Command List

EaseLoc V3.23

Embedded Application for the automatic management of GPS functions

GenLoc x41e / GenLoc x54e

Reference : EG_EaseLoc_V323_CL_018_UK

Revision : 018

Date : 10/05/2017

Document History

Rev	Modifications	Author	Date	Validation	Date
000	Creation	PBR	12/05/2010		
001	Add FTP parameters for DOWNLOAD Corrected +LOCCRS, +LOCGAP, +LOCINP, I8, +HELP, +LOCSND.	PBR	21/07/2010		
003	Reset command : AT+EGMRST=0 Modification of the GPS format $RMC Update Boot Loader menu Modification of the AT commands accepted via SMS Pin code must be entered in quotation marks	BBO	28/09/2010		
004	Modification chapter 1.2.4	BBO	11/10/2010		
005	Added “OW” (One-Wire) and “AN” (Analogue) options to the AT+LOCFRT command. Added “DI”, “SK”, “OW” and “AN” to equivalence table in the AT+LOCTPH command.	MRE	25/11/2010		
006	Added AT+LOCIOW command	PBR	14/12/2010		
007	Added AT+LOCNTP command to manage setting GSM and system date/time from SNTP information. Updated the description for “CU” in the +LOCFRT chapter. Added the DUAL SIM chapter. Added +LOCNTP, +EGDSIM and ATI8 to list of allowed commands for remote configuration. Added notes for One-Wire use in the +LOCIOW and +LOCOUT chapters. Added +LOCANA chapter. Added +LOCXRT chapter. Added +LOCANA, +LOCXRT to list of allowed commands for remote configuration. Updated +LOCFRT chapter with description +LOCFRT=3 and analog fields.	MRE	04/03/2010		
008	Added “CG” option to +LOCFRT chapter. Added the AT+CANGO chapter. In +LOCTPH chapter added “CG” and “%e” and updated example description. Updated +LOCINP, +LOCINS and +LOCOUT commands with information about available GPIOs. Corrected description in the Configuration by SMS chapter. Correct syntax error in example in AT+LOCIOW chapter. Correct syntax errors in Example of configuration SMS chapter. Added Dual SIM operation flow chart to annexes chapter. Added description for +LOCNRP to Configuration by SMS chapter. Changed Extended UART 1 default configuration to 19200 baud. Updated +LOCSTK logging parameter description. Added checksum description to the +LOCFRT chapter. In +LOCTPH chapter, corrected “IN” and double “SK” syntax errors, removed “DI” and %?. Added clarification when using %a and %o or %y and %x options. Added AT+EGADC chapter. Added notes to the +LOCSTK chapter concerning the network operator inactivity timeout.	MRE	19/07/2011		
009	Added “IM” and “LC” options to AT+LOCFRT chapter. Added %j and %r options to AT+LOCTPH chapter. Added description of special commands “SENDPOSI” and “RESET” and AT+LOCNRP to Remote management and configuration chapter. Added the Accelerometer configuration chapter with AT+EGMOVE and AT+EGSHOCK commands. Added the +LOCPWO chapter. Updated description in the Localization and AT+LOCRDI chapters. Updated description of the command AT+LOCNRP in the Configuration by SMS chapter. Updated notes in AT+LOCFRT chapter with description of +LOCINS when “IP” format is specified in the +LOCFRT command. Updated notes in AT+LOCINS chapter when the “IP” parameter has not been specified in the +LOCFRT command. Added the +LOCKAL chapter. Updated notes in the +LOCSTK chapter with +LOCKAL information. Corrected description of “course” field format in +GPSPOS command chapter. Removed +LOCTRD chapter. Added description of +LOCSND=0 via SMS method to stop the +LOCSND=4 mode to +LOCSND chapter.	MRE	22/11/2011		
010	Added LOW_BAT option to +LOCANA=3 to disconnect battery if voltage too low. Added option to +EGMOVE to save frame in +LOCSTK=2 mode only if movement is enabled. Added option to +LOCSND=2 to stop TCP connection if GPIO 0 (APC) is inactive. Added GenLoc OEM / GenPro OEM selection chapter.	MRE	13/01/2012		

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

Rev	Modifications	Author	Date	Validation	Date
011	Added the +LOCLOP and +LOCKAS chapters. Added the +LOCCUA chapter. Updated description of +LOCDIS chapter. Updated AT+EGMOVE default parameters. Updated accelerometer description. Updated CANGO fields description. Updated ATI8 response information. Updated +GPSANT command responses. Added EngTemp – cooling temperature chapter to CANGO FMS description.	MRE	22/03/2012	BBO	22/03/2012
012	Updated +LOCSND command for the transfer via SMS, TCP, UDP or FTP at regular interval or fixed time. Updated “Commands accepted via SMS” chapter. Added “divide by 10” option to +LOCANA command. Updated notes for +LOCANA command. Updated +LOCFRT chapter to separate analog alert levels and voltages into separate selectable fields. Updated +LOCTPH command with separate analog alert levels and voltages fields and distance field. Added +EGLED command to manage LEDs use. Updated +LOCOUT command by adding option for outputs to follow inputs. Updated the FTP chapter with commands to manage DOTA and GPS position file transfer parameters. Updated GPRS chapter TCP/UDP, FTP and EMAIL mode descriptions. Updated +LOCCNF and +LOCCNG command responses. Added +EGGEOF command to manage geo-fencing. Added geo-fencing zone exit and entry logging codes. Updated AT+LOCPHN command with more telephone numbers and increased optional functions. Modified +LOCANA command to allow range 0 to 99999mV. Added option 9 to AT+LOCOUT command to enable outputs to be restored to their saved states at the start-up. Updated FTP and SMTP descriptions: after FTP/SMTP file transfer, the unit will disconnect from the network. Added AT+LOCSTK1 command to manage secondary acquisition and send intervals. Added AT+LOCGSW command to manage GPS TX and RX switching option. Added <s> parameter to +LOCGAP, +LOCCRS, +EGMOVE and +EGSHOCK commands to combine +LOCSTK parameters when recording positions. Added Power supply information to logging codes. Added the +LOCUTC chapter. Updated AT+LOCSND chapter parameter description. Updated AT+LOCTPH chapter. Updated AT+LOCNTP chapter notes. Updated AT+LOCINP chapter notes. Updated AT+LOCANA default values for internal supply voltage channel and lowbat parameter. Updated AT+LOCLOP chapter notes. Added logging codes for Daily reset and no ACK reset. Updated AT+LOCPSW command examples. Updated AT+LOCIDT command examples. Added information about ring tone selection, alert sound mode and voice sound levels to AT+LOCPHN notes. Updated description and examples in remote configuration via SMS and TCP chapters. Added the AT+EGVPAR chapter. Added use last good number option to AT+LOCIOW command chapter and updated description. Added logging code for reset if invalid IP address. Updated description of Application Commands chapter. Added FTP example to the Quick Configuration chapter. Updated description in Functions chapter.	MRE	04/12/2012	BBO	04/12/2012

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

Rev	Modifications	Author	Date	Validation	Date
013	Updated description of frame formats in the AT+LOCFRT chapter. Added Genxxx OEM outputs in +LOCOUT chapter. Added Eco-Drive Configuration chapter. Added Eco-Drive logging codes to AT+LOCFRT chapter. Updated AT+LOCHTC command syntax. Updated AT+LOCTAK command description. Added option to AT+LOCIOW command to prevent the One-Wire function from using the APC input and output indicator functions. Updated AT+LOCPOS display information with DOP values. Added the Special Library Functions chapter and AT+EGLIBKEY command. Added note concerning AT+LOCFRT=x,"IP","OW" to AT+LOCFRT and AT+LOCINP chapters.	MRE	29/05/2013	BBO	29/05/2013
014	Updated description of Configuration via GPRS link in TCP chapter to allow concatenation of commands.	MRE	02/08/2013	BBO	07/08/2013
015	Added 10040 baudrate option to the AT+LOCXRT chapter.	MRE	07/01/2015	BBO	08/01/2015
016	Added commands AT+LOCFTPSIZE and AT+EGSMTPSIZE to manage maximum size of file for frame transfers. Changed default config for AT+EGANA=3 to AT+EGANA=3,0,5,3550,4460,"S",10,0,1. Updated description for AT+LOCDIS to allow total distance run to be reset to 0. Added option to AT+LOCSPD command to inhibit logging of frames with over-speed logging code. Correct syntax in description for AT+EGGEOF command. Added Limitations chapter.	MRE	23/09/2015	BBO	02/10/2015
017	Updated Multiplier and divisor values in AT+EGADC chapter. Updated maximum timer value for AT+LOCOUT in AT+LOCOUT chapter. Corrected maximum string lengths for the SMTP configuration. Added limitation concerning the EGM command AT+GPSWITCH which is not operational on the GenLoc 341e. Added note to AT+LOCSPD and AT+EGMOVE commands concerning the detection of false MOVEMENT STOP events. Added warning concerning the command AT+LOCGSW not functional on a GenLoc 341e. Added LED status table to AT+EGLED chapter. Added limitation for download port fixed at 21.	MRE	09/03/2016	BBO	09/03/2016
018	Adjusted document page headers and footers. Removed limitation for download port fixed at 21. Removed limitation on always using PASSIVE mode for the DOTA (configured with AT+LOCFMO). Added display of DOTA FTP mode to AT+LOCCNG command. Added option "TP" to AT+LOCFRT command and "%z" to AT+LOCTPH command to add temperature to frame. Added option 6 to AT+LOCCUA command to allow variable length data to be captured from the UART. Removed limitation concerning the codec enable on GenLoc 341e. Added command AT+LOCFRTX to allow extra fields to be specified for the frame format. Updated front page with GenLoc x41e / GenLoc x54e. Added option to AT+LOCRST command to reset all (ARM) or GSM only. Removed the AT+CANGO chapter.	MRE	10/05/2017	BBO	15/05/2017

The main modifications in this document compared to its previous version are easily identifiable on a screen by the blue colour of the text.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

DISCLAIMER OF WARRANTY

No warranty is given by S.A.S. ERCOGENER in relation to the Software concerning the uses to which it may be put by you, the user, or its merchantability, fitness or suitability for any particular purpose or conditions; and/or that the use of the Software and all documentation relating thereto by the Licensee will not infringe any third party copyright or other intellectual property rights. S.A.S. ERCOGENER shall furthermore be under no obligation to provide support of any nature for the software and the documentation.

LIMIT OF LIABILITY

In no event shall S.A.S. ERCOGENER be liable for any loss or damages whatsoever or howsoever caused arising directly or indirectly in connection with this license, the Software, its use or otherwise except to the extent that such liability may not be lawfully excluded. Notwithstanding the generality of the foregoing, S.A.S. ERCOGENER expressly excludes liability for indirect, special, incidental or consequential loss or damage which may arise in respect of the Software or its use, or in respect of other equipment or property, or for loss of profit, business, revenue, goodwill or anticipated savings.

In its continuing research into improving its products, S.A.S. ERCOGENER reserves the right to modify its products and documentation at any time.

TRADEMARKS

ercogener and erco&gener are a registered trademarks of S.A.S. ERCOGENER in France or in other countries. All other company and/or product names mentioned may be filed or registered trademarks of their respective owners.

COPYRIGHT

This manual is copyrighted by S.A.S. ERCOGENER with all rights reserved. No part of this manual may be reproduced in any form without the prior written permission of S.A.S. ERCOGENER

No patent liability is assumed with respect to the use of the information contained herein.

CONTENTS

1 DESCRIPTION 9

1.1 Introduction 9

1.2 Functions 9
1.2.1 Protection 9
1.2.2 Localization 9
1.2.3 Recording method 10
1.2.4 Transmission 10
1.2.5 Miscellaneous 10
1.2.6 Limitations 10

2 APPLICATION COMMANDS 11

2.1 General 11
2.1.1 GenLoc OEM / GenPro OEM selection 11
2.1.2 AT+EGVPAR – Display all parameters 11
2.1.3 AT+LOCPSW – Password 12
2.1.4 AT+LOCIDT – Identifier 13
2.1.5 AT+LOCPHN – Authorized telephone numbers 14
2.1.6 AT+LOCLOP – Low-Power mode 16

2.2 Sending the GPS positions 17
2.2.1 Via EMAIL in GPRS 17
2.2.2 Via TCP/UDP in GPRS 17
2.2.3 Via FTP in GPRS 17
2.2.4 Via SMS 17

2.3 AT+LOCFRT – GPS position frame format 18

2.4 AT+LOCFRTX – Extended GPS position frame format 22

2.5 Management of Inputs/Output 24
2.5.1 AT+LOCINS – Inputs configuration 24
2.5.2 AT+LOCINP – Inputs Activation 25
2.5.3 AT+LOCOUT – Output Activation 25
2.5.4 AT+LOCANA – Analog inputs activation 27
2.5.5 AT+LOCPWO – External power-out control 29
2.5.6 AT+EGLED – LEDs configuration 30

2.6 One-Wire identification 32
2.6.1 AT+LOCIOW – One-Wire configuration 32

2.7 GPS positions management 33
2.7.1 AT+LOCSTK – Logging GPS positions 33
2.7.2 AT+LOCSTK1 – Secondary acquisition and send intervals 35
2.7.3 AT+LOCSPD – Minimum speed for recording 36
2.7.4 AT+LOCGAP – Minimum interval of displacement 36
2.7.5 AT+LOCCRS – Deviation of angular displacement 37
2.7.6 AT+LOCCUA – UART capture configuration 38
2.7.7 AT+LOCDIS – Total distance run 39
2.7.8 AT+LOCHTC – Recovering the registered positions 40
2.7.9 AT+LOCRDI – Management of indexes in memory of GPS data 41
2.7.10 AT+LOCGSW – GPS switching option 41

2.8 AT+LOCSND – Sending GPS positions 42

2.9 Keep Alive configuration 43
2.9.1 AT+LOCKAL – TCP Keep Alive 43
2.9.2 AT+LOCKAS – Keep Alive in Low-Power mode 44

2.10 Remote management and configuration 45
2.10.1 “Special” command messages 45
2.10.2 Configuration by SMS 45
2.10.2.1 AT+LOCNRP – Request for non-response by SMS 45
2.10.2.2 Commands accepted via SMS 45

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.10.2.3 Example of configuration by SMS ... 46
2.10.3 Configuration via GPRS link in TCP ... 46
2.10.3.1 Example of configuration via TCP link ... 46

2.11 AT+LOCDWL – Remote download of a new application ... 47

2.12 AT+LOCUTC – Local time offset ... 48

2.13 AT+LOCRST – Daily reset ... 49

2.14 Configurations & general information ... 50
2.14.1 AT+LOCCNF – General Configuration ... 50
2.14.2 AT+LOCCNG – GPRS Configuration ... 50
2.14.3 AT+EGVSMTP – SMTP Configuration ... 51
2.14.4 AT+LOCPOS – GPS Information ... 51

2.15 GPRS configuration ... 52
2.15.1 AT+LOCASV – Access Point Server Name ... 52
2.15.2 AT+LOCAUN – Access Point User Name ... 53
2.15.3 AT+LOCAPW – Access Point Password ... 53

2.16 TCP configuration ... 54
2.16.1 AT+LOCTSV – TCP IP address and port number ... 54
2.16.2 AT+LOCTPT – TCP port number ... 54
2.16.3 AT+LOCTPH – Access path in TCP ... 55
2.16.4 AT+LOCTAK – acknowledge string and return delay in TCP ... 56

2.17 FTP configuration ... 57
2.17.1 AT+LOCFSV – FTP Server name ... 57
2.17.2 AT+LOCFUN – FTP User Name ... 57
2.17.3 AT+LOCFPW – FTP password ... 58
2.17.4 AT+LOCFPT – FTP port number ... 58
2.17.5 AT+LOCFMO – FTP mode ... 59
2.17.6 AT+LOCFPP – FTP put path ... 59
2.17.7 AT+LOCFPF – FTP put filename ... 60
2.17.8 AT+LOCFTPSIZE – FTP send file maximum size ... 61

2.18 EMAIL configuration ... 62
2.18.1 AT+EGSMTPPT– SMTP port number ... 62
2.18.2 AT+EGSMTPHN – SMTP Host name ... 62
2.18.3 AT+EGSMTPUN – SMTP user name ... 62
2.18.4 AT+EGSMTPPW – SMTP password ... 63
2.18.5 AT+EGSMTPSN – SMTP email sender name ... 63
2.18.6 AT+EGSMTPSE – SMTP email sender address ... 63
2.18.7 AT+EGMAIL – Recipient email address ... 64
2.18.8 AT+EGSUBJ – Email subject ... 64
2.18.9 AT+EGSMTPSIZE – SMTP send file maximum size ... 65

2.19 GPRS Operation ... 66
2.19.1 TCP/UDP mode ... 66
2.19.2 FTP mode ... 66
2.19.3 EMAIL mode ... 66

2.20 Management of the PIN code ... 67
2.20.1 AT+CPIN – Entering a PIN code ... 67
2.20.2 AT+CLCK – Locking the PIN code ... 67
2.20.3 AT+CPWD – Changing the PIN code ... 68

2.21 TRACE mode ... 68
2.21.1 AT+LOCTRC – Activate the trace ... 68

2.22 Miscellaneous ... 69
2.22.1 Time ... 69
2.22.2 Re-initialization ... 69

2.23 SNTP Date/Time ... 70
2.23.1 AT+LOCNTP – SNTP configuration ... 70

2.24 DUAL SIM ... 72
2.24.1 AT+EGDSIM – DUAL SIM configuration ... 72

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.25 Extended UARTs ... 74
2.25.1 AT+LOCXRT – Extended UARTs configuration ... 74
2.26 Accelerometer configuration ... 76
2.26.1 AT+EGMOVE – Movement detection ... 76
2.26.2 AT+EGSHOCK – Shock detection ... 78
2.27 Geo-fencing configuration ... 79
2.27.1 AT+EGGEOF – Geo-fencing configuration ... 79
2.28 Eco-Drive configuration ... 82
2.28.1 AT+EGEDSTK – Logging results information ... 82
2.28.2 AT+EGEDGPS – GPS precision limits ... 84
2.28.3 AT+EGEDFRT – Frame format ... 85
2.28.4 AT+EGEDDRV – Driving excess limits ... 87
2.28.5 AT+EGEDVEH – Vehicle specification ... 88
2.28.6 AT+EGEDACT – Show Eco-Drive activation information ... 89

3 LOW-LEVEL COMMANDS ... 90

3.1 General commands ... 90
3.1.1 AT+HELP – Display list of general commands ... 90
3.1.2 ATI8 – Display application version and build information ... 91
3.1.3 AT+GPSNMEA – GPS NMEA unsolicited ... 91
3.1.4 AT+GPSPOS – GPS position ... 92
3.1.5 AT+GPSANT – GPS antenna configuration ... 93
3.2 UBX commands ... 94
3.2.1 AT+UBXHELP – Display list of UBX commands ... 94
3.2.2 AT+UBXMONVER – Display the HW / SW version of the GPS module ... 94
3.2.3 AT+UBXMONHW – Display software status of the GPS module ... 94
3.2.4 AT+UBXCFGDAT – GPS Datum ... 95
3.2.5 AT+UBXCFGDPM – GPS module Dynamic Platform Model ... 95
3.3 Serial Flash commands ... 96
3.3.1 AT+SFTYPE – Type Memory ... 96
3.4 Analogue inputs commands ... 97
3.4.1 AT+EGADC – Measure analogue inputs ... 97

4 SPECIAL LIBRARY FUNCTIONS ... 99

4.1 AT+EGLIBKEY – Special library key ... 99

5 QUICK CONFIGURATION ... 100

5.1 General ... 100
5.2 TCP / UDP GPRS mode ... 100
5.3 GPRS Email mode ... 101
5.4 GPRS FTP mode ... 101

6 DOWNLOADING THE APPLICATION ... 102

6.1 BOOTLOADER ... 102
6.1.1 How to access ... 102
6.1.2 Bootloader menu ... 102

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

1 DESCRIPTION

1.1 Introduction

The unit is designed around an ARM7 processor, a GPS module and a GSM module incorporating GSM and GPRS communication. This results in a complete system in a single compact size package.

The tracking and logging system application described in this document has been developed using the EGM® software tools supplied by ERCOGENER and is intended to be loaded directly into the unit. This has resulted in the realization of a completely autonomous product requiring little or no intelligence connected to it.

1.2 Functions

1.2.1 Protection

The access to the commands and data stored in the unit is allowed after the entry of a password. By default, the password is “0000” and access is allowed. As soon as it is programmed with a different value, all data is protected. It is then impossible to display or modify the configuration and the stored data without entering the correct password.

The information entered is immediately saved in non-volatile memory. If a command has several parameters and the first parameters are correct, they can be saved in non-volatile memory ignoring the remaining incorrect parameters.

1.2.2 Localization

GPS position acquisition is independent of the transmission module. As such, the system is able to record positions with a selected filtering criteria and to send a data frame during a communication session.

The current filtering criteria are:

- A correct quality of the signal received from the satellites,
- A HDOP (Horizontal Dilution Of Precision) (by default less or equal to 10),
- A minimum number of visible satellites (by default less or equal to 4),
- A movement speed (by default less or equal to 0),

All these parameters are programmable.

In order to simplify the use of the received information, the system is able to send frames with a conversion of UTC time to local time.

The data recording format may be:

- RMC (Recommended Minimum specific GPS/Transit data).
- GGA (Global Positioning System Fix Data)
- Personalized. In this case, the user selects the information needed. The information status, time, latitude and longitude always make part of the stored information.

The positions are recorded in non-volatile memory in 250 blocks of 4064 bytes.
The management of these blocks works in a cyclic manner allowing the recovery of the oldest information.

Erasing the oldest block only occurs when the system needs space. The space used in memory depends on the kind of frame used.

A software optimization exists and allows to save space in memory. The data storage can then be considered to be about 50000 NMEA RMC type frames. Combined with a filter for speeds over 3 km/h and a capture every 30 seconds, it is possible to memorize 12 hours of movement per day over one month.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

1.2.3 Recording method

Generally, the continuous recording of frames occurs only if the data corresponds with the filter criteria.
When operating in cyclic mode, if the GPS position is invalid or lost, only the first frame with incorrect data is recorded, in order to have a trace of the correct functioning of the device. If the following frames are also incorrect, they will not be recorded. Correct recording will resume when the GPS information is later obtained.
(The KEEP_ALIVE frame will force the recoding of a frame even if GPS information is invalid.)

Examples:
In the following case, the capture interval is 10 seconds. A good position was received at 07:49:30, a record occurred at 07:49:40 to indicate that the GPS signal is lost, and a new correct position was seen at 07:55:59:

```
$GPLOC,123456786,A,1,074930.00,4716.81238,N,00003.51117,W,5,3.33,180.57,1.225,230106*2E
$GPLOC,123456786,V,0,074940.00,,,,,,,,,230106*05
$GPLOC,123456786,A,1,075559.00,4716.82613,N,00003.50695,W,4,3.09,161.21,0.056,230106*2F
```

In the following case, the capture interval is 30 seconds. The last good position was received at 11:54:24, a record occurred at 11:54:55 to indicate that the GPS is lost. Then, each hour a record occurs in order to indicate that the system is still operational, but out of the GPS satellites range:

```
$GPRMC,115424.00,A,4713.19609,N,00007.71711,W,40.841,250.08,210106,,,A*49
$GPRMC,115455.00,V,,,,,,,210106,,,N*78
$GPRMC,125353.00,V,,,,,,,210106,,,N*7A
```

1.2.4 Transmission

The transmission of information only occurs if needed. It can take place immediately, at a fixed time or with a period between each transfer.
The transmission is via GPRS in TCP, UDP, FTP or by SMTP and by GSM SMS.
It is possible to add to the message header a specific name for each device. By default, this is the IMEI number of the product (which is unique).
Only after a correct transmission will the unit increment its data pointer. In case of failure, a new attempt is regularly made (the acknowledge function must be active).

