Rover Version 9 Manual

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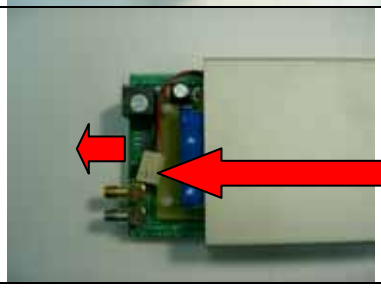
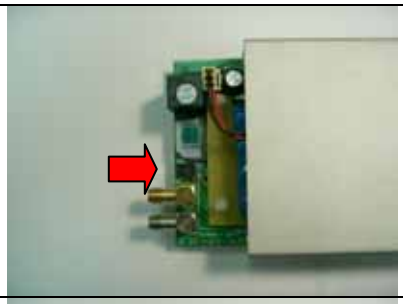
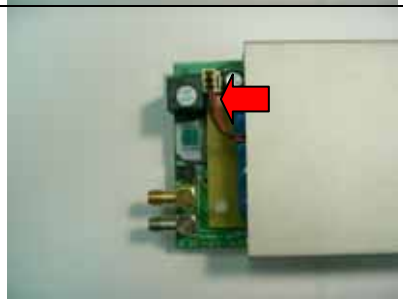
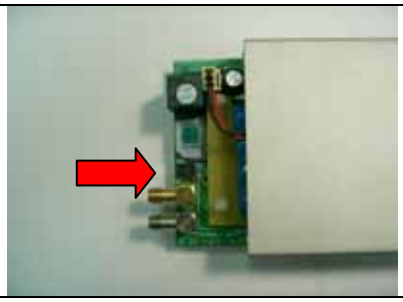
Basic first startup and testing

The Rover V9 has been designed to make installation, testing and configuration simple. For vehicle installation and testing for correct working after installation we recommend the installer to use a Notebook or PDA with serial port and serial communication software installed.
On a windows based computer you will be able to use 'Hyperterminal' (free with Windows). For PDA or Pocket PC you can use several communication programs that can be downloaded from the internet like 'ZTERM for Pocket PC' (http://www.coolstf.com/ztermppc).

Before the unit is installed, we recommend configuring the unit functions and setup using the RoverV9 setup configuration program. The ROVER V9 has many functions that will allow the unit to operate for different user applications including security and fleet management.

Sim card and back up battery Installation

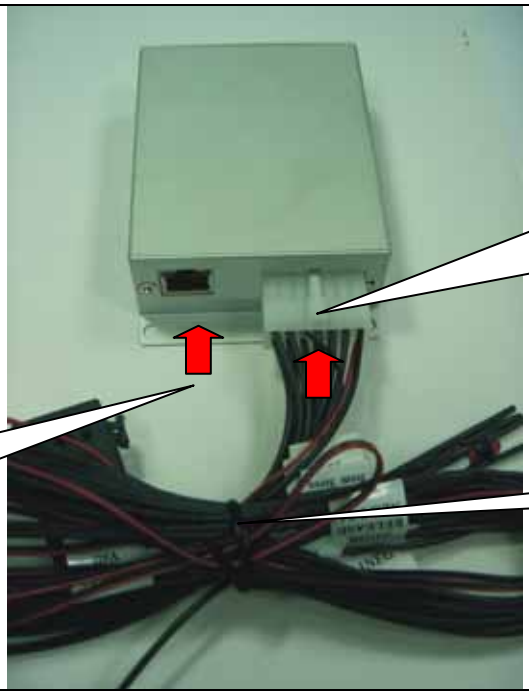
Please undo those 2 screws	
Take out the side board	
Slid out the PCB (push from other side)	

Insert the sim card	
Plug in the back up battery connector Note: Back up battery connector need to be plug in after Sim card **(*)** inserted. The unit will still operate with out back up battery	
Push back the PCB Be careful for the battery connector	
Screw back all screws	

Note: If you want to change another Sim card, please unplug the back up battery connector first, change the sim card than plug back the back up battery connector.

(*) Please disable pin code or set pin code to 0000 (4 * zero).

Connect the I/O cable com port and antennas

Connect GPS antenna with the right hand connector	 GPS connector  GPS antenna
Connect GSM antenna (middle connector)	 GSM connector  GSM antenna
Connect up I/O cable, (I/O cable included main power input). The cable has labels that shows function.	
Connect RS232 cable for communicate with PC	 I/O cable connector, this side must face up Left port (RJ45, UTP plug Type) I/O cable

Getting started, use Hyper Terminal to test Rover

Step 1

Connect Rover with your PC using com port

To test the Rover V9 after installation the **External Serial Port Connector** (standard 9 pin serial plug –DB9) of the unit should be connected either directly or via an extension cable to the serial port of a PC running Windows.

Step 2

Using Hyper Terminal

The PC will need to be running **HYPERTERMINAL,** which is a free program that comes with Windows.

If HyperTerminal is not currently installed on the PC you will need to do the following:

1. Go to ***Start/Settings/Control Panel.***
2. Go to ***Add/Remove Programs/Windows Setup Tab.*** This will bring up a list of components that can be installed.
3. Put a tick in the ***Communications Check box*** and double click. This will bring up a list of components that can be installed. Put a tick in the box next to HyperTerminal. You may need to insert your Windows Disk to install the program.
4. You may need to restart your computer after the program has installed.
5. Remember to connect the serial port on the unit to the serial port on the PC.

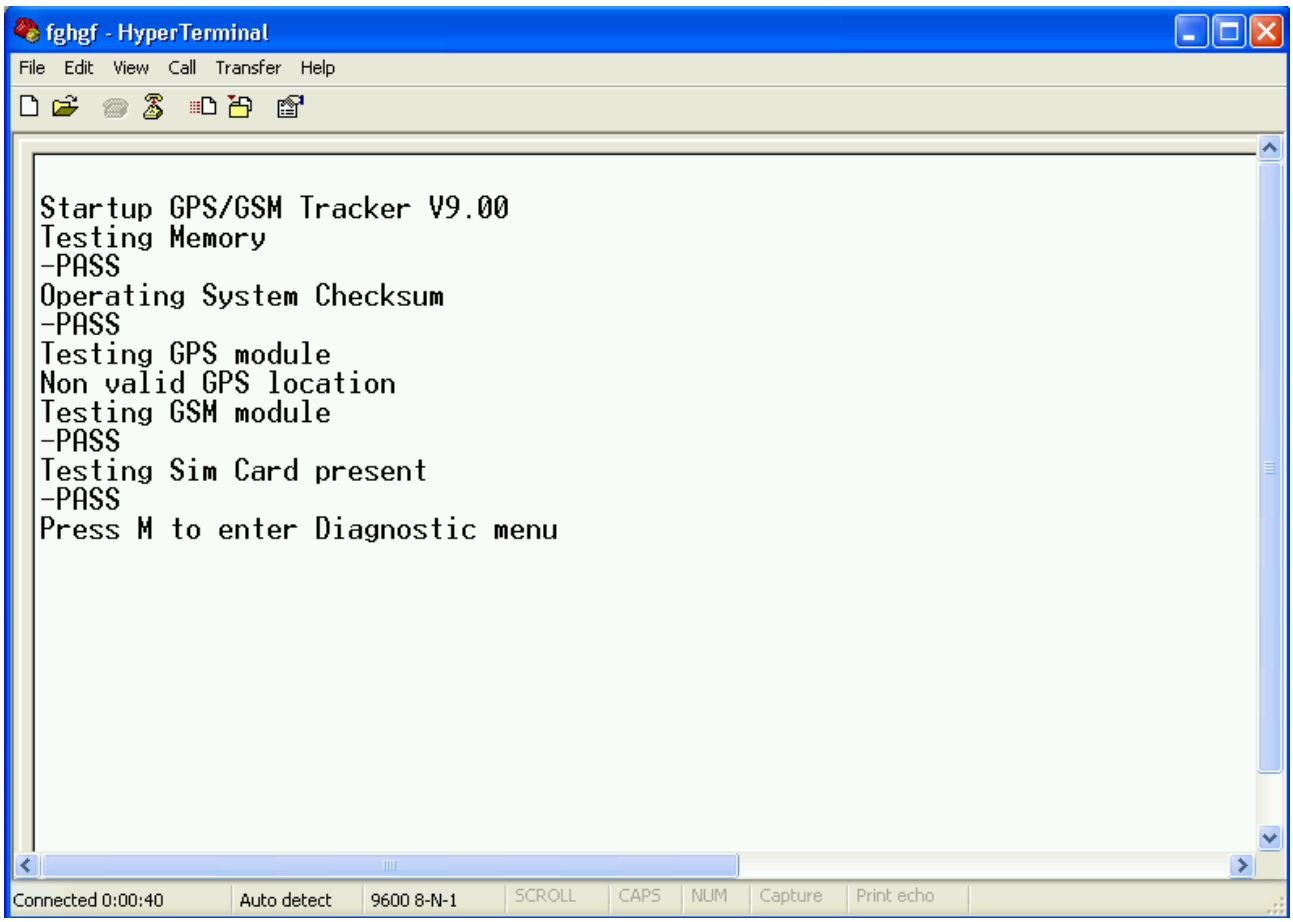
Once HyperTerminal is installed and running you will need to set the **Baud Rate to 9600 Baud** and set the **Com Port** (usually Com 1 on a laptop).

We strongly recommend that the unit be tested using a computer as this allows all options to be tested quickly and easily. The operating system/or a new or modified operating system can only be uploaded (in x-modem format) if the unit is connected to a serial port on a computer.

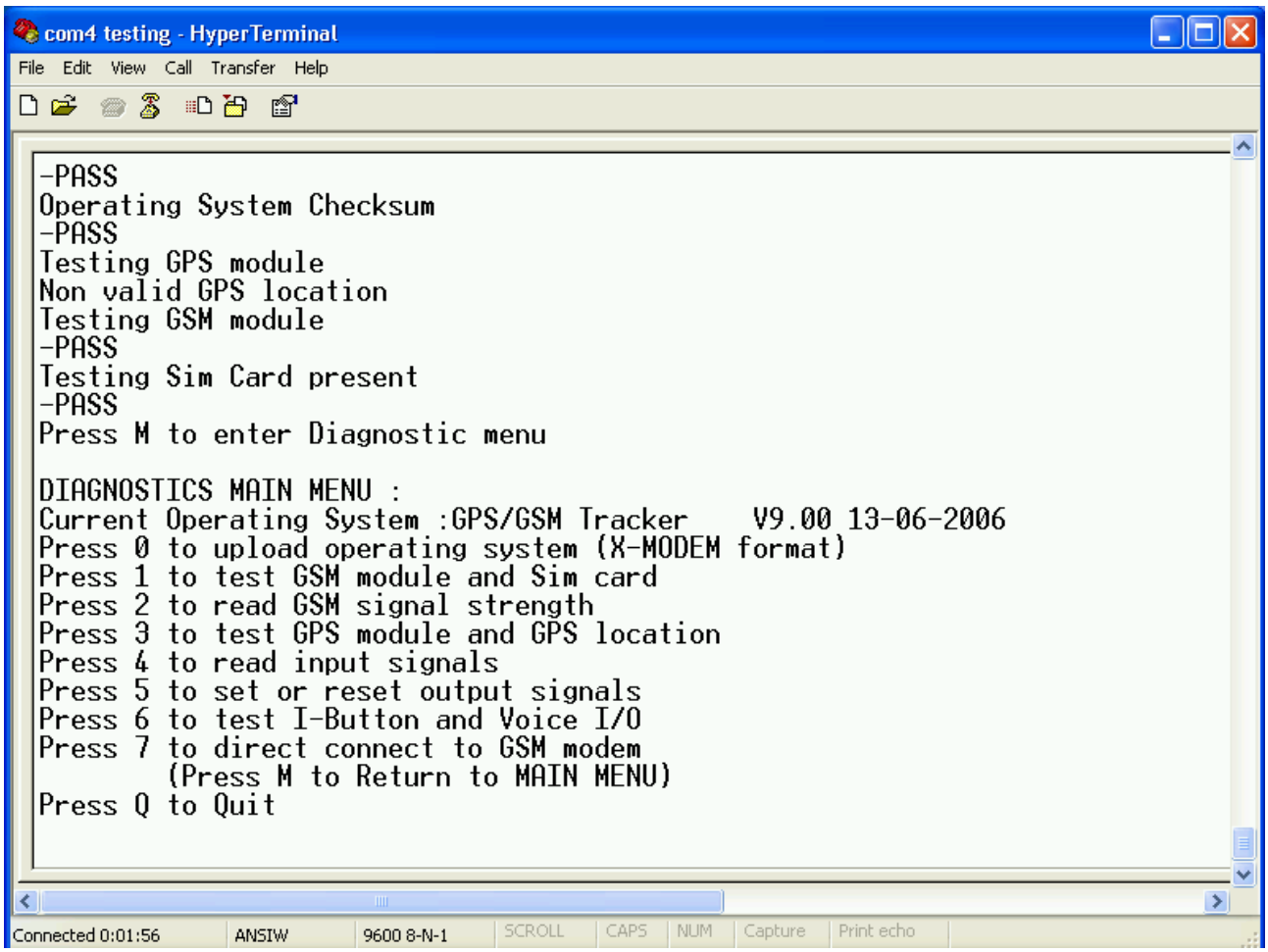
Step 3

Power up the unit. There are 2 leds above the RJ45 MULTI port connector. The green led will be on or will start flashing after power on (GPS output status led). The yellow led will flash when the unit is testing the GSM modem and if SIM card is installed. This led must be off during normal working.

Once the unit is connected to the serial port and has been connected to the **+12 volt and Earth** connections, the following screen will appear in HyperTerminal:



Startup ROVER V9 XXXX
Testing Memory
-PASS
Operating System Checksum
-PASS
Testing GPS module
Non-valid GPS location
Testing GSM module
-PASS
Testing SIM Card
-PASS
Press M to enter Diagnostic menu
If the unit **FAILS** any of the above tests the distributor should be contacted for a replacement. **Except the Operating System Checksum test where no Operating System is installed yet.**
If the unit goes into a loop from Testing GPS module, it could be because of low voltage input. Please make sure the input voltage input is +6V DC or More.
Step 6
Get into Diagnostic Menu
Pressing the **M** key will then take you to the **Diagnostic Main Menu**.



The following are the options in the Diagnostic Main Menu:

DIAGNOSTICS MAIN MENU :
Current Operating System :GPS/GSM Tracker V9.00 13-06-2006
Press 0 to upload operating system (X-MODEM format)
Press 1 to test GSM module and Sim card
Press 2 to read GSM signal strength
Press 3 to test GPS module and GPS location
Press 4 to read input signals
Press 5 to set or reset output signals
Press 6 to test I-Button and Voice I/O
Press 7 to direct connect to GSM modem
(Press M to Return to MAIN MENU)
Press Q to Quit

**** Please note options in the menu can be different from your current version.**

Test 1 Test GSM module and SIM card on board

This will test if the tracking unit can communicate with the GSM modem and that a SIM card is installed. The tracking unit will not work if there is no SIM card installed.
After testing you will return to the Diagnostic Main Menu.

Test 2 Test GSM signal strength

The aerial/aerials may need to be adjusted for optimum signal strength. The signal strength will be shown in HyperTerminal as:
Low
Medium or
High

Test 3 Test GPS module and GPS location

The following will appear on screen in HyperTerminal:
Testing GPS module
Non-valid GPS location
Press M to Return to MAIN MENU
Non-valid GPS location
Press M to Return to MAIN MENU
Non-valid GPS location
The GPS location will always be either:
Valid or
Non-valid
It may take several minutes for the GPS receiver to find the satellites and return a valid location. Remember the GPS will only find a satellite if the car is outside and the aerial has not been installed in a location in the vehicle where the signal is blocked by metal.

Test 4 Test all the inputs

To read the **Input Signals** press **4** in HyperTerminal.
The unit will display current input signals as Activated or not activated.

Remember not all Input Signals can or will be connected up at this time. This test will check the Input Signals to see if they are Activated or Not Activated. You will need to activate the alarm for the input to be activated (turn on with remote and open car door). You will need to activate GEO fencing / press the Panic Button for them to be activated.
** Please note: AUX input 3 neg is the analog input. Care must be taken to insure that the input voltage on this pin is between 0 and +3.3Volt (Max). Any higher voltage may damage the tracking unit or the onboard fuse on this input.
Pressing M will return you to the Diagnostic Main Menu when you are finished.

Test 5 Test all the outputs

To set or reset the **Output Signals** press **5** in HyperTerminal.
SET OR RESET OUTPUT SIGNALS MENU:
Press 1 to enable alarm
Press 2 to disable alarm
Press 3 to enable SOS
Press 4 to disable SOS
Press 5 to open car doors
Press 6 to flash GEO fencing LED
Press 7 to disable GEO fencing LED
Press M to Return to MAIN MENU
Press **1** and the alarm will be enabled as shown in HyperTerminal:
- Alarm Enabled
You will then return to the Set or Reset Output Signals Menu.
Press **2** and the alarm will be disabled:
- Alarm Disabled

You will then return to the Set or Reset Output Signals Menu.
Please follow the same procedure for the rest of the Output Signals. When you test the SOS Output (Press 3) the brake lights will flash the SOS signal and pressing 4 will disable the SOS signal. Only for testing purposes*. If you lock the car doors, the doors will open when you test the Open Car Doors Output (Press 5). Pressing 6 will flash the GEO fencing LED if one is connected and pressing 7 will disable the Geo fencing LED. Only for testing purposes*.
Remember to reset all outputs when you are finished testing.
******The Outputs will only be disabled (reset) for testing purposes while the unit is in Diagnostic mode, they will still work if they are connected when the unit returns to normal operation.*
Pressing **M** at anytime will return you to the Diagnostic Main Menu:

Test 6 to test I-Button and Voice I/O

This test will allow you to test the I-Button and the Voice I/O.

I-Button AND VOICE I/O MENU :
Press 1 to READ I-Button
Press 2 to TEST Voice I/O
Press M to Return to MAIN MENU

Press 1 to Read I-Button
Press 2 to test Voice I/O

Test 7 direct connect to GSM modem

This test will allow you to test communication using AT commands between your computer and the GSM modem.
The AT command 'AT comstop' <enter> or if no command has been send to the modem for more then 60 seconds the direct modem connection test will end.

For GPRS we recommend you do manual test first to test if your GPRS setup is correct. (See GPRS section for information about the GPRS Testing).

Press Q to exit!!

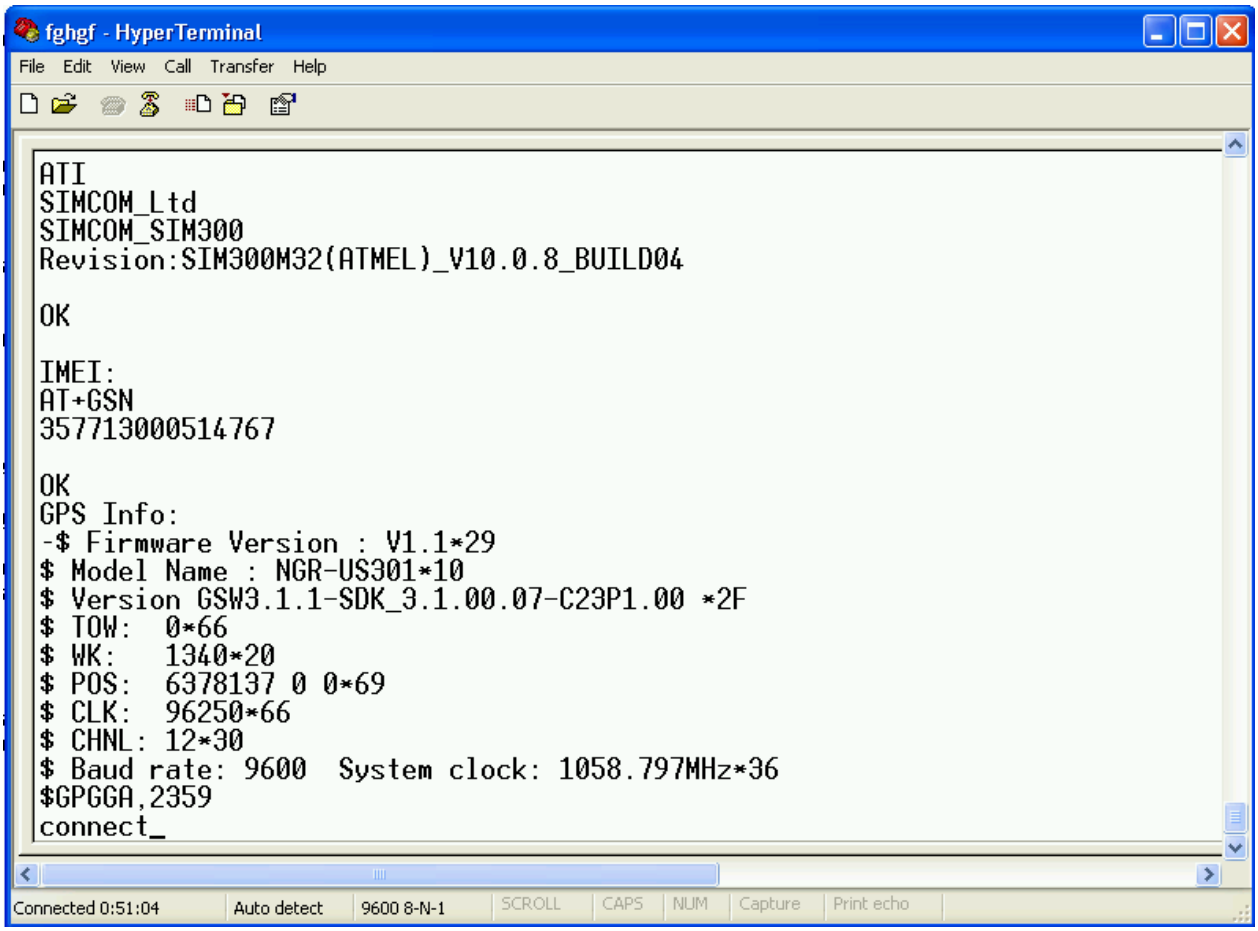
By pressing Q you will exit the Diagnostic Main Menu and return the unit to normal operation. If you do not press Q or any other option within 10 minutes the unit will return to normal operation.
The unit will display the GSM Modem information and IMEI number directly after you Quit the Diagnostic Main Menu.

To return from normal operation to the Diagnostic Main Menu press X (or x). Keep pressing X until the Diagnostic Main Menu appears. Please note that this can take several seconds or more if the ROVER V9 is processing any alarm conditions or messages!

Please always press "Q" after finish tests to exit diagnostic menu.

Modem information:
When you quit the 'DIAGNOSTICS MAIN MENU:' the tracking unit will report information about your GSM modem:

Sample:

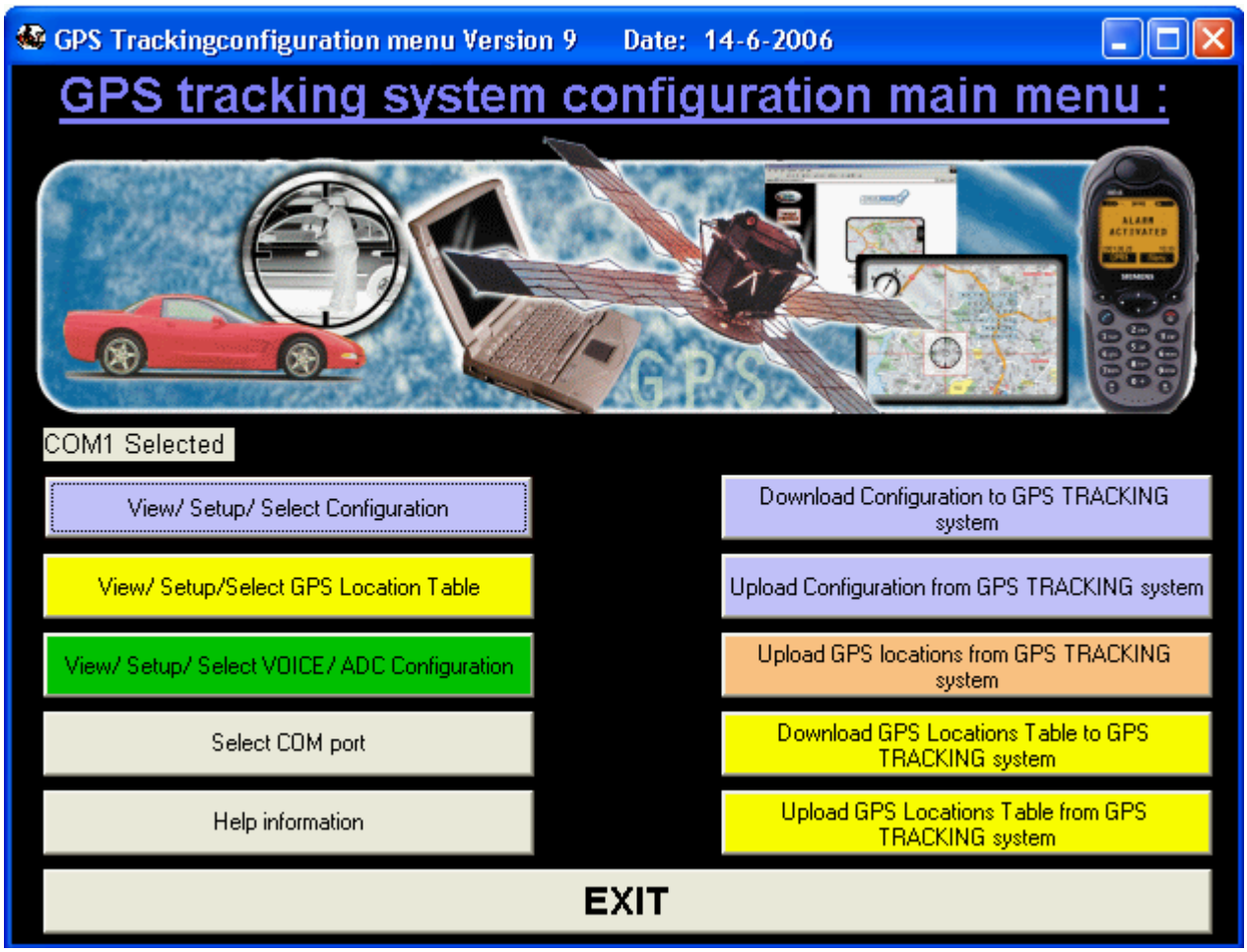


When the tracking unit is in normal operating mode the tracking unit requires the four-digit password code (can be configured in the GPS Trackingconfiguration menu. Default is ‘1234') to return to Diagnostic mode after it receives the **'X'** or **'x'** command from the serial port.
The password must be entered after the tracking unit sends the **'OK0'** or **'OK1'** command. The correct password must be followed by <CR> (ENTER) to confirm password entered. You must enter the correct password within 8 seconds or the tracking unit will return to normal operating mode.

