

# GPS Sender Software Interface Description



## EZ863 GPS Terminal Telit Cellular GPS Engine

**Version: 05.1**  
**EZ863 GPS Terminal\_HD\_V5.1 13.July.2009**

## 1. Power management

### **1.1 Turning the unit ON:**

The unit will be turned ON in one of the following cases:

1. First time startup.
2. The Ignition has been turned on.
3. The micro senses a movement.
4. The Main Car battery cut off.

- **Movement sensor:**

The unit senses the movement sensor.

If movements have been detected and the modem was turned OFF, the micro turns ON the modem and the DC\DC POWER.

- **Main POWER Fail –Main Car Battery (Vin)**

The Micro senses the Main Power - Car Battery.

If a Main power fail has been detected, the Micro will turn on the Modem and the DC\DC POWER (Internal LiPo battery needs to be placed).

### **1.2 Turning the unit OFF:**

In order to save power while the car is not IGNITED, the modem and the DC\DC Power turn OFF after sensing that the ignition has been switched OFF. The power consumption while the modem and the DC\DC POWER are turned OFF is about 3-4mA (Measured in 12V input).

The unit will be turned OFF in one of the following cases:

1. The unit has been turned ON by the ignition signal and the ignition has been turned OFF. The software waits for a period of time after the ignition has been turned off before shutting itself off (see the “SDT” command in the SMS commands section)
2. The unit has been turned ON by movement and stopped move. The software waits for a period of time after the last movement off before shutting itself off (see the “SDT” command in the SMS commands section)

### 1.3 Micro LED

Micro Status Led (Yellow)	
Device Status	Yellow Led Status
First time Modem startup or restart	Blinking ON 0.5sec/ OFF 0.5sec
Modem ON (power monitor ON)	Blinking ON 2.7sec/ OFF 0.3sec
PYTHON start working (GPIO6 changed direction)	Blinking ON 0.3sec/ OFF 2.7sec
Modem OFF (15sec after GPIO14 LOW)	Blinking ON 0.1sec/ OFF 10sec
Movement sensor ON (GPIO9 set HIGH)	Fast Blinking for 5sec
when one of the following change: GPIO14, IGNITON	Fast Blinking for 2sec
Micro Power OFF	OFF

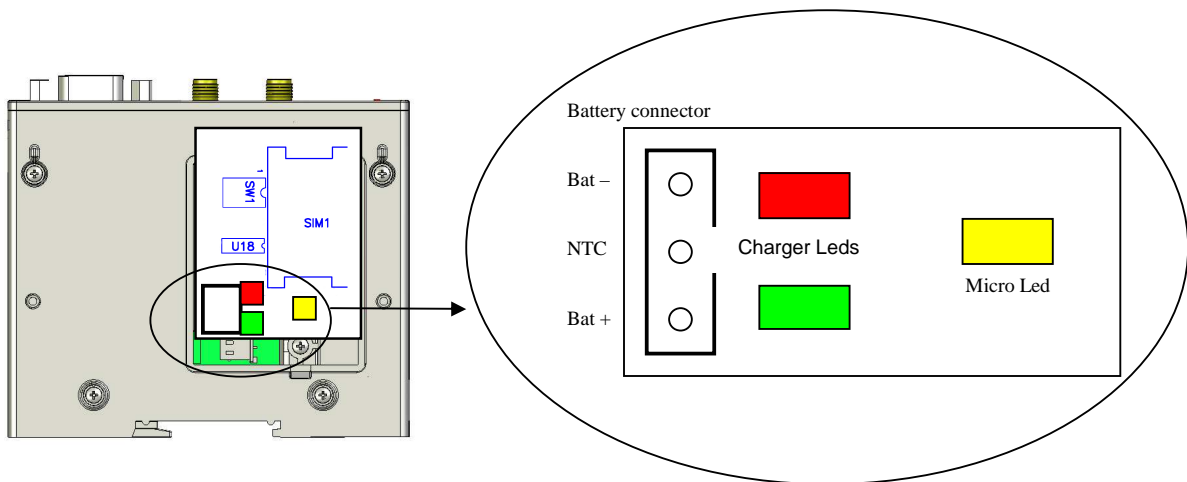


Figure 1: EZ863 GPS Charger Leds and Micro Led

## 2.1 IO Interface

The following interfaces and functions are provided via the IO interface connector.