Remote SMS configuration: all configuration commands are available, for example:

- Launch the recording,
- Stop the recording,
- Request current GPS position,
- Reset unit,
- Modify the current configuration.

This remote configuration SMS must begin with the correct password or be sent form a recognised sender number.

1.2.5 Miscellaneous

- The GenLoc 4xe is equipped with 3 opto-coupled inputs and 1 open-collector output.
- The GenLoc 5xe is equipped with 5 opto-coupled inputs and 3 open-collector outputs.
- By default an automatic reset function prevents the lock-up of the unit.
- Commands are available enabling the configuration of the unit.
- The unit automatically monitors the presence of the GSM/GPRS network. In case of loss of the network, the unit will automatically try to re-attach to it.

1.2.6 Limitations

- The telephone audio function is not available on the GenLoc 354e.
- The EGM command AT+GPSSWITCH is not operational on the GenLoc 341e.
- The EGM command AT+LOCGSW is not operational on the GenLoc 341e.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2 APPLICATION COMMANDS

2.1 General

The commands included in the application allow management of all GPS, GSM functions as well as general configuration. The commands may be configured either via the serial link, from a connected TCP server or by SMS.

- If a password different from “0000” is programmed, this password will have to be entered to enable all further access.
- All commands entered via the serial link must be terminated with <CR>.
- The concatenation of commands sent via the serial link can only be used with at least <CR> between each complete command.
- The command “A/” sent via the serial link will repeat the last command entered.

2.1.1 GenLoc OEM / GenPro OEM selection

At first time start-up, if the product is either a GenLoc OEM or a GenPro OEM only then the user is prompted to enter either **'0' to select a GenLoc OEM** product or **'1' to select a GenPro OEM** product. This information is saved in the flash memory and will not be required again (until the flash memory is erased). The product will then reset and start normally as shown in the example below:

```
00:00:00  flash_start_flash: new Flash handle – WAIT  (application starts)

                                                      (A GenLoc/Pro OEM was detected)
Enter '0' GenLoc OEM, '1' GenPro OEM:  GenLoc OEM     ('0' was entered)

00:00:00  flash_start_flash:  Flash handle exists     (application restarts)
00:00:00  EGM_INIT_SOFTWARE_RESET
```

2.1.2 AT+EGVPAR – Display all parameters

Description:

This command will display the complete current configuration of the unit.

Syntax:

AT+EGVPAR

Examples:

Command	Possible responses	Notes
AT+EGVPAR	Display parameters… … … … OK	*Display all current parameters.*

2.1.3 AT+LOCPSW – Password

Description:

This command allows to manage a password which will authorize the access to different functions of local and remote management; for the later in the case where the telephone number associated with the command is different from the one registered (SMS reception).

Syntax:

AT+LOCPSW=<PaSsWord>[,<newPWD>]

Examples:

Command	Possible responses	Notes
AT+LOCPSW=?	`+LOCPSW: 8,8` `OK`	*Display syntax. Maximum length of password.*
AT+LOCPSW=”xxxx”	`+LOCPSW: AUTHORIZED ACCESS` `OK`	*xxxx represents the current password. Authorization for access to every configuration commands*
AT+LOCPSW?	`+LOCPSW: AUTHORIZED ACCESS` `OK`	*Display current configuration, access authorized*
AT+LOCPSW=”OLD”,”NEW”	`OK`	*Change password. Immediately saved in flash.*
AT+LOCPSW=”xxxx”,”ERASE”	`OK`	*Complete erasure of flash. Then, reset by AT+EGMRST=0 to reinitialize default parameters. With xxxx representing the current password.*
AT+LOCPSW	`OK`	*Stop access*
AT+LOCPSW?	`+LOCPSW: NON-AUTHORIZED ACCESS` `OK`	*Access unauthorized*

Defined values:

<**PaSsWord**> Current password entered as an ASCII string, for example : “0000”.

<**newPWD**> New password or “ERASE” allowing the complete erasure of the flash memory.

Notes:

Maximum length of the password: 8 characters.
Password is case-sensitive.
Password by default : “0000” (AUTHORIZED ACCESS).

2.1.4 AT+LOCIDT – Identifier

Description:

This command allows to program an identifier which makes the identification of the device easier when sending information.

Syntax:

AT+LOCIDT=<IdenTifier>

Examples:

Command	Possible Responses	Notes
AT+LOCIDT=?	`+LOCIDT: (20)` `OK`	*Display syntax.*
AT+ LOCIDT?	`+LOCIDT: "354475000000001"` `OK`	*Display current identifier*
AT+LOCIDT="My module 001"	`OK`	*Set new identifier.*
AT+ LOCIDT?	`+LOCIDT: "My module 001"` `OK`	*Display current identifier*
AT+LOCIDT=""	`OK`	*Set default identifier.*
AT+ LOCIDT?	`+LOCIDT: "354475000000001"` `OK`	*Display current identifier*

Defined values:

<**IdenTifier**> Value of the identifier entered as an ASCII string, for example: “012345678912345”.

Notes:

Maximum length of the identifier: 20 characters.
Identifier by default: IMEI number. If absent “GenLocXXe”.

2.1.5 AT+LOCPHN – Authorized telephone numbers

Description:

This command will configure the telephone numbers to be used by the unit when communicating. This list is independent of the SIM card and is managed directly by the application.

During a telephone call, the frames will continue to be saved. However, a telephone call takes priority over all TCP and FTP activity. This priority is managed directly by the GSM module. No frames will be transferred during a telephone call. Transfer of frames will continue after the call has terminated.

Syntax:

AT+LOCPHN=<x>[,<nnn>,<y>] (PHoNe)

Examples:

Command	Possible Responses	Notes
AT+LOCPHN=?	`+LOCPHN: (1-50),20,(0-255)` `OK`	*Display syntax*
AT+ LOCPHN=x,,y	`OK`	*Modify only the function parameters for an existing telephone number*
AT+ LOCPHN=1, "0612345678",5	`OK`	*Program a destination number for SMS position containing the device identifier*
AT+ LOCPHN?	`+LOCPHN: 1,"0612345678",5` `OK`	*Display all saved telephone numbers.*
AT+ LOCPHN=1	`+LOCPHN: 1,"0612345678",5` `OK`	*Display saved telephone number at index 1.*
AT+ LOCPHN=1,	`OK`	*Erase telephone number of index 1.*

Defined values:

<**x**> Index (1 to 50).

<**nnn**> Telephone number (20 digits max.). The telephone number may be in international format: "+yyxxxxxxx".

<**y**> Bit map specifying the functions to be associated with this telephone number:

1	(bit 0)	Send in SMS mode (frame NMEA RMC, GGA, PERSO).
2	(bit 1)	Send in SMS mode (frame text. The date appears only if the selected format is RMC or PERSO and for the latter, if it has been validated).
4	(bit 2)	Add identifier of the unit when sending SMS.
8	(bit 3)	Not used.
16	(bit 4)	Not used.
32	(bit 5)	Not used.
64	(bit 6)	Allow response to an incoming voice call (**ATS0 must be >= 1**).
128	(bit 7)	Allow remote configuration via SMS.

Notes:

If no telephone numbers are present in the list then the unit will automatically respond to incoming calls and remote configuration via SMS will only be allowed with correct password.

The Hayes register S0 indicates the number of RINGs before automatically responding to an incoming call. This register is 0 by default and may be set with ATS0=n. **The command AT&W will save this value in the flash memory**.

If both bits 1 and 2 are specified then bit 1 takes precedence.

If bit 2 is specified then the SMS will be sent in the following fixed format:
without identifier:
H:085345 LT:4716.80244,N LG:00003.51400,W
or with identifier:
123456789012345H:085409 LT:4716.80250,N LG:00003.51339,W
where H is the time, LT is the GPS latitude and LT is the GPS longitude.

Ringing tone selection: allows the user to select one out of a set of predefined ringers.
AT+URNG=<ring_id>

where <**ring_id**> may be one of the following values:
0 - pinkpanther (default)
1 - baroque
2 - caribic
3 - jamesbond
4 - moonstar
5 - ramp_spmidi
6 - mozart_imel
7 - whenever
8 - imperialmarch

Ringing tone volume level: selects the incoming ringer sound level.
AT+CRSL=<level>

where <**level**> may be one of the following values:
0 - minimum
…
4 - (default)
5 - maximum

Alert sound mode: selects the general alert sound mode
AT+CALM=<mode>

where <**mode**> may be one of the following values:
0 - normal mode (default)
1 - silent mode (**this will disable incoming call and SMS alerts**)

Loudspeaker speech volume level: selects the speech volume.
AT+CLVL=<level>

where <**level**> may be one of the following values:
1 - minimum
…
80 - (default)
…
100 - maximum

Mute control: enables and disables the uplink voice muting during all the voice calls.
AT+CMUT=<mode>

where <**mode**> may be one of the following values:
0 - mute off (default)
1 - mute on

Microphone Gain Control: selects the microphone speech volume
AT+UMGC=0,<level>,9384

where <**level**> may be one of the following values:
1 - minimum
…
10 - (default)
…
15 - maximum

The above commands will modify the configuration directly in the GSM module. Changes may be saved in the non-volatile memory in the GSM module with the following sequence of commands:

AT&W1
AT+CFUN=16 (GSM module is reset)
The EaseLoc application must then be restarted.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.1.6 AT+LOCLOP – Low-Power mode

Description:

This command allows the Low-Power mode to be configured.
If activated, the unit will enter the Low-Power mode when the input 0 (APC input) becomes inactive.
The unit will then wake up when the input 0 (APC input) becomes active (see notes below).

Syntax:

AT+LOCLOP=<mode>,<delay>,<gps>

Examples :

Command	Possible Responses	Notes
AT+LOCLOP=?	`+LOCLOP: (0-1),(1-600)` `OK`	*Display syntax*
AT+LOCLOP=1	`OK`	*Set parameter*
AT+LOCLOP?	`+LOCLOP: 1,10` `OK`	*Display current configuration*

Defined values:

<**mode**> 0: Low-Power mode disabled (default).
1: Enabled.

<**delay**> Delay before entering Low-Power mode after input 0 (APC input) becomes inactive (1 – 600 seconds, default 10 seconds).

Notes:

When the unit enters the Low-Power mode, the GSM and GPS modules and the V24 serial interface are turned off. The ARM processor continues to function but at a reduced clock rate and most of the core functions are idle. Power consumption is reduced to a minimum.
The ARM is woken up by detecting an interrupt from the input 0 or the accelerometer or by an internal timer.

The delay can be useful to ensure that the last frame is sent to the remote server before entering the Low-Power mode. This delay is extended if the +EGMOVE is enabled and the unit is in the process of detecting the start of movement.

When enabled, the Low-Power mode will be entered when **all** of the following conditions are met:

- Input 0 (APC input) is inactive.
- No SMSs are pending.
- Remote SMS configuration is not in progress.
- SNTP is not in progress.
- The accelerometer is either not enabled or has not detected a movement.
- Not waiting for a KEEP_ALIVE frame after the previous wake-up from Low-Power.
- DOTA is not in progress.

When all of the above conditions have been met, any remaining TCP connection is terminated and the Low-Power mode is then entered.

The unit will then wake up when **either** :

- the input 0 (APC input) becomes active.
- or if the accelerometer detects a movement (+EGMOVE must be enabled before entering the Low-Power mode).
- or if +LOCKAS is enabled and the timeout expires.

Notes:

The Low-Power mode does not affect the battery charging.
Any telephone call in progress will be terminated when entering the Low-Power mode.
If required to use the accelerometer to wake up the unit then it is preferable to use +EGMOVE rather than +EGSHOCK since a wake up by a shock will not record a frame.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.2 Sending the GPS positions

2.2.1 Via EMAIL in GPRS

The transfer by email is done in SMTP mode. The command **AT+LOCSND=5** can also be directly entered.
See chapter 2.18 EMAIL configuration.

2.2.2 Via TCP/UDP in GPRS

GPS frames may be sent via TCP or UDP to a remote server, with optional acknowledgement.
The commands **AT+LOCSND=2** or **AT+LOCSND=4** are used.
With the value 2, the TCP link is only used to send data between the unit and the server.
With the value 4, the TCP link can also be used to send data to a device connected to the serial port. Once connected, the unit transfers data received from the serial port to the remote site and vice versa. When the unit has to send a frame, it inserts it into the data flow. If it requires an acknowledgement, it analyses the received data.
The transfer can be done automatically by the unit.
See chapter 2.16 TCP configuration.

2.2.3 Via FTP in GPRS

GPS frames may be sent to a file on a FTP server with the command **AT+LOCSND=3**.
See chapter 2.17 FTP configuration.

2.2.4 Via SMS

GPS frames may be sent via SMS to a telephone number with the command **AT+LOCSND=1**.
See chapter 2.1.5 AT+LOCPHN – Authorized telephone numbers.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.3 AT+LOCFRT – GPS position frame format

Description:

This command allows to select the data format.

- Complete NMEA frame with choice of the info. Two standard formats available : RMC and GGA.
- Custom frame, by positioning the indicator, it is possible to select the fields

In case of request for format change, all data previously recorded will be automatically erased. This is due to the optimization of the logged data which does not allow the change from one format to another without loss of information.

Syntax:

AT+LOCFRT=<format>[,a,b,..]

Defined values:

<**format**>	frame format, 0, 1 or 2 (user format) or 3 (user format with no GPS).
<**a,b,...**>	user format defined by the user (see table below).

With **format = 0**, the frame format is NMEA RMC frame - Recommended minimum specific GPS/Transit data.

Example:

$GPRMC,225446.00,A,4916.45122,N,16123.42150,E,0.500,054.7,190113,020.3,E,A,*1C

$GPRMC	NMEA RMC Frame standard Header
225446.00	Time : fix taken at 22:54:46.00 UTC
A	Navigation receiver warning A = OK, V = warning
4916.45122,N	Latitude in ddmm.mmmmm = 49° 16.45122' North
16123.42150,E	Longitude in dddmm.mmmmm = 161° 23.42150' East
0.500	Speed over ground in Knots
054.7	Course Made Good, True
190113	Date of fix : 19 January 2013
020.3,E	Magnetic variation 20.3 deg East
A	Type of fix (A=autonomous, D=differential, E=Estimated, N=not valid)
*1C	Mandatory checksum

With **format = 1**, the frame format is the NMEA GGA frame - Global Positioning System Fix Data.

Example:

$GPGGA,085231.00,4716.80411,N,00003.51692,W,1,10,0.86,33.5,M,46.7,M,,*7E

$GPGGA	NMEA GGA Frame standard Header
085231.00	Time : Fix taken at 08:52:31.00 UTC
4716.80411,N	Latitude in ddmm.mmmmm = 47° 16.80411' North
00003.51692,W	Longitude in dddmm.mmmmm = 000° 03.51692' West
1	Fix quality: 0 = invalid 1 = GPS fix 2 = DGPS fix
10	Number of satellites being tracked
0.86	Horizontal dilution of position
33.5,M	Altitude, Meters, above mean sea level
46.7,M	Height of Geoid (mean sea level) above WGS84 ellipsoid
(empty field)	Time in seconds since last DGPS update
(empty field)	DGPS station ID number
*7E	Mandatory checksum

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

With **format = 2**, the optional field parameters from the table below (1 to 14 maximum) determine the selected fields. The values in **bold** will always be present. The default format with no extra parameters is:

Example:

$GPLOC,A,1,085543.00,4716.80174,N,00003.51547,W*0C

$GPLOC	ERCOGENER Frame standard Header
A	Navigation receiver warning A = OK, V = warning
1	Fix quality: 0 = invalid 1 = GPS fix 2 = DGPS fix
085543.00	Time : fix taken at 08:55:43.00 UTC
4716.80174,N	Latitude in ddmm.mmmmm = 47° 16.80174' North
00003.51547,W	Longitude in dddmm.mmmmm = 000° 03.51547' West
*0C	Mandatory checksum

With **format = 3**, the optional field parameters (1 to 14 maximum) determine the selected fields. **No GPS field parameter options are allowed except "TD" and "TM" which will use system date and time**. This can be set via the command +LOCNTP.

The optional field parameters are:

Name	Description	Values	Max number of bytes reserved in flash by capture
ID	Identifier (see command +LOCIDT)		0
ST	Status (Navigation Receiver warning.)	A : Correct value V : Warning	**0**
FX	Fix indicator value	-1 : Unavailable, 0 : Invalid, 1 : GPS Fix (2D/3D), 2 : DGPS Fix	**1**
TM	Time UTC (Universal Time)	123456.00	**3**
LT	Latitude	4716.80415	**5**
LI	Latitude Indicator	N-S	**0**
LG	Longitude	00003.51805	**5**
LU	Longitude Indicator	E-W	**1**
NS	Number of satellites	1-12	0
HD	HDOP Horizontal Dilution of Precision (<2 good value)	0.01-99.99	2
AL	Altitude	0.1-9999.9	3
AI	Altitude Indicator	M	0
CS	Course	0.01-359.9	3
SN[1]	Speed knots	0.001-999.999	3
SK[1]	Speed KMH	0.001-999.999	3
GS	Geoid	0.1-179.9	2
GU	Geoid Unit	M	0
IP	InPuts states	$I_3I_2I_1$	1
CU[2]	Capture UART	See description below	Variable length
DI	Distance	0.01-99999.99	8
OW[3]	One-Wire iButton serial number	000000000000-0000xxxxxxxx	12
AA[4]	Analogue inputs states	wxyz	4
AN[5]	Analogue inputs	0000000000000000-9999999999999999	16
IM	IMEI Identifier	Always the GSM IMEI code	0
TP	Temperature	-55.0000°C to 125.0000°C	Variable length
LC[6]	Logging Code	See description below	1
DT	Date	DDMMYY	3

Notes:

If the format +LOCFRT=3 has been specified then no GPS data fields will be present in the transmitted frame. If the “DT” and “TM” fields are present then they will use the system date and time which can be set via the command +LOCNTP.

The checksum is the exclusive-OR of all the characters between the leading ‘$’ and the trailing ‘*’.

[1] Only one of the two possible speed options can be selected.

[2] The CU parameter allows data from the main UART (UART0 on a Genxxx 5xe) to be captured and sent with GPS position information. See chapter 2.7.6. AT+LOCCUA – UART capture configuration.

[3] The value 000000000000 indicates absence of 1-Wire iButton.
The value FFFFFFFFFFFF indicates an error whilst reading the 1-Wire iButton.
The value 0000xxxxxxxx indicates the serial number of the 1-Wire iButton.
The serial number may contain hexa-decimal values (0-9, A-F).
The command AT+LOCFRT=x,"IP","OW" will reactivate all inactive inputs except the input used by the One-Wire.

[4] The analog channel alert levels are concatenated as:

wxyz

where:
wxyz is the alert level for each channel (**H**igh, **N**ormal or **L**ow)

[5] The analog channel voltages are in mV and are concatenated as:

aaaabbbbccccdddd

where:
aaaa is the value for channel 0 (GPS antenna voltage)
bbbb is the value for channel 1 (optional via GPIO2)
cccc is the value for channel 2 (optional via SPK2N)
dddd is the value for channel 3 (internal supply voltage)

The range for each channel is from 0000 mV to 9999 mV.
If the “divide by 10” option is enabled (see chapter 2.5.4) then the range for each channel is from 00000 mV to 99990 mV but displayed as 0000 to 9999.

[6] The hexa-decimal Logging Code information indicates the reason for the frame as indicated in the table below:

Logging Code	Frame type	Description
01	Store	Daily reset
08	Store	Reset after no ACK
09	Store	Reset after invalid IP address
10	Store	Cyclic
11	Store	Keep Alive
12	Store	Manual (AT+LOCSTK)
13	Store	Remote (SENDPOSI)
21-28	GPIO	input 1 to 8
2A-2D	Analog	input 1 to 4
51	Capture UART	Capture UART
58	Power supply [7]	Pre-charge in progress
59	Power supply	Fast charge in progress
5A	Power supply	Charge done
5B	Power supply	Charge suspend
5C	Power supply	Battery fault
5D	Power supply	Low battery
5E	Power supply	External supply removed
5F	Power supply	External supply connected
60	One-Wire	iButton removed
61	One-Wire	iButton detected
80	Accelerometer	Movement stopped

84	Accelerometer	Movement started
8A	Accelerometer	Shock detected
90	GPS	Heading change
91	GPS	Above low-speed limit
92	GPS	Minimum gap reached
A0-BD	GPS	Geo-fencing exit zone 0-29
C0-DD	GPS	Geo-fencing enter zone 0-29
E0	Eco-Drive	Eco-Drive evaluation not possible
E1	Eco-Drive	Eco-Drive evaluation possible
E2	Eco-Drive	Eco-Drive braking over limit
E3	Eco-Drive	Eco-Drive acceleration over limit
E4	Eco-Drive	Eco-Drive turning over limit
FF	Unknown	Not specified

[7] The complete Power supply Logging Code information is available only on 40e, 42e and 54e platforms.
On the 41e platform, only the “5E” and “5F” Power supply Logging Code information is available.

A maximum of 14 optional parameters (not including the permanent parameters) may be specified from the above list.

Minimum size saved by default: 15 bytes.

An optimization procedure allows another reduction of about 5 bytes for each frame captured.

They can be entered in any order, but they will always appear in the order shown above. By this command, only 14 of the 18 possibilities are selectable.

It is possible to select all the parameters by omitting the default parameters (ST, FX, TM, LT,LI, LG, LU) which will be automatically added.

The format should be as close as possible to a NMEA frame so as to reduce the amount of treatment. The frame will be made up of the selected elements in the following order :

- Unit identifier
- Fix
- Latitude
- Longitude
- Date
- Time GMT
- (Speed)
- (Altitude)

Adding the state of the inputs with the parameter “IP” has the following consequences:

- The inputs are automatically configured with the following values :
  +LOCINS: 0-00005,"O","D",000
  +LOCINS: 1-00005,"O","D",000
  +LOCINS: 2-00005,"O","D",000
  i.e. 500 ms of integration time and double state transmitted.

- When the status of an input changes, a GPS frame will always be recorded **regardless** of the GPS “ST” status (“A” or “V”).

Below is shown the organization of the values in a frame with the command AT+LOCFRT=2,"IP" only

$GPLOC,V,0,152530.00,,,,,000*2F
Input 2┘│└Input 0
Input 1

The acquisition must be stopped before changing or modifying the data format (**AT+LOCSTK=0**).

The command **AT+LOCFRT=x,1** will completely erase the memory zone of the GPS positions.

The command **AT+LOCFRT** will display the parameter list with the format used for a connection to a http site. See 2.16.3 AT+LOCTPH – Access path in TCP for more details.

