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Specific **AT Commands**
for GPS management

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wavecom[®]

PLUG IN TO THE WIRELESS WORLD

WISMO Quik Q2500 series

Specific AT commands for GPS management

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Document Information

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Table of Contents

DOCUMENT INFORMATION	2
TABLE OF CONTENTS	3
1 INTRODUCTION	4
1.1 Scope of this document	4
1.2 Presentation rules	4
2 +WGPS COMMANDS	5
2.1 GPS controller management +WGPSM	5
2.1.1 Description	5
2.1.2 Syntax	5
2.1.3 Defined values	6
2.2 GPS Antenna Configuration +WGPSANT	8
2.2.1 Description	8
2.2.2 Syntax	8
2.2.3 Defined values	9
2.3 GPS configuration +WGPSCONF	11
2.3.1 Description	11
2.3.2 Syntax	11
2.3.3 Defined values	12
3 GPS FEATURES MANAGEMENT	15
3.1 GPS NMEA unsolicited +WGPSNMEA	15
3.1.1 Description	15
3.1.2 Syntax	15
3.1.3 Defined values	16
3.2 Get position information +WGPSPOS	17
3.2.1 Description	17
3.2.2 Syntax	17
3.2.3 Defined values	17
3.3 Send raw data to GPS +WGPSRAW	19
3.3.1 Description	19
3.3.2 Syntax	19
3.3.3 Defined values	19

1 Introduction

1.1 Scope of this document

This document provides the enhanced AT commands to drive the Internal GPS feature embedded in Wismo Q2501.

AT commands for GPS are Wavecom proprietary and descriptions comply with the Wavecom internal format.

1.2 Presentation rules

In the following, the AT commands are presented with as much precision as possible, through three paragraphs. A “Description” paragraph provides general information on the AT command (or response) behavior. A “Syntax” paragraph describes the way to use it, the possible answers, through a readable format. A “Defined values” paragraph provides parameters values, as well for the AT command as for the corresponding responses.

Schemas are provided when necessary.

For this document, the term “default” means the behavior at the first power-up. Each following modification is saved as EEPROM parameter and retrieved directly on the next reset.

2 +WGPS commands

2.1 GPS controller management +WGPSM

2.1.1 Description


This command allows to manage:

- ✓ power-up or down of the GPS controller
- ✓ perform specific GPS reset
- ✓ perform a reset with boot mode activated (Production Test boot)
- ✓ set the GSM RTC date with the fixed GPS date
- ✓ provide the current GPS software version

2.1.2 Syntax

Command syntax: AT+WGPSM =<type>,[<mode>]
= <type>,<reset type>
= <type>

Response syntax: +WGPSM: <type>,<mode>
SW: <sw version><CR>HW: <hw version>

 Note: if GPS acquisition is done, AT+WGPSM=4 will return date and time. If GPS acquisition is not done, AT+WGPSM=4 will return ERROR.

Command	Possible responses
AT+WGPSM=0,0	OK <i>Note: GPS controller is powered down</i>
AT+WGPSM=0,1	OK <i>Note: GPS controller is powered up</i>
AT+WGPSM=0,2	OK <i>Note: GPS controller is controlled from external host</i>
AT+WGPSM=0	+WGPSM: 0,2 <i>Note: gives the current state (power down here)</i>
AT+WGPSM=1,0	OK <i>Note: HW reset</i>
AT+WGPSM=2	OK <i>Note: the GPS is reset in production test mode (boot mode activated)</i>

Command	Possible responses
AT+WGPSM=3	SW: 1.01b ek Dec 23 2003 10:09:38 HW: 00000040 OK <i>Note: get GPS Software and hardware version</i>
AT+WGPSM=4	+WGPSM: 4, <date>, <E>e> OK <i>Note: the GPS date are used to program the GSM RTC</i>
AT+WGPSM=4	ERROR <i>Note: the GPS UTC date is not fixed.</i>

2.1.3 Defined values

<type>

- 0 GPS controller power management
- 1 GPS reset
- 2 GPS reset with boot mode (production test mode)
- 3 get GPS software and hardware version
- 4 update GSM RTC

2.1.3.1 Power management

<mode>

- 0 GPS controller is powered down
- 1 GPS controller is powered up (default)
- 2 GPS controller power is controlled from external pin **GPS_EN**

If <mode> is omitted, the current status is returned

2.1.3.2 Reset

<reset type>:

- 0 Hardware reset (watchdog)
- 1 cold start (clear all backup data structures)
- 2 warm start (clear ephemeris)
- 3 hot start (restart software without clearing backup data structure)

Note: Reset type 1,2 and 3 are only available in internal mode.

