NDA310L,A320L HD-Sdi H. 264 Encoder, Decoder

1. Overview

Newbridge® NDA310L/NDA320L HD-SDI H.264 Codec adopts industrial level design,reliable performance,and outstanding quality.support ONVIF 1.0/2.0.The Encoder supports 1 channel SD/HD input interface and supports high definition digital video which is up to 1080p30 and AES/EBU embedded audio.the SDI can output with loop back circuit simultaneousiy.

The Decoder receives signal from the Encoder feom TCP/IP network.After getting through the self-adaptive decoding,it will output video/audio signals as the SD/HD standard signal formats.the Decoder can output 2 channel SDI sigals simultaneously.Even if the Decoder connects with an encoding video of low code rate,the network packet loss is only about 10% because of the integration of image enhancement and fault-tolerant technology.It can clearly restore encodig video and audio with no obvious distortion,smear,frame loss and mosaic.

2．Features

 NDA310L HD-SDI H. 264 Encoder	• Support SD/HD-SDI interface and AES/EBU embedded audio • Support various formats of 525i/625i,720p@23.98/24/25/29.97/30/50/59.94/60,1080i@50/59.94/60,1080p@23.98/24/25/29.97/30 • H.264 High profile compressing technology • Support dual-stream HD and SD output,encoding code rate is adjustable,picture quality can be controlled • Support two-way voice talkback,RS-485 signaling get through and alarm semaphore get through • Support RTP/RTSP、Onvif1.0/2.0
 NDA320L HD-SDI H. 264 Decoder	• Support SD/HD-SDI interface and AES/EBU embedded audio,dual SDI output interface • Support various formats of 525i/625i,720p@23.98/24/25/29.97/30/50/59.94/60,1080i@50/59.94/60,1080p@23.98/24/25/29.97/30 • Lntelligent network delay control,typical network environment is less than 150ms decoding delay • Lmage enhancement and fault-tolerant technology,error resilience capability,excellent image quality • Support two-way voice talkback,RS-485 signaling get through and alarm semaphore get through • Support RTP/RTSP、Onvif1.0/2.0

3. Specifications

Model	NDA310L	NDA320L
Type	Encoder	Decoder
Input interface	1x BNC	SDI---
Output interface	1x BNC (SDI Looping Out)	2x BNC SDI
Analog voice Frequency input/Output	1x industrial Terminal Block Unbalanced Connection	
Alarm Semaphore	1x industrial Terminal Block	
RS-485 Connector	1x industrial Terminal Block	
Network Connector	1x RJ45,Ethernet Connected	
Output signal Type	SD-SDI(270Mbps), HD-SDI(1.485Gbps)	
Support input Format	1080p 24/25/30,1080i 60/50,720p 60/50,480i/p,576i/p	
SDI Signal Range	0.8V p-p	
SDI impedance	75 ohms	
SDI Coupling Type	AC Coupling	
Video Compression Standard	H.264 High profile	
Audio Compression Standard	AAC-LC	
Video Encoding Code Rate	512kbps~30Mbps	
Audio encoding Code Rate	64Kbps	
Encoding Delay	< 50ms	
Decoding Delay	---	< 150ms
Media Transmission Protocols	RTP/RTSP, Compatible RTP over TCP Transmission ,Mode	
Signal protocol	TCP	
Network Management protocol	HTTP	
Management interface	Web	
Remote Management/Remote Firmware	Yes	
Power Supply	5V~24V DC	
Power Consumption	10 Watts (max)	
Operating Temperature	0°C ~ 40°C / 32°F ~ 140°F	
Storage Temperature	-20°C ~ 60°C / -4°F ~140°F	
Relative Humidity	20~90% RH (Non-condensation)	