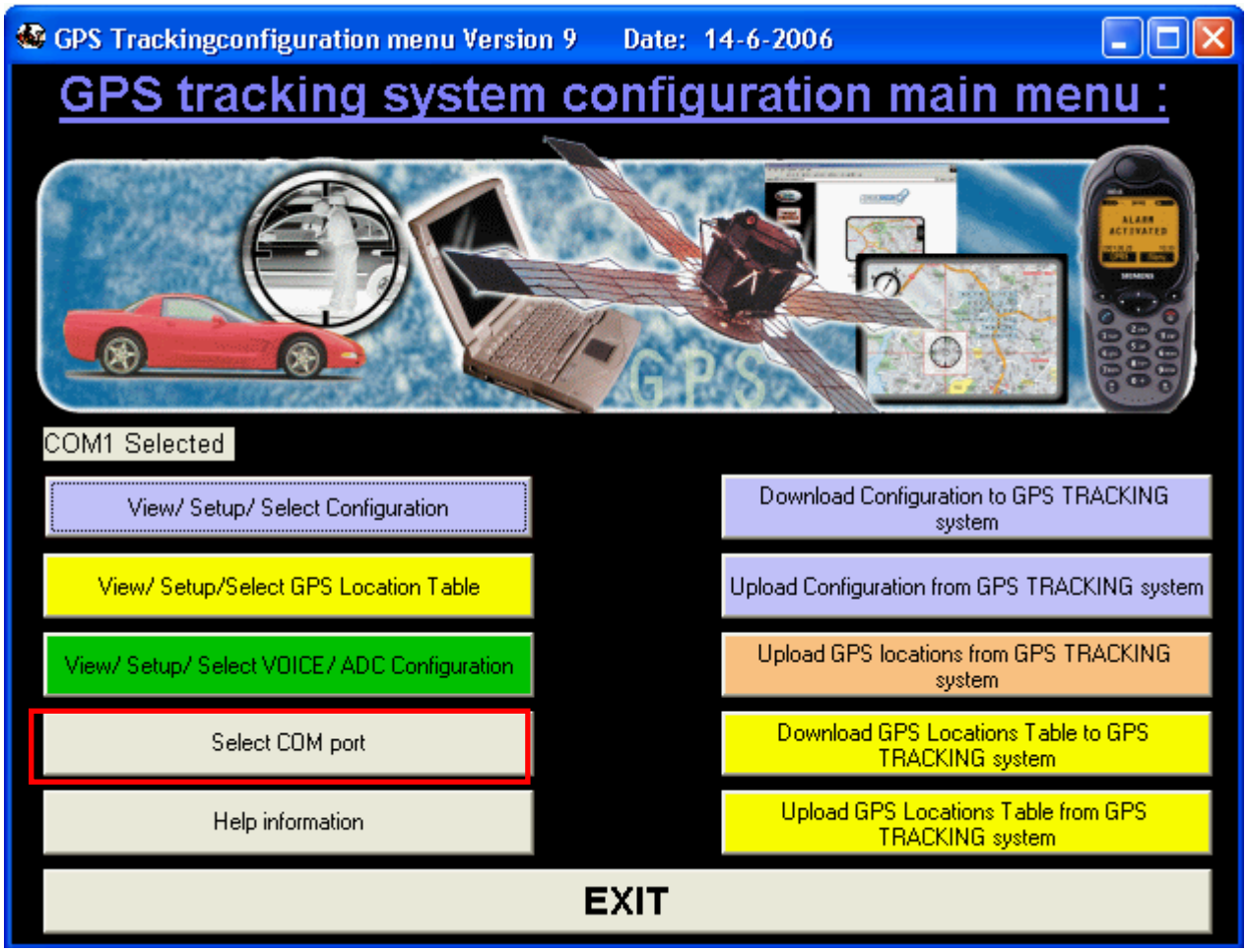
Configuration and setup :

When the tracking unit powers up it will enter the 'Diagnostic menu' first. If no key is pressed for 30 seconds the unit will enter normal operating mode.
Please note : The 'RoverV9-setup.exe' program can only access the tracking unit if the unit is working in normal operating mode.

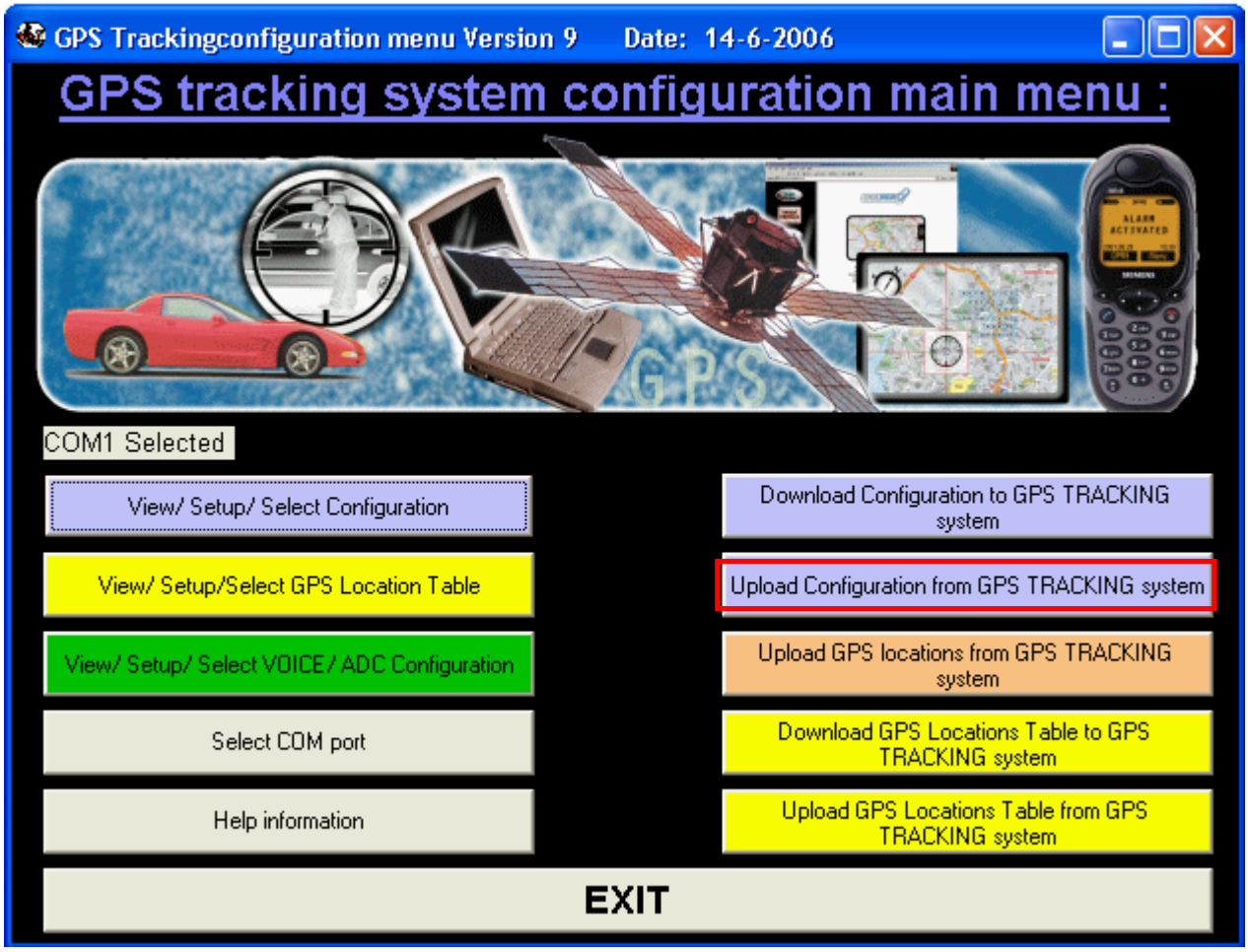
Start up the file RoverV9-setup.exe



Select Com port



Upload configuration from Rover

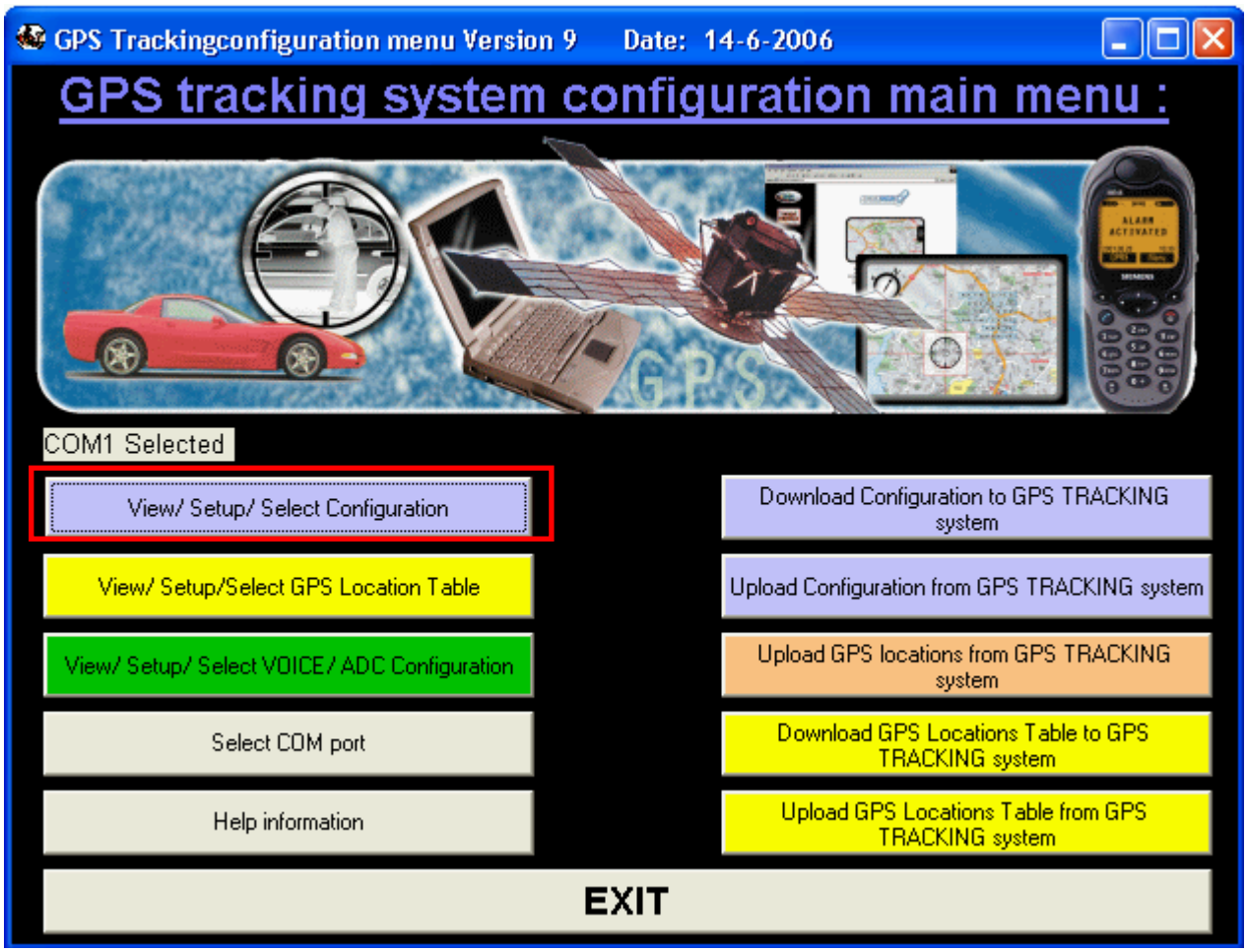


When up load or download configuration from GPS tracking system, the unit may busy in other processes and the unit will only response configuration software after finish the process.

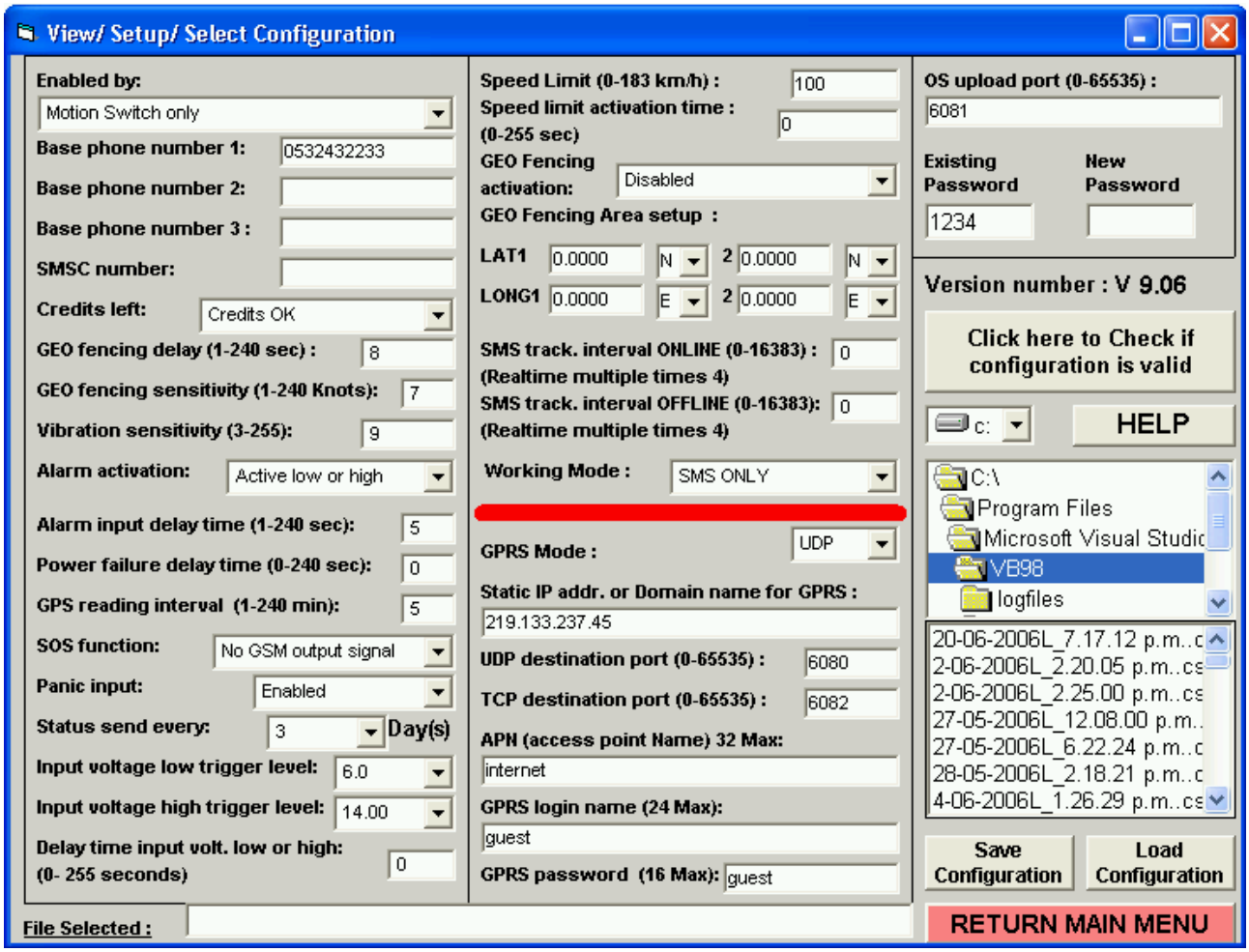
Therefore, when upload or download configuration, it may need to wait for few minutes especially the unit was setup for real time tracking already.

The best timing to upload the configuration is right after quit from diagnostic menu with hyper terminal."

After upload select View/ Select Configuration



Current configuration



Overview

Settings	Description
Enable By	Setup how unit activate from sleeping mode (off line)
Base phone number 1:	Setup the control center base 1 station number
Base phone number 2:	Setup base 2 phone number
Base phone number 3:	Setup base 3 phone number
SMSC number:	Setup SMSC number if required
Credits left:	Disable or enable all out going messages
Geo fencing delay	Setup the time delay for geo fencing
Geo fencing sensitivity	Setup the speed to activate geo fencing
Vibration sensitivity	Adjust the sensitivity of motion sensor
Alarm activation	Setup the type of alarm input
Alarm input delay time	Setup time delay for alarm input
Power failure delay time	Setup time delay for external power failure
GPS reading interval	Setup time interval to save locations in memory
SOS function	Setup how SOS output activates
Panic input	Disable or enable panic button input
Status send every	Send status message every 0-7 day(s)
Input voltage low trigger level	Setup low voltage alarm trigger

Input voltage high trigger level	Setup high voltage alarm trigger
Delay time input voltage low or high	Setup delay time to trigger over or under voltage level
Speed limit	Over the speed limit will send out message
Speed limit activation time	Time of the speed keep over speed limit
Geo fencing activation	When setup Geo fencing area, how to react on the geo fencing
Geo fencing Area setup	Rectangle geo fencing area setting
SMS tracking interval online	For SMS only and GRRS only mode and rover is activating. **(*1)**
SMS tracking interval offline	For SMS only and GRRS only mode and rover is in sleep mode. **(*1)**
Working mode	Switch between SMS only mode and SMS+GPRS mode
GPRS Mode:	Select between UDP or TCP protocol
Static IP addr. Or Domain name for GPRS:	Enter static IP address or Domain name to receive GPRS data
UDP destination port	UDP port for GPRS data
TCP destination port	TCP port for GPRS data
APN name	Access point name for GPRS data
GPRS login name	For setup GPRS connection
GPRS password	For setup GPRS connection
UDP OS update port	Setup different port for firmware update via GPRS
Existing password	To connect to unit via com port
New password	To change the password
Check configuration is valid	Check if the setting is valid (This check can only check basic setup errors)
Select directory	Select the directory of setting saved file
Select file	Select the setting saved file to load
Load configuration	Load the setting from computer file
Save configuration	Save the settings into computer file
File selected	The selected file will show in this window
Return to main menu	Return to main menu

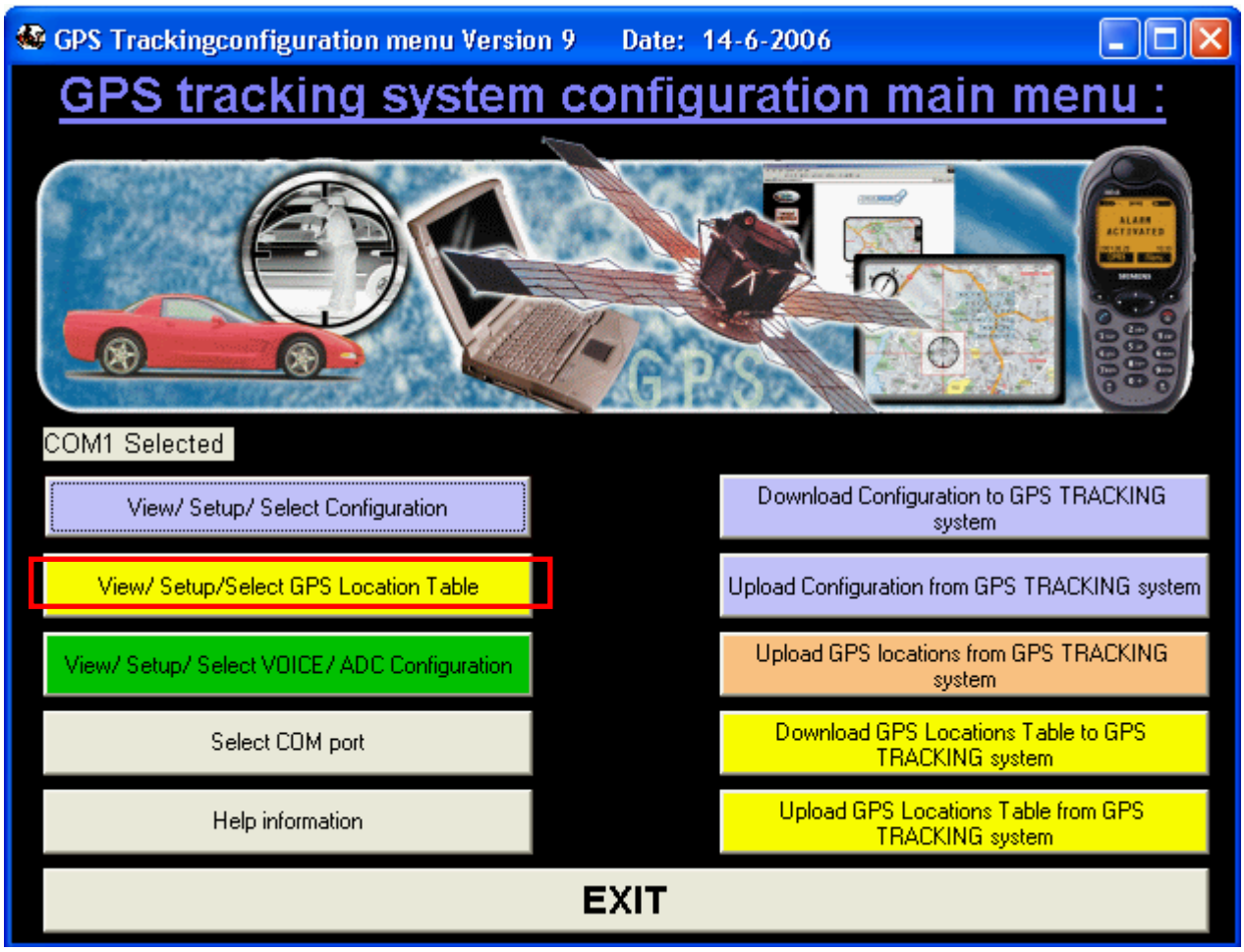
*1 Minimum Sending time (using GPRS) is about 6 seconds. It will be longer when using SMS for Real time tracking. Sending time for SMS and GPRS depends on your GSM network speed to confirm and process SMS and GPRS data commands.

Please note that the tracking unit has 2 different GEO fencing modes.

1. The first GEO fencing mode is enabled when the 'GEO fencing input' is activated. In this case the GEO fencing LED will flash to indicate that GEO fencing is activated.
   This GEO fencing mode can also be enabled by SMS message. In this case the GEO fencing activation can only be deactivated by SMS message.
2. The second option allows to configure a rectangle GEO fenced area. The unit can be configured to respond when a vehicle enters or leaves the GEO fenced area.

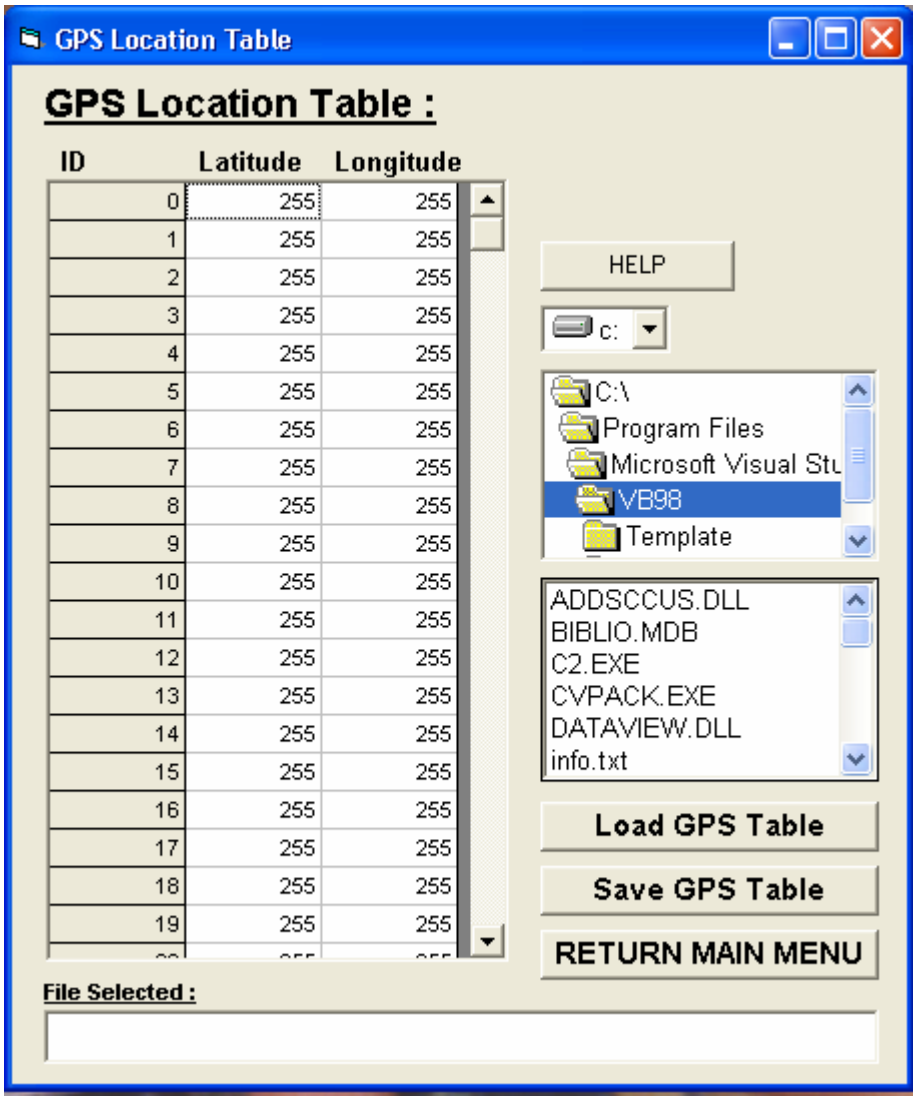
View/ Setup/ Select GPS location Table to edit, add or delete GPS locations in the GPS location table. The GPS locations in this table can be used for two different functions.

1. As warning device when a vehicle enters an area where a **fixed speed camera** is installed.
2. As an automatic reporting system when a vehicle enters and leaves a defined **'GEO'fenced** location.

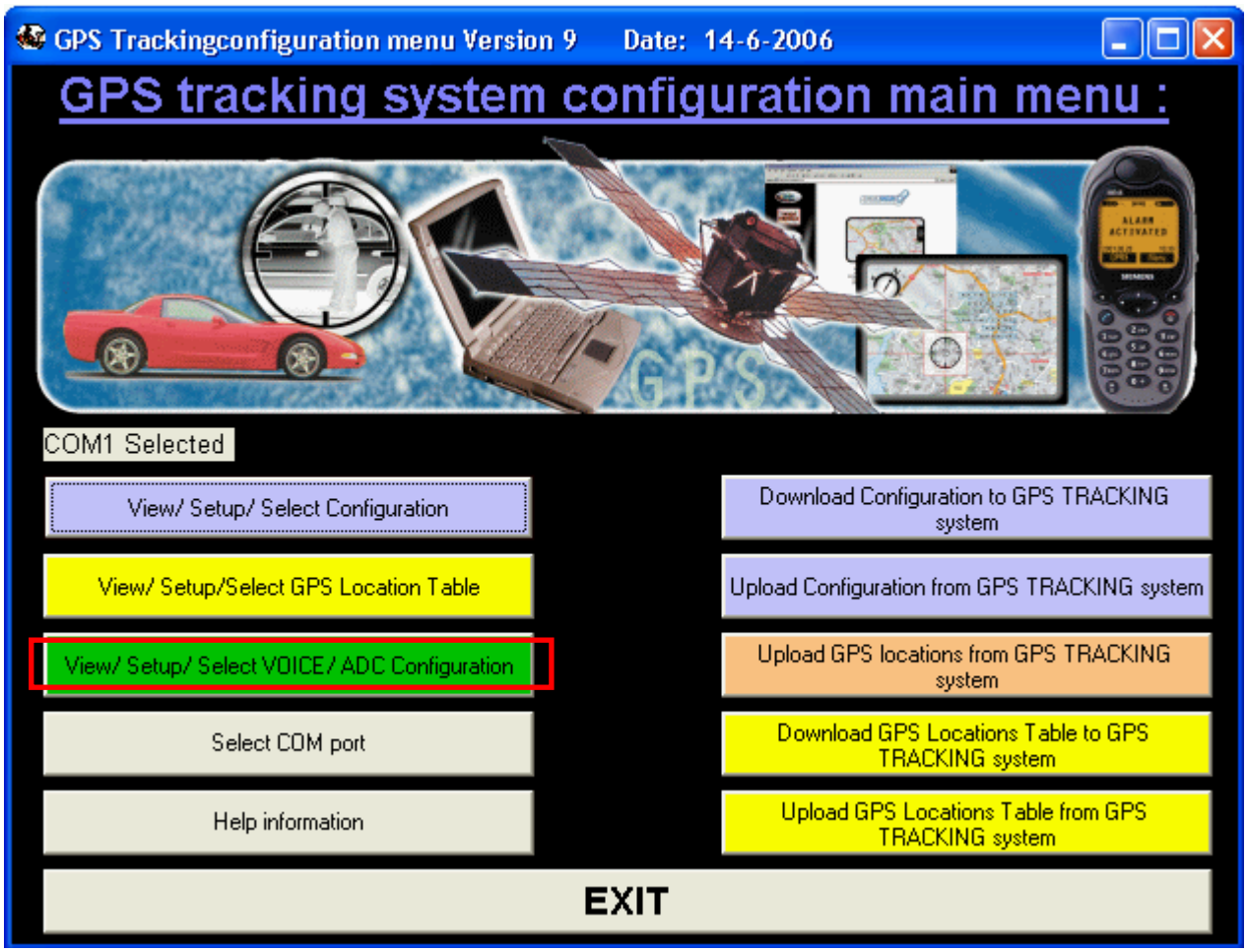


GPS Location Table

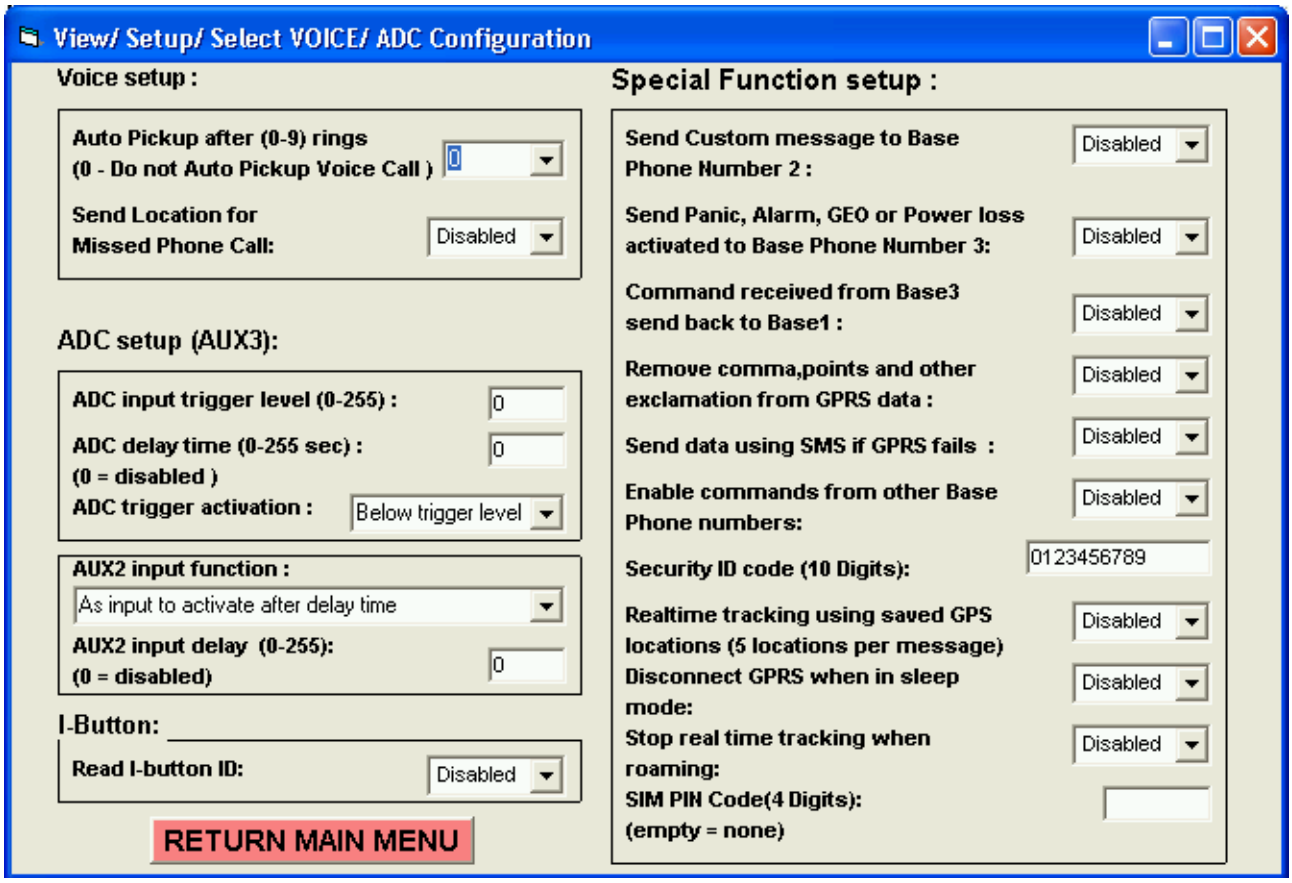
Enter Latitude (dd.mmmm) and Longitude (ddd.mmmm) format. The tracking unit will only compare the Latitude and Longitude value to the current GPS location value.