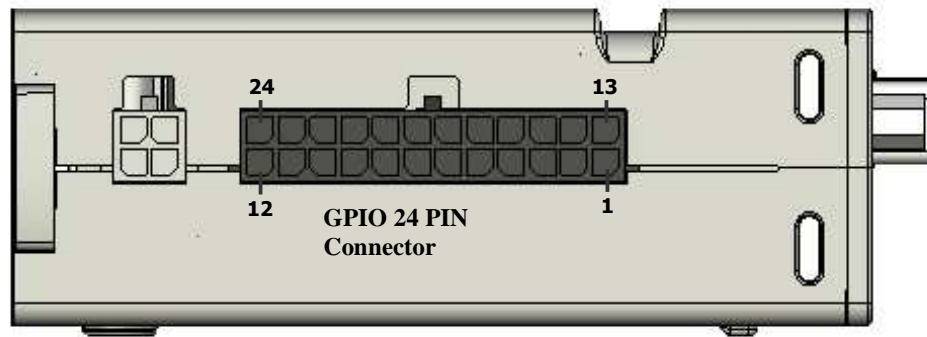


Figure 2: GPIO interface connector 24 pin

Pin	Signal name	I/O	Description
1	Input 1	I	I2C Clock or Input GPIO3 with Pull-up 4.7K
2	Input 2	I	I2C Data out or Input GPIO4 with Pull-up 4.7K
3	Emergency button	I	Input GPIO1 with Pull-up 47K
4	Input 3	I	Input GPIO8 with Pull-up 47K
5	Output 3	O	Output GPIO7 with 250ma max open collector ( 2N2222 )
6	Output 1	O	Output GPIO2 with 250ma max open collector (2N2222 )
7	Output 2	O	Output GPIO5 with 250ma max open collector (2N2222 )
8	Output 4	O	Output GPIO13 with 250ma max open collector (2N2222)
9	IGNITION	I	Pulled up 12-24V input. Connected to GPIO18
10	RST	I	RST input to GE863 Modem, use to start the Modem on save mode
11	VMOD	O	Modem power supply normally 3.8V or battery power
12	GND		
13	Relay_a	O	Normally open Relay leg 1 ( 30V 1A max)
14	Relay_b	O	Normally open Relay leg 2 ( 30V 1A max)
15	Input 5	I	Input GPIO12 with Pull-up 4.7K
16	Input 4	I	Input GPIO11 with Pull-up 4.7K
17	Input 6	I	Input GPIO15 with Pull-up 47K
18	Input 7	I	Input GPIO16 with Pull-up 47K
19	PWRMON	O	When modem is ON this pin will be high 2.8V
20	On/Off	I	Turn ON and OFF the modem
21	ADC1	I	Analog input 1
22	PPS	I	
23	GND	O	
24	VIN	I	Input Power Supply

