



GNMobile / GNMobileTM User Guide

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GNMobile / GNMobileTM User Guide

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1 General Information

Geo++® GNMmobile and Geo++® GNMmobileTM are based on Java™ application for mobile phones, terminal modems and other Java™-compatible micro controller.

GNMmobile / GNMmobileTM makes it possible, to connect several hardware interfaces, on which different protocols will be maintained. For instance is one of the application the connection to a RTCM-data stream of a NTRIP-Caster via GPRS and the delivery of the absolute RTCM-data stream on the serial interface of the mobile phone.

1.1 Differences GNMmobile / GNMmobileTM

GNMmobile was developed for application on mobile phones etc., posses an graphical Interface and an interactive user interface (keyboard, touchscreen etc.)

GNMmobileTM is for applications on terminalmodems (TM) or others, not posses an graphical Interface nor an interactive user interface either.

On these you have to config with externals like e.g. PC's.

1.2 Way of Work

GNMmobile / GNMmobileTM affords to establish connections between available and respectively supported hardware interfaces of a terminal. Terminals could be:

- Mobil phones (GNMmobile)
- Terminal modems (GNMmobileTM)
- and other Micro controller (GNMmobile / GNMmobileTM)

And the following interfaces of the terminals will be support:

- Modems (GSM/GPRS)
- Serial Ports (RS232)
- Infrared
- Bluetooth

Supplementary GNMmobile / GNMmobileTM supports still different protocols which could be apply on the several hardware interfaces. These are the Low-Level-Protocols „TCP“ and „UDP“ and additional „HTTP“ and „NTRIP“.

GNMmobile / GNMmobileTM affords for instance following applications:

- On mobile phone receipt of RTCM-data streams from a NTRIP-Caster on Internet and transfer of these data by a serial interface of the mobile phone to an attached GPS-Receiver. This makes the application of „NTRIP“ with older GPS-receiver possible which do not support directly „NTRIP“.
- Receipt of „RAW“-data stream from GPS-receiver by the serial interface or Bluetooth and forwarding this data streams to a „TCP“-Server on Internet. (at this time only GNMmobile)
- Receipt of any data or serial Port and forwarding on Bluetooth-Interface.

All connection can be configured if required as bidirectional. This affords for instance sending of „NMEA“- Messages parallel to an received RTCM-data stream.

1.2.1 NTRIP

Geo++® GNMmobile contains also a special Support for **NTRIP** (Network Transport of RTCM via Internet Protocol). It is possible – in addition to the real using the protocol for data transfer – to advise the multitude of deposit informations to the separate streams and to simplify with their help the configuration considerably. In detail it is possible to import the source tables of a „NTRIP“-Caster, to filter out the mount points according to data types and saving the selected mount points into directory.

2 Installation

The setup of Geo++® GNMmobile /GNMmobileTM is very easy and by several paths possible. Geo++® GNMmobile can be straightly from Internet on mobile phone, or Bluetooth or Infrarot or via data wire, like GNMmobileTM handles, from a local PC possible. However the steps can be easily diverge of each other per terminal and interface.

2.1 Download and Files

For the latest Geo++® GNMmobile you will find the link here: www.geopp.de/gnmobile. If you using a WAP-Browser on a mobile phone you will find at www.anton.geopp.de/wap another download-area on a WAP-Server. Following files are provided on the separate download servers. Alternatively the complete installations-packet with documentation and program files or both disassociate for downloading.

- gnmobile.zip – Contains the complete documentation and all program files
- gnmobile_userguide_de.pdf – This document
- gnmobile_userguide_en.pdf – English Version of this document
- gnmobile.jar – Program file
- gnmobile.jad – GNMmobile Application Descriptor.
- gnmobile_tm.jar – GNMmobileTM Program file
- gnmobile_tm.jad – GNMmobileTM Application Descriptor.

This contains a program description with declaration of version, needed APIs and similar. It will be used from Java™-runtime environment of the terminal, for starting links, regulating the access authorization and verifying contents.

2.2 Installation via the Internet (installation over air)

The installation via the Internet you can find in other readings or installation hints often under the term „installation over air“. The description „over air“ shall not describe the medium but reveal, that this concerns an unsure connection, which has to be handled differentiated.

For installation via the Internet it is irrelevant with which medium the connection is established, whether via GSM, GPRS, UMTS or similar. It has simply an effect on transmission time.

2.2.1 Mobile phone

An installation on mobile phones can be done with use of a WAP- or Webbrowser of the phone. Here should be entered following link to the Application Descriptor (gnmobile.jad) and executed .

<http://www.anton.geopp.de/wap/gnmobile/gnmobile.jad>

A corresponding link on a WAB- or a Website of our download areas can also be used.

After the former step the setup routine starts automatically and it makes an inquiry that depends by the chosen hardware and ask if Geo++® GNMmobile should really be downloaded and if links should be created and on which position. After answering that questions GNMmobile is fully and successful installed.

2.2.2 Terminal Modems

On GSM-, GPRS- or UMTS-terminal modems exist rarely different ways for starting a link. There is partly the possibility given by serial interface and AT-commands to start the installation-process with retrieving the link to the Application Descriptor (gmobile_tm.jad) or also by specific commands in a Telnet session. Details for that should be taken from the documentation of the special type.

