
User Manual

Product Name : HDD Mobile DVR

Product Model : WDR-4405MC(Rev.2)

Version : V1.0



WELDEX
CORPORATION

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1. introduction

1.1. Purpose of writing

WDR-4405MC(Rev.2) User Manual was written to enable users to master the features and functions of this product with the help of this manual, to correctly install and use the product, and to facilitate the daily work of technical support engineers and the maintenance work of product engineers.

1.2. Security alert

To ensure users can use this product for a long time, safely and satisfactorily, please read the following warnings carefully before installing and using this product:

- All installation and maintenance must be performed by professional technicians
- The normal working voltage range of the device is DC 8V~36V. Please note that the power input should not be connected reversely. Please ensure the stability of the power input line. The output cannot be short-circuited.
- The device outputs 12V external voltage, which is only used for camera power supply. It is not allowed to connect any non-recommended equipment.
- Correctly connect the ground wire of the device to the ground wire of the vehicle to form a loop.
- The equipment should be installed in a dry and ventilated environment to avoid moisture, rain and vehicle cleaning and flushing position, keep the equipment away from heat, dust and strong magnetic field.
- Please install the equipment as far as possible on the vehicle where the vibration is weak, to improve the stability of the equipment and prolong the service life.
- Do not stack debris within 20cm around the installation equipment, and do not have heavy objects on it to ensure the heat dissipation.
- The storage devices and modules on the device do not support hot swap. Do not insert or remove storage devices or modules while the device is powered on.
- Please perform regular maintenance on the storage device(hard disk or SD card): copy the video data to the computer and format it to protect and extend the performance and service life of the storage device.
- Do not open or disassemble the equipment without the guidance of a professional technician.

2. Product Introduction

2.1. Product Overview

WDR-4405MC(Rev.2) is a cost-effective, scalable device specially designed for in-vehicle video surveillance and remote monitoring. It adopts high-speed processor and embedded operating system, combined with the most advanced H.264/H.265 video compression/decompression technology and GPS positioning technology in the IT field. WDR-4405MC(Rev.2) supports up to 4 channels 1080P recording, with 5 recording formats (CIF/D1/960H/720P/1080P optional) to record the driving information locally.

WDR-4405MC(Rev.2) products are simple and elegant, with super vibration resistance, flexible for installation, powerful and reliable.

2.2. Main Feature

Function	Function Description
Video	<ol style="list-style-type: none">1. Support 1~4 channels of real-time audio and video local recording;2. Supported recording mode (taking PAL as an example): 4 ch CIF, 25 FPS; 4 ch D1, 25 FPS; 4 ch 960H, 25 FPS; 4 ch 720P, 25 FPS; 4 ch 1080P, 25 FPS;3. Support PAL system, NTSC system;4. Support recording OSD overlay, such as time, channel name, license plate number, GPS, speed5. Support storage device automatically overwritten when full and alarm video file protection
Storage	Hard disk supports 2TB capacity, SD card supports 256GB capacity
Playback	<ol style="list-style-type: none">1.Support local 4-channel audio and video sync playback2. Support PC Client playback and analysis3. Support traditional playback functions such as play, pause, slow play, fast forward, fast backward
Vehicle record	<ol style="list-style-type: none">1. It can record driving information such as vehicle speed, GPS data and oil quantity;2. Alarm linkage can be realized through the reserved 4pcs I/O input ports;3. Support local records, view driving information

2.3. Specification

2.3.1. List of Product Function Specification

Specification Parameter		
System	Operation language	English
	Operation interface	Graphic operation interface(OSD menu)
	Password security	Two-level administration: User/Administrator password
Video	Video input	Support 4CH D1/720P/1080P AHD video mixed inputs
	Video output	1ch video output(V-OUT), 1ch HDMI video output
	TV system	NTSC / PAL (NTSC@120 frame 1080P / PAL@100frame 1080P)
	Image compression standard	H.264 / H.265 main profile
	Resolution	Support 1080P, 720P, 960H, D1, CIF
	Dual stream	Support
	Video display	1ch/4ch display; Supports full screen display of event triggers
Audio	Audio input	4ch audio input
	Audio output	1ch audio output(A-OUT)
	Recording method	Synchronous recording in audio&video
Image processing&storage	Local record format	CIF / D1 / 960H / 720P / 1080P optional
	Video streaming standard	ISO14496-10
	Video bitrate	CIF:512Kbps ~ 128Kbps, D1/960H : 1536Kbps ~ 512Kbps (recommend spec) 720P : 3072Kbps ~ 768Kbps 1080P: 5120Kbps ~ 1024Kbps,
		4 grades optional, Highest : Best / Lowest : general
	Audio bitrate	40KB/s
	Data storage	Standard : 1x SATA HDD/SSD 1TB, up to 2TB; and 1x SD card, up to 256GB
Alarm	Alarm input	4ch alarm input
	Alarm output	2ch alarm output, highest output level: 12V
	RS232 interface	Support
	RJ45 Network interface	Support 1*6 pin aviation port to RJ45 network interface, support local network connecting with server
	USB interface	Support 1*USB interface for software upgrading and record file copy
	IR interface	IR extension interface,support remote control data reception
GPS system	Support build-in GPS module; geographic coordinates and speed could be written into coding streaming.	
G-sensor	Build-in G-Sensor; support triaxial motion detection and user setting of X, Y and Z coordinates	
Matching software	Playback analysis in PC	Video playback in PC, and analyze vehicle info in files
Software upgrading	Upgrading maintenance	USB / Hard disk / SD card upgrading
Dimension	Dimension	153.0(W) x 74.0(H) x 187.4(D) mm

2.3.2. Product performance parameters

Electrical parameter		
Power input	8 ~ 36V	Power input: + 8V ~ + 36V; always < 8V or >36V, auto power-off will start and enter into protect mode.
Power output	12V	Power output: 12V (+/-0.2V) ; max current 1A
Operating temperature	-20°C~+80°C	Referring to excellent ventilation conditions

2.4. Product characteristics

2.4.1. MDVR outlook

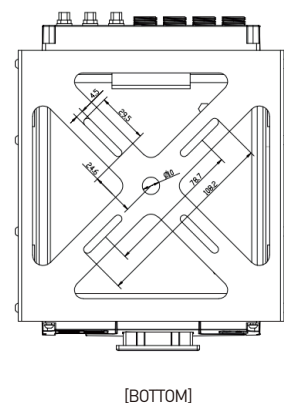
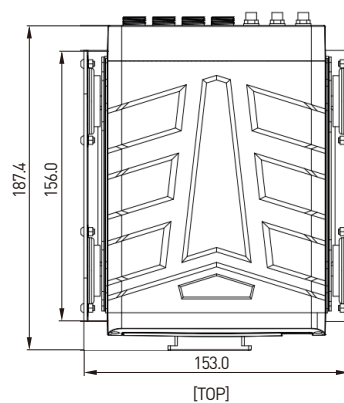
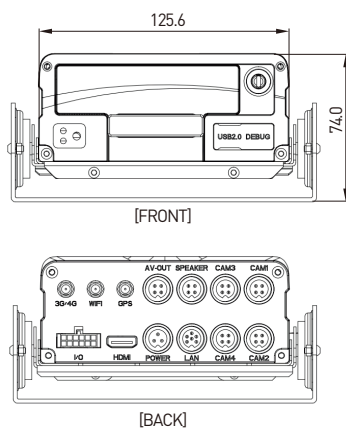


