# X7 Series

## （H.264 AHD MDVR）

# User manual

**X7（2015.08.21 Version）**

**This manual applicable for X7 series, Please read it carefully before using the products!**

# Index

# CHAPTER 1: Product introduction

## 1. Attentions before use

1.1. Before powering on the DVR, please connect all the external devices correctly.
1.2. Please disconnect or re-install all the external devices after power is off
1.3. Please remove or re-install the storage devices after power is off
1.4. Do not touch the metal parts of the SD Cards with hands.
1.5. Keep the unit away from water or other liquid, to avoid shortcut occurs.
1.6. To ensure the DVR works properly, please do not press two or more keys simultaneously.
1.7. Please make sure the DVR works under the range of rated voltage and rated current.
1.8. Please do not assemble, maintain, upgrade or replace the components without permission
1.9. As a professional equipment, regular maintenance to cable connection and storage device, fan dust removal and work environment testing are necessary.

## 2. Product Overview

X7 Series product is a h.264 compression based, new generation high performance, low consumption 4ch AHD(Analog High Definition), 720P full real time(PAL： 25FPS/NTSC： 30FPS) mobile surveillance DVR, supports IR remote operation mode, Supports 4TB high capacity SATA HDD and 128GB high speed SD/SDHC as storage devices, Supports extensible GPS option.

X7 Series support GPS function, Users can read longitude, latitude, moving speed and moving path of vehicles on google map when playback the videos on PC.

X7 Series support 4.3 inch high definition LCD, which is useful for system set up and maintenance.

X7 Series can compatible with any AHD_M standard PAL/NTSC cameras.

## 3. Main features

3.1. Real time surveillance
DVR equipped with the standard VGA port& analog AV-OUT Port (named CVBS signal port), can connect the external larger screen to realize real time monitoring.

3.2. Compression technology
DVR adopts advanced H.264 (Main Profile Level 5.0) video compression technology, each channel"s video and audio adopts independent hardware real time compression technology, make sure that the audio and video saved synchronously, and reduce the occupation of the storage space. It saves above 2/3 memory space compare to the MPEG-4 compression technology.
3.3. Safety storage
DVR supports 4TB high capacity SATA interface HDD and 128GB high capacity high speed SD Card, Videos adopts professional encryption format, Users can not modify the data privately to ensure the authenticity and safety.

### 3.3. Video Playback

Supports real time local playback function for all channels, and supports files search, events search, single channel playback, multiple channels playback, Videos could be played back with the equipped software, the software can upload google map and show the GPS data and moving path on google maps.

3.4. Data Back Up.

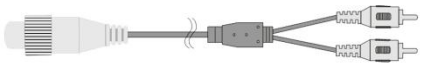
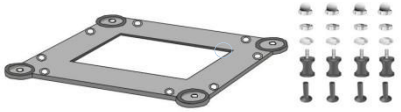
Users can back up videos via USB 2.0 port, the back up device could be USB flash drive, removable HDD, USB-DVDRW. Meanwhile, the equipped player also support the video back up from the storage devices SD Card or HDD.

3.5. Characteristic Design:

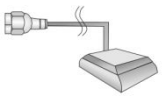
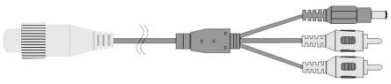
DVR adopts 8 groups of power supply system and unique cooling system design to ensure the whole system operates stably with high efficiency, device adopts modularized design philosophy, make user can freely choose optional functions such as GPS, LCD. DVR adopts aviation port and related aviation port extension cables. DVR will supply power for cameras through the aviation cables. It adopts whole aluminum alloy clam shell design, with anti-theft lock to protect the HDD, SD Card, LCD, and SIM Card in the DVR.

# 4. Contents of package

### 1. Standard accessories

| Serial No. | Descriptions | Serial No. | Descriptions |
|---|---|---|---|
| 1 | One DVR  | 5 | One IR remote control  |
| 2 | One AV cable  | 6 | Two keys  |
| 3 | One Power cable with fuse   | 7 | One printed user manual  |
| 4 | One combined alarm and control cable  | 8 | One set of anti-vibration kit  |

**2. Optional accessories(need to purchase separately)**

| Serial No. | Descriptions | Serial No. | Descriptions |
|---|---|---|---|
| 1 | GPS function and one antenna  | 5 | Aviation or CVBS extension cables  |
| 2 | 4.3” built in LCD  | 6 | One CD   |
| 3 | Four AVP cables（If customer need to purchase cameras separately. ）  | 7 | Storage devices(HDD or SD Card)   |
| 4 | Four analog AHD Cameras （ 720P/960P） | | |

# 5. Product development stages

| Generations | Period | Compression technology | Basic functions | Optional functions |
|---|---|---|---|---|
| 1st generation | 2006～2008 | MPEG4 (encrypted) | 4 channel CIF,1T Hard disk,3.5” LCD screen | GPS |
| 2nd generation | 2009～2011 | MPEG4 (encrypted) | 3ch CIF and 1ch D1, 2TB HDD, 3.5” LCD Screen, 4ch alarm input, C-BOX | GPS, GPRS |
| 3rd generation | 2012～2014 | H.264 (encrypted) | 4channel D1,4TB HDD,64GB SD Card,3.5” LCD Screen,USB mouse operation, VGA, 8ch alarm input, C-BOX, motion detect | GPS, 3G, WIFI, G-Sensor, Cloud Service, Mobile monitor |
| 4th generation | 2015～ | H.264 (encrypted) | 4ch AHD 720P, 4TB HDD, 128GB SD Card, 4.3” HD LCD Screen, VGA, 8ch alarm input ,2ch alarm output... | GPS, LCD, 3G, 4G, WIFI, APP |
| Next generation | …… | H.265 (encrypted) | 4ch/8ch AHD 1080P HD Mobile monitoring DVR... | …… |

# 6. Application scope

X7 Series products are 4ch AHD full real time Mobile monitoring and management system which

adopts Linux embedded operation system, based on H.264 digital high definition technology, support extended functions such as LCD, GPS.

X7 Series equip with high performance and wide application scope, which applicable for buses, taxi cabs, ships, vans, trains, etc. it is also applicable for the surveillance in fixed places such as offices, factories, home, buildings.

# CHAPTER 2:Device installations

## 1.Specifications

**Attentions:**

**If customer need to purchase the AHD_M Cameras by themselves, please make sure the definition of pin ports on aviation connector should match with our DVR connector"s**

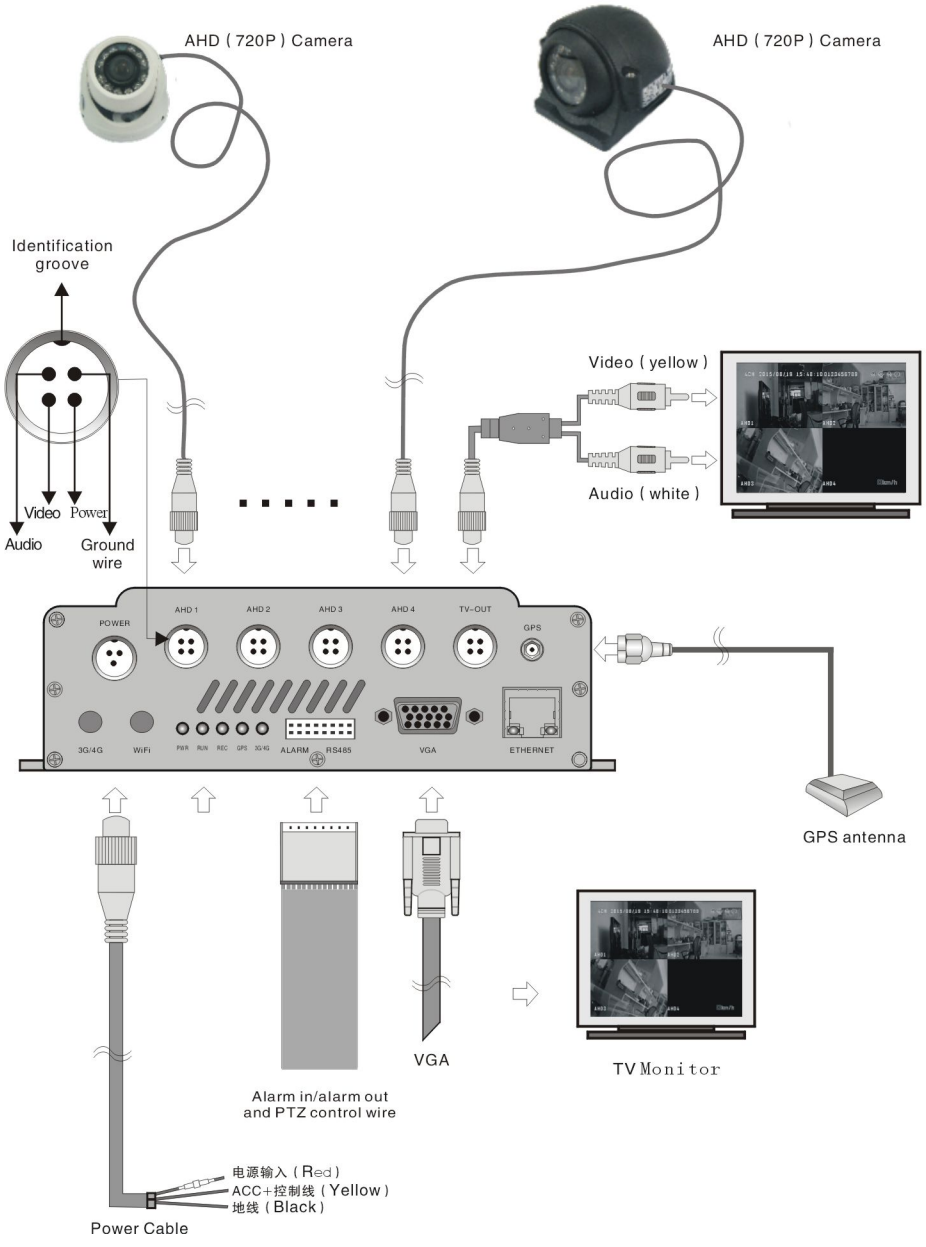
| Parameters | Descriptions |
|---|---|
| Model | **X7 Series** |
| Basic functions | with basic functions such as REC,PLAYBACK,ALARM, VGA,USB,IR,HDD,SD, TV-OUT, etc. |
| Optional functions | 4.5” LCD √ \| GPS √ \| Wi-Fi: not available now \| 3G/4G:not available now |
| Power Supply | Car battery（For mobile monitoring）/Power adapter（For other applications） |
| Power input | DC12V ～ DC36V(Standard power input:DC12V~DC24V, ultimate power input: DC8V～DC38V) |
| Working Current | **Model** \| 300 ±10 mA (the reference voltage is: **DC24V)** |
| Power output | DC12V/3A （Provide power for cameras,with built in re-settable fuses. ） |
| Working temperature | - 10℃～ + 50℃ （ultimate working temperature: - 20℃～ + 60℃） |
| Video Technology | H.264(Data encryption, need to use the playback software to play the videos） |
| Storage interface | Standard SATA II HDD interface, SD Card and USB devices |
| Storage Capacity | 2.5"" SATA II 4TB HDD/128GB SD/SDHC Card（suggest to use the SD Card with the speed over Class10) |
| Storage mode | Boot record, cycle recording |
| Camera | AHD_M standard cameras |
| Video Standard | PAL system or NTSC system （Please make sure the camera"s video standard compatible to the DVR） |
| Video input | Input standard: input frequency: Vp-p=1.0V, input impedance: 75Ù |
| Resolution | 4ch AHD 720P full real time recording, also support the playback function while recording. |
| Frame rate | PAL（1～100FPS optional）and NTSC（1～120FPS optional） |
| Video quality | Multi-grade adjustable |
| Output signal | CVBS（4ch video + 4ch audio,but only support 1ch audio output at a same time) |
| Ethernet Port | One 10M/100M Ethernet port (RJ45) |
| Alarm input | 8ch independent alarm input port (isolating function) |
| Alarm output | 2ch independent alarm output port |
| USB Standard | 2 USB 2.0 port（support USB back up and system upgrade） |
| IR Receiver | One IR receiver（beside the USB port） |
| DVR dimension | 210（Length）*180（Width）*50（Height）mm |
| mainframe weight | Around 1000g |

