Howen Hardware Communication Protocol (H-Protocol)

Version: V3.9.7

Content

Version log

Ver.	Description	Date
V3.8.13	1.4 Modify illustration: Media interaction process: 2.12.7 Add: Notification of File transmission Status 2.16 Modify: Instructions for getting module status 2.4.13 Get the specified module log 4.33 Remove the threshold “limit” and interval “delay” 4.29, 4.30, 6.8, 6.9 Modify parameter description and remove invalid fields	Dec 29, 2021
V3.8.14	Modify 2.8.3: Electronic fencing Modify: type error	March 1, 2022
V3.8.15	2.7.4, 2.7.5 Add: bit13 voltage info 2.8.3 Add: new descriptions 2.8.3 3.9 Add IO enable description 2.8.5 Add: upgrade status 2.12.6 Add: file generate notification: et 2.12.7 Add: Notification of File transmission Status 2.17.4 Add: geofence circle 3.3 add ec description 3.4 Add: ft=9 4.5 Add: description of ha\hb 4.16 Add: nodes 4.35 Add: Extend parameter 4. Modify: parameter description 7. Add parameter (Dashcam V2)	April 8, 2022
V3.9.0	2.2.1 Distinguish H.264/H.265 2.2.2 G726 audio decoding (ffmpeg convert to g726) 2.7.4 Disk Type Description 2.7.13 Geo fence parameters preOutArea\preIntoArea 2.8.3 Types of Abnormal Fuel events 2.8.3 Geo fence Pre-entry and Pre-exit warning 2.8.3 add it type for swipe card 2.9 Support monthly calendar search 2.14.10 Log recording Duration 2.14.11 Reset Mileage 2.18 Description of driver information configuration file 3.3 Added ec=45 (video exception)	July 12, 2022
3.9.1	2.3.1 Add: time zone 2.8.3 Add: People counting door types, Vibration, votalge alarm, IO types, etc. 3.3 Add: file events types 3.7 Add: AI alarm types	Sep 22, 2022
3.9.2	2.7.4, 14 Add: OBD info 3.7.4, 16 Add: Driver 3.7.4, 17 Add: Bluetooth info 2.7.5 Add: description of status bit 2.8.3, 8 Add: subtypes for storage abnormal 2.8.3, 11 Remove: fuel units for to, fr 2.8.3, 16 Add: tire pressure 3.3 Add: event types	Jan 6, 2023
3.9.3	2.8.3 Modify/Add: Speed alarm, high and low temperature, humidity alarm, tire pressure alarm, disk detection 2.7.4 Add: Content status bit (description 1, 2), load information, device temperature 2.17.3 Add: linkage parameter bit description 3.3 Add: ec code, 48, 49, 770 3.6 Change: G726 bytes	2023.08.30

	3.7 Add: tp code, BSD alarm types	
3.9.4	2.5.1 Snapshot definition 2.7.4 15 Add OBD data 2.8.3 15 overtime driving 2.9 \2.10 Support main/sub stream for playback 2.10.4 Playback control 2.17.3 Add linkage of Geofence: overEx 2.14.15 tts audio 3.3 Change: ec=17, Add alarms: 50-56 3.7 Change: BSD alarm names	2024.04.12
3.9.5	2.2 Media data description 2.8.3.20, 2.3.1 Wake-up mode, wake-up alarm 2.7.4.14 Modify OBD speed unit 3.3, Add event type	2024.08.28
3.9.6	3.3.3 Add: event type 2.8.3.21、2.8.3.22 Satellite Modem status, Alcohol detection	2025.01.16
3.9.7	2.7.4 Add: Basic Status, Privacy mode 2.8.3 Add: speed source 2.8.3.2 Modify description 2.8.3.9 Add: Disk abnormal 2.8.3.23 Add: Datahub message 3.3.3 Add: ec codes	2025.07.02

1 Fundamental Description

1.1 Transmission

Because of penetrability and stability of mobile network, the data interaction is based on the TCP/IP protocol. MDVR takes the initiative to connect to the server and then build the communication and business interaction with the server.

There are two types of network link: Signal link and Media link.

Notes:

1, If there is no special instruction, the data bit starts from 0.

2, The protocol adopts host byte sequence (small endian), when the business data is interacting, the related byte encoding sequence to send.

3, If there is no special instruction, the protocol loading data adopts JSON encoding rule, and all of them are using character string mode to represent.

4, The Session No. mentioned in this document usually are regenerated every time when the MDVR gets access to the sever, it is not recommended to use it repetitively to ensure the uniqueness.

5,text string transmission, if there is not special instruction, need to add ending code to be sent together, for example if you need to transmit string " 123", you need to send 4 bytes, refer to : 0x31 0x32 0x33 0x00, the 0x00 is the string ending code, if string is NULL, just send 0x00 ending code.

6,Json string is complete string, there is no need to split up the internal assingnment to tread it as a separate string, so only refer to item 5 rule as above when the Json string is a complete string.

1.2 Signal Link

MDVR takes the initiative to connect to the sever and build the interaction link with sever through the locally configured sever address and port. If the network gets get disconnected, the MDVR will try to reconnect to the sever in every specific interval.

This signal link is used for basic signal control business, all the signal requests, (except for the media link which contains interacting with the business data) needs to interact through this link. For more details, please refers to the protocol description.

1.3 Media Link

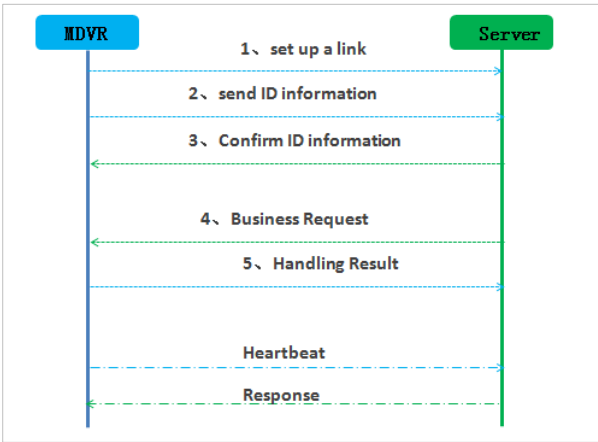
When MDVR receives the request from the signal link to rebuild the link, according to the received sever address and port, the MDVR will voluntarily try to connect to the sever.

If the network gets disconnected, the MDVR will not automatically try to connect. If reconnection is needed, then the sever will send the request according to the new business regulation.

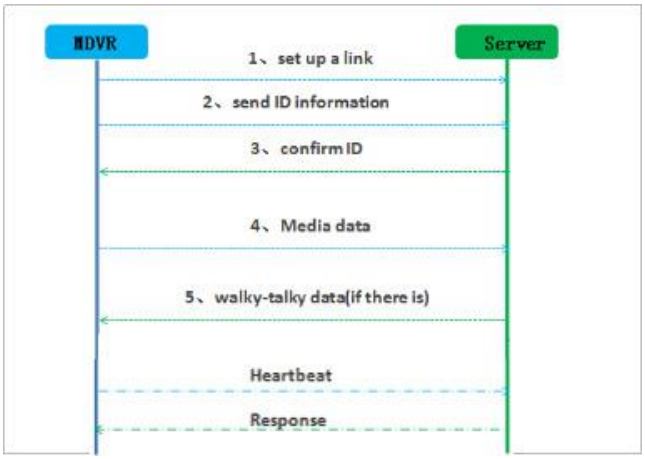
This link is used for media data transmission, such as audio video data sending to the sever, or the walky-talky data sending to the MDVR side. For more details, please refer to the protocol description.

1.4 Interaction Process

Service interaction process:



Media interaction process:



Notes:

1, MDVR takes the initiative to send the heartbeat, and sever will respond to that, it is considered to be offline when the sever still has not received the heartbeat for 60s by default.

2, If there is other message to send, then heartbeat will not be sent. Sending heartbeat will not be calculated until there is no more data to send.

1.5 Message Structure

1.5.1 Message Components

Message header+ loading data

Items	Length	Specification
Message header	8 bytes	Information header
Loading data	N bytes	the practical loading data

1.5.2 Message header

:

Please make sure the [loading length] of each command are accurate, otherwise the MDVR may take the command as “illegal” pack, then it will disconnect the link to Server

Data items	Length	Specification
ID	1 byte	it is a fixed ‘H’
Version	1 byte	1 the current version is 1
Type	2 bytes	Message type definition, to distinguish the message data.
Loading length	4 bytes	The actual loading length, it doesn’t include the length of the current message header. The actual entire data package length= loading length+ message header length (8 bytes)

1.5.3 Loading Data

Actual loading data, for details, please refer to the specific definition of each message.

1.5.4 Rules of Defining Message Type

Bidirectional message uses the range from 0x0000 to 0x0FFF.

The message that MDVR sends to the sever uses the range from 0x1000 to 0x3FFF.

The message that server sends to the MDVR uses the range from 0x4000~0x6FFF.

All the other field are reserved for future use.

1.6 Command List

Function	Value	Description
Heartbeat request	0x0001	_MDVR 请求 refer to the description
Media data	0x0011	_媒体数据 refer to the description

MDVR→→Server

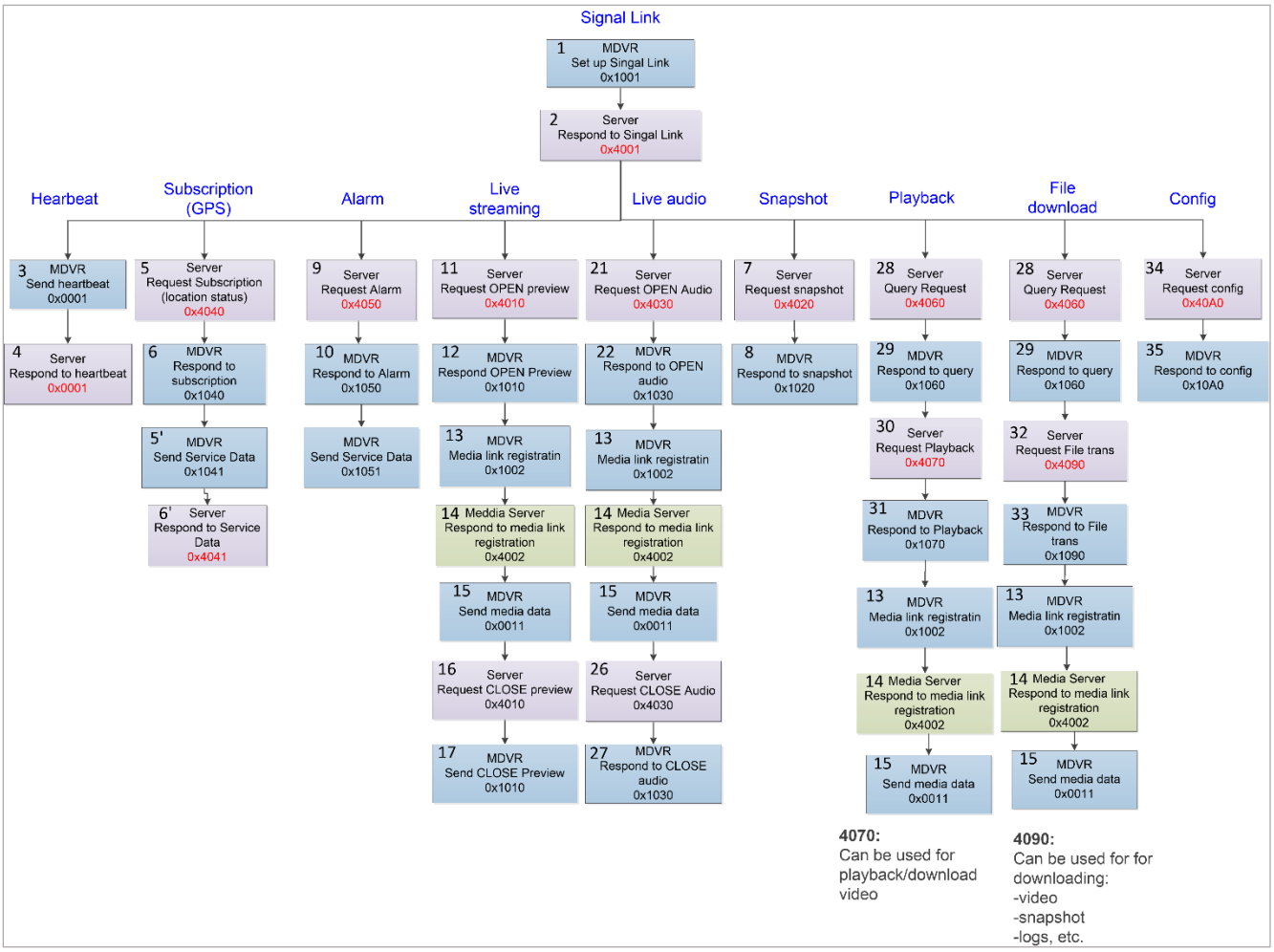
Function	Value	description
signal link registration	0x1001	refer to the description
Media link registration	0x1002	refer to the description
live viewing respond	0x1010	refer to the description
snapshot screen	0x1020	refer to the description
audio request	0x1030	refer to the description
subscription respond for location status,	0x1040	refer to the description
status data	0x1041	refer to the description
subscribe and respond for alarm	0x1050	refer to the description
alarm data	0x1051	refer to the description
file search result	0x1060	refer to the description
Playback request and respond	0x1070	refer to the description
Transparent transmission request and respond	0x1080	refer to the description
File transmission respond	0x1090	refer to the description
report for ftp file transmission	0x1091	refer to the description
parameter configuration	0x40A0	refer to the description

MDVR←←Server:

Function	Value	Description
signal link response	0x4001	refer to the description
media link response	0x4002	refer to the description
live view request	0x4010	refer to the description
Forced encoding I frame	0x4011	refer to the description
snapshot request	0x4020	refer to the description
audio request	0x4030	refer to the description
subscription request for position status	0x4040	refer to the description
alarm subscription and request	0x4050	refer to the description
file search request	0x4060	refer to the description
playback request	0x4070	refer to the description
playback control	0x4071	refer to the description
transparent transmission request	0x4080	refer to the description
file transmission request	0x4090	refer to the description
ftp file transmission request	0x4091	refer to the description
parameter configuration request	0x40A0	refer to the description
PTZ control	0x4100	refer to the description
output manage	0x4101	refer to the description
restart	0x4102	refer to the description
upgrade		refer to the description
factory default setting	0x4103	refer to the description
synchronization time	0x4104	refer to the description
record manager	0x4105	refer to the description
clear alarm	0x4106	refer to the description
vehicle manager	0x4107	refer to the description

1.7 Command workflow

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.
Commands logic with sequences:


Signal Link
1 MDVR Set up Singal Link 0x1001
2 Server Respond to Singal Link 0x4001
Hearbeat
Subscription (GPS)
Alarm
Live streaming
Live audio
Snapshot
Playback
File download
Config
3 MDVR Send heartbeat 0x0001
4 Server Respond to heartbeat 0x0001
5 Server Request Subscription (location status) 0x4040
6 MDVR Respond to subscription 0x1040
5' MDVR Send Service Data 0x1041
6' Server Respond to Service Data 0x4041
9 Server Request Alarm 0x4050
10 MDVR Respond to Alarm 0x1050
MDVR Send Service Data 0x1051
11 Server Request OPEN preview 0x4010
12 MDVR Respond OPEN Preview 0x1010
13 MDVR Media link registratin 0x1002
14 Meddia Server Respond to media link registration 0x4002
15 MDVR Send media data 0x0011
16 Server Request CLOSE preview 0x4010
17 MDVR Send CLOSE Preview 0x1010
21 Server Request OPEN Audio 0x4030
22 MDVR Respond to OPEN audio 0x1030
13 MDVR Media link registratin 0x1002
14 Media Server Respond to media link registration 0x4002
15 MDVR Send media data 0x0011
26 Server Request CLOSE Audio 0x4030
27 MDVR Respond to CLOSE audio 0x1030
7 Server Request snapshot 0x4020
8 MDVR Respond to snapshot 0x1020
28 Server Query Request 0x4060
29 MDVR Respond to query 0x1060
30 Server Request Playback 0x4070
31 MDVR Respond to Playback 0x1070
13 MDVR Media link registratin 0x1002
14 Media Server Respond to media link registration 0x4002
15 MDVR Send media data 0x0011
4070: Can be used for playback/download video
28 Server Query Request 0x4060
29 MDVR Respond to query 0x1060
32 Server Request File trans 0x4090
33 MDVR Respond to File trans 0x1090
13 MDVR Media link registratin 0x1002
14 Media Server Respond to media link registration 0x4002
15 MDVR Send media data 0x0011
4090: Can be used for for downloading: -video -snapshot -logs, etc.
34 Server Request config 0x40A0
35 MDVR Respond to config 0x10A0

2 Protocol Content

2.1 Heartbeat

2.1.1 MDVR Request

Contents	Description
Message No.	0x0001
Direction	MDVR →→ sever
Link Type	signal link, media link.
loading data	None

HEX example:
4801010000000000

2.1.2 Sever Response

Contents	Description
Message No.	0x0001
Direction	MDVR←←Server
Link Type	signal link, media link.
Loading data	None

HEX example:
4801010000000000

2.2 Media Data

The loading data in media data is using binary coding format.