Examples:

Command	Possible responses	Notes

AT+LOCFRT=?	`+LOCFRT: (0-3),("ID","ST","FX","TM","LT","LI","LG","LU","NS","HD","AL","AI","CS","SN/SK","GS","GU","IP","CU","DI","OW","AA","AN","CG","IM","LC","DT")`
	
	`OK`
		Display the syntax

AT+LOCFRT=2,"ID","CS","DI","DT","SK"	`OK`	*Enter configuration, omitting the parameters by default*

AT+LOCFRT?	`+LOCFRT: 2,"ID","ST","FX","TM","LT","LI","LG","LU","CS","SK","DI","DT"`
	
	`OK`
		Display the current configuration

2.4 AT+LOCFRTX – Extended GPS position frame format

Description:

The command **AT+LOCFRT** only allows a maximum 15 parameters to specified after the '=' (format and field parameters). After the frame format has been specified (2 or 3) as well as the first 14 field parameters, then this command will allow extra field parameters to be specified.

Syntax:

AT+LOCFRTX=<format>[,a,b,..]

Defined values:

<format> frame format, 2 (user format) or 3 (user format with no GPS). This must be the same as the format specified with the command **AT+LOCFRT**.

<a,b,...> extended user format defined by the user (see table of field parameters above).

Command	Possible responses	Notes
AT+LOCFRT=2,"ID","ST","FX","TM","LT","LI","LG","LU","NS","HD","AL","AI","CS","SK"	OK	*Enter basic configuration*
AT+LOCFRTX=2,"GS","GU","IP","CU","DI","OW","AA","AN","IM","TP","LC"	OK	*Enter extended configuration*

Notes:

Only the command **AT+LOCFRT** will modify the **<format>**

If fewer parameters are to be specified when re-entering **AT+LOCFRTX**, then the basic parameters must again be re-entered with the command **AT+LOCFRT** to reset the complete frame format.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.5 Management of Inputs/Output

The device has opto-coupled inputs and open-collector outputs. See the general product documentation for more details.
The command AT+LOCSTK – Logging GPS positions) allows to activate the position recording when a change of status is detected on an input.

2.5.1 AT+LOCINS – Inputs configuration

Description:
This command allows to configure the use of the opto-coupled inputs.

Syntax:
AT+LOCINS=<n>,<t>,<x>,<y>,<z> (INput Set-up)

Examples:

Command	Possible Responses	Notes

AT+LOCINS=?	`+LOCINS: (0-2),(0-65535),("O","C"),`
	`("B","D","S"),(0-255)`
	`OK`
		Display syntax

AT+LOCINS?	`+LOCINS: 0,00000,"O","S",000`
	`+LOCINS: 1,00000,"O","S",000`
	`+LOCINS: 2,00000,"O","S",000`
	`OK`
		Display current configuration

Defined values:

<n> Input number, 0 to 2 (0 to 4 on Genxxx 5xe, 0 to 6 on Genxxx OEM).

<t> Time of presence of the active input before action from 0 (inactive) to 65535 (time basis 100 ms).

<x> Input status (rest). "O" for Open and "C" for Closed.

<y> Type of management at change of status:
"S" for Single, the change from rest to activate initiates the action.
"D" for Double, the change from rest to activate and from activate to rest initiates the action.

<z> Reserved.

Notes:
Configuration by default: **+LOCINS: 0,00000,"O","S",000**
+LOCINS: 1,00000,"O","S",000
+LOCINS: 2,00000,"O","S",000

If the “IP” parameter has **not** been specified in the AT+LOCFRT command then :

- when the status of an input changes to the **active** state, a GPS frame will be recorded **only** if the GPS “ST” status is ”A”.
- when the status of an input changes to the **inactive** state, a GPS frame will always be recorded **regardless** of the GPS “ST” status (“A” or “V).

2.5.2 AT+LOCINP – Inputs Activation

Description:

This command allows to activate the use of the opto-coupled inputs.

Syntax:

AT+LOCINP=<n>,<mode> (INPut)

Examples :

Command	Possible Responses	Notes
AT+LOCINP=?	`+LOCINP: (0-2),(0-1)` `OK`	*Display syntax*

AT+LOCINP?	`+LOCINP: 0,1`
	`+LOCINP: 1,0`
	`+LOCINP: 2,1`
	`OK`
		Display the current configuration. Input 1 deactivated. Inputs 0 and 2 activated.

AT+LOCINP=1,0	`OK`	*Deactivate input 1*

Defined values:

<**n**> Input number, 0 to 2 (0 to 4 on Genxxx 5xe, 0 to 6 on Genxxx OEM).

<**mode**> 0 : deactivate.
1 : activate.

Notes:

- The command AT+LOCFRT=x,"IP" will reactivate all inactive inputs.
- The command AT+LOCFRT=x,"IP","OW" will reactivate all inactive inputs except the input used by the One-Wire.

2.5.3 AT+LOCOUT – Output Activation

Description:

This command allows to activate the open-collector output. The selected output may be: fixed open or closed, pulsed open or closed or configured to follow the state of an input.

Syntax:

AT+LOCOUT=<n>,<x>,<y> (OUTput)

Examples:

Command	Possible responses	Notes
AT+LOCOUT=?	`+LOCOUT: (0-2,9),(0-2),(0-65535)` `OK`	*Display syntax*
AT+LOCOUT=0,1,10	`OK`	*Output 0 closed for 1000ms*

AT+LOCOUT?	`+LOCOUT: 0,0`
	`+LOCOUT: 1,0`
	`+LOCOUT: 2,0`
	`OK`
		Display the current configuration

AT+LOCOUT=2,1	`OK`	*Output 2 closed*

AT+LOCOUT?	`+LOCOUT: 0,0`
	`+LOCOUT: 1,0`
	`+LOCOUT: 2,1`
	`OK`
		Display the current configuration

AT+LOCOUT=1,2,0	`OK`	*Output 1 follows the state of input 0*

AT+LOCOUT?	`+LOCOUT: 0,0`
	`+LOCOUT: 1,2,0,1`
	`+LOCOUT: 2,1`
	`OK`
		Display the current configuration. Output 0 is open. Output 1 follows the state of input 0 and is currently closed. Output 2 is closed.

Defined values:

<**n**> Output number, 0 (0 to 2 on Genxxx 5xe, 0 to 1 on Genxxx OEM).
9,0 : Do not restore outputs to their saved states at the start-up (default).

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

9,1 : Restore outputs to their saved states at the start-up.

<**x**> 0 : Open (default).
1 : Closed.
2 : Output follows input specified by <**y**> - 0 to 2 (0 to 4 on Genxxx 5xe).

<**y**> A non-zero value gives the pulse time for the selected output (time-base 100 ms).

Notes:

- AT+LOCOUT=0 is not accessible if +LOCIOW is active.
- If <**x**> is 0 (open) or 1 (closed) then the state of the output is saved in flash memory.
- If the AT+LOCOUT=9 option is set to 1 then the outputs are restored to their saved states at the start-up of the application.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.5.4 AT+LOCANA – Analog inputs activation

Description:

This command will activate the use of the analog inputs.

Syntax:

AT+LOCANA=<n>,<int>,<thLow>,< thHigh >,<"double">,<hyst>,<lowbat>

Examples:

Command	Possible Responses	Notes
AT+LOCANA=?	+LOCANA: (0-3,10),(0-255),(Low:0-99999),(High:0-99999),("S","D"),(Hyst:0-99999),(0-1) OK	*Display syntax*
AT+LOCANA?	+LOCANA: 0,0,0,99999,S,500 +LOCANA: 1,0,0,99999,S,500 +LOCANA: 2,0,0,99999,S,500 +LOCANA: 3,5,3550,4460,S,10,1 OK	*Display current configuration*
AT+LOCANA	+LOCANA: 0,3155,3150,3167,N +LOCANA: 1,5272,5255,5288,N +LOCANA: 2,9890,9857,9890,N +LOCANA: 3,4442,4423,4450,N OK	*Show current levels on all inputs (see notes below).*
AT+LOCANA=1	+LOCANA: 1,0,0,10000,S,500 OK	*Show current configuration for one input only.*
AT+LOCANA=1,1,3000,7000	OK	*Set configuration for one input.*
AT+LOCANA=1	+LOCANA: 1,1,3000,7000,S,500 OK	*Show current configuration for one input only.*
AT+LOCANA=10	+LOCANA: 10,0 OK	*Show current division by 10 configuration.*
AT+LOCANA=10,1	OK	*Set current division by 10 configuration.*

Defined values:

<**n**>

Channel input (0 to 3).

0: GPS antenna voltage.
1: User input 1 (optional).
2: User input 2 (optional).
3: Internal supply voltage (see notes below).
10: Divide analog values in GPS frame by 10 (see **<int>** below).

<**int**>

Integration count value.

0: Channel is disabled (default).
1 - 255 : Enabled.

If <**n**> is 10 then:

0: Do not divide analog values in GPS frame by 10 (default).
1: Divide analog values in GPS frame by 10. This allows values greater than 9999mV to be correctly recorded in the GPS frame.

<**thLow**>

Low threshold value mV (0 default – 99999).

<**thHigh**>

High threshold value mV (0 – 99999 default).

<**double**>
Single or double threshold transition detection (“S” default or “D”).

<**hyst**>
Hysterisis level mV (0 - 99999), default 500mV.

<lowbat>
0: Disabled.
1: Enabled. (default) Disconnect battery if voltage too low to avoid complete discharge of battery. Channel 3 (Internal Supply Voltage) only.

Notes:

- The command **AT+LOCANA** with no parameters will return the following response:

  +LOCANA=0,<currentValue>,<minValue>,<maxValue>,<state>
  +LOCANA=1,<currentValue>,<minValue>,<maxValue>,<state>
  +LOCANA=2,<currentValue>,<minValue>,<maxValue>,<state>
  +LOCANA=3,<currentValue>,<minValue>,<maxValue>,<state>

  <**currentValue**> Current value on the channel.
  <**minValue**> Minimum value measured on the channel.
  <**maxValue**> Current value measured on the channel.
  <**status**> Current status on the channel (H, N, L)

  Then minimum and maximum values will be reset after the configuration command.
  H, N, and L correspond to the current alert status of the channel (High, Normal or Low).

- All voltage values are in milli-volts.

- When using the LOW BAT option for the internal supply voltage analog input, the following default parameters should be used:
  AT+LOCANA=3,5,3550,4460,”S”,10,1

  int = 5 secs
  thLow = 3550 mV
  thHigh = 4460 mV
  Hyst = 10 mV
  lowBat = enabled

  The hysteresis value must be low enough to ensure correct detection of the low threshold before the detected voltage goes below the circuit operation voltage. A value of about 10mV is recommended. This will ensure that at 3550 – 10 = 3540 mV the circuit is still operating.

  The low threshold of 3550 mV is recommended to ensure that the battery does not start to completely discharge.

  The high threshold is set to 4460 mV which will detect an over-voltage of the internal operating voltage. When the external power is present the circuit operating voltage is about 4400 mV.

  The battery will be disconnected after the delay specified by the +LOCTAK timeout (the +LOCTAK does not have to be enabled).

- If the divide by 10 option is enabled, then the values in the GPS frame will be divided by 10. This allows values greater than 9999mV to be correctly recorded in the GPS frame.
  For example, if the value at user input 1 is 12345 mV, then the value in the GPS frame will be “1235”. If the value at user input 1 is 3248 mV, then the value in the GPS frame will be “0325”.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.5.5 AT+LOCPWO – External power-out control

Description :

This command will configure the external power-out signal on the Genxxx 5xe.

Command syntax :

AT+LOCPWO=<state>[,<save>]

Command	Possible Responses	Notes

AT+LOCPWO=?	`+LOCPWO: (0-1),(0-1)`
	
	`OK`
		Display syntax.

AT+ LOCPWO?	`+LOCPWO: 0,0`
	
	`OK`
		Display current value.

AT+ LOCPWO=1	`OK`	*Enable power-out.*
AT+ LOCPWO=1,1	`OK`	*Enable power-out and save its state.*

AT+ LOCPWO?	`+LOCPWO: 1,1`
	
	`OK`
		Display current value.

Defined values :

<**state**>

0: External power-out disabled (default).
1: External power-out enabled.

<**save**>

0: State not saved, always disabled after a reset (default).
1: Current state is saved and pin is set to this state after a reset.

Notes:

This command is available only on the Genxxx 5xe:

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.5.6 AT+EGLED – LEDs configuration

Description:

This command (available on a Genxxx 5xe only) will configure the use of the LEDs.

Syntax:

AT+EGLED=<mode>
AT+EGLED=<mode>[,<csqFlash>]
AT+EGLED=<mode>[,<DL1>][,<DL3>][,<DL4>][,<DL5>]

Examples:

Command	Possible responses	Notes

AT+EGLED=?	`+EGLED: (0-2),(0-8),(0-8),(0-8),(0-8)`
	
	`OK`
		Display syntax

AT+EGLED=1,1	`OK`	*Select display CSQ value mode with flash network status*

AT+EGLED?	`+EGLED: 1,1`
	
	`OK`
		Display current configuration

AT+EGLED=2,0,1,0,6	`OK`	*LEDs indicate input/output states:* *DL1 = None* *DL3 = input 0 state* *DL4 = None* *DL5 = output state*

AT+EGLED?	`+EGLED: 2,0,1,0,6`
	
	`OK`
		Display current configuration

Defined values:

<**mode**>

0 : Normal (default). DL1 indicates network status, DL3, 4 and 5 are not used.
1 : Display CSQ value on LEDs (see notes below).
2 : LEDs indicate inputs state.

<**csqFlash**>

If the selected mode is 1 (display CSQ value), then:
0 : Do not flash LEDs to indicate network status.
1 : Flash LEDs to indicate network status (default).

<**DL1**>
<**DL3**>
<**DL4**>
<**DL5**>

If the selected mode is 2 (LEDs indicate inputs state), then: DL1, 3, 4 and 5 may be one of the following values:
0: None, LED is OFF
1: ON when input 0 is active
2: ON when input 1 is active
3: ON when input 2 is active
4: ON when input 3 is active
5: ON when input 4 is active
6: ON when output 1 is closed
7: ON when output 2 is closed
8: ON when output 3 is closed

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

Notes:

- This command is available on a Genxxx 5xe only.

- In normal mode, DL1 indicates the network status:

State	ON time	OFF time	Description
Fixed ON	Always ON	-	No network / no SIM
Flash	200ms	2s	Network is ready or registration denied whilst socket is open
Flash	200ms	600ms	Connected to socket

- In Display CSQ value mode, the LEDs indicate the CSQ level (updated every 5 seconds). DL5 is not used and will be OFF:

CSQ level	DL1	DL3	DL4
0	OFF	OFF	OFF
> 0	ON	OFF	OFF
> 10	ON	ON	OFF
> 20	ON	ON	ON
> 31	OFF	OFF	OFF
99	OFF	OFF	OFF

If the option <**csqFlash**> is selected then the LEDs will flash to indicate network status as shown above.

2.6 One-Wire identification

2.6.1 AT+LOCIOW – One-Wire configuration

Description:

This command allows the configuration of the One-Wire input for identification. Used with AT+LOCFRT and "OW" parameter to allow automatic transfer of information to remote server.

Syntax:

AT+LOCIOW=[<s>,<x>,<y>,<h>,<f>,<e>] (One-Wire)

Examples:

Command	Possible responses	Notes
AT+LOCIOW=?	`+LOCIOW: (0-1),(Input:1-2),(0-65535),("D","S"),(0-1),(0-1)` `OK`	*Display syntax*
AT+LOCIOW?	`+LOCIOW: 0,2,15,"S",0,1` `OK`	*Display current configuration (default shown here)*

Defined values:

<s> identification activation:
0 : no (default).
1 : yes, in this case when a key is connected it is read and added in the GPS frame.

<x> Input to be used for One-Wire. Input 1, 2 or 39 can be used. (Only available with optional hardware modification.)

<y> Interval time between each key read to verify when the key is removed (default = 15 secs).

<h> Type of management at change of status:
"S" for Single, the connection initiates an frame storage (default).
"D" for Double, the change from rest to activate and from activate to rest initiates the frame storage.

<f> Always use last good number:
0 : no (default).
1 : yes.

<e> Option to prevent the One-Wire function from using the APC input and output indicator functions:
0 : do not activate in/out function.
1 : activate in/out function (default).

Notes:

On a Genxxx 5xe the input 39 is used for the One-Wire input.

2.7 GPS positions management

2.7.1 AT+LOCSTK – Logging GPS positions

Description:

This command allows to activate the logging of GPS positions and to select its quality.

Syntax:

AT+LOCSTK=[<s>,<x>,<y>,<h>,<f>,<v>,<n>,<d>] (STocKage)

Examples:

Command	Possible responses	Notes
AT+LOCSTK=?	`+LOCSTK: (0-2),"HHMMSS",(0-1),(0-99),(0-2),(0-255),(0-16),(0-255)` `OK`	*Display syntax*
AT+LOCSTK?	`+LOCSTK: 0,"00:00:10",0,10,1,0,4,120` `OK`	*Display current configuration (default shown here)*

Defined values:

<s> Logging management:
0 : no logging.
1 : permanent logging and at each change of status on the inputs (*****).
2 : permanent logging **if** one of the digital inputs is activated **and** at each change of status on the digital inputs (*****). Also permanent logging **if** the +EGMOVE <savePos> option is activated **and** the unit is moving.

(*****) **if** parameter ″IP″ requested with the custom frame format (AT+LOCFRT=2,…).

<x> Position acquisition interval. Format "HHMMSS" (interval max = 240000 i.e. 24 hours).

<y> GPS power management. In order to reduce the system consumption, the internal GPS module and the antenna may be set to low-power mode. Attention, this will result in a delayed acquisition after wake-up (40 sec to 2 min).
0 : no power supply management.
1 : management active. In this case, the capture depends on the reaction time of the antenna. After entering this command, the device must be reinitialized so that this parameter can be taken into account, with the command **AT+EGMRST=0**.

<h> Corresponds to the maximum allowed value, for the validation of the information, of the entire part of the HDOP (Horizontal Dilution of Precision) coming from the GPS. This information will indicate the level of exactitude of the GPS information. The theoretical value goes from 0 to 99.99, with a default value of 10. It is not advised to modify this parameter.

<f> Corresponds to the minimum allowed value for the validation of the information, for the quality parameter of FIX reception coming from the GPS. (0 : Invalid , 1 : GPS, 2 : DGPS). The default value is 1. It is not advised to modify this parameter.

<v> Corresponds to the minimum allowed value for the validation of information, of the moving speed data from the GPS. The default value is 0, which authorizes all records event if the device is not moving. This parameter can also be modified with the command **AT+LOCSPD**.

<n> Corresponds to the minimum allowed value for the validation of information, of the number of satellites used. The default value is 4.

<d> When the antenna power supply management is active, this parameter corresponds to the maximum delay in powering-up the GPS module in order to get a position. If no valid position is found, the system records the last parameters received and cuts the supply.

Notes:

- The command **AT+LOCSTK** allows to know the immediate position according to the selected format. If the information appears to be valid, the position is returned even if the filter values are incorrect. (Ex: HDOP mini is 10, and HDOP returned is 20). The position is immediately recorded in flash memory.
- The command **AT+LOCSTK="R"** allows to know the immediate position according to the selected format. If the information appears to be valid, the position is returned even if the filter values are incorrect. The position is not recorded in flash memory.
- After entering this command, the unit must be reset by either the command **AT+EGMRST=0**, or by cycling the supply.
- It is not necessary to include a short acquisition time between each capture as this could result in reducing the total recording period by the system by overwriting previously recorded data in the case of a transmission problem. The distances covered in 10 seconds are:
  at 130 km/h, 360 meters.
  at 90 km/h, 250 meters.
  at 50 km/h, 139 meters.
- In TCP mode the transmission times must be taken into account, see chapter 2.19 GPRS Operation.

Notes:
It is current practice for GPRS APN network operators to close all data transfer over the TCP link after an inactivity of more than about 30 minutes. The stop of the service is not notified to the relative layers of the IP stack. The result of this is that data then sent will not reach the server and will be lost.

The following are suggested to overcome this problem :

1. Adjust the cyclic transmission of a frame to a maximum of about 20 minutes (AT+LOCSTK=x,"00:20:00"). This will ensure that the operator inactivity timer will be regularly rearmed.

2. Make use of the acknowledge of each frame by the server with the command AT+LOCTAK. Frames not acknowledged are considered not to be sent and will be regularly resent. As such no frames will be sent and lost.

3. Use the KEEP ALIVE command AT+LOCKAL to automatically send a GPS frame if data has not been transferred for the specified timeout period. (Refer to chapter 2.9.1 AT+LOCKAL – TCP Keep Alive)

To avoid any problems with loss of data it is advised to :

- **not use a cyclic +LOCSTK value of more than 20 minutes.**
- **activate the acknowledgement of the frames by the server with +LOCTAK.**
- **use the +LOCKAL command to configure the KEEP ALIVE timeout.**

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.7.2 AT+LOCSTK1 – Secondary acquisition and send intervals

Description:

This command will specify the secondary position acquisition and send intervals. They may be used if the external supply is removed or the battery voltage is low.

Syntax:

AT+LOCSTK1=<mode>,<event>,<x>,<z>

Examples:

Command	Possible responses	Notes
AT+LOCSTK1=?	`+LOCSTK1: (0-1),(0),"HHMMSS","HHMM"` `OK`	*Display syntax*
AT+LOCSTK1?	`+LOCSTK1: 0,0,"00:01:00","00:03"` `OK`	*Display current configuration (default shown here)*
AT+LOCSTK1=1,0,”00:10:00”,”00:30”	`OK`	*Set new configuration*
AT+LOCSTK1?	`+LOCSTK1: 1,0,"00:10:00","00:30"` `OK`	*Display current configuration*

Defined values:

<**mode**> 0 : Disabled (default).
1 : Enabled.

<**event**> 0 : External supply removed or low battery voltage.

<**x**> Position acquisition interval. Format "HHMMSS" (interval max = 240000 i.e. 24 hours). The default value is the same as the +LOCSTK default value.

<**z**> Depending on +LOCSND specification, "HH:MM" with
HH = hour, MM = minutes,
transfer time interval,
or hour of transfer,
Default value is “00:03”.

Notes:

These secondary values for +LOCSTK position acquisition and +LOCSND send intervals will be used when this function is enabled and either the external supply is removed or the battery voltage is low.
The low battery voltage level is fixed at 3600 mV.

A frame will be stored in the memory if the mode is enabled and the +LOCFRT=2 or 3 and the “LC” field is selected. The logging code will indicate one of the following codes (see chapter 2.3 AT+LOCFRT – GPS position frame format):

PRE-CHARGE IN PROGRESS
FAST CHARGE IN PROGRESS
CHARGE DONE
CHARGE SUSPEND
BATTERY FAULT
LOW BATTERY
EXTERNAL SUPPLY REMOVED
EXTERNAL SUPPLY CONNECTED

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.7.3 AT+LOCSPD – Minimum speed for recording

Description:

This command allows to specify the minimum speed for the recording of GPS positions.

Syntax:

AT+LOCSPD=<n>,<m> (SPEED in km/h)

Examples:

Command	Possible Responses	Notes
AT+LOCSPD=?	`+LOCSPD: (0-255),(0-1)` OK	*Display syntax*
AT+LOCSPD=10,1	OK	*Min speed = 10 KMH, do not log over-speed events.*
AT+LOCSPD?	`+LOCSPD: 10,"5.4",1` OK	*Display current configuration, second parameter is speed in knots.*

Defined values:

<**n**> 0 : (default) all valid positions are recorded.
1-255 : only positions with a moving speed greater than this speed are recorded.

