1. Protocol based

1.1. Communication mode

Protocol The communication mode must comply with JT/T 794. The communication protocol is TCP or UDP. The platform serves as the server, and the terminal serves as the client. When the data communication link is abnormal, terminals can communicate with each other using SMS messages.

1.2. The data type

The data types used in protocol messages are shown in Table 1:

Table 1 Data types

The data type	Description and Requirements
BYTE	Unsigned single-byte integer type (bytes, 8 bits)
WORD	Unsigned double-byte integer (word, 16 bits)
DWORD	Unsigned four-byte integer (double word, 32 bits)
BYTE[n]	N bytes
BCD[n]	8421 code, n bytes
STRING	GBK code, if no data, empty

1.3. Transport rules

The protocol uses big-endian network byte order to

pass words and doublewords.The agreement is as

follows:

-- BYTE transmission convention: transmission in BYTE stream mode;

-- WORD transmission convention: transfer the high eight bits first, then transfer the low eight bits;

-- DWORD transmission convention: first pass the high 24 bits, then pass the

high 16 bits, then pass the high eight bits, finally pass the low eight

bits.

1.4. Message composition

1.4.1. Message structure

Each message is composed of identification bit, message header, message body and verification code. The message structure is shown in Figure 1:

Figure 1 Message structure

Identify a	The message header	The message body	Check code	Identify a

1.4.2. Identify a

The value is 0x7E. If 0x7e occurs in the verification code, message header, or message body, escape is required. The escape rules are defined as follows:

0x7e <————> 0x7d followed by a 0x02;

0x7d <————> 0x7d followed by a

0x01.The escape process is as follows:

When sending a message: Message encapsulate ——> calculate and fill the checksum ——> escape;

When receiving a message: Escape restore ——> Validate checksum ——> parse the message.

Example:

If a packet containing 0x30 0x7E 0x08 0x7D 0x55 is sent, it is encapsulated as follows: 0x7E 0x30 7D 0x02 0x08 0x7D 0x01 0x55 0x7E

1.4.3. The message header

The message headers are shown in Table 3:

Table 2 Header content

The starting byte	field	The data type	Description and Requirements
0	Message ID	WORD	
2	Message body properties	WORD	The message body attribute format structure is shown in Figure 2
4	Terminal Phone Number	BCD[6]	According to the mobile phone number of the terminal after installation. If the number is less than 12 digits, the number will be added in front of the number. For mainland numbers, the number will be 0. For Hong Kong, Macao and

			Taiwan, the number will be added according to the area code.
10	Message sequence number	WORD	The sum starts from 0 in the sending order
12	Message packet encapsulates items		If the relevant identifier bits in the message body attribute determine the message subcontracting process, If the item has content, otherwise no item

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
keep		The subcontract	Data encryption mode			Body length									

Figure 2 structure of message body attribute format

Data encryption mode:

-- bit10 to bit12 are data encryption identifier bits.

-- If all the three digits are 0, the message body is not encrypted.

-- If the 10th bit is 1, the message body is encrypted by the RSA algorithm.

-- Other

reservations.

Subcontractor:

When the 13th bit in the message body attribute is 1, it indicates that the message body is a long message, and the subcontracting process is carried out. The subcontracting information is determined by the message package encapsulation item. If bit 13 is 0, there is no packet encapsulation field in the message header. Contents of message package encapsulation items are shown in Table 4:

Table 3 Contents of message package encapsulation items

The starting byte	field	The data type	Description and Requireme nts
0	Total number of message packets	WORD	The total number of packets after the message is subcontracted
2	Package number	WORD	Starting from 1

1.4.4. Check code

The parity code occupies a byte starting from the message header, xor with the next byte, and ending with the previous byte of the parity code.

2. The data format

2.1. Terminal universal reply

Message ID: 0x0001.
The data format of the general response message body of the terminal is shown in Table 4.

Table 4 General response message body data format of terminals

The starting byte	field	The data type	Description and Requireme nts
0	Answer serial number	WORD	The serial number of the corresponding platform message
2	Response ID	WORD	ID of the corresponding platform message
4	The results of	BYTE	0: success/confirmation. 1. Failure. 2. The message is incorrect. 3: not supported

2.2. Platform Universal response

Message ID: 0x8001.
The data format of the platform's general response message body is shown in Table 5.

Table 5 General response message body data format of the platform

The starting byte	field	The data type	Description and Requireme nts
0	Answer serial number	WORD	Serial number of the corresponding terminal message
2	Response ID	WORD	ID of the corresponding terminal message
4	The results of	BYTE	0: success/confirmation. 1. Failure. 2. The message is incorrect. 3: not supported. 4: call the police Processing confirmation;

2.3. Terminal registration

Message ID: 0x0100.
The format of terminal registration message body data is shown in Table 6.

