

2 Panel Design

2.1 Front Panel

Figure2.1 NVP-903 Front Panel

NVP-903 Front Panel consists of an E Ink screen and 3 indicators: Power, Data and Stream.

- **E Ink:** Displays device basic info. The info in E Ink will not be vanished after powered down.
 - **Work Mode:** Current device work mode: NVP-903-E (Encoder Mode) or NVP-903-D (Decoder Mode)
 - **SSID:** Device serial number / SSID of NVP-903 internal hot-spot(AP)
 - **Password:** Password of NVP-903 internal hot-spot(AP)
 - **Stream IP:** Device IP address for streaming and web control
- **Indicators:** Displays current running status
 - **Power:** [Blue] Device is powered up now
 - **Data:** [Green] Device recognizes the input source successfully. [Red] Device does not recognize the input source now
 - **Stream:** [Green] Device is connected to target server/decoder and pushing/pulling stream to it; [Red] Device is not pushing/pulling stream to target server/decoder.



Tips:

If Data indicators keep red when you have plugged in the video source, check video/audio input settings via web control. Make sure the video/audio type in input setting and the video source type to be the same.

2.2 Rear Panel



Figure2.2 NVP-903 Rear Panel

NVP-903 Rear Panel consists of power interface, video/audio interface, network interface and SD card slot.

- **Power (XLR):** Connect NVP-903 power adapter to power up the device
- **SDI:**
 - Encoder Mode: HD/SD-SDI video/audio source input
- **Video:**
 - Encoder Mode: Analog video source input
- **Audio (L&R):**
 - Encoder Mode: Analog audio source input
- **HDMI IN:**
 - Encoder Mode: HDMI video/audio source input
- **HDMI OUT:**
 - Encoder Mode: HDMI video/audio source loop-out
 - Decoder Mode: HDMI video/audio output
- **ETH:** Network interface for streaming and device web control
- **USB:** USB2.0 for Wi-Fi dongle function (*In developing*)
- **SD Card:** Insert SD card for video recording (*In developing*)

3 Web Control [Encoder Mode]

3.1 Log In

NVP-903 supports PC web control via Ethernet port, it also supports PC/Smartphone/Pad wireless web control via NVP-903 internal hotspot.

3.1.1 Log in via Ethernet

- 1) Prepare a computer with Ethernet port and Internet web browser.
- 2) Connect your PC to the NVP-903 ETH port via Ethernet.
- 3) Configure computer IP address, make sure that NVP-903 and the computer IP are in the same network segment
- 4) Input the device IP address in the web browser, it will displays the Log in page, as follows:

(Default IP Address: **202.0.0.138**)

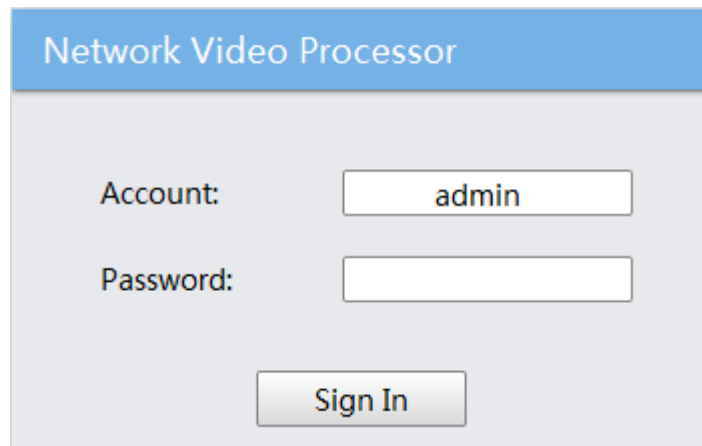


Figure3.1 Log in

- 5) Type in the Account and Password to login.
(Default Account: **admin**; Default Password: **admin**)


3.1.2 Log in via Wi-Fi

- 1) Prepare a PC/Pad/Smartphone with Wi-Fi function and Internet web browser.
- 2) Search Wi-Fi SSID of NVP-903 internal hotspot(AP) and connect your PC/Pad/Smartphone to it. (Default AP Password: **87654321**)
- 3) Input the device IP address in the web browser, it will displays the Log in page, as in

Figure 3.1

- 4) Type in the Account and Password to login.

(Default Account: **admin**; Default Password: **admin**)

 **Tips:**
SSID of NVP-903 internal hotspot (AP) will be displayed in the E-Ink of device front panel.

3.2 Configuration

Click **Configuration** in main menu to enter the basic setting page, as follows:

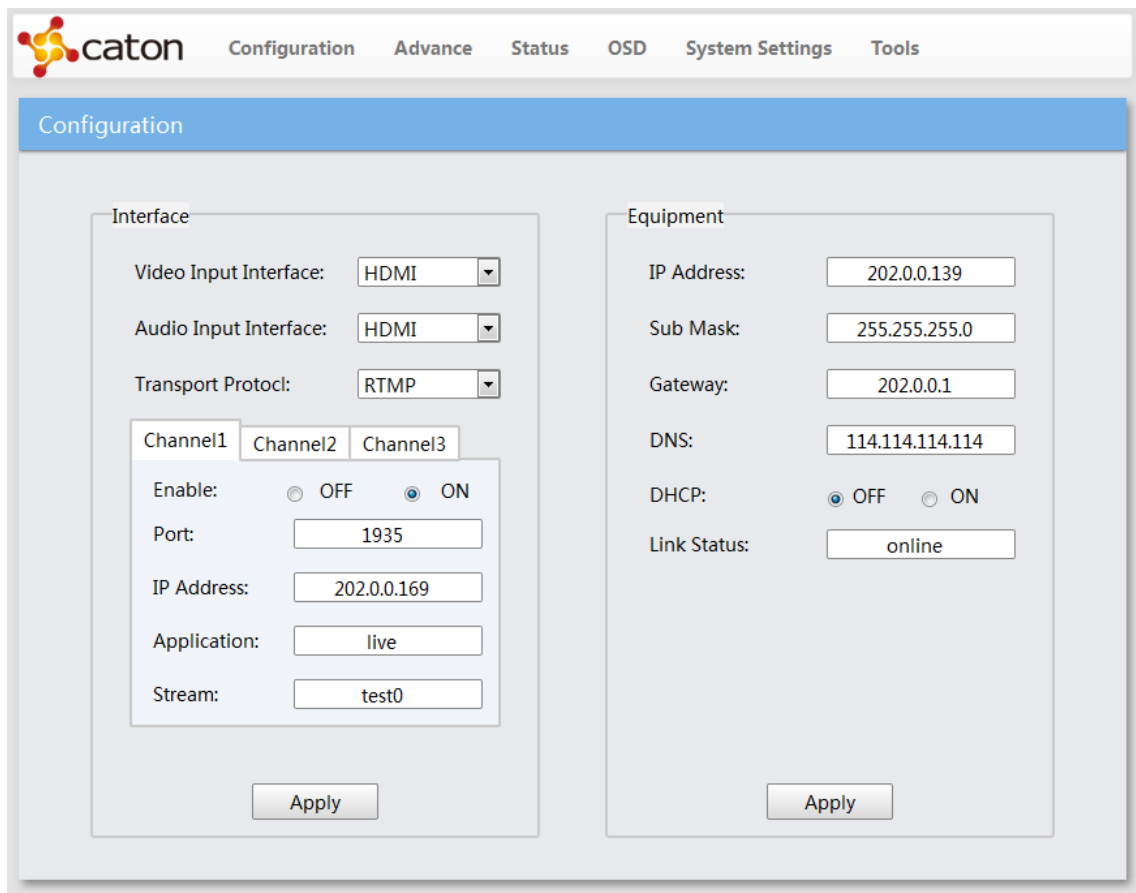
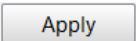


Figure3.2 Configuration

In Configuration page, users can configure basic settings of video/audio source, transport protocol and device IP setting.

Click  to save the configuration.

3.2.1 Interface

Select the video/audio source type to encode and the transport protocol for streaming.

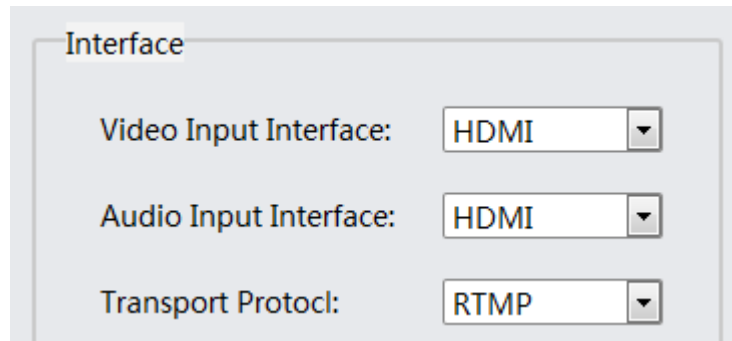


Figure3.3 Interface

Table3-1 Interface

Menu Name		Range
Interface	Video Input Source	SDI
		HDMI
		CVBS
		ColorBar (Internal Source)
		BlackField (Internal Source)
	Audio Input Source	SDI-Ch1/2
		SDI-Ch3/4
		SDI-Ch5/6
		SDI-Ch7/8
		HDMI
		Analog
		1KHz (Internal Source)
		Silence (Internal Source)
	Transport Protocol	R2TP
		R2TP-S
UDP		
HTTP (TS over HTTP)		
RTMP (RTMP Push)		

NVP-903 support 1 channel video/audio source input with 3 channel encoding streams output.