**definitions! And please make sure the TV system of camera match with the TV system of the DVR.**

# 2. Connection instructions

## 2.1. Connection diagram

Connection Diagram




### ALARM/RS485 Ports:

ALARM/RS485 Ports:

| PIN port | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| Function | AL-IN 8 | AL- IN 7 | AL- IN 6 | AL- IN 5 | AL- IN 4 | AL- IN 3 | AL- IN 2 | AL- IN 1 |
| PIN port | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| Function | AL-OUT1_A | AL-OUT1_B | GND | AL-OUT2_A | AL-OUT2_B | GND | RS485A | RS485B |

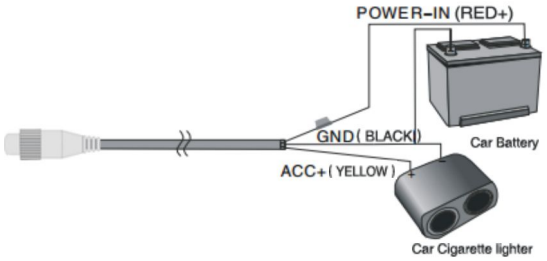
**Definitions and descriptions of ports:**

- AL-IN1~AL-IN8: alarm input port ALARM-IN1~ALARM-IN8, need to set up and work together with the related function in the system menu. Support support NO/NC switch control signal and high/low level control signal（DC 0.7V < high level <DC 12V, low level< DC 0.6V）

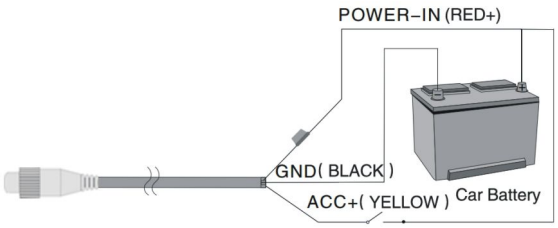
- AL-OUT1 &AL-OUT2 :Two independent relay based alarm output ports, need to work together with related function in the menu, with Normal Open contact ,can controlled by the signal under 1A
- RS485A&RS485B: PTZ control port
- The common ground wire port

## 2.2.Start up control mode

① Auto switch on/off start up mode,applicable for vehicles.




② Manually switch on/off control mode, applicable for the fixed places.




Notes：ACC+ Cable is the start up control wire, effective when triggered by high level, usually works with the car cigarette lighter.

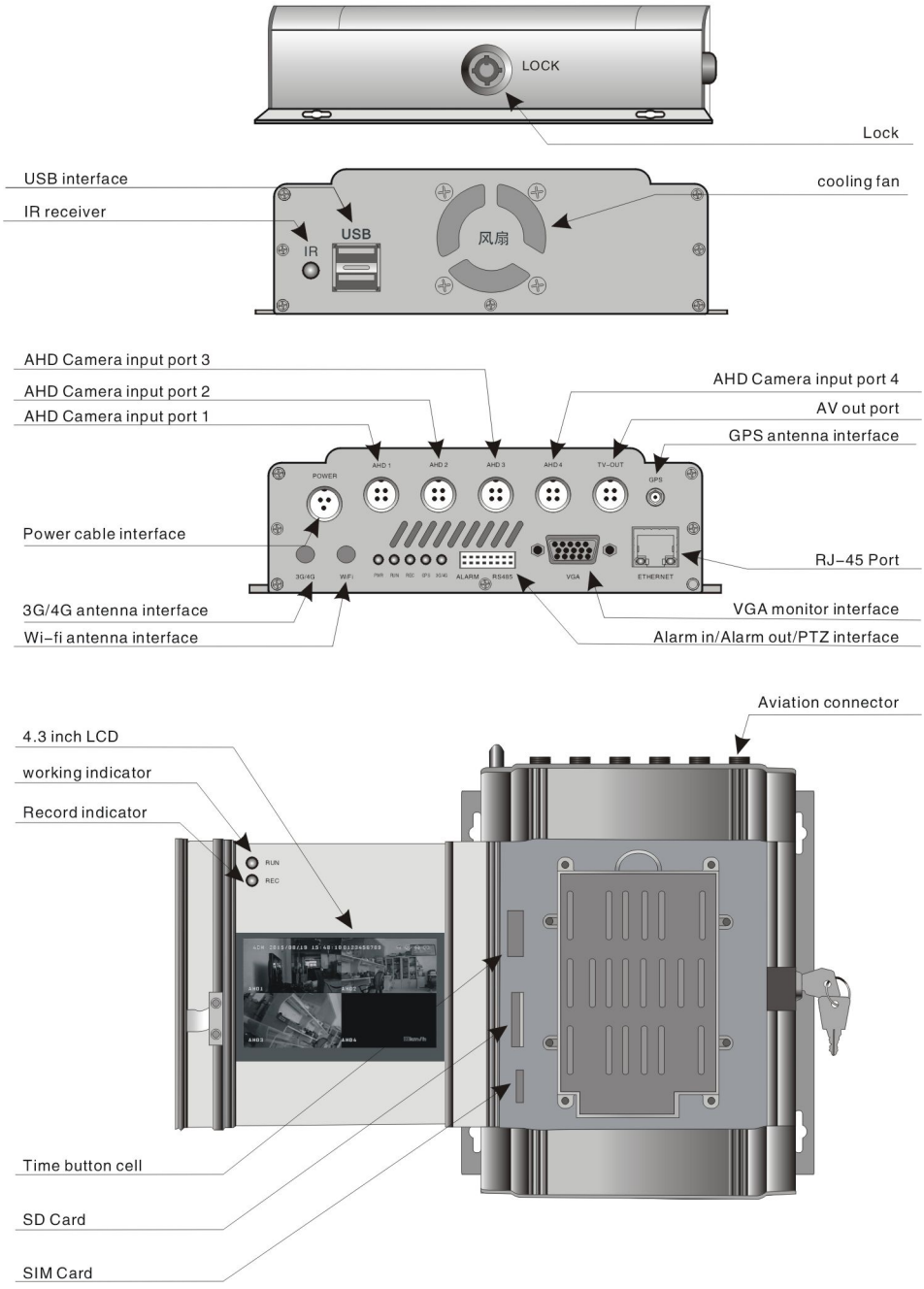
## 2.3. Attentions

① As there are many control ports for the DVR, so we do not use the special designed terminal for each port, Please use the insulating tape to bind up, in case the short circuit occurs with other wires, and affect the other control wires.
② If the power indicator has light up, it means that the power has input correctly.
③ After the DVR connect to power supply, please make sure that the ACC+ also connect to the power, or the device can not start up.

# 3.Interface explanation

## 3.1. Interfaces

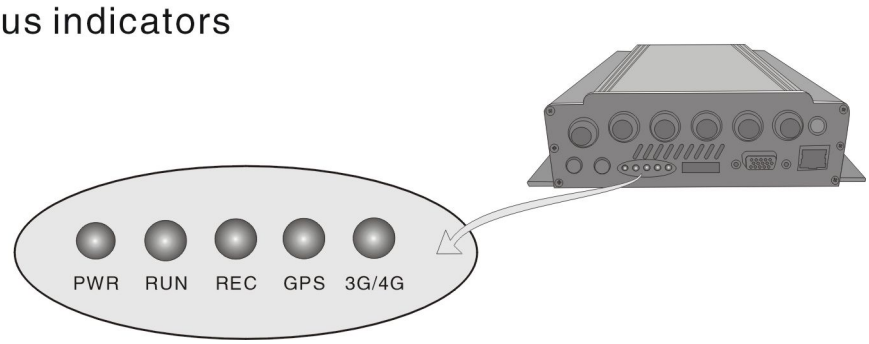
Interfaces



## 3.2. IR remote control


| Serial No. | Buttons | Functions | Serial No. | Buttons | Functions |
|---|---|---|---|---|---|
| 1 | REC | Record | 13 | 1 | Ch1 full screen display |
| 2 | STOP | Stop Record | 14 | 2 | Ch2 full screen display |
| 3 | MENU | Menu | 15 | 3 | Ch3 full screen display |
| 4 | OK | Confirm | 16 | 4 | Ch4 full screen display |
| 5 | PLAY | Play | 17 | 5 | Ch5 full screen display |
| 6 | ESC | Back to previous menu /Exit | 18 | 6 | Ch6 full screen display |
| 7 | ▲ | Upward key/Video channels shift button | 19 | 7 | Ch7 full screen display |
| 8 | ▼ | Downward key/Video channels shift button | 20 | 8 | Ch8 full screen display |
| 9 | ◀ | Left side key/ Video channels shift button | 21 | ▦ | Display all channels in preview mode |
| 10 | ▶ | Right side key/ Video channels shift button | 22 | PTZ | PTZ function |
| 11 | ◀◀ | Rewind | 23 | ZOOM- | PTZ zoom out |
| 12 | ▶▶ | Fast forward | 24 | ZOOM+ | PTZ zoom in |

## 3.3. Status indicators




**PWR**:Power input indicator, when there is power input, the indicator will keeps on.

RUN: DVR running indicator, it will keeps on after the DVR is triggered to work by ACC+

**REC:** Record indicator, it will blink when device record and save normally.

**GPS:** It will keeps on after GPS system positioning correctly

**3G/4G:** It will keeps on after 3G/4G module dial-up successful ,It will blink when the module starting to transmit the video stream.

