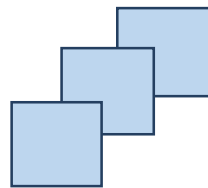


FIFOTRACK GPRS PROTOCOL




Model: A03

Version: V1.1

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Document History

Version	Revision Date	Author	Detail
V1.1	Apr 14, 2021	Vito Hu	Initial Version

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1 GPRS Package Format

GPRS uplink (i.e.: Data is sent from tracker to platform) command format:

\$\$<pack-len>,<ID>,<work-no>,<cmd-code>,<cmd-para>*<checksum>\r\n

GPRS downlink (i.e.: Data is sent form platform to tracker) command format:

##<pack-len>,<ID>,<work-no>,<cmd-code>,<cmd-para>*<checksum>\r\n

Remarks:

- ⊙ Comma (,) is used to separate data fields, and it is necessary. There is no space before or after comma.
- ⊙ pack-len: Package Length, decimal string format, the field of *pack-len* is {<ID>,<work-no>,<cmd-code>,<cmd-para>}, be careful, comma(,) in front of *ID* included.
- ⊙ ID: Tracker ID, default IMEI.
- ⊙ work-no: working number, hexadecimal string format, cyclic accumulation from 1 to 0xFFFF.
- ⊙ cmd-code: Command code, or specification of data type.
- ⊙ cmd-para: parameter or description of cmd-code, which is described in the following chapters.
- ⊙ checksum: checksum of package, 2 bytes hexadecimal string format, XOR of {<pack-len>,<ID>,<work-no>,<cmd-code>,<cmd-para>}.
- ⊙ \r\n: End of package, i.e. <CR><LF>.
- ⊙ Without specification, multi-byte binary data in cmd-para uses big endian format, i.e. Most Significant Byte first.

2 Applied Models

The document describes the format of position/alarm GPRS data, and it is applied for the following models:

- ⦿ Q2/Q3

3 GPS Position/Alarm Data Format – A03

\$\$<pack-len>,<ID>,<work-no>,A03,<alm-code | alm-para>,<date-time>,MCC|MNC|LAC|CI,<bat-v>,<bat-level>,<status>,<loc-type>,<gps-info>/<wifi-info>*<checksum>\r\n

Descriptions of position/alarm data:

Example:

A03 supports two types of position data, GPS and WIFI, which is defined by *loc-type* field. Each position data type has similar format, but different *gps-info* or *wifi-info* field after *loc-type*

When *loc-type==0*, there is *gps-info* field in the position package, and field definition:

\$\$<pack-len>,<ID>,<work-no>,A03,<alm-code | alm-para>,<date-time>,MCC|MNC|LAC|CI,<bat-v>,<bat-level>,<status>,0,<fix-flag>,<speed>,<salt-num>,<lat>,<lon>*<checksum>\r\n

Example as below:

\$\$95,866104023192332,1,A03,,210414055249,460|0|25FC|104C,4.18,100,000F,0,A,2,9,22.643175,114.018150*75\r\n

When *loc-type==1*, there is *wifi-info* in the position package, and field definition:

\$\$<pack-len>,<ID>,<work-no>,A03,<alm-code | alm-para>,<date-time>,MCC|MNC|LAC|CI,<bat-v>,<bat-level>,<status>,1,<wifi-ap1>|<wifi-ap2>...|<wifi-apN>*<checksum>\r\n

Example as below:

\$\$136,866104023192332,1,A03,,210414055249,460|0|25FC|104C,4.18,100,000F,1,94D9B377EB53:-60|EC6C9FA4CAD8:-55|CA50E9206252:-61|54E061260A89:-51*3E\r\n

Field	pack-len
Description	decimal string format, the field of <i>pack-len</i> is {,<ID>,<work-no>,A03,<alm-code alm-para>,<date-time>,MCC MNC LAC CI,<bat-v>,<bat-percentage>,<status>,<loc-type>,<gps-info>/<wifi-info>}, be careful, comma(,) in front of <i>ID</i> included.
Example	95: the length of “,866104023192332,1,A03,,210414055249,460 0 25FC 104C,4.18,100,000F,0,A,2,9,22.643175,114.018150” 136: the length of “,866104023192332,1,A03,,210414055249,460 0 25FC 104C,4.18,100,000F,1,94D9B377EB53:-60 EC6C9FA4CAD8:-55 CA50E9206252:-61 54E061260A89:-51”
Field	ID
Description	Tracker ID, default IMEI, ASCII string
Example	866104023192332
Field	work-no
Description	working number, hexadecimal string format, cyclic accumulation from 1 to 0xFFFF
Example	1, indicates that the value of <i>work-no</i> is 0x0001
Field	A03

