

M501 Portable DVR User Manual V1.1.4

Portable DVR with split design, integrated lens, MIC, speaker, 3G, GPS and voice intercom



Special Note: photos of this product model are for reference only. The real object is subject to change without notice.

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1. Introduction

1.1 Overview

M501 Portable Digital Video Recorder (Portable DVR) is a security surveillance product specially designed for handheld or portable use.

- > Portable split design with industrial level;
- > Main device work independently with CMOS camera and microphone;
- > Auxiliary device provides GPS/3G function and backup battery;
- > Lithium battery power supply, working time>4 hours;
- > Video compression H.264; audio G.726;
- > ASF File format, FAT32 file system;
- > One micro-SD card up to 32G storage;
- > Optional function: Bi-directional voice communication;
- > 2.4-inch display screen on auxiliary device;
- > Central management software provided (optional).

Portable DVR series are featured by hardware synchronized compression of video and audio signals, where compressed bit streams can be transmitted via a 3G wireless network to enable real-time video and audio previews. Two-way voice intercom and a multi-language function are also supported. Product images are shown below:



1.2 Specifications

Item		Description
Operating System		Linux
Split Design		Portable designs are used for the main device and the auxiliaries that are separated for more flexibility to meet the needs in various scenarios
Graphical User Interface		Parameters are set by press on the keys
Security Management		User password management
Video and Preview	Video Input	Main device is supplied with built-in lens with 70 degrees of viewing angle
	OSD	On Screen Display feature enables character overlay of time, date, device ID and GPS
	Video Compression Format	H.264 compression using Hisilicon high performance processor.
	Dual Stream	Supported
	Resolution	VGA by default, QVGA optional
	Rate	QVGA: 400Kbps ~ 1.5Mbps, with 4 rate levels available VGA: 1000kbps ~ 2Mbps, with 4 rate levels available
	Preview	Real-time video preview
Audio	Audio Input	Built-in MIC
	Audio Output	Built-in speaker, > 1W
	Compression Format	G.726
Video	Storage Media	Micro-SD card, supporting 1G ~ 32G
	File Format/System	ASF/FAT32
	Video Strategy	Video on startup with default settings; manual video supported
	Video Search	Search by date, time, type and other criteria
	Playback	Supports fast forward and fast backward at 2, 4, 8 and 16 times of speed, play and pause; supports play on selection
Wireless Transmission(auxiliary)		Built-in 3G wireless module, WCDMA, CDMA2000, TD-SCDMA with optional systems; Compatible with GPRS and EDGE;
GPS (auxiliary)		Built-in GPS
Screen Parameters (auxiliary)	Size	2.4-inch
	Type	TFT
	Resolution	480 * 234
System Upgrade		Supports Micro-SD card upgrade
Power and Consumption	Power Management	Manual switch on and off; supports manual screen lock and automatic screen lock on timeout
	Battery Capacity	Main Device: 1500mAh, 3.7V Auxiliary: 2100mAh, 7.4V
	Charging	< 2 hours

	Duration	
	Working Duration	Host independent work time: 4 hours
		Whole machine (main device + auxiliary) works 3.5 hours on end and can be powered by auxiliary
Work Environment	Temperature	-20°C~ +50°C
	Humidity	20% to 80%
Size	Main Device	50 (W) x90 (H) x28 (D) mm
	Auxiliary	70 (W) x110 (H) x28 (D) mm
Weight		Main device: net weight 95g, gross weight 307.5g Auxiliary: net weight 238g, gross weight 352g

1.3 Application

1.3.1 Environmental Adaptability

M501 can be adapted to complex application environments, with specific indicators as follows:

Item	Indicator
High temperature storage limit	65 °C
High temperature work limit	50 °C
Low temperature storage limit	-40 °C
Low temperature limit	-20 °C
Work altitude	-300 – 3048 m (10,000 ft)
Transportation altitude	-300 ~ 12,192 m (40,000 ft)
Relative Humidity	20% to 95%

Maximum temperature gradient	20 °C / hour
Enclosure protection rating	IP54

1.3.2 Attentions

- Please read this section carefully before installing;
- Before installation, please power-off all related equipment;
- Check the power supply voltage to prevent damage to the device due to wrong voltage;
- Do not use the device in any environment of excessive moisture or high temperature;
- Avoid using the device near any noise interference and shielding equipment;
- The device cannot be placed in any container filled with liquid;
- Do not attempt to open or repair, pierce, burn or drop the battery into water or any other liquid. Misuse of the battery may cause overheat, leading to gas leak or flames. If the battery is damaged, or any electric leakage or abnormalities are found, stop using it and contact the manufacturer. If the device is to be shelved for a long period, remove the battery and store it separately to eliminate safety hazards. Do not fully discharge the battery during use or storage, or otherwise the service life of the battery will be shortened.
- Before removing the battery, make sure the device is turned off and disconnected with the charger.



Warning:

Only batteries, charger and accessories supplied by the manufacturer for specific models can be used with the device. Use of other batteries, chargers or accessories may violate the device approval or warranty or lead to explosion in case of improper replacement. To replace the battery, please contact the device manufacturer or your local dealer.

For the availability of approved accessories, please check with your dealer. To disconnect any accessories, grab the plug and pull it out instead of pulling the cable.

[Note] If you have any questions on the device, please contact the supplier.

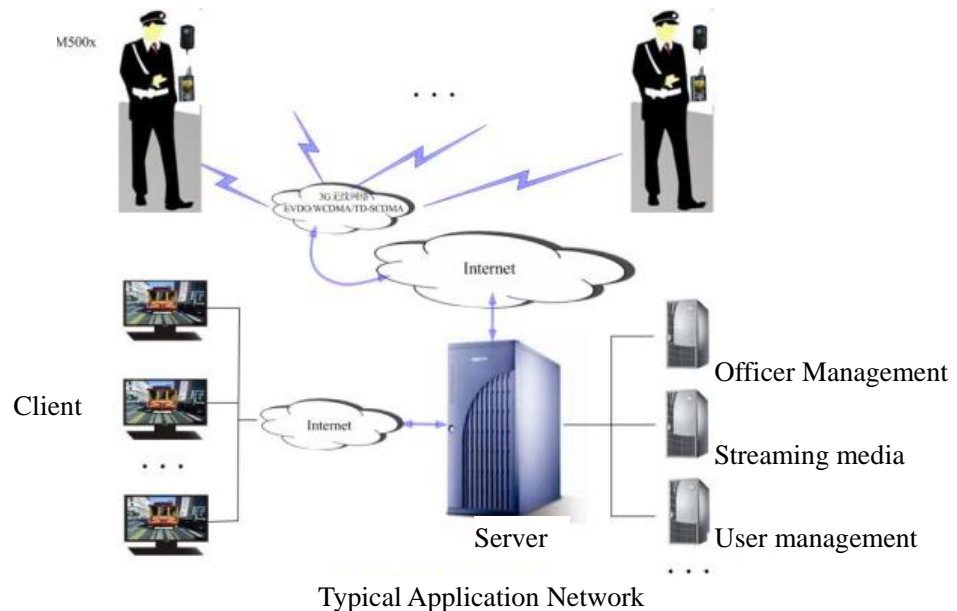
1.3.3 Typical Applications

Scenarios:

- ◆ Traffic police, patrol, urban management
- ◆ Customs
- ◆ Frontier defense
- ◆ Armed police
- ◆ Insurance investigation

- ◆ Security
- ◆ Mineral & Energy
- ◆ Business inspections
- ◆ Interviews by reporters

Scene graph on business applications:



1.4 Features

- Built-in CMOS camera and microphone for audio and video synchronized storage surveillance;
- Video Compression: H.264;
- Powered by lithium battery and easy to charge and carry on;
- Real-time local recording with multiple formats available;
- Recording Modes: recording on start or by manual control;
- Video File Formats: ASF, playable with the universal software VLC or the supplied software package;
- Data Storage: Micro-SD card with storage up to 32G;
- Short Boot Time: normal operating mode on within 15 seconds from startup;
- Optional features:
 - 3G wireless transmission;
 - GPS;
 - IP call;

1.5 Basic Functions

- Networking: supports wireless transmission, TCP / IP protocol stack, and transmission of video, audio, alarm, voice data and serial device data via TCP / IP network;

- Integrated MIC, microphone and two-way voice intercom;
- Separated main device and auxiliary, compact in appearance and easy to carry;
- Local menu easy to operate with user friendly interface;
- H.264 video compression format, CMOS video input and 1-channel composite video output; VGA pixel CMOS.
- Powered by lithium battery for easy charging and carry on.
- Support for GPS, optional.
- Support for 3G wireless transmission with a variety of 3G standards, WCDMA, CDMA 2000, TD-SCDMA, (optional) .
- Real-time video recording: 25f / s (PAL); 30f / s (NTSC). Video resolution: VGA / QVGA available
- Video recording mode: manual.
- Video file formats: ASF, playable with universal software VLC player or the supplied playback software package.
- Data storage: Micro-SD card up to 32G (one card by default), with original Japan-made SD connector.
- Short boot time: normal operating mode on within 15 seconds from startup.
- Automatic switch to power saving mode to save battery life.

1.6 Compression and Processing

- Supports 1-channel of video signal for real-time 25 frames per second independent hardware compression and video compression using H.264 compression standard that supports variable bit rate as well as variable frame rate, with of video image quality set as the bit stream for video image compression is defined;
- Supports dual-stream, VGA (640 * 480) and QVGA (320 * 240) resolutions;
- Supports OSD, date and time settings available;
- Supports character overlay.

2. Product Appearance

2.1 Main Device Front Panel



1. Camera lens;
2. Status lights;
3. Video control button;
4. 3G connection control button;
5. Illumination sensitivity;
6. LED infrared light;
7. Cable connecting the auxiliary;

2.2 Main Device Rear Panel



1. Clip;
2. Battery cover
3. Connection wire to the auxiliary;

4. Main device switch;
5. Mini SD card slot and main device power interface;

2.3 Auxiliary Front Panel



1. 3G antenna
2. Connection wire to the main device
3. Status indicator
4. Display Screen
5. Cancel (return to the previous menu, long press to switch off)
6. Right
7. OK button for selection
8. Down
9. OK button (long press to manually switch on or off the display)
10. Up
11. Left

The function of each button is shown in the Table. "Press" means the duration of press on the button is within 3 seconds; "long press" means the duration of press on the button is longer than 3 seconds.

Description of status lights:

Status Light	Description
Power Supply	Red, when the device is started on power
Network Transmission	Green, when the device is successfully registered on the platform
Video Recording	Yellow, when the device is recording
Charging	Green, when charging is progress and red when done

2.4 Auxiliary Rear Panel



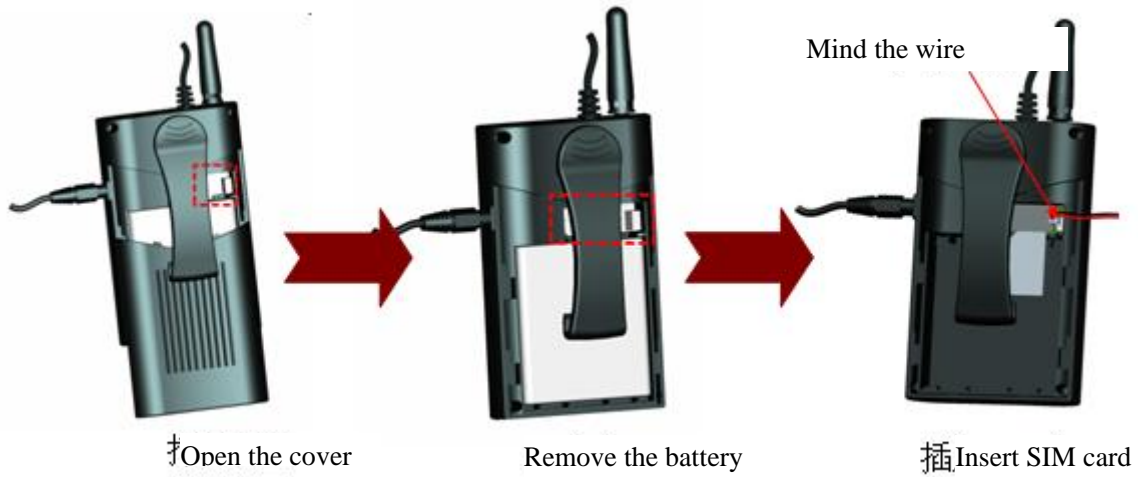
1. Clip
2. Battery cover

3. Installing and Charging

3.1 Unpacking and Checking Accessories

After unpacking, check whether the device is subject to deformation or damage of any nature. If so, please stop using the device and contact your supplier. Please examine all the accessories to the main device against the checklist supplied in the box.

3.2 Installing SIM Card



Note: The type of the SIM card shall be consist with the 3G module, which currently supports TD, EVDO and WCDMA.

The portable DVR is integrated with a 3G module. Remove the battery cover and place the SIM card into the slot, as shown below:

Note:

- 1) Do not pull with force when remove the battery to avoid tearing the wire interface, as the battery is connected to the main device with wire;
- 2) The area marked with a red label is where the SIM card should be placed.