<**m**> 0 : (default) all over-speed events are recorded (<**n**> different to zero).
1 : do not record over-speed events.

Notes:

The <**n**> parameter may also be modified with the command **AT+LOCSTK**.
The <**n**> parameter, if non-zero, will be used to avoid detecting false MOVEMENT STOP events when moving at a constant high speed.

2.7.4 AT+LOCGAP – Minimum interval of displacement

Description:

This command allows to specify the minimum distance between two records of GPS positions.
This command is independent from +LOCSTK. If a value is entered, the recording is automatically launched.

Syntax:

AT+LOCGAP="<n>",<s>

Examples:

Command	Possible responses	Notes
AT+LOCGAP=?	`+LOCGAP: ("0.0-9999"),(0-1)` OK	*Display syntax*
AT+LOCGAP="0.5"	OK	*Min distance = 500 meters*
AT+LOCGAP?	`+LOCGAP: "0.5",0` OK	*Display current configuration*

Defined values:

<**n**> Distance in kilometres, the value should contain a maximum of 4 characters, for example "99.9" or "1000" (default = 0).

<**s**> 0: (default) all positions are recorded.
1: positions are recorded only when the conditions specified in +LOCSTK are met.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.7.5 AT+LOCCRS – Deviation of angular displacement

Description:

This command allows to specify the minimum course deviation which needs a recording of the GPS position, this between 0 & 180°.
This command is independent from +LOCSTK. If a value is entered, the recording is automatically launched.

Syntax:

AT+LOCCRS="<n>",<s>

Examples:

Command	Possible responses	Notes

AT+LOCCRS=?	`+LOCCRS: ("0.0-180"),(0-1)`
	
	`OK`
		Display syntax

AT+LOCCRS="30"	`OK`	*Angle in comparison to the actual course.*

AT+LOCCRS?	`+LOCCRS: "30.0",0`
	
	`OK`
		Display current configuration

Defined values:

<n> Angle in degrees, (default = 0, no recording).

<s> 0: (default) all positions are recorded.
1: positions are recorded only when the conditions specified in +LOCSTK are met.

For example, with AT+LOCCRS="30" and a course at 122°, a position will be recorded if the course goes over 152° or below 92°. The course used for the recording will be the new reference for the calculation.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.7.6 AT+LOCCUA – UART capture configuration

Description:

This command will configure the format of the "CU" field in the frame when using the +LOCFRT=2/3,"CU" frame format option to capture data from the main UART (UART0 on a Genxxx 5xe).

Syntax:

AT+LOCCUA=<n>[,<termType>][,<char>]

Examples:

Command	Possible responses	Notes
AT+LOCCUA=?	`+LOCCUA: (3-150),(0-6),(0-255)` OK	*Display syntax*
AT+LOCCUA=21	OK	*Set required number of characters*
AT+LOCCUA?	`+LOCCUA: 21,3,13` OK	*Display current configuration*

Defined values:

<n> Number of characters including terminating character if required (default 11).

<termType> Termination type (default 3).
0 : no termination character required, just the correct number of characters.
1 : <CR> only
2 : <LF> only
3 : <CR> or <LF>
4 : <CR> and <LF>
5 : use the specific ASCII character defined by **<char>** below.
6 : variable length data up to maximum specified length with the specific terminating ASCII character defined by **<char>** below.

<char> Decimal value of the specific ASCII character (default 13, corresponds to <CR>).

Note:

The inter-character timeout is 2 seconds. If no characters are received during this time, an incomplete capture buffer will be emptied.

In **<termType>** **6**, the captured dated may be of variable length and terminated with the terminating ASCII character defined by **<char>**. If the maximum specified length is reached before the terminating character is detected and the timeout is respected then the frame will be sent. If the maximum specified length is exceeded then the frame is discarded.
The terminating characters are not added to the frame.

2.7.7 AT+LOCDIS – Total distance run

Description:

This command will display the total distance run as calculated via the GPS coordinates from the application starting and/or the erasure of the memory zone.

Syntax:

AT+LOCDIS?
AT+LOCDIS=0

Examples:

Command	Possible Responses	Notes

AT+LOCDIS=?	`+LOCDIS: ("0.00-99999.99")`
	
	`OK`
		Display syntax

AT+LOCDIS?	`+LOCDIS: "3.48"`
	
	`OK`
		Display current configuration

AT+LOCDIS=0	`OK`	*Reset the total distance run to 0.*

Notes:

The calculation is made only if the speed exceeds 3 Km/h or with the parameter +LOCSPD if it is programmed.
The total distance run is saved in flash memory every 100 meters and each time a frame is saved.

The command AT+LOCDIS=0 will reset the total distance run to 0 and save the value to flash memory.

2.7.8 AT+LOCHTC – Recovering the registered positions

Description:

This command will display the frames stored in the in the device.
Additional storage zone information may also be shown. The display is in chronological order, from the oldest to the most recent.

Syntax:

AT+LOCHTC=[<type>][,<option>]

Examples:

Command	Possible responses	Notes
AT+LOCHTC=?	`+LOCHTC: (0,10,255),(0-1)` OK	*Display syntax*
AT+LOCHTC	OK	*Display all frames with zone number information*
AT+LOCHTC=255,0	OK	*Display all frames but without zone number information*
AT+LOCHTC=10,0	OK	*Only display Eco-Drive frames without zone number information*

Defined values:

<**type**> Number of characters including terminating character if required (default all frames).
0 : Only show $GP frame types
10 : Only show $ECODRV frame types
255 : Show all frame types (default)

<**option**>
0 : Do not show storage zone information
1 : Show zone information (default)

Examples:

Command	Possible Responses	Notes
AT+LOCHTC	19 $GPRMC,144516.00,A,4716.81455,N,00003.50568,W,0.130,349.30,210606,,,A*77 $GPRMC,144555.00,V,4716.81188,N,00003.49605,W,1.154,8.41,210606,,,A*61 $GPRMC,144645.00,A,4716.80598,N,00003.50676,W,0.611,261.59,210606,,,A*7F $GPRMC,144655.00,A,4716.80674,N,00003.50843,W,1.020,261.77,210606,,,A*7E $GPRMC,144705.00,A,4716.80727,N,00003.50790,W,0.043,267.24,210606,,,A*78 $GPRMC,144715.00,A,4716.80709,N,00003.50650,W,0.004,0.00,210606,,,A*7E $GPRMC,144725.00,A,4716.80630,N,00003.50706,W,0.026,244.53,210606,,,A*70 $GPRMC,144735.00,A,4716.80586,N,00003.50764,W,0.035,241.56,210606,,,A*79 $GPRMC,144745.00,A,4716.80554,N,00003.50821,W,0.050,225.43,210606,,,A*7A $GPRMC,144755.00,A,4716.80585,N,00003.50928,W,0.109,243.82,210606,,,A*7F $GPRMC,144805.00,A,4716.80469,N,00003.50961,W,0.596,239.15,210606,,,A*7A $GPRMC,144815.00,A,4716.80105,N,00003.50947,W,0.898,202.07,210606,,,A*78 OK	*Display all positions from the flash with zone information*

2.7.9 AT+LOCRDI – Management of indexes in memory of GPS data

Description:

This command allows to know the value of reading and writing indexes of GPS positions in flash. First, the reading index is returned, then the block number, then the writing index value and the block number.

Syntax:

AT+LOCRDI? (ReaD Index)

Response syntax:

+LOCRDI: <read index>,<block number>,<write index>,<block number>

Examples:

Command	Possible Responses	Notes
AT+LOCRDI?	`+LOCRDI: 264,27,220,27` `OK`	*Display current values*
AT+LOCRDI	`OK`	*Position the reading index at the value of the writing index. This avoids emptying all of the stocking memory if not required.*

Notes:

See chapter "2.3 AT+LOCFRT – GPS position frame format" to see how to clear the GPS position from the memory.

2.7.10 AT+LOCGSW – GPS switching option

Description :

This command will configure the GPS switching option to switch GPS TX to V24 DSR to send GPS data out to the V24 DSR and switch GPS RX to V24 DTR.

Note, this command is not available on the Genxxx 5xe or GenLoc 341e.

Command syntax :

AT+LOCGSW=<dsr>,<dtr>

Command	Possible Responses	Notes
AT+LOCGSW=?	`+LOCGSW: (0-1),(0-1)` `OK`	*Display syntax.*
AT+LOCGSW?	`+LOCGSW: 0,0` `OK`	*Display current value.*
AT+LOCGSW=1	`OK`	*Switch GPS TX to V24 DSR.*
AT+LOCGSW=1,1	`OK`	*Switch GPS TX to V24 DSR and GPS RX to V24 DTR.*
AT+LOCGSW?	`+LOCGSW: 1,1` `OK`	*Display current value.*

Defined values :

<**dsr**>

0: Not switched (default).
1: Switch GPS TX to V24 DSR to send GPS data out to the V24 DSR.

<**dtr**>

0: Not switched (default).
1: Switch GPS RX to V24 DTR.

2.8 AT+LOCSND – Sending GPS positions

Description:

This command allows the activation of the transfer of GPS positions. It may at regular intervals or at a specific fixed time.

Syntax:

AT+LOCSND=<x>,<y>,<z>,<a>,<p> (SeND)

Examples:

Command	Possible Responses	Notes
AT+LOCSND=?	`+LOCSND: (0-5),("I","H"),("HH:MM"),(0-1),(0-1)` `OK`	*Display syntax*
AT+LOCSND=0,"I"," 00:10"	`OK`	*Set parameters*
AT+LOCSND?	`+LOCSND: 0,"I","00:10",0,0` `OK`	*Display current configuration*

Defined values:

<**x**> 0 : no transfer (default).
1 : transfer via SMS. If the transfer time interval ("I") is "00:00" then the SMS is sent immediately.
2 : transfer via GPRS TCP/UDP. If the transfer time interval ("I") is "00:00" then the TCP link remains connected.
3 : transfer via GPRS FTP.
4 : transfer via GPRS TCP/UDP using the serial link to send other information.
5 : transfer via GPRS SMTP.

<**y**> "I": transfer at regular time interval (default). If the transfer time interval is "00:00" then the data is sent immediately.
"H": transfer at fixed time.

<**z**> "hh:mm" with hh = hour, mm = minutes,
transfer time interval (default = 00:00),
or fixed hour of transfer.

<**a**> 0 : Disabled (default).
1: Enabled. In +LOCSND=2 mode only, the TCP connection will be stopped if the input 0 (APC) is inactive.

<**p**> 0 : TCP in transfer mode +LOCSND=2 and 4 (default).
1 : UDP in transfer mode +LOCSND=2 and 4.

Notes:

- In the case of a TCP/UDP connection, if the transfer time interval is "00:00" then the connection will remain open after transfer. If the transfer time interval ("I") is non-zero or a fixed hour of transfer is selected ("H") then the connection we be closed after transfer.
- The transfer at a fixed time is at UTC time with +LOCUTC offset.
- It is possible to request a forced transfer upon receipt of a SMS.
- Once the command **AT+LOCSND=4** is sent, to re-control the device, simply remove the SIM card or send the command **AT+LOCSND=0** to the unit via SMS.
- The parameter **<p>** will select either the TCP or UDP protocol for the +LOCSND=2 and 4 modes.
- If the TCP connection is to be closed (<**a**> enabled, or transfer time interval ("I") is non-zero or "H" is selected), then it will be stopped after the delay specified by the +LOCTAK timeout (the +LOCTAK does not have to be enabled).

INTERCONNECTION AND LOCAL POSITIONNING

- The command **AT+LOCSND=4** allows the transfer of data arriving on the serial port via the TCP link and to send to this port the data received from the GPRS link (see 2.7.6

AT+LOCCUA – UART capture configuration). It is also possible to receive locally the GPS frames coming from the command +GPSNMEA. This allows the connection of a PDA like terminal with a geolocating application and simultaneously exchange information with the remote server. The PDA will do the appropriate processing.

RESTRICTION OF USE

- The functioning in **AT+LOCSND=4** mode does not allow a remote update of the application (+LOCDWL).

2.9 Keep Alive configuration

2.9.1 AT+LOCKAL – TCP Keep Alive

Description :

This command will configure the TCP Keep Alive function.
It is current practice for GPRS APN network operators to close all data transfer over the TCP link after an inactivity of more than about 30 minutes. The stop of the service is not notified to the relative layers of the IP stack. The result of this is that data then sent will not reach the server and will be lost.
This command will ensure that the service remains open by sending a GPS frame after the specified period of inactivity.

Command syntax :

AT+LOCKAL=<state>[,<timeout>]

Command	Possible Responses	Notes

AT+LOCKAL=?	`+LOCKAL: (0-1),(1-10080)`
	
	`OK`
		Display syntax

AT+LOCKAL?	`+LOCKAL: 0,20`
	
	`OK`
		Display current configuration

AT+LOCKAL=1	`OK`	*Enable Keep Alive*

AT+LOCKAL?	`+LOCKAL: 1,20`
	
	`OK.`
		Display current configuration

AT+LOCKAL=1,1	`OK`	*Enable Keep Alive with new timeout value.*

AT+LOCKAL?	`+LOCKAL: 1,30`
	
	`OK`
		Display current configuration

Defined values :

<**state**>
0: Disabled (default).
1: Enabled.

<**timeout**>
Timeout (1 to 10080 minutes, default = 20 minutes).

2.9.2 AT+LOCKAS – Keep Alive in Low-Power mode

Description :

This command will configure the unit to wake up from the Low-Power mode and save a frame. If the logging code option is selected with the +LOCFRT command then the logging code will be KEEP_ALIVE.

Command syntax :

AT+LOCKAS=<state>[,<timeout>][,<timeout_GPS>][,<timeout_GSM>]

Command	Possible Responses	Notes

AT+LOCKAS=?	`+LOCKAS: (0-1),(1-43200),(0-300),(0-300)`
	
	`OK`
		Display syntax

AT+LOCKAS?	`+LOCKAS: 0,20,0,0`
	
	`OK`
		Display current configuration

AT+LOCKAS=1	`OK`	*Enable wakeup and save frame*

AT+LOCKAS?	`+LOCKAS: 1,1440,150,150`
	
	`OK.`
		Display current configuration

AT+LOCKAS=1,60,120,120	`OK`	*Enable wakeup with new timeout value*

AT+LOCKAS?	`+LOCKAS: 1,60,120,120`
	
	`OK`
		Display current configuration

Defined values :

<**state**>

0: Disabled (default).
1: Enabled.

<**timeout**>

Timeout (1 to 43200 minutes, default = 1440 minutes).
This value specifies the maximum time to stay in the Low-Power mode before waking up and saving a frame.

<**timeout_GPS**>

Timeout (0 to 300 seconds, default = 150).
If a non-zero value then after having woken up, will wait for valid GPS information before saving a frame. If zero or the timeout is exceeded then a frame will be saved regardless of GPS status.

<**timeout_GSM**>

Timeout (0 to 300 seconds, default = 150).
If a non-zero value then after having woken up, will wait for valid GSM attachment before saving a frame. If zero or the timeout is exceeded then a frame will be saved regardless of GSM status.

Notes :

The daily reset configured by AT+LOCRST is not managed when then the unit is in the Low-Power mode.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.10 Remote management and configuration

It is possible to send configuration information via communication channels, either via the SMS channel, or via the TCP channel.
This makes it possible to identify operating problems remotely from the device. Thus, a request by SMS for the reception level of the GSM signal (the SMS are sent with very low levels whereas a GSM DATA or GPRS connection will not work) will determine if the device is in a "white" zone and explains the non-reception of the expected information, on the server side.

2.10.1 “Special” command messages

These are additional commands which are accepted only by the **SMS channel**.

“ **SENDPOSI** ” to request an **IMMEDIATE** position correct or not with the device identifier.
“ **RESET** ” to completely reset the device.

These commands may be entered in lower or upper-case.

2.10.2 Configuration by SMS

- Password must always be included.
- Password and commands must be separated by a 'space' character.
- The first command must begin with "AT".
- Subsequent commands may omit the leading "AT".
- The command name of each command may be in upper or lower-case.
- If the SMS is accepted then each command is handled and its response (if required) appended to the reply SMS.
- Long responses may result in multiple reply SMSs.
- The presence of the command “+LOCNRP” in the configuration SMS will deactivate the reply SMS.
  A reply SMS will always be sent in the case of a request to update the application.

Notes:
The character backslash ‘\’ is currently not managed by the application.

2.10.2.1 AT+LOCNRP – Request for non-response by SMS

Description:
This command allows to ask the system not to send response after reception of a command SMS.
This command is active only when it is in the text of the SMS. Its entry via the serial port has no effect. It is not saved.

Syntax:
AT+LOCNRP

2.10.2.2 Commands accepted via SMS

With the exception of the command AT+LOCPSW, all available commands may be read (“AT+LOCSTK?”) and configured (“AT+LOCSTK=2”).

The AT+LOCPSW is not accessible via SMS and will return “+LOCPSW:KO”.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.10.2.3 Example of configuration by SMS

Configuration SMS must respect the command syntax : max 160 characters in the SMS.

APN configuration SMS

« 0000 AT+locasv="internet-entreprise","orange","orange" »

SMS response received :
« 358730000000042 +locasv:OK »

Frame format configuration SMS
« 0000 AT+locfrt=2,"ID","NS","HD","CS","SK","DT" »

SMS response received :
« 358730000000042 +locfrt :OK »

Activation of an input and check recording mode
« 0000 AT+locinp=0,1 +locstk? »

SMS response received :
« 358730000000042 +locinp:OK +LOCSTK: 0,"00:01:00",0,10,1,0,4,120 »

It is possible to initiate the update of the embedded application via the DOTA function. See chapter **2.11 *AT+LOCDWL – Remote download of a new application*** .

2.10.3 Configuration via GPRS link in TCP

The unit may be configured by sending commands from the remote TCP server to the unit.

When the unit receives data from the TCP link, it analyses it and searches for the command strings "AT" or "+LOC" or "+EG" at the beginning of the data. If they are present, it processes the command and returns the command response. If they are not present, it transfers the information to the serial port in the case of a configuration with the command **AT+LOCSND=4** otherwise it is lost.

The remote TCP server may send individual or concatenated commands.

- Password is not required.
- Concatenated commands must each be separated by a 'space' character.
- The first command must begin with "AT".
- Subsequent commands may omit the leading "AT".
- The command name of each command may be in upper or lower-case. Usual command syntax must be used.

All available commands may be read (AT+LOCSTK?) and configured (AT+LOCSTK=2).

2.10.3.1 Example of configuration via TCP link

Command : AT+LOCINP=0,1
Response : OK

Command : AT+LOCSTK?
Response : +LOCSTK: 0,"00:01:00",0,10,1,0,4,120
Response : OK

Command : AT+LOCSND? +LOCFRT?
Response : +LOCSND: 2,"I","00:00",0,0
Response : OK
Response : +LOCFRT: 0,"TM","ST","LT","LI","LG","LU","SN","CS","DT"
Response : OK

2.11 AT+LOCDWL – Remote download of a new application

Description:

This command is used to initiate the update of application. This is often to add new functions. This action is also called “DOTA” (Download Over The Air).

The transfer is possible only in GPRS via a FTP connection. As a consequence, the FTP parameters must be set in the device with the commands **AT+LOCFSV**, **AT+LOCFUN** and **AT+LOCFPW**.

Syntax:

AT+LOCDWL=<"filename">,<"path">
AT+LOCDWL=<slot>,<"filename">,<"path">

Defined values:

<slot>	(1-2) Optional serial flash slot number where the file is write before installed. If omitted slot 1 is used.
<filename>	file name to download.
<path>	directory path for the file.

ORIGIN OF THE COMMAND :

The command can be sent via the serial link, a SMS or the TCP link.

When the command is received, depending on the current action, the system stops it or waits for it to end, disconnects from the network and connects to the download server using the FTP parameters. The transfer is made, and then the application is installed. The unit is restarted with the new application if successful or with the old application in case of a problem.

Example of commands :

Via serial or TCP link

at+locdwl="EaseLoc_V01_boot.bin","./DWL" (filename, directory: "./DWL")
at+locdwl=1,"EaseLoc_V01_boot.bin","./DWL" (filename, directory: "./DWL")

By a SMS

0000 at+locdwl="EaseLoc_V01_boot.bin"," " (file in the root directory of the server: ".")

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.12 AT+LOCUTC – Local time offset

Description:

This command allows the time in the recorded GPS frames to be adjusted to be that of local time.

Syntax:

AT+LOCUTC=<offset>

Examples :

Command	Possible Responses	Notes
AT+LOCUTC=?	`+LOCUTC: "-11"/"+12"` `OK`	*Display syntax*
AT+LOCUTC="+2"	`OK`	*Set offset to +2 hours*
AT+LOCUTC?	`+LOCUTC: "+02"` `OK`	*Display current configuration*

Defined values:

<**offset**> The local time offset in hours, "-11" to "+12" (default = "+00").

Notes:

Only the reset command AT+LOCRST and the time recorded in the GPS frames in the flash memory will be adjusted.

For example, if local time is 2 hours ahead of UTC time then this may be adjusted with AT+LOCUTC="+2".

Then all recorded GPS frames will be adjusted with this offset. Also, if the AT+LOCRST configuration is set to "03.00", then the application will reset at 3h00 local time.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.13 AT+LOCRST – Daily reset

Description:

This command allows to reset the device automatically once a day. This can avoid the possible lock-up of the application due to a random rejection by the GSM network.

This function uses the internal system clock which is set either automatically by the GPS time data if correct or by the NTP information or by the command **AT+CCLK** and takes into account the local time offset set by AT+LOCUTC.

Syntax:

AT+LOCRST=<mode>[,<time>][,<type>] (ReSeT)

Examples :

Command	Possible Responses	Notes
AT+LOCRST=?	+LOCRST: (0-3),"HH:MM",0 OK	*Display syntax*
AT+LOCRST=1,"03:00"	OK	*Set reset time at 03h00. Reset ARM.*
AT+LOCRST?	+LOCRST: 1,"03:00",0 OK	*Display current configuration*
AT+LOCRST=0	OK	*Deactivate the daily reset*

Defined values:

<mode>
0 : reset inactive.
1 : reset active.
2 : reset active with re-initialization of the current read block index to zero.
3 : re-initialization o default value of the current read block index as well as the block number.

<time>
"HH:MM",
HH = hours, MM = minutes.

<type>
0 : General (default)
1 : GSM only

Notes:

The daily reset configured by AT+LOCRST is not managed when then the unit is in the Low-Power mode.

If the **<type>** parameter is not specified then a general reset will occur.

Default configuration:

+LOCRST:1,"03:00",0

2.14 Configurations & general information

2.14.1 AT+LOCCNF – General Configuration

Description:

This command displays the configuration of the unit.

