203C GNSS

AT Commands Manual

GSM/GPRS/GNSS Module Series

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About the Document

History

Revision	Date	Author	Description
1.0	2017-06-21	Maochun Li	Initial
1.1	2017-06-26	Maochun Li	Added the following new AT commands: AT+QGNSSTS/AT+QGNSSEPO/ AT+QGREFLOC/AT+QGEPOAID
1.2	2017-07-01	Maochun Li	Added new AT command: AT+QGEPOF

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1 Introduction

GNSS, a featured function embedded in Quectel 203C module, can help customers get the current accurate coordinates, high precision time, etc.

203C integrates both GNSS and GSM engines which can work as a whole (**all-in-one** solution) unit or work independently (**stand-alone** solution) according to customer demands. In **all-in-one** solution, the internal GNSS module can be regarded as a peripheral of the whole unit, and is completely controlled by the GSM module, including power supply, UART communication, etc. In **stand-alone** solution, the internal GNSS module and the GSM module work independently, and the GNSS has to be controlled separately.

2 AT Commands for 203C GNSS

2.1. Overview of AT Commands for 203C GNSS

The commands below are effective only in **all-in-one** solution.

Table 1: Overview of AT Commands for 203C GNSS

Command	Description
AT+QGNSSC	Control power supply of GNSS module
AT+QGNSSRD	Read GNSS navigation information
AT+QGNSSCMD	Send commands to GNSS module
AT+QGNSSETS	Get time synchronization status for GNSS module
AT+QGNSSEPO	Enable/Disable EPO™ function
AT+QGREFLOC	Set reference location information for QuecFastFix Online
AT+QGEPOAID	Trigger EPO™ function
AT+QGEPOF	EPO™ file operation

2.1.1. AT+QGNSSC Control Power Supply of GNSS Module

The command is used to control the power supply of GNSS module.

AT+QGNSSC Control Power Supply of GNSS Module	
Test Command **AT+QGNSSC=?**	Response **+QGNSSC:** (list of supported **<mode>**s) **OK**
Read Command **AT+QGNSSC?**	Response **+QGNSSC: <mode>**

	OK
Write Command **AT+QGNSSC=<mode>**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**

Parameter

<mode>	0	Power off GNSS module
	1	Power on GNSS module

NOTE

In **stand-alone** solution, the power supply of GNSS is controlled by an external circuit rather than the PIN GNSS_VCC_EN. In such case, command **AT+QGNSSC** cannot be used and thus can be ignored.

2.1.2. AT+QGNSSRD Read GNSS Navigation Information

The command is used to get the GNSS navigation information.

AT+QGNSSRD Read GNSS Navigation Information	
Test Command **AT+QGNSSRD=?**	Response **+QGNSSRD:** (list of supported **<item>**s) **OK**
Read Command **AT+QGNSSRD?**	Response **+QGNSSRD:** (information of all supported **<item>**s) **OK**
Write Command **AT+QGNSSRD=<item>**	Response **+QGNSSRD:** (information of **<item>**s) **OK** If error is related to ME functionality: **+CME ERROR: <err>**

Parameter

<item>	"NMEA/GGA": Get GGA sentence
	"NMEA/GLL": Get GLL sentence

	“NMEA/GSA”: Get GSA sentence “NMEA/GSV”: Get GSV sentence “NMEA/RMC”: Get RMC sentence “NMEA/VTG”: Get VTG sentence

2.1.3. AT+QGNSSCMD Send Commands to GNSS Module

The command is used to send commands to GNSS module, which allows customers to optionally use some functions to meet application demands.

AT+QGNSSCMD Send Commands to GNSS Module	
Test Command **AT+QGNSSCMD=?**	Response **+QGNSSCMD: (0,1),“cmdString”** **OK**
Write Command **AT+QGNSSCMD=<cmdType>,<cmdString>**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**

Parameter

<cmdType>	0	NMEA style command
	1	Hex style command
<cmdString>	Command string	

NOTE

Currently only **<cmdType>**=0 is supported.

2.1.4. AT+QGNSSTS Get Time Synchronization Status for GNSS Module

The command is used to get time synchronization status for GNSS module. Time plays a very important role in EPO™ function.

