Shenzhen Jimi Electronics Co. Ltd

Ji09
Communication Protocol

Content

1. Communication statute

1.1. Introduction

This document defines instructions about interface protocol on application layer of vehicles GPS tracker and location-based service platform. Related interface protocol only applies in the interaction between the platform and the terminal.

1.2. Compatibility

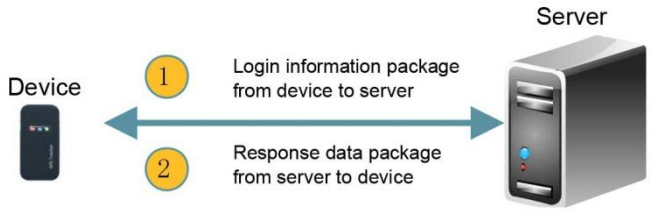
The applicable platform version is Ji06 and Ji09.

2. Terms and definitions

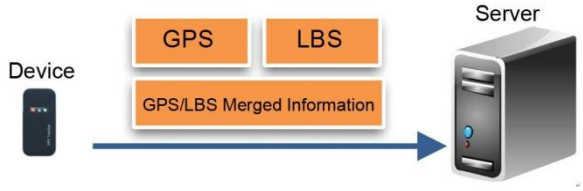
Terms/ab.	English meanings
CMPP	China Mobile Peer to Peer
GPS	Global Positioning System
GSM	Global System for Mobile Communication
GPRS	General Packet Radio Service
TCP	Transport Control Protocol
LBS	Location Based Services
IMEI	International Mobile Equipment Identity
MCC	Mobile Country Code
MNC	Mobile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

3. Basic rules

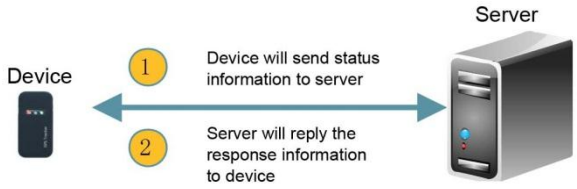
1. Terminal will send login information package by default and wait confirmation from the server.



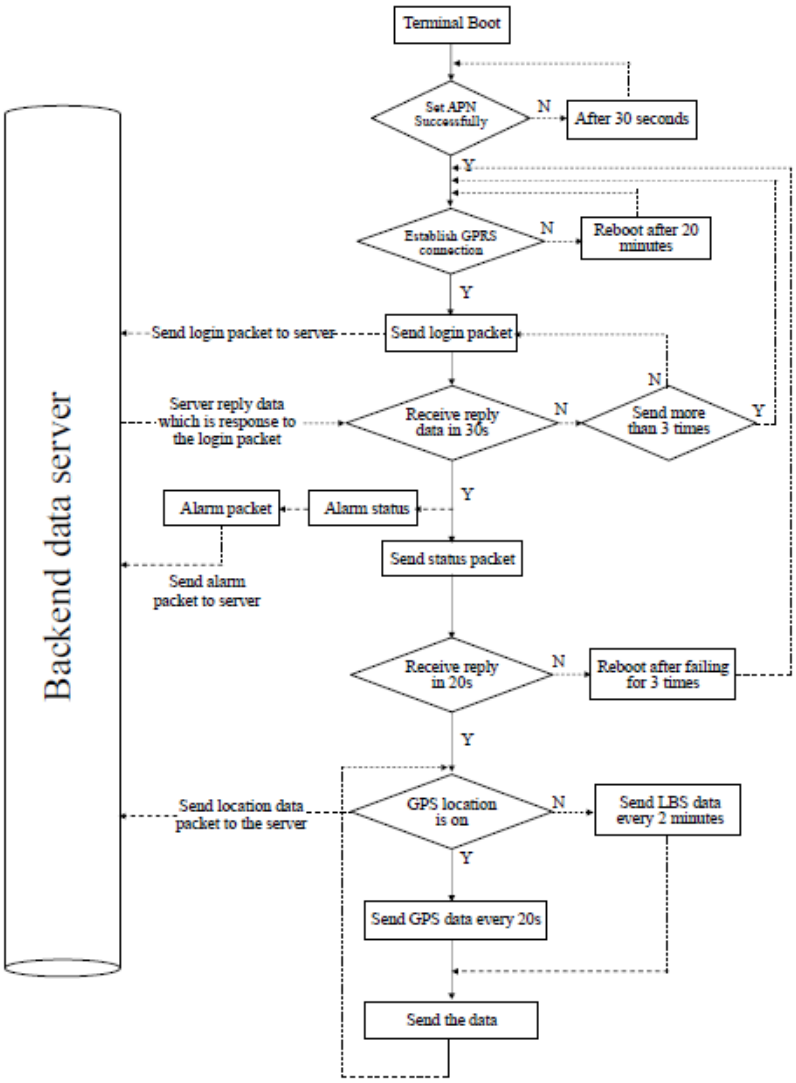
2. After the normal connection is established, the terminal will regularly send GPS, LBS combined info package or GPS and LBS info package separately to server after changing of the GPS info. Server can set the default sending protocol by command.



3. To ensure the effectiveness of the connection, the terminal will send status information to server during fixed interval and the server will reply the response information package to confirm.



Basic Procedure:



4. Data package format

Communication transfer is asynchronous mode in byte. It transfers serial data stream of every uncertain length data package between terminal and server.

Data package length:（10+N）Byte

Format	Length(Byte)
Start Bit	2
Packet Length	1
Protocol Number	1
Information Content	N
Information Serial Number	2

Error Check	2
Stop Bit	2

4.1. Start Bit

Fixed value in HEX 0x78 0x78.

4.2. Package Length

Length = Protocol Number + Information Content + Information Serial Number + Error Check, totally (5+N) Byte, because the Information Content is a variable length field.

4.3. Protocol number

Refer to different "information content" and correspond to the protocol number.

Type	Value
Login Information package	0x01
GPS Information package	0x10
LBS Information package	0x11
GPS/LBS Merged Information package	0x12
Status Information package	0x13
SNR package	0x14
String package	0x15
GPS/LBS/Status Merged Information package	0x96
LBS/Checking Location Via Phone Number Information package	0x97
LBS Extension Information packet	0x18
LBS/Status Merged package	0x99
GPS/Checking Location Via Phone Number Information package	0x9A
Geo-fence Alarm Sent Via Server package	0x9B
GPS/LBS Extension Information package	0x1E
Synchronizations package	0x1F
Server Sends Command To Terminal (setting) package	0x80
Server Sends Command To Terminal (checking) package	0x81

4.4. Information Serial Number

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'.

4.5. Error Check

A check code may be used by the terminal or the server to distinguish whether the received information is error or not. To prevent errors occur during data transmission, error check is added to against data misoperation, so as to increase the security and efficiency of the system. The check code is generated by the CRC-ITU checking method.

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.

4.6. Stop Bit

Fixed value in HEX 0x0D 0x0A

5. Information Contents

The specific contents are determined by the protocol numbers corresponding to different applications.

5.1. Login Message Packet (0x01)

5.1.1. Content

Format	Content		
	Terminal ID	Type Identifier	Extension Bit
Length	8	2	2

Login Message Package is used to confirm whether the connection is normal and submit terminal ID to server.

There are two types of login message package, one is with the extension bit, and the other is without the extension bit.

5.1.1.1.Terminal ID

The Terminal ID adapts the IMEI number in 15 bit.

E.g. If the IMEI is 123456789012345, then the Terminal ID will be: 0x01 0x23 0x45 0x67 0x89 0x01 0x23 0x45.

5.1.1.2.Type Identifier

Type Identifier occupied 2 bytes. It can be used for identify terminal type.

E.g. For Ji09 LBS version, the Type Identifier will be 0x10 0x1D.