Front panel

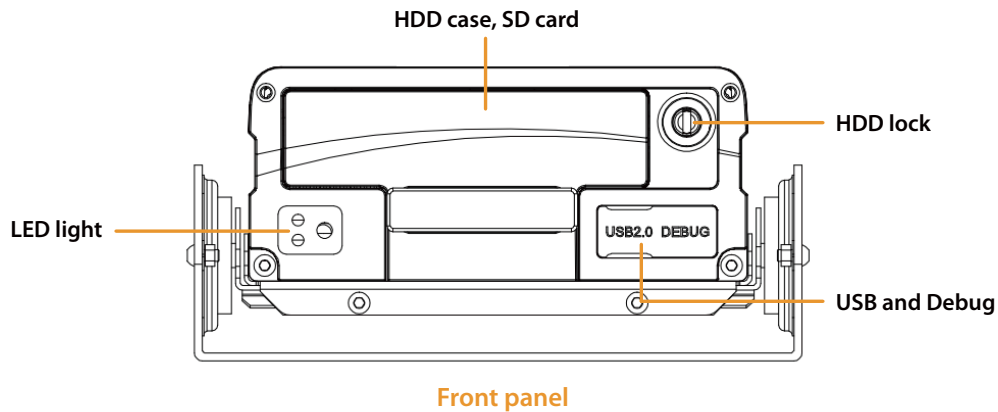


Back panel

2.4.2. MDVR size and installation holes



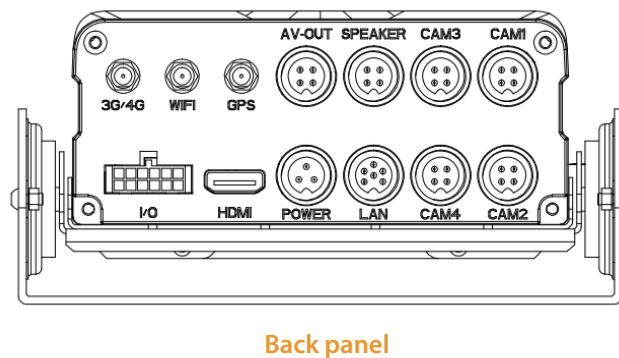
2.4.3. Front panel and back panel



Front panel definition as below shown:

Panel classification	Definition
Hard disk box, sd card slot	It is hard disk, sd card
Led indicator light	Show device operating status
IR	Receive remote control keys
Hard disk lock	Unable to start without locking the device. It will automatic standby once you open the lock during the using.
USB	Used for firmware upgrading and video file export and mouse operation
Debug	Device software debugging interface








Back panel definition as below shown:



Interface	Name	Description
Power	Power input interface	8V~36V wide voltage power input interface
GPS	GPS antenna interface	GPS antenna interface

I/O	Alarm input and output interface, I/O interface	Alarm input and output interface (input high level > 4V and low level < 3V valid, alarm output +12V)
AV-OUT	Audio & video output	Display output interface(connect to monitor)
LAN	IPC interface	IPC/ local network interface
Speaker	Intercom interface	Intercom interface for remote intercom
HDMI	HDMI output interface	HDMI output interface
CAM 1-4	Camera input interface	Camera input interface

2.4.4. Accessories

Description	Picture	Quantity(PCS)
Power cable		1
I/O cable		1
Key		2
GPS antenna(optional)		1
Remote trol(optional)		1
External camera interface cable		4
External AV-out interface cable		1

3. MDVR Installation Guide

3.1. Preparation before installation

1. Tools: cross screwdriver, set copper wrench, electrical waterproof tape, cable tie, wire stripper (oblique pliers), needle-nosed pliers, 12V---36V test pencil (multi-meter) and so on.
2. Make sure that there is a storage medium(SD card/hard disk) for recording storage.
3. Select the location where the terminal equipment is installed: mainly consider the wiring safety and convenience of installation, avoid high temperature, ensure

waterproof and shockproof.

a) Waterproof: choose a location that is not easy to enter the water, and keep away from the air conditioner as much as possible to prevent condensation from accumulating inside and outside the terminal equipment when the temperature changes, which seriously affects the service life of the product;

b) Shockproof: the terminal cannot be suspended or installed in a long-term vibration position;

c) Anti-high temperature: the terminal should avoid the high temperature part inside the car;

d) Wiring: some large vehicles have a total control switch. At this time, the installation position of the terminal equipment should also consider the connection of the power cable. The wiring should be wrapped and secured with electrical waterproof tape and cable tie.

3.2. Wiring method

Wiring from the rear panel, details of each interface definition can be seen from 2.4.4 Rear Panel Interface Definition:

POWER: Red line connects to input positive (PWR+)

Black line connects to input negative (PWR-)

Yellow line connects to start signal (ACC)

CAM (1-4): one port for one camera

AV OUT: GND: 12V power output negative

12VDC: 12V output positive

AUDIO: output audio signal

CVBS_OUT: output CVBS (video) signal

Note:

1. Confirm that the battery voltage is between 8-36V, otherwise the equipment will be burned out.
2. Pay attention to the insulation of the power cable to prevent the power supply from short-circuiting the battery.
3. The equipment power supply must take power from the positive and negative poles of the battery, can not be grounded to make the ground, the ground will produce a negative pulse to interfere with the normal operation of the host.

