GPS AT Command Specification

MDM6200/6600 Based products

Publication date: January 30, 2012
Revision: v015ext

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About this document

Confidentiality

Version History

Date	Version	Author	Revision	Remarks
8 July 2010	V001ext	D. Callaert		Initial Version
27 July 2010	V002ext	D. Callaert	S. Han	Revision
20 Sept 2010	V003ext	D. Callaert	P. Vandeneede	Revision
5 Oct 2010	V004ext	F. Bilsen		Revision
8 Nov 2010	V005ext	P. Vandeneede		Revision
14 Dec 2010	V006ext	P. Vandeneede		Revision
15 March 2011	V007ext	P. Vandeneede		Revision
29 April 2011	V008	P. Vandeneede		Revision
26 July 2011	v014ext	F. Bilsen		Revision
27 Oct 2011	V010draft	F. Bilsen		Revision
02 Nov 2011	V011draft	M. Rogmans		Revision
14 Dec 2011	V012ext	D. Hermans		Revision
30 Jan 2012	V013ext	P. Vandeneede		Cosmetic changes
2 Oct 2012	V014ext	B.Goossens		Revision
30 Apr 2013	V015ext	D.Hermans		Revision

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1 INTRODUCTION

All the GTM6xx modules do support GPS functionality. Next are the supported modes:

- Standalone GPS
- Assisted GPS

On the GTM66x and GTM67x the GPS antenna is shared with the diversity antenna, on the GTM60x a separated GPS antenna input is available.

In order to configure the GPS functionality, Option proprietary AT commands have been developed. This document describes the commands that can be used to set various modes of GPS behaviour.
The table below shows all possible variants of these devices which are covered in this document.

Commercial Name	Product Number	Wi-Fi	GSM,GPRS and EDGE Bands	WCDMA Bands	CDMA Bands
GTM661W[1]	MO6612		All models have quad band support for GSM, GPRS and EDGE: 850Mhz 900Mhz 1800Mhz 1900Mhz	I,II,V,VI,VIII	
GTM661E	MO6611			I,VIII	
GTM669W[2]	MO6692			I,II,V,VI,VIII	BC0,1
GTM669U	MO6693			II,V,VI	BC0,1
GTM671W[3]	MO6712	✓		I,II,V,VI,VIII	
GTM671E	MO6711	✓		I,VIII	
GTM679W[4]	MO6792	✓		I,II,V,VI,VIII	BC0,1
GTM679U	MO6793	✓		II,V,VI	BC0,1
GTM601W	MO6012			I,II,V,VI,VIII	
GTM601E	MO6011			I,VIII	
GTM609W	MO6092			I,II,V,VI,VIII	BC0,1
GTM609U	MO6093			II,V,VI	BC0,1

Table 1: Supported Devices

[1] GTM661WF and GTM661WFS are part of the GTM661W family and can be treated identical in this document.

[2] GTM669WF and GTM669WFS are part of the GTM669W family and can be treated identical in this document.

[3] GTM671WF and GTM671WFS are part of the GTM671W family and can be treated identical in this document.

[4] GTM679WF and GTM679WFS are part of the GTM679W family and can be treated identical in this document.

2 GENERAL GPS COMMANDS

2.1 Start/Stop GPS "AT_OGPS"

Command	Possible Response(s)
_OGPS=<Mode>[,<Interval>]	OK +CME ERROR: <cme_error>
_OGPS?	_OGPS: <mode>
_OGPS=?	_OGPS: (0-3),(2-3600)

Description

This command starts or stops a GPS position determination.
Interrogation of this AT command will return the current state of the GPS engine.

Defined values

<Mode>

Value	Description
0	GPS Off
1	Single Position Determination. The GPS engine will switch off upon error or Position fix. Can only be used when GPS is off.
2	Continuous Position Determination. This setting will automatically restart a position determination when it ends. Once the first fix has been made this will usually generate a fix once every second. Can only be used when GPS is off.
3	Continuous Position Determination with timing interval (seconds). NMEA data will only be generated with <interval> seconds between fixes. When the GPS can't make fixes, NMEA data will be generated every second. Can only be used when GPS is off.

