Version：V1.0.3

Level：Confidential

**Shenzhen Concox Information Technology Co., Ltd**

**GPS Tracker**

**Communication Protocol**

Content

I. Protocol Packet Format 4

1.1 Protocol Number 4

II. Protocol Packet 5

1. Login packet 5

1.1Login Message Packet 5

1.2 Login packet response（server response） 6

2. Heartbeat Packet 7

2.1. Heartbeat packet sent by terminal 7

2.2 Server Responds The Heartbeat Packet 8

3. GPS Location Packet 9

3.1 Location packet sent by terminal 9

3.2 Server location packet response 11

4. LBS Multiple bases extension packet 12

a) Terminal sent LBS multiple bases extension packet 12

b) Server LBS multiple bases extension packet reply 13

WIFI Information Packet 13

5. Alarm Packet (GPS) 16

5.1 Alarm packet sent by terminal 16

5.2 Alarm packet response of server 18

5.3 Server alarm packet address in Chinese 16

5.4 Server alarm packet address in English 16

6. Alarm Packet (LBS) 19

6.1 Alarm packet sent by terminal 19

6.2 Alarm packet response of server 21

6.3 Server alarm packet address in Chinese 16

6.4 Server alarm packet address in English 21

7. GPS Address Request Packet 24

Terminal Address Request Packet 24

English response of server address request packet. 24

Server no Response 24

8. LBS Address Request Packet 25

Terminal Address Request Packet 25

Chinese response of server address request packet. 25

English response of server address request packet. 25

9. Online command 26

Online command sent by server 26

Online command replied by terminal (0x21) 26

10. Time Packet 28

5.4 Time request sent by terminal 28

Server response time information 28

11. Information transmission packet 29

Information transmission packet sent by terminal 29

Server Response Information Transmission Packet 32

Server no Response 32

iii. Appendix 33

1. Code fragment of the CRC-ITU lookup table algorithm implemented based on C language 33

2. Data Flow Diagram 34

3. Voltage-Battery Correspondence of Heartbeat Packet 35

**I. Protocol Packet Format**

|  |  |  |
| --- | --- | --- |
| Format | Length(Byte) | Description |
| Start Bit | 2 | 0x780x78（packet length : 1bit）or 0x79 x79（packet length 2 bits） |
| Packet Length | 1(2) | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | Transmission packet type（see the following diagram for details） |
| Information Content | N | The specific contents are determined by the protocol numbers corresponding to different applications.  |
| Information Serial Number | 2 | The serial number of the first GPRS data (including status packet and data packet such as GPS, LBS) sent after booting is ‘1’, and the serial number of data sent later at each time will be automatically added ‘1’.  |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

* 1. **Protocol Number**

|  |  |
| --- | --- |
| Login Information | 0x01 |
| Positioning Data（UTC） | 0x22 |
| Heartbeat Packet | 0x23 |
| Online Command Response of Terminal | 0x21 |
| Alarm Data（UTC） | 0x26 |
| GPS Address Inquiry Packet（UTC） | 0x2A |
| LBS Multiple Bases Extension Packet | 0x28 |
| LBS Address Inquiry Packet | 0x17 |
| Online Command | 0x80 |
| Time Check Packet | 0x8A |
| Information Transmission Packet | 0x94 |
| Chinese address reply packet | 0x17 |
| English address reply packet | 0x97 |
| GPS positioning packet (UTC, 4G base station data) | 0xA0 |
| LBS multi-base station extension packet (4G base station data) | 0xA1 |
| 4G wif ipacket（0xA2） | 0xA2 |
| 4G single fence alarm packet（0xA3） | 0xA3 |
| 4Gmulti-fence alarm packet（0xA4） | 0xA4 |
| 4G LBS alarm packet（0xA5） | 0xA5 |
| 4G LBS address request Package（0xA7） | 0xA7 |

**II. Protocol Packet**

1. **Login packet**

Description：

* + - * Login packet is the information packet connecting the terminal and platform; it can send terminal information to platform.
			* If a GPRS connection is established successfully, the terminal will send a first login message packet to the server and, within five seconds, if the terminal receives a data packet responded by the server, the connection is considered to be a normal connection; if not, the terminal will send login packet again.
			* If no packet returned by server within 5 seconds, then the response of login packet is timeout.
			* Terminal reboot automatically after 3 timeouts.

**1.1Login Message Packet**

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x01 |
| Information Content | Terminal ID | 8 | Example：IMEI number is 123456789123456，terminal ID is：0x01 0x23 0x45 0x67 0x89 0x120x34 0x56 |
| Model Identification Code | 2 | Distinguish model of terminal by identification code. |
| Time Zone Language | 2 | See the following chart for details of time zone language mark. |
| Information Serial Number | 2 | The serial number of the first GPRS data (including status packet and data packet such as GPS, LBS) sent after booting is ‘1’, and the serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Example：78 78 11 01 08 68 12 01 55 01 39 38 36 00 00 01 00 0D DB 42 0D 0A

Time Zone Language

|  |  |  |
| --- | --- | --- |
| One and a half bits bit15—bit4 | 15 | Time zone value expands 100 times |
| 14 |
| 13 |
| 12 |
| 11 |
| 10 |
| 9 |
| 8 |
| 7 |
| 6 |
| 5 |
| 4 |
| Lower half bit4-bit0 | 3 | GMT |
| 2 | No definition |
| 1 | Language Select Bit | 1 |
| 0 | Language Select Bit | 0 |

Bit3 0-------Eastern time

 1-------Western time

Example: Extended bit: 0x32 0x00 means GMT+8

Calculation method: 8\*100=800 converts to HEX: 0X0320

Extended bit: 0x4D 0xD8 means GMT-12:45

Calculation method: 12.45\*100=1245 converts to HEX: 0x04 0xDD

Here, to save 4 bytes, calculation result left shifted 4 bits and combined eastern time, western time and language bit.

* 1. **Login packet response（server response）**

|  |  |  |
| --- | --- | --- |
| Format | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x01 |
| Information Serial Number | 2 | Serial number of data sent later each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Example：78 78 05 01 00 05 9F F8 0D 0A

1. **Heartbeat Packet**

Description：

1. Heartbeat packet is a data packet to maintain the connection between the terminal and the server.
2. If a GPRS connection is established successfully, the terminal will send a first login message packet to the server and, within five seconds, if the terminal receives a data packet responded by the server, the connection is considered to be a normal connection; if not, the terminal will send login packet again.
3. If no packet returned by server within 5 seconds, then the response of heartbeat packet is timeout.
4. Terminal reboot automatically after 3 timeouts.

**2.1. Heartbeat packet sent by terminal**

Heartbeat Packet

|  |  |  |
| --- | --- | --- |
| 　 | Length (Byte) | Description |
| Start Bit | 2 | 0x780x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x23 |
| Information Content | Terminal Information Content | 1 | See the following diagram for details |
| Voltage Level | 2 | Transformation method: To divide by 100 after converting hexadecimal into decimal.Example：0X01,0X9F, 019F converted to decimal is 415.Divide 415 by 100 get 4.15. 4.15 is the terminal’s voltage level.( See appendix for voltage-battery correspondence） |
| GSM Signal Strength | 1 | 0x00: no signal;0x01: extremely weak signal;0x02: weak signal;0x03: good signal;0x04: strong signal. |
| Language/Extended Port Status | 2 | latter bit 0x01 Chinese 0x02 English |
| Serial Number | 2 | Serial number of data sent later each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value: 0x0D0x0A |

 Example：78 78 0B 23 C0 01 22 04 00 01 00 08 18 72 0D 0A

Terminal Information

One byte is consumed defining for various status information of the mobile phone.

|  |  |
| --- | --- |
| Bit | Code Meaning |
| BYTE | Bit7 | 1: Oil and electricity disconnected |
| 0: Oil and electricity connected |
| Bit6 | 1: GPS tracking is on |
| 0: GPS tracking is off |
| Bit3～Bit5 | Extended Bit |
| Bit2 | 1: Charge On |
| 0: Charge Off |
| Bit1 | 1: ACC high |
| 0: ACC Low |
| Bit0 | 1: Defense Activated |
| 0: Defense Deactivated |

* 1. **Server Responds The Heartbeat Packet**

|  |  |  |
| --- | --- | --- |
| 　 | Length (Byte) | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x23 |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value: 0x0D 0x0A |

Example：78 78 05 23 01 00 67 0E 0D 0A

**3. GPS location packet**

Description：

1. Data packet used to transmit terminal location
2. Upload locating data based on rule after successfully connected and positioned.
3. Re-upload locating data after successfully connected.
	1. **Location packet sent by terminal**

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x22 (UTC) if protocol number is 0x2D, then reply is needed;if not reply, then back up. |
| Information Content | Date Time | 6 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to decimal）(Date Time) |
| Quantity of GPS satellites | 1 | The first character is GPS information length. The second character is positioning satellite number（converted to a decimal） |
| Latitude | 4 | Convert to a decimal and divide 1800000 |
| Longitude | 4 | Convert to a decimal and divide 1800000 |
| Speed | 1 | Convert to a decimal |
| Course, Status | 2 | Convert to binary number of 16 bits and calculate by bits (see the following diagram) |
| MCC | 2 | Mobile Country Code(MCC) (converted to a decimal) |
| MNC | 1 | Mobile Network Code(MNC)(converted to a decimal) |
| LAC | 2 | Location Area Code (LAC) (converted to a decimal) |
| Cell ID | 3 | Cell Tower ID(Cell ID)(converted to a decimal) |
| ACC | 1 | ACC Status ACC low: 00, ACC high: 01（not available for 06 ） |
| Data Upload Mode | 1 | GPS data upload mode（06 series are excluded）0x00 Upload by time interval0x01 Upload by distance interval0x02 Inflection point upload0x03 ACC status upload0x04 Re-upload the last GPS point when back to static.0x05 Upload the last effective point when network recovers.0X06 Upload mode：upload GPS data when ephemeris updates0X07 Upload mode：update when press 0X08 Upload mode：upload GPS data when device power0X09 Upload mode：not used0X0A Upload mode：upload after the last latitude and longitude after device is motionless;time updated 0X0B WIFI resolution latitude and longitude upload packet0X0C Upload mode：LJDW（positioning immediately）upload GPS data by command0X0D Upload mode：upload after the last latitude and longitude after device is motionless0X0E Upload mode：GPSDUP upload（upload in a fixed time when device is motionless) |
| GPS Real-Time Re-upload | 1 | 0x00 Real time upload 0x01 Re-upload（06 series are excluded） |
| Mileage | 4 | Divided by 100 after turn HEX into decimal. (Only available for devices with this function) |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Example：78 78 22 22 0F 0C 1D 02 33 05 C9 02 7A C8 18 0C 46 58 60 00 14 00 01 CC 00 28 7D 00 1F 71 00 00 01 00 08 20 86 0D 0A