View/ Setup/ Select VOICE/ ADC Configuration



Voice/ ADC Configuration
(This menu also has Special Function setup configuration)



Overview

Settings	Description
VOICE SETUP	
Auto Pickup after(0-9) rings	Setup if the unit will auto pickup incoming voice call
Select Aux2 input to pickup	Setup if AUX2 input is used to pickup phone call (Please note that AUX2 input also can be used to activate as input alarm trigger. You must select only one function for AUX2 input)
Send Location for Missed Phone Call	The current or last know location can also be requested from the Rover after missed Phone call (the call is not picked up by the Rover). If the Rover picks up the call no location message is returned. Only for missed calls
ADC SETUP (AUX3)	*** See Note !**
ADC input trigger level	The input voltage for the analog input must be between 0 and 3.3Volt DC max. The unit uses linear conversion to convert DC input to numeric value from 0 to 255 (0 is zero volt and +3.3 Volt is 255)
ADC delay time	Setup delay time for ADC input activation
ADC trigger activation	Setup if to activate the input below or above the configured trigger level.
AUX2 input function	Select input function for AUX2
AUX2 input delay	Configure delay time before AUX2 is activated
Read I-Button ID	Enable or disable I-Button detection
SPECIAL FUNCTION SETUP	
Send custom message to Base	This will send a custom message to Base 2 phone

phone number 2	number
Send Panic, Alarm, GEO or Power loss activated to Base Phone number 3	When enabled will also send 'location message' to Base phone number3
Command received from Base3 send back to Base1	All command messages are send to Base1 only
Remove comma, points and other exclamation from GPRS data	The 'location message' when using GPRS will be reduced by about 25% to save data communication costs
Send data using SMS if GPRS fails	This will send the data as SMS message if the GPRS connection fails or is not available. As soon as GPRS is available again the tracking unit will continue sending data using GPRS
Enable commands from other Base Phone numbers:	Enable or Disable commands from other Base stations
Security ID code	The unit will only process from other Base station that have correct security ID code
Real time tracking using saved GPS location	Saved GPS locations from memory are automatic send back **(See *1)**
Disconnect GPRS when in sleep mode	When the unit enters sleep mode the GPRS connection is disconnected
Stop real time tracking when roaming	When the unit leaves its home network real time tracking will stop
Sim card Code (4 Digits)	Enter pin code for SIM card **(See *1)**

* Once the ADC input is activated (and message has been sent) the ADC delay time will be reset back to zero disabling the ADC activation. To reactivate the value must be reloaded using SMS command or using the configuration menu.

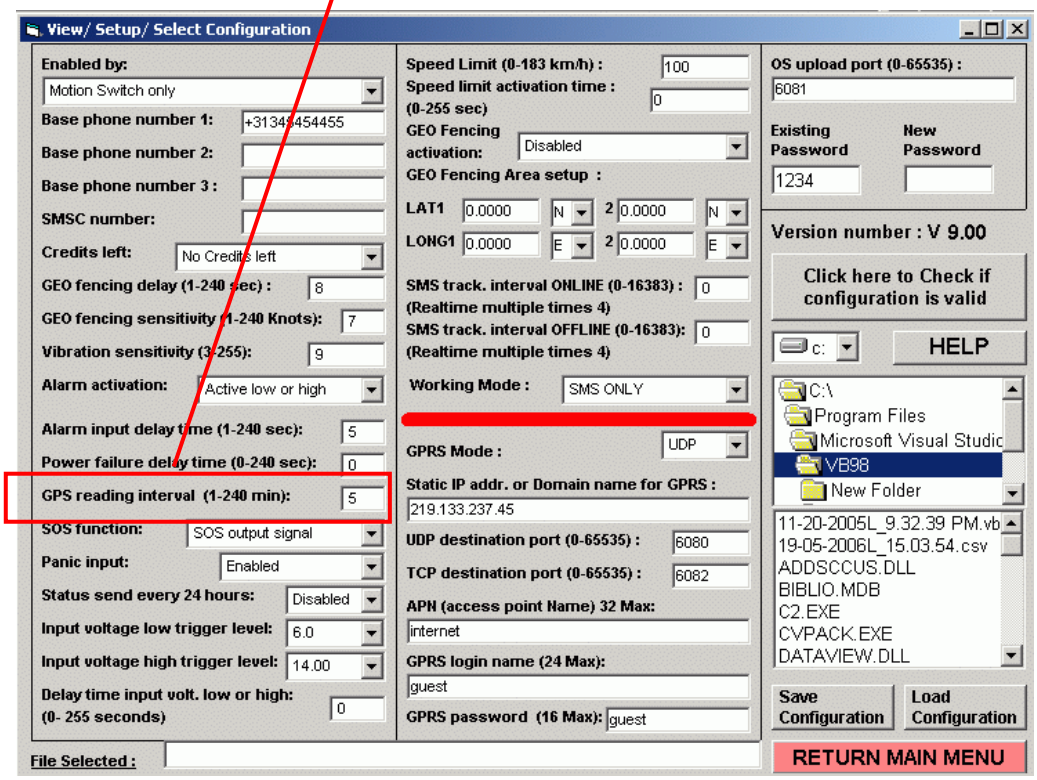
*1

- For the first time when you install a new sim card the pin number (if configured) must be set to "0000" or disabled. The pin code can be changed later updated using the configuration menu.
- **MAKE SURE THE PIN NUMBER IS CORRECT BEFORE INSTALLING SIM CARD. READ SETUP SIM PIN CODE INSTRUCTIONS FIRST!**
  If the pin code is incorrect the sim card may get 'blocked'.

*1

Rover V9 can send saved GPS locations from memory back to base using SMS or GPRS (depending on mode selected).

The interval for sending depends on the ‘GPS reading interval’ setting.



For the above settings, every 5 minutes a valid GPS location is saved to memory. If the GPS location is non-valid then no data is saved except when the unit enters sleep mode. The last location (valid or not) before entering sleep mode is always saved to memory.

The ‘Real time tracking using saved GPS locations’ is different from the normal ‘SMS track. Interval ONLINE’ and the ‘SMS track. Interval OFFLINE’.

‘Real time tracking using saved GPS locations’	‘SMS track. Interval ONLINE’ and the ‘SMS track. Interval OFFLINE’.
Multiple locations are sent per message (5 locations).	Single location messages are sent.
Status is not included. Only Time/ Date / Speed/ Direction, Lat, Long.	Full status is included as well location, Speed, Direction etc.
Message will be sent using SMS or GPRS after 5 locations are saved to memory or if unit enters sleep mode (even if less then 5 locations are saved).	Message will be sent using SMS or GPRS if online or offline time expires.
If message cannot be sent then unit will retry after 5 more messages are saved to memory. Example: The tracking unit was unable to sent the last 10 locations (no GSM signal). When the next 5 locations are saved and GSM signal OK then the unit will sent 15 locations from memory. Up to 250 locations can be resend if transmission fails.	If message cannot be sent then message will be lost.
Tracking interval from 1 minute to 240 minutes.	Tracking interval between 4 seconds to 65532 seconds.

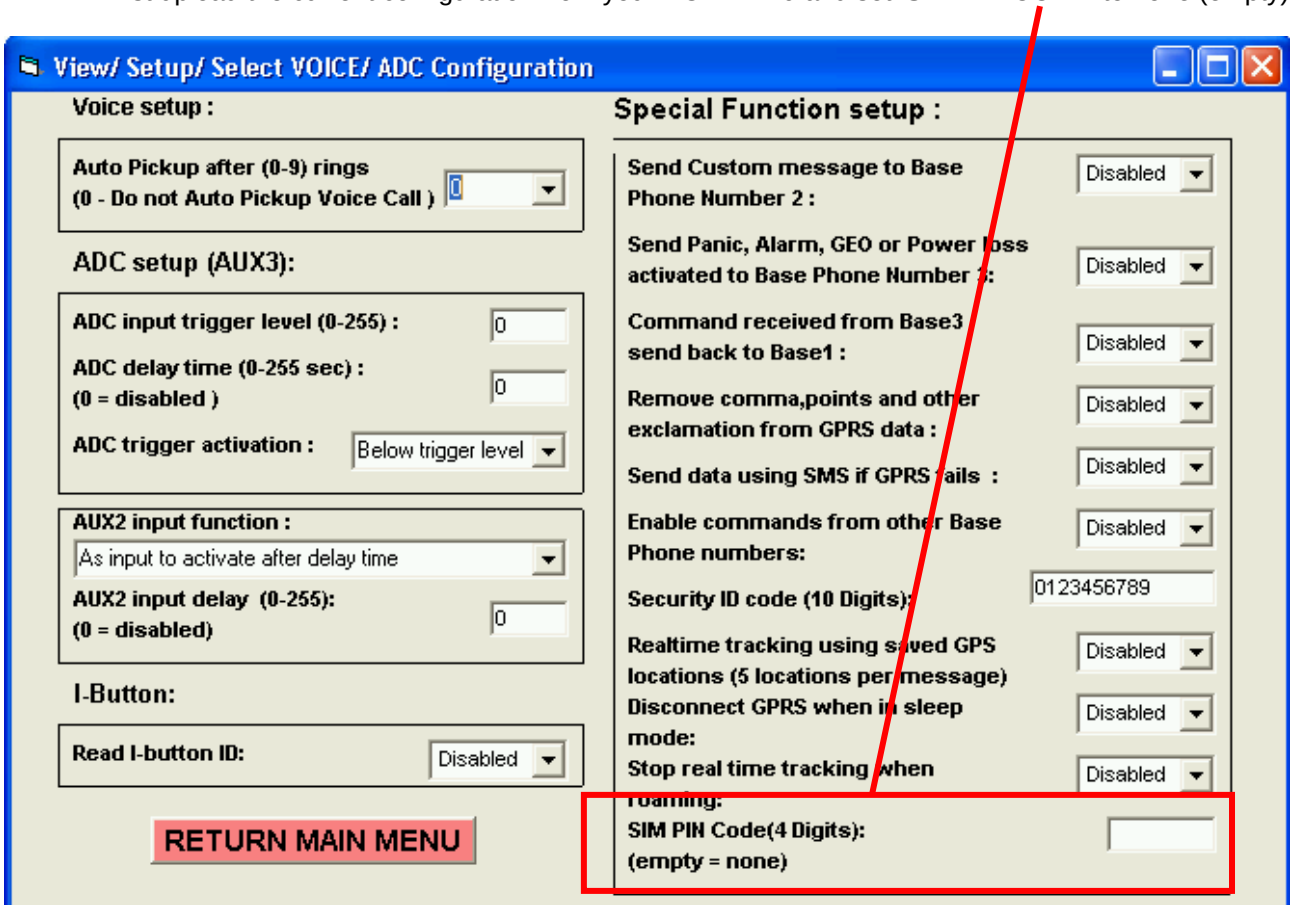
Installing SIM card with different PIN NUMBER then 0000 or None:

The default configuration after operating system upload or when you receive the ROVER V9 for the first time is NO SIM PIN number or SIM PIN number is 0000 (4 * zero). If you cannot remove SIM PIN number make sure that your SIM PIN is configured for 0000.

The ROVER V9 will first test if SIM PIN number is required. If the SIM card requires PIN number then the ROVER V9 will try to access the SIM card using the default pin number 0000 (4* zero).

To change the SIM PIN number you must follow the following instructions.

1. First upload the current configuration from your ROVER V9 and set 'SIM PIN CODE' to none (empty).



2. Then download the settings to your Rover V9.
3. Power down the Rover V9 and remove SIM card.
4. Use your normal mobile phone to change the SIM pin number.
5. Insert the SIM card back into the Rover V9 and switch on the Rover V9.
6. Wait for about 1 minute before using the configuration menu program.
7. Upload the configuration from the Rover V9.
8. Set the PIN CODE to the new PIN code you have configured (using your mobile phone).
9. Download the configuration to the Rover V9
10. DONE.

SMS commands accepted by the tracking unit:

The unit will only process SMS commands sent to the unit. If the unit is configured in SMS and GPRS mode then any confirm, update or location message is sent back using GPRS.
The unit can read and sent any SMS messages without disconnection from the GPRS connection.

When sending SMS commands please make sure that the message has the correct data format. Some commands may require a fixed length. We also suggest to only use 1 command change or update in every 1 SMS message.

11, (Request Current Status, Version , GPS location)
Example: 05*827,11,0

12, -> SMS only mode (default)
Example: 05*827,12,0

13, -> SMS and GPRS mode
Example: 05*827,13,0

14, -> Upload operating system by air using GPRS/ UDP mode
Example: 05*827,14,0

15, -> Upload configuration file by air using GPRS/ UDP mode
Example: 05*827,15,0

16, -> Upload Camera GPS locations by air using GPRS/UDP mode
Example: 05*827,16,0

17,xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx, -> APN for GPRS (32 locations max)
(Default 'internet')
Example: 05*827,17,vodafone,0

18,x -> Enable/Disable Real time tracking using saved GPS locations.
x=0 -> Disable
x=1 -> Enable
Example: 05*827,18,1,0 (Enable Real time tracking using saved GPS locations)

19,x, (x = 0 UDP mode)
(x = 1 TCP mode)
Example: 05*827,19,1,0 (switch to TCP mode)

20, -> Disable GEO Fencing!
Example: 05*827,20,0

21, -> Enable GEO Fencing!
Example: 05*827,21,0

22,x, (x = 0 No compression for GPRS real time tracking)
(x = 1 Compression for GPRS real time tracking)
Example: 05*827,22,0,0

23,x, (x = 0 Do not send data in SMS if GPRS fails for Real time tracking)
(x = 1 Send data in SMS if GPRS fails for Real time tracking)
Example: 05*827,23,1,0 (send data in SMS if GPRS fails for Real time tracking)

24,xxxxx, -> TCP Destination Port (6082 decimal – Default – from 0 to 65535)
Example: 05*827,24,6082,0 - TCP Destination Port !

25,xxxxx, - > UDP destination Port (6080 decimal – Default- from 0 to 65535)
Example: 05*827,25,6080,0 - UDP Destination Port !

26,xxxxxxxxxxxxxxxx, -> ISP login name (24 locations max)

Example: 05*827,26,guest,0
27,xxxxxxxxxxxxxxx, -> ISP password name (16 locations max)
Example: 05*827,27,guest,0

28,x, (x = 0 Disable Send location message for missed phone call)
(x = 1 Send location message for missed phone call)
Example: 05*827,28,1,0 (Enable send location message for missed phone call)

You must configure the 'Auto Pickup after (0-9) rings' for a value 3 or more. As soon as you hear the first ring tone you must hang up. If not no message will be returned.

29,xxxxxxxx, -> IP Destination Address or domain name in ASCII code MAX 32 Char
Example: 05*827,29,www.newtrack.com.tw,0

30,x, (x=0 -> default - ROVER activates using motion switch ONLY !)
(x=1 -> ROVER activates only when Auxiliary Input 1 is High)
(x=2 -> ROVER activates when motion or Auxiliary Input 1 is High)
(x=3 -> ROVER enabled by Auxiliary Input 1 only - Auto send status when input level changes.
(x=4 -> ROVER enabled by motion and Auxiliary Input 1 - Auto send status when input level changes.
Example: 05*827,30,2,0 - ROVER activates when motion or Auxiliary Input 1 is High

31,xxx, (xxx Delay Time Alarm Input) – MUST BE 3 DIGITS! From 000 to 255 max.
Example: 05*827,31,035,0 - Alarm delay time set to 35 seconds.

32,xxx, (xxx Delay Time Power Failure 3 digits) – MUST BE 3 DIGITS! From 000 to 255 max.
Example: 05*827,32,005,0 - Power failure delay time set to 5 seconds.

33,xxx, (xxx Days battery needs recharge) – MUST BE 3 DIGITS! From 000 to 255 max
DOES NOT REQUIRE ANY UPDATE !

34,xxx, (xxx Delay time GEO fencing - seconds) – MUST BE 3 DIGITS! From 000 to 255 max.
Example: 05*827,34,010,0 - GEO fencing delay time set to 10 seconds.

35,xxx, (xxx Geo fencing sensitivity in Knots/Hour - Default = 3 Knots /H (5.5 Km/hour)
– MUST BE 3 DIGITS! From 000 to 255 max. Value must be Knots !
Example: 05*827,35,004,0 - GEO fencing sensitivity set to 5 Knots.

36,xxx, (xxx Delay time between alarm messages send when alarm input is activated)
– MUST BE 3 DIGITS! From 000 to 255 max.
Example: 05*827,36,012,0 - Delay time between alarm messages is 12 seconds.

37,x, (x= 0 -> SOS output for SOS signal only !) – Default !
SOS-- activation (intermittent contact closure)
This activation condition occurs whenever the Device speed > 20 KMH, and with the Alarm Output =ON (whether triggered by Geo Fence, manual SMS or other methods).
(x= 1 -> enable Camera GPS locations function)
(x= 2 -> enable Camera GPS locations as location reference)
If current GPS location = Camera GPS location then
send text message : in x=XXXXXX y=XXXXXX
If vehicle leaves the Camera GPS location then
send text message : out x=XXXXXX y=XXXXXX
Circle function. Default = 200-300 meters
(x= 3 -> enable No GSM signal function)
SOS output will activate when the is no GSM signal for longer then 1+ minute. Only detect and read GSM signal in normal running Mode.
(x= 4 -> Over speed function enabled)
SOS output will activate for 1 second every time over speed is detected.
(Please note that 'Speed limit' and 'Speed limit activation time must be configured to make this function work!)

Example: 05*827,37,1,0 - enable Camera GPS locations function

38,xx,aaaaaa,bbbbbb, (xx from 00 to 99 -> to change camera location) – MUST be 2 DIGITS!
(xx = xx then add to end off the table as new one !)
(aaaaaa = Latitude in hex format for speed camera location) – MUST be 6 DIGITS!
(bbbbbb = Logitude in hex format for speed camera location) – MUST be 6 DIGITS!
Example: 05*827,38,03,14F34A,56ABC9,0 - Update camera location 3 with new data in hex !
39,x, (Auto Pickup Voice call after x rings)
(x= 0 to 9 -> 0 – Default ! – Do not pickup any Voice call)
Example: 05*827,39,5,0 - Pickup Voice call after 5 Rings.

4xx, (first x = command code =1 Output 1 activate - DOOR
=2 Output 2 activate - SOS
=3 Both outputs activate
=5 Output 1 deactivate
=6 Output 2 deactivate
=7 Both outputs deactivate
(second x = time =0 leave activated
=1 to 8 time(sec) active in seconds
=9 activate for 30 seconds
Example: 05*827,429,0 - Activate SOS output for 30 seconds!

5,xxxxxx..x, (xxxxx.x New Base1 Phone number for Tracking unit) -16 Digits max.
Example: 05*827,5,+6790887676,0 - new Base1 Phone number is +6790887676.

51,xxxxx, - > UDP OS upload port (6081 decimal – Default- from 0 to 65535)
Example: 05*827,51,6081,0 - UDP Destination Port !

52,aa,bb,c,
aa = Delay time ADC input (in Hex from 00 to FF) - 00 = disabled - MUST BE 2 DIGITS!
bb = ADC input trigger level (in Hex from 00 to FF) - MUST BE 2 DIGITS!
c = 0 - Below trigger level
1 - Above trigger level
Example: 05*827,52,2F,5B,1,0 - Delay time is 47 seconds, Trigger level is 91 and trigger above value.

53,xxxxxx..x, (xxxxx.x New Base2 Phone number for Tracking unit) -16 Digits max.
Example: 05*827,53,+8932324,0 - new Base2 Phone number is +8932324.

55,x, (Custom message to Base2 For GEO, Alarm, Panic or power loss activation
x=0 -> Disabled
x=1 -> Enabled
Example: 05*827,55,1,0 - Custom message enabled to Base2.

56,xxxxxx..x, (xxxxx.x New SMSC number) - (16 Digits max).
Example: 05*827,56,+12232443,0 - new SMSC number is +12232443

57,xxxxxx..x, (xxxxx.x New Phone number for Thirth Tracking base Phone)- (16 Digits max).
Example: 05*827,57,+12232443,0 - new Base3 Phone number is +12232443

58,x, (Message to Base 3 For GEO, Alarm or Panic activation or power loss
x=0 -> Disabled
x=1 -> Enabled
Example: 05*827,58,1,0 - Message to Base 3 enabled.

59,x -> Enable/Disable I-button.
x=0 -> Disable
x=1 -> Enable

Example: 05*827,59,1,0 (Enable I-button)

6,xx, (xx Time between GPS Readings in minutes) – MUST be 2 DIGITS
Example: 05*827,6,05,0 - Time between GPS readings is 5 minutes.

61,x, (GEO Fenced Area setup settings:)
x=0 -> GEO fenced area setup disabled
x=1 -> When activated send SMS message Location + Status ONLY (Vehicle must remain outside GEO fenced area)
x=2 -> When activated send SMS message Location + Status and enable alarm output to disable engine (Vehicle must remain outside GEO fenced area)
x=3 -> When activated send SMS message Location + Status ONLY (Vehicle must remain inside GEO fenced area)
x=4 -> When activated send SMS message Location + Status and enable alarm output to disable engine (Vehicle must remain inside GEO fenced area)
Example: 05*827,61,2,0 - When activated send SMS message Location + Status and enable alarm output to disable engine (Vehicle must remain outside GEO fenced area)

62,aaaaaab,cccccd,eeeeeef,ggggggh, (GEO fenced area setup)
aaaaaa = First Latitude (UP) value in hex – MUST be 4 DIGITS!
b = N or S (Latitude hemisphere)
cccccc = Second Latitude (DOWN) value in hex – MUST be 4 DIGITS!
d = N or S (Latitude hemisphere)
eeeeee = First Longitude (LEFT) value in hex – MUST be 4 DIGITS!
f = E or W (Longitude hemisphere)
gggggg = Second Longitude (RIGHT) value in hex – MUST be 4 DIGITS!
h = E or W (Longitude hemisphere)
Example:
Latitude (UP) value = 3601.8723 S
Latitude (DOWN) value = 3602.4516 S

Longitude (LEFT) value = 17433.5276 E
Longitude (RIGHT) value= 17444.6207 E

Values are in : ddmm.mmmm or dddmm.mmmm (as received in any message from the rover).
To send the values they must be converted to HEX code first and the last two digits are not used.
The above sample will convert to message command:
62,240157S,24022DS,AE2134E,AE2C3EE,

63,xx,AUX2 input delay time in HEX from 00 to FF (xx=00 AUX2 input disabled) – MUST be 2 DIGITS!
Example: 05*827,63,1B,0 - Send message when activated for more then 27 seconds.

64,xx,yy,
(xx= speed limit from 00 to FF (255 hex) max – MUST be 2 DIGITS! – VALUE in Knots !!!!)
(yy=00 Speed check disabled)
(yy=01 to FF (255 hex) seconds above speed limit before activation– MUST be 2 DIGITS!)
Example: 05*827,64,54,05,0 - Send message when speed more than 100 km/h for 5 seconds
(1 knot is 1.852 km/h)

65,x, (x=0 Disable location Message every 1-7 Days)
(x=1 –7 Enable – Location message every 1-7 days)
Example: 05*827,65,3,0 - Send location message every 3 days

66,xxxx, -> Real time tracking interval – SMS or GPRS -> configured in Hex! for SLEEP mode
MUST BE 4 DIGITS!
(xxxx = 0000 -> NO Real time tracking! - Default after operating system update or Reset) in SLEEP MODE
(xxxx = 0001 -> Send 1 message every 4 seconds)
(xxxx = 0002 -> Send 1 message every 8 seconds)
(xxxx= 0003 -> Send 1 message every 12 seconds)
(xxxx = 0004 -> Send 1 message every 16 seconds)
etc. Max xxxx = 3FFF (hex)
(xxxx = 3FFF (hex) -> Send 1 message every 65532 seconds max)
Example: 05*827,66,0015,0 - Send 1 message every 84 seconds

67,x, -> Panic input enabled / disabled
(x=0 Disabled)
(x=1 Enabled - Default)

Example: 05*827,67,1,0 - Panic input Enabled!

68,xx, -> Vibration Sensitivity - Enter value in Hex – MUST BE 2 DIGITS!
(x=09 -> Default)
(x=FF -> MAX)
Example: 05*827,68,09,0

69,aa,bb,xx, -> Power input alarm message setup in Hex.
(aa = Low voltage trigger level in ASCII HEX) – MUST be 2 DIGITS!
(bb = high voltage trigger level in ASC II HEX) – MUST be 2 DIGITS!
(xx = Delay time to enable low or high input voltage in seconds - ASC II HEX) – MUST be 2 DIGITS

The following table must be used for the aa and bb value.

