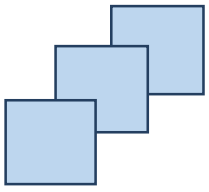
# FIFOTRACK GPRS PROTOCOL



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 |

# Contents

# 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

# 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 *pack-len* 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 *ID* 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"<br>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 *work-no* is 0x0001 |
| Field | A03 |

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

<table>
<tr><td></td><td>loc-type==0: GPS type, and gps-info define as<br><fix-flag>,<speed>,<salt-num>,<lat>,<lon><br><table><tr><th>field</th><th>definition</th></tr><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>salt-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></table><br>loc-type==1: WIFI type, and wifi-info defines as <wifi-ap1>|<wifi-ap2>…|<wifi-apN>, five WIFI APs supported maximally; wifi-ap format AABBCCDDEEFF:rssi, means MAC AA:BB:CC:DD:EE:FF, Received Signal Strength Indicator rssi, using '|' to separate various wifi-ap field</td></tr>
<tr><td>Example</td><td>0: GPS type, "A,2,9,22.643175,114.018150" means GPS fixed, 2km/h, 9 satellites, position 22.643175 °,114.018150 °<br>1: WIFI type,<br>"94D9B377EB53:-60|EC6C9FA4CAD8:-55|CA50E9206252:-61|54E061260A89:-51" means 4 WIFI APs searched, detail as below:<br><table><tr><th>WIFI AP</th><th>MAC</th><th>RSSI</th></tr><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></table></td></tr>
<tr><td>Field</td><td>checksum</td></tr>
<tr><td>Description</td><td>checksum of package, 2 bytes hexadecimal string format, XOR of {<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>}.</td></tr>
<tr><td>Example</td><td>75: XOR checksum of<br>"95,866104023192332,1,A03,,210414055249,460|0|25FC|104C,4.18,100,000F,0,A,2,9,22.643175,114.018150"<br>3E: XOR checksum of<br>"136,866104023192332,1,A03,,210414055249,460|0|25FC|104C,4.18,100,000F,1,94D9B377EB53:-60|EC6C9FA4CAD8:-55|CA50E9206252:-61|54E061260A89:-51"</td></tr>
<tr><td>Field</td><td>\r\n</td></tr>
<tr><td>Description</td><td>End of package, i.e. <CR><LF></td></tr>
<tr><td>Example</td><td>\r\n</td></tr>
</table>

# 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:<br>##37,866104023192332,29,A03, 210414055250*5C\r\n | |
|---|---|
| Field | pack-len |
| Description | decimal string format, the field of *pack-len* is {*,<ID>,<work-no>,A03,<date-time>*}, be careful, comma(,) in front of *ID* 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<br>*work-no* in response package should be the same as uplink *A02* package; tracker should compare *work-no* in response and uplink package, and only deletes local *A02* package which has the same *work-no* |
| Example | 29, indicates that the value of *work-no* is 0x0029 |
| Field | A03 |
| Description | Data type specification, which defines response command code |
| Example | |
| Field | date-time |
| Description | GMT0 date & time, format: YYMMDDHHmmss<br>01 YY: year, value(year – 2000), 2 characters<br>02 MM: month, value range 1--12, 2 characters<br>03 DD: day, value range 1--31, 2 characters<br>04 HH: hour, value range 0--23, 2 characters<br>05 mm: minute, value range 0-59, 2 characters<br>06 ss: second, value range 0--59, 2 characters<br>Device can use the *date-time* 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<br>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:<br>##29,866104023192332,36,A10,0,190*5E\r\n | |
|---|---|
| Field | pack-len |
| Description | decimal string format, the field of *pack-len* is {,<ID>,<work-no>,A10,<status>,<bat-ad>}, be careful, comma(,) in front of *ID* 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 *work-no* 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:<br>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<br>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 |