AT+QGNSSTS Get Time Synchronization Status for GNSS Module	
Test Command **AT+QGNSSTS=?**	Response **+QGNSSTS: <status>** **OK**

Read Command **AT+QGNSSTS?**	Response **+QGNSSTS: <status>** **OK**

Parameter

<status>	0	Time is not synchronized
	1	Time is synchronized successfully

NOTE

Exact time is very important to EPO™ function. So customers must ensure the time is valid before using EPO™ function.

2.1.5. AT+QGNSSEPO Enable/Disable EPO™ Function

The command is used to enable or disable EPO™ function.

AT+QGNSSEPO Enable/Disable EPO™ Function	
Test Command **AT+QGNSSEPO=?**	Response **+QGNSSEPO:** (list of supported **<mode>**s)**[,<account_id>]** **OK**
Read Command **AT+QGNSSEPO?**	Response **+QGNSSEPO: <mode>,<account_id>** **OK**
Write Command **AT+QGNSSEPO=<mode>[,<account_id>]**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**

Parameter

<mode>	0	Disable EPO™ function
	1	Enable EPO™ function
<account_id>	2	Set account ID for EPO™ function

NOTES

1. The parameter **<account_id>** only supports 2. It can be omitted and 2 will be its default value when it is omitted.
2. The EPO function should be enabled after the time is synchronized successfully.

2.1.6. AT+QGREFLOC Set Reference Location Information for QuecFastFix Online

The command is used to set reference location information for QuecFastFix Online function.

AT+QGREFLOC Set Reference Location Information for QuecFastFix Online	
Test Command **AT+QGREFLOC=?**	Response **+QGREFLOC: <ref_latitude>,<ref_longitude>** **OK**
Read Command **AT+QGREFLOC?**	Response **+QGREFLOC: <ref_latitude>,<ref_longitude>** **OK**
Write Command **AT+QGREFLOC=<ref_latitude>,<ref_longitude>**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**

Parameter

<ref_latitude>	Latitude information of the reference location
<ref_longitude>	Longitude information of the reference location

NOTES

1. The range of **<ref_latitude>** is -90°~90°North Latitude, and the range of **<ref_longitude>** is -180°~180° East Longitude. The input format of the parameter should retain 6 decimal places, and the unit is degree.
2. The command works for QuecFastFix Online function and should be set before executing **AT+QGNSSEPO=1**.

2.1.7. AT+QGEPOAID Trigger EPO™ Function

The command is used to trigger EPO™ function.

AT+QGEPOAID Trigger EPO™ Function	
Test Command **AT+QGEPOAID=?**	Response **OK**
Active Command **AT+QEPOAID**	Response **OK** If error is related to ME functionality: **+CME ERROR: <err>**

NOTES

1. If GNSS is powered on already, customers could use this command to trigger EPO™ function after executing **AT+QGNSSEPO=1**.
2. If execute **AT+QGNSSEPO=1** first and then power on GNSS, executing this command will not trigger EPO™ function.

2.1.8. AT+QGEPOF EPO™ File Operation

The command is used to operate EPO™ related files, including the operation of deleting related files and getting the file size.

AT+QGEPOF EPO™ File Operation	
Test Command **AT+QGEPOF=?**	Response **+QGEPOF:** (list of supported **<mode>**s)**,** (list of supported **<index>**s) **OK**
Write Command **AT+QGEPOF=<mode>,<index>**	Response If **<mode>** is 0: **+QGEPOF: <size_a>,<size_b>,<size_c>** **OK** If **<mode>** is 1: **OK** If error is related to ME functionality: **+CME ERROR: <err>**

