

**Quick Start Manual for  
Howen Device Protocol  
V2.2**

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## 1 General introduction

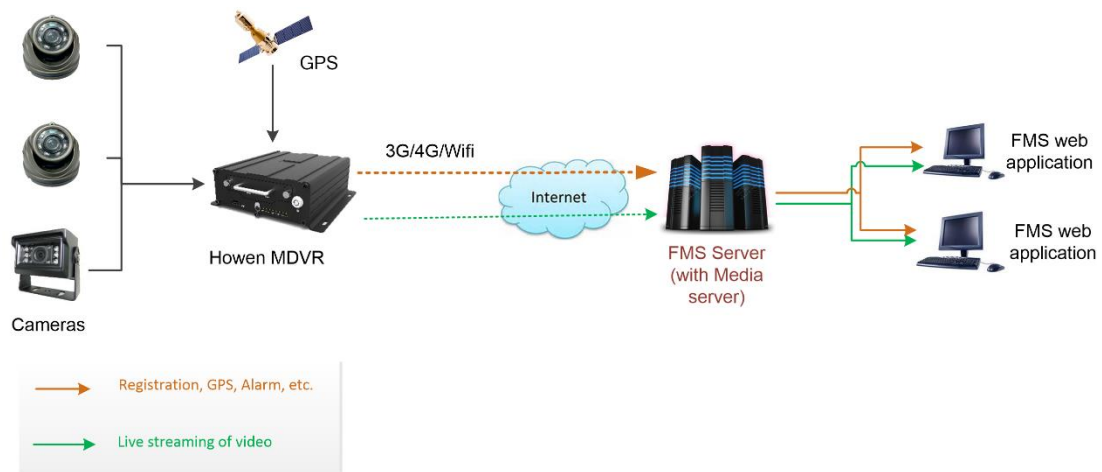
With integration of Howen MDVR into FMS, you can achieve tracking and video in all-in-one platform. Your FMS's end user can stay with the familiar platform experience while adding video at the same time,

Howen MDVR support two flexible options for integrating via:

- 1) HOWEN SDK
- 2) HOWEN device communication protocols.

This document introduces the necessary info and procedures of using Howen MDVR's communication protocol to integrate into third party-platform like FMS platform.

(If you want to use Howen SDK to integrate, please contact with your sales account manager in Howen or Howen support team: [support@howentech.com](mailto:support@howentech.com))

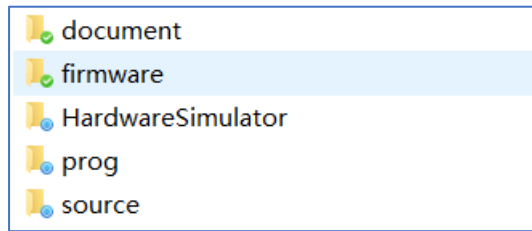


## **2 Developing environment:**

- 1, operation system: WIN7,32 & 64 or above
- 2, developing tool (IDE): visual studio 2015
- 3, developing language: C++

### 3 File Description:

Howen will provide the below file and code:



No	Folder	File
1	document:	Howen MDVR device protocol-english.docx
2	prog	DeviceDriverDemo
		ProtocolDemo
3	source	Demo: DeviceDriverDemo; ProtocolDemo
		dll
		include
		lib
4	firmware	ME41-04 / ME32-04 firmware
		ME310-08 firmware
5	Simulator	

#### 3.1 document

Howen MDVR device protocol

Howen MDVR device protocol-english.docx: the description of communication protocol between device and the platform

#### 3.2 prog

include 2 demo with the relatied .dll and exe file

##### 3.2.1 DeviceDriverDemo:

demo program related to device SDK; can demonstrate some function

x64/json:

json demo for device parameter setup.