Table 7: Assignment of the IO interface connector

## 2.2 Analog-to Digital Converter (ADC)

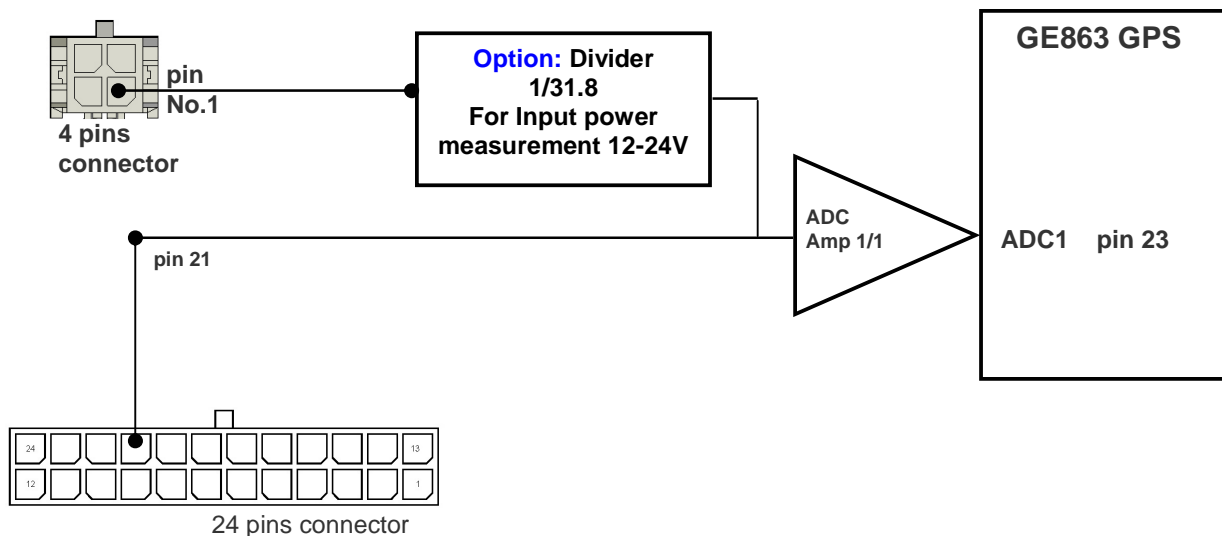


Figure 3: Connections for ADC1

## 2.3 Status LED

**Red LED** displays the network status of the EZ863 GPS Terminal.

Red LED status	Device Status
permanently on	a call is active
fast interrupt sequence (period 0,5s, Ton 1s)	Net search / Not registered / turning off
slow interrupt sequence (period 0,3s, Ton 3s)	Registered full service
permanently off	device off

Table 1: RED LED Status

**Green LED:** will turn on when the software is running.

This LED will blink on connection error

## 3. Incoming call handle.

If an incoming call is being established to the unit, the unit checks if the caller ID is in the unit phone number list, if it does, the unit answers the call (Please refer to the phone number list command in the SMS command section).

If the phone number ID is not recognized, the unit will hang-up the call.

#### **4. GPRS Protocol description**

All rows start with the next syntax:

DEVICE EZ863\_V5.1:<IMEI>,<software version>

After this prefix the modem will prompt the record.

##### **Record description:**

A record starts with "\*" and afterwards there are the records fields. The fields are separated by commas. The fields are:

1. Record type – can be "R", "D" or "S"
  - R records – Real time record, this record data captured now.
  - S records – Historic records, this record data captured in the past and not been sent from some reason (e.g. no GPRS connection).
  - D record – Data record, this record has been captured from special reasons:
    1. The unit woke up by movement sensor without ignition.
    2. Emergency button been pushed/released or Input change.
2. First time record – This field is "1" if this is the first records that been sent after wakeup, "0" o.w.
3. Last time record – This field is "1" if this is the last records that been sent before shut off, "0" o.w.
4. LAC – GSM local area code
5. Cell ID – The GSM cell ID
6. PWR – the GSM reception in dBm.
7. Inputs – The input GPIOs in hexadecimal format. Emergency input following by inputs 1-7.  
e.g. "BE", Emergency button has been pushed and all the inputs are in 1 state except input 6. (0xBE = 10111110).
8. Outputs – The output GPIOs following by the relay status.  
The GPIO state can be 0,1 or 2 while:  
0 – Output is high impedance (cut off for relay)  
1 – Output is low impedance (short for relay)  
2 – Output is following correspond input (N/A for relay)  
e.g. "01200":  
Outputs 1, 4 and the relay are in 0 states.  
Output 2 is in 1 state.  
Output 3 is following to input 3, if input 3 is 0 (active), output 3 will be in 1 state, o.w.  
output 3 will be in 0 state.  
For more information, please refer to commands "4" and "RELAY" in the SMS commands section
9. Movement sensor – The movement sensor indication input (GPIO9).  
"1" if movement have been detected, "0" o.w.  
**Please notice that unit reset the movement sensor notification all the time, so this field most likely be "0".**
10. Ignition – The ignition input. "1" if ignition have been detected, "0" o.w.
11. ADC1 – A/D input 1 read. In most cases, A/D 1 input is connected to the input voltage with ratio of 1:0.0318 (Please refer to the ADC section).  
e.g. A/D 1 = 375 → input voltage is ~11.925V.
12. Reserved.
13. Reserved.
14. GPSACP read – Please refer to the GPSACP appendix.

##### **Example record:**

```
DEVICE EZ863_V5:358281005777689,3.0.0.1,*R0,1,044C,065B,-53dbm,ff,01201,0,0,353 ,,$GPSACP:  
064551.000,3210.8232N,03452.6436E,1.0,76.3,3,142.60,0.25,0.13,240509,08>#<cr><lf>
```

GPSACP appendix:

The GPSACP fields are taken from the NMEA GPS protocol.