2.1.3.3 Boot mode

No parameter

Perform a hardware reset with the internal GPS_BOOT pin set, causing a production test boot (ROM code).

2.1.3.4 Get software version

<sw version>: software version number and date of generation

<hw version>: hardware version number

Note: Version request is only available in internal mode.

2.1.3.5 RTC update

No parameter

Notes:

- if GPS UTC date is not fixed, GSM RTC is not updated. An error response is returned.
- RTC update request is only available in internal mode.

2.2 GPS Antenna Configuration +WGPSANT


2.2.1 Description

This command drives the GPS antenna configuration.

Note: The change will be taken into account only after a module reset.

2.2.2 Syntax

Command syntax: AT+WGPSANT=<type>[,<mode>]
 =<type>[,<mon>]
 =<type>

Response syntax: +WGPSANT: <type>,<mode>resetFlag>
 : <type> , <mon>
 : <type>,<status>,<presence>,<voltage>

Unsolicited response syntax:
 +WGPSANT:<type>,<status>,<presence>,<voltage>

Command	Possible responses
AT+WGPSANT=0,3	OK <i>Note: single coax (effective after reset)</i>
AT+WGPSANT=0	+WGPSANT: 0,3,1 OK <i>Note: double connector, External power antenna</i>
AT+WGPSANT=0,1	OK <i>Note: double connector, 3V antenna</i>
AT+WGPSANT=0	+WGPSANT: 0,1 OK <i>Note: double connector, External power antenna</i>
AT+WGPSANT=1,0	OK <i>Note: deactivate antenna monitoring</i>
AT+WGPSANT=1,1	OK <i>Note: activate antenna monitoring.</i>
AT+WGPSANT=1	+WGPSANT: 1,1 OK
<i>Note: An open circuit is detected</i>	+WGPSANT: 2,0,0,2936 <i>Note: and antenna is not present, with voltage in mV</i>
AT+WGPSANT=2	+WGPSANT: 2,1,1,2750 OK <i>Note: No open circuit detected and antenna is connected, with voltage 2.75V</i>

Command	Possible responses
AT+WGPSANT=2	+WGPSANT: 2,0,0,3000 OK <i>Note: Open circuit detected with voltage 3V (no load)</i>

Note: In order to have 5V power supply on the GPS antenna, the GPS_VANT pin must be powered with 5V on the system connector.

2.2.3 Defined values

<type>

- 0 antenna configuration
- 1 antenna monitoring management
- 2 antenna status

2.2.3.1 Antenna configuration

<mode>

- 0 0v
- 1 3V(internal) (default)
- 2 EXT
- 3 Single coax option

Notes:

- o 3V selection is only valid if GPS is powered on, else an ERROR is returned.
- o Single coax selection will be effective after the next module reset.

<resetFlag>

Displayed only on mode 3:

- 0 The mode has not been modified since the last boot of the product
- 1 The mode has been modified since the last boot of the product.
A reset must be performed to take the modifications into account.

Note: If the module is reset after a modification, the <resetFlag> parameter will be reset to 0.

2.2.3.2 Antenna monitoring management

This command drives the GPS antenna monitoring configuration.

In case of short circuit, the hardware protection disconnects the antenna, causing an open circuit.

<mon>

- 0 monitoring is deactivated (default)
- 1 monitoring is activated

if **<mon>** is omitted, the current configuration is returned.

2.2.3.3 Antenna Status

<status>

- 0 KO - open circuit detected. Antenna is not powered.
- 1 OK - no open circuit detected. Antenna is powered.

Note: When an open circuit occurs, antenna is re-powered after 10 seconds.

<presence>

- 0 no antenna connected
- 1 antenna connected
- 2 antenna loading detection not activated

<voltage>

The current read voltage in mV unit.

Command	Possible responses
AT+WGPSCONF=2	+WGPSCONF=2,1,75 OK <i>Note: monitoring activated, and current Temperature is 75°C</i>
	+WGPSCONF: 2,87 <i>Note: out of range, current Temperature is 87°C</i>
AT+WGPSCONF=3,1	OK <i>Note: set to fast acquisition mode</i>
AT+WGPSCONF=3	+WGPSACQ: 3,1 OK <i>Note: The GPS controller is set to fast acquisition mode</i>

2.3.3 Defined values

<type>

- 0 function mode configuration
- 1 GPS serial link speed configuration
- 2 temperature sensor management
- 3 acquisition mode

2.3.3.1 Function mode

This command allows the host to control the INPUT/OUTPUT relationship between the GSM and the GPS modules.