Input Voltage		**Hex Value in SMS message**
5.0	-	A6
5.33	-	AA
5.66	**-**	**AF - External Power loss Voltage detected below this value**
6.0	-	B2
6.33	-	B5
6.66	-	B8
7.0	-	BB
7.33	-	BE
7.66	-	C0
8.0	-	C2
8.33	-	C4
8.66	-	C6
9.0	-	C8
9.33	-	CA
9.66	-	CB
10.0	-	CE
10.33	-	CF
10.66	-	D1
11.00	-	D3
11.33	-	D4
11.66	-	D6
12.00	-	D7
12.33	-	D8
12.66	-	D9
13.00	-	DA
13.33	-	DB
13.66	-	DC
14.00	-	DD
14.33	-	DE
14.66	-	DF
15.00	-	E0
15.33	-	E1
15.66	-	E2
16.00	-	E3
16.33	-	E3
16.66	-	E4
17.00	-	E5
17.33	-	E6
17.66	-	E6
18.00	-	E7
18.33	-	E8
18.66	-	E8
19.00	-	E9
19.33	-	EA
19.66	-	EA
20.00	-	EB
20.33	-	EC

20.66 - ED
21.00 - ED
21.33 - EE
21.66 - EE
22.00 - EF
22.33 - EF
22.66 - F0
23.00 - F0
23.33 - F1
23.66 - F1
24.00 - F2
24.33 - F2
24.66 - F3
25.00 - F3
25.33 - F4
25.66 - F4
26.00 - F5
26.33 - F5
26.66 - F6
27.00 - F6
27.33 - F6
27.66 - F7
28.00 - F7
28.33 - F8
28.66 - F8
29.00 - F9
29.33 - F9
29.66 - FA
30.00 - FA
30.33 - FA
30.66 - FA
31.00 - FB
31.33 - FB
31.66 - FB
32.00 - FC
32.33 - FC
32.66 - FC
33.00 - FD
33.33 - FD
33.66 - FE
34.00 - FE
34.33 - FE
34.66 - FE
35.00 - FF

Above is Higher then 35.00 Volt DC ($FF)

Example: 05*827,69,C8,DC,09,0 - Activate alarm if input voltage below 9 Volt or higher then 14.66 volt for more then 9 seconds.

7x, (x=1 Enable Alarm output Without Delay)
(x=2 Enable Alarm Output Phone + GPS in Range)
(x=3 Deactivate Alarm)
(x=4 Reset tracking unit(default values are loaded)
(x=5 Active low or active high for alarm input)
(x=6 Pulse activated)
Example: 05*827,71,0 - activate alarm output without delay.

79,xxxx, -> Real time tracking interval – SMS or GPRS -> configured in Hex! for ONLINE mode
MUST BE 4 DIGITS!
-> Real time tracking interval -> configured in Hex!
(xxxx = 0000 -> NO Real time tracking! - Default after operating system update or
Reset)

(xxxx = 0001 -> Send 1 message every 4 seconds)
(xxxx = 0002 -> Send 1 message every 8 seconds)
(xxxx= 0003 -> Send 1 message every 12 seconds)
(xxxx = 0004 -> Send 1 message every 16 seconds)
etc. Max xxxx = 3FFF (hex)
(xxxx = 3FFF (hex) -> Send 1 message every 65532 seconds max)
Example: 05*827,79,0005,0 - Send 1 message every 20 seconds

8xx, -> Request multiple message download from memory. Valid GPS locations are automatic saved to memory using the setting configured with the 6,xx command (6,xx, (xx Time between GPS Readings in minutes)). Up to 5 locations are send by SMS or GPRS per message.
Location messages include no status data. Only time, date, Lat, Long, Direction and speed.
The last location before the unit enters sleep mode is always saved to memory (valid or not).

xx value – MUST be 2 DIGITS!
(10 send 5 locations back to Base)
(11 send 10 locations back to Base)
(12 send 20 locations back to Base)
(13 send 30 locations back to Base)
(14 send 40 locations back to Base)
(15 send 50 locations back to Base)
(16 send 60 locations back to Base)
(17 send 70 locations back to Base)
(18 send 80 locations back to Base)
(19 send 90 locations back to Base)
(20 Total - 100 Back to Base)
(21 Total - 110 Back to Base)
(22 Total - 120 Back to Base)
(23 Total - 130 Back to Base)
(24 Total - 140 Back to Base)
(25 Total - 150 Back to Base)
(26 Total - 160 Back to Base)
(27 Total - 170 Back to Base)
(28 Total - 180 Back to Base)
(29 Total - 190 Back to Base)
(30 Total - 200 Back to Base)
(31 Total - 210 Back to Base)
(32 Total - 220 Back to Base)
(33 Total - 230 Back to Base)
(34 Total - 240 Back to Base)
(35 Total - 250 Back to Base)
(50 Send all GPS locations from memory back to base - Max 3200)
NO OTHER VALUES ARE ALLOWED !

Example: 05*827,815,0 - Send last 50 locations from memory.

9x, Enable or disable communication from tracking unit.
The unit will still accept update messages, but no locations messages or input activations messages are send.
(x=0 Disable Tracking unit ; x=1 Enable Tracking unit)
Example: 05*827,91,0 - Enable tracking unit.

A0,x -> Enable commands from other Base phone numbers
x=0 -> Disable
x=1 -> Enable
Example: 05*827,A0,1,0 (Enable commands from other Base phone numbers)

A1,xxxxxxxxxx -> Security ID code (Must be 10 Digits)
xxxxxxxxxx -> 10 Digit security code (can be any numbers or letters)
Example: 05*827,A1,Ab1245678a,0 (Change ID code to 'Ab1245678a')

All return messages are send-using Base1, 2 or 3 depending on the command received and your configuration settings.
The message received does to have to start with '05*827'.

Example:
Message sent: justtesting@rovertest.com 05*827,0123456789,11,0
Will be accepted and processed.

WARNING:

Default security code is '0123456789' and the option is automatic disabled after operating system upload. We strongly recommend for your network to keep secure to change the 'Security ID code' first and do not leave it set to '0123456789'.

A2,x -> (x=0 Stay connected to GPRS in sleep mode)
(x=1 Disconnect from GPRS in sleep mode)
Example: 05*827,A2,1,0 (Disconnect from GPRS in sleep mode)

A3,x -> (x=0 Do not stop real time tracking when roaming)
(x=1 Stop real time tracking when roaming)
Example: 05*827,A3,1,0 (Stop real time tracking when roaming)

Unit activation and sleep Mode:
The tracking unit has a build in 'motion' sensor that detects any movement and g-force change.
Depending on the activation mode (see command code 30,x,) the unit will enter 'sleep mode' after 10 minutes if no 'motion' is detected. In sleep mode the GPS module is powered down, but the unit will still process any incoming and outgoing SMS messages.
When the unit is in 'sleep mode' it will take several seconds to 'wake up' to normal running mode after motion is detected. Motion is normally detected when the vehicle starts driving.
A valid GPS location will take 10-20 seconds after the unit is operating in normal running mode (GPS aerial has clear sky view).
We recommend that in case the GPS output is also used for in car navigation to enable the unit using 'AUX1' input and motion detected. The 'AUX1' input can be connected to the ignition key to enable the unit as soon as the vehicle is started. This will minimize the delay to startup the GPS module.

Software and hardware lock-ups:
The unit has an internal hardware timer that detects 'lock-up'.
If the unit is 'locked' in it automatic 'reset' after 10 minutes.
The modem will reset if no GSM signal is detected for more then 20 seconds.
In GPRS mode the modem will reset if communication fails for more then 3 times.

Uploading the Operating System to the ROVER

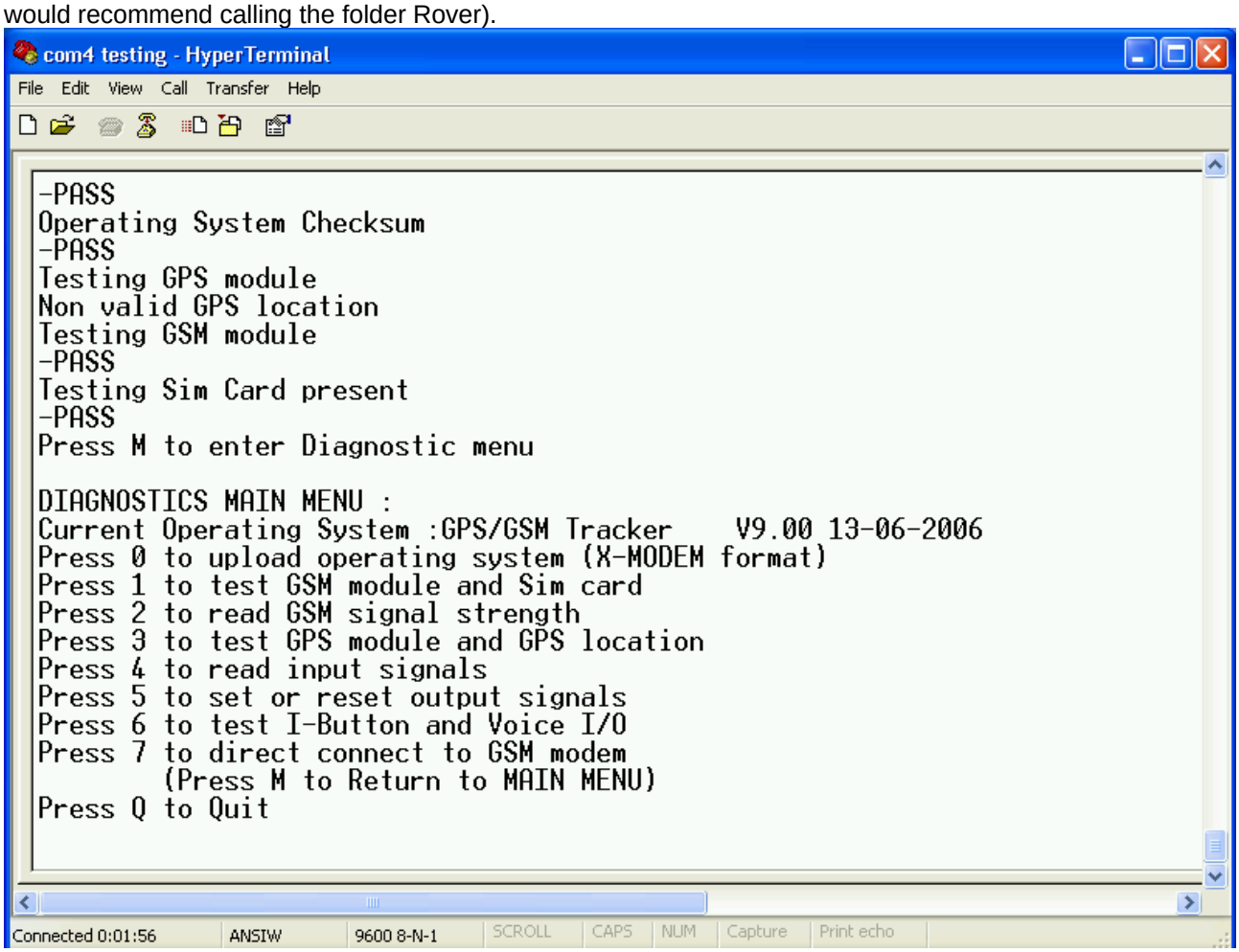
The firmware file should have an extension file name **".s19".**

When the Rover module is connected to the serial port of a computer and it is in **Diagnostic mode**,

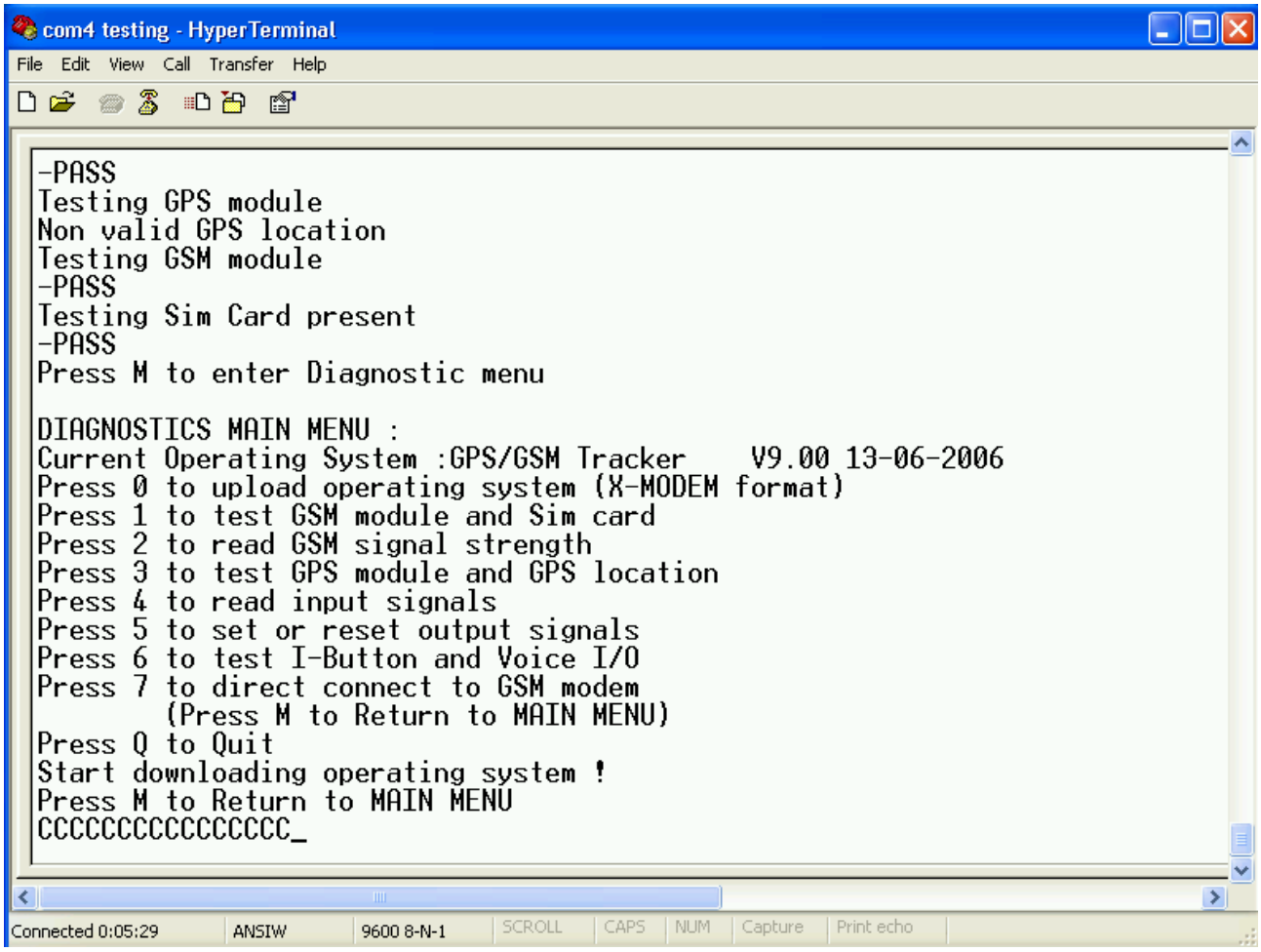
A new or modified **Operating System** can be uploaded to the Rover module by pressing **0**.

The new or modified Operating System will be distributed in the **X-Modem** format. It will be a small file that is capable of being distributed to installers by email.

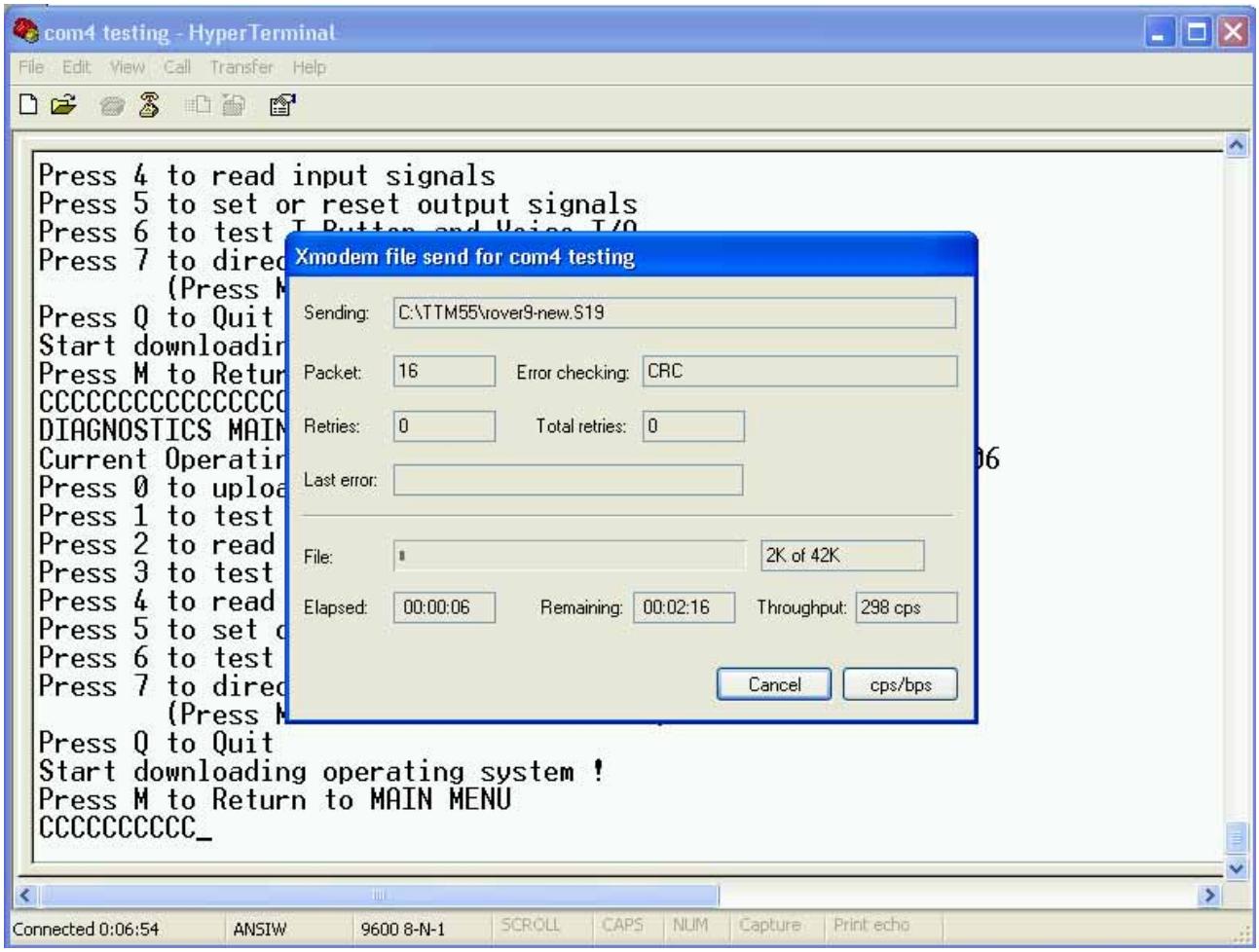
Once you have received the new operating system by email place it in a new folder on your computer (we would recommend calling the folder Rover).



· With the ROVER connected to the computer and in Diagnostic mode **press 0** to begin the upload.



· On the HyperTerminal main screen click on **Transfer** and then **Send File** from the drop down list.
· Click **Browse** to locate the folder that contains the **Operating System** file. Highlight the file and click **Open**.
· Then click **Send File**. The download will begin.

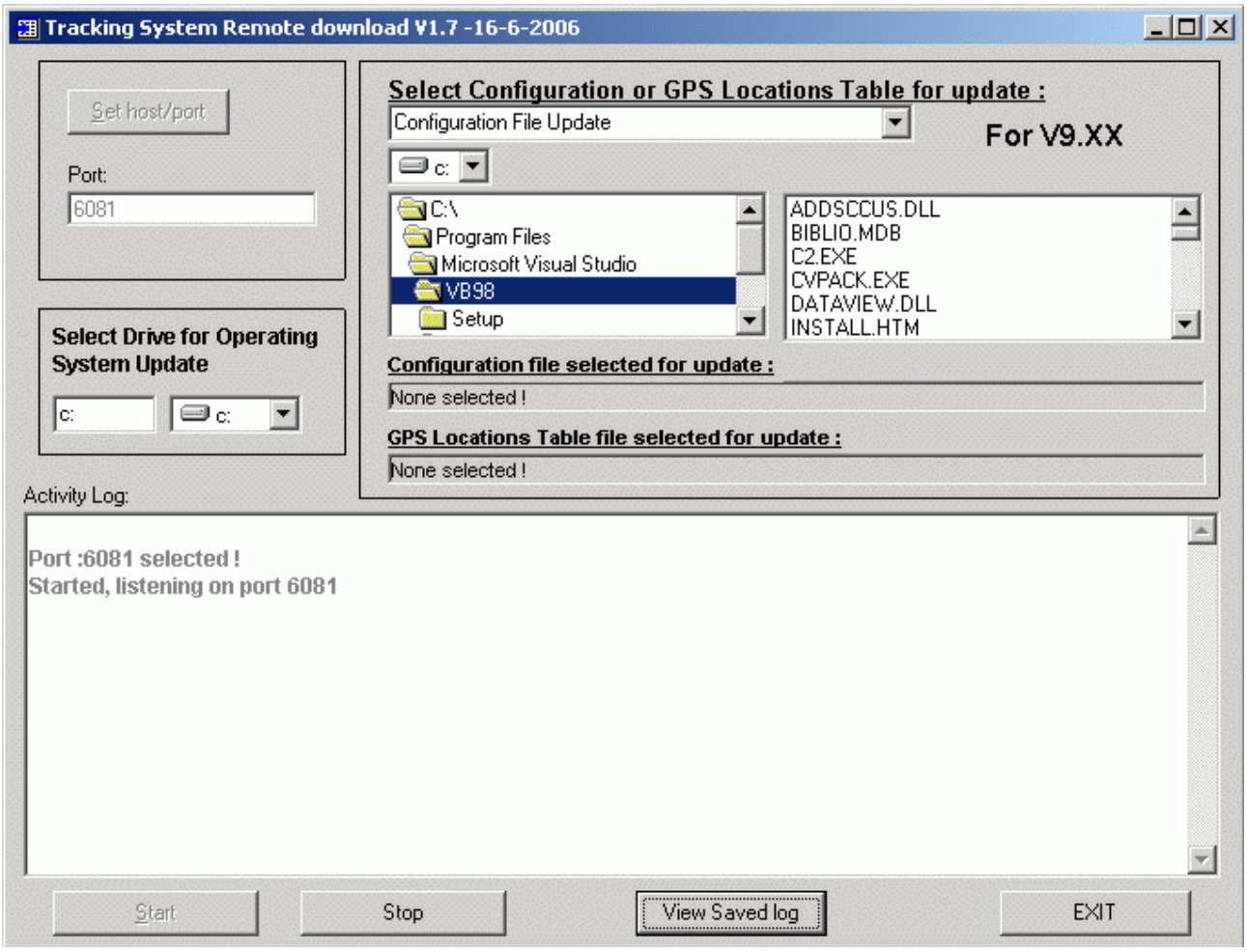


After upload the ROVER unit will restart into the **Diagnostic Main Menu**. The Version and Date details of the new Operating System will be displayed.

Upload operating system, configuration file or GPS location Table over the air using GPRS:

Before you can update the operating system, configuration file or GPS locations Table over the air you need to complete the following setup.

1. An internet connection with **Static IP** address.
2. Port **"6081"** (or any other port you want to use to upload the operating system) needs to be routed from your Router or Firewall to a computer system running the **Tracking System Remote Download Program.**



3. Make sure that **GPRS** is enabled for the **SIM** card in your tracking unit.

Once you setup and configure the above settings you can send the upload command to the tracking unit for upload of the operating system: **05*827,14,0** or **05*827,15,0** to upload the configuration file.

There is no need to configure the tracking unit for 'SMS and GPRS' as the upload command will always use GPRS to upload the operating system, configuration file or GPS location Table even if your tracking unit is configured for SMS only.

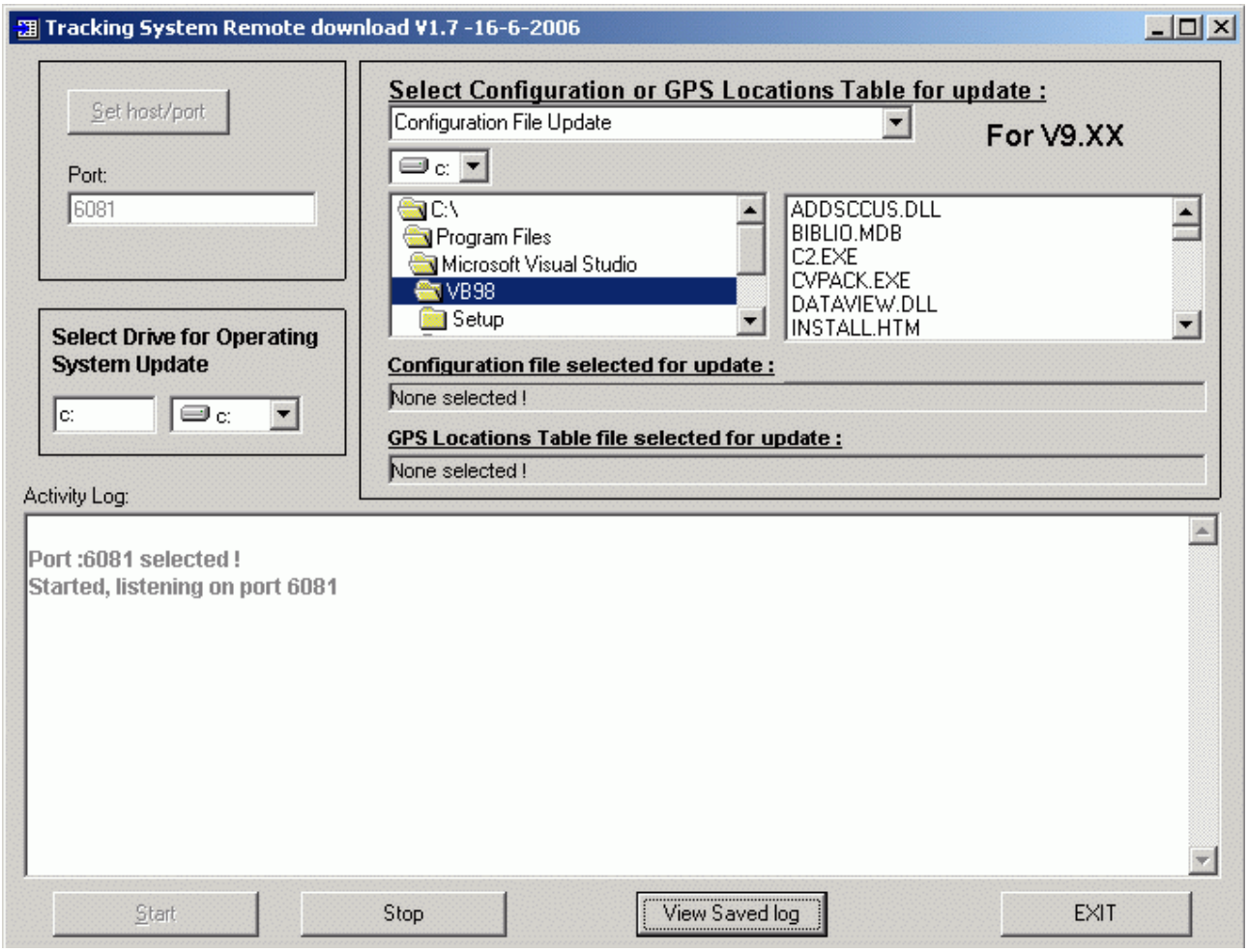
After uploading the operating system or configuration file the tracking unit will verify the 'program checksum'. If correct then the system will automatically reboot. Operating system upload over the air **will not** alter any configuration settings (operating system upload using the serial port requires the reconfiguration of the configuration menu and settings). Configuration file updates over the air will also automatic reboot the system to enable the tracking unit with the new settings.
GPS location Table update will not reboot the tracking system.

If there are any **errors** during download then you will need to resend the upload command(s) again.

Tracking System Operating System Download Program:

This program can be used to update the operating system, update the configuration file or update the GPS locations Table for the tracking unit over the air.

At present the current version 1.7 can only download data to one unit at a time.



