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MeiG SRM815&SRM825(W) &SLM750-R2.0 GPS AT Commands Manual

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Revision History

Revision	Date	Description
V1.0	2020-5-16	Creat V1.0 version
V1.1	2020-7-29	1 Modify section 1.2，Add related acronyms 2 Modify section 2.1 and 2.4，Modify the return value range of the command query 3 Modify section 2.1.8，Extended GPS+BEIDOU mode 4 Modify section 2.1.1 and 2.1.3 ,Add UART port to print NMEA prefab conditions and add GPS to output all NMEA types 5 Modify section 2.1.1，Query command return status 6 Modify section 2.10，Parameter Description 7 Modify section 2.12，add AT+GPSSTATE command
V1.2	2020-8-29	Modify section 2.7，add gpsxtra default value description Modify section 2.9，add xtra file download URL，data/ directory changed to usrdata/ Modify section 2.10，modify AT+GPSPOSINFO data format
V1.3	2020-9-23	New framework transplantation + AT instruction set rectification.
V1.4	2020-9-25	Add GNSS Error Codes. Adjust the parameter order of Table 25. Adjust the parameter of Table 4.
V1.5	2020-10-26	Modify Table 2, Adjust parameter range. Modify Table 8, Add parameter instructions. Modify Table 24 and Table 25, Modify the positioning timeout

		range and the default value of +GPSRUN.
V1.6	2020-11-11	Modify Table 1, modify the description of state 0. Add Table 21, add agpssupl command. Modify Table 30 to add instructions for using CT_NET. Modify table 26，add parameters MSB and MSA.
V1.7	2020-11-27	Modify section 2.10, realize UTC year, month and day reporting in GPSLOC instructions Modify Table 10, delete GLGNS statement output function
V1.8	2020-12-08	Modify Section 2.1 and add the type of gnnmeatype Modify section 2.1.4, delete glgsa type because baseline is not supported Modify section 2.1.5, add GGA, RMC, GSA, VTG statement control of gal Add section 2.1.11, add the reporting function of GN statement
V1.9	2020-12-22	Modify Table 30, when using AT+GPSGNMEA, you need to run GPS Modify Table 29, modify possible return results and descriptions Add example chapter 4

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1 Introduction

1.1 Purpose of the document

This document details the AT command set used for GNSS function supported by MeiG SRM815&SLM750-R2.0 module to guide the users to use the GNSS function.

1.2 Abbreviations

Table 2 Abbreviations

Abbreviation	Description
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
NMEA	National Marine Electronics Association

2 GNSS control command

As for the use of GNSS, firstly, execute the AT+GPSINIT initialization command, and then, execute other commands, such as AT+GPSCFG, AT+GPSRUN, AT+GPSSTOP, etc.

2.1 GNSS start parameter configuration command: AT+GPSCFG

This command is used for query and configuration of various GNSS settings, including NMEA sentence output port, NMEA sentence output type, etc.

Table 3 AT+GPSCFG operation command

Type	Command	Possible return results	Description
Test Command	AT+GPSCFG=?	+GPSCFG: "outport",(0-2) +GPSCFG: "nmeasrc",(0,1) +GPSCFG: "gpsnmeatype",(0-31) +GPSCFG: "glonassnmeatype",(0-7) +GPSCFG: "galileonmeatype",(0,1) +GPSCFG: "beidounmeatype",(0-3) +GPSCFG: "gsvextnmeatype",(0,1) +GPSCFG: "gnssconfig",(0-7) +GPSCFG: "autogps",(0,1) +GPSCFG: "agpssupl",<supl_ip>:<supl_port> +GPSCFG: "gnnmeatype",(0-3) OK	Functions and parameter scope set by the query command AT+GPSCFG.