Parameter

<mode>	Operation mode	
	0	Get EPO™ file size
	1	Delete EPO™ file
<index>	EPO™ file selection	
	1	Select the EPO™ file containing 6 hours of data
	2	Select the EPO™ file containing the first 3 days of data
	3	Select the EPO™ file containing the second 3 days of data
	255	Select the above 3 files
<size_a>	Integer value. Positive numbers indicate the file size, and negative numbers indicate failed file operation.	
	0-4032	Size of the EPO™ file containing 6 hours of data
	-9	File not found
	-16	File access denied
	-19	Path not found
	Other negative values	Other failed file operation
<size_b>	Integer value. Positive numbers indicate the file size, and negative numbers indicate failed file operation.	
	0-48384	Size of the EPO™ file containing the first 3 days of data
	-9	File not found
	-16	File access denied
	-19	Path not found
	Other negative values	Other failed file operation
<size_c>	Integer value. Positive numbers indicate the file size, and negative numbers indicate failed file operation.	
	0-48384	Size of the EPO™ file containing the second 3 days of data
	-9	File not found
	-16	File access denied
	-19	Path not found
	Other negative values	Other failed file operation

NOTE

If the EPO™ files are deleted, there is a need to trigger EPO™ function again. For more details, please refer to ***document [3]***.

3 Examples

3.1. AT+QGNSSC

```
AT+QGNSSC?                  //Query GNSS power status.
+QGNSSC: 0                  //GNSS is powered off.
OK
AT+QGNSSC=1                 //Power on GNSS.
OK
```

3.2. AT+QGNSSRD

```
AT+QGNSSRD?                 //Inquire GNSS NMEA sentence.
+QGNSSRD: $GNRMC,033836.000,A,3150.8272,N,11711.9889,E,0.00,140.50,140716,,,D*72
$GNVTG,140.50,T,,M,0.00,N,0.00,K,D*26
$GNGGA,033836.000,3150.8272,N,11711.9889,E,2,10,0.96,166.6,M,0.0,M,,*4A
$GPGSA,A,3,28,16,09,27,08,07,30,,,,,1.52,0.96,1.17*01
$BDGSA,A,3,04,07,10,,,,,,,,,1.52,0.96,1.17*1F
$GPGSV,3,1,10,08,64,016,51,07,61,300,28,42,42,134,34,30,34,315,42*7E
$GPGSV,3,2,10,27,32,043,45,16,25,085,43,09,17,227,39,28,08,294,30*7D
$GPGSV,3,3,10,26,02,102,,193,,,*76
$BDGSV,3,1,09,10,76,324,44,08,76,235,,07,73,125,44,15,48,226,28*6A
$BDGSV,3,2,09,01,47,141,27,12,41,240,27,02,38,231,,04,32,119,39*69
$BDGSV,3,3,09,05,18,252,27*5D
$GNGLL,3150.8272,N,11711.9889,E,033836.000,A,D*40

OK
AT+QGNSSRD="NMEA/RMC"       //Inquire RMC information.
+QGNSSRD: $GNRMC,033837.000,A,3150.8272,N,11711.9889,E,0.00,140.50,140716,,,D*73

OK
AT+QGNSSRD="NMEA/GSA"       //Inquire GSA information.
+QGNSSRD: $GPGSA,A,3,28,16,09,27,08,07,30,,,,,1.52,0.96,1.17*01
$BDGSA,A,3,04,07,10,,,,,,,,,1.52,0.96,1.17*1F

OK
AT+QGNSSRD?                 //Inquire GNSS NMEA sentence.
```

```
+QGNSSRD: $GNRMC,033839.000,A,3150.8272,N,11711.9889,E,0.00,140.50,140716,,,D*7D
$GNVTG,140.50,T,,M,0.00,N,0.00,K,D*26
$GNGGA,033839.000,3150.8272,N,11711.9889,E,2,10,0.96,166.6,M,0.0,M,,*45
$GPGSA,A,3,28,16,09,27,08,07,30,,,,,,1.52,0.96,1.17*01
$BDGSA,A,3,04,07,10,,,,,,,,,,1.52,0.96,1.17*1F
$GPGSV,3,1,10,08,64,016,51,07,61,300,26,42,42,134,34,30,34,315,42*70
$GPGSV,3,2,10,27,32,043,46,16,25,085,43,09,16,226,39,28,08,294,30*7E
$GPGSV,3,3,10,26,02,102,,193,,,*76
$BDGSV,3,1,09,10,76,324,44,08,76,235,,07,73,125,44,15,48,226,28*6A
$BDGSV,3,2,09,01,47,141,27,12,41,240,27,02,38,231,,04,32,119,39*69
$BDGSV,3,3,09,05,18,252,27*5D
$GNGLL,3150.8272,N,11711.9889,E,033839.000,A,D*4F

OK
```