E.g. For Ji09 GPS version, the Type Identifier will be 0x10 0x1C.

5.1.1.3.Extension Bit

<table>
<tr><td rowspan="2"></td><td colspan="3">Meaning</td></tr>
<tr><td>15</td><td colspan="2" rowspan="12">The time zone value times 100.</td></tr>
<tr><td rowspan="11">One and a half bytes (bit15—bit4)</td><td>14</td></tr>
<tr><td>13</td></tr>
<tr><td>12</td></tr>
<tr><td>11</td></tr>
<tr><td>10</td></tr>
<tr><td>9</td></tr>
<tr><td>8</td></tr>
<tr><td>7</td></tr>
<tr><td>6</td></tr>
<tr><td>5</td></tr>
<tr><td>4</td></tr>
<tr><td rowspan="4">Low half byte (bit4-bit0)</td><td>3</td><td colspan="2">Eastern/western time zone</td></tr>
<tr><td>2</td><td colspan="2">—</td></tr>
<tr><td>1</td><td>Language selection bit</td><td>1</td></tr>
<tr><td>0</td><td>Language selection bit</td><td>0</td></tr>
</table>

Note:

Bit3 0------- Eastern time zone

1------- Western time zone

E.g.

If the Extension bit is: 0x32 0x00, it indicates GMT+8:00.

Arithmetic: 8*100=800, convert 800 into hex value, which is 0x0320.

If the Extension bit is: 0x4D 0xD8, it indicates GMT-12:45.
Arithmetic: 12.45*100=1245, convert 1245 into hex value, which is 0X04 0XDD.

Algorithmic method: to combine the time zone value with eastern/western time zone and language selection bit so as to save the bytes.

5.1.2. **Server Responds the Data Packet**

The example of the login message packet without extension bit is as below;
Terminal->Server (here the terminal ID is 123456789012345)

	Format	Length(Byte)
Login message packet without extension bit （20 Byte）	Start Bit	2
	Packet Length	1
	Protocol Number	1
	Terminal ID	8
	Identifier	2
	Information Serial Number	2
	CRC verify	2
	Stop Bit	2

The example of the login message packet with the extension bit is as below:

	Format	Length(Byte)
Login message packet with the extension bit （22 Byte）	Start Bit	2
	Packet Length	1
	Protocol Number	1
	Terminal ID	8
	Identifier	2
	Extension bit	2
	Information Serial Number	2
	CRC verify	2
	Stop Bit	2

Server-> Terminal (the response protocol number is the same with the one sending by terminal)

Description	Example
Start Bit	0x78 0x78
Packet Length	0x05
Protocol Number	0x01

Serial Number	0x00 0x01
CRC verify	0xD9 0xDC
Stop Bit	0x0D 0x0A

5.1.3. **Function**

Login message packet will be sent the first time when the terminal connects with the platform, and it is used for platform to recognize different ID.

5.2. GPS Information package（0X10）

Format		Length(Byte)
Information Content	Date and Time	6
	GPS message length, Quantity of GPS satellites	1
	Latitude	4
	Longitude	4
	Speed	1
	Course, Status	2
	Reserved extension bit	2

5.2.1.1.Date and time

Format	Length(Byte)
Year	1
Month	1
Day	1
Hour	1
Minute	1
Second	1

E.g. 2010-03-23 15:50:23

Calculated as follows: 10(Decimal)=0A(Hexadecimal)

3 (Decimal)=03(Hexadecimal)

23(Decimal)=17(Hexadecimal)

15(Decimal)=0F(Hexadecimal)

50(Decimal)=32(Hexadecimal)

23(Decimal)=17(Hexadecimal)

Then the value is: 0x0A 0x03 0x17 0x0F 0x32 0x17

5.2.1.2.GPS info length/ Number of satellites involved in locating

1 byte converts to binary is 8 bit, the first 4 bit means GPS info length, the last 4 bit means number of satellites involved in locating.

Note: The length includes 1 byte occupied by itself.

E.g. 0xCC means GPS information length is 9 bytes, the number of satellite involved in locating is 12.

5.2.1.3.Latitude

Occupy 4 bytes, representing the latitude value. Value ranges from 0 to 162000000, which represents the latitude ranges from 0 to 90 °.Unit: 1/500 second

Conversion method:

(1) Convert the latitude (degrees, minutes) data from GPS module into a new form which represents the value only in minutes;

(2) Multiply the converted value by 30000, and then transform the result to hexadecimal number

E.g. For 22°32.7658′, (22×60＋32.7658)×30000=40582974,then convert it to hexadecimal number 0x02 0x6B 0x3F 0x3E

5.2.1.4.Longitude

Occupy 4 bytes, representing the longitude value of location data. Number ranges from 0 to 324000000, representing the range form 0 to 180 °.Unit: 1/500 seconds, Conversion method is the same as latitude's.

5.2.1.5.Speed

Occupy 1 byte, representing the speed of the terminal; ranges from 0 to 255. Unit: kilometer/hour.

5.2.1.6.Status/Course

Occupy 2 bytes; representing the moving direction of the terminal; ranges from 0-360; unit: degree, regards due north as 0 degree; clockwise.

1 byte is composed of eight binary. In the first byte, the first six binary represents status. The

last two binary and the whole eight binary in the second byte (10 binary in total) represents course.

BYTE_1	Bit7	—
	Bit6	—
	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	

0: south latitude 1: North latitude

0: East longitude 1: West longitude

0: GPS has not located 1: GPS has located

0: Real time GPS 1: Different GPS

Note: The status information in the data packet is the status corresponding to the time bit recorded in the data packet.

E.g. 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

which means GPS tracking is on, real time GPS, location at north latitude, east longitude and the

course is 332 °.

5.2.1.7.Reserved bit

Reserved bit as N is 2byte.

BYTE_1	Bit7	No definition
	Bit6	No definition
	Bit5	No definition
	Bit4	No definition
	Bit3	No definition
	Bit2	No definition
	Bit1	No definition
	Bit0	No definition
BYTE_2	Bit7	No definition
	Bit6	No definition
	Bit5	No definition
	Bit4	No definition
	Bit3	No definition
	Bit2	No definition
	Bit1	Language selection bit 1
	Bit0	Language selection bit 2

Note:
Language selection bit 0=1 (or 0), language selection bit 1=0, which means the terminal asks platform to reply Chinese location information by SMS.
Language selection bit 0=1, language selection bit 1=1, which means the terminal asks platform to reply English location information by SMS.
E.g. Extension bit value is 0x00 0x00 or 0x00 0x01, that means ask for Chinese location information. Value is 0x00 0x02 means English one.

5.2.2. **Function**

The terminal will upload GPS location after connected with platform and located by GPS.

If the GPS need work for long time, such as SOS active GPS or active GPS on platform, GPS will work for 20mins. At this moment, GPS will upload location data for every 10s by default. If the terminal does not support GPS work for long time, this data package will not be uploaded.

5.3. LBS information package (0x11)

5.3.1. Terminal Sending Data Packet to Server

Format			Length (Byte)
Info content	Date Time		6
	LBS Information	MCC	2
		MNC	1
		LAC	2
		Cell ID	3
	Reserved extension bit		2

5.3.1.1.Data and time

The same format as GPS info content mentioned before.

5.3.1.2.MCC

Affiliated country code of mobile user is Mobile Country Code (MCC). MMC of China is 460(decimal).

Value ranges: 0x0000 ～ 0x03E7

MMC of China: 0x01 0xCC(460 decimal convert to hex)

5.3.1.3.MNC

Mobile Network Code(MNC)，for example China Mobile Network Code (MNC) is 0x00.

