About this Document

Purpose

This document describes the features, hardware installation, network access, network configuration, routine maintenance, fault analysis, and troubleshooting of the Network Video Recorder (NVR).

Intended Audience

This document is intended for:

- Technical support engineers
- Maintenance engineers

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
⚠ DANGER	Alerts you to a high risk hazard that could, if not avoided, result in serious injury or death.
⚠ WARNING	Alerts you to a medium or low risk hazard that could, if not avoided, result in moderate or minor injury.
⚠ CAUTION	Alerts you to a potentially hazardous situation that could, if not avoided, result in equipment damage, data loss, performance deterioration, or unanticipated results.
☞ TIP	Provides a tip that may help you solve a problem or save time.
📖 NOTE	Provides additional information to emphasize or supplement important points in the main text.

Important Statement

Users are required to enable and maintain the lawful interception (LI) interfaces of video surveillance products in strict compliance with relevant laws and regulations. Installation of surveillance devices in an office area by an enterprise or individual to monitor employee behavior and working efficiency outside the permitted scope of the local law and use of video surveillance devices for eavesdropping of illegal purposes constitute behaviors of unlawful interception

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Contents

1 Specification

System	
CPU	SOC
Operation system	Embedded Linux 2.6
features	Embedded CMS system, fully functional friendly interface, easy to use; Original "quick configuration" feature that enables NVR configuration and management operations easy to get started. Original "camera private network enables Plug-and-play camera access auto detection and schedule setup for fast rapid use. Real-time fault alarm mechanism to timely reporting of hard disks, networks, fault information, such as camera disconnection; Embedded WebServer using Flash technology to support common browsers real-time monitoring and playback
Video	
Ability to decode	Support H.264 High profile Level5.0 decode Support resolution up to 5 megapixel
Real-time video	Single screen: 5 megapixel /3megapixel /1080P/720p/D1 resolution Quad display of 1080P/720p/D1 resolution Split screen 1/4/8/16.for D1 resolution
Audio format	G711_A/G711_U
record	
Record info	Support 32ch recording, Maximum recording bandwidth is 144Mbps Support resolution: 5 mega,3 mega, 1080p, 720p/D1 resolution.
HDD	Support four 1.5/3.0Gbps SATA hard disks，Maximum capability of single hard disks is 4TB.
recording days	4 hard disks, maximum 4*4TB hard disk support.
Playback	Support 4ch 1080P playback at the same time.
Backup	Support U drive, mobile HDD, network backup disk.

display	
interface	One VGA output interface, one HDMI output interface, support homology display
resolution	1024x768、1280x720、1920x1080
Network	
interface	Two RJ45 10/100/1000Mbps network port
Network protocol	RTP/RTCP，TCP/UDP，HTTP，DHCP，DNS，NTP
others	
Environment temperature	10℃—50℃
Environment humidity	5%-90%
power supply	AC110/220V，47-63HZ，Maximum consumed power is 200W.
consumption	Low-power design, Maximum motherboard power consumption 15w (without USB interface), with 4*4T hard disk increases 40W power consumption.
Size	chassis：440mm x 435mm x 89.8mm（L*W* H）
weight	Net weight 6.805kg，with packaging 8.975kg
USB interface	2*USB2.0 host interface；Respectively as backup and USB mouse.

2 NVR networking solutions

This the NVR has two Ethernet ports LAN1 and LAN2. Supports the private network of the cameras, and 2nd one for WAN local remote connections. LAN2 is used for network devices for automatic detection within the NVR software.

## Option One：Private Network Setup

Camcorder network is a network exists only network cameras and NVR, there is no other network equipment, and this network is dedicated to the NVR and network cameras, audio and video transmission. Dedicated camera network must be connected with the NVR LAN2, and ensure that the LAN2 camera network functions are enabled (factory default enabled detailed configuration, see "Network Video Recorder User Manual quick configuration through LAN1 access NVR.

10M/100M/1000Mbps RJ45 Internet port

For connecting the Internet or local network, And NVR need to search the camera by manually.

The camera dedicated network topology shown in Figure 2-1

Figure 2-1 camera dedicated network
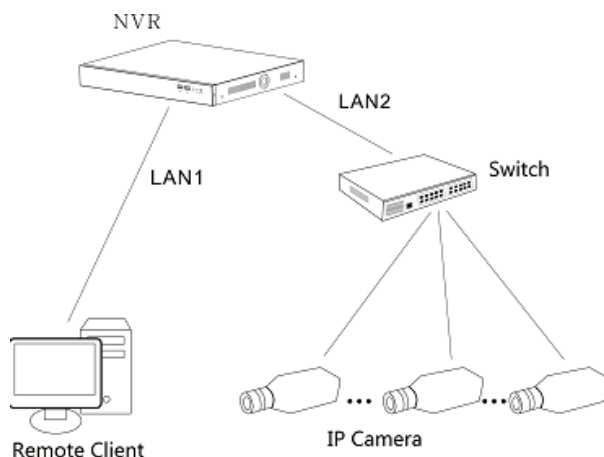
### Option II：Open network.

The open network refers to the network in addition to the network cameras and NVR, there can be other network devices, network topology can be free to organize, just need to ensure communication between the NVR and network camera is smooth. In the use of the network, LAN2 needs to turn off the camera dedicated network.

Open network, the need to manually search for and add network cameras, see detailed operation quickly configure.