## 3.4. Storage devices installation


### 3.4.1. Attentions before installation:

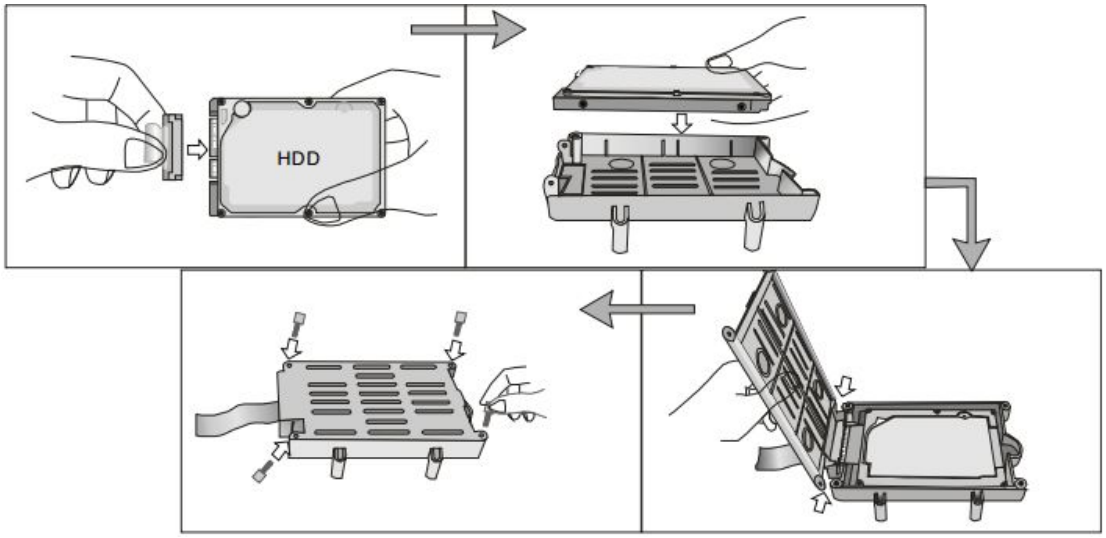
Mother board and hard disk are consist of many integrated circuit components, Integrated chip,etc,And these electronic parts are very easy to be damaged by the static electricity. So please take notes the following issues before installing the HDD:

① Disconnect power of DVR before installing and removing HDD

② To avoid the HDD damaged by static electricity, please wear anti static wrist strip or touch grounded and metal objects before you touching the HDD, like metal cases, metal tap.

③ Please do not use the HDD in shaken and dusty place.

3.4.2. How to install HDD?



Steps:

① Unlock the DVR with the key, open the DVR clam shell, unscrew the 4 screws on the HDD case.

② Remove the cover of HDD case, connect the HDD to the SATA interface, and put the HDD correctly.

③ Put back the cover of HDD case, screw up the 4 screws.

## 3.5. Memory occupancy calculation

When you install the 4ch HDD/SD card mobile DVR for the first time,please check if any hard disk/SD Card is installed. And check the write protect switch(if with SD card),Otherwise,the video files can not be recorded into the SD Card properly.

**Maximum capacity of the memory storage devices HDD/SD Card supported:**

4CH mobile DVR X7 series support SATA HDD up to 4TB and high capacity SD Card up to 128GB. Users can choose the appropriate memory storage as their request:

**How to choose HDD/SD Card`s capacity?**

**Formula for Storage space occupation:**

Total storage capacity（M）= numbers of channels（CH）* required time（H）* occupied capacity per hour （M/H）

**Formula for recording time:**

Recording time（H）= Total storage capacity（M）/【numbers of channels（CH）* occupied capacity per hour （M/H）】

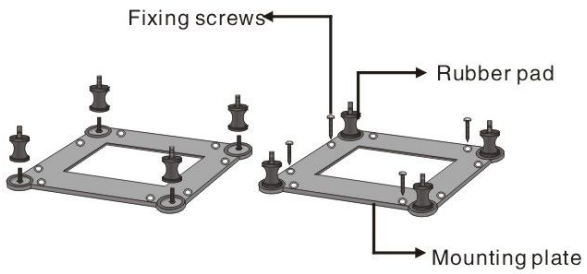
**Please notes:**X7 series MDVR adopt H.264 compression technology,with comparatively wide dynamic range,and different video input devices will affect the bit stream statistics obviously. So when users calculate the parameters above,please refer to all channels bit stream info in menu,to make sure the calculation as accurate as possible. It will assist users to choose more appropriate storage devices.

**For instance:**

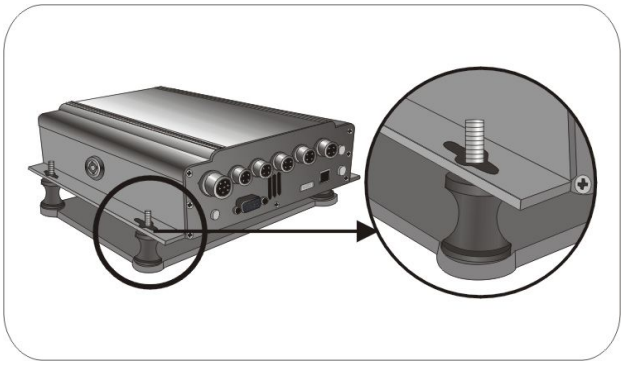
The user uses a standard hard disk of 1TB/SATAII,and set 4 ch recording at 720P/25FPS(high quality recording).Each single channel needs around 2GB capacity per hour,the recording time of 4ch real time high quality recording will be:1TB/(2GB×4CH)≈128hours(8hrs/day×16 working days or 24 hrs/day×5 working days).

## 3.6. Main frame installation

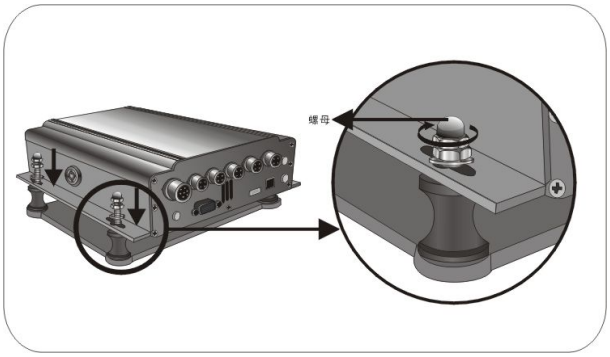
**3.6.1.** Firstly, fit the anti-vibration rubber pad onto the mounting plate(smooth side of plate faces up), then fix the rubber pad with matched screws. Then install the mounting plate with the fixing screws in the place where need to install the DVR.




**3.6.2.** Install the DVR onto the anti-vibration rubber pad according to the mounting hole(locate the DVR vertically with the mounting plate)



**3.6.3.** Install the metal gaskets, nuts, cap nuts in turn and screw up the nuts, and finish the installation.




**3.6.4.** Mounting done.

# CHAPTER 3: System Menu

## 1. Preview interface

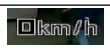

It will enter into the image preview mode after device starts up normally, system will show quad display screen.


In preview mode, operate 1,2,3,4 key on IR remote control can trigger single channel full screen display and output the audio of present channel. When DVR is in quad display screen, the DVR can not output the audio.

Press "MENU" key in preview mode and can enter system menu, Press “ESC” key can exit menu or return to previous menu,Press "PLAY" key can play back videos.

Notes: System will automatically return to preview model if no operations over 30 seconds. you do not set in the setting of system menu within 30 sec.

In all preview mode,DVR will will display date,time,channel title, car license number, GPS speed, audio recording status,GPS connecting status and video recording status with icons.

| Serial No. | Icon | Function | Serial No. | Icon | Function |
|---|---|---|---|---|---|
| **1** |  | Video Recording | **2** |  | Audio Recording |
| **3** |  | GPS connecting | **4** |  | GPS Speed |
| **5** |  | current preview channels | **6** |  | Channel title |
| **7** |  | car license number | **8** | | |

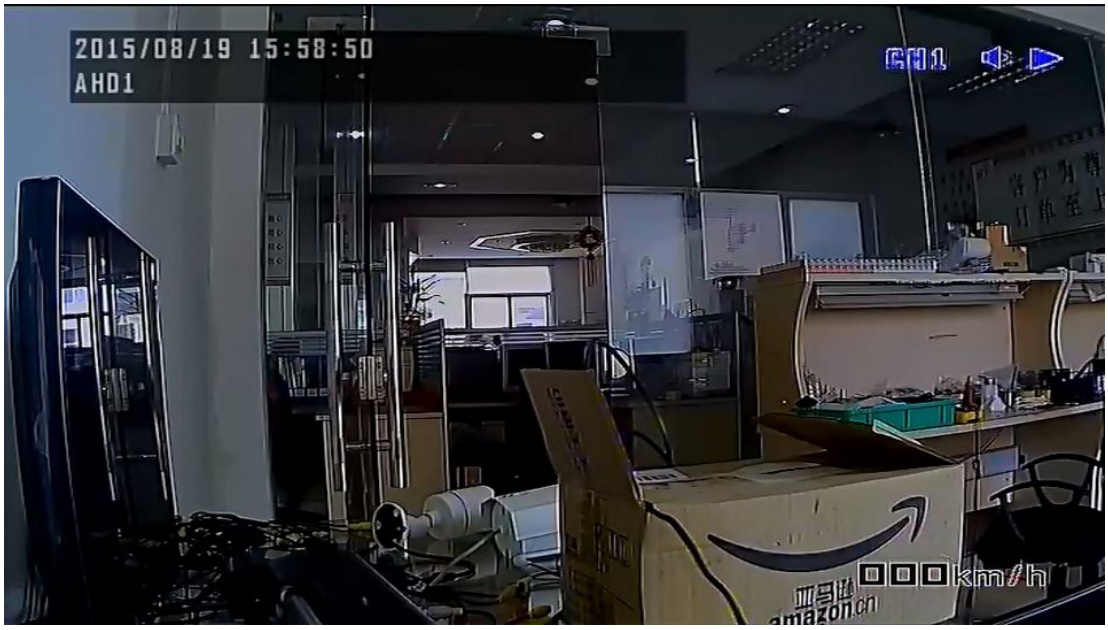
# 2. Menu introduction

| Menu | Function |
|---|---|
| Record setting | Set each channel"s frame rate,video image quality, video resolution, etc. |
| Image setting | Set each channel"s image brightness, contrast and color |
| Date&time setting | Set date,time and time zone(GPS can update the system time) etc. |
| GPS setting | GPS speed watermark display, GPS speed unit and GPS" serial communication baud rate, etc. |
| Car license number | Set up car license number/series number watermark display and the specific details of car license number, etc. |
| Working mode | Set power off delay time and turn on/off audio record function etc. |
| Alarm setting | Set the alarm input, alarm output and related configuration, etc. |
| Channel title setting | Set up every channel title and watermark display etc. |
| Languages | Set the system menu language |
| 3G/4G | Set 3G/4G parameters |
| Data back up | Search video file according to the date ,back up the data to USB |
| Default settings | Restore factory default settings |
| Format HDD | Format storage device (SD card ,HDD and SSD) |
| Firmware upgrade | Show the current system firmware version and upgrade the system firmware. |

# 3.Video Playback

In preview mode, operate"PLAY" key, enter the pack back interface, Operate "up" and "down" key to choose the video need to play according to time period, ,Operate "PLAY" or"OK" to play the chosen file, Press"PLAY" can pause playback when playing back ,press "STOP" can stop playing back current files. Press “ESC” can exit to previews menu.


In the process of video playing back, Press 1,2,3,4 and "ALL" key can switch single channel full screen display and quad screen display. The system able to output audio if single channel full screen display, and system can not output audio when system shows quad screen display。




# 4. Menu setup

Press “Ok” key and enter into the sub-menu, Then choose the parameters by left and right key, and to modify the parameters by up and down keys.

When choose or set a parameters, when the corresponding option will show a high light box, means the parameters has been chosen, now we can start to modify the value of the parameters. Then Press “OK” to confirm the setting and skip to the next option.

If do not need to modify present parameters, we can press “OK” key directly and skip to the next option, and finally choose “save” option to save the settings on current page

If do not need to set the parameters, Press “ESC” return to the previews menu or the menu setting interface.