1. Course & Status

Two bytes are consumed, defining the running direction of GPS. The value ranges from 0° to 360° measured clockwise from north of 0°.

|  |  |  |
| --- | --- | --- |
| BYTE\_1 | Bit7 | 0 |
| Bit6 | 0 |
| Bit5 | GPS real-time/differential positioning |
| Bit4 | GPS having been positioning or not |
| Bit3 | East Longitude, West Longitude |
| Bit2 | South Latitude, North Latitude |
| Bit1 | Course |
| Bit0 |
| BYTE\_2 | Bit7 |
| Bit6 |
| Bit5 |
| Bit4 |
| Bit3 |
| Bit2 |
| Bit1 |
| Bit0 |

For example: the value is 0x15 0x4C, the corresponding binary is 00010101 01001100,

BYTE\_1 Bit7 0

BYTE\_1 Bit6 0

BYTE\_1 Bit5 0 (real time GPS)

BYTE\_1 Bit4 1 (GPS has been positioned)

BYTE\_1 Bit3 0 (East Longitude)

BYTE\_1 Bit2 1 (North Latitude)

BYTE\_1 Bit1 0

BYTE\_1 Bit0 1

BYTE\_2 Bit7 0

BYTE\_2 Bit6 1

BYTE\_2 Bit5 0 Course 332° (0101001100 in Binary, or 332 in decimal)

BYTE\_2 Bit4 0

BYTE\_2 Bit3 1

BYTE\_2 Bit2 1

BYTE\_2 Bit1 0

BYTE\_2 Bit0 0

It means GPS tracking is on, real time GPS, location at north latitude, east longitude and the course is 332°.

* 1. **Server location packet response**

0x22location packet has no need to response

0x2D location packet response

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x2D is the location packet which require to reply, if not reply,then back up. |
| Information Serial Number | 2 | Serial number of data sent later each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

1. **LBS multiple bases extension packet**

Description：For transmission of data packet when device is not located

1. Terminal sent LBS multiple bases extension packet

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x28 if protocol number is 0x2D, then reply is needed;if not reply, then back up. |
| Information Content | DATE（UTC） | 6 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to a decimal）(Date Time) |
| MCC | 2 | Mobile Country Code(MCC) (converted to a decimal) |
| MNC | 1 | Mobile Network Code(MNC)(converted to a decimal) |
| LAC | 2 | Location Area Code (LAC) (converted to a decimal) |
| CI | 3 | Cell Tower ID(Cell ID)(converted to a decimal) |
| RSSI | 1 | Signal level of community, range 0x00～0xFF,0x00 Weakest signal0xFF Strongest signal |
| NLAC1 | 2 | Same as LAC |
| NCI1 | 3 | Same as CI |
| NRSSI1 | 1 | Same as RSSI |
| NLAC2 | 2 | Same as LAC |
| NCI2 | 3 | Same as CI |
| NRSSI2 | 1 | Same as RSSI |
| NLAC3 | 2 | Same as LAC |
| NCI3 | 3 | Same as CI |
| NRSSI3 | 1 | Same as RSSI |
| NLAC4 | 2 | Same as LAC |
| NCI4 | 3 | Same as CI |
| NRSSI4 | 1 | Same as RSSI |
| NLAC5 | 2 | Same as LAC |
| NCI5 | 3 | Same as CI |
| NRSSI5 | 1 | Same as RSSI |
| NLAC6 | 2 | Same as LAC |
| NCI6 | 3 | Same as CI |
| NRSSI6 | 1 | Same as RSSI |
| Timing Advance | 1 | Value= “Actual time of signal from Mobile Station to Location base”-“Time of signal from Mobile Station to Location base supposed the distance is 0”  |
| LANGUAGE | 2 | 0x00 0x01Chinese 0x00 0x02English |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Example：7878 3B 28 10 01 0D 02 02 02 01 CC 00 28 7D 00 1F 71 3E 28 7D 00 1F 72 31 28 7D 00 1E 23 2D 28 7D 00 1F 40 18 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 FF 00 02 00 05 B1 4B 0D 0A

1. Server LBS multi-bases station packet reply

0x28 LBSmulti-bases station packet has no need to reply

0x2E LBS multi-bases station packet need to reply

|  |  |  |
| --- | --- | --- |
| 　 | Length(Byte) | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x2E is the location packet which required to reply, if not reply,then back up. |
| Information Serial Number | 2 | The serial number of the first GPRS data (including status packet and data packet such as GPS, LBS) sent after booting is ‘1’, and the serial number of data sent later at each time will be automatically added ‘1’.  |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0 D0x0A |

### WIFI Information Protocol

 WIFI information packet

Description： It is used for transmitting the WIFI data packet received by terminal.

**a)  WiFi packet sent by terminal**

|  |  |  |
| --- | --- | --- |
| 　 | Length(Byte) | Explain |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length= protocol number +information content+ serial number +error check |
| Protocol Number | 1 | 0x2C |
| Info Content | Date and Time（UTC） | 6 | year（1byte）month（1byte）day（1byte）hour（1byte）minute（1byte）second（1byte）（ convert to decimal ） |
| MCC | 2 | Mobile Country Code |
| MNC | 1 | Mobile Network Code(MNC) |
| LAC | 2 | Mobile Network Code(MNC) |
| CI | 3 | Cell Tower ID(Cell ID) |
| RSSI | 1 | Received Signal Strength Indicator , range from 0x00～0xFF, 0x00weak，0xFF strongest。 |
| NLAC1 | 2 | Same as LAC |
| NCI1 | 3 | Same as CI |
| NRSSI1 | 1 | Same as RSSI |
| NLAC2 | 2 | Same as LAC |
| NCI2 | 3 | Same as CI |
| NRSSI2 | 1 | Same as RSSI |
| NLAC3 | 2 | Same as LAC |
| NCI3 | 3 | Same as CI |
| NRSSI3 | 1 | Same as RSSI |
| NLAC4 | 2 | Same as LAC |
| NCI4 | 3 | Same as CI |
| NRSSI4 | 1 | Same as RSSI |
| NLAC5 | 2 | Same as LAC |
| NCI5 | 3 | Same as CI |
| NRSSI5 | 1 | Same as RSSI |
| NLAC6 | 2 | Same as LAC |
| NCI6 | 3 | Same as CI |
| NRSSI6 | 1 | Same as RSSI |
| Time leads | 1 | Time difference between actual time of mobile station signal reaches to base station and time of mobile station signal reaches to base station when distance assumed 0 |
| WiFi quantity | 1 | Confirm WIFI quantity in the packet, 0: no WIFI detected |
| WIFI MAC1 | 6 | WIFI MAC of searched signal 1(transmit according to the actual number of searched WIFI. Search one, transmit one…; search none, then transmit 0) |
| WIFI strength 1 | 1 | WIFI strength of signal 1 |
| WIFI SSIDLength 1 | 1 | ISSID Length of SSID 1WIF |
| WIFI SSID1 | N | SSID content of SSID 1WIFI (0-32 Bytes) |
| WIFI MAC2 | 6 | Same as above |
| WIFI strength 2 | 1 | Same as above |
| WIFI SSIDLength 2 | 1 | ISSID Length of SSID 1WIF |
| WIFI SSID2 | N | SSID content of SSID 1WIFI (0-32 Bytes) |
| … |   | 　…… |
| Information Serial Number | 2 | The serial number of the first GPRS data (including status packet and data packet such as GPS, LBS package) sent after booting is ‘1’, and the serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | The check codes of data in the structure of the protocol, from the Packet Length to the Information Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU.CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. |
| Stop Bit | 2 | Fixed value: 0x0D 0x0A |

Example： 78 78 48 2C 10 06 0E 02 2D 35 01 CC 00 28 7D 00 1F 71 2D 28 7D 00 1E 17 25 28 7D 00 1E 23 1E 28 7D 00 1F 72 1C 28 7D 00 1F 40 12 00 00 00 00 00 00 00 00 00 00 00 00 FF 02 80 89 17 44 98 B4 5C CC 7B 35 36 61 A6 5B 00 1F A0 04 0D 0A

**b)  WIFI packet responded by sever**

WIFI packet server has no need to respond

1. **Alarm Packet (GPS)**

Description：

1. Transmit alarm content defined by terminal
2. Server response and parse longitude and latitude into address and re-upload to terminal after receiving the alarm content
3. Terminal send address to preset SOS number of device.
	1. **Alarm packet sent by terminal**

Alarm packet (single fence)

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x26（UTC） |
| Information Content | Date Time | 6 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to a decimal）(Date Time) |
| Quantity of GPS information satellites | 1 | The first character is GPS information length，The second character is positioning satellite number（converted to a decimal） |
| Latitude | 4 | Convert to a decimal and divide 1800000 |
| Longitude | 4 | Convert to a decimal and divide 1800000 |
| Speed | 1 | Convert to a decimal |
| Course, Status | 2 | Convert to binary number of 16 bits and calculate by bits (see the following diagram)（same as GPS packet, see GPS packet for details） |
| LBS length | 1 | LBS length in total (LBS Length+ MCC+ MNC+ Cell ID) |
| MCC | 2 | Mobile Country Code(MCC) (converted to a decimal) |
| MNC | 1 | Mobile Network Code(MNC)(converted to a decimal) |
| LAC | 2 | Location Area Code (LAC) (converted to a decimal) |
| Cell ID | 3 | Cell Tower ID(Cell ID)(converted to a decimal) |
| Terminal Information | 1 | See the following diagram |
| Voltage Level | 1 | 0x00：No Power (shutdown)0x01：Extremely Low Battery (not enough for calling or sending text messages, etc.)0x02：Very Low Battery (Low Battery Alarm)0x03：Low Battery (can be used normally)0x04：Medium0x05：High0x06：Very High |
| GSM Signal Strength | 1 | 0x00: no signal;0x01: extremely weak signal;0x02: weak signal;0x03: good signal;0x04: strong signal. |
| Alarm/Language | 2 | See the following diagram |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Example：78 78 25 26 0F 0C 1D 03 0B 26 C9 02 7A C8 18 0C 46 58 60 00 04 00 09 01 CC 00 28 7D 00 1F 71 80 04 04 13 02 00 0C 47 2A 0D 0A