2.1.1 NMEA sentence output port configuration command

Table 4 Outport operation command

Type	Command	Possible return results	Description
Set command	AT+GPSCFG=”outport”[,<outport>]	OK	Set the corresponding output port state;
Query Command	AT+GPSCFG=”outport”	+GPSCFG: ”outport”,<outport> OK	

Table 5 Outport parameter description

Parameter	Value	Description
<outport>	0 1 2	If the current set value is lost due to power failure, the resetting is required before powering on. The parameter description is as follows: 0 Close the NMEA port and UART port output simultaneously; 1 Open the USB NMEA port and close UART port; 2 Open the UART port output and close USB NMEA port;

2.1.2 NMEA information acquisition enabling/disabling command

Table 6 nmeasrc operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG=”nmeasrc” [,<nmeasrc>]	OK	Set the enabling of AT+GPSGNMEA command;default:1
Query Command	AT+GPSCFG=”nmeasrc”	+GPSCFG: ”nmeasrc”,<nmeasrc> OK	

Table 7 nmeasrc parameter description

Parameter	Value	Description
<nmeasrc>	0 Disable 1 Enable	After enabling, you can acquire the specified original NMEA sentence by following mode AT +GPSGNMEA

2.1.3 GPS NMEA information output type configuration command

Table 8 gpsnmeatype operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG=”gpsnmeatype ”[,<gpsnmeatype>	OK	Configure the corresponding GPS NMEA output type,default:31

Query Command	AT+GPSCFG= ”gpsnmeatype”	+GPSCFG: ”gpsnmeatype”,<gpsnmeatype> OK

Table 9 gpsnmeatype parameter description

Parameter	Value	Description
<gpsnmeatype>	0 Disable 1 GGA 2 RMC 4 GSV 8 GSA 16 VTG	Configure the corresponding GPS NMEA output type ; If you need to print a statement separately, please execute AT+GPSCFG=“gpsnmeatype“, 0 and set up.

2.1.4 Glonass NMEA information output type configuration command

Table 10 glonassnmeatype operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG=”glonassnmeatype”[,<glonassnmeatype>	OK	Configure the corresponding glonass NMEA output type,default:0
Query Command	AT+GPSCFG=”glonassnmeatype”	+GPSCFG: ”glonassnmeatype”,<glonassnmeatype> OK	

Table 11 glonassnmeatype parameter description

Parameter	Value	Description
<glonassnmeatype>	0 Disable 1 GSV	Configure the corresponding glonass NMEA output type

2.1.5 Galileo NMEA information output type configuration command

Table 12 galileonmeatype operation command

Type	Command	Possible return results	Description

Set Command	AT+GPSCFG=”galileonmeatype”[,<galileonmeatype>]	OK	Configure the corresponding galileo NMEA output type,default:0
Query Command	AT+GPSCFG=”galileonmeatype”	+GPSCFG: ”galileonmeatype”,<galileonmeatype> OK	

Table 13 galileonmeatype parameter description

Parameter	Value	Description
<galileonmeatype>	0 Disable 1 GGA 2 RMC 4 GSV 8 GSA 16 VTG	Configure the corresponding galileo NMEA output type

2.1.6 Beidou NMEA information output type configuration command

Table 14 beidou operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG=”beidounmeatype”[,<beidounmeatype>]	OK	Configure the corresponding beidou NMEA output type,default:0
Query Command	AT+GPSCFG=”beidounmeatype”	+GPSCFG: ”beidounmeatype”,<beidounmeatype> OK	

Table 15 beidou parameter description

Parameter	Value	Description

<beidounmeatype>	0 Disable 1 GSA 2 GSV	Configure the corresponding beidou NMEA output type

2.1.7 gsvext NMEA information output enabling command

Table 16 gsvextnmeatype operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG="gsvextnmeatype"[,<gsvextnmeatype>]	OK	Configure whether the gsvext NMEA information is outputted; Restart to take effect after configuration.default：0
Query Command	AT+GPSCFG="gsvextnmeatype"	+GPSCFG: "gsvextnmeatype",<gsvextnmeatype> OK	

Table 17 gsvextnmeatype parameter description

Parameter	Value	Description
<gsvextnmeatype>	0 Disable 1 Enable	Configure whether the gsvext NMEA information is outputted