Description	Data type specification, which is used to define position/alarm package format.		
Example			
Field	alm-code alm-para		
Description	Alarm code and alarm parameter, refer to Appendix A; For normal position data, this field is empty.		
Example	Empty, the package is a normal position one.		
Field	date-time		
Description	GMT0 date & time, in format: YYMMDDHHmmss 01 YY: year, value(year – 2000), 2 characters 02 MM: month, value range 1--12, 2 characters 03 DD: day, value range 1--31, 2 characters 04 HH: hour, value range 0--23, 2 characters 05 mm: minute, value range 0-59, 2 characters 06 ss: second, value range 0--59, 2 characters		
Example	210414055249, means 2021-4-14 05:52:49 (@GMT0)		
Field	MCC MNC LAC CI		
Description	Mobil base station information. ' ' is used to separate each data. MCC, MNC: decimal string format LAC, CI: hexadecimal string format		
Example	460 0 25FC 104C: Value of MCC is 460; Value of MNC is 0; Value of LAC is 0x25FC; Value of CI is 0x104C;		
Field	bat-v		
Description	Battery voltage, unit V		
Example	4.18, means battery voltage 4.18V		
Field	bat-level		
Description	Battery level, unit %, 0~100%		
Example	100, means battery level 100%		
Field	status		
Description	Alarm status or vehicle status, hexadecimal string format, as the following table:		
	bit	definition	description
	0--4	CSQ	GSM signal strength, range [0,31]
	5	Charging	Clear when charging cable plug out
	6	Battery low	Clear when battery normal, or charging cable plug in
	7—15	Reserve	Reserved for future use
Example	000F, means <u>CSQ==15</u>		
Field	loc-type		
Description	Position type, it defines GPS or WIFI position data type		

	<p><i>loc-type==0</i>: GPS type, and <i>gps-info</i> define as <u><fix-flag>, <speed>, <sat-num>, <lat>, <lon></u></p> <table border="1"> <thead> <tr> <th>field</th> <th>definition</th> </tr> </thead> <tbody> <tr> <td>fix-flag</td> <td>A—GPS fixed; V—GPS not fixed</td> </tr> <tr> <td>Speed</td> <td>Speed, unit km/h</td> </tr> <tr> <td>sat-num</td> <td>satellite number, update from GPS module data</td> </tr> <tr> <td>lat</td> <td>Latitude, negative in southern hemisphere, decimal string format</td> </tr> <tr> <td>lon</td> <td>Longitude, negative in western hemisphere, decimal string format</td> </tr> </tbody> </table> <p><i>loc-type==1</i>: WIFI type, and <i>wifi-info</i> defines as <u><wifi-ap1> <wifi-ap2>... <wifi-apN></u>, five WIFI APs supported maximally; <i>wifi-ap</i> format AABCCDDEEFF:rsi, means MAC <u>AA:BB:CC:DD:EE:FF</u>, Received Signal Strength Indicator <i>rsi</i>, using ' ' to separate various <i>wifi-ap</i> field</p>	field	definition	fix-flag	A—GPS fixed; V—GPS not fixed	Speed	Speed, unit km/h	sat-num	satellite number, update from GPS module data	lat	Latitude, negative in southern hemisphere, decimal string format	lon	Longitude, negative in western hemisphere, decimal string format			
field	definition															
fix-flag	A—GPS fixed; V—GPS not fixed															
Speed	Speed, unit km/h															
sat-num	satellite number, update from GPS module data															
lat	Latitude, negative in southern hemisphere, decimal string format															
lon	Longitude, negative in western hemisphere, decimal string format															
Example	<p>0: GPS type, "A,2,9,22.643175,114.018150" means GPS fixed, 2km/h, 9 satellites, position 22.643175 °, 114.018150 °</p> <p>1: WIFI type, "94D9B377EB53:-60 EC6C9FA4CAD8:-55 CA50E9206252:-61 54E061260A89:-51" means 4 WIFI APs searched, detail as below:</p> <table border="1"> <thead> <tr> <th>WIFI AP</th> <th>MAC</th> <th>RSSI</th> </tr> </thead> <tbody> <tr> <td>94D9B377EB53:-60</td> <td>94:D9:B3:77:EB:53</td> <td>-60</td> </tr> <tr> <td>EC6C9FA4CAD8:-55</td> <td>EC:6C:9F:A4:CA:D8</td> <td>-55</td> </tr> <tr> <td>CA50E9206252:-61</td> <td>CA:50:E9:20:62:52</td> <td>-61</td> </tr> <tr> <td>54E061260A89:-51</td> <td>54:E0:61:26:0A:89</td> <td>-51</td> </tr> </tbody> </table>	WIFI AP	MAC	RSSI	94D9B377EB53:-60	94:D9:B3:77:EB:53	-60	EC6C9FA4CAD8:-55	EC:6C:9F:A4:CA:D8	-55	CA50E9206252:-61	CA:50:E9:20:62:52	-61	54E061260A89:-51	54:E0:61:26:0A:89	-51
WIFI AP	MAC	RSSI														
94D9B377EB53:-60	94:D9:B3:77:EB:53	-60														
EC6C9FA4CAD8:-55	EC:6C:9F:A4:CA:D8	-55														
CA50E9206252:-61	CA:50:E9:20:62:52	-61														
54E061260A89:-51	54:E0:61:26:0A:89	-51														
Field	checksum															
Description	checksum of package, 2 bytes hexadecimal string format, XOR of <u>{<pack-len>, <ID>, <work-no>, A03, <alm-code alm-para>, <date-time>, MCC MNC LAC Cl, <bat-v>, <bat-level>, <status>, <loc-type>, <gps-info>/<wifi-info>}</u> .															
Example	<p>75: XOR checksum of "95,866104023192332,1,A03,,210414055249,460 0 25FC 104C,4.18,100,000F,0,A,2,9,22.643175,114.018150"</p> <p>3E: XOR checksum of "136,866104023192332,1,A03,,210414055249,460 0 25FC 104C,4.18,100,000F,1,94D9B377EB53:-60 EC6C9FA4CAD8:-55 CA50E9206252:-61 54E061260A89:-51"</p>															
Field	\r\n															
Description	End of package, i.e. <CR><LF>															
Example	\r\n															