4. Application Diagram

User Manual
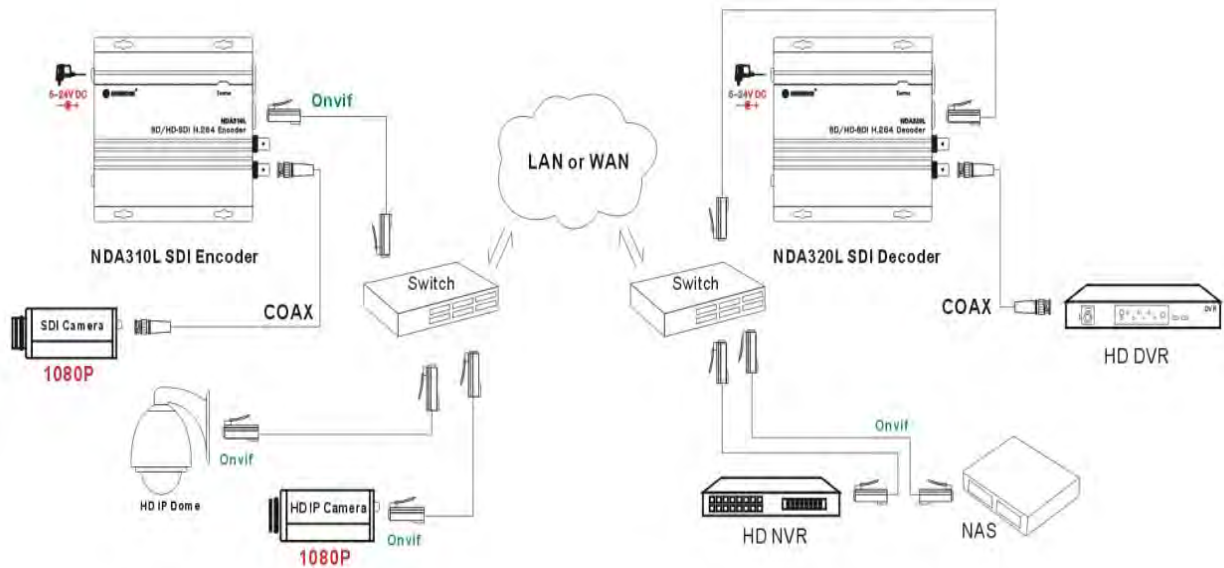
SD/HD SDI H.264 Encoder / Decoder

NOTE: The casing design is subject to change without notice.

The HD SDI video network H.264 Encoder/Decoder adopts industrial level design, reliable performance, and outstanding quality. The Encoder supports 1 channel SD/HD input interface and it supports high definition digital video which is up to 1080p30 and AES/EBU embedded audio. The SDI can output with loop back circuit simultaneously.

The Decoder receives signal from the Encoder from TCP/IP network. After getting through the self-adaptive decoding, it will output video/audio signals as the SD/HD standard signal formats. The Decoder can output 2 channel SDI signals simultaneously. Even if the Decoder connects with an encoding video of low code rate, the network packet loss is only about 10% because of the integration of image enhancement and fault-tolerant technology. It can clearly restore encoding video and audio with no obvious distortion, smear, frame loss and mosaic.

Features   ..

- Supports SD/HD-SDI interface and AES/EBU embedded audio
- Supports various formats of 1080p30/25/24,1080i,1080i50,720p60/50,480i/p,576i/p
- H.264 High Profile compressing technology, high definition, high acoustic fidelity, bellow 50ms of encoding delay
- Encoding code rate is adjustable, picture quality can be controlled
- Automatically embed SDI audio signal to HDMI signal.
- supports two-way voice talkback , RS-485 signaling get through and alarm semaphore get

through

- Image enhancement and fault-tolerant technology, strong resisting error code capability, excellent picture quality, clear acoustic
- JPEG preview and screen shot

Please read the <u>Manual</u> before attempting to use this product.