Open network topology shown in Figure 2-2.

Figure 2-2   open network topology
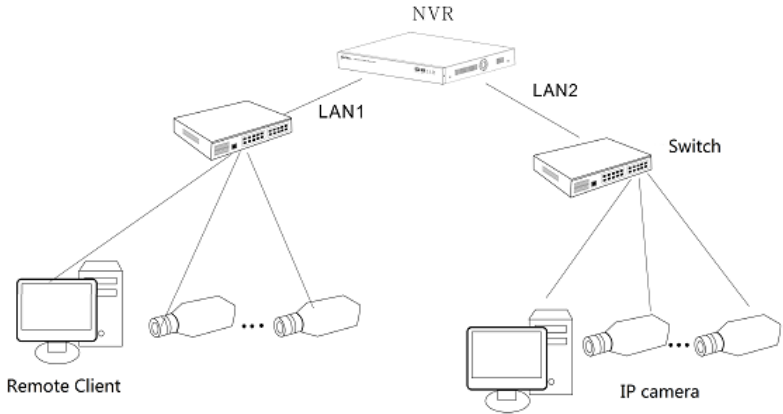
3 Hard drive

⚠️ **CAUTION**

- Formatting will clear all clear video data on disks, please pay attention to this function
- Before removing a hard disk from the NVR during operation, unload the disk, otherwise. The disk may be damaged.
- Please supply stable power supply, otherwise the disk may be damaged or loss of data.
- Maximum capacity of single hard drive is 4TB.
- Suggest to use more than two hard drive to achieve the performance balance,

3.1 Hard disk recommended

Given the current market of different brands, the uneven quality of the different models of hard, recommended to use Seagate or Western Digital brands which are designed for security/server applications offering 24x7 reliable operations.

Recommended model: Western Digital's WD AV-GP and Seagate's SV-35 SERIES

3.2 Days of recorded

Calculate recording days:

Firstly： Use the formula 1 to calculate the recording capacity **q** that one channel record need each hour

$q = d \div 8 \times 3600 \div 1024$ （formula 1）

Secondly: calculate the recording days

$$t = \frac{n \times w}{q \times h \times c}$$

w– Single capacity of single hard drive, Unit (MByte)

n – Hard drive count

h – Recording time within a day

c – Recording approaches of NVR

For example: calculate detail recording day

Calculate recording days

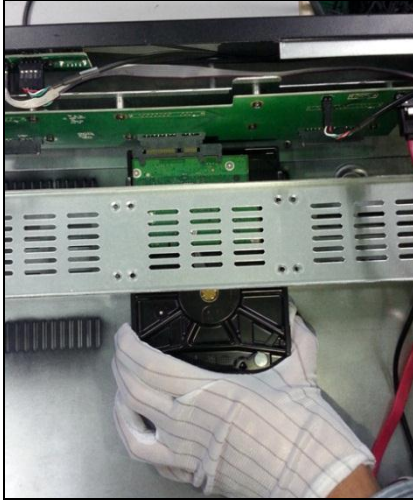| Hard drive capacity	Video stream	cameras	Days recorded
4×4TB	D1 1.5Mbps	32	30 days
4×4TB	720p 3Mbps	32	15 days
4×4TB	1080p 4.5Mbps	32	10 days

3.3 Installation

The hard specific installation steps are as follows:

Step 1 Take out the screws of the cover and the cover

Step 2   Hard drive inset to the PCB SATA interface,

Step 3   Fixed hard drive with 4 screws,

Repeat the step2, step3, untill all the hard drive are installed, and then cover the upper cover,fix the screw.s

End----

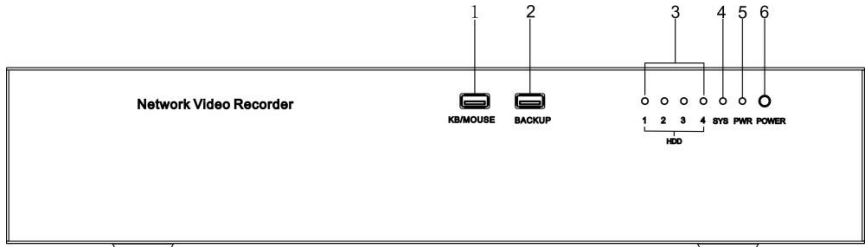# 4 Basic operation

4.1 Front panel description

Front panel

Table 4-1 Front panel

No	Name	Description
1	KB/MOUSE	For connecting external mouse, keyboard.
2	BACKUP	For connecting U drive and mobile HDD.
3	HDD 1~4	1~4 hard drive work indicating lamp (blue) Long light when it's alive, the blue light flashes when it reading and writing data.
4	SYS	NVR running indicator lamp (red), long light when it is behaving normally.
5	PWR	NVR power indicate lamp (red), long light after startup.
6	POWER	Power on/off button

Hard drive working indicate light correspond to the internal hard drive, which is shown in the following table.