2.1.8 GNSS satellite type configuration command

Table 18 gnssconfig operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG="gnssconfig"[,<gnssconfig>]	OK	Configure the satellite type supported by GNSS; Restart to become valid after configuration.Default:1
Query Command	AT+GPSCFG="gnssconfig"	+GPSCFG: "gnssconfig", <gnssconfig> OK	Read the configuration of satellite currently supported by GNSS

Table 19 gnssconfig parameter description

Parameter	Value	Description
<gnssconfig>	GPS is always ON. 0 GLONASS OFF/BeiDou OFF/Galileo OFF 1 GLONASS ON/BeiDou ON/Galileo ON 2 GLONASS ON/BeiDou ON/Galileo OFF 3 GLONASS ON/BeiDou OFF/Galileo ON 4 GLONASS ON/BeiDou OFF/Galileo OFF 5 GLONASS OFF/BeiDou ON/Galileo ON 6 GLONASS OFF/BeiDou OFF/Galileo ON 7 GLONASS OFF/BeiDou ON/Galileo OFF	Configure the satellite type supported by GNSS. Gps is supported by default and other parameters can be configured.

2.1.9 GNSS automatic operation enabling/disabling command

Table 20 autogps operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG=”autogps”[,<autogps>]	OK	Enable/disable GNSS to run automatically after start of the module; Restart to become valid after configuration.Defaule:0
Query Command	AT+GPSCFG=”autogps”	+GPSCFG: ”autogps”,<autogps> OK	

Table 21 autogps parameter description

Parameter	Value	Description
<autogps>	0 Disable GNSS to run automatically 1 Enable GNSS to run automatically	

2.1.10 Set SUPL server

Table 22 agpssupl operation command

Type	Command	Possible return results	Description

Set Command	AT+GPSCFG="agpssupl"**[** ,<supl_ip>:<supl_port>**]**	OK	Please initialize GPS before use; <supl_ IP >: the IP address of SUPL server; <supl_ Port >: the port number of the SUPL server.
Query Command	AT+GPSCFG="agpssupl"	+GPSSUPL: <supl_ip>:<supl_port> OK	

2.1.11 Configuring GN NMEA information

The GN type statement contains the mixed positioning information of GPS/GLONASS/Galileo/Beidou /QZSS/NAVIC.

Table 22: gnnmeatype operation instructions

Type	Command	Possible return results	Description
Set Command	AT+GPSCFG=”gnnmeatype”[,**<**gnnmeatype**>**	OK	Configure the corresponding GN NMEA output type. The default value is 3
Query Command	AT+GPSCFG=”gnnmeatype”	+GPSCFG: ”gnnmeatype”,**<**gnnmeatype **>** OK	

Table 23: detailed description of gnnmeatype parameter

Parameter	Value	Description
< gnnmeatype **>**	0 Disable 1 GSA 2 GNS	GNGSA: GSA statement containing five kinds of satellite data NAVIC, in which the field before parity bit identifies the satellite system ID, which is used to distinguish satellite systems; GNGNS: contains mixed positioning data.

2.2 GNSS auxiliary information deletion command: AT+GPSDEL

Table 23 AT+GPSDEL operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSDEL=<deletetype>	OK	Delete the auxiliary information. No deletion by default.

Test Command	AT+GPSDEL=?	+GPSDEL: (0-3) OK

Table 24 AT+GPSDEL parameter description

Parameter	Value	Description
<deletetype>	0 Delete all auxiliary data. If possible, execute the cold start to start the GNSS; 1 Delete some relevant data. If possible, execute the warm start to start the GNSS; 2 Don't delete any data. If possible, execute the hot start to start the GNSS. 3 Delete Xtra data injected into GNSS engine.	