3.3. Booting

In System Settings -> Power On/Off

If it is set to ignition mode(ACC), it needs to meet three conditions to start:




- a) POWER that requires POWER+ to connect to high level, PWR- to ground
- b) POWER ACC connects to the ACC ignition wire of the car
- c) Needs to lock the electronic lock on the front panel

When initial booting, the default is ACC ignition mode

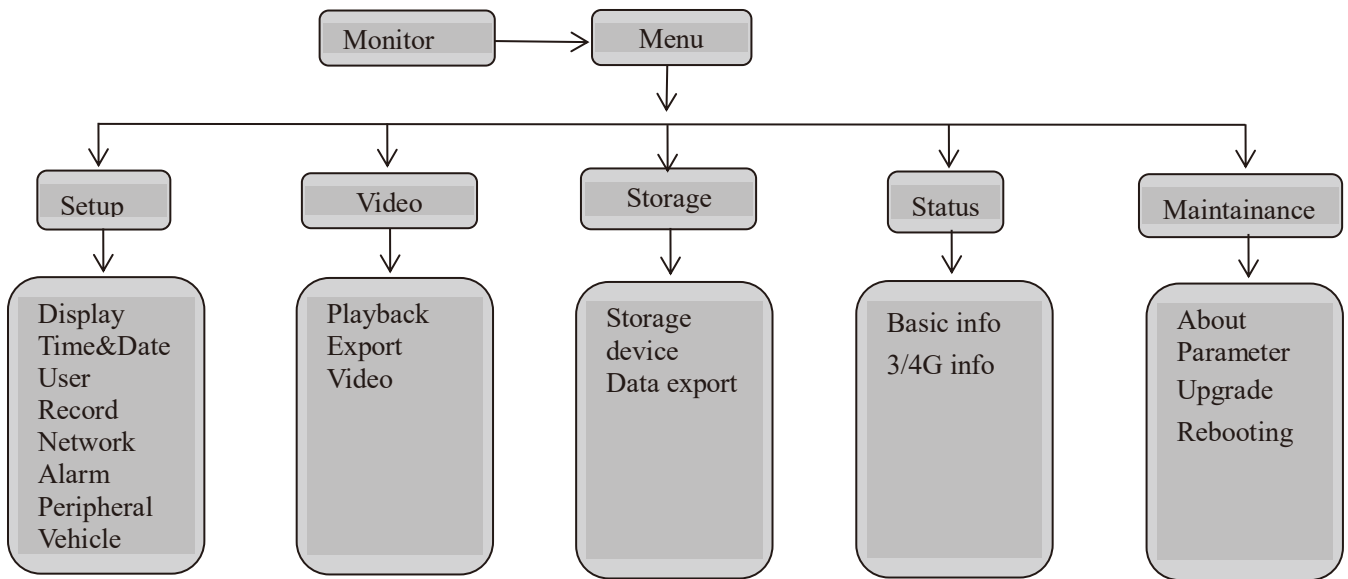
4. MDVR Operation Guide

4.1. Remote Control Function Key Guide

Remote control buttons and functions:

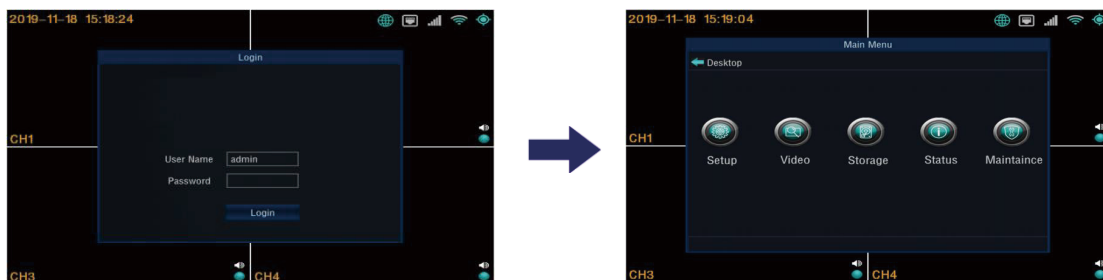
LOGIN	When the MDVR has a password, press the LOGIN button to enter the password. Because the system does not have a recovery and reset function, please remember the password.	
	4 screen split key	
Four screen split key number keys 1, 2, 3, 4	Under the monitor screen, switch between four screens and single screen. Press the four screen split button to display 4 screens. Under the monitor screen, press the corresponding number key to display the corresponding channel on one screen: 1--channel 1; 2-- Channel 2; 3--channel 3; 4--channel 4; Used for digital input on the input interface.	
	Up, down, left, right direction keys, PTZ control direction keys	
Auto, Preset, Call, Zoom +, Zoom -, Focus +, Focus -, Aperture +, Aperture -, PTZ, PRESET, RECALL, BRUSH	PTZ control function key	
【ENTER】	Confirm key	
RETURN	Go back to the previous submenu. Finally exit the setup menu and exit to the monitor screen;	
CANCEL	Delete key / backspace	
+ -	Backspace and forward space key in edit box; PgUp/PgDn key	
F1、F2、F3、F4	Backup key	

4.2. Main menu framework



4.3. Operation and configuration

4.3.1. User login



- When password switch is turned on, click the menu button will pop up the login menu, and the user needs to enter password to identify himself. As long as password is entered correctly, the menu interface will be automatically entered.
- When password switch is turned off, click the menu button will directly enter the setting menu, and the login interface will not pop up.

4.3.2. System operation and configuration

Description:

- All the settings of the following submenus will be valid after confirming [Save], otherwise the setting is invalid.
- The digital input can be entered directly by using the number keys on the remote control or by using a soft keyboard. Character and pinyin input must

be implemented through the soft keyboard.

Main Menu: Display all main settings: system setup, video search, disk management (storage), system information(status), system maintenance



4.3.2.1. System setup

System management settings include below submenu: display, time and date, user, record, network, alarm, peripherals, vehicle.



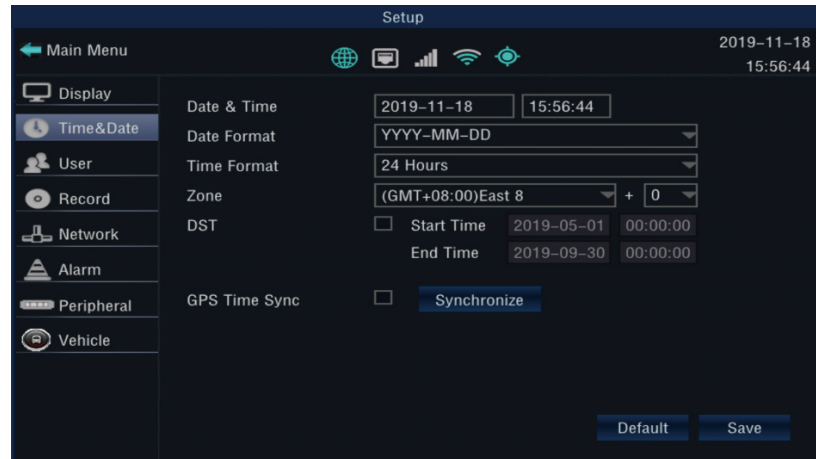
① Display setting

- Device name: display device name
- Device ID: input through the soft keyboard, must be unique to avoid conflict. used to connect with CMS platform.
- SYS(CVBS system): CVBS display output system
- Resolution(VGA): HDMI output display resolution setting
- Split screen: boot channel display
- Margin set: adjust the display size
- Language: set the system display language
- Login duration: set the login duration. If timeout will exit the login menu and return

to preview

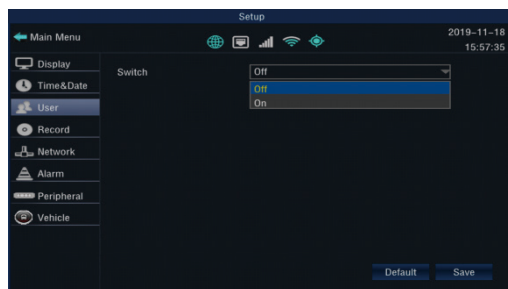
- Start guide: help users understand software operations