Because this way of installation for some terminal modems are very complicated or not possible. One of the following method may be more practicable.

2.3 Installation from a local PC

There are different ways to make up a connection between PC and terminal during the installation of a local PC. It is imperative the basic principle that the Application Descriptor (gmobile.jad or gmobile_tm.jad) and the real Application (gmobile.jar or gmobile_tm.jar) have to be transmit to the terminal. That can be different for the specific hardware. The most used ways will be described here.

2.3.1 Transfer via Data Wire

For establishing a connection by USB- or serial data wire between PC and mobile device there are several driver, which are included in delivery in all current devices. They work after installation nearly all in a similar manner. The file system of mobile phone or Terminal modem will be displayed as additional drive or directory on your PCs. Now you have only to copy the applications files gmobile.jar and gmobile.jad into a directory GNMmobile. This one has to be created in a special path which is reserved only to Java™-applications. The base directory for Java™-application is different indeed from manufacturer' s device. In the appendix 7.1 table is displayed which directory structure exists or must be created by the most popular manufacturers.

2.3.2 Transfer via Bluetooth

For a setup with use of Bluetooth connection between PC and mobile device. On the mobile phone or terminal modem Bluetooth must be activated and the device should be configures as visible for other devices. After doing that on a PC you have to run a search for Bluetooth-devices whether the mobile device is still not known. Was the mobile device found it can be opened. For this process you have to follow the respective dialogues on PC and mobile device. Afterwards a OBEX-File-Transfer shall be abound and behind that the file system of the terminal is reachable. Now the GNMmobile / GNMmobile™ can be copied as already described under point 2.3.1.

3 Program Idea

The general main principal of GNMmobile / GNMmobile™ is based on that several hardware interfaces and the protocols that can be used on it can be used in all possible combinations for creating a connection between two interfaces. A combination of hardware interface and protocol is called "Device". That are for example a serial interface, the access to a mount point on NTRIP-Caster in Internet, a Bluetooth-access to a GPS-Receiver and so one. All that devices are stored and organized in a Device Book.

Now (in standard case) two Devices can be set for one connection. For example the Device to a mount point on NTRIP-Caster in Internet can be declared as „Input Device“ and the Device which specifies the serial interfaces can be declared as „Output Device“ for outputting the data stream of mount point on serial interface

4 Quick start

In this section the necessary steps which are required for a quickly launch of the program are described. More detailed information to the several steps, dialogs and program components you will see in chapter 5.

4.1 Run

After successful installation now the GNMmobile can run by new arisen menu item GNMmobile at the menu „My Applications“ or „Applications“. It appears the start screen of Figure 1.



Figure 1:



4.2 Configure Device Book

In the first the Device Book (Figure 2) should be opened and all required devices should be added to the existing entries. This is possible by the menu item „New entry“ under „Options“ in the dialog in Figure 2. After that different menus follow which allow several devices to specify. When all needed devices are added the Device Book can be quit with „Back“.

4.3 Configure a Connection

The following step comprised the configuration of a connection. This can be done with using the menu item „Settings“ at the main dialogue. It opens up the dialogue shown at Figure 3. Here it is possible to declare a device that was specified at the Device Book as „Input“ and another one as „Output“. The connection between both devices can here also be configured as bidirectional. For non bidirectional connections it is important that the device from which the data were read are declared as „Input“ and the device on which the data were transferred as „Output“.

Figure 2:

Additional settings for the connection are also possible in dialog „Settings“ (Figure 3) for instance Timeouts, options for error handling and so on. In the normal case than can be used with the default settings. When all necessary settings are done the dialogue can be left with „Ok“, that stores and makes the configuration active.

4.4 Connect and Disconnect

After successful configuration in main menu the options „Connect“, „Disconnect“ and „Reconnect“ are available which create, close and reset the connection. The status of the connection are shown in the main dialogue by the current connect time and the transmitted and received bytes or kilobytes.



Figure 3:

5 Program Description

In following chapter all dialogs and configuration possibilities will be described.

5.1 GNMobile

For mobile phones etc. with its own display an keyboard.

5.1.1 Main Dialog

In main dialogue (Figure 4) is a description given of the active connecting state with number of received (Received) and send (Send) bytes as well as connect time (Duration) in hours - minutes - seconds. The number of bytes apply to Input-Device. For example in Figure 4 778 kilobyte were received on the Input Device and send to the Output-Device.

The Top bar shows the condition of the Input Buffer and the lower bar shows the condition of the Output Buffer.

5.1.2 Options Menu

In the Options Menu the following described Submenus could be reached.

5.1.3 Connect, Reconnect and Disconnect

The commands „Connect“, „Reconnect“ and „Disconnect“. This commands will be used for create, setting back and close the connection. After connecting or setting back the connection, the display of sent and received bytes and also the connection time will be reset as already shown in Figure 4 .



Figure 4:

5.1.4 Settings

Figure 5:



In the dialogue „Settings“ you can choose the “Application Mode”, the “Input_Device” or the “Connection Settings”.

5.1.4.1 Application Mode

In the “Application Mode” you choose if a “Single Connection” (Default) that means you have to set one Input and one Output Connection in the following steps. Or you want to create a “Multiplex Connection” where you can send multiple Input and Output Connections through the Mobile Phone. That means multiple Data Streams of the Connections are packed on one side and be unpacked and sorted on the other side of the Configuration.

