Flextrack standard Tracker Application

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INTRODUCTION

This document describes the Standard Tracker application that all Flextrack Lommy devices are delivered with. The Tracker application can be customized using a large number of parameters and commands.
Should you however, demand some functionality that is not covered by the Standard Tracker application, a customized add-on module can be added to the Standard Tracker Application solving your specific needs.

If maximum flexibility is needed, a complete new application can be developed either by Flextrack or you using our feature packed FAL API library (Application Programming Interface) with 100's of functions (even including a RTOS).

The Flextrack Lommy devices are essentially GPS based Tracking Units, intended to locate persons or assets with pinpoint accuracy (see the section "*What is the GPS system?*"), and to report this to a backend (server) system.

The Flextrack Lommy devices can communicate with the outside world through simple SMS messages, UDP, or for maximum flexibility the TCP/IP based FlexCI protocol.
The use of GPRS allows monitoring of the units position in almost real-time as the unit is "always on". GPRS is very cost-effective as one only pays for the amount of data sent, and not for the time spent "online" (see the section "*What is GPRS?*")

A large number of position reports can be stored in the cyclic memory of the device if there is no continual connection to a server. If more memory capacity is required, many of the devices support MicroSD cards for data storage

Some of the devices have an internal 433 MHz or 868 MHz RF transceiver. This RF transceiver can de used for data communication or as a locater beacon and can monitor a number of our Lommy-Tag devices (for tracking valuable assets etc).

Most devices also have an integrated 3-axis G-force sensor for motion detection. The G-sensor can be used to activate various alarms, switch off the unit when not in motion and count number of excessive bumps the unit has detected.

Roaming on the GSM network in foreign countries can also be controlled, the device can be configured with a list of "preferred operators", the unit will always try to pick one of these operators should they be available while the unit is roaming (in a "foreign" country)

Some of the Lommy devices are primarily dedicated for fixed installation, and some are targeted at personal tracking. The devices typically have a built-it rechargeable battery, motion sensor, extra communication ports, GPS receiver, speaker/microphone etc. Depending of the actual configuration of the device you have, some of the functions and parameters/commands in this manual may not be functional (for example if the device has no speaker/microphone, the GSM voice functions cannot be used)

As the line of Lommy devices are constantly evolving, some of the features in this document are only supported on the newer devices; currently Flextrack have "Generation 1" devices, based on the "Phoenix platform" and "Generation 2" devices, based on the "Blackbird platform". Although the "Generation 1" devices support many of the features in this manual, it is only the "Generation 2" devices that fully support the "Standard Tracker Application".

For a complete list of available units and their specific features, please contact Flextrack or one of our authorized dealers/integrators (see www.flextrack.dk for further information).

WHAT IS THE GPS SYSTEM?

The GPS system is a satellite-based radio navigation system developed and operated by the U.S. Department of Defense (DOD). GPS permits land, sea, and airborne users to determine their three-dimensional position, velocity, and time 24 hours a day, in all weather, anywhere in the world with a precision and accuracy far better than other radio navigation systems available today or in the foreseeable future.

One of the 28 satellites

The 28 satellites orbits the earth in 6 planes

The GPS concept of operation is based upon satellite ranging. Currently the GPS network consists of 28 satellites orbiting the earth. Users figure their position on the earth by measuring their distance from the group of satellites in space. The satellites act as precise reference points.
Each GPS satellite transmits an accurate position and time signal. The user's receiver measures the time delay for the signal to reach the receiver, which is the direct measure of the apparent range to the satellite. Measurements collected simultaneously from at least four satellites are processed to solve for the three dimensions of position, velocity and time.

WHAT IS GPRS?

GPRS facilitates instant connections whereby information can be sent or received immediately as the need arises, subject to radio coverage. No dial-up modem connection is necessary. This is why GPRS users are sometimes referred to as being "always connected". Immediacy is one of the advantages of GPRS (and SMS) when compared to Circuit Switched Data. High immediacy is a very important feature for time critical applications such as tracking persons or vehicles where it would be unacceptable to wait for a dial-up connection to be established, or where the added cost of sending SMS messages would make running the application too expensive.

Because of the Flextrack Lommy® unit is equipped with GPRS (and GSM) technology, the unit is connected to the global Internet, making system integration with back-end (server) systems easy.

The GPRS service runs on the same frequencies as the GSM network, and is an integrated part of that.
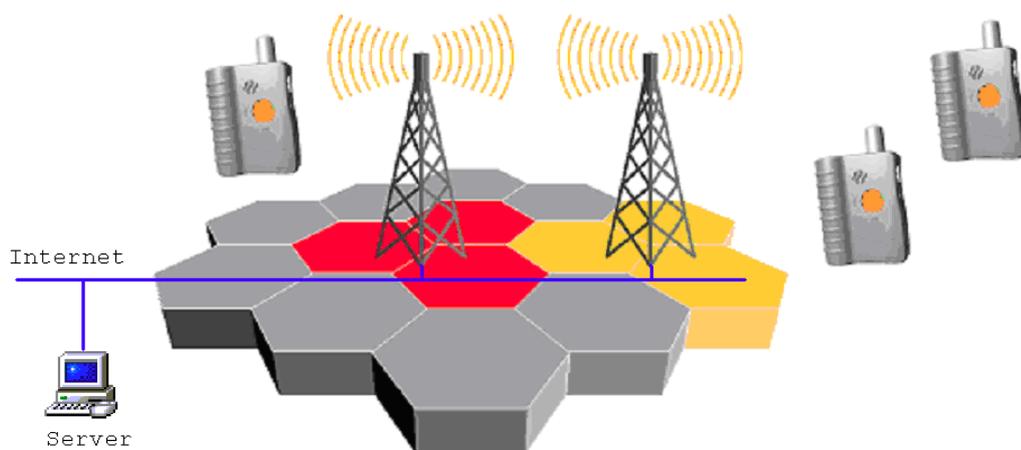
INDICATORS

The Standard Tracker Application uses some of the LED's on the various models to show operational status. Depending on the actual hardware the application is running on, some of the indicators are used and some are not.

The following 3 LED's are supported on all devices, in the future some devices will have more indicators, and these will also be implemented in the Standard Tracker Application

RED LED

The red indicator is flashing while charging and fully lit up when charging has completed. If the red indicator is flashing with no charger connected, the battery must be recharged.

YELLOW LED

The yellow indicator is on while the Lommy is starting up and initializing. Giving one flash the unit is on and giving two flashes it is connected to a server using the FlexCI2 protocol. If the LED is on constantly, it can either indicate that the battery voltage is too low to switch on the GSM module, or that there is no SIM card present.

BLUE LED

The blue light is indicating GPS reception. Giving one flash there is no GPS coverage, else it will give one flash and a number of short flashes indicating the number of GPS satellites seen while the GPS is on.

GREEN LED

The green light is indicating GSM status. Giving one flash, the device is connected to a GSM base station, solid light means that a voice call is in progress.

CONFIGURATION

The Tracker Application can be configured to do many different tasks. A large number of parameters (and commands) control how the application reacts, most parameters are common for all the different Lommy models, but some models have some extra parameters to control their specific hardware (for example voice functions on the portable devices).

The parameters can be configured when the device is connected to a PC, often by uploading a configuration file to the device, or by using a small "configuration application". The "connected" way of setting parameters in the device depends on the type of device and what capabilities it has for PC communication (for example, the Generation 1 (Phoenix) devices uses a small configuration tool called "PConfig", and the Generation 2 (Blackbird, Robin etc) line of devices uses configuration files that are transferred to the device)

However, all devices can have their parameters changed "over the air", using SMS messages or using the FlexCI (TCP/IP socket) command interface, this is the method used when the device has been deployed in the field. There are a number of commands available that can get and set the individual parameters, or on some units, even FTP file transfer (on Generation 2 units) can be used to change the configuration file in one single operation (the file is called tracker.fps).

As an example of how easy it is to change a parameter, let's say you need to change the report interval of a device. The parameter that controls this is called "REPORT-INTERVAL". To query the value of this, you can send the following command:

CONF?REPORT-INTERVAL

The device will answer back with the current value of the parameter. If you want to change this, you can send the following command:

CONF:REPORT-INTERVAL,120

This changes the parameters value to 120 (seconds in this particular case)

The Generation 2 devices have an extended way of setting parameters as some of the parameters reside in different configuration files, more information about this in the description of parameters.

COMMANDS

The Flextrack Lommy units can be controlled using a number of commands. The commands can be sent using either normal text SMS messages or through the FlexCI (TCP/IP socket) protocol.
The messages allow you to query the state of different sub-systems in the unit, modify configuration parameters etc.

Please note that the syntax for the commands has to be followed exactly, all commands must be written as stated below!

The "SL" field describes the security level needed for the command to be executed, high level means that only a sender that has its number listed in the "SMSSENDER" or "FLEXSERVER-SMS" parameter are allowed to send this command by SMS, low security level commands can be accepted from any sender.

THE AUTOEXEC.BAT FILE

The application also supports the use of a "autoexec.bat" file. If this file is present on the disk drive of the device, each line of the file is handled as command. Each command is executed after each other.

An example of a autoexec.bat file:

```
OWTEMP-CLEAR
OWTEMP-SCAN
OWTEMP-REPORT-INTERVAL,600
```

This file executes the three commands one after each other, effectively clearing the list of 1Wire temperature sensors, scanning the 1Wire bus for temperature sensors (and configures them), and finally sets the report interval for the temperature sensors to 5 minutes.

STATUS MESSAGES

The unit can send a number of different status messages, some of the messages will be sent when specific events occurs (alarm on a device on the 1Wire bus, when a Lommy-Tag is heard, status for inputs etc.)

One of the most important status messages is probably the UNITSTAT message.
The UNITSTAT message contains a lot of information for the unit, most importantly the current date and time (UTC), the current position (Lat/Lon) of the unit, speed and heading.
All of the fields contained in a UNITSTAT message can be enabled/disabled using a parameter (bitmask) in the device (UNITSTAT-FIELDS and FLEXTREAM-FIELDS parameters). If done, depending on the GSM provider, you can save some money on the GSM traffic by omitting parameters that are not used in your particular system.

CONTENTS OF UNITSTAT REPORT

The UNITSTAT report consists of a number of fields (which one are sent can be controlled with the UNITSTAT-FIELDS and FLEXSTREAM-FIELDS parameters, see below)

Field	Example	Description
UNITSTAT	UNITSTAT	Identifies the message
Date [YYYYMMDD]	20050205	The date in UTC
Time [HHMMSS]	181923	The time in UTC
NodeID	700004634	The Flextrack unit's nodeid
Latitude [DD.MM.DECM]	N55.12.0812	The latitude in degrees, minutes and decimal minutes (a leading "N" or "S" identifies the position as north or south of the equator)
Longitude [DDD.MM.DECM]	E9.58.1665	The longitude in degrees, minutes and decimal minutes (a leading "E" or "W" identifies the position as east or west of Greenwich)
Speed	122	Speed over ground in kilometers per hour
Direction	198	The compass heading in degrees
SV	6	Number of GPS satellites used for position fix
Voltage	3934	Current voltage of the battery in mVolts
Signal strength	-81	Current signal strength of the GSM base station in dBm
Unit State	000001A8	State of inputs and various states, coded as 8 ASCII Hex digits (32 bits). A detailed description of the field can be found below.
Current network	23802	Country code (3 digits) and GSM provider code (2 digits)
Height	213	Meters above sea level (MSL)
HDOP	92	The current HDOP value (multiplied with 10, 92 equals 9.2)
CellID	12FE	The cell id of the current GSM base station, 4 hex digits
Elapsed time for GPS fix	45	The elapsed time for getting a GPS fix after going to report in seconds
Locacion Area Code (LAC)	0055	The LAC from the GSM network
Odometer	12989	Odometer value calculated and shown if parameter ODOMETER is set.
GLimit exceeded	123	Number of times the GLimit has been exceeded

A typical UNITSTAT message could look like this:

UNITSTAT,20110115,115831,3100407001,N55.46.4750,E9.38.0942,0,351,10,4193,-79,3,23802,74,92,8220,1,0059,13290858,42

If we break the message up in separate fields:

UNITSTAT,	Keyword that shows the server that this is a UNITSTAT message
20110115,	current UTC date, January 15. 2011
115831,	current UTC time, 11:58:31
3100407001,	serial number of the device
N55.22.4750,	current latitude (degrees, minutes and decimal degress)
E9.12.0942,	current longitude (degrees, minutes and decimal degress)
0,	current speed (in km/h)
351,	heading in degrees (0..359)
10,	number of GPS satellites used for the position calculation
4193,	battery voltage (in millivolt)
-79,	GSM signal strength (in dBm)
3,	unitstate for the unit (see below)
23802,	GSM provider (238 is country, 02 is provider code)
74,	Height (I meters)
92,	current HDOP (horizontal Dilution of Precision) value is in x10 (actual is 9.2)
8220,	GSM Cell ID
1,	Time To Fix, number of seconds acquiring the GPS position
0059,	GSM LAC code
13290858,	odometer value (typically number of meters travelled, see ODOMETER parameter)
42	GLimit exceeded counter (see MOVE-GLIMIT parameter).

The unitstate field described above in the UNITSTAT reports, consists of a number of bits, each one signals a specific condition in the device. Using the STATEMASK variables, it is possible to configure which of these conditions should trigger a new UNITSTAT message (normally UNITSTAT messages are sent according to the REPORT-INTERVAL parameters).

When setting the corresponding bit in the STATEMASK parameters, a UNITSTAT message is sent when the condition occurs, and also when the condition disappears. For example, if bit 24 is set, a UNITSTAT message is sent (with bit 24=1 in the unitstate field) when one of the 1Wire temperature sensors detects an alarm. When the condition is removed (no more temperature sensors in alarm), a new UNITSTAT message is sent (this time with bit 24=0 in the unitstate field).

The unitstate/STATEMASK field consists of 64 bits:

Bit	Description
37	Button "D" pressed
36	Button "C" pressed
35	Reserved
34	Device has "ignition" (either input 1 active, or if EXTPOWER-IGN is '1'/'2' and device has external power)
33	Supply voltage to the device is below the value set in parameter SUPPLY-LOWVOLTAGE
32	Device is "speeding" (set with MAX-SPEED parameters)
31	Alarm on one or more 1Wire humidity sensors

Bit	Description
30	G Limit has been exceeded
29	Beacon feature enabled
28	A unconnected tag ("wolf") has been heard
27	A connected tag ("sheep") is not heard in time
26	A connected tag has lost connection with the unit is was configured for
25	Sharpturn has been detected
24	Alarm on one or more 1Wire temperature sensors
23	A known/configured 1Wire driver ID has been connected
22	State of digital output 2
21	State of digital output 1
20	GSampler was activated
19	State of input 4
18	State of input 3
17	State of input 2
16	State of input 1
15	Device is moving
14	Geofence is active
13	Geofence has been broken
12	Deadman alarm
11	Movement alarm (movement detector)
10	Button "B" pressed
9	Button "A" pressed
8	Lastgood indicator
7	Offhook (voice call in progress)
6	
5	
4	Function button pressed
3	
2	Low battery detected
1/0	Charge state 00 : No charger connected 01: undefined 10: Charge in progress 11: Charge complete

CHECKING BITS IN THE UNITSTATE OF UNITSTAT REPORT

Sometimes it can be a little complicated how to check the many bits that are present in some of the status messages, there are many ways of doing so, and there are differences between the various programming languages, but a simple way of checking the bits of the unitstate field of the UNITSTAT message (in C language) is shown below:

```
unsigned long long CurrentUnitState; // contains the value of the unitstate field from
                                      // the UNITSTAT message
unsigned long long OldUnitState=0xDEADFACE; // Remembers the old unitstate value
unsigned long long CurrentStateMask;        // Bitmask to check

CurrentUnitState = 0x0000000000008003; // example, device is moving (bit 15) and charge is
                                       // complete (bit 1/0)

// Check if device is moving (bit 15)
if (CurrentUnitState & (1<<15)) {
  printf("Device is moving\n");
else
  printf("Device is not moving\n");

//--------------------------------------------------------------------------------

 CurrentUnitStateMask = 0x0000000000008200; // We are interested in bit 15 and bit 13
                                            // Bit 15 is "moving" and bit 13 is "geofence
                                            //  broken"

  // If the state has changed since last time...
  if (CurrentUnitState != OldUnitState) {
    unsigned long long xor; // Which bits has changed since last time

   // Detect which bits changed state
   xor=CurrentUnitState ^ OldUnitState; // The changed bits are now '1'
   OldUnitState=CurrentUnitState;

   // If the bits we are interested in have changed, return true
   if ((xor & CurrentStateMask) > 0) {
     printf("Bits that have changed: %016llX\n", xor);
     if (xor & (1<<15))
       printf("Moving status has changed\n");
   }
 }
```

PARAMETERS THAT CONTROLS CONTENTS OF UNITSTAT REPORTS

A couple of parameters control the contents of the UNITSTAT messages, which fields are included when they are sent.
If a specific application does not need some of the parameters, the bitmask fields can be configured for this

Parameter	Value	Must Reset	Description
UNITSTAT-FIELDS	[0..FFFFFFFF] **0003FFFF**	No	Bitmask that decides which fields to include in the UNITSTAT message sent over FlexCI interface
FLEXSTREAM-FIELDS	[0..FFFFFFFF] **0003FFFF**	No	Bitmask that decides which fields to include in the UNITSTAT message sent over Flexstream interface

The meaning of the bits in the UNITSTAT-FIELDS and FLEXTREAM-FIELDS are:

Bit	Description
31	
30	
29	
28	
27	
26	
25	
24	
23	
22	
21	
20	
19	
18	Number of times G limit was exceeded
17	Odometer value
16	GSM LAC code
15	TTF (time to fix)
14	GSM Cell ID
13	HDOP
12	Height
11	GSM provider
10	Unitstate
9	GSM signal strength
8	Battery voltage
7	Number of satellites used
6	Course
5	Speed
4	Longitude
3	Latitude
2	Serial number of device
1	Time
0	Date

As an example, let's say that UNITSTAT-FIELDS are set to "000000FF". This would enable the following 8 fields to be sent in a UNITSTAT message:

UNITSTAT,	Keyword that shows the server that this is a UNITSTAT message
20110115,	current UTC date, January 15. 2011
115831,	current UTC time, 11:58:31
3100407001,	serial number of the device
N55.46.4750,	current latitude (degrees, minutes and decimal degrees)
E9.38.0942,	current longitude (degrees, minutes and decimal degrees)
0,	current speed (in km/h)
351,	heading in degrees (0..359)
10	number of GPS satellites used for the position calculation

CONTENTS OF OWDID-DISCOVER REPORT

The OWDID-DISCOVER message will be sent whenever a Driver ID button is connected to the 1Wire bus

Field	Example	Description
OWDID-DISCOVER	OWDID-DISCOVER	Identifies the message
Date [YYYYMMDD]	20050205	The date
Time [HHMMSS]	181923	The time in UTC
HW Address	aabbccddeeffgghh	The hardware address of the iButton seen
Status	00	Binary representation of State of inputs and various states, coded as 2 ASCII Hex digits. bit0 is raised when a device has been connected and read bit 1 is raised when the device read were found in the list of stored devices (OWDID-INSERT) Bit 23 in the STATE field of the UNITSTAT message is also set while a driverid is connected

Example:

OWDID-DISCOVER,20080820,090623,000012066D3A,00

CONTENTS OF OWTEMP-REPORT

The 1Wire bus can be connected to up to 8 temperature sensors.
The OWTEMP-REPORT message will be sent at a specific interval (OWTEMP-REPORT-INTERVAL) or when there is a change in a temperature sensors alarm state.