HDD1	HDD2	HDD3	HDD4

4.2 Rear panel description

Figure 4-2 shows the rear panel of the network video recorder. Table 4-2 shows the interface of rear panel,

Figure 4-2 Rear panel
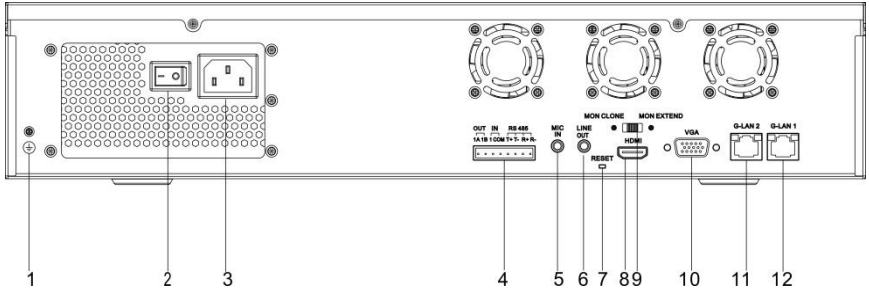
Table 4-2 Real panel description

No	Name	Description
1	Ground connector	Safety GND connect
2	Power switch	Power input switch
3	Power interface	AC110/220V power supply interface
4	OUT	1 alarm output channel (switch value)
	IN	1 alarm input channel (switch value)
	RS485	1 channel RS485
5	Audio input	Connect microphone linear audio
6	Audio output	Linear audio output
7	RESET button	Keep click the button more than 5 seconds to restore factory setting
8	HDMI interface	HDMI output
9	HDMI and VGA Double screen display mode	MON CLONE: use for Homologous double screen display output. MON EXTEND: use for non-homologous double display output
10	VGA interface	VGA video display output
11	G-LAN2 interface	RJ45 10/100/1000Mbps adaptable Ethernet interface
12	G-LAN1 interface	RJ45 10/100/1000Mbps adaptable Ethernet interface.

📖 NOTE

The No 4,5,9 in the table are functions formerly reserved, temporarily not opened to use.

4.3 Startup

⚠️ CAUTION

- Ensure that a power supply is connected to the NVR correctly.
- Before starting the NVR, ensure that a monitor is connected to the HDMI or VGA interface of the NVR correctly.

If the power indicator on the front is off, connect a power supply and turn on the power switch on the rear panel to start the NVR. If the power indicator on the front is steady in red, press the off/on button on the front panel to start the NVR, the NVR conducts a self-test and then display the result on the screen。

When an abnormality is detected and the self-test screen stays on, choose to continue or shut down in the lower right corner of the screen. If you choose to continue, the NVR enters the login interface.

- 📖 NOTE

  The hard disk(s) required by the NVR must be provided by users. Hard disk detection is performed during startup. If the detection fails, check whether it is caused by the following causes:

  - The hard disks are new and unformatted. In this case, format the hard disks.
  - The hard disks are formatted, but the file system is inconsistent with the one supported by the NVR.
  - The hard disks are damaged.

4.4 Shutdown

⚠️ **CAUTION**

Do not cut off the power supply when the system prompts "Shutting down".

When the NVR is operating, avoid cutting off the power by turning off the power switch on the rear panel or removing the power cord.

The NVR may not operate normally when a power supply exception occurs, likely causing damage to the NVR in serious conditions. In such a circumstance, you are advised to use a regulated power supply.

To shut down the NVR before logging in, press and hold the PWR button on the front panel for over 3s. The NVR is closed successfully when the power indicator on the front panel changes from steady on to flashing in red.

To shut down the NVR after logging in to the main interface, click ☒ in the upper right corner or press and hold the PWR button on the front panel for over 3s. The shutdown interface appears, as shown in Figure 4-3.

Figure 4-3 Shutdown interface

Enter a valid password and click **Shutdown**. When authentication is successful, the prompt "Are you sure to shut down?" is displayed. Click **Yes**.

4.5 Login

Take the following steps to log in to the NVR:

Step 1   Enter your user name and password on the login interface of the NVR.

Figure 4-4 Login interface of the NVR
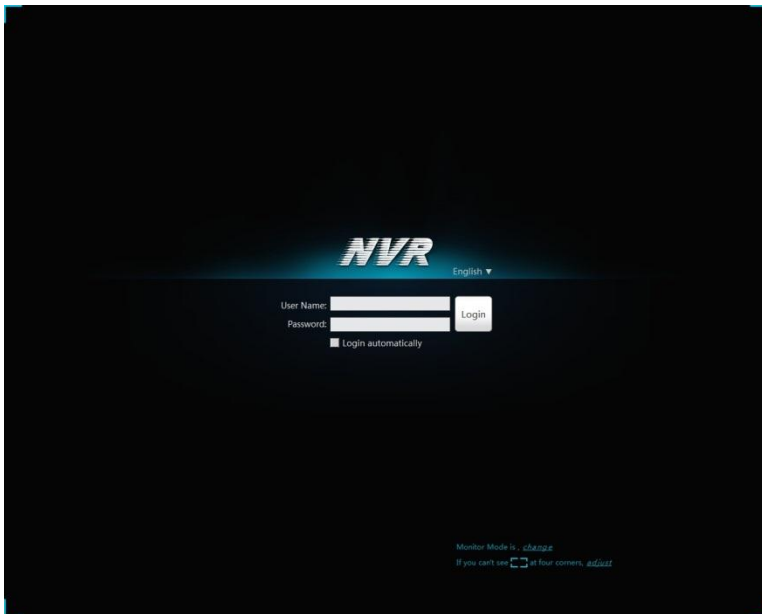
📖 NOTE

The super user is **admin** and the password is also **admin**, both of which are case-sensitive. Change the password after logging in to the NVR for the first time. When a user enters incorrect passwords three times within an hour during login, the account is locked. For how to unlock the account, see section "Network Video Recorder user manual".