Specifications and appearance are subject to change without notice.
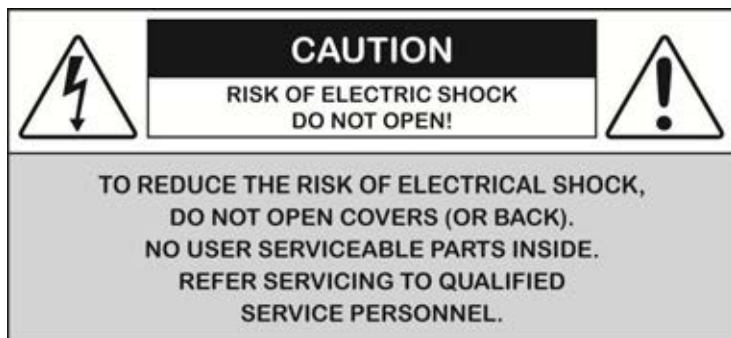
Disposal of Old Electrical & Electronic Equipment (Applicable in the European Union and other European countries with separate collection systems).

This symbol on the product or on its packaging indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

⚠ Caution   ..

1. Handle this product with care

Avoid any shock or bumping of the product. Improper handling could damage the product. Do not handle the unit with wet hands. Provide proper ventilation and air circulation and do not use near water.

2. Requires a proper operating environment

This product is not waterproof and is designed for indoor use. The allowable temperature range for operation of this product is between 0°C~40°C / 32°F~104°F.

3. Check the power source voltage

The power source voltage should be within the specified range. (Product must meet the specifications).

4. Objects and liquid entry

Never push objects of any kind into this product as this may touch dangerous voltage points of short out parts that could result in a fire or electric shock. Never spill any kind of liquid on the product.

5. Cleaning

Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.

6. Servicing

Do not attempt to service this product by yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all service to qualified servicing personnel.

Package Contents   ..

1. One (1) HD SDI Series Encoder
2. One (1) HD SDI Series Decoder
3. One (1) User Manual
4. One (1) AC Adapter

1.   2.   3.   4.

For any returns, please include all components listed above with original packaging in <u>**Resalable Condition**</u>. **Absolutely No Returns** will be accepted if any component is missing/damaged.

Parts & Functions   ..

HD-SDI Encoder Side Panel Layout

HD-SDI Decoder Side Panel Layout

Name	Color	Status	Description
LOCK	Green	ON	SDI signal is active
		Flicker	SDI signal is inactive
		OFF	SDI signal source has n't been connected.
LINK	Green	ON	Ethernet has been connected.
		OFF	Ethernet has n't been connected.
POWER	Green	ON	Power on
		OFF	Power off

Application Diagram ....

 * **The distance depends on the quality of the SDI signal from the HD camera source and also the Coax**
   Cable & Connector
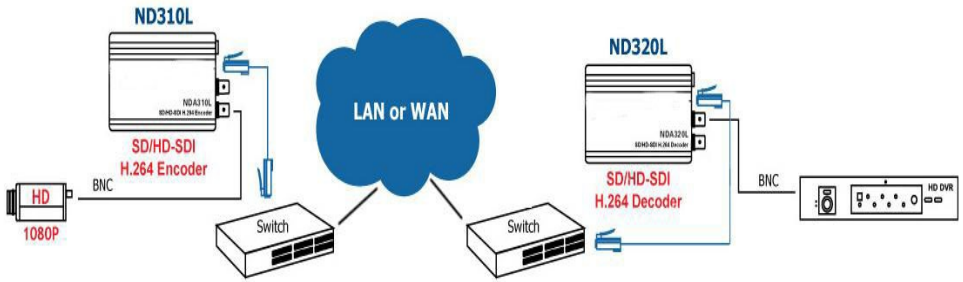
Hardware Installation

1. Check the power supply configuration and connect the correct voltage according to the power supply input requirements.
2. Use SDI coaxial cable and connect the SDI input port with the SDI Signal Source
3. Use SDI coaxial cable and connect the SDI output port with the display equipment.
4. Use Ethernet cable and connect the Ethernet device with the the encoder and the decoder
5. Turn on the power switch.

Technical Specifications ..