2.3 GNSS initialization command: AT+GPSINIT

Table 25 AT+GPSINIT operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSINIT	OK	Initialize GNSS

2.4 GNSS start command: AT+GPSRUN

Table 26 AT+GPSRUN operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSRUN=<gnssmode>[,<fixmaxtime>[,<fixmaxdist>[,<fixcount>[,<fix_interval>]]]]	OK	GNSS start; Default value: 0,30,100,0,1
Test Command	AT+GPSRUN=?	+GPSRUN: 0,(1-255),(1-1000),(0-1000),(1-65535) OK	
Query Command	AT+GPSRUN?	+GPSRUN: <gnssmode>,<fixmaxtime>,<fixmaxdist>,<fixcount>,<fix_interval> OK	

Table 27 AT+GPSRUN parameter description

Parameter	Value	Description
<gnssmode>	0	GNSS working mode: 0 Stand-alone 0 MS-based 1 MS-assisted
<fixmaxtime>	1-30-255	Maximum positioning time Requested first fix time, unit: s. It refers to the response time of GNSS receiver during measuring the pseudo range of GNSS and the maximum time of GNSS satellite search. It also includes the ephemeris demodulation data and position calculation time. Default value: 30s.
<fixmaxdist>	1-100-1000	Requested positioning precision (unit: m).100m by default.
< fixcount>	0-1	Number of positioning attempts: （Default value:0） 0: continuous positioning. 1: single positioning.
<fix _interval>	1-65535	Interval of data report: 1s by default.

2.5 GNSS stop command: AT+GPSSTOP

Table 28 AT+GPSSTOP operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSSTOP	AT+GPSSTOP OK	Make sure at+gpsrun command instruction has been executed.

2.6 NMEA information acquisition command: AT+GPSGNMEA

Table 30 AT+GPSGNMEA operation command

Type	Command	Possible return results	Description

Set Command	AT+GPSGNMEA=<type>	+GPSGNMEA: (“GGA”,“RMC”,“GSV”,“GSA”,“VTG”,“GNS”) OK	During using this command, switch on acquisition of NMEA data and execute the command: AT+GPSCFG=nmeasrc,1; Run AT+GPSRUN at the same time.
Test Command	AT+GPSGNMEA=?	+GPSGNMEA: GGA,RMC, GSV,GSA,VTG,GNS OK	

Table 31 AT+GPSGNMEA parameter description

Parameter	Value	Description
<type>	GGA RMC GSV GSA VTG GNS	Acquire different NMEA information corresponding to different parameters

2.7 gpsOneXTRA auxiliary function enabling command: AT+GPSXTRA

Table 32 AT+GPSXTRA operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSXTRA=<xtraenable>	OK	Before executing this command, ensure to initialize GNSS; this command can be used for enabling XTRA auxiliary function and activate this function after restarting this module. Default value:1 [Special Note] For CT_NET, only the XTRA function is enabled (setting 1), and it is not supported (setting 0).

Test Command	AT+GPSXTRA=?	+GPSXTRA: (0,1) OK	
Query Command	AT+GPSXTRA?	+GPSXTRA: <xtraenable> OK	Read current GNSS state

Table 29 AT+GPSXTRA parameter description

Parameter	Value	Description
<xtraenable>	0 1	0 Disable gpsOneXTRA function 1 Enable gpsOneXTRA function

2.8 gpsOneXTRA time injection command: AT+GPSXTRATIME

Table 30 AT+GPSXTRATIME operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSXTRATIME=<op>,<xtratime>[,<utc>[,<force>,<uncrtn>]]	OK	This command is used for injecting gpsOneXTRA time into GNSS engine. Before using this command, the user shall start gpsOneXTRA auxiliary function by AT+GPSXTRA=1 command. After activating this function, GNSS engine will query the gpsOneXTRA time and auxiliary data file.
Test Command	AT+GPSXTRATIME=?	+GPSXTRATIME: 0,<xtratime>,(0,1),(0,1),<uncrtn> OK	

