

**Version:V01**

**Level : C**

# Mini GT06

## **Communication protocol**

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## Directory

|                                                                                             |        |
|---------------------------------------------------------------------------------------------|--------|
| 1. Communication agreement .....                                                            | - 4 -  |
| 1.1 Introduction.....                                                                       | - 4 -  |
| 1.2 Network connection way .....                                                            | - 4 -  |
| 2. Terms and definitions.....                                                               | - 4 -  |
| 3. Basic rules.....                                                                         | - 4 -  |
| 4. GPS data packet format .....                                                             | - 5 -  |
| 5. Terminal sent to the server.....                                                         | - 7 -  |
| 5.1 Landing information packet .....                                                        | - 7 -  |
| 5.1.1 Terminal to the server to send packets.....                                           | - 7 -  |
| 5.2.2 Length of GPS information, participation on the number of satellite positioning ..... | - 12 - |
| 5.3 Alarm package (GPS, LBS, state merging packet) .....                                    | - 16 - |
| 5.3.1 Terminal to send alarm data to the server .....                                       | - 16 - |
| 5.3.2 The server terminal to send alarm data address package.....                           | - 19 - |
| 5.3.3 Reply in English .....                                                                | - 21 - |
| 5.4 Heartbeat package (State of the packet) .....                                           | - 22 - |
| 5.4.1 Terminal to the server sends a heartbeat packets.....                                 | - 22 - |
| 5.4.2 Terminal information .....                                                            | - 23 - |
| 5.4.4 Data instance.....                                                                    | - 26 - |
| 6. Address request and replay .....                                                         | - 26 - |
| 6.1 (Terminal to the server) address request packet format.....                             | - 26 - |
| 6.2 Terminal return .....                                                                   | - 27 - |
| 6.3 Check the location information .....                                                    | - 28 - |
| 6.4 Oil cut-off electric.....                                                               | - 28 - |
| 6.5 Recovery oil and electricity .....                                                      | - 29 - |
| 6.6 Server distributed query address information.....                                       | - 29 - |

|                                               |        |
|-----------------------------------------------|--------|
| 6.7 Terminal to send server information ..... | - 29 - |
| 6.8 Reply in Chinese.....                     | - 30 - |
| 6.9 Reply in English .....                    | - 32 - |
| 7. CRC code.....                              | - 33 - |
| 8. Packet format .....                        | - 35 - |

## 1. Communication agreement

### 1.1 Introduction

This document defines the GPS locator positioning service platform for the application layer interface protocols. The relevant interface protocols Only apply to the interaction between the platform and positioning terminal.

### 1.2 Network connection way

Long through GPRS using TCP connection.

## 2. Terms and definitions

| Terms | abbreviations | Meaning                                 |
|-------|---------------|-----------------------------------------|
|       | CMPP          | China Mobile Peer to Peer               |
|       | GPS           | Global Positioning System               |
|       | GSM           | Global System for Mobile Communication  |
|       | GPRS          | General Packet Radio Service            |
|       | TCP           | Transport Control Protocol              |
|       | LBS           | Location Based Services                 |
|       | IMEI          | International Mobile Equipment Identity |
|       | MCC           | Mobile Country Code                     |
|       | MNC           | Mobile Network Code                     |
|       | LAC           | Location Area Code                      |
|       | CI            | Cell ID                                 |
|       | RSSI          | Received Signal Strength Indicator      |
|       | UDP           | User Datagram Protocol                  |
|       | SOS           | Save Our Ship/Save Our Souls            |
|       | CRC           | Cyclic Redundancy Check                 |
|       | NITZ          | Network Identity and Time Zone,         |
|       | GIS           | Geographic Information System           |

## 3. Basic rules

(1) GPRS connection is established successfully and send the first landing a packet to the server, 5 seconds received server response packet that connection is normal, start sending location information (GPS, LBS packets), 3 minutes will send packets, regular communication is normal.

(2) When the GPRS connection is not successful, the terminal can't send packets. When the GPRS connection failed three times start timing restart function after the final end, time for 20 minutes. In 20 minutes if the terminal and server set up even after success, and received the terminal server to send packets to respond packets of the login, the restart function off timer, the terminal does not restart, or terminal automatic restart after 20 minutes.

(3) After receiving terminal to send the login information to the server terminal returns a response packet, if the end to send the login information package or state packet after more than five seconds didn't receive the server returns package, argues that the current abnormal connection is established, and dynamic GPS positioning data transfer function, disconnect the current GPRS, login and send packets to establish new GPRS connection.

(4) Connection is judged as abnormal, repeat 3 times after establishing a connection to send packets of the login or condition of server response packet packets, terminal launch timing reset function, timing time of 10 minutes, in 10 minutes if the end client and the server successfully establish a connection and receive the server response packet restart function off timer, terminal not heavy qi, or terminal automatic restart after 10 minutes.

(5) After normal connected, terminal after the GPS information change, regularly send GPS, LBS merger packets sent to the server, the server can be sent via command to set the default protocol.

(6) Server for the terminal without registering IMEI number, please reply the login request response and heartbeat packets response, do not disconnect even pick up directly. (if directly disconnected or does not reply, will lead to terminal constantly rewiring, GPRS traffic consumption serious)

#### **4. GPS data packet format**

For asynchronous communication transmission mode, and in bytes.

Packet length in total: (10+N Byte)

| Format                    | Length(Byte) |
|---------------------------|--------------|
| Start bit                 | 2            |
| Packet length             | 1            |
| Agreement NO.             | 1            |
| Information content       | N            |
| Serial number information | 2            |
| Error checking            | 2            |
| Stop bit                  | 2            |

**(1) Start bit**

A fixed value, unified as hexadecimal 0x78 0x78

**(2) Packet length**

Length = agreement number + information content + serial number + error checking, a total of (5 + N) Byte, because the information content of variable length field.