Table 6 Data format of terminal registration message body

The starting byte	field	The data type	Description and Requirements
0	Provincial ID	WORD	Mark the province where the terminal installation vehicle is located. 0 is reserved and the platform takes the default value.The provincial ID is the administrative division code specified in GB/T 2260 The first two of the six digits.
2	The city county ID	WORD	Mark the city and county where the terminal is installed. 0 is reserved and the platform takes the default value.The city/county ID is the line specified in GB/T 2260 The last four of six digits in the regional code.
4	The manufacturer ID	BYTE[5]	5 bytes, terminal manufacturer code
9	Terminal type	BYTE[20]	20 bytes, this terminal model is defined by the manufacturer, the bits are not When sufficient, "0X00" is added.
29	Terminal ID	BYTE[7]	The terminal ID is a string of 7 bytes, consisting of uppercase letters and digits If the number of digits is insufficient, "0X00" will be added.
36	The license plate color	BYTE	The license plate color is 5.4.12 of JT/T415-2006. If no card is displayed, the value is 0.
37	Vehicle identification	STRING	When the license plate color is 0, it means the vehicle VIN; Otherwise, it means the motor vehicle license plate issued by the traffic management department of public security.

2.4. Terminal registration reply

Message ID: 0x8100.

See Table 7 for the data format of the terminal registration response message body.

Table 7 Data format of terminal registration response message body

起始字节	字段	数据类型	描述及要求
0	应答流水号	WORD	对应的终端注册消息的流水号
2	结果	BYTE	0：成功；1：车辆已被注册；2：数据库中无该车辆 3：终端已被注册；4：数据库中无该终端

3	The authentication code	STRING	This field is available only after success

2.5. Terminal authentication

Message ID: 0x0102.

The format of terminal authentication message body data is shown in Table 8.

Table 8 Format of terminal authentication message body data

The starting byte	field	The data type	Description and Requireme nts
0	The authentication code	STRING	The terminal reports the authentication code after reconnection

2.6. Terminal heart

Message ID: 0x0002.

The heartbeat message body of the terminal is empty.

Example: 7E 00 02 00 00 01 51 23 13 07 67 00 05 07 7E

2.7. Location information reporting

Message ID: 0x0200.

The location information reporting message body consists of the basic location information and the list of additional location information items. The message structure is shown in Figure 3:

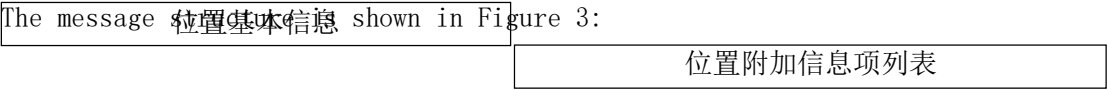| 位置基本信息 |
|---|

位置附加信息项列表

Figure 3. Location reporting message structure diagram

The list of positional additional information items is a combination of positional additional information items, or none, based on the length field in the message header.

The data format of basic location information is shown in Table 9.

Table 9 Data format of basic location information

The starting byte	field	The data type	Description and Requireme nts

0	Warning mark	DWORD	Alarm flag bits are defined in Table 10
4	State of the vehicle	DWORD	The status bits are defined in Table 11
8	latitude	DWORD	Latitude in degrees multiplied by 10 to the sixth power, accurate to millions Once per
12	longitude	DWORD	The value of longitude in degrees multiplied by 10 to the sixth power, accurate to millions Once per
16	elevation	WORD	Altitude, in meters (m)
18	speed	WORD	1/10km/h
20	The direction of	WORD	0 minus 359, due north is 0, clockwise
21	time	BCD[6]	Yy-mm-dd-hh-mm-ss (GMT+8 time, referred to later in this standard The time of and is in this region.)

Table 10 Definition of alarm flag bits

position	define	Processing instructions
0	1: SOS alarm, trigger after the alarm switch is touched	Clear zero after receiving a reply
1	1: speeding alarm	The flag remains until the alarm condition is lifted
2	1: fatigue driving	The flag remains until the alarm condition is lifted
3	1: Danger warning	Clear zero after receiving a reply
4	1: the GNSS module is faulty	The flag remains until the alarm condition is lifted
5	1: The GNSS antenna is not connected or is cut off	The flag remains until the alarm condition is lifted
6	1: the GNSS antenna is short-circuited	The flag remains until the alarm condition is lifted
7	1: External voltage low alarm	The flag remains until the alarm condition is lifted
8	1: Alarm is generated when the external power supply fails	The flag remains until the alarm condition is lifted
9	1: The LCD or monitor of the terminal is faulty	The flag remains until the alarm condition is lifted
10	1: The TTS module is faulty	The flag remains until the alarm condition is lifted
11	1: The camera is faulty	The flag remains until the alarm condition is lifted
12	1: rapid acceleration	The flag remains until the alarm condition