Requirement of this mode is that on the client side as well as on the server side the Geo++ MultiplexProtocol (GNInvers) is arranged.

5.1.4.2 Device Choice

The Menu “Device Choice” let you select the connection(s) on the Input -as well as the Output side out of the “Device Book”. Figure 5.

With the button „Launch Device Book“, it is possible to retrieve directly the Device Book for adding an missing Device or making required modifications on a existing Device.

5.1.4.3 Connection Settings

Here you can set various connection parameters as follows:

5.1.4.3.1 Connection Settings -Options

The Options setting dialog is displayed in Figure 6. There are still a couple of additional options, for example „Reconnect at errors“. When this option is activated it will be attempt at connection problems or errors to reset and reconnect the connection to the specified devices. This happens with a certain time delay. When recovering of the connection fails the time offset between the resets increases by and by.

The option „Duplex“ shall be activated or deactivated when it concerns at bidirectional connections and simply one data stream in one direction. However this adjustment has not directly a bearing on real mode of operation but upgrades only the performance.



Figure 6:

5.1.4.3.2 Connection Settings -Expert Options

The selection “Buffered” only works if the “Duplex” Mode is set. If this option is set, the data-stream will be read “buffered”, else byte-wise.

The option “Single Optimized” as well only works if the “Duplex”-Mode is set. The read and the write – Threads of the “Duplex” Mode will be optimized in one read and write Thread.

The selection of the size of the “Input buffer” and of the “Output buffer”, as you can see in Figure 7, will be used if the “Buffered”-option is set. If the “Duplex” option is not set, only the “Output buffer” selection is mentioned.

The designation „Timeout“ specifies the time offset after that a connection will be closed or reseted when no data was transferred. If it will be closed or reseted conforms with the option „Reconnect at errors“. Is this option is activated the access will be reset otherwise it will be closed.



Figure 7:

5.1.5 Device Book

The Device Book is the central address book where all Devices are created, stored and organized. You will find here options for editing, configuring and adding. For all

Figure 8:



Devices an individual name can be assigned, which only acts for ease of identification of one Device. It is not described in following chapters.

After first system boot the Device Book already will filled with some standard- and system-devices. This are for instance existing COM-Ports or Infra-red interfaces.

If you use the “MultiplexConnection” you will see the connection “Terminal” which shows the collected datastreams binary on e.g. the mobile display. Furthermore there is the “NMEA Screen” connection, shows the corrected position of the antenna on e.g. the mobile display.

5.1.6 Adding New Device

For adding a new Device, the dialogue has to be retrieve with menu item „New entry“ in Device Book (pointed in Figure 8). Now you can select the correspond type of device.

These are in the moment

- NTRIP Client
- COM- and Infraredports
- TCP-Client
- Bluetooth

After selection of the type and confirm with „Ok“ an entry mask opens for giving the special information that are required for the chosen device. That respond to the dialogs that are described in chapter „Device edit“. Details to this dialogues are available in the following chapters.

5.1.6.1 Add a new NTRIP-Device

A little bit different to other devices is the creation procedure of a „NTRIP“-Device. After the dialogue shown in Figure 8 exists the possibility to produce mount points by an import from a „NTRIP“-Caster. The import can be started through selection of the entry „Import from Caster“ at the dialogue displayed Figure 9. That will follow the dialogue of Figure 8 . If „Manually“ is chosen here an entry mask will opened that is described in chapter Fehler: Referenz nicht gefunden.



Figure 9:



Figure 10:



Figure 11:

5.1.6.2 Import NTRIP-Mount Points

At the option of import, in the dialog can be declared the corresponding Caster from that one or an set of mount points should be imported (see Figure 10). In addition there is still another mode of operation for filtering in advance the mount points. There exists the possibility the data sheet with included available mount points, to restrict only to mount points with „RTCM“- or „RAW“- data streams. See Figure 11 . After that it is possible by selecting of individual mount points to take them over in Device Book. If several mount points requires still an authentication by user name and password this information will be inquired and for selected mount point saved. However all data may be still later amend in Device Book.

5.1.6.3 Device-Parameter

This chapter describes how to edit several Devices and the meaning of the special parameters of it. The described parameters and displayed dialogues are identical to that one which will be used to at the creation process of a Device.

A parameter which is used and identical on all Device types will not be explained in the next chapters. It is an individual name which can be free defined and is advised in all further dialogs for identification of Devices. This individual name can be changed any time and can be exist repeatedly in the Device Book.

5.1.7 COM- or Infrared Port



Figure 12:

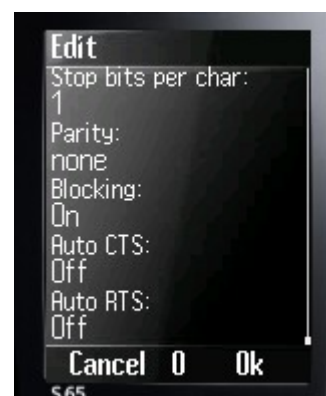


Figure 13:

5.1.7.1 ID

The ID of COM- and Infrared port are composed of identification „COM“ for COM-Port or „IFR“ for a Infrared port plus the port number. An example shows Figure 12 . The counting mode on mobile phones is a little bit different as used at PCs. The first COM- or Infrared port is referred to 0 and all others will be counted up serially. Normally COM- and Infrared ports will be separate numbered of each other.

