

Version:V01

Level: Secret

Shanghai WanWayTech Co., Ltd

GPS

Communication protocol

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I. Communication protocol

Introduction

This document defines the on-board GPS locator description of location-based services platform application layer interface protocol. Related interface protocol applies only to the interaction between the platform and positioning terminal.

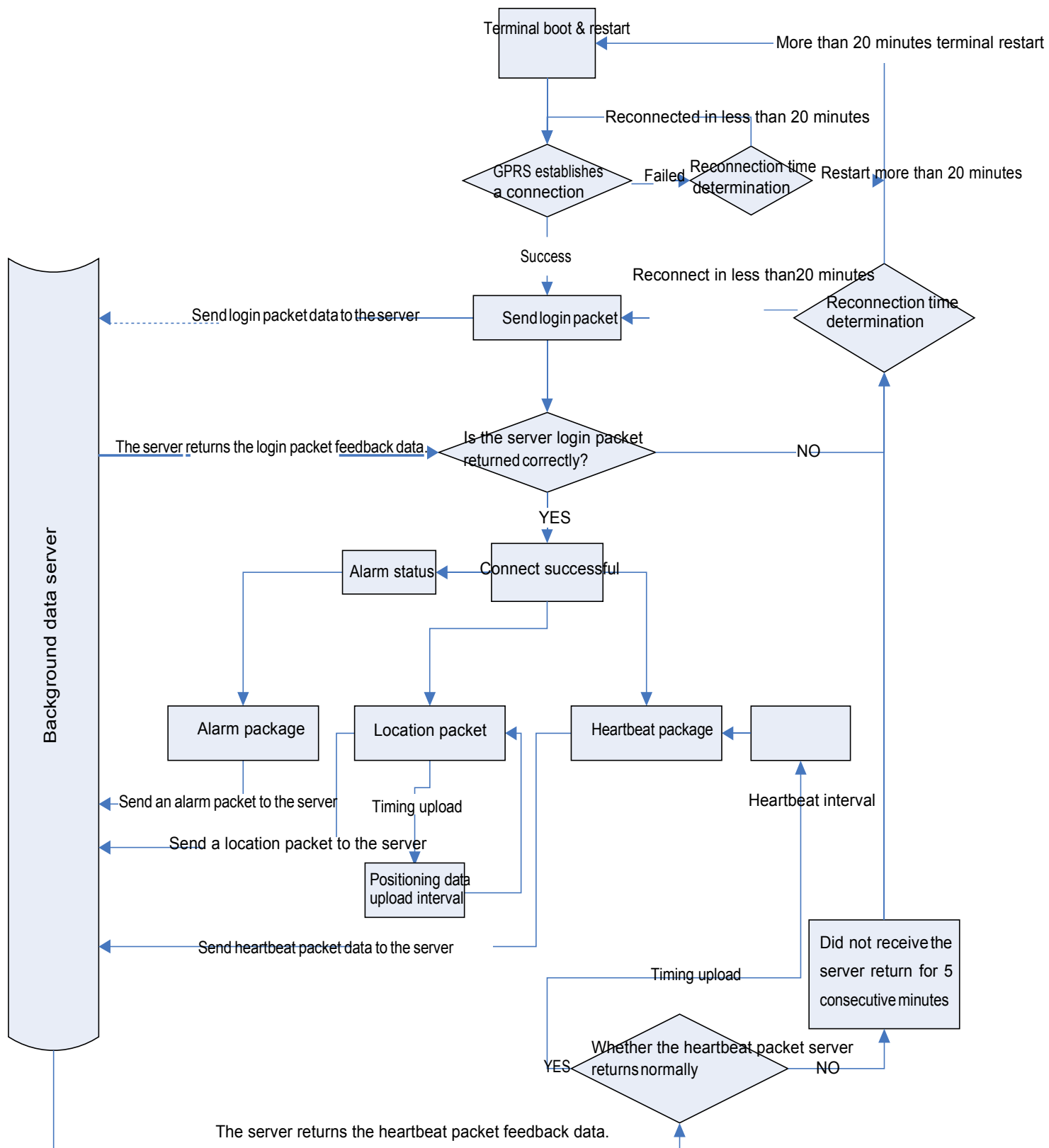
II. Definition of Terms

Terms, abbreviations	English meaning	Chinese meaning
CMPP	China Mobile Peer to Peer	China Mobile Point to Point Protocol
GPS	Global Positioning System	Global Positioning System
GSM	Global System for Mobile Communication	Global System for Mobile Communications
GPRS	General Packet Radio Service	General Packet Radio Service
TCP	Transport Control Protocol	Transmission Control Protocol
LBS	Location Based Services	Assisted positioning service
IMEI	International Mobile Equipment Identity	International Mobile Equipment Identity
MCC	Mobile Country Code	Mobile users Country Code
MNC	Mobile Network Code	Mobile network numbers
LAC	Location Area Code	Location Area Code
Cell ID	Cell Tower ID	Mobile station
UDP	User Datagram Protocol	User Datagram Protocol
SOS	Save Our Ship / Save Our Souls	SOS distress signal
CRC	Cyclic Redundancy Check	Cyclic Redundancy Check
NITZ	Network Identity and Time Zone,	Time zone
GIS	Geographic Information System	Geographic Information System

III. Basic rules

1. GPRS connection is established successfully and sends the first packet server login information received in 5 seconds the server response data packet connection is considered normal, starts sending location information (GPS, LBS packet), after 3 minutes send status information packet, confirmed the timing of normal communication.
2. When GPRS connection establishment fails, the terminal cannot send the packet landing. When the connection fails three times GPRS terminal starts scheduled reboot function, time of 20 minutes. If the terminal connection is established successfully with the server within 20 minutes, and the server receives login information packets sent by the terminal to make a response to the packet, the scheduled restart is disabled, the terminal does not restart, or restart the terminal automatically after 20 minutes.
3. The server returns the response packet is received after the login information packets sent by the terminal to the terminal, if the terminal transmits the packet landing or status packets, no more than 5 seconds the server returns the packet received is considered abnormal current connection, starts GPS fill data transmission function, disconnect the current GPRS connection, re-establish a new GPRS connection and send login information packet.
4. Connection is determined to be abnormal, repeated three times to establish a login status information packet or a packet transmitted after the connection could not receive server response data packet, the terminal starts scheduled reboot function, the timing time of 10 minutes, 10 minutes and if the terminal server connection is established successfully and receive packets from the server in response to the timing reboot function is turned off, the terminal does not restart, or restart the terminal automatically after 10 minutes.
5. After the establishment of the connection is normal, the GPS terminal information changes, the timing of sending GPS, the LBS combined packets to the server, the server may set the default protocol by sending commands.
6. To ensure the validity of the connection, the fixed time interval sends status information to the server, the server returns a response acknowledgment packet.
7. For terminal server is not registered IMEI number, please reply in response to a login request and response packets heartbeat, do not directly disconnected. (If you do not reply directly or disconnected, will lead to the terminal constantly rewiring, GPRS serious trafficconsumption).

Data flow



IV. Packet format

Asynchronous communication transmission mode, and bytes.

Total packet length: (10 + N) Byte

format	Length (Byte)
Start bit	2
Packet length	1 (2)
Agreement No.	1
information	N
Information Serial Number	2
Error checking	2
Stop bits	2

4.1. Start bit

Fixed value, unified hexadecimal 0x78 0x78 (length of a packet) or 0x79 0x79 (packet length 2)

4.2. Packet length

Protocol number = length + + content sequence number + error check,

Total (5 + N) Byte, since the information content of variable length fields.

4.3. Agreement No.

Types of	value
Login information	0x01
Positioning data (UTC)	0x22
status information	0x13
String information	0x21
LBS information (see Annex Agreement)	0x24
Alarm data (UTC)	0x26
Time zone	0x27
GPS, phone number lookup address information (UTC)	0x2A
WIFI packets	0x2C
Transmission instruction information to the terminal server	0x80
General package for information transmission	0x94

4.4. Information

In different applications, corresponding to the respective "protocol number", to determine the specific content.