5.3.1.4.5LAC

Location Area Code (LAC) is included in LAI. It is composed of 2 bytes with hex code, ranges from 0x0001－0xFFFE(not include 0x0001 and 0xFFFE). One location area can contain one or more areas.

5.3.1.5.CI（Cell ID）

Cell ID ranges from 0x000000 to 0xFFFFFF

5.3.1.6.Reserved extension bit

Reserved bit is 2 byte, the same as GPS data package definitions.

5.3.2. **Server response**

The server needs to response after receiving the data packet.

v	Format	Length (Byte)
Server response（10 Byte）	Start Bit	2
	Data Bit Length	1
	Protocol Number	1
	Serial Number	2
	Error Check	2
	Stop Bit	2

5.3.3. **Function**

The terminal starts to upload LBS data package after connected with platform.

The terminal uploads LBS data package every 2mins by default.

If the terminal stays still and no variation of LAC/CELL signal is detected, then the interval of uploading LBS data packet will switch to 4 minutes. The purpose is to save GPRS traffic.

5.4. GPS/LBS Merged Information package (0x12)

Format		Length(Byte)
GPS Info	Date and Time	6
	GPS message length, Quantity of GPS satellites	1
	Latitude	4
	Longitude	4

	Speed	1
	Course, Status	2
	Reserved extension bit	2
LBS Info	MCC	2
	MNC	1
	LAC	2
	CI	3
Reserved extension bit		N

Note: Reserved extension bit N=2, which is as same as the GPS information package.
Other parameters see the relevant information above.

5.5. Statue Information package (0x13)

	Format	Length (Byte)
Content	Terminal information	1
	Voltage level	1
	GSM signal strength level	1
	Reserved extension bit	N

5.5.1. Terminal Information

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

1 byte is regarded as 8 bit, the lowest bit is 0 bit, and the highest bit is 7 bit, when transferring, the higher bit has priority. Each bit's meaning is as follows:

High Low

7	6	5	4	3	2	1	0

Bit	Code Meaning
Bit7	No definition
Bit6	1: GPS tracking is on
	0: GPS tracking is off
Bit3~ Bit5	000: Normal
	001: No definition
	010: Power ON alarm
	011: Low battery alarm
	100: SOS alarm

	101: Enter Geo-fence alarm
	110: Exit Geo-fence alarm
	111: Power OFF alarm
Bit2	0: Not charging
	1: Charging
Bit1	No definition
Bit0	No definition

Note: All status info in data packages are the status recorded by time bit at that moment in the data package.

5.5.2. **Voltage Level**

The range is 0~6 defining the voltage is from low to high.
0: No Power (shutdown)
1: Extremely Low Battery (not enough for calling or sending text messages, etc.)
2: Very Low Battery (Low Battery Alarm)
3: Low Battery (can be used normally)
4: Medium
5: High
6: Very High

5.5.3. **GSM Signal Strength Level**

0x00: no signal;
0x01: extremely weak signal;
0x02: very weak signal;
0x03: good signal;
0x04: strong signal.

5.5.4. **Reserved extension bit**

Reserved bit is 2 bytes and the same as GPS data package definition.

Extension Bytes								
First byte		Second byte						
SOS alarm	0x01	Geo-fence alarm byte 3	Geo-fence alarm byte 2	Geo-fence alarm byte 1	No definition	No definition	Language byte 1	Language byte 2
Charging	0x02							
Viration alarm	0x03							
Enter Geo-fence alarm	0x04							
Exit Geo-fence alarm	0x05							
GT06 unknown alarm	0x06							
GT06 unknown alarm	0x07							
GT06 unknown alarm	0x08							
Moving alarm	0x09							
Over-speed alarm	0x0A							
GPS enter blind area alarm	0x0B							
GPS exit blind area alarm	0x0C							
Ilegal operation alarm	0x0D							

5.5.5. **Server response**

The server needs to response after receiving the data packet.

	Format	Length (Byte)
Server response（10 Byte）	Start Bit	2
	Data Bit Length	1
	Protocol Number	1
	Serial Number	2
	Error Check	2
	Stop Bit	2

5.5.6. **Functions**

The terminal starts to upload terminal status of battery energy and so on after connected with platform.

The terminal will upload status data package every 5mins by default.

5.6. SNR package (0x14)

This package can be sent after the terminal receives command from the server.

Format	Content					
	Number of satellites involved in locating	SNR				Reserved byte
Length (byte)	1	1	2	3	……	n

5.6.1. Number of satellites involved in locating

E.g. The value of 12 satellites is 0x0C.

5.6.2. SNR

The value ranges from: 0x00~0x63, represents (0~99dBHZ).
Every satellite consumes one byte.

5.6.3. Reserved byte

Reserved byte consumes 2 bytes, as same as GPS data.

Note: This package has not been used in this projector yet.

5.7. String package (0x15)

Note: This package has not been used in this projector yet.

5.8. Combined information packet of GPS, LBS and Status (0X16)

Format			Length (Byte)
Information Content	Date Time		6
	GPS Information	GPS information length, Quantity of GPS information satellites	1
		Latitude	4
		Longitude	4
		Speed	1

		Course, Status	2
	LBS Information	LBS Length	1
		MCC	2
		MNC	1
		LAC	2
		Cell ID	3
	status Information	Terminal Information Content	1
		Voltage level	1
		GSM Signal Strength level	1
	Reserved bytes	N	2

We have integrated the status info package based on GPS, LBS info package.

Note: the length of this LBS info has been enlarged (including 1 Byte occupied by the length itself)), the server must make corresponding response after received "GPS, status combined info" package.

Note: Reserved extension bit N=2;

5.8.1. **Server response**

The terminal asks server for replying Chinese or English address, the replying data packages are different according to extension command.

Replying data package of Chinese:

	Format		Length (Byte)
Command packet sent from the server to the terminal （15+M Byte）	Start Bit		2
	Packet length		1
	Protocol Number		1
	Information Content	Length of Command	1
		Server Flag Bit	4
		Command content	M
		Reserved extension bit	0
	Information Serial Number		2
	Check Bit		2

	Stop Bit	2

Applying Chinese address protocol no.:0X16.

Info content is as below:

	Format	Length (Byte)
Information Content	Length of Command	1
	Server Flag Bit	4
	Command content	M
	Reserved extension bit	0

Command content: ADDRESS&&address &&phone number##
Chinese address content will be sent as Unicode.

Regarding the foreign countries' addresses information are longer; add data bit into 2 Bytes in case of 1 data is not enough.

Note:
Only the data bit length of address info protocol No. is changed into 2 Bytes.

	Format		Length (Byte)
Command packet sent from the server to the terminal （17+M Byte）	Start Bit		2
	Packet length		2
	Protocol Number		1
	Information Content	Length of Command	2
		Server Flag Bit	4
		Command content	M
		Reserved extension bit	0
	Information Serial Number		2
	Check Bit		2
	Stop Bit		2

Applying for English address protocol: 0X96.

5.8.2. **Functions**

The terminal will send this status package to server, including terminal alarm status and apply for address information when SOS is calling under the condition that GPS has already located.

5.9. LBS, phone number checking location info package (0X17)

5.9.1. Terminal Sending Data Packet to Server

Format			Length (Byte)
Info content	LBS info	MCC	2
		MNC	1
		LAC	2
		Cell ID	3
	Phone number		21
	Reserved extension bit		N(N=2)

The format is almost the same as the one mentioned in LBS info content, just reduce an item of date and time and add an item of checking address by phone number.

5.9.2. Server response

The server replies Chinese address or English address based on the extended command, and the response data packet is inconsistent

The response data packet in Chinese is as follow:

	Format		Length (Byte)
Command packet sent from the server to the terminal （15+M Byte）	Start Bit		2
	Packet Length		1
	Protocol Number		1
	Information Content	Length of Command	1
		Server Flag Bit	4
		Command content	M
		Reserved extension bit	0
	Information Serial Number		2
	Check Bit		2
	Stop Bit		2

The Protocol Number of request Chinese address response is 0X17.