##### 3.2.2 ProtocolDemo:

protocol relative demo program, analysis for the protocol, and demo some function

#### 3.3 source

sample demo code and related file

#### 3.4 demo

relative sample demo source code

### **3.4.1 DeviceDriverDemo**

device drive sdk application sample demo, shows some part of the drive sdk's call function, data callback, and the process for how to use play sdk to play. If you need to use drive sdk mode to integrate with Howen device, please refer to this code and debug (drive sdk is the content encapsulation for Howen protocol)

### **3.4.2 ProtocolDemo:**

Protocol organization and analysis sample demo, show the protocol field definition for some function, the process for how to organize; if you use the protocol integrate with Howen device, please refer to this code, and follow debug

## **3.5 dll**

the relative .dll file for program running

## **3.6 include**

the relative .h file for Program compiling

## **3.7 lib:**

the relative .lib file for Program compiling

## **3.8 firmware:**

ME32-04/ME41-04 SD card MDVR firmware:

ME31-08 HDD MDVR firmware

\*For the latest version of firmware, you can please contact our technical support

## 4 How to Upgrade Firmware:

Sometimes, you may need to upgrade the firmware of MDVR, to get the latest updated features.

- 1.Copy the update firmware in the root of USB flash drive;
- 2.Plug the USB flash drive on MDVR;
- 3.MDVR will detect the firmware on USB flash drive automatically (if not, maybe the flash is formatted by the MDVR, please copy the firmware to the flash again and try)
- 4.MDVR will update automatically and restart automatically.
- 5, check the MDVR OSD menu " main menu >> info >> APP ver " to double confirm the upgrade success or not

Note: The LED in front panel will be lighting in turns during upgrade. Please make sure power supply is normal in upgrade time.

## 5 How to Register MDVR to your FMS:

Network Setup menu includes: Center settings, Local settings, Dial settings and Wi-Fi settings

### 5.1.1 Local Network Setup

Local network IP: IP address of the device is set with the central server, the same network segment, set the mask, gateway, MAC address



### 5.1.2 3G Setting

Enable: Press [Enter] to select: On / Off.

Net Type: Press [Enter] to select: WCDMA / EVDO / TD-SCDMA / TDDLTE / TDDLTE-1 / TDDLTE-APN, Center No.: Press [Enter] to enter the keyboard interface, move the cursor press the Enter key to select the corresponding letters.

User name, Password: set up a wireless service user name and password, use [Enter] to enter the keyboard interface, move the cursor press the Enter key to select the corresponding letters



### 5.1.3 Wi-Fi settings

WIFI Enabled: Press [Enter] to select: On / Off.

Enable Encryption: Press [Enter] to select: On / Off.

Authentication Mode: Press [Enter] to select: Open / Shared / WPA / WPA-PSK.

Encryption Type: Press [Enter] to select: NONE / WEP / TKIP / AES.

SSID, password, IP address, gateway, mask, and corresponding to router settings.



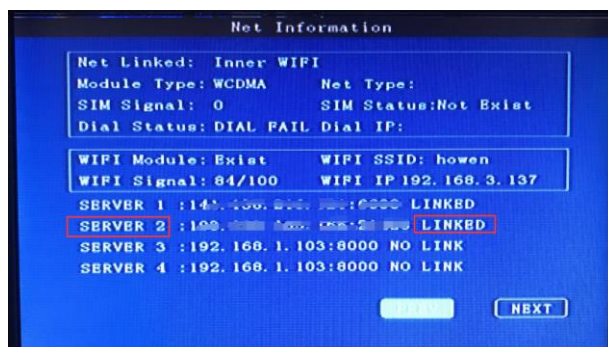
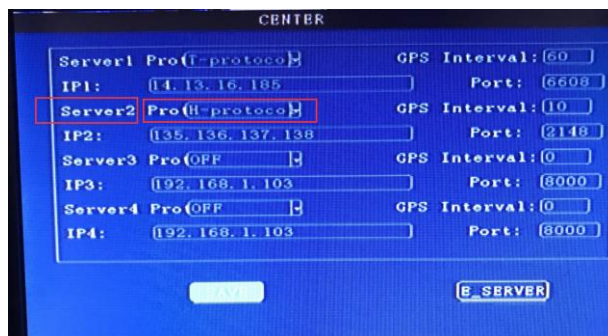


## 5.2 Connect to Server Center:

Device can register to the FMS Server IP and port, via any of the network connection methods above.