Step 2 Click **Login** to enter the main interface.

----End

5 Quick setup

Quick setup is intended to group together some frequently used functions to facilitate the configuration management of NVR. For the NVR, the quick setup functions cover the network configuration, disk configuration, data and time configuration, webcam search, and video configuration of the NVR. For the cameras added to the NVR, the quick setup functions cover the network configuration, code stream configuration, and motion detection configuration of the cameras. Figure 5-1 shows the **Quick Setup** interface.

Figure 5-1 Quick Setup interface
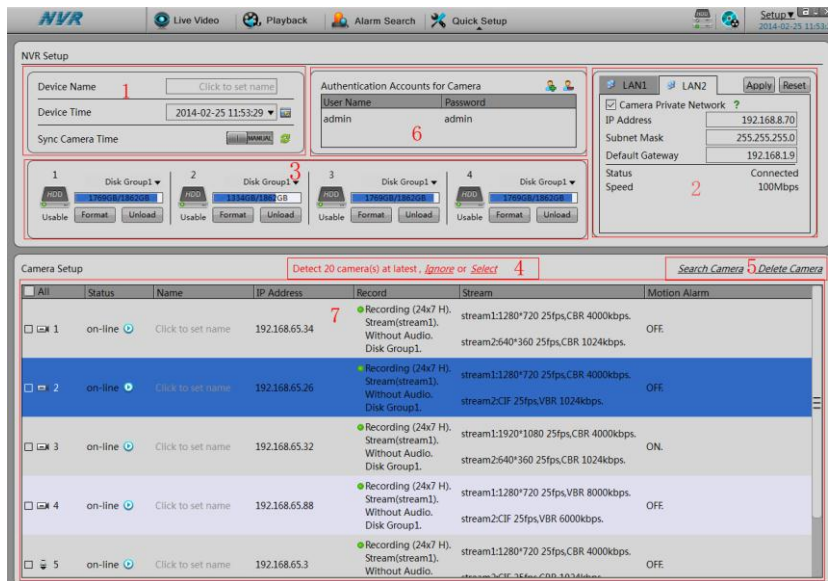
Description of the Quick Setup interface

Section 1:

- NVR basic information
  Set the name of the NVR and change the date and time.
- Synchronize the time of cameras manually or automatically.

If you select the manual mode, click ![icon] for time synchronization. If you select the auto mode, the NVR synchronizes the time of cameras automatically.

Section 2: NVR network configuration

- One default IP address of the NVR is 192.168.0.121, another IP address default is192.168.1.121 when network interface 2 is used.
- Parameters such as the IP address, subnet mask, default gateway, and DNS address can be set in basic network configuration. The network connection status and speed are displayed in real time.
- Network interface 2 of the NVR supports the camera-dedicated network function (enabled by default).
- 🛅 **NOTE**

  A camera-dedicated network is a network where only webcams and the NVR exist.

  After the camera-dedicated network function is enabled, the NVR does the following:

  - Enables the DHCP service and assigns IP addresses to webcams automatically (the DHCP function is enabled on the webcams).
  - Searches for webcams in the network.
  - Adds the searched webcams automatically and enables 24/7-hour video recording.

  Figure 5-2 shows the topology of the camera-dedicated network.

Figure 5-2 Topology of the camera-dedicated network
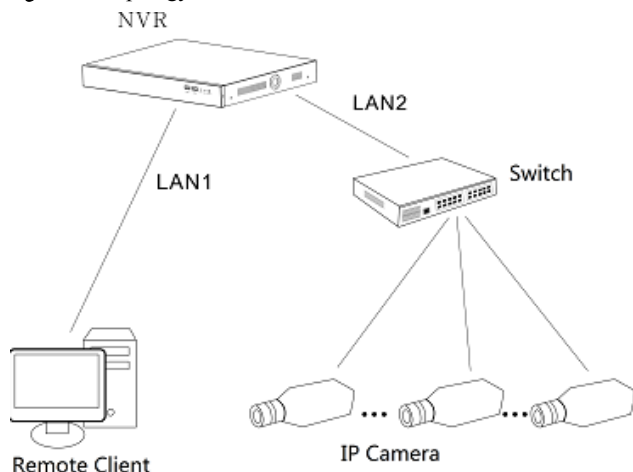
Section 3: hard disk management

⚠ CAUTION

Formatting will clear all video data on hard disks.

Before removing a hard disk from the NVR during operation, unload the disk; otherwise, the disk may be damaged.

Manage the hard disks of the NVR as follows:

- To format a hard disk, click **Format**. In the confirmation dialog box, click **Yes**. It takes about 10 minutes to format a 2 TB hard disk.
- Load or unload hard disks. Before removing a hard disk from the NVR, unload the hard disk.
- Modify a hard disk group.
- Check the statuses of hard disks (normal, abnormal, unformatted, and unavailable).
- Check the available space and total space of hard disks.

Section 4: camera quantity alarm

The NVR searches for webcams in the network automatically when the camera-dedicated network function is enabled.

- When the number of webcams does not exceed the management capability of the NVR, the NVR adds the webcams automatically.
- When the number of webcams exceeds the management capability of the NVR, the NVR adds random webcams based on its management capability automatically. The remaining webcams cannot be added and an alarm is generated, as shown in Figure 5-3.