Info content is as below:

	Format	Length (Byte)

Information Content	Length of Command	1
	Server Flag Bit	4
	Command content	M
	Reserved extension bit	0

Command Content: ADDRESS&&Address Content&&Phone Number##
Chinese address content is sent in UNICODE.

Considering the address or other foreign address in English is generally longer than that in Chinese, one data bit is not enough, so the data bit is occupied in 2 bytes.
Note: only the packet length corresponding to the protocol number of response address information is changed into two bytes.

	Format		Length (Byte)
Command packet sent from the server to the terminal （17+M Byte）	Start Bit		2
	Packet length		2
	Protocol Number		1
	Information Content	Length of Command	2
		Server Flag Bit	4
		Command content	M
		Reserved extension bit	0
	Information Serial Number		2
	Check Bit		2
	Stop Bit		2

The Protocol Number of request English address response is 0X97.

5.9.3. **Functions**

The terminal will send this status package to ask terminal address info when SMS command DW is sent.

5.6.4 Example

A. Example of Chinese address response information:

7878 //start bit
84 // data length
17 // Response Protocol Number
7E //command length, i.e.: SMS content length
00000001 //serial number sent from server

41444452455353 //ADDRESS
2626 //&& separator
624059044F4D7F6E0028 // Chinese address is sent in UNICODE
004C004200530029003A
5E7F4E1C77015E7F5DDE
5E0282B190FD533AFF17
FF15FF144E6190530028
004E00320033002E0033
00390035002C00450031
00310032002E00390038
0038002996448FD1
2626 //&& separator
313337313038313931333500000000000000000000 //phone number
2323 //## terminator of content
0106 // Serial No.
3825 // Check Bit
0D0A //end bit

B. **Example of English address info replying:**

7878 //start bit
00D1 //data length
97 // Response Protocol Number
00CA //command length; content info length;
00000001 //serial number sent from server
41444452455353 //ADDRESS
2626 //&& separator
0053004F00530028004C // English address is sent in UNICODE
0029003A005300680069
006D0069006E00200046
0061006900720079006C
0061006E006400200057
0065007300740020052
0064002C004800750069
006300680065006E0067
002C004800750069007A
0068006F0075002C0047
00750061006E00670064
006F006E00670028004E
00320033002E00310031
0031002C004500310031
0034002E003400310031
0029004E006500610072

00620079
2626 //&& separator
31323532303133373930373734303531000000000000 //phone number
2323 //## terminator of content
0007 //serial number
72b5 //check bit
0D0A //end bit

5.10. LBS Extension Information package (0X18)

Format			Length (Byte)
Information Content	Date & Time		6
	LBS extension information	MCC	2
		MNC	1
		LAC	2
		MCI	3
		MRSSI	1
		NLAC①	2
		NCI①	3
		NRSSI①	1
		NLAC②	2
		NCI②	3
		NRSSI②	1
		NLAC③	2
		NCI③	3
		NRSSI③	1
		NLAC④	2
		NCI④	3
		NRSSI④	1
		NLAC⑤	2
		NCI⑤	3
		NRSSI⑤	1
		NLAC⑥	2
		NCI⑥	3
		NRSSI⑥	1
	Reserved extension bit		N

5.10.1. Data & time

The same as last section.

5.10.2. LBS information

5.10.2.1. MCC

The same as last section.

5.10.2.2. MNC

The same as last section.

5.10.2.3. LAC

The same as last section.

5.10.2.4. CI（Cell ID）

Cell ID ranges from 0x000000 to 0xFFFFFF

5.10.2.5. RSSI（Received Signal Strength Indicator）

RSSI ranges from 0x00 to 0xFF. The actual value of signal strength is negative, while its absolute value is uploaded.

5.10.2.6. NLAC1～6

The neighboring location area code, there are six of them.

5.10.2.7. NCI1～6（Neighboring Cell ID）

The neighboring cell ID is one-to-one correspondence with the six neighboring location area code.

5.10.2.8. NRSSI1～6（Near Cell ID Signal Strength）

NRSSI is one-to-one correspondence with the six neighboring location area code.

5.10.3. Extension byte

N=2, the same as GPS data.

Note: This package has not been used in this projector yet.

5.11. LBS/ Status info package（0X19）

5.11.1. Terminal Sending Data Packet to Server

Format			Length (Byte)
Information Content	LBS Information	MCC	2
		MNC	1
		LAC	2
		Cell ID	3
	Status Information	Terminal Information Content	1
		Voltage Level	1
		GSM Signal Strength	1
	Extension bit		2

Extension bit N=2, the same as statue information.

5.11.2. Server response

The server needs to response after receiving the data packet.

	Format	Length (Byte)
Server response（10 Byte）	Start Bit	2
	Packet length	1
	Protocol Number	1
	Information Serial Number	2

	Check Bit	2
	Stop Bit	2

5.11.3. Functions

After terminal and platform are connected, press SOS key to send this data package, send terminal alarm status and apply for LBS location info to server.

5.12. GPS/phone number checking location info package (0X1A)

Format			Length (Byte)
Information Content	Date Time		6
	GPS Information	Length of GPS information, quantity of positioning satellites	1
		Latitude	4
		Longitude	4
		Speed	1
		Course, Status	2
	Phone Number		21
	Reserved extension bit		N

5.12.1. Server response

The server replies Chinese address or English address based on the extended command, and the response data packet is inconsistent

The response data packet in Chinese is as follow:

	Format		Length (Byte)
Command packet sent from the server to the terminal (15+M+N Byte)	Start Bit		2
	Length of data bit		1
	Protocol Number		1
	Information Content	Length of Command	1
		Server Flag Bit	4
		Command content	M

		Reserved extension bit	0
	Information Serial Number		2
	Check Bit		2
	Stop Bit		2

The Protocol Number of request Chinese address response is 0X1A.

Info content is as below:

	Format	Length (Byte)
Information Content	Length of Command	1
	Server Flag Bit	4
	Command content	M
	Reserved extension bit	0

Command Content: ADDRESS&&Address Content&&Phone Number##
Chinese address content is sent in UNICODE.

Considering the address or other foreign address in English is generally longer than that in Chinese, one data bit is not enough, so the data bit is occupied in 2 bytes.
Note: only the length of data bit corresponding to the protocol number of response address information is changed into two bytes.

	Format		Length (Byte)
Command packet sent from the server to the terminal （17+M Byte）	Start Bit		2
	Length of data bit		2
	Protocol Number		1
	Information Content	Length of Command	2
		Server Flag Bit	4
		Command content	M
		Reserved extension bit	0
	Information Serial Number		2
	Check Bit		2
	Stop Bit		2

The Protocol Number of request English address response is 0X9A.

5.12.2. **Functions**

The server will send this data package while sending txt message command DW to activate GPS

and apply for location info.

5.13. Geo-fence Alarm Sent Via Server package (0x1B)

5.13.1. Functions

Server will add the function of Geo-fence. The server will identify the location of the terminal. If the terminal enters or exits the area, the server will send the package to the terminal automatically. The terminal will send alarm messages to pre-set family numbers.

5.13.2. Format

	Format		Length (Byte)
Command packet sent from the server to the terminal （15+M Byte）	Start Bit		2
	Packet length		2
	Protocol Number		1
	Information Content	Length of Command	2
		Server Flag Bit	4
		Command content	M
		Reserved extension bit	0
	Information Serial Number		2
	Error Check		2
	Stop Bit		2

Note: This package is not added on COOMIX.