4.5. Information Serial Number

The first power-transmission data after the GPRS (packet including status and GPS, LBS isochronous packet) with sequence number '1', then each transmits data (packet including status and GPS, LBS packet) sequence number automatically incremented .

4.6. Error checking

Terminal or the server is available to receive information check code determines whether an error occurred. To prevent data corruption during transmission, provided the added error checking to prevent misuse of data, thus increasing the safety and efficiency of the system. Using the error check code CRC-ITU check method.

CRC-ITU body from the value of the protocol "Packet Length" that part of the data to the "sequence number" (including the "Packet Length", "serial number information") is.

If the recipient received information to calculate the CRC error is ignored, discard the packet.

4.7. Stop bits

Fixed value, unified hexadecimal 0x0D 0x0A.

V. Detailed terminal transmits a packet to the server

Common explained individually transmitted packets and return the server

5.1. Login information packet

5.1.1. Transmitting packet to the server terminal

Login packet to the server is used to confirm normal connection establishment, terminal ID submitted to the server.

format		length
Login information packet (18 Byte)	Start bit	2
	Packet length	1
	Agreement No.	1
	Terminal ID	8
	Type Identifier	2
	Time zone Language	2
	Information Serial Number	2
	Error checking	2
	Stop bits	2

5.1.1.1. Start bit

See Packet Format 4.1

5.1.1.2. Packet length

See packet format 4.2

5.1.1.3. Agreement No.

See packet format 4.3

5.1.1.4. Terminal ID

Such as: 123456789012345,

The terminal ID: 0x01 0x23 0x45 0x67 0x89 0x01 0x23 0x45

5.1.1.5. Type Identifier

Type identifier is two bytes. This terminal type is determined according to the identification code.

Two representatives of the first three bytes of aircraft, after a representative of the aircraft branch
R001 represents 0X00 0X01

GW518_TY (tire pressure) expressed 0X05 0X19

NB represents 0X05 0X1A

Air conditioning door state detection 0X00 0X53

5.1.1.6. Time zone Language

A nibble bit15-bit4	15	Time zone to expand the value of 100	
	14		
	13		
	12		
	11		
	10		
	9		
	8		
	7		
	6		
	5		
	4		
Nibble bit4-bit0	3	What time zone	
	2	No definitions	
	1	Language selection bit	1
	0	Language selection bit	0

Bit3 0----- Eastern time zone

1----- West time zone

Note: Extended position: 0X32 0X00 represent the East eight districts, GMT + 8: 00.

Calculation: $8 * 100 = 800$, to hexadecimal, 0X0320

Extended bit: 0X4D 0XD8 represent 12 districts west and 3/4time zone, GMT-12: 45.

Calculated: $12.45 * 100 = 1246$ hexadecimal turn, 0X04,0XDD.

An algorithm is here that the calculated value of the cycle time zone and then left split four time zones east, west, language selection position, in order to save four bytes.

5.1.1.7. Information Serial Number

See packet format 4.5

5.1.1.8. Error checking

See packet format 4.6

5.1.1.9. Stop bits

See Packet Format 4.7

5.1.2. The server response data packet

Explanation	length
-------------	--------

Login informatio n packet (18 Byte)	Start bit	2
	Packet length	1
	Agreement No.	1
	Information Serial Number	2
	Error checking	2
	Stop bits	2

Server response packet to the terminal number and the same protocol :(terminal a data packet to the packet number in response to the protocol)

5.1.2.1. Start bit

See Packet Format 4.1

5.1.2.2. Packet length

See packet format 4.2

5.1.2.3. Agreement No.

See packet format 4.3

5.1.2.4. Information Serial Number

See packet format 4.5

5.1.2.5. Error checking

See packet format 4.6

5.1.2.6. Stop bits

See Packet Format 4.7

5.2. Positioning data packet (GPS, LBS combined packets)

5.2.1. Extended mileage statistics positioning data package

format		Length (Byte)	Examples
information	Start bit	2	0x78 0x78
	Packet length	1	0x26
	Agreement No.	1	0x22
	GPS informatio n	Date Time	0x0a 0x03 0x17 0xf 0x32 0x17
		Number of GPS satellites	0xcc
		latitude	0x02 0x6C 0x6C 0x82
		longitude	0x0C 0x37 0x16 0x82
		speed	0x00
		Course, state	0x15 0x3e
	LBS informatio n	MCC	0x01 0xcc
		MNC	0x00
		LAC	0x26 0x33
		Cell ID	0x00 0x0e 0x7f
	ACC	1	0x01
	Data reporting mode	1	0x00
	Real-time GPS pass up	1	0x00
	Mileage	4	0x00 0x00 0x00 0x00
	serial number	2	0x00 0x08
	Error checking	2	0x1a 0xcf
	End position	2	0x0d 0x0a

The terminal sends a general positioning data packet to the server

format		Length (Byte)	Examples
information	Start bit	2	0x78 0x78
	Packet length	1	0x22
	Agreement No.	1	0x22
	GPS informatio n	Date Time	0x0a 0x03 0x17 0xf 0x32 0x17
		Number of GPS satellites	0xcc
		latitude	0x02 0x6C 0x6C 0x82
		longitude	0x0C 0x37 0x16 0x82
		speed	0x00
		Course, state	0x15 0x3e
	LBS informatio n	MCC	0x01 0xcc
		MNC	0x00
		LAC	0x26 0x33
		Cell ID	0x00 0x0e 0x7f
	ACC	1	0x01
	Data reporting mode	1	0x00
	Real-time GPS pass up	1	0x00
	serial number	2	0x00 0x08
	Error checking	2	0x60 0xa5
	End position	2	0x0d 0x0a

5.2.1.1. Start bit

See Packet Format 4.1

5.2.1.2. Packet length

See packet format 4.2

5.2.1.3. Agreement No.

See packet format 4.3

5.2.1.4. Date Time

format	Length (Byte)	Examples
year	1	0x0A
month	1	0x03
day	1	0x17
Time	1	0x0F
Minute	1	0x32
second	1	0x17

Such as: at 15:50:23 on March 23rd, 2010

Calculation method: 10 (decimal) = 0A (16 hex)

3 (10 hex) = 03 (hex)

23 (10 hex) = 17 (hex)

15 (decimal) = 0F (16 hex)

50 (10 hex) = 32 (hex)

23 (10 hex) = 17 (hex)

The value is: 0x0A 0x03 0x17 0x0F 0x32 0x17

5.2.1.5. GPS information length, the number of satellite positioning participation

1Byte there are two hexadecimal character display, the first character GPS information length, the second character is involved in a number of satellite positioning

Example: When the value 0xCB GPS information indicates a length of 12, the number of satellites 11 is engaged in the positioning.

(C = 12Bit length, B = 11 satellites)

5.2.1.6. latitude

4 bytes, the data represents the latitude value of the positioning. Values range from 0 to 162,000,000, represents 0 to 90 degrees of the range, the conversion method is as follows:

The latitude and longitude values output from the GPS module into a unit to be converted into decimal; and then the conversion is multiplied by the decimal 30,000, converts the multiplication result into hexadecimal can.

As $22^{\circ} 32.7658' = (22 \times 60 + 32.7658) \times 30000 = 40582974$, then converted to a hexadecimal number 40582974 (decimal 10) = 26B3F3E (Hexadecimal)

Finally, a value of 0x02 0x6B 0x3F 0x3E.

5.2.1.7. longitude

4 bytes, longitude value of the positioning data. Values range from 0 to 324,000,000, represents a range of 0 degrees to 180 degrees.

Consistent conversion method and conversion method latitude

5.2.1.8. speed

It occupies one byte, represents the GPS speed, a value in the range of 0x00 ~ 0xFF represents the range of 0 to 255 km / h.

Such as: 0x00 represents 0 km / h.