Alarm packet (multiple fences)

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x27（UTC） |
| Information Content | Date Time | 6 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to a decimal）(Date Time) |
| Quantity of GPS information satellites | 1 | The first character is GPS information length，The second character is positioning satellite number（converted to a decimal） |
| Latitude | 4 | Convert to a decimal and divide 1800000 |
| Longitude | 4 | Convert to a decimal and divide 1800000 |
| Speed | 1 | Convert to a decimal |
| Course, Status | 2 | Convert to binary number of 16 bits and calculate by bits (see the following diagram)（same as GPS packet, see GPS packet for details） |
| LBS length | 1 | LBS length in total (LBS Length+ MCC+ MNC+ Cell ID) |
| MCC | 2 | Mobile Country Code(MCC) (converted to a decimal) |
| MNC | 1 | Mobile Network Code(MNC)(converted to a decimal) |
| LAC | 2 | Location Area Code (LAC) (converted to a decimal) |
| Cell ID | 3 | Cell Tower ID(Cell ID)(converted to a decimal) |
| Terminal Information | 1 | See the following diagram |
| Voltage Level | 1 | 0x00：No Power (shutdown)0x01：Extremely Low Battery (not enough for calling or sending text messages, etc.)0x02：Very Low Battery (Low Battery Alarm)0x03：Low Battery (can be used normally)0x04：Medium0x05：High0x06：Very High |
| GSM Signal Strength | 1 | 0x00: no signal;0x01: extremely weak signal;0x02: weak signal;0x03: good signal;0x04: strong signal. |
| Alarm/Language | 2 | See the following diagram |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

78 78 26 27 10 04 19 09 2D 07 C5 02 7A C9 1C 0C 46 58 00 00 05 37 09 00 00 00 00 00 00 00 00 80 02 00 0C 01 FF 00 00 4D F6 0D 0A

1. Terminal Information

|  |  |
| --- | --- |
| Bit | Code Meaning |
| BYTE | Bit7 | 1:Oil and electricity disconnected |
| 0: Oil and electricity connected |
| Bit6 | 1: GPS tracking is on |
| 0: GPS tracking is off |
| Bit3～Bit5 |   |
| 011: Low Battery Alarm |
| 000: Normal |
| Bit2 | 1: Charging |
| 0: Not Charge |
| Bit1 | 1: ACC high |
| 0: ACC Low |
| Bit0 | 1: Defense Activated |
| 0: Defense Deactivated |

1. Alarm language

|  |  |
| --- | --- |
| Byte 1 | 0x00：normal |
| 0x01：SOS |
| 0x02：Power cut alarm |
| 0x03: Vibration alarm |
| 0x04: Enter fence alarm  |
| 0x05: Exit fence alarm |
| 0x06 Over speed alarm |
| 0x09 Vibration alarm |
| 0x0A Enter GPS dead zone alarm |
| 0x0B Exit GPS dead zone alarm |
| 0x0C Power on alarm |
| 0x0D GPS first fix notice |
| 0x0E Low battery alarm |
| 0x0F Low battery protection alarm |
| 0x10SIM change notice |
| 0x11Power off alarm |
| 0x12Airplane mode alarm |
| 0x13Disassemble alarm |
| Byte 1 | 0x14 Door alarm |
| 0x15 Low power alarm |
| 0x16 Voice alarm |
| 0x17 Pseudo base station alarm |
| 0x18 Open cover alarm |
| 0x19 Internal battery low alarm |
| 0x20 Deep Sleep alarm |
| 0x21 Reserved |
| 0x22 Reserved |
| 0x23 Fall off alarm |
| 0xFF ACC off |
| 0xFE ACC on |
| Byte 2 | 0x01Chinese0x02 English0x00 Platform has no need to reply |

* 1. **Alarm packet response of server**

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x26（UTC） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1)  |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Example：78 78 05 26 00 1C 9D 86 0D 0A

* 1. Server alarm packet address in Chinese

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x17 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 8 | Alarm code（ASCII） |
| && | 2 | Alarm code（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload“0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

Example: 78 78 9F 17 99 00 00 00 01 41 4C 41 52 4D 53 4D 53 26 26 97 07 52 A8 62 A5 8B 66 00 3A 00 47 00 54 00 30 00 36 00 44 00 2D 00 31 00 32 00 38 00 33 00 36 00 2D 00 5A 00 4A 00 4D 00 2C 5E 7F 4E 1C 77 01 00 2E 60 E0 5D DE 5E 02 00 2E 60 E0 57 CE 53 3A 00 2E 4E 91 5C 71 89 7F 8D EF 00 2E 79 BB 60 E0 5D DE 5E 02 5B 66 59 27 65 59 80 B2 7E A6 00 32 00 37 7C 73 00 2E 00 2C 00 31 00 30 00 3A 00 34 00 33 26 26 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 23 23 00 1C EA 97 0D 0A

* 1. Server alarm packet address in English

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x79 0x79 |
| Packet Length | 2 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x97 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 8 | Alarm code（ASCII） |
| && | 2 | Alarm code（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload “0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Check Bit | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

Example：79 79 00 BC 97 00 B5 00 00 00 01 41 4C 41 52 4D 53 4D 53 26 26 00 4A 00 4D 00 30 00 31 00 2D 00 38 00 39 00 37 00 33 00 31 00 3A 00 53 00 4F 00 53 00 20 00 61 00 6C 00 61 00 72 00 6D 00 2E 00 68 00 74 00 74 00 70 00 3A 00 2F 00 2F 00 6D 00 61 00 70 00 73 00 2E 00 67 00 6F 00 6F 00 67 00 6C 00 65 00 2E 00 63 00 6F 00 6D 00 2F 00 6D 00 61 00 70 00 73 00 3F 00 71 00 3D 00 4E 00 32 00 32 00 2E 00 35 00 37 00 33 00 35 00 36 00 2C 00 45 00 31 00 31 00 33 00 2E 00 39 00 32 00 31 00 37 00 31 26 26 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 23 23 00 69 15 9B 0D 0A

**6 Alarm Packet (LBS)**

Description：

1. Transmit alarm content defined by terminal
2. Server response and parse LBS information into address and re-upload to terminal after receiving the alarm content
3. Terminal send address to preset SOS number of device.

**6.1 Alarm packet sent by terminal**

Alarm packet

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x19 |
| Information content | MCC | 2 | Mobile Country Code(MCC) (converted to a decimal) |
| MNC | 1 | Mobile Network Code(MNC)(converted to a decimal) |
| LAC | 2 | Location Area Code (LAC) (converted to a decimal) |
| Cell ID | 3 | Cell Tower ID(Cell ID)(converted to a decimal) |
| Terminal Information | 1 | See the following diagram |
| Voltage Level | 1 | 0x00：No Power (shutdown)0x01：Extremely Low Battery (not enough for calling or sending text messages, etc.)0x02：Very Low Battery (Low Battery Alarm)0x03：Low Battery (can be used normally)0x04：Medium0x05：High0x06：Very High |
| GSM Signal Strength | 1 | 0x00: no signal;0x01: extremely weak signal;0x02: weak signal;0x03: good signal;0x04: strong signal. |
| Alarm/Language | 2 | See the following diagram |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Example: 78 78 12 19 01 CC 00 28 7D 00 1F 71 20 04 04 01 01 00 94 6C 89 0D 0A

1. Terminal Information

|  |  |
| --- | --- |
| Bit | Code Meaning |
| BYTE | Bit7 | 1:Oil and electricity disconnected |
| 0: Oil and electricity connected |
| Bit6 | 1: GPS tracking is on |
| 0: GPS tracking is off |
| Bit3～Bit5 |  |
| 011: Low Battery Alarm |
|  |
| 000: Normal |
|  |
| Bit2 | 1: Charging |
| 0: Not Charge |
| Bit1 | 1: ACC high |
| 0: ACC Low |
| Bit0 | 1: Defense Activated |
| 0: Defense Deactivated |

1. Alarm language

|  |  |
| --- | --- |
| Byte 1 | 0x00：normal |
| 0x01：SOS |
| 0x02：Power cut alarm |
| 0x03: Vibration alarm |
| 0x04: Enter fence alarm  |
| 0x05 :Exit fence alarm |
| 0x06 Over speed alarm |
| 0x09 Displacement alarm |
| 0x0A Enter GPS dead zone alarm |
| 0x0B Exit GPS dead zone alarm |
| 0x0C Power on alarm |
| 0x0D GPS First fix notice |
| 0x0E Low external battery alarm |
| 0x0F Low external battery protection alarm |
| 0x10 SIM card change notice |
| 0x11Power off alarm |
| 0x12Airplane mode alarm |
| 0x13Disassemble alarm |
| 0x14 Door alarm |
| 0x15 Low battery and shutdown alarm |
| 0x16 Sound control alarm  |
| 0x17 Pseudo base-station alarm |
| 0x18 Open cover alarm |
| 0x19 Internal battery low alarm |
| 0x20 Deep Sleep alarm |
| 0x21 Reserved |
| 0x22 Reserved |
| 0x23 Fall off alarm |
| OxFF ACC off |
| OxFF ACC on |
| Byte 2 | 0x01Chinese0x02 English |
| 0x00 Platform no needs to reply |

**6.2 Alarm packet response of server**

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| 康凯斯信纸Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x26（UTC） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1)  |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

 Example: 78 78 05 26 00 1C 9D 86 0D 0A

#### Response package in Chinese

The response data packet in Chinese is as follow:

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x17 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 8 | Alarm code（ASCII） |
| && | 2 | Alarm code（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload“0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