5.14. GPS/LBS Merged Extension Information package (0x1E)

Format			Length (Byte)
Information Content	Date & Time		6
	GPS information	GPS information length, Quantity of GPS information satellites	1
		Latitude	4
		Longitude	4
		Speed	1

		Course, Status	2
		Reserved extension bit	M
	LBS extension information	MCC	2
		MNC	1
		LAC	2
		MCI	3
		MRSSI	1
		NLAC①	2
		NCI①	3
		NRSSI①	1
		NLAC②	2
		NCI②	3
		NRSSI②	1
		NLAC③	2
		NCI③	3
		NRSSI③	1
		NLAC④	2
		NCI④	3
		NRSSI④	1
		NLAC⑤	2
		NCI⑤	3
		NRSSI⑤	1
		NLAC⑥	2
		NCI⑥	3
		NRSSI⑥	1
		TA	1
	Reserved extension bit		2

Reserved extension bit is as same as statue package.

5.15. Synchronizations package (0x1F)

	Format	Length (Byte)
Information Content	Date and time	6
	Reserved extension bit	2

5.15.1. Date and time

The time of the terminal.

5.15.2. Reserved extension bit

Same as GPS data package.

5.15.3. Server response

	Format		Length (Byte)
Command packet sent from the server to the terminal (10+4+N Byte)	Start Bit		2
	Length of data bit		1
	Protocol Number		1
	Information Content	Time (UTC second)	4
		Reserved extension bit	2
	Information Serial Number		2
	Check Bit		2
	Stop Bit		2

Respond protocol number: 0x1F

The time is the UTC seconds shown on server.

5.15.4. Function

When the terminal registers successfully, it will upload data package every 24 hours.

5.16. Data Packet Sent From Server to Terminal (Setting Command 0x80)

Format		Length (Byte)
Information Content	Length of Command	1
	Server Flag Bit	4
	Command content	M
	Reserved extension bit	2

The Protocol Number is 0x80.

The terminal response the command from server，data package format is the same as the command format from server to terminal. The protocol no. is different, using “0x80” or “0x81”. 0x80 is

setting command, 0x81 is checking command.
Note: Reserved extension bit N=0;

5.16.1. Length of Command

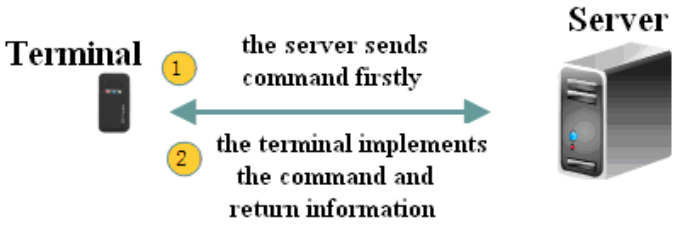
Length= Server flag bit (4) +Comment content (M) + Reserved extension bit (2)

5.16.2. Server Flag Bit

It is reserved to the identification of the server. The binary data received by the terminal is returned without change.

5.16.3. Command Content

It is represented in ASC II of string, and the command content is compatible with text message command.



5.16.3.1. Activate GPS online

(1) Without parameters setting
SMS command format:
GPSON#
Function description: Start GPS locating function
Returned SMS:
If successful, return: GPSON=Success!
If failed, return: GPSON=Fail!
(2) With parameters setting
SMS command format:
GPSON,T#
Function description: Start GPS locating function in T minutes. (T ranges from 5 to 60)
Returned SMS:
If successful, return: GPSON=Success!
If failed, return: GPSON=Fail!

Note: this function is not added on COOMIX platform.

5.16.3.2. Set Family numbers online

SMS command format:

Add numbers:

FN&&A&&name 1&&number1&&name 2&&number 2&&name 3&&number 3&&name 4&& number 4##

Note: the maximum length of the names is 6 letters. Names are shown in Unicode. Other characters will be shown in ASCII. "&&" can not to be omitted.

Delete numbers:

FN&&D&&serial number 1&&serial number 2&& serial number 3&&serial number 4##

OR

FN&&D&&number##

Returned SMS:

If successful, return: FN=Success!

If failed, return: FN=Fail!

E.g.

FN&&A&&familynumber1&&13790774051&&zhangsan&&13790774051&&lisi&&13790774051&&wangwu&&13790774051##

FN&&A&&&&&&zhangsan&&13785421542&&&&&&&&&## (Add the second number without adding other numbers)

FN&&D&&1&&3##（Delete the first and third numbers and names）

5.16.3.3. Set White List numbers

SMS command format:

Add numbers: The server will upload all 15 numbers and every time it will cover the previous settings.

WN&&A&&Name 1&&Number 1&&Name 2&&Number 2&&Name 3&&Number 3&&Name 4&&Number 4……Name 15&&Number 15##

Delete numbers: The server may not support the delete command. This action can be performed by adding numbers.

OR

WN&&D&&serial number 1&&serial number 2&& serial number 3&&serial number 4##

Return SMS:

If successful, return: WN=Success!

If failed, return: WN=Fail!

e.g.

WN&&A&&familynumber1&&13790774051&&zhangsan&&13790774051&&lisi&&13790774051&&wangwu&&13790774051## to set white list numbers.

WN&&A&&&&&&zhangsan&&13785421542&&&&&&&&##

WN&&D&&1&&3## delete the first and third number.

WN&&D&&132487346727## to delete the number 132487346727.

Note: If the White List number too long (over 255 bytes), command length and package length need to be filled by 0xFF for terminal to analyze.

5.16.3.4. Set SOS numbers online

SMS command format:

SOS, A, Number 1, Number 2, Number 3, Number 4#

e.g.

SOS,A,13790774051,13790774051,13790774051,13790774051#

Function description: Set SOS numbers

Returned SMS:

If successful, return：SOS=Success!

If failed, return：SOS=Fail!

e.g.

SOS ,A,13790774051,13553442881,13556286698,13525449308#（add 4 numbers at one time）

SOS,A,13790774051#（add the first SOS number）

SOS,A, ,13553442881#（add the second SOS number）

SOS,A, , ,13556286698 #（add the third SOS number）

SOS,A, , , ,13525449308#（add the fourth SOS number）

SOS,A,13790774051, 13553442881#(add the first and second SOS number)

SOS,A,13790774051, 13553442881, 13556286698#(add the first, second and third SOS number)

5.16.3.5. Set silent mode and GPS working hours online

(1) Send SMS command:

TIME,M,N,D,S1,S2,S3,S4,S5,S6,S7,S8#

M=0 silent mode hours; M=1 GPS working hours;

N=0 OFF; N=1 ON (only works for silent mode)

D=0 school days; D=1 Saturday; D=2 Sunday

S1,S2,S3……,S8 means time period. Format: HH:MM-HH:MM

e.g.

TIME,0,1,0,08:30-09:15,,10:15-11:00,,13:30-14:15,,,# (means to set silent mode period on the first, third and the fifth time period of the weekday. Other period will be not be silent

mode.)

TIME,1,1,1,08:30-09:15,,10:15-11:00,,13:30-14:15,,,# (means to set GPS working hours on the first, third and fifth time period of the weekend. Other period will not be working.)

(2) GPRS command format:

TIME,M,N,S1,S2,S3,S4,S5,S6,S7,S8;S1,S2,S3,S4,S5,S6,S7,S8;S1,S2,S3,S4,S5,S6,S7,S8#

OR

TIME|M|N|S1|S2|S3|S4|S5|S6|S7|S8]S1|S2|S3|S4|S5|S6|S7|S8]S1|S2|S3|S4|S5|S6|S7|S8}

M=0 silent mode; M=1, GPS working period

N=0 OFF; N=1 ON (only works for silent mode)

S1,S2,S3……,S8 means time period. Format: HMHM (length is 4 bytes)

e.g. If S1 is 10:30-11:30, then the content in decimal is 10301130; in hexadecimal will be 0x0a0x1e0x0b0x1e).