Contents	Description		
Message No.	0x0011		
Direction	MDVR→→ Server, MDVR←←Server		
Link Type	Media link		
Loading data	Contents	Length	Description
	Media type	2bytes	Refer to Data Frame Code
	Channel	2 bytes	The channel of encoder (valid in real-time video and playback replay, start from 1)
	Time stamp	8 bytes	The millisecond from 1970-1-1 0:0:0, the same as the time display on OSD.
	Media data	N bytes	The corresponding ending data

HEX example:
48011100e41e0000010001000476a78bd7505000000000016742001495a85825900000000168ce3c800000000106e501b580000000016
5b800000ead70bf1088e10fc2d010a366000100ead4186aad63ebcac447110c3e15e031899c0032ab3243fabc196aef586cb9456ebd317d3
e06da96e85f003baacc0ce6815a66c357194770647fadef7915f8e243adfe512b8553b8504571f0fecc227be5fe22aa23f05e8371925f6b084
04a301806156037193 02f79d3061a5142a5fc4462ec71626bd70df5b0097724252b3bdb0460649c03a10fbdb18bb05f5cb98188beeff486
30322444169ad244a668c0f9bd8015ad
.....
Load data analysis:
Media type: 0x0001 (0100 means: Main stream)
Channel number: 0x0001 (0100 means: Channel 1)
Time stamp: 0x000575bd786a4700 (00476a78bd750500)
Confirmation message now only support serial port type.

Content	Description
Message No.	0x4111
Link direction	MDVR ←← Server
Link Type	Signal link
Loading data	None

2.2.1 Distinguish H264/H265

When the first I frame data is received, the encoding format can be distinguished according to the first nalu type:

```
unsigned char type = _frameBuffer[4];
// 0x01 slice 0x05 idr 0x06 sei 0x07 sps 0x08 pps
if (type == 0x40 || type == 0x42 || type == 0x44 || type == 0x4E || type == 0x26 || type == 0x02)
    m_encodeType = AV_CODEC_ID_H265;
else
    m_encodeType = AV_CODEC_ID_H264;
```

2.2.2 G726 audio decoding

Compared with the standard g726, the audio data has two more bytes of header.

```
if (hFrameType == 0x0003) {
    // audio frame, skip 4 byte then wirte to file
}
// ffmpeg   g726 -> wav
ffmpeg -y -f g726le -code_size 5 -i m072218.g726 -ar 8000 -ac 1 -f wav 1.wav
// ffmpeg   g726 -> pcm
ffmpeg -y -f g726le -code_size 5 -i m072218.g726 -ar 8000 -ac 1 -f s16le 1.pcm
```

2.3 Device Registration

2.3.1 Signal Link Registration Request

Contents	**Description**		
Message No.	0x1001		
Direction	MDVR →→ sever		
Link Type	Signal link		
Loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Contents	Field name	Description
	Device numbering	dn	Device ID, for example “10011”
	Unique ID	guid	The one and only ID, for example “01128F134D8E00FA”, (Temporarily reserved)
	Session No.	ss	Generated by the device, for example “12FB-01DE-0001-0203”
	Access network	at	1—Ethernet, 2—WIFI, 3--2G, for more information, please refer to Network Type Code.
	mobile phone number	mb	
	Device type	dt	2 bytes length, the higher byte is for the channel number, such as “16384” =0x4000, of which, the 4 means the 4 channels MDVR, the other byte is reserved. “0x40000” can also be used to do the transmission. “0x8000” means: 8 channel MDVR； The lowest byte is IPC channel number.
	Device time	dtu	2017-01-01 00:10:11
	Device Time zone	gmt	i.e., +08:00; (dtu is the value after converting by timezone)
	Optional type		
	Connect to the AP	ap	The hotspot when MDVR connects to the sever in Wi-Fi mode.

	Version	Ver	Current version of device
	Device model	fw	For example, “ME 34-08”, “ ” means new model
	Wake-up mode	um	0: normal 1: Timer 2: IO trigger 3: Gsensor 4: remote
	iccid	iccid	SIM card ID

Loading data sample:

```
{
"dn": "10012",
"guid": "01128F134D8E00FA",
“ss”:” 12FB-01DE-0001-0203”,
      "at": "5",
"mb": "13912346688",
“dtu”: “2017-01-01 00:10:11”,
      "dt": "0x4000",
"ap": "howen-wifi-ap",
"ver": "V1.3.21",
“fw”: “ME-31-04”
}
```

HEX example:

```
48010110c80000007b226170223a22222c226174223a2231222c22646e223a22323830383131313032222c226474223a223078343030302
22c22647475223a22323031382d30392d31322032303a31383a3134222c2267756964223a22364238423435363372d323343363332374
22d41393938334336342d373334383333333636222c226d62223a22323830383131313032222c227373223a22364238423435363372d32334
336333237422d41393938334336342d373334383333333636222c22766572223a22563138303832394230227d0a00
```

Plain text example:

```
HÈ{"ap":"","at":"1","dn":"28081102","dt":"0x4000","dtu":"2018-09-12 20:18:14","guid":"6B8B4567-23C6327B-A9983C64-
73483366","mb":"28081102","ss":"6B8B4567-23C6327B-A9983C64-73483366","ver":"V180829B0"}
```

Loading data analysis:

Device number: 28081102
Unique ID: 6B8B4567-23C6327B-A9983C64-73483366
Session No.: 6B8B4567-23C6327B-A9983C64-73483366
Accessing network: 1 (LAN)
Phone Number: 28081102
Device type: 4 channel MDVR
Device time: 2018-09-12 20:18:14
Accessed AP: None (Not set)
Version: V180829B0

2.3.2 Signal Link Registration Response

After the MDVR sends the signaling link registration request (0x1001), the platform server must respond (0x4001) within one minute of receiving the request (based on the actual signaling time of the MDVR), otherwise the MDVR will actively disconnect and re-initiate new signaling link registration request (0x1001).

Content	**Description**		
Message No.	0x4001		
Direction	MDVR←←Server		
Link Type	Signal link		
Loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the device, for example, “12FB-01DE-0001-0203”.

	Error code	err	Please refer to error code table.

Loading data sample:

{
“ss”:”12FB-01DE-0001-0203”,
"err": "0"
}

HEX example:

48010140380000007b22657272223a2230222c227373223a22364238423435363372d32334336333237422d413939383343363342d3733343833333636227d0a00

Plain text example:

H@8{"err":"0","ss":"6B8B4567-23C6327B-A9983C64-73483366"}

Loading data analysis:

Session number: 6B8B4567-23C6327B-A9983C64-73483366

Error code: 0 (means: success)

2.3.3 Media Link Registration Request

Contents	**Description**		
Message No.	0x1002		
Direction	MDVR →→sever		
Link Type	Media link		
Loading data	Adopt JASON encoding rule		
	Items must be filled in		
	Content	Field name	Description
	Session No.	ss	Device replies to request from server: session number is generated by server; Device sends request to server: session number is generated by device; Example for session number: “live_10012_02_00”, in which: 10012: device ID 02: camera channel 02 00: sub stream (01: main stream)
	Device numbering	dn	Device ID, for example “10011”
	Access network	at	1-Ethernet 2-WIFI 3-2G, for more information, please refer to Network Type Code.
	Media type	mt	1-live view 2-playback 3-audio 4-file transmission 5-serial data transparent transmission 6-Result of recording search
	Channels	ch	Correspond with specific channel, starting from 1, 0 means no need for the channel.
	Optional items (mt=4 – Valid in file transmission		
	File offset address	of	The offset address relative to the file, it is used for breakpoint transmission.
	File type	ft	Reference File Type Code

Loading data sample:

{
"dn": "10012",
“ss”: “live_10012_02_00",
"at": "5",
"mt": "1",
“ch”:”2”
}

HEX example:
4801021049000000 7b226174223a2231222c226368223a2231222c22646e223a22323830383131313032222c226d74223a2231222c22737 3223a226c6976655f32383038313130325f30315f3030227d0a00
Plain text example:
HI{"at":"1","ch":"1","dn":"28081102","mt":"1","ss":"live_28081102_01_00"}
Loading data analysis:
Session No.: live_28081102_01_00
Device number: 28081102
Access network: 1 (LAN)
Media type: 1 (live streaming)
Channel number: 1

2.3.4 Media Link Registration Response

Contents	**Description**		
Message No.	0x4002		
Direction	MDVR ←← Server		
Link Type	Media link		
Loading data	Adopt JASON encoding rule		
	Items that must be filled in		
	Contents	Field name	Description
	Session No.	ss	Device replies to request from server: session number is generated by server; Device sends request to server: session number is generated by device; Example for session number: “live_10012_02_00”, in which: 10012: device ID 02: camera channel 02 00: sub stream (01: main stream)
	Error code	err	please refer to Error Code
	Optional items (In register request command, mt=4 is only valid in file transmission)		
	File offset	of	The offset address relative to the file, it is used for breakpoint transmission.

Loading data sample:

```
{
“ss”: "live_10012_02_00",
"err": "0"
}
```

HEX example:
48010240280000007b22657272223a2230222c227373223a226c6976655f323830383131313032 5f30315f3030227d0a00
Plain text example:
H@({"err":"0","ss":"live_28081102_01_00"}
Loading data analysis:
Session No.: live_28081102_01_00
Error code: 0 (means: success)

2.4 Live Preview

2.4.1 Preview Request


:

After the MDVR is successfully registered to the platform, the heartbeat function should be processed before the platform implements the real-time preview function. Otherwise, after the platform performs the real-time preview request, the signaling link and the media link can be disconnected due to the heartbeat. The device will he disconnected and reconnected, causing the platform to mistakenly believe that MDVR can only transmit and play short-time live video streams.

Contents	Description		
Message No.	0x4010		
Direction	MDVR←←Server		
Link Type	Signal link		
Loading data	Adopt JASON encoding rule		
	Items that must be filled in		
	Contents	Contents	Contents
	Session No.	ss	Generated by the sever, for example, “live_10012_02_01”, in which: 10012: device ID 02: camera channel 02 01: main stream (00: sub stream).
	Channel	ch	Correspond to the specific channel, starting from 1, 0 means no need for the channel.
	Stream type	si	0-substream 1-main stream
	Report to the sever	srv	The sever address or domain name of sever receiving the report. For example, “www.how.com:31500”www.how.com is the domain name and 31500 is the port number.
	Switch	on	0-close, 1-open. When pt is 0, sever can close the link to stop preview. When pt = others, then this value needs to be used to close the link. (this field is must)
	Data frame list	fl	List of data frame in transmission. Refer to Data Frame Code. e.g. “1;2;3” means needing to transmit data of type1,2,3
	Optional items		
	Protocol type	pt	0-private protocol (by default)

Loading data sample:

{
“ss”: "live_10012_02_01",
"si": "1",
"on": "1",
"fl": "1; 2; 3",
"srv": "192.168.3.210:5678",
“ch”:”2”
}

HEX example:

4801104061000000 7b226368223a2231222c22666c223a22313b323b333b222c226f6e223a2231222c227369223a2230222c22737276223a2233392e3130382e35392e36313a37373939222c227373223a226c6976655f32383038313130325f30315f3030227d0a00

Plain text example:

H@a{"ch":"1","fl":"1;2;3;","on":"1","si":"0","srv":"39.108.59.61:7799","ss":"live_28081102_01_00"}

Loading data analysis:

Session No.: live_28081102_01_00
Channel: 1
Streaming type: 0 (sub stream)
Reporting server: 39.108.59.61:7799
Switch: 1 (open)
Data frame list: 1;2;3; (Video key frame, Video non-key frame, audio frame)


:

When add [fl], please pay attention that the content must be ended up with number, not with “;”, otherwise the Server or Media Server may break the link.

Correct examples: “1;2” “1;2;3;5”
Wront examples: “1;2;” “1;8;”

2.4.2 Preview Response

Contents	Description		
Message No.	0x1010		
Direction	MDVR →→ Sever		
Link Type	Signal link		
Loading data	Adopt JASON encoding rule		
	Items that must be filled in		
	Contents	Contents	Contents
	Session No.	ss	Session No.generated by the device, for example, “live_10012_02_01”, in which: 10012: device ID 02: camera channel 02 01: main stream (00: sub stream)
	Channel	ch	Correspond to the specific channel, starting from 1, 0 means no need for the channel.
	stream type	si	0—sub stream, 1—mainstream
	error code	err	Please refer to error code table

Loading sample:
{
“ss”: “live_10012_02_01”,
"si": "1",
“ch”:”2”,
“err”:”0”
}
HEX example:
480110103a0000007b226368223a2231222c22657272223a2230222c227369223a2230222c227373223a226c6976655f3238303831313
0325f30315f3030227d0a00
Plain text example:
H:{"ch":"1","err":"0","si":"0","ss":"live_28081102_01_00"}
Loading data analysis
Session No.: live_28081102_01_00
Channel: 1
Streaming type: 0 (sub stream)
Error code: 0 (success)

2.4.3 Forced Coding I Frame (Not completed yet)

Contents	Description
Message No.	0x4011
Direction	MDVR←←Server
Link Type	Media link
Loading data	None

2.5 Snapshot

Note: The capture data follows the video stream. If you choose the main stream video, it is the main stream snapshot. If you choose the sub-stream video, it is the sub-stream snapshot.