Figure 5-3 Camera discovery prompt

> A webcam is discovered. *Ignore* or *Select*.

Select cameras managed by the NVR. If you click **Ignore**, the webcams currently managed by the NVR are used. If you click **Select**, the **Camera Search** interface appears, as shown in Figure 5-4.

Figure 5-4 Camera Search interface
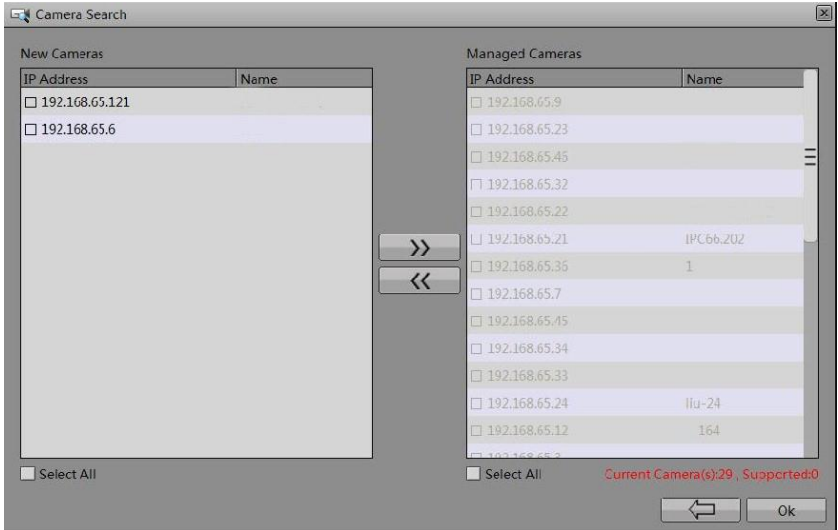
Select webcams and click **Ok**.

Section 5: searching and deleting cameras

When the camera-dedicated network function is not enabled, click **Search Camera** to search for webcams manually. The **Camera Search** interface appears, as shown in Figure 5-5.

Figure 5-5 Camera Search interface
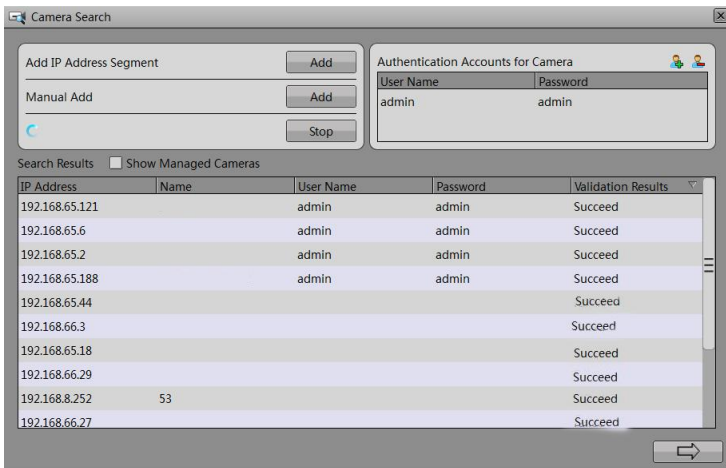
Click [→]. The **Camera Search** interface (shown in Figure 5-4) appears. Select cameras and click **Ok**.

To remove managed cameras, check the ☑ ☐ 1 check box in the camera list, select the cameras to be removed, and click **Delete Camera**.

Section 6: Management of the authentication accounts of cameras

⚠️ **CAUTION**

Only successfully authenticated cameras can be used normally. Before adding a camera, add the authentication account and password of the camera to the corresponding list.

To log in to a webcam, enter the corresponding authentication account. Only successfully authenticated webcams can be added.

- The system provides the default account **admin** and default password **admin**. Click
  to add a camera authentication account.

- To delete a camera authentication account, select the account and click.

Section 7: camera setup

This section displays the statuses of webcams and provides setting of the names, IP addresses, record policies, code streams, and motion detection of webcams.

- The statuses of webcams include Online, Offline, and Account error.
  To view live videos, click on-line ⊙ following an online webcam.
- Change the name of a webcam.
  Enter a new name in the **Name** column.
- Modify the IP address of a webcam.
  1. Click the IP address to be modified. The **Camera IP Setup** dialog box appears.
  2. Enter a new IP address. For details, s
- Set a record policy.
  1. Click the record policy to be modified. The **Record policy Configuration** dialog box appears.
  2. Enter a new record policy. For details,.
- Set a code stream.
  1. Click the code stream to be modified. The **Stream** dialog box appears, as shown in Figure 5-6.
  2. Enter a new code stream, set **Apply to All Devices** to **On**, and click **OK**. The parameter settings are applied to all webcams with the same resolution.