**NOTES: The IR remote control’s operation rule and method will be same for all settings.**

## 4.1. Record Settings


Under the “Record” page, It is available to set the frame rate, image quality and resolution.

**Frame rate**: Adjustable range is 5fps~25fps in PAL, and adjustable range is 5fps~30fps in NTSC，default value is 25FPS or 30FPS.

**Image quality**：Setting the image quality, Best/Better/Normal three grade adjustable. The default is “Best”

**Resolution:** 720P/VGA

## 4.2. Color Settings:

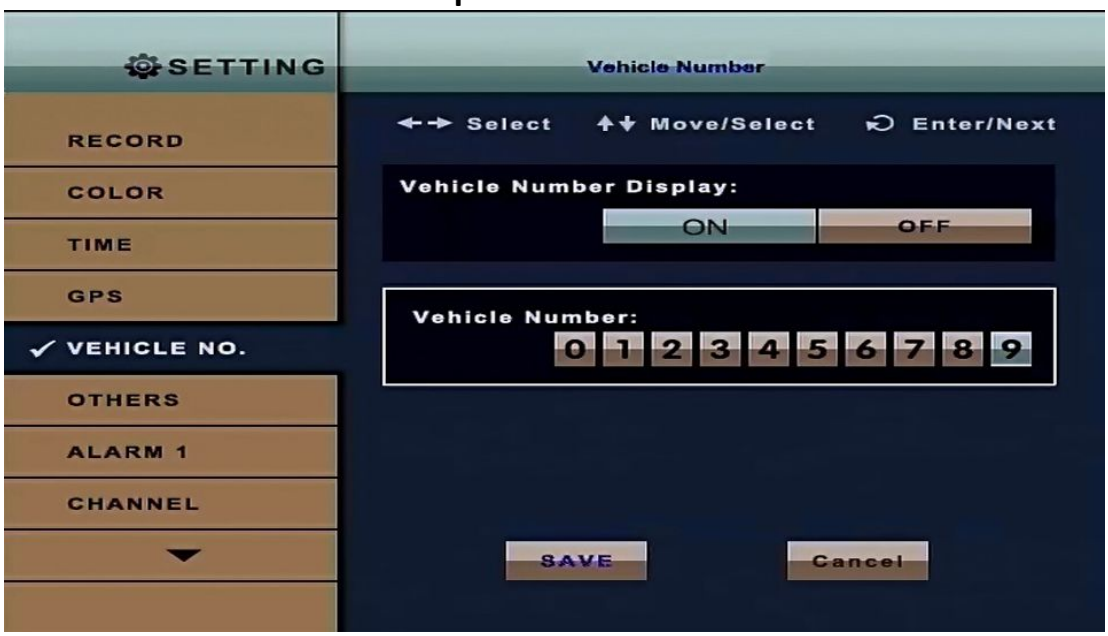

Under the ”color” page, adjust the brightness Contrast and Saturation. We can set each channel separately.

## 4.3. Date and time


Under the“TIME”page, we can set Date Time and Time Zone. If DVR support GPS function, The GPS and time zone setting will automatically update the time and date of DVR system.

**Time Zone:** London GMT+0,Berlin GMT+1, Cairo GMT+2, Moscow GMT+3, New Delhi GMT+5,Bangkok GMT+7,Beijing and Hong Kong GMT+8,Tokyo GMT+9,Sydney GMT+10,Hawaii GMT-10,Alaska GMT-9,Pacific Ocean GMT-8,MST GMT-7,CST GMT-6,EST GMT-5,AST GMT-4 ,Brazil GMT-3, Central Atlantic GMT-2.

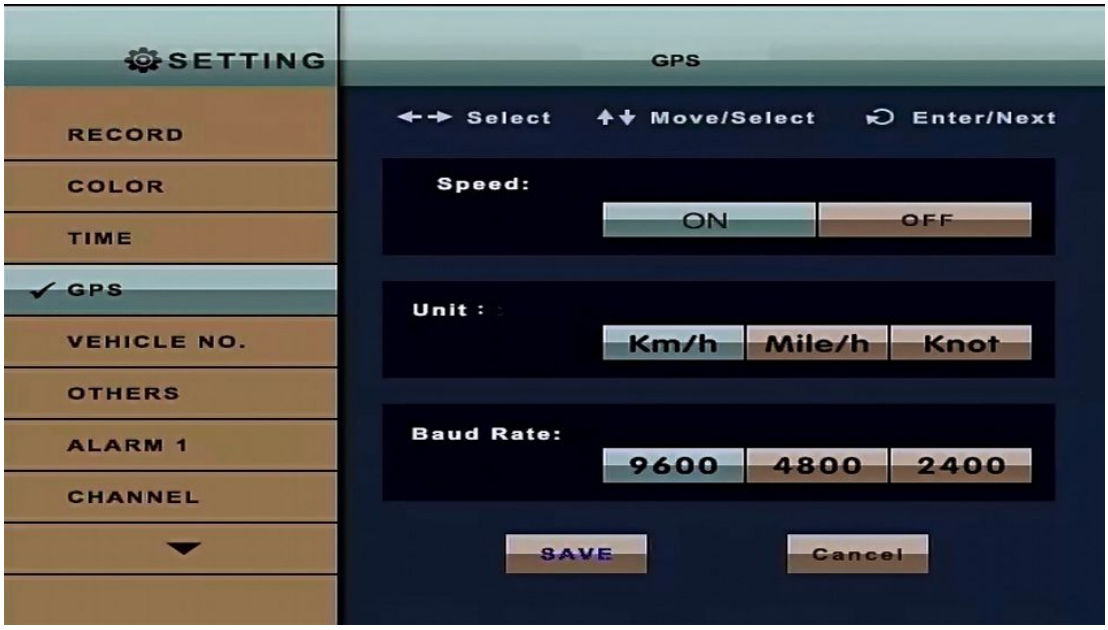
## 4.4. Car License Number setup




Under “ Vehicle number” page, We can set the car license number, and choose display or do not display the car license number in preview interface.

Car license number can be consist of 10 numbers and letters.

## 4.5. GPS set up




Set the “GPS speed watermark” display option, “GPS speed unit”, “GPS communication baud rate”.

The “GPS speed display” set is on by default , default “GPS communication baud rate” is 9600.

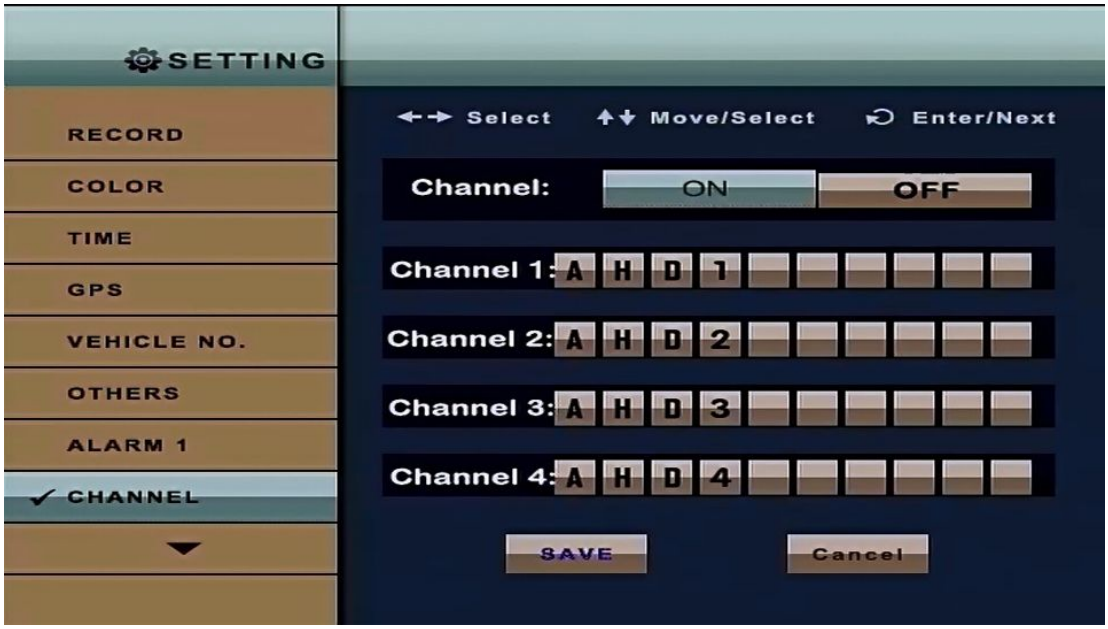
## 4.6. Operation mode


The “others” interface are actually “operation mode” interface, we can set “default display channel when system start”, “power off delay time after ACC+ disconnect”, and “audio record switch”.

## 4.7. Alarm in&Alarm out


Under “Alarm” interface, we can configure the alarm in & alarm out function.

## 4.8. Channel titles



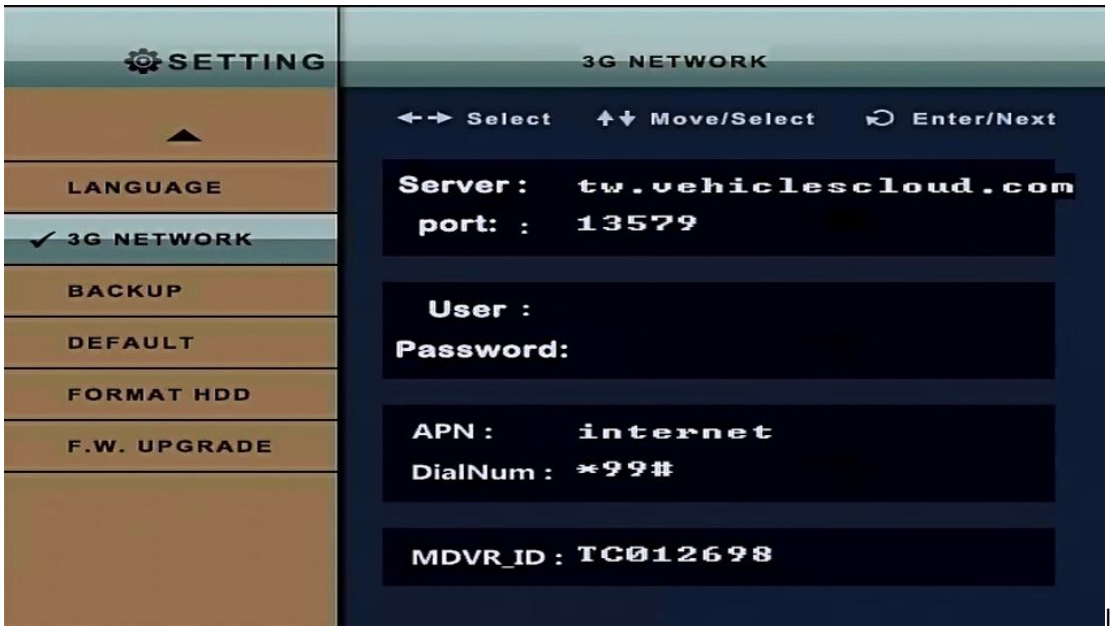

Under “CHANNEL” interface, we can set the channel title and set channel title watermark on/off.