Type	HD-SDI Encoder	HD-SDI Decoder
Input Interface	1x BNC SDI	---
Output Interface	1x BNC (SDI Looping Out)	2x BNC SDI
Analog audio line-in	1*3.5mm audio socket (Unbalanced Connection)	
Analog audio line-out	1*3.5mm audio socket (Unbalanced Connection)	
Alarm Semaphore	1x Industrial Terminal Block	
RS-485 Connector	1x Industrial Terminal Block	
Network Connector	1x RJ45, Ethernet Connected	
Output Signal Type	SD-SDI (270Mbps), HD-SDI (1.485Gbps)	
Support Input Format	1080p24/25/30, 1080i60/50, 720p60/50, 480i/p, 576i/p	
SDI Signal Range	0.8V p-p	
SDI Impedance	75 ohms	
SDI Coupling Type	AC Coupling	
Video Compression Standard	H.264 Main profile ,High Profile,Slice encoding	
Audio Compression Standard	AAC-LC , G711	
Video Encoding Code Rate	512Kbps ~ 30Mbps	--
Audio encoding Code Rate	64Kbps	--
Encoding Delay	< 5	
Decoding Delay		

Media Transmission Protocols	RTP/RTSP, Compatible RTP over TCP Transmission Mode
Signal Protocol	TCP
Network Management	HTTP,ONVIF 1.1/2.0
Management Interface	Web
Remote Management / Remote upgrade Firmware	Yes
Power Supply	5V~24V DC
Power Consumption	6 Watts (max)
Operating Temperature	32°F ~ 104°F / 0°C ~ 40°C
Storage Temperature	-4°F ~140°F / -20°C ~ 60°C
Relative Humidity	20~90% RH (Non-condensation)

*Specifications are subject to change without notice

Key Components ..

Components Made in USA for this product:

Name of Component	Manufacturer
Multi-Rate SDI Adaptive Cable Equalizer	*Gennum*
Multi-Rate SDI Automatic Reclocker	*Gennum*
Multi-Rate Dual Slew-Rate Cable Driver	*Mindspeed & Gennum*
SDI SPD	*Bourns*
HDMI ESD Protection	*Semtech*
Micro Controller Unit	*Texas Instruments*

Components Made in China for this product:

Name of Component	Manufacturer
DC/DC Converter	*Richtek*

*Key components are listed by the manufacturer and are subject to change without notice

Default IP address

HD-SDI Encoder default IP is 192.168.1.168, Subnet mask is 255.255.255.0
HD-SDI Encoder default IP is 192.168.1.169,Subnet mask is 255.255.255.0
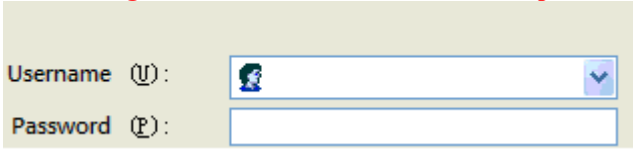You could alter the IP address through web-browser.

Logon management interface by web- browser

- Please ensure following network connection before log on the web browser
- Ensure that the network is working if the computer and Encoder Net-port is connected well physically.
- Please set your computer's IP address in same network segment of the Encoder's IP address.
- Try to use Ping ect. network test tool to ensure that it could connect to Encoder base on TCP/IP protocol .
- After you make sure all of these, you could log in following IP address through Web browser.

http://<device's IP address >

For example device default IP address is 192.168.1.168 .So we could log in by http://192.168.1.168. Then it would arise Login authentication dialog box
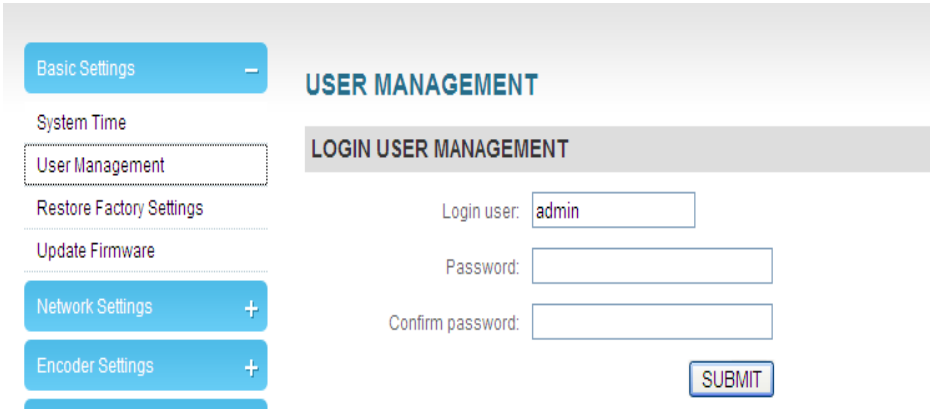
Default Logon user name is admin and default password is admin as bellow:

Username (U):	🐱	⌄
Password (P):		

Alter the log-in password

To prevent from logging in the device by illegal visitor , we strongly suggest that you should alter the default user name and password once you logged in .
The revising steps are that firstly click to ' basic setting'> 'user management '.then it would arise following interface to alter the password .

Basic Settings —
System Time
User Management
Restore Factory Settings
Update Firmware
Network Settings +
Encoder Settings +

USER MANAGEMENT

LOGIN USER MANAGEMENT

Login user: admin

Password:

Confirm password:

SUBMIT

Note：Current version soft could not support the altering of the user name .It only recognize user name :admin.

System status

Once entry Encoder or Decoder web browser management interface ,Firstly it would arise the device work status page. Or you also could click 'Setting' in menu of the management interface by manual to arise work status page.

The work status page would show current Encoder following status informations.

system basic status	
Device start time	The time after device start to power on

Duration operation time	Duration operation time after power on
The links of decoder user end	Current linked quantity to decoder end
Processor load	Encoder Host processor load percentage
Available memory	Encoder system balance memory
SDI video and audio signals status	
SDI Signal input	Indicate if SDI input signal is ok or not . LED indicator status imply the meaning as following : ok（LOCK indicator is bright） No Signal （LOCK indicator is off ）
SDI signal system	Display SDI signal mode（SD/HD/3G）
SDI video format	Display current SDI input signal format
SDI audio format	Display current audio format (sampling rate)
Encoding status	
Main stream：	
Encoding mode	Coding mode of the current main stream (CBR / VBR)
Real-time encoding bit rate	Current main stream of the actual coding rate (Note: the actual coding rate and the bit rate set of the H.264 coding system will deviate more apparent, particularly in VBR mode)
Real-time encoding frame rate	Current main stream video encoding frame rate (close to but not exactly equal to the set target frame rate)
Encoded frames	The current main stream has been collecting and coding of video frames
Sub-stream：	
Sub stream state	Display stream opening / closing state, as well as stream objectives set by the resolution scheme
Encoding mode	Encoding mode of current sub-stream （CBR/VBR）
Real time coding bit rate	Current sub stream actual coding rate (Note: H.264 coding system the actual coding rate and the rate will be somewhat deviation, especially in the VBR model is more obvious)
Real time coding frame rate	Current sub stream video of the actual coding frame rate (close to but not exactly equal to the set target frame rate)
Encoded Stream frames	Current sub stream has been collecting and coding of video frames
Network status	
Address achieving mode	Display the current TCP/IP network address acquisition mode (DHCP dynamic acquisition or manually specify)
IP address	Device IP address
Subnet mask	Device sub-net mask
Default gateway	Device default gateway
DNS	Device setted DNS server address

Select audio signal source

HD-SDI encoder would support the input of digital built-in SDI AES/EBU audio signal and bidirectional analog audio signal .You could switch between SDI AES /EBU audio and Analog audio by manual .
 If want to select SDI AES/EBU audio, you could Switch the switch dip K2 to OFF side. Or if you want to select analog audio, could switch the switch dip K2 to On side.
After this switching, HD-SDI Encoder would recognized rapidly (Current connected our HD-SDI decoder would disconnect automatically) .This processing would last about 3 second

Realtime image preview

In work status page , there is one status information bar called ' SDI image and audio signal ' ,Following the information bar, ,there exist the link "Click to VLC realtime image preview " ' . Please click the link to entry HD-SDI Encoder or HD-SDI decoder realtime image preview interface .