3.3 Charging

3.3.1 Charging for the Main Device



3.3.2 Charging for the Auxiliary

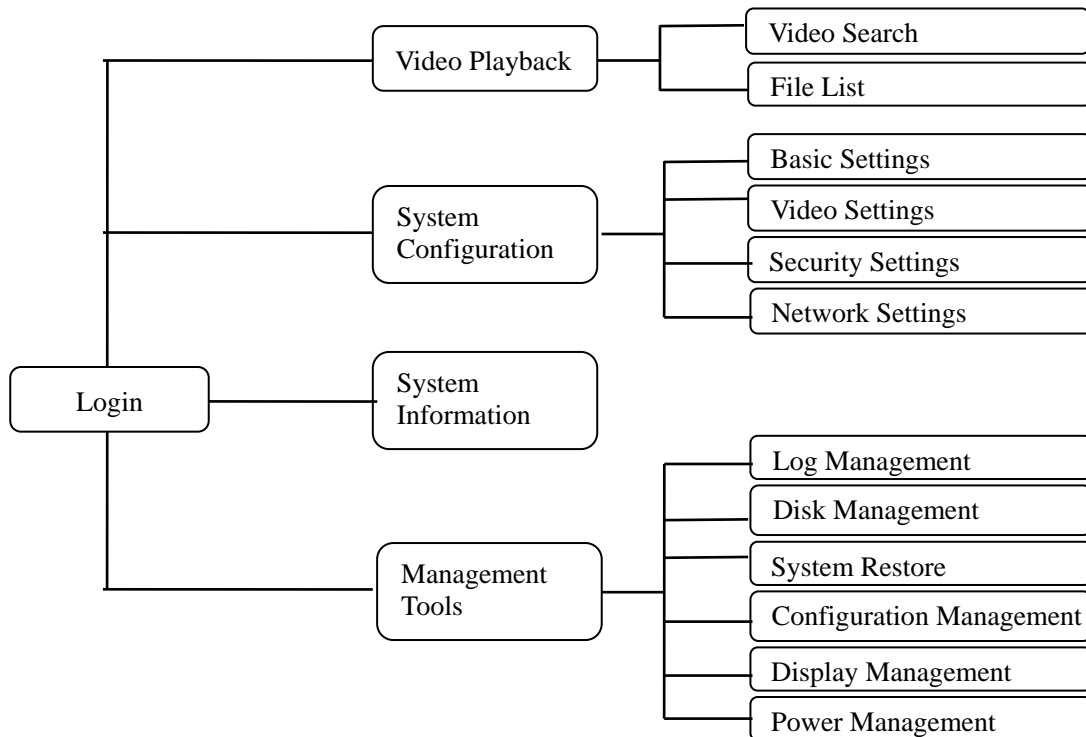


Note: To charge the device, open the left panel and insert the power adapter. The status light is green during charging and turns red upon completion. The battery of the auxiliary can supply power to the main device.

4. Menu of the Main Device

4.1 Menu Structure

Users can operate the device and use all the features through a series of menus. The section will give a brief description of these menus, followed by details in succeeding sections.

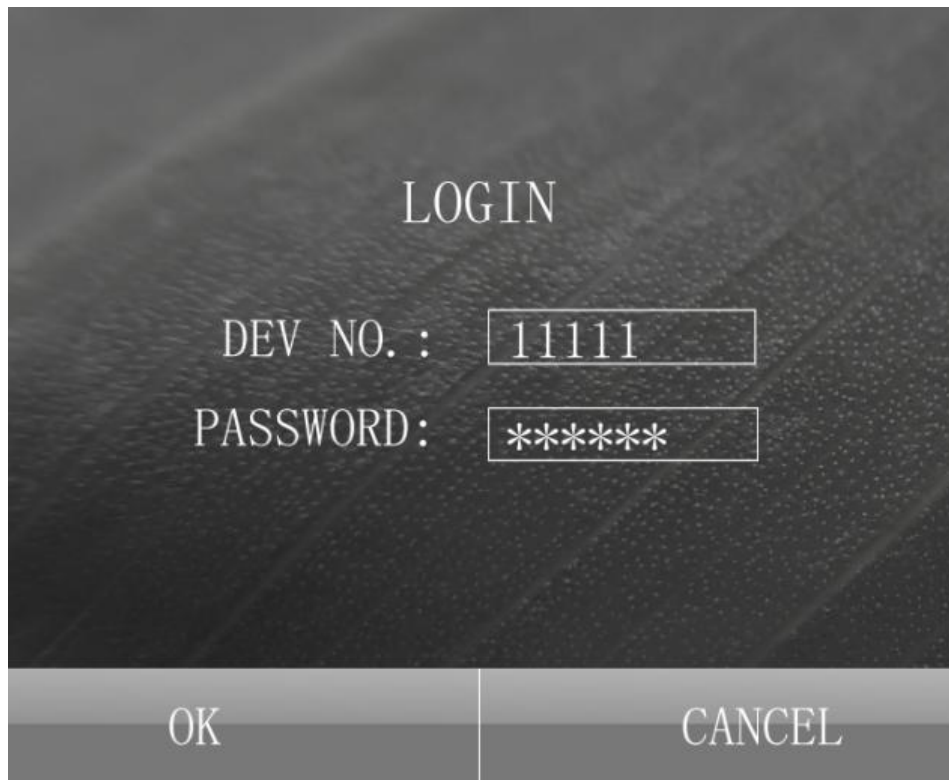


Menu Structure

4.2 User Login

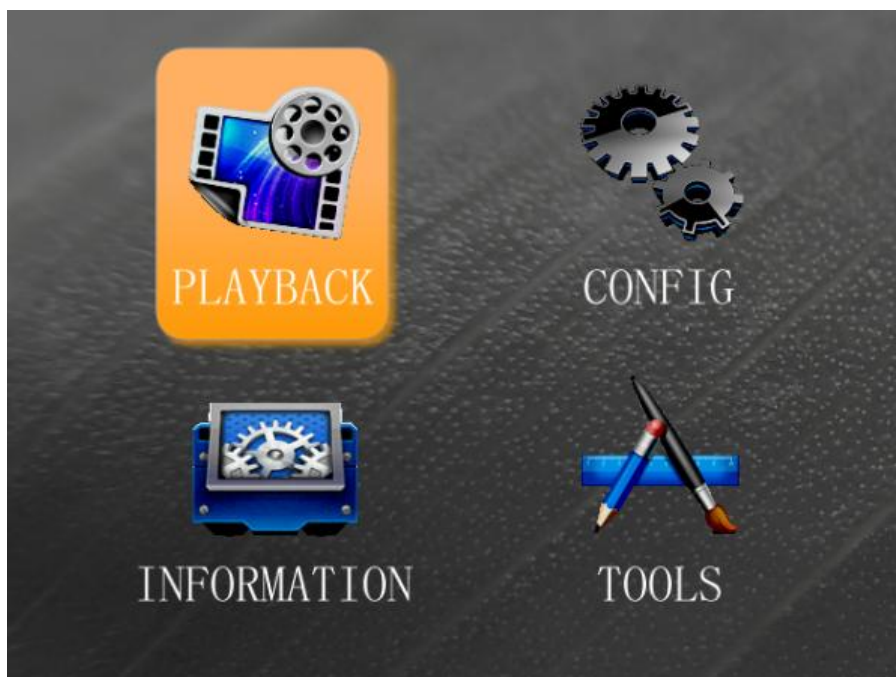
- When the password is to set on "Enable": press [ENTER] on startup of the main device to enter the login menu (see below) and type in the correct user password or administrator password;
- Move the cursor to "OK" and press [ENTER] or simply press "OK" to enter the system's main menu;
- Move the cursor to the "Cancel" and press [ENTER] or simply press the "Power" button to exit the login menu.
- When the password is set to "Disabled": press [ENTER] on startup of the main device to skip login and directly enter the main menu;

Note: After resetting, the password is 888888. Log in to view the system menu with permission to modify the parameters.