Channel title setting: User can define the channel title with 10 numbers or letters, the default channel title will be: AHD1, AHD2, AHD3, AHD4

## 4.9. Languages


Here you can choose the language, for now, the system support “English” “简中(Simplified Chinese)” and “繁中(Traditional Chinese)”.

## 4.10. 3G/4G Network




n “3G/4G Network”, we can configure the 34/4G dial up and server parameters.

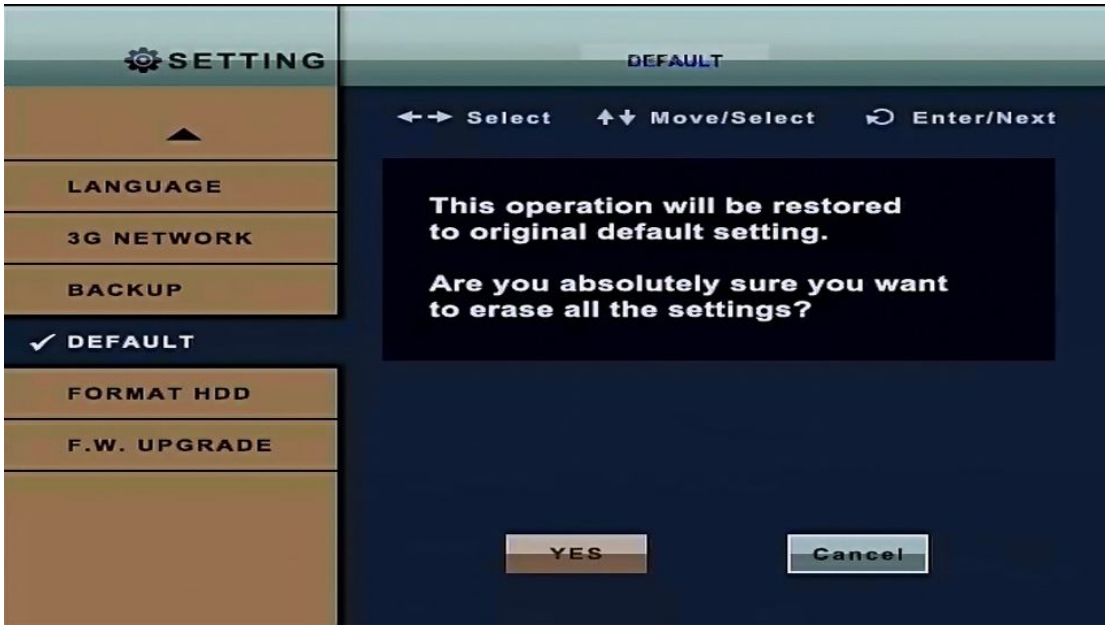
## 4.11. Data Back up


Under data backup interface, we can search the files lists need to back up by date, then choose the files according to the time period to back up. Data back up should operated via USB port and USB devices,

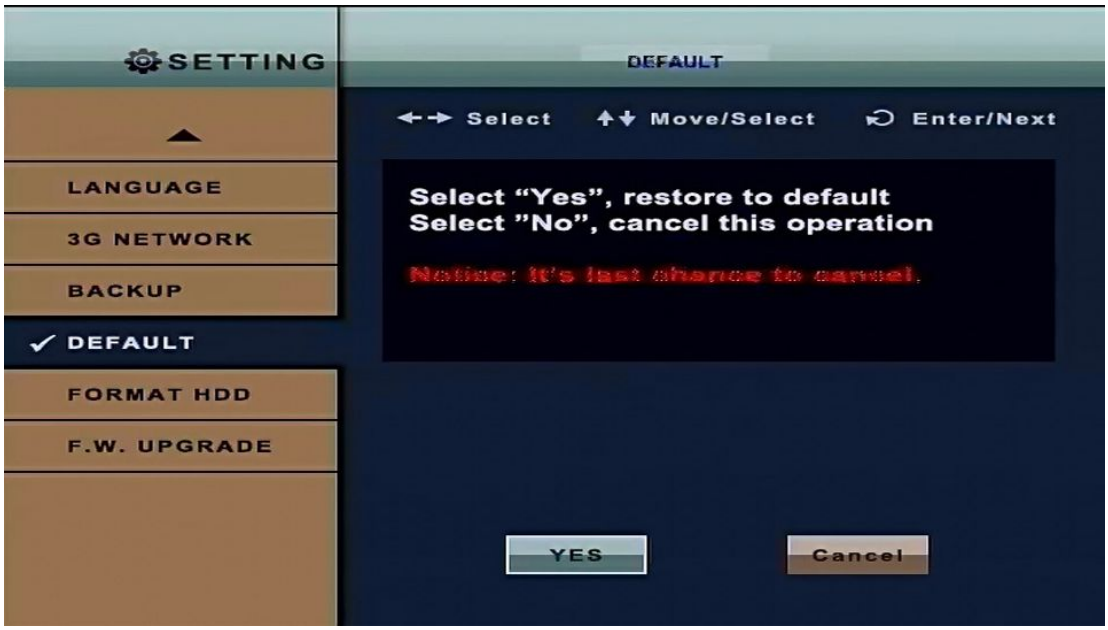
We need to use USB devices to back up the files, please do not cut off power in the process of back up. If back up failure or other faults occurs when back up, please check the back up devices.

## 4.12. Factory settings


In “Default” interface, Choose “confirm” button, system will pop up the alert messages twice to ask you if confirm to do the factory settings. Please check carefully before confirming the factory settings.

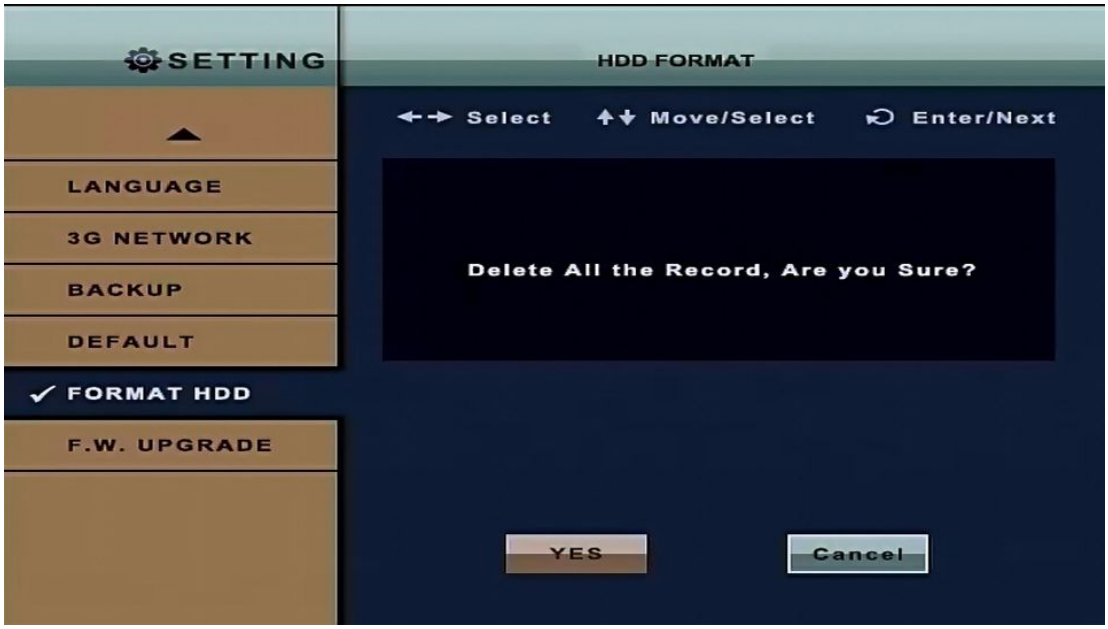



When the system pop out the alert messages, if you don't want to do factory settings, you can choose "cancel" to exit.

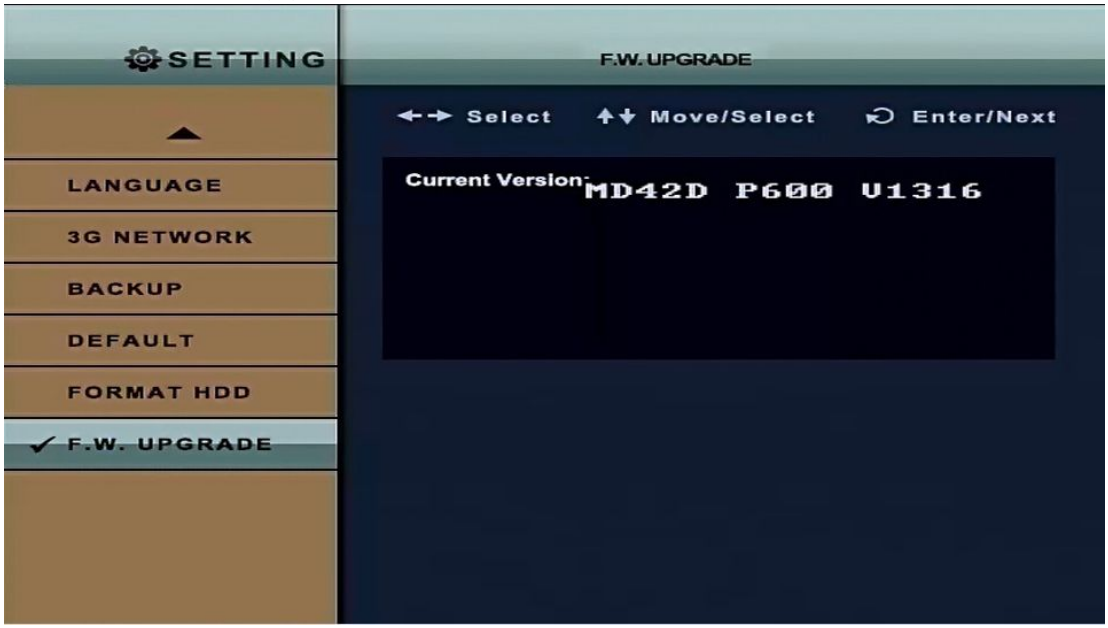


## 4.13. Format storage device


Under “format storage device” interface, we can format the storage devices (SD card, HDD, SSD). Please check if there are any files need to back up before formatting storage devices, Once the devices the formatting is done, the video files can not be recovered.