<mode>

- 0 External control mode (default). The GPS module is driven by an external host. The GSM module could not control or listen to GPS frames. In this mode, the GSM auxiliary serial link is fully available for another external application
- 1 Internal control mode. The GPS module is fully driven by the GSM module. An external host may listen to NMEA frames on the system connector pin "GPS_RXD2". In this mode, the GSM auxiliary serial link is unavailable.

If <mode> is omitted, the current configuration is returned.

<resetFlag>

- 0 The mode has not been modified since the latest boot of the product
- 1 The mode has been modified since the latest boot of the product. A reset must be performed to take the modifications into account.

If the module is reset after a modification, the **<resetFlag>** parameter will be reset to 0.

2.3.3.2 Serial link speed**<speed>**


- o 4800 (bauds)(default).
- o 9600
- o 19200
- o 38400
- o 57600
- o 115200

If **<speed>** is omitted, the current link speed is returned.

Note: the serial link is controlled by the Wismo Module. Actually, the module must always be aware and master of the GPS subsystem (that means it is not recommended to change directly the GPS UART speed through the GPS main serial link in external control mode (using the proprietary protocol provided by Ublox).

2.3.3.3 Temperature management

This command starts the temperature monitoring.

If  the temperature is out of range $-35/+85$ °C, an unsolicited message is displayed on the GSM main serial link only once, and also after each module reset.. It is up to host computer to perform appropriate action.

<mode>

- 0 deactivate temperature monitoring (default)
- 1 activate temperature monitoring

if **<mode>** is omitted, the current configuration is returned

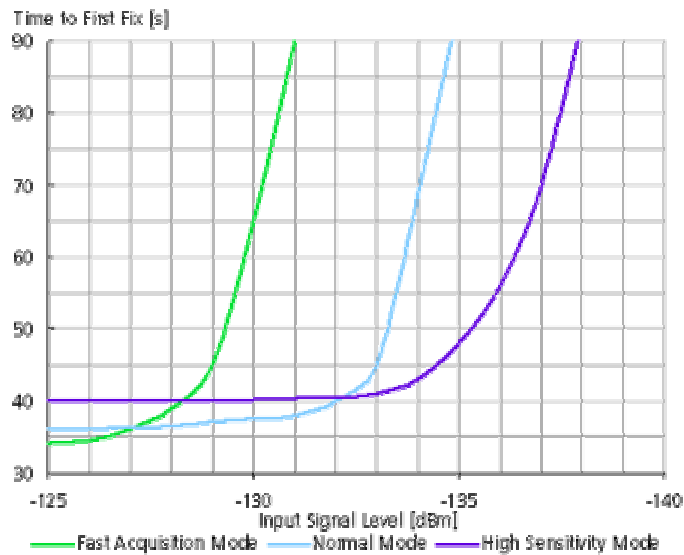
<temp> current measured temperature in Celsius degrees.

2.3.3.4 Acquisition Mode

This command drives the GPS acquisition procedure.

<mode>: acquisition mode

Value	Mode	Description
0	Normal (default)	Trade off between sensitivity and acquisition time.
1	Fast Acquisition	Optimized for acquisition time, at the cost of 3dB lower sensitivity than Normal mode.
2	High sensitivity	Optimized for higher sensitivity (3dB higher than Normal mode), at the cost of acquisition time. Primarily intended for applications with passive antennas.



If <mode> is omitted, the current configuration is returned.

Note: Acquisition mode setting is only available in internal mode.

3 GPS features management

3.1 GPS NMEA unsolicited +WGPSNMEA

3.1.1 Description

This command allows the host to activate the GPS NMEA frames provided as unsolicited messages on GSM main serial link.

The National Marine Electronics Association (NMEA) standard defines an electrical interface and data protocol for communications between marine instrumentation. The NMEA-0183, scope of this document, defines a set of frame prefixed by \$GP and concerning Global Positioning System.

This command is only available in internal mode.

Important note: NMEA frames will be displayed only if UART1 is open. Consequently, make sure that UART2 is closed (AT+WMFM=0,0,1) to use this command.

3.1.2 Syntax

Command syntax: AT+WGPSNMEA=<mode>[,<NMEA1>,<NMEA2>...]

Response syntax: +WGPSNMEA: <mode>[,<NMEA1>,<NMEA2>...]