4.3 Main Menu

After login, enter the following main menu interface. The main menu includes: Playback, Configuration, Information and Tools.



4.4 Video Playback

In the main menu, press the arrow keys to select Playback, press [ENTER] to enter the following video search interface.

1	2	3	4	5	6	7	8	9	10	
11	12	13	14	15	16	17	18	19	20	
21	22	23	24	25	26	27	28	29	30	31

DATE: 2011-03-02

START TIME: 00:00

END TIME: 23:59

OK CANCEL

Note:

Once in the video search interface, the system will automatically search for video dates for the month. In this table, the cursor cannot be moved and the dates highlighted in green means video is available for these days. One search only looks up files for a single day. When the month the user types in is not the current month, the table will be refreshed.

"Date": Press the numeric keys to input the date. The default is the current date.

"Start Time": Press the numeric keys to input the time. The default is 00: 00.

"End Time": Press the numeric keys to input the time. The default is 23: 59.

"OK": Move the cursor to "OK" and press [ENTER] or simply press "OK" to enter the following search results interface.

"Cancel": Move the cursor to "Cancel" and press [ENTER] or simply press the "Power" button to exit the search interface.

2011-03-02		10/20
START	END	SIZE
13:00	13:30	83M
13:30	14:00	78M
14:00	14:30	80M
14:30	15:00	82M
15:00	15:30	79M

FIRST	PREV	NEXT	LAST
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- Press the arrow keys to select the video file to view. Press [ENTER] to start playing the video and press [EXIT] to return to the previous menu.
- Press the arrow keys to select "First", "Previous", "Next", "Last". Press [ENTER] to display page information, or directly press the left or right key for the previous or next page

4.5 System Configuration

In the main menu, press the arrow keys to select the System Configuration menu and press [ENTER] to enter the System Configuration interface, which includes the following sub-menus: Basic settings, Record settings, Network settings and Security settings.



4.5.1 Basic Settings

This menu is used to set the system's basic information.

The image shows a 'Basic Settings' menu screen with a dark, textured background. It contains several settings fields and two buttons at the bottom. The fields are: 'DATE FORMATS:' with a dropdown menu showing 'Y-M-D'; 'DATE:' with a text box containing '2011-03-02'; 'TIME:' with a text box containing '10:02:31'; 'GPS TIMING:' with a checked checkbox; 'TIME ZONE:' with a dropdown menu showing 'GMT + 08'; and 'DEV NO.:' with a text box containing '11111'. At the bottom, there are two large buttons labeled 'OK' and 'CANCEL'.

- Date Formats

Select a date format, e.g. year - month - day, day - month - year, month - day - year. Press [ENTER] to select.

- Time zone

The default time zone is GMT +08. Press [ENTER] to select another time zone.

- Date / Time

Press the numeric keys to change the current system date. The default is local time in hour, minute and second on a 24-hour basis.

- Device No.

It is a number ranging from 00000 to 99999 to identify the device. The default is 00000.

Press OK to save the settings when done.

4.5.2 Record Settings

This menu is used to set recording parameters.



- Basic Settings

◆ Working Mode:

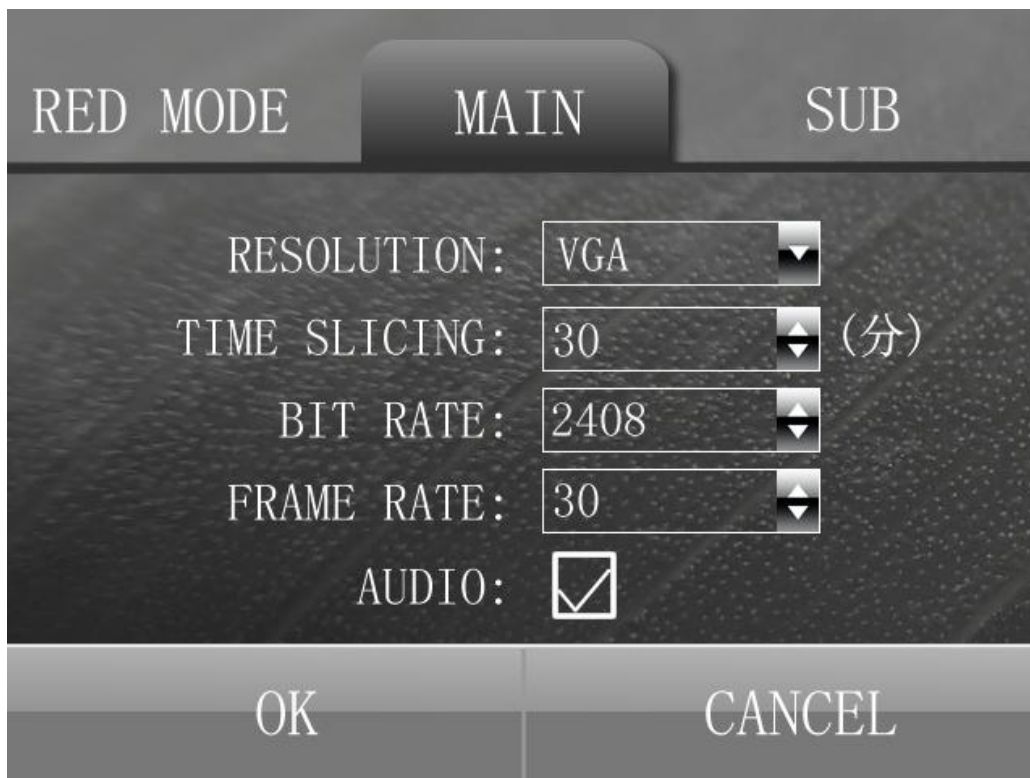
Recording on startup / manual recording: with manual recording, press REC to starting recording; long press REC to stop recording.

◆ Automatic Overwritten

On / Off: with On, the earliest videos are automatically deleted when the disk is full; with Off, recording will disconnected when the disk is full.