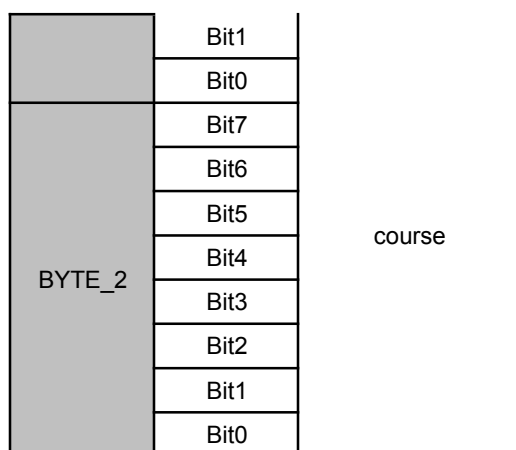
0x10 representatives of 16 km / h

0xFF on behalf of 255 km / h

5.2.1.9. Heading state

It occupies 2 bytes and indicates the running direction of the GPS, represents the range of 0 to 360, units: degrees to 0 degrees north, clockwise.

BYTE_1	Bit7	0
	Bit6	0
	Bit5	Real-time GPS / DGPS
	Bit4	No GPS fix
	Bit3	East longitude, longitude
	Bit2	Latitude north latitude



Note: The data packet status information is the moment the status bit packet time recorded.

Such as: value 0x15 0x4C, into a binary 00010101 01001100,

BYTE_1 Bit7 0

BYTE_1 Bit6 0

BYTE_1 Bit5 0 (Real-Time GPS)

BYTE_1 Bit4 1 (GPS positioned)

BYTE_1 Bit3 0 (longitude)

BYTE_1 Bit2 1 (latitude)

BYTE_1 Bit1 0

BYTE_1 Bit0 1

BYTE_2 Bit7 0

BYTE_2 Bit6 1

BYTE_2 Bit5 0 → Heading 332 ° (0101001100Binary to decimal 332)

BYTE_2 Bit4 0

BYTE_2 Bit3 1

BYTE_2 Bit2 1

BYTE_2 Bit1 0

BYTE_2 Bit0 0

That means the GPS positioning, real-time GPS, latitude, longitude, heading 332 °.

5.2.1.10. MCC

Mobile users Country Code Mobile Country Code (MCC)

Such as: China's mobile country code is: China's mobile country code 460 (decimal) 0x01 0xCC (decimal 460 converted to hexadecimal, hexadecimal less than four on the left side fill 0)

Here ranges: 0x0000 ~ 0x03E7

5.2.1.11. MNC

Mobile network numbers Mobile Network Code (MNC)

Such as: China Mobile is 0x00.

5.2.1.12. LAC

Location Area Code Location Area Code (LAC) is included in the LAI, consisting of two bytes, coded in hexadecimal. The available range is 0x0001-0xFFFFE, 0x0000 and 0xFFFF code group cannot be used (see, 03.03,04.08 and 11.11 GSM specification).

5.2.1.13. Cell ID

Mobile station Cell Tower ID (Cell ID) Range of values is 0x000000 ~ 0xFFFFF

5.2.1.14. ACC

ACC ACC state low as 00, ACC high as 01

5.2.1.15. Data reporting mode

Set aside, at present no effect

5.2.1.16. Information Serial Number

Real-time GPS pass up

0x00 real-time upload

0x01 pass up

5.2.1.17. Information Serial Number

See packet format 4.5

5.2.1.18. Error checking

See packet format 4.6

5.2.1.19. Stop bits

See Packet Format 4.7

5.3. Alarm package (GPS, LBS, combined status information packet)**5.3.1. Alarm terminal transmits packets to the server**

format		Length (Byte)
information	Start bit	2
	Packet length	1
	Agreement No.	1
	Date Time	6
	GPS information	Number of GPS satellites
		latitude
		longitude
		speed
		Course, state
	LBS information	LBS length
		MCC
		MNC
		LAC
		Cell ID
	status information	Terminal information content
		Voltage level
		GSM signal strength
		Alarm / language / expansion port status
	serial number	
	Error checking	
	End position	

Alarm package is based on the positioning of the package increases state information (alarm information) composition, encoding protocol packet format is based on the positioning state information added composition

5.3.1.1. Start bit

See Packet Format 4.1

5.3.1.2. Packet length

See packet format 4.2

5.3.1.3. Agreement No.

See packet format 4.3

5.3.1.4. Date Time

See packet format positioning 5.2.1.4

5.3.1.5. GPS information length, the number of satellite positioning participation

See packet format positioning 5.2.1.5

5.3.1.6. latitude

See packet format positioning 5.2.1.6

5.3.1.7. longitude

See packet format positioning 5.2.1.7

5.3.1.8. speed

See packet format positioning 5.2.1.8

5.3.1.9. Heading state

See packet format positioning 5.2.1.9

5.3.1.10. MCC

See packet format positioning 5.2.1.10

5.3.1.11. MNC

See packet format positioning 5.2.1.11

5.3.1.12. LAC

See packet format positioning 5.2.1.12

5.3.1.13. Cell ID

See packet format positioning 5.2.1.13

5.3.1.14. Terminal Information

1 byte, used to indicate various status information of the mobile phone.

Place		Code Meaning
BYTE	Bit7	1: Oil electrically disconnected
		0: oil and electricity is turned on
	Bit6	1: GPS positioning has been
		0: GPS positioning is not
	Bit3 ~ Bit5	100: SOS distress (not supported)
		011: low battery alarm
		010: power failure alarm
		001: vibration alarm
		000: Normal

	Bit2	1: Received power charging
		0: No power charging
	Bit1	1: ACC high
		0: ACC low
	Bit0	1: fortification
		0: Disarm

Such as: 0x44, corresponding to binary is 01000100

Represents a status of a terminal: ON electric oil, GPS has been positioned, the alarm is not normal, the power has been turned charged, the ACC is low,disarmed

5.3.1.15. Voltage level

It ranges from 0 to 6, marked by the low to high voltage magnitude.

0: No electricity (off)

1: very low power consumption (not enough to call and send text messages, etc.)

2: the lighting is low (low battery alarm)

3: low battery (normal use)

4: power in

5: High power

6: high power

Such as: 0x02 low power alarm sends location

5.3.1.16. GSM signal strength level

0x00: no signal;

0x01: very weak signal

0x02: the signal is weak

0x03: good signal

0x04: signal strength

Such as: 0x03 GSM signal good

5.3.1.17. Alarm / language

0x00 (anterior) 0x01 (posterior)

Anterior: Terminal alarm state (alarm pack suitable for an electronic fence function item and need)

After the bit: the current language-bit terminal

Byte 1	0x00: Normal
	0x01: SOS distress
	0x02: Power failure alarm
	0x03: vibration alarm
	0x04: into the fence alarm
	0x05: a fence alarm
	0x06 Speed alarm
	0x09 displacement alarm
	0x0A into GPS blind area alarm
	0x0B out GPS blind area alarm
	0x0C start the alarm
	0x0E foreign low battery alarm

	0x0F foreign lows protection alarm
	0X11 off alarm
	0X13 (demolition alarm)
	0X14 door alarm
	0X15 low-power shutdown
	0x2C collision Call the police
	0x2D Flip Alarm
	0x4C Sharp turn alarm
	0x30 Rapid deceleration alarm
	0x29 anxious plus Speed alarm
Byte 2	0x01 Chinese
	0x02 English

Such as:

No alarm Chinese: 0x00 0x01; no alarm English: 0x00 0x02

To increase the reliability of alarm information, the alarm message is repeated labeling, in most cases the alarm message is consistent with the upper terminal information inconsistency follows:

A, low battery alarm message the terminal B, the alarm / alarm language information out of the fence

5.3.1.18. Information Serial Number

See packet format 4.5

5.3.1.19. Error checking

See packet format 4.6

5.3.1.20. Stop bits

See Packet Format 4.7

Note: The data packet status information are the moment the status bits packet time recorded.

5.3.2. Alarm server sends reply packet to the terminal

format		Length (Byte)
information	Start bit	2
	Packet length	1
	Agreement No.	1
	serial number	2
	Error checking	2
	End position	2

Alarm package is increased state information (alarm information) composed of a packet on the basis of the positioning, the positioning encoding protocol packet format is also added in a composition on the basis of the status information.