**(3) Agreement NO.**

| Type                                              | Value |
|---------------------------------------------------|-------|
| Login information                                 | 0x01  |
| Positioning data (UTC)                            | 0x22  |
| State information                                 | 0x13  |
| String information                                | 0x21  |
| Alarm data (UTC)                                  | 0x26  |
| Time zone                                         | 0x27  |
| GPS, phone number query address information (UTC) | 0x2A  |
| Information server terminal to send instructions  | 0x80  |

**(4) Information content**

According to the different application, corresponding to the corresponding "agreement date", to determine the specific content.

**(5) Serial number information**

Boot after sending the first GPRS data (GPS data packets, a heartbeat packets, instruction package) serial number as the '1', after to send data serial number is automatically add 1 at a time.

**(6) Error checking**

A terminal or server error check code for identifying whether receive information available. In order to prevent data error during transmission, adding error checking and data to prevent wrong operation, so that increase the safety and efficiency of the system. Error checking code the CRC - ITU calibration method. Agreement in the body from the "packet length" to "information serial number" (including "packet length", "information serial number") the CRC - ITU values of the partial data. If the receiver received information calculated CRC errors, are ignored, discard the packet.

**(7) Stop bit**

A fixed value, unified as hexadecimal 0x0D 0x0A.

**5. Terminal sent to the server****5.1 Landing information packet****5.1.1 Terminal to the server to send packets**

Landing information packet is used to confirm the connection is established from the server to normal, submit terminal ID to the server.

| Format                                  |                            | Length(Byte) |
|-----------------------------------------|----------------------------|--------------|
| Landing information packet<br>(18 Byte) | Start bit                  | 2            |
|                                         | Packet length              | 1            |
|                                         | Agreement NO.              | 1            |
|                                         | Terminal ID                | 8            |
|                                         | Type identification number | 2            |
|                                         | Time zone language         | 2            |
|                                         | Serial number information  | 2            |
|                                         | Error checking             | 2            |
|                                         | Stop bit                   | 2            |

**(1) Start bit**

A fixed value, unified as hexadecimal 0x78 0x78

## (2) Packet length

Length = agreement number + information content + serial number + error checking, a total of (5 + N) Byte, because the information content of variable length field.

## (3) Agreement NO.

| Type                                              | Value |
|---------------------------------------------------|-------|
| Login information                                 | 0x01  |
| Positioning data (UTC)                            | 0x22  |
| State information                                 | 0x13  |
| String information                                | 0x21  |
| Alarm data (UTC)                                  | 0x26  |
| Time zone                                         | 0x27  |
| GPS, phone number query address information (UTC) | 0x2A  |
| Information server terminal to send instructions  | 0x80  |

## (4) Terminal ID

Such as:123456789012345

Terminal ID:0x01 0x23 0x45 .0x67 0x89 0x01 0x23 0x45

## (5) Type identification number

Type identification of two bytes.According to the identification number to determine terminal type.

After the first three representative models of two words a representative model.

| Model                                | Identification code |
|--------------------------------------|---------------------|
| ET200 Power off function             | 2200                |
| ET200 Not with the function of power | 2201                |
| ET130 Power off function             | 1300                |
| ET130 Not with the function of power | 1301                |



**(6) Time zone language**

|                                             |    |                                      |   |
|---------------------------------------------|----|--------------------------------------|---|
| <b>One and a half byte<br/>(15bit-4bit)</b> | 15 | Time zone to expand the value of 100 |   |
|                                             | 14 |                                      |   |
|                                             | 13 |                                      |   |
|                                             | 12 |                                      |   |
|                                             | 11 |                                      |   |
|                                             | 10 |                                      |   |
|                                             | 9  |                                      |   |
|                                             | 8  |                                      |   |
|                                             | 7  |                                      |   |
|                                             | 6  |                                      |   |
|                                             | 5  |                                      |   |
|                                             | 4  |                                      |   |
| <b>Lower half byte<br/>(bit4-0bit)</b>      | 3  | Time zone thing                      |   |
|                                             | 2  | No definition                        |   |
|                                             | 1  | Language selection                   | 1 |
|                                             | 0  | Language selection                   | 0 |

Bit3 0-----Eastern time zone

1-----West zone

Such as:Extension 0x32 0x00 East eight area,GMT +8:00

Calculation method: $8 \times 100 = 800$ ,Converted to hexadecimal 0x0320

Extend byte:0x4D 0xD8 West 12 district and 3/4 time zone,GMT -12:45

Calculation method: $12.45 \times 100 = 1245$ , Turn the hex 0x04 0xDD

The algorithm here is left will be calculated time zone value cycle again four split time zone east, west, language selection, in order to save four bytes.

**5.12 Server response packet**

| Instructions                                          |                           | Length |
|-------------------------------------------------------|---------------------------|--------|
| <b>Landing information packet</b><br><b>(18 Byte)</b> | Start bit                 | 2      |
|                                                       | Packet length             | 1      |
|                                                       | Agreement NO.             | 1      |
|                                                       | Serial number information | 2      |
|                                                       | Error checking            | 2      |
|                                                       | Stop bit                  | 2      |

Terminal server response packet (response packet and terminal sends packets agreement, the agreement on the same)

**(1) Start bit**

A fixed value, unified as hexadecimal 0x78 0x78

**(2) Packet length**

Length = agreement number + information content + serial number + error checking, a total of (5 + N) Byte, because the information content of variable length field.

**(3) Agreement NO.**

| Type                                                     | Value |
|----------------------------------------------------------|-------|
| <b>Login information</b>                                 | 0x01  |
| <b>Positioning data (UTC)</b>                            | 0x22  |
| <b>State information</b>                                 | 0x13  |
| <b>String information</b>                                | 0x21  |
| <b>Alarm data (UTC)</b>                                  | 0x26  |
| <b>Time zone</b>                                         | 0x27  |
| <b>GPS, phone number query address information (UTC)</b> | 0x2A  |
| <b>Information server terminal to send instructions</b>  | 0x80  |

**(4) Information content**

According to the different application, corresponding to the corresponding "agreement date", to

determine the specific content.

