

MC60 GNSS

AT Commands Manual

GSM/GPRS/GNSS Module Series

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About the Document

History

Revision	Date	Author	Description
1.0	2016-06-24	Hyman DING	Initial
1.1	2016-07-30	Hyman DING	Added the following new AT commands: AT+QGNSSSTS/AT+QGNSSSEPO/ AT+QGREFLOC/AT+QGEPOAID

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1 Introduction

GNSS, a featured function embedded in Quectel MC60 module, can help customers get the current accurate coordinates, high precision time, etc.

MC60 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.

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2 AT Commands for MC60 GNSS

2.1. Overview of AT Commands for MC60 GNSS

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

Table 1: Overview of AT Commands for MC60 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+QGNSSSETS	Get time synchronization status for GNSS module
AT+QGNSSSEPO	Enable/Disable EPO™ function
AT+QGREFLOC	Set reference location information for QuecFastFix Online
AT+QGEPOAID	Trigger EPO™ function

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>	<u>0</u>	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 GPS_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+QGNSSSTS 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+QGNSSSTS Get Time Synchronization Status for GNSS Module

Test Command AT+QGNSSSTS=?	Response +QGNSSSTS: <status>
--------------------------------------	--

	OK
Read Command AT+QNSSTS?	Response +QNSSTS: <status>
	OK

Parameter

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

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+QNSSEPO Enable/Disable EPO™ Function

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

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

Parameter

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

NOTE

The parameter **<account_id>** only supports 2. It can be omitted when input, and in this case, 2 will be used as the default value.

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+QGNSSSEPO=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+QGEPOAID	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+QGNSSSEPO=1**.
2. If execute **AT+QGNSSSEPO=1** first and then power on GNSS, executing this command will not trigger EPO™ function.

3 Examples

3.1. AT+QGNSSC

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

3.2. AT+QGNSSRD

```
AT+QGNSSRD?           // Inquire GNSS NMEA sentence
+QGNSSRD: $GNRMC,034035.000,A,3150.8617,N,11711.9038,E,3.02,183.45,240516,,,A*75
$GNVTG,183.45,T,M,3.02,N,5.59,K,A*20
$GNGGA,034035.000,3150.8617,N,11711.9038,E,1,4,1.50,40.9,M,0.0,M,,*44
$GPGSA,A,3,26,21,,,,,,,,,1.75,1.50,0.91*0A
$GLGSA,A,3,82,70,,,,,,,,,1.75,1.50,0.91*1C
$GPGSV,3,1,12,16,67,308,,26,58,021,16,23,40,307,,31,40,088,*7F
$GPGSV,3,2,12,08,17,199,,09,14,320,,21,10,086,14,14,10,153,*73
$GPGSV,3,3,12,22,09,226,,193,06,165,,32,03,154,,29,01,034,*45
$GLGSV,3,1,09,81,44,073,,79,40,041,,82,38,145,15,80,36,323,*66
$GLGSV,3,2,09,70,30,290,16,69,26,225,,78,12,078,,88,09,027,*64
$GLGSV,3,3,09,71,05,334,*5B
$GNGLL,3150.8617,N,11711.9038,E,034035.000,A,A*4C

OK
AT+QGNSSRD="NMEA/RMC" // Inquire RMC information
+QGNSSRD: $GNRMC,034036.000,A,3150.8612,N,11711.9045,E,2.74,178.00,240516,,,A*7C

OK
AT+QGNSSRD="NMEA/GSA" // Inquire GSA information
+QGNSSRD: $GPGSA,A,3,26,21,,,,,,,,,1.76,1.50,0.91*09
$GLGSA,A,3,82,70,,,,,,,,,1.75,1.50,0.91*1C

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

```
+QGNSSRD: $GNRMC,034039.000,A,3150.8596,N,11711.9049,E,2.13,194.12,240516,,A*70
$GNVTG,194.12,T,M,2.13,N,3.95,K,A*23
$GNGGA,034039.000,3150.8596,N,11711.9049,E,1,5,1.50,38.7,M,0.0,M,,*44
$GPGSA,A,3,22,26,21,,,,,,,,,1.75,1.50,0.91*0A
$GLGSA,A,3,82,70,,,,,,,,,1.75,1.50,0.91*1C
$GPGSV,3,1,12,16,67,308,,26,58,021,17,23,40,307,,31,40,088,*7E
$GPGSV,3,2,12,08,17,199,,09,14,320,,21,10,086,12,14,10,153,*75
$GPGSV,3,3,12,22,09,226,16,193,06,165,,32,03,154,,29,01,034,*42
$GLGSV,3,1,09,81,44,073,,79,40,041,,82,38,145,16,80,36,323,*65
$GLGSV,3,2,09,70,30,290,16,69,26,225,,78,12,078,,88,09,027,*64
$GLGSV,3,3,09,71,05,334,*5B
$GNGLL,3150.8596,N,11711.9049,E,034039.000,A,A*4C
```

OK

3.3. AT+QGNSSCMD

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

OK