Field	Example	Description
OWTEMP-REPORT	OWTEMP-REPORT	Identifies the message
Date [YYYYMMDD]	20050205	The date
Time [HHMMSS]	181923	The time in UTC
HW Address	aabbccddeeffgghh	The hardware address of the temperature sensor
Temp	200	Current temperature in 1/10 degree Celsius (shown as 0 if device does not respond, status value is 00)
Status	01	status field (binary coded), and is coded as follows: bit 0: Is 1 if device is responding bit 1: Is 1 if low temperature alarm bit 2: Is 1 if high temperature alarm Bit 24 in the STATE field of the UNITSTAT message is also set
HW Address		
Temp		
Status		
HW Address		
Temp		
Status		
...		
...		
...		

The fields HW Address, Temp & Status are continued the number of sensors configured.

Example:

OWTEMP-REPORT,20080820,090623,289D7C6C01000080,225,01

CONTENTS OF OWRH-REPORT

The 1Wire bus can be connected to up to 8 humidity/temperature sensors.
The OWRH-REPORT message will be sent at a specific interval (**OWRH-REPORT-INTERVAL**) or when there is a change in a humidity sensors alarm state.

Field	Example	Description
OWRH-REPORT	OWRH-REPORT	Identifies the message
Date [YYYYMMDD]	20050205	The date
Time [HHMMSS]	181923	The time in UTC
HW Address	aabbccddeeffgghh	The hardware address of the temperature sensor
Humidity	65	Current humidity in % RH. Value is temperature compensated using the internal temperature sensor.
Temp	231	Current temperature in 1/10 degree Celsius
Status	01	status field (binary coded), and is coded as follows: bit 0: Is 1 if device is responding; bit 1: Is 1 if low humidity alarm; bit 2: Is 1 if high humidity alarm. Bit 31 in the STATE field of the UNITSTAT message is also set
HW Address		
Humidity		
Temp		
Status		
HW Address		
Humidity		
Temp		
Status		
…		
…		
…		

The fields HW Address, Humidity, Temp & Status are continued the number of sensors configured.

Example:

OWRH-REPORT,20080820,090623,289D7C6C01000080,67,231,01,289D7C6D01300080,66,233,01

CONTENTS OF OPT-STATUS REPORT

The OPT-STATUS report is sent at a specific interval (OPT-REPORT-INTERVAL), it contains the state of the different inputs as well as a "hour counter" for each input.

Field	Example	Description
OPT-STATUS	OPT-STATUS	Identifies the message
DATE[YYYYMMDD]	20050205	The date in UTC
TIME[HHMMSS]	182033	The time in UTC
Input 1	120	Analog value for input 1 (0..1023)
Input 2	968	Analog value for input 2 (0..1023)
HOURVALUE 1	221	Number of minutes (accumulated) input 1 has been active (level is configured with OPT-THRESHOLDS)
HOURVALUE 2	23433	Number of minutes (accumulated) input 2 has been active (level is configured with OPT-THRESHOLDS)

The value reported in "Input 1" is the 1+0 bit analog value measured on the port. Please consult the specifications of the inputs for the specific unit. Typically the span is 0..60 volt.

For a unit with a input voltage span of 60 volt, the formula looks like this:

Voltage = (count / 1023) * 60, in the above example where input 1 reports a count of 120:

Voltage = (120/1023) * 60 = 7.04 volts

Example:

OPT-STATUS,20080820,090623,120,968,221,23433

CONTENTS OF WOLF-HEARD REPORT

The WOLF-HEARD message is sent when a Lommy-Tag (unconnected tag) is entering the range of the Lommy. The Lommy is only listening for Lommy-Tags if parameter BEACON is set to 3.
If STATEMASK bit 28 is set to '1', a UNITSTAT report is also generated whenever a Lommy-Tag (unconnected tag) enters the range of the Lommy.

Field	Example	Description
WOLF-HEARD	WOLF-HEARD	Identifies the message
Date [YYYYMMDD]	20090923	The date in UTC
Time [HHMMSS]	115745	The time in UTC
Tag ID	0938000011	ID of the tag heard
RSSI	-91	Signal strength of the signal received from the tag in dBm

Status	03	Last status of the device:
		Bit 7: 1 => tag is a listed unconnected tag, 0=>"normal" unconnected tag
		Bit 1/0: battery level
		  00=> Battery <20%
		  01=> Battery <40%
		  10=>Battery<60%,
		  11=> Battery >=60%

Example:

WOLF-HEARD,20090923,115745,0938000011,-91,03

CONTENTS OF WOLF-REMOVED REPORT

The WOLF-REMOVED message is sent when Lommy-Tag (unconnected tag) was previously in range of this Lommy, but hasn't been heard for the period given in the parameter WOLF-TIMEOUT.
If STATEMASK bit 28 is set to '1', a UNITSTAT report is also generated

Field	Example	Description
WOLF-REMOVED	WOLF-REMOVED	Identifies the message
Date [YYYYMMDD]	20090923	The date in UTC
Time [HHMMSS]	115945	The time in UTC
Tag ID	0938000011	ID of the tag heard

Example:

WOLF-REMOVED,20090923,115945,0938000011

CONTENTS OF WOLF-ALIVE REPORT

The WOLF-ALIVE message is sent every WOLF-REPORT-INTERVAL number of seconds and if one of the buttons that have their corresponding bit in STATEMASK set is pressed.
The message contains a list of currently heard un-connected tags and their status and signal strength.
If a listed unconnected tag transmits, and it is known in the wolflist.fps file, it is not included in the WOLF-ALIVE message.

Field	Example	Description
WOLF-ALIVE	WOLF-ALIVE	Identifies the message
Date [YYYYMMDD]	20090923	The date in UTC
Time [HHMMSS]	115945	The time in UTC
Tag ID	0938000011	ID of the tag heard
RSSI	-91	Signal strength of the signal received from the tag in dBm

Status	03	Last status of the device:
		Bit 7: 1 => tag is a listed unconnected tag, 0=>"normal" unconnected tag
		Bit 1/0: battery level
		   00=> Battery <20%
		   01=> Battery <40%
		   10=>Battery<60%,
		   11=> Battery >=60%

Tag ID		
RSSI		
Status		
Tag ID		
RSSI		
Status		
...		
...		
...		
Reason	0000	Reason code for the message to be sent: Bit 0: 1 => message sent due to state change according to WOLF-STATEMASK

Example (currently the Lommy can hear 3 un-connected tags):

WOLF-ALIVE,20090923,115945,0938000011,-66,03,0932100011,-44,03,0967760011,-86,02,0000

CONTENTS OF SHEEP-ALARM REPORT

The SHEEP-ALARM message is sent when Lommy-Tag (connected tag) has not been heard for the last number of configured seconds (when a connected tag is configured in the Lommy, a timeout for each connected tag is set) If STATEMASK bit 27 is set to '1', a UNITSTAT report is also generated. The report is also generated when a tag previously in error, is heard again (status bit 2 is then 0)

Field	Example	Description
SHEEP-ALARM	SHEEP-ALARM	Identifies the message
Date [YYYYMMDD]	20090923	The date in UTC
Time [HHMMSS]	115945	The time in UTC
Tag ID	0938000011	ID of the tag heard

Status	03	Last status of the device:
		Bit 2: Alarm state (1 alarm, 0 no alarm)
		Bit 1/0: battery level
		  00=> Battery <20%
		  01=> Battery <40%
		  10=>Battery<60%,
		  11=> Battery >=60%

Example:

SHEEP-ALARM,20090923,115945,0938000011,03

CONTENTS OF SHEEP-SOS REPORT

If a connected Lommy-Tag is configured in a Lommy device, but can no longer communicate with the Lommy device (out of range), the connected tag enters a "panic" mode. When such a tag in panic mode is heard by another Lommy device, this Lommy will send a SHEEP-SOS report to the server.

If STATEMASK bit 26 is set to '1', a UNITSTAT report is also generated.

Field	Example	Description
SHEEP-ALARM	SHEEP-ALARM	Identifies the message
Date [YYYYMMDD]	20090923	The date in UTC
Time [HHMMSS]	115945	The time in UTC
Tag ID	0938000011	ID of the tag heard
RSSI	-91	Signal strength of the signal received from the tag in dBm
Status	03	Last status of the device: Bit 1/0: battery level 00=> Battery <20% 01=> Battery <40% 10=>Battery<60%, 11=> Battery >=60%

Example:

SHEEP-SOS,20090923,115945,0938000011,-76,02

CONTENTS OF CTAG REPORT

When the parameter **CLIMATAG-REPORT** is set to "1" alle climatags heard will be reported to the server using the CTAG message.

Field	Example	Description
CTAG	CTAG	Identifies the message
Date [YYYYMMDD]	20090923	The date in UTC
Time [HHMMSS]	115945	The time in UTC
Tag ID	0000004708	ID of the tag heard
Humidity	43	Relative humidity in %
Temperature	253	Current temperature in 1/10 deg C
RSSI	-91	Signal strength of the signal received from the tag in dBm
Status	03	Last status of the device: Bit 1/0: battery level 00=> Battery <20% 01=> Battery <40% 10=>Battery<60%, 11=> Battery >=60%

Example:

CTAG,20120511,091440,0000004708,43,253,-91,03

CONTENTS OF GSM-INFO REPORT

The GSM-INFO command returns information for the serving GSM cell, and data for up to 6 neighboring cells.

	Field	Example	Description
	MCC	238	Mobile Country Code (238 is Denmark)
	MNC	2	Mobile Network Code (code for the operator)
	LAC	0059	Location Area Code (hexadecimal)
	CI	7565	Cell Identifier (hexadecimal)
	Channel	102	Channel
	RX Level	93	Signal strength the base is heard with (in –dBm, 93 is -93 dBm)
Neighbour 1	LAC	0059	Location Area Code (hexadecimal)
	CI	7565	Cell Identifier (hexadecimal)
	Channel	102	Channel
	RX Level	93	Signal strength the base is heard with (in –dBm, 93 is -93 dBm)
Neighbour 2	LAC	0059	Location Area Code (hexadecimal)
	CI	8100	Cell Identifier (hexadecimal)
	Channel	98	Channel
	RX Level	66	Signal strength the base is heard with (in –dBm, 66 is -66 dBm)
	Continued for up to 6 neighbour cells		

Example:

238,2,0059,7565,102,93,0059,8220,76,93
Only info for the serving cell and one neighbor cell is returned (data for up to 6 neighbor cells can be included in the response)

CONTENTS OF GSAMLER REPORT

The GDATA,5 report is sent whenever the GSampler has data to report to the server. The data are typically sent using a number of reports (the data can be quite large, up to approx 7 KB)

The first GDATA,5 message sent will contain more info than the rest of the messages:

Field	Example	Description
GDATA,5	GDATA,5	Identifies the message
Date [YYYYMMDD]	20090923	The date in UTC
Time [HHMMSS]	115945	The time in UTC
Latitude [DD.MM.DECM]	N55.12.0812	The latitude in degrees, minutes and decimal minutes (a leading "N" or "S" identifies the position as north or south of the equator)
Longitude [DDD.MM.DECM]	E9.58.1665	The longitude in degrees, minutes and decimal minutes (a leading "E" or "W" identifies the position as east or west of Greenwich)
Speed	122	Speed over ground in kilometers per hour
Direction	198	The compass heading in degrees
SV	6	Number of GPS satellites used for position fix
Height	213	Meters above sea level (MSL)
HDOP	92	The current HDOP value (multiplied with 10, 92 equals 9.2)
Samples	43	Number of datasets in the data follwoing
<data>	123,322,456<tab>33,44,22……	The sample data, each set of X/Y/Z will be separated by the tabulator character (0x09) (data will be continued in the next GDATA,5 message)

The following GDATA,5 messages will only contain the date/time and sample data:

Field	Example	Description
GDATA,5	GDATA,5	Identifies the message
Date [YYYYMMDD]	20090923	The date in UTC
Time [HHMMSS]	115945	The time in UTC
<data>	123,322,456<tab>33,44,22……	The sample data, each set of X/Y/Z will be separated by the tabulator character (0x09) (data will be continued in the next GDATA,5 message)

Example:

First messages:
GDATA,5,20110511,110557,N55.46.4751,E9.38.0965,148,208,8,63,16,42,452,293,67<tab>378,312,164<tab>134,21,36<tab>432,101,86<tab>-149,120,-377<tab>63,-6,139<tab>12,-18,-26<tab>23,4,-26<tab>-19,-15,-455<tab>62,25,-190<tab>88,-39,613<tab>242,57,69<tab>114,16,6<tab>110,6,196<tab>50,-34,202<tab>73,13,10<tab>34,13,-40<tab>20,16,

The following message(s):
GDATA,5,20110511,110557,-114<tab>13,23,-324<tab>76,14,-5<tab>-18,-35,198<tab>127,-3,339<tab>134,58,231<tab>87,47,-26<tab>-26,-36,-97<tab>0,-9,-9<tab>-1,-4,-48<tab>5,-1,-14<tab>5,1,-14<tab>15,1,19 22,5,60<tab>22,4,58<tab>16,4,-7<tab>-4,-15,-32<tab>6,-2,-2<tab>16,9,13<tab>14,0,30<tab>15,4,27<tab>13,2,4<tab>14,2,16<tab>13,3,8<tab>12,2,23

CONTENTS OF SMS REDIRECT REPORT

The GDATA,7 report is sent whenever the device receives an SMS message (from someone that is not listed in the **SMSSENDER** and **FLEXSERVER-SMS**).

The GDATA,7 message can also be sent from the server to the device, in this case the message will be sent to the number as a SMS message (in this case the message contains no date/time fields)

Contents of the message:

Field	Example	Description
GDATA,7	GDATA,7	Identifies the message
Date [YYYYMMDD]	20090923	The date in UTC
Time [HHMMSS]	115945	The time in UTC
Number	+4512345678	The number the message was sent from
Message	Hello world	The message from the sender

Example:

First messages:
GDATA,7,20110511,110557,+4512345678,Hello World

CONTENTS OF FLEETMAN REPORT

The FLEETMAN report is sent as a HTTP GET request to a specified server (set by **FLEETMAN** parameter)

Contents of the message:

Field	Example	Description
"FLEETMAN"	www.server.com/httprece iver.dll	The contents of the **FLEETMAN** parameter
Date [YYYYMMDD]	20090923	The date in UTC
Time [HHMMSS]	115945	The time in UTC
Number	+4512345678	The number the message was sent from
Message	Hello world	The message from the sender

Example:

First messages:
GDATA,7,20110511,110557,+4512345678,Hello World

CORE FUNCTIONS

The device has a number of "core functions". This core functionality makes sure the device can connect to the GSM network, that it is possible to get a "system health" status from the device, connect to a FlexCI server, upload new software to the device etc.

A number of commands and parameters control the basic functionality, these are listed below.

SYSTEM COMMANDS

Command	Example	SL	Description
STAT	STAT	Low	Sends a SMS message with the status of the unit, battery voltage, signal level etc.
RELOAD [<IP> <TYPE>]	RELOAD 120.121.122.123 3	High	Starts the download of new firmware and/or application from a server (using HTTP). Please note that 'APN', 'DNS', 'USERNAME' and 'PASSWORD' must be configured correctly for this to work. Firmware file must be named "firmware.tmp" and application file must be name "userapp.tmp" on the server. Type: 1 Firmware 2 Application 3 Firmware+Application When the RELOAD command is executed, the connection (FlexCI) to the server is immediately closed! The HTTP GET command sent to the server contains also "?n=xxxxxxx" where xxxxxx is the units serial number
SRELOAD [<IP> <TYPE>]	SRELOAD 120.121.122.123 3	High	Starts the download of new firmware and/or application from a server (using HTTP). The download will automatically resume should an network error occur (retry max 10 times with 10 minutes between each). Please ask Flextrack for further information! Please note that 'APN', 'DNS', 'USERNAME' and 'PASSWORD' must be configured correctly for this to work. Firmware file must be named "firmware.tmp" and application file must be name "userapp.tmp" on the server. Type: 1 Firmware 2 Application 3 Firmware+Application When the SRELOAD command is executed, the connection (FlexCI) to the server is immediately closed! The HTTP GET command sent to the server contains also "?n=xxxxxxx" where xxxxxx is the units serial number.
FTPGET <IP>,<REMOTENAME>,< LOCALNAME>[,<ACKFIL	ftpget user:password@www.domain. com,/Public/test.txt,\test.txt,/P	High	Fetch a file using FTP from a FTP server The file "test.txt" from the root of drive A: on the device, is copied to the folder "Public" on

Command	Example	SL	Description
E>	ublic/done.ack		the FTP server and named "test.txt". If ACKFILE is specified, a file with that name, and length of 0, is written to the FTP server once the file has been fetched successfully.
FTPPUT <IP>,<REMOTENAME>,< LOCALNAME>[,<ACKFIL E>	ftpput user:password@www.domain. com,/Public/tracker.fps,\tracke r.fps, /Public/finished.ack	High	Put a file from the device to a FTP server The file tracker.fps in folder "Public" on the FTP server is copied to tracker.fps on the root of drive A: on the device. If ACKFILE is specified, a file with that name, and length of 0, is written to the FTP server once the file has been stored successfully on the server.
GETFILE <IP> <NAME>[<LOCALFILE>]	GETFILE www.domain.com:80 firmware.sfw localfile.bin	High	Copy a file from a HTTP server (using HTTP GET command) In the example, the file "firmware.sfw" is copied locafile.bin at the root of drive A: in the device. If localfile.bin was omitted, firmware.sfw would be copied to the root of the A: drive (local name same as remote name)
DELFILE <NAME>	DELFILE A:\test.txt	High	Delete a file in the units disk system. Userapp.fal and tracker.fps cannot be deleted!
RESET	RESET	High	The unit will be reset
ICCID	ICCID	High	Will return the ID of the SIM card in the unit
IMEI	IMEI	High	Returns the IMEI of the GSM module in the unit
POWERDOWN	POWERDOWN 60	High	The unit will power down and wake up again after the specified number of minutes has elapsed. During power down the unit can be switched on manually as normal (or the G force sensor can be configured to wake the device up)
POWEROFF	POWEROFF	High	The unit will be switched off. You must manually switch on the unit again.
TIME	TIME YYMMDDHHMMSS	High	Sets the current UTC time of the device, YY is year (00..99), MO is month (01..12), DD is date (01..31),HH is hour (00..23), MM is minutes (00..59) and SS is seconds (00..59)
GSM-INFO	GSM-INFO	High	Returns info for serving cell and data for (up to) 6 neighbour cells
STAT-IO	STAT-IO	High	Returns the status of the in- and outputs of the unit (both the analog voltage, and the logic state of the input according to OPT-THRESHOLDS parameter)
OPT-DO1	[OPT-DO1:ON/ OPT-DO1:OFF]	High	Set output 1 on or off
OPT-DO1:PULSE,<MS>	OPT-DO1:PULSE,100	High	Set output 1 high for a number of milliseconds. Maximum is 3600000 milliseconds (1 hour)
OPT-TIMER <inputnum> <value>	OPT-TIMER 1,23	High	Set new value for one of the hour counters for the inputs (value is in minutes)
GDATA,7,<number>,<mess age>	GDATA,7,+4512345678,Hello World	High	The device sends the message "Hello World" as a SMS message to the number "+4512345678"
STAT-BUF	STAT-BUF	High	Returns the number of entries in the circular buffers for FlexCI, FlexStream and FlexNav

Command	Example	SL	Description
SAVEDEBUG	SAVEDEBUG a:\dump.txt	High	Stores the contents of the debug buffer to <filename>. The debug buffer can contain 64 Kbyte.