Set the download port for the tracking unit (**default 6081**). Press the **'Set host/port'** to select the current port.
The **'Select Drive'** option will select where the new operating system to download to the tracking unit is located.
As there may be several different tracking unit versions you will need to create a directory where the operating system for download is located.

As an example the unit you have is version **V009** and your **'Select Drive'** is **C:**.
Then you need to create a directory called: V009 (C:\V009) and copy the operating system you want to download to your unit (one (**1**) file with extension **.s19**) to this directory.

The **'Start'** button will start the program scanning the selected port for any **UDP** data.
For configuration file update select the configuration file to download to your tracking system.

Tracking unit download sequence:

The tracking unit will send the following command to try to connect to the 'Tracking System Operating System Download Program':
<IMEI>,<current version number>,UPLOAD

(Example: **352439098765431,V009,UPLOAD**).

The 'Tracking System Remote Download Program' will '**scan**' the **'V009'** directory for the **first file** with extension **.s19**.
This file will be used to download to the tracking unit.
The 'Tracking System Operating System Download Program' sends data in small blocks to the tracking unit and the tracking unit will confirm each packet after correct download only.
If any errors are detected the tracking unit will request the incorrect data block to be sent again.

The last data block sent will have the packet number: **512** (last packet).
After this the tracking unit will disconnect and update the operating system.
After download the tracking unit will automatically reset and restart the new uploaded operating system.
The tracking unit will send the following commands to try to connect to the 'Tracking System Remote Download Program' for configuration file or GPS location Table update:

<UDP packet identification>,<current version number>,CONFIG

(Example: **353445676543213,V009,CONFIG**).

<UDP packet identification>,<current version number>,GPSLOC

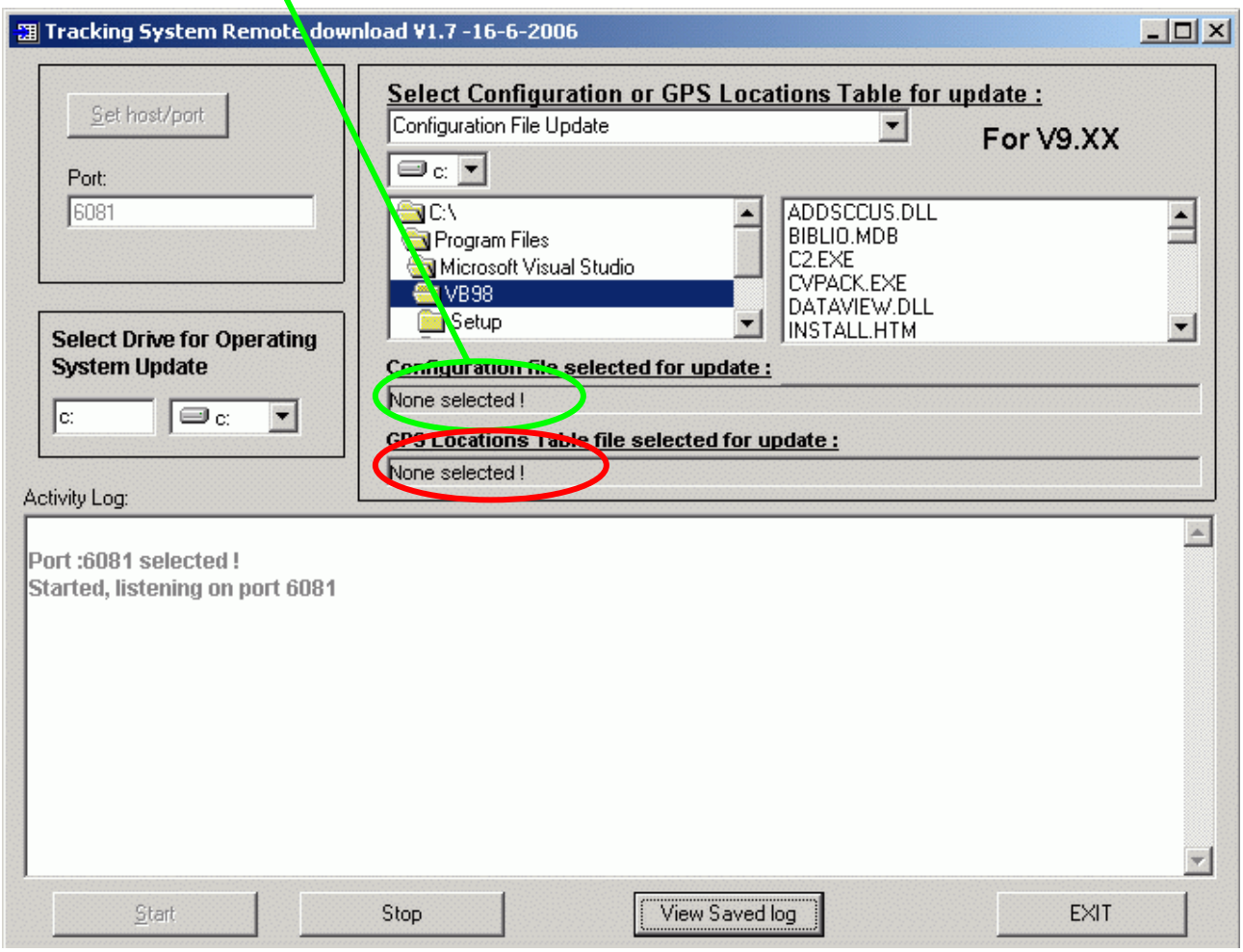
Example: **353445676543213,V009,GPSLOC**).

Configuration file update will send the selected configuration file to your tracking unit.
GPS location Table update will send the selected GPS location Table file to your tracking unit.

Tracking system data download format:
Each packet is send as <packet number>+504 bytes data. After the tracking unit receives the data it will verify for the correct packet number. If correct then it will return ‘1’. If incorrect it will return ‘0’ to request the same packet again.

GPS location Table file selected for upload

Configuration File selected for upload

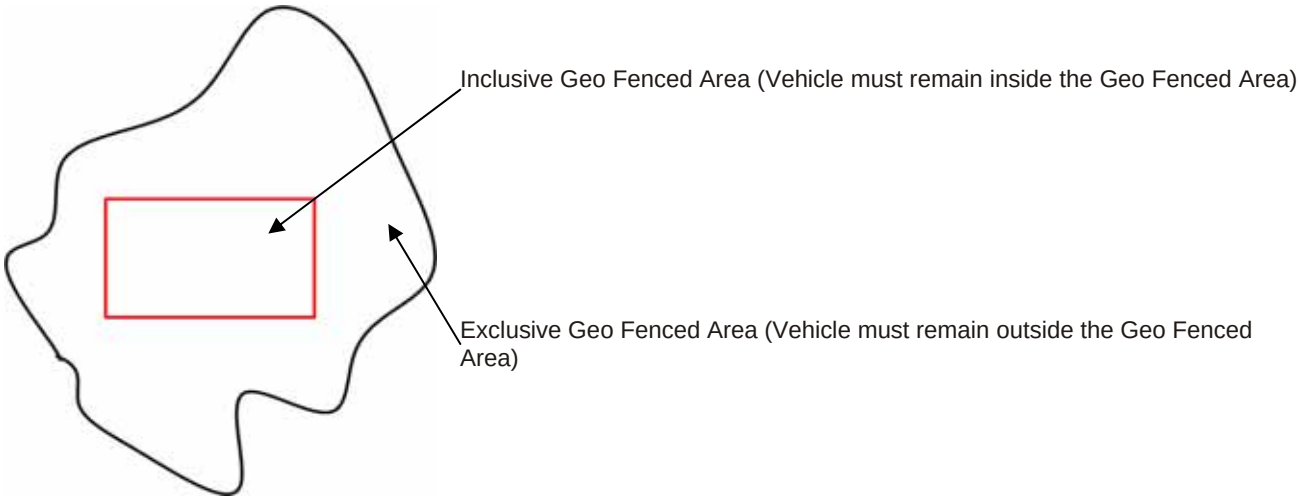


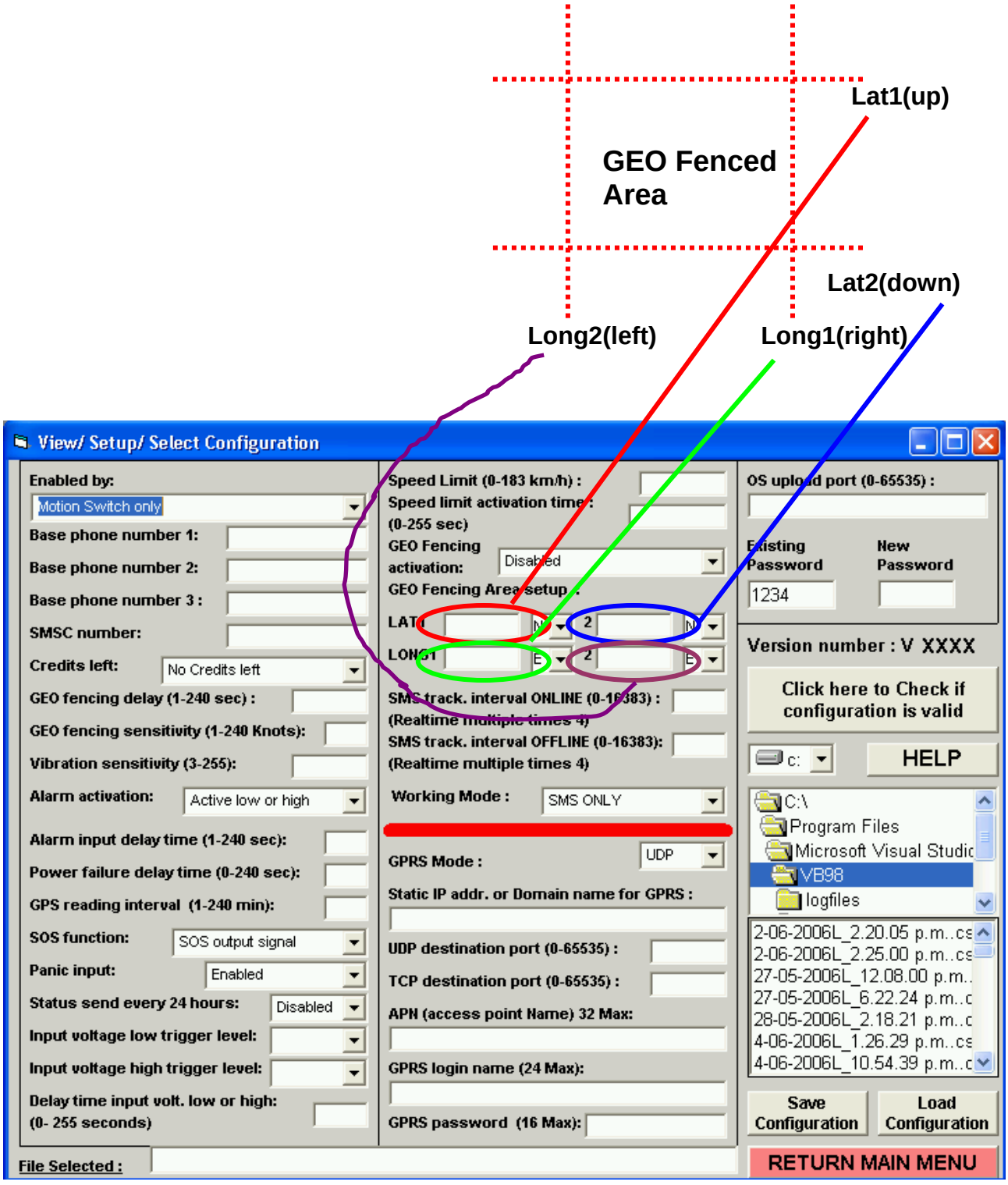
Geo Fencing

There are 2 options for GEO fencing
1. When you park your vehicle and the GEO fencing input is low then your vehicle will be automatically GEO fenced to that location in about 30 seconds (default) and the GEO fencing LED starts flashing!
If your vehicle is moved from that location (with GEO fencing input low) then the tracking unit will automatically send an SMS message with alarm status code = 044 (if no other alarm is activated at that time). This combination code can only be sent if the vehicle is moved from the GEO fenced area.

2. When you define a GEO fenced area and the vehicle leaves the GEO fenced area then an SMS message is sent with the alarm status code = 0@0 (if no other alarm is activated at that time).

Geo Fenced area setup:
You can configure a Geo Fenced area. You can configure the settings so that a vehicle has to stay within that Geo Fenced area or must stay out of the Geo Fenced area.
When activated an SMS message can be sent back to base, as well the alarm output can be activated to disable the vehicle. . The alarm output will stay activated as long as the vehicle is inside or outside the configured area. The location accuracy must be less then 20 meters before the tracking unit will compare the current GPS location to the configured GEO fenced values.





Lat1 and Lat2 in: dd.mmmm format.
Long1 and Long2 in: ddd.mmmm format

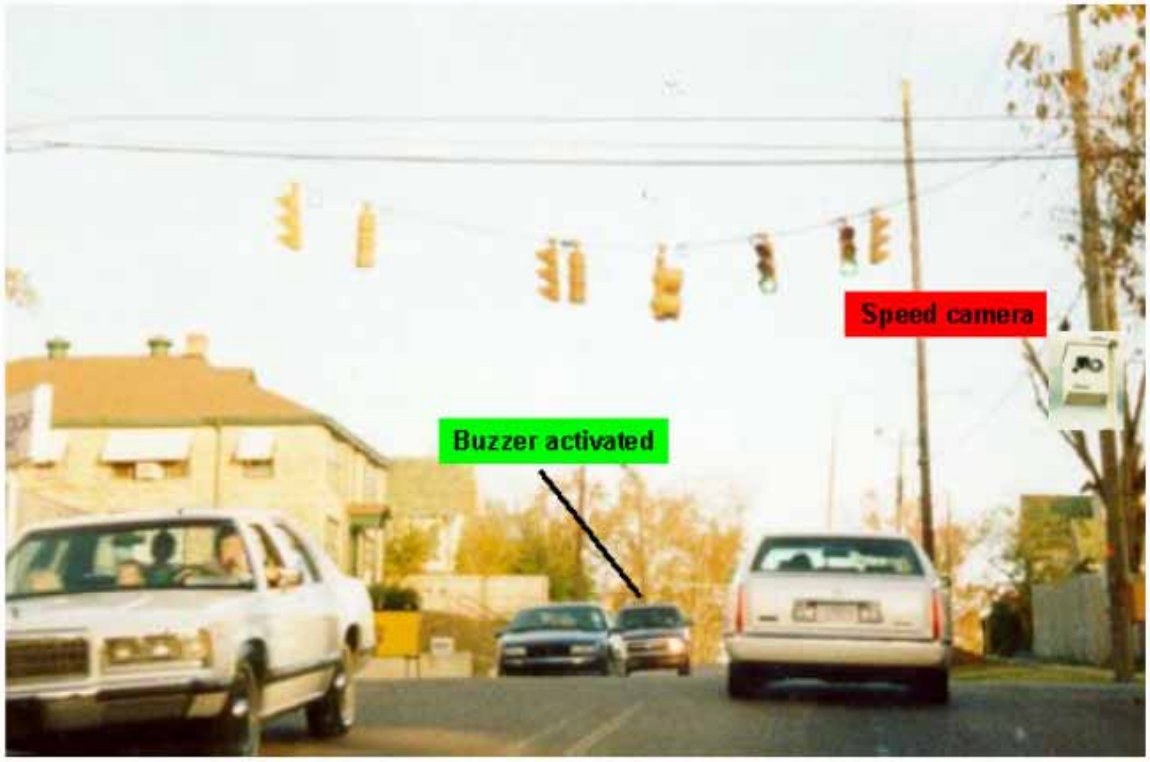
- ‘dd’ in decimal (or ‘ddd’)
- ‘mm’ (after ‘dd’ or ‘ddd’) in MINUTES (00 to 59)
- last two ‘mm’ in decimal (00 to 99)

Camera GPS locations (code 37,1 and code 37,2):

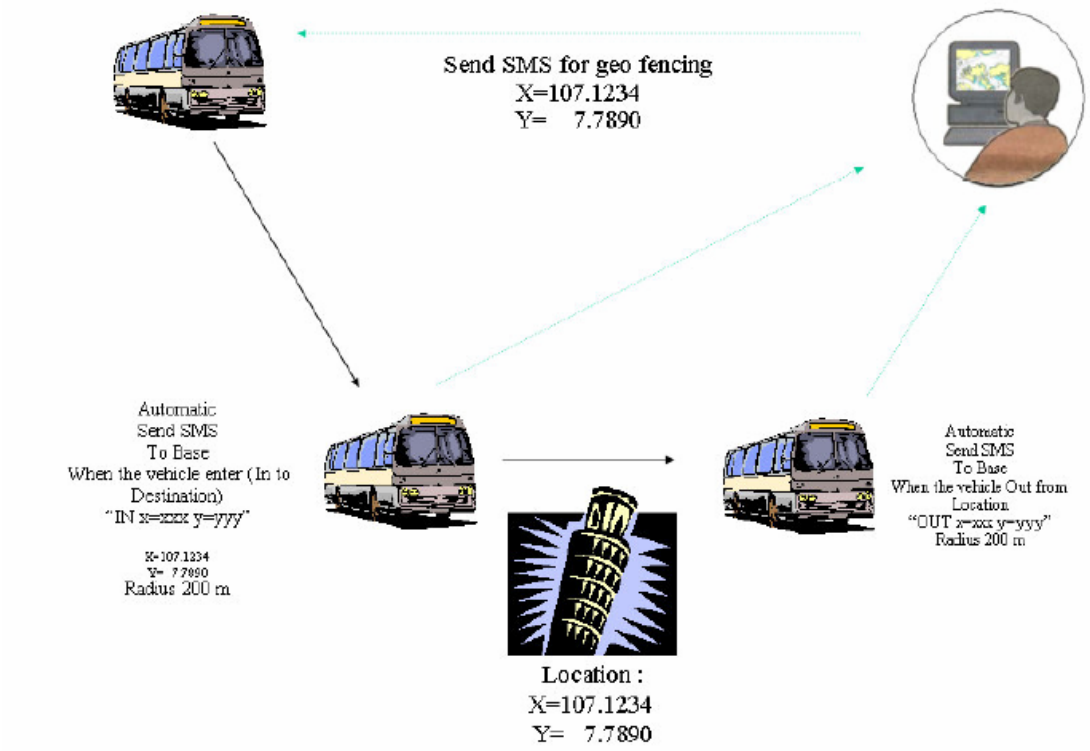
Our ROVER AVL unit has 100 GPS locations that can be used for 2 functions.

1. As warning device when a vehicle enters an area where a **fixed speed camera** is installed. To use this function you must know the GPS (lat - long) location(s) for the fixed speed cameras installed.

If the ROVER speed camera function is enabled and you have the speed camera locations loaded then whenever you come closer then **300 meters** from these locations the SOS output will be activated (low). A small buzzer connected to this output can warn you that there is a speed camera installed. Once your distance is more then 300 meters away from the location the SOS output automatically deactivates.



2. As an automatic reporting system when a vehicle enters and leaves a defined **'GEO'fenced** location. The following picture shows how this works.



Up to 100 locations can be configured.

Sample setup and operation:
SMS setup
Lets say we have 3 locations where we need to know when the vehicle enters or leaves these locations. The locations must be entered as hex code and in 'ddmm.mmmm' format.
Example: 3723.2475 hex format to send -> 2517184B or 0456.5580 hex format to send - > 04383750.
Latitude and longitude are always positive numbers.
The last entry in the table must be hex FFFFFF.
Command code sample:
05*827,38,00,414141,424242,38,01,434343,444444,38,02,454545,464646,38,03,FFFFFF,FFFFFF,0
This will setup 3 locations:
First location : latitude = 414141 (hex) and longitude =424242 (hex)
Second location : latitude = 434343 (hex) and longitude =444444 (hex)
Third location : latitude = 454545 (hex) and longitude =464646 (hex)
Then we can enable the function with command code: 05*827,37,2,0
If the vehicle enters the second location, an text message will be sent (IN 434343,444444). When the vehicle leaves the second location, another text message will be sent (OUT 434343,444444). The message sent when a vehicle leaves a location is delayed about 30-40 seconds to make sure that the vehicle has left the location.

The GPS location table can also be updated using the 'ROVERV9-setup.exe' program or the 'server.exe' program using GPRS.

Messages send by ROVER-V9:

Message from the ROVER-V9 can be send using SMS or GPRS. In SMS only mode all data is sent using SMS. In SMS and GPRS mode all messages are sent using GPRS. If SMS and GPRS mode is enabled and GPRS is not available then any input activations will be sent using SMS. Whenever GPRS is available again the unit will use GPRS again. In case real time tracking is enabled in SMS and GPRS mode and GPRS is not available then the unit can send the data using SMS if enabled (see configuration menu).

If GSM signal is not available and input is activated then the tracking unit will send the alarm message as soon as there is GSM signal again. The time and date in the message is from the GPS time and date at the time the message is sent.

If real time tracking is enabled and there is no GSM signal then the information will be lost. The tracking unit will still save GPS locations using the 'GPS tracking interval setting' if the GPS location is valid.

Any command messages can also be sent to the tracking unit in GPRS mode. Any message(s) can be sent, but only within 2 seconds after any message is received in GPRS mode. The command messages are identical to the messages sent using SMS.

1. **Location Message.**
2. **Multiple Location Message (5 locations per message).**
3. **Confirm Message for Update.**

1.Location Message:

The data length is always the same!

Sample:

05*850,000,L001,A,2459.3640,N,12125.2958,E,000.0,224.8,00.8,07:47:26 09-09-05,9.00,D3,0,C4,1

ID Code (6 Bytes in ASCII), Status code (3 Bytes in ASCII), Version Number, Status (A or V), Latitude, N/S indicator,
Longitude, E/W Indicator, speed, Course,HDOP, GPS time lat/lon value - GPS date lat/lon value,Unit Version number,Input power level,Status ADC converter,ADC voltage level level**,<online or sleep mode>**

The online bit setting is '0' and the offline bit setting is '1'

ID CODE:

The ID code can be 05*850 or 05*827.
05*850 is returned when the unit has received a request message from base to send a location message.
05*827 is returned if any input is activated.

STATUS CODE:

Sent in ASCII code for text message. Add $30 to First, Second and Third Code.
; **First code:**
; 00001 = 1 = External Alarm (NO/NC or Voltage) input active
; 00010 = 2 = External Power failure
; 00100 = 4 = GPS not installed or not working
; 01000 = 8 = control input 3 activated (Auxiliary input 2)
;
; Second Code - Alarm codes
; 0001 = 1 = Panic Button Activated
; 0010 = 2 = Alarm Output Active
; 0100 = 4 = GEO fencing enabled
; 1000 = 8 = Input power above or below set value
; 10000=16=Vehicle left (or inside – if enabled) GEO fenced area
; **Third Code - Control Outputs and inputs**
; 00001 = 1 = Control output 1 active - DOOR RELEASE

; 00010 = 2 = Control output 2 active - GEO FENCING LED
; 00100 = 4 = Control input 1 activated - GEO input
; 01000 = 8 = Control input 2 activated (Auxiliary input 1)
; 10000 = 16 = Vehicle traveled above MAX configured speed limit

The ASCI conversion (samples):

First code is: 0 (ASCII code is 48)
To find the status code value subtract 48 from the ASCII code to find the status value 0.
First code is: 7 (ASCII code is 55)
To find the status code value subtract 48 from the ASCII code to find the status value 7.
First code is: = (ASCII code is 61)
To find the status code value subtract 48 from the ASCII code to find the status value 13.

ASCII table conversion used:

0 = 48	5 = 53	: = 58	? = 63	D = 68
1 = 49	6 = 54	; = 59	@= 64	E = 69
2 = 50	7 = 55	< = 60	A = 65	F = 70
3 = 51	8 = 56	= =61	B = 66	G = 71
4 = 52	9 = 57	> = 62	C = 67	H = 72

I = 73 N=78
J = 74 O=79
K= 75
L = 76
M=77

Samples:

Message received:

05*850,001,L001,A,2459.3640,N,12125.2958,E,000.0,224.8,00.8,07:47:26 09-09-05,9.00,D3,0,C4,1

Status Code: 001

First code Second Code Third Code

Code Status = Control output 1 active - DOOR RELEASE

Message received:

05*850,81 :,L001,A,2459.3640,N,12125.2958,E,000.0,224.8,00.8,07:47:26 09-09-05,9.00,D3,0,C4,1

Status Code: 8 1 :

First code Second Code Third Code

Code Status (First Code) = ASCII conversion table (see above) shows value 56.
Subtract 48 to find value
Value is: 8
Control input 3 activated (Auxiliary input 2)

Code Status(Second Code) = Panic Button Activated

Code Status(Third Code) = ASCII conversion table (see above) shows value 58 (for : sign).
Subtract 48 to find value
Value is: 10
Control output 2 active - GEO FENCING LED
Control input 2 activated (Auxiliary input 1)

Version number:
Always 4 char: L001

Status (A or V):

GPS status:
A = Valid GPS location
V = NON Valid GPS location (last known location)

Latitude:
Always the same format xxxx.xxxx

N/S indicator:
N = North
S = South

Longitude:
Always the same format xxxxx.xxxx

E/W Indicator:
E = East
W = West

Speed:
Value in Knots.
Always the same format xxx.x

Course:
Course in degrees.
Always the same format xxx.x

HDOP:
Horizontal Dilution of Precision.
Always the same format xx.x

GPS time:
Format as hh:mm:ss
Example : 07:47:26

GPS date:
Format as dd-mm-yy
Example: 09-09-05

Unit Version number:
Format as x.xx
Example: 9.00

Input power level Status (value in HEX):
From: $00 to Hex: $FF

The following table can be used to see what the current input voltage is when the message is received (+/- 1Volt).

Input Voltage		Hex Value in SMS message
5.0	-	A6
5.33	-	AA
5.66	**-**	**AF - External Power loss Voltage detected below this value**
6.0	-	B2
6.33	-	B5
6.66	-	B8
7.0	-	BB

7.33	-	BE
7.66	-	C0
8.0	-	C2
8.33	-	C4
8.66	-	C6
9.0	-	C8
9.33	-	CA
9.66	-	CB
10.0	-	CE
10.33	-	CF
10.66	-	D1
11.00	-	D3
11.33	-	D4
11.66	-	D6
12.00	-	D7
12.33	-	D8
12.66	-	D9
13.00	-	DA
13.33	-	DB
13.66	-	DC
14.00	-	DD
14.33	-	DE
14.66	-	DF
15.00	-	E0
15.33	-	E1
15.66	-	E2
16.00	-	E3
16.33	-	E3
16.66	-	E4
17.00	-	E5
17.33	-	E6
17.66	-	E6
18.00	-	E7
18.33	-	E8
18.66	-	E8
19.00	-	E9
19.33	-	EA
19.66	-	EA
20.00	-	EB
20.33	-	EC
20.66	-	ED
21.00	-	ED
21.33	-	EE
21.66	-	EE
22.00	-	EF
22.33	-	EF
22.66	-	F0
23.00	-	F0
23.33	-	F1
23.66	-	F1
24.00	-	F2
24.33	-	F2
24.66	-	F3
25.00	-	F3
25.33	-	F4
25.66	-	F4
26.00	-	F5
26.33	-	F5
26.66	-	F6
27.00	-	F6
27.33	-	F6
27.66	-	F7
28.00	-	F7

28.33	-	F8
28.66	-	F8
29.00	-	F9
29.33	-	F9
29.66	-	FA
30.00	-	FA
30.33	-	FA
30.66	-	FA
31.00	-	FB
31.33	-	FB
31.66	-	FB
32.00	-	FC
32.33	-	FC
32.66	-	FC
33.00	-	FD
33.33	-	FD
33.66	-	FE
34.00	-	FE
34.33	-	FE
34.66	-	FE
35.00	-	FF

Above is Higher then 35.00 Volt DC ($FF)

Status ADC converter (AUX3 input):
0 = NOT activated
1 = ACTIVATED

ADC voltage level(value in HEX):
From: $00 to Hex: $FF

2. Multiple Location Message (5 locations per message).

Five locations are sent in 1 SMS message.
Data includes:
; Time, Latitude, Longitude, Latitude/Longitude Hemisphere, Speed (4 digits), Course (first 3 digits ONLY),Date
; 3+8+9+1+4+3+3, = 31 * 5 = 155+ 5 * '.' = 160 Char per Message
; Date and Time compressed
; Date:
; Month = $31 = 01 to $3C = 12 (sub $30)
; Day = $31 = 01 to $50 = 31 (sub $30)
; Year = $31 = 01 to $XX = xx (sub $30)
; Time: Sec = $30 = 00 to $6F = 59
; $30 = 0 = 0 Sec
; $59 = Y = 41 Sec
; > 59 add $7 -> $61
; $61 = a = 42 Sec
; $72 = r = 59 Sec
;
; Min = $30 = 00 to $6F = 59
; $30 = 0 = 0 Min
; $59 = Y = 41 Min
; > 59 add $7 -> $61
; $61 = a = 42 Min
; $72 = r = 59 Min
;
; Hour = $30 = 00 to $47 = 23 (sub $30)

The last 5 locations format example:
7g<39308965176509391000221472 63.5O139303300176530284000011972 63.5J2392976651765244900230019726 3.52q39307223176516124028711112 63.4pp392971491765381710238213626 3.