② Time and date setting: set time and date



- Date and time: set the date and time, select the date with the mouse, enter the number keys to manually set the time
- Date format: three formats, year/month/day, month/day/year, day/month/year
- Time format: select time (12/24 hours) format display
- Zone(GPS time synchronization): on/off. Select on, when device boots every time, and when the GPS signal is valid, the system time error will be automatically corrected.
- DST(Summer Time): On/Off, set the daylight saving time start time according to different regions
- Time zone: drop-down selection to set time zone and time zone offset

③ User settings: login password settings





- Switch: On/Off; select Off, you can log in to the setting interface without entering the password; when you open, you must enter the user name and password to log in to the setting interface.
- User name and password can be set by yourself (please keep your username and password properly)

④ Record setting

1. Record attribute: set record attribute



- Encode format: set H264/H265 encoding format
- Record stream type: select main stream or substream recording
- Record file format: video file format selection (currently only .asf).
- File duration: set the length of a single video file.
- Pre-record duration: alarm pre-recording duration setting (max 20s) .
- Delay record duration: set the delay recording time after alarm (max 20s) .

2. Main stream setting: set the main stream encoding and recording parameters



- Main stream setting: you can set the recording enable, resolution, frame rate, image quality, and volume.

3. Substream setting: set substream encoding and recording parameters



- Sub stream settings: you can set the recording enable, resolution, frame rate, image quality

4. Camera attribute: set camera attributions

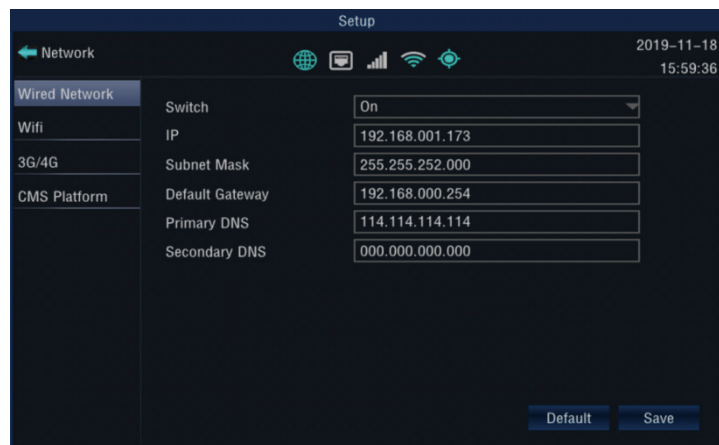


- Camera settings: you can set the recognition mode (automatic, manual), type, resolution, system, mirror flip.

Note: the main stream, sub-stream, camera attribution settings have shortcuts

⑤ Network setting

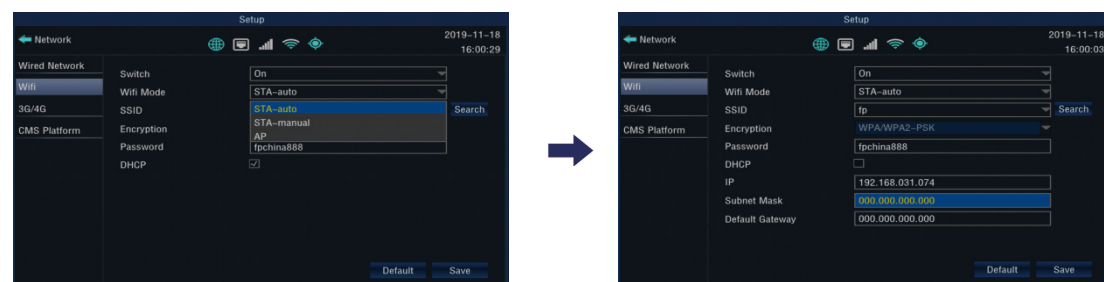
1. Wired network



- Switch: wired network setting switch
- IP : set the network IP address
- Network related parameters like subnet mask, default gateway, primary DNS, secondary DNS server can be set

2. WIFI setting

STA mode



- Switch: WIFI setting switch
- WIFI mode: set STA-auto, STA-manual, AP
- Encryption method: set the encryption method
- Password: Set WIFI password
- Automatically obtain IP address: check to automatically obtain the IP address
- If unchecked automatically obtain IP address, you can manually set the IP address, subcode mask, and default gateway

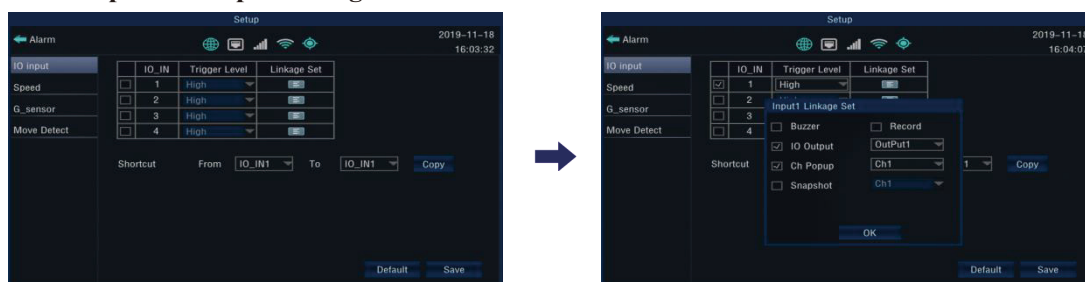
AP mode:



- Name: set the SSID name of the WIFI hotspot
- Password: set the password of the WIFI hotspot
- Allow networking: turn on networking (AP hotspot network)
- Networking: set wired or 3/4G networking

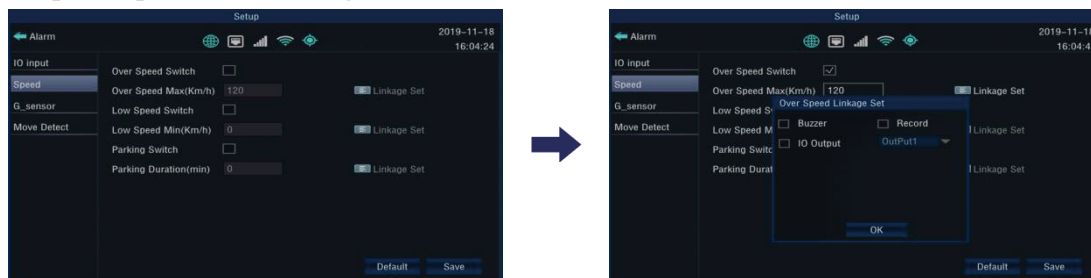
⑥ Alarm: Alarm Settings

1. I/O input: I/O input setting



- I/O input: I/O enable, trigger level, linkage setting (buzzer, I/O output, snapshot, Ch pop-up, record, etc.) can be set.