Unsolicited syntax: <CR><NMEA frames><CR>

Command	Possible responses
AT+WGPSNMEA=1,0,2,3	OK <i>Note: These free frames will be provided as unsolicited messages</i>
AT+WGPSNMEA=0	OK <i>Note: turn-off the unsolicited mode</i>
AT+WGPSNMEA?	+ WGPSNMEA: 1,0,2 OK <i>Note: give the current frame selected(GGA and GSV)</i>
AT+WGPSNMEA=?	+ WGPSNMEA: (0-1) ,(0-5) OK

Command	Possible responses
	<pre>\$GPGGA, 152331, 4859.9036, N, 01205.7588, E, 2, 03, 4.3, 253.4, M, 46.6, M, 0, 0000*7E \$GPGSA, A, 2, , 11, 21, , 31, , , , , 4.3, 4.3, *1C \$GPGSV, 2, 1, 05, 02, 06, 331, , 11, 36, 275, 42, 21, 59, 064, 35, 23, 19, 047, *78 \$GPGSV, 2, 2, 05, 31, 76, 233, 41, , , , , , , , *48 \$GPRMC, 152332, A, 4859.9037, N, 01205.7588, E, 000.0, 000.0, 100400, 001.2, E*7D</pre> <p><i>Note: unsolicited message</i></p>

3.1.3 Defined values

<mode>

- 0 deactivate NMEA unsolicited mode (**default**).
- 1 activate NMEA unsolicited mode

<NMEA x>: selected NMEA frame list chosen in the following list

- 0 GGA GPS fix data (**default**)
- 1 GSA GPS DOP and Active satellites
- 2 GSV GPS satellites in view
- 3 RMC Recommended minimum data
- 4 VTG Course over ground and ground speed
- 5 GLL Latitude and longitude, with time of position fix and status.

Notes:

- If <NMEA x> parameters are omitted, last configuration remains active. This configuration is stored in EEPROM.
- This mode is only available with internal mode (+WGPSCONF=0,1).

3.2 Get position information +WGPSPOS

3.2.1 Description

This command allows to get the last position information received.
This command is only available in internal mode.

3.2.2 Syntax

Command syntax: AT+WGPSPOS

Response syntax: +WGPSPOS:<fix>, <time>, <date>, <latitude>, <longitude>, <altitude>, <hdop>, <speed>, <course>, <nbsat>

Command	Possible responses
AT+WGPSPOS	+WGPSPOS: 1,225454,192294,4916.45N,12311.12W,111.1,0.9,25.5,1 80.0,06 OK <i>Note: see defined values</i>
AT+WGPSPOS	+WGPSPOS:-1,,,,,,,,,0 OK <i>Note: see defined values</i>

3.2.3 Defined values

<fix>

- 0 Invalid Fix
- 1 2D fix
- 2 3D fix
- 1 It is not possible to define a position

<time>: hhmmss time of fix

- ranges of values: hh (hour) 00 to 23
- mm (minute) 00 to 59
- ss (second) 00 to 59

Example: 225454 means 22:54:54 UTC

<date>: ddmmyy date of fix

ranges of values: dd (day) 01 to 31
 mm (month) 01 to 12
 yy (year) 2000 to 2099

Example: 191194 means November 19th of 1994

<latitude>: ddmm.mmmm(N/S)

ranges of values: dd (degree) 00 to 90
 mm.mmmm (minute) 00,0000 to 59.9999
 (N/S) North or South

Example: latitude of the fix- 4916.45N means 49 degree 16.45 min North

<longitude>: dddmm.mmmm(E/W)

ranges of values: dd (degree) 00 to 180
 mm.mmmm (minute) 00,0000 to 59.9999
 (E/W) East or West

Example: longitude of the fix – 12.311.12W means 123 degree 11.12 min West

<altitude>: mmmm.m altitude of fix in meter

<hdop>: mmm.mm: horizontal dilution of position in meter

<speed>: ssss.s Speed over ground, in kilometers per hour

<course>: dddmm.mmmm course in degree, minute

ranges of values: ddd (degree) 000 to 360
 mm.mmmm (minute) 00.0000 to 59.9999

<nbsat>: nn number of satellites in view

Note: This command is only available if the module is in internal mode (AT+GPSCONF=0,1)

3.3 Send raw data to GPS +WGPSRAW

3.3.1 Description

This command allows to write a raw data stream to the GPS controller. Data are not interpreted inside the GSM module.

This command is only available in internal mode.

3.3.2 Syntax

Command syntax: AT+WGPSRAW=<pdu>

Command	Possible responses
AT+WGPSRAW="0102AD2324" <i>Note: send a pdu stream in hexa to GPS controller</i>	OK <i>Note: successful transmission</i>

3.3.3 Defined values

<pdu> data are given in as a binary string (in hexadecimal format). Therefore, only the following set of characters is allowed: '0' to '9', and 'A' to 'F'. Each pair of character is converted to a byte (e.g. 41 is converted to ASCII character 'A', whose hexadecimal value is 0x41 or decimal 65).

Notes:

- The contents of <pdu> is the responsibility of the host user.
- The length of <pdu> is limited to 512 characters corresponding to a frame of 256 hexa-bytes.

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