To decode the first location:
Time = '7g<' = 07:48:12
Latitude = '39308965' = 3930.8965
Longitude = '176509391' = 17650.9391
Latitude/Longitude Hemisphere = 0 = NE
(0 = NE , 1 = SE , 2 = NW , 3 = SW)
Speed (Knots) = '0022' = 002.2 Knots
Direction = '147' = 147 Degrees
Date = '263' = 02/06/2003

Each location is separated by a dot (.).

3. Confirm Message:

A confirm message will be sent whenever the tracking unit receives a command to update a setting.

The ROVER V9 has 3 Base phone numbers that can be configured to allow configuration setup.

Information that is received from the 3 Base phone numbers is processed as follows:

Base 1: Master Base phone number. Accepts all command messages and update messages. Location request or configuration update messages are sent back to Master Base phone number if unit is configured for SMS only.
In combined working mode **(SMS and GPRS)** the location request or configuration update message is sent back using GPRS.

Base 2: This phone number can be used by the 'End User' to receive a 'Pager' message.
The following message(s) can be displayed:

GEO Fencing Activated
Alarm Activated
PANIC Button Activated
POWER Loss Detected

The message is sent directly from the tracking unit to the Base 2 phone number.

The 'End user' can send the following commands to the tracking unit. **No other commands are accepted.** The commands can be sent in all **small or all capital characters**. No other combinations are accepted.

a) Geo fencing option
Send: '**geo enable**' or '**GEO ENABLE**' to enable GEO fencing.
'**geo disable**' or '**GEO DISABLE**' to disable GEO fencing.

b) Alarm option
Send: '**alarm enable**' or '**ALARM ENABLE**' to enable alarm.
'**alarm disable**' or '**ALARM DISABLE**' to disable alarm.

c) Open car door option

Send: '**open doors**' or '**OPEN DOORS**' to open car doors.

After the message is sent to the tracking unit an 'End User' confirm message will be returned.
'**geo enable CONFIRM**' or '**GEO ENABLED CONFIRM**' when GEO fencing is enabled.
'**geo disable CONFIRM**' or '**GEO DISBLE CONFIRM**' when GEO fencing is disabled.

'**alarm enabled CONFIRM**' or '**ALARM ENABLED CONFIRM**' when alarm is enabled.
'**alarm disabled CONFIRM**' or '**ALARM DISABLED CONFIRM**' when alarm is disabled.

'**open doors CONFIRM**' or '**OPEN DOORS CONFIRM**' when car doors are opened.

The 'End User' will also receive a confirm message if the option is enabled or disabled by the Base 1 or Base 3 phone number.

Base 3: Master Backup Base phone number. Accepts all command messages and update messages. Location request or configuration update messages are sent back to Master Backup Base phone number only.
In combined working mode (SMS and GPRS) the location request or configuration update message is also sent back to Master Backup Base phone number.
When enabled Master Backup phone number can also receive input alarm activation messages (Panic, Geo Fencing, Alarm or Power loss detected) as 'location format' message.

Confirm message format: **05*827,CONFIRM,xx,x1,x2, ,0**

Where xx, x1, x2 etc is the command code setting that has been updated.

The xx can have the following settings:

12,13,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,4ab,5,51,52,53,55,56,57,58,59,6,61,62,63,64,65,66,67,68,69,71,72,73,74,75,76,79,90,91,A0,A1,A2,A3

12 = Unit is configured for SMS messages only. All data is sent using SMS.
13 = Unit will work in combined GPRS and SMS mode.
17 = APN number has been updated.
18 = Real time tracking using saved GPS locations updated.
19 = GPRS sending data mode has been updated (UDP or TCP).
20 = Disable GEO fencing confirm.
21 = Enable GEO fencing confirm
22 = GPRS compression mode updated.
23 = Data sent in SMS if GPRS fails updated.
24 = TCP data mode port updated.
26 = ISP login name for GPRS updated.
27 = ISP password name for GPRS updated.
28 = UDP/TCP packet ID code updated.
29 = Static IP address or domain name for GPRS data updated.
30 = Tracking unit activation updated.
31 = Delay time Alarm input updated.
32 = Delay time power failure updated.
33 = Days battery needs recharge updated.

34 = Delay time GEO fencing updated.
35 = GEO fencing sensitivity updated.
36 = Delay time between alarm messages activated updated.
37 = SOS function updated.
38 = GPS table location updated.
4ab = a can be 1 to 7
b can be 0 to 9

a = 1 = Door Release activated
2 = SOS output activated
3 = Door Release and SOS output activated
4 = Door Release deactivated
5 = SOS output deactivated
6 = Door Release and SOS output deactivated

b= 0 = Leave selected output(Door release or SOS) activated
1 to 8 time(seconds) to activate Door release or SOS output
9 = Activate for 30 seconds only

Any combination of a and b is possible.
Sample:
05*827,CONFIRM,411,0
05*827,CONFIRM,438,0

5 = Master Base phone number updated
51 = GPRS Operating system, Configuration file and GPS location table UDP port updated.
52 = ADC settings updated.
53 = Base 2 phone number updated.
55 = Custom message settings for Base 2 updated.
56 = SMSC number updated.
57 = Master Backup Base phone number updated.
58 = Messages to Master Backup Base updated.
59 = I-Button status updated.
6 = Time between GPS readings updated.
61 = GEO fencing area settings updated.
62 = GEO fenced area updated.
63 = AUX1 input settings updated.
64 = Speed settings updated.
65 = 24 hours status setting updated.
66 = Real time tracking interval settings OFFLINE updated.
67 = Panic input settings updated.
68 = Vibration sensitivity settings updated.
69 = Input voltage settings updated.
71 = Alarm output activated without delay.
72 = Alarm output will activate when GSM signal and Valid GPS location.
73 = Alarm output deactivated.
74 = Reset tracking system activated.
75 = Alarm input activates on high and low signal.
76 = Alarm input activates on Pulse counting.
79 = Real time tracking interval settings ONLINE updated
90 = Tracking unit disabled.
91 = Tracking unit enabled.

A0 = Command from other Base phone numbers updated.
A1 = Security ID code updated.
A2 = GPRS connected in sleep mode updated.
A3 = Real time tracking when roaming updated.

Serial port data sending using the GSM Modem:

Serial port data sending allows any external device to use the tracking units as communication interface. As the tracking unit has the TCP/IP protocol build in the external device does not require the protocol to send and receive data using the Internet to or from any location in the world.
Simple 'AT' commands are used for all communication.

Serial port data sending:
Tracking unit must have credits to access the modem using the serial port for SMS and GPRS mode(s).
Send "S". (Capital "S")
Wait for "OK+<mode - 1 byte>" **(mode is 0 when in SMS only mode and 1 if in SMS and GPRS mode)**

Then send 4 digit password + CR ($0D).
Wait for ">" + CR($0D) + LF($0A).

The serial port has now 'direct' access to the GSM modem. Baud speed is set at 9600 and cannot be changed. Only 'AT' commands are allowed, no connection to the internet using dial-up is allowed on this port.
The tracking unit will monitor the port for data communication.
Type 'AT COMSTOP' or 'at comstop' to disconnect.

Type 'at status' or 'AT STATUS'

This command will report current status and GPS location.

Example:

< Connected using 'S' command>

>
at status < CR>
05*850,000,L001,A,2459.3640,N,12125.2958,E,000.0,224.8,00.8,07:47:26 09-09-05,9.00,D3,0,C4,1

When connected using the 'Serial port data sending' the GPS module is automatically powered on if the tracking unit is in 'sleep' mode.

If no data is send (from the serial port to the modem) for more then 60 seconds the port will automatic disconnect.
During connection the tracking unit cannot send or process any data.

Please note:
In SMS only mode the unit will send all data using SMS. In SMS and GPRS mode the unit will send all data using GPRS.
The unit still processes SMS messages when connected to the GPRS network. The unit can process and send SMS messages without disconnecting from the GPRS network.

Priority of Messages:

As your tracking system processes many inputs and outputs there are several outputs and inputs that have priority above others.
In general:

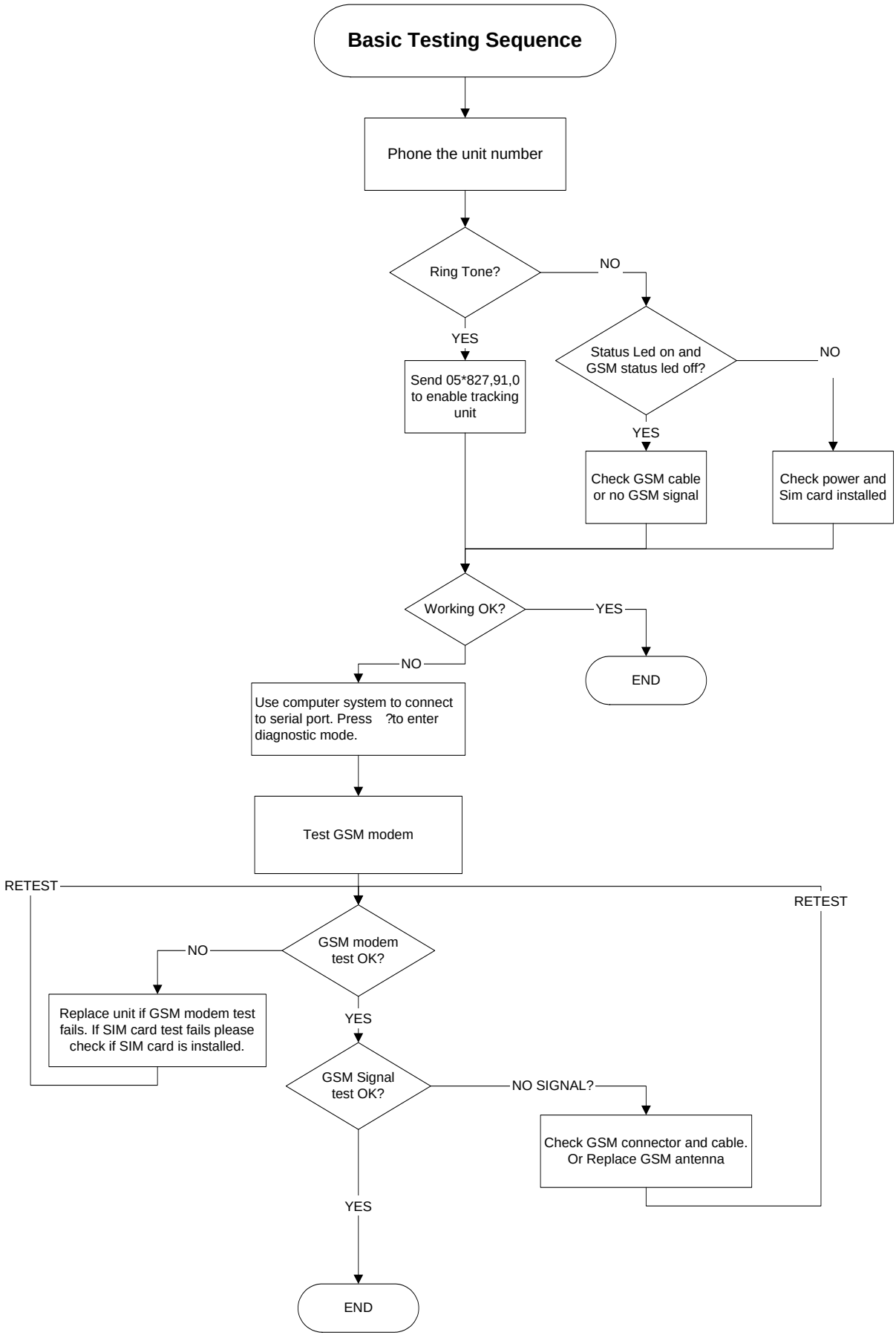
Panic Button – First Priority
Alarm input – Second Priority

All others have the same priority, but reporting of the activation may depend on what input has activated first if several inputs are activated at the same time.

This priority setup may delay messages that have less priority.

When changing operating mode from 'SMS Only' to 'SMS+GPRS' the current active commands are completed first before changing operating mode.

Basic testing and problem solving:



10. GPRS TESTING

Using the direct connection to the GSM modem (in test mode under ‘Hyperterminal).

1. Check GSM signal

AT+CSQ <Enter>

Example: +CSQ: 21,0

2. Check SIM card registered

AT+CREG?

Example: +CREG:0,1 (registered Home network)

3. Check network connected

AT+COPS?

Example: +COPS: 0,0,"CHINA MOBILE"

4. Set APN (AT + CSTT)

AT + CSTT = “APN”[,”ID”, “password”]

Ex.

at + cstt = “internet” <Enter> (Chun Huw, TCC)

at + cstt = “FETNet01” <Enter> (FET)

5. Attach to GPRS network (AT + CIICR)

AT + CIICR <Enter>

6. Get local IP address assign by GPRS Network（AT + CIFSR）

AT + CIFSR <Enter>

7. Start TCP/UDP connection (AT+CIPSTART)

AT + CIPSTART = ”Mode”,”IP”,”Port”

Mode =TCP”or”UDP”

IP =remote server IP address

Port =remote server port

Example.

at + cipstart = “TCP”,”192.168.100.1”,”1234” <Enter>

8. DATA Send (AT+CIPSEND)

AT + CIPSEND <Enter> (Send data out by Ctrl-z)

>DATA

Ctrl Z

AT + CIPSEND = <length> <Enter> (setup Length of data and send out automatically)

9. Close connection(AT + CIPCLOSE)

AT + CIPCLOSE <Enter>

10. Shut down connect (AT + CIPSHUT)

AT+CIPSHUT<Enter>

(Enter ‘at comstop’ to return to main menu)

11. AT COMMANDS FOR GPRS SUPPORT

Detailed Descriptions of commands
AT Commands For (TCP/UDP)

8 AT Commands for TCPIP Application Toolkit

8.1 Overview

Command	Description
AT+CIPSTART	START UP TCP OR UDP CONNECTION
AT+CIPSEND	SEND DATA THROUGH TCP OR UDP CONNECTION
AT+CIPCLOSE	CLOSE CONNECTION
AT+CIPSHUT	DEACTIVATE GPRS PDP CONTEXT
AT+CLPORT	SET LOCAL PORT
AT+CSTT	SET APN, USER NAME, PASSWORD
AT+CIICR	BRING UP WIRELESS CONNECTION WITH GPRS OR CSD
AT+CIFSR	GET LOCAL IP ADDRESS
AT+CIPSTATUS	QUERY CURRENT CONNECTION STATUS
AT+CDNSCFG	CONFIGURE DOMAIN NAME SERVER
AT+CDNSGIP	QUERY IP ADDRESS OF GIVEN DOMAIN NAME
AT+CDNSORIP	CONNECT WITH IP ADDRESS OR DOMAIN NAME SERVER
AT+CIPHEAD	ADD AN IP HEADER WHEN RECEIVING DATA
AT+CIPATS	SET AUTO SENDING TIMER
AT+CIPSPRT	SET PROMPT OF '>' WHEN SENDING DATA
AT+CIPSERVER	CONFIGURE AS SERVER
AT+CIPCSGP	SET CSD OR GPRS FOR CONNECTION MODE
AT+CIPCCON	CHOOSE CONNECTION
AT+CIPFLP	FIX LOCAL PORT
AT+CIPSRIP	SHOW WHERE RECEIVED DATA FROM
AT+CIPDPDP	SET WHETHER CHECK STATE OF GPRS NETWORK TIMING
AT+CIPSCONT	SAVE TCPIP APPLICATION CONTEXT
AT+CIPMODE	SELECT TCPIP APPLICATION MODE
AT+CIPCCFG	CONFIGURE TRANSPARENT TRANSFER MODE

8.2 Detailed Descriptions of Commands

8.2.1 AT+CIPSTART Start up TCP or UDP connection

AT+CIPSTART	Start up TCP or UDP connection
Test command +CIPSTART=?	Response +CIPSTART: (list of supported <mode>),(IP address range),(port range) <CR><LF>+CIPSTART: (list of supported <mode>),(domain name),(port

	range) OK Parameter See set command
Set command +CIPSTART=<mode>,[<IP address>,<domain name>],<port>	Response If format is right response OK, otherwise response ERROR If connect successfully response CONNECT OK Otherwise STATE:<state> CONNECT FAIL Parameter <mode> a string parameter which indicates the connection type "TCP" Establish a TCP connection "UDP" Establish a UDP connection <IP address> remote server IP address <port> remote server port <domain name> remote server domain name <state> a string parameter which indicates the progress of connecting 0 IP INITIAL 1 IP START 2 IP CONFIG 3 IP IND 4 IP GPRSACT 5 IP STATUS 6 TCP/UDP CONNECTING 7 IP CLOSE 8 CONNECT OK
Reference	Parameter

8.2.2 AT+CIPSEND Send data through TCP or UDP connection

AT+CIPSEND Send data through TCP or UDP connection	
Test command +CIPSEND=?	Response OK
Execution command +CIPSEND response"> ", then type data for send, tap CTRL+Z to send	Response This command is used to send changeable length data. If connection is not established or disconnection: ERROR If sending successfully: SEND OK If sending fail: SEND FAIL

	Note This command is used to send data on the TCP or UDP connection that has been established already. Ctrl-Z is used as a termination symbol. There are at most 1024 bytes that can be sent at a time.
Set command +CIPSEND=<data_length>	Response This command is used to send fixed length data. If connection is not established or disconnect: ERROR If sending successfully: SEND OK If sending fail: SEND FAIL Parameter <data_length> a numeric parameter which indicates the length of sending data, it must less than 1024
Reference	Note 1. There are at most 1024 bytes that can be sent each time. 2. Set the time that send data automatically with the command of AT+CIPATS. 3. Only send data at the status of established connection, otherwise Response ERROR

8.2.3 AT+CIPCLOSE Close TCP or UDP Connection

AT+CIPCLOSE	Close connection
Test command +CIPCLOSE=?	Response +CIPCLOSE: OK
Execution command +CIPCLOSE	Response If close successfully: CLOSE OK If close fail: ERROR
Reference	Note AT+CIPCLOSE only close connection at the status of TCP/UDP CONNECTING or CONNECT OK， otherwise response ERROR, after close the connection, the status is IP CLOSE

8.2.4 AT+CIPSHUT Disconnect wireless connection

AT+CIPSHUT	Disconnect wireless connection

Test command +CIPSHUT=?	Response +CIPSHUT: OK
Read command +CIPSHUT?	Response +CIPSHUT: OK
Execution command +CIPSHUT	Response If close successfully: SHUT OK If close fail: ERROR Note Except at the status of IP INITIAL, you can close moving scene by AT+CIPSHUT. After closed, the status is IP INITIAL.
Reference	Note

8.2.5 AT+CLPORT Set local port

AT+CLPORT Set local port	
Test command +CLPORT=?	Response +CLPORT: (list of supported <port>s) Parameter See set command
Read command +CLPORT?	Response <mode>:<port> <CR><LF><mode>:<port> Parameter See set command
Set command +CLPORT=<mode>,<port>	Response OK ERROR Parameter <mode> a string parameter which indicates the connection type "TCP" TCP local port "UDP" UDP local port <port> a numeric parameter which indicates the local port
Reference	Note

8.2.6 AT+CSTT START task and Set APN、USER ID、PASSWORD

AT+CSTT Start task and Set APN、USER ID、PASSWORD	
Test command +CSTT=?	Response +CSTT: "APN","USER","PWD"

	OK
Read command +CSTT?	Response +CSTT: <apn>,<user id>,<password> OK Parameter See set command
Set command +CSTT=<apn>,<user id>,<password>	Response OK ERROR Parameter <apn> a string parameter which indicates the GPRS access point name <user id> a string parameter which indicates the GPRS user name <password> a string parameter which indicates the GPRS password
Execution Command +CSTT	Response OK ERROR
Reference	Note

8.2.7 AT+CIICR Bring up wireless connection with GPRS or CSD

AT+CIICR Bring up wireless connection with GPRS or CSD	
Test command +CIICR=?	Response OK
Execution command +CIICR	Response OK STATE: <state> ERROR Parameter <state> referred to AT+CIPSTART
Reference	Note AT+CIICR only activate moving scene at the status of IP START， after operate this command, the state changed to IP CONFIG. If module accept the activate operation, the state changed to IP IND; after module accept the activate operation, if activate successfully, the state changed to IP GPRSACT, response OK, otherwise response ERROR.

8.2.8 AT+CIFSR Get local IP address

AT+CIFSR Get local IP address	
Test command +CIFSR=?	Response +CIFSR: OK

Read command +CIFSR?	Response +CIFSR: OK
Execution command +CIFSR	Response <IP address> OK ERROR Parameter <IP address> a string parameter which indicates the IP address assigned from GPRS or CSD
Reference	Note Only at the status of activated the moving scene: IP GPRSACT、TCP/UDP CONNECTING、CONNECT OK、IP CLOSE can get local IP Address by AT+CIFSR, otherwise response ERROR.

8.2.9 AT+CIPSTATUS Query current connection status

AT+CIPSTATUS	**Query current connection status**
Test command +CIPSTATUS=?	Response +CIPSTATUS: OK
Read command +CIPSTATUS?	Response +CIPSTATUS: OK
Execution command +CIPSTATUS	Response STATE: <state> OK Parameter <state> referred to AT+CIPSTART
Reference	Note

8.2.10 AT+CDNSCFG Configure domain name server

AT+CDNSCFG	**Configure domain name server**
Test command +CDNSCFG=?	Response +CDNSCFG: ("(0,255).(0,255).(0,255).(0,255)"),("(0,255).(0,255).(0,255).(0,255)") OK
Read command +CDNSCFG?	Response +CDNSCFG: ("PRIMARY DNS"),("SECONDARY DNS")

Set command +CDNSCFG=<pri_dns>,<sec_dns>	Response OK ERROR Parameter <pri_dns> a string parameter which indicates the IP address of the primary domain name server <sec_dns> a string parameter which indicates the IP address of the secondary domain name server
Reference	Note

8.2.11 AT+CDNSGIP Query the IP address of given domain name

AT+CDNSGIP	Query the IP address of given domain name
Test command +CDNSGIP=?	Response +CDNSGIP: DOMAIN NAME LENGTH(0,100) OK
Read command +CDNSGIP?	Response +CDNSGIP: ("DOMAIN NAME") ok
Set command +CDNSGIP=<domain name>	Response OK ERROR If successful, return: <IP address> If fail, return: ERROR: <error code> STATE: <state> Parameter <domain name> a string parameter which indicates the domain name <IP address> a string parameter which indicates the IP address corresponding to the domain name <error code> a numeric parameter which indicates the error code 1 DNS not Authorization 2 invalid parameter 3 network error 4 no server 5 time out 6 no configuration 7 no memory <state> refer to AT+CIPSTART
Reference	Note

8.2.12 AT+CDNSORIP Connect with IP address or domain name server

AT+CDNSORIP	Connect with IP address or domain name server
Test command +CDNSORIP=?	Response +CDNSORIP: (list of supported <mode>s) OK Parameter See set command
Read command +CDNSORIP?	Response +CDNSORIP: <mode> OK Parameter See set command
Set command +CDNSORIP=<mode>	Response OK ERROR Parameter <mode> a numeric parameter which indicates whether connecting with IP address server or domain name server 0 remote server is an IP address 1 remote server is a domain name
Reference	Note

8.2.13 AT+CIPHEAD Add an IP head when receiving data

AT+CIPHEAD	Add an IP head when receiving data
Test command +CIPHEAD=?	Response +CIPHEAD: (list of supported <mode>s) Parameter See set command
Read command +CIPHEAD?	Response +CIPHEAD: <mode> Parameter See set command
Set command +CIPHEAD=<mode>	Response OK ERROR Parameter <mode> a numeric parameter which indicates whether adding an IP header to received data or not 0 not add IP header 1 add IP header, the format is "+IPD(data length):"

Reference	Note

8.2.14 AT+CIPATS Set auto sending timer

AT+CIPATS Set auto sending timer	
Test command +CIPATS=?	Response +CIPATS: (list of supported <mode>s) OK Parameter See set command
Read command +CIPATS?	Response +CIPATS: <mode> Parameter See set command
Set command +CIPATS=<mode>,<time>	Response OK ERROR Parameter <mode> a numeric parameter which indicates whether set timer when sending data 0 not set timer when sending data 1 Set timer when sending data <time> a numeric parameter which indicates the seconds after which the data will be sent
Reference	Note

8.2.15 AT+CIPSPRT Set prompt of '>' when sending data

AT+CIPSPRT Set prompt of '>' when sending data	
Test command +CIPSPRT=?	Response +CIPSPRT: (<send prompt>) Parameter See set command
Read command +CIPSPRT?	Response +CIPSPRT: <send prompt> Parameter See set command
Set command +CIPSPRT=<send prompt>	Response OK ERROR Parameter <send prompt> a numeric parameter which indicates whether echo prompt

	'>' after issuing AT+CIPSEND command 0 no prompt and show "send ok" when send successfully 1 echo '>' prompt and show "send ok" when send successfully 2 no prompt and not show "send ok" when send successfully
Reference	Note

8.2.16 AT+CIPSERVER Configure as a server

AT+CIPSERVER Configure as a server	
Read command +CIPSERVER?	Response <mode> OK Parameter <mode> 0 has not been configured as a server 1 has been configured as a server
Execution command +CIPSERVER	Response OK ERROR If configuration as server success, return: SERVER OK If configuration as server fail, return: STATE:<state> CONNECT FAIL Parameter <state> refer to AT+CIPSTART
Reference	Note

8.2.17 AT+CIPCSGP Set CSD or GPRS connection mode

AT+CIPCSGP Set CSD or GPRS for connection mode	
Test command +CIPCSGP=?	Response +CIPCSGP: (list of supported connection <mode>s),[(GPRS parameters <apn>,<user name>,<password>),(CSD parameters <dial number>,<user ID>,<password>,<rate>)] OK Parameter See set command
Read command +CIPCSGP?	Response +CIPCSGP: <mode> OK Parameter See set command
Set command	Response

+CIPCSGP=<mode>,[(<apn>, <user name >, <password>), (<dial number>,<user ID>,<password>, <rate>)]	OK ERROR Parameter <mode> a numeric parameter which indicates the wireless connection mode 0 set CSD as wireless connection mode 1 set GPRS as wireless connection mode GPRS parameters: <apn> a string parameter which indicates the access point name <user name> a string parameter which indicates the user name <password> a string parameter which indicates the password CSD parameters: <dial number> a string parameter which indicates the CSD dial numbers <user ID> a string parameter which indicates the CSD USER ID <password> a string parameter which indicates the CSD password <rate> a numeric parameter which indicates the CSD connection rate
Reference	Note

8.2.18 AT+CIPCCON Choose connection

AT+CIPCCON	Choose connection
Test command +CIPCCON=?	Response +CIPCCON: (list of supported <connection>s) OK Parameter See set command
Read command +CIPCCON?	Response <connection> OK Parameter See set command
Set command +CIPCCON=<connection>	Response OK ERROR Parameter <connection> a numeric parameter which indicates the chosen connection 1 choose connection as client 2 choose connection as server Note that there may exist two connections at one time: one connection is as client connecting with remote server, the other connection is as server connecting with remote client. Using this command to choose through

	which connection data is sent.
Reference	Note

8.2.19 AT+CIPFLP Set whether fix the local port

AT+CIPFLP Set whether fix the local port	
Test command +CIPFLP=?	Response +CIPFLP: (list of supported <mode>s) Parameter See set command
Read command +CIPFLP?	Response +CIPFLP: <mode> OK Parameter See set command
Set command +CIPFLP=<mode>	Response OK ERROR Parameter <mode> a numeric parameter which indicates whether increasing local port automatically when establishing a new connection 0 do not fix local port, increasing local port by 1 when establishing a new connection 1 fix local port, using the same port when establishing a new connection Note that in default mode, the local port is fixed. It can speed up the connection progress if setting to not fixed local port when establishing a new connection after closing previous connection.
Reference	Note