The rule for ID generation can be different at different hardware types. All Devices for existing COM- and Infrared ports will be added automatically to the Device Book. So that in the normal case it is not necessary to edit ID manually.

5.1.7.2 Baud Rate

As per Figure 12 to see the parameter for the Baud rate specifies the data transmission speed and is declared in bits per second. The most popular value for modern terminals are 57600 bits and 115200 bits. Most important at this is that both sides are plugged by COM- or Infrared port and using the same speed.

5.1.7.3 Transmission Control

The next three parameters in Figure 12 and Figure 13 „Bits per char“, „Stop bits per char“ and „Parity“ serve for transmission control. They should used as a rule with values, as pointed in Figure 12 and Figure 13 . This is conform with „8N1“. As well it is important once again, like at the baud rate that both sides of the access by COM- or Infrared port use the same settings.

The next parameter for transmission control „Blocking“, „Auto CTS“ and „Auto RTS“ in Figure 13 do not compulsory require the same settings on opposite side. The „Blocking“ says that to reading stream will not be read until the internal read buffer is filled.

The next both parameter „Auto CTS“ and „Auto RTS“ will be unsupported in many cases on mobile phones or terminal modems. In this case they shall be set to „Off“ as shown in Figure 13.

5.1.8 TCP-Client

In the editor for a TCP-Client only two parameters are needed as displayed in Figure 14. The first parameter is the „Host“ which can be either a host name or a valid IP address. See Figure 14. The second parameter specifies the port number of circularized service.

5.1.8.1 TCP-Access via proxy server

For establishing a connection to a TCP-Server through the use of a proxy server it is not possible to declare the Proxy server internal the GNMmobile. That must be done in general HTTP-profile or the special HTTP-profile for the application of the mobile phone or terminal modem. That configuration differs racily from manufacturer of mobile device. For more information have look to the documentation of the mobile device.

The configuration internal the Geo++® GNMmobile with the use of a proxy server differs not from the configuration without a proxy server.



Figure 14:

5.1.9 NTRIP-Client



Figure 15:



Figure 16:

5.1.9.1 NTRIP-Caster and Mount Point

For the configuration of a „NTRIP-Device“ the „Host“ and „Port“ out of known chapter 5.1.8 are necessary, which describes an „NTRIP“-Caster with a host name or IP address as well as port number, as to see in Figure 15 . Additionally is for description of data stream still the designation of a mount point required which is identifying the data stream. .

5.1.9.2 NTRIP-Authentication

As per Figure 16 described dialog to see, the optional authentication for „NTRIP“-data stream are possible. The field „Authentication“ at Figure 16 declares the type of authentication. Here are „None“ no authentication, „Basic“ or „Digest“ possible. The types of „Basic“ or „Digest“ requires the definition of a username and password in the fields „User“ and „Password“ (Figure 16).

The different between both authentication type are the type of encryption that will be used to encode user name and password. The chosen type must equal to the type that is expected by the caster.

5.1.9.3 NTRIP - Optional Information



Figure 18:



Figure 17:



Figure 19:

Additionally exits for the „NTRIP-Device“ some optional input fields that are shown in figure 18 to 19. That field are

only used as information, have no effects for creating connection and can be blank at a manual configuration.

5.1.9.4 NTRIP-Connection via a Proxy-Server

This connection is identical to the chapter „TCP“-Connection. Have a look to chapter 5.1.8.1

5.1.10 System information

The menu entry „System info“ makes it possible to display some system information. This view is split in three categories. First a category that shown a status of JAVA™ -APIs. The second category contains information about the system properties that likes the environment variables on a PC and the last category show information about the permission of an application.

5.1.11 System logs

On the main menu under „System logs“ are log information for the running application available. Here exists also the possibility to send this information and the System information from chapter 5.2.2 to the Geo++® Support-Server with the use of the “Send” button.

5.2 GNMmobileTM

GNMmobileTM is a terminal-modem-edition especially for automatically use.

5.2.1 Manually configuration

The configuration for a terminal-modem uses a PC editable data file, which has to transfer via data wire to the terminal-modem:

```
gnmobile_tm.properties
```

This ACSII readable data file is editable with every standard editor program.

Options not to be set could be set to nostring as well as to remove completely.

The order of the entries does no effect for the correct compilation.

The entries were just read out and set into the terminal-modem. It is rather important to obtain the correct spelling (see appendix).

During further documentation there are given examples to the parameters, to ensure the correct spelling and choices.

5.2.1.1 GNMmobileTM register for autostart

Register GNMmobileTM for autostart. If this option is set true and not set in the Terminalmodem, GNMmobileTM register itself for autostart.

```
add.to.autostart=true
```

(not available yet, you have to register/deregister for/from autostart by AT Commands as seen in Chapter 7.3.2)

5.2.1.2 GNMmobileTM deregister from autostart

Deregister GNMmobileTM from autostart. If this option is set true GNMmobileTM will deregister from autostart for next time.

```
remove.from.autostart=true
```

(not available yet, you have to register/deregister for/from autostart by AT Commands as seen in Chapter 7.3.2)

5.2.1.3 Autoconnect

The GNMmobileTM program will start automatically on starting the terminal-modem when this option is set.