The encoding streams can be configured with different target address.

1) UDP

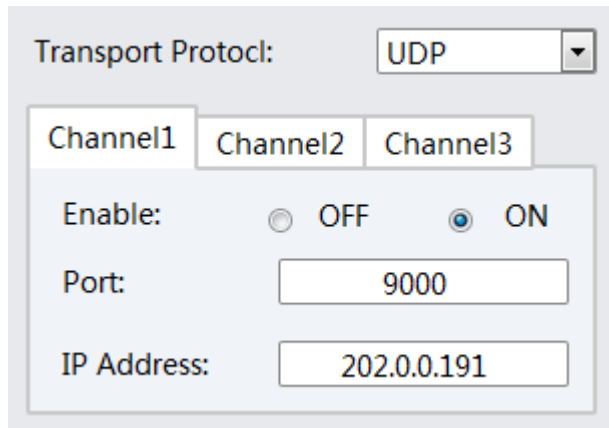


Figure3.4 UDP

- **Enable:** Enable current encoding streams to transmit. **ON:** Enable the transmitting; **OFF:** Disable the transmitting
- **Port:** Transport port for UDP transmission. Range: 1024~65535
- **IP Address:** IP address of target device to receive UDP streams.

2) HTTP (TS over HTTP)

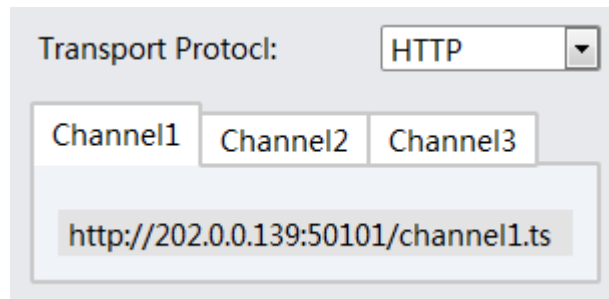


Figure3.5 HTTP

For HTTP transmission, NVP-903 will generate a stream URL for each encoding channel (e.g. http://202.0.0.139:50101/channel1.ts). Configure target decoder/server with this stream URL to pull the stream for NVP-903.

3) RTMP

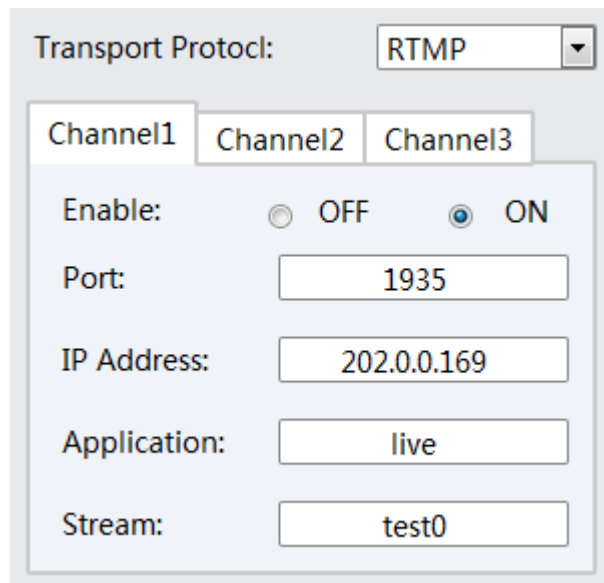


Figure3.6 RTMP

For RTMP transmission, the stream URL is generated by target RTMP streaming server. Configure NVP-903 with this stream URL to push the stream to RTMP streaming server.

- **Enable:** Enable current encoding streams to transmit. **ON:** Enable the transmitting; **OFF:** Disable the transmitting
- **Port:** Transport port for RTMP transmission. Default: 1935
- **IP Address:** IP address of target RTMP streaming server
- **Application:** The Application info in the stream URL
- **Stream:** The Stream ID in the stream URL

4) R2TP

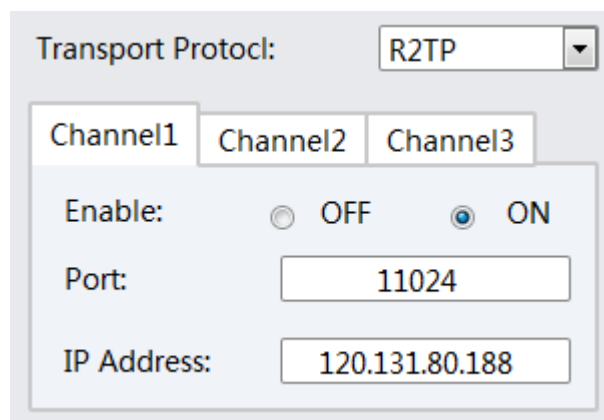


Figure3.7 R2TP

- **Enable:** Enable current encoding streams to transmit. **ON:** Enable the transmitting; **OFF:** Disable the transmitting
- **Port:** Transport port for R2TP transmission. Range: 1024~65535. Please make sure R2TP port of NVP-903 and target decoder device to be the same.
- **IP Address:** IP address of target decoder device.


Tips:

R2TP is the proprietary transport protocol of Caton Technology. For R2TP transmission, please make sure the decoder device support R2TP protocol.

5) R2TP-S

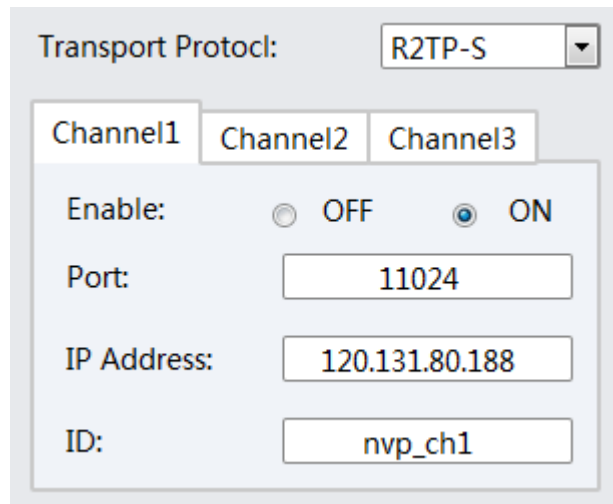
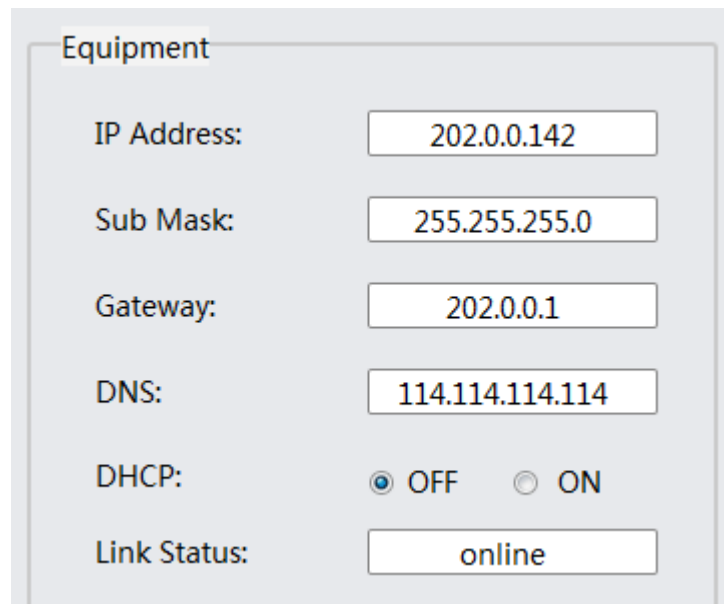


Figure3.8 R2TP-S

- **Enable:** Enable current encoding streams to transmit. **ON:** Enable the transmitting; **OFF:** Disable the transmitting
- **Port:** Transport port for R2TP-S transmission. The R2TP-S port is provided by target R2TP Relay Server
- **IP Address:** IP address of target R2TP Relay Server
- **ID:** Transport ID for R2TP-S transmission. The transport ID is provided by target R2TP Relay Server

3.2.2 Equipment

Configure device IP for video streaming and web control.



The screenshot shows a configuration window titled "Equipment" with the following fields and values:

IP Address:	202.0.0.142
Sub Mask:	255.255.255.0
Gateway:	202.0.0.1
DNS:	114.114.114.114
DHCP:	<input checked="" type="radio"/> OFF <input type="radio"/> ON
Link Status:	online

Figure3.9 Equipment

- **IP Address:** Device IP address for video streaming and web control
- **Sub Mask:** Net mask of device IP setting
- **Gateway:** Gateway of device IP setting
- **DNS:** DNS server of device IP setting
- **DHCP:** Select IP setting mode. **OFF:** Manual mode; **ON:** DHCP mode
- **Link Status:** Working status of ETH port. **Online:** ETH port has connected to the network.
Offline: ETH port does not connect to the network.