2.5.1 Snapshot Request

Content	Description
Message No.	0x4020
Direction	MDVR ←←Server
Link Type	Signal Link
	Adopt JSON Encoding Rule

Loading Data	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Channel list	cl	Channel list, start from 1, using “;” to split multi channels, for example “1; 2; 3” means Channel 1, Channel 2, and Channel 3
	Optional (default is 0, that is, when there is no res field, it follows the resolution of the video)		
	Snapshot resolution	res	0: follow video resolution, 1:1080, 2:720, 3: VGA, 4:D1

Loading Data Sample:
{
“ss”:”12FB-01DE-0001-0203”,
“cl”:”1;3”
“res”:”1”
}
HEX example:
480120403900000007b22636c223a22313b34222c227373223a223835453343303645 2d45333634343932312d383136363833453 52d413742363334346302 27d0a00
Plain text example:
H @9{"cl":"1;4","ss":"85E3C06E-E3644921-816683E5-A7B634F0"}
Loading data analysis:
Session No.: 85E3C06E-E3644921-816683E5-A7B634F0
Channel: 1;4

2.5.2 Snapshot Respond

Content	**Description**		
Message No.	0x1020		
Direction	MDVR →→Server		
Link Type	Signal Link		
Loading Data	Adopt JSON Encoding Rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Error Code	err	错误代码 Please refer to Error Code list
	Result List	rl	Array, refer to the result List

Result List rl (content is included in the rl)		
Content	Field name	Description
Channel	ch	1, Start from 1
File Path	fn	

Loading Data Example:
{
“ss”:”12FB-01DE-0001-0203”,
“err”:”0”,
“rl”:[
{
“ch”:”1”,
“fn”:”/mnt/snap_1.jpg”
},

{
“ch”:”2”,
“fn”:”/mnt/snap_2.jpg”
}
]
}
Remark:
1, after the capture is completed, will determine whether the automatic upload to the server, according to the device configured ftp server address and configuration rules.
HEX example:
48012010bd0000007b22657272223a2230222c22726c223a5b7b226368223a2231222c22666e223a222f6d6e742f7364312f7069637475
72652f506963323031383039313331363537323031393 54e30302e6a7067227d2c7b226368223a2234222c22666e223a222f6d6e742f73
64312f706963747572652f506963323031383039313331363537323037313 94e30332e6a7067227d5d2c227373223a223835453343303
6452d45333634343932312d38313636383345352d413742363334463022 7d0a00
Plain text example:
H
½{"err":"0","rl":[{"ch":"1","fn":"/mnt/sd1/picture/Pic20180913165720195N00.jpg"},{"ch":"4","fn":"/mnt/sd1/picture/Pic20180913165720719N03.jpg"}],"ss":"85E3C06E-E3644921-816683E5-A7B634F0"}
Loading data analysis:
Session No.: 85E3C06E-E3644921-816683E5-A7B634F0
Error code: 0 (success)
Result list
Channel: 1
File path: /mnt/sd1/picture/Pic20180913165720195N00.jpg
Channel: 4
File path: /mnt/sd1/picture/Pic20180913165720719N03.jpg

2.6 Audio Operation

2.6.1 Audio Request

Content	**Description**		
Message No.	0x4030		
Direction	MDVR ←←Server		
Link Type	Signal Link		
Loading Data	JSON/ Adopt JSON Encoding Rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, for example “voice_28081102_01”, in which: 28081102:device ID 01: audio Channel 1
	Channel	ch	Correspond to the specific channel, starting from 1 1, intercom: temporarily the ch1 camera audio will be reported to the server, the other channels audios cannot be used as an intercom, only as listening use. Will adjust later based on hardware device (channel is invalid) 2, listening is for all channels 3, broadcast has nothing to do with the channel
	Working Mode	wm	0—listening, 1—intercom, 2—Broadcast, 3—PTT (not implemented yet)
	Registered Server	srv	Registered Server IP address or Domain Name, for example” www.how.com:31500“, the www.how.com is domain name, 31500 is port
	Switch	on	0-OFF, 1-ON, Server can shut the link and stop the real time viewing when pt is 0, if pt is xx value, then the real time viewing will be shut when pt=xx
	optional items		

	Protocol Type	pt	0—private protocol (default)

Loading data Sample:
{
“ss”: “voice_28081102_01”,
"ch": "1",
"wm": "0",
"srv": "192.168.3.210:5678"
}
HEX example:
48013040510000007b226368223a2231222c226f6e223a2231222c22737276223a2233392e3130382e35392e36313a37373939222c227373223a22766f6963655f32383038313130325f3031222c22776d223a2231227d0a00
Plain text example:
H0@Q{"ch":"1","on":"1","srv":"39.108.59.61:7799","ss":"voice_28081102_01","wm":"1"}
Loading data analysis:
Session No.: voice_28081102_01
Channel: 1
Working mode: 1 (Intercom)
Reporting server: 39.108.59.61:7799
switch: 1 (Open)

2.6.2 Request Respond

Content	**Description**		
Message No.	0x1030		
Direction	MDVR →→Server		
Link Type	Signal Link		
Loading Data	JSON/Adopt JSON Encoding Rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, for example “voice_28081102_01”, in which: 28081102: device ID 01: audio Channel 1
	channel	ch	Correspond to the specific channel, starting from 1
	working mode	wm	0—listening, 1—intercom, 2—Broadcast, 3—PTT (not completed yet)
	Error Code	err	_错误代码 Please refer to Error Code list

Loading data Sample:
{
“ss”: “voice_28081102_01”,
"si": "1",
"us": "192.168.3.210:5678",
“ch”:”2”,
“err”:”0”
}
HEX example:
48013010380000007b226368223a2231222c22657272223a2230222c227373223a22766f6963655f32383038313130325f3031222c22776d223a2230227d0a00
Plain text example:
H08{"ch":"1","err":"0","ss":"voice_28081102_01","wm":"0"}
Loading data analysis:
Session No.: voice_28081102_01
Channel: 1

Working mode: 0 (Listening)
Error code: 0 (Success)

2.6.3 Audio Data

_媒体数据 Refer to the media data

The data needs to be encoded by the G726 and then be sent to the device, otherwise the device cannot be play.
The server needs to perform G726 decoding after receiving the data, otherwise can not play.

2.7 GPS Location Status

2.7.1 Subscription Request

Content	Description		
Message No.	0x4040		
Direction	MDVR←←Server		
Link Type	Signal Link		
Loading Data	JSON/Adopt JSON Encoding Rule		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Subscription	ct	the subscribed content is corresponded to the bit reference 2.7.5 status context bits description
	Option		
	Upload model	rt	0-real time priority 1-history priority 2-Gps timing transmission (0x4050 rt is invalid) (Default is 0)

Loading Data Sample:

```
{
“ss”:”12FB-01DE-0001-0203”,
  “ct”:”0x0F”
}
```

Means subscribe the below content
bit0-- location info
bit1—G-sensor
bit2-- basic status
bit3-- communication module working status
HEX example:
4801404038000000 7b226374223a223635353335222c227373223a227374617475732d323830383131303 22d3030303030314539364244464230313 0227d0a00
Plain text example:
H@@8{"ct":"65535","ss":"status-28081102-000001E96BDFB010"}
Loading data analysis:
Session No.: status-28081102-000001E96BDFB010
Subscription: 65535 (Means: subscribe to all statuses)

2.7.2 Subscription Respond

Content	Description		
Message No.	0x1040		
Direction	MDVR →→Server		
Link Type	Signal Link		
Loading Data	JSON/Adopt JSON Encoding Rule		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Error Code	err	_错误代码 please refer the Error Code list

Loading Data Sample:
{
“ss”:”12FB-01DE-0001-0203”,
“err”:”0”
}
HEX example:
48014010350000007b22657272223a2230222c227373223a227374617475732d323830383131303322d303030303031453936424446423031302227d0a00
Plain text example:
H@5{"err":"0","ss":"status-28081102-000001E96BDFB010"}
Loading data analysis:
Session No.: status-28081102-000001E96BDFB010
Error code: 0 (success)

2.7.3 Service Data

Content	**Description**		
Message No.	0x1041		
Direction	MDVR →→Server		
Link Type	Signal Link		
Loading Data	Binary coded format		
	Content	length	Description
	Session No.length	1 byte	including Ending mark, If the session number is empty/NULL, the session number field needs to add an Ending mark, length is 1
	Session No.	N byte	1~N byte
	Status Data	N byte	状态数据 1Refer to Status Data

2.7.4 Status Data

1. Header Info

header info		
Content	length	Description
Device Time	6 bytes	Device time: (It may not be consistent with the DTU in the positioning information). each byte corresponds to year, month, date, min, second, and year; Year= current year-2000 (pay attention to little endian sequence)

Content status bit:

Content	2 bytes	Reference 2.7.5 status context bits description-1. Description 1

2. Location Info

Location info		
Content	length	description
info	1 byte	bit0—direction indicator, 0—0°~180°, 1--180°~360° bit1--longitude mark, 0--east longitude, 1--west longitude bit2--altitude direction, 0--above sea level, 1--lower than sea level bit3--mileage, 0--data does not exist, 1--Data exist bit4--latitude mark, 0--north latitude, 1--south latitude bit5~bit7: reserved
location type	1 byte	0--location invalid, 1—GPS, 2—BD, 3--GLONASS 4—AGPS, 5--base station location, 6—Wi-Fi
time	6 bytes	Positioning module acquisition time, each bit corresponds to YEAR, MONTH, DATE, HOUR, MIN, SECOND, and year=current year-2000

direction	1 byte	0~180, unit is degree (If the bit0 in information is 1, direction value add +180)
satellite QTY	1 byte	
Speed	2 bytes	km/hour*100
Altitude	2 bytes	Meter
positioning accuracy	2 bytes	Multiply by 10
Degree of longitude	1byte	0~ 180
Minute of longitude	4byte	minute*10000
Degree of latitude	1byte	-90 ~ +90 (remark: if the value over 90, need to be converted to negative number)
Latitude Division	4byte	minute*10000

3. Gsensor

GSensor		
Content	length	description
Identifier bit	1 byte	bit0-xyz acceleration (0: data not exist, 1: data exist) bit 1-tilt (0: data not exist, 1: data exist) bit2-impact (0: data not exist, 1: data exist) bit3~bit7—reversed
X	2byte	g*100, (Remark : If the value's first bit is 1, then it needs the convert decimal value minus 65536. For example, 0xFFDA[1111 1111 1101 1010]=65498, then 65498-65536=-38, the real value is -0.38.
Y	2byte	g*100, (Remark : If the value's first bit is 1, then it needs the convert decimal value minus 65536)
Z	2byte	g*100, (Remark : If the value's first bit is 1, then it needs the convert decimal value minus 65536)
Tilt	2byte	g*100, (Remark : If the value's first bit is 1, then it needs the convert decimal value minus 65536)
Impact	2byte	g*100, Remark : If the value's first bit is 1, then it needs the convert decimal value minus 65536)

4. Basic Status

Basic Status		
Content	length	description
Identifier bit 1	1 byte	bit0-ACC (0-invalid, 1-valid) bit1-break (0-invalid, 1=valid) bit2-turn left (0-invalid, 1-valid) bit3-turn right (0-invaid, 1-valid) bit4-forward (0-invalid, 1-valid) bit5-backword (0-invalid, 1-valid) bit6-left front door (0-Close, 1-Open) bit7-right front door (0-close, 1-Open)
Identifier bit2	1 byte	bit0-left mid door (0-close, 1-Open) bit1-right mid door (0-close, 1-open) bit2-left back door (0-close, 1-open) bit3-right back door (0-close, 1-open) bit4-private mode (0-invalid, 1-valid)
reverse	2 bytes	

5. Module Working Status

Module Working Status		
Content	length	description

Identifier bit	2 bytes	bit0-mobile network (0: data not exist, 1: data exist) bit1-location module (0:data not exist, 1:data exist) bit2-WIFI module (0:data not exist, 1:data exist) bit3-G-sensor (0:data not exist, 1:data exist) bit4-recording status (0:data not exist, 1:data exist)
mobile network	1 byte	0—unknown, 1—normal, 2—abnormal,3—not exist
GPS location module	1byte	0—unknown, 1—normal, 2—abnormal, 3—not exist
WIFI module	1byte	0—unknown, 1—normal, 2—abnormal, 3—not exist
G-sensor	1byte	0—unknown, 1—normal, 2—abnormal, 3—not exist
Recording status	2byte	each byte corresponds to a channel number, 0-not recording, 1-recording

6. Fuel Consumption Status

Fuel consumption status		
Identifier bit	1 byte	bit0-fuel consumption (0: data not exist, 1: data exist) bit1-balance fuel (0: data not exist, 1: data exist)
Fuel consumption	2 bytes	Fuel consumption *10
balance fuel	2 bytes	

7. Mobile Network Status

mobile network status		
Content	length	description
Identifier bit 1	1byte	
signal intensity	1 byte	0: invalid, 1~10 (strongest)
network type	1 byte	please refer to 3.2 the network type list
reserved	2 bytes	

8. WIFI network

WIFI network		
Content	length	description
Identifier bit1	1 byte	bit0-signal intensity (0:data not exist, 1: data exist) bit1-network address (0:data not exist, 1: data exist) bit2-Gateway (0: data not exist, 1: data exist) bit3-subnet mask (0: data not exist, 1: data exist) bit4-SSID (0: data not exist, 1: data exist)
signal intensity	1 byte	0: invalid, 1~10 (strongest)
network address	4byte	192.168.0.1, byte [0] =0xC0, byte [1] =0xA8, byte [2] =x000, byte [3] =0x01
gateway	4 bytes	Same as above
Subnet mask	4 bytes	Same as above
SSID length	1 byte	length includes terminator / ending mark
SSID	N byte	1~256 byte

9. Hard Disk Status

Hard Disk Status		
Content	length	Description
Identifier bit	1 byte	each bit corresponds to one group of hard disk status (0: data not exist, 1: data exist)
one group of hard disk data information		
ID	1 byte	1~8 When it is > 10, it means disk type: 11--hdd1 12--hdd2 13--hdd3 14—hdd4 15—sd1 16—sd2 17—sd3 18—sd4 19—usb1 20—usb2
hard disk status	1 byte	0--unknown, 1--recording, 2--idle, 3--abnormal, 4--full
hard disk size	4 bytes	Mega Bytes
hard disk balance capacity	4 bytes	Mega Bytes

10. Alarm Status

Alarm status		
Content	length	Description
Identifier bit	4 bytes	bit0—video loss (0: data not exist, 1: data exist) bit1—motion detection (0: data not exist, 1: data exist) bit2—video blind (0: data not exist, 1: data exist) bit3—alarm input trigger (0: data not exist, 1: data exist) bit4—over speed alarm (0: no trigger, 1: trigger) bit5—low speed alarm (0: no trigger, 1: trigger) bit6—emergency alarm (0: no trigger, 1: trigger) bit7—over time stop (0: no trigger, 1: trigger) bit8—vibration alarm (0: no trigger, 1: trigger) bit9—out of GEO fencing alarm (0: no trigger, 1: trigger) bit10—enter GEO fencing alarm (0: no trigger, 1: trigger) bit11—exit line alarm (0: no trigger, 1: trigger) bit12-enter line alarm (0: no trigger, 1: trigger) bit13—fuel level alarm (0: no trigger, 1: trigger)
video loss	2 bytes	1 is alarm, 0 is no alarm, bit0 is channel 1
motion detection	2 bytes	1 is alarm, 0 is no alarm, bit0 is channel 1
video blind	2 bytes	1 is alarm, 0 is no alarm, bit0 is channel 1
alarm input trigger	2 bytes	1 is alarm, 0 is no alarm, bit0 is IO1

11. Temperature and Humidity Status

Temperature and Humidity Status		
Content	length	Description
Identifier bit	2 bytes	bit0—temperature 1 (0: data not exist, 1: data exist) bit1—temperature 2 (0: data not exist, 1: data exist) bit2—temperature 3 (0: data not exist, 1: data exist) bit3—temperature 4 (0: data not exist, 1: data exist) bit4—hudmidity 1 (0: data not exist, 1: data exist) bit5—hudmidity 2 (0: data not exist, 1: data exist)
temperature 1	2 bytes	temperature *100 times
temperature 2	2 bytes	temperature *100 times

temperature 3	2 bytes	temperature *100 times
temperature 4	2 bytes	temperature *100 times
hudmidity 1	1 byte	percentage
hudmidity 2	1 byte	percentage