8.2.20 AT+CIPSRIP Set whether display IP address and port of sender when receive data

AT+CIPSRIP Set whether display IP address and port of sender when receive data	
Test command +CIPSRIP=?	Response +CIPSRIP: (list of supported <mode>s) OK Parameter See set command
Read command	Response

+CIPSRIP?	<mode>: OK Parameter See set command
Set command +CIPSRIP=<mode>	Response OK ERROR Parameter <mode> a numeric parameter which indicates whether show the prompt of where the data received are from or not before received data. 0 do not show the prompt 1 show the prompt, the format is as follows: RECV FROM:<IP ADDRESS>:<PORT> Note that the default mode is not to show the prompt.
Reference	Note

8.2.21 AT+CIPDPDP Set Whether Check State Of GPRS Network Timing

AT+CIPDPDP Set Whether Check State Of GPRS Network Timing	
Test command +CIPDPDP =?	Response +CIPDPDP:(list of supported< mode>s) OK Parameter See set command
Read command +CIPDPDP?	Response +CIPDPDP:<mode>,<interval>,<timer> +CIPCPCP: 0 OK Parameter See set command
Set command +CIPDPDP=<mode>,<interval>,<timer>	Response OK ERROR Parameter <mode> 0 not set detect PDP 1 set detect PDP <interval> 0<interval<=180(ms) <timer> 0<timer<=255

Reference	Note

8.2.22 AT+CIPSCONT Save TCPIP Aplicaton Context

AT+CIPSCONT Save TCPIP Application Context	
Read command AT+CIPSCONT?	Response TA returns TCPIP Application Context, which consists of the following AT Command parameters. SHOW APPTCPIP CONTEXT +CDNSORIP:<mode> +CIPSPRT:< sendprompt> +CIPHEAD:<iphead> +CIPFLP:<flp> +CIPSRIP:<srip> +CIPCSGP:<csgp> Gprs Config APN:<apn> Gprs Config UserId:<gusr> Gprs Config Password:<gpwd> Gprs Config inactivityTimeout:<timeout> CSD Dial Number:<cnum> CSD Config UserId:<cusr> CSD Config Password:<cpwd> CSD Config rate:<crate> +CIPDPDP:<dpdp> Detect PDP Inerval:<int> Detect PDP Timer:<timer> OK

	Parameters <mode> see AT+CDNSORIP <sendprompt> see AT+CIPSPRT <iphead> see AT+CIPHEAD <flp> see AT+CIPFLP <srip> see AT+CIPSRIP <csgp> see AT+CIPCSGP <apn> see AT+CIPCSGP <gusr> see AT+CIPCSGP <gpwd> see AT+CIPCSGP <timeout> see AT+CIPCSGP <cnum> see AT+CIPCSGP <cusr> see AT+CIPCSGP <cpwd> see AT+CIPCSGP <crate> see AT+CIPCSGP <dpdp> see AT+CIPDPDP <int> see AT+CIPDPDP <timer> see AT+CIPDPDP
Set command AT+CIPSCONT	Response TA saves TCPIP Application Context which consist of following AT command parameters, and when system is rebooted, the parameters will be loaded automatically: AT+CDNSORIP, AT+CIPSPRT, AT+CIPHEAD, AT+CIPFLP,AT+CIPSRIP, AT+CIPCSGP, AT+CIPDPDP **OK**
	Parameter

8.2.23 AT+CIPMODE Select TCPIP Application mode

AT+CIPMODE Select TCPIP Application mode	
Test command +CIPMODE=?	Response +CIPMODE: (0,1) OK
Read command +CIPMODE?	Response +CIPMODE: <mode> OK Parameter See set command
Set command +CIPMODE=<mode >	Response OK ERROR

	Parameter <mode> 0:command mode 1:transparent transfer mode
Execution Command +CIPMODE	Response ERROR
Reference	Note

8.2.24 AT+CIPCCFG Configure Transparent Transfer mode

AT+CIPCCFG Configure Transparent Transfer Mode	
Test command +CIPCCFG=?	Response +CIPCCFG: <3-8>,<2-10>,<256-1024>,<0,1> OK
Read command +CIPCCFG?	Response +CIPCCFG: <NmRetry>,<WaitTm>,<SendSz>,<esc> OK Parameter See set command
Set command +CIPCCFG=<NmRetry>,<WaitTm>,<SendSz>,<esc>	Response OK ERROR Parameter <NmRetry> number of retries to be made for an IP packet. <WaitTm> number of 200ms intervals to wait for serial input before sending the packet. <SendSz> size in bytes of data block to be received from serial port before sending. <esc> whether turn on the escape sequence, default is TRUE.
Execution Command +CIPCCFG	Response ERROR
Reference	Note

Receiving and sending GPRS data:

The GPRS data format for sending is identical to the message format sent using SMS except that the GPRS has a 'header' string at the start off the message. This is for all GPRS data including the 'CONFIRM' and multiple location message.
The 'header string' is the IMEI number from the tracking unit GSM modem. The IMEI number is displayed on the tracking unit or is shown when you exit the diagnostic main menu using 'Hyperterminal'.

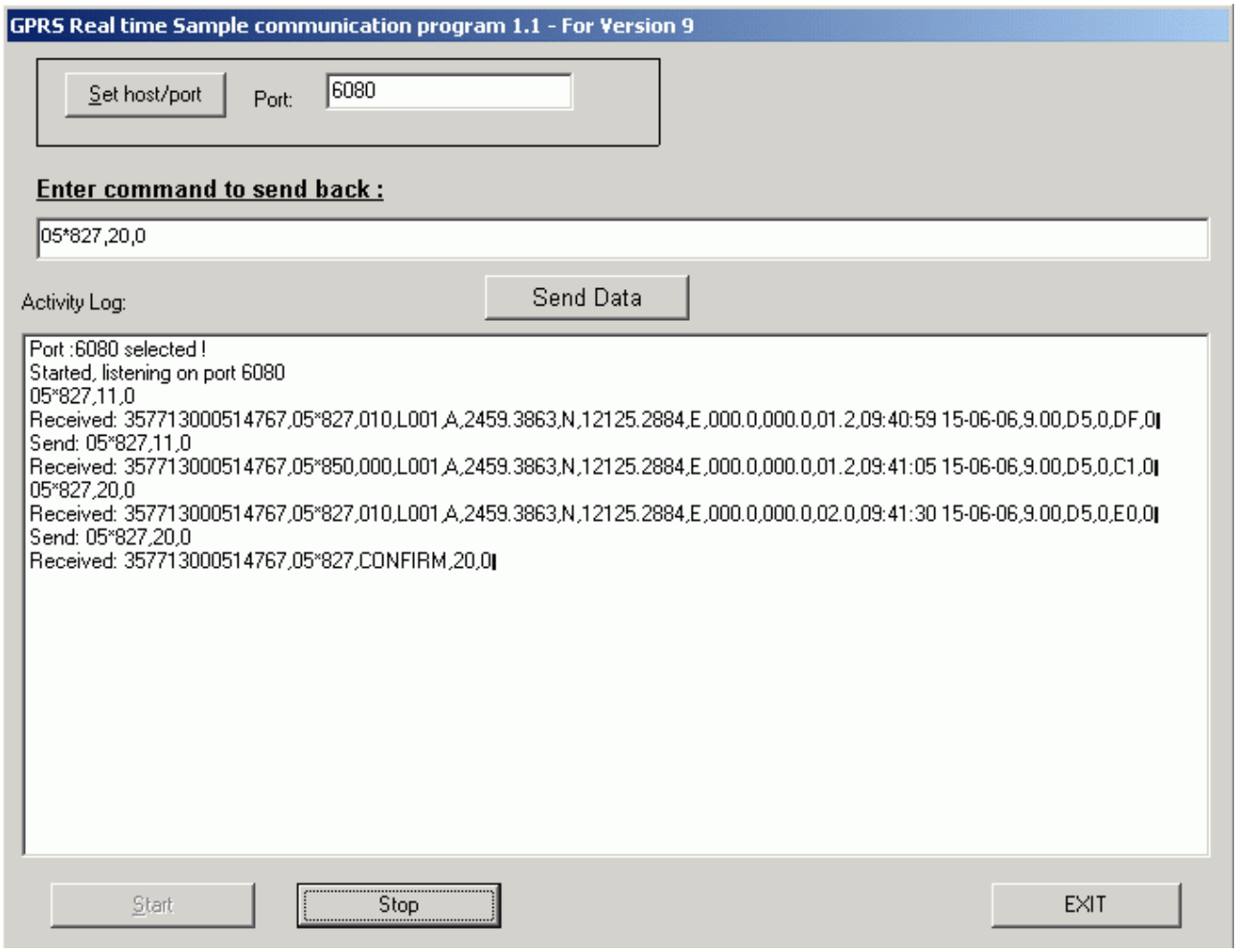
Any command message(s) can also be sent to the tracking unit in GPRS mode.
The message(s) must be send within 2 seconds after any message is received in GPRS mode. The command(s) messages as identical to the messages sent using SMS.

Sample data string received in GPRS mode (without compression):
<IMEI number>,05*850,000,L001,A,2459.3640,N,12125.2958,E,000.0,224.8,00.8,07:47:26 09-09-05,9.00,D3,0,C4,1

Sample data string received in GPRS mode (with compression):
<IMEI number>,05*850000L001A24593640N121252958E000022480080747260909059 00D30C41

For simple testing you can use the 'receive.exe' sample program. This program will receive data from the tracking unit. To receive data from the unit in GPRS you must have a 'static IP address'. Data from the unit can be sent in UDP or TCP format. In general TCP data format will use more communication data and therefore the cost when using GPRS will be higher.
When using UDP format the tracking unit cannot check if the data has been received correctly. The UDP format uses less communication data and will be cheaper to use.

Sample data received using 'realGPRS.exe' (without compression):



GPRS errors:

The serial port will output any errors when connection or sending data in GPRS mode.

Rover V9 Connections

I-Button:

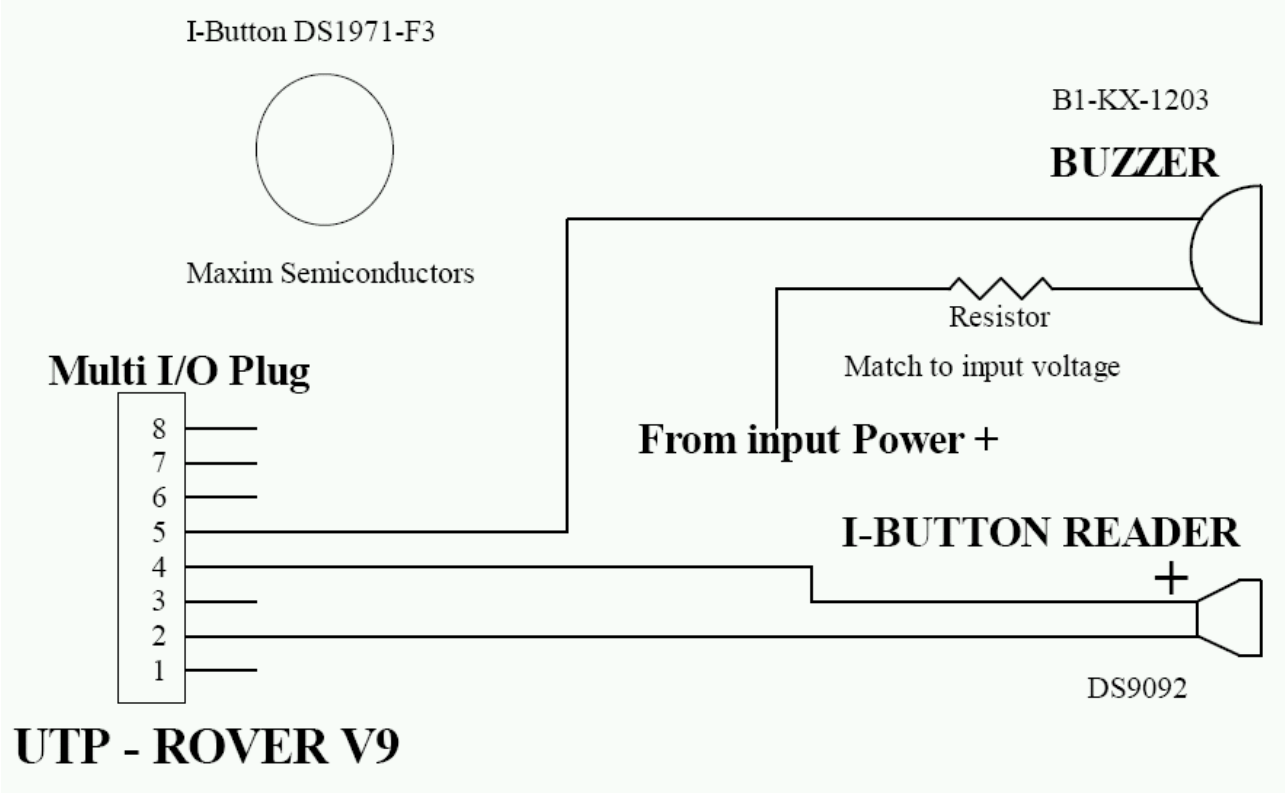
For driver identification the ‘DALLAS I-button’ can be used.
The Rover V9 has been tested and is working using the DS1971-F3 and DS1990A-F5 I-button. It may also work with other I-buttons, but has NOT been tested (so it is possible that it may NOT work).

You will require the I-button and the I-button reader.

I-Button Reader

I-Button

They must be connected as shown.



Any type off buzzer can be used, but current to the buzzer must be less then 30 mA or it will damage your tracking unit!

The I-button can be enabled using the configuration menu or use new command code '59'.

The Rover V9 will read the I-button when the GEO fencing input LED is flashing. We suggest connecting the GEO fencing input to the car ignition. So every time the driver removes the keys from the ignition the GEO LED will start flashing after the GEO fencing delay time.
Once the GEO fencing LED starts flashing the Rover V9 will check for I-button. You will hear 2 short beeps from the buzzer after reading the I-button.
Once the I-button has been read it stays in memory until you disable and enable GEO fencing again and the GEO fencing LED starts flashing.
If you forget to use the I-button when you start the vehicle and GEO fencing LED was flashing the buzzer will generate for 30 seconds a single on/off beep tone. During this time the Rover V9 will read the I-button. Once the beeping stops it will stop reading the I-button until GEO fencing LED starts flashing again.

The I-button ID is added to the end off the single location message if enabled. Default (or no I-button ID is read) is : 00000000000000 (14 digital numbers).
The I-button ID is only added to the message if enabled.

Example messages:

05*827,000,L001,A,3500.6644,S,17231.4500,E,000.0,068.4,01.0,01:50:34 18-05-06,9.00,D8,0,FF,0,00000152231214

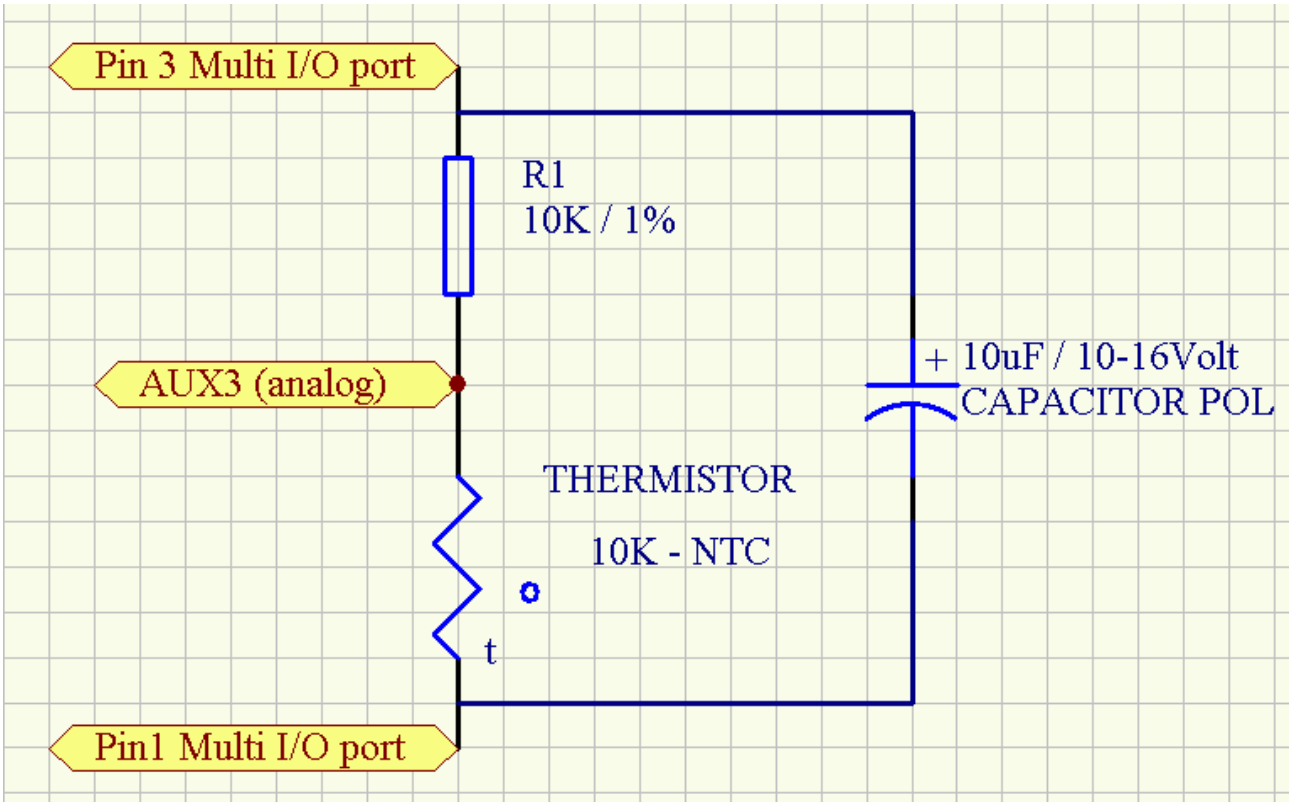
ID button: 00000152231214

05*827,000,L001,A,3440.2344,S,17343.2200,E,000.0,068.4,01.2,01:49:37 18-05-06,9.00,D9,0,FF,0,00000000000000

ID button: 00000000000000

Please note:
In most cases the Rover V9 will read the I-button within a few seconds except if the unit is sending data or any other inputs are activated (like Panic input). In this case it will take longer to read the I-button.

Measuring temperature using the AUX3 input:



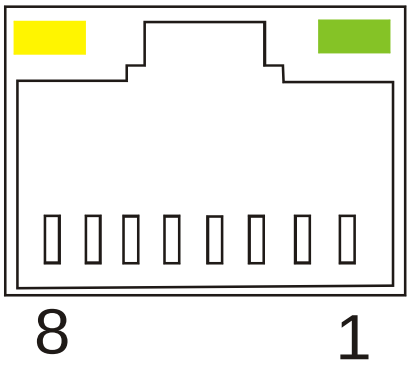
The AUX3 input voltage will change when the temperature changes. Most Thermistors are at normal resistance (in above example we use 10 K) at 25 degrees. So in our example that will be 10K.
The input voltage to AUX3 will then be 1.27 Volt (ADC value will be 128 decimal or 80 hex).

The input voltage is always included in the 'location message' and can be configured to activate below or above set value.

Multi I/O pinout

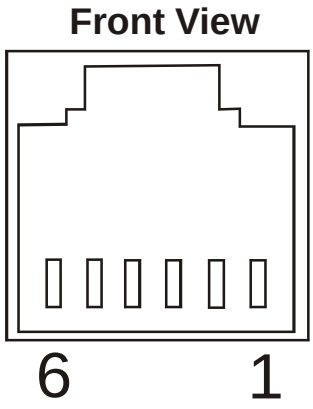
ROVER V9 UTP connection (MULTI PORT)

Front View



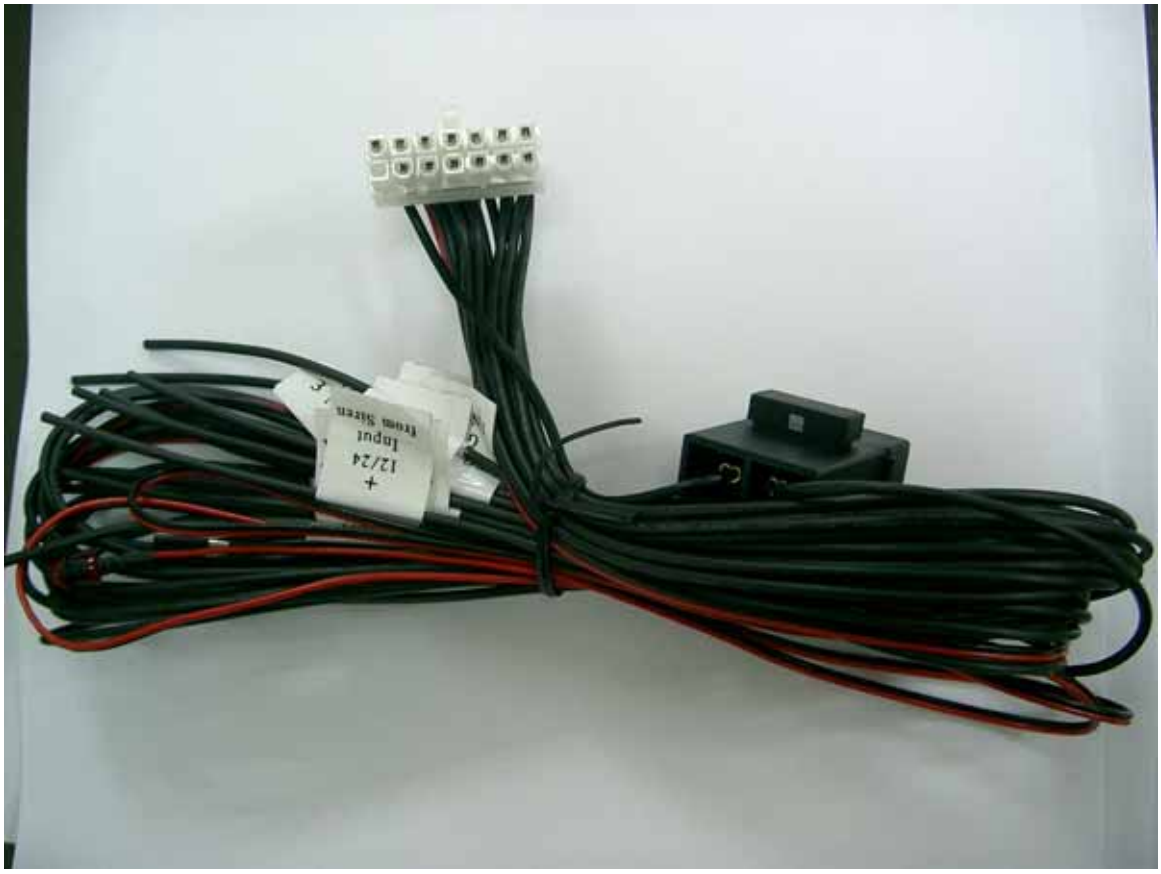
1 = GND
2 = GND (I-BUTTON)
3 = Vout +3.3Volt
4 = I-BUTTON (+)
5 = Buzzer (I-Button) - Negative
6 = Serial out RS232 (9600 Baud)
7 = Serial in RS232 (9600 Baud)
8 = Serial out RS232 - GPS data

Voice port pinout



1 = Mic input negative
2 = Mic input positive
3 = Speaker output negative)
4 = Speaker output positive
5 = NC
6 = Vin power (directly from I/O connector)
Has only power when voice is detected.

I/O cable



I/O Cable pin out

1- Vin (Power input +)-connect to DC+12v

2- GND

3- Panic Input - activated by connecting to ground.

4- Door Release output-connect to GND pin of device

5- GEO fencing LED output -connect to GND pin of device

6- SOS output -connect to GND pin of device

7- Alarm output -connect to GND pin of device

8- Voltage negative input - activated by connecting to ground

9- Voltage positive input - activated by connecting to DC+12v

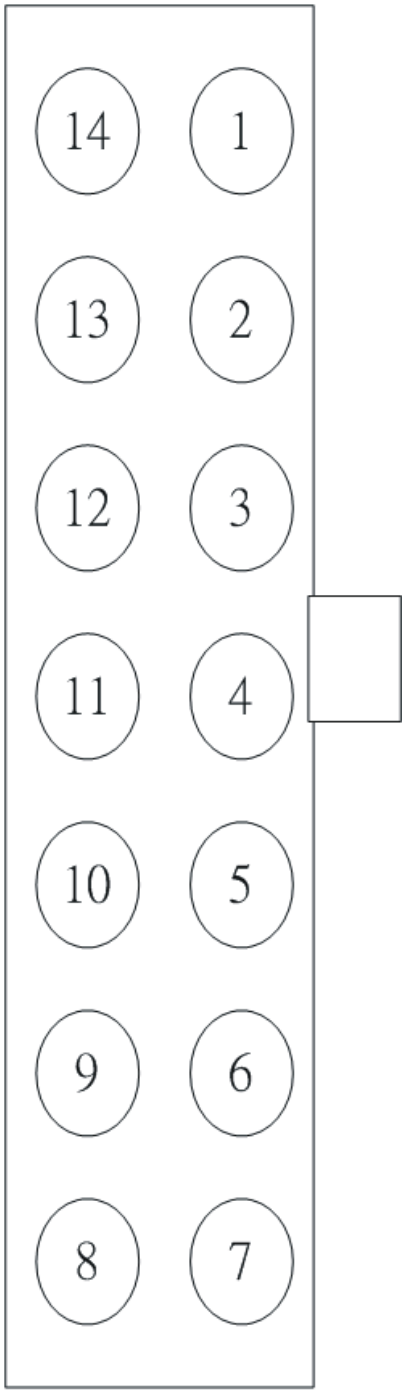
10- GEO fencing input - activated by connecting to ground

11- AUX1 input - activated by connecting to DC+12v

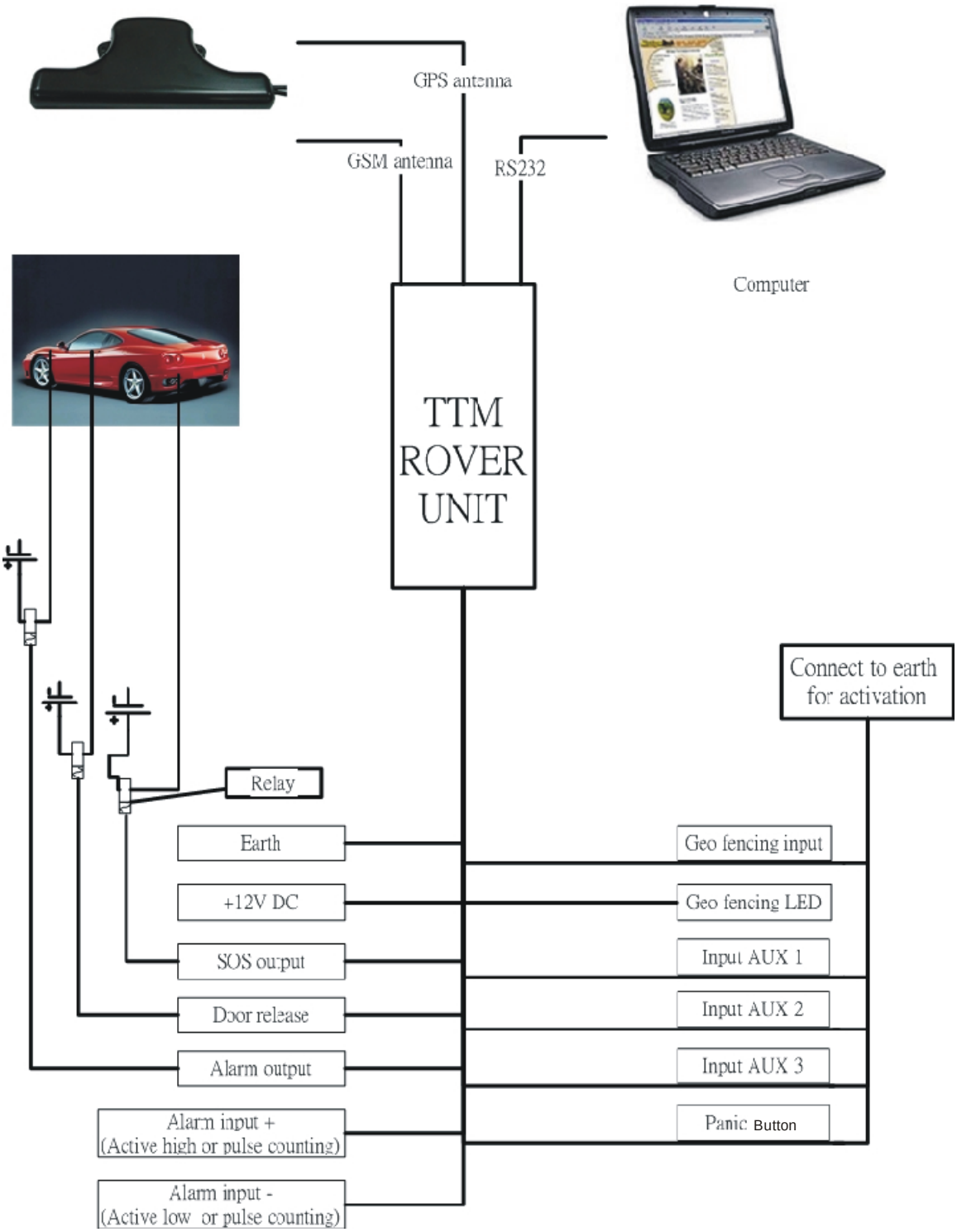
12- AUX2 input - activated by connecting to ground

13- AUX3 input (Analog max +3.3 Volt) - activated by connecting to +

14- NC



Installation



Note: the connector on the cable is designed so it can only attach to the PCB board connector one way. It cannot be connected incorrectly.