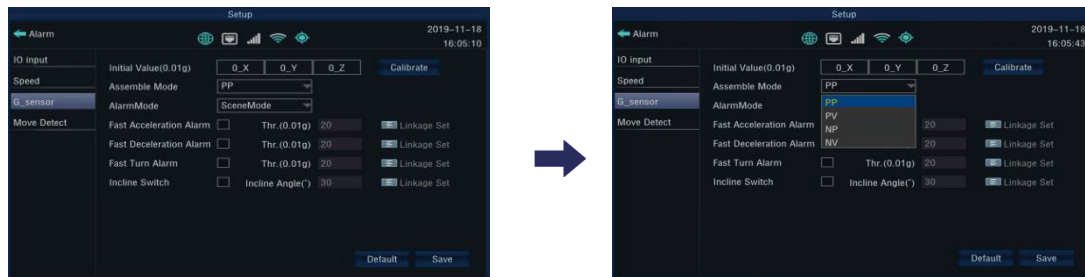
2. Speed: speed alarm setting



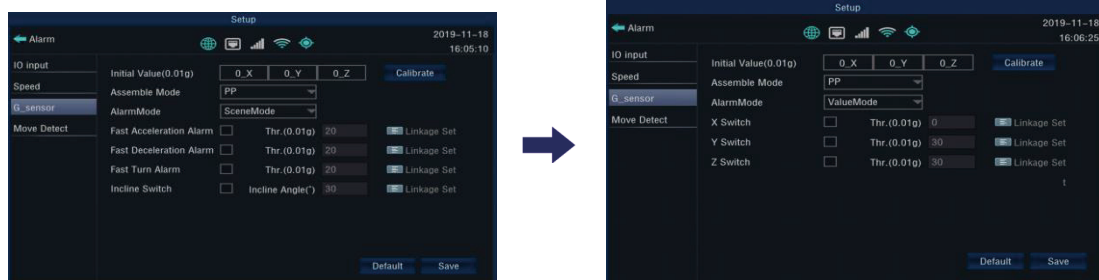
Speed: you can set speed alarm enable, over speed alarm, low speed alarm, parking alarm, alarm linkage setting (buzzer, I/O output, record).

Note: The linkage setting can be set only when enabled.

3. G_sensor: G_sensor alarm setting



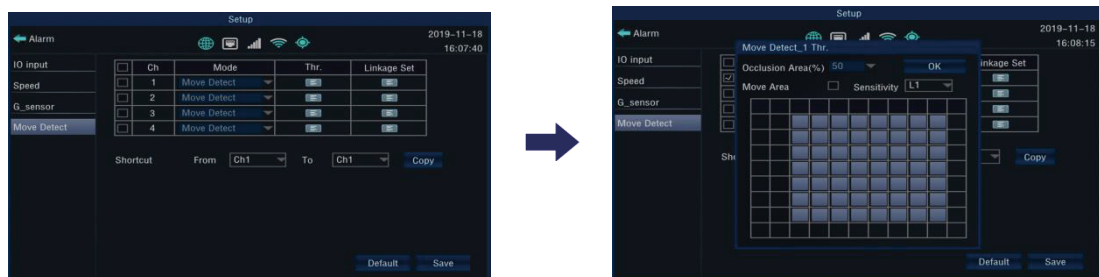
- Horizontal installation: you can set forward parallel, forward vertical, reverse parallel, reverse vertical
- Alarm mode: can be set to scene mode, value mode



- (1) Scene mode: you can set harsh acceleration alarm, harsh deceleration alarm, harsh turn alarm, incline alarm, linkage setting
- (2) Value mode: you can set Y reverse alarm, X direction alarm, Z direction alarm, linkage setting (buzzer, I/O output, record)

Note: The linkage setting can be set only when enabled.

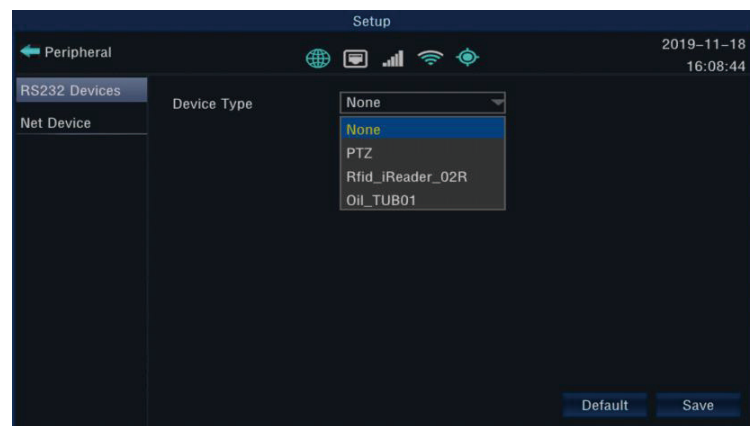
4. Motion detection setting



- Motion detection: you can set the recording enable, mode, trigger value (can set the trigger range for triggering motion detection and sensitivity), linkage setting (buzzer, I/O output, record)

Note: with shortcuts

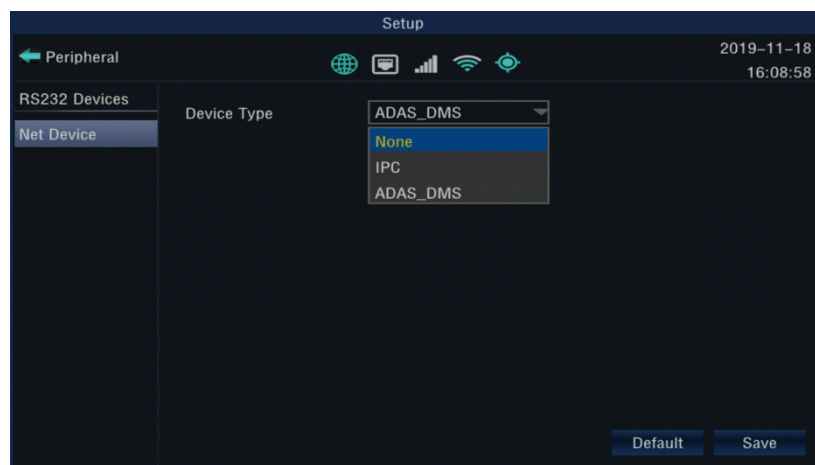
⑦ Peripherals



1. RS232 serial port peripherals

- Device type: select the peripheral type and select the corresponding setting for the corresponding device.
- Parameter setting: set corresponding parameters (baud rate, data bit, stop bit, check mode, etc.) according to the corresponding peripheral devices

2. Network device



- Device type: select the peripheral type and select the corresponding setting for the corresponding device.