Further on the terminal-modem connects, on starting the GNMmobileTM, automatically confirm to the given parameter and connection settings.

The connection will stop when powering off or connection errors occur.

```
auto.connect=true
```

5.2.1.4 PIN Number of SIM Card

At this point the PIN-number of the SIM-Card of the terminal-modem should be set.

GNMobileTM tries to activate the modem by sending the AT+CPIN=xxxx comand. If this value is not set, GNMobileTM expects an already given and initialized PIN of the modem.

If a correct PIN for the modem is already available, a manually option setting has no effect.

```
sim.pin=0000
```

5.2.1.5 License Key

This entry contains the license key to admire work with GNMobileTM.

After first start of GNMobileTM, on display as well as in a log data file named:

gmobile_tm.log, in the installation path of GNMobile which depends on the used modem (see appendix), the serial number of the terminal modem will be set.

You can get the license key by visiting our homepage www.geopp.de and put the serial number of the terminal-modem to the path of "support"->"Geo++GNMobile"->"download/register" where the input is expected.

```
key=011478658830
```

5.2.1.6 Devices / Settings

Out of the various Devices you have to specify an "input" and an "output" device, by "type" parameter setting.

```
input=in      name of input device e.g. „in“  
output=out   name of output device e.g. „out“
```

The possible devices are:

gsm	=	data service provider directly (only for input)
com	=	serial port / infrared
tcp	=	TCP client
ntrip	=	NTRIP client

```
in.type=ntrip  forNTRIP-input  
out.type=tcp   for TCP-output
```

Further options:

If the option "reconnect" is set "true", the program tries to reconnect the connection if an connection error occurred.

The program tries to reconnect in time-steps with intervals even getting longer.

```
reconnect=false
```

The "duplex" option should be activated or deactivate, if you have a bidirectional connection or the data stream is running in one direction. This option has no direct effect at all on the real cause function, but slows or accelerate the connection performance.

```
duplex=false
```

The selection "Buffered" only works if the "Duplex" Mode is set. If this option is set, the data-stream will be read "buffered", else byte-wise.

```
buffered=false
```

The option “Single Optimized” as well only works if the “Duplex”-Mode is set. The read and the write – Threads of the “Duplex” Mode will be optimized in one read and write Thread.

```
optimized=true
```

The selection of the size of the “Input buffer” and of the “Output buffer” will be used if the “Buffered”-option is set. If the “Duplex” option is not set, only the “Output buffer” selection is mentioned.

```
input.buffer.size=4096
```

```
output.buffer.size=96
```

5.2.1.7 GPRS / CSD Connection

Depending on your Net-Provider / modem-manufacturer the following parameter has to be set, if you wanted to connect to the **Internet** by using TCP or NTRIP (see above).

The connections could be GPRS (General Packed Radio Service) or CSD (Circuit Switched Data). There for the type has to be set:

```
inet.bearer_type=GPRS
```

If you use GPRS you have to set the internet address for GPRS depending on your provider called: access-point:

```
inet.access_point=web.vodafone.de
```

Using GPRS you do not need a dial-in number.

If you use CSD you have to set a dial-in number, depending on the modem-manufacturer:

```
inet.phone_number=01234
```

Using CSD you do not need an access-point.

Depending on your provider a username and a password is required.

```
inet.username=username_value
```

```
inet.password=password_value
```

To solve the given internet address for GPRS or the dial-in number for CSD, you have to set the name-server, who manages that:

```
inet.dns=139.7.30.125
```

last step for this you have to set a period time after the internet connection should be closed, when there is no data traffic.

```
inet.timeout=180
```

Advise: Ask your provider to get the correct connection parameter.

5.2.1.8 GSM – Connection

If the connection to the DataServiceProvider should be accessed directly via telefontnumber dialing, you have to set the `in.type=gsm`

```
in.phone_number=0123456789 (GSM-dial-in number)
```

The dial-in number for the related mountpoint is given by your DataServiceProvider.

5.2.1.9 Serial Port (COM-Prot-ID) / Infrared

The counting for COM-and-Infrared-ports for terminal-modems is quiet different as you are used to from PC's .

The first COM-and-Infrared-port on your modem you can see in the log-file (as described in chapter 5.1.9).

This file contains behind the entry "microedition.commports:" a comma separated list of ID's.

```
in.id=0
```

5.2.1.9.1 Baudrate

The "baudrate" parameter specify the transferspeed and has to be set in bits per second.

Usual for modern modems are 57600 and 115200. The important thing is that both sides of the COM-port connection has to use the same transferspeed.

```
out.baudrate=57600
```

5.2.1.9.2 Transmission control

The next three parameters "bitsperchar", "stopbits" and "parity" serve for transmission control. They should used as a rule with values, as pointed above . As well it is important once again, like at the baud rate that both sides of the access by COM- or Infrared port use the same settings.

```
out.bitsperchar=8
```

```
out.stopbits=1
```

```
out.parity=none
```

The next parameter for transmission control "blocking", "autoCTS" and "autoRTS" do not compulsory require the same settings on opposite side. The "blocking" says that to reading stream will not be read until the internal read buffer is filled.

