FM3101

Quick Start Guide v1_1.3

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This document describes how to start using FM3101 module and set it to send first data.

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1. Introduction

In this manual the first steps using FM3101 module and basic operation for testing and integration to custom systems is described. Reviewed chapters are FM3101 connection, configuration and data acquisition and transfer.

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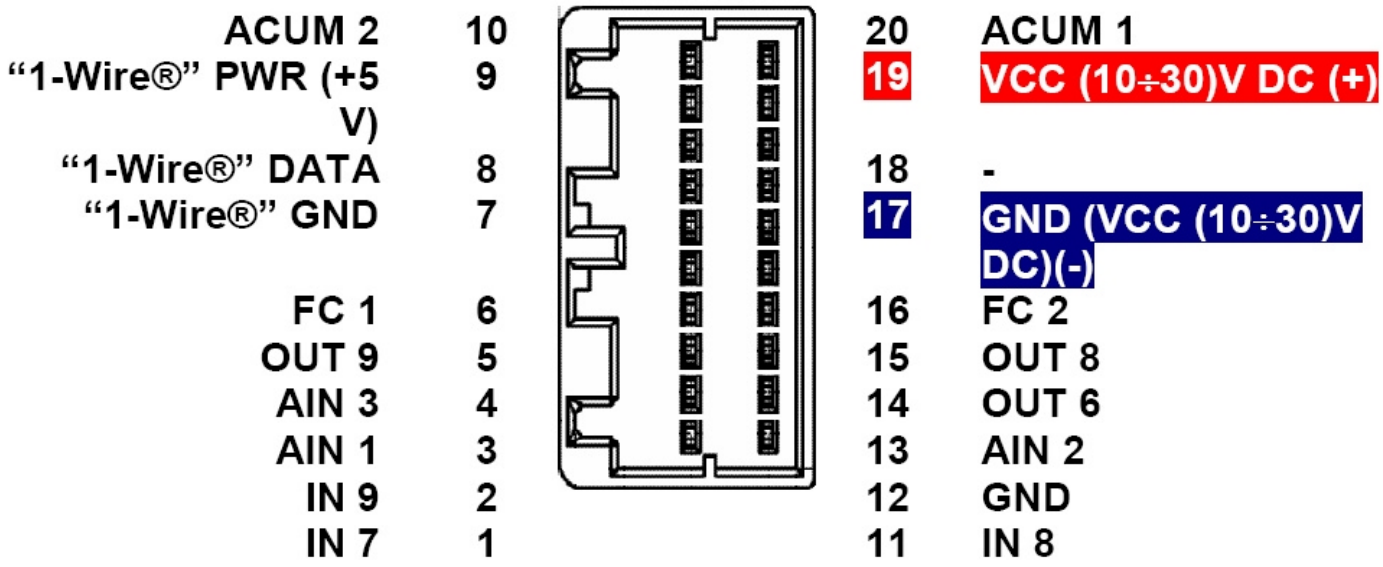
2. Connecting FM3101 module

2.1 Connecting Power Supply

Connect power supply to the FM3101 as shown in the figure.



Detail connection pinout and schemes are described in "FM3101 User Manual" 5'th chapter.

2.2 Connecting Antennas

Connect GSM and GPS antennas to their sockets according to the sticker on the FM3101 module.

GPS antenna

GSM antenna

GPS antenna should be placed where it can see as much open sky as possible without any obstacles preventing it from seeing satellites. In case of using the module indoors, put antenna near the window or outside on the windowsill.

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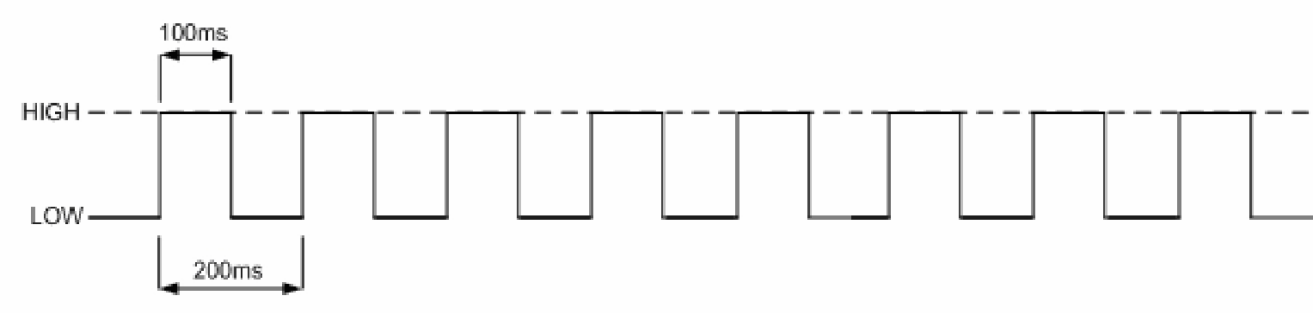
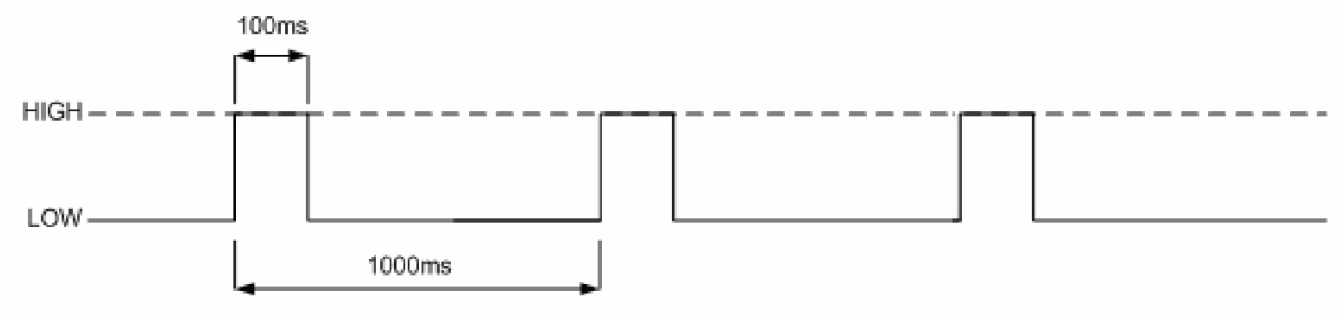
2.3 LED indication

Check if LEDs are blinking, as they should.