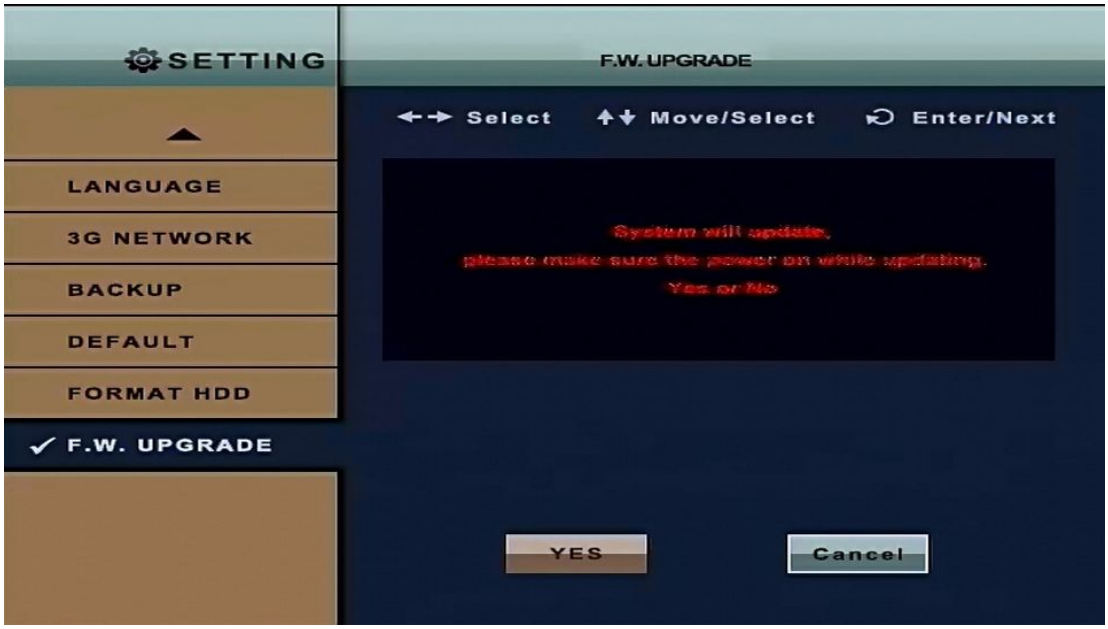


## 4.14. Firmware upgrade




Firstly, please copy the firmware to a USB device, and upgrade the system via USB port.

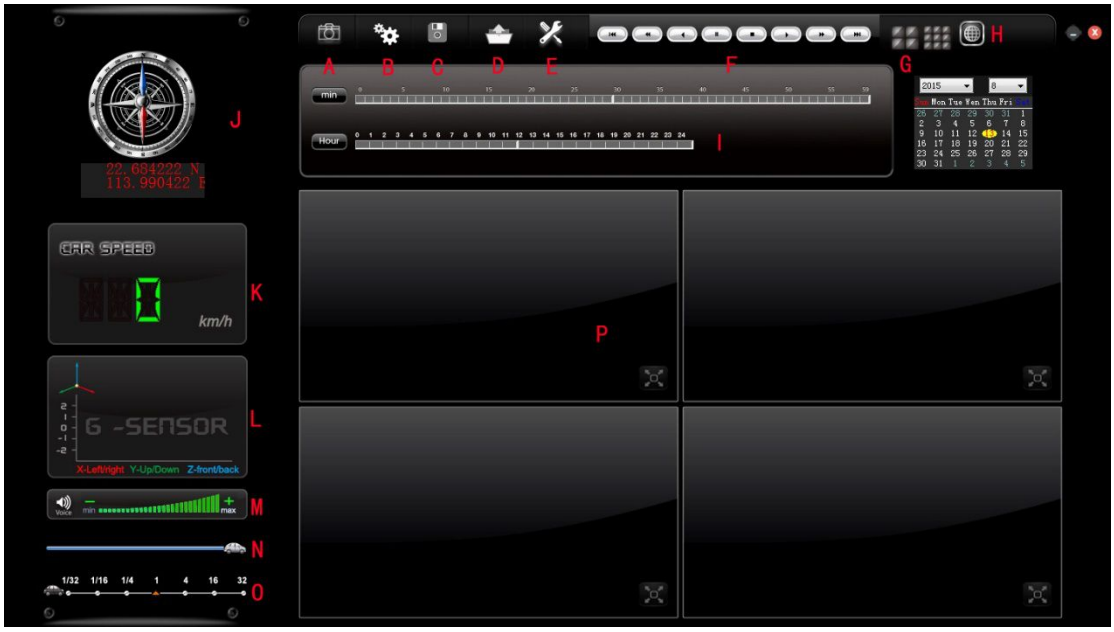
**Notes: I**n the process of upgrading, please make sure that the device comes with constant power supply, If the power supply is cut when upgrading, the DVR may not be able to start again, you will need to return it to our factory for repairing.



# CHAPTER 4: Windows Based Playback Software

## 1. Software introduction:

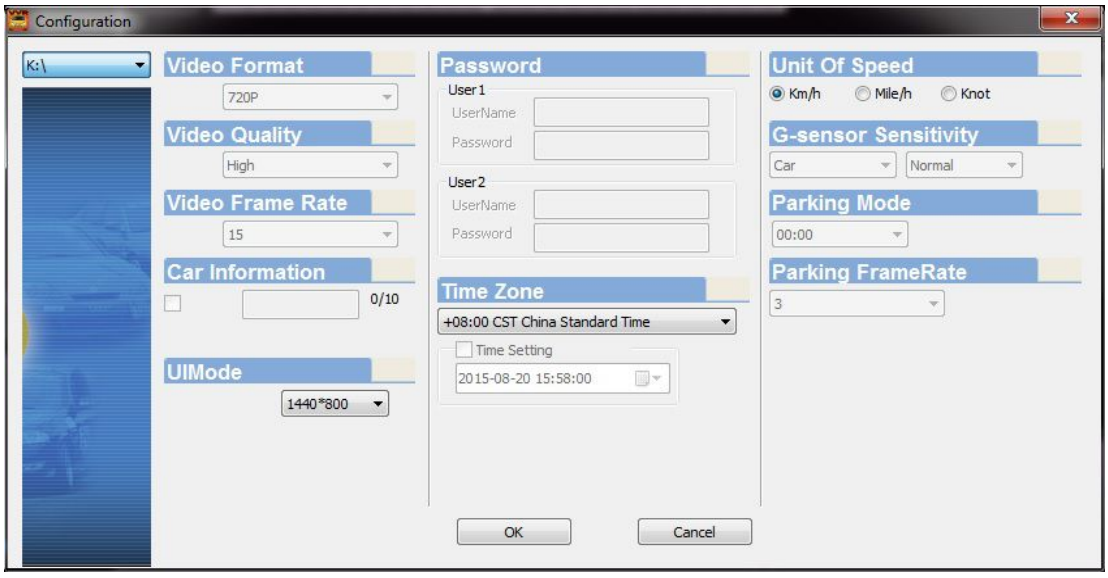
1. Software introduction



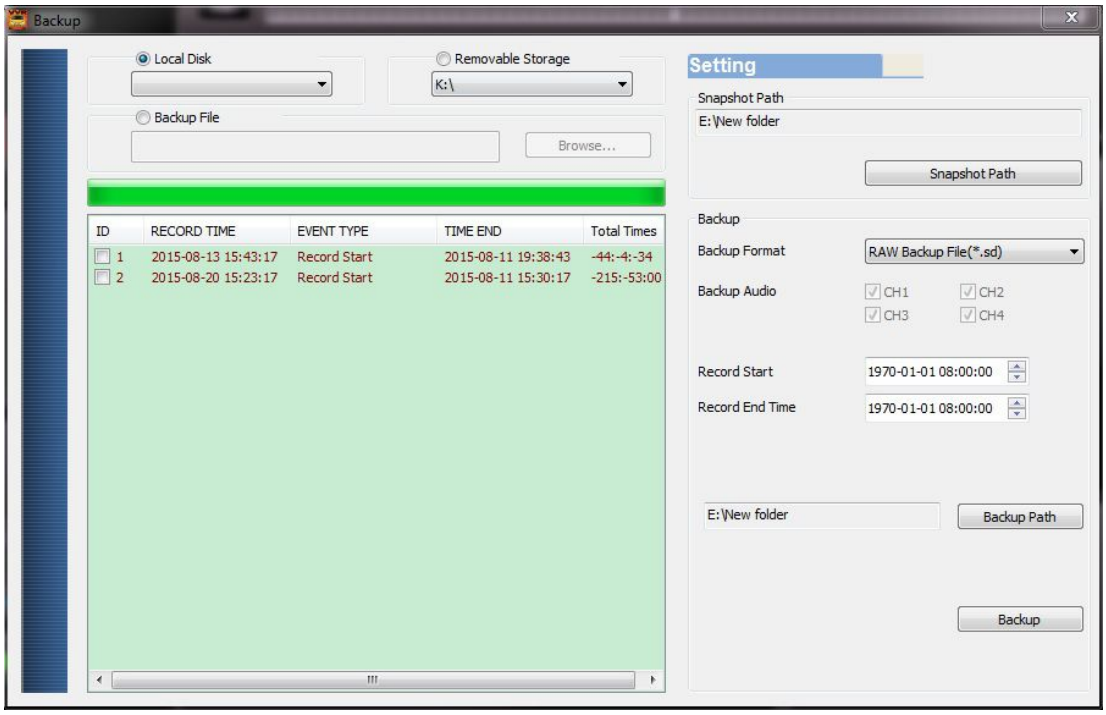

Open the PC client playback software, To learn about the functions of all icons.