Table 31 AT+GPSXTRATIME parameter description

Parameter	Value	Description
<op>	<op> 0	<op>Operating type 0: injection of gpsOneXTRA time.
<xtratime>	<xtratime>	<xtratime>Current UTC/GPS time

	YYYY-MM-DD hh:mm:ss	Format: YYYY-MM-DD hh:mm:ss. For example: 2060-12-19 14:29:52
<utc>	<utc> 0 1	<utc>Time type 0 GPS time 1 UTC time
<force>	<force> 0 1	<force>Allow or force GPS subsystem to accept the injection time 0: allow to accept 1: force to accept
<uncrtn>	<uncrtn> 3500	<uncrtn>Uncertainty of time. Unit: ms; default value: 3500ms. If the set time is shorter than 3.5s, it will be designed as 3.5s.

2.9 gpsOneXTRA data file injection command: AT+GPSXTRADATA

Table 32 AT+GPSXTRADATA operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSXTRADATA	OK	This command can be used for injecting the gpsOneXTRA auxiliary data into GNSS engine. Before executing this command, execute the following operation: 1. Execute the gnss initialization 2. Ensure AT+GPSXTRA =1 (start gpsOneXTRA) 3. After **successful initialization**, rename the latest xtra file as xtra.bin and push into usrdata/xtra-data for validation. **Special description**: 1. **Never manually delete** xtra.bin in usrdata/xtra-data catalog. Otherwise, it is unable to inject the file properly due to permission issues; 2. During initialization, xtra.bin file will be automatically cleaned up. Please ensure that xtra.bin file is pushed into usrdata/xtra-data catalog after initialization of gnss. 3. After successful injection, xtra.bin file in usrdata/xtra-data catalog will be automatically cleaned up.

			4. Xtra.bin file download URL: http://xtrapath1.izatcloud.net/xtra3g.bin http://xtrapath2.izatcloud.net/xtra3g.bin http://xtrapath3.izatcloud.net/xtra3g.bin
Test Command	AT+GPSXTRADATA=?	<xtradatafilename> OK	
Query Command	AT+GPSXTRADATA?	+GPSXTRADATA: <xtradatadurtime>,<injecteddatatime> OK	Function not completed

Table 33 AT+GPSXTRADATA parameter description

Parameter	Value	Description
<xtradatafilename**>**	xtra.bin	<xtradatafilename> name of gpsOneXTRA data file
<xtradatadurtime>		Valid time of injected gpsOneXTRA data file. Unit: min. 0 No gpsOneXTRA file or the file is overdue 1-10080 Valid time of gpsOneXTRA file
<injecteddatatime>		Starting time of the valid time of gpsOneXTRA data file Format: YYYY/MM/DD,hh:mm:ss, e.g. 2016/01/03,15:34:50.

2.10 GNSS positioning information acquisition command: AT+ GPSLOC

Table 34 AT+ GPSLOC operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSLOC=<mode>	+GPSLOC: <UTC>,<latitude>,<nors>,<longitude>,<eorw>,<hdop>,<altitude>,<fixmode>,<cog>,<speed_kmh>,<speed_knots>,<date>,<nsat> OK	Before executing the command, enable GNSS by AT+GPSRUN command.
Test Command	AT+ GPSLOC=?	+GPSLOC: <UTC>,<latitude>,<nors>,<longitude>,<eorw>,<hdop>,<altitude>,<fixmod	<UTC>:UTC time Format: hhmmss.sss <latitude>:Latitude <nors>：N/S，

	e>,<cog>,<speed_km h>,<speed_knots>,<d ate>,<nsat> OK	North latitude/South latitude <longitude> : Longitude <eorw> : E/W , East longitude/West longitude <altitude> : Altitude , unit: m <speed_kmh> : Speed over ground Format: xxxx.x; unit: Km/h <speed_knots> : Speed over ground Format: xxxx.x; unit: knots; <cog> : Course Over Ground based on true north , Format: ddd.mm ddd 000-359 (degree) mm 00-59 (minute) <fixmode> : GNSS positioning mode 1 no fix 2 2D positioning 3 3D positioning <hdop> : Horizontal precision , 0.5-99.9 <date>： UTC time，format:ddmmyy <nsat> : Number of satellites