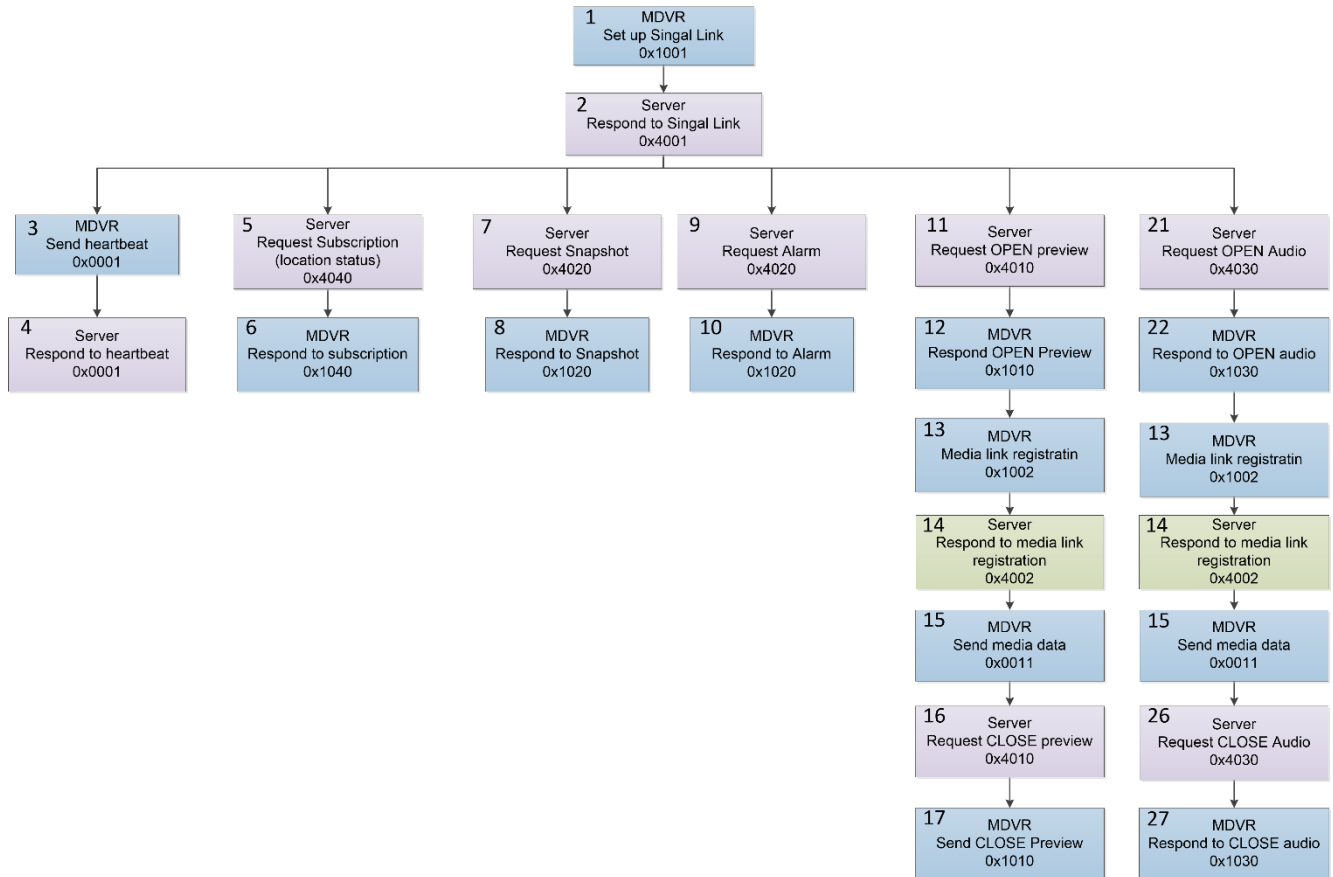
Input the IP and port of FMS server in the **Server 2**, via **H protocol**.