3.3 Advance

Click **Advance** in main menu to enter the advanced setting page, as follows:

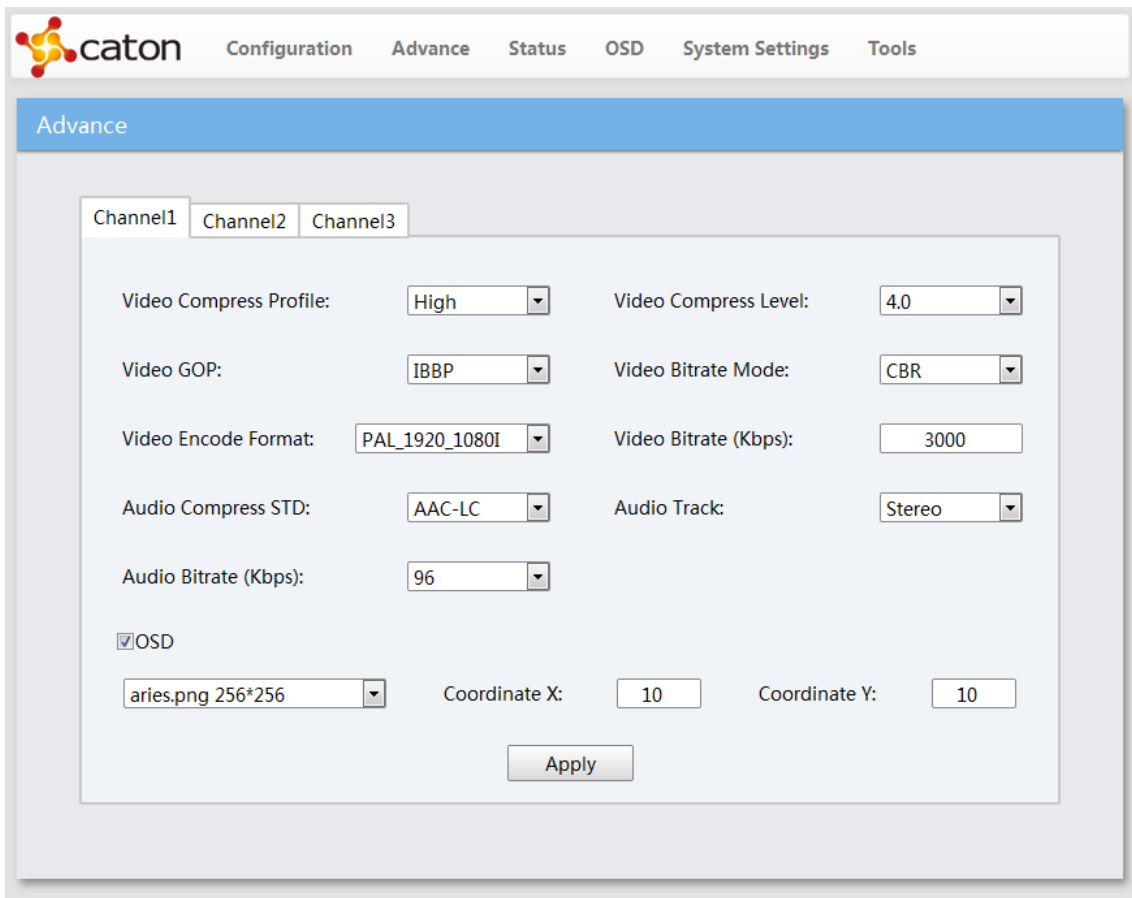


Figure3.10 Advance

In the advanced setting page, user can configure the encode settings of 3 encoding streams separately.

Click **Channel1/Channel2/Channel3** column to select the encoding channel.

Click to save the configuration.

Table3-2 Advance

Menu Name		Range
Advance	Video Compress Profile	High
		Main
		Baseline
	Video Compress Level	1.1/1.3/2.0/2.1/2.2/2.3/3.0/3.1/3.2/4.0/4.1/4.2
	Video GOP	IP
IBBP		

	<i>Video Bitrate Mode</i>	<i>CBR</i>	
		<i>VBR</i>	
	<i>Video Encode Format</i>	<i>PAL</i>	<i>1920*1080P (Channel1 Only)</i>
			<i>1920*1080P_25Hz</i>
<i>1920*1080I</i>			
<i>1440*1080P</i>			
<i>1440*1080I</i>			
<i>960*1080I</i>			
<i>1280*720P</i>			
<i>1280*720P_25Hz</i>			
<i>720*576P</i>			
<i>720*576I</i>			
<i>720*576P_25Hz</i>			
<i>640*360P</i>			
<i>352*288P</i>			
	<i>Video Encode Format</i>		<i>NTSC</i>
		<i>1920*1080P_29.97Hz</i>	
		<i>1920*1080I</i>	
		<i>1440*1080P</i>	
		<i>1440*1080I</i>	
		<i>960*1080I</i>	
		<i>1280*720P</i>	
		<i>1280*720P_29.97Hz</i>	
		<i>720*480P</i>	
		<i>720*480I</i>	
		<i>720*480P_29.97Hz</i>	
		<i>640*360P</i>	
		<i>352*240P</i>	
<i>SD: 300-8000Kbps</i>			
<i>VBR</i>	<i>HD: 650-4000Kbps</i>		
	<i>SD: 300-4000Kbps</i>		
	<i>Audio Compress STD</i>	<i>AAC-LC</i>	
		<i>AAC-HE</i>	

		<i>MPEG1-Layer2</i>	
	<i>Audio Track</i>	<i>Stereo</i>	
		<i>Monaural</i>	
		<i>DualMono</i>	
	<i>Audio Bitrate (Kbps)</i>	<i>AAC-LC</i>	96
			128
			192
			256
			384
			512
		<i>AAC-HE</i>	48
			64
		<i>MPEG1-Layer2</i>	128
192			
256			

For OSD setting, please refer to *Chapter 3.5 OSD* in this manual.



Tips:

1. For Video Encode Format, Channel1 support up to 1920*1080P_59.94/50Hz, Channel2 & Channel3 support up to 1920*1080P_29.97/25Hz.
2. NVP-903 support encoding format up-scaler and down-scaler, however it cannot transform the frequency between PAL and NTSC.

3.4 Status

Click **Status** in main menu to enter device status page. The device status page is also the default page after log in.

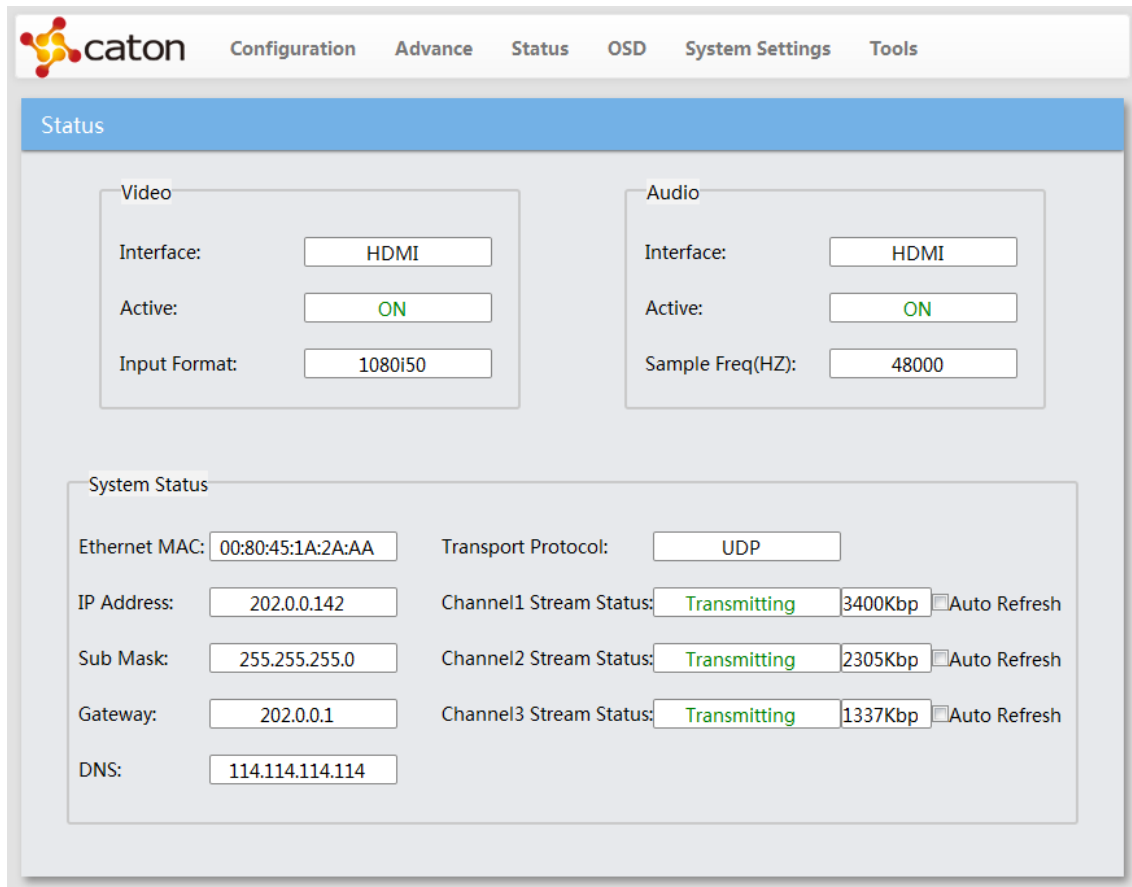


Figure3.11 Status

The device status page will displays video/audio source status, device IP info and stream transmitting status.