A. Capture/Snapshot in the process of playing back.

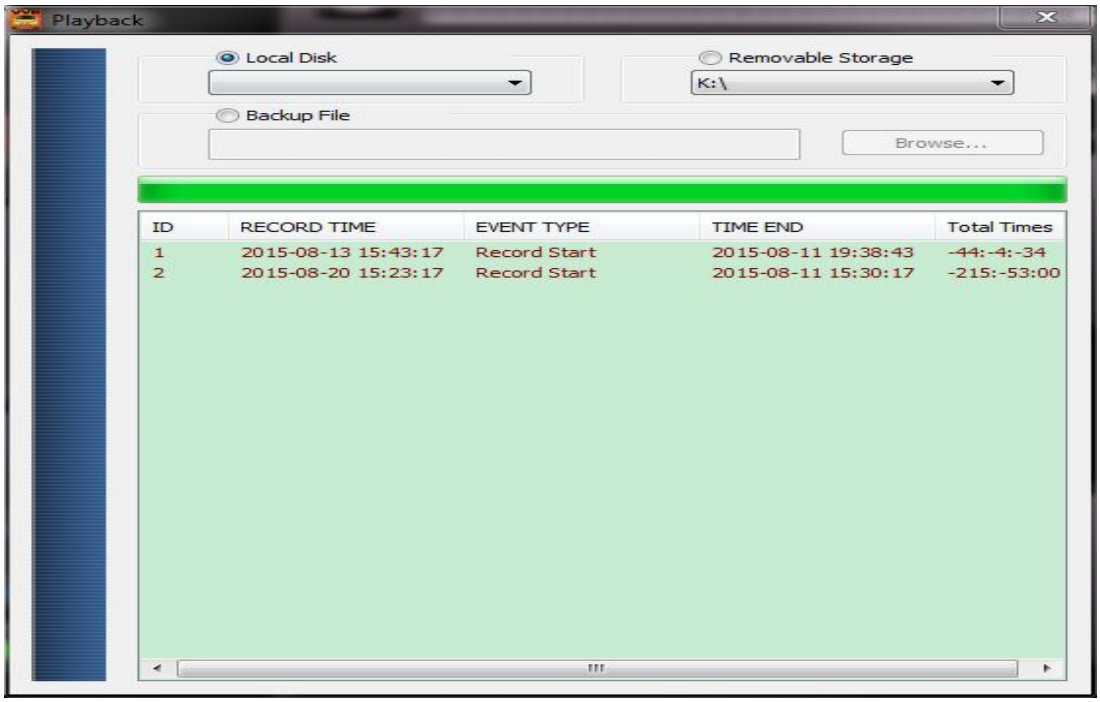
B. software configuration



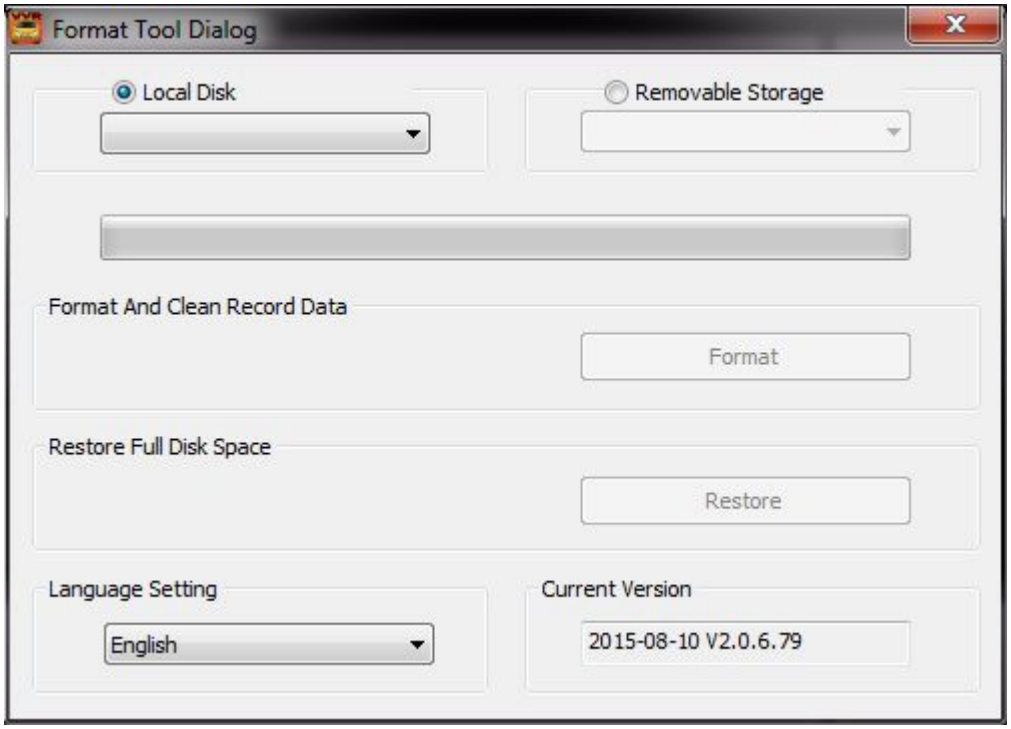

C. backup file




D. Playback (open the files list)

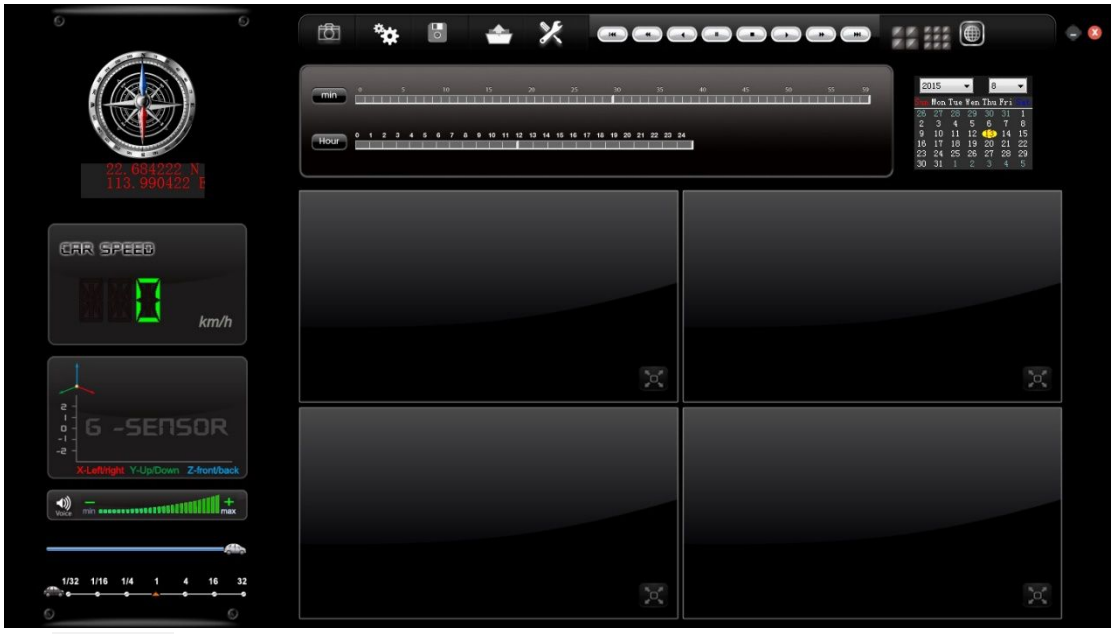



E. Formatting tool and software languages configuration




F. File play control buttons

G. Switch playback interface between Quad screen(four grids) and Octal screen(eight girds screen)




H. **Google Map**

I. time progress bar of the played file

J. GPS location data

K. GPS speed information

L. G - SENSOR data curve

M. Voice adjustment

N. Video clips' playback progress

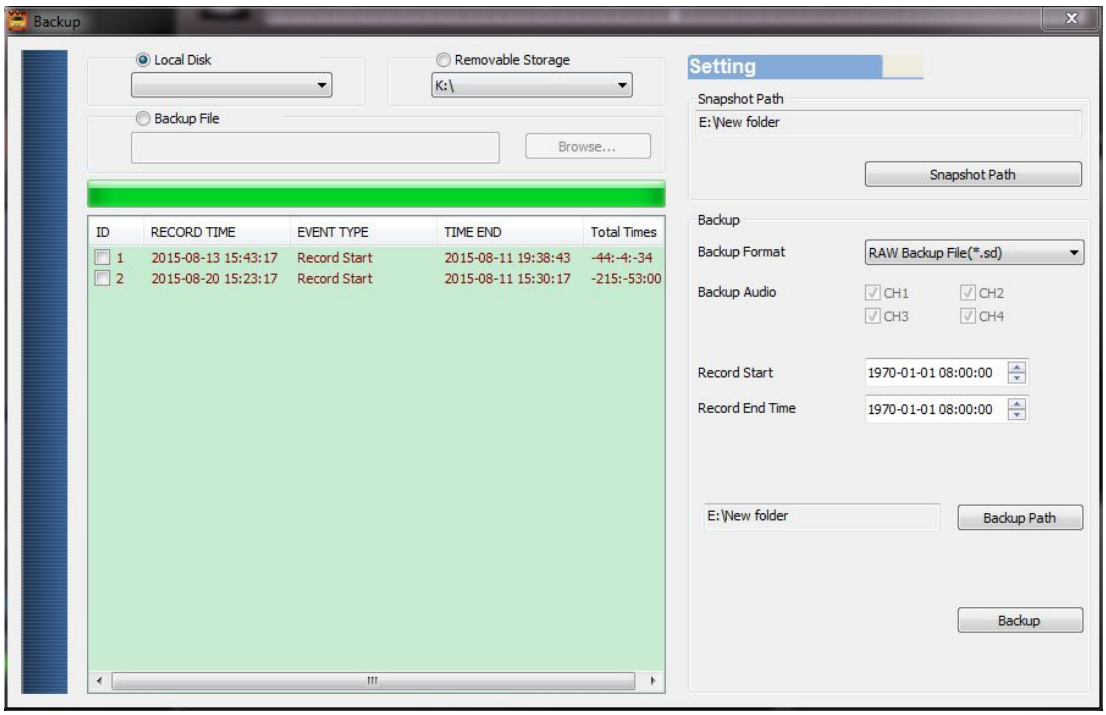
O. Fast playback and slow playback

P. Video play back area

## 2. Video playback

2.1. Connecting the storage device to the computer via USB interface

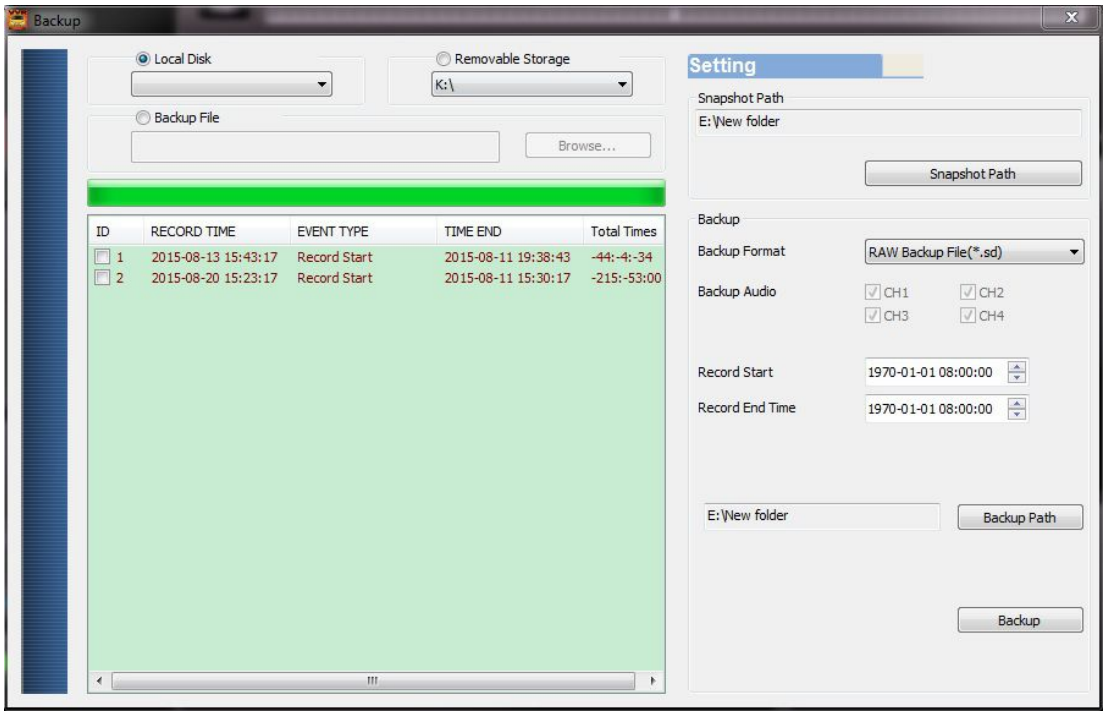
2.2. Open the play back software, click the playback icon, select the USB drive, then double click the video files.




2.3. in the process of playing video files, we can click the Google Map Icon, the vehicle running path will be displayed in the map. On the playback software, we can see the GPS speed, and can play the video files faster or slower.


2.4. we can double click the playback images of one channel to enlarge this channel separately, to check the videos more clearly. For google map, we can drag the map's boarder line to enlarge the map's display area.

## 3. Backup Videos




On the player software, click the backup icon, select the disk drive that need to back up, set the back up path, time slice, back up channels and back up format, and click backup button after configure all options.