When GPS signal is not received, the Navigation LED is blinking as follows:

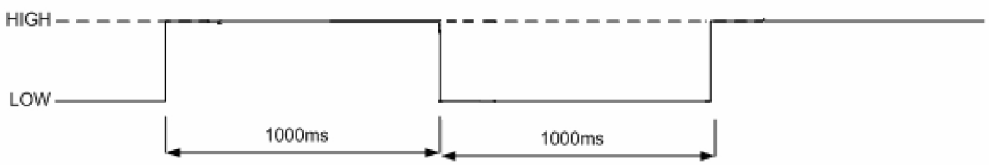


When GPS signal is received, the Navigation LED is blinking as follows:



When Navigation LED is off, that means a short circuit is GPS antenna or connector. Power LED means that device is switched on.

When TrakGPS AVL Imlet is started, the Status LED is blinking as follows:



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3. Configuring FM3101 Module

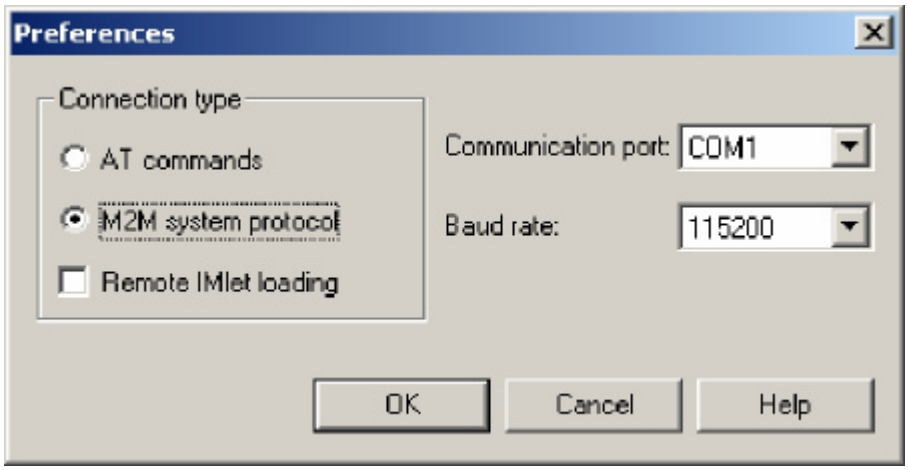
Nokia 12 Configurator is used to start new modules and prepare them for work. For this few requirements are to be met: SIM cards must have activated SMS and GPRS services, VPN or global Internet access, static IP address and roaming function enabled. SIM card provider should also present you with the following SIM card data: phone number, SMS center number, CHAP user name and password (if any), access point name (APN) and static IP address (not necessary but highly recommended).

For general use of configurator a computer with COM port (RS232) and installed Nokia (Aplicom) 12 Configurator (available on TrakGPS CD included in the package) application is needed as well as configuration files. To connect the module to the computer, FM3101 cable marked PORT 1/2 is used.

PORT 1/2 cable is used to operate module with Configurator while plugged to PORT 2 in the device, and for monitoring purposes while plugged in PORT 3 of the device. PORT 3 cable is used as GPS serial output NMEA (could be used for navigation in the vehicle when connected to portable PC).

3.1 Connecting

For the first time, when launching Nokia 12 Configurator, you need to specify what port it will use to connect to module. Plug the cable to FM3101 Port2. Click "File" - "Preferences". In the new window mark "M2M system protocol", choose the Communication Port that you are using and set Baud Rate to 115200. Enter SIM card's, which is inserted in the module, PIN code and click "Ok". The picture below shows the main window with operators name or logo.



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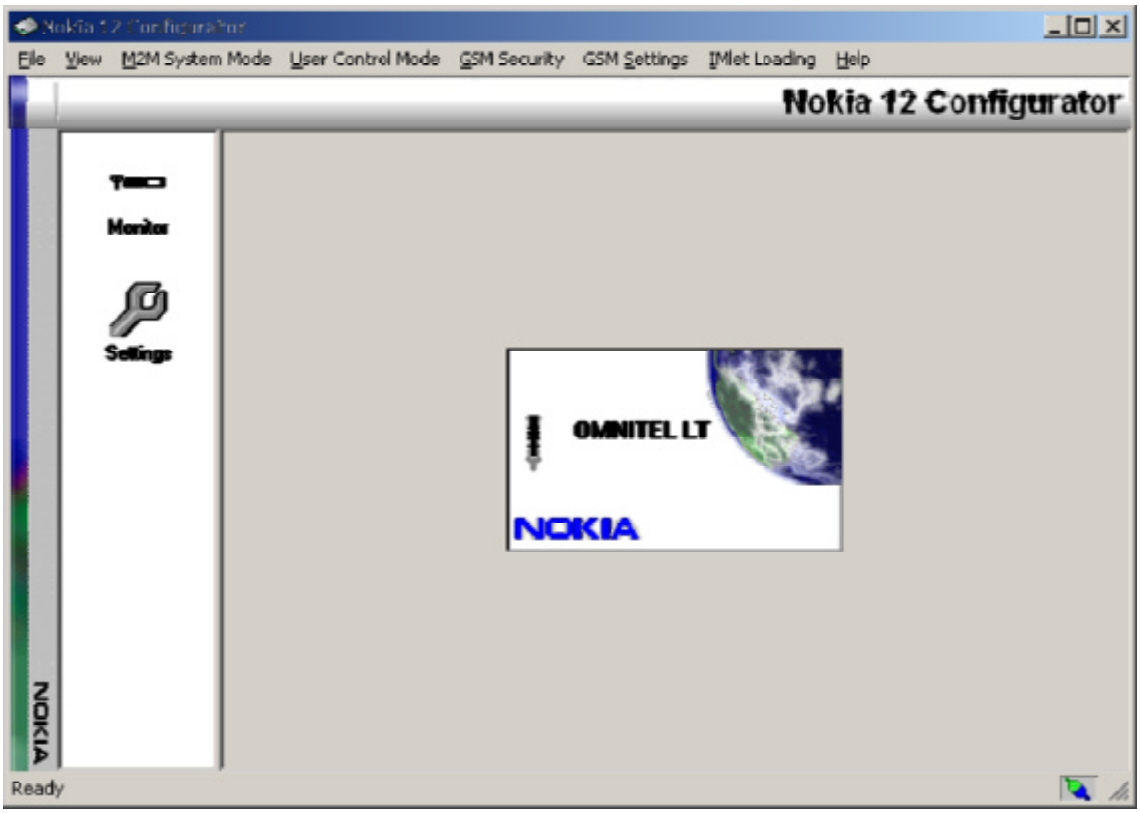
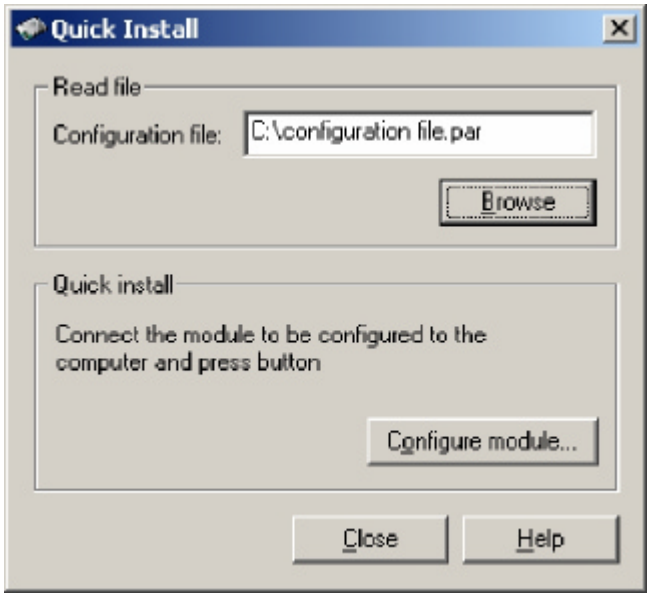