⑧ Vehicle:

1. Vehicle info

Setup

2019-11-18 16:10:34

Vehicle Info

Plate Number 888888

Driver Name 888888

Phone Number 133348888

Company FP

Default Save

- Plate number: set the corresponding license plate number of the device
- Driver Name: set the corresponding driver name
- Phone Number: set the corresponding phone number
- Company: set the corresponding company name

2. Location service

Setup

2019-11-18 16:11:34

Location

Position Mode GPS

Update Interval(s) 3

Default Save

- Position Mode: set device position mode (BD、GPS、or BD/GPS mixed)
- Update Interval(s): set the time interval for uploading device GPS data to the platform (for platform upload)

3. Power

Setup

2019-11-18 16:11:09

Vehicle

Vehicle Info

Location

Power

Protect Enable ☐

Min Voltage(V) 9

ON-OFF Mode ACC

Delay Switch ☒

Delay 1(min) 10

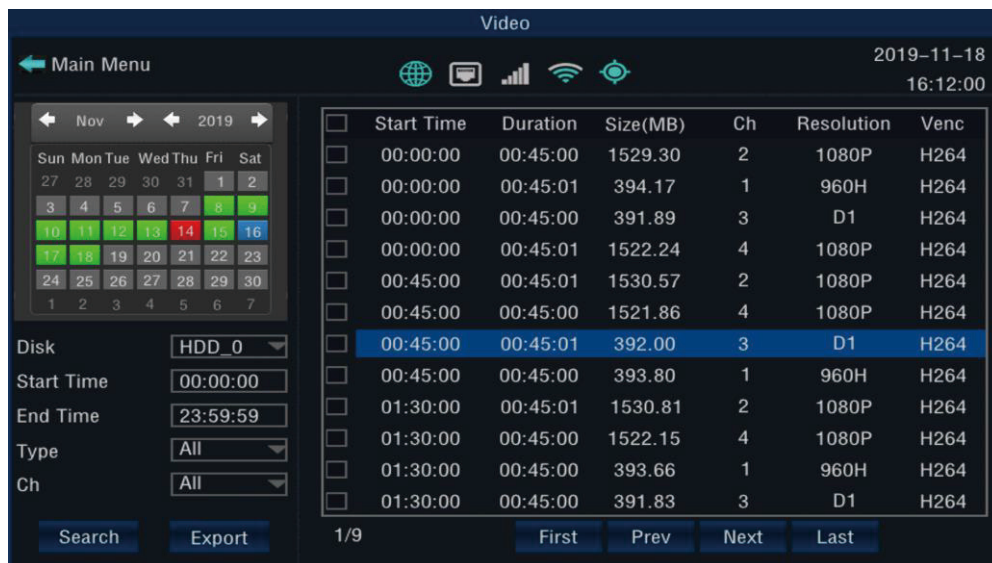
Delay 2(min) 1

Default Save

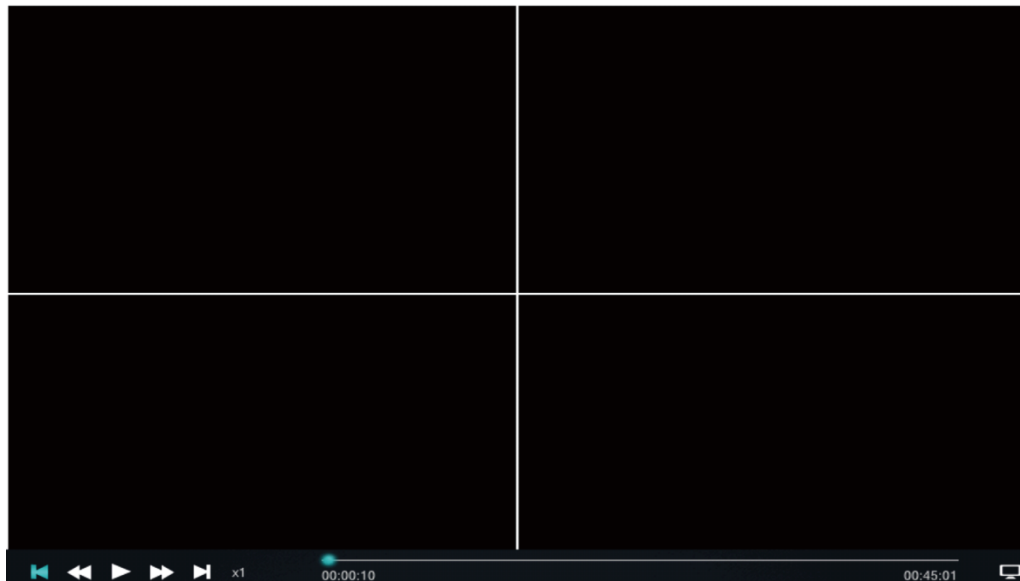
- **Protect Enable:** set the power protection switch
- **Min Voltage (V):** set the minimum voltage for power protection
- **ON-OFF Mode:** select switch mode
- **Delay Switch:** after the switch is turned on, you can choose Delay 1 (level 1: time-lapse recording time after ACC disconnection), Delay 2 (level 2: delayed shutdown time after ACC disconnection and delay level 1 ends)

4.3.2.2. Video search

① **Video search:** select the corresponding device and click Search for the video as shown below:



- Monthly calendar: the date displayed in the table which shows green indicates that the day is with normal recording, shows red indicates that there is alarm video on the day, shows blank indicates that there is no video file on the day, and shows blue indicates that the video is selected for the day.
- Type(video type): All/Normal/Alarm
- Disk(storage device): select the storage device which needs to search.
- Start/ End time: select the recording time period you want to check.
- Ch(Channels): select the channels you need to search.
- Press the “Prev””Next””First””Last” to select previous page, next page, first page, last page.




Play: there are two ways (playback interface as shown above)

Method 1: select the file to be played, press the ENTER button on the remote control to play (press the up and down buttons of the remote control to select the video file to be played. The selected file is with blue bottom, then press the remote control ENTER button to play the currently selected file.)

Method 2: select the file with the mouse and double click the left button to play

Export:

- 1) Insert USB disk
- 2) Select the video file to be exported on the current page (press the up/down keys of the remote control to select the video file you want to export, press the ENTER button on the remote control to check). When the first column become ☒, indicates already selected. As shown above, you can select multiple video files.
- 3) Select  button, you can export the selected video file to a USB flash drive.

