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SIM800 Series_GNSS_Application Note_V1.00

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VERSION HISTORY

Date	Version	Description of change	Author
2015.05.15	1.00	New version	Zhongyu.gou

Scope

This document presents the AT command of GNSS function and application examples. The document can apply to SIM800 series modules, including SIM808 witch hardware release version is V2.01 and above and the software release version is 1418B01SIM808M32 and above.

1 Introduction

SIM808 module combines GNSS technology for satellite navigation. Featuring an industry-standard interface and GNSS function, it allows variable assets to be tracked seamlessly at any location and anytime with signal coverage.

GNSS application provides a method to interact with a GNSS module.

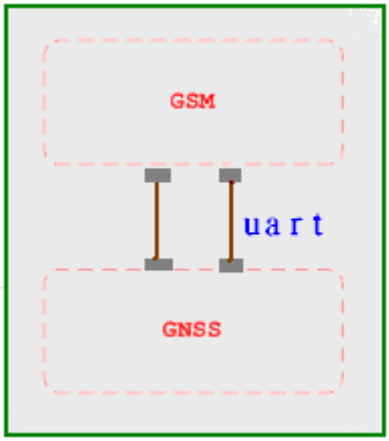

Figure 1-1 SIM808 System connection

2 AT Command

SIM800 series modules provide GNSS AT command is as follows:

Commands	Description
AT+CGNSPWR	GNSS power control
AT+CGNSSEQ	Define the last NMEA sentence that parsed
AT+CGNSINF	GNSS navigation information parsed from NMEA sentences
AT+CGNSURC	GNSS navigation, GEO-fence and speed alarm URC report control
AT+CGNSCMD	Send command to GNSS
AT+CGNSTST	Send data received from GNSS to AT UART

2.1 AT+CGNSPWR GNSS power control

AT+CGNSPWR GNSS power control	
Test Command **AT+CGNSPWR=?**	Response **+CGNSPWR: (**list of supported <**mode**>s **)** **OK**
	Parameters See Write Command
Read Command **AT+CGNSPWR?**	Response TA returns the current status of GNSS Power supply **+CGNSPWR: <mode>** **OK**
	Parameters See Write Command
Write Command **AT+CGNSPWR=<mode>**	Response GNSS POWER CONTROL ON/OFF **OK** **ERROR**
	Parameters **<mode>** 0 Turn off GNSS power supply 1 Turn on GNSS power supply
Reference	

2.2 AT+CGNSSEQ Define the last NMEA sentence that parsed

AT+CGNSSEQ Define the last NMEA sentence that parsed	
Test Command **AT+CGNSSEQ=?**	Response **+CGNSSEQ: (GGA,GSA,RMC,GSV)** **OK**
	Parameter See Write Command
Read Command **AT+CGNSSEQ?**	Response TA returns the current setting of last sentence parsed: **+CGNSSEQ: <last sentence>** **OK**
	Parameter See Write Command
Write Command **AT+CGNSSEQ=<last sentence>**	Response **OK** **ERROR**
	Parameters <**last sentence**> is a string type parameter: **"**GGA**"** refer to **"**GPGGA" or "GLGGA" or "GNGGA" **"**GSA**"** refer to **"**GPGSA**"** or "GLGSA" or "GNGSA" **"**GSV" refer to **"**GPGSV**"** or "GLGSV" or "GNGSV" "RMC" refer to **"**GPRMC" or "GLRMC" or "GNRMC"
Reference	Note Factory setting is: **AT+CGNSSEQ="RMC".**

Table 2-1: parsed NMEA message

Message	**Description**	**Possible Talker Identifiers**
GGA	Time, position and fix type data	GP
GSA	GNSS receiver operating mode, satellites used in the position solution, and DOP values	GP, GN
GSV	Number of GNSS satellites in view satellite ID numbers, elevation, azimuth, & SNR values	GP,GL,GN
RMC	Time, date, position, course and speed data	GP,GN

Table 2-2: parsed GNSS navigation parameters

Parameters	**Description**
UTC Time	Parsed from "$--RMC" NMEA sentence
fix status	Parsed from "$--RMC" NMEA sentence

