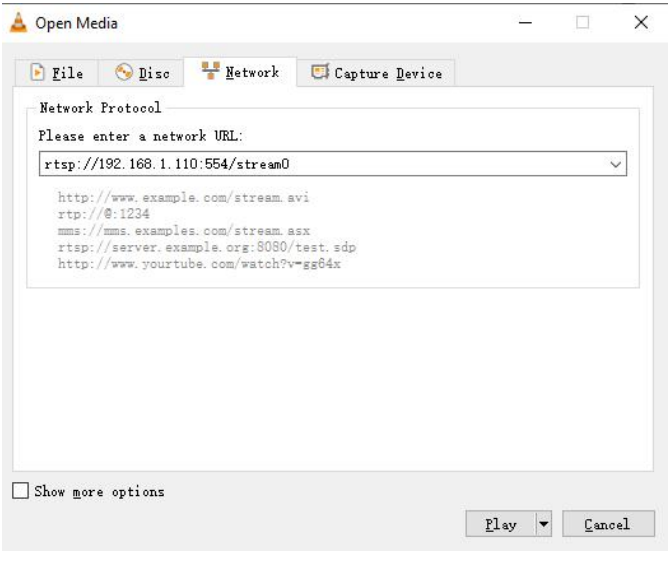


Address field input:rtspsrclocation=rtsp://192.168.1.110:554/stream0latency =0!decodebin! videoconvert!video/x-raw,format=BGRA!appsinkname=outsink

⚠ Note that "192.168.1.110" in the above address is the default IP address of NanoHD N1, if the user has changed, replace the IP address in the address bar.

Get the video stream of NanoHD N1 via VLC

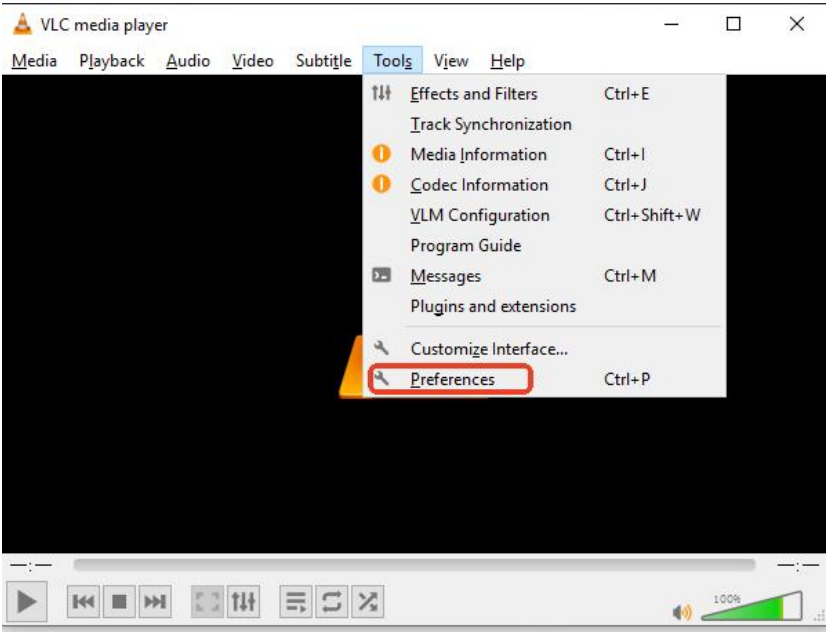
Refer to the steps in the previous chapter to connect the NanoHD N1 to the PC and set the IP of the computer. In the address input interface of the video player software VLC, enter the pull stream address of the RTSP, as shown in the following figure.