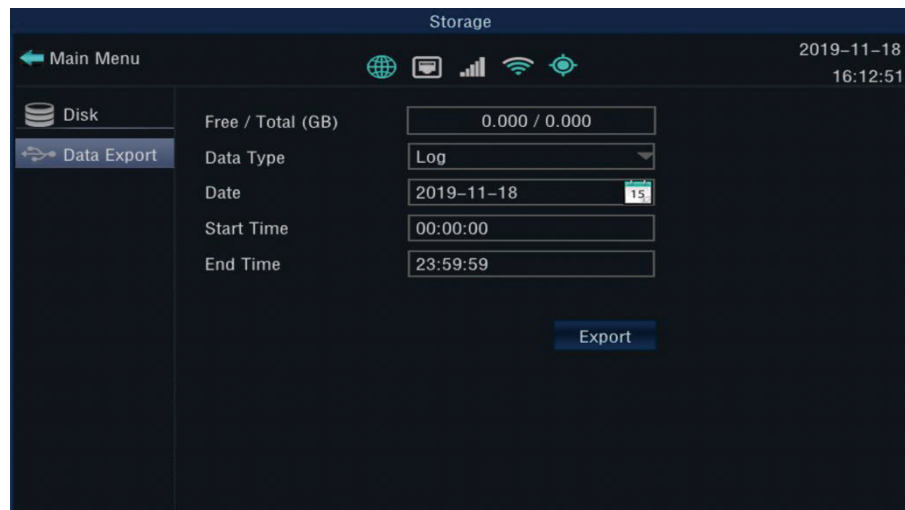
4.3.2.3. Storage



① Disk(Storage device): manage video storage devices

- Overwrite mode: set the recording loop overwrite mode
- Format: after checking, click Format to format the storage device, which can display information such as the available capacity and total capacity of the storage device and the file system format.

② Data export: export log, image data

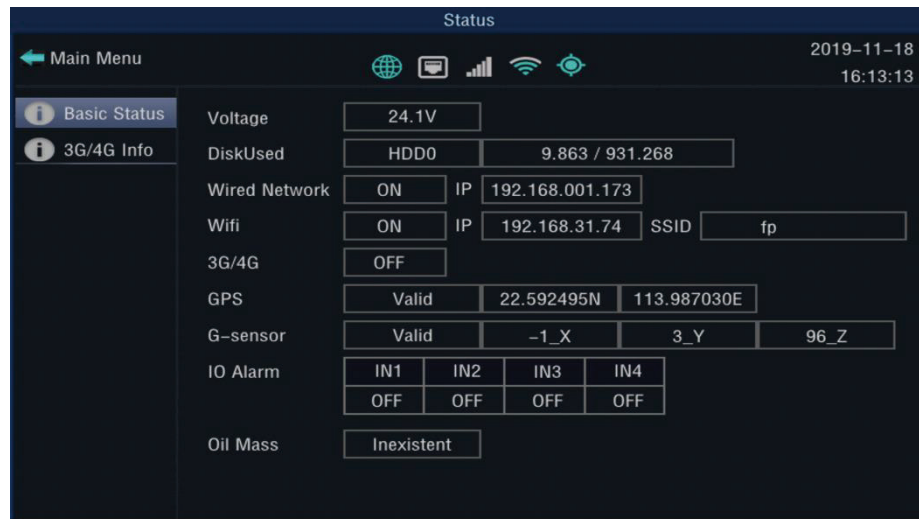


- Free/Total(GB): display the capacity information of the exported storage device
- Data Type: select the type of exported data (log, picture)
- Date: select the date to export data
- Start Time: select when to start exporting data
- End Time: select the time to end the export of data

4.3.2.4. Status

① Basic status

The basic status can also be entered directly by clicking the menu bar of the channel live preview interface.



- Voltage: display device input power voltage.
- Disk Used: display hard disk space status in normal recording
- Wired Network: display the current network status of the wired network connection.
- WiFi: show the WiFi connection status.
- GPS: show GPS connection status.
- G-sensor: show G-sensor status.
- IO Alarm: I/O triggers the alarm status.
- Oil Mass: show the amount of oil.

4.3.2.5. Status



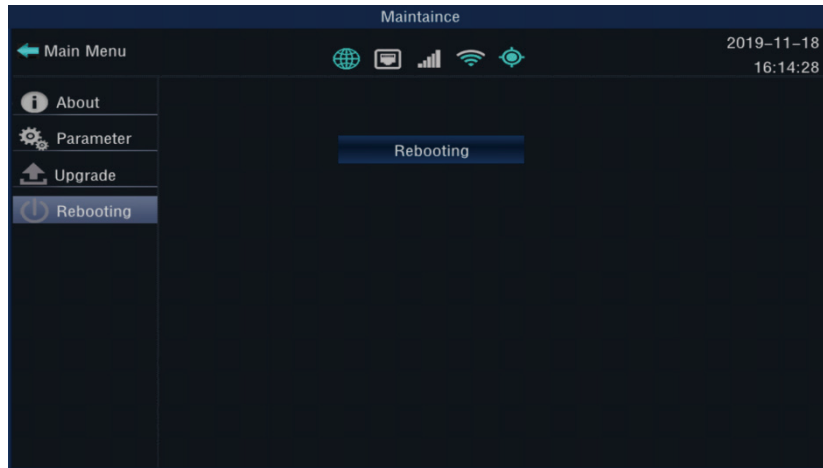
- About: display device firmware related information, such as: operating system, device name, customer version, App version, Mcu version, etc.



- Parameter maintenance: you can export and import device configuration parameters and restore factory settings

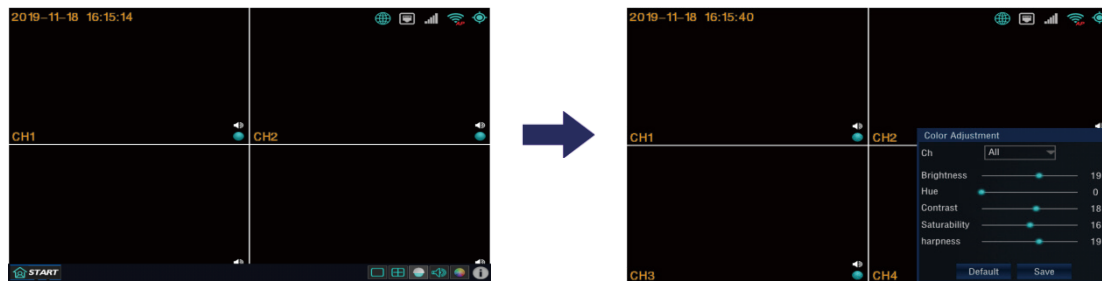



- Upgrade: used to upgrade device firmware and microcontroller software



- Rebooting: operating device security restart

4.3.2.6. Menu Bar Description



- Menu: click to enter the menu
- Full screen(□): show one channel
- Four split screen(田): show four channels
- Color adjustment: you can select the channel, set the brightness, chroma, contrast, saturation, sharpness and other image related parameters of the channel.
-  Basic status shortcut button
- The device CMS, network port, WiFi, and GPS connection status are displayed in the upper right corner.