Example：78 78 9F 17 99 00 00 00 01 41 4C 41 52 4D 53 4D 53 26 26 97 07 52 A8 62 A5 8B 66 00 3A 00 47 00 54 00 30 00 36 00 44 00 2D 00 31 00 32 00 38 00 33 00 36 00 2D 00 5A 00 4A 00 4D 00 2C 5E 7F 4E 1C 77 01 00 2E 60 E0 5D DE 5E 02 00 2E 60 E0 57 CE 53 3A 00 2E 4E 91 5C 71 89 7F 8D EF 00 2E 79 BB 60 E0 5D DE 5E 02 5B 66 59 27 65 59 80 B2 7E A6 00 32 00 37 7C 73 00 2E 00 2C 00 31 00 30 00 3A 00 34 00 33 26 26 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 23 23 00 1C EA 97 0D 0A

#### Response package in English

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x79 0x79 |
| Packet Length | 2 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x97 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 8 | Alarm code（ASCII） |
| && | 2 | Alarm code（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload “0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Check Bit | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

Example：79 79 00 BC 97 00 B5 00 00 00 01 41 4C 41 52 4D 53 4D 53 26 26 00 4A 00 4D 00 30 00 31 00 2D 00 38 00 39 00 37 00 33 00 31 00 3A 00 53 00 4F 00 53 00 20 00 61 00 6C 00 61 00 72 00 6D 00 2E 00 68 00 74 00 74 00 70 00 3A 00 2F 00 2F 00 6D 00 61 00 70 00 73 00 2E 00 67 00 6F 00 6F 00 67 00 6C 00 65 00 2E 00 63 00 6F 00 6D 00 2F 00 6D 00 61 00 70 00 73 00 3F 00 71 00 3D 00 4E 00 32 00 32 00 2E 00 35 00 37 00 33 00 35 00 36 00 2C 00 45 00 31 00 31 00 33 00 2E 00 39 00 32 00 31 00 37 00 31 26 26 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 23 23 00 69 15 9B 0D 0A

####

**7 GPS Address Request Packet**

Description：

1. Users send address request command to terminal first, then terminal will send address request packet to server for address resolution.
2. Terminal forwards the resolved address to user.

Terminal Address Request Packet

|  |  |  |
| --- | --- | --- |
| Format | Length (Byte) | Example |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x2A |
| Information Content | Date Time | 6 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to a decimal） |
| Quantity of GPS information satellites | 1 | The first character is GPS information length，The second character is positioning satellite number（converted to a decimal） |
| Latitude | 4 | Convert to a decimal and divide 1800000 |
| Longitude | 4 | Convert to a decimal and divide 1800000 |
| Speed | 1 | Convert to a decimal |
| Course, Status | 2 | Convert to binary number of 16 bits and calculate by bits (see the following diagram) |
| Phone Number | 21 | Phone Number |
| Alarm/Language | 2 | latter bit 0x01 Chinese 0x02 English |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value: 0x0D0x0A |

Example：78 78 2E 2A 0F 0C 1D 07 11 39 CA 02 7A C8 00 0C 46 58 00 00 14 D8 31 32 35 32

30 31 33 35 33 32 31 37 37 30 37 39 00 00 00 00 00 00 01 00 2A 6E CE 0D 0A

1. Server address inquiry packet address in Chinese

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x17 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 7 | Alarm code（ASCII） |
| && | 2 | Separator（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload“0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

Example：78 78 6E 17 68 00 00 00 01 41 44 44 52 45 53 53 26 26 4F 4D 7F 6E 00 3A 5E 7F 4E 1C 77 01 00 2E 60 E0 5D DE 5E 02 00 2E 60 E0 57 CE 53 3A 00 2E 4E 91 5C 71 89 7F 8D EF 00 2E 79 BB 60 E0 5D DE 5E 02 5B 66 59 27 65 59 80 B2 7E A6 00 32 00 35 7C 73 00 2E 26 26 38 36 31 33 34 32 31 36 33 32 36 39 39 00 00 00 00 00 00 00 00 23 23 00 16 C1 EC 0D 0A

1. Server address inquiry packet address in English

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x79 0x79 |
| Packet Length | 2 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x97 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 7 | Alarm code（ASCII） |
| && | 2 | Separator（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload “0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Check Bit | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

Example：79 79 00 BB 97 00 B5 00 00 00 01 41 44 44 52 45 53 53 26 26 00 4A 00 4D 00 30 00 31 00 2D 00 38 00 39 00 37 00 33 00 31 00 3A 00 53 00 4F 00 53 00 20 00 61 00 6C 00 61 00 72 00 6D 00 2E 00 68 00 74 00 74 00 70 00 3A 00 2F 00 2F 00 6D 00 61 00 70 00 73 00 2E 00 67 00 6F 00 6F 00 67 00 6C 00 65 00 2E 00 63 00 6F 00 6D 00 2F 00 6D 00 61 00 70 00 73 00 3F 00 71 00 3D 00 4E 00 32 00 32 00 2E 00 35 00 37 00 33 00 35 00 36 00 2C 00 45 00 31 00 31 00 33 00 2E 00 39 00 32 00 31 00 37 00 31 26 26 38 36 31 33 34 32 31 36 33 32 36 39 39 00 00 00 00 00 00 00 00 23 23 00 16 8E A5 0D 0A

**8 LBS Address Request Packet**

Description**：**

1. Users send address request command to terminal first, then terminal will send address request packet to server for address resolution.
2. Terminal forwards the resolved address to user.
	1. Terminal Address Request Packet

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x17 |
| Information Content | MCC | 2 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to a decimal）(Date Time) |
| MNC | 1 | Mobile Country Code |
| LAC | 2 | Mobile Network Code(MNC) |
| Cell ID | 3 | Mobile Network Code(MNC) |
| Phone Number | 21 | Cell Tower ID(Cell ID) |
| Alarm/Language | 2 | latter bit 0x01 Chinese 0x02 English |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Example：78 78 24 17 01 CC 00 28 7D 00 1F 71 31 32 35 32 30 31 33 35 33 32 31 37 37 30 37 39 00 00 00 00 00 00 01 00 2A 7D D6 0D 0A

1. Server address inquiry packet in Chinese

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x17 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 7 | Alarm code（ASCII） |
| && | 2 | Separator（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload“0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

Example：78 78 6E 17 68 00 00 00 01 41 44 44 52 45 53 53 26 26 4F 4D 7F 6E 00 3A 5E 7F 4E 1C 77 01 00 2E 60 E0 5D DE 5E 02 00 2E 60 E0 57 CE 53 3A 00 2E 4E 91 5C 71 89 7F 8D EF 00 2E 79 BB 60 E0 5D DE 5E 02 5B 66 59 27 65 59 80 B2 7E A6 00 32 00 35 7C 73 00 2E 26 26 38 36 31 33 34 32 31 36 33 32 36 39 39 00 00 00 00 00 00 00 00 23 23 00 16 C1 EC 0D 0A

1. Server address inquiry packet in English

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x79 0x79 |
| Packet Length | 2 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x97 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 7 | Alarm code（ASCII） |
| && | 2 | Separator（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload “0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Check Bit | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

79 79 00 BB 97 00 B5 00 00 00 01 41 44 44 52 45 53 53 26 26 00 4A 00 4D 00 30 00 31 00 2D 00 38 00 39 00 37 00 33 00 31 00 3A 00 53 00 4F 00 53 00 20 00 61 00 6C 00 61 00 72 00 6D 00 2E 00 68 00 74 00 74 00 70 00 3A 00 2F 00 2F 00 6D 00 61 00 70 00 73 00 2E 00 67 00 6F 00 6F 00 67 00 6C 00 65 00 2E 00 63 00 6F 00 6D 00 2F 00 6D 00 61 00 70 00 73 00 3F 00 71 00 3D 00 4E 00 32 00 32 00 2E 00 35 00 37 00 33 00 35 00 36 00 2C 00 45 00 31 00 31 00 33 00 2E 00 39 00 32 00 31 00 37 00 31 26 26 38 36 31 33 34 32 31 36 33 32 36 39 39 00 00 00 00 00 00 00 00 23 23 00 16 8E A5 0D 0A

**9 Online command**

Description：

1. Use server online command to control terminal to execute task.
2. Terminal response results to server.

**Online command sent by server**

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Length of data bit | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x80 |
| Information Content | Length of Command | 1 | Server flag bit + command content length + language |
| Server Flag Bit | 4 | Leave for server identification. Terminal receives the original data in Binary in response packet |
| Command Content | M | Character string replied in ASCII coding. Command content is compatible with SMS command. |
| Information Serial Number | 2 | latter bit 0x01 Chinese 0x02 English |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Example ：78 78 0E 80 08 00 00 00 00 73 6F 73 23 00 01 6D 6A 0D 0A

1) Family number setting (FN)

Command: A, number 1, number 2, number 3 # number 2 and 3 can be empty

Reply OK!

FN1: Number 1 FN2: Number 2 FN3: Number 3

Example:

Add family number: A, 13795722682, 15208337751, #

Reply OK!

