

Vehicle GPS Tracker AT07 protocol version 1.0

Hardware Spec	
MCU	STM32F (ARM 32-bit Cortex™-M3 CPU)
GSM	GSM/GPRS; Quad-band: 850/900/1800/1900Mhz
GPS	UBlox NEO 6M (can replace to 7M to support Glonass)
G-sensor/3-axis sensor	Build in for sleep/wake up and harsh break
GSM antenna	internal
GPS antenna	External
PIN IO interface	3 digital input 3 digital output 1 analog input 1 panic button 1 1-wire for iButton 1 RS232 for RFID, Camera, dispatch screen and other serial port device with customize firmware 1 speaker and microphone 1 Micro USB (No driver need, totally a HID/USB device)
Dimension	87mm*55mm*25mm
Firmware feature	
Firmware upgrade	By USB or by GPRS remotely(OTA)
Working parameter	Request the working remotely in configurator tool
Communication	TCP/UDP, SMS
Report interval	By time/distance combines with angle/veer
Sleep/deep sleep	Sleep
SMS alarm	Send out alarm when vehicle status has been changed Ignition on/off, GPS antenna drop, IO port changed, low battery
Voice monitoring	Two way conversation: build in authorized phone list.
Digital output/input	Enable/disable

1. GPRS communication format summary

\$\$<length><package flag><data><checksum>

String	Note
\$\$	Head (2 byte)
Length	Length (4 byte)
Package flag	Package flag
Data	Data
Checksum *	Checksum (2 byte)* Unsigned char Checksum (const char *s,int Length) { Unsigned char result; result=0; for(int i=0;i<Length;i++) { result ^=*s++ } return result; }

The message type between device and sever will be including:

- 1) Location information: \$\$<length><AA><data><checksum>
- 2) Hear beat package: \$\$<length><BB><data><checksum>
- 3) GPRS command: \$\$<length><CF><data><checksum>

2. GPRS String message format

2.1 Data receive in server:

\$\$<length><DataType><IMEI><|><VehicleStatus><Time><IOStatus><BatteryVoltage><SupplyVoltage>
<ADC1><LACCI><Cell ID><GPSSatellite><CSQ><Angle><Speed><HDOP><Mile>
<Latitude><N/S><longtitude><E/W> <SerialNumber><checksum>

Data string example:

\$\$0108AA864244026063437|1A0000001401010101014111000027BA0E57003100000000.0000000000
00.0000N00000.0000E048156

2.2 Acknowledge response (From server to device)

\$\$<Lengh><AA><SerialNumber><ReceiveChecksum><Checksum>

Note: This response only for the function of ACK has been enabled.

Code	Description	length	Actual Data
\$\$	Header	2	\$\$
Length	Total length is for the entire string including the Header, Length and Checksum.	4	108

DataType	Package flag	2	AA
IMEI	IMEI(End with 'I')	N/A	864244023028128
VehicleStatus	Vehicle status; HEX code Detailed Alarm code please refer to Annex 1	8	14012000
Date/Time	UTC Date/Time: YYMMDDHHMMSS Example: YY (year 00-99): 14 MM (month 01-12): 07 DD (day 01-31): 29 HH (hour 00-23): 08 MM (minute 00-59): 20 SS (second 00-59): 13	12	140729082013
Battery Voltage	Battery Voltage Format: BB example: 42 42 means 4.2V	2	42
Supply Voltage	Supply voltage Format: CC V 12 means 12V	2	12
ADA	Collected voltage AAAA Actual voltage: AA.AA V 0006 means 0.06V	4	0006
LACCI	Location area code	4	27BA
Cell ID	Cell ID	4	0E58
GPS Satellites	Current available GPS satellites that can be used Value range: (00 ~ 12)	2	05
GSM signal	Strength of GSM signal (0 ~31)	2	31
Angle	Veer: Direction of travel in degrees Value range:(000 ~ 359)	3	000
Speed	Actual GPS speed when record is generated. Unit: KM/H	3	000
HDOP	HDOP Value range: (00.0 ~ 99.9)	4	02.0
Mileage	Mileage between current string and last string Unit: meter	7	0000000
Latitude	Latitude	9	2237.8291
NS	North/South N = North S = South	1	N
Longitude	Longitude	10	11403.5410