5.3.2.1. Start bit

See Packet Format 4.1

5.3.2.2. Packet length

See packet format 4.2

5.3.2.3. Agreement No.

See packet format 4.3

5.3.2.4. Information Serial Number

See packet format 4.5

5.3.2.5. Error checking

See packet format 4.6

5.3.2.6. Stop bits

See Packet Format 4.7

5.3.3. The server sends reply packet to address alarm data terminal**5.3.3.1. Chinese reply**

Chinese reply packet as follows:

The server transmits the packet to the command terminal (15 + M + N Byte)	Start bit		2
	Data bit length		1
	Agreement No.		1
	information	Instruction length	1
		Server flag	4
		ALARMSMS	8
		&&	2
		Address Content	M
		&&	2
		telephone number	twenty one
		##	2
	Information Serial Number		2
	Check Digit		2
	Stop bits		2

Chinese request reply protocol number Address: 0X17.

Instruction content: ALARMSMS&& && address the content of telephone numbers (all zero) ##
 (ALARMSMS, &&, ## is fixed string)

Chinese content to address **UNICODE** Encoding issued.**Chinese reply address information Example:**

7878 // start bit

85 //Data length

17 // No reply protocol

7E // length instruction transmits content information length i.e.

00000001 // server flag

414C41524D534D53 // ALARMSMS

2626 && // delimiter

624059044F4D7F6E0028 // Chinese position is sent to UNICODE

004C004200530029003A

5E7F4E1C77015E7F5DDE

5E0282B190FD533AFF17

```

FF15FF144E6190530028
004E00320033002E0033
00390035002C00450031
00310032002E00390038
0038002996448FD1
2626    && // delimiter
0000000000000000000000000000000000000000 // phone number
2323    // ## content information terminator
0106    //serial number
3825    //Check Digit
0D0A    // stop bits

```

5.3.3.2. English Reply

Considering the case where English or other foreign longer address, one data bit is not enough, to 2 bytes. note:

Wherein the bit length for the data back to the address information corresponding to only two protocol number.

The server transmits the packet to the command terminal (15 + M + N Byte)	Start bit		2
	Data bit length		2
	Agreement No.		1
	information	Instruction length	2
		Server flag	4
		ALARMSMS	8
		&&	2
		Address Content	M
		&&	2
		telephone number	twenty one
		##	2
	Information Serial Number		2
	Check Digit		2
	Stop bits		2

English address request reply protocol number: 0X97

Instruction content:ALARMSMS&& && address the content of telephone numbers (all zero) ##
(ALARMSMS, &&, ## is fixed string)

Examples reply address information in English Example:

```

7979 // start bit changed from the previous 78,787,979
00D// Data length 2
Protocol No. 97 // Reply
00CA // length instruction transmits content information length i.e.
00000001 // server flag
414C41524D534D53 // ALARMSMS
2626 && // delimiter

```

```

0053004F00530028004C // English position to send UNICODE
0029003A005300680069
006D0069006E00200046
0061006900720079006C
0061006E006400200057
00650073007400200052
0064002C004800750069
006300680065006E0067
002C004800750069007A
0068006F0075002C0047
00750061006E00670064
006F006E00670028004E
00320033002E00310031
0031002C004500310031
0034002E003400310031
0029004E006500610072
00,620,079
2626 && // delimiter
00000000000000000000000000000000000000000000000000000000000000000000 // phone number
2323 // ## content information terminator
0007 //serial number
72b5 //Check Digit
0D0A // stop bits

```

Note: Some internet alarm function does not need to reply-address information, the terminal receives the alarm platform need not reply packet to resolve the address, the address does not need to respond to the alarm types are as follows:

1. 2. The low battery alarm blind speed alarm 3.GPS

5.4. Heartbeat packet (status information packet)

Heartbeat packet is data packet to maintain the connection terminal and the server

5.4.1. The terminal sends a heartbeat packet to the server

format			Length (Byte)
information	Start bit		2
	Packet length		1
	Agreement No.		1
	status information	Terminal information content	1
		Voltage level	1
		GSM signal strength	1

	Language / expansion port status	2
	serial number	2
	Error checking	2
	End position	2

5.4.1.1. Start bit

See Packet Format 4.1

5.4.1.2. Packet length

See packet format 4.2

5.4.1.3. Agreement No.

0x13

5.4.1.4. Terminal Information

1 byte, used to indicate various status information of the mobile phone.

Place		Code Meaning
BYTE	Bit7	1: Oil electrically disconnected
		0: oil and electricity is turned on
	Bit6	1: GPS positioning has been
		0: GPS positioning is not
	Bit3 ~ Bit5	100: SOS distress (not supported)
		011: low battery alarm
		010: power failure alarm
		001: vibration alarm
		000: Normal
	Bit2	1: Received power charging
		0: No power charging
	Bit1	1: ACC high
		0: ACC low
	Bit0	1: fortification
		0: Disarm

Such as: 0x44, corresponding to binary is 01000100

It represents a status of a terminal: ON electric oil, GPS positioning has been charged power, the ACC is low, disarmed

5.4.1.5. Voltage level

The battery state

It ranges from 0 to 6, marked by the low to high voltage magnitude.

0: No electricity (off)

1: very low power consumption (not enough to call and send text messages, etc.)

2: the lighting is low (low battery alarm)

3: low battery (normal use)

4: power in

5: High power

6: high power

Such as: 0x02 low power alarm sends location

Foreign access state, the bit is foreign voltage * 10 byte1

byte1 0xFF F is a fixed value that represents the state of contact foreign

5.4.1.6. GSM signal strength level

0x00: no signal;

0x01: very weak signal

0x02: the signal is weak

0x03: good signal

0x04: signal strength

Such as: 0x03 GSM signal good

5.4.1.7. Language / expansion port status

0x00 (anterior) 0x01 (posterior)

Anterior: port state termination extension (foreign voltage * 10 byte0)

Analytical foreign exemplary voltage

byte1 byte0

Take 0xFF 0x20 0x320 800 rpm decimal i.e. foreign voltage 80.0V

After the bit: the current language-bit terminal

Anterior	
Posterior	0x01 Chinese 0x02 English

Such as:

No alarm Chinese: 0x00 0x01

No alarm English: 0x00 0x02

5.4.1.8. Information Serial Number

See packet format 4.5

5.4.1.9. Error checking

See packet format 4.6

5.4.1.10. Stop bits

See Packet Format 4.7

5.4.2. The server response data packet

format		length
	Start bit	2

Heartbeat packet (18 Byte)	Packet length	1
	Agreement No.	1
	Information Serial Number	2
	Error checking	2
	Stop bits	2

Server response packet to the terminal number and the same protocol :(terminal a data packet to the packet number in response to the protocol)

5.4.2.1. Start bit

See Packet Format 4.1

5.4.2.2. Packet length

See packet format 4.2

5.4.2.3. Agreement No.

0x13

5.4.2.4. Information Serial Number

See packet format 4.5

5.4.2.5. Error checking

See packet format 4.6

5.4.2.6. Stop bits

See Packet Format 4.7

5.4.3. Examples of data

Examples of terminal sends

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

Explanation

<u>0x78 0x78</u>	<u>0x08</u>	<u>0x13</u>	<u>0x4B 0x04 0x03</u>	<u>0x00 0x01</u>	<u>0x00 0x11</u>	<u>0x06 0x1F</u>	<u>0x0D 0x0A</u>
Start bit	length	Agreement No.	information	Reserved bits (language)	serial number	Error checking	Stop bits

Examples of server reply

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

Explanation

<u>0x78 0x78</u>	<u>0x05</u>	<u>0x13</u>	<u>0x00 0x11</u>	<u>0xF9 0x70</u>	<u>0x0D 0x0A</u>
Start bit	length	Agreement No.	serial number	Error checking	Stop bits