3.2 Configuring the Module

Click "File" - "Quick Install". In the new window select the path to the configuration file (with extension .PAR). For every operator a different configuration file is needed with different settings, although settings can be changed manually. To finish configuration, click "Configure module" button.



The default par file could be downloaded at: http://www.trakgps.com/downloads/fm3101/defaultcfg.par

3.3 Check-Up and Manual Configuration

To configure module manually choose "M2M System Mode" and click "M2M Bearer Selection". In the "General" tab click "Read parameters". Usually parameters are only reviewed to check if they are correctly defined, so you don't have to do the following steps. However, sometimes manual configuration is needed. If your operator needs CHAP authentification, mark "Incoming CHAP authentification" field and enter username and password.

Also mark "GPRS always online" and "Use Nokia M2M gateway". Default connection is usually chosen Connection 1. Click "Write parameters" button to apply the settings to the module.

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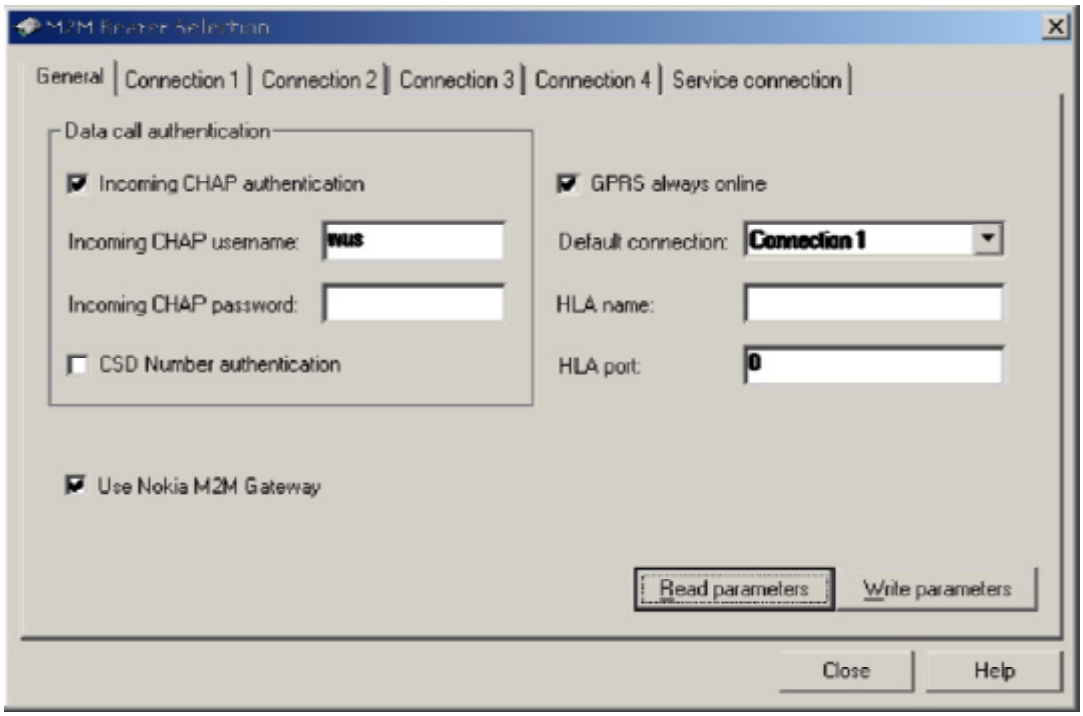
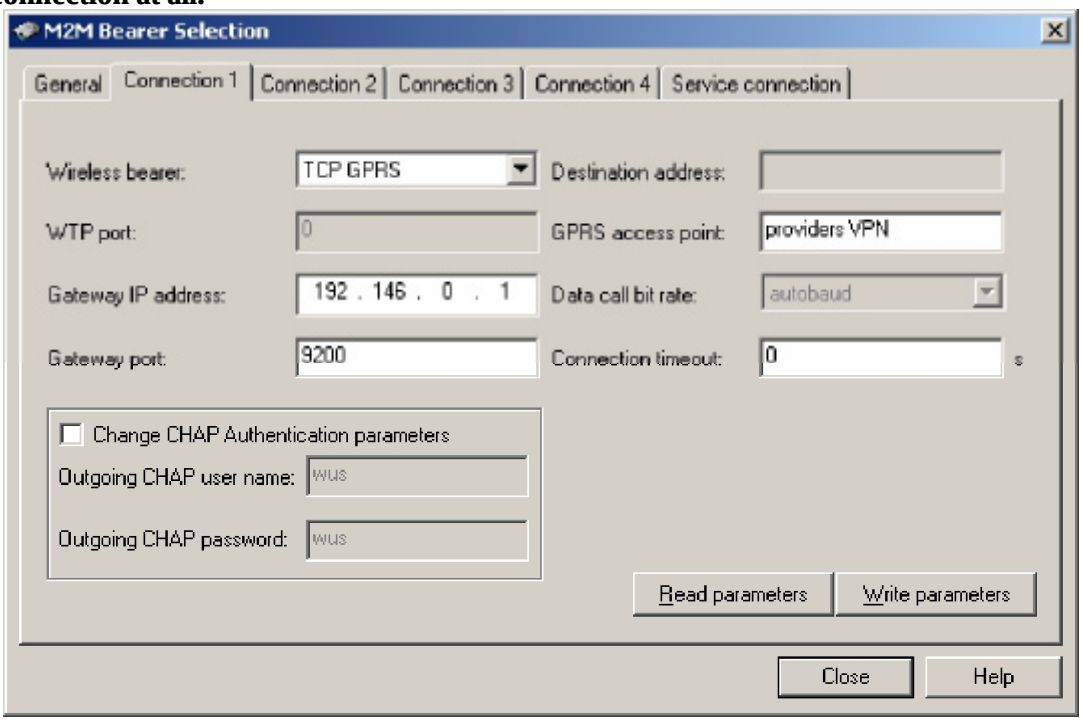