➤ Video

- **Interface:** Video type of video source setting
- **Active:** Video source status. **ON:** Device has recognized this type of video source; **OFF:** Device has not recognized this type of video source
- **Input Format:** Format of video input source

➤ Audio

- **Interface:** Audio type of audio source setting
- **Active:** Audio source status. **ON:** Device has recognized this type of audio source; **OFF:** Device has not recognized this type of audio source
- **Sample Freq(HZ):** Sampling rate of audio input source

➤ **System Status**

- **Ethernet MAC:** Device MAC address
- **IP Address:** Device IP address for video streaming and web control
- **Sub Mask:** Net mask of IP setting
- **Gateway:** Gateway of IP setting
- **DNS:** DNS Server of IP setting
- **Transport Protocol:** Current transport protocol for 3 encoding streams
- **Channel Stream Status:** Transport status of each encoding streams. It also displays transport bit rate of current stream.
 - Transmitting:** NVP-903 is transmitting the stream to target device now
 - Connecting:** NVP-903 is trying to connect to target device now
 - Disconnected:** NVP-903 does not transmit the stream to target device.
- **Auto Refresh:** Transport bit rate that displays will be refreshed for every 1 second.

3.5 OSD

Click **OSD** in main menu to enter the OSD setting page, as follows:

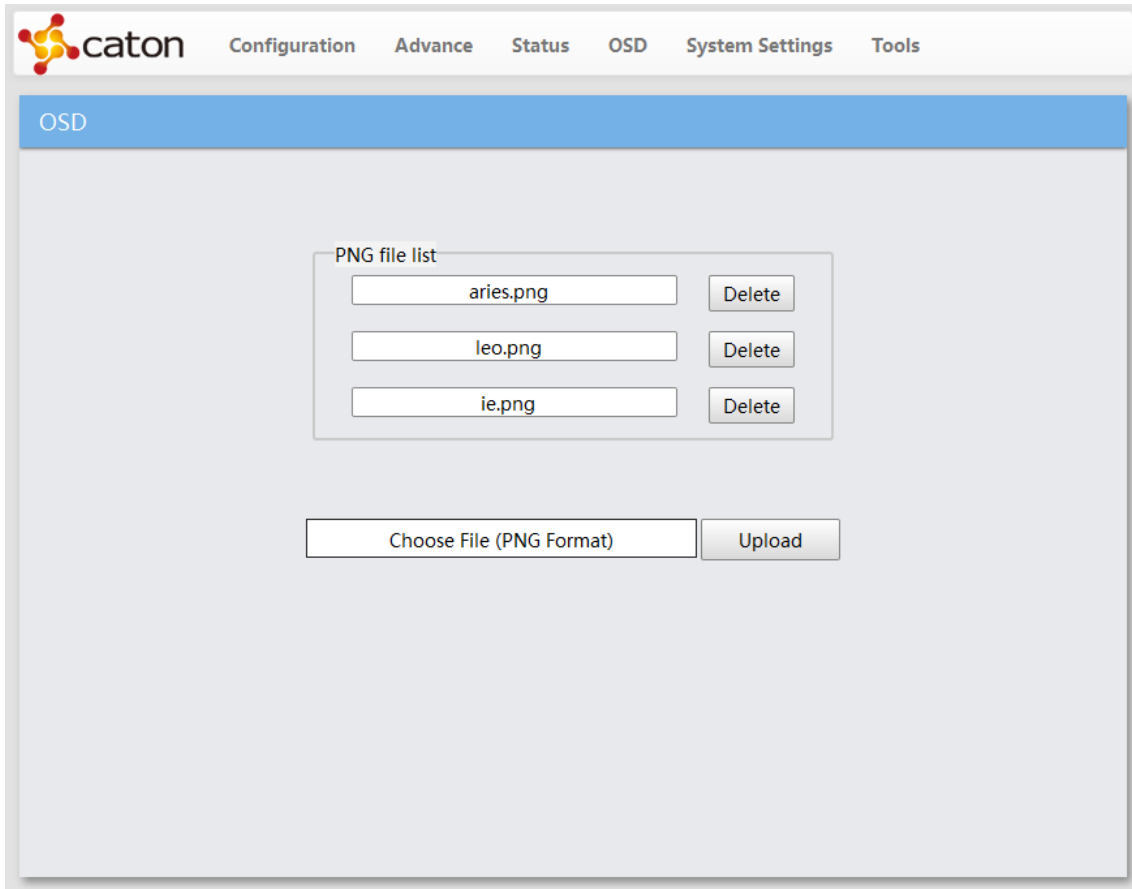
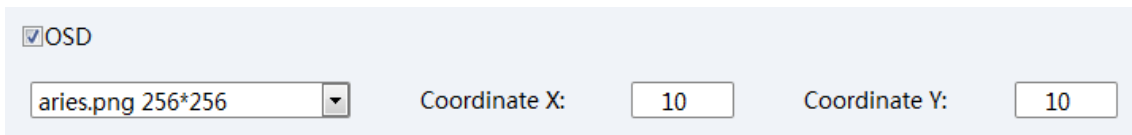


Figure3.12 OSD

To use the picture file as OSD during encoding, you need to upload the png. file to the file list in OSD page.

- 1) Click **Choose File** column to select png. file in your PC and click to upload.
- 2) Click on OSD button in **Advance** page to use the png. file as OSD during encoding.



Select picture file name and set Coordinate X and Coordinate Y to configure the position of OSD. (Left front corner is <0, 0>, OSD move to the right for 1 pixel as Coordinate X add 1, and move to the bottom for 1 pixel as Coordinate Y add 1)

- 3) To delete picture file in the file list, click .


Tips:

1. NVP-903 support uploading up to 3 picture files.
2. The picture format for OSD should be PNG.
3. The width pixel of the picture should be multiple to 128.
4. The picture size should not exceed the size of encoding format

3.6 System Setting

Click **System Settings** in main menu to enter the system setting page, as follows:

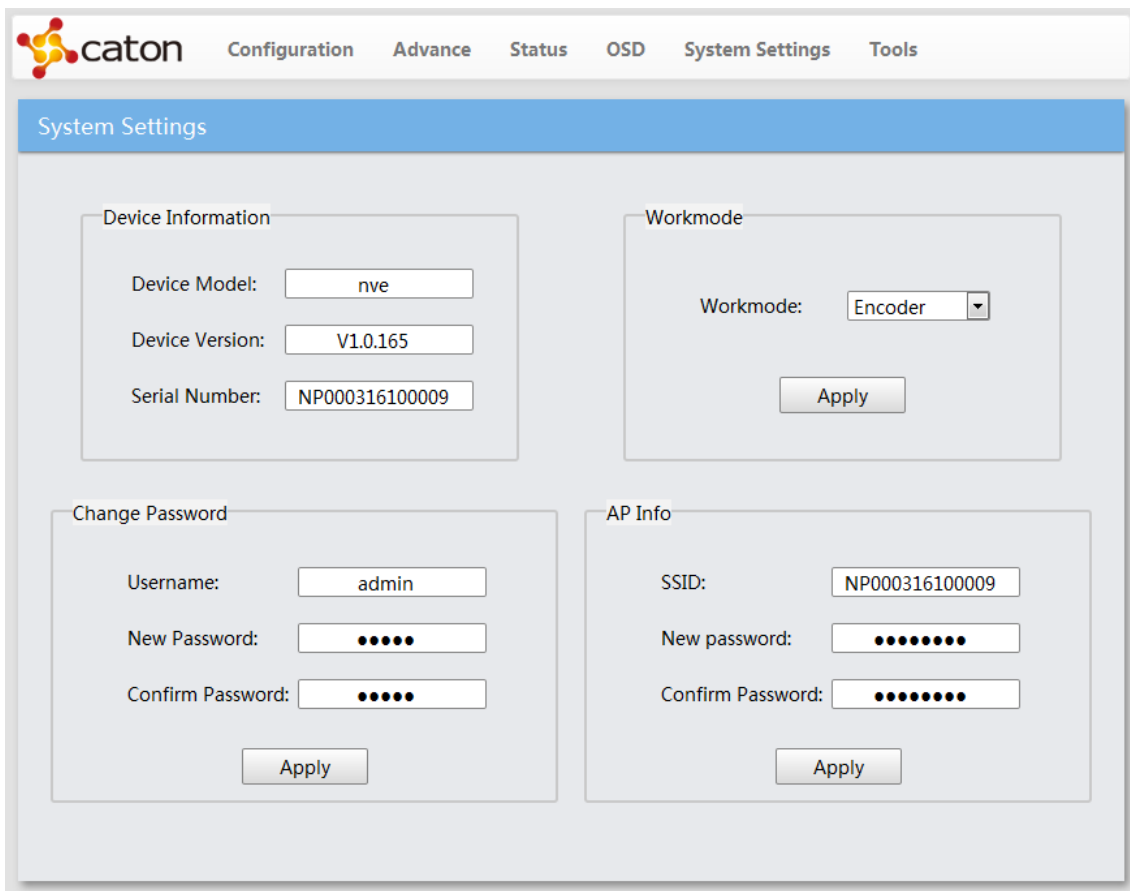


Figure3.13 System Setting

In System Setting page, user can view or set the basic device info, and set the work mode:

Encoder or Decoder.

Click to save the configuration.