Table 35 AT+ GPSLOC parameter description

Parameter	Value	Description
<mode>	0 1 2	Display format of latitude and longitude <latitude>,<longitude> 0: format: ddmm.mmmm N/S,dddmm.mmmm E/W 1: format: ddmm.mmmmmm N/S,dddmm.mmmmmm E/W 2: format: dd.ddddd N/S, ddd.ddddd E/W

2.11 GNSS de-initialization: AT+GPSDEINIT

Table 40 AT+GPSDEINIT operation command

Type	Command	Possible return results	Description
Set Command	AT+GPSDEINIT	OK	Before executing the command, ensure that GNSS has been successfully initialized.

2.12 Query GNSS permission status：AT+GPSSTATE

Table 41 AT+ GPSSTATE operation command

Type	Command	Possible return results	Description
Query Command	AT+ GPSSTATE?	+GPSSTATE: <value> OK	<value>: 0: Status when GNSS is not initialized for the first time after startup 1: gnss start 2: gnss stop
Test Command	AT+GPSSTATE=?	+GPSSTATE: (0-2) OK	

3 GNSS Error Codes

The <errcode> indicates an error related to GNSS operation. The details about <errcode> are described in the following table.

Table 42 Summary of Error Codes

Error codes	Description
2001	Invalid parameter(s)
2002	Operation not supported
2003	GNSS subsystem busy
2004	Session is ongoing
2005	Session not active
2006	Operation timeout
2007	Function not enabled
2008	Time information error
2009	Validity time is out of range
2010	Internal resource error
2011	GNSS locked
2012	End by E911
2013	Not fixed now
2014	The query value is out of the normal range
2015	Failed to read or write file

2016	Port error
2017	File is NULL
2018	GNSS is not run
2019	Unknown error

4 Examples

4.1 Start GNSS

AT+GPSRUN=0,30,100,0,1

OK

4.2 Stop GNSS

AT+GPSSTOP

OK

4.3 Set up AGPS SUPL server

AT+GPSINIT

OK

AT+GPSCFG="agpssupl",supl.qxwz.com:7276

OK

4.4 Enable XTRA function

AT+GPSXTRA=1

OK

4.5 Enable GSV-NMEA reporting of GLO, BDS, and GAL

AT+GPSINIT

OK

AT+GPSCFG=”beidounmeatype”,2

OK

AT+GPSCFG=”glonassnmeatype”,1

OK

AT+GPSCFG=”galileonmeatype”,4

OK

The NMEA port data is as follows:

$GLGSV,1,1,04,68,71.7,189.8,23.5,78,49.9,14.1,,77,4.9,46.4,,80,4.2,241.9,,1*6A

$PQGSV,1,1,03,01,34.5,126.6,31.4,02,40.8,218.0,35.4,03,47.8,177.2,44.7,,0,4*6D

$GAGSV,1,1,04,01,71.7,250.3,30.9,19,62.6,146.3,28.3,21,49.9,38.0,21.2,31,19.0,230.6,35.7,7*4B

4.6 Enable nmea-port output

AT+GPSINIT

OK

AT+GPSCFG=”outport”,1

OK

4.7 Get NMEA data

AT+GPSRUN=0,30,100,0,1

OK

AT+GPSGNMEA="GGA"
+GPSGNMEA: $GPGGA,,,,,,0,,,,,,,,*66

OK

4.8 Get positioning data

AT+GPSRUN=0,30,100,0,1

OK

AT+GPSLOC=2
+GPSLOC:
084117.00,34.196926,N,108.863574,E,1.800000,450.621460,238,0.000000,0.000000,0.000000,241220,-1294982016

OK

4.9 Delete positioning data (cold start)

AT+GPSRUN=0,30,100,0,1

OK

AT+GPSSTOP

OK

AT+GPSDEL=0

OK