EW	East/West E = East W = West	1	E
SerialNumber		4	0002
Checksum	Checksum	2	2A

Annex 1: Refer to VehicleStatus (it's a HEX code, 01 is at high bit, 32 is at low bit)

Original data in example in HEX: 14012000

Data convert to decimal: 0001 0100 0000 0001 0010 0000 0000 0000

Status code	description	Note
1	Panic button (SOS)	1=SOS 0= without SOS
2	ACC	IN1 (digital input 1) 1= ignition ON 0= ignition OFF
3	Over speed	1= over speed 0= without over speed
4	External power	1= with supply power 0= without supply power
5	GEO fence (out)	1=out alarm 0= none out alarm
6	GEO fence (in)	1= GEO in alarm 0= without in alarm
7	GPS antenna drop	1= GPS antenna drop alarm 0= GPS antenna is ok
8	GPS module error	1= module error 0= GPS module is ok
9	Output1	1= output1 in high level 0= output1 in low level
10	Output2	1= output2 in high level 0= output2 in low level
11	Output3	1= output3 in high level 0= output3 in low level
12	IN2 (digital input 2)	1= input2 has been triggered 0= input2 without triggering
13	IN4 (digital input 4)	1= input4 has been triggered 0= input4 without triggering
14	Shocking	1= shocking alarm 0= no shocking (Status will show '1' if it's in shocking even shock alarm has been disabled.)
15	Idle	1= Idle speed alarm 0= without idle speed
16	Inner battery in low level	1= inner battery voltage is low

		0= inner battery voltage is ok
17	Unauthorized Driving	1= Unauthorized driving 0 = without unauthorized driving
18	GPS status	1= GPS fixed 0= No GPS fixed
19	Inner batter in charging	1= battery charge 0= batter not charging.
20	reserve	
21	reserve	
22	reserve	
23	reserve	
24	reserve	
25	reserve	
26	reserve	
27	reserve	
28	reserve	
29	reserve	
30	reserve	
31	reserve	
32	reserve	
<i>Other alarm event can be customized upon the detailed needs.</i>		

3. Heart Beat/Keep GPRS connection alive

In order to always keep GPRS connection alive, device has provided another package for this purpose

Device send to server :\$\$<0025>BB<IMEI><CheckSum>

Server send to AT09: \$\$<0010>BB<CheckSum>

4. GPRS command

Server sends command to device remotely:

Server send to AT09: \$\$<length><CF><*****,<Command><checksum>

AT09 response to server: \$\$<0030>CF<IMEI><Commandnumber>01<checksum> (command ok)

\$\$<0030>CF<IMEI><Commandnumber>02<checksum> (Password error)

\$\$<0030>CF<IMEI><Commandnumber>03<checksum> (format error)

Note: ***** is the password of device

Command refer to **SMS** command list

5. OTA upgrade

This part has been integrated in configuration tool

6. Working parameter requested remotely

This part has been integrated in configuration tool

7. SMS control command

Command number	Command Description	Command	Note
001	SIM PIN	001,X	PIN code should <=4 digitals numbers
*002	APN	002,APN,UserName,Password	APN[1,30] User Name: [1,20] Password[1,20]
*003	GPRS IP setting	003,ip,port,protocol	IP[1,30]; port[1,5] Protocol=0, TCP Protocol=1, UDP
\$004	OTA upgrade	004	
\$005	OTA disable	005	
*006	Restart device	006	*@@@@@,006# (sent by SMS. It works only when SM module works)
*007	Initialize device	007	*@@@@@,007#
*011	Clear inner memory	011	*@@@@@,011#
012	Request coordinate	012	*@@@@@,012# (works in sms mode)
013	Request the configuration	013	*@@@@@,013#(works only in configuration software and through gprs), kindly note the command format in configuration software and gprs is different.
014	Change password	014,new_password	*@@@@@,014,\$\$\$\$\$# password: 6 digits