Media Player

 HD-SDI encoder realtime image preview employ current popular free and open video media player. VLC is the component of the media player .VLC media player could be loaded freely by the link http://www.videolan.org/
In the time, the device support to load built-in VLC1.1.11 version soft.. You could find the loading link through the mention contents of Encoder realtime image preview interface as bellow:

If current computer do not install VLC media player, The system would try to load VLC media player components automatically and install it. But the system may prevent to load and install automatically because of browser safety. If so, Please try to settle it by following solutions.

Add current address HD-SDI encoder l web browser's URL to trusted website list
Load and install VLC media player by manual .

PS. You are strongly suggested to install VLC 1.1.11 version. Because too old and too new version is not good to realtime image preview and delay control

Main stream and Sub-Stream

The system would try to connect Encoder automatically to achieve realtime images and show through web browser simultaneously. But pay attention to following conditions.
Master stream/ Sub-stream choice
Main stream is encoding directly SDI original images.It is high resolution and bigger bandwidth. Sub-stream is encoding compressed original SDI images. It is low resolution and low bandwidth. Please select main stream or Sub-stream to play image preview according to your actual application. Click the " dialogue "and select Main stream or Sub-stream, then click to ' play' button.
 Pass through Firewall and Nat

Firewall and NAT pass -through

As HD-SDI encoder and managed Encoder computer are not in same network segment , It has to pass through NAT device, Router or Network firewall . .And Encoder default media transmission method is RTP/UDP.So it cause that it could not be over NAT or Firewall.. For we could prevent from this condition .,we could select ' NAT(TCP) Pass through firewall /NAT(TCP)' from the options of ' transmit 'bar ,then click ' Play'button to renew the connection to our Encoder
If Our Encoder is setted after firewall /NAT and Encoder employ private network addresses (e.f 192.168.X.X,10.X.X.X,172.16.X.X – 172.31.X.X. Encoder's 80 port (Web browser management interface would employ) and 554 port (RTSP media would apply this port to transmit protocol) must be on port mapped in Firewall/NAT device.
In addition ,RTSP media may do not apply 554 port to transmit protocol.If so, We need alter the port number as play realtime image preview. The step is that alter 'RTSP port' with actual port magged number through realtime image preview interface ,then click 'Play' button to renew connecting to Encoder

Connect to NDA310L by the decoder or video decoder soft

Our Encoder apply to standard RTSP media transmission protocol to transmit encoded video and audio. It support all standard RTSP transmission protocol and H.264 decoded devices (e.f Our

Decoder decoder, PC based soft).

RTSP's URL of Our encoder is
Main stream：

rtsp://<our encoder IP address>/ch01

　　（ For example ： rtsp://192.168.1.168/ch01 ）

Sub- stream ：

rtsp://<our encoder IP address/sub01

 （For example： rtsp://192.168.1.168/sub01)
In addition ch01 and sub01 mean RTSP dialogue sign.(Session ID)
If Encoder is involved in passing through firewall /Nat,Please refer to 8.7 section about setting instruction of passing through firewall /NAT . If Encoder is setted port mapped to the firewall /NAT ,RTSP 's URL of Encoder is :
 Main stream：

rtsp://< firewall/NAT device's public network address>:<RTSP mapped port>/ch01

 （For example： rtsp://211.0.0.1:554/ch01)
Sub-stream：

　　rtsp://<firewall/NAT device 's public network address >:<RTSP mapped port>/sub01

 （For example： rtsp://211.0.0.1:554/sub01)
If it is setted to entry Encoder's realtime image preview by the identity authentication, decoder device or soft would is visited by offering user name and password. As to relate identity authentication setting,Please refer to 8.15 sections.
 Support ONVIF

Our Encoder would support ONVIF 1.1/2.0 protocol。According to ONVIF specification, The device would support auto-detection,media description, RTSP media achieving , setting parameter and PTZ remote controlling.