<Interval>

Value	Description
2-3600	Target number of seconds between fixes, subject to environment.

Remarks

CME_ERROR : CME errors are listed in section 3 of this document.

Example

AT_OGPS=1 This command will start a single position determination.
AT_OGPS=2 This command will start continuous position determination.
AT_OGPS=3,5 This command will start continuous position determination every 5 seconds.

2.1 Option GPS Mode "AT_OGPSMODE"

Command	Possible Response(s)
AT_OGPSMODE=<Operating Mode>, <AGPS Roaming>	OK ERROR
_OGPSMODE?	_OGPSMODE: <Operating Mode>, <AGPS Roaming>
_OGPSMODE=?	_OGPSMODE: (1-3),(0-1)

Description

Set the GPS Mode to be used.

Defined values

<Operating Mode >

Value	Description
1	PDSM_SESSION_OPERATION_STANDALONE_ONLY
2	PDSM_SESSION_OPERATION_MSBASED
3	PDSM_SESSION_OPERATION_MSASSISTED

**Modes 1 and 2 are most commonly used.*

<AGPS Roaming>

Value	Description
0	Disable AGPS data download when roaming (sets mode effectively to PDSM_SESSION_OPERATION_STANDALONE_ONLY).
1	Enable AGPS data download when roaming

2.2 Get Unsolicited when GPS Fix "AT_OGPSFIX"

Command	Possible Response(s)
_OGPSFIX=<enable>	OK +CME ERROR: <cme_error>
_OGPSFIX?	_OGPSFIX: <enable>
_OGPSFIX=?	_OGPSFIX: (0-1)

Description

This command will enable/disable unsolicited response in case a GPS fix is received or lost.

Defined values

<enable>:

Value	Description
0	Disable unsolicited response
1	Enable unsolicited response

**Default is 0. This will enable _OGPSUNSOLFIX unsolicited response.*

Unsolicited Values
4 possible values:

Value	Description
0	GPS engine started *(triggered when _OGPS=1,2 or 3)*
1	GPS engine stopped *(triggered when _OGPS=0)*
2	GPS fix is available *(triggered right after GPS fix becomes available)* *Only in continuous GPS position determination mode!*
3	GPS fix is lost *(triggered when toggled from fix to no fix)*

2.3 Clear GPS Assistance Data "AT_OGPSCLEAR"

Command	Possible Response(s)
_OGPSCLEAR=<data>,1	OK ERROR CME ERROR
_OGPSCLEAR?	*ERROR*
_OGPSCLEAR=?	_OGPSCLEAR

Description

This AT command allows you to clear all or part of the GPS assistance data stored on the device. This command can only be used to clear data.
Interrogation of the AT commands (AT_OGPSCLEAR?) will return an error.

You can only clear assistance data while the GPS engine is switched off. Please keep in mind GPS will stay on for a while after the last fix. OGPSEVT can be used to see when issuing this command will be possible.

Defined values

<data>

Value	Description
ALL	Clears all assistance data.
COLD	Clears all assistance data except Almanac.
WARM	Clears ephemeris data.
TIME	Clears time.
REFLC	Clears Reference Location
SVDIR	Clears SV dir
SVSTR	Clears SV Steer
SADAT	Clears SV Data
EPH	Clears ephemeris data.
IONO	Clears ionosphere corrections.
UTC	Clears time.
ALM	Clears almanac data.
RTI	Clears real time info.
CELDB	Clears Cell Database.

Example

Clear all stored assistance data: AT_OGPSCLEAR="ALL",1

2.4 Is GPS allowed "AT_OGPSALLOW"

Command	Possible Response(s)
_OGPSALLOW=<value>	OK ERROR
_OGPSALLOW?	_OGPSALLOW: <value> ERROR
_OGPSALLOW=?	_OGPSALLOW: (0-3)

Description

This AT command allows you to specify if GPS should be permitted for Mobile-originated (MO) or Mobile-terminated (MT). During an emergency call, a MT session will always be permitted irrespective of the setting.
If the item has never been written, then reading will give an error.
This command is also used for gps privacy.

The command is persistent; it will read/write a specific NV item.
It only has effect in CDMA mode.