Note: If set weekday and weekend at the same time, use "]" to separate weekday and weekend. The three S1 means the first period of first period of weekday, Saturday and Sunday.

Returned SMS:

If successful, return: TIME=Success!

If failed, return: TIME=Fail!

e.g.

TIME|0|1|08300915||10151100||13301415|||]07000730|08300915|09301020|13301415|14301450|15001530|16001630|17101800]07100720|08200935|09401040|13401445|14401455|15101520|16101640|17301800} (means turning on silent mode, works for the first, third and the fifth time period; and the first to eighth time period on Saturday and Sunday. Those time period that separate by ||means they are not in silent mode.)

5.16.3.6. Check upload time interval

SMS command: **SEEPARAM#**

5.16.4. **Reserved byte**

N=0

5.16.5. **Example**

A. Example of activate GPS online:

7878 //start bit

10 // data packet length

80 // protocol number

0A //content length

0000A039 //serial number from server

4750534F4E //GPSON
23 //#
0001 //serial number
238 //CRC check
d0D0A //end

B. Example of set SOS online:

7878 //Start bit
2A //data package length
80 // protocol number
24 // content length
00009F5D //serial number from server
534F53 //SOS
2C //,
41 //A
2C //,
313330353438373238303039 //13054872809
2C //,
2C //,
2C //,
313337303634313236333334 //13706412634
23 //#
0001 //serial number
c6ba //CRC check
0D0A //end

5.17. Command from server to terminal (setting command 0X81)

5.17.1. Format 1: Content less than 255 bytes

5.17.1.1. Start Bit

Consume 2 bytes. 0x78 0x78.

5.17.1.2. Packet Length

Consume 1 byte.

5.17.1.3. Protocol Number

Consume 1 byte.

5.17.1.4. Serial Number

Consume 2 bytes.

5.17.1.5. Error Checking

Consume 2 bytes.

5.17.1.6. Stop Bit

Consume 2 bytes.

5.17.1.7. Content Information

(1) Command length: Consume 1byte.
(2) Server Flag bit: Consume 4 byte.
(3) Command content: M
(4) Reserved bit: N(2)

5.17.2. **Format 2: Content longer than 255 bytes**

5.17.2.1. Start Bit

Consume 2 bytes. 0x79 0x79.

5.17.2.2. Packet Length

Consume 2 bytes.

5.17.2.3. Protocol Number

Consume 1 byte.

5.17.2.4. Serial Number

Consume 2 bytes.

5.17.2.5. Error Checking

Consume 2 bytes.

5.17.2.6. Stop Bit

Consume 2 bytes.

5.17.2.7. Content Information

(5) Command length: Consume 2 bytes.
(6) Server Flag bit: Consume 4 byte.
(7) Command content: M
(8) Reserved bit: N(2)

Note: Reserved bit (1): not used yet
Reserved bit (2): Coding mode for command content: 1=UNICODE 2=ASCII

5.17.3. **Content Information**

It is written in ASCII code. It is used to sync the server with the terminal.

5.17.3.1. Sync Family Numbers

Format: **SEEFN#**
Returned SMS: **SEEFN&&Name 1&&Number 1&&Name 2&& Number 2&& Name 3&& Number 3&& Name 4&& Number4##**
Names will be shown in Unicode while others will be shown in ASCII.

E.g. SEEFN&&&&&&zhangsan&&13785421543&&&&&&&&&##

5.17.3.2. Sync SOS Numbers

Format: **SEESOS#**
Returned SMS: **SEESOS: Number 1,Number 2, Number3#**
E.g. SEESOS:18734356421,18656425588,13888888888#
SEESOS:18734356421,,13888888888#

5.17.3.3. Sync silent mode and GPS working period

See as 5.17.3.5

5.17.3.4. Sync upload time interval

See as 5.17.3.6.

5.17.3.5. Sync Control Parameters

Format: **CTRLPARAMS#**
Returned SMS: **CTRALPARAM: Control group 1,Control group 2, …Control group n#**

Control Group List

Parameters	**Function**	**Explanation**
GTIMER	GPS locating time	See command list
TIMER	LBS/GPS data upload interval	
PWRLIMIT	Power off limited	
RING	Ringtone setting	
CALLMODE	Call reminder	
SIMALM	SIM card change alarm	
BATALM	Low power alarm	
PWROFFALM	Power off alarm	
PWRONALM	Power on alarm	
BLINDALM	Enter/exit GPS blind area alarm	
SOSALM	SOS alarm	
RINGVOL	Ringtone volume	

CALLVOL	Call volume	

5.17.3.6. Sync Geo-fence Data

Format: **ALLGFENCES#**

Returned SMS: **ALLGFENCES:First Fence content,Second Fence content,……Fifth Fence content#**

5.17.3.7. Sync White List Data

Format: **ALLWHITEBOOK#**

Returned SMS: **ALLWHITEBOOK:Name 1, Number 1, Name 2, Number 2,……Name N, Numebr N;#**

Note: Names will be written in UNICODE.

E.g.

For **WHITE:FATHER,8826267; mother,13312341234;#**

The actual data frame will be :

78 78 57 81 52 00 00 00 00 57 00 48 00 49 00 54
00 45 00 3a 00 36 72 b2 4e 2c 00 38 00 38 00 32
00 36 00 32 00 36 00 37 00 3b 00 6d 00 6f 00 74
00 68 00 65 00 72 00 2c 00 31 00 33 00 33 00 31
00 32 00 33 00 34 00 31 00 32 00 33 00 34 00 3b
00 23 00 00 00 00 01 00 0d 4a 5a 0d 0a

5.18. Server Send Command To Terminal (Leave Messages 0x82)

Format		Length (Byte)
Information Content	Length of Command	1
	Server Flag Bit	4
	Command content	M
	Reserved extension bit	2

Note: This package is only applied in Ji09.

6. Instruction about login data package and status package

1. 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. The terminal will begin to send location information (i.e., GPS, LBS information package). A status information package will be sent by the terminal after three minutes to regularly confirm the connection.

2. If the GPRS connection is established unsuccessfully, the terminal will not be able to send the login message packet. The terminal will start schedule reboot in twenty minutes if the GPRS connection is failed three times. Within twenty minutes, if the terminal successfully connects to the server and receives the data packet from the server as the server's response to the login message packet sent by the terminal, the schedule reboot will be off and the terminal will not be rebooted; otherwise, the terminal will be rebooted automatically in twenty minutes.

3. After receiving the login message packet, the server will return a response data packet. If the terminal doesn't receive packet from the server within five seconds after sending the login message packet or the status information package, the current connection is regarded as an abnormal connection. The terminal will start a retransmission function for GPS tracking data, which will cause the terminal to disconnect the current GPRS connection, rebuild a new GPRS connection and send a login message packet again.

4. If the connection is regarded to be abnormal, and the data packet as a response from the server is failed to be received three times after a connection is established and a login message packet or status information package is sent, the terminal will start schedule reboot and the scheduled time is ten minutes. Within ten minutes, if the terminal successfully connects to the server and receives the data packet responded by the server, the schedule reboot will be off and the terminal will not be rebooted; otherwise, the terminal will be rebooted automatically in ten minutes.

5. Server will not return data package to terminal which has not been registered. The connection will be ended directly.

6. When SIM card is not inserted, the GPRS connection will not be activated, and the terminal will not restart automatically.

7. When SIM cars is inserted while the GPRS connection is not on, the terminal will restart automatically after 20 minutes.