**\$GPSACP: <UTC>,<latitude>,<longitude>,<hdop>,<altitude>,<fix>,<cog>,<spkm>,<spkn>,<date>,<nsat>**

Where:

**<UTC>** - UTC time (hhmmss.sss) referred to GGA sentence

**<latitude>** - format is ddmm.mmmm N/S (referred to GGA sentence)

dd - degrees

00..90

mm.mmmm - minutes

00.0000..59.9999

N/S: North / South

**<longitude>** - format is dddmm.mmmm E/W (referred to GGA sentence)

ddd - degrees

000..180

mm.mmmm - minutes

00.0000..59.9999

E/W: East / West

**<hdop>** - x.x - Horizontal Dilution of Precision (referred to GGA sentence)

**<altitude>** - xxxx.x Altitude - mean-sea-level (geoid) in meters (referred to GGA sentence)

**<fix>** -

0 - Invalid Fix

2 - 2D fix

3 - 3D fix

**<cog>** - ddd.mm - Course over Ground (degrees, True) (referred to VTG sentence)

ddd - degrees

000..360

mm - minutes

00..59

**<spkm>** - xxxx.x Speed over ground (Km/hr) (referred to VTG sentence)

**<spkn>** - xxxx.x- Speed over ground (knots) (referred to VTG sentence)

**<date>** - ddmmyy Date of Fix (referred to RMC sentence)

dd - day

01..31

mm - month

01..12

yy - year

00..99 - 2000 to 2099

**<nsat>** - nn - Total number of satellites in use (referred to GGA sentence)

00..12

## 5. SMS commands

### General instruction

**All the SMS start with the unit password**

The unit default password is: **1234**

Example 1:           **12340:internet,orange,mobile54**

The **1234** in the beginning of the message is the unit password and after it, command number “**0**”, this command set unit connection to the GPRS network. Then the GPRS parameters **internet,orange,mobile54** setting command (as defined at the guide below).

Example 2:           **12341:3,054444444**

The **1234** in the beginning of the message is the unit password and after it, command number “**1**”, this command set unit how to send the GPS information. Then the Way of GPS data sends command (as defined below).

The SMS command should NOT include spaces.

Example:

OK message:           **12340:internet,orange,mobile54**

NOT OK message:      **1234 0: internet, orange,mobile54**



**DO NOT include spaces**

When sending SMS use Capital letters or small letters do not combine

Unit will send replay SMS for each SMS command sent to the unit with the correct password and will ignore SMSs with wrong password.

### Get Software version

**VER**

**Example: 1234VER**

**1234 --- Password**

**VER --- Command "VER"**

**Unit will replay with SMS with the format: Version \*.\*.\***

### Command "0" --- Set GPRS Parameters:

**This command set the UNIT to use your cellular company parameters.**

**All parameter will be supply by your local cellular provider.**

**0:APN,GPRS user name,GPRS password**

**Example: 12340:internet,orange,mobile54**

**1234 --- Password**

**0 --- Command "0"**

**APN --- Get from your cellular provider**

**GPRS user name --- Get from your cellular provider**

**GPRS password --- Get from your cellular provider**

### Command "1" --- Options GPS data sending:

**GPS information can be send via GPRS with TCP, UDP protocols, SMS or not send the GPS data at all.**

**Send GPS data via GPRS TCP/IP protocol selection:**

**1:{1,2},IP address,remote port**

**Where:**

**1 - Select TCP protocol to send GPS information.**

**Example: 12341:1,62.90.100.160,10120**

**1234 --- Password**

**1 --- Command "1"**

**1 --- TCP**

**62.90.100.160 --- IP address**

**10120 --- Remote port**

**2 - Select UDP protocol to send GPS information.**

**Example: 12341:2,62.90.100.160,10110**

**1234 --- Password**

**1 --- Command "1"**

**2 --- UDP**

**62.90.100.160 --- IP address**

**10110 --- remote port**

*Send GPS data via SMS:*

**1:3,Send SMS to first phone number**

**Example: 12341:3,0**

The SMS will be sent to all the phone number in the phone numbers list (refer to command “Phone number list”)

**1234 --- Password**

**1 --- Command “1”**

**3 --- SMS send**

**0 --- Send SMS to all the phone numbers in the phone number list**

**Example: 12341:3,1**

The unit will try to send the SMS to all the list, and stop when succeeded.

**1234 --- Password**

**1 --- Command “1”**

**3 --- SMS send**

**1 --- Send SMS just to the first successful phone number in the phone number list**

*Don't send beckon data:*

**1:4**

**Example: 12341:4**

The unit will not send beckon data by GPRS or SMS.

**1234 --- Password**

**1 --- Command “1”**

**4 --- Don't send beckon data**

**Command “2” --- GPS data sending intervals:**

**GPS data sends in two types of intervals: moving and parking**

**2:move interval,parking interval**

**Example: 12342:30,600**

**1234 --- Password**

**2 --- Command “2”**

**30 --- Move interval**

**600 --- Parking interval**

If the car is moving, GPS data would be sent every 30 seconds,  
Otherwise GPS data would be sent every 600 seconds (10 minutes).