Latitude	Parsed from "$--RMC" NMEA sentence
N/S Indicator	Parsed from "$--RMC" NMEA sentence
Longitude	Parsed from "$--RMC" NMEA sentence
E/W Indicator	Parsed from "$--RMC" NMEA sentence
Speed Over Ground	Parsed from "$--RMC" NMEA sentence
Course Over Ground	Parsed from "$--RMC" NMEA sentence
Date	Parsed from "$--RMC" NMEA sentence
Magnetic Variation	Reserved
East/West Indicator	Reserved
RMC mode	Parsed from "$--GGA" NMEA sentence
HDOP	Parsed from "$--GGA" NMEA sentence
MSL Altitude	Parsed from "$--GGA" NMEA sentence
Units	Parsed from "$--GGA" NMEA sentence
Geoid Separation	Reserved
Units	Reserved
Age of Diff. Corr.	Reserved
Diff. Ref. Station ID	Reserved
Satellites Used	Parsed from "$--GGA" NMEA sentence
PDOP	Parsed from "$--GGA" NMEA sentence
VDOP	Parsed from "$--GGA" NMEA sentence
Satellites in View	Parsed from "$--GSV" NMEA sentence
HPA	Reserved
VPA	Reserved

2.3 AT+CGNSINF GNSS navigation information parsed from NMEA sentences

AT+CGNSINF GNSS navigation information parsed from NMEA sentences	
Execution Command **AT+CGNSINF**	Response **+CGNSINF: <GNSS run status>,<Fix status>,** **<UTC date & Time>,<Latitude>,<Longitude>,**

	<MSL Altitude>,<Speed Over Ground>, **<Course Over Ground>,** **<Fix Mode>,<Reserved1>,<HDOP>,<PDOP>,** **<VDOP>,<Reserved2>,<GNSS Satellites in View>,** **<GNSS Satellites Used>,<GLONASS Satellites Used>,<Reserved3>,<C/N0 max>,<HPA>,<VPA>** **OK**
	Parameters See below table 2-3.
Reference	

Table 2-3: AT+CGNSINF return Parameters

Index	Parameter	Unit	Range	Length
1	GPS run status	--	0-1	1
2	Fix status	--	0-1	1
3	UTC date & Time	yyyyMMddhh mmss.sss	yyyy: [1980,2039] MM : [1,12] dd: [1,31] hh: [0,23] mm: [0,59] ss.sss:[0.000,60.999]	18
4	Latitude	±dd.dddddd	[-90.000000,90.000000]	10
5	Longitude	±ddd.dddddd	[-180.000000,180.000000]	11
6	MSL Altitude	meters		8
7	Speed Over Ground	Km/hour	[0,999.99]	6
8	Course Over Ground	degrees	[0,360.00]	6
9	Fix Mode	--	0,1,2[1]	1
10	Reserved1			0
11	HDOP	--	[0,99.9]	4
12	PDOP	--	[0,99.9]	4
13	VDOP	--	[0,99.9]	4
14	Reserved2			0
15	GPS Satellites in View	--	[0,99]	2
16	GNSS Satellites Used	--	[0,99]	2
17	GLONASS Satellites in View	--	[0,99]	2
18	Reserved3			0
19	C/N0 max	dBHz	[0,55]	2
20	HPA[2]	meters	[0,9999.9]	6

21	VPA[2]	meters	[0,9999.9]	6
			Total：(94) chars	

Note:

1. ***The range of < Fix Mode >depends on the GNSS part used.***
2. ***Reserved.***

2.4 AT+CGNSURC GNSS navigation, GEO-fences and speed alarm URC report

AT+CGNSURC GNSS navigation, GEO-fences and speed alarm URC report	
Test Command **AT+CGNSURC=?**	Response **+CGNSURC: (0-255)** **OK**
	Parameters See Write Command
Read Command **AT+CGNSURC?**	Response TA returns the current URC setting **+CGNSURC: < Navigation mode>** **OK**
	Parameters See Write Command
	Unsolicited Result Code **+UGNSINF: <GNSS run status>,<Fix status>,** **<UTC date & Time>,<Latitude>,<Longitude>,** **<MSL Altitude>,<Speed Over Ground>,** **<Course Over Ground>,** **<Fix Mode>,<Reserved1>,<HDOP>,<PDOP>,** **<VDOP>,<Reserved2>,<Satellites in View>,** **<Satellites Used>,<Reserved3>,<C/N0 max>,<HPA>,<VPA>**
Write Command **AT+CGNSURC=<Navigation mode>**	Parameters **< Navigation mode>:** 0 Turn off navigation data URC report 1 Turn on navigation data URC report, and report every GNSS FIX 2 Turn on navigation data URC report, and report every 2 GNSS FIX … 255 Turn on navigation data URC report, and report every 255 GNSS FIX
Reference	Note 1. Factory setting is "AT+CGNSURC=0". 2. URC "**+UGNSINF:** "parameters are the same as "**+CGNSINF:**" return.