The next both parameter "autoCTS" and "autoRTS" will be unsupported in many cases on mobile phones or terminal modems. In this case they shall be set to "false".

```
out.blocking=true
```

```
out.autoCTS=false
```

```
out.autoRTS=false
```

5.2.1.10 TCP-Client

Only two parameters are needed.

The first parameter is the „host“ which can be either a host name or a valid IP address. The second parameter specifies the port number of circularized service.

```
in.host=localhost
```

```
in.port=2101
```

5.2.1.11 NTRIP-Client

For the configuration of a “NTRIP-device” the well known “host” and “port” are necessary, given by a hostname or an IP-address as well as the port number describing a “NTRIP” caster.

```
in.host=localhost
```

```
in.port=2101
```

5.2.1.11.1 NTRIP-Mountpoint

After selecting the NTRIP-Imports you have to set a “mountpoint”.

```
in.mountp=test1
```

If a “mountpoint” needs an authentication with username and password, they have to be set:

username:

```
in.user=geopp
```

password:

```
in.pwd=geopp
```

5.2.1.11.2 NTRIP- authentication

An optional authentication for NTRIP -data streams are possible.

The option “encrypt” set the type of authentication. Possible are no authentication, “basic” or “digest”.

The types “basic” or “digest” effort a given username and password.

The difference between the two types is the encryption of transferred the given username and password, depends on the caster.

```
in.encrypt=0 (0 =basic, 1 = digest) or in.encrypt= (no authentication)
```

5.2.1.11.3

5.2.1.11.4 NTRIP Protocol (TCP / UDP)

For the Datastreams there is beside the TCP-Protocol the UDP-Protocol available. (see Chapter 7.5).

```
in.protocol=2 (1=tcp, 2=udp) default if not available 1=tcp.
```

5.2.2 System information and logfile

Differing to GNMmobile writes GNMmobileTM the systeminformation-status-states and other information in a logfile named:

gnmobile_tm.log.

Usually this file will be stored in the install path. If the GNMmobileTM is installed on a “read-only” filesystem or there is a reason for not to be able to write this file, GNMmobileTM searches for any writeable storages, and stores the logfile in the first found directory.

To ensure not to produce a memory overflow of the found storages, the logfile overwrites itself by restart the system.

5.2.2.1 Logfile on standard-out

If this option is set

```
stdout=true
```

you will get the output for the logfile additional to the standard-out device (mostly the PC screen).

5.2.2.2 Debug output

If this option is set

```
debug=true
```

you will get additional to the INFO, WARNING and the ERROR messages a DEBUG output to the logfile or, if stdout is set as well to the standard-out device.

6 System requirements

Geo++® GNMmobile / Geo++® GNMmobile™ requires some Java™ Application APIs which have to be provided by the mobile device. Normally these are sufficiently supported by most devices from the well known manufacturers, even on older hardware.

6.1 Required Java™ -Application-APIs

Following APIs are required for the main functionality:

- CLDC 1.0
- MIDP 2.0

If Bluetooth and other additional functions shall be used, the device must support the following additional APIs:

- Bluetooth API
- File Access/Connection API
- Location API

6.2 Hardware

Have a notice at the purchasing of hardware that the chosen types support the system requirements from chapter 6.1 and also that all required hardware interfaces and required utilities like data cable are available. Here are some problems at special types known that serial ports are supported by the mobile phone but that no data cable are available on the market.

Geo++® GNMmobile / GNMmobile™ are tested successfully on following listed types:

- Siemens / BenQ 65 Serie
- Siemens / BenQ TC 65 (Terminal-Modem)
- Siemens / BenQ 75 Serie
- Siemens / BenQ 85 Serie
- Siemens / BenQ 68 Serie
- Nokia 6230I
- Sony / Ericsson K750i, K800i (Bluetooth seen in Chapter 8)

7 Appendix

7.1 Installation Pathes

<i>Manufacturer</i>	<i>Typ / Serie</i>	<i>path</i>
Siemens / BenQ	65, 68, 75, 85	Data\Java\jam\Applications\GNMmobile
Siemens / BenQ	TC65	Free chooseable and configurable
Nokia		
Motorola		
Sony / Ericsson	K800i	