Syntax:

AT+LOCCNF (CoNFig)

Examples :

Command	Possible Responses
AT+LOCCNF	CONFIGURATION Local identify ..... 354112023011500 GSM Registered parameters ..... Searching to Registered SIM Card presence ..... Removed, Removed SIM Code Status ..... SIM Removed GPS position capture ..... STOPPED GPS power supply management ..... Always powered GPS antenna parameters ..... Powered, Connected, 3135 mV Interval between capture ..... 00:01:00 HDOP max value ..... 10 FIX min value ..... 1 SPEED min value ..... 0 km/h (0.0 knots) NB SAT min value ..... 04 Frame output format ..... NMEA RMC Transmit position ..... STOPPED Transmit method ..... Interval Interval delay ..... 00:03 Number of remote phone numbers ..... 0 Hour correction parameter ..... +00 GPI status ..... I0:0 I1:0 I2:0 I3:0 I4:0 GPO status ..... O0:Open O1:Open O2:Open EaseLoc V321_EGM430 - GenLoc341e A - xxxxxxxx OK

2.14.2 AT+LOCCNG – GPRS Configuration

Description:

This command displays the GPRS configuration of the unit.

Syntax:

AT+LOCCNG (CoNfig Gprs)

Examples :

Command	Possible Responses
AT+LOCCNG	GPRS CONFIGURATION Access Point Server Name.....(+LOCASV) ""," Access Point User Name .....(+LOCAUN) ""," Access Point Password .....(+LOCAPW) ""," TCP/UDP Server .....(+LOCTSV) "" TCP/UDP Port .....(+LOCTPT) 00000 TCP/UDP Path .....(+LOCTPH) ""," TCP/UDP Acknowledge Frame ....(+LOCTAK) "" TCP/UDP Acknowledge Delay.....(+LOCTAK) 200 FTP Server (DWL,PUT).....(+LOCFSV) ""," FTP Username (DWL,PUT).....(+LOCFUN) ""," FTP Password (DWL,PUT).....(+LOCFPW) ""," FTP Port (DWL,PUT).....(+LOCFPT) 21,21 FTP Mode (DWL,PUT).....(+LOCFMO) PASSIVE,PASSIVE FTP Path (PUT).....(+LOCFPP) "." FTP Filename PUT).....(+LOCFPF) "%I_%D_%H.txt" OK

2.14.3 AT+EGVSMTP – SMTP Configuration

Description:

This command displays the SMTP and email configuration of the unit.

Syntax:

AT+EGVSMTP

Examples :

Command	Possible Responses
AT+EGVSMTP	SMTP CONFIGURATION SMTP Port ..... (+EGSMTPPT) 25 SMTP Host Name .....(+EGSMTPHN) "smtp.mail.google.com" SMTP User Name .....(+EGSMTPUN) "ercogener_smtp" SMTP Password .....(+EGSMTPPW) "ercogener8303" SMTP Sender Name .....(+EGSMTPSN) "358730xxxxxx" (default = IMEI) SMTP Sender Address .....(+EGSMTPSE) "smtp@ercogener.com" SMTP Recipient.....(+EGMAIL) "ercoserver@ercogener.com" SMTP Subject.....(+EGSUBJ) "%I_%D_%H" OK

Notes: Values between "" are given as example.

2.14.4 AT+LOCPOS – GPS Information

Description:

This command displays the last correct GPS position found by forced capture.

Description:

AT+LOCPOS (POSition)

Examples :

Command	Possible Responses
AT+LOCPOS	Position parameters Current local date, Time ..... 300413, 145023 Position read UTC date, time .... 300413, 145022.00 Latitude ..... 4716.80958, N Longitude ..... 00003.53978, W Fix Quality ..... 1 Fix value required for stock .... 1 Number satellites in view ..... 10 Number satellites used ..... 09 Number sats required for stock .. 4 HDOP, VDOP, PDOP ..... 0.93, 1.33, 1.63 HDOP value required for stock ... 10 Altitude ..... 87.7 M Height of Geoid ..... 46.7 M Magnetic Variation ..... Course Made Good ..... Ground speed kmh, knots ..... 0.032, 0.017 Speed value required for stock .. 000 OK

Notes:

The first line indicates the current time of the GPS. This allows the “age” of the information to be checked, as only the last correct data is displayed.

2.15 GPRS configuration

See chapter ***GPRS Operation***. Note that if a second SIM is present then it may also be configured.

2.15.1 AT+LOCASV – Access Point Server Name

Description:

This command allows to enter all the parameters given by the GSM operator for the GPRS access :

- The "**A**ccess point **S**er**V**er name",
- The "**A**ccess point **U**ser**N**ame",
- The "**A**ccess point **P**ass**W**ord".

Syntax:

AT+LOCASV=<"ServerString">,<"UserName">,<"PassWord">,<"ServerString">,<"UserName">,<"PassWord"> (Access point SerVer name)

Examples :

Command	Possible Responses	Notes
AT+LOCASV=?	`+LOCASV: "ServerString","UserName","Password"` `OK`	*Display syntax*
AT+LOCASV="internet"," user","pass"	`OK`	*Set parameters*
AT+LOCASV?	`+LOCASV: "internet","user","pass"` `OK`	*Display current configuration*
AT+LOCASV=,0	`OK`	*Erase all parameters*
AT+LOCASV?	`+LOCASV: "","",""` `OK`	*Display current configuration*

Defined values:

<**ServerString**> Access point server name. Maximum 100 characters.
<**UserName**> Access point user name. Maximum 50 characters.
<**PassWord**> Access point password (case sensitive). Maximum 50 characters.

If a second SIM is present then :

<**ServerString**> Access point server name. Maximum 100 characters.
<**UserName**> Access point user name. Maximum 50 characters.
<**PassWord**> Access point password (case sensitive). Maximum 50 characters.

Notes:

If a parameter is incorrectly entered, the information will not be automatically saved in flash memory.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.15.2 AT+LOCAUN – Access Point User Name

Description:

This command allows to enter the **A**ccess Point Name **U**ser**N**ame, given by the GSM operator for the GPRS access.

Syntax:

AT+LOCAUN=<"UserName">,<"UserName"> (Access point UserName)

Examples :

Command	Possible Responses	Notes
AT+LOCAUN=?	`+LOCAUN: "UserName"` `OK`	*Display syntax*
AT+LOCAUN="user"	`OK`	*Set parameter*
AT+LOCAUN?	`+LOCAUN: "user"` `OK`	*Display current configuration*
AT+LOCAUN=,0	`OK`	*Erase the parameter*

Defined values:

<**UserName**> Point name access. Maximum 50 characters.

<**UserName**> Point name access. Maximum 50 characters. (For second SIM if present only)

2.15.3 AT+LOCAPW – Access Point Password

Description:

This command allows to enter the **A**ccess Point Name **P**ass**W**ord, given by the GSM operator for the GPRS access.

Syntax:

AT+LOCAPW=<"PassWord">,<"PassWord"> (Access point PassWord)

Examples :

Command	Possible Responses	Notes
AT+LOCAPW=?	`+LOCAPW: "Password"` `OK`	*Display syntax*
AT+LOCAPW="pass"	`OK`	*Set parameter*
AT+LOCAPW?	`+LOCAPW: "pass"` `OK`	*Display current configuration*
AT+LOCAPW=,0	`OK`	*Erase the parameter*

Defined values:

<**PassWord**> Access point password. Maximum 50 characters (case sensitive).

<**PassWord**> Access point password. Maximum 50 characters (case sensitive). (For second SIM if present only)

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.16 TCP configuration

2.16.1 AT+LOCTSV – TCP IP address and port number

Description:

This command allows to enter the IP address of the remote "**T**CP **S**er**V**er" distant and the value of the "**T**CP **P**or**T**".

Syntax:

AT+LOCTSV=<"addr">[,<port>]

Examples :

Command	Possible Responses	Notes
AT+LOCTSV=?	`+LOCTSV: "xxx.xxx.xxx.xxx",(0-(1-65535))` `OK`	*Display syntax*
AT+LOCTSV= "123.98.76.54",1234	`OK`	*Set parameter*
AT+LOCTSV?	`+LOCTSV: "123.98.76.54", 1234` `OK`	*Display current configuration*
AT+LOCTSV=,0	`OK`	*Erase the parameter*

Defined values:

<**addr**> IP address of the remote TCP server ("xxx.xxx.xxx.xxx" or www.tcpserver.com"). Maximum 100 characters.

<**port**> Port number (1 to 65535).

Notes:

If a parameter is incorrectly entered, the parameters will not be automatically saved in flash memory.

2.16.2 AT+LOCTPT – TCP port number

Description:

This command allows to enter the value of the "**T**CP **P**or**T**".

Syntax:

AT+LOCTPT=<port>

Examples :

Command	Possible Responses	Notes
AT+LOCTPT=?	`+LOCTPT: (1-65535)` `OK`	*Display syntax*
AT+LOCTPT=1234	`OK`	*Set parameter*
AT+LOCTPT?	`+LOCTPT: 1234` `OK`	*Display current configuration*

Defined values:

<**port**> TCP/IP port number (1 to 65535).

2.16.3 AT+LOCTPH – Access path in TCP

Description:

This command allows to enter the access path to the remote site or the deposit command, "**T**CP **P**at**H**". In the case of an access to a HTTP site, it can be set as "GET /GPS=".

Syntax:

AT+LOCTPH=<"path">,<"aux"> (**T**cp**P**at**H**)

Examples :

Command	Possible Responses	Notes
AT+LOCTPH=?	`+LOCTPH: "\PATH=",(0-H)` `OK`	*Display syntax*
AT+LOCTPH="GET /GPS="	`OK`	*Set parameter*
AT+LOCTPH?	`+LOCTPH: "GET /GPS=",""` `OK`	*Display current configuration*
AT+LOCTPH=,0	`OK`	*Erase the parameter*

Defined values:

<**path**> Access path to remote site ("path"). Maximum 200 characters.

<**aux**> complementary parameter allowing:
to erase if equal to `"0"`,
or indicating a http frame if equal to `"H"`.

In the case of a TCP link to a HTTP site (port 80), it is necessary to use HTTP requests like "GET" or "POST". In this case, the GPS data must be integrated in the request. To make it easier, there are some parameters which allow to create a dynamic HTTP frame.

AT+LOCTPH="GET /mypath/test ?$GPLOC,%i,%s,%f,%t,%a,%o,%n,%p,%d HTTP/1.1\\r\\n Host: mysite.com\\r\\n\\r\\n","H"

This table shows the equivalence between the parameters use in the frame +LOCFRT.

"ID"	"ST"	"FX"	"TM"	"LT"	"LG"	"NS"	"HD"	"AL"	"CS"	"SK"	"GS"	"IP"	"CU"	"DT"
%i	%s	%f	%t	%a	%o	%n	%h	%l	%c	%k	%g	%p	%u	%d
				%y	%x									

"SN"	"OW"	"AA"	"AN"	"CG"	"IM"	"TP"	"LC"	"DI"
%k	%w	%m	%b	%e	%j	%z	%r	%v

Notes :

The reserved characters '\' and '%' as well as the **carriage-return** and **line-feed** characters may be added to the frame as follows:
To add the **carriage-return** character then it must be written as "**\\r**".
To add the **line-feed** character then it must be written as "**\\n**".
To add the '%' character then it must be written as "**%%**".
To add the '\' character then it must be written as "****".
To add the '"' character then it must be written as "*****".

The HTTP frame will be used only if the formats +LOCFRT=2 or 3 are used.
The parameters %a and %o implicate the addition of the coordinates E,W and N,S.
The parameters %y and %x convert data from the degrees-minutes format to decimal degrees. The positive value for y indicates the North and for x it indicates the East.
Be sure to use %a and %o or %y and %x otherwise %a and %o format will be assumed.
The command AT+LOCFRT with no parameters will display the current list being used.

Example for a frame type RMC
AT+LOCFRT returns :
$GPRMC,%t,%s,%a,%o,%k,%c,%d*

2.16.4 AT+LOCTAK – acknowledge string and return delay in TCP

Description:

This command allows to enter the value of the acknowledge string returned after having sent a data frame to the remote site, and to program the waiting time of this acknowledge.

Syntax:

AT+LOCTAK=<"string">[,<param>,<time>]

Examples :

Command	Possible Responses	Notes
AT+LOCTAK=?	`+LOCTAK: "Value for Ack",0-1,(Delay:0-65535)` `OK`	*Display syntax*
AT+LOCTAK=”OK”	`OK`	*The string OK validates the received frame with the default delay, otherwise the unit will re-send 5 times and then closes the TCP link*
AT+LOCTAK?	`+LOCTAK: "OK",1,200` `OK`	*Display current configuration*
AT+LOCTAK=”OK”,,100	`OK`	*The string OK validates the received frame with a waiting time of 10 seconds, otherwise the unit will re-send 5 times and then closes the TCP link*
AT+LOCTAK=,0	`OK`	*Erase the parameters*
AT+LOCTAK="",0	`OK`	*Erase the parameters*

Defined values:

<**string**> Acknowledge string (“string”). Maximum 50 characters.

<**param**> Parameter used to manage the <string> string.
0 : erase, the string must be empty.

<**time**> Waiting time in multiples of 100ms, default = 200 (20 seconds).

Notes:

The string validates the received frame with the specific waiting time. After this time, the unit will re-send 5 times and then closes the TCP link.

Acknowledge string is case sensitive.

2.17 FTP configuration

2.17.1 AT+LOCFSV – FTP Server name

Description:

This command will configure the IP addresses of the remote FTP servers used for application download and for the transfer of GPS positions.

Syntax:

AT+LOCFSV=<"addrDwl">,<"addrPut">

Examples :

Command	Possible Responses	Notes
AT+LOCFSV=?	`+LOCFSV: (100),(100)` `OK`	*Display syntax*
AT+LOCFSV="dwlServer","123.98.76.54"	`OK`	*Set parameters*
AT+LOCFSV?	`+LOCFSV: "dwlServer","123,98,76,54"` `OK`	*Display current configuration*
AT+LOCFSV=" ","123.98.76.54"	`OK`	*Erase the download parameter*
AT+LOCFSV?	`+LOCFSV: "","123,98,76,54"` `OK`	*Display current configuration*

Defined values:

<**addrDwl**> IP address of the download server (“xxx.xxx.xxx.xxx” or “www.ftpserver.com”). This server will be accessed when downloading the application upgrade file. Maximum 100 characters.

<**addrPut**> IP address of the position transfer server (“xxx.xxx.xxx.xxx” or “www.ftpserver.com”). This server will be accessed when transferring GPS positions via FTP (AT+LOCSND=3). Maximum 100 characters.

2.17.2 AT+LOCFUN – FTP User Name

Description:

This command will configure the usernames of the remote FTP servers used for application download and for the transfer of GPS positions.

Syntax:

AT+LOCFUN=<"userDwl"><"userPut">

Examples :

Command	Possible Responses	Notes
AT+LOCFUN=?	`+LOCFUN: (50),(50)` `OK`	*Display syntax*
AT+LOCFUN="userDwl","userPut"	`OK`	*Set parameters*
AT+LOCFUN?	`+LOCFUN: "userDwl","userPut"` `OK`	*Display current configuration*
AT+LOCFUN=" ","userPut"	`OK`	*Erase the download parameter*
AT+LOCFUN?	`+LOCFUN: "","userPut"` `OK`	*Display current configuration*

Defined values:

<**userDwl**> User name of the download server. Maximum 50 characters.

<**userPut**> User name of the position transfer server. Maximum 50 characters.

2.17.3 AT+LOCFPW – FTP password

Description:

This command will configure the passwords of the remote FTP servers used for application download and for the transfer of GPS positions.

Syntax:

AT+LOCFPW=<"passDwl">,<"passPut">

Examples :

Command	Possible Responses	Notes
AT+LOCFPW=?	`+LOCFPW: (50),(50)` `OK`	*Display syntax*
AT+LOCFPW="passDwl","passPut"	`OK`	*Set parameters*
AT+LOCFPW?	`+LOCFPW: "passDwl","passPut"` `OK`	*Display current configuration*
AT+LOCFPW="","passPut"	`OK`	*Erase the download parameter*
AT+LOCFPW?	`+LOCFPW: "","passPut"` `OK`	*Display current configuration*

Defined values:

<**PassDwl**> Password of the download server. Maximum 50 characters, case-sensitive.

<**PassPut**> User name of the position transfer server. Maximum 50 characters, case-sensitive.

2.17.4 AT+LOCFPT – FTP port number

Description:

This command will configure the ports of the remote FTP servers used for application download and for the transfer of GPS positions.

Syntax:

AT+LOCFPT=<portDwl>,<portPut>

Examples :

Command	Possible Responses	Notes
AT+LOCFPT=?	`+LOCFPT: (1-65535), (1-65535)` `OK`	*Display syntax*
AT+LOCFPT=1234	`OK`	*Set parameter*
AT+LOCFPT?	`+LOCFPT: 1234,21` `OK`	*Display current configuration*

Defined values:

<**portDwl**> Port of the download server, (1 to 65535). Default = 21.

<**portPut**> Port of the position transfer server (1 to 65535). Default = 21.

2.17.5 AT+LOCFMO – FTP mode

Description:

This command will configure the modes of the remote FTP servers used for application download and for the transfer of GPS positions.

Syntax:

AT+LOCFPT=<modeDwl>,<modePut>

Examples :

Command	Possible Responses	Notes
AT+LOCFMO=?	`+LOCFMO: (0-1),(0-1)` `OK`	*Display syntax*
AT+LOCFMO=1,1	`OK`	*Set parameters*
AT+LOCFMO?	`+LOCFMO: 1,1` `OK`	*Display current configuration*

Defined values:

<**modeDwl**> Mode of the download server (0 = Active, 1 Passive). Default = 1.

<**modePut**> Mode of the position transfer server (0 = Active, 1 Passive). Default = 1.

2.17.6 AT+LOCFPP – FTP put path

Description:

This command will configure the path on the remote FTP server used for the transfer of GPS positions.

Syntax:

AT+LOCFPP=<"pathPut">

Examples :

Command	Possible Responses	Notes
AT+LOCFPP=?	`+LOCFPP: (50)` `OK`	*Display syntax*
AT+LOCFPP="passPut"	`OK`	*Set parameters*
AT+LOCFPP?	`+LOCFPP: "passPut"` `OK`	*Display current configuration*
AT+LOCFPP="passPut"	`OK`	*Erase the parameter and restore default path*
AT+LOCFPW?	`+LOCFPP: "."` `OK`	*Display current configuration*

Defined values:

<**PassPut**> Path name of the position transfer server (default “.”). Maximum 50 characters.

Notes:

If the path is erased then the default path will be the server root directory (“.”).

2.17.7 AT+LOCFPF – FTP put filename

Description:

This command will configure the filename on the remote FTP server used for the transfer of GPS positions.

Syntax:

AT+LOCFPF=<"filenamePut">

Examples :

Command	Possible Responses	Notes
AT+LOCFPF=?	`+LOCFPP: (100)` `OK`	*Display syntax*
AT+LOCFPF="%D_%H.txt"	`OK`	*Set parameters*
AT+LOCFPF?	`+LOCFPP: "%D_%H.log"` `OK`	*Display current configuration*
AT+LOCFPF="passPut"	`OK`	*Erase the parameter and restore default filename*
AT+LOCFPF?	`+LOCFPP: "%I_%D_%H.txt"` `OK`	*Display current configuration*

Defined values:

< **filenamePut** > Filename of the position transfer server (default "%I_%d_%h.txt"). Maximum 100 characters.

Notes:

If the path is erased then the default filename will be ("%I_%D_%H.txt").

The value “%I” will add the unit’s identifier to the filename.
The value “%D” will add the first valid date of the data transmitted to the filename.
The value “%H” will add the first valid hour of the data transmitted to the filename.
The value “.txt” will add “.txt” to transmitted in the filename.

Example, the name “**%I_%D_%H.txt**” will create for the following GPS frame :

$GPRMC,164432.00,A,4716.81710,N,00003.50147,W,0.112,0.00,041208,,,A*78

The filename : **354475000000394_041208_164432.txt**

The content of the file will be:
$GPRMC,164432.00,A,4716.81710,N,00003.50147,W,0.112,0.00,041208,,,A*78

Each file created on the server will have a maximum size of about 10k bytes. The index is updated after successful transfer of the file to the server.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.17.8 AT+LOCFTPSIZE – FTP send file maximum size

Description:

This command will configure the maximum size of the file used and for the transfer of frames via FTP.

Syntax:

AT+LOCFTPSIZE=<size>

Examples :

Command	Possible Responses	Notes
AT+LOCFTPSIZE=?	`+LOCTPSIZE: (500-100000)` `OK`	*Display syntax*
AT+LOCTPSIZE=50000	`OK`	*Set parameter*
AT+LOCTPSIZE?	`+LOCTPSIZE: 50000` `OK`	*Display current configuration*

Defined values:

<**size**> Maximum size of file for transfer of frames (500 to 100000). Default = 10000.

2.18 EMAIL configuration

2.18.1 AT+EGSMTPPT– SMTP port number

Description:
This command allows to enter the value of the “**SMTP P**or**T**“.

Syntax:
AT+EGSMTPPT=<port>

Examples :

Command	Possible Responses	Notes
AT+EGSMTP=25	OK	*Set parameter*
AT+EGSMTP?	+EGSMTP: "1234" OK	*Display current configuration*

Defined values:
<**port**> SMTP port number (1 to 65535). Default = 25.

2.18.2 AT+EGSMTPHN – SMTP Host name

Description:
This command allows to enter the name of the SMTP server (URL) address “**SMTP Host N**ame”.

Syntax:
AT+EGSMTPHN=<"name">

Examples :

Command	Possible Responses	Notes
AT+EGSMTPHN="smtp.ercogener.com”	OK	*Set parameter*
AT+EGSMTPHN?	+EGSMTPHN: "smtp.ercogener.com" OK	*Display current configuration*

Defined values:
<**name**> URL of the SMTP server. Maximum 120 characters.

2.18.3 AT+EGSMTPUN – SMTP user name

Description:
This command allows to enter the “**U**ser**N**ame” of the SMTP server.

Syntax:
AT+EGSMTPUN=<"UserName">

Examples :

Command	Possible Responses	Notes
AT+EGSMTPUN="user"	OK	*Set parameter*
AT+EGSMTPUN?	+EGSMTPUN: "user" OK	*Display current configuration*

Defined values:
<**UserName**> User name of the SMTP server. Maximum 64 characters.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.18.4 AT+EGSMTPPW – SMTP password

Description:

This command allows to enter the "**SMTP P**ass**W**ord".

Syntax:

AT+EGSMTPPW=<"PassWord">

Examples :

Command	Possible Responses	Notes
AT+EGSMTPPW="pass"	OK	*Set parameter*
AT+EGSMTPPW?	+EGSMTPPW: "pass" OK	*Display current configuration*

Defined values:

<**PassWord**> SMTP server password. Maximum 64 characters. Password is case-sensitive.

2.18.5 AT+EGSMTPSN – SMTP email sender name

Description:

This command allows to enter the "**S**ender**N**ame" of the email using SMTP server. This parameter will appear in the 'From:' field in the header of the received email.

Syntax:

AT+EGSMTPSN=<"SenderName">

Examples :

Command	Possible Responses	Notes
AT+EGSMTPSN="sender"	OK	*Set parameter*
AT+EGSMTPSN?	+EGSMTPSN: "sender" OK	*Display current configuration*

Defined values:

<**SenderName**> Sender name of the email using SMTP server. Maximum 120 characters. By default, IMEI's modem.

2.18.6 AT+EGSMTPSE – SMTP email sender address

Description:

This command allows to enter the "**E**mailAddressof**S**ender" of the email using SMTP server.