5.5. Positioning data packet (LBS ONLY)

5.5.1. General packet station

format		Length (Byte)	Detailed
information	Start bit	2	0x78 0x78
	Packet length	1	0x3B
	Agreement No.	1	0x28
	Date Time (UTC)	6	
	LBS information	MCC	2
		MNC	1
		LAC	2
		CI	3
		RSSI	1
		NLAC1	2
		NCI1	3
		NRSSI1	1
		NLAC2	2
		NCI2	3
		NRSSI2	1
		NLAC3	2
		NCI3	3
		NRSSI3	1
		NLAC4	2
		NCI4	3
		NRSSI4	1
		NLAC5	2
		NCI5	3
		NRSSI5	1
		NLAC6	2
		NCI6	3
		NRSSI6	1
	Timing Advance	1	It refers to the actual arrival time of a signal the mobile station and the base station is assumed that the time difference between the mobile station and a base station from a mobile station signals reach the base station is 0.
	Language	2	After the bit 0x02 0x01 Chinese English
	serial number	2	

	Error checking	2	
	End position	2	

5.5.2. Positioning terminal transmits packets to the server

format			Length (Byte)	
information	Start bit		2	
	Packet length		1	
	Agreement No.		1	
	Date Time		6	
	LB S inf or ma tio n	TA		1
		MCC		2
		MNC		1
		CellNum		1
		The base station 1	LAC	2
			Cell ID	3
			RSSI	1
		Base station 2	LAC	2
			Cell ID	3
			RSSI	1
		The base station 3	LAC	2
			Cell ID	3
			RSSI	1
		Base station 4	LAC	2
			Cell ID	3
			RSSI	1
		The base station 5	LAC	2
			Cell ID	3
			RSSI	1
		Reserve		1
		Reserve		1
		Reserve		1
		serial number		2
Error checking		2		
End position		2		

5.5.2.1. Start bit

See Packet Format 4.1

5.5.2.2. Packet length

See packet format 4.2

5.5.2.3. Agreement No.

See packet format 4.3 0x24

5.5.2.4. Date Time

format	Length (Byte)	Examples
year	1	0x0A
month	1	0x03
day	1	0x17
Time	1	0x0F
Minute	1	0x32
second	1	0x17

Such as: at 15:50:23 on March 23rd, 2010

Calculation method: 10 (decimal) = 0A (16 hex)

3 (10 hex) = 03 (hex)

23 (10 hex) = 17 (hex)

15 (decimal) = 0F (16 hex)

50 (10 hex) = 32 (hex)

23 (10 hex) = 17 (hex)

The value is: 0x0A 0x03 0x17 0x0F 0x32 0x17

5.5.2.5. MCC

Mobile users Country Code Mobile Country Code (MCC)

Such as: China's mobile country code is: China's mobile country code 460 (decimal) 0x01 0xCC

(decimal 460 converted to hexadecimal, hexadecimal less than four on the left side fill 0)

Here ranges: 0x0000 ~ 0x03E7

5.5.2.6. MNC

Mobile network numbers Mobile Network Code (MNC)

Such as: China Mobile is 0x00.

5.5.2.7. LAC

Location Area Code Location Area Code (LAC) is included in the LAI, consisting of two bytes, coded in hexadecimal. The available range is 0x0001-0xFFFFE, 0x0000 and 0xFFFF code group can not be used (see, 03.03,04.08 and 11.11 GSM specification).

5.5.2.8. Cell ID

Mobile station Cell Tower ID (Cell ID)Range of values is 0x000000 ~ 0xFFFFF

5.5.1.9. RSSI

Primary cell signal strength values range0x00~0xFF, Actual signal strength is negative, its absolute value uploading.

See Glossary - RSSI.

5.5.2.9. Terminal Information

1 byte, used to indicate various status information of the mobile phone.

Place		Code Meaning
BYTE	Bit7	1: Oil electrically disconnected
		0: oil and electricity is turned on
	Bit6	1: GPS positioning has been
		0: GPS positioning is not
	Bit3 ~ Bit5	100: SOS distress (not supported)
		011: low battery alarm
		010: power failure alarm
		001: vibration alarm
		000: Normal
	Bit2	1: Received power charging
		0: No power charging
	Bit1	1: ACC high
		0: ACC low
	Bit0	1: fortification
		0: Disarm

Such as: 0x44, corresponding to binary is 01000100

It represents a status of a terminal: ON electric oil, GPS positioning has been charged power, the ACC is low, disarmed

5.5.2.10. GSM signal strength level

0x00: no signal;

0x01: very weak signal

0x02: the signal is weak

0x03: good signal

0x04: signal strength

Such as: 0x03 GSM signal good

5.5.2.11. Information Serial Number

Real-time GPS pass up

0x00 real-time upload

0x01 pass up

5.5.2.12. Information Serial Number

See packet format 4.5

5.5.2.13. Error checking

See packet format 4.6

5.5.2.14. Stop bits

See Packet Format 4.7

5.6. General information transmission packet

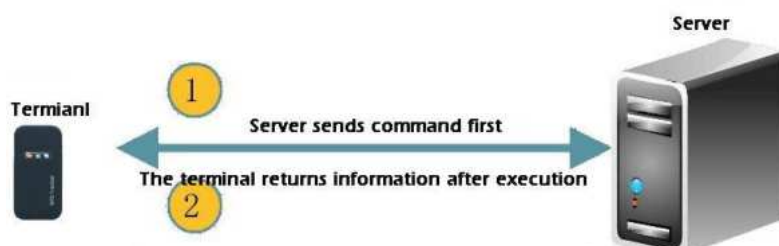
A terminal for transmitting the positioning data using various non-

		length	Detailed
Start bit		2	0x79 0x79
Packet length		2	Protocol number = length + + content sequence number error check +
Agreement No.		1	0x94
information	Message type (a protocol number)	1	00 foreign voltage 01 to 03 (custom) 04 the terminal state synchronization 05 Air conditioning door state 08 self-test parameters 09 positioning satellite information 0A ICCID and other information to be added
	Data content	N	Depending on the information content different from the content transmission
Information Serial Number		2	From the start, every time the transmission data sequence number automatically incremented
Error checking		2	"Packet Length" to the "sequence number" value of CRC-ITU. If the recipient received information to calculate the CRC error is ignored, (discard the packet)
Stop bits		2	Fixed value, unified 0x0D 0x0A

Type is 0A, this bit transfers the following information, transmitted to a hexadecimal number

IMEI	8	Example: IMEI number 123456789123456, the terminal ID is 0x01 0x23 0x45 0x67 0x89 0x12 0x34 0x56
IMSI	8	Example: IMSI number 123456789123456, the terminal ID is 0x01 0x23 0x45 0x67 0x89 0x12 0x34 0x56
ICCID	10	Example: ICCID number is 12345123456789123456, the terminal ID is 0x12 0x34 0x51 0x23 0x45 0x67 0x89 0x12 0x34 0x56
Air conditioning door state	1	Example: : 0x03 Air conditioning and car door is open Bit7 - Bit2 retain Bit1 0: 0 Car door is close 1 car door is open Bit0 0: 0 Air conditioning is close 1 Air conditioning is open

VI. The server sends the data packet to the terminal



6.1. The server sends

format		Length (Byte)
Start bit		2
Packet length		1
Agreement No.		1
information	Instruction length	1
	Server flag	4
	Instruction content	M
	Language	2
Information Serial Number		2
Error checking		2
Stop bits		2

6.1.1. Start bit

See Packet Format 4.1

6.1.2. Packet length

See packet format 4.2

6.1.3. Agreement No.

Terminal transmission protocol number used: 0x80

6.1.4. Instruction length

Content server flag bit instruction length +

Such as: units of length in bytes, 0x0A, i.e. a flag bit instruction + the content occupies 10 bytes

6.1.5. Server flag

Leaving the server identification, the terminal will receive the binary data is returned as the return package

6.1.6. Instruction content

To ASCII string representation of the contents of the instruction is compatible with SMS commands

6.1.7. Language

Terminal current language site.