#### (5) Serial number information

Boot after sending the first GPRS data (GPS data packets, a heartbeat packets, instruction package) serial number as the '1', after to send data serial number is automatically add 1 at a time.

#### (6) Error checking

A terminal or server error check code for identifying whether receive information available. In order to prevent data error during transmission, adding error checking and data to prevent wrong operation, so that increase the safety and efficiency of the system. Error checking code the CRC - ITU calibration method. Agreement in the body from the "packet length" to "information serial number" (including "packet length", "information serial number") the CRC - ITU values of the partial data. If the receiver received information calculated CRC errors, are ignored, discard the packet.

#### (7) Stop bit

A fixed value, unified as hexadecimal 0x0D 0x0A.

### 5.2 Positioning data packets (GPS, LBS merger packet)

#### 5.2.1 Terminal to send positioning data to the server

| Format              |                 |                                  | Length(Byte) |
|---------------------|-----------------|----------------------------------|--------------|
| Information content | Start bit       |                                  | 2            |
|                     | Packet length   |                                  | 1            |
|                     | Agreement NO.   |                                  | 1            |
|                     | GPS information | Date/time                        | 6            |
|                     |                 | GPS satellite number information | 1            |
|                     |                 | Latitude                         | 4            |
|                     |                 | Longitude                        | 4            |
|                     |                 | Speed                            | 1            |
|                     |                 | Course and State                 | 2            |
|                     | LBS information | MCC                              | 2            |

|  |                           |         |   |
|--|---------------------------|---------|---|
|  |                           | MNC     | 1 |
|  |                           | LAC     | 2 |
|  |                           | Cell ID | 3 |
|  | ACC                       |         | 1 |
|  | Report data model         |         | 1 |
|  | GPS real-time to fill the |         | 1 |
|  | Serial number             |         | 2 |
|  | Error checking            |         | 2 |
|  | Stop bits                 |         | 2 |

**(1) Date/time**

| Forrmat | Length(Byte) | Sample |
|---------|--------------|--------|
| Year    | 1            | 0x0A   |
| Month   | 1            | 0x03   |
| Day     | 1            | 0x17   |
| Hour    | 1            | 0x0F   |
| Minutes | 1            | 0x32   |
| Seconds | 1            | 0x17   |

Such as: On March 23, 2010, 15 when 50 minutes 23 seconds

Calculation method: 0 (decimal) = 0A(hexadecimal)

3 (decimal) =03(hexadecimal)

23 (decimal) = 7(hexadecimal)

15 (decimal) = 0F(hexadecimal)

50 (decimal) = 32(hexadecimal)

23 (decimal) = 17(hexadecimal)

Value is: 0x03 0x0A 0x17 0x0F 0x32 0x17

**5.2.2 Length of GPS information, participation on the number of satellite positioning**

1 byte, according to two hexadecimal character length of the first character for the GPS information, the second character to participate in positioning satellites.

Example: the duty to 0xCB said length of 12 GPS information, participate in the number of satellite positioning of 11.

(C=12 Bit Length,B=11 Satellites)

### (1) Latitude

Takes up 4 bytes, said latitude value of the location data. Numerical range 0 to 162000000, said the range of 0 to 90 degrees, the conversion method is as follows:

The GPS module output of latitude and longitude values into to decimal divided into unit; And then put into decimal multiplied by 30000, the results into hexadecimal Numbers multiplied.

Such as:  $22^{\circ}32.7658' = (22 \times 60 + 32.7658) \times 3000 = 40582974$ , And then converted to hexadecimal number  $40582974_{(10 \text{ Decimal})} = 26B3F3E_{(\text{Hexadecimal})}$

Takes up 4 bytes, said latitude value of the location data. Numerical range 0 to 162000000, said the range of 0 to 90 degrees, the conversion method is as follows:

The GPS module output of latitude and longitude values into to decimal divided into unit; And then put into decimal multiplied by 30000, the results into hexadecimal Numbers multiplied.

Such as  $22^{\circ}32.7658' = (22 \times 60 + 32.7658) \times 3000 = 40582974$ , then convert hexadecimal number

$40582974_{(\text{Decimal})} = 26B3F3E_{(\text{Hexadecimal})}$

The value is 0x02 0x6B 0x3F 0x3E.

### (2) Longitude

Takes up 4 bytes, said the longitude of the location data values. Numerical range 0 to 324000000, said the range of 0 to 180 degrees.

Conversion method and the latitude conversion method

### (3) Speed

Takes up one byte, said the GPS speed, value range is 0x00 ~ 0xFF indicating range 0 to 255 km/small

At the right time.

Such as: 0x00 represent 0 km/hour.

0x10 represent 16 km/hour

0xFF on behalf of 255 km/h

#### (4) Course

2 bytes, said the running direction of GPS, said range 0 ~ 360, unit: degrees, at due north to 0 degrees, clockwise.

|        |      |                                    |
|--------|------|------------------------------------|
| BYTE_1 | Bit7 | 0                                  |
|        | Bit6 | 0                                  |
|        | Bit5 | GPS real-time/difference Bit5 bits |
|        | Bit4 | GPS positioning                    |
|        | Bit3 | East, west longitude               |
|        | Bit2 | South latitude, north latitude     |
|        | Bit1 | Course                             |
|        | Bit0 |                                    |
| BYTE_1 | Bit7 |                                    |
|        | Bit6 |                                    |
|        | Bit5 |                                    |
|        | Bit4 |                                    |
|        | Bit3 |                                    |
|        | Bit2 |                                    |
|        | Bit1 |                                    |
|        | Bit0 |                                    |

Note: the packet for the state of information in a record time state of the moment.