Syntax:

AT+EGSMTPSE=<"SenderEmailAddress">

Examples :

Command	Possible Responses	Notes
AT+EGSMTPSE="senderemailaddress@myprovider.com"	OK	*Set parameter*
AT+EGSMTPSE?	+EGSMTPSE: "senderemailaddress@myprovider.com" OK	*Display current configuration*

Defined values:

<**SenderEmailAddress**> Sender email address using SMTP server. Maximum 120 characters.

2.18.7 AT+EGMAIL – Recipient email address

Description:

This command allows to enter the "**E**mailAddressof**R**ecipient" of the email using SMTP server.

Syntax:

AT+EGMAIL=<"RecipientEmailAddress">

Examples :

Command	Possible Responses	Notes
AT+EGMAIL="recipientemailaddress@hisprovider.com"	OK	*Set parameter*
AT+EGMAIL?	+EGMAIL: "recipientemailaddress@hisprovider.com" OK	*Display current configuration*

Defined values:

<**RecipientEmailAddress**> Recipient email address using SMTP server. Maximum 120 characters. Friendly names may be specified: "**Bob <robert.noname.hisaddress.com**>". Ensure a space between the friendly name and the '<' character. Multiple recipients may be specified each separated by '**;**'.

2.18.8 AT+EGSUBJ – Email subject

Description:

This command allows to enter the value of the "**SUBJ**ect" of the email .

Syntax:

AT+EGSUBJ=<"Subject">

Examples :

Command	Possible Responses	Notes
AT+EGSUBJ?	+EGSUBJ: "%I_%D_%H" OK	*Display syntax*
AT+EGSUBJ="myGPSframes"	OK	*Set parameter*
AT+EGSUBJ?	+EGSUBJ: "myGPSframes" OK	*Display current configuration*

Defined values:

<**Subject**> Subject of the email. Maximum 120 characters.

Notes:

The value "%I" will add the unit's identifier to the email subject.
The value "%D" will add the first valid date of the data transmitted to the email subject.
The value "%H" will add the first valid hour of the data transmitted to the email subject.
The value ".txt" will add ".txt" to transmitted to the email subject.

Example, the name "**%I_%D_%H**" will create for the following GPS frame :

$GPRMC,164432.00,A,4716.81710,N,00003.50147,W,0.112,0.00,041208,,,A*78

The subject : **354475000000394_041208_164432**

The content of email will be:

$GPRMC,164432.00,A,4716.81710,N,00003.50147,W,0.112,0.00,041208,,,A*78

Each email will have a maximum size of about 10k bytes. The index is updated after successful transfer of the file to the server.

2.18.9 AT+EGSMTPSIZE – SMTP send file maximum size

Description:

This command will configure the maximum size of the file used and for the transfer of frames via SMTP.

Syntax:

AT+EGSMTPSIZE=<size>

Examples :

Command	Possible Responses	Notes
AT+EGSMTPSIZE=?	`+EGSMTPSIZE: (500-100000)` `OK`	*Display syntax*
AT+EGSMTPSIZE=50000	`OK`	*Set parameter*
AT+EGSMTPSIZE?	`+EGSMTPSIZE: 50000` `OK`	*Display current configuration*

Defined values:

<**size**> Maximum size of file for transfer of frames (500 to 100000). Default = 10000.

2.19 GPRS Operation

2.19.1 TCP/UDP mode

In this mode (AT+LOCSND=2/4,,,0 for TCP or AT+LOCSND=2/4,,,1 for UDP), the system opens a GPRS connection. After having checked that there is data to be sent, the application operates according to the following modes:

1) No wait for returned acknowledge:
   - In this case, a TCP/UDP link is opened as specified by the interval or fixed time, and the system sends the frames one after another. If link errors are detected, the connection is closed, and re-opened.

2) Wait for returned acknowledge:
   - The TCP/UDP link is opened as specified by the interval or fixed time. Acknowledge wait timeout is initialized (20 seconds by default).
   - If a correct acknowledge is received, the system prepares to send a new frame.
   - If an incorrect acknowledge is received, the frame is re-sent up to 10 times. The link is then closed and the system reconnects.
   - If the wait timeout is reached, the frame is re-sent up to 5 times. The link is then closed and the system reconnects.

In mode 4, **(AT+LOCSND=4**) a link is also established with the serial port of the device. When a TCP/UDP link is opened, data from the serial port or the TCP/UDP server is transferred through the device towards the destination link - from the serial port to the TCP/UDP server or from the TCP/UDP server to the serial port. This allows the use an independent device on the serial port and to benefit from the TCP/UDP link.

2.19.2 FTP mode

In this mode (AT+LOCSND=3) the application opens a GPRS connection. After having detected that data is to be sent, it operates according to the following mode :

- Depending on the transmission interval or fixed time requested, the device opens an FTP link, creates a file on the remote site according to the parameters requested and sends the GPS frames in the selected format.
- After transmission, the FTP link is closed but the GPRS link remains open. In case of error, the frames that were not sent will be sent during the next file transfer.
- Each file created on the server will have a maximum size of about 10k bytes, i.e. if many frames are to be sent then they will be sent in files of up to 10k bytes of complete frames. The index is updated after each successful file transfer to the server.
- After all file transfers have finished, the unit will disconnect from the network

2.19.3 EMAIL mode

In this mode (AT+LOCSND=5) the application opens a GPRS connection. After having detected that data is to be sent, it operates according to the following mode :

- Depending on the transmission interval requested or fixed time, the device creates an email which contains all the GPS frames in the selected format. The header of the message and the sender name are the ones defined by the settings **(+ EGSMTPSN, +EGSUBJ**).
- Each email will have a maximum size of about 10k bytes, i.e. if many frames are to be sent then they will be sent in emails of up to 10k bytes of complete frames. The index is updated after each successful transmission of the email.
- After the transmission, the GPRS link remains open. In case of error, the frames that are not sent will be sent during the next transfer within the next email.
- After all emails have been sent, the unit will disconnect from the network.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.20 Management of the PIN code

2.20.1 AT+CPIN – Entering a PIN code

The PIN code is essential to make a call or to accept a response coming from the GSM network.
This code is held on the SIM card, and it can be changed by the user.

ATTENTION !	The user has only **3 attempts** to enter the PIN code. After these 3 attempts, only the **PUK** code supplied by the operator will allow to choose a new PIN code. (See chapter ***AT+CPWD – Changing the PIN code***.)

Example (PIN code = 1234) :

- Enter the PIN code :
  AT+CPIN="1234"

- Control the PIN code :
  AT+CPIN?

  The modem replies :
  +CPIN: READY (PIN code correct)
  +CPIN: SIM PIN (PIN code incorrect or not entered yet)
  +CPIN: SIM PUK (PUK code requested)

2.20.2 AT+CLCK – Locking the PIN code

To avoid entering systematically the PIN code of the SIM card at each power-up, a command allows to lock the request.

ATTENTION !	The card will be unlocked and usable on any other GSM terminal. To protect the use, see the command ***AT+CPIN – Entering a PIN code*** . Pin code must be entered in quotation marks : **"xxxx"**

Example (PIN code = 1234) :

- Enter the PIN code:
  AT+CPIN="1234"

- Control the PIN code :
  AT+CPIN?

  The modem replies :
  +CPIN: READY (PIN code correct)

- Lock the PIN code ('SC' must be entered in capital letters):
  AT+CLCK="SC",0,"1234" (the digit 0 means locked)

  The modem replies :
  OK (the PIN code is correctly locked)
  or
  ERROR (wait 2 minutes and send again the command (a certain time is needed before the initialization of the SIM card)

At the next power-up, the modem will accept any outgoing or incoming call. To re-activate the PIN code request at each power-up, enter the command:

AT+CLCK="SC",1,"1234"

2.20.3 AT+CPWD – Changing the PIN code

Description:

The PIN code may be changed by the user, only if the current PIN code is known.

Syntax:

AT+CPWD=<"SC">,<old>,<new>

Example (current PIN code = 1234, new PIN code = 4321) :

AT+CPWD="SC","1234","4321"

Notes:

The request for the PIN code must be active. See command **AT+CLCK="SC",1,"1234"**

2.21 TRACE mode

2.21.1 AT+LOCTRC – Activate the trace

Description:

It is possible to activate the trace mode which allows to follow the functioning operation on the serial port. By default, all the traces are active.

Syntax:

AT+LOCTRC=<level>

Examples :

Command	Possible Responses	Notes
AT+LOCTRC=?	`+LOCTRC: (0-255)` `OK`	*Display syntax*
AT+LOCTRC=17	`OK`	*Validate the traces **DISPLAY_GPRS** (level **16**) and **DISPLAY_GENERAL** (level **1**)*
AT+LOCTRC?	`TRACE : GENERAL ON, WIND OFF, GPS OFF, GSM OFF, GPRS ON, DATA OFF, DOWNLOAD OFF` `OK`	*Display current configuration*
AT+LOCTRC	`All Traces State inversed` `OK`	*Inverse all trace levels*
AT+LOCTRC?	`TRACE : GENERAL OFF, WIND ON, GPS ON, GSM ON, GPRS OFF, DATA ON, DOWNLOAD ON` `OK`	*Display current configuration*

Defined values:

<**level**> Trace level (see notes).

Notes:

The following trace levels are available :

- **1** : **DISPLAY_GENERAL**, send the message “READY” when starting the application.
- **2** : **DISPLAY_WIND**, send information concerning the SIM card and the attachment to network.
- **4** : **DISPLAY_GPS**, send the GPS frames in active logging mode.
- **8** : **DISPLAY_GSM**, send info about attachment to GSM network.
- **16** : **DISPLAY_GPRS**, send info about attachment to GPRS network and transfer in TCP and FTP.
- **32** : **DISPLAY_DATA**, send info about attachment to network and transfer in connection DATA GSM.
- **64** : **DISPLAY_DOWNLOAD**, send info about application updating in DOTA mode (Download Over The Air).

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

The command **AT+LOCTRC** with no parameters allows to inverse all the traces. The following report is returned : “All Traces State inversed”. See examples bellow. The action of this command is not saved in flash. The value by default will be reloaded at the next powering-on.

2.22 Miscellaneous

2.22.1 Time

When the system receives a valid GPS frame, it extracts the time information and set the internal system clock.
Alternatively, the internal system clock may be set from the SNTP information (refer to the AT+LOCNTP command).

2.22.2 Re-initialization

If after various manipulations the unit does not perform as expected, it is possible to completely re-initialize the memory with the factory parameters.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.23 SNTP Date/Time

The GSM and system real-time-clocks maybe set to the network date/time via the SNTP service. This may be done manually or automatically at a regular time interval.

2.23.1 AT+LOCNTP – SNTP configuration

Description:

This command will configure the SNTP service.

Syntax:

AT+LOCNTP=<option>,<t>,<s>
AT+LOCNTP=<option>,<server>,<port>
AT+LOCNTP=<option>,<timeout>

Examples:

Command	Possible Responses	Notes
AT+LOCNTP=?	+LOCNTP: (0-4),(0-200)/(64),(0-1)/(1-65535) OK	*Display syntax*
AT+LOCNTP?	+LOCNTP: 0,0,0 +LOCNTP: 1,"europe.pool.ntp.org",123 +LOCNTP: 2,15 OK	*Display current configuration*
AT+LOCNTP=0,24	OK	*Set auto-update configuration*
AT+LOCNTP=0	+LOCNTP: 0,24,0 OK	*Display auto-update configuration*
AT+LOCNTP=4	00:01:38 SNTP: starting connection to network OK 00:01:50 SNTP: Waiting for data 00:01:50 SNTP: UTC date and time: 11/02/16,16:00:58 00:01:50 SNTP: System time has been set 00:01:50 SNTP: Socket closed 00:01:51 SNTP: GSM RTC has been set	*Start manual update*
AT+LOCNTP=3	+LOCNTP: 3,11/01/07,13:46:43 OK	*Display current system time*

Defined values:

<**option**>

0: Display, modify auto-update configuration.
=0 - display current configuration.
=0,<t> - set auto-update rate, 0 to 720 hours, (default = 0, inactive).
=0,<t>,<s> - set auto-update rate, 0 to 720 hours, (default = 0, inactive).
- set auto-update at start-up, 0 = inactive (default), 1 = active.

1: Display, modify SNTP server configuration.
=1 - display current configuration.
=1,<"server"> - set server address (default = "europe.pool.ntp.org").
=1,<"server">,<port>
- set server address (default = "europe.pool.ntp.org").
- set server port (default = 123).

2: Display, modify SNTP response timeout configuration.
=2 - display current configuration.
=2,<timeout > - set SNTP response timeout, 1 to 60 seconds (default = 15).

3: Display system time.
=3 - display current system time.

4: Get SNTP date/time time manually.
=4 - Get SNTP date/time time and set GSM and system real-time-clocks.

80: Set SNTP server configuration to default values.
=80 - Set SNTP server configuration to default values.
- set server address (default = “europe.pool.ntp.org”).
- set server port (default = 123).

81: Set auto-update configuration to default values.
=81 - Set auto-update rate to default value.
- Set auto-update at start-up to default value.

Notes:

The SNTP server uses IP/UDP via port 123. This should NOT be changed.
This current system time is NOT modified by the +LOCUTC offset.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.24 DUAL SIM

On units where two SIM holders are present, the user may configure the changeover between the two SIMs. When activated, the function monitors:

- GSM/GPRS network registration,
- CSQ level,
- detected networks.

2.24.1 AT+EGDSIM – DUAL SIM configuration

Description:

This command will configure the Dual SIM service.

Syntax:

AT+EGDSIM=<mode>,<defsim>,<op1>,<tim1>,<csq>,<op2>,<tim2>

Examples:

Command	Possible Responses	Notes
AT+EGDSIM=?	`+EGDSIM: (0-3),(1-2),(5),(0-600),(0-31),(5),(10-600)` `OK`	*Display syntax*
AT+EGDSIM?	`+EGDSIM: 0,0,0,60,10,0,600` `OK`	*Display current configuration*
AT+EGDSIM=3	`+EGDSIM: 3,1,1` `OK`	*Show available SIMs. Here both SIMs are present.*
AT+EGDSIM=1,1,20820,45,10,20801,45	`OK`	*Enable Dual SIM mode. Set SIM 1 as preferred SIM. Set CSQ threshold, operator preferences and timeouts.*
AT+EGDSIM=2	`+EGDSIM: 2,1,12,Registered` `OK`	*Display current SIM used, CSQ and registration status.*

Defined values:

<**mode**>

0: Disabled (default).

1: Enabled (all other parameters must be correct).

2: Show current SIM being used, CSQ level and Dual-SIM registration status (**mode** must already be enabled).

Response: **+EGDSIM: 2,<SIM>,<CSQ>,<Registration state>**

SIM

Current SIM, 1 or 2

CSQ

Level, 0 to 31, 99

Registration state

"Registered" or "Unregistered"

3: Show available SIMs.

Response: **+EGDSIM: 3,<Sim1>,<Sim2>**

Sim1 and **Sim2**

0: absent

1: present

<**defsim**>
Select preferred SIM.
1: SIM 1 (default)
2: SIM 2.

<**op1**>
Expected operator for SIM 1 (numerical international operator code), default = 0 (Roaming).

<**tim1**>
Timeout before returning to SIM 2 (0 to 600 secs) (default 60 secs).

<**csq**>
Minimum CSQ threshold level (0 to 31) (default 10).

<**op2**>
Expected operator for SIM 2 (numerical international operator codes), default = 0 (Roaming).

<**tim2**>
Timeout before returning to SIM 1 (0 to 600 secs) (default 600 secs).

Notes:

This command will return “ERROR” if not running on a GenLoc5xe.

The numerical international operator codes may be found here:
http://www.gsm-security.net/gsm-operator-codes.shtml
http://www.activexperts.com/xmstoolkit/networkcodes/

When operating on the preferred SIM, if the network has been lost or the CSQ is below the threshold level for the time **timN** then the operation will be changed to use the secondary SIM.

An attempt will be made to return to the preferred SIM after time **timN** regardless of network status and CSQ level.

Before changing SIM, if a specific operator has been specified for the next SIM then a check will be made to determine if this operator is present before changing. If not present then the SIM will not be changed.

However, if no specific operator has been specified for the next SIM (“0”, Roaming), then operation will always be changed to the next SIM.

Refer to the Dual SIM flow chart in annex **Erreur ! Source du renvoi introuvable.** for operation details.

Examples:

AT+EGDSIM=1,1,20820,90,10,0,300

SIM 1 is the preferred SIM with operator “20820”. Loss of network timeout is 90 seconds.
SIM 2 is the secondary SIM operating in Roaming mode. Timeout to return to preferred SIM 1 is 300 seconds. CSQ threshold level is 10.

Operation will start with SIM 1. If the network has been lost or CSQ has been low for at least 90 seconds, the unit will change over to the secondary SIM 2 and operate in the Roaming mode for a maximum of 300 seconds.

After 300 seconds the unit will check the presence of operator “20820” and if present will change back to the preferred SIM 1.

If whilst operating on the secondary SIM 2, the network has been lost or CSQ has been low for at least 90 seconds, the unit will change back to the preferred SIM 1.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.25 Extended UARTs

Two extra UARTs are available on the GenLoc 5xe units only.
The first extended UART will output received GPS data. The second extended UART may be used to transfer data with a remote TCP server.

2.25.1 AT+LOCXRT – Extended UARTs configuration

Description:
This command will configure the extended UARTs.

Syntax:
AT+LOCXRT=<n>,<mode>,<baud>,< parity >,<data bits>,<stop bits>

Examples:

Command	Possible Responses	Notes
AT+LOCXRT=?	`+LOCXRT: (0-1),(0-1),(baud),(parity),(Data bits),(stop bits)` `OK`	*Display syntax*

AT+LOCXRT?	`+LOCXRT: 0,1,9600,"N",8,1`
	`+LOCXRT: 1,0,115200,"N",8,1`
	`OK`
		Display current configuration for all UARTs.

AT+ LOCXRT=1	`+LOCXRT: 1,0,115200,"N",8,1` `OK`	*Show current configuration for one UART only.*
AT+ LOCXRT=1,1	`OK`	*Set configuration for one UART.*
AT+ LOCXRT=1	`+LOCXRT: 1,1,115200,"N",8,1` `OK`	*Show current configuration for one UART only.*

Defined values:

<**n**>
Extended UART (0 to 1).
0: Received GPS data will be send from this UART.
1: User UART.

<**mode**>
Extended UART activation (by default UART 0 is enabled and UART 1 is disabled).
0: Disabled.
1: Enabled.

<**baud**>
Baud rates.
Available values: 300, 600, 1200, 2400, 4800, 9600, 10400, 14400, 19200, 38400, 57600, 115200.

<**parity**>
Parity. Available values: “N”, “E”, “O”, “1”, “0”.

<**data bits**>
Data bits. Available values: 5, 6, 7, 8.

<**stop bits**>
Stop bits. Available values: “1”, “1,5”, “1”.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

Notes:

Default values:

+LOCXRT:0,1,9600,"N",8,1
+LOCXRT:1,0,19200,"N",8,1

UART 0 is enabled by default at 9600 baud and will output received GPS data.
UART 1 is disabled by default at 19200 baud.

When UART 1 is enabled and +LOCSND=2, then UART 1 may be used to transfer data with a remote TCP server.

When UART 1 is enabled and +LOCSND=2, then frame acknowledge and remote configuration will NOT be operational.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.26 Accelerometer configuration

These commands will configure the detection of movement and shock. Note that both movement and shock may be enabled simultaneously.
If not using a GenLoc 5xe or if the accelerometer is not present then these commands will return “ERROR”.

2.26.1 AT+EGMOVE – Movement detection

Description

This command will configure the movement detection parameters. When enabled a frame will be recorded when movement starts and when movement stops.

Syntax :

AT+EGMOVE=<mode>[,<ctrMode>,<threshold>,<integTime>,<timeMove>,<timeStop>,<savePos>,<s>]

Command	Possible Responses
AT+EGMOVE=?	`+EGMOVE: (0-1),(0-1),(1-127),(1-255),(1-4095),(1-4095),(0-1),(0-1)` OK *Note: Display syntax.*
AT+EGMOVE?	`+EGMOVE: 0,1,3,50,2,5,0,0` OK *Note: Display current value.*
AT+EGMOVE=1	OK *Note: Enable with current parameters.*
AT+EGMOVE=1,1,3,50,2,180	OK *Note: Enable movement detection with new parameters.*
AT+EGMOVE?	`+EGMOVE: 1,1,3,50,2,180,0,0` OK *Note: Display current value.*

Defined values :

<**mode**>
0: Disabled (default).
1: Enabled.

<**ctrMode**>
0: Reset counter if movement stops.
1: Decrement counter if movement stops (default). This is recommended for movement detection.

<**threshold**>
Free-fall / wake-up Threshold (1 to 127, default = 3). Each step = 18 mg (* see table below).

<**integTime**>
Integration time (1 to 255, default = 50). Each step = 10 ms.

<**timeMove**>
Time for valid movement start detection (1 to 4095 seconds, default = 2 seconds).

<**timeStop**>
Time for valid movement stop detection (1 to 4095 seconds, default = 5 seconds).

<**savePos**>
0: Disabled (default).

1: Enabled. In +LOCSTK=2 mode only, permanent logging when movement is active and detected.

<s>

0: (default) all positions are recorded.
1: positions are recorded only when the conditions specified in +LOCSTK are met.

Notes:

The following parameters are suitable for detection of vehicle movement:

AT+EGMOVE=1,1,3,50,2,180,0.

The AT+LOCSPD=<**n**> parameter, if non-zero, will be used to avoid detecting false MOVEMENT STOP events when moving at a constant high speed.

2.26.2 AT+EGSHOCK – Shock detection

Description :

This command will configure the shock detection parameters. When enabled a frame will be recorded when a shock is detected.

Syntax :

AT+EGSHOCK=<mode>[,<ctrMode>,<threshold>,<integTime>,<s>]

Command	Possible Responses
AT+EGSHOCK=?	`+EGSHOCK:(0-1),(0-1),(0-127),(0-255)` OK *Note: Display syntax.*
AT+ EGSHOCK?	`+EGSHOCK:0,0,56,1` OK *Note: Display current value.*
AT+ EGSHOCK=1	OK *Note: Enable with current parameters.*
AT+ EGSHOCK=1,0,58,1	OK *Note: Enable shock detection with new parameters.*
AT+ EGSHOCK?	`+EGSHOCK:1,0,58,1` OK *Note: Display current value.*

Defined values :

<**mode**>

0: Disabled (default).
1: Enabled.

<**ctrMode**>

0: Reset counter if movement stops (default). This is recommended for shock detection.
1: Decrement counter if movement stops.

<**threshold**>

Free-fall / wake-up Threshold (1 to 127, default = 56). Each step = 72 mg (* see table below).

<**integTime**>

Integration time (1 to 255, default = 1). Each step = 10 ms.

<**s**>

0: : (default) all positions are recorded.
1: positions are recorded only when the conditions specified in +LOCSTK are met.

Notes:

The accelerometer is guaranteed up to a maximum of 8000mg (threshold = 111).

* The table below indicates the accelerometer full-scale and step-size depending on the use of movement and shock detection.

MOVEMENT	SHOCK	Accelerometer Full-scale / step size
Disabled	Disabled	8g / 72mg
Disabled	Enabled	8g / 72mg
Enabled	Disabled	2g / 18mg
Enabled	Enabled	2g / 18mg

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.27 Geo-fencing configuration

2.27.1 AT+EGGEOF – Geo-fencing configuration

This command will allow the geo-fencing operating mode and zones to be configured. The coordinates of each zone may be entered in either “NMEA” format or in “DMS” format (Degrees Minutes Seconds).