```
+QGNSSCMD: $PMTK705,AXN_3.82_3333_16051101,0001,MC60-GNSS,1.0*2A
```

3.4. AT+QSNSSTS

AT+QSNSSTS=? // Test command

+QSNSSTS: (0,1)

OK

AT+QSNSSTS? // Read time synchronization mode and status

+QSNSSTS: 1 // Time synchronized successfully

OK

3.5. AT+QSNSSEPO

AT+QSNSSEPO=? // Test command

+QSNSSEPO: (0,1)[,<account_id>]

OK

AT+CREG?;+CGREG? // Check network status

+CREG: 0,1

+CGREG: 0,1

OK

AT+QGNSSSEPO=1 // Enable EPO™ function

OK

AT+QGNSSSEPO? //Read EPO™ status

+QGNSSSEPO: 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+QGNSSSTS? // Inquire time synchronization status

+QGNSSSTS: 1

OK

AT+QGNSSSEPO=1

OK

AT+QGEPOAID

OK

3.8. Complete Example for Operating EPOTM and QuecFastFix Online

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

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

+CREG: 0,2

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

+CREG: 0,1

OK
AT+QGNSSSTS?           // Read time synchronization status
+QGNSSSTS: 1           // Time synchronization completed

OK
AT+QGREFLOC=31.507985,117.119750 // Set reference location information for QuecFastFix Online
OK
AT+QGNSSSEPO=1         // Enable EPO™ function
OK
AT+QGEPOAID            // Trigger EPO™ function
OK
AT+QGNSSRD?
+QGNSSRD: $GNRMC,125349.093,V,,,,,0.00,0.00,010716,,,N*50
$GNVTG,0.00,T,M,0.00,N,0.00,K,N*2C
$GNGGA,125349.093,,,,,0,0,,,M,,M,,*54
$GPGSA,A,1,,,,,,,,,,,,,*1E
$GLGSA,A,1,,,,,,,,,,,,,*02
$GPGSV,1,1,02,09,,,29,06,,,29*74
$GLGSV,1,1,00*65
$GNGLL,,,,,125349.093,V,N*66
```


OK

AT+QGNSSRD?

+QGNSSRD: \$GNRMC,125350.093,V,,,,,0.00,0.00,010716,,,N*58
\$GNVTG,0.00,T,,M,0.00,N,0.00,K,N*2C
\$GNGGA,125350.093,,,,,0,0,,,M,,M,,*5C
\$GPGSA,A,1,,,,,,,,,,,,,*1E
\$GLGSA,A,1,,,,,,,,,,,,,*02
\$GPGSV,1,1,02,09,,,29,06,,,29*74
\$GLGSV,1,1,00*65
\$GNGLL,,,,,125350.093,V,N*6E

OK

.....

AT+QGNSSRD?

+QGNSSRD: \$GNRMC,125353.092,A,3150.8278,N,11711.9888,E,0.31,111.02,010716,,,A*7C
\$GNVTG,111.02,T,,M,0.31,N,0.58,K,A*2F
\$GNGGA,125353.092,3150.8278,N,11711.9888,E,1,5,1.63,145.5,M,0.0,M,,*7A
\$GPGSA,A,3,06,09,07,02,12,,,,,,1.83,1.63,0.83*0E
\$GLGSA,A,3,,,,,,1.83,1.63,0.83*1B
\$GPGSV,4,1,15,02,68,022,28,05,61,286,,06,37,091,32,13,31,181,*73
\$GPGSV,4,2,15,19,25,155,,29,24,318,,20,18,257,,12,17,243,25*7E
\$GPGSV,4,3,15,25,13,278,,09,11,039,31,07,06,081,26,15,06,205,*7A
\$GPGSV,4,4,15,30,05,107,,17,01,151,,193,,,*44
\$GLGSV,1,1,04,85,77,105,,86,41,334,,84,26,139,,72,12,227,*65
\$GNGLL,3150.8278,N,11711.9888,E,125353.092,A,A*4B

OK

AT+QGNSSRD?

+QGNSSRD: \$GNRMC,125354.092,A,3150.8278,N,11711.9888,E,0.31,111.02,010716,,,A*7B
\$GNVTG,111.02,T,,M,0.31,N,0.58,K,A*2F
\$GNGGA,125354.092,3150.8278,N,11711.9888,E,1,5,1.63,145.5,M,0.0,M,,*7D
\$GPGSA,A,3,06,09,07,02,12,,,,,,1.83,1.63,0.83*0E
\$GLGSA,A,3,,,,,,1.83,1.63,0.83*1B
\$GPGSV,4,1,15,02,68,022,28,05,61,286,,06,37,091,32,13,31,181,*73
\$GPGSV,4,2,15,19,25,155,,29,24,318,,20,18,257,,12,17,243,25*7E
\$GPGSV,4,3,15,25,13,278,,09,11,039,31,07,06,081,26,15,06,205,*7A
\$GPGSV,4,4,15,30,05,107,,17,01,151,,193,,,*44
\$GLGSV,1,1,04,85,77,105,,86,41,334,,84,26,139,,72,12,227,*65
\$GNGLL,3150.8278,N,11711.9888,E,125354.092,A,A*4C

OK

4 Appendix

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]	Quectel_MC60_Hardware_Design	MC60 Hardware Design

4.2. Terms and Abbreviations

Table 3: Terms and Abbreviations

Abbreviation	Description
GGA	Global Positioning System Fixed Data
GLL	Geographic Position – Latitude/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