Version: V1.0

Security Level: Confidential

Shenzhen Concox Information Technology Co., Ltd.

GPS Tracker
Communication Protocol
(JM-LL301)

Contents

1. Packet Format (V1.0)

Format	Length (Byte)	Description
Start Bit	2	0x78 0x78 (1 byte) or 0x79 0x79 (2 bytes)
Packet Length	1(2)	Length = Protocol number + Information content + Information sequence number (SN) + CRC
Protocol Number	1	It indicates the type of the transfer packet (see the following table for details).
Information Content	N	It is determined by different applications and their "protocol numbers".
Information SN	2	The SN will be automatically added by "1" for each data sending after power-on.
CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

2. Login Packet (0x01) (V1.0)

Description:

- A login packet is used to establish the connection between the terminal and the platform. It carries terminal information.
- When the GPRS link is established, the terminal will send a login packet to the server. If a return packet is received within 5 seconds, the link is through; otherwise, the terminal will continue to send login packets.
- If no return packet is received within 5 seconds, the terminal will regard it as response timeout.
- If the timeout count reaches 3, the terminal will enable timed restart.

a) Login packet

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x01
Information Content	Terminal ID	8	For example: If the IMEI is "123456789123456", then the terminal ID is "0x01 0x23 0x45 0x67 0x89 0x12 0x34 0x56".
	Type Identifier	2	It is used to judge the type of a terminal.
	Time Zone/Language	2	See the following table for details.
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.

CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

Example data: 78 78 11 01 07 52 53 36 78 90 02 42 70 00 32 01 00 05 12 79 0D 0A

Time Zone/Language

One and a half byte (bit15–bit4)	15	It is a value calculated by expanding the time zone by 100.	
	14		
	13		
	12		
	11		
	10		
	9		
	8		
	7		
	6		
	5		
	4		
Lower half byte (bit4–bit0)	3	GMT	
	2	It is not defined.	
	1	Language select bit	1
	0	Language select bit	0

Bit30-------Eastern time 1-------Western time

If: the extended bit "0X32 0X00" refers to "GMT+8:00",

then the GTM in Hex is "0X0320", which is converted from "8*100=800".

The extended bit "0X4D 0XD8" refers to "GMT-12:45",

then the GTM in Hex is "0X04,0XDD", which is converted from "12.45*100=1246".

Here, to save 4 bytes, the calculation result shifts to the left for 4 bits cyclically and combines the eastern time, western time, and language select bit.

b) Return packet (from server)

	Length	Details
Start Bit	2	0x78 0x78

Packet Length	1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number	1	0x01
Information SN	2	The SN will be automatically added by "1" for each data sending after power-on.
CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

Example data: 78 78 05 01 00 05 9F F8 0D 0A

3. Time Calibration Packet (0x8a) (V1.0)

Description:

- **The time calibration packet is sent by the terminal to the server upon power-on to request for time synchronization to resolve the issue of time error when the terminal is not positioned.**
- **The server responds with the correct UTC in correct format.**

a) Time calibration packet (sent by terminal)

	Length	Details
Start Bit	2	0x78 0x78
Packet Length	1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number	1	0x8A
Information SN	2	The SN will be automatically added by "1" for each data sending after power-on.
CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

Example data: 78 78 05 8A 00 06 88 29 0D 0A

b) Return packet (from server)

	Length	Details
Start Bit	2	0x78 0x78

Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x8A (UTC)
Information Content	Date and time	6	Year (1 byte) Month (1 byte) Day (1 byte) Hour (1 byte) Minute (1 byte) Second (1 byte) (which must convert to decimal)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

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

4. Heartbeat Status Information Packet (0x23) (V1.0)

Description:

- The heartbeat packet is used to maintain GPRS link connectivity.
- When the GPRS link is established, the terminal will send a heartbeat packet to the server. If a return packet is received within 5 seconds, the link is through. In this case, new heartbeat packets will be sent in a timed manner.
- If no return packet is received within 5 seconds, the terminal will regard it as response timeout.
- If the timeout count reaches 3, the terminal will enable timed restart.

a) Heartbeat packet sent by terminal (0x23)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x23
Information Content	Terminal Information Content	1	See the following table for details.

	Voltage Level	2	Conversion method: Convert HEX to decimal and then divide the decimal value by 100. Take 0X01 0X9F for example, "019F" is "415" in decimal and is "4.15" after being divided by 100, which means the current voltage of the terminal is 4.15 (see the Attachment for details about the mapping relationship between battery voltage and strength).
	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, where "0x01" refers to Chinese and "0x02" English.
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

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

Terminal Information Content Details

It occupies 1 byte and indicates various status information of the mobile phone.

Bit		Code Connotation
BYTE	Bit7	1: Cut off fuel/power
		0: Restore fuel/power
	Bit6	1: Position fixed
		0: Not Positioned
	Bit4–Bit5	Extended bit
	Bit3	Remote lock: 1: Yes; 0: No
	Bit2	1: Charge with power connected
		0: Charge with no power connected
	Bit1	1: ACC on
		0: ACC off
	Bit0	1: Defense on
		0: Defense off

b) Return packet (from server)

	Length	Details
Start Bit	2	0x78 0x78
Packet Length	1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number	1	0x23
Information SN	2	The SN will be automatically added by "1" for each data sending after power-on.
CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

Example: 78 78 05 23 01 00 67 0E 0D 0A

5. Heartbeat Packet (0x36) (V1.0)

Description:

- The heartbeat packet is used to maintain GPRS link connectivity.
- When the GPRS link is established, the terminal will send a heartbeat packet to the server. If a return packet is received within 5 seconds, the link is through. In this case, new heartbeat packets will be sent in a timed manner.
- If no return packet is received within 5 seconds, the terminal will regard it as response timeout. If the timeout count reaches 3, the terminal will enable its timed restart feature.
- This mainly applies to the fake shutdown.

a) 0x36 Heartbeat packet (extension module)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x36 (extension module)
Information Content	Terminal Information Content	1	See the following table for details.

	Voltage Level	1	0X00: No power (power off) 0x01: Battery extremely low (making calls or sending SMS's are impossible) 0x02: Battery very low (low battery alert will be triggered) 0x03: Battery low (the device can be used as usual) 0x04: Battery medium 0x05: Battery high 0x06: Battery extremely high
	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, where "0x01" refers to Chinese and "0x02" English.
	Extension module (protocol 36 is valid)	N	Extension module format byte consists of: module number (2) + module length (1) + module content (N is parsed based on the module number), such as module number 1 module length 1 module content 1 module number 2 module length 2 module content 2 ..... For example: "00 27 02 05 46" means the voltage of the external power is 13.5. Supported module: 0x18 0x32 0x40 See the Attachment for details.
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

i. Terminal information content details

It occupies 1 byte and indicates various status information of the mobile phone.

Bit		Code Connotation
BYTE	Bit7	1: Cut off fuel/power
		0: Restore fuel/power
	Bit6	1: Position fixed
		0: Not Positioned
	Bit4–Bit5	Extended bit
	Bit3	Remote lock: 1: Yes; 0: No
	Bit2	1: Charge with power connected

		0: Charge with no power connected
	Bit1	1: ACC on
		0: ACC off
	Bit0	1: Defense on
		0: Defense off

b) Return packet (from server)

	Length	Details
Start Bit	2	0x78 0x78
Packet Length	1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number	1	0x36
Information SN	2	The SN will be automatically added by "1" for each data sending after power-on.
CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

Example data: 78 78 05 36 01 00 DB 26 0D 0A

6. GPS Location Packet over 2G (0x22) (V1.0)

Description:

- The location packet carries the location data of the terminal.
- After the GPS module is positioned and the connection is established, the terminal will upload data about fixes by preset rules.
- After the connection is established and there are cache fixes, the terminal will upload these cache fixes.

a) Location packet sent by terminal (0x22)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x22 (UTC) If the protocol number is "0x2D", then it is a location packet that requires a response; if the server doesn't respond, then a backup action will be performed.
Information Content	Date and time	6	Year (1 byte) Month (1 byte) Day (1 byte) Hour (1 byte) Minute (1 byte) Second (1 byte) (which must convert to decimal)
	Number of Satellites	1	The first character refers to GPS Information Length; while the second character refers to Number of Satellites that involve in positioning (which must convert to decimal).

	Latitude	4	It is a value calculated by converting to decimal which is further divided by 1,800,000.
	Longitude	4	It is a value calculated by converting to decimal which is further divided by 1,800,000.
	Speed	1	It is a value in decimal.
	Course and Status	2	Convert to a 16-bit binary. Please calculate by bit (see i for details)).
	MCC	2	Mobile Country Code (convert to decimal) The MSB of the MCC is 1 and the MNC occupies 2 bytes.
	MNC	1 (or 2)	Mobile Network Code (convert to decimal)
	LAC	2	Location Area Code (convert to decimal)
	Cell ID	3	Cell Tower ID (convert to decimal)
	ACC	1	It refers to the ACC status, where "00" means ACC off and "01" ACC on (unavailable on GT06)
	Data upload mode	1	GPS data point upload type (unavailable on GT06) 0x00: Upload in fixed interval 0x01: Upload at fixed distance 0x02: Upload at cornering point 0x03: Upload upon ACC status change 0x04: Upload the last fix after the status changes from moving to still 0x05: Upload the last valid fix prior to reconnection from a network interruption 0x06: Force to upload a GPS fix upon ephemeris refresh 0x07: Upload a fix upon key press 0x08: Upload location information upon power-on 0x09: Not used 0x0A: Upload the last longitude and latitude and update the time after the device goes still 0x0B: Parse the uploaded longitude and latitude packet over WiFi 0x0C: Upload upon LJDW (immediate position) command 0x0D: Upload the last longitude and latitude after the device goes still 0x0E: GPSDUP upload (upload at a fixed interval in still state) 0x0F: Exit tracking mode
	GPS data re-upload	1	0x00: Real-time upload; 0x01: Re-upload (unavailable on GT06)
	Mileage statistics	4	Convert to decimal to get the result (for products without this feature, there is no such place in the packet)

Information SN	2	The SN will be automatically added by "1" for each data sending after power-on.
CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

Example data: 78 78 22 22 15 08 17 06 0B 3A CF 03 2E EA 80 0B 6C E1 10 00 14 00 00 00 00 00 00 00 00 00 01 09 00 00 1C 66 25 0D 0A

The reserved place occupies 2 bytes.