12. Statistics Data

Statistics data		
Content	length	Description
flag	2 bytes	Bit0--mileage ,0--data not exist, 1--data exist, include total mileage and current day mileage
Total Mileage	4byte	meter
Current day mileage	4byte	meter

13. iButton Status

IButton Status		
Content	Length	Description
Identifier	1 byte	Each bit corresponds to a set of button status, (0: invalid data, 1: valid data)
A set of IButton data		
Number length	1 byte	
Number	N byte	

14. OBD Status

OBD status		
Content	Length	Description
Number of packages	1 byte	
Length of packages	2 bytes	
OBD Single packet data V1		
Accumulated mileage	4 bytes	km
Cumulative fuel consumption	4 bytes	L
Instant fuel consumption	4 bytes	*100; L/km
Vehicle voltage	2 bytes	*100; V
Engine speed	2 bytes	Rpm
speed	2 bytes	*100; Km/h
Intake air flow	1 byte	G/s
Intake pressure	1 byte	Kpa
Coolant temperature	1 byte	°
Intake air temperature	1 byte	°
Engine load	1 byte	%
Throttle position	1 byte	%
Remaining oil	1 byte	%
OBD Single packet data V2		
Vin sign	1 byte	0: Not exist 1: exist
Vin	32 byte	Analyze when Vin sign =1

OBD Single packet data V3		
Engine status	1 byte	1: ON 0: OFF
Engine on time	6 byte	BCD code
Engine off time	6 byte	BCD code
idle	1 byte	1: Start 0: End
Harsh cornering	1 byte	1: Yes 0: No
Harsh acceleration	1 byte	1: Yes 0: No
Harsh brake	1 byte	1: Yes 0: No
Battery low voltage	1 byte	1: Yes 0: No
OBD Single packet data V4		
Engine running accumulative time	2 bytes	Unit: hours
OBD Single packet data V5		
Fault code	5 bytes	[0][1][2][3]: Traveling [4]: J1939
Single mileage	2 bytes	Unit: km

15. Voltage Status

Voltage Status		
Content	Length	Description
Number of packages	1 byte	
Length of packages	2 bytes	
Voltage single pack value		
Voltage	2 bytes	Unit: Volt (*100) [0] Device voltage [1] Super capacitor voltage Analog value;(*1000) [2] Analog value 1 [3] Analog value 2

16. Driver

Driver Info		
Content	Length	Description
Info length	1 byte	
Driver info	N byte	Card No., Name Divided by ,

17. Bluetooth

Bluetooth info		
Content	Length	Description
Length	1 byte	
V1		
Status	1 byte	1: Connected 0: not connected

18. Content status bit

Content	2 bytes	Refer to Description 2

19. Load info

Load info		
Content	Length	Description
Length	1 byte	
Parse data based on packet length		
Status	1 byte	0: peripheral not connected; 1: connected
Voltage	2 bytes	mV
Cargo weight	4 bytes	ton，*1000
Total weight	4 bytes	ton，*1000

20. Device Temperature

Device temperature		
Content	Length	Description
Quantity of sets	1 byte	
a set of temperature info		
Temperature	2 bytes	*100; 65536 means invalid [0] CPU temperature [1] Hard disk temperature

21. Module extension information

Device temperature		
Content	Length	Description
Length	1 byte	
Identifier	2 bytes	bit 0--Temperature peripheral operation time (0: data does not exist, 1: data exists)
Temperature peripheral operating time	4 bytes	Unit: min

Annex: Polling data analyzing example

Below is an example of how to analyze a polling data, following the rules of [Chapter 2.7.4 Status Data] and [2.7.5 Status context bits description] in Protocol document:

Hex Example:

480141108300000021737461747573 2d32383038313130322d303030303031453936424446423031300012090e0b0320af0300011209 0e0b031a0008000018150900 71d88f0800164729050007000004000000020000008100000001f00000103010f000000000000010001eae d000000000000f000000000000000000000003f000000000000000000000

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 field.

For example, we can divide the HEX data into below blocks, using different colors:

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	
4	83000000	0x00000083=131	Length of loading data: 131 Bytes	1.1.2 Loading length
1	21	0x21=33	Session length is 33Byte	2.7.3 Service Data
(33)	7374617475732d323 83038313130322d30 30303030314539364 244464230313000		Session No.	
6	12090e0b0320		Device Time: 2018-09-14 11:03:32	2.7.4 Status Data: header info
	12	18	Year: 2018	
	09	09	Month: September	
	0e	14	Day: 14th	
	0b	11	Hour: 11	
	03	03	Minute:03	
	20	32	Second: 32	
2	af03	0x03af=0011101011 1	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	HDOP : 0.9	Real value= Protocol Value/10
1	71	0x71=113	Degree of longitude: 113 degrees	0~ 180
4	d88f0800	0x00088fd8= 561112	Minute of longitude: 56.1112	minute*10000
1	16	0x16=22	Degree of latitude: 22	-90 ~ +90
4	47290500	0x00052947=338247	Latitude Division: 33.8247	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	0x0000edea=60906	Har disk size: 60906MB	
4	00000000	0x00000000=0	Hard disk balance capacity: 0MB	
4	0f000000	0x0000000f=00000001111	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=00000011111	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 than 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-invaid, 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)

2.7.5 Content Status bit description

1. Description 1

Content	**Length**	**Description**
Content	2 bytes	The contents of the following data, according to the bit corresponding to the specific content, if the bit is 0, that means no such data. the following status definition refer to this rule, if the bit is 0, means no data bit0-location info (0: no, 1: exist) bit1- G-sensor (0: no, 1: exist) bit 2-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—button info (0: none, 1: exist) bit12—OBD info (0: none, 1: exist) bit13—Power Voltage info (0: none, 1: exist) bit14—Driver info (0: none, 1: exist)

		bit15—Bluetooth info (0: none, 1: exist)

HEX example:
480141108300000021737461747573 2d32383038313130322d303030303031453936424446423031300012090e0b0320af03000112090e0b031a0008000018150900 71d88f0800164729050007000004000000020000008100000001f00000103010f000000000000010001eaed0000000000000f000000000000000000000003f00000000000000000000000
Loading data analysis:
Session number length: 0x21
Session No.: status-28081102-000001E96BDFB010
Status data
Device time: 2018-09-14 11:03:32
Content: 0x03af (Means: location status exists, G-sensor exist, basic status exists, module working status exist, mobile network status exists, hard disk status exists, alarm status exists, temperature and humidity status exist)
Location info
Info: 0x00
Location type: 0x01
Time: 2018-09-14 11:03:26
Direction: 0x00
Satellite quantity: 0x08
Speed: 0x0000
Altitude: 0x1518
Location accuracy: 0x0009
Degree of longitude: 0x71
Minute of longitude: 0x00088fd8
Degree of latitude: 0x16
Minute of latitude: 0x00052947
G-sensor:
Identifier bit: 0x07 (Means there exists: x/y/z acceleration data, tilt data, impact data)
X: 0x0000
Y: 0x0004
Z: 0x0000
Tilt: 0x0002
Impact: 0x0000
Basic Status:
Identifier bit 1: 0x81 (Means ignition key/ACC valid, right front door open)
Identifier bit 2: 0x00
Reserved: 0x0000
Module working status
Identifier bit: 0x001f (Means there exists: mobile network data, location module data, Wi-Fi module data, G-sensor data, recording status data)
Mobile network: 0x00
Location module: 0x01
WIFI module: 0x03
G-sensor: 0x01
Recording status: 0x000f
Mobile network status:
Identifier ID1: 0x00
Signal Strength: 0x00
Network type: 0x00
Reserved: 0x0000
Hard disk status
Identify bit: 0x01
Numbering: 0x00
Disk status: 0x01
Disk size: 0x0000edea
Disk balanced capacity: 0x00000000
Alarm status
Identifier bit: 0x0000000f (Means: Video loss data is valid, motion detection data is valid, Video cover data is valid, input alarm data is valid, other alarm is not triggered)

Video loss: 0x0000
Motion detection: 0x0000
Video cover: 0x0000
Input trigger: 0x0000
Temperature and Humidity Status (Not Implemented Yet)
Identifier bit: 0x003f
Temperature in the vehicle: 0x0000
Temperature out of the vehicle: 0x0000
Engine temperature: 0x0000
Device temperature: 0x0000
Humidity in the vehicle: 0x00
Humidity out of the vehicle: 0x00

Description 2

Description		
Content	2 Byte	The content contained in the following data corresponds to the specific content bit by bit. If the bit is 0, it means that there is no data in this segment. This rule will be referenced in each subsequent status data definition. If it is 0, it means that there is no relevant data. bit0--load information (0: none, 1: exists) bit1--device temperature (0: none, 1: exist)

2.7.6 Service data response


:

For our newer firmwares after June 2018, the FMS platform need to add 2.7.6 Service data response. So, the server has to respond (0x4041) to 0x1041. Otherwise, the MDVR will keep sending the first piece GPS coordinates, then the FMS will mistakenly consider the MDVR is not moving.

Content	**Description**
Message No.	0x4041
Direction	MDVR ←← Server
Link Type	Signal link
Loading data	None

HEX example:
4801414000000000

2.8 Alarm Event

2.8.1 Subscription Request

Content	**Description**		
Message No.	0x4050		
Direction	MDVR ←← Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Content	Field name	Description
	Session No.	ss	Generated by the device, i.e.: 12FB-01DE-0001-0203”
	request	ct	Refer to Status context bits description
	Optional items		
	Additional info	ei	Determines if the status info contains session number. It is used to be compatible with older version:

			0 – not contain[default], 1 – contain, Other – reserved
	Upload mode	rt	0-real time priority 1-history priority (Default is 0)
	Ack response	ack	0-no need to reply ack(Default is 0) -1-need to reply ack

Loading data sample:
{
“ss”:”12FB-01DE-0001-0203”,
“ct”:”0x01”
}
, means if alarm trigger, device will report to server for the below data
bit0—location information
alarm load
HEX example:
480150403400000007b226374223a223435222c227373223a22616c61726d2d323830383131303 22d303030303031453936424446423031302 27d0a00
Plain text example:
HP@4{"ct":"45","ss":"alarm-28081102-000001E96BDFB010"}
Loading data analysis:
Session No.: alarm-28081102-000001E96BDFB010
Subscription: 45

2.8.2 Subscription Respond

Content	Description		
Message No.	0x1050		
Direction	MDVR →→Server		
Link Type	signal link		
loading data	JSON /adopt JSON encoding rule		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Error Code	err	_错误代码 please refer to the Error Code list

Loading data sample:
{
“ss”:”12FB-01DE-0001-0203”,
“err”:”0”
}
HEX example:
480150103400000007b22657272223a2230222c227373223a22616c61726d2d323830383131303 22d303030303031453936424446423031302 27d0a00
Plain text example:
HP4{"err":"0","ss":"alarm-28081102-000001E96BDFB010"}
Loading data analysis:
Session No.: alarm-28081102-000001E96BDFB010
Error code: 0 (Success)

2.8.3 Service Data

Alarm service data format as below:
Message header + JSON load (alarm detail) +status data

Content	Description		
Message No.	0x1051		
Direction	MDVR →→ Server		
Link Type	signal link		
loading data	Binary coded format		
	Content	Length	Description
	Session No. length	1 byte	Including terminator, if Session No.is empty, the session number field needs to add terminator, length is 1
	Session No.	N byte	1~255 byte

	Content length	4 bytes	Length of Alarm content description string, including terminator/ending mark
	adopt JSON encoding rule (alarm content description)		
	Content	Field name	Description
	Items that must be filled in		
	Device Time	dtu	For example: 2017-01-01 12:11:31
	start time	st	for example: 2017-01-01 11:05:31, trigger time may not be the report time, need to separate them
	End Time	et	empty means trigger, not empty means end time
	Event Type	ec	_Event Type Coderefer to the Event Type Code <1000: Device event notification >1000: VSS Platform event notification
	Picture address	pa	save path of related pictures (data have not been used, invalid value)
	Recording address	ra	save path of related recording files (data have not been used, invalid value)
	Alarm ID	uuid	Null
	alarm description	det	The definition for different event type is different, refer to the below description, the content in description is included in det For example, if video loss, it will be “det”:{“ch”:”1”};
	Driver ID	drid	Can be null
	Driver name	drname	Can be null
	Speed source	spds	Refer to the spds description in the speed alarm
	location status data (If the subscribed data is 0, it will not load the data)		
	Binary coded format		
	_状态数据_1refer to Status Data		

1. Video loss, motion detection, video blind, input trigger, emergency alarm, Output

Video loss, motion detection, video blind, input trigger, emergency alarm ,**Output**		
Content	Field name	description
channel	ch	trigger channel, starting from 1

2. Input Trigger

Input trigger		
Content	Field name	Description
Channel	ch	Triggered channel, starting from 1
Number	num	0- close. 1- Emergency/ Panic 2- F-door 3- M- door 4- B-door 5- Near light 6- Far light 9- R-Turn (right turn) 10- L-Turn (left turn) 11- Braking, 12- Reverse 13- Reserved 1 14- F-door close 15- M-Door Close 16- B-door close 17- Talk (start the intercom) 18- Raise up 19- Airtight

		20- Load 22- Custom defines 23- Safe to load 31-IBT2 17-22 represents datahub's input 1-6

3. High temperature, Low temperature

High temperature, low temperature		
Content	Field	Description
Type	num	0: CPU 1: HDD 2: cabin
Trigger threshold	vt	
Current value	cur	

4. Speed alarms, etc.

low speed alarm, over speed alarm, low speed warning, high speed warning, harsh acceleration, harsh braking, ~~low temperature alarm, high temperature alarm~~, idle alarm, ~~excessive high speed~~		
Content	Field name	description
trigger threshold	vt	conditional value, if >90 is over speed, then the trigger threshold is 90
time threshold	tt	if > 90 over 5 second is over speed, then the time threshold is 5 second
maximum value	max	Maximum speed value during the alarm
minimum value	min	Minimum speed value during the alarm
average	avg	Average speed value during the alarm
current value	cur	Current speed value when reporting
Previous second	pre	The speed value of one second before
Duration	dur	Unit: s (valid when idling, other alarms are 0)
Speed resource	spds	0—GPS speed 1—OBD speed 2--Reserved 3--Pulse

5. Overtime parking

Overtime parking		
Content	Field name	Description
trigger value	vt	
parking time	st	second

6. Vibration Alarm

vibration alarm / Acceleration Alarm		
Content	Field name	Description
trigger threshold	vt	When dt=5: *10 Other: *100
time threshold	tt	Anti-shake time (s): *10
maximum value	max	Maximum speed value during the alarm
minimum value	min	Minimum speed value during the alarm
current value	avg	Average speed value in a period
current value	cur	Current speed value
direction	dt	1—X direction, 2—Y direction, 3—Z direction, 4—impact, 5—tilt, 6-

		turn, 7-Harsh acceleration, 8—harsh braking
Previous second	pre	The speed value of one second before

7. Geofence

Electronic fencing, Electronic route		
Content	Field name	description
numbering	num	fencing or route numbering
status	st	0-enter 1-exit 2- over-speed alarm 3- over speed warning 4-low speed alarm 5-low speed warning 6-forbidden parking engine star 7-forbidden parking engine off 8-overtime stay in geofence 9-Pre-entry 10- Pre-exit
Trigger Threshold	vt	Valid when st = 2 or 4, unit: Km/h