SYSTEM PARAMETERS, BASIC

Parameter	Value	Must Reset	Description
PIN	1234	Yes	Pin code for the SIM card
APN	internet	Yes	APN name for attaching to internet via GPRS
USERNAME	user	Yes	Username for attaching to internet via GPRS
PASSWORD	password	Yes	Password for attaching to internet via GPRS
DNS	122.133.144.155	Yes	DNS server IP address, on some networks this must be specified, on other networks it can be blank.
DEBUGFILE	dump.txt	Yes	Saves all debug info to a file. Be careful, no check of full disk is made, use with care!
FLEXSERVER-IP	www.server.com:12345 **fs1.care4all.dk:30000**	Yes	IP address and port number to use for connecting to a FlexServer. If this parameter is set to SMS, no connection will be made, but instead the FlexCI interface will behave as if there is no connection (SMS messages will be used for sending UNITSTA messages) (If set to SMS, please make sure that the parameter ENABLE-SMS-UNITSTAT parameter to 1 in the file storage.fps !)
FLEXSERVER-IP-SEC	www.server-2.com:12345	Yes	IP address and port number to use for contacting a secondary FlexServer. This IP will be used if the "*FLEXSERVER-IP*" is not responding.
FLEXSERVER-SMS	+4512345678,+4577665544 **+4550503185**		List of SMS phone numbers to use for contacting a FlexServer if not possible to establish a GPRS connection. A message is sent to each number in the list
FLEXSERVER-IDLE	[180..99999] **0**	Yes	Number of seconds between "keep alive" communication to the FlexServer. If set to 0 no "keep alive" communication is sent. The keep alive communication consists only of a <CR>. The FlexServer should answer back with a <CR>.
FLEXSERVER-CIRCULAR	[0..10000] **10**	Yes	Circular buffers for messages sent over GPRS. The parameter sets the number of entries in the buffer, if set to 0 the buffers are disabled (the messages are sent immediately if device is connected to a server else they are discarded). If REPORT-INTERVAL is equal or below 7 seconds, the buffer is disabled (it would not be able to keep up with the high rate of reports)
FLEXSTREAM-CIRCULAR	[1..2000] **120**	Yes	Circular buffers for messages sent over the UDP Flexstream **connection**. The parameter sets the number of entries in the buffer.
FLEXSTREAM-IP	[www.server.com:12345] [AUTO]	No	IP address and port number to use for contacting a FlexServer using UDP. Only UNITSTAT's will be sent to this service. If set to "AUTO" the FlexStream interface uses the same IP (and port) as the FlexCI interface is using (FLEXSERVER-IP / FLEXSERVER-IP-SEC)
FLEXSTREAM-ACK	[0/1] **0**	Yes	If this parameter is set to "1" the messages sent

Parameter	Value	Must Reset	Description
			over the Flexstream interface (UDP) must be "Ack'ed" by the server (the same way as the FlexCI interface). If set to "0" the messages are just sent "blindly" to the server.
STATEMASK	[0000000000000000..FFFFFFFFFFFFFFFF] **00000000FDFFFFFE**	No	A bitmask used to identify when the *"UNITSTAT"* message should be sent, a '1' in a bit in the mask will force the unit to send the *"UNITSTAT"* command whenever the corresponding bit in the Unit State field changes state. This mask is used when connected to the server in FlexCI mode. See section *"UNITSTAT reports"*
STATEMASK-SMS	[0000000000000000..FFFFFFFFFFFFFFFF] **00000000FDFFFFFE**	No	A mask used to identify when the *"UNITSTAT"* message should be sent, a '1' in a bit in the mask will force the unit to send the *"UNITSTAT"* command whenever the corresponding bit in the Unit State field changes state. This mask is used when sending UNITSTAT as SMS messages. See section *"UNITSTAT reports"*
FLEETMAN	www.server.com/httpreceiver.dll	No	The URL for sending HTTP GET requests to. If this parameter is either omitted or left blank, no HTTP GET requests will be attempted. See the section *"HTTP Get Request"* for an explanation. If defined, no SMS UNITSTAT messages are sent to FLEXSERVER-SMS number!
SMSSENDER	+451123344,+452233432 **+4550503185**	No	A list of phone numbers that are allowed to send SMS messages to the unit (see section *"System Commands"*). The numbers MUST include the country code also. (The parameter *FLEXSERVER-SMS"* is also checked). If set to "ALL", all senders will be accepted.
EXTPOWER-IGN	[**0**/1/2]	No	If set to '1', all features using input 1 as an "ignition" input will instead use the presence of power at the external power connector as an indicator that ignition is present (on a vehicle) If set to '2' and the device is charging, ignition is considered active
GSM-RESTART	[0..99999] **[86400]**	No	Number of seconds between forced resets of the GSM module (some networks will detach the GSM module if no activity for a long period) ex: "86400" this sets the restart period to 24 hours. If set to "0", no restart will be made.
SMS-SCA	+4540590000	Yes	This can be set to the phonenumber of the SMS center if the default of the SIM card is not to be used
PREFERRED-OPERATORS	23801,23802,24012,310112,24112	Yes	List of up to 200 providers (max length of string is 1300 characters) in the format MMMNNN where the MMM is country code and NNN is provider ID (NNN is 2 digit in Europe, 3 digits used in US).
VOLUME-VOICE	[filename],[0..100]	No	File and volume of the file to be played when volume up/down is pushed
NO-ROAMING	[0/1] **0**	Yes	if set to '1' and the PREFERRED-OPERATOR list is defined, and none of the providers in the list can be used, no reports are being sent (both FlexCI, Flexstream and SMS) (Reports are inserted in the

Parameter	Value	Must Reset	Description
			circular buffer if defined) If NO-ROAMING is set to 0, the list of operators will be tried first, if none of the providers in the list are available, the unit does an "automatic" attach to one of the available providers in the network

SYSTEM PARAMETERS, PREFERRED OPERATORS

The device can be configured to have a "preferred GSM operator list".

Whenever a device is outside of its "normal" GSM provider ("home" operator), for example when travelling into another country etc, the device will try to connect to a GSM operator in that area that are available (roaming). Sometimes it is not desirable to just connect to what the network "thinks" is appropriate. In these cases, you are able to control which operator to use, if your "home" operator is not available.
For this reason, the standard Tracker Application has a parameter, PREFERRED-OPERATORS, this parameter holds a list of operators the device should try and use, if the device is roaming on the GSM network.

Rules for preferred provider list:

In the list PREFERRED-OPERATORS (PO in the following explanation) all the preferred operators are listed (the first operator is the one with the highest priority etc.).

The list looks like this:
23801,23802,24012,310112,24112

If the unit is Roaming, every 5 minutes the unit will ask for a list of currently "online" providers that can be heard by the unit.
The unit then goes through the configured PO list, one entry at a time. For every entry it checks if the entry is in the "on-line" list (and marked as "allowed"), if the entry in the PO list is "on-line", the unit will attempt to use that provider. If no provider from the PO list is on-line, the unit will just do an automatic selection of the provider. If the PO entry is the one the unit is currently connected to, the unit will not look further in the list of PO's, but just stay connected to this provider

In the above example (with the PO list configured as shown), the following scenario will happen:

The providers 23801 and 23802 are both listed as "on-line" and allowed (for the SIM card used). The unit will then make a connection to 23801 as this is the first entry in the list (before 23802). The next time the unit checks the currently on-line providers, it will see that it is already is connected to 23801, so nothing will happen, it will just stay connected to this provider.
If for some reason, the 23801 provider is no longer "on-line" (maybe out of reach), the unit will see that 23802 is on-line (and allowed), and connect to that provider.
If none of the entries in the PO list is currently on-line, the unit will just do an automatic selection of the available providers. If NO-ROAMING, if set to '1' and the PREFERRED-OPERATOR list is defined, and none of the providers in the list can be used, no reports are being sent (FlexCI, Flexstream and SMS)

SYSTEM PARAMETERS, POWERCONTROL

Parameter	Value	Must Reset	Description
CYCLIC	[0..99999] **0**	Yes	If this parameter is set (greater than 0) the unit will power down for this number of minutes 7 minutes AFTER the last command has been received (either by SMS or FlexCI protocol). The 7-minute period is restarted every time a command is received (there is approximately 1 minute overhead when using this feature, if you specify 10 minutes, it will actually take approximately 11 minutes before the unit is powered up again). If no GPS-fix is found within the 7 minutes, the value of GPS-TIMEOUT is added to the 7 minutes (see also CYCLIC-OFF-DELAY)
CYCLIC-OFF-DELAY	[0..60000] **0**	No	If this parameter is set to 0, the device will power down immediately if the device sees the ignition signal being removed and CYCLIC is active. However, if the parameter is to to something different than 0, the device will wait this number of seconds before shutdown after the ignition is removed (ignition sense is controlled by EXTPOWER-IGN).
AUTOSTART-CHARGE	[0/2/3/4] **0**	No	Specify what the unit should do if charger is connected: 0: Unit will switch on 1: Unit will switch on 2: Unit should switch off (if on) 3: Unit switches on when charger is disconnected, and off when charger connected 4: Unit switches off when charger is disconnected, and on when charger connected 5: If the charger is connected when the unit is on, device will switch off and only indicate charging state. If the charger is then disconnected the unit will switch completely off.
BATT-SMS	+451123344,+452233432	No	List of numbers to send an SMS to if battery voltage goes below "BATT-LEVEL"
BATT-LEVEL	[0..4300] **0**	No	Whenever the voltage goes below the value defined in "BATT-LEVEL" (value is mV) a SMS message is sent to the list of numbers in "BATT-SMS". The detector is armed again when the voltage goes 200 mV above the "BATT-LEVEL" LOWBAT-VOICE message will be played when the battery level is below BATT-LEVEL
SUPPLY-LOWVOLTAGE	[0..60000] **0**	No	If the supply voltage to the device gets below this value (for more than 10 seconds) bit 33 in the UNITSTATE field of the UNITSTAT message will be set. If this parameter is set to 0, function is disabled. Value is set in mV.
SUPPLY-LOWVOLTAGE-SMS	+451123344,+45223343	No	List of numbers to send "Low supply voltage" message to. If list is empty, no SMS will be sent

Parameter	Value	Must Reset	Description
SMSLOWBAT	+451123344,+45223343	No	List of numbers to send "Low battery" message to
LOWBAT-VOICE	[filename],[0..100]	No	Voice message to play when battery level goes low.
LOWBAT-VOICE-REPEAT	[0..3600] **0**	No	Interval between low battery voice announcements when battery is low. If set to 0, announcement will only sound once.
CHARGER-SMS	+451123344,+452233432	No	List of numbers an SMS is sent to whenever the charger is connected/disconnected (new state must be stable for at least 30 seconds before message is sent)
CHARGING-VOICE	[filename],[0..100]	No	File and volume of the file to be played when device is connected to charger
CHARGECOMPLETE-VOICE	[filename],[0..100]	No	File and volume of the file to be played when charging is complete
CHARGENOTCOMPLETE-VOICE	[filename],[0..100]	No	Voice message to play in the speaker if the charger is removed while the battery is not fully charged.
POWEROFF-VOICE	[filename],[0..100]	No	File and volume of the file to be played when unit is switching off.
WELCOME-VOICE	[filename],[0..100]	No	File and volume of the file to be played when unit is switching on.

SYSTEM PARAMETERS, I/O PORTS

Parameter	Value	Must Reset	Description
OPT-THRESHOLDS	[0..600],[0..600] **80,80**	Yes	Set the voltage for the analog inputs for active high state ex: "80,80". This sets the active high state for the two inputs to 8.0 and 8.0 Volts.
DOUT1	[:ON] [:OFF]	No	If defined, the value it is set to, plus ":ON"/":OFF" will activate/deactivate the digital output 1
DOUT1-ON	Heater is on	No	If defined, this text will be returned when the "DOUT1" :ON command is received
DOUT1-OFF	Heater is off	No	If defined, this text will be returned when the "DOUT1" :OFF command is received
DIN1-SMS	+451123344,+452233432	No	Number(s) to send message to when DIN1 changes state
DIN2-SMS	+451123344,+452233432	No	Number(S) to send message to when DIN2 changes state
DIN1-HIGH-TEXT	DIN1 is high	No	Text to send when DIN1 goes high
DIN1-LOW-TEXT	DIN1 is low	No	Text to send when DIN1 goes low
DIN2-HIGH-TEXT	DIN2 is high	No	Text to send when DIN2 goes high
DIN2-LOW-TEXT	DIN2 is low	No	Text to send when DIN2 goes low
OPT-REPORT-INTERVAL	[0..99999] **0**	No	Sets the number of seconds between reports of analog values of the input ports
OPT-TRIGGER-MASK	[00..03] **00**	No	If bit 0 is set, input 1 is monitored, if the level on the input has changed more than OPT-TRIGGER-LEVEL number of mV, a OPT-REPORT is sent. If bit 1 is set, input 2 is (also) monitored.
OPT-TRIGGER-LEVEL	[0..60000] **1000**	No	If the inputs specified in OPT-TRIGGER-MASK

Parameter	Value	Must Reset	Description
			changes more than this number of millivolts since a OPT-REPORT was sent, a new report is sent.

SYSTEM PARAMETERS, ALERTS

Parameter	Value	Must Reset	Description
SOS-SMS	+45123456,+4566778899	No	This list of numbers (if defined) will receive a position report (like the answer to a "POS" command, only the first line will contain the word "PANIC") if the function button is activated for more than half a second. The word "PANIC can be changed with the SOS-TEXT parameter. See below for contents of the message sent.
SOS-TEXT	ALARM	No	The pre-text for SOS-SMS If the text is followed by a "/" only the text in the parameter is sent, otherwise position etc is added.
SOS-SMS1	+45123456,+4566778899	No	This list of numbers (if defined) will receive a position report (like the answer to a "POS" command, only the first line will contain the word "PANIC") if the "A" button is activated for more than half a second. The word "PANIC can be changed with the SOS-TEXT1 parameter. See below for contents of the message sent.
SOS-TEXT1	ALARM	No	The pre-text for SOS-SMS1 If the text is followed by a "/" only the text in the parameter is sent, otherwise position etc is added.
SOS-SMS2	+45123456,+4566778899	No	This list of numbers (if defined) will receive a position report (like the answer to a "POS" command, only the first line will contain the word "PANIC") if the "B" button is activated for more than half a second. The word "PANIC can be changed with the SOS-TEXT2 parameter. See below for contents of the message sent.
SOS-TEXT2	ALARM	No	The pre-text for SOS-SMS2 If the text is followed by a "/" only the text in the parameter is sent, otherwise position etc is added.
SOS-SMS3	+45123456,+4566778899	No	This list of numbers (if defined) will receive a position report (like the answer to a "POS" command, only the first line will contain the word "PANIC") if the "C" button is activated for more than half a second. The word "PANIC can be changed with the SOS-TEXT3 parameter.

			See below for contents of the message sent.
SOS-TEXT3	ALARM	No	The pre-text for SOS-SMS3 If the text is followed by a "/" only the text in the parameter is sent, otherwise position etc is added.
SOS-SMS4	+45123456,+4566778899	No	This list of numbers (if defined) will receive a position report (like the answer to a "POS" command, only the first line will contain the word "PANIC") if the "D" button is activated for more than half a second. The word "PANIC can be changed with the SOS-TEXT4 parameter. See below for contents of the message sent.
SOS-TEXT4	ALARM	No	The pre-text for SOS-SMS4 If the text is followed by a "/" only the text in the parameter is sent, otherwise position etc is added.
SOS-NOWAIT	[0/1] **0**	No	If set to '1' and either the function button, button "A", "B", "C" or button "D" is pressed, a UNITSTAT message (and Fleetman message if defined) is sent immediately before any voice calls or SMS messages are initiated. There will be no waiting for a valid GPS fix.

RESPONSE TO STAT COMMAND

The STAT command returns the general status of the device to the sender. The contents of the response depend on the type of device it is coming from.
(All values written in red below is variable and depends on the current value in the device)

The content of the STAT response from a Generation 2 device is:

Version=Blackbird 0.39	Version of the tracker application
(UAP=0.20	User app version, only if this is a UAP enabled tracker[1])
FW=0.43	Firmware version. This is the version of the FAL API currently running on the device
BL=0.15	Bootloader version. Version of the bootloader currently running on the device
NodeID=1020110213	Serial number of the unit
BattV=3920	Battery voltage in mV
Runtime=113122	Number of seconds since the unit started
MCC=23801	Mobile Country Code + Mobile Network Code
Signal=-71	GSM signal strength in dBm
Sat=10	Number of satellites the GPS currently receives signals from
Ichg=234.0	Charging current of the battery in mA
Bt=22.10	Device temperature in Celsius degrees
odo=143	Current odometer value in meters (configurable)
vt=1	Valid time indicator, 1 if unit has a valid date/time, 0 if not

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[1] UAP: User Application Program. If a customer needs some additional functionality in the device, but still needs the basic Tracker functionality to be present, a UAP module can be included in the Tracker application with this additional functionality.