+12 Volt –input power for the unit must be in the range of +6 to +36 volts for the unit to operate correctly. **A direct connection to the vehicles fuse box is best.** There is a fuse on this cable to protect the power input on the unit.
Earth (GND)–connected to car chassis ground
Geo fencing Input neg - Enables GEO fencing. Whenever this input is low GEO fencing has been enabled automatically. This input can be connected to the ignition. If the vehicle is moved faster than 5 km/h with the GEO fencing enabled the Rover unit will automatically send an alarm message that the vehicle has left the GEO fenced area.
Auxiliary Input 1- When selected activates the ROVER when High. See command code **'30,x,'** for explanation.
Auxiliary Input 2– Activated by connecting to ground.
Auxiliary Input 3– (Analog max +3.3 Volt)-activated by connecting to +
Door release neg- –0.2 Amp pulse output. Connect through a relay to open car doors!
Geo fencing LED –connect to an LED on dash to indicate status of Geo fencing input ON/OFF. **Comes already wired up**.
SOS (neg – output) –connect through a **relay (max 200mAmp)** to brake/reverse lights
Panic (neg - input) –connect to a **push button switch**
Alarm Input Neg (Input from Siren neg -) Connect to Siren output from existing vehicle alarm system if trigger is active low –continuous active low or pulse counting to activate.
Alarm input Pos (Input from Siren pos +) Connect to Siren output from existing vehicle alarm system if trigger is active high –continuous active high or pulse counting
Alarm Output (neg -) –connect through a relay **(max 200mAmp)** to starter/fuel pump or existing immobilisers.

Basic installation guideline:
To install the tracking unit in any vehicle we recommend you understand the basic requirements that are needed. The tracking unit GPS and GSM aerial need to be installed correctly with the GPS aerial facing up to the sky view and the GSM aerial as close as possible to any car window. Any metal above the GPS will block or reduce the GPS signal. Please do not cut, extend or bend the GPS or GSM cable. Doing so will reduce the performance.

Any outputs from the unit (open car doors, disable engine etc) will require a relay. All outputs from the tracking unit are active low.
Any inputs (**except the Analog input**) can be connected to any power input from 0 to +60VDC) . Inputs are normally activated by low (negative < 1 volt DC) signal except the alarm positive input connection.
The positive alarm input must be more then +5 volt DC to be activated. Below this value the tracking unit will not detect that the input is activated.

During battery charge the power consumption will be about 100mA more. The unit automatic re-charge the battery after power loss or if the battery voltage is low.

Stars Navigation Tech -Rover AVL System

Technical Specifications

Description:

Hardware Features:

* The GPS and GSM modules are integrated inside the tracking unit case.
* GPRS/ SMS and Voice I/O
* Up to 3200 individual locations can be saved
* Built in motion switch (activated by G-Force)
* Four negative outputs (200mA max per output)
  - Alarm out
  - SOS
  - Open Car doors
  - GEO fencing LED (included in wire harness).
* 4 negative inputs (active low to activate input).
* 2 Positive inputs (Alarm input and AUX1 input).
* 1 Analog input (0 to +3.3 Volt – MAX) AUX3 input.
* Serial RS232 port (9600 baud Rate) for external communication, firmware upgrade or direct access to modem (9600 baud rate).
* Detects external power loss (Measures external power voltage).
* I-BUTTON connection option.
* Voice I/O connector.
* Direct serial RS232 (9600 baud Rate) GPS data output port for Navigation purpose.
* Operating temperature range -25 deg. C to +70 deg. C (Battery 0 – 60 deg. C)

Firmware Features:

* Main Power Lost detection or input power below or above set value.
* Multiple Location Memory requests.
* Battery Back-up in case main battery is CUT-OFF.
* Auto GEO-Fencing (- Geo fencing input activated when drivers remove vehicle keys).
* Un-lock Doors : Allow owner to un-lock vehicle door from his mobile phone using simple SMS commands.
* SOS Panic Button: In demand alarm SMS emergency data and activates the vehicle external hazard warning system.
* Disable Vehicle: Immobilize remotely using mobile phone or WEB browser in response to an alarm.
* Alarm Alert: Integrated with vehicle alarm system to trigger current status of the vehicle in case of tampering.
* Operation system (Firmware), Configuration and GPS location table can be uploaded over the air, the vehicle does not need to be call back to service station.
* Send and receive data using SMS or GPRS

Physical Characteristics:
Unit size: 95 * 77 * 30mm (height)
Weight: 220 g
Aluminum case
Case Environmental Characteristics:
Operational Temperature: - 25 ~ + 70 °C (board temperature)
Battery: 0 + 60 °C
4 digital outputs (200mA max)
5 digital inputs
1 analog input
1 RJ45 port for serial RS232 (low speed 9600 Baud) , Direct GPS output RS232 (9600 Baud) and I-BUTTON option.
1 RJ11 port for voice I/O

Electrical Characteristics:
Input Voltage: + 6~37 Volt DC regulated / 2A-MAX (GSM Transmit)
Power Consumption:
12 Volt – 100~320 mA (GPS On Line, GSM/GPRS On Line)
12 Volt – 60 mA (GPS on line, GSM standby)
12 Volt – <20 mA (GPS in Power Down Mode, GSM Standby)
Backup Power: Li-ion Battery – 1100 mA
Memory Backup: Flash Memory – Data retention – 200 Years.
64 Kbyte (64000 * 8 Bits data)

GPS Specifications:

SIRF III chipset version

General

1). Frequency：L1, 1575.42 MHz.
2). C/A code：1.023 MHz chip rate.
3). Channels：20

Accuracy (Open Sky)

1). Position：10 meters, 2D RMS.
2). 7 meters 2D RMS, WAAS corrected.
3). 1-5 meters, DGPS corrected.
4). Time 1 microsecond synchronized to GPS time.

Datum

1). Default：WGS-84.
2). Other Support different datum by request.

Acquisition Rate (Open sky, stationary requirements)

1). Reacquisition：0.1 sec., average.
2). Hot start：1 sec., average.
3). Warm start：38 sec., average.
4). Cold start：42 sec., average. (Open Sky) – Can be between 1-3 minutes or more

Dynamic Conditions

1). Altitude : 18,000 meters (<60,000 feet) Max
2). Velocity：736 m/s (<1,000 knots) Max
3). Acceleration：4 G, Max
4). Jerk：20 meters/second, Max

RF interface

1). Minimum signal tracked: -159dBm

Nemerix chipset version

General

Frequency L1, 1575.42 MHz
C/A code 1.023 MHz chip rate
Channels 16

Accuracy

Position 7 meters CEP (90%) horizontal, SA off.
Velocity 0.1 meters/second
Time 1 microsecond synchronized to GPS time

Datum

Default WGS-84
Other Support different datum by request

2.1.4 Acquisition Rate (Open sky, stationary requirements)

Reacquisition 0.1 sec, average
Snap start 2 sec, average
Hot start 10 sec, average
Warm start 38 sec, average
Cold start 45 sec, average (Open Sky) – Can be between 1-3 minutes or more

Dynamic Conditions

Altitude 18,000 meters (60,000 feet) max
Velocity 515 meters/second (1000 knots) max
Acceleration 4g, max
Jerk **20 meters/second, max**

GSM Modem Specifications:

Power supply Single supply voltage 3.4V – 4.5V
Power saving Typical power consumption in SLEEP mode to 3mA

Frequency bands
Tri-band: EGSM 900, DCS 1800, PCS 1900 or
Tri-band: EGSM 850, DCS 1800, PCS 1900
Compliant to GSM Phase 2/2+
GSM class Small MS

Transmit power Class 4 (2W) at EGSM900
Class 1 (1W) at DCS1800 and PCS 1900
GPRS connectivity
GPRS multi-slot class 10
GPRS mobile station class B

Temperature range
Operation: -25°C to +70°C
Storage temperature -40°C to +80°C

DATA
GPRS:
CSD:

GPRS data downlink transfer: max. 85.6 kbps
GPRS data uplink transfer: max. 42.8 kbps
Coding scheme: CS-1, CS-2, CS-3 and CS-4
Supports the protocols PAP (Password Authentication
Protocol) usually used for PPP connections.
Integrated TCP/IP protocol.
Support Packet Switched Broadcast Control Channel (PBCCH)
CSD transmission rates: 2.4, 4.8, 9.6, 14.4 kbps, non-transparent
Unstructured Supplementary Services Data (USSD) support
SMS, MT, MO, CB, Text and PDU mode
SMS storage: SIM card
Support transmission of SMS alternatively over CSD or GPRS.
User can choose preferred mode.
FAX Group 3 Class 1
SIM interface Supported SIM card: 1.8V ,3V

Audio features Speech codec modes:
Half Rate (ETS 06.20)
Full Rate (ETS 06.10)
Enhanced Full Rate (ETS 06.50 / 06.60 / 06.80)
Echo cancellation
Noise reduction
Phonebook management Supported phonebook types: SM, FD, LD, MC, RC, ON,
ME,BN,VM,LA,DC,SD
Application Toolkit Supports SAT class 3, GSM 11.14 Release 98
Real time clock Implemented
Timer function Programmable via AT command
Firmware upgrade Firmware upgradeable over serial interface

Coding schemes and maximum net data rates over air interface

Coding scheme	**1 Timeslot**	**2 Timeslot**	**4 Timeslot**
CS-1:	9.05kbps	18.1kbps	36.2kbps
CS-2:	13.4kbps	26.8kbps	53.6kbps
CS-3:	15.6kbps	31.2kbps	62.4kbps
CS-4:	21.4kbps	42.8kbps	85.6kbps

GPS/ GSM Antenna Specifications:

General Architecture Design 2 Stages active LNA
Dual Filters, (BPF (dielectric) & LPF (lump element))
Dielectric Patch antenna
Low Noise Low drop-out, Linear Regulator
Low Loss RG/174 Coax cable
Short Circuit/ Auto shutdown (GPS rcvr load protect) Performance Receiving Frequency L1 Band (1575MHz)
Output Impedance 50 ohms
Polarization's Right Hand Circular (RHC)
Bandwidth 10dB Mhz @ -3dB point
VSWR 1.5 Typical @ 1575MHz
Elev. Angle Coverage 5~90 degree
Az. Bearing Coverage 360 degree
Filtering Dual (BPF <10 Mhz B/W, LPF @1576 MHz
Stop-band @ 1585MHz)
Over-all Gain 28dB (typical including 4dB cable loss & Filters)
Over-all NF <1.8dB @ fo, 2dB max.
LNA Characteristic K=>1 Un-conditionally Stable Electrical Power Input +3Vdc to +12Vdc input auto Switch
Power Consumption 8 to 11mA (max)
Power Input Sensor Reverse Polarity Short Circuit shutdown
Over-Current Sensor Thermal Over-current shutdown >+150degreeCPhysical Dimensions
1 5/8" x 2 1/8" x 3/8"
Mount Suction or Adhesive
Radome Color Black
Coax Connectors BNC, SMA, SMB, TNC
Coax Cable RG-174U double shielded 5m, Low Loss 0.7dB/m
Environmental Operating Temperature -30 to + 85 degree C
Storage -40 to + 90 degree C

Cellular/GSM Antenna
Architecture Design PCB patch passive
Operating Frequency 850~960mhz / DCS-1800/ PCS-1900
Gain 3dBi typical
VSWR <1.5; 1
Coax Connectors BNC, SMA, SMB, TNC
Coax Cable RG-174U double shielded 5m, Low Loss 0.7dB/m
Environmental Operating Temperature -30 to + 85 degree C
Storage -40 to + 90 degree C

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Federal Communications Commission (FCC) Statement

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

Operation is subject to the following two conditions:

1) this device may not cause interference and

2) this device must accept any interference, including interference that may cause

undesired operation of the device.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Conversion help for multiple location messages:

7g<393089651765093910002214726 3.5O139303300176530284000011972 63.5J2392976651765244900230 0197263.52q39307223176516124028711112 63.4pp392971491765381710238213626 3.

There can be up to 5 locations in 1 SMS or 1 GPRS message.
Every message is separated by a dot (.)

7g<393089651765093910002214726 3. **= 1 Single location message**

All char are in ASCII format.

The first 3 char represent the time.
The Last 3 char represent the date;

Conversion table for first and last 3 digits:

0	**= 0**	**G**	**= 23**	**e**	**=46**
1	**= 1**	**H**	**= 24**	**f**	**=47**
2	**= 2**	**I**	**= 25**	**g**	**=48**
3	**= 3**	**J**	**= 26**	**h**	**=49**
4	**= 4**	**K**	**= 27**	**I**	**=50**
5	**= 5**	**L**	**= 28**	**j**	**=51**
6	**= 6**	**M**	**= 29**	**k**	**=52**
7	**= 7**	**N**	**= 30**	**l**	**=53**
8	**= 8**	**O**	**= 31**	**m**	**=54**
9	**= 9**	**P**	**= 32**	**n**	**=55**
:	**= 10**	**Q**	**= 33**	**o**	**=56**
;	**= 11**	**R**	**= 34**	**p**	**=57**
<	**= 12**	**S**	**= 35**	**q**	**=58**
=	**= 13**	**T**	**= 36**	**r**	**=59**
>	**= 14**	**U**	**= 37**		
?	**= 15**	**V**	**= 38**		
@	**= 16**	**W**	**= 39**		
A	**= 17**	**X**	**= 40**		
B	**= 18**	**Y**	**= 41**		
C	**= 19**	**a**	**= 42**		
D	**= 20**	**b**	**= 43**		
E	**= 21**	**c**	**= 44**		
F	**= 22**	**d**	**= 45**		

The above sample time will be:
Time = '7g<' = 07:48:12

The above sample date will be:
Date = '263' = 02/06/2003

Updates – 16-2-2007

Firmware version V9.19 or higher will collect information when data cannot be sent or there are errors on the GSM network when sending or receiving data.

After OS version update all counter are RESET to zero (0000). All counters will count in HEX format from '0000' to max 'FFFF'.
The user can request the errors counters value by SMS or GPRS message, or can display the value after quitting the diagnostic menu.

****
IMEI:
AT+GSN
351525018440223

OK
GPS Info:
þ$GPGGA,003218.548,,,,,0,00,,,M,0.0,M,,0000*57
$GPGSA,A,1,,,,,,,,,,,,,*1E
$GPGSV,3,1,11,16,70,103,,23,57,218,,25,55,135,,20,46,308,*7A
$GPGSV,3,2,11,01,35,063,,13,23,227,,31,22,114,,03,19,031,*71
$GPGSV,3,3,11,07,07,136,,06,01,145,,19,00,011,*42
$G

Error Counter 0: 0000
Error Counter 1: 0000
Error Counter 2: 0000
Error Counter 3: 0000
Error Counter 4: 0000
Error Counter 5: 0000

connect

****

The counter value will NOT be RESET after configuration menu updates.

There are 6 error counters that collect errors when data cannot be sent or there are errors on the GSM network when sending or receiving data.

Error Counter 0 = Phone Pickup Call command failed
Error Counter 1 = Real time data cannot be send as SIM is roaming
Error Counter 2 = GSM signal test command failed.
Check GSM aerial to make sure aerial is connected correctly.
Error Counter 3 = Cannot Read or Delete SMS message command failed.
Possible corrupted message or cannot read SIM card. Remove SIM card and check if SIM card works ok. Delete any message on the sim card.
Error Counter 4 = GPRS Reset after sending Fails.
Rover cannot connect to the GPRS network. Make sure GPRS is enabled on the SIM card. Possible GSM network error. GSM modem has been reset to retry the connection.
Error Counter 5 = Sending SMS message fails
Possible no credits (money left) or SIM card is disabled so no messages can be sent.

Two extra SMS commands have been added to support the new function.

C0 -> RESET Error counters value

Example: 05*827,C0,0 **(NO CONFIRM MESSAGE WILL BE RETURNED)**

C1 -> Request error counters value

Example: 05*827,C1,0

Will Return:

05*850,ERRORS,<ERROR COUNTER 0>,<ERROR COUNTER 1>,<ERROR COUNTER 2>,<ERROR COUNTER 3>,<ERROR COUNTER 4>,<ERROR COUNTER 5>,0

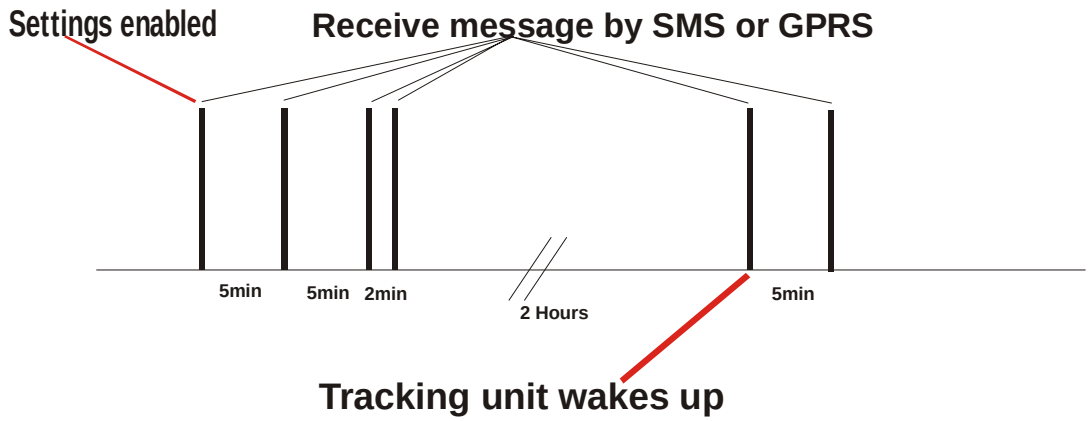
Example:

05*850,ERRORS,0000,0000,0000,0000,0000,0000,0

Real time tracking interval samples:

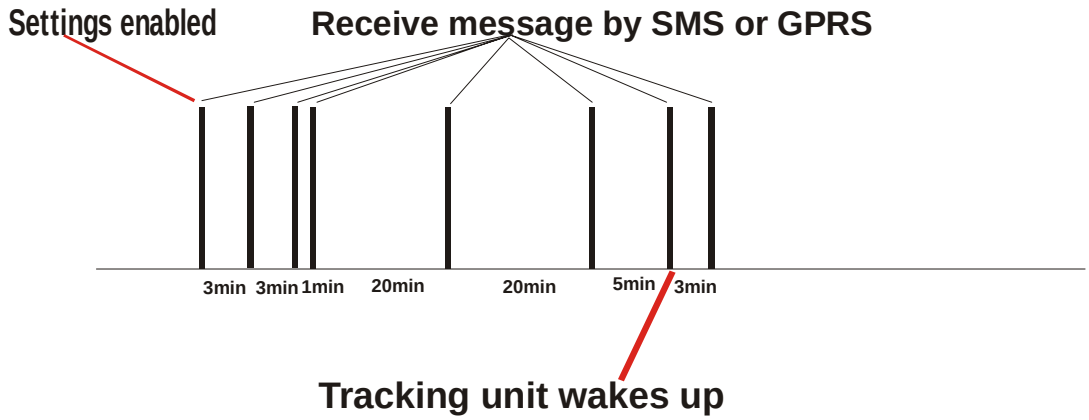
Example 1

Online Tracking interval 5 minutes
Offline tracking interval 0 minutes



Example 2

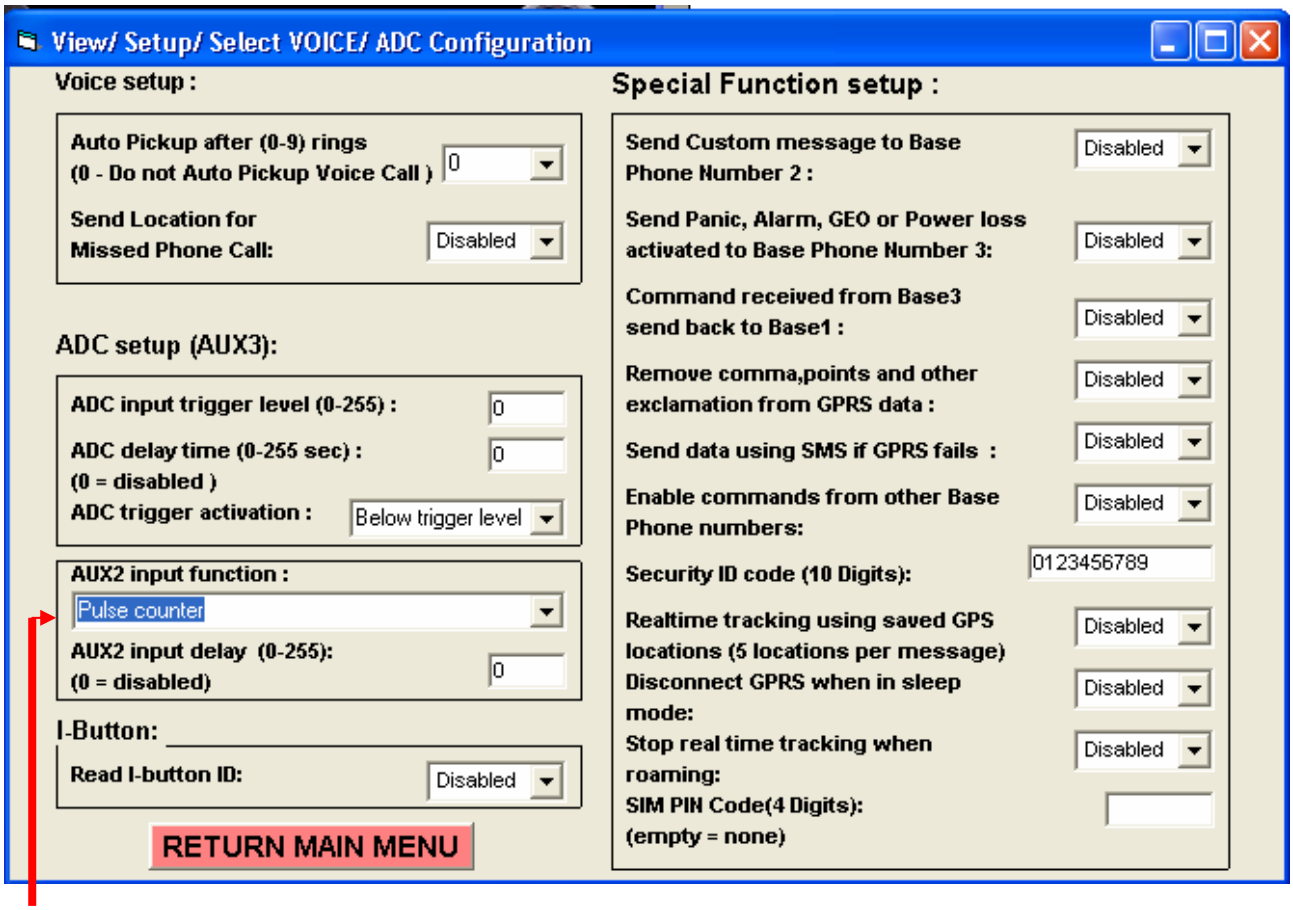
Online Tracking interval 3 minutes
Offline tracking interval 20 minutes



Please note that The Rover enters sleep mode after 10-11 minutes. So every time the Rover changes from ONLINE to OFFLINE tracking interval or from OFFLINE to ONLINE tracking interval you will also receive one real time tracking interval message.

Using AUX2 input to count digital pulses:

Firmware version V9.31 has option to count digital pulses using the AUX2 input.
You can select the feature using the configuration menu program (version Date: 25-6-2007 or later).
Select the 'View/Setup/Select Voice/ ADC Configuration' option.



Select AUX2 input function to 'Pulse counter'. The counter can count from 1 to 65535 Max. After 65535 the counter will reset back to zero and continue counting.
When enabled the pulse counter value is automatic added to the end off the location message in Hex format. The hex format is from 0000 to FFFF (65535 decimal).

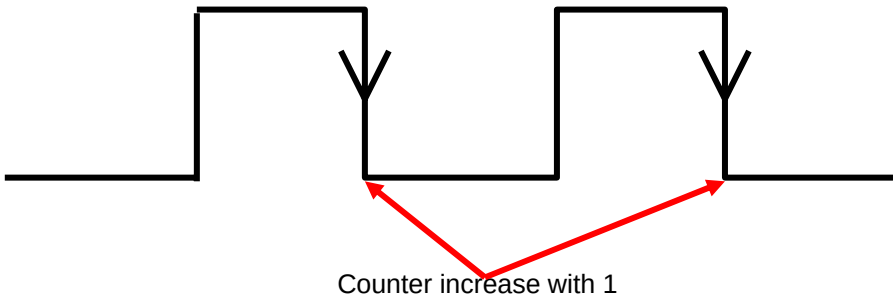
Example (counter value is 043F (hex)):

05*850,000,L001,A,2459.3640,N,12125.2958,E,000.0,224.8,00.8,07:47:26 09-09-05,9.00,D3,0,C4,1,043F

The AUX2 option must be selected using the configuration menu program. It cannot be enabled or disabled any other way.

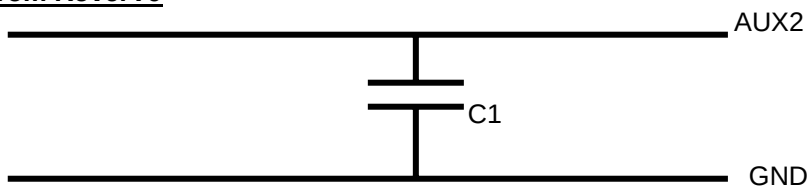
Care must be taken when there is noise on AUX2 input. The counter will increase every time a high to low pulse is detected.

Example:



There is no input capacitor used on AUX2 input. When AUX2 is connected to noisy input an capacitor connected to ground can be used to eliminate noise.
The value for the capacitor (C1) depends on the noise on the AUX2 input.

From RoverV9



Please Note:
The counter value is saved to backup memory every 24 hours. If the Rover loses power and restarts then the last saved value from backup memory will be used for the pulse counter value.
The value is automatic saved when you enter the diagnostic or configuration menu program.
After firmware upload using the serial port the pulse counter is reset to zero.

The counter can be reset using a new SMS/GPRS command code.

A4 -> RESET pulse counter.

Example: 05*827,A4,0 (RESET pulse counter)

NO CONFIRM MESSAGE WILL BE RETURNED!

Updated 6-7-2007