016	Digital output control	016,x,y	X(A,B,C,D) Y(1 enable,0 disable) (only works in user define mode, or it will return format error)
018	Set mileage	018	Reserved, no effect if device receives this command.
019	Set ACK	019,X	(0 enable,1 disable)
051	Set sensitivity of 3D sensor	051,x	sensitivity value:[1, 30]
052	set the ID of device	052,XXX	XXX: letter and number, 1 to 17 digits
053	Set lbutton	053,Y,X	Y:01-100 X: must 16 digits
*101	Set GSM Band	101,X	X=0=900/1800 X=1=850/1900 X=2=850/900/1800/1900
102	Data sending mode	102,X,Y,Z,K	X: interval time when vehicle is moving [1, 99999] secs. Y: data sending by distance: [1, 99999] meters Z: data sending by angel: [1, 359] degree. K: interval time when vehicle is stop.[1, 99999] secs
103	Set the sleep mode	103,X,Y	<u>X=0: no sleep mode</u> <u>=1: sleep mode.</u> no data generated, and gps module and gsm module are turned on. <u>=2: deep sleep mode.</u> no data generated, and gps module shut down and gsm module are turned on. <u>Y: time after which device gets into sleep mode: [1, 9999].</u> After 20secs trembles, device will wake up from sleep mode.
104	Set over speeding alarm	104,X,Y	X=0: enable, =1: disable Y: over speeding value: [1-999] meter
105	Set the phone numbers for call	105,K,X,Y,Z	K=0: enable, =1: disable Can set at least three phone

			numbers: X,Y,Z For example: set one number: *000000,105,0,18675642745,,# Not set any numbers: *000000,105,1,,,# digits of phone number: [1, 25]
106	enable GEO fence alarm	106,X,Y	X=0: alarm for entering into geo fence; =1: disable it. Y=0: alarm for out of geo fence; =1: disable it.
107	Set GEO fence alarm location and scope	107,X,Y,Z	X: GEO scope: [1, 9999]meter Y: Latitude must be 9 digits. i.e. 2837.7172,(degree+minute format) Z: Longitude, must be 9 digits. i.e. 07722.6363. (in degree+minute format)
108	GPS antenna disconnect alert	108,X	X=0 enable it; =1 disable it.
109	External power disconnect alert	109,X	X=0 enable it; =1 disable it.
110	TOW	110,X	X=0 enable it; =1 disable it.
111	SOS	111,X	X=0 enable it; =1 disable it.
112	SMS GeoIn	112,X	X=0 enable it; =1 disable it.
113	SMS GeoOut	113,X	X=0 enable it; =1 disable it.
114	SMSIN1_ON	114,X	X=0 enable it; =1 disable it.
115	SMSIN1_OFF	115,X	X=0 enable it; =1 disable it.
116	SMSIN2_ON	116,X	X=0 enable it; =1 disable it.
117	SMSIN2_OFF	117,X	X=0 enable it; =1 disable it.

118	SMSIN3_ON	118,X	X=0 enable it; =1 disable it.
119	SMSIN3_OFF	119,X	X=0 enable it; =1 disable it.
120	SMS Low battery	120,X	X=0 enable it; =1 disable it.
121	SMSIN4_ON	121,X	X=0 enable it; =1 disable it.
122	SMSIN4_OFF	122,X	X=0 enable it; =1 disable it.
123	set the phone number for receiving alarms by sms	123,XXX	XXXX: cell number, (<= 25digits)
125	Set IN1	125,X	X=0 enable it; =1 disable it.
126	Set IN2	126,X	X=0 enable it; =1 disable it.
127	Set IN3	127,X	X=0 enable it; =1 disable it.
128	Set IN4	128,X	X=0 enable it; =1 disable it.
129	Set SOS	129,X	X=0 enable it; =1 disable it.
130	Set digital output1	130,X	0= default; 1= defined by user; 2= disable it.
131	Set digital output2	131,X	0= default; 1= defined by user; 2= disable it.
132	Set digital output3	132,X	0= default; 1= defined by user; 2= disable it.
801	Device sends one sms to the typed phone number	801,xxx	Text message: "Read SIM Serial Number"