5. Common Shortcut Settings and Solutions for Possible Issues

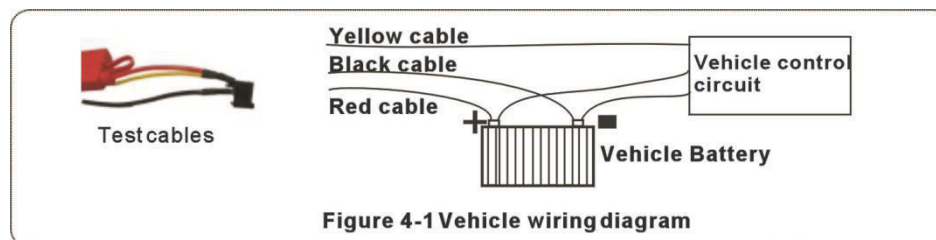
5.1. Shorcut settings

5.1.1. Wiring test and boot

The mobile dvr power cable has three lines(red, black and yellow). The red and black line needs to connect directly to the vehicle battery. The red line is connected to the positive pole, while the black line is connected to the negative pole, and the yellow line is connected to the ignition line (ACC). If you test indoor, you need to combine the red and yellow lines together, and connect to positive, then directly powered by DC12V.

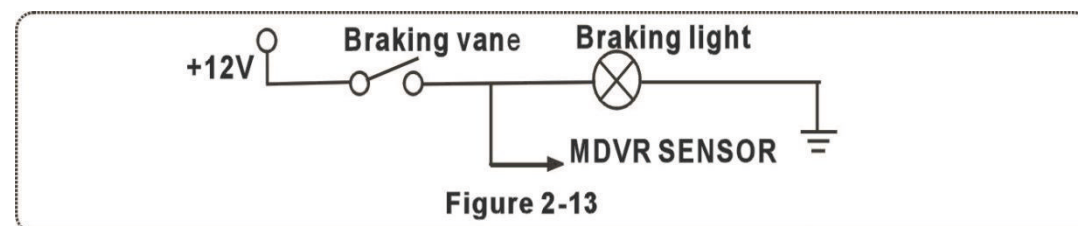
1. Check the power cable to see if connected properly. Confirm that the key gear set to the LOCK after the cable is connected, and it will start normally. The power light will be blue if boot normally.
2. Connect the AV-OUT output cable to the display and connect the corresponding device to the terminal to confirm that the connection is correct.

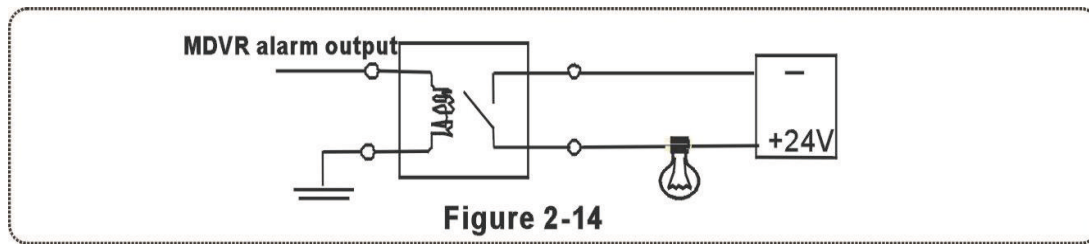
The following figure shows the test wiring and the power supply wiring in actual installation:



5.1.2. IO serial port usage

The device has 4 alarm inputs and 2 alarm output interfaces. The alarm input detection is level detection and can be connected to various vehicle driving states, such as brake, turning, vehicle switch and alarm button, as shown in Figure 2-13. When the brake pedal is stepped down, MDVR can detect high level, and vice versa, low level. The alarm output is level output, and the driving capability is 500mA. If the device connects to high power component, external relay must be connected, and the alarm output wiring must be as Figure 2-14 shows:





5.2. Related issues

5.2.1. Why no record after the device is turned on?

- ①. Please check whether the SD card slot of the front panel has a SD card.
- ②. If the SD card exists, please check the storage disk status on the system info interface:
 Status types: non-existent; unformatted; normalcapacity(disk not full); disk is full
 Status description:
 - a. Non-existent: the device does not detect the SD card. Please check the SD card on the computer, and replace the SD card to check. Or replace the device to detect whether it is a SD card problem or a device problem.
 - b. Unformatted: please format the device in the device formatting interface. After the format is completed, check whether the SD card capacity can be displayed normally.
 - c. The capacity of the disk is not full: please check the recording mode setting and see whether meets the recording conditions.
 - d. Disk is full: check if the video overwrite switch is turned on.

5.2.2. Why does the mdvr restart frequently when installed in the car?

- ①. Frequently restart phenomena: the device repeatedly goes online and offline; the video is intermittent, not continuous
- ②. Causes for frequent restarts:
 - a. The vehicle power supply is unstable. Please measure the input voltage of the device when there is a problem. This is a common cause for restart in practical applications.
 - b. The storage disk is faulty. Please format the storage disk or replace it after you backup the data.

- c. The device firmware or hardware is faulty. Please remove the storage hard disk or SD card. If the device is powered normally and still restarts. Please inform the technical support engineer the firmware version of mdvr and return to the factory for repair if necessary.

5.3. GPS related issues

5.3.1. Why can't I see the GPS location information on the device?

- ①. Check if the GPS module on the device exists.
- ②. Check if the GPS antenna is connected properly. The antenna should be placed in a wide and unobstructed place for good signal. If the vehicle passes through the tunnel during the driving or if there is a tall building or a large tree nearby, it is normal the signal will not be received temporarily.

5.3.2. The device is online, why can't I see the vehicle location information?

- ①. Please check the set GPS upload interval on the CMS platform.
- ②. Only when GPS signal on the device can receive normal positioning information, it can upload to the platform, so please check whether the GPS signal on the device is displayed normally.

5.4. Appendix

Image quality and storage comparison table

H264					H265				
Quality Resolution	Best	Better	Medium	Normal	Quality Resolution	Best	Better	Medium	Normal
Cif	140.6	112.5	84.4	56.3	Cif	84.4	67.2	50.5	34.4
D1/960H	562.5	450.0	337.5	225.0	D1/960H	337.5	269.8	202.2	134.9
720P	1125.0	900.0	675.0	450.0	720P	675.0	539.6	404.7	269.8
1080P	2250.0	1800.0	1350.0	900.0	1080P	1350.0	1079.7	809.9	539.6

The storage space occupied by the hourly video of one channel is shown in the above table. This table is for reference only. The size of the actual video file is related to the light changes of the current channel and object movement. To save space, you can turn off no video channels.

Calculation of Video file size:

1 hour 1 image quality D1 resolution video file size:

$$3600 * 1024\text{Kbps} / 8 / 1024 = 450\text{M}$$

Flow calculation

Bit rate X3600/8/1024=MB

384X3600/8/1024=168.75MB (per channel & per hour)