FN1: 13795722682 FN2: 15208337751 FN3:

Delete family number: D, number 1, number 2, number 3 #

number 2 and 3 can be empty

Set family number with name:

FN && A && Name 1 && Phone Number 1 && Name 2 && Phone Number 2 && Name 3 && Phone Number 3 ##

(2) sos number setting (SOS)

  SOS, <A>, <number 1> [number 2] [, number 3] #

Add the SOS number

SOS, <D>, <serial number 1> [, serial number 2] [,serial number 3]#

Delete the corresponding SOS number according to the serial number,

SOS, <D>, <phone number> #

SOS #

     Query the set SOS number

Right reply example:

OK SOS1: 13530454825 SOS2: SOS3:

Parameter Error example:

Error: Parameter 1

(3) Monitor command (LISTEN)

Command: LISTEN, <number 1> #

（4）Geofence (GFENCE)

Command

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 30
 | FENCE | Set the fence alarm | FENCE,<B>,0,<D>,<E>,<F>[,X][,M]# Round area B=ON/OFF；Turn on / off fence alarm；default: offD = center latitudeE = center longitude F=1～9999；fence radius, unit: 100 meters X=IN/OUT；IN: Enter fence alarm，OUT: Exit fence alarm; Default: If it is empty, it means either enter/exit the fence will trigger alarm;M=0/1；alarm report mode，0：GPRS，1：SMS+GPRS；Default: M=1；FENCE,<B>,1,<D>,<E>,<F>,<G>[,X][,M]# Square area  B=ON/OFF；Turn on / off fence alarm；default: offD=latitude of coordinate 1；range: -90 ~ 90° ;E= longitude of coordinate 1；range：-180～180°；F=latitude of coordinate 2；range：-90 ～90°；G=longitude of coordinate 2；range：-180～180°；For latitude, N/S & +/- can be input;For longitude, E/W & +/-can be input；X=IN/OUT；IN: Enter fence alarm，OUT: Exit fence alarm; Default: If it is empty, it means either enter/exit the fence will trigger alarm;M=0/1；alarm report mode，0：GPRS，1：SMS+GPRS；Default: M=1；FENCE# Query fence parameters  |

Command reply

|  |
| --- |
| Command reply： |
| 1 | FENCE,ON,0,0,0,R# | Automatically obtain the fence center | If successfully obtained, the reply will be：Chinese：OK！已自动获取圆心位置：N22.577091,E113.916748，时间：2013-01-08 19:14:57 English：OK! Automatically obtain latitude：N22.577091 Longitude: E113.916748, in the time 2013-01-08 19:14:57 If GPS is not on, the reply will be： Chinese：当前GPS未开启，请开启GPS定位！ English：GPS is not working, Please open the GPS first! If GPS is not positioning, the reply will be：：  Chinese：当前GPS未定位，请在GPS定位后设置！ English：GPS not fixed,Please set again after GPS fixed！ |
| 2 | FENCE,ON,0latitude, longitude，R# | Set the circular fence | Reply example：Chinese：设置成功! 圆形围栏，报警已开启；圆心：N22.577091, E113.916748，半径：600米，出入围栏报警，报警类型：1English：OK! FenceType:Circle, ON, Latitude:N22.577091, Longitude:E113.916748, radius:600m, in out:IN or OUT, alarm type:1. |
| 3 | FENCE,OFF# | Turn off the round fence | Reply example：Chinese：设置成功! 圆形围栏，报警已关闭；圆心：0.000000, 0.000000，半径：600米，出入围栏报警，报警类型：1English：OK! FenceType:Circle, OFF, Latitude:0.000000, Longitude:0.000000, radius:0m, in out:IN or OUT, alarm type:1. |
| Turn off the rectangular fence | Reply example：Chinese：设置成功! 矩形围栏，报警已关闭；纬度1：N22.577091, 经度1：E113.916748,纬度2：N22.577091,经度2：E113.916748；出围栏报警，报警类型：1English：OK! FenceType:Square, OFF, Latitude1:0.000000, Longitude1:0.000000, Latitude2:0.000000, Longitude2:0.000000, in out:OUT, alarm type:1. |
| 4 | FENCE, ON, 0 Upper left latitude, upper left latitude, upper right latitude, upper right latitude # | Set the rectangular fence | Reply example：Chinese：设置成功! 矩形围栏，报警已开启；纬度1：N22.577091, 经度1：E113.916748,纬度2：N22.577091,经度2：E113.916748；出围栏报警，报警类型：1English：OK! FenceType:Square, ON, Latitude1:N22.575069, Longitude1:E113.911140, Latitude2:N22.573568, Longitude2:E113.921463, in out:OUT, alarm type:1. |

(5) White List Setup (WN)

Set: WN, A, number 1, number 2, number 3, number 4, ........., number 15 #

Delete: WN, D, 1,3 # (delete the first 1,3 number)

Three command to reply

Success: WN = Success!

Failed: WN = Fail!

Query return: success: WN = number 1, number 2 ..............., number 15

Command for whitelist setting

WN && A && Name 1 && Phone number 1 && name 2 && phone number 2 && {4} && {5} && {6} && {7} && {8} && {9} && {10} && {11} && {12} && { && {14} && {16} && {17} && {18} && {19} && {20} && {21} && {22} && {23} && {24} && {25} && { 26} && {27} && {28} && {29} ##

**Online command replied by terminal (0x21)**

Terminal reply（general command）

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x79 0x79 |
| Length of data bit | 2 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x21 |
| Information Content | Server Flag Bit | 4 | Leave for server identification. Terminal receives the original data in Binary in response packet |
| Content Code | 1 | 0x01 ASC II code0x02 UTF16-BE code. |
| Content | M | Data needed to be sent（according to content code format） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Example：79 79 00 9D 21 00 00 00 00 01 42 61 74 74 65 72 79 3A 34 2E 31 36 56 2C 4E 4F 52 4D 41 4C 3B 20 47 50 52 53 3A 4C 69 6E 6B 20 55 70 3B 20 47 53 4D 20 53 69 67 6E 61 6C 20 4C 65 76 65 6C 3A 53 74 72 6F 6E 67 3B 20 47 50 53 3A 53 65 61 72 63 68 69 6E 67 20 73 61 74 65 6C 6C 69 74 65 2C 20 53 56 53 20 55 73 65 64 20 69 6E 20 66 69 78 3A 30 28 30 29 2C 20 47 50 53 20 53 69 67 6E 61 6C 20 4C 65 76 65 6C 3A 3B 20 41 43 43 3A 4F 46 46 3B 20 44 65 66 65 6E 73 65 3A 4F 46 46 00 2E 26 DF 0D 0A

**10 Time Packet**

**Description：**

* + - 1. **Used for checking time request sent by terminal to server, avoiding wrong time.**
			2. **Server response right time and format. Time is UTC time.**
	1. Time request sent by terminal

|  |  |  |
| --- | --- | --- |
| 　 | Length (Byte) | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x8A |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value: 0x0D0x0A |

Example：78 78 05 8A 00 06 88 29 0D 0A

Server response time information

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x8A（UTC） |
| Information Content | Date Time | 6 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to a decimal）(Date Time |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (SeeAppendix 1) |
| Stop Bit | 2 | Fixed value: 0x0D0x0A |

Example：78 78 0B 8A 0F 0C 1D 00 00 15 00 06 F0 86 0D 0A

**1~~1 Information transmission packet~~**

~~Description：~~

 ~~Terminal transmits all types of non-position data.~~

**~~Information transmission packet sent by terminal~~**

|  |  |  |
| --- | --- | --- |
|  | ~~Length~~ | ~~Description~~ |
| ~~Start Bit~~ | ~~2~~ | ~~0x790x79~~ |
| ~~Length of data bit~~ | ~~2~~ | ~~Length = Protocol Number + Information Content + Information Serial Number + Error Check~~ |
| ~~Protocol Number~~ | ~~1~~ | ~~0x94~~ |
| ~~Information Content~~ | ~~Information Type（Sub-protocol Number）~~ | ~~1~~ | ~~00 External power voltage01~03（custom）04 terminal status synchronization05door status……to add~~ |
| ~~Data Content~~ | ~~N~~ | ~~Different information type results in different transmission content. See the following for details.~~ |
| ~~Information Serial Number~~ | ~~2~~ | ~~Serial number of data sent later at each time will be automatically added ‘1’.~~ |
| ~~Error Check~~ | ~~2~~ | ~~Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1)~~ |
| ~~Stop Bit~~ | ~~2~~ | ~~Fixed value:0x0D0x0A~~ |

~~Example：79 79 00 7F 94 04 41 4C 4D 31 3D 43 34 3B 41 4C 4D 32 3D 43 43 3B 41 4C 4D 33 3D 34 43 3B 53 54 41 31 3D 43 30 3B 44 59 44 3D 30 31 3B 53 4F 53 3D 2C 2C 3B 43 45 4E 54 45 52 3D 3B 46 45 4E 43 45 3D 46 65 6E 63 65 2C 4F 4E 2C 30 2C 32 33 2E 31 31 31 38 30 39 2C 31 31 34 2E 34 30 39 32 36 34 2C 34 30 30 2C 49 4E 20 6F 72 20 4F 55 54 2C 30 3B 4D 49 46 49 3D 4D 49 46 49 2C 4F 46 46 00 0A 06 1E 0D 0A~~

**~~Transmitted information content~~**

~~When type is 00，the bit transmit external battery. This bit is two-digit hexadecimal value. Hexadecimal value converted to decimal value and divide 100~~

~~Example：0X04,0X9F, 049F converted to decimal is 101183，then divide 100 is 11.83, which means external voltage is 11.83V~~

~~When type is 04, the bit transmits information of terminal status synchronization. The bit length extended. Transmission is ASCII code.~~

 **~~Definition of content identifier~~**

|  |  |
| --- | --- |
| ~~Definition~~ | ~~Identifier~~ |
| ~~Alarm Bit1~~ | ~~ALM1~~ |
| ~~Alarm Bit 2~~ | ~~ALM2~~ |
| ~~Alarm Bit 3~~ | ~~ALM3~~ |
| ~~Status Bit 1~~ | ~~STA1~~ |
| ~~SOS Number~~ | ~~SOS~~ |
| ~~Centre Number~~ | ~~CENTER~~ |
| ~~Fence~~ | ~~FENCE~~ |
| ~~Fuel/Electricity Cutoff Status~~ | ~~DYD~~ |
| ~~Mode~~ | ~~MODE~~ |

* **~~ALM1 Definition (Status）~~**

|  |  |  |
| --- | --- | --- |
| ~~Bit~~ | ~~Definition~~ | ~~Mark~~ |
| ~~bit7~~ | ~~Vibration Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit6~~ | ~~Network Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit5~~ | ~~Phone Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit4~~ | ~~SMS Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit3~~ | ~~Displacement Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit2~~ | ~~Network Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit1~~ | ~~Phone Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit0~~ | ~~SMS Alarm~~ | ~~1 ON 0 OFF~~ |

* ~~ALM2 Definition (Status）~~

|  |  |  |
| --- | --- | --- |
| ~~Bit~~ | ~~Definition~~ | ~~Mark~~ |
| ~~bit7~~ | ~~Low Battery Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit6~~ | ~~Network Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit5~~ | ~~Phone Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit4~~ | ~~SMS Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit3~~ | ~~Low Battery Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit2~~ | ~~Network Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit1~~ | ~~Phone Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit0~~ | ~~SMS Alarm~~ | ~~1 ON 0 OFF~~ |