Figure 5-6 Stream dialog box
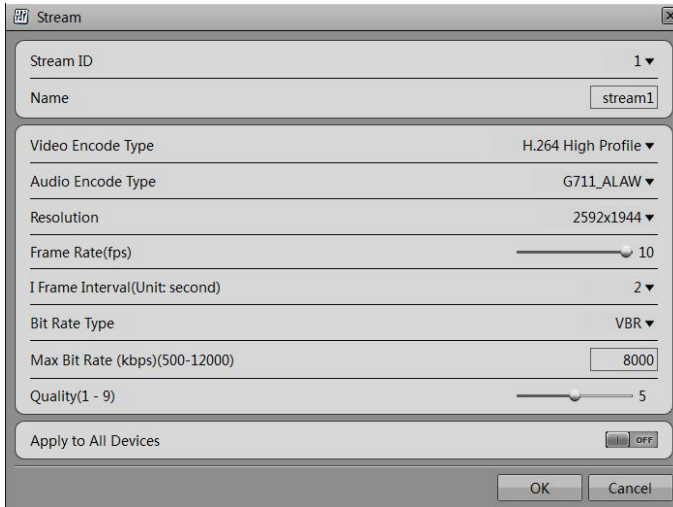
- Set a motion detection alarm.
  1. Click the motion detection information to be modified. The **Motion Alarm** dialog box appears.
  2. Set the deployment time and detection zone if the motion detection alarm function is enabled.

6 Live Video

Enter your user name and password on the login interface and click **Login**.

The **Live Video** interface appears, as shown in Figure 6-1.

Figure 6-1 **Live Video** interface

On the **Live Video** interface, drag a camera in the **Cameras** pane on the left to the live channel and perform the following operations:

- Live video playing
- Alarm viewing
- Record status viewing
- PTZ control
- Audio listening
- Automatic full screen
- Video bookmark
- Front-end parameter setting

Decoding capability

When the video to be played exceeds the supported decoding capability, the video pane prompts insufficient decoding capability.

Intelligent code stream adaptation

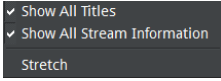The system provides an intelligent code stream adaptation mechanism.

When a video is played, the system selects a proper code stream based on the sizes and number of video windows and its own decoding capability to achieve optimal real-time surveillance effect.

To change a code stream manually, right-click and select a new code stream among the ones supported by the video device from the **Stream** option in the shortcut menu. Code stream information is displayed at the bottom of the video pane.

Figure 6-1Table 6-1 lists the elements of the **Live Video** interface.

Table 6-1 Elements of the Live Video interface

No.	Name	Description
1	Top menu	The top menu includes **Live Video**, **Playback**, **Alarm Search**, and **Quick Setup**. Click each one to enter the corresponding operation interface. Click [icon] to view the hard disk information of the NVR. Click [icon] to enter the record backup interface. Click [icon] to lock the interface.
2	**Layouts** pane	To play a live video, select the one-screen, four-screen, or six-screen layout and drag a camera in the **Cameras** pane to the layout window. To save a layout, click **Save** in the control bar at the bottom of the interface and select **Shared Layout** or **My Layout** as the save location. The camera sequencing layout is supported and can be set in **Layouts** of **NVR Setup**.
3	**Cameras** pane	The **Cameras** pane shows all cameras managed by the system. To play a live video, drag a camera to the layout window. Online cameras are marked with [icon]; offline cameras are marked with [icon]; non-authenticated cameras are marked with [icon] (the entered user name or password is incorrect).
4	**Alarm Info** pane	The **Alarm Info** pane displays the latest 20 camera alarms, including motion detection alarms and I/O alarms. To clear alarms, click [icon].
5	Bottom menu	Click [icon], [icon], and [icon] to hide or show the

| No.	Name	Description
		Layouts, Cameras, and **Alarm Info** panes.
		▶ : used to play a live video.
		■ : used to close a live video.
		▶ : used to bookmark a live video in the current channel so that the corresponding file can be located during video playback.
		✓ Show All Titles ✓ Show All Stream Information ℹ : ⎯ Stretch ⎯ is displayed when you click this button. Select an option to adjust the display of the live video pane based on requirements.
		PTZ : The PTZ control menu appears when you click this button.
6	**Live Video** pane	This pane plays live videos and provides the front-end parameter setting function. To change a code stream manually, right-click and select a new code stream among the ones supported by the video device from the **Stream** option in the shortcut menu. Code stream information is displayed at the bottom of the video pane.

Automatic full screen

Click 🔲 and choose whether to enable automatic full screen and the delay time to enable automatic full screen in the shortcut menu. If automatic full screen is enabled, the full screen is displayed when no operation is performed during the delay time. A toolbar appears when you move the cursor to the bottom of the full screen. To exit the full screen, click 🔳 in the toolbar. To enter the full screen mode manually, click 🔳 .

PTZ operation

Click PTZ . The PTZ operation menu appears, as shown in Figure 6-2. The following items can be configured: PTZ direction, zoom, preset position, track, scanning, home position, infrared lamp, true north, and timer.

Figure 6-2 PTZ control menu
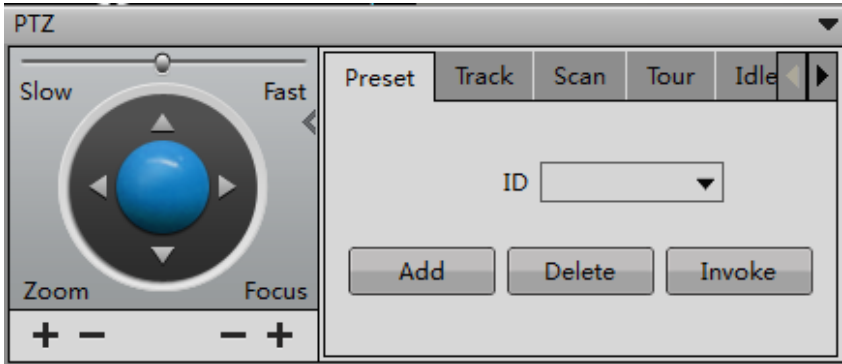
📖 **NOTE**

The PTZ control menu takes effect only for high-speed domes and external PTZ cameras.