3.3. AT+QGNSSCMD

```
AT+QGNSSCMD=0,"$PMTK605*31"          //Inquire GNSS version information.
OK

+QGNSSCMD: $PMTK705,AXN_3.82_3333_16051101,0001,MC20-GNSS,1.0*2A
```

3.4. AT+QGNSSTS

```
AT+QGNSSTS=?          //Test command
+QGNSSTS: (0,1)

OK
AT+QGNSSTS?           //Read time synchronization mode and status.
+QGNSSTS: 1           //Time is synchronized successfully.

OK
```

3.5. AT+QGNSSEPO

```
AT+QGNSSEPO=?              //Test command
+QGNSSEPO: (0,1)[,<account_id>]

OK
AT+CREG?;+CGREG?           //Check network status.
+CREG: 0,1
```

```
+CGREG: 0,1

OK
AT+QGNSSEPO=1          //Enable EPO™ function.

OK
AT+QGNSSEPO?           //Read EPO™ status.
+QGNSSEPO: 1,2

OK
```

3.6. AT+QGREFLOC

```
AT+QGREGLOC=?              //Test command
+QGREFLOC: <ref_latitude>,<ref_longitude>

OK
AT+QGREFLOC=31.507985,117.119750
OK
```

3.7. AT+QGEPOAID

```
AT+QGNSSC=1            //Power on GNSS.
OK
AT+CREG?;+CGREG?       //Check network status.
+CREG: 0,1

+CGREG: 0,1

OK
AT+QGNSSTS?            //Inquire time synchronization status.
+QGNSSTS: 1

OK
AT+QGNSSEPO=1
OK
AT+QGEPOAID
OK
```

3.8. AT+QGEPOF

```
AT+QGEPOF=?              //Test command
+QGEPOF: (0,1),(1-3,255)

OK
AT+QGEPOF=0,255          //Get EPO™ file size.
+QGEPOF: -9,48384,48384

OK
AT+QGEPOF=1,255          //Delete all EPO™ files.

OK
AT+QGEPOF=0,255
+QGEPOF: -9,-9,-9

OK
```