* **~~ALM3 Definition (Status）~~**

|  |  |  |
| --- | --- | --- |
| ~~Bit~~ | ~~Definition~~ | ~~Mark~~ |
| ~~bit7~~ | ~~Overspeed Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit6~~ | ~~Network Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit5~~ | ~~Phone Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit4~~ | ~~SMS~~ ~~Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit3~~ | ~~Power Off Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit2~~ | ~~Network Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit1~~ | ~~Phone Alarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit0~~ | ~~SMS Alarm~~ | ~~1 ON 0 OFF~~ |

* **~~STA1 Definition (Status）~~**

|  |  |  |
| --- | --- | --- |
| ~~Bit~~ | **~~Definition~~** | ~~Mark~~ |
| ~~bit7~~ | ~~Arm Status~~ | ~~1 Arm0 Disarm~~ |
| ~~bit6~~ | ~~Automatically~~ ~~Arm~~ | ~~1 ON 0 OFF~~ |
| ~~bit5~~ | ~~Manually Arm~~ | ~~1 ON 0 OFF~~ |
| ~~bit4~~ | ~~Remotely Disarm~~ | ~~1 ON 0 OFF~~ |
| ~~bit3~~ | ~~To Be Defined~~ |  |
| ~~bit2~~ | ~~To Be Defined~~ |  |
| ~~bit1~~ | ~~Disassembly OFF~~ | ~~1 ON 0 OFF~~ |
| ~~bit0~~ | ~~Disassembly Alarm Status~~ | ~~1 ON 0 OFF~~ |

* **~~Fuel/Electricity Status Definition~~**

|  |  |  |
| --- | --- | --- |
| ~~Bit~~ | **~~Definition~~** | ~~Mark~~ |
| ~~bit7~~ | ~~Undefined~~ |  |
| ~~bit6~~ | ~~Undefined~~ |  |
| ~~bit5~~ | ~~Undefined~~ |  |
| ~~bit4~~ | ~~Undefined~~ |  |
| ~~bit3~~ | ~~Deferred execution caused by overspeed~~ | ~~1Valid bit 0 Invalid bit~~ |
| ~~bit2~~ | ~~Deferred execution caused by un-located GPS~~  | ~~1Valid bit 0 Invalid bit~~ |
| ~~bit1~~ | ~~Oil/Electricity cutoff~~ | ~~1Valid bit 0 Invalid bit~~ |
| ~~bit0~~ | ~~Oil/Electricity connection~~ | ~~1Valid bit 0 Invalid bit~~ |

* ~~SOS definition：adopt ASCII to transmit（use “,” to separate if multiple SOS numbers）~~
* ~~Center number definition：adopt ASCII to transmit~~
* ~~Fence definition：adopt ASCII to transmit~~
* ~~Mode：adopt ASCII to transmit(separate parameters by “，”)~~

 ~~Example：ALM1=FF;ALM2=FF;ALM3=FF;STA1=CO；DYD=01；SOS=12345，2345，5678；CENTER=987654;FENCE=FENCE,ON,0,-22.277120,-113.516763,5,IN,1；MODE=MODE,1,20,500~~

~~Notice：Not all contents are transmitted and please parse based on bits. Different products upload different contents.~~

~~When type is 05，this bit transmit external IO detection( door checking). Transmission is hexadecimal.~~

|  |  |  |
| --- | --- | --- |
| ~~Bit~~ | **~~Definition~~** | ~~Mark~~ |
| ~~bit7~~ | ~~To Be Defined~~ |  |
| ~~bit6~~ | ~~To Be Defined~~ |  |
| ~~bit5~~ | ~~To Be Defined~~ |  |
| ~~bit4~~ | ~~To Be Defined~~ |  |
| ~~bit3~~ | ~~To Be Defined~~ |  |
| ~~bit2~~ | ~~IO Status~~ | ~~1 High 0 Low~~ |
| ~~bit1~~ | ~~Triggering Status~~ | ~~1High triggering~~ ~~0 Low triggering~~ |
| ~~bit0~~ | ~~Door Status~~ | ~~1ON0OFF~~ |

**~~Server Response Information Transmission Packet~~**

~~Server no Response~~

1. **4G GPS location packet（4G base station, protocol number：0xA0）**

Description：

1. Data packet used to transmit terminal location
2. Upload locating data based on rule after successfully connected and positioned.
3. Re-upload locating data after successfully connected.

**Location packet sent by terminal**

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0xA0 (UTC) |
| Information Content | Date Time | 6 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to decimal） |
| Quantity of GPS satellites | 1 | The first character is GPS information length. The second character is positioning satellite number（converted to a decimal） |
| Latitude | 4 | Convert to a decimal and divide 1800000 |
| Longitude | 4 | Convert to a decimal and divide 1800000 |
| Speed | 1 | Convert to a decimal |
| Course, Status | 2 | Convert to binary number of 16 bits and calculate by bits (see the following diagram) |
| MCC | 2 | Mobile Country Code(MCC) (converted to a decimal) |
| MNC | 1 | Mobile Network Code(MNC)(converted to a decimal) |
| LAC | 4 | Location Area Code (LAC) (converted to a decimal) |
| Cell ID | 8 | Cell Tower ID(Cell ID)(converted to a decimal) |
| ACC | 1 | ACC Status ACC low: 00, ACC high: 01（not available for 06 ） |
| Data Upload Mode | 1 | GPS data upload mode（06 series are excluded）0x00 Upload by time interval0x01 Upload by distance interval0x02 Inflection point upload0x03 ACC status upload0x04 Re-upload the last GPS point when back to static.0x05 Upload the last effective point when network recovers.0X06 Upload mode：upload GPS data when ephemeris updates0X07 Upload mode：update when press 0X08 Upload mode：upload GPS data when device power0X09 Upload mode：not used0X0A Upload mode：upload after the last latitude and longitude after device is motionless;time updated 0X0B WIFI resolution latitude and longitude upload packet0X0C Upload mode：LJDW（positioning immediately）upload GPS data by command0X0D Upload mode：upload after the last latitude and longitude after device is motionless0X0E Upload mode：GPSDUP upload（upload in a fixed time when device is motionless) |
| GPS Real-Time Re-upload | 1 | 0x00 Real time upload 0x01 Re-upload（06 series are excluded） |
| Mileage | 4 | Divided by 100 after turn HEX into decimal. (Only available for devices with this function) |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Example：78 78 22 22 0F 0C 1D 02 33 05 C9 02 7A C8 18 0C 46 58 60 00 14 00 01 CC 00 28 7D 00 1F 71 00 00 01 00 08 20 86 0D 0A

1. Course & Status

Two bytes are consumed, defining the running direction of GPS. The value ranges from 0° to 360° measured clockwise from north of 0°.

|  |  |  |
| --- | --- | --- |
| BYTE\_1 | Bit7 | 0 |
| Bit6 | 0 |
| Bit5 | GPS real-time/differential positioning |
| Bit4 | GPS having been positioning or not |
| Bit3 | East Longitude, West Longitude |
| Bit2 | South Latitude, North Latitude |
| Bit1 | Course |
| Bit0 |
| BYTE\_2 | Bit7 |
| Bit6 |
| Bit5 |
| Bit4 |
| Bit3 |
| Bit2 |
| Bit1 |
| Bit0 |

For example: the value is 0x15 0x4C, the corresponding binary is 00010101 01001100,

BYTE\_1 Bit7 0

BYTE\_1 Bit6 0

BYTE\_1 Bit5 0 (real time GPS)

BYTE\_1 Bit4 1 (GPS has been positioned)

BYTE\_1 Bit3 0 (East Longitude)

BYTE\_1 Bit2 1 (North Latitude)

BYTE\_1 Bit1 0

BYTE\_1 Bit0 1

BYTE\_2 Bit7 0

BYTE\_2 Bit6 1

BYTE\_2 Bit5 0 Course 332° (0101001100 in Binary, or 332 in decimal)

BYTE\_2 Bit4 0

BYTE\_2 Bit3 1

BYTE\_2 Bit2 1

BYTE\_2 Bit1 0

BYTE\_2 Bit0 0

It means GPS tracking is on, real time GPS, location at north latitude, east longitude and the course is 332°.

**Server location packet response**

1. **4G LBS Multiple bases extension packet（4G base station, protocol number：0xA1）**

Description：For transmission of data packet when device is not located

1. Terminal sent LBS multiple bases extension packet

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0xA1 |
| Information Content | DATE（UTC） | 6 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to a decimal） |
| MCC | 2 | Mobile Country Code(MCC) (converted to a decimal) |
| MNC | 1 | Mobile Network Code(MNC)(converted to a decimal) |
| LAC | 4 | Location Area Code (LAC) (converted to a decimal) |
| CI | 8 | Cell Tower ID(Cell ID)(converted to a decimal) |
| RSSI | 1 | Signal level of community, range 0x00～0xFF,0x00 Weakest signal0xFF Strongest signal |
| NLAC1 | 4 | Same as LAC |
| NCI1 | 8 | Same as CI |
| NRSSI1 | 1 | Same as RSSI |
| NLAC2 | 4 | Same as LAC |
| NCI2 | 8 | Same as CI |
| NRSSI2 | 1 | Same as RSSI |
| NLAC3 | 4 | Same as LAC |
| NCI3 | 8 | Same as CI |
| NRSSI3 | 1 | Same as RSSI |
| NLAC4 | 4 | Same as LAC |
| NCI4 | 8 | Same as CI |
| NRSSI4 | 1 | Same as RSSI |
| NLAC5 | 4 | Same as LAC |
| NCI5 | 8 | Same as CI |
| NRSSI5 | 1 | Same as RSSI |
| NLAC6 | 4 | Same as LAC |
| NCI6 | 8 | Same as CI |
| NRSSI6 | 1 | Same as RSSI |
| Timing Advance | 1 | Value= “Actual time of signal from Mobile Station to Location base”-“Time of signal from Mobile Station to Location base supposed the distance is 0”  |
| LANGUAGE | 2 | 0x00 0x01Chinese 0x00 0x02English |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

1. LBS Multiple bases extension packet response of server

0x28 LBS multiple bases extension packet server has no need to reply

1. **4G WIFI Information packet（4G base station, protocol number：0xA2）**

WIFI information packet

Description： It is used for transmitting the WIFI data packet received by terminal.