Such as: the value is 0x15 0x4C, into a binary is : 00000001 0100110

|        |      |   |
|--------|------|---|
| BYTE_1 | Bit7 | 0 |
| BYTE_1 | Bit6 | 0 |
| BYTE_1 | Bit5 | 0 |
| BYTE_1 | Bit4 | 0 |
| BYTE_1 | Bit3 | 0 |
| BYTE_1 | Bit2 | 0 |
| BYTE_1 | Bit1 | 0 |
| BYTE_1 | Bit0 | 1 |
| BYTE_2 | Bit7 | 0 |
| BYTE_2 | Bit7 | 1 |
| BYTE_2 | Bit7 | 0 |
| BYTE_2 | Bit7 | 0 |
| BYTE_2 | Bit7 | 0 |
| BYTE_2 | Bit7 | 1 |
| BYTE_2 | Bit7 | 1 |
| BYTE_2 | Bit7 | 0 |
| BYTE_2 | Bit7 | 0 |

→ Heading 332 ° binary is converted to a decimal (0101001100 to 332)

**(5) MCC**

Mobile user belongs to country code: Mobile Country Code(MCC)

Such as: China mobile number is: China mobile number is 460 (decimal) 0x01 0xCC 460 (decimal into hexadecimal hexadecimal less than four on the left side of the fill 0)

Value range:0x0000~0x03E7

**(6) MNC**

Mobile number: Mobile Network Code(MNC)

Such as:China mobile 0x00

**(7) LAC**

The Location Area Code the Location Area Code (LAC) containing in LAI, is composed of two bytes, using hexadecimal codes.Available range of 0x0000-0xFFFFE 0, block x0000 0 and 0 XFFFF may not be used (see the GSM specification 03.03, 04.08 and 11.11).

**(8) Cell ID**

Mobile base station Cell Tower ID (Cell ID), value range is 0 x000000 ~ 0 XFFFFFF

**(9) ACC**

ACC state ACC low is 00, high ACC is 01

**(10) Report data model**

GPS Report data point type

0x00 Regular report

0x01 Distance to report

0x02 Inflection point to upload

0x03 Upload the ACC state changes

**5.3 Alarm package (GPS, LBS, state merging packet)****5.3.1 Terminal to send alarm data to the server**

| Format              |                   |                                  | Length(Bytes) |
|---------------------|-------------------|----------------------------------|---------------|
| Information content | Start bits        |                                  | 2             |
|                     | Packet length     |                                  | 1             |
|                     | Agreement NO.     |                                  | 1             |
|                     | Date/time         |                                  | 6             |
|                     | GPS information   | GPS satellite number information | 1             |
|                     |                   | Latitude                         | 4             |
|                     |                   | Longitude                        | 4             |
|                     |                   | Speed                            | 1             |
|                     |                   | Route/State                      | 2             |
|                     | LBS information   | LBS length                       | 1             |
|                     |                   | MCC                              | 2             |
|                     |                   | MNC                              | 1             |
|                     |                   | LAC                              | 2             |
|                     |                   | Cell ID                          | 3             |
|                     | State information | Terminal information content     | 1             |
|                     |                   | Voltage grade                    | 1             |
|                     |                   | GSM signal strength              | 1             |



|  |                |                                     |   |
|--|----------------|-------------------------------------|---|
|  |                | Alarm/language/extension port state | 2 |
|  | Serial number  |                                     | 2 |
|  | Error checking |                                     | 2 |
|  | Stop bits      |                                     | 2 |

Alarm package is on the basis of the orientation package increased state information (alarm message), coding protocol format is also on the basis of orientation package added the status information.

### (1) Terminal information

Takes up one byte, used to represent the various state of the cell phone information.

| Bit  |           | Code meaning                      |
|------|-----------|-----------------------------------|
| BYTE | Bit7      | 1: oil electricity disconnect     |
|      |           | 0: Oil electric connection        |
|      | Bit6      | 1: GPS positioning                |
|      |           | 0: GPS is not positioning         |
|      | Bit3~Bit5 | 100: SOS for help                 |
|      |           | 011: low power alarm              |
|      |           | 010: power outage alarm           |
|      |           | 001: vibration alarm              |
|      |           | 000: normal                       |
|      | Bit2      | 1: have to connect power charging |
|      |           | 2: not to connect power charging  |
|      | Bit1      | 1: ACC high                       |
|      |           | 0: ACC low                        |
|      | Bit0      | 1: set up defense                 |
|      |           | 0: cancel defense                 |

Such as: 0X44 corresponding binary is 01000100

Terminal status : oil and electronic is connection, GPS have to position, normal did not alarm, has

been charging power、ACC for low、cancel defense.

## (2) Voltage grade

Range of 0 ~ 6, from low to high voltage size.

0: Without electricity (power off)

1: Very low power (to phone text messaging, etc.)

2: Light is very low (low electric alarm)

3: Low power (normal use)

4: Electricity

5: High power

6: High power

Such as: 0x02 Electricity is very low for sending alarm.

## (3) GSM signal strength level

0x00 No signal

0x01 Signal is very weak

0x03 Signal is good

0x04 Signal is strong

Such as: 0x03 Signal is good

## (4) Alarm/language

0x00 (former) 0x01 (after)

Before a: terminal alarm status (applicable to alarm package and function of electronic fence project) : after terminal current language level

|       |                                  |
|-------|----------------------------------|
| Byte1 | 0x00 Normal                      |
|       | 0x01 SOS for help                |
|       | 0x02 Power outage alarm          |
|       | 0x03 Vibration alarm             |
|       | 0x04 Into the alarm of the fence |

|       |                                       |
|-------|---------------------------------------|
|       | 0x05 out the alarm of the fence       |
|       | 0x06 Overspeed alarm                  |
|       | 0x09 Displacement of the alarm        |
|       | 0x0A Into the GPS dead zoom alarm     |
|       | 0x0B out the GPS dead zoom alarm      |
|       | 0x0C Starting alarm                   |
|       | 0x0D Positioning p for the first time |
|       | 0x0E Low electric alarm               |
| Byte2 | 0x01 Chinese 0x02 English             |

Such as: No alarm in Chinese:0x00 0x01 No alarm in English:0x00 0x02

To increase the reliability alarm information, alarm information repeated, in most cases the alarm information consistent with the upper terminal information, inconsistencies are as follows:

A: Low power alarm terminal information B: In and out of the fence alarm, alarm/language information

##### (5) Reply to send alarm data to the terminal server

| Format              |                | Length(Bbyte) |
|---------------------|----------------|---------------|
| Information content | Start bit      | 2             |
|                     | Package length | 1             |
|                     | Agreement NO.  | 1             |
|                     | Serial number  | 1             |
|                     | Error checking | 2             |
|                     | Stop bit       | 2             |

Alarm package is on the basis of the orientation package increased state information (alarm message), coding protocol format is also on the basis of orientation package added the status information.