■ Main Stream

Move the cursor to "MAIN" and press [ENTER] to enter the following main stream interface:



◆ Resolution

VGA/ QVGA

◆ Time Slicing

5/10/15/20/30 min, the length of each video recorded

◆ Bit Rate

2048/2000/1400/1000

◆ Frame Rate

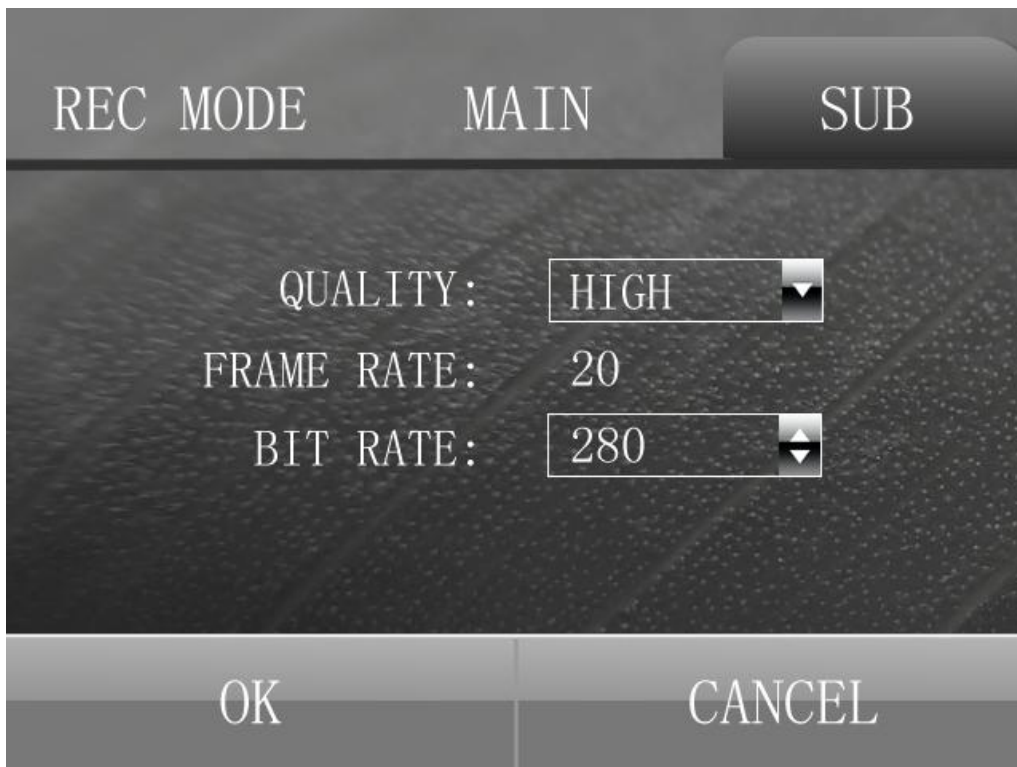
Choose from 1 to 30, which means the number of updates per second handled by the image processor. The default frame rate is 30.

◆ Audio

On / Off

■ Sub-stream

Move the cursor to "SUB" and press [ENTER] to enter the following sub-stream interface:



◆ Quality

High / Medium / Low. Press [ENTER] to select

◆ Frame Rate

01/03/05/10/15/20 frames corresponding to bit rates. Press [ENTER] to select.

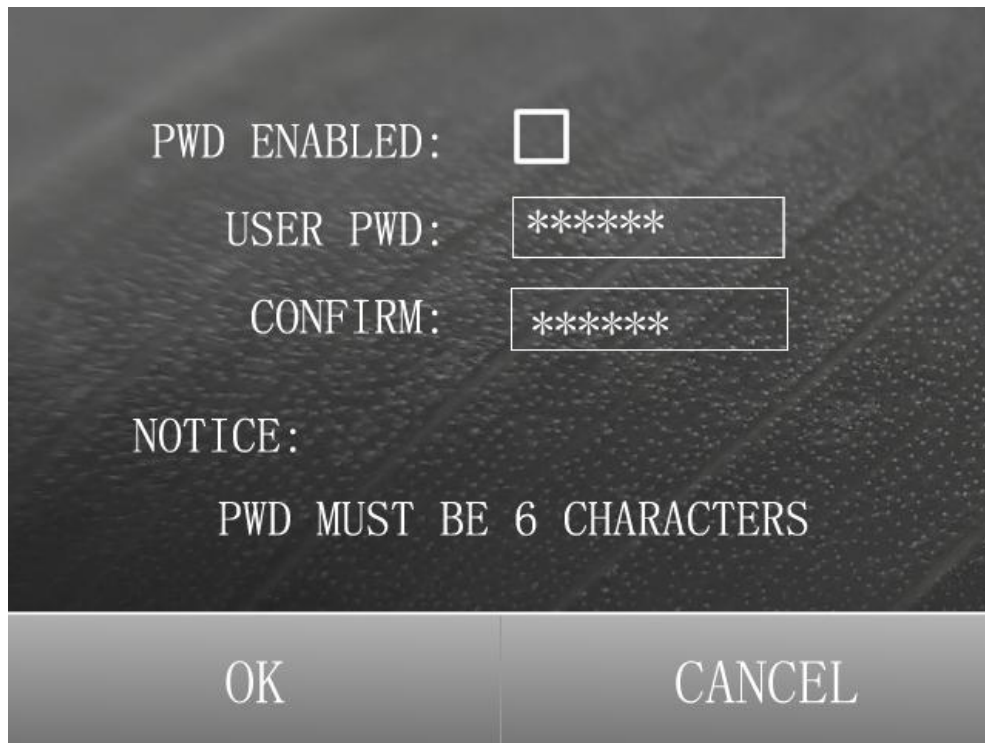
◆ Bit Rate

Frame rate changes with bit rate. The default frame rate is 20, and the default bit rate is 210. Press [ENTER] to select.

Upon completion of settings, press the OK button to save the settings.

4.5.3 Security Settings

Set login password.



The image shows a security settings menu on a dark background. At the top, it says "PWD ENABLED:" followed by an empty square checkbox. Below that, "USER PWD:" is followed by a rectangular input field containing six asterisks. Underneath, "CONFIRM:" is followed by another rectangular input field containing six asterisks. Further down, the text "NOTICE:" is displayed, followed by "PWD MUST BE 6 CHARACTERS". At the bottom of the screen, there are two large buttons: "OK" on the left and "CANCEL" on the right.

■ Password effective

Enable or disable login password. Press [ENTER] to select.

- On: Press the numeric keys to enter the same password twice. The password must be six characters. The default password is: 888888.
- Off: Disable password. Enter the main menu without login.