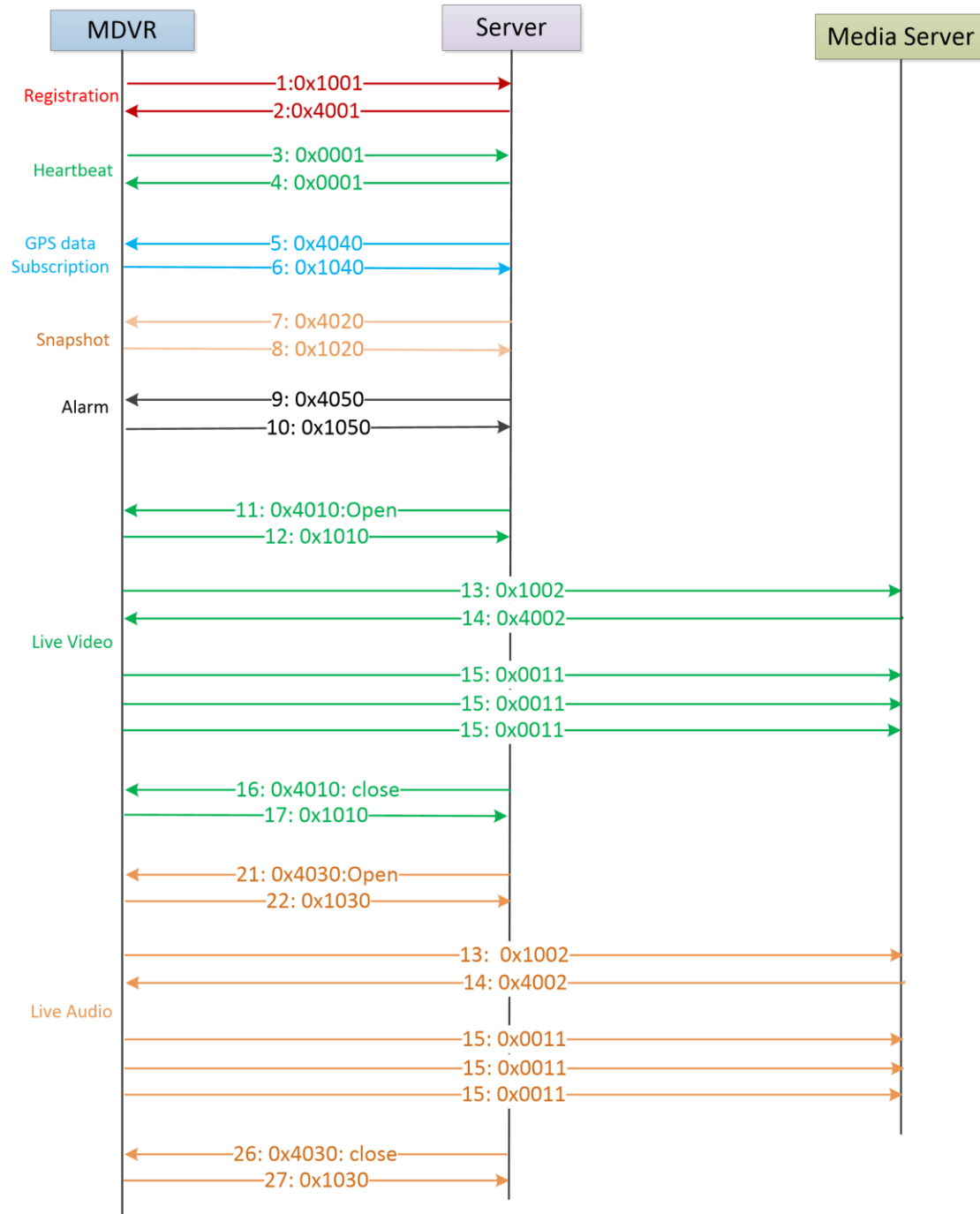
Then you should be able to see the Center 2 connected, in the Info page of MDVR.



## 6 Connection Steps:

You can use tools like Wireshark to capture and analyzing the data that received from MDVR. Below work flow and chart shows the logic and sequence you need to follow for the main steps.





### 7.1 Status content bit length:

bit	Rules
bit0	location info (0: no, 1: exist)
bit1	Gsensor (0: no, 1: exist)
bit2	basic status (0: no, 1: exist)
bit3	communication module working status (0: no, 1: exist)
bit4	fuel consumption status (0: no, 1: exist)
bit5	network status (0: no, 1: exist)
bit6	WIFI network status (0: no, 1: exist)
bit7	hard disk status (0: no, 1: exist)
bit8	alarm status (0: no, 1: exist)
bit9	temperature and humidity status (0:no, 1: exist)
bit10	statistics data (0:no, 1: exist)
bit11	ibutton info (0: none, 1: exist)

Content bitmask example	Binary	Subscribed bits
1	0000 0000 0001	bit0
63	0000 0011 1111	bit0-bit5
255	0000 1111 1111	bit0-bit7
1023	0011 1111 1111	bit0-bit9
4095	1111 1111 1111	bit0-bit11

When a polling data is received, we need to divide the data following the Byte length of each part, and analyze one by one, following the definition of each fields.