4 Server Response to A03

After receives A03 package, server should sending response package to device. Device resends A03 package every 1min when no response received.

Format of response package: ##<pack-len>,<ID>,<work-no>,A03,<date-time>\r\n

Descriptions of position/alarm data:

Example: ##37,866104023192332,29,A03, 210414055250*5C\r\n	
Field	pack-len
Description	decimal string format, the field of <i>pack-len</i> is {,<ID>,<work-no>,A03,<date-time>}, be careful, comma(,) in front of <i>ID</i> included.
Example	37
Field	ID
Description	Tracker ID, default IMEI, ASCII string
Example	866104023192332
Field	work-no
Description	working number, hexadecimal string format, cyclic accumulation from 1 to 0xFFFF <i>work-no</i> in response package should be the same as uplink <i>A02</i> package; tracker should compare <i>work-no</i> in response and uplink package, and only deletes local <i>A02</i> package which has the same <i>work-no</i>
Example	29, indicates that the value of <i>work-no</i> is 0x0029
Field	A03
Description	Data type specification, which defines response command code
Example	
Field	date-time
Description	GMT0 date & time, format: YYMMDDHHmmss 01 YY: year, value(year – 2000), 2 characters 02 MM: month, value range 1--12, 2 characters 03 DD: day, value range 1--31, 2 characters 04 HH: hour, value range 0--23, 2 characters 05 mm: minute, value range 0-59, 2 characters 06 ss: second, value range 0--59, 2 characters Device can use the <i>date-time</i> to calibrate local date and time
Example	210414055250: 2021-04-14 05:52:50
Field	checksum
Description	Checksum of package, 2 bytes hexadecimal string format, XOR of {<pack-len>,<ID>,<work-no>,A03,<date-time>}
Example	5C The XOR checksum is 0x5C
Field	\r\n

Description	End of package, i.e. <CR><LF>
Example	\r\n

5 GPRS Heartbeat Data Format – A10

Heartbeat package is used to keep device online, under that condition, GPRS setting command can be delivered.

```
$$<pack-len>,<ID>,<work-no>,A10,<status>,<bat-ad>*<checksum>\r\n
```

Descriptions of position/alarm data:

Example: ##29,866104023192332,36,A10,0,190*5E\r\n	
Field	pack-len
Description	decimal string format, the field of <i>pack-len</i> is {,<ID>,<work-no>,A10,<status>,<bat-ad>}, be careful, comma(,) in front of <i>ID</i> included.
Example	29
Field	ID
Description	Tracker ID, default IMEI, ASCII string
Example	866104023192332
Field	work-no
Description	working number, hexadecimal string format, cyclic accumulation from 1 to 0xFFFF
Example	36, indicates that the value of <i>work-no</i> is 0x0036
Field	A10
Description	Data type specification, which is used to define GPRS heartbeat package format.
Example	
Field	status
Description	Reserved field
Example	
Field	bat-ad
Description	bat-ad: Voltage of internal battery, unit 0.01V
Example	190: Voltage of battery is 0x01A0, i.e. 4.00V
Field	checksum
Description	Checksum of package, 2 bytes hexadecimal string format, XOR of {<pack-len>,<ID>,<work-no>,A10,<status>,<bat-ad>}
Example	5E The XOR checksum is 0x5E
Field	\r\n
Description	End of package, i.e. <CR><LF>
Example	\r\n

6 Server Response to A10

There is no response package from server to device.

Appendix A - Alarm Code and Alarm Parameter

The following table describes the relationship of *alm-code* and *alm-para* in GPS Position/Alarm data:

alm-code	alm-para	Description	SMS Head String
2	NULL	Input1 active	SOS
33	NULL	Exit Fence	Exit Fence
34	NULL	Enter Fence	Enter Fence
17	NULL	Internal battery low	Low Battery