##### 5.3.2 The server terminal to send alarm data address package

| Format                                                            |                           |                     | Length          |   |    |
|-------------------------------------------------------------------|---------------------------|---------------------|-----------------|---|----|
| The server terminal to send Instruction package (15 + M + N Byte) | Start bit                 |                     | 2               |   |    |
|                                                                   | Packet length             |                     | 1               |   |    |
|                                                                   | Agreement NO.             |                     | 1               |   |    |
|                                                                   | Information content       | Instruction length  |                 | 1 |    |
|                                                                   |                           | Server flags        |                 | 4 |    |
|                                                                   |                           | Instruction content | ALARMSMS        |   | 8  |
|                                                                   |                           |                     | &&              |   | 2  |
|                                                                   |                           |                     | Address content |   | M  |
|                                                                   |                           |                     | &&              |   | 2  |
|                                                                   |                           |                     | phone number    |   | 21 |
|                                                                   |                           |                     | ##              |   | 2  |
|                                                                   | serial number information |                     | 2               |   |    |
| Check digit                                                       |                           | 2                   |                 |   |    |
| Stop bit                                                          |                           | 2                   |                 |   |    |

Request Chinese address reply agreement number:0x17

Content instruction content: ALARMSMS && address & telephone number (0) all # #

(ALARMSMS, &&, # # for the fixed string) Chinese address content in UNICODE issued.

Reply address information paradigm in Chinese:

7878 //Start bit

85 //length of the data

17 //Reply to deal

7E // length of the instruction length or send content information

00000001 //Server flags

414C41524D534D53 //ALARMSMS

2626 //separator

624059044F4D7F6E0028

004C004200530029003A

5E7F4E1C77015E7F5DDE

5E0282B190FD533AFF17

FF15FF144E6190530028

004E00320033002E0033

00390035002C00450031

00310032002E00390038

0038002996448FD1

2626 //separator

000000000000000000000000000000000000

2323

0106

3825

0D0A

### 5.3.3 Reply in English

Considering the English or other foreign address longer, a data not enough use, increased to 2 bytes. Note: the address information is only for back agreement number corresponding to the length of data bits instead of two.

| Format                                                            |                           |                     | Length          |    |
|-------------------------------------------------------------------|---------------------------|---------------------|-----------------|----|
| The server terminal to send Instruction package (15 + M + N Byte) | Start bit                 |                     | 2               |    |
|                                                                   | Packet length             |                     | 1               |    |
|                                                                   | Agreement NO.             |                     | 1               |    |
|                                                                   | Information content       | Instruction length  |                 | 1  |
|                                                                   |                           | Server flags        |                 | 4  |
|                                                                   |                           | Instruction content | ALARMSMS        | 8  |
|                                                                   |                           |                     | &&              | 2  |
|                                                                   |                           |                     | Address content | M  |
|                                                                   |                           |                     | &&              | 2  |
|                                                                   |                           |                     | phone number    | 21 |
|                                                                   |                           |                     | ##              | 2  |
|                                                                   | serial number information |                     | 2               |    |
|                                                                   | Check digit               |                     | 2               |    |
| Stop bit                                                          |                           | 2                   |                 |    |

Request Chinese address reply agreement number:097

The instruction content: ALARMSMS && address content & telephone number (0) all # # (ALARMSMS, &&, # # for the fixed string)

7878 //Start bit

0D0A

Page - 22 - of 36

| Format              |                   | Length(Byte)                        |
|---------------------|-------------------|-------------------------------------|
| Information content | Start bit         | 2                                   |
|                     | Package length    | 1                                   |
|                     | Agreement NO.     | 1                                   |
|                     | State information | Terminal information content        |
|                     |                   | Voltage grade                       |
|                     |                   | GSM signal strength                 |
|                     |                   | Alarm/language/extension port state |
|                     | Serial number     | 2                                   |
|                     | Error checking    | 2                                   |
|                     | Stop bit          | 2                                   |

#### 5.4.2 Terminal information

Takes up one byte, used to represent the various state of the cell phone information.

| Bit  |           | Code meaning                      |
|------|-----------|-----------------------------------|
| BYTE | Bit7      | 1: oil electricity disconnect     |
|      |           | 0:Oil electric connection         |
|      | Bit6      | 1: GPS positioning                |
|      |           | 0: GPS is not positioning         |
|      | Bit3~Bit5 | 100:SOS for help                  |
|      |           | 011: low power alarm              |
|      |           | 010: power outage alarm           |
|      |           | 001: vibration alarm              |
|      |           | 000:normal                        |
|      | Bit2      | 1: have to connect power charging |
|      |           | 2: not to connect power charging  |

|  |      |                   |
|--|------|-------------------|
|  | Bit1 | 1:ACC high        |
|  |      | 0:ACC low         |
|  | Bit0 | 1: set up defense |
|  |      | 0: cancel defense |

Such as:0X44 corresponding binary is 01000100

Terminal status :oil and electronic is connection、GPS have to position、 normal did not alarm、 has been charging power、 ACC for low、 cancel defense.

### (1) Voltage grade

Range of 0 ~ 6, from low to high voltage size.

0: Without electricity (power off)

1: Very low power (to phone text messaging, etc.)

2: Light is very low (low electric alarm)

3: Low power (normal use)

4: Electricity

5:High power

6: High power

Such as:0x02 Electricity is very low for sending alarm.