CONFIGURATION COMMANDS

The Flextrack Lommy units can be configured with a number of parameters. The parameters are normally set to fixed values from the factory; the individual parameters can be changed by sending the "*CONF:*" SMS message to the unit (see the section "*Configuration Commands*"). Whenever the unit is started, the parameters are read from non-volatile storage into the unit's internal working memory. If a parameter is changed with the *"CONF:"* command, it is only this internal representation in RAM that is changed.

Please note that all the parameter names MUST be typed, or the device will not recognize them!

Command	Example	SL	Description
CONF: <name,value>	CONF:PIN,1234	High	Modify/add a configuration parameter in the unit. If the "name" does not exist, it will be created in the configuration parameters. (On Generation 1 devices, SAVEPARAM must be executed to save the parameters to non-volatile storage)
CONF?<name>	CONF?PIN	High	This will return the value of the parameter "name".
GETCONF	GETCONF		Unit sends the complete current Tracker configuration (will only return the configuration if the command is issued on the FlexCI protocol, if sent using SMS, the answer is too big to be returned (max 160 characters))

On Generation 2 (and later) devices, there are a number of configuration files. For example, the 1Wire devices has their own configuration files, one of them is the "TempSensor.fps" file. In order to change a value in this file, the normal CONF: and CONF? commands can be used (omitting the ".fps" suffix of the filename).
If you want to query the value of the "REPORT-INTERVAL" parameter for the temperature sensors, issue the command:

CONF?TempSensor:REPORT-INTERVAL

This will return the value of the parameter, setting the parameter is done with the CONF: command using the same syntax:

CONF:TempSensor:REPORT-INTERVAL,120

This sets the report interval to 120 seconds.
If the name of the configuration file is omitted, it is the "Tracker" (Tracker.fps) configuration file that is used.

(Generation 1 devices only supports the "Tracker" configuration file, there is no support for multiple configuration files on these devices.)

The naming of the configuration files is also used for accessing parameters of a UAP[2] application, if one is added to the Standard Tracker Application.

Currently, the Standard Tracker Application uses the following configuration files (some of them are not active on all types of devices, for example the TempSensor and HumidSensor are only active on devices with 1Wire support):

Tracker.fps	Parameters for the Tracker application, system parameters etc.
DriverID.fps	Driver ID buttons, their id's etc.
HumidSensor.fps	Humidity sensors attached to the 1Wire bus. Their ID's and max/min thresholds etc.
TempSensor.fps	Temperature sensors attached to the 1Wire bus. ID's and max/min thresholds etc.
SheepTag.fps	List of connected Lommy-Tags to monitor, timeout period and id for each Tag
WolfList.fps	List of "listed unconnected" Lommy-Tags that needs to be sent to the server if heard

A list of the individual parameters is shown after each section in the following.

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[2] UAP: User Application Program. If a customer needs some additional functionality in the device, but still needs the basic Tracker functionality to be present, a UAP module can be included in the Tracker application with this additional functionality.

VOICE FEATURE

Some of the Lommy devices (typically the portable ones) have built in microphone and speaker to allow the unit to function as an emergency device. The unit can be configured to establish a voice call to a specific telephone number when a button is pressed, if the unit is being/not being moved, is tilted etc. There are a number of parameters that controls this; some of the parameters are described in the specific sections in this manual (for example in the *"Movement detector"* section). The basic parameters (and commands) are listed here for your reference.

Normally when the Lommy is being called from another telephone it will emit a ringtone. This tone can be customized by storing a "ringtone.mp3" file on the A: disk drive. If present, the ringtone.mp3 file will be played whenever someone calls the Lommy. If the ringtone.mp3 is present the "caller id ringtone" feature is also enabled. This feature enables you to play a custom ringtone depending on who is calling the Lommy. If for example one with the caller id +45123456 is calling the Lommy, the Lommy will check if the file "+45123456.mp3" exists on the A: drive. If so, it will be played until the call is picked up or the calling phone hangs up.

Please note that the mp3 files (ringtone.mp3 and caller id files) must be present at reset/power-on for the feature to work!

COMMANDS RELATED TO VOICE FEATURE

Command	Example	SL	Description
VIBRATE	[VIBRATE:ON/ VIBRATE:OFF]	High	This will start/stop the vibrator manually (if VIBRATE parameter is set)
PLAY	PLAY filename, 20	High	Message "filename" is played thru the speaker at volume 20 (these are the same parameters as used in all the VOICExxx parameters)

PARAMETERS RELATED TO VOICE FEATURE

Parameter	Value	Must Reset	Description
VOICE	[1/2/3]	Yes	Specifies if the speaker and microphone is enabled for the GSM module (voice calls). 1: Both speaker and microphone are enabled 2: speaker is off; microphone is in high sensitivity mode. 3: microphone is disabled, speaker in high volume mode
SOSPHONE	+4512345678	No	The number to dial for establishing a voice channel when the function button is activated for more than half a second.
SOSPHONE1	+4512345678	No	The number to dial for establishing a voice channel when the "A" button is activated for more than half a second.

Parameter	Value	Must Reset	Description
SOSPHONE2	+4512345678	No	The number to dial for establishing a voice channel when the "B" button is activated for more than half a second.
SOSPHONE3	+4512345678	No	The number to dial for establishing a voice channel when the "C" button is activated for more than half a second.
SOSPHONE4	+4512345678	No	The number to dial for establishing a voice channel when the "D" button is activated for more than half a second.
AUTOANSWER	[ALL/list of number]	No	Specify a list of phone numbers that will be answered automatically by the unit. If the unit should answer an incoming voice call, and the phone number is NOT in this list, the call will only be accepted if the function switch is pressed. If the parameter is set to "ALL", all callers will be answered automatically.
STEALTH	[**0**/1/2/3]	No	When bit 0 is set to '1' and the unit makes an outgoing call, the speaker will be silent until 20 seconds after the calling party has answered. When bit 1 is set to '1' all LED's are constantly off.
VIBRATE	[0..5] **0**	No	Set to 1..5 to enable vibrate function. The value sets the vibrate pattern. 0 disables

POSITIONING FUNCTIONS

The most important feature of the Standard Tracker Application is of course, tracking. There is a large number of both commands and parameters that control the behavior of the device. Report intervals, quality of the GPS positions, idle reporting, "sharp turn" detection etc., are all features that can be controlled with different parameters.

Now, because of all these features and parameters, it can be a complex job to configure the device to do exactly what you want it to do. If you are in doubt what some of the parameters does, please do not hesitate to contact Flextrack or one of our distributers/dealers, we are here to help!

The Lommy devices that are delivered with the Standard Tracker Application, are all configured with a basic configuration, and many of the devices are already configured so they will connect to a backend server (depends on the distributor/dealer).

POSITIONING COMMANDS

Command	Example	SL	Description
POS	POS	High	A message containing the last good GPS fix is sent back with information about lat/Lon, speed, direction and number of satellites used in the fix. If there was no GPS fix the last time a report was sent, "No fix" will be indicated in the answer.
NEWPOS	NEWPOS	High	Same behaviour as the "POS" command above, except that the unit will try to get a GPS fix before sending the answer. (This command ONLY works when issued via SMS a message!)
LPOS	LPOS	High	When LPOS command is received, a special formatted response (much like the FLEETMAN HTTP GET requests) is sent back with the current position in, this can be used on cell phones as a link to, for example, Google Maps
ODOMETER-SET	ODOMETER-SET,0	High	Sets the current odometer value (in meters)
UNITSTAT	UNITSTAT	Low	Forces unit to send a UNITSTAT message. The unit will NOT attempt to make a new GPS fix, the data from last time fix was attempted will be sent.
NEWUNITSTAT	NEWUNITSTAT	Low	Forces unit to send a UNITSTAT message. The unit will attempt to make a new GPS fix.

PARAMETERS RELATED TO POSITIONING

Parameter	Value	Must Reset	Description
FLEXSTREAM-INTERVAL	[0..99999] **0**	No	The report interval for UDP datagram messages sent if FLEXSTREAM-IP is defined. Shortest interval possible is 1 second. Times in seconds between position (status) messages. MAT-LAT, MAX-LON, MAX-HDOP and FORCE-REPORT are taken into consideration before the position is sent.
FLEXSTREAM-INTERVAL-IGN	[-1,10..99999] **120**	No	This value will be used instead of FLEXSTREAM-INTERVAL if Ignition is active. If set to -1, the normal FLEXSTREAM-INTERVAL will be used regardless of the ignition input
FLEXSTREAM-CRYPTKEY	[Key1, Key2, Key3, Key4, Delta]	No	Crypt key used for encryption of FlexStream messages (UDP). If not set, messages are sent in clear text. The format is: key1, key2, key3, key4, delta. The 5 parameters is in "C hexadecimal" representation (32bit) of the values (ex: "0x9F4E,0x3E5D,0x0903,0x0509,0x9E3779B9") Please contact Flextrack regarding algorithms for decoding the data
REPORT-INTERVAL	[10..99999] **120**	No	Times in seconds between position (status) messages. MAT-LAT, MAX-LON, MAX-HDOP and FORCE-REPORT are taken in consideration before the position is sent. If the value is higher than 50000(seconds) then the actual interval will be "report-interval-xxx" minus 50000 minutes instead! Example: The report-interval is set to 65000; the actual report interval will then be 65000 minus 50000, i.e. 15000 minutes.
REPORT-INTERVAL-SMS	[10..99999] **1800**	No	Time in seconds between position (status) messages are sent when a Flexserver is not present, and messages are sent to the "*FLEXSERVER-SMS*" number if the unit is on its home network (NOT roaming). If the value is higher than 50000(seconds) then the actual interval will be "report-interval-xxx" minus 50000 minutes instead! Example: The report-interval is set to 65000, the actual report interval will then be 65000 minus 50000, ie 15000 minutes.
REPORT-INTERVAL-SMS-ROAMING	[10..99999] **1800**	No	Time in seconds between position (status) messages are sent when a Flexserver is not present, and messages are sent to the "*FLEXSERVER-SMS*" number if the unit is NOT on its home network (it is roaming). If the value is higher than 50000(seconds) then the actual interval will be "report-interval-xxx" minus 50000 minutes instead! Example: The report-interval is set to 65000, the actual report interval will then be 65000 minus 50000, ie 15000 minutes.
REPORT-INTERVAL-SMS-	[0..99999] **1800**	No	Number of seconds between SMS reports when

Parameter	Value	Must Reset	Description
			voice call is in progress
REPORT-INTERVAL-IGN	[-1,10..99999] **120**	No	This value will be used instead of REPORT-INTERVAL if Ignition)is active. If set to -1, the normal REPORT-INTERVAL will be used regardless of the ignition state
GPS-CHARGE	0/**1**	No	If set to '1', the GPS will be powered on continuously if the charger is connected to the unit (same effect as setting *'GPS-GIVEUP'* to 0)
GPS-GIVEUP	**300**	No	Number of seconds to keep listening for a GPS position if no fix available, before powering the GPS off. The GPS will be powered on again when a new report is to be sent. If set to 0, the GPS will NOT be powered down between the individual "request for fix".
GPS-TIMEOUT	[0..60000] **50**	No	Number of seconds to keep listening for a GPS position. If no valid fix is found within this specified time, the report will be sent with the current information from the GPS receiver (position might be wrong)
GPS-NOWAIT	[0/1] **0**	No	If set to 1 and a state change occurs (according to STATEMASK), the device will not wait for a GPS fix, but instead send the UNITSTAT immediately
FORCE-REPORT	[0.1000] **5**	No	If the position has not changed enough this number of times according to "*MAX-LAT*" and "*MAX-LON*", send a position report anyway.
MAX-HDOP	[0..500] **300**	No	Maximum "Horizontal Dilution Of Precision". When a GPS position is acquired, the precision can be less than optimal, this number basically tells the unit how precise the position must be (as reported by the GPS receiver) before a position report is sent. The factor is based on the "standard accuracy of the GPS receiver" which is typically 5 meters. A HDOP value of 20 (2.0) means that the position error must be better than 5 meters multiplied by 2.0, i.e. 10 meters. Please note that there are other factors that influence the precision of the GPS positions, such as reflected signals etc!
MAX-LAT	[0..9999] **250**	No	This is the number of "decimal minutes" a position must change in latitude for the position report to be sent. If the current position has NOT changed by more than this number as compared to the last position reported, no position report is sent (however "*FORCE-REPORT*" sets an upper limit for the number of not-sent reports).
MAX-LON	[0..9999] **500**	No	This is the number of "decimal minutes" a position must change in longitude for the position report to be sent. If the current position has NOT changed by more than this number as compared to the last position reported, no position report is sent (however "*FORCE-REPORT*" sets an upper limit for the number of not-sent reports).
LASTGOOD	[0/1] **0**	No	If this parameter is set to 1, the values of Date, Time, Longitude, Latitude, Speed, Direction, SV and Elapsed time for fix, will be taken from the last

Parameter	Value	Must Reset	Description
			good position, if unable to get the most current. Bit 8 in the Unit State will be raised then.
IDLE-TIME1	[0..99999] **60**	No	Number of seconds the reported GPS speed must be above the value in "IDLE-SPEED" for bit 15 in the unitstate to be '1'
IDLE-TIME2	[0..99999] **60**	No	Number of seconds the reported GPS speed must be below the value in "IDLE-SPEED" for bit 15 in the unitstate to be '0'
IDLE-SPEED	[0..99999] **0**	No	Speed in km/hour for the "moving bit" to be set in unitstate (bit 15). If set to "0", no detection is active (bit 15 is always '0')
MAX-SPEED-TIME1	[0..99999] **60**	No	Number of seconds the reported GPS speed must be above the value in "MAX-SPEED" for bit 32 in the unitstate to be '1'
MAX-SPEED-TIME2	[0..99999] **60**	No	Number of seconds the reported GPS speed must be below the value in "MAX-SPEED" for bit 32 in the unitstate to be '0'
MAX-SPEED	[0..99999] **0**	No	Speed in km/hour for the "speeding bit" to be set in unitstate (bit 32). If set to "0", no detection is active (bit 32 is always '0')
REPORT-STARTUP	[0/1] **0**	No	If set to '1' a UNITSTAT report is triggered immediately when the unit is switched on.
~~*SOS-NOWAIT*~~	[0/1] **0**	No	If set to '1' and the red button is pressed, the UNITSTAT (and FLEETMAN) reports are send regardless if there is a GPS fix, and before a configured voice call/SMS is sent
LPOS-PREFIX		No	The prefix to put before the response (always prefixed with "http://") back to the LPOS command (typically something like "www.something.com/position.php?")
SHARPTURN	[0..20],[0..360] **[0,0]**	Yes	Number of positions (1 position per second) and degrees in a (sharp)turn that will initiate a UNITSTAT report. If set to 0,0 the feature is disabled. The first number is the number of positions between the directions are compared, if parameter is set to "5,30", the first and the 5. position is being compared, if there is more than 30 degrees change, a report is generated.
ODOMETER	[0..3] **0**	No	Controls the odometer function. If set to '0', the odometer value is omitted from the UNITSTAT message (and no longer updated internally). If the parameter is set to '1', the odometer value is updated (every 10 seconds) as long as input 1 is active (high). If set to '2', the odometer value is calculated continuously (every 10 seconds) regardless of the input. If set to '3', the odometer function counts the number of pulses on input 2.
POS-DECDEG	[0/1] **0**	No	If set to 1, "POS"messages will be sent with decimal degrees added for the latitude and longitude parameters. If set to 0, lat/lon will only be sent in degrees, minutes and decimal minutes (1/1000)
GPS-REDIRECT	[0],[1200..115200] **0**	Yes	The GPS data (NMEA verbs) can be redirected on

Parameter	Value	Must Reset	Description
<type>,<baudrate>			the serial port of a device (if this option is enabled in the device). This requires that the GPS is powered on (set GPS-GIVEUP to 0) Type: 0 Use RS232 port 1 Use RS485 port Baudrate is the baud rate of the GPS data on the serial line, can be 1200, 2400, 4800, 9600, 57600, 115200. Data is sent with 8 bits/byte, no parity, 1 stop bit (if baudrate is set to 0, function is disabled)

REPORTING INTERVAL

The Tracker Application sends regular reports to the backend (server). Because of the great flexibility of the Tracker Application, a large number of parameters control the behavior of the reporting, how often reports are sent. There are many different things in a device that can trigger the transmission of reports; the events that can trigger reports (UNITSTAT reports) are controlled/masked by the parameter **STATEMASK** (and **STATEMASK-SMS**).
A number of other parameters controls the time between reports, when a report is scheduled (because of time) to be sent, it can also be skipped because of other parameters (for example if the device has not moved enough from the last position it reported etc.).

PARAMETERS THAT CONTROL THE REPORTING INTERVAL

REPORT-INTERVAL, REPORT-INTERVAL-IGN, REPORT-INTERVAL-SMS, REPORT-INTERVAL-SMS-ROAMING and **REPORT-INTERVAL-SMS-VOICE**
These parameters controls the intervals (in seconds) between reports are scheduled to be sent. The different parameters are used in specific cases, for example the **REPORT-INTERVAL-IGN** is used as the interval whenever Ignition is active (typically input 1 on a device or the presence of external power).
The parameter **REPORT-INTERVAL-SMS** is used whenever the device needs to send reports using SMS (because of no connection to a backend server). **REPORT-INTERVAL-ROAMING** is used if the device is roaming on a foreign GSM network and if the device is in an active voice call (in this case the device can not send reports thru GPRS so SMS is used instead), the parameter **REPORT-INTERVAL-SMS-VOICE** is used.

Normally the report intervals are defined in seconds, however if the "report interval" values are higher than 50000 (seconds) then the actual interval will be "report-interval-xxx" minus 50000 <u>minutes</u> instead! Example: The value is set to 65000; the actual report interval will then be 65000 minus 50000, i.e. 15000 minutes.