7. Appendix A: code fragment of the CRC-ITU lookup table algorithm implemented based on C language

Code fragment of the CRC-ITU lookup table algorithm implemented based on C language is as follow:

```
static const U16 crctab16[] =
{
    0X0000, 0X1189, 0X2312, 0X329B, 0X4624, 0X57AD, 0X6536, 0X74BF,
    0X8C48, 0X9DC1, 0XAF5A, 0XBED3, 0XCA6C, 0XDBE5, 0XE97E, 0XF8F7,
    0X1081, 0X0108, 0X3393, 0X221A, 0X56A5, 0X472C, 0X75B7, 0X643E,
    0X9CC9, 0X8D40, 0XBFDB, 0XAE52, 0XDAED, 0XCB64, 0XF9FF, 0XE876,
    0X2102, 0X308B, 0X0210, 0X1399, 0X6726, 0X76AF, 0X4434, 0X55BD,
    0XAD4A, 0XBCC3, 0X8E58, 0X9FD1, 0XEB6E, 0XFAE7, 0XC87C, 0XD9F5,
    0X3183, 0X200A, 0X1291, 0X0318, 0X77A7, 0X662E, 0X54B5, 0X453C,
    0XBDCB, 0XAC42, 0X9ED9, 0X8F50, 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.
U16 GetCrc16(const U8* pData, int nLength)
{
    U16  fcs  =  0xffff;            //  initialization
    while(nLength>0){
        fcs = (fcs >> 8) ^ crctab16[(fcs ^ *pData) & 0xff];
        nLength--;
        pData++;
    }
    return  ~fcs;           //  negated
```

}

8. Appendix B: a fragment of example of data packet of communication protocol

The following data displayed in hexadecimal are intercepted from the communication between a terminal and a server.

The example of data packet:

Login message packet (protocol number: 0x01)
Old version:
78780F0102524190307115241005000 1F3D70D0A
Reply:
787805010001d9dc0D0A

New version:
78781101035341903009962110063201000 1376C0D0A
Reply:
787805010001d9dc0D0A

GPS data packet (protocol number: 0x10)
787819100B03110A100FCF027AC8570C4657350014000001000452830D0A
Reply:
78780510000451380D0A

LBS data packet（protocol number：0X11）
7878151100000000000001CC013182005C83000003F2A3E70D0A
Reply:
7878051103f2b3350D0A

Status packet (protocol number:0x13)
78780A13000504000003F352940D0A
Reply:
7878051303f317040D0A

GPS.LBS.STATUS packet（protocol number：0x16)
787825160B03110A1010CF027AC8450C4657410014000901CC00266A001E236006040001000
A34620D0A
Reply:

78787F1779000000014144445245535326267D276025547C53EB003A5E7F4E1C770160E05DD
E5E0260E057CE533A4E915C71897F8DEF003653F70028004E00320033002E003100310031003
70031002C00450031003100340002E00340030003900310033002926260000000000000000000000
0000000000000000002323000af4250D0A

LBS.PHB packet（protocol number：0x17）

7878241701CC00266A001E2331323532303133373930373734303531000000000000001000B1F1
A0D0A

Reply:

78787C1776000000014144445245535326266240590 44F4D7F6E003A5E7F4E1C770160E05DDE
5E0260E057CE533A4E915C71897F8DEF003653F70028004E00320033002E003100310032002C
00450031003100340002E00340030003900299644 8FD126263132353230313337393037373430353
1000000000023230 00b6ff80D0A

LBS.STATUS packet (protocol number:0x19)

7878121901CC00266A001E2320060400010009939 10D0A

Reply:

78787B1775000000014144445245535326267D276025547C53EB003A5E7F4E1C770160E05DD
E5E0260E057CE533A4E915C71897F8DEF003653F70028004E00320033002E003100310032002
C00450031003100340002E00340030003900299644 8FD126260000000000000000000000000000
0000000000232300096e6c0D0A

GPS.PHB packet (protocol number：0x1A)

78782E1A0B03110A1736CF027AC82D0C4657CE001400313235323031333739303737343035 3
100000000000001000D7F810D0A

Reply:

787880177A000000014144445245535326267CBE786E5B9A4F4D003A5E7F4E1C770160E05D
DE5E0260E057CE533A4E915C71897F8DEF003653F70028004E00320033002E0031003100310
0370030002C00450031003100340002E00340030003900320031002926263132353230313337393 0
37373430353100000000002323000dda000D0A

Online activation GPS packet（protocol number：0x80）

787810800A0000A0394750534F4E230001238d0D0A

Reply:

GPSON=OverTime Off!

78782080180000CBFC4750534F4E3D4F76657254696D65204F666621000001001A94CE0D0A

Reply:

GPSON=Success!

78782080180000D4104750534F4E3D5375636365737321000000000000000000001C31DC0D0A

Online setting SOS numbers packet（protocol number：0x80）

Set SOS numbers: SOS,A,13808479181,15274908009,15802618796,82911693#
78783D80370000D41C534F532C412C3133383038343739313831 2C31353237343930383030392C31353830323631383739362C38323931313639332300011 5dd0D0A
Reply:
SOS=Success!
78782080180000D41C534F533D537563636573732100000000000000001001002018210D0A

Online view SOS number packet（protocol number：0x81）
SEESOS:13808479181,15274908009,15802618796,82911693#
78785C81540000D41C534545534F533A313338303834373931383 12C31353237343930383030392C31353830323631383739362C38323931313639332300000000000000000000000000000000000000000000000000000000000000000000000000001001003075340D0A

Online issue message packet（protocol number：0x82）
787866826600000000000006786000000000000B7B2673165874FCA00320030003100300 02D00310032002D00310030002000320031003A00320038003A00300035002066256696 82B15F007684004D006F00620069006C00656D88606F00300033003200390001d9130D0A

9. Appendix C: Complete format of information package

A．Data packet sent by the terminal to the server

	Format		Length(Byte)	Example
Login Message Packet （22 Byte） ---new version	Start Bit		2	0x78 0x78
	Packet Length		1	0x0F
	Protocol Number		1	0x01
	Info content	Terminal ID	8	0x01 0x23 0x45 0x67 0x89 0x01 0x23 0x45
		Type Identifier	2	0x10 0x0B
		Extension bit	2	
	Information Serial Number		2	0x00 0x01
	Error Check		2	0xA3 0x67
	Stop Bit		2	0x0D 0x0A

	Format		Length(Byte)	Example
GPS information packet (30 Byte)	Start Bit		2	0x78 0x78
	Packet Length		1	0x1F
	Protocol Number		1	0x10
	Information Content	Date Time	6	0x0B 0x08 0x1D 0x11 0x2E 0x10
		GPS message length,	1	0x9C

		Quantity of GPS satellites		
		Latitude	4	0x02 0x7A 0xC7 0xEB
		Longitude	4	0x0C 0x46 0x58 0x49
		Speed	1	0x00
		Course, Status	2	0x14 0x8F
		Reserved extension bit	2	0x00 0x01
	Serial Number		2	0x00 0x03
	Error Check		2	0x80 0x81
	Stop Bit		2	0x0D 0x0A

	Format		Length (Byte)	Example
LBS information packet（26Byte）	Start Bit		2	0x78 0x78
	Packet Length		1	0x15
	Protocol Number		1	0x11
	Date Time		6	0x00 0x00 0x00 0x00 0x00 0x00
	Info content	MCC	2	0x01 0xCC
		MNC	1	0x00
		LAC	2	0x26 0x6A
		Cell ID	3	0x00 0x1D 0xF1
		Reserved extension bit	2	0x00 0x01
	Serial Number		2	0x00 0x18
	Error Check		2	0x91 0x88
	Stop Bit		2	0x0D 0x0A