### (2) GSM signal strength level

0x00 No singal

0x01 Signal is very weak

0x03 Signal is good

0x04 Signal is strong

Such as: 0x03 Signal is good

### (3) Alarm/language

0x00 (former) 0x01 (after)

Before a: terminal alarm status (applicable to alarm package and function of electronic fence project) : after terminal current language level



|       |                                       |
|-------|---------------------------------------|
| Byte1 | 0x00 Normal                           |
|       | 0x01 SOS for help                     |
|       | 0x02 Power outage alarm               |
|       | 0x03 Vibration alarm                  |
|       | 0x04 Into the alarm of the fence      |
|       | 0x05 out the alarm of the fence       |
|       | 0x06 Overspeed alarm                  |
|       | 0x09 Displacement of the alarm        |
|       | 0x0A Into the GPS dead zoom alarm     |
|       | 0x0B out the GPS dead zoom alarm      |
|       | 0x0C Starting alarm                   |
|       | 0x0D Positioning p for the first time |
|       | 0x0E Low electric alarm               |
| Byte2 | 0x01 Chinese 0x02 English             |

Such as: No alarm in Chinese:0x00 0x01 No alarm in English:0x00 0x02

### 5.4.3 Server response packet

| Format                     |                           | Length |
|----------------------------|---------------------------|--------|
| Heartbeat packets(18 Byte) | Start bit                 | 2      |
|                            | Packet length             | 1      |
|                            | Agreement NO.             | 1      |
|                            | Serial number information | 2      |
|                            | Error checking            | 2      |
|                            | Stop bit                  | 2      |

Terminal server response packet (response packet and terminal sends packets agreement, the agreement on the same)

**5.44 Data instance****Terminal to send sample:**

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 78 | 78 | 08 | 13 | 4B | 04 | 03 | 00 | 01 | 00 | 11 | 06 | 1F | 0D | 0A |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

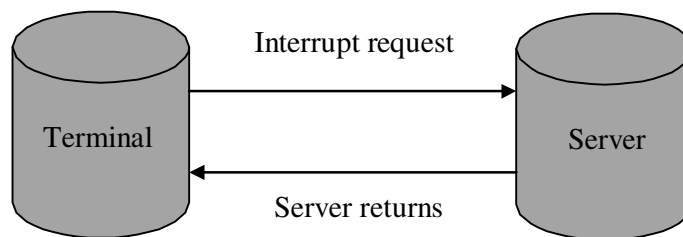
|           |        |               |                     |                       |               |                |          |      |      |      |      |      |      |      |
|-----------|--------|---------------|---------------------|-----------------------|---------------|----------------|----------|------|------|------|------|------|------|------|
| 0x78      | 0x78   | 0x08          | 0x13                | 0x4B                  | 0x04          | 0x03           | 0x00     | 0x01 | 0x00 | 0x11 | 0x06 | 0x1F | 0x0D | 0x0A |
| Start bit | Length | Agreement NO. | Information content | Reserve bit(language) | Serial number | Error checking | Stop bit |      |      |      |      |      |      |      |

**Server response paradigm:**

|    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|
| 78 | 78 | 05 | 13 | 00 | 11 | F9 | 70 | 0D | 0A |
|----|----|----|----|----|----|----|----|----|----|

**Explain:**

|           |        |               |               |                |          |      |      |      |      |
|-----------|--------|---------------|---------------|----------------|----------|------|------|------|------|
| 0x78      | 0x78   | 0x05          | 0x13          | 0x00           | 0x11     | 0xF9 | 0x70 | 0x0D | 0x0A |
| Start bit | Length | Agreement NO. | Serial number | Error checking | Stop bit |      |      |      |      |

**6. Address request and replay****6.1 (Terminal to the server) address request packet format****server sends**

| Format         | Length(Byte) |
|----------------|--------------|
| Start bit      | 2            |
| Package Length | 1            |
| Agreement NO.  | 1            |

|                                  |                            |   |
|----------------------------------|----------------------------|---|
| <b>Information Content</b>       | <b>Instruction length</b>  | 1 |
|                                  | <b>Server flags</b>        | 4 |
|                                  | <b>Instruction content</b> | M |
|                                  | <b>Language</b>            | 2 |
| <b>serial number information</b> |                            | 2 |
| <b>Error checking</b>            |                            | 2 |
| <b>Stop bit</b>                  |                            | 2 |

## 6.2 Terminal return

### (1) Terminal return(1)

| <b>Format</b>                    |                         | <b>Length(Byte)</b> | <b>Example</b>      |
|----------------------------------|-------------------------|---------------------|---------------------|
| <b>Start bit</b>                 |                         | 2                   | 0x79 0x79           |
| <b>Package Length</b>            |                         | 2                   | 0x00 0x09           |
| <b>Agreement NO.</b>             |                         | 1                   | 0x21                |
| <b>Information content</b>       | <b>Server flags</b>     | 4                   | 0x00 0x00 0x00 0x01 |
|                                  | <b>Content encoding</b> | 1                   |                     |
|                                  | <b>Cotent</b>           | M                   |                     |
| <b>serial number information</b> |                         | 2                   | 0x00 0x01           |
| <b>Error checking</b>            |                         | 2                   | 0xD9 0xDC           |
| <b>Stop bit</b>                  |                         | 2                   | 0x0D 0x0A           |

### (2) Terminal return(2)

| <b>Format</b>              |                           | <b>Length(Byte)</b> |
|----------------------------|---------------------------|---------------------|
| <b>Start bit</b>           |                           | 2                   |
| <b>Package Length</b>      |                           | 1                   |
| <b>Agreement NO.</b>       |                           | 1                   |
| <b>Information content</b> | <b>Instruction length</b> | 1                   |

|                                  |                            |   |
|----------------------------------|----------------------------|---|
|                                  | <b>Server flags</b>        | 4 |
|                                  | <b>Instruction content</b> | M |
|                                  | <b>Language</b>            | 2 |
| <b>serial number information</b> |                            | 2 |
| <b>Error checking</b>            |                            | 2 |
| <b>Stop bit</b>                  |                            | 2 |

### 6.3 Check the location information

Function description: the location information of instructions. Mobile phone users and message server are available through this will send instructions for positioning information instance and return a string converting ASCII generated instruction content

//server sends

DWXX#

DWXX=Lat:<South of the equator/ North of the equator >,Lon:<East longitude / West longitude >,Course:<Angle>,Speed:<Speed>,DateTime:<Time> Failure return

DWXX=Command Error!