System time setting
Encoder is designed to built-in RTC clock.So it would sustain system time once shut off the power.But if Encoder is first time to work, need to proofread system time by manual. In addition, because RTC clock system exist the error, the system maybe need to proofread again Every 3-5 month for few seconds errors. ,

Click ' basic setting ' > system time setup"to proofread system time.
System time proofreading methods：
Automatical simultaneous time

Follow current computer simultaneous time	Achieve automatically current computer system time and set the time as Encoder system time

	Through internet standard network time service, it would achieve the time from encoder built-in NTP server and set the time as encoder system time. Pay attention to following conditions:
Follow NTP server simultaneous time	(1) Encoder must connect to internet well (2) Encoder's network configuration e.f default gateway and DNS must be setted properly.

Set device's time by manual

Please press on the pattern"YYYY-MM-DD HH:NN:SS"to input the time （YYYY mean Year ， MM mean month ， DD mean day， HH mean hours， NN mean minute， SS mean second） ， then confirm the setting。[

Streaming media user management

Encoder is configured that RTSP media could connect to user end (decoder or decoding soft) through identify authentication (Refer to 8.15 section) . It is good way to prevent from visiting freely by illegal visitor by offering user name and password as RTSP connect to user end. The function setup is through " basic setting ＞ user administration ＞ stream media user administration"

Add user

By clicking on the "add a user interface" button, you can add a RTSP for authentication username and password set user

Alter user password

Click the "change password user list" icon "", can modify the user password

Cancel user

Click the "delete user interface user list" 🗑 "", can delete the user

Restore factory setting

If the user to modify the Encoder parameters lead to equipment can not work (most typically modify the network address that is not accessible by a network of Encoder), can restore equipment factory settings, the Encoder configuration restore factory default values.

Restore factory settings with two methods:

1.Through the WEB interface "basic settings > restore factory settings"
2.By pulling equipment Encoder K1 switch
The Encoder device K1 switch by the current position is moved to the opposite position (such as the current K1 located in the OFF position, set the K1 transferred to ON position; otherwise, K1 turned to OFF position), wait 5 seconds, then equipment LOCK and LINK indicator lights flash at the same time; continue to wait for 5 seconds, until LOCK and the LINK indicator light and extinguish, said device has been successfully restore factory settings.

Note: if your mistake operation toggle switch in the LOCK K1, and LINK indicator lights are not at the same time out before the K1 switch back to cancel the operation to restore the factory settings.

Restore factory settings will cause the device to restart, restart process takes about 1 minutes.

To restore the factory settings, the following parameters will be changed to default values:

1.User login password for admin will return to admin

2.Equipment network address acquisition mode will revert to manual acquisition

3. The IP address of the device will return to the 192.168.1.168, subnet mask will return to 255.255.255.0;

4.All video, audio coding parameters will restore to factory default;

5.Media transmission parameters (RTSP settings) will restore to factory default;

6. RS-485 port parameters will restore to factory default

To restore the factory settings, the following parameters will remain unchanged:

1.RTSP authentication user and password;

2.System time;

3.Default gateway;

4. DNS set.

Firmware upgrade

Encoder online support for updating firmware upgrade, the encoder software version.

Through the WEB management interface "basic settings > firmware upgrade" function, can upload manufacturers provide firmware upgrade file firmware on-line upgrade.

Please be careful.

1. Since the original software BUG, if the Encoder software version 3 before (including 3), please send firmware upgrade file must be placed in the name without spaces, no Chinese character folder (special attention is not placed on the Windows desktop), then upload firmware upgrade file.The 3.1 and subsequent software versions do not pay attention to the problem.

2. The firmware update file upload speed is slower, please wait patiently.

3. The firmware update file upload is successful, Encoder will automatically reboot the device to upgrade, the procedure may be continued for 1 to 2 minutes (depending on how much time updating content differ), please wait patiently.