4801411083000000217374617475732d32383038313130322d303030303031453936424446  
423031300012090e0b0320af03000112090e0b031a0008000f1815090071d88f080016472905  
000700000400000020000000810000001f00000103010f000000000000010001eaed000000  
000000f0000000000000000000000003f0000000000000000000000

Len(B)	HEX		Convert to DEC	Meaning	Rules
1	48		H	H protocol	
1	01		0x01=1	Protocol version V1	
2	4110		0x1041	2.7.3 Service Data	
1	21		0x21=33	Session length is 33Byte	2.7.3 Service Data
(33)	7374617475732d32383038313130322d3030303030314539364244464230313000			Session numbering	
6	12090e0b0320			Device Time: 2018-09-14 11:03:26	
		12	18	Year: 2018	2.7.4 Status Data: header info
		09	09	Month: September	
		0e	14	Day: 14th	
		0b	11	Hour: 11	
		03	03	Minute:03	
		20	32	Second: 32	
2	af03		0x03af=001110101111	Location info bit: parameters exist or not [1]	[1] 2.7.5 Status context bits description
1	00		0x00=00000000	Direction type bit	[2]
1	01		0x01=1	Location Type: GPS	2.7.4 Status Data: Location info
6	12090e0b031a			Positioning module acquisition time: 2018-09-14 11:03:26	
		12	18	Year: 2018	
		09	09	Month: September	
		0e	14	Day: 14th	
		0b	11	Hour: 11	
		03	03	Minute:03	
		1a	26	Second: 26	
	00		0x00=0	Direction: 0 degree	0~180, unit is degree
1	08		0x08=8	Satellites Quantity: 8 pcs	
2	000f		0x0f00=1500	Speed: 1500/100=15 km/h	km/hour*100
2	1815		0x1518=5400	Altitude: 54m	Meter*100
2	0900		0x0009=9	Positioning accuracy: 9m	meter
1	71		0x71=113	Degree of longitude: 113 degree	0~ 180
4	088f0800		0x00088fd8= 561112	Minute of longitude: 56.1112	minute*10000

1	16	0x16=22	Degree of latitude: 22	-90 ~ +90
4	47290500	0x00054729=345897	Latitude Division: 34.5897	minute*10000
1	07	0x07=00000111	G-sensor identifier bit	[3]
2	0000	0x0000=0	X: 0	g*100, -4000~+4000
2	0400	0x0004=4	Y: 0.04	g*100, -4000~+4000
2	0000	0x0000=0	Z: 0	g*100, -4000~+4000
2	0200	0x0002=2	Tilt: 0.02	g*100, -4000~+4000
2	0000	0x0000=0	Impact: 0	g*100, -4000~+4000
1	81	0x81=10000001	Basic Data bit identifier 1	[4]
1	00	0x00=00000000	Basic Data bit identifier 2	[5]
2	0000	N/A	N/A	Reserve
2	1f00	0x001f=00011111	Module Working Status bit	[6]
1	00	0x00=0	Mobile Network: Unknown	
1	01	0x01=11	GPS module: normal	
1	03	0x03=3	Wi-Fi module: not exist	
1	01	0x01=1	G sensor: normal	
2	0f00	0x000f=00001111	Recording status: Ch1-4: recording, Ch 5-8: not recording	
Fuel consumption status does not exist, so no data here.				
1	00	0x00=0000	mobile network status bit identifier	
1	00	0x00=0	signal intensity: invalid	0: invalid, 1~10 (strongest)
1	00	0x00=0	network type: unknown	(refer to 3.2 network type list)
2	0000	N/A	Reserved	
WIFI network: Wi-Fi module not exist, so no data here				
1	01	0x01=00000001	Hard disk bit identifier	
1	00	0x00=0	ID: 1	
1	01	0x01=0	Har disk status: recording	
4	eaed0000	0x0000eaed=60141	Har disk size: 60141MB	
4	00000000	0x00000000=0	Hard disk balance capacity: 0MB	
4	0f000000	0x0000000f=000000001111	Alarm Status identifier bit	[7]
2	0000	0x0000=0	video loss	
2	0000	0x0000=0	motion detection	
2	0000	0x0000=0	video blind	
2	0000	0x0000=0	alarm input trigger	
2	3f00	0x003f=000000111111	Temperature & Humidity Status identifier bit (Not Implemented Yet)	
2	0000		in vehicle temperature	
2	0000		outside of vehicle temperature	
2	0000		motor temperature	
2	0000		device temperature	
1	00		in vehicle humidity	
1	00		outside of vehicle humidity	
Statistics data: data not exist, so no data here				