Click on "Connection 1" and click "Read parameters" button. If by default the connection is Connection 1 (by GPRS), wireless bearer should be set to TCP GPRS. Gateway IP address and port is the address of the server that data will be sent to. GPRS access point defines providers VPN. If VPN is entered incorrectly, some operators may let you connect to public domains, others don't allow connection at all.



Click on "Connection 2" and click "Read parameters" button. Connection 2 is usually SMS connection, so "Wireless bearer" should be set to WAP SMS. Used gateway port should be defined as well as destination address, which is server's modem number in international format. If any changes are made to connections, click "Write parameters" button to apply settings to the module.

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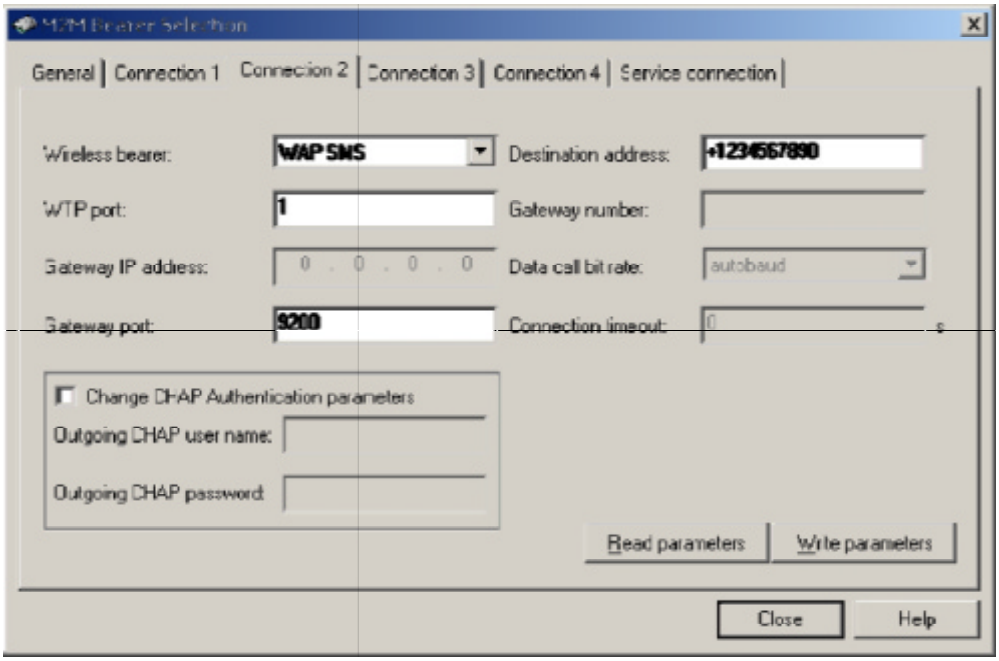
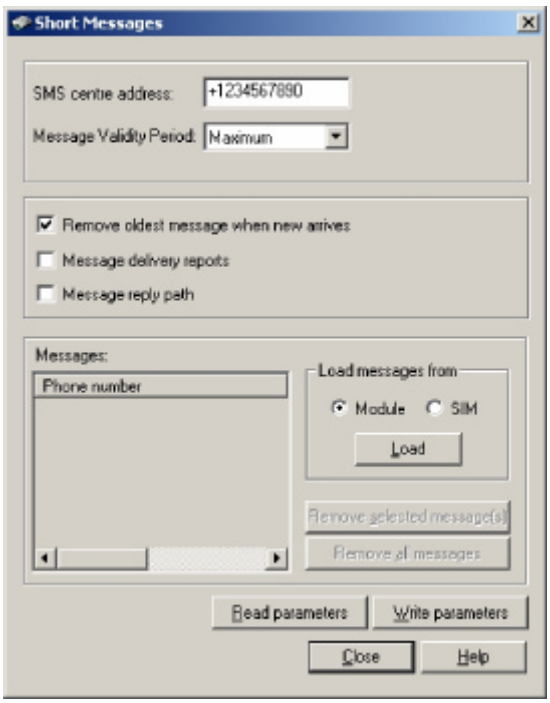


In the toolbar click "GSM Settings", "Advanced" and "Short Messages". Click "Read parameters" and check the operators SMS center number. "Message Validity Period" is usually set to maximum and "Remove oldest message when new arrives" box is checked.



If configuration was changed or done manually, settings can be saved, so you don't have to enter them manually again later. In the main configuration window click "File" and "Save All Settings" and create a new .par file.

To set message identifier click "User Control Mode" - "Settings". Click on "Read Parameters" button and check the identifier. If you want to change it, click "Change", enter new identifier and click "Accept" button. To activate settings, click "Write Parameters" button.