To close the PTZ setup menu, click ◀ on the PTZ control interface.

To exit the PTZ control menu, click ▼ on the PTZ control interface.

Quick operation on the Live Video interface

Right-click and the **Live Video** menu appears (shown in Figure 6-3), where you can choose to show the title and code stream information, turn on/off audio, select and switch code streams, and position 3D PTZs.

Figure 6-3 Live Video menu
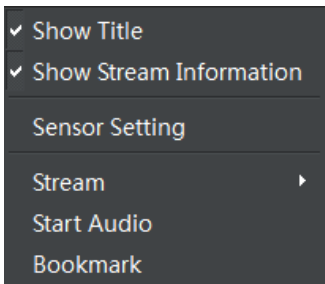
7 Video Playback

7.1 Video Playback

Video playback refers to playing of videos stored in local hard disks, as shown in Figure 7-1.

Figure 7-1 Local video playback
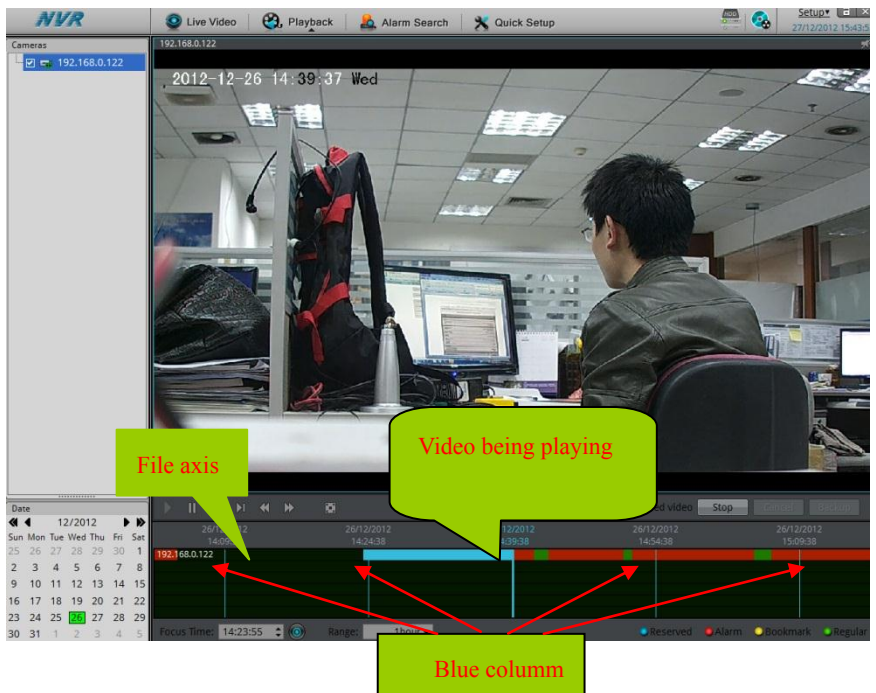
Take the following steps to play a video:

Step 1 Select a camera.

Click a camera in the **Cameras** pane. A selected camera is marked with [icon]. An unselected camera is marked with [icon].

Step 2 Select a date.

Select a date in the **Date** pane. Click ◀ and ▶ to change months or click ◀◀ and ▶▶ to change years. 23 Indicates the selected date. The green color indicates that there are videos captured on that day.

Step 3 Display videos.

After a camera and date are selected, video information is displayed below the video pane. The time scale above the file axis shows the different time points of video recording. The time in blue in the middle is the time of the video being played. The file axis displays videos. Reserved videos are in blue, alarm videos are in red, bookmarked videos are in yellow, and ordinary videos are in green.
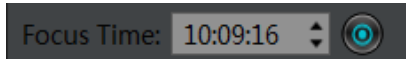
Focus Time: 10:09:16 ⟳ ◉ : Enter a time point in the **Focus time** field

and click ◉. Then the video corresponding to the specified time is played.

Time Range: 1hour ▼ : provides the time options of 15 minutes, 30 minutes, 1 hour, 4 hours, 8 hours, 12 hours, and 1 day.

If 1 hour is selected, the time span from the first blue column to the last blue column is 1 hour.

Step 4 Play a video.

You can play a video after selecting a camera and date. 0 shows the control bar of video playback.

Control bar

▶ ‖ ◀◁¹⁰ ▶∣ ◀◀ ▶▶   ⛶

- 📖 **NOTE**

  When a video is being played, drag the video information bar in the video pane horizontally