Defined values

<value>

Value	Description
0	Allow all GPS sessions (default)
1	Allow MT GPS sessions only
2	Allow MO GPS sessions only (except for E91)
3	Disallow all GPS sessions (except for E911)

2.5 GPS LNA enable "AT_OGPSLNA"

Command	Possible Response(s)
AT_OGPSLNA=<Enable>, [<GPS RF Loss>]	OK ERROR
_OGPSLNA?	_OGPSLNA: <Enabled>, <GPS RF Loss>
_OGPSLNA=?	_OGPSLNA: (0-1),(0-254)

Description

Enable or Disable the external LNA for GPS. Optionally also setting the RF loss of the currently chosen RF path (with or without external LNA). The LNA/no LNA RF loss values are written to NV items, and are restored from the right NV item (depending on LNA enabled or disabled) at boot time.
The changes are only effective after a reboot of the device.

Defined values

<Enable >

Value	Description
0	Disable the external LNA
1	Enable the external LNA

< GPS RF Loss >

Value	Description
0-254	RF loss of the GPS path in 0.1 dB. So a value of 56 means the RF loss is 5.6dB. A value for both with and without external LNA are kept into NV memory.

Examples

Enable external LNA, set RF loss to 3.1dB: AT_OGPSLNA=1,31
Disable external LNA, set RF loss to a previously set value: AT_OGPSLNA=0

3 SUPL A-GPS COMMANDS

3.1 Set SUPL Parameters "AT_OGPSLS"

Command	Possible Response(s)
_OGPSLS= URL:Port ID, <Security>	OK ERROR
_OGPSLS?	_OGPSLS: <URL:Port ID>,_<Security>
_OGPSLS=?	_OGPSLS: <URL:Port ID>,(0-1)

Description

This AT Command is used to set server connection parameters for use with SUPL A-GPS.

Defined values

<URL> URL (Uniform Resource Locator) format: String, max 128 bytes in length.

<Port ID> Port Number

<Security> Transport Security for secure or non-secure SUPL server connections

Value	Description
0	non-secure SUPL server *(no certificates needed)* Default value
1	secure SUPL server *(SUPL certificates needed)*

Examples

AT_OGPSLS="http://www.yourSUPLsite.com:7275", 0

3.2 SUPL PDP Context Information “AT_OGPSCONT”

Command	Possible Response(s)
_OGPSCONT=<Cid=1>,[PDP type],[APN],[IP Address],[D_comp] ,[H_comp]	OK ERROR
_OGPSCONT?	_OGPSCONT: <Context ID>,<PDP type>,<APN>,<IP Address>,<D_comp> ,<H_comp>
_OGPSCONT=?	_OGPSCONT: 1,"IP",,,(0-2),(0-4) _OGPSCONT: 1,"PPP",,,(0-2),(0-4)

Description

Sets the Context information which GPS will use to contact the SUPL server.

Defined values

<Cid> Only context id 1 is allowed because the GPS engine will always use that one.

<PDP type>

Value	Description
PPP	Point to Point Protocol
IP	Internet Protocol

<APN> Access Point Name: a string parameter which is a logical name that is used to select the GGSN or the external packet data network, max. 100 characters (bytes) of length.

<IP Address> IP Address format: "xxx.xxx.xxx.xxx"

<D_comp> A numeric parameter that controls PDP data compression (applicable for SNDCP only) (refer 3GPP TS 44.065)

Value	Description
0	Off
1	On (manufacturer preferred compression)
2	V.42bis

<H_comp> A numeric parameter that controls PDP header compression (refer 3GPP TS 44.065 and 3GPP TS 25.323)

Value	Description
0	Off
1	On (manufacturer preferred compression)
2	RFC1144 (applicable for SNDCP only)
3	RFC2507
4	RFC3095 (applicable for PDCP only)

Remark

Only ***context id 1*** is allowed because the GPS engine will always use that one.