7.2 GNMmobileTM Configuration file(example)

```
#####  
##### General Section #####  
#####  
#  
#  
# Contains SIM card PIN. GNMmobileTM try to activate via the command  
# AT+CPIN=xxxx. If that entry is not given GNMmobileTM expects a with PIN  
# initialized modem environment at starttime.  
# This setting has not effects if a valid PIN is already available  
#  
sim.pin=0000  
#  
#  
# GNMmobile prof. license key  
#  
key=1111111111111111  
#  
#  
#  
# Is this option is enabled GNMmobileTM will register itself for an autostart  
# after power on. At the next start GNMmobileTM will start 5 sec after power on.  
# That option will no effects if GNMmobileTM is allready registered for autostart  
# [true|false]  
#  
add.to.autostart=true  
#  
#  
# Is this option is enabled GNMmobileTM will deregister itself from the autostart  
# table That option will no effects if GNMmobileTM is not registered for an autostart  
# [true|false]  
#  
remove.from.autostart=false  
#  
#  
# Connect automaticly after startup [true|false]  
#  
auto.connect=true  
#  
#  
# Reconnect at connection errors [true|false]  
#  
reconnect=false  
#
```

```
#
# Use bidirectional connections. Please enable that only if
# it is necessary because an enabled duplex option at a non duplex
# connection use much CPU power [true|false]
#
duplex=true
#
# *****
buffered=true
# *****
single.thread=true
#
# Max buffer size for UDP connections at Siemens TC65 are 1472 bytes
# *****
input.buffer.size=1024
output.buffer.size=96
#
#
#####
##### GPRS/CSD Section #####
#####
##
## Following settings contains the dialin parameters to your GPRS or CSD
## provider. So all settings depends from your internet provider.
##
## This settings are only be required in case that an ntrip or tcp connection
## is configured and activated in the next steps.
##
#####
#
# Service type [GPRS|CSD]
inet.bearer_type=GPRS
#
# Host or IP address of GPRS access point in case of GPRS
inet.access_point=web.vodafone.de
#
# Username for connection
# inet.username=username_value
#
# Password for connection
# inet.password=password_value
#
# Host or IP address the name server that should be used
inet.dns=139.7.30.125
#
```

```
#
# dialin for CSD connections
# inet.phone_number=
#
#
# Connection timeout in seconds
inet.timeout=180
#
#
#####
##### Device Section #####
#####
#
##### Device activation #####
#
# ID of input device
#
input=in
#
#
# ID of output device
#
output=out
#
##### Device definitions #####
#
# Device type possible values
#   gsm           Dataserviceprovider
#   com           Serial port
#   tcp           TCP Client
#   ntrip         NTRIP client
#   bluetooth     Bluetooth slave
#
#in.type=gsm
#
#in.phone_number=0123456789
#
in.type=ntrip
#
#
# NTRIP caster host
#
in.host=193.173.48.194
#
#
```

```
# NTRIP caster host
#
in.port=2107
#
#
# NTRIP Mountpoint
#
in.mountp=VRS01
#
#
# NTRIP User
#
in.user=geopp
#
#
# NTRIP PWD
#
in.pwd=hannibal
#
#
# NTRIP pwd encryption type [0|1] 0=basic 1=digest
#
in.encrypt=0
#
#
# NTRIP underlying protocol [1|2] 1=tcp 2=udp default if not available =1=tcp
# *****
in.protocol=2
#
#
#
# COM-Port id. Have a notice that the comport numbers starts on a mobile phone or
# terminal modem in the most cases from zero instead from one.
#
out.id=0
#
# Device type possible values
#
#   com           Serial port
#   tcp           TCP Client
#   ntrip        NTRIP client
#   bluetooth    Bluetooth slave
#
out.type=com
#
```

```
# Baudrate of the comport [57600]
#
out.baudrate=115200
#
#
# The number bits per character [7|8].
#
out.bitsperchar=8
#
#
# the number of stop bits per char [1|2]
#
out.stopbits=1
#
#
# The parity can be [odd|even|none]
#
out.parity=none
#
#
# If on, wait for a full buffer when reading. [true|false]
#
out.blocking=true
#
#
# If on, wait for the CTS line to be on before writing [true|false]
#
out.autoCTS=false
#
#
# If on, turn on the RTS line when the input buffer is not full. If off, the RTS line is always on.[true|false]
#
out.autoRTS=false
#
#
#
#####
##### Experimental Section #####
#####
#
# Serial interface configuration. GNMmobile™ will execute for each following
# setting the responding AT command. An AT command will be executed if the
# responding key exist and also if the value contains the default value. If
# you don't want to execute a special command than remove the key value pair.
```

```
#
#
#
#
# AT\Q
#
# [0|1|2|3]
#
# 0 Disable flow control
# 1 XON/XOFF software flow control
# 2 Only CTS by DCE (TA)
# 3 RTS/CTS hardware flow control
#
# com.flow.control=0
#
# AT&C
#
# [0|1|2]
#
# 0 DCD line shall always be on
# 1 DCD line shall always be on only when data carrier signal is present
# 2 DCD line shall always be on when ....
# com.dsd=0
#
# AT&D
#
# [0|1|2]
#
# 0 TA ignores status of DTR
# 1 ON->OFF on DTR: Change to command mode while retaining the connected call
# 2 ON->OFF on DTR: Disconnect data call change to command mode. During state
#     DTR=OFF auto-answer is off
#
# com.dtr=0
#
# AT&S
#
# [0|1]
#
# 0 DSR line is always on
# 1 TA in command mode: DSR is OFF
# TA in data mode: DSR is ON
#
# com.dts=0
#
```

```
#
#
#####
#
# Following you are able to configure AT commands that will be that will be
# executed at the startup of GNMmobile™.
#
#
# at.1=AT&F
#
# at.2=AT+CPIN?
#
# at.X
#
#
#
#####
#
# An example for bluetooth in the moment in development state
#
# in.bt_protocol=bt_l2cap
# in.bt_id=an_id
# in.bt_psm=1
# in.bt_encrypt=false
# in.bt_authentication=true
# in.bt_master=false
#
#####
#
# buffered=false
# stdout=false
# debug=true
#
#####
##### End of file #####
```

7.3 Configuration with JAD- file

For make it easier to use, the configuration file (see above) could be copied and paste to the end of the gnmobile_tm.jad file.