One and a half byte (bit15–bit4)												Lower half byte (bit4–bit0)			
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
It is not defined.														Language select bit 1	Language select bit 0

Language select bit 0=1 (or 0) and language select bit 1=0: This means to request in SMS the backend system to return the location information in Chinese.

Language select bit 0=0 and language select bit 1=1: This means to request in SMS the backend system to return the location information in English.

For example: The extended byte 0x00 0x00 or 0x00 0x01 means to request for Chinese location information; while the extended byte 0x00 0x02 means to request for English location information.

i. Status and course details

This occupies 2 bytes to indicate the moving direction of the terminal. The value range is 0–360°. It regards due north as 0° and counts clockwise.

BYTE_1	Bit7	0
	Bit6	0
	Bit5	GPS Real-time/Differential Positioning
	Bit4	Positioned or Not
	Bit3	East/West longitude
	Bit2	South/North latitude
	Bit1	Course
	Bit0	
BYTE_2	Bit7	
	Bit6	
	Bit5	
	Bit4	
	Bit3	

	Bit2	
	Bit1	
	Bit0	

Return packet (from server)

No return packet is required.

7. GPS Location Packet over 4G (0xa0) (V1.0)

Description:

- The location packet carries the location data of the terminal.
- After the GPS module is positioned and the connection is established, the terminal will upload data about fixes by preset rules.
- After the connection is established and there are cache fixes, the terminal will upload these cache fixes.

a) Location packet (sent by terminal)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0xA0 (UTC)
Information Content	Date and time	6	Year (1 byte) Month (1 byte) Day (1 byte) Hour (1 byte) Minute (1 byte) Second (1 byte) (which must convert to decimal)
	Number of Satellites	1	The first character refers to GPS Information Length; while the second character refers to Number of Satellites that involve in positioning (which must convert to decimal).
	Latitude	4	It is a value calculated by converting to decimal which is further divided by 1,800,000.
	Longitude	4	It is a value calculated by converting to decimal which is further divided by 1,800,000.
	Speed	1	It is a value in decimal.
	Course and Status	2	Convert to a 16-bit binary. Please calculate by bit (see Attachment 3).
	MCC	2	Mobile Country Code (convert to decimal)
	MNC	1 (or 2)	Mobile Network Code (see the following note for length details)
	LAC	4	Location Area Code (convert to decimal)
	Cell ID	8	Cell Tower ID (convert to decimal)
	ACC	1	It refers to the ACC status, where "00" means ACC off and "01" ACC on (unavailable on GT06)
	Data upload mode	1	GPS data point upload type (unavailable on GT06) 0x00: Upload in fixed interval 0x01: Upload at fixed distance 0x02: Upload at cornering point

			0x03: Upload upon ACC status change 0x04: Upload the last fix after the status changes from moving to still 0x05: Upload the last valid fix prior to reconnection from a network interruption 0x06: Force to upload a GPS fix upon ephemeris refresh 0x07: Upload a fix upon key press 0x08: Upload location information upon power-on 0x09: Not used 0x0A: Upload the last longitude and latitude and update the time after the device goes still 0x0B: Parse the uploaded longitude and latitude packet over WiFi 0x0C: Upload upon LJDW (immediate position) command 0x0D: Upload the last longitude and latitude after the device goes still 0x0E: GPSDUP upload (upload at a fixed interval in still state)
	GPS data re-upload	1	0x00: Real-time upload; 0x01: Re-upload (unavailable on GT06)
	Mileage statistics	4	Convert to decimal to get the result (for products without this feature, there is no such place in the packet)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 78 78 29 A0 15 08 11 01 0B 31 C5 02 6C 1E 04 0C 39 2E C0 0D 14 94 01 CC 00 00 00 28 66 00 00 00 00 0D 67 F6 42 00 00 00 02 C4 62 8D 0D 0A

Note: As the MNC of some countries occupies 2 bytes, we use the MSB in MCC to differentiate the length of MNC. When the MSB in MCC

is "1", the length of the MNC is "2". For shipped devices, Bit15 is "0" by default; while for newly-shipped devices, Bit15 is "1".

MCC bits

Bit		Code Connotation
BYTES	Bit15	1: The length of MNC is 2
		0: The length of MNC is 1
	Bit0–bit14	MCC information

i. Status and course details

This occupies 2 bytes to indicate the moving direction of the terminal. The value range is 0–360°. It regards due north as 0° and counts clockwise.

BYTE_1	Bit7	0
	Bit6	0
	Bit5	GPS Real-time/Differential Positioning
	Bit4	Positioned or Not
	Bit3	East/West longitude
	Bit2	South/North latitude
	Bit1	Course
	Bit0	
BYTE_2	Bit7	
	Bit6	
	Bit5	
	Bit4	
	Bit3	
	Bit2	
	Bit1	
	Bit0	

b) Return packet (from server)

No return packet is required.

8. LBS Multi-base Extended Information Packet over 2G (0x28) (V1.0)

Description:

- It is used to transmit location information when the terminal doesn't locate.

a) LBS extended information packet (sent by terminal)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x18 If the protocol number is "0x2E", then it is a location packet that requires a response; if the server doesn't respond, then a backup action will be performed.
Information Content	UTC	6	Year (1 byte) Month (1 byte) Day (1 byte) Hour (1 byte) Minute (1 byte) Second (1 byte) (which must convert to decimal)
	MCC	2	Mobile Country Code (convert to decimal)
	MNC	1 (or 2)	Mobile Network Code (convert to decimal)
	LAC	2	Location Area Code (convert to decimal)
	CI	3	Cell Tower ID (convert to decimal)

	RSSI	1	It indicates the signal strength of a cell. Its value range is 0x00–0xFF, where "0x00" indicates the signal is the weakest; while "0xFF" the 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
	Timing Advance	1	It refers to the difference between the actual length of time that a signal takes to reach the base station from a mobile station and the length of time that a signal takes to reach the base station from a mobile station when the distance between the two is "0".
	Language	2	0x00 0x01: Chinese; 0x00 0x02: English
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 78 78 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 00 FF 00 02 00 05 B1 4B 0D 0A

Note: As the MNC of some countries occupies 2 bytes, we use the MSB in MCC to differentiate the length of MNC. When the MSB in MCC is "1", the length of the MNC is "2". For shipped devices, Bit15 is "0" by default; while for newly-shipped devices, Bit15 is "1".

MCC bits

Bit		Code Connotation
BYTES	Bit15	1: The length of MNC is 2
		0: The length of MNC is 1
	Bit0–bit14	MCC information

<spanb)serverlbs< span="">Return packet</spanb)serverlbs<>

For vehicle and OBD trackers, no return packet is required from the server to the LBS multi-base extended information packet.

For 0x28, no return packet is required from the server.

For 0x2E, a return packet is required from the server.

	Length	Details
Start Bit	2	0x78 0x78
Packet Length	1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number	1	A location packet whose protocol number is "0x2E" requires a response from the server. If the server doesn't respond, a backup action will be performed.
Information SN	2	The SN will be automatically added by "1" for each data sending after power-on.
CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

9. LBS Multi-base Extended Information Packet over 4G (0xa1) (V1.0)

Description:

- It is used to transmit location information when the terminal doesn't locate.

a) LBS extended information packet (sent by terminal)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0xA1
Information Content	UTC	6	Year (1 byte) Month (1 byte) Day (1 byte) Hour (1 byte) Minute (1 byte) Second (1 byte) (which must convert to decimal)

	MCC	2	Mobile Country Code (convert to decimal)
	MNC	1 (or 2)	Mobile Network Code (see the following note for length detail)
	LAC	4	Location Area Code (convert to decimal)
	CI	8	Cell Tower ID (convert to decimal)
	RSSI	1	It indicates the signal strength of a cell. Its value range is 0x00–0xFF, where "0x00" indicates the signal is the weakest; while "0xFF" the 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
	Timing Advance	1	It refers to the difference between the actual length of time that a signal takes to reach the base station from a mobile station and the length of time that a signal takes to reach the base station from a mobile station when the distance between the two is "0".
	Language	2	0x00 0x01: Chinese; 0x00 0x02: English
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data:78 78 6C A1 15 08 11 01 22 2D 01 CC 00 00 00 24 7F 00 00 00 00 03 3B 36 8D 38 00 00 24 7F 00 00 00 00 03 3B 36 8C 1F 00 00 24 7F 00 00 00 00 0A 80 8A 0C 22 00 00 24 7F 00 00 00 00 0A 80 8A 0D 22 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 FF 00 02 02 D5 21 D7 0D 0A

Note: As the MNC of some countries occupies 2 bytes, we use the MSB in MCC to differentiate the length of MNC. When the MSB in MCC

is "1", the length of the MNC is "2". For shipped devices, Bit15 is "0" by default; while for newly-shipped devices, Bit15 is "1".

MCC bits

Bit		Code Connotation
BYTES	Bit15	1: The length of MNC is 2
		0: The length of MNC is 1
	Bit0–bit14	MCC information

b) Return packet (from server)

No return packet is required from the server.

10. WIFI Information Packet over 2G (0x2c) (V1.0)

Description:

- It is used to transmit the packet received by the terminal from the WiFi network.

a) WiFi packet sent by terminal

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x2C
Information Content	UTC	6	Year (1 byte) Month (1 byte) Day (1 byte) Hour (1 byte) Minute (1 byte) Second (1 byte) (which must convert to decimal)
	MCC	2	It is the abbreviation of Mobile Country Code, which indicates the country to which a mobile subscriber belongs. The MSB in MCC is 1 and the MNC occupies 2 bytes.
	MNC	1 (or 2)	It is the abbreviation of Location Area Code.
	LAC	2	It is the abbreviation of Location Area Code.
	CI	3	It is the abbreviation of Cell Tower ID.
	RSSI	1	It indicates the signal strength of a cell. Its value range is 0x00–0xFF, where "0x00" indicates the signal is the weakest; while "0xFF" the 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
	Timing Advance	1	It refers to the difference between the actual length of time that a signal takes to reach the base station from a mobile station and the length of time that a signal takes to reach the base station from a mobile station when the distance between the two is "0".
	Number of WiFi Networks	1	It is used to determine the number of WiFi networks carried in the packet. "0" means no WiFi is detected.
	WIFI MAC1	6	It is the MAC address of WiFi1 received (transmitted based on the actual number of WiFi networks searched, that is, if one or multiple WiFi networks are searched, then one/multiple MAC addresses will be transmitted. If none is searched, then none will be transmitted.)
	WIFI1 Strength	1	It indicates the strength of WiFi1.
	WIFI MAC2	6	As above
	WIFI2 Strength	1	As above
	/		/
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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) Response by server to WiFi packet

No reply is required from the server.