4.5.4 Network Settings



- ◆ Triggering mode

Manual / Startup, default: startup

- 3G settings

Move the cursor to "3G Settings" and press [ENTER] to enter the following 3G settings interface:

The screenshot shows a menu with three options: NET, 3G, and CENTER. The 3G option is selected. Below the menu, there are five input fields:

- TYPE: WCDMA (with a dropdown arrow)
- APN: XXXXXX
- CENTER NO. : XXXXXX
- USER NAME: XXXXXX
- PASSWORD: XXXXXX

At the bottom, there are two buttons: OK and CANCEL.

- ◆ Type

WCDMA / EVDO / TD, WCDMA (China Unicom), EVDO (China Telecom), TD (China Mobile); default: WCDMA

- ◆ Access center number, user name and password

Different types of module access points require different center numbers, user names and passwords.

- Center Settings

Move the cursor to "CENTER" and press [ENTER] to enter the following center settings interface:

The screenshot shows a configuration menu with the following fields and values:

Field	Value
LINK MODE:	IP
SERVER IP:	192.168.0.1
DOMAIN:	WWW.WWW.WWW
PORT:	5678

Buttons: OK, CANCEL

◆ Link Mode

Choose domain or IP mode.

◆ Server IP

IP address of the central server under the IP mode

◆ Server Domain

Address of the central server under the domain mode

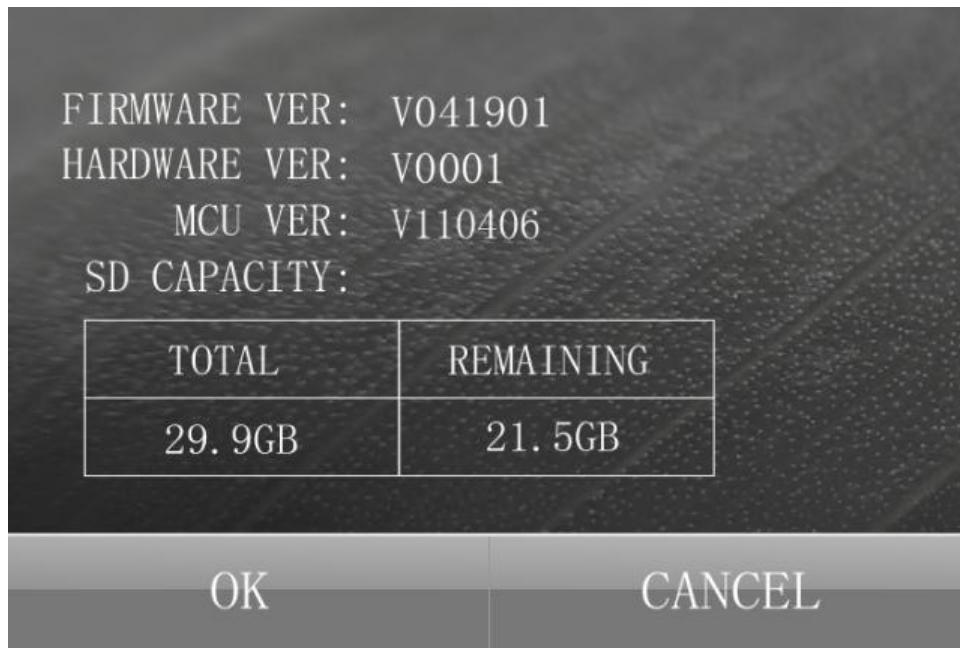
◆ Control Port

Server IP mapping port

When done, press OK to save the settings.

4.6 System Information

In the main menu, press the arrow keys to select the System Information menu, and press [ENTER] to enter the following system information interface.



- Firmware Version

Version number of the device's firmware

- Hardware Version

Version number of the device's hardware

- MCU Version

Version number of the device's MCU

- SD Capacity

"Total": total capacity of the SD card.

"Remaining": remaining capacity of the SD card.

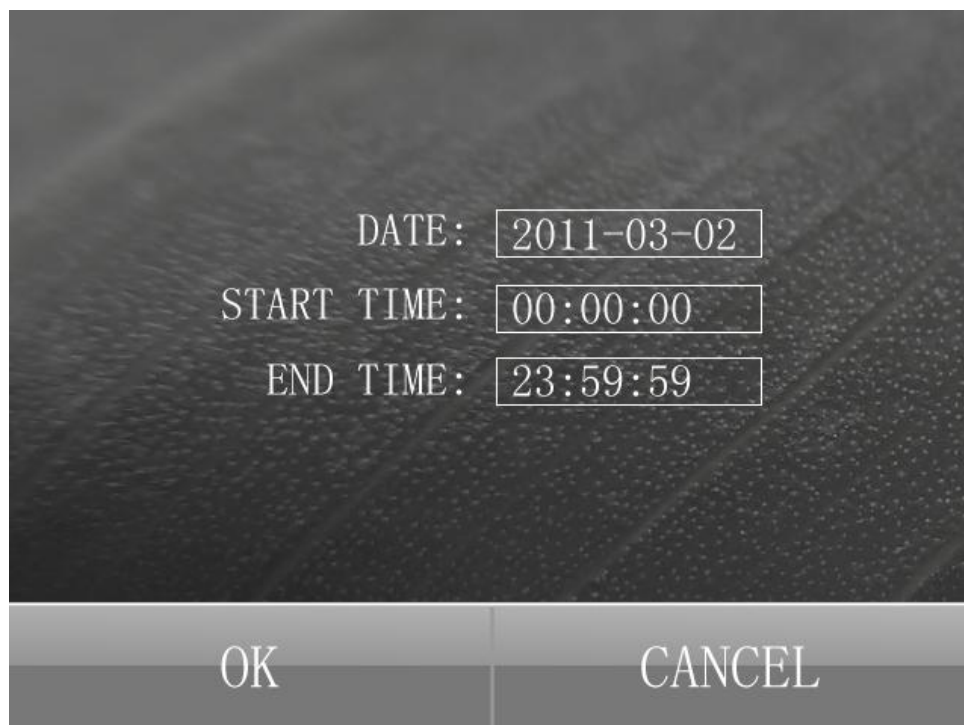
4.7 Management Tools

In the main menu, press the arrow keys to select the Management Tools menu, and press [ENTER] to enter the following administrative tools interface. Management Tools includes log management, disk management, configuration management, system restore, display management and power management



4.7.1 Log Management

The log management record generates event information on switch on and off, GPS time check and system upgrades, including dates, times and names of the events.



- Start Date

Press the numeric keys to set the start date for the log for review.

- Start Time

Press the numeric keys to set the start time for the log for review.

- End Time

Press the numeric keys to set the end time for the log for review.

- OK

Move the cursor to OK to search log information within start - end times. Press [ENTER] to start searching.