8. Door open/close

Abnormal open/ close door		
Content	Field name	description
Channel	Ch	Triggered channel of inputs, starting from 1
numbering	num	2—front door, 3—mid door, 4—back door
status	st	0—close, 1—open

9. Storage abnormal

Storage abnormal		
Content	Field name	description
numbering	num	For example: sd1, sd2, hdd1, hdd2
status	st	0 - Missing 1 -- Broken (disk partition fatal error) 2--The log cannot be overwritten 3--Failed to write Block (EIO write error) 4--Disk failure (disk cannot be partitioned) 5--The disk cannot be mounted: the log partition cannot be mounted 6--There are too many bad blocks in disk video storage, more than 20% 7--Disk invalid block: Judge the video partition, at the beginning of formatting, or when the key information of the corresponding file is updated later 8--Disk video sampling verification failed: Failed when compare key information, after a file is finished 9--Disk pauses to write video: 3 consecutive pauses will be reported once 10--Disk recording overwrite exception: a kind of verification for false writing 11--The disk has not recorded for a long time: no recording has been written for more than 2 minutes 12--The disk is written slowly, causing the cached data to be overwritten 13--Video partition abnormality (cannot read or write) 14--Disk temperature alarm (high than 70 degrees, low than 0 degrees)

10. People counting

People counting		
Content	Field name	description
Front door get-on people number	Up0	The number of onbus people, <0 means invalid
Front door get-off people number	Dw0	The number of offbus people, <0 means invalid
Back door get-on people number	Up1	The number of onbus people, <0 means invalid
back door get-off people number	Dw1	The number of offbus people, <0 means invalid
Middle door get-on people number	Up2	The number of onbus people, <0 means invalid
Middle door get-off people number	Dw2	The number of offbus people, <0 means invalid
[Reserved] get-on people number	Up3	The number of onbus people, <0 means invalid
[Reserved] get-off people number	Dw3	The number of offbus people, <0 means invalid
longitude	lon	
latitude	lat	
	Pat	0-real time 1-stored and upload (data was resent after network works)
time	tm	Format: " yyyy-mm-dd hh:mm:ss"
	Va	Current onbus people number byte is valid or not (device calculated), 0-invalid , 1-valid
	Cur	the current number of people onbus

11. DMS&ADAS

Fatigue driving (DMS & ADAS)		
Content	Field name	Description
fatigue level	tp	Refer to alarm type
ID	id	
Identification name	name	

12. Fuel level abnormal alarm

fuel level abnormal alarm		
Content	Field name	Description
trigger threshold	vt	
oil tank capacity	to	~~unit : Liter~~ 0-invalid / not supported
balance fuel capacity	fr	~~unit : Liter~~ 0-invalid / not supported
Alarm Type	dt	1: Refuel 2: Fuel theft

13. Swipe card

Swipe Card (RFID/NFC/ Magnetic Card reader etc.)		
Content	Field name	Description
Swipe card type	tp	1-Driver, 2-Student, 3-invalid card
Swipe card info	cn	Card number, etc.

Onboard/offboard	up	1: Onboard (check-in), 2: Offboard (check out), else—invalid if for Driver swipe card: 1-login, 2-log out. Other-invalid
History	ht	1—Historical data 2—Realtime data, Else—invalid
Type	it	0—RFID;1—IBT (i-button); 2—face recognition, 3-ibutton+Face Recognition

14. Voltage

Voltage		
Content	Field name	Description
High/low voltage	dt	1—low voltage 2—high voltage 3—Power off 4—Power on 5-Power off when moving 6—Low voltage shutdown 7—Start up
Trigger Threshold	vt	Threshold； *100
Current value	cur	Current voltage value when reporting；*100

15. Over-time Driving (Fatigue Detection)； Total driving time exceeded

Over-time Driving，Total driving time exceeded		
Content	Field name	Description
Fatigue level	de	Reserved
Lasting duration	du	Unit: second
Threshold	lt	Unit: minute
ID	Id	
Name	na	

Non-alarm event

16. Trip notification

Trip Notification		
Content	Field name	Description
Average speed	avg	
Max Speed	max	
Duration	dur	
Driver ID	drid	
Start longitude	slng	
Start latitude	slat	

17. Tire pressure

Notification of Tire pressure, (a group of tire pressures)		
Content	Field	Description
ID	id	
Temperature	temp	id=0: not exist
Pressur	pres	id=0: not exist
Group No.	gn	id=0: not exist， A1、A2、A3
Alarm data	od	id=0: exist， Format: type, raw data; type 1-tpms, 2-undefined

18. Disk detection

Disk abornal		
Content	Field	Description

No.	num	Like: sd, sd2, hdd1, hdd2
Overwriting times	ow	

19. Load alarm

Load alarm		
Content	Field	Description
Type	dt	0--overload 1--underload 2--connection abnormality
Valid when over-loaded, under-loaded		
Trigger threshold	vt	Unit: ton
Total weight	tw	Unit: ton
Cargo weight	gw	Unit: ton
Voltage	vl	Unit: mv (current voltage of load sensor)

20. Wake up event

Wake up		
Content	Field	Description
Wake up type	num	0: IO 1: Gsensor 2: Timer 4: remote

21. Satellite Modem Status

Content	**Field**	**Description**
Status	st	0—Working normal 1—Module normal, satellite communication abnormal 2—Module abnormal

22. Alcohol detection alarm

Content	**Field**	**Description**
Trigger threshold	vt	mg/100ml;
Alcohol concentration	cur	mg/100ml;
Concentration unit	unit	0--mg/100ml, 1--mg/l, 2--%, 3--‰

23. .Datahub Information Notification

A set of Datahub information		
Content	**Field**	**Description**
Acceleration	acc	ACCELERATOR_PEDAL_POS
Coolant	ct	ENGINE_COOLANT_TEMPERATURE
Distance	ds	DISTANCE
Fuel consumption	fu	FUELLEVEL
RPM	rpm	ENGINE_SPEED_RPM

Speed	**spd**	SPEED
Mileage	**ml**	TOTAL_TRIP_FUEL_USED_CC
Hub input	**hin**	
Hub output	**hout**	
Device input	**in**	
Device output	**out**	
Time	**dtu**	
Peripheral type	**tp**	0--VOLVO 1--SCANIA 2--UD 3--HINO

24. Alarm File

Notification of file generated		
Content	Field	Description
File type	ft	Refer to the file type code: File Type Code
File name	fn	

25. Alarm file in visible partition

Notification of alarm file in visible partiion generated (mp4/jpg)		
Content	Field	Description
Channel	ch	
Duration	dur	
File size	fs	
File type	ft	Refer to the file type code: File Type Code
File name	fn	

{"ch":"1","dur":"20","fn":"/mnt/sd2/REC-ALARM/20220811/171059_1/1_1_0_1660237859.mp4","fs":"2557615","ft":"2"}

26. Timer Snapshot

Timer Snapshot		
Content	Field	Description
Channel	ch	
File type	ft	Refer to the file type code: File Type Code
File name	fn	

{"ch":"3","fn":"/mnt/sd2/capture/20220811/1660238445073CH03T1.jpg","ft":"3"}

27. Ftp file upload

Notification of ftp file upload		
Content	Field	Description
Channel	ch	
File type	ft	Refer to the file type code: File Type Code
File name	fn	

{"ch":"3","fn":"/mnt/sd2/capture/20220811/1660238445073CH03T1.jpg","ft":"3"}

Some data in the alarm load data is not yet implemented.
HEX example:
48015110bc00000020616c61726d2d32383038313130322d3030303030314539364244464230313000640000007b22646574223a7b22

6368223a2231227d2c22647475223a22323031382d30392d31342031343a33313a3037222c226563223a2232222c226574223a22222c227061223a22222c227374223a22323031382d30392d31342031343a33313a3037227d0a0012090e0e1f072d00000112090e0e1f07000b0000821408007158f0800165a280500810000001f00000103010f000000000000
Loading data analysis:
Session No. length: 0x20
Session No.: alarm-28081102-000001E96BDFB010
Content length: 0x00000064
Content (JSON) : {"det":{"ch":"1"},"dtu":"2018-09-14 14:31:07","ec":"2","et":"","pa":"","st":"2018-09-14 14:31:07"}
Device time: 2018-09-14 14:31:07
Start time: 2018-09-14 14:31:07
End time: Null (means triggered)
Event type: 2
Photo location: Null
Alarm description: {"ch":"1"} (means Ch1)
Location status data
Device time: 2018-09-14 14:31:07
Content: 0x002d (Means there is location info, basic status, module working status, mobile network status)
Location info
Info: 0x00
Locating type: 0x01
Time: 2018-09-14 14:31:07
Direction: 0x00
Satellite quantity: 0x0b
Speed: 0x0000
Altitude: 0x1482
Location accuracy: 0x0008
Longitude degree: 0x71
Longitude minute: 0x00088f58
Latitude degree: 0x16
Latitude minute: 0x0005285a
Basic Status
Identifier bit 1: 0x81 (Means ignition key valid, right front door open)
Identifier bit 2: 0x00
Reserve: 0x0000
Module working status
Identifier bit: 0x001f (Means there exists: mobile network data, location module data, Wi-Fi module data, G-sensor data, recording status data)
Mobile network: 0x00
Location module: 0x01
WIFI module: 0x03
G-sensor: 0x01
Recording status: 0x000f
Mobile network status
Identifier bit 1: 0x00
Signal strength: 0x00
Network type: 0x00
Reserved: 0x0000

2.8.4 Business data response

Note: It is valid when the 4050 ack is 1

Content	Description
Message No.	0x4051
Direction	MDVR ←← Server
Link Type	Signaling link
Load Data	Null

Hexadecimal example:
4801514000000000

2.8.5 Upgrade Status Notification

Content	Description		
Message No.	0x1052		
Direction	MDVR →→ Server		
Link Type	Signal link		
Load Data	adopt JSON encoding rule		
	Mandatory fields		
	Content	Field	Description
	Session Number	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203
	Upgrade type	ut	1-—Main firmware 2--MCU 3-—MCU font 4-extension program
	Upgrade status	us	0: succeed, 1: start, other: failed

2.9 File Query

2.9.1 Query Request

Content	Description		
Message No.	0x4060		
Direction	MDVR ←←Server		
Link Type	Signal link		
loading data	JSON adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the device, i.e.: 12FB-01DE-0001-0203”
	start time	st	start time, for example: “2017-01-01 12:30:30” Start date, for example: “2017-01-01”
	end time	et	end time, for example “2017-01-02 10:30:30” End date, for example: “2017-01-31”
	channel list	chl	corresponding to the exact channel, starting from 1, and split by “;”, for example “1;2;5” means channel 1, channel 2, and channel 5
	file type	ft	File Type Coderefer to the file type code
	optional items		
	storage list	ml	Correspond to the storage location, split by “;”, all type including sd1, sd2, hd1, hd2, for example “sd1; hd1”means searching recording file from sd1 and hd1 If this item not exist, then search all the storage as default. (not yet implemented)
	Upload server	srv	The sever address or domain name of auto upload server. For example: www.how.com:31500。 www.how.com is the domain name and 31500 is the port number If there is not this field, then follow signal link. Otherwise after adding this field, will create a new media link
	Stream type	si	0: sub stream; 1: main stream

“st” and “et” cannot be same, otherwise cannot get search result.
Loading data sample:
{
“ss”:”12FB-01DE-0001-0203”,

"chl": "1;3",
"st": "2017-01-01 00:00:00",
"et": "2017-01-02 12:30:00",
"ft": "1"
" si ": "1"
}

HEX example:
480160406700000007b2263686c223a22313b323b34222c226574223a22323031382d30392d31332032333a35393a3539222c226674223a2231222c227373223a2266696c655f71756572795f74657374222c227374223a22323031382d30392d31332030303a30303a3030227d0a00
Plain text example:
H`@g{"chl":"1;2;4","et":"2018-09-13 23:59:59","ft":"1","ss":"file_query_test","st":"2018-09-13 00:00:00"}
Loading data analysis:
Session No.: file_query_test
Start time: 2018-09-13 00:00:00
End time: 2018-09-13 23:59:59
Channel list: 1;2;4
File type: 1 (Means: normal recording)

2.9.2 File Result

Content	**description**		
Message No.	0x1060		
Direction	MDVR →→Server		
Link Type	signal link/Media link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
		Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Error Code	err	_错误代码 please refer to the error code list, No.8 and No. 9 error type
	Optional items (if error code is No. 8, there is data coming, else no data coming)		
	file information		file data, refer to the below file result list

file information fi (content included in fi field)		
Optional items		
Content	Field name	Description
start time	st	start time, for example “2017-01-01 12:30:30”
End time	et	end time, for example “2017-01-01 13:30:30”
Channel list	chl	corresponding to the exact channel, starting from 1, and split by “;”, for example “1;2;5” means channel 1, channel 2, and channel 5
file type	ft	_File Type Coderefer to file type code
file path	fn	For example, “/mnt/sd1/xxxx.264”
file size	fs	byte
file duration length	fd	second
Disk name	dn	Hdd or SD1, etc.
Stream type	si	0: sub stream; 1: main stream

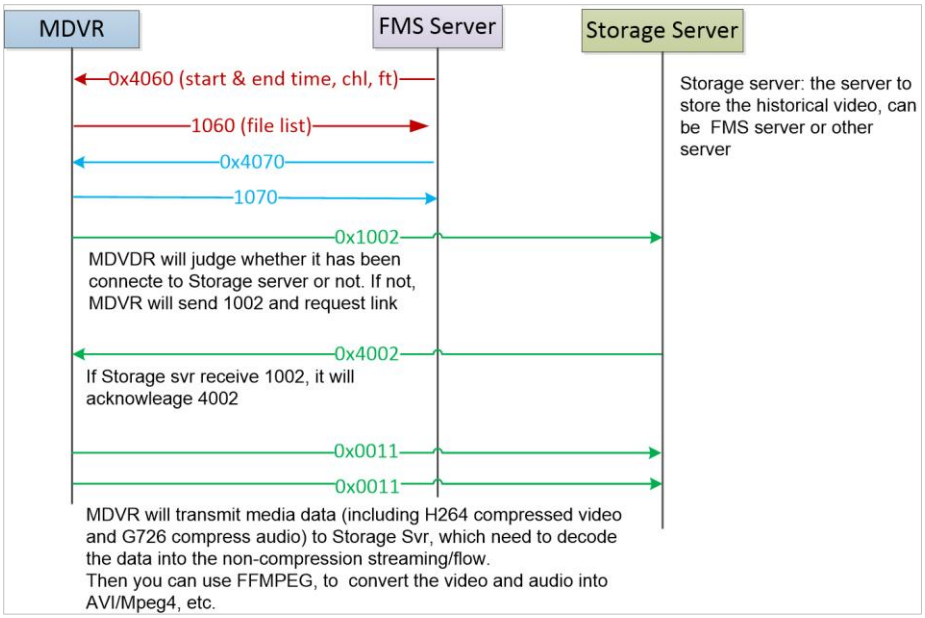
Loading Data Sample:
{

“ss”:”12FB-01DE-0001-0203”,
“err”:”8”,
“fi”:{
"chl": "1;2;3",
"st": "2017-01-01 00:00:00",
"et": "2017-01-02 01:30:00",
"ft": "1",
"fn ": "/mnt/sd1/20170111.jpg",
"fs": "102400"
" dn": "sd1",
" si": "1"