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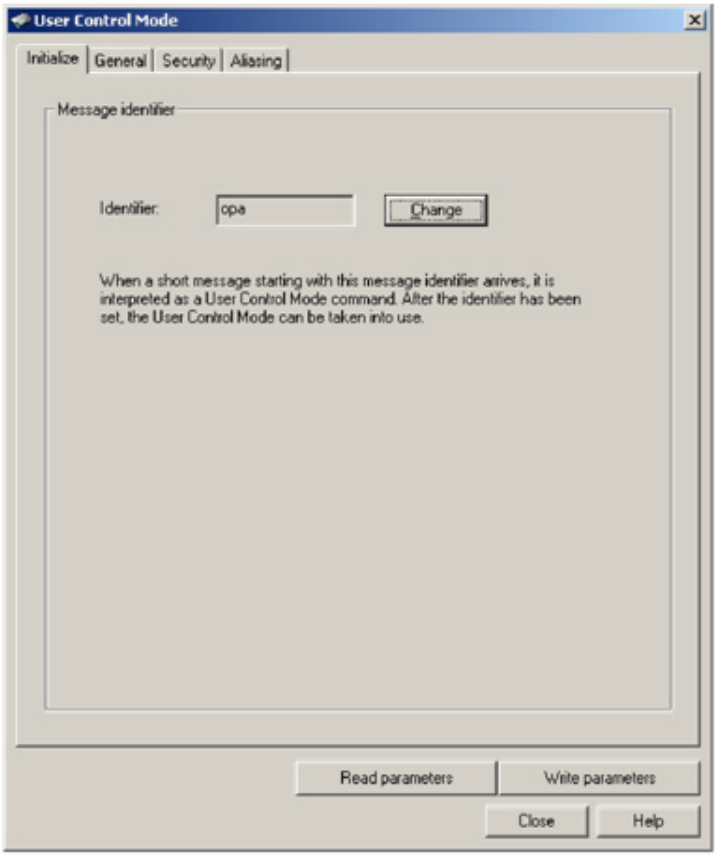

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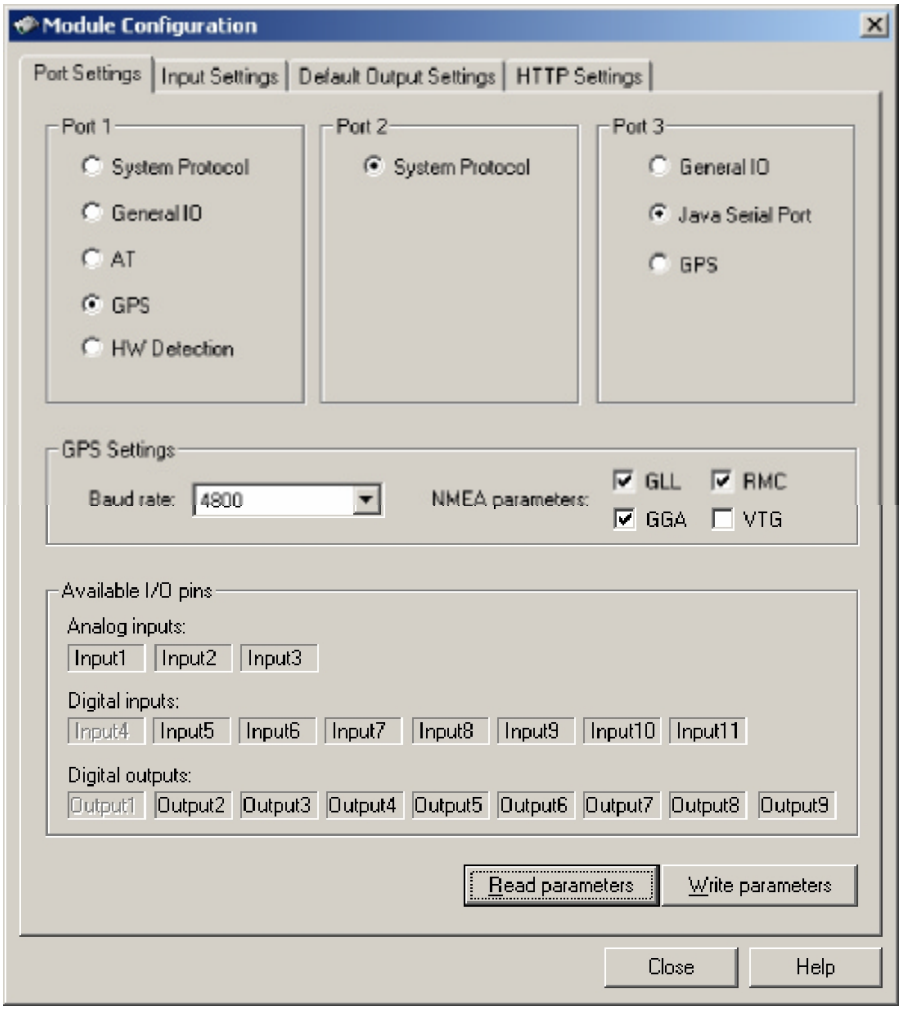
Password is set in the "Security" tab. If you are not sure what password is entered, enter new password in both fields and click "Write Parameters" button. Also check Authorized Numbers list to see which numbers can send requests and configuration messages to the device. If list is empty, it means that any number can send these messages.

Note, that configurator specified IP address and modem number are not used for data transferring to the server. They are used for remote device connection and remote IMlet loading. Parameters that define destination (IP, ports, GSM number) are entered in the IMlet and can be configured either by sending SMS, using TAVL application or defining default values in the IMlet itself. Simple SMS commands are described in chapter 4.2, TAVL application interface – in TAVL Advanced User Manual. How to enter default values in the IMlet see chapter 5.

3.4 GPS Receiver and Ports Configuration

GPS settings can be checked by sending a "location_get: message, as described in chapter 4.1. Response "Unknown Command" usually means that either device does not see enough GPS satellites, to set its coordinate right or configuration is wrong. Click "File" and choose "Module Configuration". Click "Read parameters" to read current settings.