**Command “3” --- Phone number list:**

**The phone numbers are used for many purposes in the GpsSender software.**

**3:phone number,phone number,....**

**Example: 12343:054777777,0542365555,054777778**

**1234 --- Password**

**3 --- Command “3”**

**054777777 --- First Phone number in the list**

**0542365555 --- Second Phone number in the list**

**054777778 --- Third Phone number in the list**

### Command “4” --- Set outputs state:

This command sets the 4 open collector outputs parameters

**4:output 1 state,output 2 state,output 3 state,output 4 state**

Output state can be: 0-2.

0 – Output is not active.

1 – Output active

2 – Output is following the correspond input.

Output 1 follows input 1, Output 2 follows input 2, etc..

In this state, if the correspond input is “0” (pulled to GND -> Active), the output becomes active, otherwise the output is deactivated.

Example: **12344:1,0,0,2**

**1234 --- Password**

**4 --- Command “4”**

**1 --- Output 1 set to active**

**0 --- Output 2 set to be deactivated**

**0 --- Output 3 set to be deactivated**

**2 --- Output 4 set to follow input 4**

### Command “5” --- Over speed SMS:

You can use this command to send an SMS to the first phone number in the phone number list if the car has being over speeding.

*Turn off over speed SMS:*

**5:0**

Example: **12345:0**

**1234 --- Password**

**5 --- Command “5”**

**0 --- Deactivate the over speed SMS**

*Turn on over speed SMS:*

**5:1,<speed threshold>,<SMS send interval>,<SMS message>**

The SMS interval is in minutes

Example: **12345:1,120,10,Over\_speed\_detected**

**1234 --- Password**

**5 --- Command “5”**

**1 --- Activate the over speed SMS**

**120 --- The speed threshold is 120 km/h**

**10 --- The SMS interval is 10. The SMS interval means that the unit will ignore over speed for 10 minutes after the SMS have being sent.**

**Over\_speed\_detected --- Part of the over speed SMS content (the SMS also contain the measured speed).**

**Because the SMS command cannot contain spaces, use the character “\_” instead.**

The SMS “Over\_speed\_detected“ will be sent if 120 Km/h will be detected, but no more than 1 SMS in 10 minutes.

### Command “6” --- Theft SMS:

Theft SMS is used to send SMS *to the first phone number in the phone list* in case the unit wakes up by the movement sensor without ignition. This SMS can indicate that the car is being towed.

*Turn off theft SMS.*

**6:0**

Example: **12346:0**

**1234 --- Password**

**6 --- Command “6”**

**0 --- Deactivate the theft SMS**

*Turn on theft SMS.*

**6:1,<SMS send interval>,<SMS send count>,<SMS message>**

Example: **12346:1,5,3,The\_car\_is\_being\_towed**

**1234 --- Password**

**6 --- Command “6”**

**1 --- Activate the theft SMS**

**5 --- The SMS interval in minutes**

**3 --- The maximum amount of SMSs to send (The unit can turn off itself before if the car will stop moving, please see “Turning the unit OFF” section).**

**The\_car\_is\_being\_towed --- The SMS content.**

**Because the SMS command cannot contain spaces, use the character “\_” instead.**

The SMS “The\_car\_is\_being\_towed” will be sent to the first phone number in the phone number list if movement has been detected without ignition.

The SMS will be sent every 5 minutes and after maximum 3 times it will stop.

### Command “7” --- Emergency SMS:

The emergency Input can be used to send also an SMS.

When someone presses this button, an SMS is being sent to the first phone number in the phone list.

*Turn off emergency SMS.*

**7:0**

Example: **12347:0**

**1234 --- Password**

**7 --- Command “7”**

**0 --- Deactivate the emergency SMS**

*Turn on theft SMS.*

**7:1,<emergency SMS interval>,<GPS data beckon interval >,<SMS message>**

Example: **12347:1,3,30,Help**

**1234 --- Password**

**7 --- Command “7”**

**1 --- Activate the emergency SMS**

**3 --- The SMS interval in minutes**

**30 --- The GPS data send interval in seconds. While the emergency button is being pressed, the unit uses this interval instead of the intervals in command “2” (GPS data sending intervals).**

**Help --- The SMS content. Because the SMS command cannot contain spaces, use the character “\_” instead.**

“Help” SMS will be sent if the emergency button will be pushed.