Format				Length (Byte)	Example
GPS, LBS information packet（38 Byte）	Start Bit			2	0x78 0x78
	Packet Length			1	0x0A
	Protocol Number			1	0x12
	Information Content	Date Time		6	0x0A 0x03 0x17 0x0F 0x32 0x17
		GPS Info	GPS information length, Quantity of GPS information satellites	1	0x9C
			Latitude	4	0x02 0x7A 0xC7 0xEB
			Longitude	4	0x0C 0x46 0x58 0x49
			Speed	1	0x00
			Course, Status	2	0x14 0x8F
		LBS	MCC	2	0x01 0xCC

		Info	MNC	1	0x00
			LAC	2	0x26 0x6A
			Cell ID	3	0x00 0x1D 0xF1
	Serial Number			2	0x00 0x1F
	Error Check			2	0xC4 0x39
	Stop Bit			2	0x0D 0x0A

Format			Length (Byte)	Example
Status packet information (15 Byte)	Start Bit		2	0x78 0x78
	Packet Length		1	0x0A
	Protocol Number		1	0x13
	Information Content	Terminal Information	1	0x40
		Voltage Level	1	0x06
		GSM Signal Strength	1	0x04
		Reserved extension bit	2	0x00 0x01
	Serial Number		2	0x00 0x1F
	Error Check		2	0xC4 0x39
	Stop Bit		2	0x0D 0x0A

SNR packet	Format	Content				
		Number of satellites involved in locating	SNR			
	Length (byte)	1	1	2	3	……

	Format			Length (Byte)	Example
GPS, LBS, Status information packet（42 Byte）	Start Bit			2	0x78 0x78
	Packet Length			1	0x0A
	Protocol Number			1	0x16
	Information Content	Date Time		6	0x0B 0x08 0x1D 0x11 0x2E 0x10
		GPS Information	GPS information length, Quantity of GPS information satellites	1	0x9C
			Latitude	4	0x02 0x7A 0xC7 0xEB
			Longitude	4	0x0C 0x46 0x58 0x49
			Speed	1	0x00
			Course, Status	2	0x14 0x8F

		LBS Information	LBS Length	1	0x08
			MCC	2	0x01 0xCC
			MNC	1	0x00
			LAC	2	0x26 0x6A
			Cell ID	3	0x00 0x1D 0xF1
		Status Information	Terminal Information Content	1	0x40
			Voltage Level	1	0x06
			GSM Signal Strength	1	0x04
	Serial Number			2	0xC4 0x39
	Error Check			2	0x0D 0x0A
	Stop Bit			2	0x00 0x1F

	Format			Length (Byte)	Example
LBS, phone number checking location info package (41byte)	Start Bit			2	0x78 0x78
	Packet Length			1	0x1F
	Protocol Number			1	0x17
	Info content	LBS info	MCC	2	0x01 0xCC
			MNC	1	0x00
			LAC	2	0x26 0x6A
			Cell ID	3	0x00 0x1D 0xF1
		Phone number		21	
		Reserved extension bit		2	
	Serial Number			2	0x00 0x03
	Check Bit			2	0x80 0x81
	Stop Bit			2	0x0D 0x0A

Format				Length (Byte)
LBS extension information packet （62+N Byte）	Start Bit			2
	Packet Length			1
	Protocol Number			1
	Info content	Date Time		6
		LBS extension information	MCC	2
			MNC	1
			LAC	2
			MCI	3
			MRSSI	1
			NLAC①	2
			NCI①	3
			NRSSI①	1
			NLAC②	2

			NCI②	3
			NRSSI②	1
			NLAC③	2
			NCI③	3
			NRSSI③	1
			NLAC④	2
			NCI④	3
			NRSSI④	1
			NLAC⑤	2
			NCI⑤	3
			NRSSI⑤	1
			NLAC⑥	2
			NCI⑥	3
			NRSSI⑥	1
			TA	1
		Reserved extension bit		N
	Serial Number			2
	Check Bit			2
	Stop Bit			2

Format				Length (Byte)
Combined packet of GPS and LBS extension information （76 Byte）	Start Bit			2
	Packet Length			1
	Protocol Number			1
	Info content	Date Time		6
		GPS information	GPS information length, Quantity of GPS information satellites	1
			Latitude	4
			Longitude	4
			Speed	1
			Course, Status	2
		LBS extension information	MCC	2
			MNC	1
			LAC	2
			MCI	3
			MRSSI	1
			NLAC①	2
			NCI①	3
			NRSSI①	1
			NLAC②	2

			NCI②	3
			NRSSI②	1
			NLAC③	2
			NCI③	3
			NRSSI③	1
			NLAC④	2
			NCI④	3
			NRSSI④	1
			NLAC⑤	2
			NCI⑤	3
			NRSSI⑤	1
			NLAC⑥	2
			NCI⑥	3
			NRSSI⑥	1
			TA	1
	Serial Number			2
	Check Bit			2
	Stop Bit			2

Format				Length (Byte)	Example
LBS and Status information packet (23 Byte)	Start Bit			2	0x78 0x78
	Packet Length			1	0x15
	Protocol Number			1	0x19
	Information Content	LBS Information	MCC	2	0x01 0xCC
			MNC	1	0x00
			LAC	2	0x26 0x6A
			Cell ID	3	0x00 0x1D 0xF1
		Status Information	Terminal Information Content	1	0x40
			Voltage Level	1	0x06
			GSM Signal Strength	1	0x04
		Extension bit	Language	2	0x00 0x01
	Serial Number			2	0x00 0x1F
	Check Bit			2	0xC4 0x39
	Stop Bit			2	0x0D 0x0A

Format		Length (Byte)	Example
GPS, phone number checking	Start Bit	2	0x78 0x78
	Packet Length	1	0x1F

location info package (49 Byte)	Protocol Number			1	0x1A
	Information Content	Date Time		6	0x0B 0x08 0x1D 0x11 0x2E 0x10
		GPS Information	GPS information length, Quantity of GPS information satellites	1	0xCF
			Latitude	4	0x02 0x7A 0xC7 0xEB
			Longitude	4	0x0C 0x46 0x58 0x49
			Speed	1	0x00
			Course, Status	2	0x14 0x8F
		Telephone number		21	
	Serial Number			2	0x00 0x03
	Check Bit			2	0x80 0x81
	Stop Bit			2	0x0D 0x0A

Synchronizations package	Information Content	Format	Length (Byte)
		Date and time	6
		Reserved extension bit	2

	Format		Length (Byte)	Example
Terminal response to the command sent by server （15+M+N Byte）	Start Bit		2	0x78 0x78
	Data Bit Length		1	0x0F
	Protocol Number		1	0x1A
	String content	Length of Command	1	0x7E
		Server Flag Bit	4	0x00 0x00 0x00 0x01
		Command content	M	
		Reserved extension bit	0	
	Serial Number		2	0x00 0x01
	Check Bit		2	0xD9 0xDC
	Stop Bit		2	0x0D 0x0A

B．Data Packet Sent by Server to Terminal

	Format	Length(Byte)	Example
Server response （10 Byte）	Start Bit	2	0x78 0x78
	Data Bit Length	1	0x01
	Protocol Number	1	0x16
	Serial Number	2	0x00 0x01
	Error Check	2	0xD9 0xDC
	Stop Bit	2	0x0D 0x0A

	Format		Length (Byte)	Example
Command packet sent from the server to the terminal （15+M Byte）	Start Bit		2	0x78 0x78
	Packet length		1	0x84
	Protocol Number		1	0x16
	Information Content	Length of Command	1	0x7E
		Server Flag Bit	4	0x00 0x00 0x00 0x01
		Command content	M	
		Reserved extension bit	0	
	Information Serial Number		2	0x00 0x01
	Check Bit		2	0xD9 0xDC
	Stop Bit		2	0x0D 0x0A

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