Syntax :

AT+EGGEOF=<function>[,<operation>]

Command	Possible Responses

AT+EGGEOF=?	`+EGGEOF(0-6),(0-30,NMEA-DMS),(ref)`
	
	`OK`
	Note: Display syntax.

AT+EGGEOF=0,5	`OK` *Note: Set operating mode to log all positions.*

AT+EGGEOF=0	`+EGGEOF:0,5`
	
	`OK`
	Note: Display current value.

AT+EGGEOF=2,0,"DMS”,47,16,50,2,"N",0,3,30,56,"W",500,”m”	`OK` *Note: Set zone 0 reference position in DMS format 500 meter radius.*

AT+EGGEOF=1,0	`+EGGEOF:1,0,"4716.83367","N","00003.50933","W",500,"M"`
	
	`OK`
	Note: Display parameters for zone 0 (always in NMEA format).

AT+EGGEOF=6,0,”My zone 0”	`OK` *Note: Set text description for zone 0.*

AT+EGGEOF=1,0	`+EGGEOF:1,0,"4716.83367","N","00003.50933","W",500,"M","My zone 0"`
	
	`OK`
	Note: Display parameters for zone 0 (always in NMEA format).

Defined values:

<**function**>

0: Display or modify geo-fencing operation.

=0 - Display current operating mode.
=0,0 - Geo-fencing disabled (default).
=0,1 - Log zone exits only.
=0,2 - Log zone entries only.
=0,3 - Log zone exits and entries only.
=0,4 - Log all positions after first exit zone. (This will condition cyclic memorisation of positions with +LOCSTK.)
=0,5 - Log all positions.

1: Display geo-fencing zones.

=1,30 - Display all zones (30 = maximum number of zones).
=1,n - Display zone n only (n = 0 to 29).
=1 - Display all used zones only.

2: Set geo-fencing position coordinates for zone n.

=2,n,format,position,distance,“units” - set the geo-fencing parameters :

<**n**>

Geo-fencing zone (n = 0 to 29).

<**format**>
Reference position coordinates format.
"NMEA": Specify NMEA format.
"DMS": Specify DMS format.

<**position**>
Geo-fencing zone position coordinates.
NMEA format : "DDMM.mmmmm","N/S","DDDMM.mmmmm","E/W"
DMS format : DD,MM,SS,ss,"N/S",DDD,MM,S,ss,"E/W"

Where:
DD or DDD = degrees,
MM = Minutes,
mmmmm = decimal minutes
SS = seconds,
ss = decimal seconds.

<**distance**>
Geo-fencing zone radius (1 to 10000), default = 100.

<**units**>
Geo-fencing zone radius units.
"M" = metres
"K" = kilometres
"S" = miles
"N" = nautical miles.

3: Clear one or all geo-fencing zones.
=3,n,"CLEAR" - clear geo-fencing zone n (n = 0 to 29).
=3,"CLEAR" - clear all geo-fencing zones.

4: Display or modify hysteresis for all geo-fencing zones.
=4 - Display current hysteresis value.
=4,val - Set hysteresis value (val = 5 to 1000), default = 20.

5: Display or modify SMS operation.
=5 - Display current operating mode.
=5,0 - Send SMS disabled (default).
=5,1 - Send SMS on zone exit only.
=5,2 - Send SMS on zone entry only.
=5,3 - Send SMS on zone exit or entry.

6: Display or modify geo-fencing zone description.
=6,n - Display description for zone n (n = 0 to 29).
=6,n,"text" - Enter short text description for zone n (20 characters maximum).

Notes:

This command will return "ERROR" if running on a GenPro.

Displayed geo-fencing zone positions will be in NMEA format.

A zone is "used" when its position and distance information has been configured.

Hysteresis checking will use the same units as specified for the zone currently being checked.

The SMSs will be sent in the format specified by the command AT+LOCFRT and the AT+LOCPHN telephone number options.
The destination telephone number and options must be entered with the command AT+LOCPHN.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

Clearing or entering a new reference position will reset the internal geo-fencing status.

If configuring multiple zones, they need not be grouped from 0 to n. For example, setting zones 0, 3, 9, 10, 21 is allowed as only valid zones are checked.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.28 Eco-Drive configuration

These commands will configure the Eco-Drive function. This function uses the received GPS data to determine vehicle driving performance.
Note that the library key must be entered with the command AT+EGLIBKEY to be able to unlock this function. The library key is automatically saved in the flash memory. It must be re-entered if the flash objects are erased.
Please refer to chapter **4.1 AT+EGLIBKEY – Special library key** for a complete description of this command.

WARNING: The results information and events provided by the Eco-Drive function is purely statistical and is based on the quality of the received GPS data. It must not be used in any legal procedure.

2.28.1 AT+EGEDSTK – Logging results information

Description

This command will configure the activation of logging of the Eco-Drive results information. This information is generated from the analysis of the GPS information.

Syntax :
AT+EGEDSTK=<mode>[,<rate>,<noSupply>,<overLimitWarning>,<activateIndicator>,<resetResults>]

Command	Possible Responses
AT+EGEDSTK=?	`+EGEDSTK: (0-2,9),"HHMMSS",(0-1) ,(0-1),(0-1),(0-7)` OK *Note: Display syntax.*
AT+EGEDSTK?	`+EGEDSTK: 0,"00:10:00",0,0,0,0` OK *Note: Display current value.*
AT+EGEDSTK=1	OK *Note: Enable with current parameters.*
AT+EGEDSTK=1,"0015",1,1	OK *Note: Enable with new parameters.*
AT+EGEDSTK?	`+EGEDSTK: 1,"00:15:00",1,1,0,0` OK *Note: Display current value.*
AT+EGEDSTK	OK *Note: Manual record results.*

Defined values :

<mode>

This must be enabled to allow cyclic recording of results and events.

0: Disabled (default).
1: Enabled – permanent cyclic logging **and** at each change of status on the digital inputs (*).
2: Enabled – permanent cyclic logging **if** one of the digital inputs is activated **and** at each change of status on the digital inputs (*).
9: Reset Eco-Drive results (does not modify recording mode).

(*****) **if** parameter "IP" requested with the custom frame format (AT+LOCFRT=2,…).

<rate>

Results acquisition interval. Format "HHMMSS", default = "00:10:00" (10 minutes). Interval max = "24:00:00", i.e. 24 hours). This value may be set to "00:00:00" if cyclic recording of results is not required.

<**noSupply**>

This option will stop recording of results if the external supply is absent. This may be used to save memory space.

0: Disabled (default).
1: Enabled.

< **overLimitWarning** >

This option will cause a warning to be activated if an over-limit excess is detected. This warning will be a buzzer when either a **braking**, **acceleration** or **turning** over-limit excess event is detected.

0: Disabled (default).
1: Enabled.

< **activateIndicator** >

If the Eco-Drive function is enabled and active then this option will cause the output S1 to be activated when Eco-Drive evaluation is possible and deactivated when Eco-Drive evaluation is not possible.

0: Disabled (default).
1: Enabled. This overrides any other functions using S1 (such as AT+LOCIOW and AT+LOCOUT).

<**resetResults**>

This bit-map option provides different methods to automatically reset the Eco-Drive results.
b0: 0 = no reset, 1 = reset at start-up.
b1: 0 = no reset, 1 = reset if APC input is becomes active (save frame then reset).
b2: 0 = no reset, 1 = reset after each cyclic AT+EGEDSTK (save frame then reset).
Default value is 0 (all bits = 0).

Notes:

The results are saved to flash memory every second and at each new event and are restored at the start of the application if the Eco-Drive function is enabled and AT+EGEDSTK=1 and **resetResults** b0=0.

The option AT+EGEDSTK=9 will manually reset the results to zero.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.28.2 AT+EGEDGPS – GPS precision limits

Description

This command will configure the GPS precision limits for the calculation of the Eco-Drive results information. This sets the minimum GPS accuracy that the Eco-Drive library must use. When the GPS precision is below this level, the library cannot evaluate the driver attitude.

Syntax :

AT+EGEDGPS=<sats>[,<hdop>,<vdop>,<pdop>]

Command	Possible Responses
AT+EGEDGPS=?	`+EGEDGPS: (3-10),(1-10),(1-10),(1-10)` OK *Note: Display syntax.*
AT+EGEDGPS?	`+EGEDGPS: 5,3,4,5` OK *Note: Display current value.*
AT+EGEDGPS=4	OK *Note: Set new parameters.*
AT+EGEDGPS?	`+EGEDGPS: 4,3,4,5` OK *Note: Display current value.*

Defined values :

<**sats**>

Specify the minimum number of satellites required for the calculation of the results (default = 5).

<**hdop**>

Specify the **Horizontal Dilution Of Precision** (measure of accuracy in 2-D position, longitude and latitude) limit required for the calculation of the results (default = 3)

<**vdop**>

Specify the **Vertical Dilution Of Precision** (measure of accuracy in 1-D position, height) limit required for the calculation of the results (default = 4).

<**pdop**>

Specify the **Positional Dilution Of Precision** (measure of accuracy in 3-D position) limit required for the calculation of the results (default = 5).

Meaning of DOP values:

When visible GPS satellites are close together in the sky, the geometry is said to be weak and the DOP value is high; when far apart, the geometry is strong and the DOP value is low.
Thus a low DOP value represents a better GPS positional precision due to the wider angular separation between the satellites used to calculate a GPS unit's position. Other factors that can increase the effective DOP are obstructions such as nearby mountains or buildings.

1-2 Excellent: Positional measurements are considered accurate enough for all calculations.

2-5 Good: Represents a level that marks the minimum appropriate for calculations.

5-10 Moderate: Positional measurements could be used for calculations, but the fix quality could still be improved. A more open view of the sky is recommended.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.28.3 AT+EGEDFRT – Frame format

Description

This command will configure the format of the Eco-Drive results and statistics information frame.

Syntax :

AT+EGEDFRT=<"gps">[,<"results">]

Command	Possible Responses

AT+EGEDFRT=?	`+EGEDFRT: ("ID","DT","TM","LT","LG"),("a-w")`
	
	`OK`
	Note: Display syntax.

AT+EGEDFRT?	`+EGEDFRT: "abcdefghijklmnopqrstuvw"`
	
	`OK`
	Note: Display current value.

AT+EGEDFRT="ID","DT","TM", "LT","LG,"abcdkpqt"	`OK` *Note: Set new parameters.*

AT+EGEDFRT?	`+EGEDFRT: "ID","DT","TM","LT","LG","abcdkpqt"`
	
	`OK`
	Note: Display current value.

Defined values :

<gps>

Specify the GPS fields to be included in the frame. The following may be specified:

"ID" : Identifier
"DT" : Date
"TM" : Time
"LT" : Latitude (the indicator N/S is always added)
"LG" : Longitude (the indicator E/W is always added)
"$RESET" : Reset frame format to default value ("`abcdefghijklmnopqrstuvw`").

<results>

Specify the Eco-Drive results and statistics fields to be included in the frame. The following may be specified:

a : total distance (meters)
b : total duration library is active (seconds)
c : total consumption (litres)
d : instantaneous consumption per time (millilitres per second)
e : instantaneous consumption per distance (millilitres per meter)
f : instantaneous speed (meters per second)
g : average speed (meters per second)
h : over limit counts (occurrences)
i : over limit durations (seconds)
j : topology distances (meters)
k : topology durations (seconds)
l : topology consumptions (litres)
m : actual topology
n : rpm evaluation instantaneous (rpm)
o : rpm evaluation mean (rpm)
p : GPS get enough precision for computation duration (seconds)
q : GPS get at least time duration (seconds)
r : average HDOP (meters)
s : average HDOP duration (seconds)
t : evaluation status
u : vehicle type
v : total number of over limit counts / hour = (sum of all h) / (p : GPS get enough precision for computation duration in hours)
w : total number of over limit counts / km = (sum of all h) / (a : total distance in km)

Example :

```
$ECODRV,358696048185113,190313,144547.00,4716.82532,N,00003.54318,W,112,1213,0.406,0.684,136.800,0,0
,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,112,0,0,1184,0,0,0,0,0,0,800,799,1167,1185,0.99,1185,1,0,0,0*00
```

Data	Option	Description
$ECODRV		Frame header
358696048185113	"ID"	Identifier
190313	"DT"	Date
144547.00	"TM"	Time : Fix taken at 14:45:47.00 UTC
4716.82532,N	"LT"	Latitude in ddmm.mmmmm = 47° 16.82532' North
00003.54318,W	"LG"	Longitude in dddmm.mmmmm = 000° 03.54318' West
112	a	total distance (meters)
1213	b	total duration Eco-Drive active (seconds)
0.046	*c*	*total consumption (litres, approx.)*
0.684	*d*	*instantaneous consumption per time (millilitres per second, approx.)*
136.800	*e*	*instantaneous consumption per distance (millilitres per meter, approx.)*
0	f	instantaneous speed (meters per second)
0	g	average speed (meters per second)
0	h	over limit counts (occurrences) : BRAKE - CITY
0	h	over limit counts (occurrences) : BRAKE - COUNTRY
0	h	over limit counts (occurrences) : BRAKE - HIGHWAY
0	h	over limit counts (occurrences) : ACCELERATION - CITY
0	h	over limit counts (occurrences) : ACCELERATION - COUNTRY
0	h	over limit counts (occurrences) : ACCELERATION - HIGHWAY
0	h	over limit counts (occurrences) : TURN - CITY
0	h	over limit counts (occurrences) : TURN - COUNTRY
0	h	over limit counts (occurrences) : TURN - HIGHWAY
0	i	over limit durations (seconds) : BRAKE - CITY
0	i	over limit durations (seconds) : BRAKE - COUNTRY
0	i	over limit durations (seconds) : BRAKE - HIGHWAY
0	i	over limit durations (seconds) : ACCELERATION - CITY
0	i	over limit durations (seconds) : ACCELERATION - COUNTRY
0	i	over limit durations (seconds) : ACCELERATION - HIGHWAY
0	i	over limit durations (seconds) : TURN - CITY
0	i	over limit durations (seconds) : TURN - COUNTRY
0	i	over limit durations (seconds) : TURN - HIGHWAY
112	j	topology distances (meters) : CITY
0	j	topology distances (meters) : COUNTRY
0	j	topology distances (meters) : HIGHWAY
1184	k	topology durations (seconds) : CITY
0	k	topology durations (seconds) : COUNTRY
0	k	topology durations (seconds) : HIGHWAY
0	*l*	*topology consumptions (litres, approx.) : CITY*
0	*l*	*topology consumptions (litres, approx.) : COUNTRY*
0	*l*	*topology consumptions (litres, approx.) : HIGHWAY*
0	*m*	*actual topology (0 = CITY, 1 = COUNTRY, 2 = HIGHWAY) (approx.)*
800	*n*	*rpm evaluation instantaneous (rpm, approx. depends on gear and speed)*
799	*o*	*rpm evaluation mean (rpm, approx. depends on gear and speed)*
1167	p	GPS get enough precision for computation duration, E1 (seconds)
1185	q	GPS get at least time duration, total GPS time (seconds)
0.99	r	average HDOP (meters)
1185	s	average HDOP duration (seconds)
1	t	evaluation status (0 = evaluation impossible, 1 = evaluation possible)
0	u	vehicle type (0 to 5)
0	v	total number of over limit counts (h) / hour (p)
0	w	total number of over limit counts (h) / km (a)
*00		Mandatory checksum

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

Notes:

The frame type is identified by the start "**$ECODRV**". Each field is separated by a comma (',). The checksum is the exclusive-OR of all the characters between the leading '$' and the trailing '*'.

Distances, speeds, over-limit information and evaluation status is based on analysis of received GPS data.

Over-limit information will also be controlled by the driving excess limits for the **braking**, **acceleration** and **turning** forces entered by the command **AT+EGEDDRV – Driving excess limits**.

Evaluation of topology is approximate and is based on average speed over a small period of time.
Fuel consumption, instantaneous speed and engine speed evaluation is approximate and is based on gear, speed and vehicle characteristics.

The distance information may continue to be incremented even when the device is stationary. This is due to the uncertainty or "jitter" in knowing the exact GPS position. Even when stationary, over a period of time the distance between these very small variations in position will accumulate.

All the results information in this frame may be reset via the command **AT+EGEDSTK – Logging results information**.

2.28.4 AT+EGEDDRV – Driving excess limits

Description

This command will configure the driving excess limits for the **braking**, **acceleration** and **turning** forces. These values will influence the over-limit counts and durations in the Eco-Drive results and statistics information frame.

Syntax :
AT+EGEDDRV=<brake>[,<accel>][,<turn>]

Command	Possible Responses

AT+EGEDDRV=?	`+EGEDDRV: (1-1000),(1-1000),(1-1000)`
	
	`OK`
	Note: Display syntax.

AT+EGEDDRV?	`+EGEDDRV: -200,150,160`
	
	`OK`
	Note: Display current value.

AT+EGEDDRV=250,150,180	`OK` *Note: Set new parameters.*

AT+EGEDDRV?	`+EGEDDRV: -250,150,180`
	
	`OK`
	Note: Display current value.

Defined values :

<**brake**>

Specify the excess limit for the **braking** force in mg (default = -200). Note that this value is always displayed as negative.

<**accel**>

Specify the excess limit for the **acceleration** force in mg (default = 150).

<**turn**>

Specify the excess limit for the **turning** force in mg (default = 160).

2.28.5 AT+EGEDVEH – Vehicle specification

Description

This command will configure the characteristics for the type of vehicle used.

Syntax :

AT+EGEDRV=<engine>[,<gears>][,<weight>][,<"urban">][,<"mixed">][,<"extraUrban">][,<simVeh>]

Command	Possible Responses

AT+EGEDVEH=?	`+EGEDVEH: (0-1),(4-6),(100-30000),("1-100"),("1-100"),("1-100"),(0-5)`
	
	`OK`
	Note: Display syntax.

AT+EGEDVEH?	`+EGEDVEH: 0,5,1350,"6.6","5.7","5.1",0`
	
	`OK`
	Note: Display current value.

AT+EGEDVEH=0,5,1800,"9.1", "8.2","7.9",3	`OK` *Note: Set new parameters.*

AT+EGEDVEH?	`+EGEDVEH: 0,5,1800,"9.1","8.2","7.9",3`
	
	`OK`
	Note: Display current value.

Defined values :

<**engine**>

Specify engine type.
0: Diesel (default).
1: Petrol.

<**gears**>

Specify vehicle number of gears, (default = 5).

<**weight**>

Specify vehicle weight, (default = 1350kg).

<**urban**>

Specify vehicle fuel consumption for urban conditions, (default = 6.6 litres / 100 km).

<**mixed**>

Specify vehicle fuel consumption for mixed conditions, (default = 5.7 litres / 100 km).

<**extraUrban**>

Specify vehicle fuel consumption for extra urban conditions, (default = 5.1 litres / 100 km).

<**simVeh**>

Specify similar vehicle type.
0: Small family car, diesel (default)
1: Mini car, petrol
2: Family saloon, diesel
3: Light commercial van, diesel
4: Mini car, diesel
5: Leisure activity van, diesel

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

2.28.6 AT+EGEDACT – Show Eco-Drive activation information

Description:

This command will display the information about the current Eco-Drive activation and evaluation status.

Syntax:

AT+EGEDACT?
AT+EGEDACT=?

Examples:

Command	Possible Responses
AT+EGEDACT?	`+EGEDACT: 0,0` OK
AT+EGEDACT=?	`+EGEDACT: Eco-Drive NOT active, evaluation NOT possible` OK
AT+EGEDACT?	`+EGEDACT: 1,0` OK
AT+EGEDACT=?	`+EGEDACT: Eco-Drive active, evaluation NOT possible` OK
AT+EGEDACT?	`+EGEDACT: 1,1` OK
AT+EGEDAC=T?	`+EGEDACT: Eco-Drive active, evaluation possible` OK

Note:

The command AT+EGEDACT? will display a basic status.
The command AT+EGEDACT=? will display a more verbose status.

Eco-Drive activation will occur with the presence of a valid libkey and after Eco-Drive library initialisation.
Eco-Drive evaluation will be possible when AT+EGEDSTK=1 and when valid GPS information is being received (logging code E1).

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

3 LOW-LEVEL COMMANDS

These commands provide a direct low-level access to the unit's hardware. They include commands to access to the serial flash, UBX frame commands and some GSM commands.

3.1 General commands

3.1.1 AT+HELP – Display list of general commands

Description:

This command will display a list of the available general commands. The list includes some GSM commands which have been recreated by the application in order to be compatible with the Genxxx hardware and the original GPS commands (example: **AT+GPSPOS**).

Syntax:

AT+HELP

Example :

Command	Possible Responses
AT+HELP	AVAILABLE COMMANDS: AT+HELP(Display list of ALL commands) AT+EGM3(Show library build information) AT+EGMRST(Reset ARM/GSM/GPS) AT+EGEVT(Get/set EGEVT level) AT+GPSHELP(Display list of GPS commands) AT+GPSPWR(Set GPS power:0=OFF, 1=ON) AT+GPSPOS AT+GPSNMEA AT+GPSSWITCH AT+GPSANT AT+UBXHELP(Display list of UBX commands) AT+UBXMONVER(GPS module HW/SW version) AT+UBXMONHW(GPS module HW status) AT+UBXCFGDAT(Display or set datum (=0-215)) AT+UBXCFGDPM(Display or set Dynamic Platform Model (=0-8)) AT+UBXSHOW(Display UBX frames) AT+UBXRAW(Send RAW UBX frame) AT+UBXCFGRATE(Display Navigation/Measurement Rate) AT+UBXCFGSBAS(Retrieve SBAS receiver subsystem) AT+GSMHELP(Display list of GSM commands) AT+GSMRST(Set GSM RESET:0=OFF, 1=ON) AT+GSMPWR(Set GSM POWER:0=OFF, 1=ON) AT+GSMRTS(Set GSM RTS:0=LOW, 1=HIGH) AT+GPIOHELP(Display list of GPIO commands) AT+GPIODIR(Set GPIO pin direction) AT+GPIOSET(Set/Clear GPIO pin) AT+GPIOGET(Get GPIO pin) AT+GPIOHWID(Get hardware ID) AT+GPIOEXTHELP(Display list of GPIO Ext commands) AT+GPIOEXTDIR(Set GPIO Ext pin direction) AT+GPIOEXTSET(Set/Clear GPIO Ext pin) AT+GPIOEXTGET(Get GPIO Ext pin) AT+TRACE(Set trace, 1-32, 0-1) AT+SFTYPE(Display manufacturer, memory size and erase block size(s)) AT+EGMFLH=3(Erase all flash objects) AT+ACCHELP(Display list of ACCELEROMETER commands) AT+ACCTYPE(Display type) AT+EGTONEHELP(Display list of sound commands) AT+EGTONE(Play sound on buzzer) AT+EGADC(Measure analogue inputs) *Note: Display list of commands*

3.1.2 ATI8 – Display application version and build information

Description:

This command will display the version and build information of the application.