4. Please do not upload unofficial releases firmware file or other illegal file, so as not to cause permanent damage to the device.

5. After the upgrade is complete, please go through the WEB interface "system information > version information" to view the most recent version of the information is consistent with expectations, confirm that the upgrade is successful.

Network Configuration

By Encoder WEB management interface function "Network Settings > network address and parameters", you can configure the encoder IP address and network parameters, these parameters include: the IP address, subnet mask, default gateway, the primary DNS server address and a secondary DNS server address.

Encoder supports dynamic DHCP to obtain an IP address, subnet mask, default gateway and the DNS address.In "network address and parameter configuration interface, select the" address "access" to "DHCP dynamic acquisition" can, this IP address, subnet mask, default gateway and the DNS server, DNS server parameters will be prohibited from modifying auxiliary.

Note: set address access mode called "DHCP dynamic acquisition", please manually reboot Encoder equipment to update the DHCP address acquisition.

Alarm signal

Encoder supports a warning signal (switch) input and a warning signal output (switch).Alarm signal interface is mainly used with the Encoder decoder signaling transmission, but can also be based on user demand expansion definition alarm signal interface effect, please contact with the manufacturer or dealer agreement.

In the WEB management interface "alarm signal set" function at the interface can view and set the alarm signal state.

The interface can display the current alarm signal level (high / low level), and can be set to output alarm signal default level (high / low).

Open "and the decoder through transmission of alarm signal", Encoder and Decoder between automatic transmission of alarm signal (i.e. Encoder alarm signal input state will be in the encoder alarm signal output response, whereas the Encoder alarm signal input state will be in the decoder alarm signal output response).

RS485 and PTZ control

Select the WEB management interface "RS485 and PTZ control settings" function, you can set the Encoder RS-485 interface baud rate parameter.If you turn "and the decoder through RS-485 signaling", then Encoder decoder RS-485 input signal from the Encoder encoder RS-485 interface output.

The current version of Encoder software supports only through the RS-485 control interface that supports the Pelco-D protocol console (PTZ), in the ONVIF protocol for PTZ control.If you need to support other protocol type, please contact with us

Rapid reset

"Fast reset" function for fast reset Encoder video encoding function.When the video signal is not stable, the parameter is not set properly by Encoder coding function is abnormal, please try to perform rapid resetting device.Fast reduction may need to wait for 3 seconds.

Device restart

"Equipment for Encoder executive hot restart restart", when the equipment function, through the rapid reduction is still unable to solve the problem, try restarting of device.Device reset about need to wait for 1 minutes.

In some cases, may need the help of cold reboot device reboot, the first removal of the Encoder power input, then the power is switched on

Warning: do not recommend that you often use cold restart restart on equipment.Cold restart on hardware and software are likely to cause adverse effects.

Limited Warranty

LIMITED ONE (1) YEAR WARRANTY AND EXCLUSIONS

Manufacturer warrants to the original consumer purchaser and not for the benefit of anyone else that this product at the time of its sale by Manufacturer is free of defects in materials and workmanship under normal and proper use for one (1) year from the purchase date. Manufacturer's only obligation is to correct such defects by repair or replacement, at its option, if within such one (1) year period the product is returned prepaid, with proof of purchase date, and a description of the problem. This warrant excludes and there is disclaimed liability for labor for removal of this product or reinstallation. **This warranty is voided if this product is installed improperly or in an improper environment, overloaded, misused, opened, abused, or altered in any manner, or is not used under normal operating conditions or not in accordance with any labels or instructions. There are no other implied warranties of any kind, including merchantability and fitness or a particular purpose**, but if any implied warranty is required by the applicable jurisdiction, the duration of any such implied warrant, including merchantability and fitness of or a particular purpose, is limited to one (1) year.

Manufacturer is not liable for incidental, indirect, special, or consequential damages, including without limitation, damage to, or loss of use of, any equipment, loss sales or profits or delay or failure to perform this warranty obligation. The remedies, provided therein are the exclusive remedies under this warranty, whether based on contract, tort or otherwise.