**Positioning is not return success:**

DWXX=Lat:,Lon:, Course:,Speed:,DateTime:-:

**Return to the sample:**

DWXX=Lat:N23d5.1708m,Lon:E114d23.6212m,Course:120,Speed:53.02;DateTime:08-09-12 14:52:36

**Explain:** means: 23 degrees north latitude 5.1708 points and 23.6212 east longitude 114 degrees, Angle: 120 degrees, speed: 53.02 km/hour, time date: 08 on September 12, 14 point 52 minutes and 36 seconds.

### 6.4 Oil cut-off electric

Function description: to cut off the vehicle oil electric control circuit. Instance will send instruction content and return a string converting ASCII creation.

Server sends :

DYD#

Terminal returns successfully :

DYD=Success!

Failure return :

DYD=Unvalued Fix or DYD=Speed Limit, Speed 40km/h

Explanation: when the GPS positioning or speeds above 20 km/H do not allow the oil electricity cut off

### **6.5 Recovery oil and electricity**

Function description: the electric control circuit connected to the vehicle oil. Instance will send instruction content and return a string converting ASCII creation.

Server sends :

HFYD#

Terminal returns successfully :

HFYD=Success!

Failure return :

HFYD=Fail!

### **6.6 Server distributed query address information**

Instance will send instruction content and return a string converting ASCII creation.

Server sends :

Will send and return a string converting ASCII generated instance.

Server sends :

ADDRESS,Address content,Phone number

Notes: Chinese address content in UNICODE issued.

### **6.7 Terminal to send server information**

| Format              |                 |                               | Length(Byte) |
|---------------------|-----------------|-------------------------------|--------------|
| Start bit           |                 |                               | 2            |
| Package lenght      |                 |                               | 1            |
| Agreement NO.       |                 |                               | 1            |
| Information content | Date/Time       |                               | 6            |
|                     | GPS information | length of the GPS information | 1            |
|                     |                 | Latitude                      | 4            |
|                     |                 | Longitude                     | 4            |
|                     |                 | Speed                         | 1            |
|                     |                 | Course state                  | 2            |
|                     |                 | Phonenumber                   | 21           |
|                     |                 | Language                      | 2            |
|                     |                 | serial number information     |              |
| Error checking      |                 |                               | 2            |
| Stop bit            |                 |                               | 2            |

## 6.8 Reply in Chinese

Chinese reply packet is as follows:

| Format                                                            |                     |                     |                 | Length |
|-------------------------------------------------------------------|---------------------|---------------------|-----------------|--------|
| The server terminal to send Instruction package (15 + M + N Byte) | Start bit           |                     |                 | 2      |
|                                                                   | Packet length       |                     |                 | 1      |
|                                                                   | Agreement NO.       |                     |                 | 1      |
|                                                                   | Information content | Instruction length  |                 | 1      |
|                                                                   |                     | Server flags        |                 | 4      |
|                                                                   |                     | Instruction content | ALARMSMS        | 8      |
|                                                                   |                     |                     | &&              | 2      |
|                                                                   |                     |                     | Address content | M      |



3825

0D0A

### 6.9 Reply in English

Considering the English or other foreign address longer, a data not enough use, increased to 2 bytes. Note: the address information is only for back agreement number corresponding to the length of data bits instead of two.

| Format                                                            |                           |                     | Length          |    |
|-------------------------------------------------------------------|---------------------------|---------------------|-----------------|----|
| The server terminal to send Instruction package (15 + M + N Byte) | Start bit                 |                     | 2               |    |
|                                                                   | Packet length             |                     | 1               |    |
|                                                                   | Agreement NO.             |                     | 1               |    |
|                                                                   | Information content       | Instruction length  |                 | 1  |
|                                                                   |                           | Server flags        |                 | 4  |
|                                                                   |                           | Instruction content | ALARMSMS        | 8  |
|                                                                   |                           |                     | &&              | 2  |
|                                                                   |                           |                     | Address content | M  |
|                                                                   |                           |                     | &&              | 2  |
|                                                                   |                           |                     | phone number    | 21 |
|                                                                   |                           |                     | ##              | 2  |
|                                                                   | serial number information |                     | 2               |    |
|                                                                   | Check digit               |                     | 2               |    |
| Stop bit                                                          |                           | 2                   |                 |    |

Request Chinese address reply agreement number:097

The instruction content: ALARMSMS && address content & telephone number (0) all # # (ALARMSMS, &&, # # for the fixed string)

7878 //Start bit

85 //length of the data

17 //Reply to deal

7E // length of the instruction length or send content information

00000001 //Server flags

414C41524D534D53 //ALARMSMS

2626 //separator

624059044F4D7F6E0028



004C004200530029003A

5E7F4E1C77015E7F5DDE

5E0282B190FD533AFF17

FF15FF144E6190530028

004E00320033002E0033

00390035002C00450031

00310032002E00390038

0038002996448FD1

```
2626 //separator
```

000000000000000000000000000000000000000000000

2323

0106

3825

0D0A

## 7. CRC code

If the receiver received information calculated CRC errors, are ignored, discard the packet.