Example

AT_OGPSCONT=1,”IP”,"yourAPNhere"

3.3 SUPL PDP Context Authentication Parameters "AT_OGPSPDPP"

Command	Possible Response(s)
AT_OGPSPDPP=<cid=1>,<authtype> [,<password>][,<user_name >]	OK ERROR
AT_OGPSPDPP?	_OGPSPDPP: 1,<authtype>,<password>,<username>
AT_OGPSPDPP=?	_OGPSPDPP: (1),(0-2),,

Description

This command is used to define the authentication parameters associated with GPS PDP context 1 (cid=1). <cid> corresponds to the id used in the _OGPSCONT command.

Only the first context will be used.

Defined values

<cid>: The context corresponding to the _OGPSCONT context id. must be 1.

<auth-type>:

Value	Description
0	None
1	PAP
2	CHAP

<password>: password

<username>: username

Remark

Only ***context id 1*** is allowed because the GPS engine will always use that one.

3.4 Enable or disable GPS status unsolicited events "AT_OGPSEVT"

Command	Possible Response(s)
_OGPSEVT=<enable>	*OK* *ERROR* *+CME ERROR: <err>*
_OGPSEVT?	*<enable>*
_OGPSEVT=?	_OGPSEVT: (0-1)

Description

With this command you can enable or disable the unsolicited events that will display the status of the GPS engine (for A-GPS SUPL sessions on UMTS, IS-95 sessions on CMDA and GpsOneXTRA sessions for both UMTS and CDMA).
**This command is not applicable for S-GPS sessions.*

Defined values

<enable>:

Value	Description
0	Disable
1	Enable

**Default is 0. This will enable _OGPSEVT unsolicited response.*

Unsolicited Values
5 possible values:

Value	Description	Valid For	
0	GPS Comm Begin.	AGPS on UMTS, CDMA	Will be sent when an AGPS service starts making a connection to the server.
1	GPS Comm Connected.	AGPS for UMTS, CDMA	Will be sent when an AGPS service successfully made a connection to the server.
2	GPS Comm Failure.	AGPS on UMTS, CDMA	Will be sent when an AGPS service failed to make a connection to the server.
3	GPS Comm Done.	AGPS on UMTS, CDMA	Will be sent when the AGPS service communication to the network ends. This will be sent both for successful and unsuccessful sessions.
4	GPS Update failure.	AGPS on UMTS, CDMA	Indicates a failure in updating the module. This will usually follow a completed Comm session containing a Comm Failure.

5	GPS Done.	All GPS modes	After GPS is turned off it will stay hot for a number of seconds. This event is sent when the engine turns off completely.
10	GpsOneXTRA Time Download Start.	GpsOneXTRA on UMTS	
11	GpsOneXTRA Time Download Connected to server.	GpsOneXTRA on UMTS	
12	GpsOneXTRA Time Download Done.	GpsOneXTRA on UMTS	
13	GpsOneXTRA Time Download Failed.	GpsOneXTRA on UMTS	
14	GpsOneXTRA Data Download Start.	GpsOneXTRA on UMTS, CDMA	
15	GpsOneXTRA Data Download Connected to server.	GpsOneXTRA on UMTS, CDMA	
16	GpsOneXTRA Data Download Done.	GpsOneXTRA on UMTS, CDMA	
17	GpsOneXTRA Data Download Failed.	GpsOneXTRA on UMTS, CDMA	

Example

When the unsolicited events are enabled and a A-GPS SUPL session is going to be setup, the following response will be seen:

- In case of a successful SUPL connection
  _OGPSEVT: 0
  _OGPSEVT: 1
  _OGPSEVT: 3
- In case of a failing SUPL connection
  _OGPSEVT: 0
  (_OGPSEVT: 2)
  (_OGPSEVT: 3)
  _OGPSEVT: 4

3.5 Set secure time (gps clock) “AT_OGCLK”

Command	Possible Response(s)
_OGCLK=<time>	*+CME ERROR: <err>*
_OGCLK?	_OGCLK: <time> *+CME ERROR: <err>*
_OGCLK=?	

Description

This command sets the secured time in the device. This time is used by GPS to verify the validity of the GPS certificate and ***should always be set to the universal time (UTC).*** If setting of the time fails, a `+CME ERROR: <err>` is returned. Read command returns the current setting of the secure (gps) clock.