Ibutton info: data not exist, so no data here

[1] 0x03af=001110101111 (2.7.5 Status content bits description)

	Value	Meaning	Rules
bit0	1	Exist	location info (0: no, 1: exist)
bit1	1	Exist	G-sensor (0: no, 1: exist)
bit 2	1	Exist	basic status (0: no, 1: exist)
bit3	1	Exist	communication module working status (0: no, 1: exist)
bit4	0	No	fuel consumption status (0: no, 1: exist)
bit5	1	Exist	network status (0: no, 1: exist)
bit6	0	No	WIFI network status (0: no, 1: exist)
bit7	1	Exist	hard disk status (0: no, 1: exist)
bit8	1	Exist	alarm status (0: no, 1: exist)
bit9	1	Exist	temperature and humidity status (0:no, 1: exist)
bit10	0	No	statistics data (0:no, 1: exist)
bit11	0	No	ibutton info (0: none, 1: exist)

[2] 0x00=00000000 (Location info bit description)

	Value	Meaning	Rules
bit0	0	0°~180°	Direction Indicator, 0: 0°~180°, 1: 180°~360°
bit1	0	East Longitude	Longitude mark, 0: East Longitude, 1: West Longitude
bit2	0	above sea level	Altitude direction, 0: above sea level, 1: lower then sea level
bit3	0	data does not exist,	Mileage, 0: data does not exist, 1: Data exist
bit4	0	North latitude	Latitude mark, 0: North latitude, 1: South latitude
bit5	0		Reserved
bit6	0		Reserved
bit7	0		Reserved

[3] 0x07=00000111 (G sensor bit analyzing)

	Value	Meaning	Rules
bit0	1	Data exist	xyz acceleration (0: data not exist, 1: data exist)
bit1	1	Data exist	tilt (0: data not exist, 1: data exist)
bit2	1	Data exist	Impact (0: data not exist, 1: data exist)
bit3	0		Reserved
bit4	0		Reserved
bit5	0		Reserved
bit6	0		Reserved
bit7	0		Reserved

[4] 0x81=10000001 (Basic Status bit analyzing 1)

	Value	Meaning	Rules
bit0	1	Valid: Ignition is on	bit0-ACC (0-invalid, 1-valid)
bit1	0	Off	bit1-break (0-invalid, 1=valid)
bit2	0	Off	bit2-turn left (0-invalid, 1-valid)
bit3	0	Off	bit3-turn right (0-invaidd, 1-valid)
bit4	0	Off	bit4-forward (0-invalid, 1-valid)
bit5	0	Off	bit5-backword (0-invalid, 1-valid)
bit6	0	Off	bit6-left front door (0-Close, 1-Open)
bit7	1	Right front door open	bit7-right front door (0-close, 1-Open)

[5] 0x00=00000000 (Basic Status bit analyzing 2)

	Value	Meaning	Rules
bit0	0	Left middle door: close	bit0: left mid door (0: close, 1: Open)
bit1	0	Right middle door: close	bit1: right mid door (0: close, 1: open)
bit2	0	Left back door: close	bit2: left back door (0: close, 1: open)
bit3	0	Right back door: close	bit3: right back door (0: close, 1: open)
bit4	0		
bit5	0		
bit6	0		
bit7	0		

[6] 0x001f=00011111 (Module Working Status bit analyzing)