➤ Device Information

- **Device Model:** To view device model name
- **Device Version:** To view device software & hardware version
- **Serial Number:** To view device serial number

- **Workmode:** To set the work mode of NVP-903: **Encoder** or **Decoder**
- **Change Password**
 - **Username:** To view account name to log in. Default: **admin**
 - **New Password:** To set new password to log in. Default password: **admin**
 - **Confirm Password:** To refill the new password to confirm.
- **AP Info**
 - **SSID:** To view SSID of device AP. SSID of AP is the same as device serial number.
 - **New Password:** To set new password of device AP. Default password: **87654321**
 - **Confirm Password:** To refill the new password to confirm.

**Tips:**

When the work mode of NVP-903 is changed, device will reboot automatically. Encoder mode and Decoder mode cannot work in the same time.

For web control on decoder mode, please refer to Chapter 4.

3.7 Tools

Click **Tools** in main menu to enter the tools page, as follows:

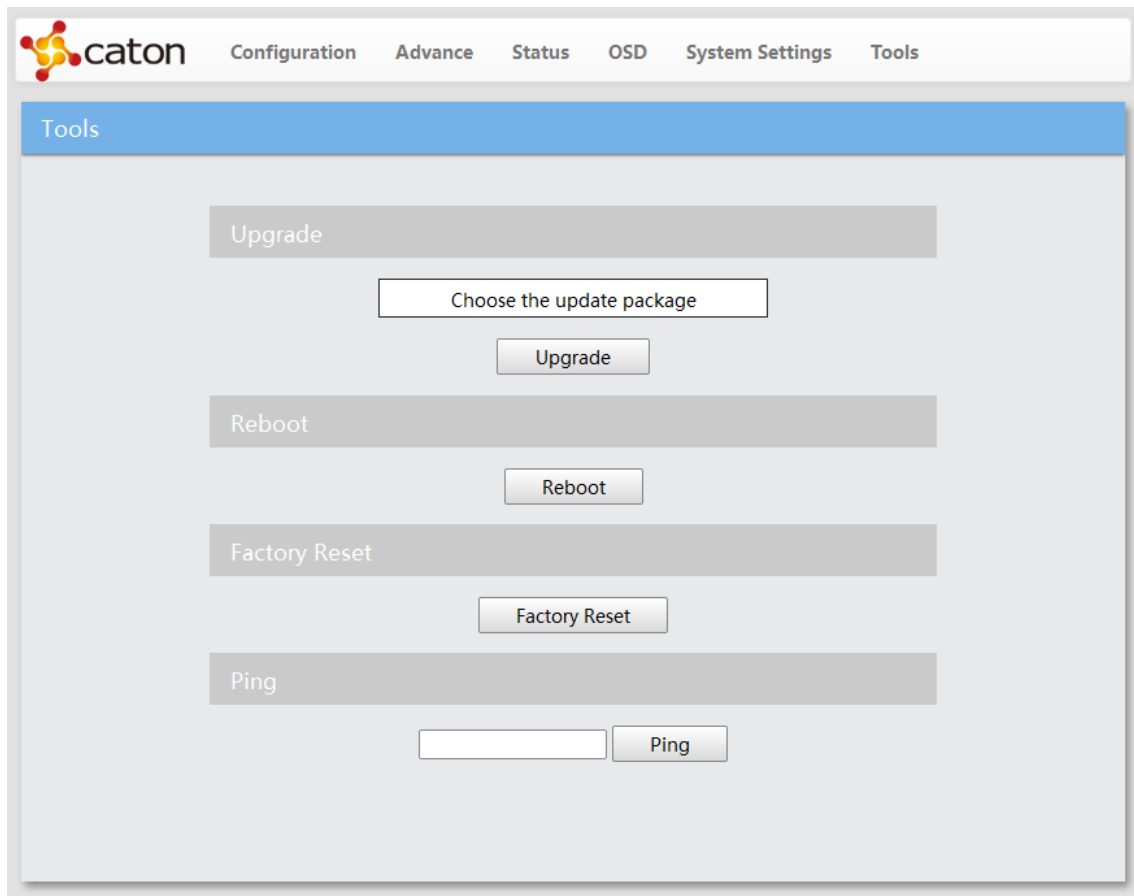


Figure3.14 Tools

1) Upgrade

Click to select the upgrade package in PC, and click to upgrade. The upgrade process will need about 2 minutes, and device will reboot automatically.

2) Reboot

Click to reboot the device. The reboot process will need about 1 minute.

3) Factory Reset

Click to recover to the default settings. The reset process will need about 2 minutes, and device will reboot automatically.

4) Ping

Use the ping tools to confirm the connection status between NVP-903 and target device. Type in the target IP address and click to get the result.

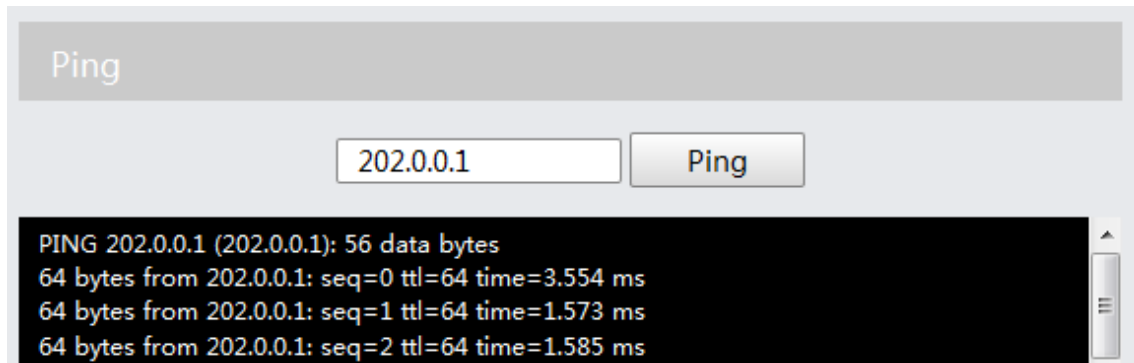


Figure3.15 Ping



Tips:

Please do not power off the device during the upgrade or factory reset process. The web page will refresh automatically which means the process is already finished.

4 Web Control [Decoder Mode]

4.1 Log In

NVP-903 supports PC web control via Ethernet port, it also supports PC/Smartphone/Pad wireless web control via NVP-903 internal hotspot.

4.1.1 Log in via Ethernet

- 1) Prepare a computer with Ethernet port and Internet web browser.
- 2) Connect your PC to the NVP-903 ETH port via Ethernet.
- 3) Configure computer IP address, make sure that NVP-903 and the computer IP are in the same network segment
- 4) Input the device IP address in the web browser, it will displays the Log in page, as follows:

(Default IP Address: **202.0.0.138**)

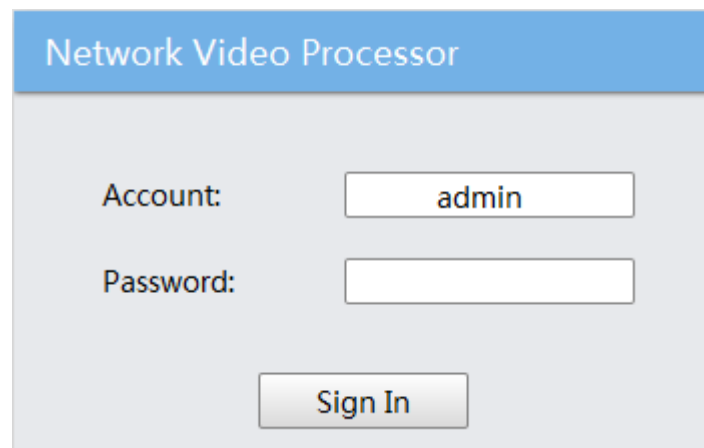


Figure4.1 Log in

- 5) Type in the Account and Password to login.
(Default Account: **admin**; Default Password: **admin**)


4.1.2 Log in via Wi-Fi

- 1) Prepare a PC/Pad/Smartphone with Wi-Fi function and Internet web browser.
- 2) Search Wi-Fi SSID of NVP-903 internal hotspot(AP) and connect your PC/Pad/Smartphone to it. (Default AP Password: **87654321**)
- 3) Input the device IP address in the web browser, it will displays the Log in page, as in

Figure 4.1

- 4) Type in the Account and Password to login.

(Default Account: **admin**; Default Password: **admin**)

 **Tips:**
SSID of NVP-903 internal hotspot (AP) will be displayed in the E-Ink of device front panel.

4.1.3 Work Mode

After log in, click System Settings in main menu to enter the system setting page.