If the parameter **REPORT-STARTUP** is set to "1", the device will force a report right after it has been powered up (after getting a valid GPS fix), if it is set to "0", the device will wait until the normal report interval has expired (or an event that is masked thru the **STATEMASK** has occurred)

STATEMASK controls which events in the device that should trigger a UNITSTAT report. The parameter consists of 32 bits; each controls a specific event (see description of the **STATEMASK** parameter for the specific bits and their meaning)

When searching for a valid GPS fix, the parameter **MAX-HDOP** is used as a "filter", only if the GPS position has a HDOP value that falls below the value set in **MAX-HDOP** it will be considered valid (or if the HDOP value was not achieved the last time the device tried to do a report, in which case we will send a report anyway).

When it's time to do a report, the two parameters **MAX-LAT/MAX-LON** are used to see if the device has moved enough in terms of latitude and longitude. If the device has not moved more than specified in these two parameters, the report is skipped, but only for the number of times specified in the parameter **FORCE-REPORT**! If this is set to for example "4", and the device is stationary, and **REPORT-INTERVAL** is set to 1 minute, the unit will only send a report every 4 minutes, as it will skip 4 reports before sending one. If the device starts to move continuously, the reports will be sent every minute as specified in the **REPORT-INTERVAL** parameter.

If the device is not able to get a valid GPS fix, maybe because of obstacles, the parameter **LASTGOOD** can be used to tell the device to use the last known good GPS fix in the report it sends. When the "last good GPS fix" is sent, all other parameters of the UNITSTAT are up to date (lat/lon, speed, direction, height, HDOP, number of satellites used and date/time are from the last know good fix, the rest are "live" data). When a UNITSTAT is sent, it is indicated in the field UNITSTATE that this report uses "last good known GPS data" (bit 8 is set to '1').

Using the parameter **SHARPTURN**, it is possible for the device to detect sharp turns, for example when a vehicle makes a turn in a crossing, it can sometimes be nice to have a report just in the crossing. If **SHARPTURN** is not used, the next position will be on the road, maybe at a long distance to the point where the turn was made. Using **SHARPTURN**, it is possible to set a threshold for the number of degrees the turn has to exceed before a report is sent (the UNITSTATE field of the UNITSTAT will indicate if it was a "sharp turn" that triggered this report (remember, the **STATEMASK** must have the bit set for the detection of the **SHARPTURN** event)

It is also possible to generate an event in the device both if the device is moving above a certain speed, and if the device is moving below this set speed. The **IDLE-SPEED** parameter (set in KM/H) controls the threshold speed wise, and if the device is moving above this speed for more than **IDLE-TIME1** number of seconds, the device is "moving", and if it is below the **IDLE-SPEED** for more than **IDLE-TIME2** it is defined as "not moving". A bit (bit 15) in **STATEMASK** again controls if this event should generate a UNITSTAT report. The move detector also checks the current HDOP value against **MAX-HDOP** parameter. In order for "moving" to be detected the device must have "ignition".

The device can also generate an event if it is moving faster than a certain speed ("Speeding"), and when the device moves slower than this set speed. The **MAX-SPEED** parameter (set in KM/H) controls the threshold speed wise, and if the device is moving above this speed for more than **MAX-SPEED-TIME1** number of seconds, the device is "speeding", and if it is below the **MAX-SPEED** for more than **MAX-SPEED-TIME2** it is defined as "not speeding". A bit (bit 32) in **STATEMASK** again controls if this event should generate a UNITSTAT report. The speeding detector also checks the current HDOP value against **MAX-HDOP** parameter

THE IGNITION DETECTION (AND MOVE-WAKEUP / CYCLIC)

Most of the devices have a number of digital/analog inputs. The first of these inputs can be used as a "ignition" input.

To free the input 1 for other purposes, it is possible to set the parameter **EXTPOWER-IGN** to '1', if done so, all functions in the device that uses "ignition" will see the presence of external power as "ignition"

The ignition input is often connected to the ignition wire in a vehicle, by doing so, the device knows whenever the vehicle is "switched on". If the device is powered down (using for example the **CYCLIC** parameter or **MOVE-WAKEUP**), and the ignition input is becoming active, the device will power up. By setting a bit in **STATMASK**, this "event" can also trigger a UNITSTAT report.

If the ignition input is active, the **CYCLIC** command will be inactive (the unit will stay switched on), only after the ignition input is becoming inactive will the **CYCLIC** feature again be active.

The same applies to the **MOVE-WAKEUP** feature, as long as ignition is active, the unit will not power down because of the **MOVE-WAKEUP** feature.

If **MOVE-WAKEUP** and **CYCLIC** are both active, and the cyclic time is up (the unit should shutdown because of **CYCLIC**), and the timer for **MOVE-TIMEOUT** is still running (unit has "just" been moved), the unit stays on until the timer is 0 (the unit has been stationary for the number of seconds in **MOVE-TIMEOUT**).

GEOFENCE

The Geofence feature is used to place a virtual circular fence around the device. If this virtual fence is "broken" by moving the unit outside, a report will be generated to the server (and to a specified SMS number). When the device is brought back into the virtual fence another report is sent.
Using parameters, it is possible to set the radius of the virtual fence.
When the Geofence function is active, it is possible with a command (typically using SMS), to get the distance and bearing to the device. The function can also be controlled by the "ignition" status of a vehicle (or a boat), so whenever the vehicle is stopped (ignition removed), a new centre position is acquired, and this new position is now the centre of the virtual fence. If the vehicle is then moved outside this fence, a message is sent.
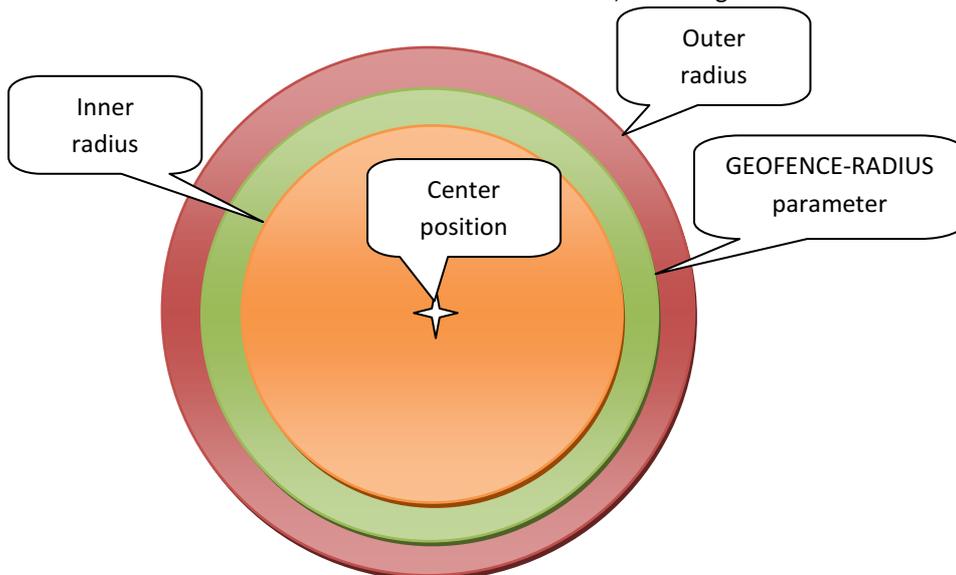
MANUAL MODE (GEOFENCE = 1)

In Manual mode, the centre (latitude/longitude) of the Geofence is set either by the **GEOFENCE-CENTER** parameter, or by sending the GEOFENCE-SET command to the unit. If the centre is set using the GEOFENCE-SET command, the Geofence function will switch the GPS receiver on, and try to get a valid fix within the number of seconds set by **GEOFENCE-GIVEUP** parameter. The parameter **MAX-HDOP** sets the maximum HDOP (Horizontal Dilution Of Precision) that is allowed before the GPS position is taken as "valid" (high enough precision).

If the position becomes valid, it will be stored in the GEOFENCE-CENTER non-volatile parameter in the device, and it will be used as the centre until a new position is set either using the GEOFENCE-SET command or the **GEOFENCE-CENTER** parameter is changed.
If the position does not become valid with the number of seconds set by parameter GEOFENCE-GIVEUP, the Geofence function will not do any further checking of the position (effectively disabled)

If a valid fix was obtained, and the centre therefore was set, the Geofence function will check the current position each **GEOFENCE-TIME** number of seconds. When the check is to be performed, the function will wait a maximum of **GEOFENCE-GIVEUP** number of seconds for a valid fix (that obeys the **MAX-HDOP** value). If no valid fix is obtained within **the GEOFENCE-TIME** period, the check will be aborted, and the function will again wait GEOFENCE-TIME number of seconds before making another test if the position is within the specified geofence (centre/radius).

If either the GEOFENCE-SET command is received or the **GEOFENCE-CENTER** parameter is changed, a new centre position will be used in subsequent checks

When checking if the current position is within the specified circle, the following steps are performed (same procedure as in Auto mode):

1) If the position in within the specified radius, the position is regarded as "within limits", and the position is reported as "inside the geofence"

2) If the position is outside the specified radius, but inside the calculated "outer radius", the GPS will continue to "run", and the position is checked **GEOFENCE-MAXCHECK** number of times (typically 10 times) with 12 seconds between each check, and if the position does not come inside the specified radius again during the checks, the position is "outside limits", and a report is generated. "Outer radius" is calculated as: if **GEOFENCE-RADIUS** is less than 1000 meters, then "outer radius" is 2 x **GEOFENCE-RADIUS**, else it's **GEOFENCE-RADIUS** x 1,20

3) If the position is outside the calculated "outer radius", the GPS will continue to "run", and the position is checked 2 times (12 seconds between each check) and if the position does not come inside the specified radius any of the 2 times it is checked, the position is "outside limits", and a report is generated.

After the device have determined that it's "outside" and a report is generated, the current position needs to be 10 % closer to the centre than the inner circle (if radius is set to 1000 meter,
we have to be within 900 meters of the centre in order to re-arm the geofence function again)

When the position is outside the geofence zone bit 13 in the unit state will be raised. Bit 14 is raised when the geofence checking is active (if a centre has been acquired or set).

AUTO MODE (GEOFENCE = 2)

In Auto mode, the Input 1 input on the OPT2 board (or "Ignition") is used as the "activation" signal for the Geofence function. When the input 1 signal is at a high level (typically signaling that a car is driving) no check is performed. When the car is stopped (ignition is removed) the unit will try for **GEOFENCE-GIVEUP** number of seconds to get a valid fix. The parameter **MAX-HDOP** sets the maximum HDOP (Horizontal Dilution Of Precision) that is allowed before the GPS position is taken as "valid" (high enough precision).

When the position becomes valid, it will be stored non-volatile internally in the device, and it will be used as the centre.
If the position does not become valid with the number of seconds set by parameter GEOFENCE-GIVEUP, the Geofence function will not do any checking of the position (effectively disabled)

If a valid fix was obtained, and the centre therefore was set, the Geofence function will check the current position every GEOFENCE-TIME number of seconds for the first 24 hours. After the first 24 hours, the check will be performed every 15 minutes for power saving.
When the check is to be performed, the function will wait a maximum of **GEOFENCE-GIVEUP** number of seconds for a valid fix (that obeys the **MAX-HDOP** value).
If no valid fix is obtained within the **GEOFENCE-TIME** period, the check will be aborted, and the function will again wait **GEOFENCE-TIME** number of seconds (or 15 minutes if within the first 24 hours of activation) before making another test if the position is within the specified geofence (center/radius).

If bit 0 in **GEOFENCE-CFG** is set to '1', then the function will make a check for the position if the G sensor signals movement (more than +/- 200 mG)

If either the GEOFENCE-SET command is received or the **GEOFENCE-CENTER** parameter is changed, a new center position will be used in subsequent checks (the center position will be overwritten on the next high to low transition of the Ignition status)

When checking if the current position is within the specified circle, the following steps are performed (same procedure as in Manual mode):

1) If the position in within the specified radius, the position is regarded as "within limits", and the position is reported as "inside the geofence"

2) If the position is outside the specified radius, but inside the calculated "outer radius", the GPS will continue to "run", and the position is checked GEOFENCE-MAXCHECK times (typically 10 times) with 12 seconds between each check and if the position does not come inside the specified radius any of the checks, the position is "outside limits", and a report is generated. "Outer radius" is calculated as: if GEOFENCE-RADIUS is less than 1000 meters, then "outer radius" is 2 x **GEOFENCE-RADIUS**, else it's **GEOFENCE-RADIUS** x 1,20

3) If the position is outside the calculated "outer radius", the GPS will continue to "run", and the position is checked 2 times (12 seconds between each check) and if the position does not come inside the specified radius any of the 2 times it is checked, the position is "outside limits", and a report is generated.
After the device have determined that it's "outside" and a report is generated, the current position needs to be 10 % closer to the centre than the inner circle (if radius is set to 1000 meter, the device have to be within 900 meters of the centre in order to re-arm the geofence function again)

When the position is outside the geofence zone bit 13 in the unit state will be raised. Bit 14 is raised when the geofence checking is active (if a centre has been acquired or set).

GEOFENCE COMMANDS

Command	Example	SL	Description
GEOFENCE:SET		High	Use the current/existing position as the centre of the geofence (only if there is a valid position, will wait GEOFENCE-GIVEUP period for a fix) A message will be sent back telling if the geofence was successfully set or not. Same effect as setting GEOFENCE parameter to 1
GEOFENCE:ON		High	ON will use the existing centre for the Geofence, or acquire one if no centre position is present.
GEOFENCE:OFF		High	Same effect as setting GEOFENCE parameter to 0
GEOFENCE:AUTO		High	Same effect as setting GEOFENCE parameter to 2
GEOFENCE:LOCATE		High	Returns distance and bearing to the geofence centre position

GEOFENCE PARAMETERS

Parameter	Value	Must Reset	Description
GEOFENCE	[**0**/1/2]	No	0: Function disabled 1: Manual mode, geofence enabled 2: Auto mode, will follow input 1 (Only some models)
GEOFENCE-CFG	[**0000**]	No	Configuration of the various Geofence features Bit 0: Enable check if device is moved (using G sensor)
GEOFENCE-CENTER		No	Centre in Lat/Lon of the geofence centre ("N55.38.1234,E009.12.2234")
GEOFENCE-RADIUS	[100..99999] **1000**	No	Radius of the geofence in meters
GEOFENCE-GIVEUP	[0..99999] **60**	No	Number of seconds to wait for a GPS fix
GEOFENCE-TIME	[0..99999] **60**	No	Number of seconds between Geofence checks (if GPS is not already powered on, it will be switched on for minimum GEOFENCE-GIVEUP seconds)
GEOFENCE-MAXCHECK	[1..100] **10**	No	Number of times the inner circle must be exceeded before alarm
GEOFENCE-SMS	+451123344,+45223334 32	No	List of numbers to send SMS to. Pre-text is either "Outside of geofence" or "Inside geofence". This can be changed with the parameters GEOFENCE-OUT-TEXT and GEOFENCE-IN-TEXT. Format follows then the "POS" response
GEOFENCE-OUT-TEXT	OUTSIDE-ZONE	No	The pre-text that will be added to GEOFENCE-SMS. The rest of the SMS is the same as POS. If the text is followed by a "/" only the text in the parameter is sent, otherwise position etc is added
GEOFENCE-IN-TEXT	INSIDE-ZONE	No	The pre-text that will be added to GEOFENCE-SMS. The rest of the SMS is the same as POS. If the text is followed by a "/" only the text in the parameter is sent, otherwise position etc is added
GEOFENCE-VOICE1	[filename,[0..100]	No	File and volume of the file to be played ("Geofence activated")
GEOFENCE-VOICE2	[filename,[0..100]	No	File and volume of the file to be played ("Geofence deactivated")
GEOFENCE-VOICE3	[filename,[0..100]	No	File and volume of the file to be played ("Outside geofence zone")
GEOFENCE-VOICE4	[filename,[0..100]	No	File and volume of the file to be played ("Inside geofence zone")

DEADMAN FUNCTION

The deadman function enables the device to report an alarm should the user for some reason be unable to respond. When active, the user must press the large red button on the device at a specific time when instructed so by the device. If the user does not respond in a timely manner, and alarm is sent (to the server, an SMS and/or a voicecall).

When **DEADMAN** is set to '1' the function is enabled (if '0' it is disabled). **DEADMAN-TIME** is the time between the user must press the red button. When **DEADMAN-TIME** has elapsed the message in **DEADMAN-VOICE1** is played over and over until the user presses the button. If the user has not pressed the button during **DEADMAN-WARNING** number of seconds, and alarm is sent and **DEADMAN-VOICE2** is played. If the user presses the button during the **DEADMAN-WARNING** period, the function is reset, and **DEADMAN-TIME** will elapse again before the user needs to reset the function again.

DEADMAN-VOICECALL is the phone number the device will call in case of an alarm, **DEADMAN-SMS** is the phone number it will send SMS alarms to, **DEADMAN-TEXT** is the message to send in the SMS (position data will be added too). When the alarm is sent, Bit 12 in unitstate field of UNITSTAT message is set to '1'.

If SOSPHONE and/or SOS-SMS is defined the alarm can only be reset in the DEADMAN-WARNING period

If **SOSPHONE** and **SOS-SMS** is undefined, the period can be reset in both the **DEADMAN-TIME** and **DEADMAN-WARNING** period, otherwise it is only possible to reset/restart the period in the **DEADMAN-WARNING** period (during playback of **DEADMAN-VOICE1** file)

If the device is connected to a charger the function is disabled (except if LommyManager/FALManager is running!)

PARAMETERS RELATED TO DEADMAN DETECTION

Parameter	Value	Must Reset	Description
DEADMAN	[**0**/1]	No	0: Function disabled. 1 Function active. The red function button must be activated in a period given by DEADMAN-TIME or a deadman alarm will be sent. (see below)
DEADMAN-TIME	[30..99999] **30**	No	The interval (in seconds) the red function button must be activated or a deadman alarm is sent.
DEADMAN-WARNING	[5..1800] **5**	No	Is the delay time in seconds where beeps (DEADMAN-VOICE1) are played before activating the alarm.
DEADMAN-VOICE1	[filename,[0..100]	No	File and volume of the file to be played (normally a "beep")
DEADMAN-VOICE2	[filename,[0..100]	No	File and volume of the file to be played ("Deadman alarm has been sent")
DEADMAN-VOICECALL	+4512345678	No	When a deadman alarm occurs, a voice call will be established to the number in this parameter
DEADMAN-SMS	+451123344,+4522334 32	No	List of numbers to send SMS to. Pre-text is "DEADMAN period exceeded". This

Parameter	Value	Must Reset	Description
			can be changed with the parameter DEADMAN-TEXT. Format follows then the "POS" response.
DEADMAN-TEXT	[**0**/1]	No	The pre-text that will be added to DEADMAN-SMS. The rest of the SMS is the same as POS. If the text is followed by a "/" only the text in the parameter is sent, otherwise position etc is added.