}
}
Loading example of Date result ：
{
“ss”:” 12FB-01DE-0001-0203” ,
“err”:”8” ,
“fi”:{
"chl": "0",
"st": "2017-01-01",
"et": "2017-01-01",
" ft": "1",
" fn ": "",
" fs": "0"
}
}
HEX example:
48016010c50000007b22657272223a2238222c226669223a7b2263686c223a2234222c226574223a22323031382d30392d31332031353a33333a3132222c226664223a223339222c22666e223a222f303030335f30306537303630305f355f313533363835323735335f3135333638353523739325f325f35343834392e617669222c226673223a223534383439222c226674223a2231222c227374223a22323031382d30392d31332031353a33323a3333227d2c227373223a2266696c655f71756572795f74657374227d0a00
Plain text example:
H`Å{"err":"8","fi":{"chl":"4","et":"2018-09-13 15:33:12","fd":"39","fn":"/0003_00e70600_5_1536852753_1536852792_2_54849.avi","fs":"54849","ft":"1","st":"2018-09-13 15:32:33"},"ss":"file_query_test"}
Loading data analysis:
Session No.: file_query_test
Error code: 8 (Means: there is data following)
File info
Starting time: 2018-09-13 15:32:33
End time: 2018-09-13 15:33:12
Channel list: 4
File type: 1 (Means: normal recording)
File path: /0003_00e70600_5_1536852753_1536852792_2_54849.avi
File size: 54849 Byte
File duration time: 39 seconds
HEX example:
48016010240000007b22657272223a2239222c227373223a2266696c655f71756572795f74657374227d0a00
Plain text example:
H`${"err":"9","ss":"file_query_test"}
Loading data analysis:
Session No.: file_query_test
Error code: 9 (Means file searching ends)

2.10 Recording Playback

2.10.1 Playback Request



Content	**Description**		
Message No.	0x4070		
Direction	MDVR ←←Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Channel list	chl	corresponding to the exact channel, starting from 1, and split by “;”, for example “1;2;5” means channel 1, channel 2, and channel 5
	Upload server	srv	upload Server IP address or Domain Name, for example” www.how.com:31500“, the www.how.com is domain name, 31500 is port (remark: 31500 port is just a sample port)
	start time	st	start time, for example “2017-01-01 12:30:30”
	End time	et	end time, for example “2017-01-02 10:30:30”
	Optional items		
	Data frame list	fl	List of data frame in transmission. Refer to Data Frame Code. e.g., “1;2;3” means needing to transmit data of type1,2,3
	File name	fn	Corresponding file name of recording file. It is usually used in alarm recording playback, and start time/end time is invalid in this mode.
	Playback way	act	The default is 0, 0- download playback (full speed playback), 1-stream playback (normal speed playback)
	Stream type	si	0: sub stream; 1: main stream

Loading Data Sample:

```
{
“ss”:” 12FB-01DE-0001-0203”,
"chl": "1;3",
"st": "2017-01-01 00:00:00",
      "et": "2017-01-02 12:30:00",
"srv": "192.168.3.210:5678"
" fl ": "1",
}
```

HEX example:
480170408e0000007b2263686c223a2231222c226574223a22323031382d30392d31342031353a31363a3131222c22666c223a22313b323b33222c22666e223a22222c22737276223a223139322e3136382e332e3231303a3333303030222c227373223a227265706c61792d72656d6f74652d66696c65222c227374223a22323031382d30392d31342031353a31343a3337227d0a00
Plain text example:
Hp@{"chl":"1","et":"2018-09-14 15:16:11","fl":"1;2;3","fn":"","srv":"192.168.3.210:33000","ss":"replay-remote-file","st":"2018-09-14 15:14:37"}
Loading data analysis:
Session No.: replay-remote-file
Channel list: 1
upload server: 192.168.3.210:33000
Starting time: 2018-09-14 15:14:37
Ending time: 2018-09-14 15:16:11
Data frame list: 1;2;3
File name: Null

2.10.2 Request Respond

Content	**Description**		
Message No.	0x1070		
Direction	MDVR →→Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Error Code	err	

Loading Data Sample:
{
“ss”:”12FB-01DE-0001-0203”,
“err”:”0”
}
HEX example:
480170102700000007b22657272223a2230222c227373223a227265706c61792d72656d6f74652d66696c65227d0a00
Plain text example:
Hp'{"err":"0","ss":"replay-remote-file"}
Loading data analysis:
Session No.: replay-remote-file
Error code: 0

2.10.3 Media Data

媒体数据 refer to Media Data
After all the data has been sent, a packet with a media length of 0 is sent, as a mark that replay is completed.

2.10.4 Time control (specify the time)

Content	**Description (specify the time duration for video playback)**		
Message No.	0x4071		
Direction	MDVR ←←Server		
Link Type	Media link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description

	control type	act	0-seek, 1-pause, 2-play， 3-Fast play
	Jump time	of	Valid when act=0 (exact time, for example “2017-01-01 12:35:58”, Jump time valid) When act=3, value means times of fast play (1, 2, 4, 8, 16)

Loading Data Sample:
{
“act”:”0”,
“of”:” 2017-01-01 12:35:58”,
}
HEX example:
48017140280000007b22616374223a2230222c226f66223a22323031382d30392d31342031353a33333a3333227d0a00
Plain text example:
Hq@({"act":"0","of":"2018-09-14 15:33:33"}
Loading data analysis:
Control type: 0
Offset time: 2018-09-14 15:33:33

2.11 Series port transparent transmission

2.11.1 Transparent transmission Request

Content	**Description**		
Message No.	0x4080		
Direction	MDVR ←←Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Port numbering	si	starting from 1(The corresponding serial port function, can only select the third-party transparent transmission 1)
	stop bit	sb	0 -- 1; 1--1.5; 2--2
	check bit	cb	0—no 1—odd 2--Even numbers 3—sign 4--space
	data bit	db	value from 4~8
	baud rate	br	
	registered server	srv	Registered Server IP address or Domain Name, for example” www.how.com:31500“, the www.how.com is domain name, 31500 is port

Loading Data Sample:
{
“ss”:” 12FB-01DE-0001-0203”,
"si": "3",
"sb": "2",
"cb: "0",
"db: "8",
"br: "8000",
"srv": "192.168.3.210:5678"
}

2.11.2 Request Respond

Content	**Description**
Message No.	0x1080

Direction	MDVR →→Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Error Code	err	

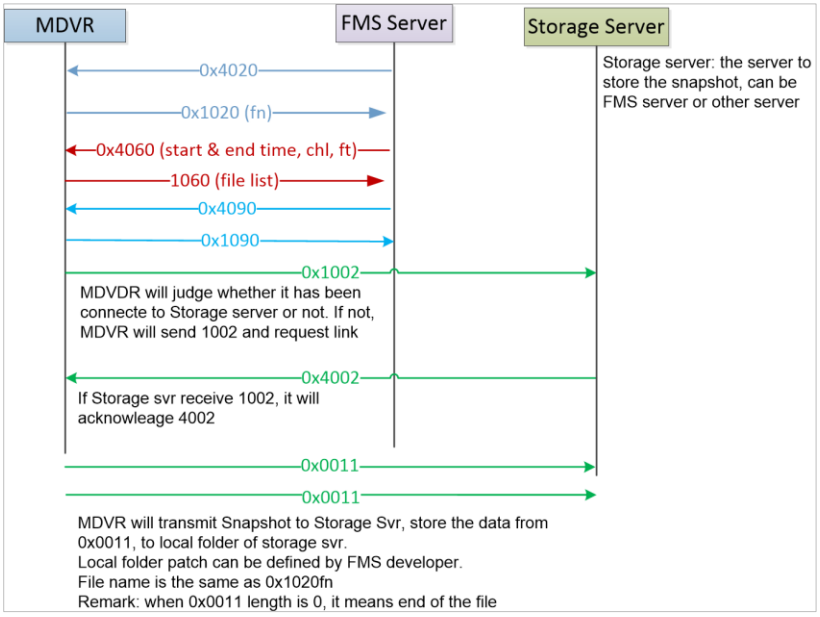
Loading Data Sample:
{
“ss”:”12FB-01DE-0001-0203”,
“err”:”0”
}

2.11.3 Media Data

refer to Media data

2.12 File Transmission

2.12.1 Request to transmit the file to Device



Content	**Description**		
Message No.	0x4090		
Direction	MDVR ←←Server		
Link Type	signal link		
Loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Action	act	0—download from device 1—download from server
	Registered Server	srv	Registered Server IP address or Domain Name, for example” www.how.com:31500“, the www.how.com is domain name, 31500 is port
	File type	ft	Reference 3.4 File Type Code
	file name	fn	device save file name, if empty, device can define the name

	File size	fs	Numbers of bytes
	File offset	fo	The offset bytes from file begin

Loading Data Sample:
{
“ss”:” 12FB-01DE-0001-0203”,
"act": "0",
“ft”: “1”,
"fs": "10240",
"fn": "aa.avi",
"srv": "192.168.3.210:5678",
"of": "0"
}
Note: You can get the file name by sending a 0x4060 request.

Remark:
when server send 4090 command to download history recording file, MDVR will send the H.264 streaming (RAW data) to upload server (the server to receive and store file)
server need to decode the RAW data base on the device protocol, and write the media data into file, then convert the file into AVI/ MP4 please refer to the steps as below:
1, create a file in the registration server, name it xxxx.h264 , for example tmp.h264
2, decode the device protocol raw data after MDVR sending the history recording file (streaming) to server, the raw data sending from MDVR to Server is 0X0011 media data, please decode the loading data base on device protocol document
3, write the decoded loading data into tmp.h264 file
4, when 0x0011 length is 0, it means end of the file.
5, after decoding all the 0x0011 data, exclude ffmpeg command to convert the tmp.h264 file into video file
demo command as below
ffmpeg -i test.h264 -c copy out.mp4

2.12.2 Request Respond

Content	**Description**		
Message No.	0x1090		
Direction	MDVR →→Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Error Code	err	
	offset address	of	the relative offset for file, for resume from break point uploading again

Loading Data Sample:
{
“ss”:”12FB-01DE-0001-0203”,
“err”:”0”,
“of”:”0”
}

2.12.3 Media Data

媒体数据 refer to the media data
After all the data has been sent, a packet with a media length of 0 is sent, as a mark that file transfer is completed.

2.12.4 ftp file transmission

Content	**Description**

Message No.	0x4091		
Direction	MDVR ←←Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	ftp server	ftp	rule: ftp://user name:password@server: port
	Action type	act	0—upload files to ftp 1—download files from ftp
	File name	fn	File name to be processed
	Optional		
	File type	ft	Refer to: 3.4 File type code
	Storage file name	sfn	server storage file name (ftp absolute path) act=0 valid

Loading Data Sample:
ftp Download data to device
{
“ss”:”12FB-01DE-0001-0203”,
“ftp”:” ftp://aa:123@192.168.0.5:32001”,
“act”:”1”,
“ft”:”5”,
“fn”:”HW3521D-V19080902-V200108A0.sw””,
}
Upload file to ftp
{
“ss”:”12FB-01DE-0001-0203”,
“ftp”:” ftp://aa:123@192.168.0.5:32001”,
“act”:”0”,
“sfn”:”20198002/2020-08-13/*****.jpg”,
“fn”:”/mnt/snap_1.jpg””,
}

2.12.5 ftp transmission over report

Content	Description		
Message No.	0x1091		
Direction	MDVR →→Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	1. Generated by the sever, i.e.: 12FB-01DE-0001-0203” 2. Automatic upload of alarm linkage is consistent with 0x1051uuid
	ftp server	ftp	rule: ftp://user name:password@server: port
	action type	act	0-upload file to ftp. 1-download file from ftp
	Error Code	err	
	Optional items		
	version	ver	version need to be upgraded
	file name	fn	file need to be processed
	File channel	chl	

Loading Data Sample:

{
“ss”: “12FB-01DE-0001-0203”,
“ftp”: “ftp://aa:123@192.168.0.5:32001”,
“act”:”1”,
“ft”: “1”,
“ver”:”1.02.3”,
“err”:”0”
}

2.12.6 Device file generation notification

Content	Description		
Message No.	0x1092		
Direction	MDVR →→ Server		
Link Type	Signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the device, such as "12FB-01DE-0001-0203", uses the session number corresponding to the registered link
	File type	ft	Refer to File Type Code
	File name	fn	File name to be processed
	Optional field:		
	Event type	et	Event of file generated
	Accessory content	dt	
File event (et)			
1280	Alarm files(jpg, recording of invisible partition, .avi）		
1281	Timed snapshot		
1282	Alarm triggered video clips (jpg, recording of visible partition, mp4）		

Loading Data Sample:

```
{
	"dt": {
	"images": {
		"capturedTime": "2021-06-30 14:08:53",
		"channel": "1",
		"latitude": "22.558142",
		"longitude": "113.946671",
		"speed": "0.000000"
		}
	},
	"et": "1281",
	"fn": "/mnt/sd2/capture/20210630/1625062133319CH01T1.jpg",
	"ft": "3",
	"ss": ""
}
```

2.12.7 Notification of File transmission Status

Content	Description		
Session Number	0x1093		
Direction	MDVR →→ Server		
Link Type	Signal link		
Load Data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description

	Session No.	ss	Generated by the device, such as "12FB-01DE-0001-0203", uses the session number corresponding to the registered link
	File type	ft	Refer to File Type Code
	File name	fn	File name to be processed
	Transmission Status	ts	1--Start 0--End

2.13 Parameter Configuration

2.13.1 Configuration Request

Content	Description		
Message No.	0x40A0		
Direction	MDVR ←←Server		
Link Type	signal link		
Loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Optional items		
	Content	sc	the definition is different for each parameter configuration, Field name is different as well. the described content is included in the Field name, if the data is empty behind Field name, that means operation for gain parameter, refer to parameter description for example: set the clock parameter, it will be “clock”:{“a”:”1”,”b”:”6”} Gain the clock parameter, it will be “clock”:“” Sub-module parameter: “Mod”: “AI BOX”, Get the Mod parameter, it will be “Mod”: “ ”
	Upload Server	srv	IP address or domain name of upload server[e.g., www.how.com:31500, www.how.com is address and 31500 is port]. It will use signal link if there are no server settings, otherwise it will create a new link like media data transfer.

Loading Data Sample:
1, Set clock and time at the same time

```
{
"ss" : "12FB-01DE-0001-0203"
    "sc" :
    {
        "clock" :
         {
            "timezone" : "3"
        },
        "time" :
         {
            "interval" : "7",
            "ntp" : "www.ntp.com"
        }
    },
}
```

2, obtain clock, time and record at the same time

```
{
"ss" : "12FB-01DE-0001-0203"
    "sc" :
    {
```

```
        "clock" :
         {
            "timezone" : "3"
        },
        "time" :
         {
            "interval" : "7",
            "ntp" : "www.ntp.com"
        }
    },
}
```

2.13.2 Request Respond

Content	Description		
Message No.	0x10A0		
Direction	MDVR →→Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Error Code	err	错误代码 refer to the Error code list
	Optional items		
	parameter content	pc	refer to the same content in the configuration request

Loading Data Sample:

```
{
“ss”:” 12FB-01DE-0001-0203” ,
“err”:”0”,
"sc" :
    {
“time”:{
"mode": "5"
}
}
}
```

2.14 Device Control

The below protocol will not have relative MDVR respond except special remark.