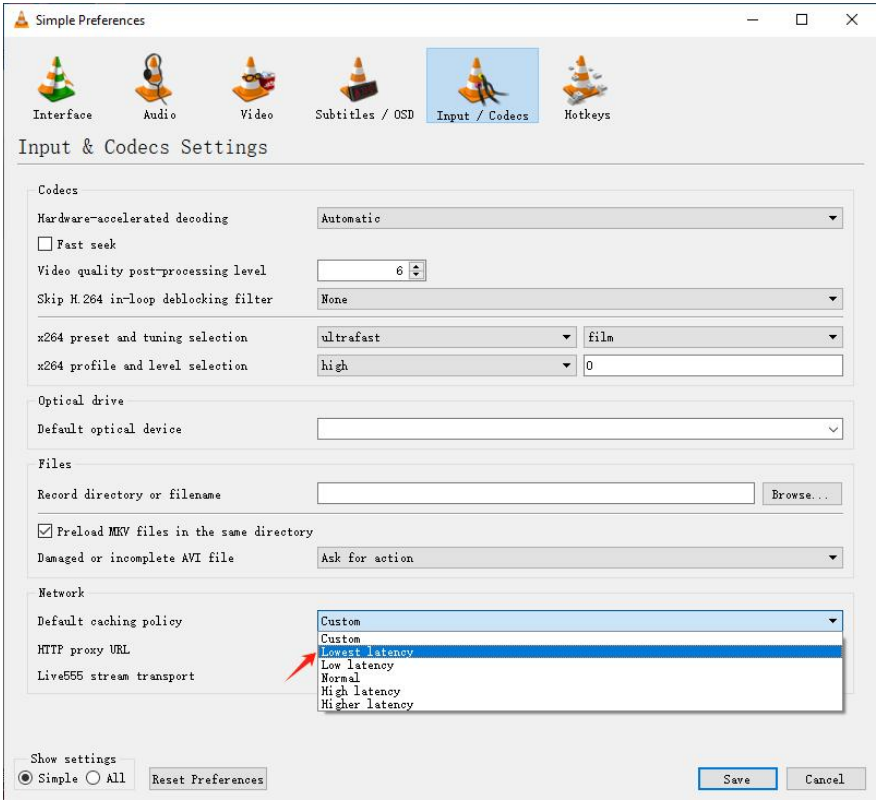
After entering the correct URL of the video stream address, you can see the real-time video in the playback area of the video player software.

Method of setting low latency through VLC

To get a better view of the video, the “default caching policy” in VLC needs to be set to “minimum latency”, open the VLC pull stream software, click the "Tools" bar, go to "Preference Settings", as shown in the figure below.



At the top of the "Preferences" screen, select the "Input/Codec" menu. Under "Default Cache Policy", select "Minimum Latency", Pull stream video can be obtained with the minimum latency. As shown in the figure below.



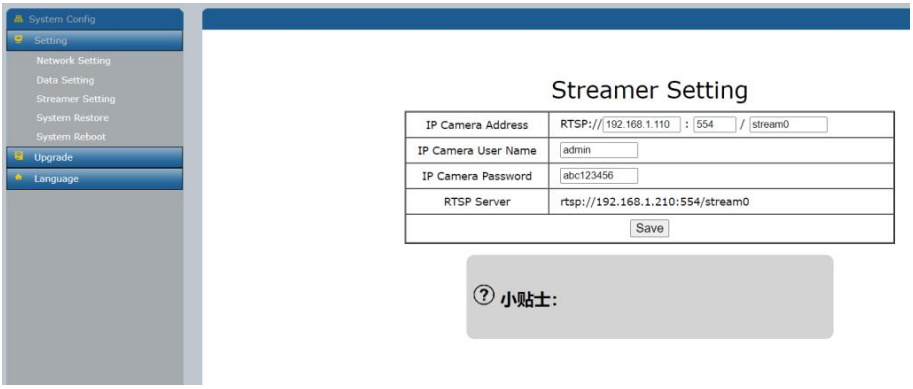
Decodes video streams from network cameras with NanoHD N6

Using HIKVISION's network camera as an example, describe how to output high-definition HDMI video by decoding NanoHD N6.