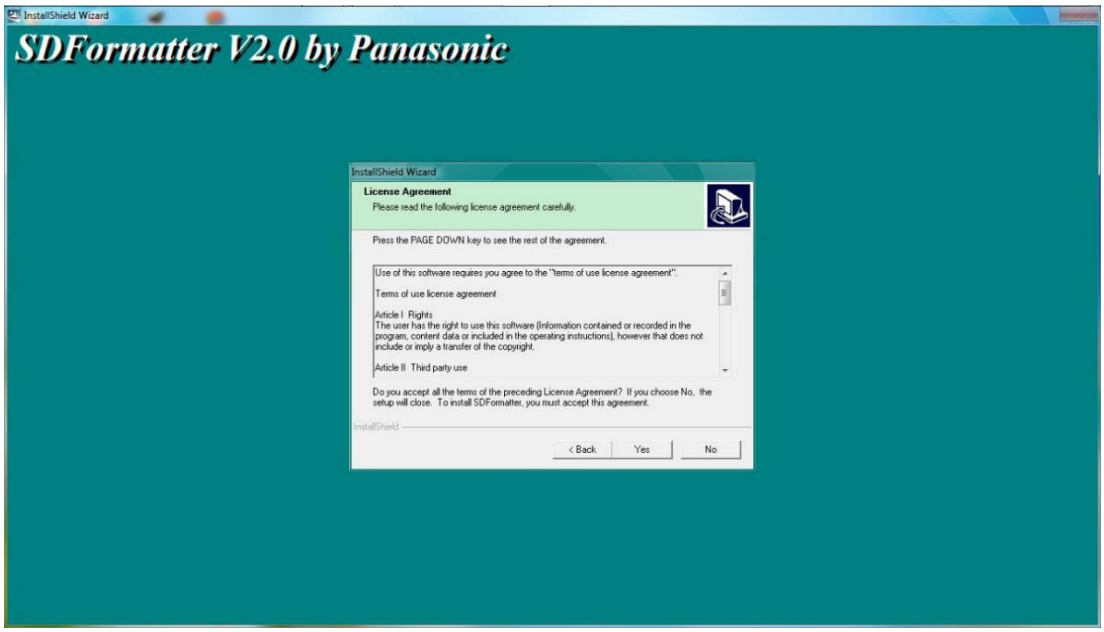
# Appendix: SD Card low level formatting instructions

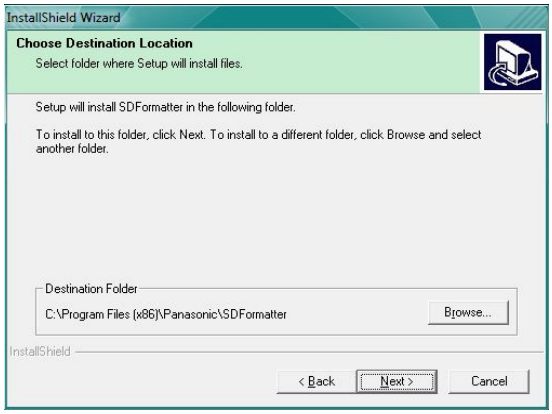
**Key functions:** 1. Low level formatting instructions.

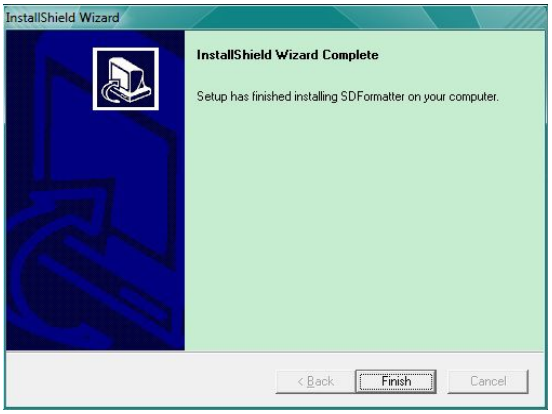
2. Check if the SD Card is fault.

Note: This instructions use the Panasonic official SD card format software as example to demonstrate the operations! Other formatting software are similar!

1.install low level formatting software "**Panasonic SD Card Formatter Tool"**



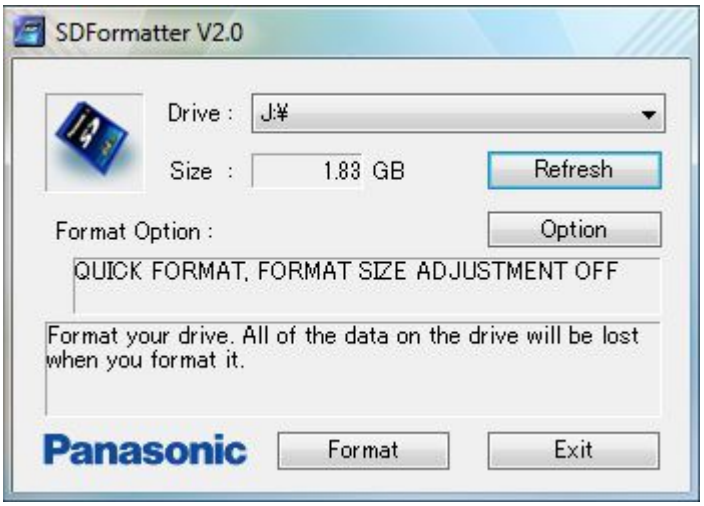

2.Parameters configuration:

Operation method:

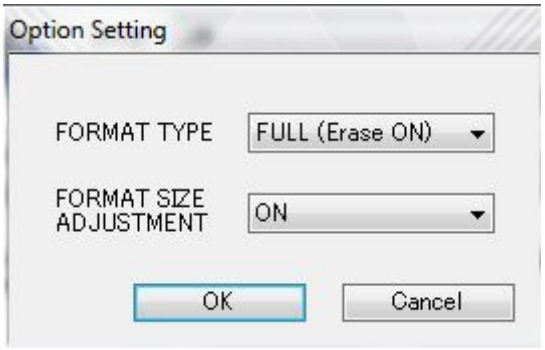
2.1. Insert the SD card

2.2. Open the SD Card Formatter Tool, check if the SD card has been recognized by software

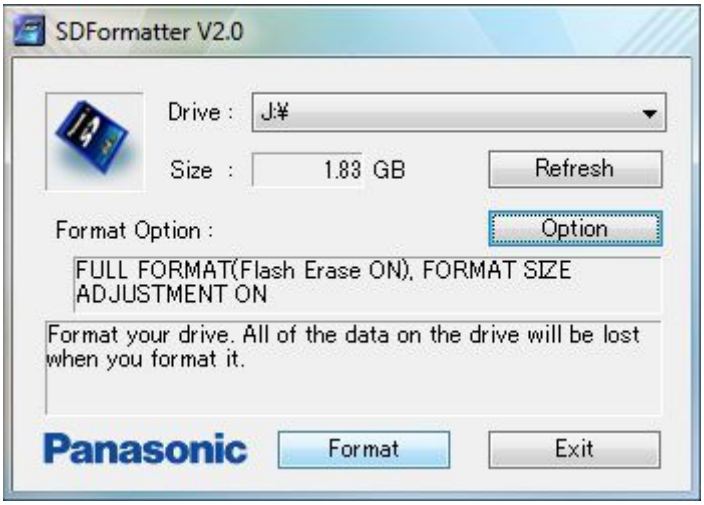
Note: if the SD card has not been recognized, you can click “Refresh”, if refresh many time but still can not recognized the SD Card, please check if the SD Card connect the PC correctly, if car reader works well, If the PC always can not detect the SD Card, then SD Card might have serious failure.

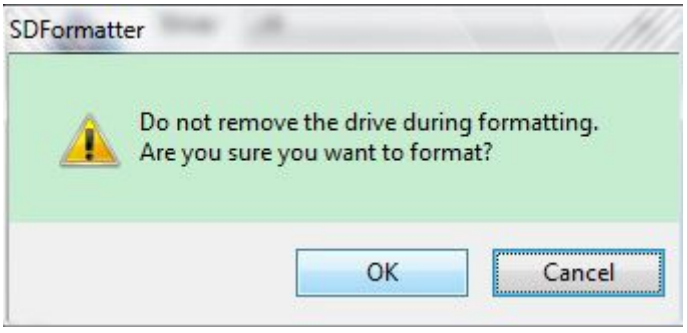



3. click “Option” icon, in the pop-up dialog box, choose the Format Type “Full(Erase ON)”, choose “ON” for “Format Size Adjustment”

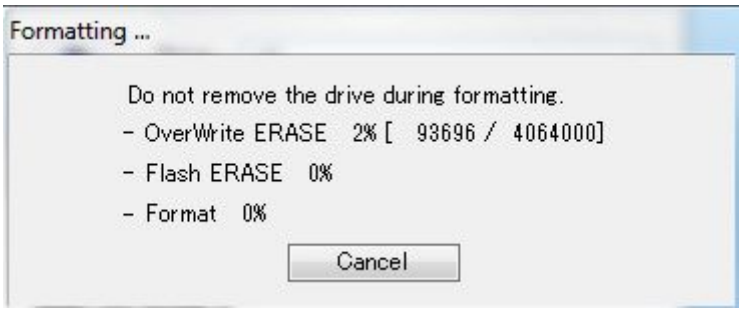



4. After the setup is done, click the “Format” to start the low level formatting.

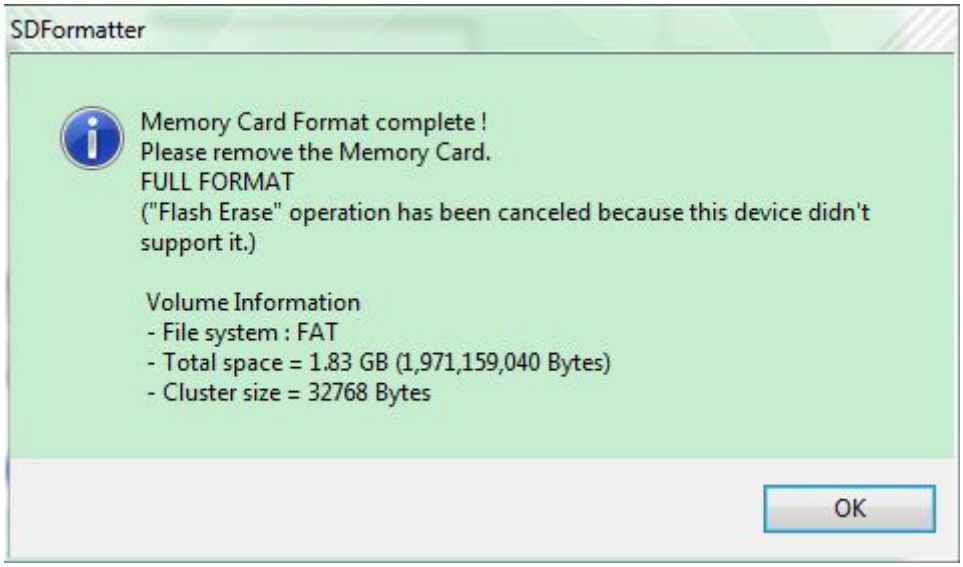


Note: Click “Format” button, it will pop up a security warning, remind you do not remove the drive during formatting, Click OK.




Note: In the process of formatting, please wait patiently till the formatting complete.




Note: Check if the formatting complete and successfully according to the prompts.

Other notes:

1. In the process of formatting, if prompted SD card under write protect, please check the SD card ‘s write protect switch.
2. In the process of formatting, if the software can not complete the formatting, please make more tries, if you still can not complete formatting, please try with other low level formatting software, or contact the SD card vendor
3. If software promotes that the SD card has a partition that cannot be formatted after formatting, which means that the SD card is damaged