MOVEMENT DETECTION

The Standard Tracker Application can be used to monitor if the device is being moved (tilted) above a certain threshold (angle) and signal an alarm. It can also use this movement detector function to power itself on, this feature is often used in asset tracking, the device is normally powered down to conserve energy, and when it is being moved, it will "wake up" and send it's GPS position etc. The "Wake-up on movement is covered under the "*System parameters, basic*" section.

Using the parameter MOVE-GLIMIT and MOVE-GLIMIT-DELAY is is possible for the device to monitor if it has been exposed to excessive G force. The number of G's (actually milli G) is set by MOVE-GLIMIT, and the time between two successive shocks (for them to be counted as two separate shocks) is set with MOVE-GLIMIT-DELAY (number of shocks are reported in the UNITSTAT message).

The parameter MOVEMENT, controls the move detector (Tilt and NO-Move mode, if parameter is set to "0", the detector is disabled).

TILT MODE (MOVEMENT = 1)

If MOVEMENT is set to 1 tilt mode is enabled
When the Lommy is tilted more than 70 degrees from vertical, the timer for MOVEMENT-TIME is started. When the timer has exceeded MOVEMENT-VOICE1 is played and after 10 seconds the alarm is sent (MOVEMENT-SMS and/or bit 11 in the unit state) and MOVEMENT-VOICE2 is played. If the Lommy is placed vertical again before the timer exceeds the voice file MOVEMENT-VOICE3 is played and the timer for MOVEMENT-TIME is reset.

If the device is connected to a charger the function is disabled (except if LommyManager/FALManager is running!)

NOMOVE MODE (MOVEMENT = 2)

If MOVEMENT is set to 2, the "no move" mode is enabled
When the Lommy hasn't moved in the period set with MOVEMENT-TIME the voice file MOVEMENT-VOICE1 is played. After 10 seconds MOVEMENT-VOICE2 is played and the alarm is sent (MOVEMENT-SMS and/or bit 11 in the unit state). If the Lommy moving again before the timer exceeds the voice file MOVEMENT-VOICE3 is played and the timer for MOVEMENT-TIME is reset.

If the device is connected to a charger the function is disabled (except if LommyManager/FALManager is running!)

PARAMETERS RELATED TO MOVEMENT DETECTION

Parameter	Value	Must Reset	Description
MOVE-WAKEUP	[**0**/1]	No	If set to '1' and the unit is moved more than "MOVE-SENSITIVITY", the unit will poweron for "MOVE-TIMEOUT" number of seconds before powering off again. If unit is moved with the "MOVE-TIMEOUT" period, the time is "restarted" When using this function, the NOMOVE and TILT functions can not be active (and vice-versa)

Parameter	Value	Must Reset	Description
MOVE-TIMEOUT	[0..99999] **300**	No	Number of seconds the unit will be active if powered on because of "MOVE-WAKEUP" feature
MOVE-SENSITIVITY	[100..6000] **1000**	No	Number of mG of movement (minimum 100) before the unit is turned on (if "MOVE-WAKEUP" is set to '1')
MOVE-GLIMIT	[100..6000] **0**	Yes	The sensitivity for the "G detector" in mG, if unit is "shocked" beyond this amount, the "G Limit exceeded" counter is incremented with 1 (the counter can be returned in the UNITSTAT messages)
MOVE-GLIMIT-DELAY	[1..60] **2**	No	Number of seconds between two shocks. If two shocks occurs within this time, they are only counted as one.
MOVEMENT	[**0**/1/2]	No	0: Function disabled 1: TILT mode (see above) 2: NOMOVE mode (see above)
MOVEMENT-TIME	[10..6000] **60**	No	The delay in seconds before being in alarm mode.
MOVEMENT-VOICE1	[filename],[0..100]	No	File and volume of the file to be played ("Movement alarm will be sent in 10 seconds")
MOVEMENT-VOICE2	[filename],[0..100]	No	File and volume of the file to be played ("Movement alarm has been sent")
MOVEMENT-VOICE3	[filename],[0..100]	No	File and volume of the file to be played ("Movement alarm reset")
MOVEMENT-SMS	+451123344,+452233432	No	One or more numbers that will receive the movement alarm as SMS Pre-text is "MOVEMENT event" this can be changed with MOVEMENT-TEXT The rest of the text is the same as for SOS-SMS
MOVEMENT-VOICECALL	+4512345678	No	When a movement (tilt alarm) occurs, a voice call will be established to the number in this parameter
MOVEMENT-TEXT	MOVEMENT	No	The pre-text that will be added to MOVEMENT-SMS. If the text is followed by a "/" only the text in the parameter is sent, otherwise position etc is added

1WIRE INTERFACE

Some of the devices support temperature and humidity sensors and a driver id "button" on a 1Wire bus. The 1Wire bus is a "single wire bus", it only uses one signal wire (hence the "1Wire" name) and signal ground. The bus can be connected to a number of devices, the maximum number depends on the type of sensor (and if it is externally supplied with power), please contact Flextrack for further information.

All 1Wire devices have an 8 byte id, this is normally written as 8 groups of 2 digits (0-9)/letters (A-F): 00 01 3E FE 00 28 00 8D, in all communication, the space between each digit is removed, so in all commands and reports the 1Wire device id will be sent like:

99913EFE0028008D

TEMPERATURE SENSORS

The device supports up to 8 temperature sensors. Each sensor is configured with a minimum and a maximum allowed temperature.
If one of these temperatures is exceeded, a report will be generated to the server (just like the UNITSTAT report).
All connected sensors will report their current temperatures (as well as their high/low alarm states) with a specified (configurable) interval.
The unit will also trigger the transmission of a UNITSTAT message if bit 24 is set in the STATEMASK parameter should a high/low alarm be triggered on a sensor!

HUMIDITY SENSORS

The device supports up to 8 humidity sensors. Each sensor is configured with a minimum and a maximum allowed humidity (0..100% RH).
If one of these values is exceeded, a report will be generated to the server (just like the UNITSTAT report).
All connected sensors will report their current humidity (as well as their high/low alarm states) with a specified (configurable) interval.
The unit will also trigger the transmission of a UNITSTAT message if bit 31 is set in the STATEMASK parameter should a high/low alarm be triggered on a sensor!

DRIVER ID

The device can hold up to 80 different driver id's in a list. Whenever the device discovers a connected driver id button, it will search this list for the specific driver id.
A report will be generated and sent to the server (containing the driver id and status for the search result).
If the driver id is present in the list, one of the digital outputs (configurable) will be active for 10 seconds, this could allow a vehicle to be immobilized if this signal is not present when the driver attempts to start the vehicle.
If bit 23 is set in the STAMEMASK parameter the unit will also trigger the transmission of a UNITSTAT message whenever a driver id is being connected/disconnected!

The device number for driver id's is written on the small metal can of the "Driver id button" like this:

8D   01
000011B215B2

The format to write this number is:
01B215B21100008D

EXAMPLES OF REPORTS

OWTEMP-REPORT,20080617,170715,1122334455667788,-105,01,1234556677889900,230,05
The first sensor reports -10.5 deg, it is responding, and no alarms
The second sensor reports 23.0 deg, it is responding, and has a "high temperature" alarm

OWDID-DISCOVER,20080617,170715,1122334455667788,03
The device 1122.. is now connected, and it is present in the configured list of driver id's
then the device is removed, the following message is sent:

OWDID-DISCOVER,20080617,170715,1122334455667788,00
The device 1122.. is now disconnected

OWDID-DISCOVER,20080617,170715,2345667711223344,01
The device 2345.. is now connected, and it is not present in the configured list of driver id's then the device is
removed, the following message is sent:

OWDID-DISCOVER,20080617,170715,2345667711223344,00
The device 2345.. is now disconnected

LIST OF COMMANDS FOR 1WIRE DEVICES

Command	Example	SL	Description
OW-DEVICES	OW-DEVICES	High	Will scan the bus for devices, and when done, send a OW-DEVICES report back in the format: OW-DEVICES,YYYYMMDD,HHMMSS,[id1],[id2]......
OWDID-CLEAR	OWDID-CLEAR	High	Clears the list of the 80 driver id's
OWDID-DELETE	OWDID-DELETE, aabbccddeeffgghh	High	Is deleting a specific driver id from the list of driver id's
OWDID-INSERT	OWDID-INSERT, aabbccddeeffgghh	High	Inserts a specific driver id into the list of driver id's
OWDID-TOGGLE	OWDID-TOGGLE,1	High	If a Driver ID is connected that is present in the list of driver id's, the OPT2 output 'x' will be on for 10 seconds. x can be '0' for none, '1' for output 1 or '2' for output 2. Note: The 10 seconds will be extended for as long as ignition is detected!
OWTEMP-SCAN	OWTEMP-SCAN	High	Scans the 1Wire bus for temperature sensors, and adds them to the list of sensors in the device
OWTEMP-CLEAR	OWTEMP-CLEAR	High	Clears the list of the 8 temperature sensors
OWTEMP-INSERT	OWTEMP-INSERT, aabbccddeeffgghh,0,230	High	Inserts a specific sensor id and low/high temperature (in 1/10 deg) alarm into the list of temperature sensors

Command	Example	SL	Description
OWTEMP-DELETE	OWTEMP-DELETE, aabbccddeeffgghh	High	Deletes a specific sensor id from the list of temperature sensors
OWTEMP-SHOW	OWTEMP-SHOW	Low	Returns a list of temperature sensors and their current temperature (the temperature is shown as "NA" if sensor does not answer)
OWTEMP-REPORT-INTERVAL *Deprecated, use OWTEMP-REPORT-INTERVAL parameter instead!*	OWTEMP-REPORT-INTERVAL,600	High	Number of seconds between reports (temperature for all configured sensors and their alarm state is sent)
OWRH-SCAN	OWRH-SCAN	High	Scans the 1Wire bus for humidity sensors, and adds them to the list of sensors in the device
OWRH-CLEAR	OWRH-CLEAR	High	Clears the list of the 8 temperature sensors
OWRH-INSERT	OWRH-INSERT, aabbccddeeffgghh,0,230	High	Inserts a specific sensor id and low/high temperature (in 1/10 deg) alarm into the list of temperature sensors
OWRH-DELETE	OWRH-DELETE, aabbccddeeffgghh	High	Deletes a specific sensor id from the list of temperature sensors
OWRH-SHOW	OWRH-SHOW	Low	Returns a list of humidity sensors and their current reading (the humidity is shown as "NA" if sensor does not answer)
OWRH-REPORT-INTERVAL *Deprecated, use OWRH-REPORT-INTERVAL parameter instead!*	OWRH-REPORT-INTERVAL,600	High	Number of seconds between reports (humidity for all configured sensors and their alarm state is sent)

PARAMETERS RELATED TO 1WIRE DEVICES

Parameter	Value	Must Reset	Description
OWTEMP-REPORT-INTERVAL	OWTEMP-REPORT-INTERVAL,600	Yes	Number of seconds between reports (temperature for all configured sensors and their alarm state is sent)
OWRH-REPORT-INTERVAL	OWRH-REPORT-INTERVAL,600	Yes	Number of seconds between reports (humidity for all configured sensors and their alarm state is sent)
OW-DISABLE	[0/1] **0**	Yes	Set to 1 to disable 1Wire support

LOMMY-TAG FEATURES

Some of the Lommy devices have support for Lommy-Tag devices.

A Lommy- Tag is basically a small radio transmitter (and receiver), which can be hidden almost everywhere. It sends out a unique signal (its tag-id) within a short distance (signal strength can be configured in each tag) every 5 seconds (can also be configured). This means that each Lommy-Tag has its own identity and the Lommy Tracker knows exactly which Tag it is close to when it picks up its signal.

Lommy-Tags comes in several types, basically there are connected tags (referred to as a "sheep") and un-connected tags (referred to as a "wolf"). A connected tag is known to the Lommy (configured with its ID and a timeout), and un-connected tags are not known to Lommy devices.

Basically connected tags are being watched by the Lommy they are configured in, they are typically kept close to the Lommy. A good example could be when a Lommy is installed in a home, and some of your valuable assets have a connected tag mounted inside (for example your new and valuable Plasma TV). Should one of the connected tags that are configured in the Lommy, disappear from your house (your TV is stolen), the Lommy will detect this, and send a message to the server about this. At the same time, when the connected tag in the stolen TV, is heard by any other Lommy, this Lommy will send a message to the server that it just have heard a connected tag that is in "panic".

Un-connected tags are not configured in the Lommy devices. They are basically just "floating around" sending their ID every number of seconds. If a Lommy enters the range of the unconnected tag, it will send a message to the server about this.

A variance to an "un-connected" tag is a "listed un-connected" tag. A listed tag is basically an "un-connected" tag, but one that is known to the Lommy. This means, if a "listed un-connected" tag is heard by a Lommy (and the tags ID is not in the list), no message is sent to the server (no WOLF-HEARD is sent). Only if this "listed un-connected tag" has its ID present in the Lommy hearing it, a report (WOLF-REPORT) is sent to the server. The listed un-connected tag, can be configured to control a digital output on the device, if this feature is used, it is important that the parameter SHEEP-OUTPUT is not set to the same output number as is used by one of the listed un-connected tags!

Using the parameter **WOLF-STATEMASK** it is possible to trigger WOLF-ALIVE messages when the device changes state according to this mask. If any of the bits change state (masked by the statemask), a WOLF-ALIVE message is triggered. Whenever the **WOLF-STATEMASK** is set to a value different from 0, all WOLF-HEARD messages are not sent to the server (only WOLF-ALIVE, either triggered by the **WOLF-REPORT-INTERVAL** or because of state change according to **WOLF-STATEMASK**, and WOLF-REMOVED messages)

Whenever a message are sent to the server about a connected or unconnected tag the tags ID is sent, and most of the time the report also contains the signal strength and battery level when the tag was last heard.

If a Lommy is without GSM coverage for a extended time, it will start acting as a connected tag, and send its serial number out as an Tag ID. When GSM coverage is re-established, this behavior will stop again (controlled by the parameter **NOGSM-BROADCAST**)

If a Lommy receives the command BEACON:ON, it will start acting as a tag itself, and send its serial number out as an Tag ID at regular intervals (if **TAGID-IMEI** is set to "1" it will use the last 9 digits as the Tag ID instead of its serial number). The number of seconds between transmissions is controlled by the parameter **BEACON-INTERVAL.** When the device is acting as a connected tag, it will have bit 29 in the unitstate field of UNITSTAT messages set as '1'. When the command BEACON:OFF is received, this behavior will stop. Depending on the parameter **TAG-TYPE**, it will act as a connected tag, a unconnected tag or as an listed unconnected tag.

ClimaTags reports humidity and temperature with a set report interval (the interval is set in the tag itself). The ClimaTag also reports signal strength and battery level. If the parameter **CLIMATAG-REPORT** is set to "1", all ClimaTags heard will be reported to the server using the CTAG report.

GENERAL PARAMETERS RELATED TO LOMMY-TAGS

Parameter	Value	Must Reset	Description
BEACON	[0/3] **0**	Yes	If set to '3' it's in "Lommy-Tag" mode, and it is able to interact with both connected and unconnected Tags. Please consult Flextrack for further info.
BEACON-INTERVAL	[0/1..3600] **2**	No	If the device receives the "BEACON:ON" command, this is the number of seconds between the device sends out "Panic messages", simulating a connected Tag (that is without coverage of it's "master")
TAGID-IMEI	[0/1] **0**	No	If beacon is active (with BEACON:ON command) the device will use the last 9 digits of it's IMEI number as the source address, otherwise it will use it's serial number as the source address.
TAG-TYPE	[0/1/2] **0**	No	Determines what type of Tag the device acts as when the device receives the "BEACON:ON" command. 0 is sheep (connected tag), 1 is wolf (unconnected tag) and 2 is listed unconnected tag (listed wolf)
NOGSM-BROADCAST	[0/10..60000] **0**	No	If the device is without GSM coverage for more than 1 minute, the device will begin acting like a connected tag, sending it's serial number out each n number of seconds (if set to 60, the message will be sent every minute until GSM coverage is established again). If set to 0, this feature is disabled.
CLIMATAG-REPORT	[0/1] **0**	No	If climatags are heard, the CTAG reports will only be sent to the server if this parameter is set to 1

GENERAL COMMANDS RELATED TO LOMMY-TAGS

Command	Example	SL	Description
BEACON:ON		High	The device starts to act as a tag, sending a message every BEACON-INTERVAL number of seconds. (TAG-TYPE determines the type of tag the device emulates)
BEACON:OFF		High	The device stops to act as a connected tag.

COMMANDS RELATED TO CONNECTED LOMMY-TAGS

Command	Example	SL	Description
SHEEP-CLEAR	SHEEP-CLEAR	High	The list of connected tags in the Lommy is cleared
SHEEP-SHOW	SHEEP-SHOW	High	Shows a list of configured connected tags in

			the Lommy if it is connected to a PC and the "Log window" program is running
SHEEP-INSERT [id],[timeout]	SHEEP-INSERT, 12349988,30	High	Inserts a connected Lommy-Tag in the list of connected tags. Timeout is max number of seconds between transmissions from the tag. If tag is not heard for this number of seconds, a SHEEP-ALARM message is sent to the server
SHEEP-DELETE [id]	SHEEP-DELETE,12349988	High	Deletes a specific connected tag from the list

PARAMETERS RELATED TO CONNECTED LOMMY-TAGS

Parameter	Value	Must Reset	Description
SHEEP-OUTPUT <state>	[0/1..4] **0**	No	If at least one of the connected tags are within range, this digital output will be active. If none of the configured connected tags are heard, output is off (MUST be different from the output number configured for any of the listed un-connected tgas (if any))

COMMANDS RELATED TO UN-CONNECTED LOMMY-TAGS

Command	Example	SL	Description
WOLF-SHOW	WOLF-SHOW	High	Shows a list of currently heard un-connected tags if Lommy is connected to a PC and the "Log window" program is running
WOLF-LIST-INSERT [id,output]	WOLF-LIST-INSERT, 12349988,1	High	Inserts a "listed un-connected" Lommy-Tag in the list of listed un-connected tags. The "output" number is the output to be active if this listed tag is heard (0 = no output) MUST be different that the SHEEP-OUTPUT number (if specified)
WOLF-LIST-DELETE [id]	WOLF-LIST-DELETE, 12349988	High	Deletes a specific "listed un-connected" tag from the list
WOLF-LIST-CLEAR	WOLF-LIST-CLEAR	High	The list of "listed un-connected" tags in the Lommy is cleared

PARAMETERS RELATED TO UN-CONNECTED LOMMY-TAGS

Parameter	Value	Must Reset	Description
NOGSM-BROADCAST	[0/10..60000] **0**	No	If the device is without GSM coverage for more than 1 minute, the device will begin acting like a connected tag, sending it's serial number out each n number of seconds (if set to 60, the message will be sent every minute until GSM coverage is established again)
WOLF-THRESHOLD	[0/-100..-10] **0**	Yes	If a un-connected tag is heard with a signal strength below this value, the tag is ignored
WOLF-REPORT-INTERVAL <interval>	[10..60000] **3600**	No	Number of seconds between a list of currently heard un-connected tags are sent to the server (WOLF-ALIVE message)
WOLF-TIMEOUT <interval>	[10..60000] **120**	No	Number of seconds since a unconnected tag has been heard before it is removed from a temporary list (meaning that if the tag is heard again, a new WOLF-HEARD report is sent to the server)
WOLF-STATEMASK <val>	[0000..FFFF] **0000**	No	A bitmask used to identify when the *"WOLF-ALIVE"* message should be sent, a '1' in a bit in the mask will force the unit to send the *"WOLF-ALIVE"* message whenever the corresponding state changes.