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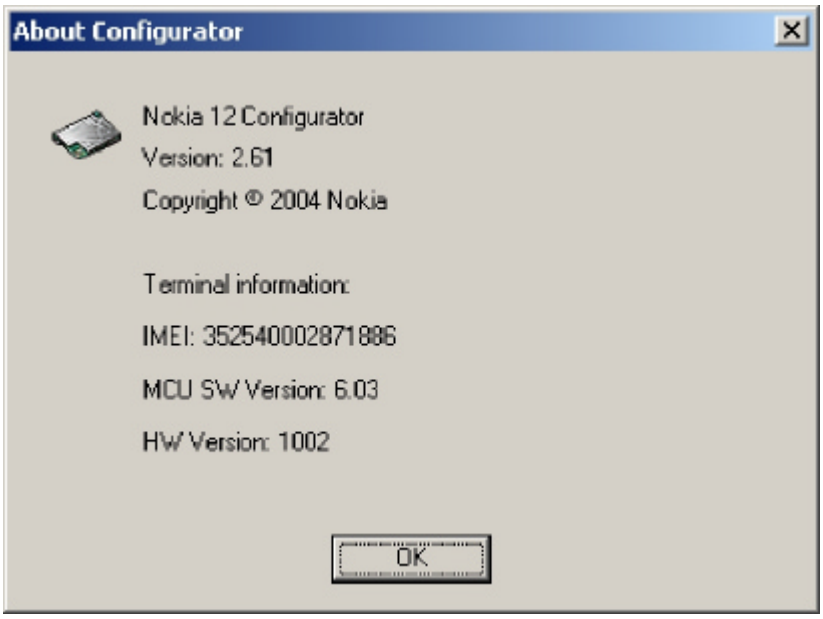
"Port1" should be set to "GPS", "Port2" – to "System Protocol", "Port3" – "Java Serial Port". Depending on used GPS receiver, choose a baud rate – some units support 9600, while others work with 4800 bps. If changes were made, click "Write Parameters" button.

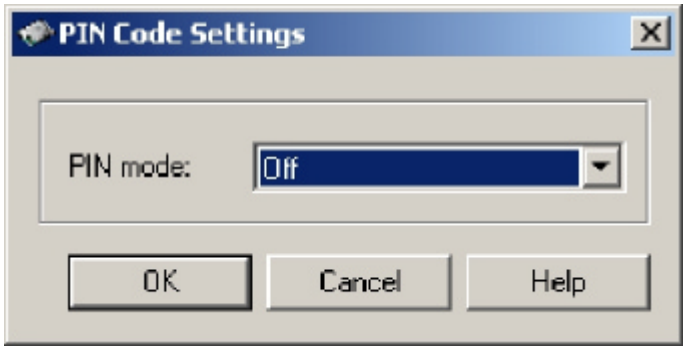
3.5 Additional Settings and Preferences

Modules Imei number, software and hardware version numbers can be viewed with configurator. These are needed for module registration in the database. To access it, please click "Help" and "About".



It is also important to set PIN code entering to "auto" or "off" on configurator, or turn off PIN code manually (usually it is done with mobile phone). Click "GSM Security" in the toolbar and choose "PIN Code

Settings". Select mode and click "Ok". If mode is set to "Off", PIN code request is turned off. For better SIM card protection you can turn mode to "Auto". This way the module will enter PIN code automatically every time it starts.



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4. Data Transfers

There are two possible ways to receive data - by SMS or GPRS.. In the example we will use internal Nokia modem command, which sends a coordinate to the user. Also we will specify general settings for sending data by GPRS protocol.

GPRS connectivity (data sending) is a function of the TrakGPS AVL imlet, and it doesn't work without it. Please check, if the imlet is loaded and started (see chapter 2.3)

4.1 Data Sending by SMS

We will use simple command, which makes Nokia modem read current GPS coordinates and send them to the sender of the command. This way data acquisition can be tested as well as Nokia modem work. Type text `"<identifier> <password> location_get"` **(with default settings it will be "**`opa opa location_get`**") and send to the number of the card inserted to the FM3101 module. Identifier and password may differ depending on the settings and client needs, but the default identifier and password are "opa". Note, that while monitoring device with Terminal, Location Get requests are not shown in the log.**

When sending the commands and operating – Nokia (Aplicom) Configurator application should be closed (inactive).

4.2 Data Sending by GPRS

. In the configurator GSM providers APN should be set, so the module should be able to connect to the server. Server can be specified (or changed) by sending special SMS commands - type

```
"+<identifier> <password> write /profile/0 4 socket://192.168.1.1:80" or
"+<identifier> <password> write /profile/0 4 datagram://192.168.1.1:80".
```

Identifier and password are those mentioned in 4.1 chapter. Number 4 is written parameters number. Other parameters can be viewed in the "SMS Command Set Manual" and "Parameters Description Manual". In our case parameter Id = 4 is server address to which data is sent by GPRS. "Socket" and "Datagram" defines which protocol should module use:

"Socket" is for TCP protocol, and "Datagram" is for UDP protocol. IP address and port number is the address of the server to which data is sent.

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When data is not sent automatically, a command "+<identifier> <password> flush" **can be sent to module. This is the request to send immediately the freshest data packet using GPRS to the server defined. For automatic transfer some data acquisition parameters should be set. These are:**

Acquire Interval (Id = 0) - Interval in milliseconds to acquire new data (coordinates and sensor readings). Default value of 60000 is usually set, minimal recommended value is 20000.

Send GPRS Interval (Id = 1) - interval in milliseconds to send all data to server using GPRS protocol. Default value is 600000 (10 minutes) minimal recommended value is 60000.

These settings are sent like any other command: type

"+<identifier> <password> write /profile/0 0 60000" **for Acquire Interval setting or** "+<identifier> <password> write /profile/0 1 600000" **for Send GPRS Interval setting.**

For automatic GPRS transfers a message defining GPRS opening time should be sent:

"+<identifier> <password> write /profile/0 45
7FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF".

More about this message read "Parameters Description Manual"

If you are using TAVL application, you can configure module with it too. Detail description how to do it is found in the Advanced User Manual 5'th chapter.