  to control video playback. To switch to the full screen, click ⛶.
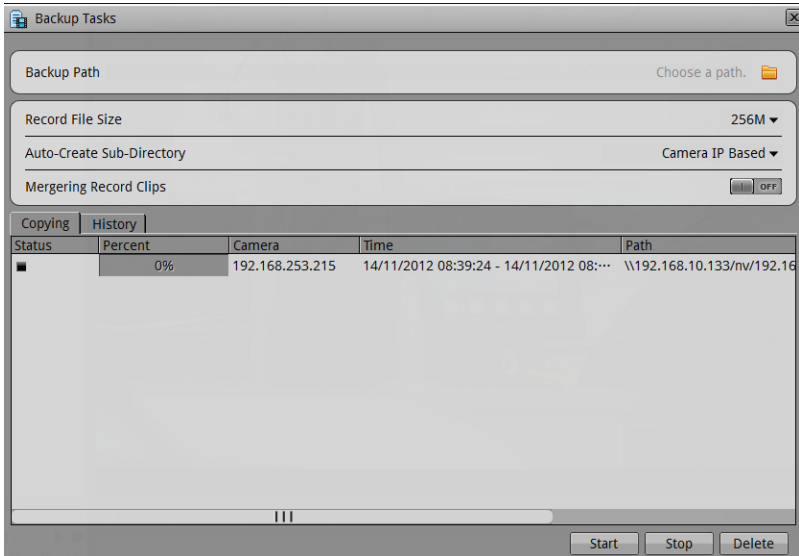
----End

7.2 Video Backup

Step 1 Set a backup path.

Click 🎞 in the upper right corner of the **Playback** interface. The **Backup Tasks** interface appears. Click 📁. The **Choose a path** dialog box appears.

Figure 7-2 Selecting a backup path

The **Backup Path** bar displays the selected backup path. If it is empty, select a backup path. The list below shows available backup storage devices. The NVR supports two types of backup storage device, that is, network storage device (NAS) and USB storage device (USB flash drive or mobile hard disk).

- Network storage device
1. Double-click **Add Network Disk** in the list, or right-click and choose **Add Network Disk**. The **Add Network Disk** dialog box appears, as shown in Figure 7-3.

Figure 7-3 Add Network Disk dialog box
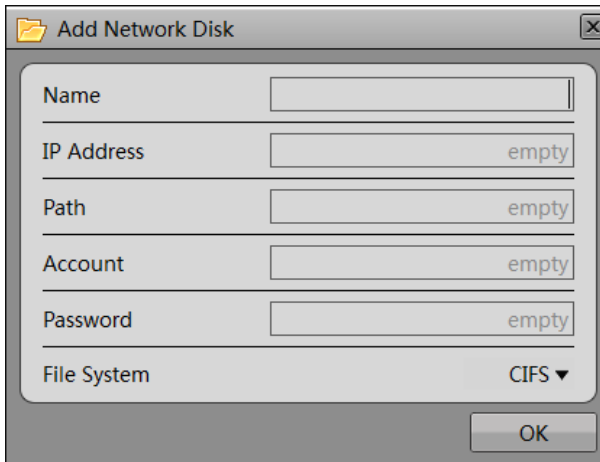
2. Specify the name, IP address, path, account and password, and file system of the network disk to be added, and click **OK**.

3. View the status of the network disk. The **Status** column displays the status (Available, Connection failed, and Unavailable) of the network disk. Only the network disk in Available state can be used for backup.

4. Double-click the network disk to access the corresponding path list, select a backup path, and click **OK** to save the setting and exit.

− USB storage device

5. Connect a USB flash drive or mobile hard disk to the USB interface on the front panel.

6. The NVR detects and displays the USB storage device automatically.

7. Right-click the USB flash drive and choose **Popup** or **Format** to perform the corresponding operation.

8. Double-click the USB flash drive to access the corresponding path list, select a backup path, and click **OK** to save the setting and exit.

Step 2   Set backup file options.

- **Record File Size**: specifies the maximum size of a single backup file.
- **Auto-Create Sub-directory**: creates a subdirectory by webcam IP address or ID.
- **Merging Clips**: specifies whether to merge two videos with discontinuous time segments into a file.

Step 3   Select the video to be backed up.

Method 1: Select the video to be backed up during video playback. 0 shows the video backup control bar.

Video backup control bar

1. Click **Start** in the video backup control bar to select a video segment.
2. Select the video file to be backed up (the selected video segment is highlighted in blue in the display area), click and hold the left mouse button, and drag the cursor horizontally to select the video file segment to be backed up.
3. Click **Stop** to stop the selection (or click **Cancel** to unselect the selected video segment).
4. Click **Backup** to back up the video.

Method 2: Click **Backup** on the **Alarm Search** interface when an alarm video is played.

Step 4 View the file backup progress.

The **Backup Tasks** interface displays the statuses of backup tasks. A task in progress is marked with ⬇. A task to be done is marked with 🕓. A stopped task is marked with ■. A failed task is marked with ✕. A completed task is marked with ✓.

Step 5 Search for a video backup file.

Access the backup folder to view completed backup files.

----End

8 F.A.Q

1. Why stop the device self-test interface does not move?

You can be processed in accordance with the following methods:

Method one: Check the NVR are not equipped with hard disk;

Method Two: check the NVR detected, but not formatted;

Method three: Check the hard disk has been damaged;

Do not need to use the hard disk, you can click continue into the device。

2. Why interface display incomplete or location offset?

You can be processed in accordance with the following methods:

Method: automatically adjust the display function.

Method: In the login screen, select the adjustment, enter the display adjustment interface. Detailed steps Check 3 operating manual required reading.

3. Why monitor cannot see the image?

You can be processed in accordance with the following methods:

Method One: Detect Displays power;

Method Two: Detect Displays whether the correct access NVR;

Option 3: Please restart NVR.

4 Why can search the network camera, but can connect？

Please be sure network cameras and NVR are in the same subnet.