Defined values

<time>: String type value; format is "yy/MM/dd,hh:mm:ss", where the characters indicate year (two last digits), month, day, hour, minutes, seconds.

Example

6th of May 2010, 22:10:00 hours (UTC) equals to "10/05/06,22:10:00".
AT_OGCLK="10/05/06,22:10:00"

4 GPSONEXTRA COMMANDS

4.1 Option GPS XTRA Parameters “AT_OGPSXP”

Command	Possible Response(s)
_OGPSXP=<enabled>,<url1>,<url2>,<url3>	*+CME ERROR: <err>*
_OGPSXP?	_OGPSXP: <enabled>, <url1>, < url2>, <url3> *+CME ERROR: <err>*
_OGPSXP=?	_OGPSXP: (0-1),,,

Description

Can be used to enable or disable the XTRA download and set the XTRA download servers.

Defined values

<enabled>:
- 0: disable
- 1: enable

<url1>: Contains the url of the xtra.bin file on the primary XTRA data server.
Default value: http://xtra1.gpsonextra.net/xtra.bin
<url2>: Contains the url of the xtra.bin file on the secondary XTRA data server.
Default value: http://xtra1.gpsonextra.net/xtra.bin
<url3>: Contains the url of the xtra.bin file on the tertiary XTRA data server.
Default value: http://xtra1.gpsonextra.net/xtra.bin

4.2 Option GPS XTRA Time Parameters "AT_OGPSXT"

Command	Possible Response(s)
_OGPSXT=<enabled>,<url1>,<url2>,<url3>	*+CME ERROR: <err>*
_OGPSXT?	_OGPSXT: <enabled>, <url1>, < url2>, <url3> *+CME ERROR: <err>*
_OGPSXT=?	_OGPSXT: (0-1),,,

Description

Can be used to enable or disable the XTRA time info download and set the XTRA time info download servers.

Defined values

<enabled>:
- 0: disable
- 1: enable

<url1>: Contains the url of the primary XTRA SNTP server.
Default value: time.gpsonextra.net
<url2>: Contains the url of the secondary XTRA SNTP server.
Default value: time.gpsonextra.net
<url3>: Contains the url of the tertiary XTRA SNTP server.
Default value: time.gpsonextra.net

CME ERRORS

The following numbers and messages of CME ERRORS are specific to GPS.

550	Invalid PDSM Client ID	This is an internal error.	Please report this error.
551	Bad PDSM Service Parameter	Unused	
553	PDSM Privacy Error	Unused	
554	PDSM Download Error	Unused	
555	PDSM Network Access Error	Unused	
556	PDSM Operating Error	Bad Operation Parameter	AT_OGPSMODE accepted an illegal value for a parameter. This should not occur.
558	Wrong Location Server Info	Internal Error	Please report this error.
559	Wrong GPS Timeout	Unused	
561	No Active GPS Session		An action that requires the GPS session to be active was executed while the session was off. Either start the GPS session first or execute the command only when no GPS session is active.
562	GPS Session Already active for this client	Unused	
563	GPS Session Busy		An action that requires the GPS session to be off was executed while the session was busy. Either stop the GPS session or execute the command only when no GPS session is active.
564	Phone is offline	Unused	
565	Phone is CDMA locked	Unused	
566	GPS is locked	This is an internal error.	Please report this error.
567	Invalid GPS command in this phone state	e.g when phone is in E911.	A GPS session was started when the phone was in a state that doesn't allow a GPS session to be started. Try again when that state is exited.
568	GPS Connection Failure with PDE		A session with assisted GPS (operation mode: MS assisted or Ref position) is started while the UE is out of service.
569	No GPS buffers available	This is an internal error.	Please report this error.
570	GPS communication	Unused	

	problems with search		
571	GPS Results can not be reported at this time	Unused	
572	GPS Mode not supported	Unused	
573	Periodic Network Induced Position Request in progress	Unused	
574	GPS Authentication failure	e.g. for Secure SUPL	The HTTPS connection in Secure SUPL failed to authenticate the SUPL user correctly. You probably need a new SUPL certificate to authenticate properly
575	Unknown PDSM Error	Other errors.	Please report this error.

References

Reference documents		Owner