Chinese: 0x00 0x01

English: 0x00 0x02

6.1.8. Information Serial Number

See packet format 4.5

6.1.9. Error checking

See packet format 4.6

6.1.10. Stop bits

See Packet Format 4.7

6.2. Terminal returns

format		Length (Byte)	Examples
Start bit		2	0x79 0x79
Packet length		2	0x00 0x09
Agreement No.		1	0x21
information	Server flag	4	0x00 0x00 0x00 0x01
	Content-Encoding	1	
	content	M	
Information Serial Number		2	0x00 0x01
Error checking		2	0xD9 0xDC
Stop bits		2	0x0D 0x0A

6.2.1 start bit

Fixed value 0x79 0x79

6.2.2 packet length

2 bytes

6.2.3 Protocol No.

Use 0x21

6.2.4 Server flag

Leaving the server identification, the terminal will receive the binary data is returned as the return package

6.2.5 Content-Encoding

0x01 ASCII coding

0x02 UTF16-BE encoding

6.2.6 content

Data transmission needs.

6.2.7 Information Serial Number

See packet format 4.5

6.2.8 Error checking

See packet format 4.6

6.2.9 Stop bits

See Packet Format 4.7

6.3. Off petrol and electricity

Functional Description: Cutting oil vehicle electrical control circuit

Examples in the send and return string conversion ASCII command generated content

The server sends

RELAY, 1 #

Terminal returns

Successful return

DYD = Success!

Failure to return

6.4. Restore oil and electricity

Functional Description: An electrical control circuit of the vehicle is turned on oil

Examples in the send and return string conversion ASCII command generated content

The server sends

RELAY, 0 #

Terminal returns

Successful return

Failure to return

Description:

The following are the various reply off petrol and electricity, in order to determine the character search to Success.

RELAY, ERROR: 104

Command Error

RELAY, ERROR: 103

Instruction parameter error

RELAY, FAIL! ACC ON, GPS has Not FIXED or speed> 20KM / H, relay delay !!

Off petrol and electricity failure! , The ACC is turned on, GPS positioning is not greater than or speed 20KM / H, the fuel cut operation delay!

RELAY, The oil has been cut already!!

Off petrol and electricity failure! Already in electricity off the state oil!

RELAY, The oil has been Resume already!!

Restore oil and electricity failed! Oil is already in electricity restored state!

Cut off the fuel supply: Success Speed: ! 0 km / h.

Off petrol and electricity success

Restore fuel supply: Success!

Restore oil and electricity success

RELAY, Restore fuel supply: Success!
Restore oil and electricity success

RELAY, Cut off the fuel supply: Success Speed:! 0 km / h.
End tour electrical success!

6.5. Add SOS numbers

Functional Description: Adding to receive alarm messages and telephone number of SOS

Examples in the send and return string conversion ASCII command generated content

The server sends

SOS, A, NUM1, NUM2, NUM3 #

Terminal returns

Successful return

OK SOS1:! NUM1SOS2: NUM2SOS3NUM3

Failure to return

ERROR: XXX

6.6. Delete SOS number

Functional Description: Delete alarm receiving text messages and telephone number of SOS

Examples in the send and return string conversion ASCII command generated content

The server sends

SOS, D, NUM1, NUM2, NUM3 #

Terminal returns

Successful return

OK SOS1:! NUM1SOS2: NUM2SOS3NUM3

Failure to return

ERROR: XXX

6.7. Set the center number

Functional Description: Center number is provided to control power shutoff

Examples in the send and return string conversion ASCII command generated content

The server sends

CENTER, A, NUM #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

6.8. Delete center number

Functional Description: Delete able to control the oil off power center number

Examples in the send and return string conversion ASCII command generated content

The server sends

CENTER, D #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

6.9. Vibrate alert

Functional Description: Vibrate alert

Examples in the send and return string conversion ASCII command generated content

The server sends

SENALM, ON, Alarm #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

NOTE: Alarm 0: internet; 1: + internet message; 2: + SMS + internet call; 3 + internet call;

6.10. Off vibration alarm

Functional Description: Off vibration alarm

Examples in the send and return string conversion ASCII command generated content

The server sends

SENALM, OFF #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

6.11. Open speed alarm

Functional Description: Open speed alarm

Examples in the send and return string conversion ASCII command generated content

The server sends

SPEED, ON, TIME, SPEED, Alarm #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

NOTE: Alarm 0: internet; 1: + internet message;

6.12. Close speed alarm

Functional Description: Close speed alarm

Examples in the send and return string conversion ASCII command generated content

The server sends

SPEED, OFF #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

6.13. Turn off alarm

Functional Description: Turn off alarm

Examples in the send and return string conversion ASCII command generated content

The server sends

POWERALM, ON, Alarm #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

NOTE: Alarm 0: internet; 1: + internet message; 2: + SMS + internet call; 3 + internet call;

6.14. Shut off the alarm

Functional Description: Shut off the alarm

Examples in the send and return string conversion ASCII command generated content

The server sends

POWERALM, OFF #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

6.15. Open displacement alarm

Functional Description: Open displacement alarm

Examples in the send and return string conversion ASCII command generated content

The server sends

MOVING, NO, radial displacement, Alarm #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

NOTE: Alarm 0: internet; 1: + internet message; 2: + SMS + internet call; 3 + internet call;
Displacement radius:100~1000

6.16. Close displacement alarm

Functional Description: Close displacement alarm

Examples in the send and return string conversion ASCII command generated content

The server sends

MOVING, OFF #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

6.17. Open low battery alarm

Functional Description: Open low battery alarm

Examples in the send and return string conversion ASCII command generated content

The server sends

BATALM, ON, Alarm #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

NOTE: Alarm 0: internet; 1: + internet message;

6.18. Off Low battery alarm

Functional Description: Off Low battery alarm

Examples in the send and return string conversion ASCII command generated content

The server sends

BATALM, OFF #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

6.19. Open fence alarm

Functional Description: Open the electronic fence

Examples in the send and return string conversion ASCII command generated content

The server sends

FENCE, ON, 0, Latitude center, Longitude center, Radius of the fence, X, Alarm#
E.g: FENCE, ON, 0, N1.2971, E103.822349, 61, IN, 0 #

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

NOTE: Alarm 0: internet; 1: + internet message;

X = IN / OUT; IN: nominated bar alarm, OUT: a fence alarm, empty showing entrance / exit fence will alarm; default entry / exit fence will alarm;

6.20. Close fence alarm

Functional Description: Open the electronic fence

Examples in the send and return string conversion ASCII command generated content

The server sends

FENCE, OFF#

Terminal returns

Successful return

OK

Failure to return

ERROR: XXX

6.21. Control device reboot

Functional Description: After 1 minute, the device is restarted

Examples in the send and return string conversion ASCII command generated content

The server sends

RESET #

Terminal returns

Successful return

The terminal will restart after 1 minute!

Failure to return

ERROR: XXX

6.22. Send inquiry address information in the server

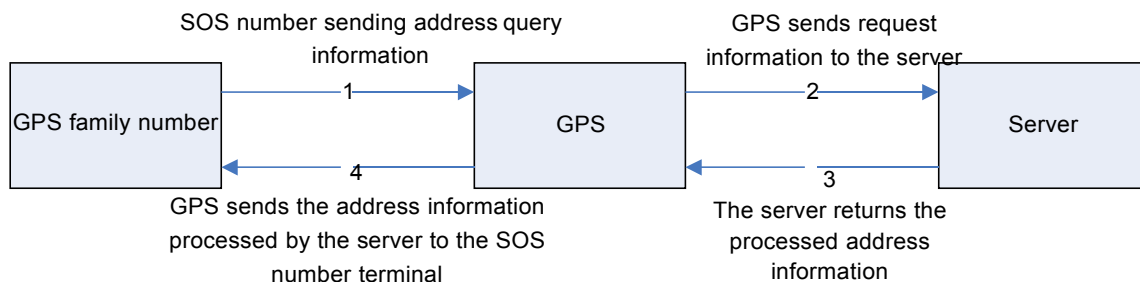
Examples in the send and return string conversion ASCII command generated content

The server sends

ADDRESS, the contents of the address, phone number

Note: The contents of the address issued following Chinese UNICODE encoding.