position	define	Processing instructions
		is lifted
13	1: rapid deceleration	The flag remains until the alarm condition is lifted
14	1: Sharp turn	The flag remains until the alarm condition is lifted
15	Vibration alarm	
16	Device battery low power alarm	
17	The reserved	
18	1: accumulated driving overtime on the day	The flag remains until the alarm condition is lifted
19	1: Overtime parking	The flag remains until the alarm condition is lifted
20	1: Access area	Clear zero after receiving a reply
21	1: Access route	Clear zero after receiving a reply
22	1: The road section driving time is insufficient/too long	Clear zero after receiving a reply
23	1: Route deviation alarm	The flag remains until the alarm condition is lifted
24	1: VSS of the vehicle is faulty	The flag remains until the alarm condition is lifted
position	define	Processing instructions
25	1: abnormal reduction of vehicle oil	The flag remains until the alarm condition is lifted
26	1: vehicle refueling alarm	The flag remains until the alarm condition is lifted
27	1: illegal ignition of vehicles	Clear zero after receiving a reply
28	1: illegal displacement of vehicles	Clear zero after receiving a reply
29	1: Collision warning	The flag remains until the alarm condition is lifted
30	1: rollover warning	The flag remains until the alarm condition is lifted
31	1: alarm of illegal door opening (no area is set at the terminal Judge illegal opening)	Clear zero after receiving a reply

Note: Location information should be reported immediately in case of alarm and early warning

Table 11 Status bit definitions

position	state
0	0: ACC close; 1: the ACC
1	0: not located. 1: locate

2	0: north latitude; 1: south of the equator
3	keep
4	keep
5	keep
6 to 7	keep
Eight to nine	keep
10	0: The vehicle oil circuit is normal; 1: the oil circuit of the vehicle is disconnected
11	0: The vehicle circuit is normal; 1: The vehicle circuit is disconnected
12	keep
13	keep
14	keep
15	keep
16	keep
17	keep
18	keep
19	keep
position	state
20	keep
21	keep
Between 22 and 31	keep

Note: Location information should be reported immediately when status changes

Table 12 Format of location additional information items

field	The data type	Description and Requirements
Additional Information ID	BYTE	1-255.

Length of additional information	BYTE	
Additional information		Additional information is defined in Table 13

Table 13 Additional information table definitions

Additional Information ID	Length of additional information	Description and Requireme nts
0x01	4	Mileage, DWORD, 1/10km, corresponds to the on-board odometer reading
0x02	2	Oil quantity, WORD, 1/10L, corresponding to oil gauge reading on board
0x03	2	Driving record function to obtain speed, WORD, 1/10km/h
0x2B	4	Power line ADC voltage ADC1: BIT0-15 ADC2:16-31 Percentage of the battery capacity of the device
0x30	1	BYTE, wireless communication network signal intensity
0x31	1	BYTE, the number of GNSS positioning satellites
0x40	1	Location information reporting type: 1. Real-time positioning; 2. Offline backup; 3
0x5D	1+N*10	The first byte is the number of base stations, followed by n base station data; Base station data :0-1 MCC;2 MNC; 3-4 LAC; 5-8 CELLID; 9 Signal strength
0xE1-0xFF		Custom area

Example:7E 02 00 00 2F 01 51 23 13 07 67 00 71 00 00 00 00 00 00 00 03 00 F5 0D 95 06 72 CA D3 00 00 00 35 01 4E 22 06 14 10 42 38 01 04 00 02 FF 17 30 01 19 31 01 0B E1 01 55 E2 02 05 78 AB 7E

2.8. Upload location data in batches

Message ID: 0x0704.

Table 14 shows the format of batch upload data.

Table 14 Format of batch upload data
for location data

The starting byte	field	The data type	instructio ns
0	Number of data items	WORD	Number of positional report data items contained, >0
1	Location data type	BYTE	0: normal position batch report, 1: blind area supplement report
2	Location report data item		See Table 15 for definitions

Table 15 Data format of location report
data item

The starting byte	field	The data type	instructions
0	Position report data body length	WORD	The length of the position report data body, n
2	Location reporting data body	BYTE[n]	See 8.18 Location Information Report

2.9. Location information query

Message ID: 0x820
The location information query message body is empty.

2.10. Location information query response

Message ID: 0x0201.
The format of the response message body data is shown in Table 33.

Table 16 Format of location information query response message body data

The starting byte	field	The data type	Description and Requirements
0	Answer serial number	WORD	Serial number of the corresponding location query message
2	Location information reporting		Location information is reported in 2.7

2.11. Forwarding subcontract request

Message ID: 0x8003.
See Table 17 for the data format of the request message body.