Syntax:

ATI8

Example:

Command	Possible Responses
ATI8	EaseLoc V321_EGM430 - GenLoc341e A - xxxxxxxx OK

3.1.3 AT+GPSNMEA – GPS NMEA unsolicited

Description:

This command allows the host to activate the GPS NMEA frames provided as unsolicited messages on the main serial link of the device, as follows :

```
$GPGGA,092003.00,4716.80272,N,00003.51569,W,1,08,1.01,28.7,M,47.9,M,,*7F
$GPGSA,A,3,20,11,23,17,24,01,04,13,,,,,2.05,1.01,1.79*0E
$GPGSV,3,1,09,20,75,044,48,11,39,138,47,23,61,168,49,17,47,261,50*7C
$GPGSV,3,2,09,24,54,302,45,01,25,045,47,33,34,201,44,04,22,303,43*75
$GPGSV,3,3,09,13,31,196,51*4A
$GPGLL,4716.80272,N,00003.51569,W,092003.00,A,A*75
$GPRMC,092004.00,A,4716.80273,N,00003.51572,W,0.004,,080606,,,A*6C
$GPVTG,,T,,M,0.004,N,0.008,K,A*2F
```

Syntax:

AT+GPSNMEA=<mode>[,<NMEA1>,<NMEA2>…]

Examples :

Command	Possible Responses	Notes
AT+GPSNMEA	AT+GPSNMEA=(0-1),(0-5),... OK	*Display syntax*
AT+GPSNMEA=1,0,2,3	OK	*These three frames will be displayed as unsolicited messages*
AT+GPSNMEA?	+GPSNMEA: 1,0,2,3 OK	*Display current configuration (GGA, GSV, RMC)*
AT+GPSNMEA=0	OK	*Stop the display of unsolicited frames*
AT+GPSNMEA=1	OK	*Returns to unsolicited display (previous selection is used)*

Defined values:

<mode> 0 : deactivate the display of unsolicited NMEA frames (default).
1 : activate the display of unsolicited NMEA frames.

<NMEAx> select NMEA frames from the following list :
0 : GGA - GPS fix data.
1 : GSA - GPS DOP and Active satellites.
2 : GSV - GPS satellites in view.
3 : RMC - Recommended minimum data.
4 : VTG - Course over ground and ground speed.
5 : GLL - Latitude and longitude, with time of position fix and status.

Notes:

If the parameters <NMEAx> are omitted, the last configuration is used. The parameters are saved in flash.

3.1.4 AT+GPSPOS – GPS position

Description:

This command will get as a response the last GPS position information received.

Syntax:

AT+GPSPOS

Response syntax:

+GPSPOS:<fix>,<time>,<date>,<latitude>,<longitude>,<altitude>,<hdop>,<speed>,<course>,<nbsat>

Examples :

Command	Possible Responses	Notes
AT+GPSPOS	`+GPSPOS:2,100556.00,080606,4716.80053N,00003.51560W,83.4,1.45,0.013,,07` `OK`	*See defined values*

Defined values:

<fix> 0 : Invalid fix
1 : 2D fix
2 : 3D fix
-1 : impossible to define a position

<time> hhmmss time of fix
range of values: hh (hour) 00 to 23
mm (minute) 00 to 59
ss (second) 00 to 59
Example: 130556 = 13:05:56 UTC

<date> ddmmyy date of fix
range of values: dd (day) 01 to 31
mm (month) 01 to 12
yy (year) 2000 to 2099
Example: 191105 = 19th November 2005

<latitude> ddmm.mmmmm(N/S)
range of values: dd (degrees) 00 to 90
mm.mmmmm (minutes) 00,00000 to 59.99999
(N/S) North or South
Example: latitude 4716.80053N = 47° 16.80053’ North

<longitude> dddmm.mmmm(E/W)
range of values: dd (degrees) 00 to 180
mm.mmmm (minutes) 00,0000 to 59.9999
(E/W) East or West
Example: longitude 12303.51560W = 123° 3.51560’ West

<altitude> mmmm.m altitude in meters

<hdop> mmm.mm horizontal dilution of position in meters

<speed> ssss.s speed in KPH

<course> ddd.dd course in degrees
range of values: ddd.dd (degrees) 000.00 to 360.00

<nbsat> nn number of satellites in view

Notes:

Some fields may be empty depending on the availability of the information.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

3.1.5 AT+GPSANT – GPS antenna configuration

Description:

Management of the GPS antenna configuration.

Syntax:

AT+GPSANT=<type>[,<mode>][,<mon>]

Response:

+GPSANT: <type>,<mode>
: <type>,<mon>
: <type>,<status>,<presence>,<voltage>

Syntax of unsolicited response :

+GPSANT: <type>,<status>,<presence>,<voltage>

Examples :

Command	Possible Responses	Notes
AT+GPSANT=?	`+GPSANT=type(,[mode][mon])` `OK`	*Display syntax*
AT+GPSANT=0	`+GPSANT: 0,1` `OK`	*The antenna is currently powered-on*
AT+GPSANT=1,1	`OK`	*Activate antenna monitoring*
Unsolicited message	`+GPSANT: 2,1,0,3258`	*Open circuit detected. Antenna disconnected.*
Unsolicited message	`+GPSANT: 2,1,1,3142`	*Antenna reconnected and present*
AT+GPSANT=2	`+GPSANT: 2,1,1,3142` `OK`	*No open circuit detected and antenna connected with 3.142V*

Defined values:

<type> 0 : Antenna configuration (see <mode>).
1 : management of monitoring antenna (see <mon>).
2 : antenna status (see <status>).

<mode> 0 : 0v (antenna not powered).
1 : 3v internal (default) (antenna powered).

<mon> 0 : monitoring deactivated (default).
1 : monitoring activated.

<status> 0 : antenna not powered.
1 : antenna powered.
Note : In case of short-circuit, the internal protection system disconnects the antenna, opening the circuit. After 10 seconds, the antenna is re-powered.

<presence>
0 : no antenna connected.
1 : antenna connected
2 : system for detection of antenna presence is not activated.

<voltage> antenna voltage in mV.

Notes:

The command AT+WGPSANT does not manage the EXT modes or Single Coax Options for the configuration of the GPS antenna.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

3.2 UBX commands

3.2.1 AT+UBXHELP – Display list of UBX commands

Description:

This command will display the list of UBX commands that it is possible to use between the CPU and the le GPS module.

Syntax:

AT+UBXHELP

Example :

Command	Possible Responses
AT+UBXHELP	AT+UBXMONVER.....Display hardware and software version of the GPS module AT+UBXMONHW.....Display status of the hardware of the GPS module AT+UBXCFGDAT.....Display (?) or set datum (=0-215) AT+UBXCFGDPM.....Display (?) or set Dynamic Platform Model (=1-7) OK *Note: Display the list of UBX commands*

3.2.2 AT+UBXMONVER – Display the HW / SW version of the GPS module

Description:

This command will display the software and hardware version of the GPS module.

Syntax:

AT+UBXMONVER

Example :

Command	Possible Responses
AT+UBXMONVER	GPS module - SW version: "5.00 (28483)" GPS module - HW version: "00040005" OK *Note: Display the software and hardware version of the GPS module*

3.2.3 AT+UBXMONHW – Display software status of the GPS module

Description:

This command will display the status of the different hardware aspects of the GPS module, like the antenna, the noise level, the command of automatic gain (AGC) and the Real Time Clock.

Syntax:

AT+UBXMONHW

Example :

Command	Possible Responses	Notes
AT+UBXMONHW	Noise Level measured by GPS Core : 159 AGC Monitor : 6123 Antenna Supervisor Status : OK Antenna PowerStatus : ON Real-Time Clock : Calibrated OK	*Noise level.* *AGC level.* *Antenna supervision machine status.* *Antenna power status.* *Internal HTR adjusted to GPS time received.*

3.2.4 AT+UBXCFGDAT – GPS Datum

Description:

This command allows to program the GPS Datum.

Syntax:

AT+UBXCFGDAT=<n>

Examples :

Command	Possible Responses	Notes
AT+UBXCFGDAT=?	AT+UBXCFGDAT=(0-215) OK	*Display syntax*
AT+UBXCFGDAT=0	OK	*Program Datum at 0 (WGS84)*
AT+UBXCFGDAT?	Current Datum: 0 - WGS84 OK	*Display current configuration. In this case, 0 (WGS84)*

Defined values:

<n> 0 à 215 : datum identifier (Default 0, corresponding to WGS84).

3.2.5 AT+UBXCFGDPM – GPS module Dynamic Platform Model

Description:

This command allows to modify the Dynamic Platform Model used by the GPS module, thus adjusting the navigation engine to the expected environment. This can result to a better interpretation of the measurements and consequently to a more precise performance for the position.

Syntax:

AT+UBXCFGDPM=<n>

Examples :

Command	Possible Responses	Notes
AT+UBXCFGDPM=?	AT+UBXCFGDPM=(0-7) OK	*Display syntax*
AT+UBXCFGDPM=3	OK	*Select Automotive Dynamic Platform Model*
AT+UBXCFGDPM?	+UBXCFGDPM: 3 OK	*Display current configuration. In this case, 3 (Automotive)*

Defined values:

<n>

0	Portable	– Assuming low accelerations, portable devices (NEO-5 devices only).
1	Stationary	– Velocity is constrained to 0 m/s.
2	Pedestrian	– Assuming low accelerations, portable devices moved by manpower.
3	Automotive	– Assuming low vertical acceleration, passenger car dynamics.
4	Sea	– Zero vertical velocity, applications at sea.
5	Airborne <1g	– Dynamic range greater than car and greater vertical acceleration.
6	Airborne <2g	– Typical airplane environment.
7	Airborne <4g	– Extreme dynamic environment.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

3.3 Serial Flash commands

These commands allow the access to the **optional** serial flash memory. See data sheet for more information about the type of flash used.

3.3.1 AT+SFTYPE – Type Memory

Description:

This command will display the manufacturer, type, memory size and block size in bytes of the serial flash memory (if present).

Syntax:

AT+SFTYPE

Examples:

Command	Possible Responses	Notes

AT+SFTYPE	`---------- SERIAL FLASH ----------`
	`Manufacturer: SST (0xBF), Type: SST25VF016B (0x2541)`
	`Size: 2097152 Bytes`
	`Erase Blocks: 64KB 32KB 4KB`
	`OK`
		Display information about serial flash memory detected

AT+SFTYPE	`No Serial Flash detected` `OK`	*No serial flash present*

3.4 Analogue inputs commands

3.4.1 AT+EGADC – Measure analogue inputs

Description:

This multi-purpose command can measure the voltage on one of the analogue inputs, check and adjust the reference voltage value to be used when determining the actual analogue voltage and check and adjust the external resistance multiplier and divisor values on the analogue inputs.

Command syntax : **AT+ EGADC=<channel>[,<mult>][,][,<offset>]**
AT+ EGADC=<channel>[,<Vref>]

Response syntax**: +EGADC : <channel>,<value mv>**
: <channel>,<Vref mV>
: <channel>,<mult>, ,<offset>

Command	Possible Responses

AT+EGADC=?	`+EGADC: (0-4,8),(0-65535),(0-65535),"+/-(0-32767)"`
	
	`OK`
	
	Note: Possible values.

AT+EGADC=3	`+EGADC: 3,4418`
	
	`OK`
	
	Note: Get internal supply voltage.

AT+EGADC=3,0,0	`+EGADC: 3,2715,2000`
	
	`OK`
	
	Note: Get current multiplier and divisor values.

AT+EGADC=3,200, 100	`OK` *Note: Set multiplier and divisor values.*

AT+EGADC=8	`+EGADC: 8,3300`
	
	`OK`
	
	Note: Get reference voltage.

AT+EGADC=8,3300	`OK` *Note: Set reference voltage.*

Defined values:

<**channel**> 0 GPS antenna voltage
1 User GPIO input voltage (if option is present via GPIO2)
2 Analogue input 3 (if option is present via SPK2N)
3 Internal supply voltage
4 External supply voltage (40e, 42e and 54e only)
8 Reference voltage (default = 3300mV)

<**mult**> Multiplier value (0 – 65535)

<**div**> Divisor value (0 – 65535)

<**Vref**> Reference voltage in mV (1 – 65535)

<**Offset**> The offset value (0 to “+/-32767” mV). This offset may be set to compensate for a non-zero input voltage when using the input as part of a 4-20mA current loop. For example,

4mA into 150 ohms requires the offset to be set to “-600” mV so that the command returns 0 Volts.

Notes:

All voltages are in milli-volts.

If both the multiplier and divisor values are specified as 0 then the current multiplier and divisor values for the specified channel will be returned.

The default values for each channel are:

Channel	Multiplier	Divisor	Offset (mV)	Notes
0	200	100	0	All platforms
0	110	100	0	341e with charger
1	3050	1000	0	All platforms
1	332	100	0	341e with charger
2	3050	1000	0	All platforms
2	332	100	0	341e with charger
3	2715	2000	0	All platforms
3	300	200	0	341e with charger
4	3050	1000	0	54e
4	987	100	0	40e / 42e
4	1100	100	0	341e with charger

Example: For a maximum input voltage of 10 Volts then the series input resistance is 20k5 ohms and the parallel input resistance is 10k ohms. The voltage at the input to the ADC on the CPU is:

Vadc = Vin x 10k / (10k + 20k5) = Vin x 1000 / 3050.

i.e.: the measured value must be multiplied by 3050 (multiplier) and divided by 1000 (divisor) to obtain the real value at input to the input.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

4 SPECIAL LIBRARY FUNCTIONS

4.1 AT+EGLIBKEY – Special library key

Description:
This command allows a library key to be entered to allow access to special functions. The key may be obtained from ERCOGENER upon request.

Command syntax : AT+EGLIBKEY=<"**key**">

Response syntax : OK or ERROR

Command	Possible Responses

AT+EGLIBKEY=?	`+EGLIBKEY: (160)`
	
	`OK`
	Note: Possible values.

AT+EGLIBKEY?	`+EGLIBKEY: ""`
	
	`OK`
	Note: Key is empty.

AT+EGLIBKEY="my key"	 *Note: If the key is accepted, the key is installed and the product resets. If the key is not accepted, ERROR is returned.*

AT+EGLIBKEY?	`+EGLIBKEY: "my key"`
	
	`OK`
	Note: Display current key.

Defined values:

<key>

The library key is a hexadecimal number of 160 characters. It is supplied by ERCOGENER to unlock various library functions. For example: `"019207af. . . .9832eb"`.

The key is checked and if valid, it will be installed. The application will then be restarted and the various library functions will be unlocked as determined by the library key.
If the key is not accepted, ERROR is returned.

5 QUICK CONFIGURATION

5.1 General

As soon as the GPS and GSM antennas are connected and that the indicators flash, this indicates that the device correctly receives the GPS information and that it is attached to GSM/GPRS network.

The examples bellow only work if the above conditions are respected.

Select the frame format:

AT+LOCFRT=0	RMC format (default),
AT+LOCFRT=1	GGA format,
AT+LOCFRT=2	CUSTOM format.

Display the GPRS configuration:
AT+LOCCNG

Display the general configuration:
AT+LOCCNF

5.2 TCP / UDP GPRS mode

Information concerning the Network Access Provider and the destination server must be programmed as shown in the example below:

AT+LOCASV="internet","myuser","mypass"	Access point provider, username, password
AT+LOCTSV="00.00.00.00",port	Server IP address and port number
Program the capture interval of GPS positions: Examples :	
AT+LOCSTK=1,"000500",0,4,1,000,03	every 5 minutes speed mini 0 KMH / HDOP <= 4 and 3 satellites.
Or : **AT+LOCSTK=1,"000030",0,10,1,007,04**	every 30 seconds, speed mini 7 KMH / HDOP <= 10 and 4 satellites.
Program the transmission : **AT+LOCSND=2,"I","00:00",0,0**	transmission of frames immediately in TCP mode.
Or : **AT+LOCSND=2,"I","00:00",0,1**	transmission of frames immediately in UDP mode.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

5.3 GPRS Email mode

Information concerning the Network Access Provider, the SMTP server and the sender and recipient email addresses must be programmed as shown in the example below:

AT+LOCASV="internet","myuser","mypass"	Access point provider, username, password
AT+EGSMTPHN="smtp.myprovider.com"	SMTP SerVer
AT+EGSMTPUN="siteusername"	SMTP UserName
AT+EGSMTPPW="sitepassword"	SMTP PassWord

By default, the name of the created email will contain the unit identifier, the date and time of the first frame written in the email.
This is true only for the RMC format frame or in the case of a PERSO frame when the date field is selected. Otherwise this is replaced by “000000” and only the email content creation date will allow the re-order of the received data.
The email will be sent to the recipient defined by:

AT+EGMAIL=”myrecipient@hisprovider.com”	Email address of the recipient

The email will be sent by email address defined by:

AT+EGSMTPSE=”myemailaddress@myprovider.com”	Email address of the sender

Program the capture interval of GPS positions:

AT+LOCSTK=1,"000500",0,4,1,000,03	every 5 minutes speed mini 0 KMH / HDOP <= 4 and 3 satellites.
Or :	
AT+LOCSTK=1,"000030",0,10,1,007,04	every 30 seconds, speed mini 7 KMH / HDOP <= 10 and 4 satellites.
Program the transmission interval :	
AT+LOCSND=5,"I","00:10",0,0	transfer every 10 minutes in SMTP mode.

5.4 GPRS FTP mode

Information concerning the Network Access Provider and FTP server that will receive the file must be programmed as shown in the example below:

AT+LOCASV="internet","myuser","mypass"	Access point provider, username, password
AT+LOCFSV="…","addrPut"	FTP server name to receive file
AT+LOCFUN="…","userPut"	FTP server username
AT+LOCFSV="…","passPut"	FTP server password

Program the capture interval of GPS positions:

AT+LOCSTK=1,"000500",0,4,1,000,03	every 5 minutes speed mini 0 KMH / HDOP <= 4 and 3 satellites.
Or :	
AT+LOCSTK=1,"000030",0,10,1,007,04	every 30 seconds, speed mini 7 KMH / HDOP <= 10 and 4 satellites.
Program the transmission interval :	
AT+LOCSND=3,"I","00:10",0,0	transfer every 10 minutes in FTP mode.

Descriptions and non-contractual illustrations in this document are given as an indication only.
ERCOGENER. reserves the right to make any modifications.

6 DOWNLOADING THE APPLICATION

6.1 BOOTLOADER

The Bootloader functionality allow you to put the new application in the ARM flash. In the ARM flash area a sector is reserved (20K bytes) for the "Bootloader" application.
The Bootloader is an application which runs independently of your EGM application.
This application runs first and looks for a valid EGM application. If found then the application is started
This secures your application, if you have download a bad application in the product in all cases you can recover the control.
The Bootloader manages the low power functions. When waking up from the low-power mode, the Bootloader will start the EGM application with the start-up event code.

6.1.1 How to access

All the products are delivered with Bootloader.
To communicate with the Bootloader use a terminal application such as "HyperTerminal".
Configure this to 115200 b/s, 8 bits, no parity.

There are four ways to access to the Bootloader.

1. A new product, if you switch on a product with no application, the Bootloader menu is displayed.
2. Press the key '∗' and reset the unit or recycle the power at the same time.
   The bootloader will reply:
   "Release key"
   Release the '∗' key.
   The bootloader menu is displayed.
3. With a specific cable, with buttons BOOT and RESET (or hold the boot button).
   Hold the boot button and reset the module with the other button.
   The bootloader menu is displayed.
   Release the boot button.
4. With an AT command from your application, "AT+EGMRST=3" at your application communication speed.
   Then if necessary modify the terminal speed and send a carriage return to obtain the menu.

6.1.2 Bootloader menu

```
Bootloader Vx.xx GLxx UA Gener Ublox (HWF1 rev D/E)
GSM voltage = 4303 mV
 1 - Update application
 2 - Erase objects
 M - GSM direct access (external supply required)
 A - Advanced
 P - Power off
 E - Exit
```

"Vx.xx GLxx" is the current version
"U" indicate that it is an unsecured version, in our roadmap we have a secured version which prevents read back of the application.
"K" indicates that the access to the Bootloader is due to a key "∗" process, "B" for "Boot button", "E" for empty (in case of no application) and "A" for AT+EGMRST=3 reset command.
"Genxxx" is the product identification.
"ENF" or Ublox for GSM Module type.
"HWxx rev x" is the hardware identification.

1 - Update Application

Use this choice to put a new application in the product.
The bootloader will reply:
"CCCCCC..." etc. It is waiting for the file to be downloaded

- With HyperTerminal
- In the tool bar, select "**Transfer**" and "**Send file**".
- Select the file to send which has the extension **"_boot.bin**"
- Select the protocol "**1K Xmodem**".
- Validate the selection.
- The transfer starts.

When the download has finished the bootloader will reply:
"Finished - Press a key"
Press the key 'E' to Exit the bootloader and start the new application.

2 - Erase Object

Are you sure Y/N ?

Use this choice to erase your serial flash datas sector.

M - GSM direct acces

Use this choice to access directly with the GSM module, this allow you to upgrade the firmware or to verify some GSM informations.

A - Advanced

Use this choice to access to advanced functionality.

1 - ARM Flash

1 - Status

Application founded
No application

2 - Update Application **(like choice "1" above)**

3 - Erase Application

Are you sure Y/N ?
Erasing in progress /

4 - Update Bootloader (use with caution)

Are you sure Y/N ?

Use this choice if you are sure that the power can't be switch off during the update.
The bootloader will reply:
"CCCCCC..." etc. It is waiting for the file

- With HyperTerminal
- In the tool bar, select "**Transfer**" and "**Send file**".
- Select the file to send which has the extension **".bup**"
- Select the protocol "**1K Xmodem**".
- Validate the selection.
- The transfer starts.

When the download has finished the bootloader will reboot.

E – Return

2 - SPI Flash

1 – Status

Model SST25VF016B, JDEC ID = BF2541
Update slot 1
status flag = new
firmware length = 363520
crc after crypto = 4AA5
encryption = N
crc ok
Update slot 2 (erased)
status flag = empty
Objects erased

2 – Upload in an update slot

Select 1 or 2
Erasing slot n
Erasing in progress /

Encrypt firmware Y/N
3 – Erase all update slots
Are you sure Y/N ?
Erasing in progress /

Erasing in progress /
4 – Erase an update slot
Select 1 or 2
Erasing in progress /
5 – Reactive an update slot
Select 1 or 2
Empty slot
or
Erasing in progress (reactivate)
6 – Erase objects
Are you sure Y/N ?
Erasing in progress /
7 – Check objects
Finished (0 bytes used, 0 errors)
Objects stats
Valids : 0
Near not valids : 0
Not valids : 0
or
Finished (1549 bytes used, 0 errors)
Objects stats
Valids : 41
Near not valids : 0
Not valids : 0
E - Return
3 - Accelerometer
Accelerometer (ID = FF)
1 – Measure
ax=-1, ay=-1, az=-1
2 – On
3 – Off
E - Return
4 - GPS
GPS
1 – Direct access
2 – On
3 – Off
E - Return
5 - GSM
GSM
1 – Direct access
2 – On
3 – Off
4 – Status
Off
or
On
E - Return
6 - Change password
Enter new password
***
Re-type new password

Incorrect entry, try again
Enter new password
No password

7 - Change baudrate

Select a new baudrate :

Use this choice if your download did not terminate correctly, in some case it is because the serial link speed is too fast.

1 – 9600
2 – 19200
3 – 38400
4 – 57600
5 - 115200

E – Return

E - Exit

In case of a new application in SPI flash.

Firmware update found in SPI flash update slot 1
Encryption = N
Transfer in progress /

Firmware update finished