2.14.1 PTZ Control

Content	Description		
Message No.	0x4100		
Direction	MDVR ←←Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	action	act	云台动作代码 refer to the PTZ action code
	channel	ch	Related channel, from 1
	Optional items		
	X direction	xs	X direction moving speed, 1~10

	speed		
	Y direction speed	ys	Y direction moving speed, 1~10
	preset	pre	0~255

Loading Data Sample:
{
“ss”:”12FB-01DE-0001-0203”,
“act”:”3”,
"xs": "3",
"ys": "10",
"pre”: "15"
}

2.14.2 Restart

MDVR restart is based on Message No.to identify

Content	**Description**		
Message No.	0x4102		
Direction	MDVR ←←Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”

Loading Data Sample:
{
“ss”:”12FB-01DE-0001-0203”
}

2.14.3 Upgrade

refer to command 4090 file transmission

2.14.4 Factory Default Setting

Content	**Description**		
Message No.	0x4103		
Direction	MDVR ←←Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”

Loading Data Sample:
{
“ss”:”12FB-01DE-0001-0203”
}

2.14.5 Synchronization time (not implemented yet)

Content	Description		
Message numbering	0x4104		
Transmission Direction	MDVR ←←Server		
Interaction Link	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	field name	Description
	Session numbering	ss	The session number generated by the sever, for example” 12FB-01DE-0001-0203”
	Time	tm	The specific time: if empty, then MDVR access to the positioning time to synchronize; if such as "2017-01-01 11:30:58", then set to this point in time

Loading Data Sample:

{
“ss”:”12FB-01DE-0001-0203”,
“tm”:”2017-01-01 11:30:58”

}

2.14.6 Recording Control (not implemented yet)

Content	Description		
Message numbering	0x4105		
Transmission Direction	MDVR ←←Server		
Interaction Link	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	field name	Description
	Session numbering	ss	The session number generated by the sever, for example” 12FB-01DE-0001-0203”
	Open List	ol	corresponds to the exact channel, starting from channel 1, and split by “;”, for example “1;2;5” means channel 1, channel 2, channel 5
	Close List	cl	same as above

Loading Data Sample:

{
“ss”:”12FB-01DE-0001-0203”,
“ol”:”1;3;4”,
“cl”:”2”
}

Means channel 1, 3, 4 start recording, channel 2 stop recording, other channels will be remaining the existing status

2.14.7 Clear Alarm (not implemented yet)

Content	Description		
Message numbering	0x4106		
Transmission Direction	MDVR ←←Server		
Interaction Link	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	field name	Description
	Session numbering	ss	The session number generated by the sever, for example” 12FB-01DE-0001-0203”

Loading Data Sample:

{
“ss”:”12FB-01DE-0001-0203”
}

2.14.8 Vehicle Control

Content	Description		
Message No.	0x4107		
Direction	MDVR ←←Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Action type	act	1—cut the fuel, 2—resume the fuel(1 and 2 control out1; 1 is high level, 2 is low level) 3—cut the electronic 4—resume electronic(3 and 4 control out2; 3 is high level, 4 is low level) 5—open the door6—close the door(5 and 6 are reserved, not yet implemented)
	Optional items		
	door ID	do	1—left front door 2—right front door 3—left mid door 4—right mid door 5—left rear door 6—right rear door

Loading Data Sample:
{
“act”:”5”,
“do”:”2”
}

2.14.9 Format Disk

Content	Description		
Message No.	0x4108		
Direction	MDVR ←← Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”
	Disk ID	num	For example, “sd1,sd2,hdd1,hdd2”

Loading Sample:
{
“ss”:” 12FB-01DE-0001-0203”
“num”:”sd1”
}

2.14.10 Gsensor Calibration

Content	Description		
Message No.	0x4109		
Direction	MDVR ←← Server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session number	ss	Generated by the sever, i.e.: 12FB-01DE-0001-0203”

Loading Data Sample:
{
“ss”:”12FB-01DE-0001-0203”,
}

2.14.11 OSD Speed overlay

Content	Description		
Message No.	0x410A		
Direction	MDVR ←← server		
Link type	Signal link		
Load data	adopts JSON encoding rules		
	Required		
	Content	Field name	Description
	Session ID	ss	Generated by the server, such as "12FB-01DE-0001-0203"
	OSD speed	ods	Such as obd, gps

Load sample:
{
“ss”:” 12FB-01DE-0001-0203”,
“ods”:”obd”
}

2.14.12 Send Short Message

Content	Description
Message	0x410B

No.			
Direction	MDVR ←← Server		
Link type	Signal Link		
Load data	adopts JSON encoding rules		
	Required		
	Content	Field name	Description
	Session ID	ss	Generated by the server, such as "12FB-01DE-0001-0203"
	Short Message Type	tp	1: Display in terminal
	Short Message Content	text	Max. 1024 characters

Load sample:

{
“ss”:” 12FB-01DE-0001-0203”,
“tp”:”1”,
“text”: “hello world”
}

2.14.13 Device Log

Content	**Description**		
Message No.	0x410C		
Direction	MDVR ←← Server		
Link Type	Signal Link		
Load data	adopts JSON encoding rules		
	Required		
	Content	Field name	Description
	Session ID	ss	Generated by the server, such as "12FB-01DE-0001-0203"
	Log module	name	gps -- 0x4060 search log file, ended by .gps
	Log duration	dur	Unit: minute

Load sample:

{
“ss”:” 12FB-01DE-0001-0203”
“name”: “gps”,
“dur”, 30
}

2.14.14 Reset Mileage

Content	**Description**		
Message No.	0x410D		
Direction	MDVR ←← Server		
Interactive link	Signal Link		
Load data	adopts JSON encoding rules		
	Required		
	Content	Field name	Description
	Session No.	ss	Generated by the server, such as "12FB-01DE-0001-0203"
	Mileage	mile	Km

Load sample:

{
“ss”:” 12FB-01DE-0001-0203”
“mile”: 30

}

2.14.15 TTS audio

Content	Description		
Message No.	0x410E		
Direction	MDVR ←← Server		
Link Type	Signal link		
Load data	adopts JSON encoding rules		
	Required		
	Content	Field name	Description
	Session ID	ss	Session number generated by the server, for example “12FB-01DE-0001-0203”
	TTS audio No.	num	

{
“ss”:” 12FB-01DE-0001-0203”
“num”: 3
}

2.14.16 Answer

Content	Description		
Message No.	0x1100		
Direction	MDVR →→ server		
Link Type	Signaling link (All requests in 2.14 will return this response, distinguished by session number)		
Load data	adopts JSON encoding rules		
	Required		
	Content	Field name	Description
	Session ID	ss	Session number generated by the server, for example ”12FB-01DE-0001-0203”
	error code	err	Please refer: Error Code

Load sample:
{
“ss”:” 12FB-01DE-0001-0203” ,
“err”:”0”
}

2.15 GPS Optimization switch

2.15.1 GPS Optimization switch

Note: GPS turn-to-turn polling, based on the turning direction, providing more accurate tracking curves. (When the vehicle turns, will report a GPS coordinate when the vehicle turns every 10 degrees)

Content	Description		
Message No.	0x42A0		
Direction	MDVR ←← Server		
Link Type	Signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	The session No. generated by server, like ”12FB-01DE-0001-0203”

	Switch	on	1: Enable GPS optimization，0: Disable GPS optimization
	Angle	dg	The value is angle *100, and the value ranges from 1000 to 35900. i.e., 1000 means 10 degrees, and the angle is greater than or equal to 10 degrees, the position status will be reported.
	Action	act	1: obtain parameter 0: set parameter (if no act filed, default is set parameter; when act=1, on and dg value is invalid, could not be set)

Loading example:
{
"ss":"12FB-01DE-0001-0203",
"on":"1",
"dg":"1000"
“act”:”1”
}

2.15.2 Response to GPS Optimization switch

Content	**Description**		
Message No.	0x12A0		
Direction	MDVR →→ Server		
Link Type	Signal link		
Loading data	Adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	The session No. generated by server, like ”12FB-01DE-0001-0203”
	Error code	err	Please refer to Error code

Loading example:
Set parameter loading data sample:
{
"ss":"12FB-01DE-0001-0203",
"err":"0"
}
Obtain parameter loading data sample:
{
"ss":"12FB-01DE-0001-0203",
"err":"0",
"gpsAngleConfig":{
"on":"1",
"dg":"2000"
}
}

2.16 External module status

2.16.1 Query request

Content	**Description**		
Message No.	0x4300		
Direction	MDVR ←← server		
Link Type	signal link		
loading data	adopt JSON encoding rule		
	Items that must be filled in		
	Content	Field name	Description
	Session No.	ss	Generated by the sever, for example ”12FB-01DE-0001-

			0203”
	Module name	mn	Module name: for example, ”pls”
	Upload to server	srv	(added in firmware after 2021/12/24) Report the server address or domain name, such as "www.how.com:31500", where www.how.com is the domain name and 31500 is the port If there is no such field, the signaling link is taken, Otherwise, after adding this definition, it will create a new link just like the media data.

Loading Data Sample:
{
“ss”:” 12FB-01DE-0001-0203” ,
"mn": "pls"
}

2.16.2 Module data

Content	**Description**		
Message No.	0x1300		
Direction	MDVR →→ server		
Link Type	signal link		
loading data	Binary encoding format		
	Content	length	Description
	Error code	1 byte	error code is 0 means there is loading data
	Device ID length	1 byte	Contains the terminator. If the session number is empty, the session number field needs to add an end character, length is 1
	Device ID	N byte	1~N byte
	Status data	N byte	Refer to status data
Added in firmwares after 2021/12/24:			
Load data	Content	Field	Description
	Length	4	Alarm content description string length, including terminator
	Using JSON encoding rules (alarm content description)		
	Content	Fields	Description
	Session No.	ss	
	Module	mn	
	Error code	err	error code error code 为 0 有模块数据
	Different modules use different encodings (binary or JSON)		
	Module data	N Byte	Refer to Chapter 2.16.3

2.16.3 Module Data

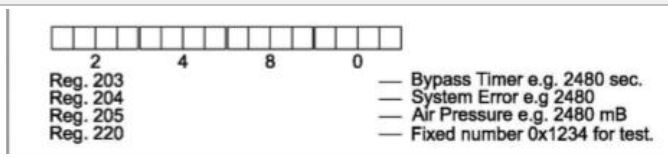
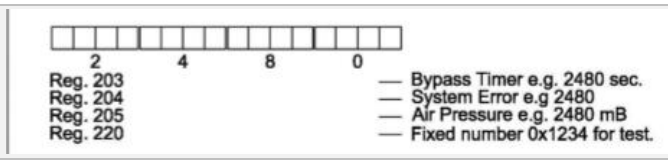
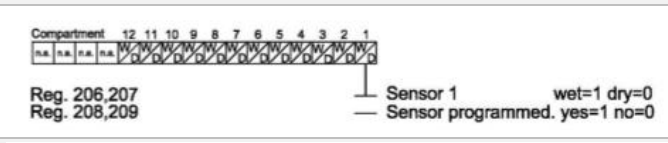
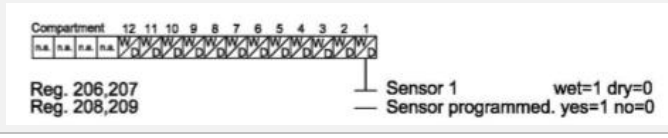
28. PLS (Product Level Sensor) ,

Note: Refer to 2.7.5 to transmit data, when the message ID is 0x1300, bit12 indicates pls data information

Use binary coding rules. Refer to 2.7.5		
Content	Length	Description
Content	2 bytes	The content contained in the following data corresponds to the specific content by bit. If the bit is 0, it means that there is no data in this segment. This rule is referenced in each subsequent state data definition. If it is 0, it means that there is no related data. bit0--location information (0: no, 1: exist) bit2--basic state (0: no, 1: exist) Bit12--pls information (0: no, 1: exist)

PLS status		
type	1 byte	
data	n byte	Type 1(Dixon), type 2(3205)

PLS Dixon (23 byte)	**Content**	**length**	**Introduction refer to Dixon Bayco Communication Protocol rev D.pdf**
	STX	1 byte	0x03
	RCD	1 byte	0xA0
	CNT	1 byte	0x12
	PGMO/R	2 bytes	
	STA	16 bytes	Sensor DRY……..... 0x00 Sensor WET……... 0x80 Sensor NOT PROGRAMMED……..0xFF
	CHK	1 byte	0x**
	ETX	1 byte	0x03

PLS 3205 (9 byte)	**Content**	**length**	**Introduction refer to H72589-12MAY19 - 3205 MODBUS Implementation Rev 2F.pdf**
	Slave Address	1 byte	0x01
	Func Code	1 byte	0x03
	Data Len	1 byte	0x08
	204 Error number	2 bytes	
	205 Air pressure	2 bytes	
	206 Retain Sensor	2 bytes	
	207Overfill Sensor	2 bytes	
	CRC	2 bytes	ModbusCRC16

29. GPS

Use JSON encoding rules		
Content	Field	Description
Satellite Number	num	
Satellite details	star	array
Raw data	raw	

Satellite details (The content is contained in the star paragraph)

Content	Field	Description
No.	id	
Signal Strength	sig	

2.17 Description of electronic Geo fence configuration

At present the realization of the function of the electronic Geo fence is controlled through a configuration file, and no other interface between MDVR and platform.

Direct transmission configuration file (for example, the platform changed the new area of the Geo fence, and it will generate a new configuration file directly, and then through 0x4090 upload the new configuration file to MDVR, MDVR will automatically replace the new configuration files; Every time the MDVR is just started, the platform can also download the configuration file of the electronic Geo fence in the MDVR by sending a request 0x4090.

2.17.1 Upload the Geo fence of the configuration file

0x4090 loading example:

{
“ss”:” 12FB-01DE-0001-0203” ,
"act": "1",
“ft”: ”6”,
"fs": "65535",
"fn": "geofence.config",
"srv": "192.168.3.210:5678",
"of": "0"
}

After sending a 0x4090 request, MDVR will send a media channel registration request of 0x1002 to 192.168.3.2107:5678. After 192.168.3.2107:5678 replies to 0x4002, it reads the local modified Geofence configuration file, and package it as the media data of 0x0011 and send it to MDVR; Please notice that, when the local geofence.config file read and finish sending, and it need to send a loading data as 0 0x0011 data package to indicate the file transfer is complete.