The WOLF-STATEMASK field consists of 16 bits:

Bit	Description
6	Device is speeding (according to MAX-SPEED)
5	State of output 1
4	State of input 2
3	State of input 1
2	Device is moving (according to IDLE-SPEED)
1	Geofence monitor is active
0	Geofence broken

FLEXNAV FEATURES

The Standard Tracker Application also supports communication with a Lommy-Terminal. The Lommy Terminal has a 5" or 7" color touch screen, and it is based on a standard Windows CE Terminal, with a wide range of programs. The user can choose to have the screen with or without navigation, or just use it as a platform to develop their own programs on. The Lommy-Terminal enables a broad range of fleet management systems (orders can be sent to the driver, messages, addresses etc.)

The Lommy-Terminal communicates with the backend system thru the Standard Tracker Application, the Lommy acts as a "data carrier" for the terminal. Please contact Flextrack for further information on this feature.

COMMANDS RELATED TO FLEXNAV

The data flowing between the backend system and the Lommy-Terminal is sent using the GDATA command. All responses from the Terminal are also sent to the backend system as GDATA messages. Contact Flextrack for the exact syntax of these data.

Command	Example	SL	Description
GDATA,1	GDATA,1,20110201,130317, 6_1_1	High	Data to/from the Lommy-Terminal

PARAMETERS RELATED TO FLEXNAV

Parameter	Value	Must Reset	Description
FLEXNAV <state>	[0/1/2/3] **0**	Yes	Enable and set the communication type between the Lommy and the Lommy-Terminal. 0: Flexnav not enabled 1: Use RS485 as communication (57600 baud) 2: Use RS232 as communication (57600 baud) 3: Use RF (868 MHz) as communication
FLEXNAV-CIRCULAR	[0/1..1000] **10**	Yes	Sets the size of the circular buffer for messages FROM the server TO the terminal If set to 0, the legacy protocol is used (first version of protocol), if different than 0, the new improved protocol is used between the Lommy and the terminal.
FLEXNAV-BAUDRATE	[1200/2400/4800/9600/ 19200/57600/115200] **576000**	Yes	Sets the Baudrate used between the Lommy and the terminal.

DOORLOCK CONTROL

The Standard Tracker Application can be used to control the access to for example a truck. The idea is that an output (controlled by **DOOR-LOCK**) from the device controls the locking mechanism for the trucks doors. By combining the doorlock feature with listed unconnected tags (that control the same output as the doorlock feature), it is possible to make a secure solution.

When the driver stops the truck (ignition is removed), the doors will unlock for the number of seconds in **DOOR-LOCK-TIME** and then they will lock again. However, by configuring a listed unconnected tag, that tag will also keep the doors unlocked.

1) The driver stops the truck; the doors are unlocked, for example for 15 seconds (controlled by **DOOR-LOCK-TIME**).
2) The driver steps out of the truck, carrying a listed tag in his pocket
3) The device hears this listed tag, keeping the doors unlocked
4) The driver walks away from the truck, the device can no longer hear the listed tag he is wearing, and the doors are locked
5) The driver comes back to the truck, the listed tag is heard again, and the doors are unlocked again
6) The driver starts the truck (ignition is on), the doors are kept locked, even if the listed tag is heard

PARAMETERS RELATED TO DOORLOCK FEATURE

Parameter	Value	Must Reset	Description
DOOR-LOCK \<output\>	[0/1] **0**	Yes	Output to use for the doorlock feature. 0: Doorlock feature not enabled 1: Use output 1 for the doorlock
DOOR-LOCK-TIME \<time\>	[1..9999] **5**	Yes	Number of seconds to keep the output (see above) active after a trailing edge is seen on ignition.

GSAMPLER FEATURES

The GSampler feature is active if the parameter **GSAMPLER-TRIGGER** > 0 at poweron of the unit.

Whenever it is active, the 3 axis (X/Y/Z) is sampled 40 times per second. If the unit is moved so that the G force on at least one of the 3 axis exceeds the value in **GSAMPLER-TRIGGER**, the device will sample data from all 3 axis for up to 10 seconds. If the measured G force for all 3 axes are below the trigger level for at least 3 seconds during the 10 seconds, the sampling is stopped.

When sampling is stopped, the samples at the end of the buffer are eliminated "backwards", the device eliminates samples starting from the last sample, moving towards the front. All samples that are below the **GSAMPLER-ELIMINATE** value will be removed from the data. When all the samples below the eliminate threshold has been removed, 1/2 second of the samples are included again in the dataset.

The resulting data will be stored to one of the disks in the device if **GSAMPLER-PATH** is defined (f.ex "A:" or "C:"), and the resulting data are sent back to the server using GDATA message (slot 5), and bit 20 is set in the UNITSTATE field of UNITSTAT message.

The data are sent in small packages of maximum xxx bytes. The first message will contain date,time,lat/lon, speed, direction, SV used, HDOP, number of samples and the first of the data. The next messages will contain the same date/time as the first, and the rest of the data (each message is limited to 256 bytes in length).

After the event has been sent, a number of seconds, **GSAMPLER-DELAY**, has to elapse before a new trigger is accepted.

Please see the section "Contents of the GSampler report" in the beginning of this document for the data sent to the server.

Please contact Flextrack for further information on this feature.

Below you see an example of data recorded when the device is moved in X/Y/Z direction, also the contents of a CSV file is shown.
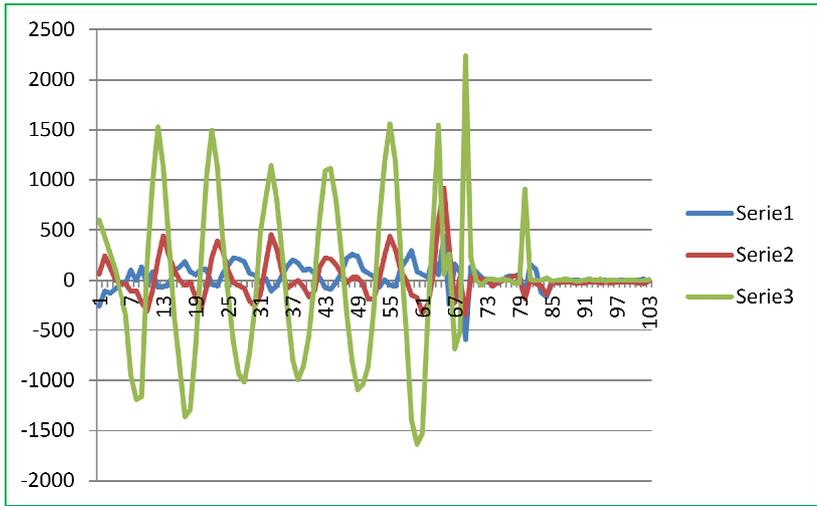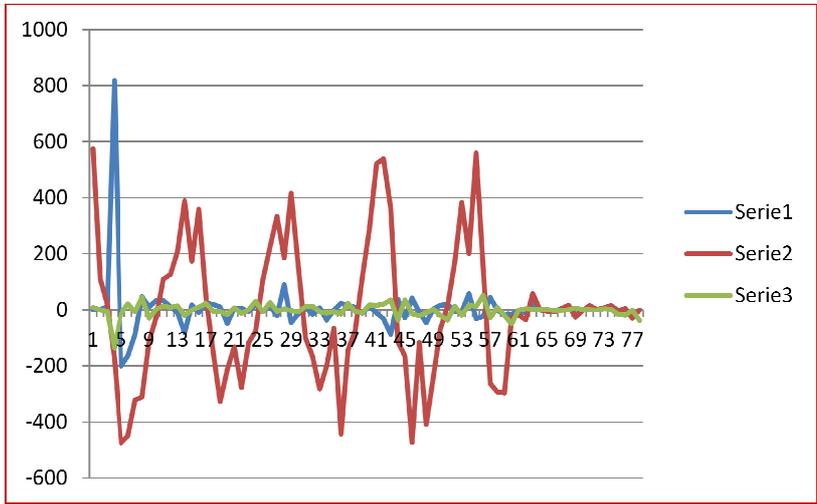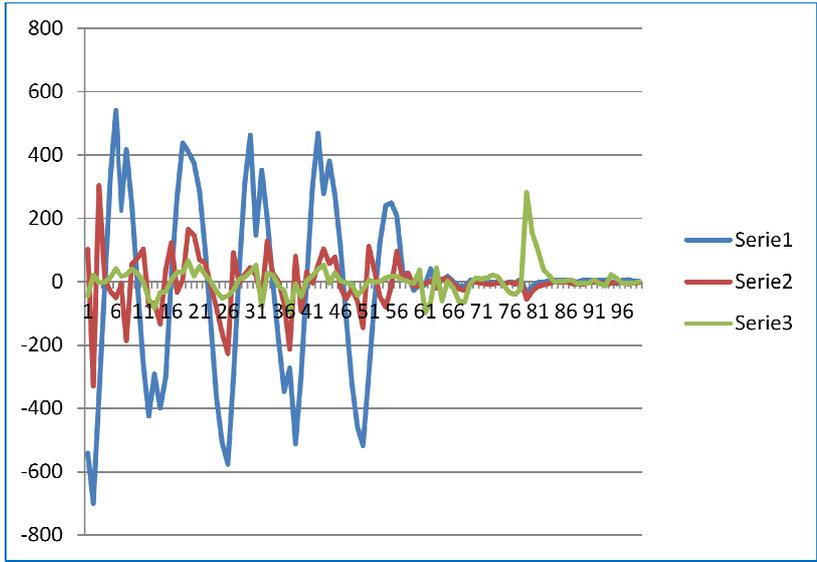
CONTENTS OF CSV FILE FROM GSAMPLER

First line in the .CSV file:

Field	Example	Description
Date [YYYYMMDD]	20090923	The date in UTC
Time [HHMMSS]	115945	The time in UTC
Latitude [DD.MM.DECM]	N55.12.0812	The latitude in degrees, minutes and decimal minutes (a leading "N" or "S" identifies the position as north or south of the equator)
Longitude [DDD.MM.DECM]	E9.58.1665	The longitude in degrees, minutes and decimal minutes (a leading "E" or "W" identifies the position as east or west of Greenwich)
Speed	122	Speed over ground in kilometers per hour
Direction	198	The compass heading in degrees
SV	6	Number of GPS satellites used for position fix
Height	213	Meters above sea level (MSL)
HDOP	92	The current HDOP value (multiplied with 10, 92 equals 9.2)

The following lines in the .CSV file:

Field	Example	Description
X,Y,Z data	378;212;766	Data for X,Y and Z axis in mG (1000 mG equals 1G)

EXAMPLE OF CSV FILE

20110819;084522;N54.26.4456;E9.32.0960;148;137;8;62;91
169;49;-2824
-69;-363;1406
138;-201;581
179;-136;164
190;-140;210
185;-132;117
178;-136;204
111;-165;453
291;107;6
86;-102;-343
4;28;-489
-227;-51;-175
-9;-26;67
-6;-30;164
2;-11;10
-8;-4;6
-21;-2;-16
-24;-1;-30
-17;-2;-22
-19;6;-82
-26;12;-104
-23;7;-20
-15;-1;39
-10;-11;47
-4;-16;25
-3;-15;-2
0;-6;-38
-11;-5;-3
-5;-10;44
0;-17;46
-1;-16;19

PARAMETERS RELATED TO GSAMPLER

Parameter	Value	Must Reset	Description
GSAMPLER-TRIGGER *<level>*	[0/1..6000] **0**	Yes	Number of mG before sampling starts 0: GSampler not enabled
GSAMPLER-ELIMINATE *<level>*	[0/1..6000] **0**	Yes	Number of mG, eliminates samples from the end of the sample buffer.
GSAMPLER-DELAY *<delay>*	[0..6000] **2**	No	Number of seconds from an event has occurred, until the device looks for a new event.
GSAMPLER-PATH <path>	path	Yes	If defined, the data will be saved in CSV files on the disk system.

HTTP GET REQUEST REPORTS

A simple way to send position reports to a web server is by having the unit issue simple HTTP GET requests. The GET request contains a number of parameters, such as time, position, battery voltage etc. These data can then be saved / used by the web server depending on the application. The HTTP GET request is using GPRS in the GSM network to transport data. For an explanation of the contents, please see section "Contents of FLEETMAN Report"

PARAMETERS RELATED TO HTTP GET REQUESTS

Parameter	Value	Must Reset	Description
FLEETMAN	www.server.com/httpreceiver.dll	Yes	The URL for sending HTTP GET requests to. If this parameter is either omitted or left blank, no HTTP GET requests will be attempted. See the section "*HTTP Get Request*" for an explanation.

FLEXCI COMMUNICATION PROTOCOL

The FlexCI protocol is described at both "low-level" and "high-level". The low-level description explains the basic mechanisms that must be followed in order to transfer data between a Flextrack unit and a Server (or more general, between two "nodes"). The high-level description details the steps needed to establish a connection to the Server, this step is mainly issuing a "LOGON" command to the Server.

To test the protocol when developing a backend, you can download a small "server" listening for incoming connections on port 30000.
You will find the program here http://www.flextrack.dk/files/FlexCIServer.exe

Low-level
FlexCI (Flextrack Communication Interface) is a TCP/IP based communication protocol, that handles the interface to and from the Flextrack units, typically from a PC based Server of some kind. The FlexCI protocol "rides" on normal TCP/IP sockets, which is supported on GPRS.

FlexCI is ASCII based, all data and commands is pure ASCII. This makes it easy to handle in various Web applications, and also for testing purposes, as all information is human readable. The FlexCI protocol uses a single socket connection for the communication between the Flextrack unit and the Server. All commands consist of a transaction number (TNO) and some data. The data is of no interest to the FlexCI protocol itself, only the TNO is important (the data is simply passed to the application layer).
Whenever a node wants to send something to the server, it starts by incrementing its current transaction number and then it sends the command. At the same time, it starts a timer. It will then "listen" for a message from the other node, with the same TNO as it used in the command it just sent. If the timer expires before a frame with the same TNO is received, it will report an error, and try to make a new connection to the server.

It is important to notice, that only ONE command can be "in the air" at one time between the Flextrack unit and the Server, it is NOT allowed to send another command before the previous is either acknowledged or an timeout has occurred!

The FlexCI protocol does not distinguish between the Flextrack unit and Server, both are just considered "nodes".

On some GSM networks it is necessary to send occasional "dummy communication" in order to keep the GPRS socket connection up and running. This communication simply consists of a <CR>. The <CR> character is sent after a number of seconds (for example 600 seconds) inactivity on the FlexCI communication channel (socket). When the Server receives an <CR> only, it should simply respond with a <CR> character.

NORMAL FLOW, NO ERRORS:

Node A sends two commands to Node B.

Node A		Node B
Send command xxx	"3311,xxx<CR>" →	Execute command
Response received	← "3311,ACK<CR>"	Send response
Send command yyy	"3312,yyy<CR>" →	Execute command
Response received	← "3312,ACK<CR>"	Send response
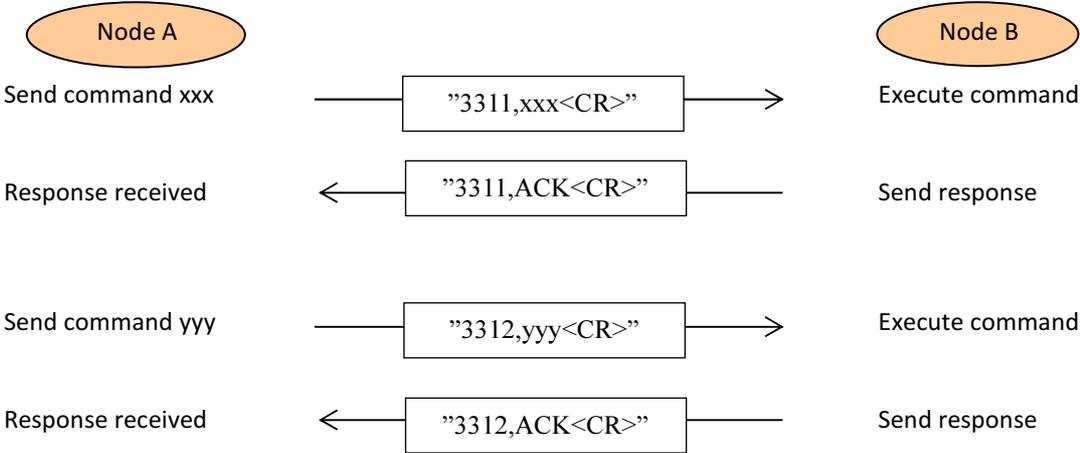
NORMAL FLOW, CROSSING MESSAGES:

Node A sends a command to Node B, and at the same time Node B send a command to Node A (effectively crossing each other before responses are received at each end)

Node A		Node B
Send command xxx	"3313,xxx<CR>" →	Execute command
Execute command	← "2311,zz<CR>"	Send command zz
Response received	← "3313,ACK<CR>"	Send response
Send response	"2311,ACK<CR>" →	Execute command
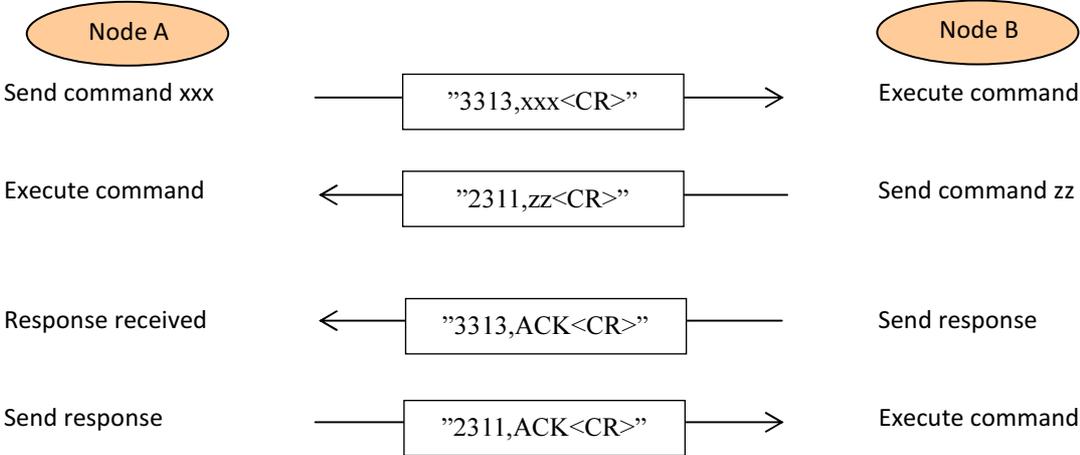
ABNORMAL FLOW, NO RESPONSE RECEIVED:

Node A sends a command to Node B which sends a response that is NOT received at Node A. Node A resends the command to Node B (using the same TNO), and receives a response (it is also allowed to close and re-open the connection when the error occurs).