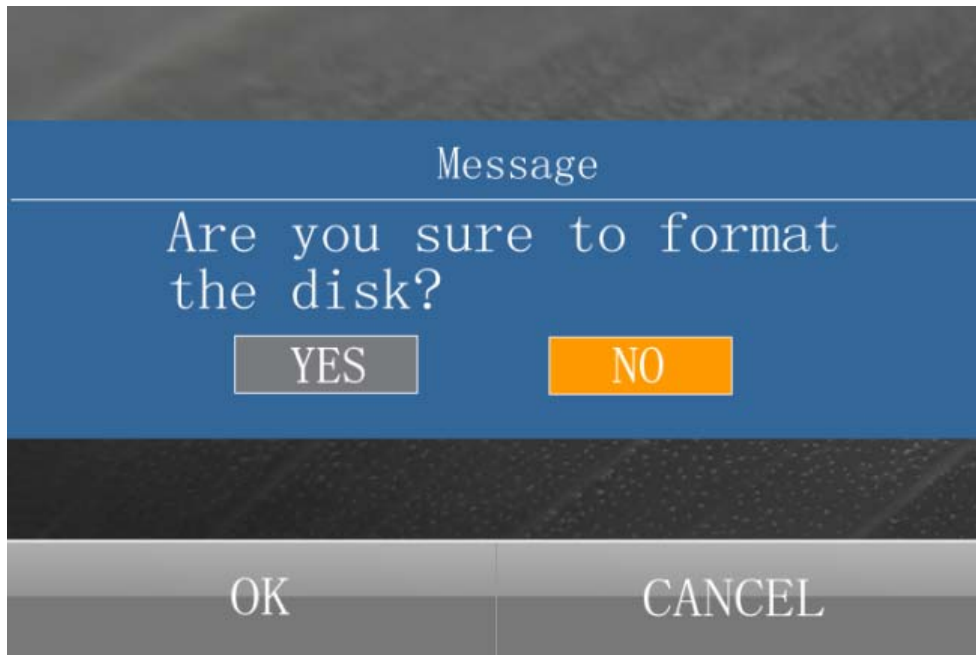
2011-03-02		1/3	
TIME	EVENT NAME		
16:19:00	POWER ON		
16:19:30	UPGRADE OK		
16:20:00	POWER OFF		
16:21:00	POWER ON		
16:22:02	POWER OFF		
FIRST	PREV	NEXT	LAST

Select "First", "Previous", "Next" or "Last" and press [ENTER] to display the page information, or directly press the left or right key to view the previous or next page.

4.7.2 Disk Management

Format the specified SD card.

Choose "Format", press [ENTER] and the system will pop up the following window.

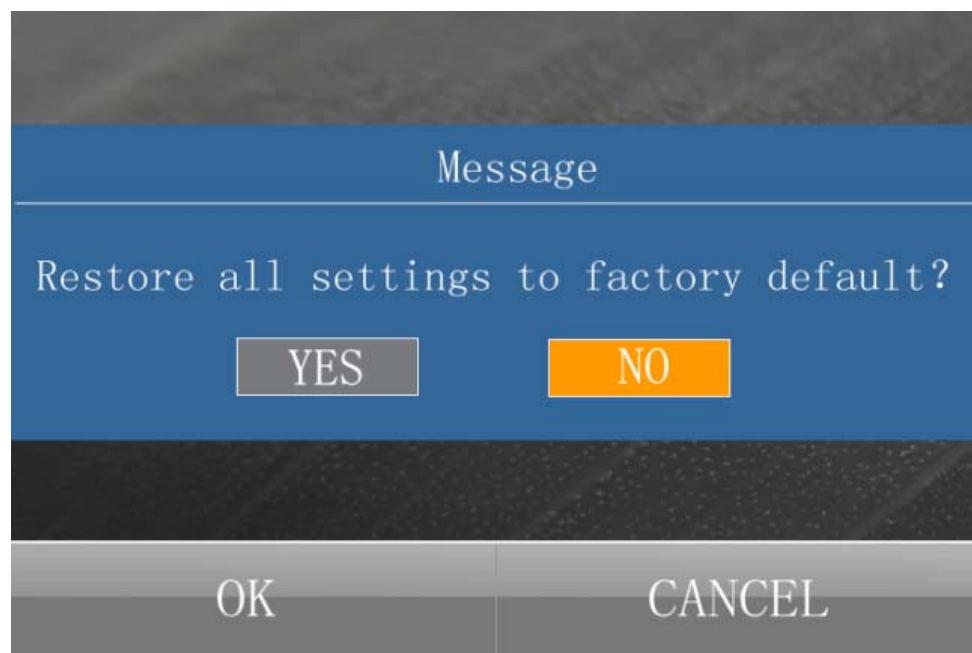


"OK": Start formatting the SD card by pressing [ENTER].

"No": Cancel formatting and return to the Management Tools interface.

4.7.3 System Restore

Restore factory settings on the device with parameter configurations return to default.

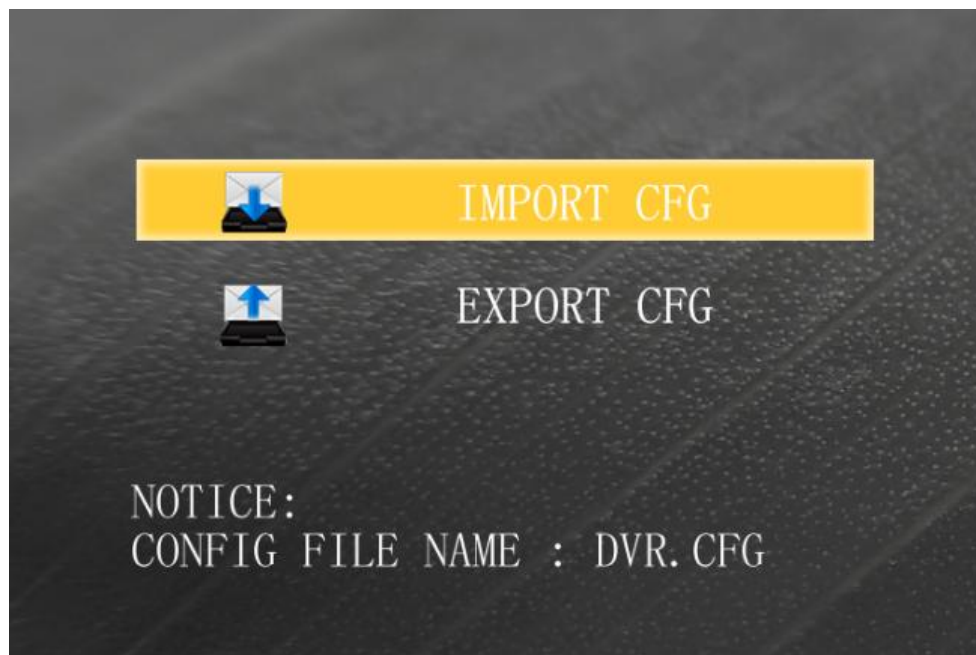


"Yes": Restore factory settings.