The SMS will be sent every 3 minutes while the GPS data will be sent every 30 seconds.

**Command “RELAY” --- Relay status:**

Use this command to activate or deactivate the relay.

**RELAY={0,1}**

**0 – Relay is not active**

**1 - Relay is active**

Example: **1234RELAY=1**

**1234 --- Password**

**RELAY --- Command “RELAY”**

**1 --- Activate the relay**

Use this command if the relay is connected to external part.

**Do NOT use this command if the relay is connected to the car’s gas pump, in this case use the “STOP” command**

**Command “STOP” --- Stop the car:**

Use this command to stop the car if the relay is connected to the gas pump.

**STOP**

Example: **1234STOP**

**1234 --- Password**

**STOP --- Command “STOP”**

**The unit will send a respond message and will wait for the car to be below 5 km\h, then it will active the relay that will stop the car’s gas pump.**

**After activating the relay, the unit will send its position to the fist phone number in the phone number list.**

**Command “RELEASE” --- Release the car’s gas pump:**

Use this command to release the car’s gas pump if the relay is connected to it.

**RELEASE**

Example: **1234 RELEASE**

**1234 --- Password**

**RELEASE --- Command “RELEASE”**

**After stopping the car with the “STOP” command, use this command to release the gas pump.**

### Command “SDT” --- Shut down Time:

Use this command to set the time (in seconds) before shutting down the unit, please see “Turning the unit OFF” section.

In order to cancel the unit self turn off, set the value “0” in this command.

**SDT=<Shut down time>**

Example: **1234SDT =120**

**1234 --- Password**

**SDT --- Command “SDT”**

**120 --- The unit will wait 120 seconds before turn itself off.**

Example 2: **1234SDT =0**

**1234 --- Password**

**SDT --- Command “SDT”**

**0 --- Cancel the unit turn off.**

### Command “INPUT” --- Input change SMS:

Use this command to send SMS to the first number in the phone number list on input change.

*Turn off input SMS.*

**INPUT=<Input number>,0**

Example: **1234 INPUT=1,0**

**1234 --- Password**

**INPUT --- Command “INPUT”**

**1 --- The input number.**

**0 --- Turn off the input SMS**

The unit won't send SMS on input 1 change

*Turn on input SMS.*

**INPUT=<Input number>,1,<Set SMS >,<Release SMS>**

Example: **1234 INPUT=1,1,Input\_1\_activated,Input\_1\_deactivated**

**1234 --- Password**

**INPUT --- Command “INPUT”**

**1 --- The input number.**

**1 --- Turn on the input SMS**

**Input 1 activated --- Set SMS**

**Input 1 deactivated --- Release SMS**

The SMS “Input 1 activated” will be sent to the first phone number in the list when input 1 will be pulled to GND and the SMS “Input 1 deactivated” will be sent when it will be released from GND.

**Command “BAND” --- GSM band selection:**

Use this command to choose your GSM network band

**BAND={0-3}**

**0 - GSM 900MHz + DCS 1800MHz**

**1 - GSM 900MHz + PCS 1900MHz**

**2 - GSM 850MHz + PCS**

**3 - GSM 850MHz + PCS 1900MHz**

**4 - Auto detect**

Example: **1234BAND=0**

**1234 --- Password**

**BNAD --- Command “BAND”**

**0 --- Use bands: GSM 900MHz + DCS 1800MHz**

**Command “NP” --- Set new password:**

Set new SMS password to the unit. The password length should be 4 characters

**NP:new pass**

Example: **1234NP:4321**

**1234 --- Password**

**NP --- Command “NP”**

**4321 – The new password**

**Command “RESET” --- Software reset:**

The unit will send back an OK SMS and reset itself

**RESET**

Example: **1234RESET**

**1234 --- Password**

**RESET --- Command “RESET”**

**Command “INFO” --- Get unit configuration information:**

The unit will send back its configuration information.

**INFO**

Example: **1234INFO**

**1234 --- Password**

**INFO --- Command “INFO”**

**Command “PHONES” --- Get unit phone list:**

The unit will send back an SMS with it phone list (from command “3”).

**PHONES**

Example:     **1234PHONES**

**1234 --- Password**

**PHONES --- Command “PHONES”**

**Command “POS” --- Get unit position:**

The unit will send back its GPS position.

**POS**

Example:     **1234POS**

**1234 --- Password**

**POS --- Command “POS”**