	Value	Meaning	Rules
bit0	1	Data exist	bit0: mobile network (0: data not exist, 1: data exist)
bit1	1	Data exist	bit1: location module (0:data not exist, 1:data exist)
bit2	1	Data exist	bit2: WIFI module (0:data not exist, 1:data exist)
bit3	1	Data exist	bit3: G-sensor (0:data not exist, 1:data exist)
bit4	1	Data exist	bit4: recording status (0:data not exist, 1:data exist)
bit5	0		
bit6	0		
bit7	0		

[7] 0x0000000f=000000001111 (Alarm Status bit analyzing)

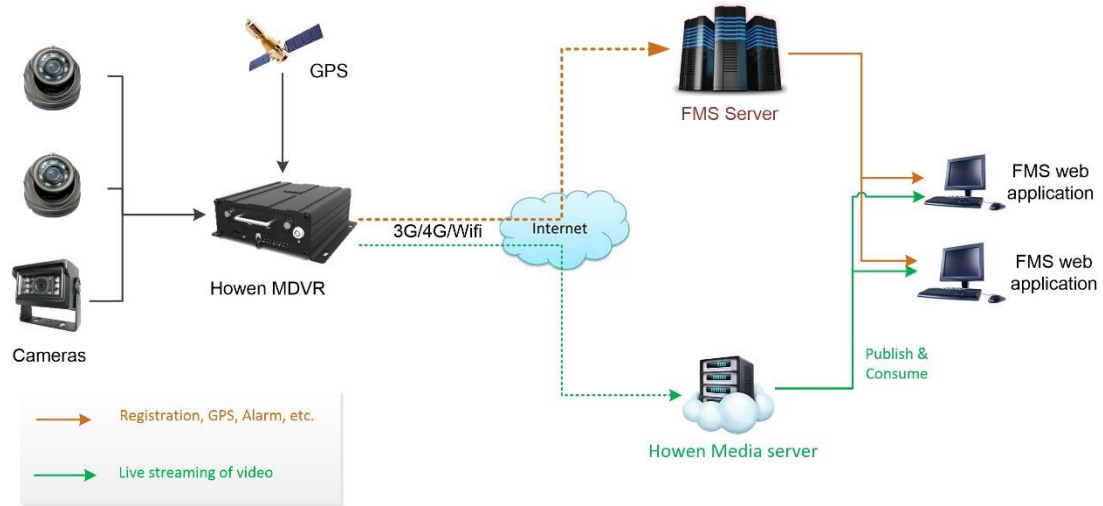
	Value	Meaning	Rules
bit0	1	Video loss alarm	bit0: video loss (0: data invalid, 1: data valid)
bit1	1	Motion alarm	bit1: motion detection (0: data invalid, 1: data valid)
bit 2	1	Video blind/cover	bit2: video blind (0: data invalid, 1: data valid)
bit3	1	Input alarm	bit3: alarm input trigger (0: data invalid, 1: data valid)
bit4	0	No overspeed	bit4: over speed alarm (0: no trigger, 1: trigger)
bit5	0	No low speed	bit5: low speed alarm (0: no trigger, 1: trigger)



bit6	0	No emergency alarm	bit6: emergency alarm (0: no trigger, 1: trigger)
bit7	0	No overtime stop	bit7: over time stop (0: no trigger, 1: trigger)
bit8	0	No vibration alarm	bit8: vibration alarm (0: no trigger, 1: trigger)
bit9	0	No out geo fencing alarm	bit9: out of GEO fencing alarm (0: no trigger, 1: trigger)
bit10	0	No enter geo alarm	bit10: enter GEO fencing alarm (0: no trigger, 1: trigger)
bit11	0	No exit line alarm	bit11: exit line alarm (0: no trigger, 1: trigger)

## 8 How to use Howen Media Server:

If you want to use Howen media server, we can help you to deploy our media server software, and this chapter introduce how to use Howen's media server to transmit live streaming.



### 8.1 Live streaming procedure:

Step 1:

You need to register the MDVR to your server.

Step 2:

You need to request preview (live streaming) from your server, following the Chapter 2.4 in Protocol document.