2.5 AT+CGNSCMD Send command to GNSS

AT+CGNSCMD Send command to GNSS	
Test Command **AT+CGNSCMD=?**	Response **+CGNSCMD: (0-1),"CmdString"**

	OK
	Parameters See Write Command
Write Command **AT+CGNSCMD=<Cmdtype>,<CmdString>**	Response If send ok: **OK** If send false[3]: **ERROR**
	Parameters **< CmdType>** 0 NMEA style command 1 HEX style command **< CmdString >** command string For example, if you want to send "$PMTK000*32<CR><LF>" command to GNSS: You can use: AT+CGNSCMD=0,"$PMTK000*32" Or: AT+CGNSCMD=1,"24504D544B3030302A33320D0A"
Reference	Note Max length of <CmdString> is 258.

2.6 AT+CGNSTST Send data received from GNSS to AT UART

AT+CGNSTST Send data received from GNSS to AT UART	
Test Command **AT+CGNSTST=?**	Response **+CGNSTST: (**0-1 **)** **OK**
	Parameters See Write Command
Read Command **AT+CGNSTST?**	Response GNSS test mode on/off **+CGNSTST: <mode>** **OK**
	Parameters See Write Command
Write Command **AT+CGNSTST=<mode>**	Response **OK** **ERROR**

	Parameters **<mode>** 0 Turn off GNSS test mode 1 Turn on GNSS test mode
Reference	Note This command is used for test.

3 CME Error Code

The following errors are related to GPS. The format is like this: +CME ERROR: <err>. The detail error code and description is list in the following table.

Code	Description
895	GNSS baud rate selected by HW
891	GNSS data check sum err

4 AT Commands Examples

Demonstration	Syntax	Expect Result
Turn on GNSS power	AT+CGNSPWR=1	OK
Turn off GNSS power	AT+CGNSPWR=0	OK
Define the last NMEA sentence that parsed	AT+CGNSSEQ= “RMC”	OK
Read GNSS navigation information	AT+CGNSINF	+CGNSINF: 1,1,20150327014838.000,31.221783,121.354528,114.600,0.28,0.0,1,,1.9,2.2,1.0,,8,4,,,42,, OK
Set URC reporting every 2(1-255) GNSS fix	AT+CGNSURC=2	OK
Turn off URC reporting	AT+CGNSURC=0	OK
Send Command to GNSS.	AT+CGNSCMD=0,"$PMTK000*32”	OK
Send NMEA data to AT UART	AT+CGNSTST=1	OK

Appendix

A Related documents

SN	Document name	Remark
[1]		

B Terms and Abbreviations

Abbreviation	Definition
APN	Access Point Name
URC	Unsolicited Result Code
FTP	File Transfer Protocol
GGA	Global Positioning System Fixed Data
GLL	Geographic Position - Latitude/Longitude
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
AGPS	Assisted GPS
DGPS	Differential Global Positioning System
GPRS	General Packet Radio Service
GSA	GNSS DOP and Active Satellites
GSV	GNSS Satellites in View
HPA	Horizontal Position Accuracy
VPA	Vertical Position Accuracy
GEO-Fence	A geographic area
HTTP	The Hypertext Transfer Protocol
HDOP	Horizontal Dilution of Precision
HTTP	Hypertext Transfer Protocol
NMEA	National Marine Electronics Association
NMEA	National Marine Electronics Association
PDOP	Position Dilution of Precision
PDP	Packet Data Protocol
RMC	Recommended Minimum Specific GNSS Data
VDOP	Vertical Dilution of Precision
VTG	Course Over Ground and Ground Speed
ZDA	Time & Date

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