"No": Return to the Management Tools menu.

4.7.4 Configuration Management

Import and export the configuration file.



Import the configuration file: Press [Enter] to import the configuration file "DVR.CFG" to the root directory of the SD card;

Export the configuration file: Press [Enter] to save the configuration file "DVR.CFG" to the root directory of the SD card.

4.7.5 Display Management

Configure OSD overlay for videos.



- Real Time Display

Yes / No, press [ENTER] to select.

- Record Time Overlay

Yes / No, press [ENTER] to select.

- GPS Overlay

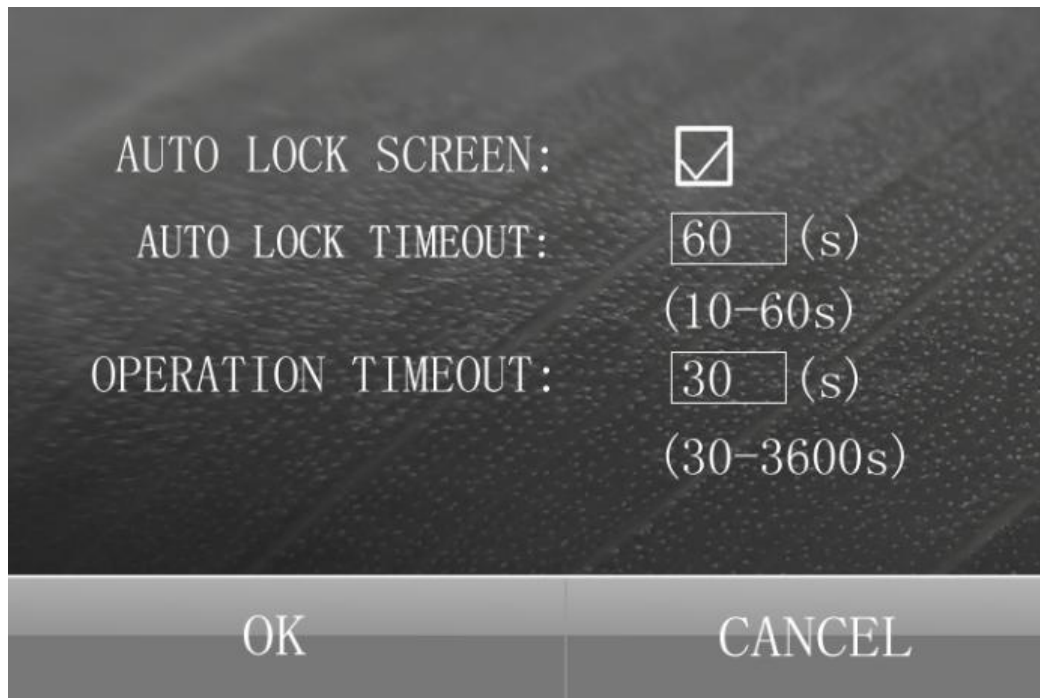
Yes / No, press [ENTER] to select.

- Device Number Overlay

Yes / No, press [ENTER] to select.

4.7.6 Power Management

Configure the power saving features within the device system.



- Automatic Lock Screen

Yes / No, press [ENTER] to select.

- Automatic Lock Timeout

Set the timeout for automatic lock screen. The screen turns off to save power and extend the service life of the battery if no action is detected within the timeout, which can be set anywhere from 10 seconds to 1 minute.

- Operation Timeout

Set wait time for menu operations. The current user will be logged off and return to the preview screen if the set time is out. The default wait time is 30 seconds and can be set anywhere from 30 to 3,600 seconds by press the numeric keys to enter a number.

5. Upgrading the Main Device

Attentions:

During upgrading, the following operations are not allowed: cut off power, plug in/out the hard drive or SD card, unlock the hard disk or turn off ACC.

5.1 Upgrade Mode

The device supports local upgrade mode on SD card. Please refer to the Network Platform Operating Manual for upgrading via the network.

5.2 Upgrade Steps

5.2.1 Application Program

Format of the upgrade file name: M500X-APP-*****.crc

Step 1: Copy the upgrade files onto the Micro-SD card and make sure the complete files are copied;

Step 2: Plug the Micro-SD card into the device in disconnection with the power;

Step 3: As the device is switch on, the system will automatically check the upgrade package on the Micro-SD and start upgrading;

Step 4: When the upgrade is complete, restart the device.

5.2.2 File System / Bootloader / Kernel

M500X-RFS-*****.crc

M500X-LDR-*****.crc

M700X-KNL-*****.crc

Upgrade steps is the same as the above. Type of upgrades: file system, bootloader and kernel.

5.2.3 MCU (Micro Control Unit)

Format of the upgrade file name: M500X-MCU-*****.bin

Step 1: Copy the upgrade files onto the Micro-SD card and make sure the complete files are copied;

Step 2: Plug the Micro-SD card into the device in disconnection with the power;

Step 3: Switch on to enable automatic upgrading;

Step 4: "UPGRADE MCU!", "SUCCESSFUL!" and "REBOOT!" are successively displayed on the screen;

Step 5: When the upgrade is complete, restart the device to return to the monitoring status.

Step 6: For MCU, there is no need to enter the interface for settings. Switch on to upgrade, as upgrade files are available on the SD card.

5.2.4 View Versions

Enter the system menu "System Information" to view the upgrade version. On this page, only the firmware, hardware and MCU versions can be viewed. To view the versions of the kernel, file system and boot loader, go to Management Tools - System Upgrade and select the type of upgrade to display corresponding versions.

Remarks:

- ① Enter the Management Tools menu and restore the factory settings for the device to automatically restart to the surveillance status;
- ② Make sure upgrade files are available on the SD card and the device is powered off before upgrading;
- ③ During upgrade, the indicator is in the current status without special status indicator. The main device reboot to the surveillance status after upgrading;
- ④ If the upgrade fails, the following prompt appears: "No upgrade file is available", "This is the latest version", "Upgrade failed to start", "File Error", or "Memory Error."

6. Frequently Asked Questions

Q: Boot failed

A: Please check whether the battery contacts are good, and try to boot on an external power.

Q: Register failed on the platform software

A: Please check whether the registered platform IP and ports configured in the Center Settings under the Configuration menu is correct, and whether the 3G dial-up is successful.

Q: Video footage displayed abnormally

A: Check whether the camera wire is in good contact.

Q: Upgrade failed

A: Check whether the upgrade files are placed under the MICRO SD card root directory and whether the upgrade files match with the device.

Q: Playback not smooth; images blurred

A: Check whether the parameters for video encoding are properly set. Try again with reduced bit stream. In

most cases, it is caused by an unstable 3G network.