2.17.2 Download the Electronic Fence Configuration File

0x4090 Loading example:

{
“ss”:” 12FB-01DE-0001-0203” ,
"act": "0",
“ft”: ”6”,
"fs": "65535",
"fn": "/etc/config/geofence.config",
"srv": "192.168.3.210:5678",
"of": "0"
}

After sending a 0x4090 request, The MDVR will send a packet of 0x0011 to 192.168.3.210:5678, parse the contents inside, and when the length of media data in the load data of the received packet of 0x0011 is 0, it means that the document has been received

2.17.3 Description of Electronic Geo Fence Configuration File Content

Configuration file:

```
{
    "num":2,
    "list":{
        "a1":{
            "id":3301,
            "attr":23,
            "st":1591887459,
            "et":1599999999,
            "spd":70,
            "ostm":7,
            "apNum":3,
            "p1":{
                "lo":"113.937332",
```

```
                "la":"22.560095"
            },
            "p2":{
                "lo":"113.940674",
                "la":"22.560097"
            },
            "p3":{
                "lo":"113.943733",
                "la":"22.558964"
            }
        },
          "a2":{
            "id":3302,
            "attr":23,
            "st":1591887459,
            "et":1599999999,
            "spd":60,
            "ostm":6,
            "apNum":2,
            "p1":{
                "lo":"113.946999",
                "la":"22.559135"
            },
            "p2":{
                "lo":"113.946716",
                "la":"22.561094"
            }
        }
    }
}
```


Description of relevant parameters:

Content	Field name	Description
The total of region	num	
Region list	list	
Region 1	a1（an）	ax to indicate a specific region
Region id	id	
Regional attribute	attr	Check 2.17.4 Definition of regional attributes
Starting time	st	Time range setting BCD[6] in area
The end of time	et	Time range setting BCD[6] in area
The highest speed	spd	The unit is kilometers per hour (km/h). If the speed limit in the area property is 0, there is no such field
Overspeed duration	ostm	The unit is seconds (s). If the speed limit in the area property is 0, there is no such field
Total number of vertices in a region	apNum	
vertices 1	p1（pn）	px indicate a particular vertex
Vertex longitude	lo	The longitude in degrees is multiplied by sixth power of 10, and the precision is one millionth of a degree
Vertex latitude	la	Latitude in degrees is multiplied by sixth power of 10, and the precision is one millionth of a degree
circle radius	lr	The radius of the circle centered on the vertex, valid when the number of vertices is 1. (unit: m)
Linkage output	root node	over preOver low preLow

		intoArea outArea fbParkOn fbParkOff stayTimeout preIntoArea preOutArea overEx (Excessive overspeed)	
		Field name	Description
		enable	Enable alarm
		spd	Speed threshold
		dut	Duration lasted
		linkRecord	Enable Recording
		linkOutput	Link Output
		linkLockChn	Link recording channel
		linkUploadChn	Link recording upload channel
		linkSnapChn	Link snapshot channel
		linkNetCamTTSSwitch	bit0--turn off the network bit1--camera bit2--tts bit3--turn off the network, recover when alarm ends
		linkBuzzer	Audio switch
		Optional	
		start_spd	Start speed
		end_spd	End speed

2.17.4 Definition of regional attributes（2 bytes）

bit	Sign
0	1: According to the time
1	1: The speed limit
2	1: send alert to the driver when entering geofence
3	1: send alert to the Platform when entering geofence
4	1: send alert to the driver when exiting geofence
5	1: send alert to the Platform when exiting geofence
6	0: Turn on the camera when entering the area；1: Turn off the camera when entering the area
7	0: Open the communication module when entering the zone；1: Close the communication module when entering the zone
8-15	Reserved

Note: The definition here is 2 bytes, and stored in the configuration file are decimal Numbers

2.18 Synch Driver Info

The driver information is in the form of a file and is sent to the device through 0x4090. The device will actively synchronize the driver information and report the synchronization status through http (https is not supported).

Note:

It does not support adding, deleting, modifying or checking the information of a single driver, and it must be fully synchronized.

Filename must be *drivers.config*

2.18.1 Upload driver info file

0x4090 loading sample:

```
{
  "ss": "12FB-01DE-0001-0203",
```

```
        "act": "1",
        "ft": "7",
        "fs": "65535",
        "fn": "drivers.config",
        "srv": "192.168.3.210:5678"
    }
```

The device initiates a media link connection to the srv service, the service media link sends the drivers.config face configuration file data after the response, and finally sends a data packet of 0x0011 with a payload of 0 to indicate that the file transfer is complete

2.18.2 drivers.config File

Adopt JSON encoding rule		
Content	Field name	Description
Synchronization status reporting address	taskNotifyUrl	Customer defined
Driver info	dataList	array
	guid	ID
	name	Name
	cardID	Card No.
	photoUrl	Driver Photo address(.jpg)
	photoMD5	Driver Photo md5 value (32bit)
	photoFlag	Driver Photo status 0--not updated 1--updated

Loading sample:

```
{
  "taskNotifyUrl": "http://localhost:8080/notify",
  "dataList": [
    {
      "guid": "153A5F15-B18447EF-A0651C85-37D650C5",
      "name": "Oscar2",
      "cardID": "318B73DC",
      "photoUrl": "http://localhost:8080/drivers/abc.jpg",
      "photoMD5": "aba72498a77b49dec6f80580a9e71cfd",
      "photoFlag": 0
    },
    {
      "guid": "A0651C85-37D650C5-A0651C85-37D650C5",
      "name": "fsfs",
      "cardID": "123456",
      "photoUrl": "http://localhost:8080/drivers/fsdfsfsd.jpg",
      "photoMD5": "e7172498a77b49dec6f80580a9e71cfd",
      "photoFlag": 0
    }
  ]
}
```

1. The device will download the driver picture according to the http address provided by photoUrl, and verify the md5 value of the picture file
2. Modify the driver's picture: set photoFlag: 1, set a new picture photoMD5 value; if the download address of the picture changes, please update photoUrl synchronously
3. Delete driver: delete the driver information in drivers.config, and synchronize drivers.config to the device.

2.18.3 Synchronization status report

Note:

invalid for Non-AI devices
Request URL: url set by taskNotifyUrl
Request method: POST
Request parameters:

```
{
  "deviceID":"",
  "dataList":[
    {
     "guid": "153A5F15-B18447EF-A0651C85-37D650C5",
     "state": "",
     "rpguid": "",
     "photoMD5": ""
     }
  ]
}
```

After all driver information synchronization is completed, all driver synchronization information will also be sent to the service at one time.

Field	Description
state	Status code: 0--success 1--Not synced 2--The picture is downloading 3--The picture is being certified 10--The picture is not legal 11--Download failed 12--Repeat face 13--The number of faces exceeds the maximum number 99--Other errors

3 Code List

3.1 Error Code: error

Value	Description
0	Success
1	Duplicated ID
2	invalid parameter
3	invalid command
4	device busy
5	connection lost
6	related file not exist
7	disk not exist
8	follow up data
9	file search finish
10	Device is not authorized
255	Unknown error

3.2 Network Type Code: at

Value	Description
0	unknown
1	wired
2	WIFI
3	2G
4	3G
5	4G
6	5G
7	WIFI+3/4/5G, connect with mobile network proxy via WIFI to access Internet
8	CABLE+3/4/5G, connect with mobile network proxy via CABLE to access Internet

3.3 Event Type Code: ec

ONLINE EVENT CODE LIST:

For details on device event codes, please refer to the unified document:

https://docs.google.com/spreadsheets/d/1zLB_oTg2bKf1Dfzwkdfc_yps-AaVYEAtlWOCo_QL9aI/edit?usp=sharing

Event Code			Event Name								
(H-Protocol)		(Web API)			MC series	ME series					
Main type (ec)	Sub Type (tp, dt, ...)		Main type	Sub type	MC30-01	ME40-02 V3 ME40-02 V3C	ME40-02 V8 ME40-02 V8C	ME41-02N	ME40-04N ME30-04N	ME40-04N2
	st=9			9--Disk pauses to write video: 3 consecutive p	Y	Y	Y	Y	Y	Y
	st=10			10--Disk recording overwrite exception: a kind	Y	Y	Y	Y	Y	Y
	st=11			11--The disk has not recorded for a long time:	Y	Y	Y	Y	Y	Y
	st=12			12--The disk is written slowly, causing the cac	Y	Y	Y	Y	Y	Y
17		17	Overtime driving (fatigue)							
18	dt=1	210	fuel consumption abnormal	Refuel						
	dt=2	211		Fuel theft						
19		19	ACC Off		Y	Y	Y	Y	Y	Y
20		20	GPS module abnormal							
21		21	front panel open							
22	tp=1	22	Swipe card	Driver swipe card	Y	Y	Y	Y	Y	Y
	tp=2			Student swipe card	Y	Y	Y	Y	Y	Y
	tp=3			invalid card	Y	Y	Y	Y	Y	Y
23		23	IBUTTON							
24		24	Harsh acceleration		Y	Y	Y	Y	Y	Y
25		25	Harsh braking		Y	Y	Y	Y	Y	Y
26		26	Low speed warning		Y	Y	Y	Y	Y	Y
27		27	High speed warning		Y	Y	Y	Y	Y	Y
	dt=1	230		1-low voltage	Y	Y	Y	Y	Y	Y

Value	Description
0	unknown
1	video lost
2	motion detection
3	video blind
4	input trigger
5	emergency alarm
6	low speed alarm
7	over speed alarm
8	low temperature alarm
9	high temperature alarm
10	humidity alarm
11	parking over time
12	acceleration alarm
13	GEO fencing
14	electronic route
15	abnormal open/close the door
16	storage abnormal
17	Overtime driving
18	fuel consumption abnormal
19	ACC off. (compatible with old firmwares. In old firmwares: During ACC-off delay, if ignites (et > st), will report “accoff ends”; in new firmware: During ACC-off delay, if ignites (et > st), will report “accon”)
20	GPS module abnormal
21	front panel open
22	Swipe card
23	IBUTTON
24	Harsh acceleration
25	Harsh braking
26	Low speed warning
27	High speed warning
28	Voltage alarm
29	People counting
30	DMS and ADAS alarm (Driver monitoring system, and Advanced Driving Assistant System)
31	“Acc on”. Report once at boot
32	Idle
33	Gps antenna break
34	Gps antenna short
35	IO output
36	CAN Bus connection abnormal
37	Towing
38	Free wheeling
39	RPM exceeds
40	Vehicle Move
41	Trip start（st/et/dtu time same）
42	In trip
43	Trip ends (periodically report after acc off)
44	GPS location recover

45	Video abnormal
46	None trip position (report periodically after trip ends)
47	Main unit anomly (Device not connected for long time, periodical alarms)
48	Excessive overspeed
49	Load alarm
50	SIM Card Lost
51	Tracker seat belt alarm
52	Tracker harsh acceleration
53	Tracker harsh braking
54	Tracker overspeed
55	Tracker excessive overspeed
56	Tracker panel open
57	Roaming Mode start
58	Roaming Mode end
59	Wake up event
60	Satellite Modem status
61	Alcohol detection alarm
62	Total driving time exceeded
63	Tracker: RPM exceeds
64	Tracker: Impact
65	Tracker: Towing
66	Tracker: Fraudulent disconnection
67	Tracker: Displacement
68	Tracker: Freewheeling
69	Tracker: Rollover / Overturn
70	Tracker: Panic button pressed / Emergency button
71	Tracker: Sharp turn /Harsh cornering
768	Trip notification
769	Tire pressure notification
770	Disk detection alarm
771	Datahub Status Notification
1280	Alarm file
1281	Timer Snapshot
1282	Alarm file (in visible partition)
1283	ftp file upload notification

3.4 File Type Code: ft

Value	Description
0	unknown
1	general recording
2	alarm recording
3	general snapshot file
4	alarm snapshot file
5	upgrade file
6	log file
7	Configuration file

8	Black box file
9	Visible alarm video/snapshot

3.5 PTZ Movement Code: act

Value	Description
0	unknown
1	up
2	down
3	left
4	right
5	left up
6	left down
7	right up
8	right down
9	call preset
10	set preset
11	clear preset
12	Iris +
13	Iris -
14	zoom -
15	zoom +
16	focus -
17	focus+
18	auto pan
19	wiper ON
20	Wiper OFF
21	Patrol ON
22	Patrol OFF
23	light ON
24	Light OFF

3.6 Data Frame Code: fl

Value	Description
0	Invalid
1	I frame of video (H264)
2	P frame of video(H264)
3	Audio frame (G726 contains a special head of 4 bytes)
4	Serial data frame
5	File data frame (If the length of media data and other info are 0, it means file transmission is finished or file playback is finished.)
6	Status data frame (Only valid in playback, there are gps, gsensor, and acc three status)
7	Alarm data frame (Only valid in playback)

3.7 AI Alarm Type: tp

ONLINE EVENT CODE LIST:

For details on device event codes, please refer to the unified document:

https://docs.google.com/spreadsheets/d/1zLB_oTg2bKf1Dfzwkdfc_yps-AaVYEAtlWOCo_QL9aI/edit?usp=sharing

Event Code			Event Name		How					
(H-Protocol)		(Web API)			MC series	ME series				
Main type (ec)	Sub Type (tp, dt, ...)		Main type	Sub type	MC30-01	ME40-02 V3 ME40-02 V3C	ME40-02 V8 ME40-02 V8C	ME41-02N	ME40-04N ME30-04N	ME40-04N2
	st=9			9--Disk pauses to write video: 3 consecutive p	Y	Y	Y	Y	Y	Y
	st=10			10--Disk recording overwrite exception: a kind	Y	Y	Y	Y	Y	Y
	st=11			11--The disk has not recorded for a long time:	Y	Y	Y	Y	Y	Y
	st=12			12--The disk is written slowly, causing the cac	Y	Y	Y	Y	Y	Y
17		17	Overtime driving (fatigue)							
18	dt=1	210	fuel consumption abnormal	Refuel						
	dt=2	211		Fuel theft						
19		19	ACC Off		Y	Y	Y	Y	Y	Y
20		20	GPS module abnormal							
21		21	front panel open							
22	tp=1	22	Swipe card	Driver swipe card	Y	Y	Y	Y	Y	Y
	tp=2			Student swipe card	Y	Y	Y	Y	Y	Y
	tp=3			invalid card	Y	Y	Y	Y	Y	Y
23		23	IBUTTON							
24		24	Harsh acceleration		Y	Y	Y	Y	Y	Y
25		25	Harsh braking		Y	Y	Y	Y	Y	Y
26		26	Low speed warning		Y	Y	Y	Y	Y	Y
27		27	High speed warning		Y	Y	Y	Y	Y	Y
	dt=1	230		1-low voltage	Y	Y	Y	Y	Y	Y

When the ec=30, there will be data in tp. Otherwise, there will not be tp data.
remark: 1-21 is ADAS alarm ; 33 to 85 is DMS alarm

Value	Description
17	FCW Forward collision warning #1
18	HMW Front vehicle distance is too close #1
2	LDW Lane departure warning #1
4	PCW Pedestrian collision warning #1
7	Front Vehicle Start #1
3	HMW Front vehicle distance is too close #2
6	Road sigh violation alarm #2
1	FCW Forward collision warning #3
8	Harsh breaking #3
19	LDW_L Left lane departure #3
20	LDW_R Right lane departure #3
21	VB Low-speed forward collision alarm #3
5	~~Frequent lane change alarm~~
16	~~Road sign recognition incident~~
33	Fatigue driving alarm #1
34	Calling alarm #1
35	Smoking alarm #1
49	Driver change duty #1
65	Eyes closing #1
66	Yawning #1
67	Camera cover alarm #1
68	glance right and left #1
69	Not wearing a seat belt #1
70	Driver leave duty #1
71	Drinking water
73	Driver returns #1
80	Infrared sunglasses #1
81	Driver authentication succeeded #1

82	Driver authentication failed #1
36	Distracted driving alarm #2
37	Driver abnormal alarm #2
39	Severe eye closure
40	Severe yawning
72	Driver changed #3
83	No face detected #3
85	Mask not worn
96	BSD1 Level 1
97	BSD1 Level 2
98	BSD1 Level 3
99	BSD2 Level 1
100	BSD2 Level 2
101	BSD2 Level 3
102	BSD3 Level 1
103	BSD3 Level 2
104	BSD3 Level 3
105	BSD4 Level 1
106	BSD4 Level 2
107	BSD4 Level 3

3.8 Input alarm: enable type

Value	Description
0	Close
1	Emergency
2	Front door
3	Middle door
4	Rear door
5	Low beam
6	High beam
9	Right turn signal
10	Left turn signal
11	Brake
12	Reverse
13	Reserve
14	Front door closed
15	Middle door closed
16	Rear door closed
17	Intercom
18	Lift
19	Enclosed
20	Load
22	User-defined
23	Safe to Load
31	Ibutton2