3.9. Complete Example for Operating EPO™ and QuecFastFix Online

```
AT+QGNSSC=1              //Power on GNSS.
OK
AT+QIFGCNT=2
OK
AT+QICSGP=1,"CMNET"
OK
AT+QGNSSTS?              //Read time synchronization status.
+QGNSSTS: 0

OK
AT+CREG?;+CGREG?         //Check network status.
+CREG: 0,2

+CGREG: 0,2

OK
AT+CREG?;+CGREG?         //Check network status.
+CREG: 0,1

+CGREG: 0,1

OK
AT+QGNSSTS?              //Read time synchronization status.
```

```
+QGNSSTS: 1                          //Time synchronization completed.

OK
AT+QGREFLOC=31.507985,117.119750     //Set reference location information for QuecFastFix Online.
OK
AT+QGNSSEPO=1                        //Enable EPO™ function.
OK
AT+QGEPOAID                          //Trigger EPO™ function.
OK
AT+QGNSSRD?
+QGNSSRD: $GNRMC,032220.291,V,,,,,0.00,0.00,140716,,,N*5D
$GNVTG,0.00,T,,M,0.00,N,0.00,K,N*2C
$GNGGA,032220.291,,,,,0,0,,,M,,M,,*5D
$GPGSA,A,1,,,,,,,,,,,,,,,*1E
$BDGSA,A,1,,,,,,,,,,,,,,,*0F
$GPGSV,2,1,07,23,,,31,08,,,49,30,,,33,16,,,45*7E
$GPGSV,2,2,07,07,,,44,27,,,49,26,,,43*72
$BDGSV,1,1,03,10,,,47,04,,,40,07,,,48*62
$GNGLL,,,,,032220.291,V,N*6F

OK
AT+QGNSSRD?
+QGNSSRD: $GNRMC,032221.301,V,,,,,0.00,0.00,140716,,,N*54
$GNVTG,0.00,T,,M,0.00,N,0.00,K,N*2C
$GNGGA,032221.301,,,,,0,0,,,M,,M,,*54
$GPGSA,A,1,,,,,,,,,,,,,,,*1E
$BDGSA,A,1,,,,,,,,,,,,,,,*0F
$GPGSV,2,1,07,23,,,31,08,,,49,30,,,33,16,,,45*7E
$GPGSV,2,2,07,07,,,44,27,,,49,26,,,43*72
$BDGSV,1,1,03,10,,,47,04,,,40,07,,,48*62
$GNGLL,,,,,032221.301,V,N*66

OK
…
AT+QGNSSRD?
+QGNSSRD: $GNRMC,032225.306,A,3150.7859,N,11711.9215,E,0.06,204.08,140716,,,A*70
$GNVTG,204.08,T,,M,0.06,N,0.11,K,A*2B
$GNGGA,032225.306,3150.7859,N,11711.9215,E,1,9,1.54,35.0,M,0.0,M,,*40
$GPGSA,A,3,08,30,16,07,27,26,,,,,,,1.75,1.54,0.83*00
$BDGSA,A,3,10,04,07,,,,,,,,,,1.75,1.54,0.83*19
$GPGSV,3,1,09,08,70,004,49,07,55,309,44,42,45,141,,27,38,040,49*7D
$GPGSV,3,2,09,16,28,079,45,30,28,317,31,26,06,096,43,193,,,*7C
$GPGSV,3,3,09,23,,,28*7B
$BDGSV,1,1,03,07,74,113,48,10,74,329,47,04,32,119,40*51
```

```
$GNGLL,3150.7859,N,11711.9215,E,032225.306,A,A*4A

OK
AT+QGNSSRD?
+QGNSSRD: $GNRMC,032225.306,A,3150.7859,N,11711.9215,E,0.06,204.08,140716,,,A*70
$GNVTG,204.08,T,,M,0.06,N,0.11,K,A*2B
$GNGGA,032225.306,3150.7859,N,11711.9215,E,1,9,1.54,35.0,M,0.0,M,,*40
$GPGSA,A,3,08,30,16,07,27,26,,,,,,,1.75,1.54,0.83*00
$BDGSA,A,3,10,04,07,,,,,,,,,,1.75,1.54,0.83*19
$GPGSV,3,1,09,08,70,004,49,07,55,309,44,42,45,141,,27,38,040,49*7D
$GPGSV,3,2,09,16,28,079,45,30,28,317,31,26,06,096,43,193,,,*7C
$GPGSV,3,3,09,23,,,28*7B
$BDGSV,1,1,03,07,74,113,48,10,74,329,47,04,32,119,40*51
$GNGLL,3150.7859,N,11711.9215,E,032225.306,A,A*4A

OK
```

4 Appendix A References

4.1. Related Documents

Table 2: Related Documents

SN	Document Name	Remark
[1]	NMEA 0183 Version 3.01	Standard for Interfacing Marine Electronic Devices
[2]	ZF_203C_Hardware_Design	203C hardware design
[3]	ZF_203C_GNSS_AGPS_Application_Note	203C GNSS AGPS application note

4.2. Terms and Abbreviations

Table 3: Terms and Abbreviations

Abbreviation	Description
GGA	Global Positioning System Fixed Data
GLL	Geographic Latitude and Longitude
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GSA	GNSS DOP and Active Satellites
GSM	Global System for Mobile Communication
GSV	GNSS Satellites in View

ME	Mobile Equipment
NMEA	National Marine Electronics Association
RMC	Recommended Minimum Specific GNSS Data
VTG	Course Over Ground and Ground Speed

4.3. Summary of CME ERROR Codes Related to GNSS

Table 4: Different Coding Schemes of +CME ERROR Related to GNSS: <err>

Code of <err>	Meaning
7101	Invalid parameter
7102	Not supported
7103	Operation failed