1. Confirm the IP address and RTSP pull stream address of the network camera, for example:

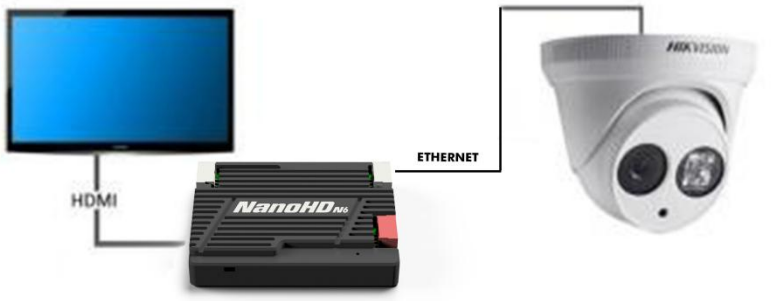
RTSP：//192.168.1.110：554/stream0。

2. Connect NanoHD N6 to your computer and log in to NanoHD N6's web configuration interface, its default factory IP address is 192.168.1.210, as shown below.



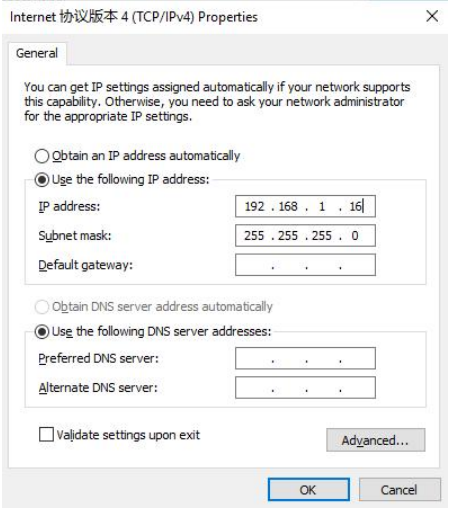
In the Setting page, enter the RTSP pull stream Address of the network Camera in the "IP Camera Address" column. If the network Camera requires User Name and Password authentication, please fill in the corresponding "IP Camera User Name" and "IP Camera Password".

3. As shown in the following figure, connect the network camera and Nano HDN6 through the network cable of the accessory box to display the real-time HD video of the network camera on the display.



NanoHD's web configuration

When you access the web page of the device through a browser, set the IP address of the host to the IP address segment 192.168.1.X. For example, you can set the IP address of your computer as follows:

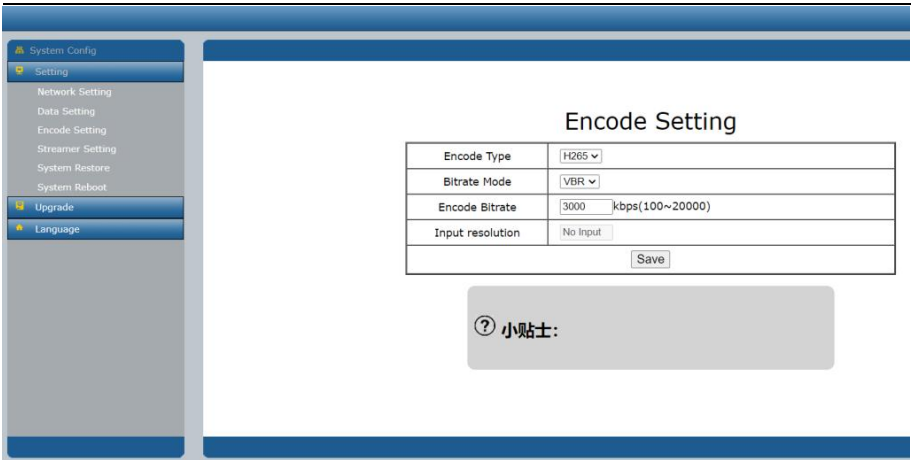


Login interface

After entering the IP address of NanoHD N1, the browser will open the Login interface as shown above. The default user name is admin and password is 123456. After entering the user name and password, click Login to enter the configuration interface of NanoHD N1.