1. **WiFi packet sent by terminal**

|  |  |  |
| --- | --- | --- |
| 　 | Length(Byte) | Explain |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length= protocol number +information content+ serial number +error check |
| Protocol Number | 1 | 0xA1 |
| Info Content | Date and Time（UTC） | 6 | year（1byte）month（1byte）day（1byte）hour（1byte）minute（1byte）second（1byte）（ convert to decimal ） |
| MCC | 2 | Mobile Country Code |
| MNC | 1 | Mobile Network Code(MNC) |
| LAC | 4 | Mobile Network Code(MNC) |
| CI | 8 | Cell Tower ID(Cell ID) |
| RSSI | 1 | Received Signal Strength Indicator , range from 0x00～0xFF, 0x00weak，0xFF strongest。 |
| NLAC1 | 4 | Same as LAC |
| NCI1 | 8 | Same as CI |
| NRSSI1 | 1 | Same as RSSI |
| NLAC2 | 4 | Same as LAC |
| NCI2 | 8 | Same as CI |
| NRSSI2 | 1 | Same as RSSI |
| NLAC3 | 4 | Same as LAC |
| NCI3 | 8 | Same as CI |
| NRSSI3 | 1 | Same as RSSI |
| NLAC4 | 4 | Same as LAC |
| NCI4 | 8 | Same as CI |
| NRSSI4 | 1 | Same as RSSI |
| NLAC5 | 4 | Same as LAC |
| NCI5 | 8 | Same as CI |
| NRSSI5 | 1 | Same as RSSI |
| NLAC6 | 4 | Same as LAC |
| NCI6 | 8 | Same as CI |
| NRSSI6 | 1 | Same as RSSI |
| Time leads | 1 | Time difference between actual time of mobile station signal reaches to base station and time of mobile station signal reaches to base station when distance assumed 0 |
| WiFi quantity | 1 | Confirm WIFI quantity in the packet, 0: no WIFI detected |
| WIFI MAC1 | 6 | WIFI MAC of searched signal 1(transmit according to the actual number of searched WIFI. Search one, transmit one…; search none, then transmit 0) |
| WIFI strength 1 | 1 | WIFI strength of signal 1 |
|  |  |  |
|  |  |  |
| WIFI MAC2 | 6 | Same as above |
| WIFI strength 2 | 1 | Same as above |
|  |  |  |
|  |  |  |
| … |  | 　…… |
| Information Serial Number | 2 | The serial number of the first GPRS data (including status packet and data packet such as GPS, LBS package) sent after booting is ‘1’, and the serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | The check codes of data in the structure of the protocol, from the Packet Length to the Information Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU.CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. |
| Stop Bit | 2 | Fixed value: 0x0D 0x0A |

**b)  WIFI packet responded by sever**

WIFI packet server has no need to respond

1. **4G Single Fence Alarm Packet （4G base station, protocol number：0xA3）**

Description：

1. Transmit alarm content defined by terminal
2. Server response and parse longitude and latitude into address and re-upload to terminal after receiving the alarm content
3. Terminal send address to preset SOS number of device.
	1. Alarm packet sent by terminal

Alarm packet (single fence)

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x27（UTC） |
| Information Content | Date Time | 6 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to a decimal）(Date Time) |
| Quantity of GPS information satellites | 1 | The first character is GPS information length，The second character is positioning satellite number（converted to a decimal） |
| Latitude | 4 | Convert to a decimal and divide 1800000 |
| Longitude | 4 | Convert to a decimal and divide 1800000 |
| Speed | 1 | Convert to a decimal |
| Course, Status | 2 | Convert to binary number of 16 bits and calculate by bits (see the following diagram)（same as GPS packet, see GPS packet for details） |
| LBS length | 1 | LBS length in total (LBS Length+ MCC+ MNC+ Cell ID) |
| MCC | 2 | Mobile Country Code(MCC) (converted to a decimal) |
| MNC | 1 | Mobile Network Code(MNC)(converted to a decimal) |
| LAC | 4 | Location Area Code (LAC) (converted to a decimal) |
| Cell ID | 8 | Cell Tower ID(Cell ID)(converted to a decimal) |
| Terminal Information | 1 | See the following diagram |
| Voltage Level | 1 | 0x00：No Power (shutdown)0x01：Extremely Low Battery (not enough for calling or sending text messages, etc.)0x02：Very Low Battery (Low Battery Alarm)0x03：Low Battery (can be used normally)0x04：Medium0x05：High0x06：Very High |
| GSM Signal Strength | 1 | 0x00: no signal;0x01: extremely weak signal;0x02: weak signal;0x03: good signal;0x04: strong signal. |
| Alarm/Language | 2 | See the following diagram |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

Alarm packet （multiple fences）

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x27（UTC） |
| Information Content | Date Time | 6 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to a decimal）(Date Time) |
| Quantity of GPS information satellites | 1 | The first character is GPS information length，The second character is positioning satellite number（converted to a decimal） |
| Latitude | 4 | Convert to a decimal and divide 1800000 |
| Longitude | 4 | Convert to a decimal and divide 1800000 |
| Speed | 1 | Convert to a decimal |
| Course, Status | 2 | Convert to binary number of 16 bits and calculate by bits (see the following diagram)（same as GPS packet, see GPS packet for details） |
| LBS length | 1 | LBS length in total (LBS Length+ MCC+ MNC+ Cell ID) |
| MCC | 2 | Mobile Country Code(MCC) (converted to a decimal) |
| MNC | 1 | Mobile Network Code(MNC)(converted to a decimal) |
| LAC | 4 | Location Area Code (LAC) (converted to a decimal) |
| Cell ID | 8 | Cell Tower ID(Cell ID)(converted to a decimal) |
| Terminal Information | 1 | See the following diagram |
| Voltage Level | 1 | 0x00：No Power (shutdown)0x01：Extremely Low Battery (not enough for calling or sending text messages, etc.)0x02：Very Low Battery (Low Battery Alarm)0x03：Low Battery (can be used normally)0x04：Medium0x05：High0x06：Very High |
| GSM Signal Strength | 1 | 0x00: no signal;0x01: extremely weak signal;0x02: weak signal;0x03: good signal;0x04: strong signal. |
| Alarm/Language | 2 | See the following diagram |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

1. Terminal Information

|  |  |
| --- | --- |
| Bit | Code Meaning |
| BYTE | Bit7 | 1:Oil and electricity disconnected |
| 0: Oil and electricity connected |
| Bit6 | 1: GPS tracking is on |
| 0: GPS tracking is off |
| Bit3～Bit5 |   |
| 011: Low Battery Alarm |
| 000: Normal |
|  |
|  |
| Bit2 | 1: Charging |
| 0: Not Charge |
| Bit1 | 1: ACC high |
| 0: ACC Low |
| Bit0 | 1: Defense Activated |
| 0: Defense Deactivated |

1. Alarm language

|  |  |
| --- | --- |
| Byte 1 | 0x00：normal |
| 0x01：SOS |
| 0x02：Power cut alarm |
| 0x03: Vibration alarm |
| 0x04: Enter fence alarm  |
| 0x05:Exit fence alarm |
| 0x06 Over speed alarm |
| 0x09 Vibration alarm |
| 0x0A Enter GPS dead zone alarm |
| 0x0B Exit GPS dead zone alarm |
| 0x0C Power on alarm |
| 0x0D GPS First fix notice |
| 0x0E Low battery alarm |
| 0x0F Low battery protection alarm |
| 0x10S IM change notice |
| 0x11 Power off alarm |
| 0x12 Airplane mode alarm |
| 0x13 Disassemble alarm |
| 0x14 Door alarm |
| 0x15 Low power alarm |
| 0x16 Voice alarm |
| 0x17 Pseudo base station alarm |
| 0x18 Open cover alarm |
| 0x19 Internal battery low alarm |
| 0x20 Deep Sleep alarm |
| 0x21 Reserved |
| 0x22 Reserved |
| 0x23 Fall off alarm |
| 0xFF ACC off |
| 0xFE ACC on |
| Byte 2 | 0x01Chinese0x02 English0x00 Platform no need to reply |

* 1. **Alarm packet response of server**

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x26（UTC） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1)  |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

* 1. Server alarm packet address in Chinese

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x17 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 8 | Alarm code（ASCII） |
| && | 2 | Alarm code（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload“0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

* 1. Server alarm packet address in English

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x79 0x79 |
| Packet Length | 2 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 2 | 0x97 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 8 | Alarm code（ASCII） |
| && | 2 | Alarm code（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload “0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Check Bit | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

1. **4G LBS Address Request Packet（4G base station, protocol number：0xA7）**

Description**：**

1. Users send address request command to terminal first, then terminal will send address request packet to server for address resolution.
2. Terminal forwards the resolved address to user.
	1. Terminal Address Request Packet

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0xA7 |
| Information Content | MCC | 2 | Year（1byte）Month（1byte）Day（1byte）Hour（1byte）Min（1byte）Second（1byte）（converted to a decimal）(Date Time) |
| MNC | 1 | Mobile Country Code |
| LAC | 4 | Mobile Network Code(MNC) |
| Cell ID | 8 | Mobile Network Code(MNC) |
| Phone Number | 21 | Cell Tower ID(Cell ID) |
| Alarm/Language | 2 | latter bit 0x01 Chinese 0x02 English |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

1. Server address inquiry packet in Chinese

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x17 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 7 | Alarm code（ASCII） |
| && | 2 | Separator（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload“0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

78 78 6E 17 68 00 00 00 01 41 44 44 52 45 53 53 26 26 4F 4D 7F 6E 00 3A 5E 7F 4E 1C 77 01 00 2E 60 E0 5D DE 5E 02 00 2E 60 E0 57 CE 53 3A 00 2E 4E 91 5C 71 89 7F 8D EF 00 2E 79 BB 60 E0 5D DE 5E 02 5B 66 59 27 65 59 80 B2 7E A6 00 32 00 35 7C 73 00 2E 26 26 38 36 31 33 34 32 31 36 33 32 36 39 39 00 00 00 00 00 00 00 00 23 23 00 16 C1 EC 0D 0A

1. Server address inquiry packet in English

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x79 0x79 |
| Packet Length | 2 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x97 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 7 | Alarm code（ASCII） |
| && | 2 | Alarm code（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload “0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Check Bit | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

79 79 00 BB 97 00 B5 00 00 00 01 41 44 44 52 45 53 53 26 26 00 4A 00 4D 00 30 00 31 00 2D 00 38 00 39 00 37 00 33 00 31 00 3A 00 53 00 4F 00 53 00 20 00 61 00 6C 00 61 00 72 00 6D 00 2E 00 68 00 74 00 74 00 70 00 3A 00 2F 00 2F 00 6D 00 61 00 70 00 73 00 2E 00 67 00 6F 00 6F 00 67 00 6C 00 65 00 2E 00 63 00 6F 00 6D 00 2F 00 6D 00 61 00 70 00 73 00 3F 00 71 00 3D 00 4E 00 32 00 32 00 2E 00 35 00 37 00 33 00 35 00 36 00 2C 00 45 00 31 00 31 00 33 00 2E 00 39 00 32 00 31 00 37 00 31 26 26 38 36 31 33 34 32 31 36 33 32 36 39 39 00 00 00 00 00 00 00 00 23 23 00 16 8E A5 0D 0A

1. **4G LBS Alarm Packet（4G base station, protocol number：0xA5）**

Description：

1. Transmit alarm content defined by terminal
2. Server response and parse LBS information into address and re-upload to terminal after receiving the alarm content
3. Terminal send address to preset SOS number of device.