11. WiFi Information Packet over 4G (0xa2) (V1.0)

Description:

- It is used to transmit the packet received by the terminal from the WiFi network.

a) WiFi packet sent by terminal

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0xA2
Information Content	UTC	6	Year (1 byte) Month (1 byte) Day (1 byte) Hour (1 byte) Minute (1 byte) Second (1 byte) (which must convert to decimal)
	MCC	2	It is the abbreviation of Mobile Country Code, which indicates the country to which a mobile subscriber belongs.
	MNC	1 (or 2)	Mobile Network Code (see the following note for length detail)
	LAC	4	It is the abbreviation of Location Area Code.
	CI	8	It is the abbreviation of Cell Tower ID.
	RSSI	1	It indicates the signal strength of a cell. Its value range is 0x00–0xFF, where "0x00" indicates the signal is the weakest; while "0xFF" the 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
	Timing Advance	1	It refers to the difference between the actual length of time that a signal takes to reach the base station from a mobile station and the length of time that a signal takes to reach the base station from a mobile station when the distance between the two is "0".
	Number of WiFi Networks	1	It is used to determine the number of WiFi networks carried in the packet. "0" means no WiFi is detected.
	WIFI MAC1	6	It is the MAC address of WiFi1 received (transmitted based on the actual number of WiFi networks searched, that is, if one or multiple WiFi networks are searched, then one/multiple MAC addresses will be transmitted. If none is searched, then none will be transmitted.)
	WIFI1 Strength	1	It indicates the strength of WiFi1.
	WIFI MAC2	6	As above
	WIFI2 Strength	1	As above
	/		/
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 78 78 95 A2 15 08 11 01 25 08 01 CC 00 00 00 24 7F 00 00 00 00 03 3B 36 8D 36 00 00 24 7F 00 00 00 00 0A 80 8A 0D 27 00 00 24 7F 00 00 00 00 03 3B 36 8C 20 00 00 24 7F 00 00 00 00 0A 80 8A 0C 23 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 FF 06 78 57 73 3F F1 60 31 00 5A 13 64 C1 F0 32 78 57 73 3F F1 61 3D 78 57 73 3F F1 62 3E 78 57 73 3F F1 63 3E 78 57 73 3F F0 41 50 02 D6 52 71 0D 0A

Note: As the MNC of some countries occupies 2 bytes, we use the MSB in MCC to differentiate the length of MNC. When the MSB in MCC

is "1", the length of the MNC is "2". For shipped devices, Bit15 is "0" by default; while for newly-shipped devices, Bit15 is "1".

MCC bits

Bit		Code Connotation
BYTES	Bit15	1: The length of MNC is 2
		0: The length of MNC is 1
	Bit0–bit14	MCC information

b) Response by server to WiFi packet

No reply is required from the server.

12. 2G Alarm Packet (0x27) (V1.0)

Description:

- It is used to transmit the terminal-defined alarm content.
- The server responds to the alarm content received and sends the address parsed from the longitude and latitude to the terminal.
- Then the terminal sends the address received to the preset SOS number.

a) Alarm packet (multiple geofences)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x27 (UTC)
Information Content	Date and time	6	Year (1 byte) Month (1 byte) Day (1 byte) Hour (1 byte) Minute (1 byte) Second (1 byte) (which must convert to decimal)
	Number of Satellites	1	The first character refers to GPS Information Length; while the second character refers to Number of Satellites that involve in positioning (which must convert to decimal).
	Latitude	4	It is a value calculated by converting to decimal which is further divided by 1,800,000.
	Longitude	4	It is a value calculated by converting to decimal which is further divided by 1,800,000.
	Speed	1	It is a value in decimal.
	Course and Status	2	Convert to a 16-bit binary. Please calculate by bit (see GPS location packet for details).
	LBS length	1	Total length of LBS information (Self-length + MCC + MNC + LAC + CellID)
	MCC	2	Mobile Country Code (convert to decimal) The MSB in MCC is 1 and the MNC occupies 2 bytes.
	MNC	1 (or 2)	Mobile Network Code (convert to decimal)
	LAC	2	Location Area Code (convert to decimal)
	Cell ID	3	Cell Tower ID (convert to decimal)
	Terminal information	1	See the following table for details.
	Voltage Level	1	0X00: No power (power off) 0x01: Battery extremely low (making calls or sending SMS's are impossible) 0x02: Battery very low (low battery alert will be triggered) 0x03: Battery low (the device can be used as usual) 0x04: Battery medium 0x05: Battery high 0x06: Battery extremely high

	GSM signal strength	1	0X00: No signal; 0x01: Extremely weak signal; 0x02: Weak signal; 0x03: Good signal; 0x04: Strong signal
	Alert and language	2	See the following table for details.
	Fence No.	1	This byte is valid for geofence alerts. 0: Fence No. 1; 1: Fence No. 2; …; FF: Invalid
	Mileage statistics **(vehicle trackers)**	4	Convert to decimal to get the result (for products without this feature, there is no such place in the packet)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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

ii. Terminal information details

Bit		Code Connotation
BYTE	Bit7	1: Cut off fuel/power
		0: Restore fuel/power
	Bit6	1: Position fixed
		0: Not Positioned
	Bit3–Bit5	~~100: SOS~~
		011: Low battery alert
		~~010: Power cutoff~~
		~~001: Vibrating alert~~
		000: Normal
	Bit2	1: Charge with power connected
		0: Charge with no power connected
	Bit1	1: ACC on
		0: ACC off
	Bit0	1: Defense on
		0: Defense off

iii. Alarm and Language Details

Byte 1	0x00: Normal
	0x01: SOS alert
	0x02: Power cut alert
	0x03: Vibrating alert
	0x04: Entered fence alert
	0x05: Left fence alert
	0x06: Speed alert
	0x09: Tow/theft alert

	0x0A: Entered GPS blind spot alert
	0x0B: Left GPS blind spot alert
	0x0C: Powered on alert
	0x0D: GPS first fix alert
	0x10: SIM changed alert
	0x11: Powered off alert
	0x13: Tamper alert
	0x15: Powered off due to low battery
	0x16: Sound-control alert
	0x17: Rogue base station detected alert
	0x18: Cover removed alert
	0x19: Low internal battery alert
	0x21: Reserved
	0x22: Reserved
	0x3E: Key press event report
	0xFF: ACC OFF
	0xFE: ACC ON
Byte 2	0x01: Chinese 0x02: English 0x00: No reply from the platform is required

Note: As alerts accumulate, the alerts and alarm bytes in the terminal information may overlap, in which case the alarm byte will be regarded as the baseline. That means when the alarm byte is "0x00", the alarm content in the terminal information can be determined.

a) Return packet (from server)

	Length	Details
Start Bit	2	0x78 0x78
Packet Length	1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number	1	0x26 (UTC)
Information SN	2	The SN will be automatically added by "1" for each data sending after power-on.
CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

Example data: 78 78 05 27 00 1C C7 5A 0D 0A

b) Server returns the Chinese address

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x17
Information Content	Length	1	It is the length of the data between the server flag bit and the information SN.

	Server flag bit	4	It is used by the server to mark the specific alert.
	ALARMSMS	8	Alarm code flag (ASCII)
	&&	2	Alarm code flag (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is "0" for all uploaded alarm packets (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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 00 23 23 00 1C EA 97 0D 0A

c) Server returns the English address

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x97
Information Content	Length	2	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ALARMSMS	8	Alarm code flag (ASCII)
	&&	2	Alarm code flag (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is "0" for all uploaded alarm packets (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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 00 23 23 00 69 15 9B 0D 0A

13. 4G Alarm Packet (0xa4) (V1.0)

Description:

- It is used to transmit the terminal-defined alarm content.
- The server responds to the alarm content received and sends the address parsed from the longitude and latitude to the terminal.
- Then the terminal sends the address received to the preset SOS number.

a) Alarm packet (multiple geofences)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0xA4 (UTC)
Information Content	Date and time	6	Year (1 byte) Month (1 byte) Day (1 byte) Hour (1 byte) Minute (1 byte) Second (1 byte) (which must convert to decimal)
	Number of Satellites	1	The first character refers to GPS Information Length; while the second character refers to Number of Satellites that involve in positioning (which must convert to decimal).
	Latitude	4	It is a value calculated by converting to decimal which is further divided by 1,800,000.
	Longitude	4	It is a value calculated by converting to decimal which is further divided by 1,800,000.
	Speed	1	It is a value in decimal.
	Course and Status	2	Convert to a 16-bit binary. Please calculate by bit (see GPS location packet for details).
	LBS length	1	Total length of LBS information (Self-length + MCC + MNC + Cell ID)
	MCC	2	Mobile Country Code (convert to decimal)
	MNC	1 (or 2)	Mobile Network Code (see the following note for length details)
	LAC	4	Location Area Code (convert to decimal)
	Cell ID	8	Cell Tower ID (convert to decimal)
	Terminal information	1	See the following table for details.
	Voltage Level	1	0x00: No power (power off) 0x01: Battery extremely low (making calls or sending SMS's are impossible) 0x02: Battery very low (low battery alert will be triggered) 0x03: Battery low (the device can be used as usual) 0x04: Battery medium 0x05: Battery high 0x06: Battery extremely high

	GSM signal strength	1	0X00: No signal; 0x01: Extremely weak signal; 0x02: Weak signal; 0x03: Good signal; 0x04: Strong signal
	Alert and language	2	See the following table for details.
	Fence No.	1	This byte is valid for geofence alerts. 1: Fence No. 2; 1: Fence No. 2; …; FF: Invalid
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data:78 78 2D A4 15 08 17 07 3B 10 CF 03 2E EA 9C 0B 6C E0 80 00 15 14 10 01 CC 01 00 00 9A 00 00 00 00 00 0A 6F 24 01 46 05 04 13 02 FF 01 90 8A 64 0D 0A

Note: As the MNC of some countries occupies 2 bytes, we use the MSB in MCC to differentiate the length of MNC. When the MSB in MCC

is "1", the length of the MNC is "2". For shipped devices, Bit15 is "0" by default; while for newly-shipped devices, Bit15 is "1".