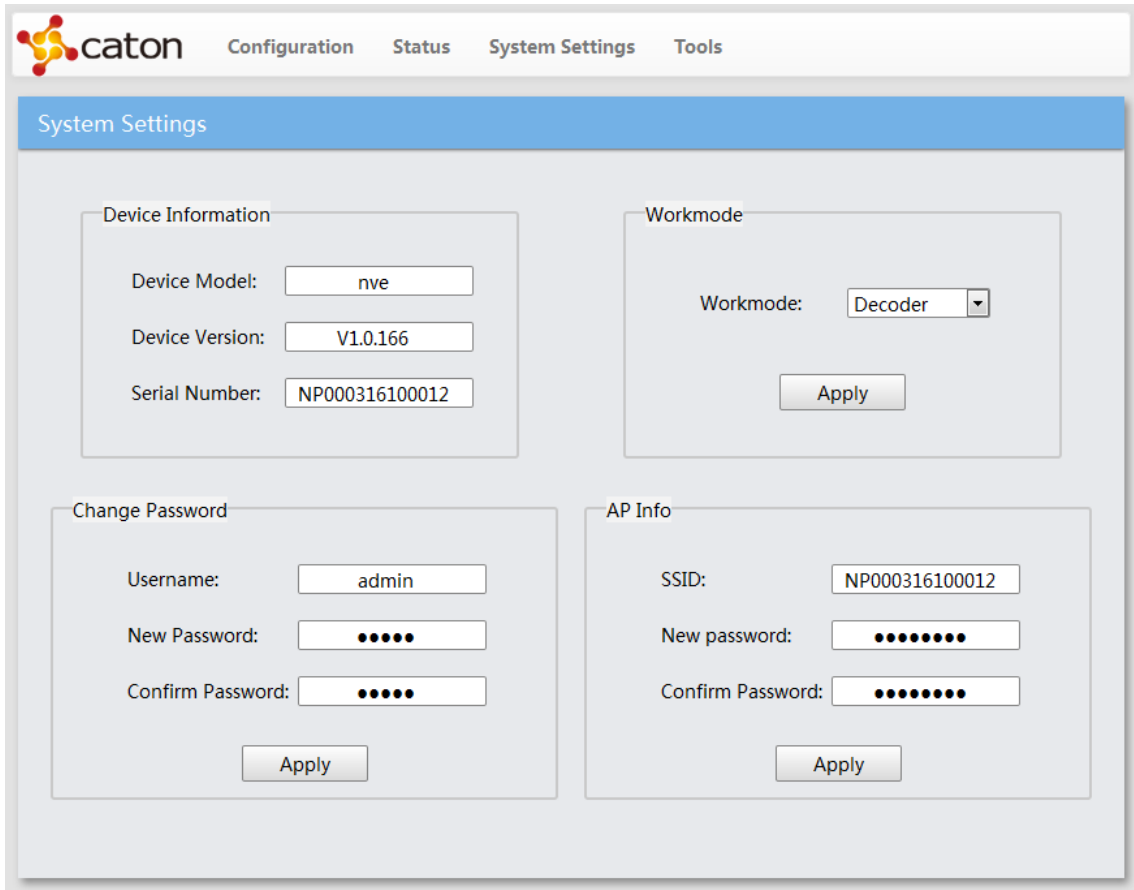


Figure4.2 Work Mode

Confirm **Workmode** to be **Decoder** mode. Device will reboot automatically if the work mode is changed.

4.2 Configuration

Click **Configuration** in main menu to enter the basic setting page, as follows:

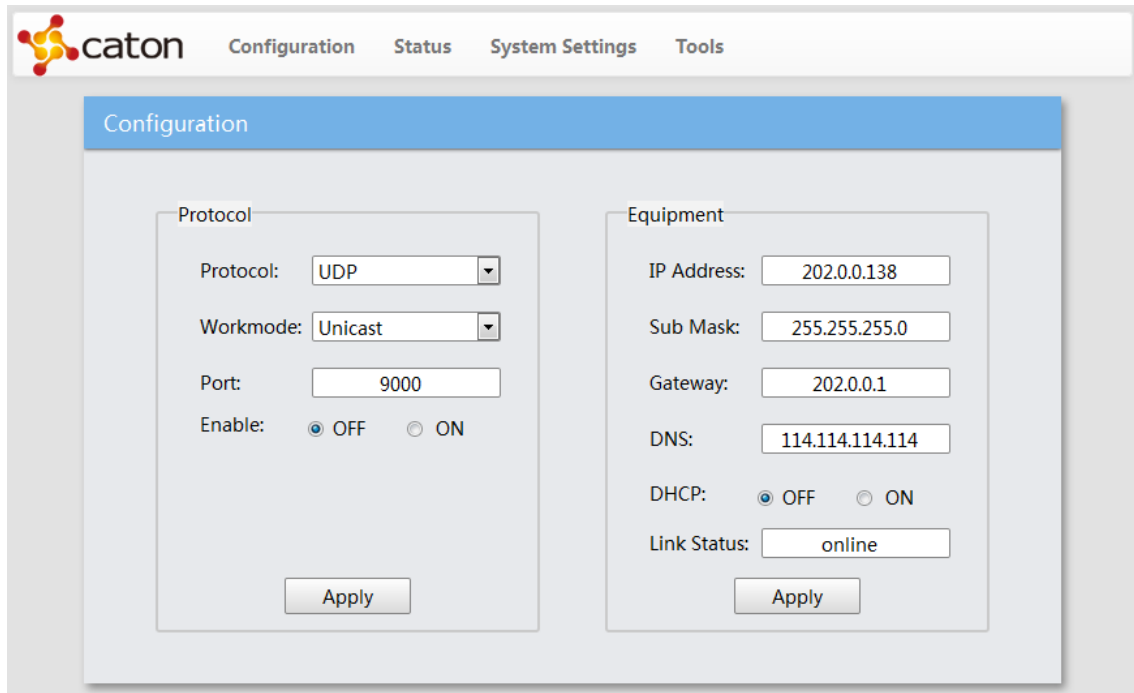


Figure4.3 Configuration

In Configuration page, users can configure basic settings of transport protocol and device IP setting.

Click to save the configuration.

4.2.1 Protocol

NVP-903 decoder mode support 1 channel STPS over IP decoding with HDMI output.

1) UDP Unicast

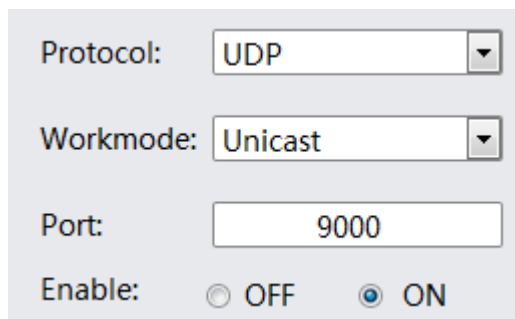


Figure4.4 UDP Unicast

- **Protocol:** Set Protocol to **UDP**
- **Workmode:** Set Workmode to **Unicast**

- **Port:** Transport port for UDP Unicast transmission. Range: 1024~65535
- **Enable:** Enable stream receiving. **ON:** Enable the receiving; **OFF:** Disable the receiving

2) UDP Multicast

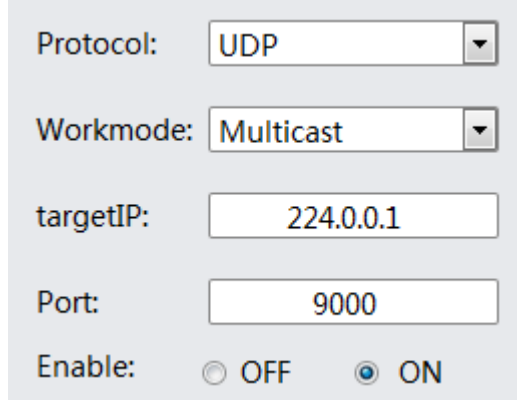


Figure4.5 UDP Multicast

- **Protocol:** Set Protocol to **UDP**
- **Workmode:** Set Workmode to **Multicast**
- **TargetIP:** IP address for UDP Multicast transmission. Range: 224.0.0.0—239.255.255.255
- **Port:** Transport port for UDP Multicast transmission. Range: 1024~65535
- **Enable:** Enable stream receiving. **ON:** Enable the receiving; **OFF:** Disable the receiving

3) HTTP (TS over HTTP)

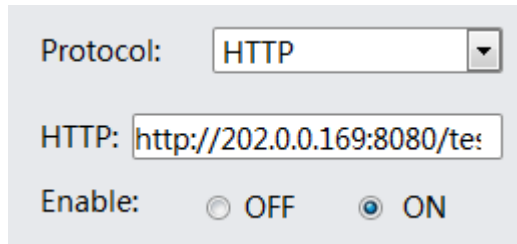
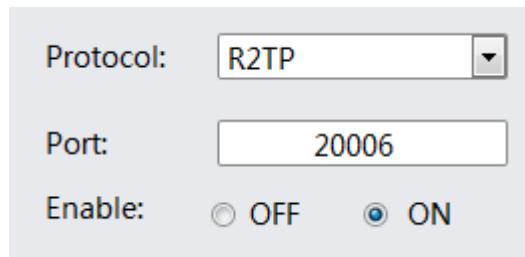


Figure4.6 HTTP

- **Protocol:** Set Protocol to **HTTP**
- **HTTP:** Type in HTTP stream URL that provided by encoder or streaming server
- **Enable:** Enable stream receiving. **ON:** Enable the receiving; **OFF:** Disable the receiving

4) R2TP



Protocol:

Port:

Enable: OFF ON

Figure4.7 R2TP

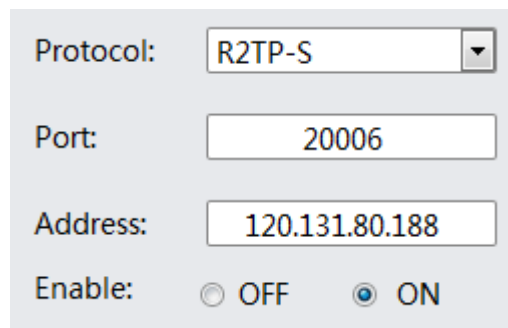
- **Protocol:** Set Protocol to **R2TP**
- **Port:** Transport port for R2TP transmission. Range: 1024~65535. Please make sure R2TP port of NVP-903 and target encoder device to be the same.
- **Enable:** Enable stream receiving. **ON:** Enable the receiving; **OFF:** Disable the receiving



Tips:

R2TP is the proprietary transport protocol of Caton Technology. For R2TP transmission, please make sure the encoder device support R2TP protocol.