6.23. GPS, phone number lookup address information packet (0X2A)



6.23.1. A terminal information sending server

The terminal receives

Basically the same format with the previously mentioned GPS information content, add the phone number of an inquiry address.

format			Length (Byte)
Start bit			2
Packet length			1
Agreement No.			1
information	Date Time		6
	GPS information	GPS information length, the number of satellite positioning participation	1
		latitude	4
		longitude	4
		speed	1
		Course, state	2
	telephone number		twenty one
	Language		2
Information Serial Number			2
Error checking			2
Stop bits			2

6.7.1.1. Start bit

See Packet Format 4.1

6.7.1.2. Packet length

See packet format 4.2

Such as: units of length in bytes, 0x2E, it means that the instruction content occupies 46 bytes

6.7.1.3. Agreement No.

Use 0x2A.

6.7.1.4. Date Time

See packet format positioning 5.2.1.4

6.7.1.5. GPS information length, the number of satellite positioning participation

See packet format positioning 5.2.1.5

6.7.1.6. latitude

See packet format positioning 5.2.1.6

6.7.1.7. longitude

See packet format positioning 5.2.1.7

6.7.1.8. speed

See packet format positioning 5.2.1.8

6.7.1.9. course

See packet format positioning 5.2.1.9

6.7.1.10. telephone number

SOS phone number address lookup request by ASCII conversion, less than 21 right side up 0

6.7.1.11. Language

Terminal current language site.

Chinese: 0x00 0x01

English: 0x00 0x02

6.7.1.12. Information Serial Number

See packet format 4.5

6.7.1.13. Error checking

See packet format 4.6

6.7.1.14. Stop bits

See Packet Format 4.7

6.23.2. Server response

Chinese or English request reply address according to the extended instruction address, the reply packet is inconsistent.

6.23.2.1. Chinese reply

Chinese reply packet as follows:

format				Length (Byte)
The server transmits the packet to the command terminal (15 + M + N Byte)	Start bit			2
	Data bit length			1
	Agreement No.			1
	informatio n	Instruction length		1
		Server flag		4
		Instructio n content	ADDRESS	7
			&&	2
			Address Content	M
			&&	2
			telephone number	twenty one
			##	2
	Information Serial Number			2
Check Digit			2	
Stop bits			2	

Chinese request reply protocol number Address: 0X17.

Instruction content: ADDRESS && && contents of the address telephone number ## (ADDRESS, &&, ## is fixed string)

Chinese content to address **UNICODE** Encoding issued.

Chinese reply address information Example:

```

7878      // start bit
84        //Data length
17        // No reply protocol
7E        // length instruction transmits content information length i.e.
00000001  // server flag
41444452455353  // ADDRESS
2626      && // delimiter
624059044F4D7F6E0028 // Chinese position is sent to UNICODE
004C004200530029003A
5E7F4E1C77015E7F5DDE
5E0282B190FD533AFF17
FF15FF144E6190530028
004E00320033002E0033
00390035002C00450031
00310032002E00390038
0038002996448FD1
2626      && // delimiter
313337313038313931333500000000000000000000 //telephone number
2323      // ## content information terminator
0106      //serial number
3825      //Check Digit
0D0A      // stop bits

```

6.23.2.2. English Reply

Considering the case where English or other foreign longer address, one data bit is not enough, to 2 bytes. note:

Wherein the bit length for the data back to the address information corresponding to only two protocol number.

format			Length (Byte)
The server transmits the packet to the command terminal (15 + M + N Byte)	Start bit		2
	Data bit length		2
	Agreement No.		1
	informati on	Instruction length	2
		Server flag	4
		ADDRESS	7
		&&	2
		Address Content	M
		&&	2

			telephone number	twenty one
			##	2
	Information Serial Number			2
	Check Digit			2
	Stop bits			2

English address request reply protocol number: 0X97

Instruction content: ADDRESS && && contents of the address telephone number ## (ADDRESS, &&, ## is fixed string)

Examples reply address information in English Example:

7878 // start bit

00D1 //Data length

Protocol No. 97 // Reply

00CA // length instruction transmits content information length i.e.

00000001 // server flag

41444452455353 // ADDRESS

2626 && // delimiter

0053004F00530028004C // English position to send UNICODE

0029003A005300680069

006D0069006E00200046

0061006900720079006C

0061006E006400200057

00650073007400200052

0064002C004800750069

006300680065006E0067

002C004800750069007A

0068006F0075002C0047

00750061006E00670064

006F006E00670028004E

00320033002E00310031

0031002C004500310031

0034002E003400310031

0029004E006500610072

00,620,079

2626 && // delimiter

313235323031333739303737343035310000000000 //telephone number

2323 // ## content information terminator

0007 //serial number

72b5 //Check Digit

0D0A // stop bits

VII. A CRC-ITU attached table lookup algorithm C language code fragment

CRC-ITU lookup algorithms C language code fragment

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, 0XFBF7, 0XEA66, 0XD8FD, 0XC974,
  0X4204, 0X538D, 0X6116, 0X709F, 0X0420, 0X15A9, 0X2732, 0X36BB,
  0XCE4C, 0XD5C5, 0XE5E, 0XFC7, 0X8868, 0X99E1, 0XAB7A, 0XBAF3,
  0X5285, 0X430C, 0X7197, 0X601E, 0X14A1, 0X0528, 0X37B3, 0X263A,
  0XDECD, 0XCF44, 0XDFDD, 0XEC56, 0X98E9, 0X8960, 0XBBFB, 0XAA72,
  0X6306, 0X728F, 0X4014, 0X519D, 0X2522, 0X34AB, 0X0630, 0X17B9,
  0XEF4E, 0XFE7, 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,
};
```

// 16-bit CRC is calculated for a given length of the 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; // negated
}
```

VIII. B Attachment exemplary protocol data packet fragments

The following data is intercepted from the data communication between the terminal and the server, the hexadecimal display, indicating that the terminal issuing sent, receiving a returned by the server:

Log package:

Issued: 78 78 0D 01 03 53 41 35 32 15 03 62 00 02 2D 06 0D 0A

Reception: 78 78 05 01 00 02 EB 47 0D 0A

GPS data packets (06 packets using GPSLBS merger):

Issued: 78 78 1F 12 0B 08 1D 11 2E 10 CF 02 7A C7 EB 0C 46 58 49 00 14 8F 01 CC 00 28 7D 00 1F B8 00 03 80 81 0D 0A

State packet:

Issued: 78 78 0A 13 44 01 04 00 01 00 05 08 45 0D 0A

Receiving: 78 78 05 13 00 05 AF D5 0D 0A

Online off oil and electricity:

Receiving: 78 78 15 80 0F 00 01 A9 58 44 59 44 2C 30 30 30 30 30 23 00 A0 DC F1 0D 0A

Issued: 78 78 18 15 10 00 01 A9 58 44 59 44 3D 53 75 63 63 65 73 73 21 00 02 00 18 91 77 0D 0A

Issued under DYD server, # 000000

Reply: DYD = Success!

Command issued in the case of oil and electricity has been disconnected:

Receiving: 78 78 15 80 0F 00 01 A9 61 44 59 44 2C 30 30 30 30 30 23 00 A0 3E 10 0D 0A

Issued: 78 78 53 15 4B 00 01 A9 61 41 6C 72 65 61 64 79 20 69 6E 20 74 68 65 20 73 74 61 74 65 20 6F 66 20 66 75 65 6C 20 73 75 70 70 6C 79 20 63 75 74 20 6F 66 66 2C 74 68 65 20 63 6F 6D 6D 61 6E 64 20 69 73 20 6E 6F 74 20 72 75 6E 6E 69 6E 67 21 00 02 00 1C F3 0D 0D 0A

Issued under DYD server, # 000000

Reply: Already in the state of fuel supply cut off, the command is not running!

Online restore oil and electricity:

Receiving: 78 78 16 80 10 00 01 A9 63 48 46 59 44 2C 30 30 30 30 30 23 00 A0 7B DC 0D 0A

Issued: 78 78 19 15 11 00 01 A9 63 48 46 59 44 3D 53 75 63 63 65 73 73 21 00 02 00 1E F8 93 0D 0A

Under the server sends: HFYD, 000000 #

Reply: HFYD = Success!