MCC bits

Bit		Code Connotation
BYTES	Bit15	1: The length of MNC is 2
		0: The length of MNC is 1
	Bit0–bit14	MCC information

i. Terminal information details

Bit		Code Connotation
BYTE	Bit7	1: Cut off fuel/power
		0: Restore fuel/power
	Bit6	1: Position fixed
		0: Not Positioned
	Bit3–Bit5	~~100: SOS~~
		011: Low battery alert
		~~010: Power cutoff~~
		~~001: Vibrating alert~~
		000: Normal
	Bit2	1: Charge with power connected
		0: Charge with no power connected
	Bit1	1: ACC on
		0: ACC off
	Bit0	1: Defense on

		0: Defense off

ii. Alarm and language details

Byte 1	0x00: Normal
	0x01: SOS alert
	0x02: Power cut alert
	0x03: Vibrating alert
	0x04: Entered fence alert
	0x05: Left fence alert
	0x06: Speed alert
	0x09: Tow/theft alert
	0x0A: Entered GPS blind spot alert
	0x0B: Left GPS blind spot alert
	0x0C: Powered on alert
	0x0D: GPS first fix alert
	0x10: SIM changed alert
	0x11: Powered off alert
	0x13: Tamper alert
	0x15: Powered off due to low battery
	0x16: Sound-control alert
	0x17: Rogue base station detected alert
	0x18: Cover removed alert
	0x19: Low internal battery alert
	0x20: Entered deep sleep mode alert
	0x21: Reserved
	0x22: Reserved
	0xFF: ACC OFF
	0xFE: ACC ON
Byte 2	0x01: Chinese 0x02: English 0x00: No reply from the platform is required

a) Return packet (from server)

	Length	Details
Start Bit	2	0x78 0x78
Packet Length	1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number	1	0x26 (UTC)
Information SN	2	The SN will be automatically added by "1" for each data sending after power-on.
CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).

Stop Bit	2	It is fixed at 0x0D 0x0A.

b) Server returns the Chinese address

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x17
Information Content	Length	1	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ALARMSMS	8	Alarm code flag (ASCII)
	&&	2	Alarm code flag (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is "0" for all uploaded alarm packets (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

c) Server returns the English address

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		2	0x97
Information Content	Length	1	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ALARMSMS	8	Alarm code flag (ASCII)
	&&	2	Alarm code flag (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is "0" for all uploaded alarm packets (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

14. GPS Address Request Packet (0x2a) (V1.0)

Description:

- **The user sends an address request command to the terminal, which sends an address request packet to the server to request for address parsing.**
- **Then the terminal sends the address parsed and returned by the server to the user.**

a) Address request packet (sent by terminal)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x2A
Information Content	Date and time	6	Year (1 byte) Month (1 byte) Day (1 byte) Hour (1 byte) Minute (1 byte) Second (1 byte) (which must convert to decimal)
	Number of Satellites	1	The first character refers to GPS Information Length; while the second character refers to Number of Satellites that involve in positioning (which must convert to decimal).
	Latitude	4	It is a value calculated by converting to decimal which is further divided by 1,800,000.
	Longitude	4	It is a value calculated by converting to decimal which is further divided by 1,800,000.
	Speed	1	It is a value in decimal.
	Course and Status	2	Convert to a 16-bit binary. Please calculate by bit (see GPS location packet for details).
	Phone number	21	Phone number
	Alert and language	2	Latter bit, where "0x01" refers to Chinese and "0x02" English.
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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

b) Server returns the Chinese address

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x17
Information Content	Length	1	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ADDRESS	7	Address request code flag (ASCII)
	&&	2	Separator (ASCII)

	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is the phone number used by the server to transmit back the terminal request packet (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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

c) Server returns the English address

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x97
Information Content	Length	2	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ADDRESS	7	Address request code flag (ASCII)
	&&	2	Separator (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is the phone number used by the server to transmit back the terminal request packet (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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

15. LBS Address Request Packet over 2G (0x17) (V1.0)

Description:

- **The user sends an address request command to the terminal, which sends an address request packet to the server to request for address parsing.**
- **Then the terminal sends the address parsed and returned by the server to the user.**

a) Address request packet (sent by terminal)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x17
Information Content	MCC	2	Mobile Country Code (convert to decimal)
	MNC	1 (or 2)	Mobile Network Code (convert to decimal)
	LAC	2	Location Area Code (convert to decimal)
	Cell ID	3	Cell Tower ID (convert to decimal)
	Phone number	21	Phone number
	Alert and language	2	Latter bit, where "0x01" refers to Chinese and "0x02" English.
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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

Note: As the MNC of some countries occupies 2 bytes, we use the MSB in MCC to differentiate the length of MNC. When the MSB in MCC is "1", the length of the MNC is "2". For shipped devices, Bit15 is "0" by default; while for newly-shipped devices, Bit15 is "1".

MCC bits

Bit		Code Connotation
BYTES	Bit15	1: The length of MNC is 2
		0: The length of MNC is 1
	Bit0–bit14	MCC information

b) Server returns the Chinese address

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x17
Information Content	Length	1	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ADDRESS	7	Address request code flag (ASCII)

	&&	2	Separator (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is the phone number used by the server to transmit back the terminal request packet (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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

c) Server returns the English address

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x97
Information Content	Length	2	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ADDRESS	7	Address request code flag (ASCII)
	&&	2	Separator (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is the phone number used by the server to transmit back the terminal request packet (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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

16. LBS Address Request Packet over 4G (0xa7) (V1.0)

Description:

- **The user sends an address request command to the terminal, which sends an address request packet to the server to request for address parsing.**

- **Then the terminal sends the address parsed and returned by the server to the user.**

a) Address request packet (sent by terminal)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0xA7
Information Content	MCC	2	Mobile Country Code (convert to decimal)
	MNC	1 (or 2)	Mobile Network Code (see the following note for length details)
	LAC	4	Location Area Code (convert to decimal)
	Cell ID	8	Cell Tower ID (convert to decimal)
	Phone number	21	Phone number
	Alert and language	2	Latter bit, where "0x01" refers to Chinese and "0x02" English.
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example:

b) Server returns the Chinese address

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x17
Information Content	Length	1	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ADDRESS	7	Address request code flag (ASCII)
	&&	2	Separator (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is the phone number used by the server to transmit back the terminal request packet (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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

c) Server returns the English address

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x97
Information Content	Length	1	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ADDRESS	7	Address request code flag (ASCII)
	&&	2	Separator (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is the phone number used by the server to transmit back the terminal request packet (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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

Note: As the MNC of some countries occupies 2 bytes, we use the MSB in MCC to differentiate the length of MNC. When the MSB in MCC

is "1", the length of the MNC is "2". For shipped devices, Bit15 is "0" by default; while for newly-shipped devices, Bit15 is "1".

MCC bits

Bit		Code Connotation
BYTES	Bit15	1: The length of MNC is 2
		0: The length of MNC is 1
	Bit0–bit14	MCC information

17. LBS Alarm Packet over 2G (0x19) (V1.0)

Description:

- It is used to transmit the terminal-defined alarm content.
- The server responds to the alarm content received and sends the address parsed from the LBS information to the terminal.
- Then the terminal sends the address received to the preset SOS number.

a) Alarm packet (sent by terminal)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x19
Information Content	MCC	2	Mobile Country Code (convert to decimal)
	MNC	1 (or 2)	Mobile Network Code (convert to decimal)
	LAC	2	Location Area Code (convert to decimal)
	Cell ID	3	Cell Tower ID (convert to decimal)
	Terminal information	1	See the following table for details.
	Voltage Level	1	0x00: No power (power off) 0x01: Battery extremely low (making calls or sending SMS's are impossible) 0x02: Battery very low (low battery alert will be triggered) 0x03: Battery low (the device can be used as usual) 0x04: Battery medium 0x05: Battery high 0x06: Battery extremely high AM01 smart ankle bracelet: It uses percentage to indicate the battery strength, wherein 0x5a refers to 90%.
	GSM signal strength	1	0X00: No signal; 0x01: Extremely weak signal; 0x02: Weak signal; 0x03: Good signal; 0x04: Strong signal
	Alert and language	2	See the following table for details.
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

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

Note: As the MNC of some countries occupies 2 bytes, we use the MSB in MCC to differentiate the length of MNC. When the MSB in MCC is "1", the length of the MNC is "2". For shipped devices, Bit15 is "0" by default; while for newly-shipped devices, Bit15 is "1".

MCC bits

Bit		Code Connotation
BYTES	Bit15	1: The length of MNC is 2
		0: The length of MNC is 1

	Bit0–bit14	MCC information

ii. Terminal information details

Bit		Code Connotation
BYTE	Bit7	1: Cut off fuel/power
		0: Restore fuel/power
	Bit6	1: Position fixed
		0: Not Positioned
	Bit3–Bit5	~~100: SOS~~
		011: Low battery alert
		~~010: Power cutoff~~
		~~001: Vibrating alert~~
		000: Normal
	Bit2	1: Charge with power connected
		0: Charge with no power connected
	Bit1	1: ACC on
		0: ACC off
	Bit0	1: Defense on
		0: Defense off

iii. Alarm and Language Details

Byte 1	0x00: Normal
	0x01: SOS alert
	0x02: Power cut alert
	0x03: Vibrating alert
	0x04: Entered fence alert
	0x05: Left fence alert
	0x06: Speed alert
	0x09: Tow/theft alert
	0x0A: Entered GPS blind spot alert
	0x0B: Left GPS blind spot alert
	0x0C: Powered on alert
	0x0D: GPS first fix alert
	0x0E: Low external power alert
	0x0F: External power low voltage protection alert
	0x10: SIM changed alert
	0x11: Powered off alert
	0x12: Airplane mode on following external power low voltage protection
	0x13: Tamper alert
	0x14: Door alert
	0x15: Powered off due to low battery
	0x16: Sound-control alert
	0x17: Rogue base station detected alert
	0x18: Cover removed alert
	0x19: Low internal battery alert
	0x1B: Suspected of leaving the herd
	0x20: Entered deep sleep mode alert (airplane mode)
	0x21: Reserved

	0x22: Reserved
	0x23: Fall alert
	0x24: Charger connected alert
	0x25: Light detected alert
	0x26: Moving away from the Bluetooth zone alert
	0x27: Wire cut alert
	0x28: Solicited offline (powered off) alert
	0x3E: Key press event report
Byte 2	0x01: Chinese 0x02: English 0x00: No reply from the platform is required

b) Return packet (from server)

	Length	Details
Start Bit	2	0x78 0x78
Packet Length	1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number	1	0x26 (UTC)
Information SN	2	The SN will be automatically added by "1" for each data sending after power-on.
CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

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

c) Server returns the Chinese address

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x17
Information Content	Length	1	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ALARMSMS	8	Alarm code flag (ASCII)
	&&	2	Alarm code flag (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is "0" for all uploaded alarm packets (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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 00 00 23 23 00 1C EA 97 0D 0A

d) Server returns the English address

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x97
Information Content	Length	2	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ALARMSMS	8	Alarm code flag (ASCII)
	&&	2	Alarm code flag (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is "0" for all uploaded alarm packets (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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 00 00 23 23 00 69 15 9B 0D 0A

18. LBS Alarm Packet over 4G (0xa5) (V1.0)

Description:

- It is used to transmit the terminal-defined alarm content.
- The server responds to the alarm content received and sends the address parsed from the LBS information to the terminal.
- Then the terminal sends the address received to the preset SOS number.

a) Alarm packet (sent by terminal)

	Length	Details
Start Bit	2	0x78 0x78

Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0xA5
Information Content	MCC	2	Mobile Country Code (convert to decimal)
	MNC	1 (or 2)	Mobile Network Code (see the following note for length details)
	LAC	4	Location Area Code (convert to decimal)
	Cell ID	8	Cell Tower ID (convert to decimal)
	Terminal information	1	See the following table for details.
	Voltage Level	1	0x00: No power (power off) 0x01: Battery extremely low (making calls or sending SMS's are impossible) 0x02: Battery very low (low battery alert will be triggered) 0x03: Battery low (the device can be used as usual) 0x04: Battery medium 0x05: Battery high 0x06: Battery extremely high
	GSM signal strength	1	0X00: No signal; 0x01: Extremely weak signal; 0x02: Weak signal; 0x03: Good signal; 0x04: Strong signal
	Alert and language	2	See the following table for details.
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 78 78 19 A5 01 CC 01 00 00 9A 00 00 00 00 00 0A 6F 24 01 0E 05 04 03 00 01 88 D3 3A 0D 0A

Note: As the MNC of some countries occupies 2 bytes, we use the MSB in MCC to differentiate the length of MNC. When the MSB in MCC

is "1", the length of the MNC is "2". For shipped devices, Bit15 is "0" by default; while for newly-shipped devices, Bit15 is "1".

MCC bits

Bit		Code Connotation
BYTES	Bit15	1: The length of MNC is 2
		0: The length of MNC is 1
	Bit0–bit14	MCC information

Example data:

i. Terminal information details

Bit		Code Connotation
BYTE	Bit7	1: Cut off fuel/power
		0: Restore fuel/power
	Bit6	1: Position fixed
		0: Not Positioned
	Bit3–Bit5	~~100: SOS~~
		011: Low battery alert
		~~010: Power cutoff~~
		~~001: Vibrating alert~~
		000: Normal
	Bit2	1: Charge with power connected
		0: Charge with no power connected
	Bit1	1: ACC on
		0: ACC off
	Bit0	1: Defense on
		0: Defense off

ii. Alarm and language details

Byte 1	0x00: Normal
	0x01: SOS alert
	0x02: Power cut alert
	0x03: Vibrating alert
	0x04: Entered fence alert
	0x05: Left fence alert
	0x06: Speed alert
	0x09: Tow/theft alert
	0x0A: Entered GPS blind spot alert
	0x0B: Left GPS blind spot alert
	0x0C: Powered on alert
	0x0D: GPS first fix alert
	0x10: SIM changed alert
	0x11: Powered off alert
	0x12: Airplane mode on following external power low voltage protection
	0x13: Tamper alert
	0x14: Door alert
	0x15: Powered off due to low battery
	0x16: Sound-control alert
	0x17: Rogue base station detected alert
	0x18: Cover removed alert
	0x19: Low internal battery alert
	0x20: Entered deep sleep mode alert

	0x21: Reserved
	0x22: Reserved
	0xFF: ACC OFF
	0xFE: ACC ON
Byte 2	0x01: Chinese 0x02: English 0x00: No reply from the platform is required

b) Return packet (from server)

	Length	Details
Start Bit	2	0x78 0x78
Packet Length	1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number	1	0x26 (UTC)
Information SN	2	The SN will be automatically added by "1" for each data sending after power-on.
CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

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

c) Server returns the Chinese address

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x17
Information Content	Length	1	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ALARMSMS	8	Alarm code flag (ASCII)
	&&	2	Alarm code flag (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is "0" for all uploaded alarm packets (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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 00 00 23 23 00 1C EA 97 0D 0A

d) Server returns the English address

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		2	0x97
Information Content	Length	1	It is the length of the data between the server flag bit and the information SN.
	Server flag bit	4	It is used by the server to mark the specific alert.
	ALARMSMS	8	Alarm code flag (ASCII)
	&&	2	Alarm code flag (ASCII)
	Address content	M	It is the address parsed by the server (UNICODE)
	&&	2	Separator (ASCII)
	Phone number	21	It is "0" for all uploaded alarm packets (ASCII)
	##	2	Separator (ASCII)
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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 00 00 23 23 00 69 15 9B 0D 0A

19. Online Command (0x80) (V1.0)

Description:

- **It is assigned by the server and used to control the terminal to execute tasks.**
- **The terminal then responds to the server with the execution results.**

a) Online command (sent by server)

		Length	Details
Start Bit		2	0x78 0x78
Packet Length		1	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x80
Information Content	Length	1	Server flag bit + command content length
	Server Flag Bit	4	It is reserved for server recognition. The terminal returns to the server the data it receives as it is in binary in a return packet.
	Command Content	M	It is a character string in ASCII. It is compatible with SMS command.
	Language	2	Latter bit, where "0x01" refers to Chinese and "0x02" English.
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 Fragments of CRC Lookup Table in C for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

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

b) The terminal responds to the online command (0x21)

Return packet sent by the terminal (universal command)

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x21
Information Content	Server Flag Bit	4	It is reserved for server recognition. The terminal returns to the server the data it receives as it is in binary in a return packet.
	Code	1	0x01: ASCII code 0x02: UTF16-BE code
	Content	M	It refers to the data to be sent (by the coding format).
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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

20. General Information Transmission Packet (0x94) (V1.0)

Description:

- **It is used to transmit all kinds of non-location data.**

a) Information transmission packet (sent by terminal)

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x94
Information Content	Information type (sub-protocol No.)	1	**(Container trackers)** 00: Voltage of external power **(domestic yak trackers)** ~~00: Voltage of external power~~ **(container trackers)** 01-03 (customized) **(domestic yak trackers)** ~~01-03 (customized)~~ **(container trackers)** 04: Terminal status synchronization **(domestic yak trackers)** ~~04: Terminal status synchronization~~ **(container trackers)** 05: Door status **(domestic yak trackers)** ~~05: Door status~~ **(Container trackers)** 08: Self-check parameters **(domestic yak trackers)** ~~**08: Self-check parameters**~~ **(Container trackers)** 0x09: Satellite status **(domestic yak trackers)** ~~0x09: Satellite status~~ (**Vehicle and OBD trackers)** 09: Location satellite information (**Container and OBD trackers)** 0x0A: ICCID **(domestic yak trackers)** ~~0x0A: ICCID~~ 0x0C: Data uploaded by the fuel level sensor and other sensors 0x0D: Data uploaded by the sensor of DS1309 **(Vehicle trackers) 0x1B**: Cost counter **(Container trackers)**0x11: Vibrating count (customized) **(domestic yak trackers)** ~~0x11: Vibrating count (customized)~~ 0x15: MAC addresses of similar neighbor Bluetooth devices (JM66) 0x16: Activity data (JM66 and JM69) 0x17: Environment information (JM66) 0x20: Upload VIN **0x22**: Device status information (container trackers)

			Vehicle trackers: 1B RFID 0x24: Transparent transmission of steps, temperature, battery, and solar energy over Bluetooth (GEN2 domestic yak trackers) 0x25: Administrator list update flag (timestamp) 0x26: Safety zone update flag (timestamp) 0x27: Transparent transmission of solar charging information (GEN2 domestic yak trackers) 0x28: GSM timestamp + over-Bluetooth data transparent transmission (GEN2 domestic yak trackers) 0x29: Upload instant activity data (GEN2 domestic yak tracker) 0x30: Bluetooth pair code (content format: ASCII) 0x1C: GT800 long-term logistics radar information 0x1D: Soft external power voltage 0x1E: Collect temperature and humidity data (GT420D) 0x1F: Temperature sensing (data content: temperature in 2 bytes [Big Endian]) …… To be added
	Data content	N	Different content will be transmitted according to different information types. For details, see the table below.
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Example data: 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

Transferred information content

(Container, vehicle, and OBD trackers) When the information type is "00", it carries the voltage of the external power, which is a 2-digit hex. The hex is then converted into a decimal and further divided by 100. Take "0x04,0x9F" for example, "049F" is

1183 in decimal and is 11.83 after being divided by 100, which means the voltage of the external power is 11.83V.

Definition	ID
Byte (2)	Voltage
Byte (1)	ID (optional)

(Container, vehicle, and OBD trackers) When the information type is "04", it carries the terminal status synchronization information and is of variable-length in ASCII coding.

([Vehicle trackers feature no such parsing method] Parsing method: Extract the information content from the packet, convert the ASCII code into characters, and then parse identifiers (IDs) one by one according to definitions of these IDs.)

Content IDs

Definition	ID
Alarm byte 1	ALM1
Alarm byte 2	ALM2
Alarm byte 3	ALM3
Alarm byte 4	ALM4
Status byte 1	STA1
SOS number	SOS
Center number	CENTER
Geofence	FENCE
Fuel/power cutoff status	DYD
Mode	MODE
IMSI **(vehicle and OBD trackers have no such parameter)**	IMSI
ICCID **(vehicle and OBD trackers have no such parameter)**	ICCID
From power-on to login success **(vehicle and OBD trackers have no such parameter)**	STARTTIME
Login packet count **(vehicle and OBD trackers have no such parameter)**	LOGINPACKET
Restart retries **(vehicle and OBD trackers have no such parameter)**	RESTART

² **ALM1 (status)**

Bit	Definition	Remarks
bit7	Vibrating alert	1: ON; 0: OFF
bit6	Alert via GPRS	1: ON; 0: OFF
bit5	Alert via call	1: ON; 0: OFF
bit4	Alert via SMS	1: ON; 0: OFF
bit3	Tow/theft alert	1: ON; 0: OFF
bit2	Alert via GPRS	1: ON; 0: OFF
bit1	Alert via call	1: ON; 0: OFF
bit0	Alert via SMS	1: ON; 0: OFF

² ALM2 (status)

Bit	Definition	Remarks
bit7	Low internal battery alert	1: ON; 0: OFF
bit6	Alert via GPRS	1: ON; 0: OFF
bit5	Alert via call	1: ON; 0: OFF
bit4	Alert via SMS	1: ON; 0: OFF
bit3	Low external power alert	1: ON; 0: OFF
bit2	Alert via GPRS	1: ON; 0: OFF
bit1	Alert via call	1: ON; 0: OFF
bit0	Alert via SMS	1: ON; 0: OFF

² ALM3 (status)

Bit	Definition	Remarks
bit7	Speed Alert	1: ON; 0: OFF
bit6	Alert via GPRS	1: ON; 0: OFF
bit5	Alert via call	1: ON; 0: OFF
bit4	Alert via SMS	1: ON; 0: OFF
bit3	Power Cut Alert	1: ON; 0: OFF
bit2	Alert via GPRS	1: ON; 0: OFF
bit1	Alert via call	1: ON; 0: OFF
bit0	Alert via SMS	1: ON; 0: OFF

² ALM3 (status)

Bit	Definition	Remarks
bit7	SOS alert	1: ON; 0: OFF
bit6	Alert via GPRS	1: ON; 0: OFF

bit5	Alert via call	1: ON; 0: OFF
bit4	Alert via SMS	1: ON; 0: OFF
bit3	Voice control alert	1: ON; 0: OFF
bit2	Alert via GPRS	1: ON; 0: OFF
bit1	Alert via call	1: ON; 0: OFF
bit0	Alert via SMS	1: ON; 0: OFF

² ALM3 (status)

Bit	Definition	Remarks
bit7	Defense status	1: Defense on; 0: Defense off
bit6	Auto defense	1: ON; 0: OFF
bit5	Manual defense	1: ON; 0: OFF
bit4	Remote cancellation of defense	1: ON; 0: OFF
bit3	Remote vehicle lock	1: ON; 0: OFF
bit2	To be defined	
bit1	Tamper switch	1: Close; 0: Open 1: No light; 0: With light
bit0	Tamper alert	1: ON; 0: OFF

Fuel/power cutoff status

Bit	Definition	Remarks
bit7	Undefined	
bit6	Undefined	
bit5	Undefined	
bit4	Undefined	
bit3	Delay execution because the speed is too high	1: Valid; 0: Invalid
bit2	Delay execution because the terminal is not positioned	1: Valid; 0: Invalid
bit1	Cut off fuel/power (or GT520 is not started)	1: Valid; 0: Invalid
bit0	Connect fuel/power (or GT520 is started)	1: Valid; 0: Invalid

- **SOS: It transmits in ASCII coding (multiple SOS numbers are separated by commas [,]).**
- **Center number: It transmits in ASCII coding.**
- **Geo-fence: It transmits in ASCII coding.**
- **Mode: It transmits in ASCII coding (parameters are separated by commas [,]).**

(Pet trackers) When the information type is "04", it carries the terminal status synchronization information and is of variable-length in ASCII coding.

(Parsing method: Extract the information content from the packet, convert the ASCII code into characters, and then parse IDs one by one according to definitions of these IDs.)

Content IDs

Definition	ID
~~Alarm byte 1~~	~~ALM1~~
Alarm byte 2	ALM2
Alarm byte 3	ALM3
~~Alarm byte 4~~	~~ALM4~~
~~Status byte 1~~	~~STA1~~
SOS number	SOS
~~Center number~~	~~CENTER~~
Geofence	FENCE
~~Fuel/power cutoff status~~	~~DYD~~
Mode	MODE
IMSI	IMSI
ICCID	ICCID
~~From start to login success~~	~~STARTTIME~~
~~Login packet count~~	~~LOGINPACKET~~
~~Restart retries~~	~~RESTART~~

- **~~ALM1 (status)~~**

~~Bit~~	~~Definition~~	~~Remarks~~
~~bit7~~	~~Vibrating alert~~	~~1: ON; 0: OFF~~
~~bit6~~	~~Alert via GPRS~~	~~1: ON; 0: OFF~~
~~bit5~~	~~Alert via call~~	~~1: ON; 0: OFF~~

bit4	Alert via SMS	1: ON; 0: OFF
bit3	Tow/theft alert	1: ON; 0: OFF
bit2	Alert via GPRS	1: ON; 0: OFF
bit1	Alert via call	1: ON; 0: OFF
bit0	Alert via SMS	1: ON; 0: OFF

² ALM2 (status)

Bit	Definition	Remarks
bit7	Low internal battery alert	1: ON; 0: OFF
bit6	Alert via GPRS	1: ON; 0: OFF
bit5	Alert via call	1: ON; 0: OFF
bit4	Alert via SMS	1: ON; 0: OFF
bit3	Low external battery alert	1: ON; 0: OFF
bit2	Alert via GPRS	1: ON; 0: OFF
bit1	Alert via call	1: ON; 0: OFF
bit0	Alert via SMS	1: ON; 0: OFF

² ALM3 (status)

Bit	Definition	Remarks
bit7	Speed Alert	1: ON; 0: OFF
bit6	Alert via GPRS	1: ON; 0: OFF
bit5	Alert via call	1: ON; 0: OFF
bit4	Alert via SMS	1: ON; 0: OFF
bit3	Power Cut Alert	1: ON; 0: OFF
bit2	Alert via GPRS	1: ON; 0: OFF
bit1	Alert via call	1: ON; 0: OFF
bit0	Alert via SMS	1: ON; 0: OFF

² ALM3 (status)

Bit	Definition	Remarks
bit7	SOS alert	1: ON; 0: OFF
bit6	Alert via GPRS	1: ON; 0: OFF
bit5	Alert via call	1: ON; 0: OFF
bit4	Alert via SMS	1: ON; 0: OFF
bit3	Voice control alert	1: ON; 0: OFF
bit2	Alert via GPRS	1: ON; 0: OFF
bit1	Alert via call	1: ON; 0: OFF
bit0	Alert via SMS	1: ON; 0: OFF

² ALM3 (status)

Bit	Definition	Remarks
bit7	Defense status	1: Defense on; 0: Defense off

bit6	Auto defense	1: ON; 0: OFF
bit5	Manual defense	1: ON; 0: OFF
bit4	Remote cancellation of defense	1: ON; 0: OFF
bit3	To be defined	
bit2	To be defined	
bit1	Tamper switch	1: Close; 0: Open
bit0	Tamper alert	1: ON; 0: OFF

Fuel/power cutoff status

Bit	Definition	Remarks
bit7	Undefined	
bit6	Undefined	
bit5	Undefined	
bit4	Undefined	
bit3	Delay execution because the speed is too high	1: Valid; 0: Invalid
bit2	Delay execution because the terminal is not positioned	1: Valid; 0: Invalid
bit1	Cut fuel/power	1: Valid; 0: Invalid
bit0	Connect fuel/power	1: Valid; 0: Invalid

- **SOS: It transmits in ASCII coding (multiple SOS numbers are separated by commas [,]).**
- **Center number: It transmits in ASCII coding.**
- **Geo-fence: It transmits in ASCII coding.**
- **Mode: It transmits in ASCII coding (parameters are separated by commas [,]).**

  JM69 pet tracker:

  MODE=PWRSAVE (transit mode)

  MODE=TRACKING (tracking mode)

  MODE=WIFI (WIFI scan mode)

  MODE=BT (Bluetooth mode)

For example:
ALM1=FF;ALM2=FF;ALM3=FF;STA1=CO;DYD=01;SOS=12345,2345,5678;CE

NTER=987654; FENCE=FENCE,ON,0,-22.277120,-113.516763,5,IN,1; MODE=TRACKING;

Note: Not all of the content will be transmitted. The platform can parse according to bits. The content uploaded varies with products.

(Container, vehicle, and OBD trackers) When the information type is "05", it carries the detection (door detection) status of the external I/O in hex.

Bit	Definition	Remarks
Bit15	TBD	
Bit14	TBD	
Bit13	TBD	
Bit12	TBD	
Bit11	TBD	
Bit10	Input2 status;	
Bit9	TBD	
Bit8	TBD	
bit7	TBD	
bit6	TBD	
bit5	TBD	
bit4	TBD	
bit3	TBD	
bit2	I/O port status	1: High; 0: Low
bit1	Trigger status	1: Level high; 0: Level low
bit0	Door status	1: ON; 0: OFF

(Container trackers) When the information type is "06", it carries the terminal self-check parameters and is of variable-length in ASCII coding.

(Container, vehicle, and OBD trackers) When the information type is "09", it carries the terminal's satellite status in hex.

GPS module status	1	0x00: No such feature; 0x01: Satellite searching; 0x02: 2D positioning; 0x03: 3D positioning; 0x04: Sleeping
Number of satellites engaged in position fix	1	Based on this the number of transmission strength is determined.
GPS1 strength	1	Strength of GPS location satellite 1
GPS2 strength	1	Strength of GPS location satellite 2
……		
Number of GPS satellites that are visible but not engaged in position fix	1	Based on this the number of transmission strength is determined.
Visible GPS1 Strength	1	Strength of visible satellite 1
Visible GPS2 strength	1	Strength of visible satellite 2
……		

BDS module status	1	0x00: No such feature; 0x01: Satellite searching; 0x02: 2D positioning; 0x03: 3D positioning; 0x04: Sleeping
Number of BDS satellites engaged in position fix	1	This is the basis for determining the volume of satellite signal strength.
BDS1 strength	1	Strength of BDS location satellite 1
BDS2 strength	1	Strength of BDS location satellite 2
……		
Number of BDS satellites that are visible but not engaged in position fix	1	This is the basis for determining the volume of satellite signal strength.
Visible BDS1 strength	1	Strength of visible satellite 1
Visible BDS2 strength	1	Strength of visible satellite 2
……		
Extended bit length	1	It is reserved for feature expansion. If no extended bit is added, then it is "0x00" (Note: For future feature expansion, you are advised to reserve the extended bit during protocol debugging).
Extended bit	N	It changes as the extended bit length changes. When the extended bit length is "0x00", the extended bit will not be transmitted.

(Container, vehicle, and OBD trackers) When the information type is "0A", it carries the ICCID in hex.

IMEI	8	For example: If IMEI is "123456789123456", then the terminal ID is "0x01 0x23 0x45 0x67 0x89 0x12 0x34 0x56".
IMSI	8	For example: If the IMSI is "123456789123456", then the terminal ID is "0x01 0x23 0x45 0x67 0x89 0x12 0x34 0x56".
ICCID	10	For example: If the ICCID is "12345123456789123456", then the terminal ID is "0x12 0x34 0x51 0x23 0x45 0x67 0x89 0x12 0x34 0x56".

When the information type is "0d", it carries the transparent value of the fuel level sensor in ASCII code.

!AIOIL	**!AIOIL**	Special protocol start
02	**02**	The address of the device
021.800	**021.800**	Output value of the fuel level sensor (unit: cm)
000.000	**000.000**	Temperature
412z	**4**	The protocol number of the standard ThinkSonic protocol
	12	Software version
	z	Hardware version
0200	**02**	Number of echoes
	0	Software status code
	0	Hardware status code
2	**2**	Installation status code
06	**06**	Excitation wave multiplier

BF	BF	Verification code

When the information type is "0E", it carries the sensor information. Data of multiple types will be combined and uploaded in (type+data)*n format. Note: The data format is determined by the type.

type=00 fuel level sensor;

type	1	00: Fuel level sensor
path	1	Address
value	2	Reading on the fuel level sensor
unit	1	1: Height; 2: Percentage; 3: Voltage value

(Vehicle trackers) When the information type is "0x10", it carries the Brazilian cost counter information in ASCII coding.

Example data: 79 79 00 4E 94 10 35 41 36 31 32 30 34 43 32 30 33 30 33 30 33 30 33 30 33 30 33 30 33 30 33 30 33 30 45 42 38 39 37 46 30 34 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 35 45 00 09 46 2B 0D 0A

Transmitted information: 5A61204C20303030303030303030EB897F04000000000000000000000000000000005 E(35 41 36 31 32 30 34 43 32 30 33 30 33 30 33 30 33 30 33 30 33 30 33 30 33 30 33 30 45 42 38 39 37 46 30 34 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 35 45)

(Container trackers) When the information type is "0x11", it carries the customized vibrating counts information in a 2-digit hex.

(Domestic yak and pet trackers) When the information type is "15", it carries the MAC information of the herd in hex.

Definition	Length
Number of MAC addresses	2
Date	6
MAC_0 (Native)	6
MAC_1	6
MAC_2	6
MAC_3	6
MAC_4	6
……	……

00 03 11 0A 1B 08 00 00 5A 8C 9F 33 45 78 E0 12 34 56 56 56 E0 12 34 55 55 55

This indicates on 2017-10-27 8:00:00 the Bluetooth MAC address of the current device is 5A 8C 9F 33 45 78. There are two yaks nearby, whose MAC addresses are E0 12 34 56 56 56 and E0 12 34 55 55 55.

(Domestic yak trackers) When the information type is "16", it carries the steps information of the yak. The data comprises of the GSM timestamp and the steps log transparently uploaded via Bluetooth (little endian).

Definition		Length
Timestamp		4
(transparently transmitted)	Timestamp	4
	Steps	4
	Timestamp	4
	Steps	4
	……	……

Max. 48H*8 = 384 bytes

(Pet trackers) When the information type is "16", it carries the activity information, which comprises of the MTK timestamp (big endian) and the steps log transparently uploaded via Bluetooth (little endian).

Definition		Length
MTK timestamp		4
(transparently transmitted)	Timestamp	4
	Steps	4
	Timestamp	4
	Steps	4
	……	……

(Pet and domestic yak trackers) When the information type is "17", it carries the current environment information. The data is uploaded via Bluetooth and transparently transmitted over GSM (little endian).

Definition		Length
	Atmospheric pressure	4
	Temperature	4
	Humidity	4

(OBD trackers) When the information type is "20", it carries the VIN.

The data is the 17-byte VIN acquired from the CAN bus (the CAN protocol normally displays [0x25], [0x26], and [0x27] of the information).

(Container trackers) When the information type is "0x22", it carries the 2-bit device exception information.

Bit	Definition	Remarks
bit7	Pressure low	

bit6	**Pressure high**	
bit5	**Temperature low**	
bit4	**Temperature high**	
bit3	**Left geo fence**	
bit2	**Entered geo fence**	
bit1	**Door opened/closed**	
bit0	**Removed/installed**	**1/0**

Bit	**Definition**	**Remarks**
bit7	**Reserved**	
bit6	**Reserved**	
bit5	**Reserved**	
bit4	**Reserved**	
bit3	**Reserved**	
bit2	**Battery low**	**1/0**
bit1	**Humidity low**	**1/0**
bit0	**Humidity high**	**1/0**

(Vehicle trackers) When the information type is "1B", it carries the RFID information in hex.

RFID	8	For example: If the RFID is "2345678912", then the terminal RFID is "0x23 0x45 0x67 0x89 0x12".

When the information type is "24", it carries the transparently-transmitted Bluetooth information (steps, temperature, battery, and solar energy).

GSM timestamp + Bluetooth data + CRC

Bluetooth data:

Definition		Length
Transparently transmitted	Timestamp	4
	Steps	4
	Temperature	4
	Battery voltage	2

	Solar voltage/current	4
	Timestamp	4
	……	……

When the information type is "25", it carries the administrator list update flag.

Definition		Length
	Timestamp	6

When the information type is "26", it carries the safety zone update flag.

Definition		Length
	Timestamp	6

When the information type is "27", it carries the solar charging information.

GSM timestamp + Bluetooth data

Solar charging information

Definition		Length
Transparently transmitted	Timestamp	4
	Battery voltage	2
	Solar voltage/current	4
	Timestamp	4
	……	……

When the information type is "28", it carries the GSM timestamp + transparently-transmitted Bluetooth data.

Definition		Length
	Current battery voltage	2
	Current voltage of the solar panel	2
	Current charging current	2

When the information type is "29", it carries the GSM timestamp + transparently-transmitted Bluetooth data.

Current instant activity data:

Definition		Length
Transparently transmitted	Current activity data	4

When the information type is "1C", it carries long-term logistics radar information in hex.

Radar	165	15 pieces of information [55 00 3F 5F 7F 85 BF DF FF 3F BA], a total of 165 natives.

Radar information: 55 00 3F 5F 7F 85 BF DF FF 3F BA 55 00 3F 5F 7F 85 BF DF FF 3F BA 55 00 3F 5F 7F 85 BF DF FF 3F BA 55 00 3F 5F 7F 84 BF DF FF 3E BA 55 00 3F 5F 7F 80 BF DF FF 3A BA 55 00 3F 5F 7F 85 BF DF FF 3F BA 55 00 3F 5F 7F 85 BF DF FF 3F BA 55 00 3F 5F 7F 84 BF DF FF 3E BA 55 00 3F 5F 7F 85 BF DF FF 3F BA 55 00 3F 5F 7F 85 BF DF FF 3F BA 55 00 3F 5F 7F 85 BF DF FF 3F BA 55 00 3F 5F 7F 84 BF DF FF 3E BA 55 00 3F 5F 7F 84 BF DF FF 3E BA 55 00 3F 5F 7F 84 BF DF FF 3E BA 55 00 3F 5F 7F 80 BF DF FF 3A BA

When the information type is "1D", the data contains the voltage data of the external power in N consecutive seconds.

The voltage data of one second is represented by a 2-digit hex. The hex is then converted into a decimal and further divided by 100. Take "0x04,0x9F" for example, "049F" is 1183 in decimal and is 11.83 after being divided by 100, which means the voltage of the external power is 11.83V.

EXTADC	N	UTC timestamp (4-byte) Upload second count n (1–120) (1-byte) Voltage data (2-byte*n)

For example: Upload 3s voltage data 5C E7 30 32 03 04 9F 04 9F 04 9F

Timestamp (5CE73032)

Second count (03)

Convert consecutive separate voltage data (049F 049F 049F) to decimal value and then divide the decimal value by 100, the following results are got: 11.83V, 11.83V, and 11.83V.

(GT420D) When the information type is "1E", the data contains the collected temperature and humidity data.

Definition		Length	Description (Big endian)
Transparently transmitted Content	Temperature	4	Expand by 10 times: 401 indicates 40.2 Celsius.
	Humidity	4	Expand by 10 times: 855 indicates 85.5%.

b) Return packet (from server)

No reply is required from the server.

21. Large File Transmission Packet (0x8d) (V1.0)

Description:

- **It is used to transmit large-size files such as audio files.**
- **The terminal uses the 8D protocol to transmit data to the server, while the server uses the 90 protocol to deliver data to the terminal. The formats of the protocols are the same.**
- **Due to limited space on the terminal, the server will send handshake messages to confirm the free space on the terminal before transmitting data to the terminal.**

a) File from terminal to server (8D)

The file is sent by the terminal to the server.

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x8D
Information Content	File Type	1	0x00: Recoding file (listening) 0x01: Recording file (SOS and voice) 0x02: Recording file (two-way communication) 0x03: Recording file upon TCP command
	Total file length	4	Total length of transmitted file

	File error check type	1	If the file error check type is “00”, the file will be transmitted using CRC. If the file error check type is “01”, the file will be transmitted using MD5.
	File error check	N	If the file error check type is “00”, the file will be transmitted using CRC and the result will be 2-bit long. If the file error check type is “01”, the file will be transmitted using MD5 and the result will be 16-bit long.
	Start position	4	Number of bytes at the start position of the transmission segmentation
	Length of current content	2	Length of data after the start position of the transmission segmentation
	Content	M	The data packet after segmentation
	Identifier	N	The file type indicates what type is a file belongs to . If the file type is “00 recording file (listening)”, it occupies 6 bytes. The file contains the start date and time of the listening. The coding method is the same as that of time format in the location packet. If the file type is “01 recording file (SOS and voice)”, it occupies 2 bytes and the bytes are the same as the serial numbers of the corresponding SOS and voice control alarm packets. If the file type is “02 recording file (two-way communication)”, it occupies 6 bytes. It contains the start date and time of the communication. The coding method is the same as that of the time format in the location packet. If the file type is “03 recording file upon TCP command”, it will upload the unified service ID. It occupies 6 bytes, wherein the former 4 bytes are the service flag bytes and the latter 2 bytes are the transmission serial number.
Information SN		2	The SN will be automatically added by "1” for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Reply from the server

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x8D
Information Content	Receive status flag	1	0x00: Received; 0x01: Receive error
Information SN		2	The SN will be automatically added by "1” for each data sending after power-on.

CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 Fragments of CRC Lookup Table in C for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

b) File from server to terminal (GW100)

The terminal sends a request to check if there are files on the server (0x92)

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x92
Information Content	System capacity	1	Total number of messages that can be held by the terminal (it is 0x05, as GW110 can hold 5 messages)
	Remaining capacity	1	It indicates how many new messages can the terminal hold. For example, if there is one unread messages, then the remaining capacity is 4 messages and the value is 0x04.
Information SN		2	The SN will be automatically added by "1" for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 Fragments of CRC Lookup Table in C for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

Server Replies or Auto Sends Message Indicating Whether There are Data (0x91)

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x91
Information Content	Number of non-transmitted files	1	Number of non-transmitted files in the server
	File Type	1	0x00: Recoding file (listening) (no files of this type transmitted by server) 0x01: Recording file (SOS) (no files of this type transmitted by server) 0x02: Recording file (two-way communication)
	Total length of the first file	4	Information about the length of the first non-transmitted file
	The error check type of the first file	1	If the file error check type is “00”, the file will be transmitted using CRC. If the file error check type is “01”, the file will be transmitted using MD5. (Currently, only CRC is available)
	Error check of the first file	N	If the file error check type is “00”, the file will be transmitted using CRC and the result will be 2-bit long.

			If the file error check type is “01”, the file will be transmitted using MD5 and the result will be 16-bit long.
Information SN		2	The SN will be automatically added by "1” for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

iii. Reply from Terminal on Whether to Start Download (0x91)

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x91
Information Content	Download or not	1	0x00: Do not download; 0x01: Download
	Start position	4	It indicates at which position in the file will the download start.
	Download length	4	Total download length requested by the terminal
Information SN		2	The SN will be automatically added by "1” for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

iv. File data packet from server to terminal (0x90)

(The transmission will be launched based on the storage time)

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x90
Information Content	File Type	1	~~0x00: Recoding file (listening)~~ (no files of this type transmitted by server) ~~0x01: Recording file (SOS)~~ (no files of this type transmitted by server) 0x02: Recording file (two-way communication)
	Total file length	4	Total length of transmitted file
	File error check type	1	If the file error check type is “00”, the file will be transmitted using CRC. If the file error check type is “01”, the file will be transmitted using MD5.

	File error check	N	If the file error check type is “00”, the file will be transmitted using CRC and the result will be 2-bit long. If the file error check type is “01”, the file will be transmitted using MD5 and the result will be 16-bit long.
	Start position	4	Number of bytes at the start position of the transmission segmentation
	Length of current content	2	Length of data after the start position of the transmission segmentation
	Content	M	The data packet after segmentation
	Identifier	N	The file type indicates what type is a file belongs to. ~~If the file type is “00 recording file (listening)”, it occupies 6 bytes. The file contains the start date and time of the listening. The coding method is the same as that of time format in the location packet.~~ ~~If the file type is “01 recording file (SOS)”, it occupies 2 bytes and the bytes are the same as the serial number of the corresponding SOS alarm packet.~~ If the file type is “02 recording file (two-way communication)”, it occupies 6 bytes. It contains the start date and time of the communication. The coding method is the same as that of the time format in the location packet.
Information SN		2	The SN will be automatically added by "1” for each data sending after power-on.
CRC		2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit		2	It is fixed at 0x0D 0x0A.

v. Reply by Terminal to the File Data Packet from Server (0x90)

		Length	Details
Start Bit		2	0x79 0x79
Packet Length		2	Length = Protocol number + Information content + Information SN + CRC
Protocol Number		1	0x90
Information Content	Receive status flag	1	0x00: Received; 0x01: Receive error
Information SN		2	The SN will be automatically added by "1” for each data sending after power-on.

CRC	2	It is the CRC-ITU value from "Packet Length" to "Information SN". If the receiver receives a packet that contains a CRC error, it ignores the error and discards the packet (See Attachment 1 for algorithm details).
Stop Bit	2	It is fixed at 0x0D 0x0A.

22. Attachment 1 Fragments of CRC Lookup Table in C (V1.0)

Attachment 1 CRC-ITU Algorithm in C (Fragments)

```
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 16-bit CRC of the given-length data.
U16 GetCrc16(const U8* pData, int nLength)
{
    U16 fcs = 0xffff;       // Initialize
    while(nLength>0){
      fcs = (fcs >> 8) ^ crctab16[(fcs ^ *pData) & 0xff];
      nLength--;
```

```
        pData++;
    }
    return  ~fcs;        //  Negate
}
```

23. Alarm Type List (V1.1)

Alarm codes (Trackers)	
0x00	Normal
0x01	SOS call
0x02	Power cut alert
0x03	Vibrating alert
0x04	Entered fence alert
0x05	Left fence alert
0x06	Speed Alert
0x07	
0x08	
0x09	Tow/theft alert
0x0A	Entered GPS blind spot alert
0x0B	Left GPS blind spot alert
0x0C	Power-on alert
0x0D	GPS first fix alert
0x0E	Low external power alert
0x0F	External power low voltage protection alert
0x10	SIM changed alert
0x11	Power-off alert (manually powered off)
0x12	Airplane mode on alert
0x13	Tamper alert
0x14	Door alert
0x15	Powered off due to low battery
0x16	Voice control alert
0x17	Rogue base station alert
0x18	Cover removed alert
0x19	Low internal battery alert
0x1A	Exit transit mode alert
0x1B	Suspected of leaving the herd alert
0x1C	

0x1D	
0x1E	
0x1F	
0x20	Entered deep sleep mode alert
0x21	Reserved (Do not use)
0x22	Reserved (Do not use)
0x23	Fall alert
0x24	Charger connected alert
0x25	Light detected alert
0x26	Moved away from Bluetooth zone alert
0x27	Wire cut alert
0x28	Solicited offline (powered off) alert
0x29	Harsh acceleration
0x2A	Harsh left cornering alert
0x2B	Harsh right cornering alert
0x2C	Collision alert
0x2D	Vehicle rollover alert -> Fall alert
0x2E	
0x2F	
0x30	Harsh braking
0x31	Left-the-herd alert
0x32	Power-disconnected-triggered rollover alert – Tamper alert
0x33	Locked alert
0x34	Unlocked alert
0x35	Illegally unlocked alert
0x36	Unlock failed alert
0x37	Knocking alert
0x38	Over-distance alert
0x39	Mute over-distance alert
0x3A	Anklet recovered
0x3B	Stationary alert
0x3C	Theft Alert
0x3D	Illegally started alert
0x3E	Key press event upload
0x3F	Defense off alert (customized)
0x40	Defense on alert (customized)
0x41	Silenced alert (customized)
0x42	Vehicle finding alert (customized)

0x43	Trunk opened alert (customized)
0x44	RSV1 (customized)
0x45	RSV2 (customized)
0x46	RSV3 (customized)
0x47	Fatigue driving
0x48	Pet lost alert
0x49	Battery fully charged alert
0x4A	Battery exception alert
0x4B	Tilt alert
0x4C	Harsh cornering
0x4D	Sudden lane change
0x4E	Vehicle stability
0x4F	Vehicle Euler angle
0x50	Door closed event
0x51	Door opened event
0x52	Body temperature exception alert
0x53	Fuel stolen alert (GT800) (added on Jun. 28, 2019)
0x54	External GPS antenna disconnected alert (added on Sept. 29, 2019)
0x55	Battery temperature high alert
0x56	Charging started
0x57	Charging stopped
0x58	Charging complete soon
0x59	Charging complete
0x5A	Overcharging reminder
0x5B	Temperature high alert
0x5C	Temperature low alert
0x5D	RFID error alert
0x5E	Pulse alert
0x5F	Speeding in fence alert
0x60	Phase wire alert
0x61	Temperature sensor alert
0x62	High external power alert
0x63	Approaching Bluetooth alert
0x64	Temperature exception recovered
0x65	Violent crash damage canceled
0x66	ADC value alert
0x67	Logged in alert
0x68	Logged out alert

0x69	File upload notification
0x70	SD card mounting
0x71	Refill notification
0x72	Installation Alert
0x73	Fuel level sensor timeout
0x74	Speed alert recovered
0x75	Fatigue driving alert dismissed
0x76	Temperature sensor timeout
0x77	ADC1 high voltage alert
0x78	ADC1 low voltage alert
0x79	Abnormal ADC1 voltage rise alert
0x7A	Abnormal ADC1 voltage drop alert
0x7B	Abnormal temperature rise alert
0x7C	Abnormal temperature drop alert
0x7D	Idling block
0x7E	Humidity alert
0XFF	ACC OFF
0XFE	ACC ON

Alarm codes (DVRs)	
0x80	Vibrating alert
0x81	SIM exceeds traffic limit
0x82	Device restarted
0x83	Collision alert
0x84	Camera 1 exception
0x85	Camera 2 exception
0x86	TF card unidentifiable
0x87	Speeding alert
0x88	Power cut alert
0x89	No USB camera
0x90	Harsh acceleration
0x91	Harsh braking

0x92	Harsh cornering
0x93	Collision alert
0x8A	Power/fuel cut alert enabled
0x8B	Power/fuel cut alert disabled
0x8D	Switched to land transport
0x8E	Environment exception
0x95	Switched to waterborne transport mode
0x96	Switched to parking mode
0x8C	Fatigue driving
0x97	Driver in a call
0x9A	Driver smoking
0x8F	Driver distracted
0x94	Driver strange
0x98	Active capture
0x99	Driver changed
0xA0	Yawn alert (added on Nov. 04, 2019)
0xA1	Shelter alert (added on Nov. 04, 2019)
Alarm codes (ET110N)	
0xC0	Illegally moved alert
0xC3	Backup battery low alert
0xC4	Cross line alert
0xC5	Fuel insufficient alert
Other devices	
0xD0	GPS antenna open circuited alert
0xD1	GPS antenna short circuited alert
0xD2	Magnetic sensor alert
0xD3	Signal shielded alert