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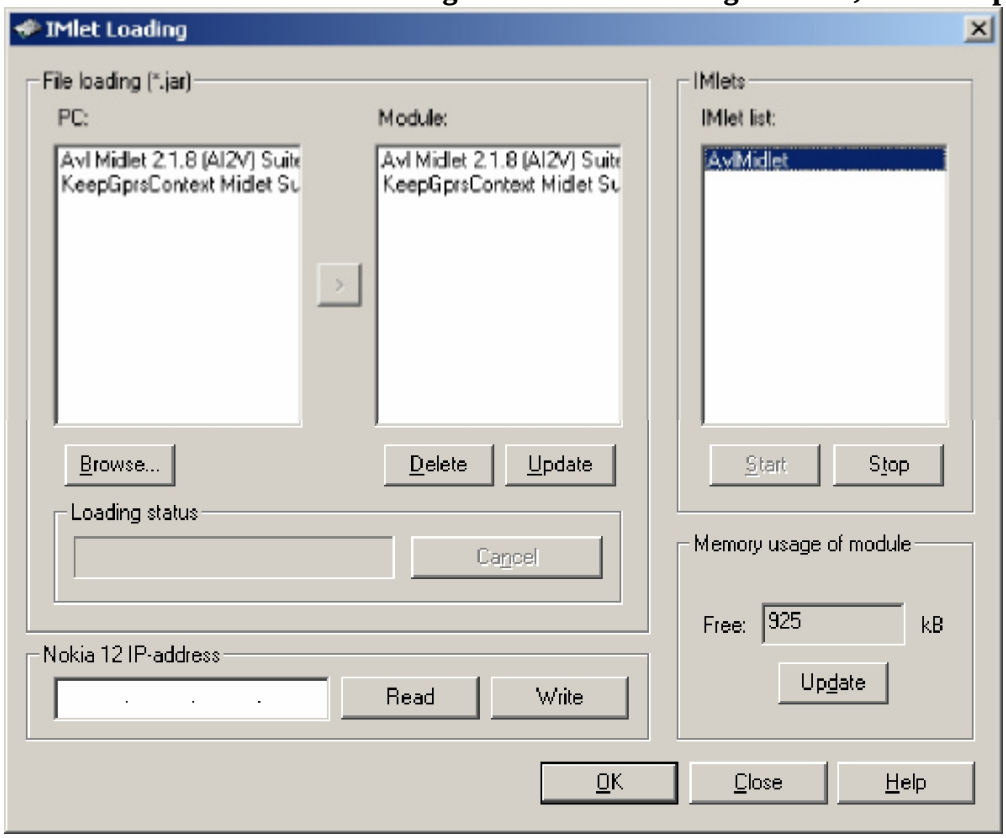
5. IMlet Loading

To load an IMlet to the module click "Imlet Loading" in the toolbar and select "Cable". Click "Browse" button under PC dialog box and set the path to the folder with Imlets (.jar files). By default in every module "Keep GPRS Context" and "Avl Midlet" should be installed. Select the midlet and click ">" button to load it to the module. When all midlets are loaded, select "Avl Midlet" in the Module dialog box. Imlet list appears in the Imlets dialog box. Click the "Start" button to launch the Imlet. Note that if you want to delete the Midlet, it has to be stopped first. Again select the Midlet in the Module dialog box and after clicking on Imlet, click "Stop".



6. Modifying IMlet

You can modify default IMlet values, so you will not have to configure the new device every time you start it. Do not extract, but open .JAR file with WinRar or any other archiver. In the 'META- INF' folder find the file named 'MANIFEST.MF'. Open it with any text editor. You can see all parameters default values entered here. Parameters ID number and description can be found in Parameters Description Manual.

Referring back to chapter 4.2 where server address was defined, we changed parameter 4. Find the same parameter in this file and enter new value. Same changes can be made to 'Acquire Interval' and 'Send GPRS Interval' as well as other parameters. When new parameters are entered, save changes to 'MANIFEST.MF' file and update the archive. If you have trouble opening the file and editing it, you can extract it, make changes and overwrite the old one.

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7. Monitoring Module

To monitor module you will need terminal (can be downloaded from TrakGPS website: http://www.trakgps.com/downloads/fm3101/terminal.zip). Plug the same cable, which was used to configure module, to the Port 3 and launch terminal. Choose the COM port, that you are using and click "Connect". To start logging session click "Start Log". Monitoring is usually used for keeping track of modules behavior and possible errors.

7.1 Reading Terminal

When connecting power supply to the device, first line that it responds with is

"1980.1.1 0:0:10 223940028 176056 3 Start". **First symbols are timestamp for event. Default starting time is 1980.1.1 0:0:0. When clock is set, the displayed time is in GMT format. 223940028 is thread ID, 176056 – free RAM memory, 3 – log level. These are not essential to reading device's behavior, so further messages will be displayed without them.**

Next line that should be noticed is "Creating preference /boot". **This means, that IMlet is starting. If you don't see this line, start IMlet using configurator (chapter 5).**

After skipping some lines you should see "Reading available operators..." **followed by few lines of** "Checked [Name=OMNITEL LT][Area=24601]

[Priority=OPERATOR_PRIORITY_HOME_NETWORK][Status=OPERATOR_STATUS_CURRENT], selected [Name=OMNITEL LT][Area=24601] [Priority= OPERATOR PRIORITY HOME NETWORK] [Status=OPERATOR_STATUS_CURRENT] profile 1"**.**

A list of available GSM operators is displayed here. Depending on country and available operators, some parameters may vary. If no operators are visible or you are sure that there should be more, check GSM antenna connection.

After some more lines "Operator selected [Name=OMNITEL LT][Area=24601][Priority=OPERATOR_PRIORITY_HOME_NETWORK][Status=OP ERATOR_STATUS_CURRENT], signal quality -70. GsmOperatorManager [Active profile=1] [Scan interval=300000] [Online=false]" **is displayed. This indicates which operator is chosen.**

You should also see a line saying "Clock initialized 2007.5.3 7:12:21". **This means, that internal clock has been started and from now timestamp will use GMT time. This is a good way to determine if GPS satellites are visible, because time is set using them. If clock is not initialized, device shows exception:** "Get parameter Time com.nokia.m2m.orb.idl.