## CRC - ITU look-up table algorithm C language code snippet

```
static const U16 crctab16[] =
```

$$\{$$

0X0000, 0X1189, 0X2312, 0X329B, 0X4624, 0X57AD, 0X6536, 0X74BF,  
0X8C48, 0X9DC1, 0XAF5A, 0XBED3, 0XCA6C, 0XDBE5, 0XE97E, 0XF8F7,  
0X1081, 0X0108, 0X3393, 0X221A, 0X56A5, 0X472C, 0X75B7, 0X643E,  
0X9CC9, 0X8D40, 0XBFDB, 0XAE52, 0XDAED, 0XCB64, 0XF9FF, 0XE876,  
0X2102, 0X308B, 0X0210, 0X1399, 0X6726, 0X76AF, 0X4434, 0X55BD,  
0XAD4A, 0XBCC3, 0X8E58, 0X9FD1, 0XEB6E, 0XFAE7, 0XC87C, 0XD9F5,  
0X3183, 0X200A, 0X1291, 0X0318, 0X77A7, 0X662E, 0X54B5, 0X453C,  
0XBDCB, 0XAC42, 0X9ED9, 0X8F50, 0XFB EF, 0XEA66, 0XD8FD, 0XC974,  
0X4204, 0X538D, 0X6116, 0X709F, 0X0420, 0X15A9, 0X2732, 0X36BB,

```

0XCE4C, 0XDFC5, 0XED5E, 0XFCD7, 0X8868, 0X99E1, 0XAB7A, 0XBAF3,

0X5285, 0X430C, 0X7197, 0X601E, 0X14A1, 0X0528, 0X37B3, 0X263A,

0XDECD, 0XCF44, 0XFDDF, 0XEC56, 0X98E9, 0X8960, 0XBBFB, 0XAA72,

0X6306, 0X728F, 0X4014, 0X519D, 0X2522, 0X34AB, 0X0630, 0X17B9,

0XEF4E, 0XFEC7, 0XCC5C, 0XDDD5, 0XA96A, 0XB8E3, 0X8A78, 0X9BF1,

0X7387, 0X620E, 0X5095, 0X411C, 0X35A3, 0X242A, 0X16B1, 0X0738,

0XFFCF, 0XEE46, 0XDCDD, 0XCD54, 0XB9EB, 0XA862, 0X9AF9, 0X8B70,

0X8408, 0X9581, 0XA71A, 0XB693, 0XC22C, 0XD3A5, 0XE13E, 0XF0B7,

0X0840, 0X19C9, 0X2B52, 0X3ADB, 0X4E64, 0X5FED, 0X6D76, 0X7CFF,

0X9489, 0X8500, 0XB79B, 0XA612, 0XD2AD, 0XC324, 0XF1BF, 0XE036,

0X18C1, 0X0948, 0X3BD3, 0X2A5A, 0X5EE5, 0X4F6C, 0X7DF7, 0X6C7E,

0XA50A, 0XB483, 0X8618, 0X9791, 0XE32E, 0XF2A7, 0XC03C, 0XD1B5,

0X2942, 0X38CB, 0X0A50, 0X1BD9, 0X6F66, 0X7EEF, 0X4C74, 0X5DFD,

0XB58B, 0XA402, 0X9699, 0X8710, 0XF3AF, 0XE226, 0XD0BD, 0XC134,

0X39C3, 0X284A, 0X1AD1, 0X0B58, 0X7FE7, 0X6E6E, 0X5CF5, 0X4D7C,

0XC60C, 0XD785, 0XE51E, 0XF497, 0X8028, 0X91A1, 0XA33A, 0XB2B3,

0X4A44, 0X5BCD, 0X6956, 0X78DF, 0X0C60, 0X1DE9, 0X2F72, 0X3EFB,

0XD68D, 0XC704, 0XF59F, 0XE416, 0X90A9, 0X8120, 0XB3BB, 0XA232,

0X5AC5, 0X4B4C, 0X79D7, 0X685E, 0X1CE1, 0X0D68, 0X3FF3, 0X2E7A,

0XE70E, 0XF687, 0XC41C, 0XD595, 0XA12A, 0XB0A3, 0X8238, 0X93B1,

0X6B46, 0X7ACF, 0X4854, 0X59DD, 0X2D62, 0X3CEB, 0X0E70, 0X1FF9,

0XF78F, 0XE606, 0XD49D, 0XC514, 0XB1AB, 0XA022, 0X92B9, 0X8330,

0X7BC7, 0X6A4E, 0X58D5, 0X495C, 0X3DE3, 0X2C6A, 0X1EF1, 0X0F78,

};

```

```
// A 16-bit CRC calculation for a given length data.
```

```
U16 GetCrc16(const U8* pData, int nLength)
```

```
{
```

```

    U16 fcs = 0xffff; // Initialize

    while(nLength>0){

        fcs = (fcs >> 8) ^ crctab16[(fcs ^ *pData) & 0xff];

        nLength--;

        pData++;

    }

    return ~fcs; // Not
}

```

## 8. Packet format

**GPS data packets:** 686825266A03586880000001580001100A0C1E0A2E05027AC8390C4657C5000156001

DF1000000060D0A

### Request address package:

68683B266A035868800000015800051B0A0C1E0A2E05027AC8390C4657C5000156001DF100000006313235

323031353031333938313436310049004F00020D0A

### English address packets:

787800AF9700A80000000141444452455353262600320030003100

30002D00310032002D00330030002000310030003A00340036003A003000350020003653F700

2000590075006E007300680061006E00200057006500730074002000520064002C00480075006

9006300680065006E0067002C004800750069007A0068006F0075002C004700750061006E006

70064006F006E00672626313235323031353031333938313436310049004F002323000103020D

0A

### Chinese address packets:

787872176C00000001414444524553532626003200300031003000

2D00310032002D00330030002000310031003A00340031003A0030003500205E7F4E1C7701

60E05DDE5E0260E057CE533A4E915C71897F8DEF003653F7262631323532303135303133

393831343631 003600360023230001ffa80D0A

### Heartbeat package:

68680F03040358688000000158E5181A012A0D0A

**Heart rate response package:**

54681A0D0A

**IP request packets:**

787817000358688000000158300101CC00266A001DF10000DD310D0A

**IP response packets:**

78780B00716C44082275000025fc0D0A