5) R2TP-S



Protocol:

Port:

Address:

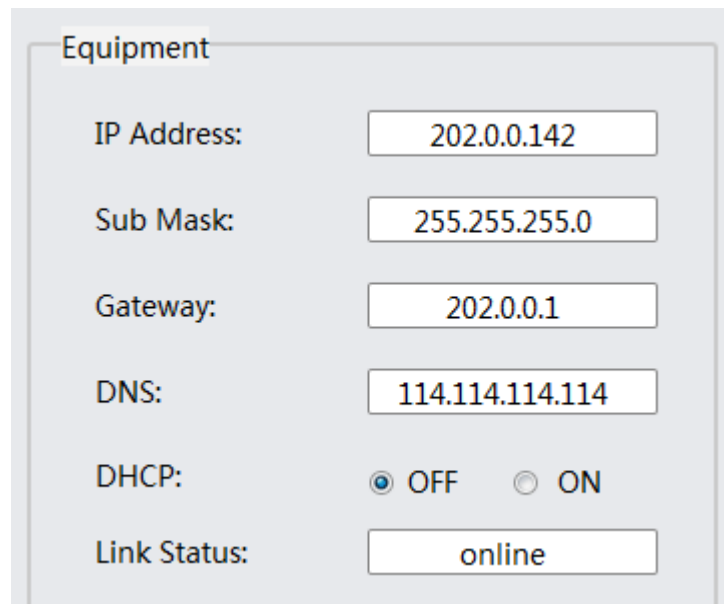
Enable: OFF ON

Figure4.8 R2TP-S

- **Protocol:** Set Protocol to **R2TP-S**
- **Port:** Transport port for R2TP-S transmission. The R2TP-S port is provided by target R2TP Relay Server
- **IP Address:** IP address of target R2TP Relay Server
- **Enable:** Enable stream receiving. **ON:** Enable the receiving; **OFF:** Disable the receiving

4.2.2 Equipment

Configure device IP for video streaming and web control.



The screenshot shows a configuration window titled "Equipment" with the following fields and values:

IP Address:	202.0.0.142
Sub Mask:	255.255.255.0
Gateway:	202.0.0.1
DNS:	114.114.114.114
DHCP:	<input checked="" type="radio"/> OFF <input type="radio"/> ON
Link Status:	online

Figure4.9 Equipment

- **IP Address:** Device IP address for video streaming and web control
- **Sub Mask:** Net mask of device IP setting
- **Gateway:** Gateway of device IP setting
- **DNS:** DNS server of device IP setting
- **DHCP:** Select IP setting mode. **OFF:** Manual mode; **ON:** DHCP mode
- **Link Status:** Working status of ETH port. **Online:** ETH port has connected to the network.
Offline: ETH port does not connect to the network.

4.3 Status

Click **Status** in main menu to enter device status page. The device status page is also the default page after log in.

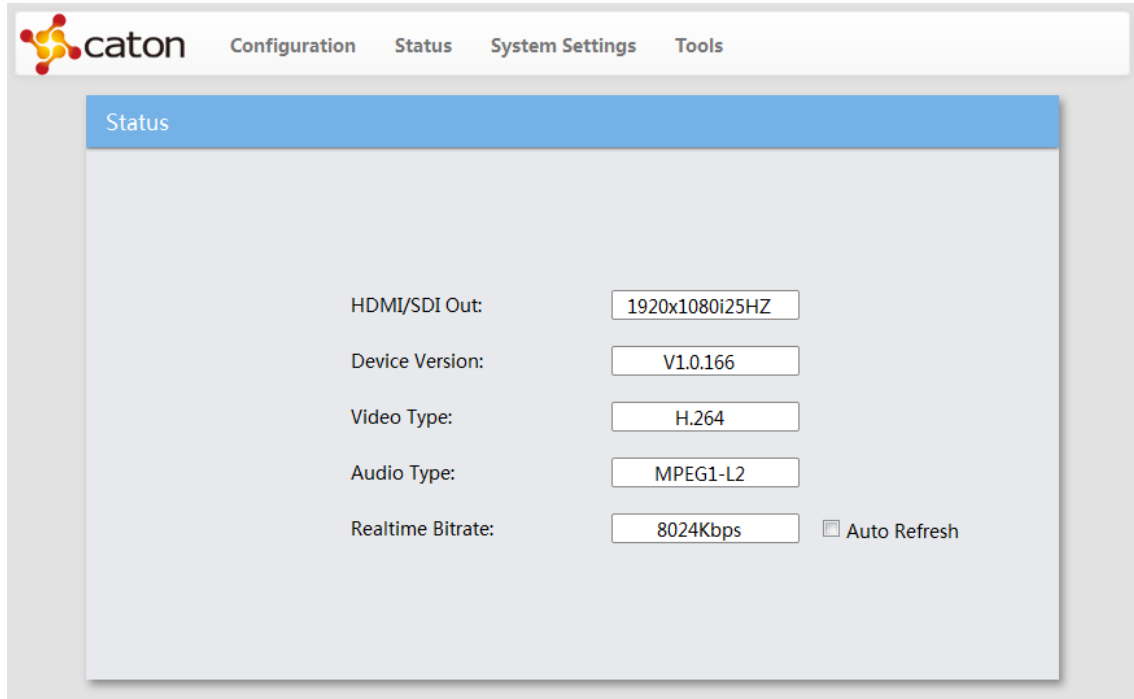


Figure4.10 Status

The device status page will displays video/audio format, device info and stream transmitting status.

- **HDMI/SDI Out:** The format of decoded video
 - **Device Version:** Device software & hardware version
 - **Video Type:** Video compress format of input video source
 - **Audio Type:** Audio compress format of input audio source
 - **Realtime Bitrate:** Displays transport bit rate of stream that device is receiving
- Auto Refresh:** Transport bit rate that displays will be refreshed for every 1 second.

4.4 System Setting

Click **System Settings** in main menu to enter the system setting page, as follows:

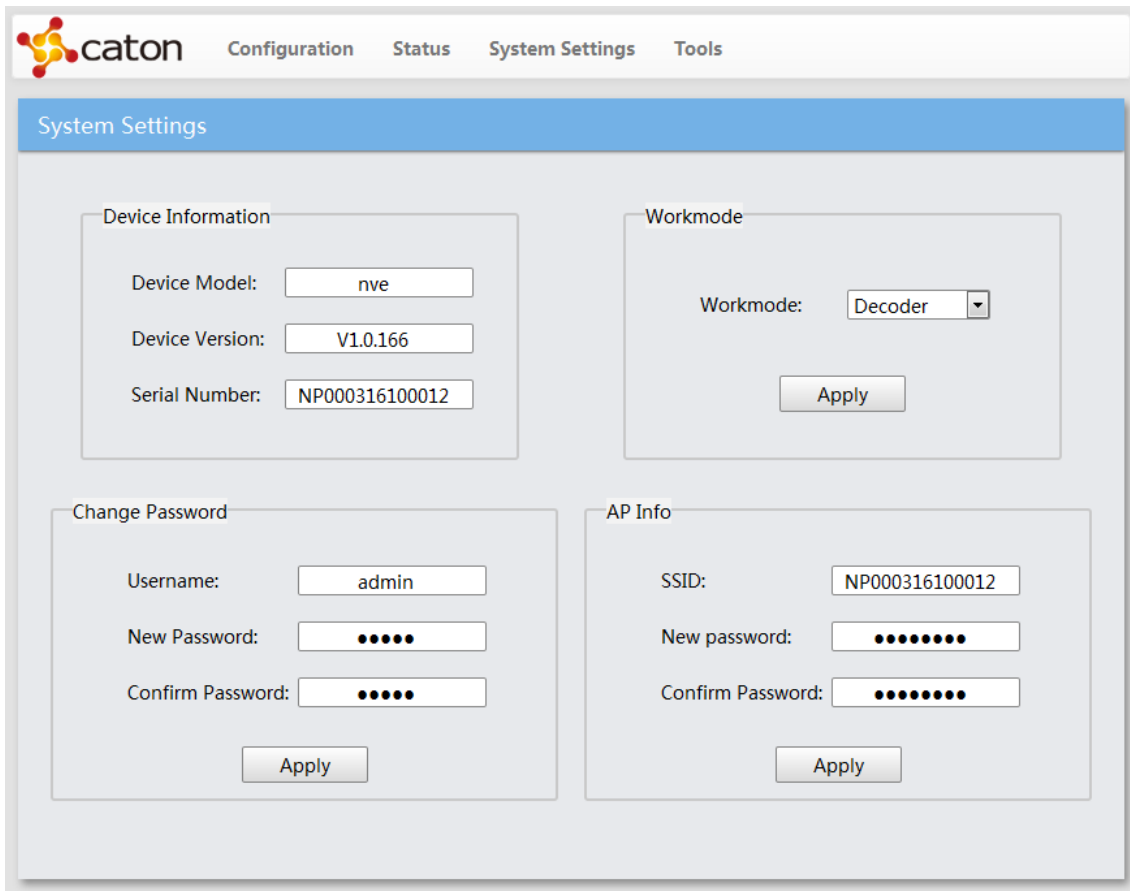


Figure4.11 System Setting

In System Setting page, user can view or set the basic device info, and set the work mode:

Encoder or Decoder.