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wirelessdevice.DevicePackage.ParamFailureException:

IDL:wirelessDevice/Device/ParamFailureException:1.0"**. Try replacing antenna and check its connection. Note, that it may take up to few minutes to set the clock.**

After initializing all parameters device shows final line: "Running TAvl application version (2.1.11 [AI2V])"**, where numbers and symbols in brackets represent current Imlet version.**

When new coordinate is stored in the memory, device responds with line "Data added to Data store append only list [Elements=44] [Append only list=Rms append only list [Size=44] [Last=0] [First=0] [Max records=0] [Name=store] [Circular=true] [Size indexes=[44]]]. DataRouter [Split priority=15] [QueueProcessor [Elements=1]]"**. First parameter in brackets 'Elements' represents how many coordinates device already stored.**

When trying to send all data to server, module is trying to connect using GPRS. Depending on configuration, GPRS context may not be allowed to be used at the moment. In this case device will respond with "java.io.IOException: Gprs use is not allowed

SendDataStoreToServer [Min=1]"**. If GPRS context is allowed, device will display a line**

"Event GPRS-OPENED. GsmOperatorManager [Active profile=1] [Scan interval=300000] [Online=true]"**.**

Data sending is indicated by displaying line "Starting task SendDataStoreToServer [Min=1]"**. Number in brackets represents minimum quantity of coordinates, that is allowed to be sent. The following line indicates connection:** "Sending 20 datas to server. UdpTransport [SimpleStreamTransport [Connection string=datagram://212.47.99.62:5305] [Imei=352540003291936]] [timeout=60000]"**. Displayed parameters are protocol used (TCP or UDP), destination server IP address and device IMEI number, which is used for authorisation.**

When connected to server, respond is "Set online true. GsmOperatorManager [Active profile=1] [Scan interval=300000] [Online=true]" **and when data is successfully sent, device responds with a line** "Send ok"**.**

Most processes are repeated every fixed time so some lines may be displayed again from time to time. Also, note, that this is just a sample log with no unexpected exceptions or errors.

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8. FAQ

1. FM3101 doesn't see any GPS satellites and cannot set its coordinate. What should I do?

Minimum 3 satellites are used to set coordinate. For better performance, place GPS antenna near the window, or even outside the window, so it would see as greater area of the sky as possible. Metal and concrete obstacles (floor, walls or even poles) prevent module from receiving good signal).

2. I'm sending messages with settings or request for coordinates, but messages don't reach their destination. What is the problem?

Check if FM3101 module has GSM network. You can view it in Configurators title window - it's shown in the left side, near the operators' logo. If module is not in network coverage or GSM signal is too low, it may not establish operators' name. See if GSM antenna is connected properly and is not placed near metal or in the electromagnetic field. Check if PIN code request is off in the configurator (chapter 3.4). Also you can check the SIM card by inserting it in the mobile phone.

3. Messages reach their destination and I am sure that module doesn't react to them. What now?

Check in the log if GPRS is allowed at that moment if you are transferring data by GPRS. Check if SMS center is correct (chapter 3.3) for sending SMS. See what identifier and password are entered and see if you wrote correct ones in the message text and check if configuration is not restricted to receiving only authorized numbers (in the Configurator window click "User Control Mode" - "Settings", "Read Parameters", "Security").

4. Why doesn't module send data automatically? Each time I want new data, I have to request for it.

Default data sending intervals may be too long. Try configuring device so it acquires data more frequently and sends it more often. Also check log if specified destination is correct.

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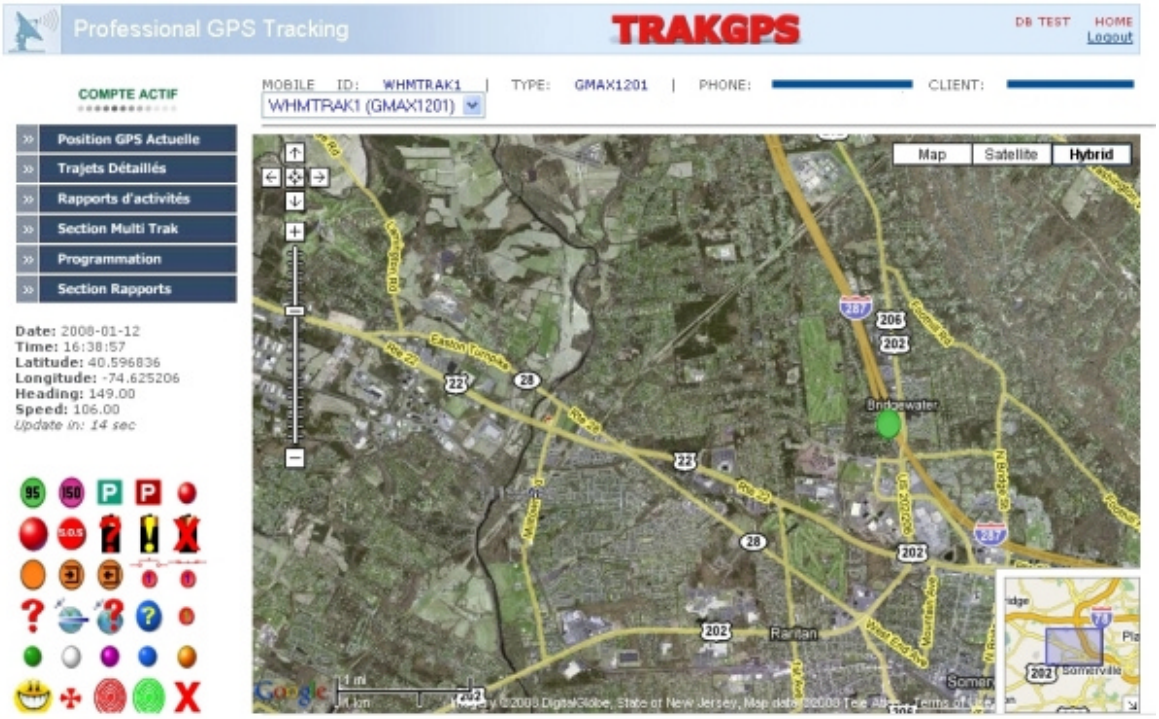
9. TRACKING SOLUTION

We can provide you *FREE* solution to start Real Time GPS Tracking with our Web-Based interface. Take a look to our demo right here : www.trakgps.com/member

username : demo
password : demo

You will have access to Actual GPS Position features section. You can use your own model of tracker and trak for free also with our interface. For more information please call us at +14504396403 or +15148876403.



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10. TECHNICAL SUPPORT

If you encounter any problems when using our products, please contact our technical support by writing an e-mail to support@trakgps.com . We will be pleased to help you.

If you are interested in other products from TrakGPS, please visit our website www.trakgps.com/shop, where you will find our newest products.

If you are interested in product pricing or want to order our products with different antennas, connectors or built-in programs, please contact our sales department by writing an e-mail to info@trakgps.com

The supervision of the device is undemanding.

You can also visit our Technical Support Forum at : www.trakgps.com/phpbb

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