**6.1 Alarm packet sent by terminal**

Alarm packet

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0xA5 |
| Information content | MCC | 2 | Mobile Country Code(MCC) (converted to a decimal) |
| MNC | 1 | Mobile Network Code(MNC)(converted to a decimal) |
| LAC | 4 | Location Area Code (LAC) (converted to a decimal) |
| Cell ID | 8 | Cell Tower ID(Cell ID)(converted to a decimal) |
| Terminal Information | 1 | See the following diagram |
| Voltage Level | 1 | 0x00：No Power (shutdown)0x01：Extremely Low Battery (not enough for calling or sending text messages, etc.)0x02：Very Low Battery (Low Battery Alarm)0x03：Low Battery (can be used normally)0x04：Medium0x05：High0x06：Very High |
| GSM Signal Strength | 1 | 0x00: no signal;0x01: extremely weak signal;0x02: weak signal;0x03: good signal;0x04: strong signal. |
| Alarm/Language | 2 | See the following diagram |
| Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

1. Terminal Information

|  |  |
| --- | --- |
| Bit | Code Meaning |
| BYTE | Bit7 | 1:Oil and electricity disconnected |
| 0: Oil and electricity connected |
| Bit6 | 1: GPS tracking is on |
| 0: GPS tracking is off |
| Bit3～Bit5 |   |
| 011: Low Battery Alarm |
|  |
|  |
| 000: Normal |
| Bit2 | 1: Charging |
| 0: Not Charge |
| Bit1 | 1: ACC high |
| 0: ACC Low |
| Bit0 | 1: Defense Activated |
| 0: Defense Deactivated |

1. Alarm language

|  |  |
| --- | --- |
| Byte 1 | 0x00：normal |
| 0x01：SOS |
| 0x02：Power cut alarm |
| 0x03: Vibration alarm |
| 0x04:Enter fence alarm  |
| 0x05:Exit fence alarm |
| 0x06 Over speed alarm |
| 0x09 Displacement alarm |
| 0x0A Enter GPS dead zone alarm |
| 0x0B Exit GPS dead zone alarm |
| 0x0C Power on alarm |
| 0x0D GPSFirst fix notice |
| 0x0E Low external battery alarm |
| 0x0F Low external battery protection alarm |
| 0x10 SIM card change notice |
| 0x11Power off alarm |
| 0x12Airplane mode alarm |
| 0x13Disassemble alarm |
| 0x14 Door alarm |
| 0x15 Low battery and shutdown alarm |
| 0x16 Sound control alarm  |
| 0x17 Pseudo base-station alarm |
| 0x18 Open cover alarm |
| 0x19 Internal battery low alarm |
| 0x20 Deep Sleep alarm |
| 0x21 Reserved |
| 0x22 Reserved |
| 0x23 Fall off alarm |
| OxFF ACC off |
| OxFF ACC on |
| Byte 2 | 0x01Chinese0x02 English |
| 0x00 Platform no needs to reply |

**Alarm packet response of server**

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| 康凯斯信纸Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x26（UTC） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Error check (From “Packet Length” to“Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1)  |
| Stop Bit | 2 | Fixed value:0x0D 0x0A |

 Example: 78 78 05 26 00 1C 9D 86 0D 0A

#### Response package in Chinese

The response data packet in Chinese is as follow:

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x78 0x78 |
| Packet Length | 1 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 1 | 0x17 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 8 | Alarm code（ASCII） |
| && | 2 | Alarm code（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload“0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Error Check | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

Example：78 78 9F 17 99 00 00 00 01 41 4C 41 52 4D 53 4D 53 26 26 97 07 52 A8 62 A5 8B 66 00 3A 00 47 00 54 00 30 00 36 00 44 00 2D 00 31 00 32 00 38 00 33 00 36 00 2D 00 5A 00 4A 00 4D 00 2C 5E 7F 4E 1C 77 01 00 2E 60 E0 5D DE 5E 02 00 2E 60 E0 57 CE 53 3A 00 2E 4E 91 5C 71 89 7F 8D EF 00 2E 79 BB 60 E0 5D DE 5E 02 5B 66 59 27 65 59 80 B2 7E A6 00 32 00 37 7C 73 00 2E 00 2C 00 31 00 30 00 3A 00 34 00 33 26 26 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 23 23 00 1C EA 97 0D 0A

#### Response package in English

|  |  |  |
| --- | --- | --- |
| 　 | Length | Description |
| Start Bit | 2 | 0x79 0x79 |
| Packet Length | 2 | Length = Protocol Number + Information Content + Information Serial Number + Error Check |
| Protocol Number | 2 | 0x97 |
| Information Content | Length of Command | 1 | Data length between the bit after server flag to the bit before Information Serial Number |
| Server Flag Bit | 4 | The flag used to mark alarm on server  |
| ALARMSMS | 8 | Alarm code（ASCII） |
| && | 2 | Alarm code（ASCII） |
| Address Content | M | DNS address（UNICODE） |
| && | 2 | Separator（ASCII） |
| Phone Number | 21 | All alarm packet upload “0”（ASCII） |
| ## | 2 | Separator（ASCII） |
| Information Serial Number | 2 | Serial number of data sent later at each time will be automatically added ‘1’. |
| Check Bit | 2 | Serial Number (including “Packet Length” and “Information Serial Number”) , are values of CRC-ITU. CRC error occur when the received information is calculated, the receiver will ignore and discard the data packet. (See Appendix 1) |
| Stop Bit | 2 | Fixed value:0x0D0x0A |

Example：79 79 00 BC 97 00 B5 00 00 00 01 41 4C 41 52 4D 53 4D 53 26 26 00 4A 00 4D 00 30 00 31 00 2D 00 38 00 39 00 37 00 33 00 31 00 3A 00 53 00 4F 00 53 00 20 00 61 00 6C 00 61 00 72 00 6D 00 2E 00 68 00 74 00 74 00 70 00 3A 00 2F 00 2F 00 6D 00 61 00 70 00 73 00 2E 00 67 00 6F 00 6F 00 67 00 6C 00 65 00 2E 00 63 00 6F 00 6D 00 2F 00 6D 00 61 00 70 00 73 00 3F 00 71 00 3D 00 4E 00 32 00 32 00 2E 00 35 00 37 00 33 00 35 00 36 00 2C 00 45 00 31 00 31 00 33 00 2E 00 39 00 32 00 31 00 37 00 31 26 26 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 23 23 00 69 15 9B 0D 0A

**iii. Appendix**

* 1. code fragment of the CRC-ITU lookup table algorithm implemented based on C language

staticconstU16crctab16[]=

{

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,0XAC42,0X9ED9,0X8F50,0XFBEF,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,

};

//calculate the 16-bit CRC of data with predetermined length.

U16GetCrc16(constU8\*pData,intnLength)

{

U16fcs=0xffff;//initialization

while(nLength>0){

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

nLength--;

pData++;

}

return~fcs;//negated

}

* 1. Data Flow Diagram



* 1. Voltage-Battery Correspondence of Heartbeat Packet

|  |  |
| --- | --- |
| Battery Percentage ( % ) | 　Voltage |

 

Voltage-Battery Correspondence of Heartbeat Packet

|  |  |  |  |
| --- | --- | --- | --- |
| Battery Percentage | Voltage（V） | Battery Percentage | Voltage（V） |
| 100% | 4.2 | 70% | 3.91 |
| 99% | 4.17 | 68% | 3.9 |
| 98% | 4.16 | 67% | 3.9 |
| 97% | 4.15 | 64% | 3.89 |
| 96% | 4.14 | 62% | 3.88 |
| 95% | 4.13 | 60% | 3.87 |
| 94% | 4.12 | 59% | 3.86 |
| 93% | 4.11 | 57% | 3.85 |
| 92% | 4.1 | 55% | 3.84 |
| 91% | 4.09 | 54% | 3.83 |
| 90% | 4.08 | 52% | 3.82 |
| 89% | 4.07 | 50% | 3.81 |
| 88% | 4.06 | 48% | 3.8 |
| 87% | 4.05 | 45% | 3.79 |
| 85% | 4.04 | 40% | 3.78 |
| 84% | 4.03 | 35% | 3.76 |
| 83% | 4.02 | 30% | 3.75 |
| 81% | 4.01 | 25% | 3.74 |
| 80% | 4 | 20% | 3.73 |
| 79% | 3.99 | 17% | 3.72 |
| 78% | 3.98 | 15% | 3.71 |
| 77% | 3.97 | 12% | 3.7 |
| 75% | 3.96 | 10% | 3.69 |
| 74% | 3.95 | 7% | 3.68 |
| 73% | 3.94 | 5% | 3.67 |
| 72% | 3.93 | 2% | 3.66 |
| 71% | 3.92 | 0% | 3.65 |