Click to save the configuration.

➤ Device Information

- **Device Model:** To view device model name
- **Device Version:** To view device software & hardware version
- **Serial Number:** To view device serial number

➤ Workmode: To set the work mode of NVP-903: **Encoder** or **Decoder**

➤ Change Password

- **Username:** To view account name to log in. Default: **admin**
- **New Password:** To set new password to log in. Default password: **admin**
- **Confirm Password:** To refill the new password to confirm.

➤ **AP Info**

- **SSID:** To view SSID of device AP. SSID of AP is the same as device serial number.
- **New Password:** To set new password of device AP. Default password: **87654321**
- **Confirm Password:** To refill the new password to confirm.



Tips:

When the work mode of NVP-903 is changed, device will reboot automatically. Encoder mode and Decoder mode cannot work in the same time.

4.5 Tools

Click **Tools** in main menu to enter the tools page, as follows:

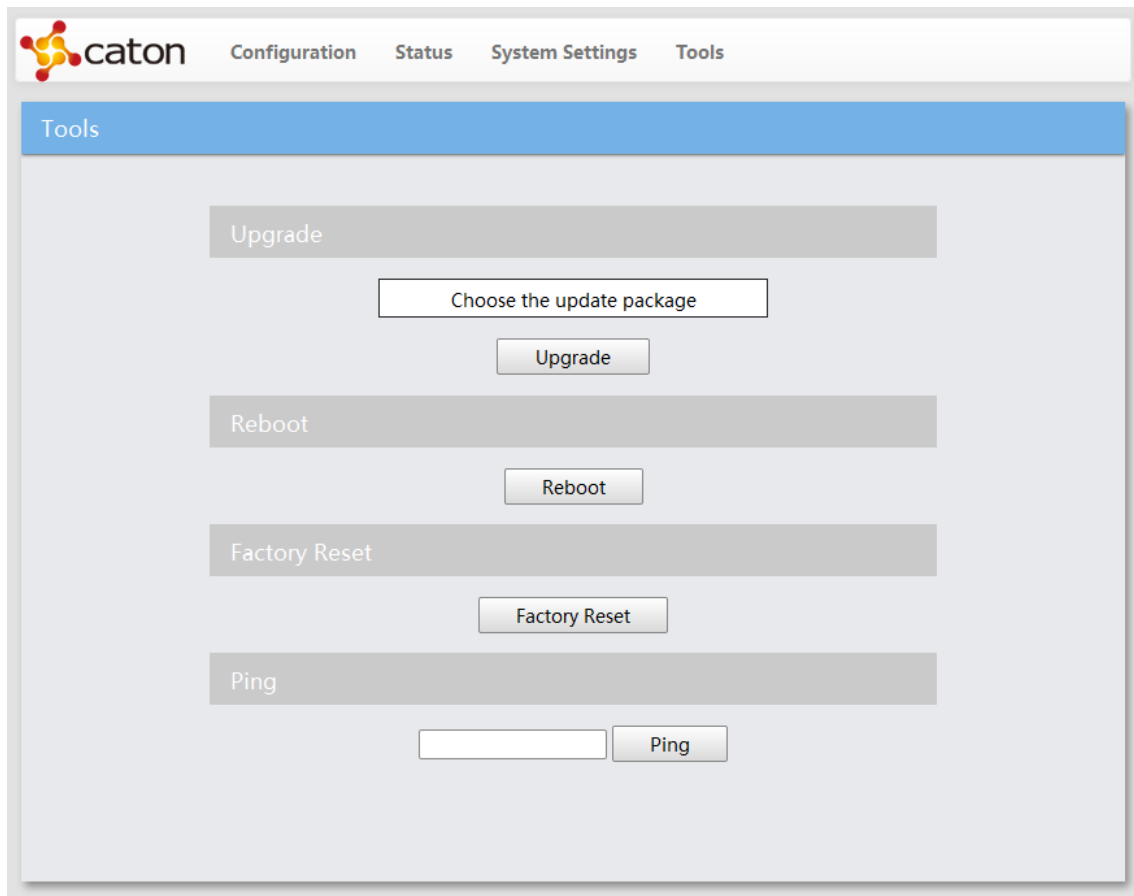


Figure4.12 Tools

1) Upgrade

Click to select the upgrade package in PC, and click to upgrade. The upgrade process will need about 2 minutes, and device will reboot automatically.

2) Reboot

Click to reboot the device. The reboot process will need about 1 minute.

3) Factory Reset

Click to recover to the default settings. The reset process will need about 2 minutes, and device will reboot automatically.

4) Ping

Use the ping tools to confirm the connection status between NVP-903 and target device. Type in the target IP address and click to get the result.

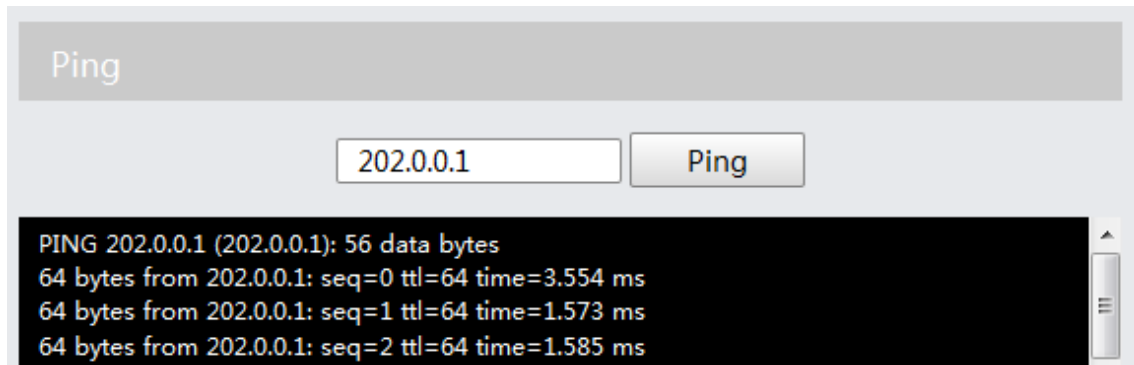


Figure5.15 Ping



Tips:

Please do not power off the device during the upgrade or factory reset process. The web page will refresh automatically which means the process is already finished.

5 Technical Specifications

[ENCODER MODE SPEC]

CODEC

Video Codec	H.264	GOP	IP/IBBP
Profile	BaseLine/Main/High	Bitrate Ctrl	CBR/VBR
Level	1.2/1.3/2.0/2.1/3.0/3.1/3.2/4.0/4.1/4.2	Bitrate	HD: 650Kbps-8Mbps SD: 300Kbps-8Mbps
Bit Depth	8bit	Multi-Stream	Up to 3 encoding streams
Chroma	4:2:0	Total Bitrate	≤20Mbps
Input Format	1920x1080p59.94/50/29.97/25 1920x1080i59.94/50 1280x720p59.94/50 720x576i50, 720x480i59.94	Audio Codec	MPEG-1 Layer 2 AAC-LC HE-AAC V1
Resolution	Up-Scalable & Down-Scalable	Audio Mode	Stereo/Dual Mono/Mono
OSD	PNG File for OSD		

INPUT & OUTPUT

Video Inputs	HD-SDI *1, BNC, 75Ω HDMI *1, V1.4a Analog Video *1, RCA	IP Outputs	FLV over RTMP PUSH TS over UDP TS over HTTP R2TP (License Need)
Audio Inputs	HD-SDI *1, BNC, 75Ω (Embedded) HDMI *1, V1.4a (Embedded) Analog Audio *2, RCA	Ethernet	RJ-45 *1(10/100/1000 BASE-T)
Video Loop	HDMI Loop Out	USB	USB2.0 *1
		SD Card	Standard SD Card Slot*1

PHYSICAL & MANAGEMENT

Management	Web-UI Control	Hotspot	Internal Wireless AP, 2.4GHz
Front Panel	E-Ink Info Display	Input Voltage	DC 12V
Dimensions	200.0 x 44.5 x 153.0mm (W x H x D)	Weight	900g

[DECODER MODE SPEC]

CODEC

Video Codec	H.264: HP@L4.1/MP@L4.1 MPEG-2: MP@HL	Format	1920x1080p59.94/50/29.97/25 1920x1080i59.94/50/29.97/25 1280x720p59.94/50/29.97/25 720x480i59.94, 720x576i50
Audio Codec	MPEG-1 Layer2 MPEG-1 Layer3 MPEG-2 AAC		

INPUT & OUTPUT

Video Output	HDMI *1, V1.4a	IP Inputs	TS over UDP TS over HTTP R2TP (License Need)
Audio Output	HDMI *1, V1.4a (Embedded)		
Ethernet	RJ-45 *1(10/100/1000 BASE-T)		