Instructions have been issued to restore oil and electricity case:

Receiving: 78 78 16 80 10 00 01 A9 64 48 46 59 44 2C 30 30 30 30 30 23 00 A0 8B 1B 0D 0A

Issued: 78 78 55 15 4D 00 01 A9 64 41 6C 72 65 61 64 79 20 69 6E 20 74 68 65 20 73 74 61 74 65 20 6F 66 20 66 75 65 6C 20 73 75 70 70 6C 79 20 74 6F 20 72 65 73 75 6D 65 2C 74 68 65 20 63 6F 6D 6D 61 6E 64 20 69 73 20 6E 6F 74 20 72 75 6E 6E 69 6E 67 21 00 02 00 1F DB BF 0D 0A

Under the server sends: HFYD, 000000 #

Reply: Already in the state of fuel supply to resume, the command is not running!

Online inquiry location:

Receiving: 78 78 16 80 10 00 01 A9 67 44 57 58 58 2C 30 30 30 30 30 23 00 A0 06 2D 0D 0A

Issued: 78 78 64 15 5C 00 01 A9 67 44 57 58 58 3D 4C 61 74 3A 4E 32 33 2E 31 31 31 36 38 32 2C 4C 6F 6E 3A 45 31 31 34 2E 34 30 39 32 31 37 2C 43 6F 75 72 73 65 3A 30 2E 30 30 2C 53 70 65 65 64 3A 30 2E 33 35 31 38 2C 44 61 74 65 54 69 6D 65 3A 31 31 2D 31 31 2D 31 35 20 20 31 31 3A 35 33 3A 34 33 00 02 00 23 07 AE 0D 0A

Fat content on the terminal: DWXX = Lat: N23.111682, Lon: E114.409217, Course: 0.00, Speed: 0.3518, DateTime: 11-11-15 11:53:43

IX. Full packet format attached C

A. Data packets sent by the terminal to the server

Login information packet (18 Byte)						
Start bit	Packet length	Agreement No.	Terminal ID	Information Serial Number	Check Digit	Stop bits
2	1	1	8	2	2	2

GPS information packet (26 + N Byte)												
S t a r t b i t	Pack et len g t h	A g r e e m e n t N o .	information							Inform ation Serial Num ber	Che ck Digit	Stop bits
			Date Time	GPS information					Reser ve expan sion bit			
				GPS information length, the number of satellite positioning participation	lati tud e	lon git ud e	sp ee d	Course, state				
2	1	1	6	1	4	4	1	2	N	2	2	2

LBS information packet (23 + N Byte)											
S t a r t b i t	P a c k e t l e n g t h	A g r e e m e n t N o.	information						I n f o r m a t i o n S e r i a l N u m b e r	C h e c k D i g i t	S t o p b i t s
			D a t e T i m e	LBS information				R e s e r v e e x p a n s i o n b i t			
				MCC	MNC	LAC	Cell ID				
2	1	1	6	2	1	2	3	N	2	2	2

LBS complete information packet (42 + N Byte)																						
Sta rt bit	Pa cke t len gth	Agr ee me nt No.	information															Inf or ma tio n Ser ial Num ber	Ch eck Dig it	Sto p bits		
			Dat e Ti me	LBS information																	Re se r ve ex pa nsi on bit	
				M C C	M N C	L A C	M C I	M C I S S	N C I 1	N C I S S 1	N C I 2	N C I S S 2	N C I 3	N C I S S 3	N C I 4	N C I S S 4	N C I 5					N C I S S 5
2	1	1	6	2	1	2	2	1	2	1	2	1	2	1	2	1	2	1	N	2	2	2

GPS, LBS packet (34 + M + N Byte)																	
Sta rt bit	Pac ket len gth	Agr ee me nt No.	information												Infor matio n Serial Num ber	Ch eck Digi t	Sto p bits
			Date Tim e	GPS information						LBS information				Res erve exp ansi on			
				GPS information length, the number of satellite positioning participation	lati tude	lon git ud e	spe ed	Cours e, state	Rese rve expa nsion bit	M CC	M NC	LA C	Cell ID				
2	1	1	6	1	4	4	1	2	M	2	1	2	3	M	2	2	2

Status Packet (13 + N Byte)									
S t a r t	Packet length	Agre me nt No.	information				Informati o n Serial Number	Chec k Digit	Stop bits
			Terminal information content	Voltage level	GSM signal strength level	Reserve expansion bit			

GPS locator communications protocol

b it						(language)			
2	1	1	1	1	1	2	2	2	2

Satellite SNR information (11 + M + N Byte)										
Start bit	Packet length	Agree ment No.	information					Information Serial Number	Check Digit	Stop bits
			The number of satellites involved in positioning	Satellite signal to noise ratio			Reserve expansion bit			
				1	2	3				
2	1	1	1	M			N	2	2	2

Terminal response command (15 + M + N Byte) sent by the server									
Start bit	Packet length	Agreement No.	String content				Information Serial Number	Check Digit	Stop bits
			Instruction length	Server flag	Instruction content	Reserve expansion bit (language)			
2	1	1	1	4	M	2	2	2	2

GPS, LBS, status information packet (40 + M + N + L Byte)																						
Start bit	Packet length	Agreement No.	information															Reserve expansion bit (Language)	Information Serial Number	Check Digit	Stop bits	
			GPS information							LBS information						status information						
			GPS information length, the number of satellite positioning participation	latitude	longitude	speed	Course, state	Reserve expansion bit	LBS length	MCC	MNC	LAC	Cell ID	Reserve expansion bit	Terminal information content	Voltage level	GSM signal strength level					
2	1	1	6	1	4	4	1	2	M	1	2	1	2	3	N	1	1	1	2	2	2	2

B. Packet sent to the terminal server

The server receives a response (10 Byte) state of the terminal after the transmission of the packet					
Start bit	Packet length	Agreement No.	Information Serial Number	Check Digit	Stop bits
2	1	1	2	2	2

The server transmits the packet to the command terminal (15 + M + N Byte)									
Start bit	Packet length	Agreement No.	information				Information Serial Number	Check Digit	Stop bits
			Instruction length	Server flag	Instruction content	Reserve expansion bit			
2	1	1	1	4	M	N	2	2	2

Description: Symbol must be in English, the instruction sets the correct reply: the OK, the instruction is not normal: no reply or return instruction format is incorrect

NO.	Function Item	Instruction format	Remarks / Example
1	Address Lookup	Or DW 123	
2	Status Inquiry	STATUS #	

3	Versions Query	VERSION #	
4	Query parameter settings	PARAM #	
5	Restart instruction	RESET #	
6	Add SOS numbers	SOS, A, number 1,number 2,number 3#	
7	Delete SOS number	SOS,D, number 1,number 2,number 3#	
8	Query SOS numbers	SOS #	
9	Changing IP settings	SERVER, 0, IP, port, # 0	SERVER, 0,120.24.248.12,8005,0 #
10	Change domain settings	SERVER, 1, domain name, port, # 0	SERVER, 1, GW.CARHERE.NET, 8005,0 #
11	Turn off alarm	POWERALM,A, M, T1, T2, # A = ON M = 0~2;0 onlyGPRS,1 SMS + GPRS,2 GPRS + SMS + CALL T1 = 2~60Sec; power-off time detecting T2 = 1-3600Seconds; minimum charge time	
12	Shut off the alarm	POWERALM, OFF #	
13	Query power failure alarm status	POWERALM #	
14	Open low battery alarm settings	BATALM, A, M # A = ON M = 0~1 0representative: onlyGPRS,1 representative: SMS + GPRS,	
15	Close low battery alarm setting	BATALM, OFF #	
16	Queries low battery alarm state	BATALM #	
17	Open displacement alarm settings	MOVING, A, R, M # A = ON R = 100~1000; Radial displacement M = 0~2;0 onlyGPRS,1 SMS + GPRS;2 GPRS + SMS + CALL	
18	Close displacement alarm	MOVING, OFF #	
29	Query displacement setting status	MOVING #	