Table 17 Data format of message body for supplementary transmission and
subcontract request

The starting byte	field	The data type	Description and Requirements
0	The original message stream number	WORD	Message sequence number corresponding to the first packet of the original message to be retransmitted

4	Total number of retransmitted packets	BYTE	n
5	ID list of retransmitted packets	BYTE[2*n]	Sequence number of retransmitted packets, for example, ID1 ID2...... Package the IDn."

Note: This message should allow the original message to retransmit the subcontract in the retransmission packet ID list once, with the original subcontract

The messages are identical.

2.12. Text message delivery

Message ID: 0x8300

Table 18 shows the format of text message body data.

Table 18 Text message body data format

The starting byte	field	The data type	Descriptio n and o
0	mark	BYTE	See Table 19 for the meanings of text message flags
1	Text information	STRING	The maximum length is 1024 bytes, encoded by GBK

Table 19 Meanings of text message flag bits

position	mar k
0	1: the emergency
1	keep
2	1: terminal display
3	1: TTS broadcast read
4	1: advertising screen display
5	0: central navigation information. 1: CAN fault code information
6 to 7	keep

Note: When the device sends a text message command, the device replies with two messages. The first one is the general reply of the device, and the second one is the terminal extended reply 6006. The general reply content is the ministry standard reply, and the extended reply includes the text message reply set for the device.

Terminal universal reply

Message ID: 0x0001.

Terminal expansion answer 6006

Message ID: O x6006

The terminal takes the initiative to publish this message, and the platform shall reply to the platform after receiving it.The details are shown in Table 20

Table 20 Format of terminal reply data

The starting byte	field	The data type	Description and Requirements
0	A text message encoding	BYTE	=0x00 BG2312 Encoding mode =0x01 UNICODE encoding mode
1	A text message	STRING	

Example: the original data: 7 e00010005105051637777000d0001830000f97e

Packet type: Terminal Universal Reply (0001)

Body Length: 5(0000000101),(0000000000000101)(0005)

Mobile Phone Number: 105051637777(105051637777)

Message SERIAL Number: 13(000D)

Message body: 0001830000

Answer Serial Number: 1(0001)

Response ID: 8300 (8300).

Response result: Success/Confirmation (00)

Check digit: F9 (F9)

Raw data: 7
e600600028105051637777000e0056455253494f4e3a4c435630385f56312e302c54494d453a32303231313231372e3135313932380a7e

Packet type: Terminal Extended Reply (6006)

Body Length: 40(0000101000),(0000000000101000)(0028)

Mobile Phone Number: 105051637777(105051637777)

Message SERIAL Number: 14(000E)

Message body: 0056455253494
f4e3a4c435630385f56312e302c54494d453a32303231313231372e313531393238

Text message encoding: BG2312(00)

Text message:VERSION: LCV08_V1. 0, TIME: 20211217.151928 (56455253494
f4e3a4c435630385f56312e302c54494d453a32303231313231372e313531393238)

Check digit: 0 (0 a a)

Note: The terminal extended reply message sequence number is the general reply sequence number plus 1

2.13. Data is transmitted through downlink

Message ID: 0x8900.
Table 21 shows the format of the body data of the downlink transparent transmission message.

Table 21 Data format of message body in downlink transparent transmission

The starting byte	field	The data type	Description and Requirements
0	Transparent message type	BYTE	The transparent message types are defined in Table 23
1	Transparent transmission of message content		

2.14. Data is transparently transmitted upstream

Message ID: 0x0900
Table 22 shows the format of the message body for uplink transparent transmission.

Table 22 Data format of message body for
uplink transparent transmission

The starting byte	field	The data type	Description and Requirements
0	Transparent message type	BYTE	The transparent message types are defined in Table 23
1	Transparent transmission of message content		

Table 23 Definitions of transparent message types

Transparent message type	define	Description and Requirements
Detailed positioning data of the GNSS module	0x00	Detailed positioning data of the GNSS module
Road transport card IC card information	0x0B	The IC card information upload message is 64 bytes, and the downstream message is 24 bytes. The timeout period for transparent transmission of IC card authentication is 30 seconds. After the timeout, no retransmission.
Serial port 1 Transparent	0x41	Serial port 1 transparently transmits messages

transmission		
Serial port 2 Transparent transmission	0x42	Serial port 2 transparently transmits messages
Bluetooth Temperature and humidity sensor	0x31	
RS232 temperature sensor	0x32	
Thai magnetic card reader	0x3B	
The RFID card device	0x3D	
Sensor data		
User-defined transparent transmission	0xF0-0xFF	Users define transparent message transmission