Then you can check the device status in <http://47.88.11.27:8800/stat> (as an example. The real IP should be the one that you deployed with media server)

If it shows this device ID is **Publishing**, it means the request is successful. Otherwise, not successful

Step 3:

You can use [rtmp://47.88.11.27/live/live\\_XXXXX\\_01\\_00](rtmp://47.88.11.27/live/live_XXXXX_01_00) to Play the live streaming

(Please refer to below guidance for detailed explanation of live playing)

You can check <http://47.88.11.27:8800/stat>

if it shows **Playing**, it means the playing is successfully

After requesting live video, you need to open the live streaming window within **300 seconds** (the time can be configured in our media server's setting by us), otherwise the live request will be invalid, which means you need to request again.

### 8.2 Media Server Info

Streaming Server address: 47.88.11.27 (as an example. The real IP should be the one that you deployed with media server)

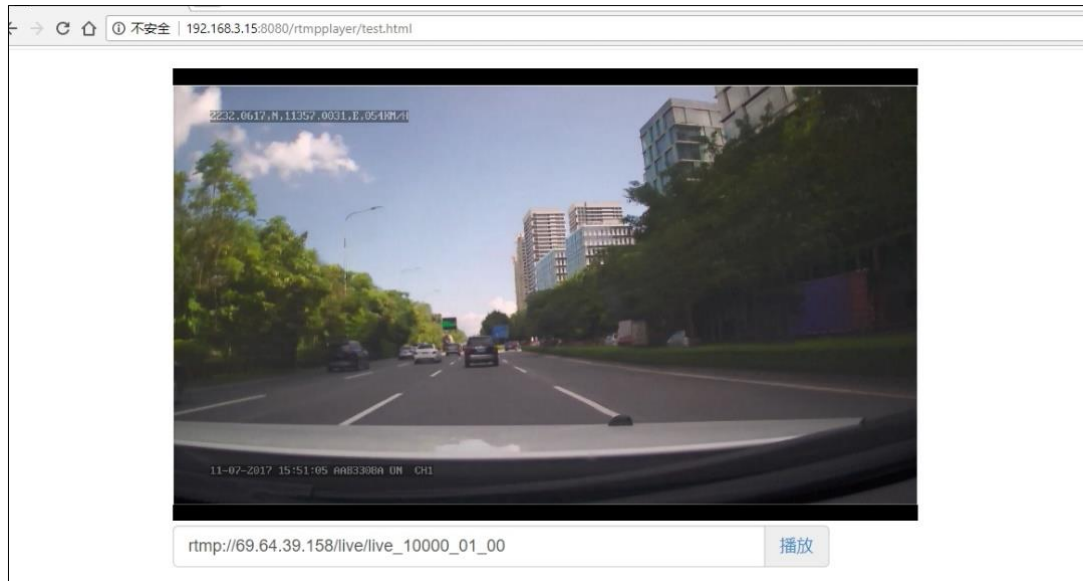
RTMP SERVER Port: 1935

Http SERVER Port: 8800

Video transmission: 7799

Device ID: 10000, 20000, or your device's ID.

Below is snapshot of live streaming



### 8.3 Request format of Video

When requesting for video, need to send session ID in below format:

*live\_Device ID\_channel number\_Stream type*

- 1) Device ID: ID of MDVR, from 01 – 16, means Channel 01- Channel 16
- 2) Channel number: two digits, like: 01, 02, 03, 04
- 3) Stream type: two digits, 00: sub stream, 01: main stream

The address for flash access is: *rtmp://ip:port/live/live\_Device ID\_channel number\_Stream type*

Example: *rtmp://192.168.3.210:1935/live/live\_10010\_01\_00*

### 8.4 Request format of Audio

When requesting for video, need to send session ID in below format:

*voice\_Device ID\_channel number*

- 1) Device ID: ID of MDVR, from 01 – 16, means Channel 01- Channel 16
- 2) Channel number: two digits, like: 01, 02, 03, 04

The address for flash access is: *rtmp://ip:port/live/voice\_Device ID\_channel number*

Example: *rtmp://192.168.3.210:1935/live/voice\_10010\_01*

### 8.5 Request for HLS (html5) video:

After requesting video of cameras, you can use below link to view HLS video streaming:

*http://ip:port/hls/live\_deviceID\_channel\_stream.m3u8*

Example: *http://47.88.11.27:8800/hls/live\_20000\_01\_00.m3u8*

Note: Please use Internet Explorer or other browser to try (Chrome may will download the m3u8 instead of playing in the browser window)

Below is snapshot of HLS streaming in mobile browser:

