

GT02 Communication Protocol Introduction

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1. Content of Communication (Device→Server)

Info header	Content-Length	Reserved	Device ID	Information serial number	Protocol number	Information content	End mark
2 Bytes	1 Byte	2 Bytes	8 Bytes	2 Bytes	1 Byte	24 Bytes	2 Bytes
68H68H	25H (equal to 37 Bytes)	00H00H	(8 Bytes)	(2 Bytes)	10H	Complete locating information, 24 Bytes in all	0DH0AH

Device ID:

Hexadecimal System; GT02 uses 15 digits IMEI number of device as the device ID. For example, the IMEI number is 123456789123456 and the device ID is 0x01 0x23 0x45 0x67 0x89 0x12 0x34 0x56.

Information serial number:

After turning on the GT02, it will send the first item of GPRS data (including heartbeat package and location data); the serial number of this item is “1”. After that, the serial number will be added on by 1 automatically at every sending process (including heartbeat package and location data).

Information content part (24bytes)

Date & Time	Latitude	Longitude	Speed	Course	Reserved bytes	Status bits
6 bytes	4 bytes	4 bytes	1 byte	2 bytes	3 bytes	4 bytes

1.1. Date & Time

It shows when this locating information is generated. 6 bytes are distributed as follows:

Table 4

Year	Month	Day	Hour	Minute	Second
1byte	1byte	1byte	1byte	1byte	1byte

1.2. Latitude

Occupy 4 bytes; representing the latitude value. Number range is from 0 to 162000000, which represents the range from 0°to 90°. Unit: 1/500

second.

Conversion method:

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

B Multiply the converted value by 30000, and then transform the result to hexadecimal number.

For example $22^{\circ}32.7658'$, $(22*60+32.7658) * 30000 = 40582974$, then convert it to hexadecimal number 0x026B3F3E

1.3 Longitude

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

1.4 Speed

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

1.5 Course

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

1.6 Reserved bytes

3 bytes are all 0

1.7 Status bits

Occupy 4 bytes; representing each status information of the device. Regard 4 bytes as 32 bits, the lowest bit is 0, the highest is 31. In the process of data transmitting, the high one comes first and the low one follows. Each bit represents the detailed meaning as follows:

high bit										low bit					
31	30	29	28	27	8	7	6	5	4	3	2	1	0	

Zeroth bit	0: GPS has not located 1: GPS has located
First bit	0: southern latitude 1:northern latitude
Second bit	0:western longitude 1: eastern longitude
Third bit	1:charged
Fourth bit	Reserved
Fifth bit	Reserved

For example: 0x00 0x00 0x00 0x0F means device has been located, northern latitude, eastern longitude, charged

2. Heartbeat package format (Device->Server)

Info header	The length of content	Voltage degree	GSM signal strength degree	Device ID	Information serial number	Protocol number	content of information	end mark
2 bytes	1 byte	1 byte	1 byte	8 bytes	2 bytes	1 byte	2+N bytes	2 bytes

68H68H	15+N,N means the number of satellite	00H~06H	00H~04H	(8 bytes)	(2 bytes)	1AH	2+N bytes N means the number of satellite	0DH0AH
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2.1 The length of content

It is the total bytes number from “Voltage degree”(include itself) to “End mark”(not include itself). The total is 15+N bytes; N means the number of satellites. For example:

If the device has successfully searched out 6 satellites, in this case, N=6, the length of content is 15+6=21 bytes

2.2 Voltage degree

Decimal, range from 0-6

0-- lowest power and power off

1-- no enough power to dial a call or send messages.

2-- low power and alarm

3-- low power but can work normally

3~6 work in good condition

As Gt02 is always connected with the car battery, this value is always maintain in 5 or 6.

2.3 GSM signal strength degree:

0x00: no signal
0x01: weaker signal
0x02: weak signal
0x03: good signal
0x04: strong signal

2.4 Device ID:

Hex, GT02 takes 15 digits IMEI NO. as Device ID, such as IMEI NO. 123456789123456, whose device ID is : 0x01 0x23 0x45 0x67 0x89 0x12 0x34 0x56.

2.5 Information serial number:

2 bytes, After turning on the GT02, it would send the first item of GPRS data (including heartbeat package and location data); the serial number is "1". After that, the serial number will be added on by 1 automatically at every sending process (including heartbeat package and location data).

2.6 Protocol NO.: hex 1AH

2.7 Information content:

Locating status 1 byte	Number of Satellites involved in locating 1byte	Satellite I SNR 1 byte	Satellite II SNR 1byte	Satellite N SNR 1byte
00H~02H Locating status: 0— Have not located 1—real-time GPS 2—DGPS	00H~0CH(0~12)	00H~63H (0~99dBHZ)	00H~63H (0~99dBHZ)	00H~63H (0~99dBHZ)

2.8 End bit: end by 0dH 0aH

3. Information (from Server to Device)

Info Header 2 byte	Protocol NO. 1 byte	End mark 2 byte
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54H68H	1AH	0DH0AH
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4. Instruction about heartbeat:

A. If GPRS connection succeed, after the device sending first locating data to server, the heart beat packet follows immediately. Receiving feedback package in 5 seconds will be considered as normal. Next heartbeat package will be sent after 3 minutes.

B. If there is not feedback package sent from the server in 5 seconds, it will be considered as failure to connect. In this case, device will activate the GPS data backup function, and then reconnect to the server after one minute;

C. If the procedure **B** happens for 3 times, device will activate timed-restarting function.(Note: The restart process will activate once after 10 minutes. If device connect with server and receiving heartbeat package successfully in this 10 minutes, the timed-restarting function will be disabled automatically,)

D. When GPRS connection fails, device will not send heartbeat package. When GPRS connection fails for 3 times, device will activate timed-restarting function. (Note: The restart process will activate once after 20 minutes. If device connect with server and receiving heartbeat package successfully in this 20 minutes, the timed-restarting function will be disabled automatically,)

Notice:

- I . Server will not reply heartbeat package to device which has not been registered
- II . If the device has not been inserted by sim card, or the GPRS service of this sim card has not been activated, the device will restart automatically once after 21 minutes.
- III. When the heartbeat package is timeout, the GPRS will reconnect after 1 minute.
- IV. The device would not send location data when it is static. But it would not affect sending heartbeat package.

Appendix I :

SMS command table

SMS command format

NO.	SMS command	Description
Asking coordinates	DWXX,user password (6 digits)#	<p>To receive the coordinates</p> <p>Mobile user and SMS server can ask coordinate via this command.</p> <p>The device will reply SMS containing coordinates to the sender once it receive the command.</p> <p>Lat:N23d 5.1708m, Lon: E114d 23.6212m, Course:120, Speed:53.02, DateTime:08-09-12 14:52:36</p> <p>It means: North latitude 23 degree 5.1708 minute, east longitude 114 degree 23.6212 minute, Course:120 degree, Speed:53.02 kilometers /hour, Date/Time:12th September 2008 14: 52: 36</p>

		(hour/ minute/ second)
Modify common-user password	XGYHMM,existed common-user password (6 digits),new common-user password (6 digits)#	<p>The default password is 000000.</p> <p>For example: XGYHMM,000000,123456#</p> <p>This command replace the default password 000000 by the new one 123456.</p>
<p>Set GPRS connection parameter</p> <p>Two approaches to set the GPRS parameter, choose either of them</p> <p>1.Refer to IP of the server:</p> <p>GPRS,user passwords,APN,0/1,server IP,serverer port,device ID,0#</p> <p>2.Refer to URL of server:</p>	<p>For example, sending configuration SMS to the device as following:</p> <p>1.IP</p> <p>GPRS,000000,cmnet,0,202.173.231.112,8821,0000000000000001,0#</p> <p>2.URL</p>	<p>If asking any further detailed description, please refer to the Appendix II .</p> <p>1.IP:</p> <p>GPRS,user passwords,APN(30 bytes in maximum),0 or 1(0 is TCP,1 is UDP),server IP,server port,device ID(15 bits IMEI N.O),0#(Ending Mark)</p> <p>2.URL:</p>

GPRS,user passwords,APN,0/1,Serverer URL:Server port#	GPRS,000000,cmnet,0,www.gpsbox.net:88 21#	GPRS,user passwords,APN(30 bytes in maximum),0 or 1(0 is TCP,1 is UDP),Server URL:Server Port#
Set Interval of GPRS data transfer	GPRSDS,user passwords,time#	Time limitation: Minimum:5s Maximum:18000s
Check software version	RJBB,user passwords#	Sender will get back of software version.

Appendix II

GPRS Configuration

➤ **Modify the configuration of GT02 through SMS**

For example: When the device goes to Indonesia, and the customer put the sim card from the Indosat operator in it.

Send a message to the sim card which has been put into the device. The content of the SMS is as following:

GPRS,000000,indosatgprs,0,gt02.szdatacenter.com:8821#

※ indosatgprs is the APN of the Indonesian operator Indosat, please replace it by the local one. You might need to give a call to the local operator to ask them what their APN is.

After sending the SMS, the situation could be:

- 1) If you receive “Success”, go to web www.goosky.net to track the device.
- 2) If you receive “Fail”, it means that the device can not identify the content of the SMS. In this case, please check the content of SMS, especially the format of Minuscule/ Majuscule. Find the problems and resend the SMS, you would get “success”.
- 3) If you can not get any feedback after 5min, please check the device.
A Whether the indicating lights work orderly (The Green and Blue light should stay in solid bright)

B If the Green light is not on solid bright, please check whether you insert the sim card in an appropriate way.

C If the green light is on solid bright already; please give a call to this sim card to see whether it could be called. If you have successfully make a call to this card, but you still can not track this device. Please also check whether the messages are full in this sim card (because the problem might be caused by the exceeding of SMS). Finally, you could track this device.

➤ **CONTENT OF SMS:**

GPRS – GPRS

000000 – Default password;

indosatgprs – APN of the GSM operator (Here just a example);

0 or 1 – GPRS Communication Protocol (0 stands for TCP, 1 stands for UDP), (Recommended way is TCP)

gt02.szdatacenter.com – Internet Domain name for the server;

:8821 – Server port;

– ending symbol