Device settings interface

NanoHD N1 settings

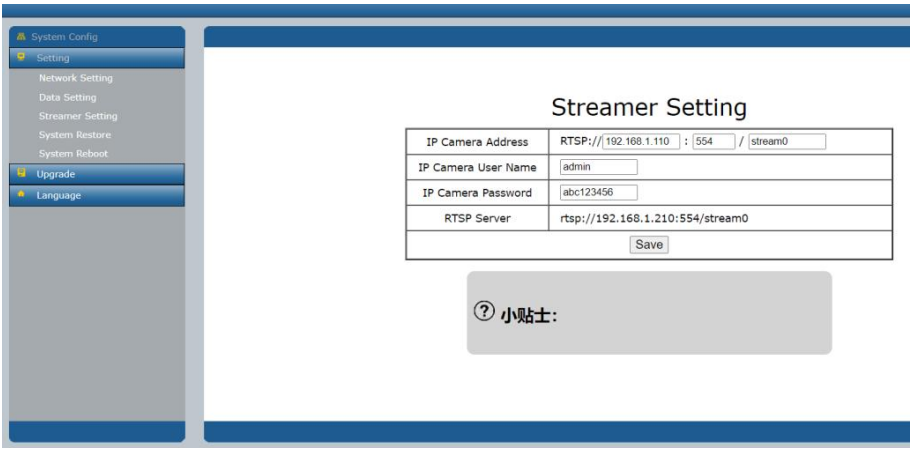


The NanoHD N1 basic Settings interface can change the IP address of the device and some parameters of the HDMI input encoder, the values are described in the following table.。

Parameter	Value	Description
Encode Type	H264/H265	Set this parameter as required, default H265
Bitrate Mode	CBR/VBR	Set this parameter as required, default CBR
Encode Bitrate	500~5000kbps	Set this parameter as required, default 2000
Input resolution	The camera real-time changes based on the input	Users cannot be modified but can only be queried
Save		Parameter saving

After the modified parameters are saved, go to the system operation page and restart the device for the parameters to take effect. If the IP address is changed, after the device restarts, enter the new IP address in the browser and log in again.

NanoHD N6 settings



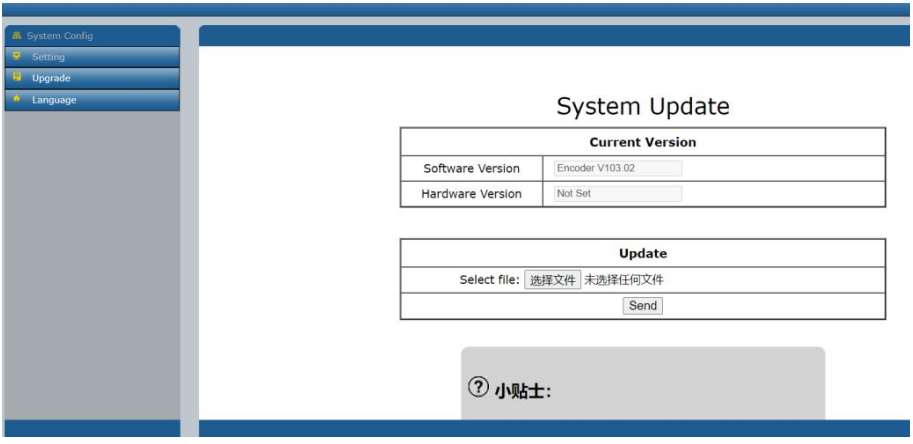
The NanoHD N6 basic configuration interface can change the IP address, gateway, RTSP pull address and HDMI output resolution of the device. The parameter values and descriptions are as follows:

Parameter	Value	Description
IP Camera Address	Default: 192.168.1.110: IP camera address; 554: Port number of IP camera RTSP stream0: The stream name of IP camera's RTSP	User set according to demand, The default is the default address of NanoHD N1
IP Camera User Name	character string	Set this parameter as required
IP Camera User Password	character string	Set this parameter as required

RTSP Server	rtsp://192.168.1.110:554/stream0	This is the NanoHD N6's own RTSP server address, the address that provides the RTSP video stream out, and the local forwarding of the video stream. This parameter is for viewing only and cannot be modified
Save		Parameter saving

After the modified parameters are saved, go to the system operation page and restart the device for the parameters to take effect. If the IP address is changed, after the device restarts, enter the new IP address in the browser and log in again.

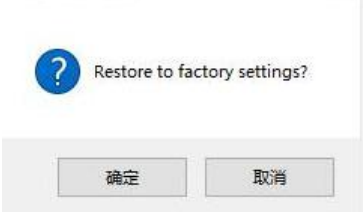
System upgrade interface



System Update is used for firmware upgrade. Before upgrading, please download the required firmware from our official website to the computer and click "Browse..." Press the button to select the upgrade file and click Send. The system sends the upgrade file and displays the upgrade progress on the web page. After the upgrade is complete, the system automatically restarts. Please log in to the web page again to check whether the firmware version is the latest.

System restore interface

On the system setting screen, you can click the "system Restore" button to restore factory Settings. After you click Restore, a dialog box is displayed asking you whether to "Restore to factory settings?".



Clicking OK will restore the device parameters to factory status.

System reboot interface

On the setting screen, you can tap System Reboot to restart the device.

Click OK to restart the device. After Restart, enter the IP address in the address bar of the browser, and log in again.

Specification

Category	Item	Detail
Video Performance	Resolution	4KP30 downward compatibility
	Coding standard	H.264/H.265 configurable
	Video bit rate	500kbps~15Mbps adjustable
	Transport protocols	RTSP、RTMP、TS stream
	Delay	About 50ms
Power Range	DC 5V	
Power Consumption	NanoHD N1≤1.5W	
	NanoHD N6≤1.5W	
Interface	USB（Power supply）	Power*1（UVC pull in the back）
	HDMI	HDMI*1
	ETH	4 Pin*1
	UART/SBUS	UART/SBUS OUT*1
	Key	Key*1（Factory default Settings）
	SWR	≤2.0
Environment	Work temperature	-40℃～+70℃
	Storage temperature	-40℃～+85℃
	Humidity	5~95%，non-condensing
Appearance	Size	NanoHD N1　45X37X9mm
		NanoHD N6　45X37X9mm
	Weight	NanoHD N1　20g
		NanoHD N6　20g
	Indicator light	Power indicator/status indicator

FAQ

1	Description	The power indicator is off after power-on.
Solutions: 1、Check the wiring order of the power cable; 2、Check the DC power range; 3、Please contact our company's after-sales service.		
2	Description	The computer cannot get the Nano HDN1 video stream.
Solutions: 1、Check whether the computer and NanoHD N1 in the same IP segment, whether the computer Ping successfully, otherwise, please change the IP of the computer. 2、Check the HDMI cable that connects the camera to the NanoHD N1 is plugged in. 3、Check the RTSP address of the PC application software is correct. 4、Please contact our company's after-sales service.		
3	Description	The NanoHD N6 is unable to decode video streams from network cameras and can't display them via the HDMI interface.
Solutions: 1、 Check whether the computer is in the same IP segment as NanoHD N6, and whether there is IP conflict between the camera, NanoHD N6, and the computer. please make sure computer can Ping the NanoHD N6 and network camera. 2、Check the NanoHD N6 is properly connected to the HDMI cable of display screen. 3、 Please check if the camera has a username and password enabled, if so, please configure the username and password to NanoHD N6's web configuration interface, or you can try to cancel the camera username and password. 4、Please contact our company's after-sales service.		

Note: For more detailed teaching videos, please refer to official website.