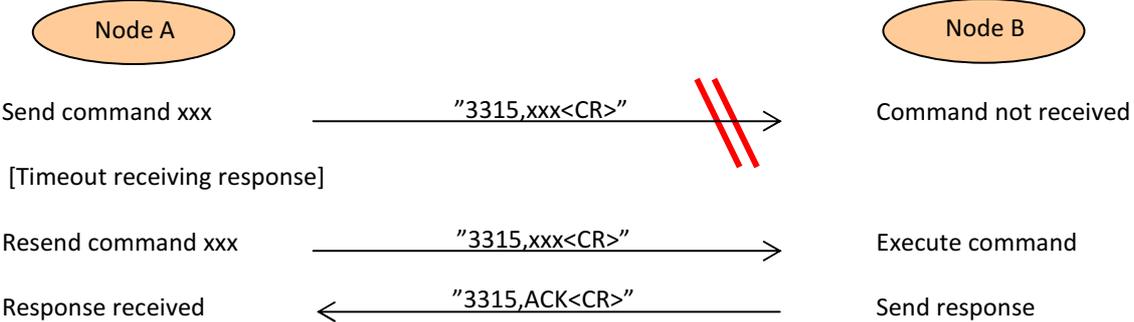| Node A		Node B
Send command xxx	———— "3314,xxx<CR>" ————→	Execute command
	←—— "3314,ACK<CR>" ————	Send response
[Timeout receiving response]		
Resend command xxx	———— "3314,xxx<CR>" ————→	Same TNO, don't execute again!
Response received	←—— "3314,ACK<CR>" ————	Resend response
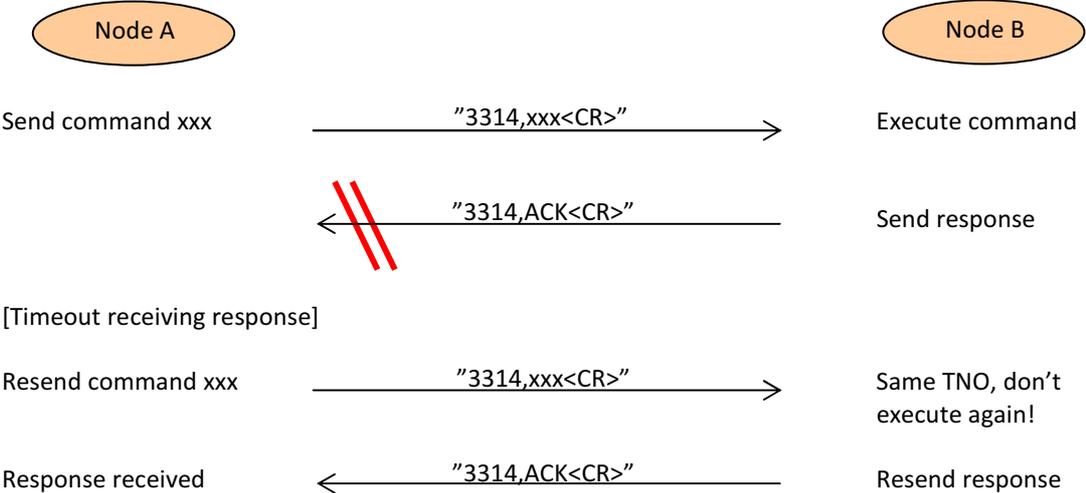
ABNORMAL FLOW, COMMAND NOT RECEIVED:

Node A sends a command to Node B, which does not receive the command. Node A gets a timeout receiving the response (which is never sent as Node A never received the command), and sends the command again (with the same TNO), this time it receives a response (it is also allowed to close and re-open the connection when the error occurs).

Node A		Node B
Send command xxx	———— "3315,xxx<CR>" ————→	Command not received
[Timeout receiving response]		
Resend command xxx	———— "3315,xxx<CR>" ————→	Execute command
Response received	←—— "3315,ACK<CR>" ————	Send response

HIGH-LEVEL

In order to establish a valid connection where commands can float in both directions, the Flextrack unit must make an "LOGON" sequence with the Server. Basically this just means that the Flextrack unit sends a "LOGON,nnnnnnnnnn,iiiiiiiiiiiiiiiiii" where the "nnnnnnnnnn" is the units 10 digit Node ID (typically the serial number of the unit) and "iiiiiiiiiiiiiiiiii" is the ICCID number of the SIM-card. When the Flextrack unit receives an "ACK" on this command, it is connected, and further communication can follow between the Flextrack unit and the Server.

Whenever a Flextrack unit is started, it will try to establish a socket connection to the defined Server. The Flextrack unit has to establish the connection, as the unit often sits behind the GSM operators Firewall, and therefore it's not possible for the Server to establish the connection to the unit.

When the Flextrack unit has created the connection, it must send a "LOGON" command to the Server, in order to identify itself. The logon command contains the Flextrack unit's serial number and the ICCID number of the SIM-card. When the unit receives an acknowledge message from the Server, both ends are ready to communicate with each other.

If either the Server or the Flextrack unit discovers that the communication is lost (socket closes or timeout on send/receive) it will initiate a socket close. The Flextrack unit will then discover this situation, and re-establish the connection (and make a new "LOGON" attempt).

Whenever a Lommy unit is switched off by the user (or a RESET command is received from the server, the unit will send a DISCONNECT message to the server. This tells the server that the unit is about to close the socket connection in a "controlled" manner.

Below you will see a typical scenario between a Lommy unit and a Server, beginning with the Lommy being switched on.
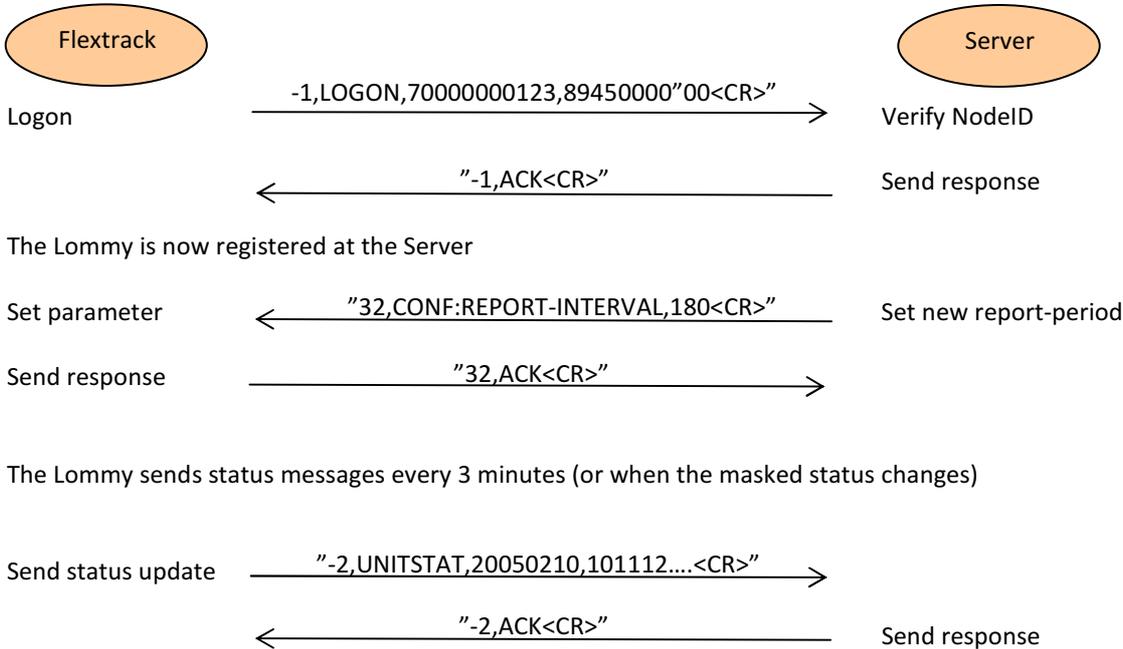
APPENDIX A

This section contains examples of configuration for the Standard Tracker Application.
The different configuration sets each contain a number of parameters; please consult the correct section in this manual for a precise description of the parameters.

STANDARD CONFIGURATION

This is a basic simple configuration that will send a position (UNITSTAT) report every 120 seconds if the device is moving. The device will also detect (SHARPTURN) if the device is in a car that turns around a corner

FLEXSERVER-IP	= devel.care4all.dk:30000	IP address and port of the FlexCI Server
FLEXSERVER-IP-SEC	= devel.care4all.dk:30000	Secondary server (if the primary is not running)
REPORT-INTERVAL	= 120	report interval for UNITSTAT messages (in seconds)
STATEMASK	= 8DEFBE16	which events will also trigger an UNITSTAT (see table)
GPS-GIVEUP	= 300	GPS should try for 300 seconds to get a fix in idle Mode, if no success, switch GPS off (unless GPS-CHARGE is set to 1)
MAX-HDOP	= 30	maximum HDOP value for a fix is 3.0
MAX-LAT	= 250	maximum change in latitude for forced report
MAX-LON	= 500	maximum change in longitude for forced report
FORCE-REPORT	= 2	If MAX-LAT/LON is not exceeded for this number, send UNITSTAT anyway
GPS-CHARGE	= 1	GPS always powered on when charger is connected
FLEXSERVER-IDLE	= 300	send dummy traffic to server each 300 seconds to keep the connection "alive"
GPS-TIMEOUT	= 60	wait 60 seconds for a GPS fix when doing a report
LASTGOOD	= 1	If no GPS fix, use data from last good fix
FLEXSERVER-CIRCULAR	= 25	room for 25 reports in circular buffer (if server momentarily not available)
IDLE-TIME1	= 10	If the device has been moving faster than IDLE-SPEED for this number of seconds, the unitstate bit 15 will be set (signaling that the device is "moving"
IDLE-TIME2	= 90	number of seconds the device should be stationary before unitstate bit 15 is reset again
IDLE-SPEED	= 10	speed the device should at least move before it is considered "moving"
REPORT-STARTUP	= 1	unit will send a UNITSTAT report immediately when started
SHARPTURN	= 5,30	detect a "sharp turn" if device is turning more than 30 degrees over "5 samples (5 seconds)" of the GPS position
REPORT-INTERVAL-IGN	= -1	report interval when ignition is active is just the normal report interval in REPORT-INTERVAL
GSM-RESTART	= 86400	GSM module is restarted every 24 hours (86400 seconds)
UNITSTAT-FIELDS	= 0003FFFF	the first 19 fields of the UNITSTAT message is sent

"WAKEUP" ON MOVEMENT

This configuration will wake the device up from powerdown when it is being moved with a force greater than 0.35G. When powered on, it will stay "on" for 60 seconds after the last physical movement (above 0.35G)

FLEXSERVER-IP	= devel.care4all.dk:30000	IP address and port of the FlexCI Server
FLEXSERVER-IP-SEC	= devel.care4all.dk:30000	Secondary server (if the primary is not running)
REPORT-INTERVAL	= 30	report interval for UNITSTAT messages (in seconds)
STATEMASK	= 8DEFBE16	which events will also trigger an UNITSTAT (see table)
GPS-GIVEUP	= 300	GPS should try for 300 seconds to get a fix in idle Mode, if no success, switch GPS off (unless GPS-CHARGE is set to 1)
MAX-HDOP	= 30	maximum HDOP value for a fix is 3.0
MAX-LAT	= 250	maximum change in latitude for forced report
MAX-LON	= 500	maximum change in longitude for forced report
FORCE-REPORT	= 2	If MAX-LAT/LON is not exceeded for this number of reports, send UNITSTAT anyway
GPS-CHARGE	= 1	GPS always powered on when charger is connected
FLEXSERVER-IDLE	= 300	send dummy traffic to server each 300 seconds to keep the connection "alive"
GPS-TIMEOUT	= 60	wait 60 seconds for a GPS fix when doing a report
LASTGOOD	= 1	If no GPS fix, use data from last good fix
FLEXSERVER-CIRCULAR	= 25	room for 25 reports in circular buffer (if server momentarily not available)
IDLE-TIME1	= 10	If the device has been moving faster than IDLE-SPEED for this number of seconds, the unitstate bit 15 will be set (signaling that the device is "moving"
IDLE-TIME2	= 90	number of seconds the device should be stationary before unitstate bit 15 is reset again
IDLE-SPEED	= 10	speed the device should at least move before it is considered "moving"
MOVE-WAKEUP	**= 1**	**unit will power on when it is being moved**
MOVE-TIMEOUT	**= 60**	**number of seconds device must be stationary before it powers down again**
MOVE-SENSITIVITY	**= 350**	**number of mG (0.35G) device must be moved before powering on**
REPORT-STARTUP	= 1	unit will send a UNITSTAT report immediately when started
SHARPTURN	= 5,30	detect a "sharp turn" if device is turning more than 30 degrees over "5 samples (5 seconds)" of the GPS position
REPORT-INTERVAL-IGN	= -1	report interval when ignition is active is just the normal report interval in REPORT-INTERVAL
GSM-RESTART	= 86400	GSM module is restarted every 24 hours (86400 seconds)
UNITSTAT-FIELDS	= 0003FFFF	the first 19 fields of the UNITSTAT message is sent

SMS BASED

This configuration uses SMS messages for reports etc. This is basically a device that is "standalone", there is no server used and the FlexCI server interface is not configured.

FLEXSERVER-IP	=	SMS
FLEXSERVER-IP-SEC	=	left blank
FLEXSERVER-SMS	**= +4511223344**	**SMS number the UNITSTAT messages should be sent to**
SMSSENDER	= ALL	which numbers are allowed to send SMS messages to the unit (in this case, all are allowed)
REPORT-INTERVAL-SMS	**= 86400**	**report interval for UNITSTAT messages (in seconds)**
GPS-GIVEUP	= 300	GPS should try for 300 seconds to get a fix in idle Mode, if no success, switch GPS off (unless GPS-CHARGE is set to 1)
MAX-HDOP	= 30	maximum HDOP value for a fix is 3.0
MAX-LAT	= 250	maximum change in latitude for forced report
MAX-LON	= 500	maximum change in longitude for forced report
FORCE-REPORT	= 2	If MAX-LAT/LON is not exceeded for this number of reports, send UNITSTAT anyway
GPS-CHARGE	= 1	GPS always powered on when charger is connected
PREFERRED-PROVIDER	= 23801,23802	list of GSM provider if device is roaming (and not can use it's "home" network)
REPORT-INTERVAL-SMS-ROAMING	**= 86400**	**report interval If device is roaming on GSM network, and a provider in the PREFERRED-PROVIDER is not present in the GSM network**
GPS-TIMEOUT	= 60	wait 60 seconds for a GPS fix when doing a report
LASTGOOD	= 1	If no GPS fix, use data from last good fix
IDLE-TIME1	= 10	If the device has been moving faster than IDLE-SPEED for this number of seconds, the unitstate bit 15 will be set (signaling that the device is "moving"
IDLE-TIME2	= 90	number of seconds the device should be stationary before unitstate bit 15 is reset again
IDLE-SPEED	= 10	speed the device should at least move before it is
SHARPTURN	= 5,30	detect a "sharp turn" if device is turning more than 30 degrees over "5 samples (5 seconds)" of the GPS position
STATEMASK-SMS	**= 81003E12**	**which events will also trigger an UNITSTAT (see table)**
GSM-RESTART	= 86400	GSM module is restarted every 24 hours (86400 seconds)
UNITSTAT-FIELDS	= 0003FFFF	the first 19 fields of the UNITSTAT message is sent

CYCLIC WAKEUP

This is a configuration that will power up the device every 60 minutes, attempt to get a GPS fix, and send a UNITSTAT report to the server and switch itself off again.

FLEXSERVER-IP	= devel.care4all.dk:30000	IP address and port of the FlexCI Server
FLEXSERVER-IP-SEC	= devel.care4all.dk:30000	secondary server (if the primary is not running)
REPORT-INTERVAL	= 30	report interval for UNITSTAT messages (in seconds)
STATEMASK	= 8DEFBE16	which events will also trigger an UNITSTAT (see table)
GPS-GIVEUP	= 300	GPS should try for 300 seconds to get a fix in idle Mode, if no success, switch GPS off (unless GPS-CHARGE is set to 1)
MAX-HDOP	= 30	maximum HDOP value for a fix is 3.0
MAX-LAT	= 250	maximum change in latitude for forced report
MAX-LON	= 500	maximum change in longitude for forced report
FORCE-REPORT	= 0	If MAX-LAT/LON is not exceeded for this number of reports, send UNITSTAT anyway
GPS-CHARGE	= 1	GPS always powered on when charger is connected
FLEXSERVER-IDLE	= 300	send dummy traffic to server each 300 seconds to keep the connection "alive"
GPS-TIMEOUT	= 60	wait 60 seconds for a GPS fix when doing a report
LASTGOOD	= 1	If no GPS fix, use data from last good fix
FLEXSERVER-CIRCULAR	= 25	room for 25 reports in circular buffer (if server
CYCLIC	**= 60**	**time in minutes between the device should power up and send a UNITSTAT report**