Then you have to remove all comments and exchange all equal signs between key and the value by colons.

The search algorithm for the configurationfile is now:

- 1) Configuration file “gnmobile_tm.properties” if exists and is valid
- 2) JAD file “gnmobile_tm.jad”
- 3) Internal default values

You have to delete all configuration files before from the terminal-modem if you want to use this functionality.

Example:

MIDlet-1: GNMmobileTM,/icon.png,gnmobile.GNMmobileTM

MIDlet-Data-Size: 1

MIDlet-Icon: /icon.png

MIDlet-Info-URL: www.internet.de

MIDlet-Jar-Size: 55907

MIDlet-Jar-URL: gnmobile_tm.jar

MIDlet-Name: GNMmobileTM

MIDlet-Vendor: Geo++ GmbH

MIDlet-Version: 1.2.3

MicroEdition-Configuration: CLDC-1.0

MicroEdition-Profile: IMP-NG

support_server: socket://localhost:8080

sim.pin: 1234

key: 0123456789

add.to.autostart: true

remove.from.autostart: false

auto.connect: true

reconnect: false

duplex: true

inet.bearer_type: GPRS

inet.access_point: web.provider.de

inet.dns: 111.111.111.111

inet.timeout: 180

input: in

output: out

in.type: ntrip

in.host: www.internet.de

in.port: 8080

in.mountp: mount

in.user: geopp
in.pwd: geopp
in.encrypt: 0
out.id: 0
out.type: com
out.baudrate: 115200
out.bitsperchar: 8
out.stopbits: 1
out.parity: none
out.blocking: true
out.autoCTS: false
out.autoRTS: false

7.4 AT-Commands

7.4.1 Manually startup:

For the first time, or later manually startup of GNMmobileTm you have set the AT-Command:

```
AT^SJRA=a:/gnmobile_tm.jar
```

After the Modem-ID has been read out of the LogFile [A:/gnmobile_tm.log](#), and the license key is set in the file: gnmobile_tm.properties, the GNMmobileTM could be start everytime by using the AT-Command seen above.

7.4.2 Automatically startup:

If you like to register GNMmobileTM for automatically startup on power on, or bootup, please use following AT commands:

```
AT^SCFG="AutoExec",1,1,0,0,"AT^SJRA=a:/gnmobile_tm.jar",000:00:05
```

```
AT+CFUN=1
```

and to deregister:

```
AT^SCFG="AutoExec",0,1,0,0
```

```
AT+CFUN=1
```

or to check the register status:

```
AT^SCFG?
```

7.5 UDP Protocol

GNMmobile / GNMmobile™ uses a special, **Geo++UDP-Protocol**, which is enlarged 2Bytes to the standard UDP-Protocol, to exclude Provider depending problems.

7.5.1 Explanation

1. We have added two bytes to every datagram sent by either caster or client.
These two bytes are a Connection-Id in the first byte and a datagram counter in the second byte.
2. We have deleted the Null-Byte messages because they could not be received by the UDP client.
May be either a problem of our mobile phone service or a problem with the Siemens module.
3. A datagram with 2 bytes only (Control-Datagram) (i.e. no application data) serves as a control datagram.

The connection, disconnection control works as follows:

1. The first Datagram sent by the client to the server is a Control-Datagram with both bytes set to zero (0x00,0x00) (UDP-CONNECT)
2. The caster starts a new internal connection,once it receives the (UDP-CONNECT) (0,0) Control-Datagram.
3. As a response to the UDP-CONNECT the Caster will send a Control-Datagram with a Connection-ID in the First Byte (Range 1-255) and a connection active byte (0x01) in the second byte.
4. The Client must use the Connection-ID in any datagram sent to the server. The second byte must be a rolling counter, starting with 1 for the first and incremented by 1 for every new data-datagram.
5. The caster will send datagrams to the Clients-IP and UDP-Port using the same Connection-ID and a rolling counter (starting with 1) for the first- data-datagram. The client should not forward the 2 control bytes.
6. To maintain the connection the client should send a data-datagram or a control-datagram with (ID,0x01) (UDP-KEEP-ALIVE) at least once within the timeout period (60 seconds) to the server.
7. To actively stop the connection the client can send a Control-Datagram (UDP-DISCONNECT) (ID,0x00).
8. If the caster stops the connection it will also send the UDP-DISCONNECT control-datagram.
9. The client should stop the connection if it receives the UDP-DISCONNECT. The client should further allow for any other type of control-datagram and ignore them.
10. If the caster receives a new UDP-CONNECT from the same client (i.e. same IP address and Port number) it will automatically disconnect any existing connection for the same client immediately and start the new connection.
12. Your client may monitor the datagram counter to identify any out-of-sequence datagrams.

8 Bluetooth Example:

8.1 Mission:

Regarding the huge amount of questions referring to an up to date mobile phone connecting to an receiver via serial cable we would like to present a more modern way.

8.2 Solution:

Because of trouble handling various *USB* to *serial* port simulating versions we would suggest to fill out the *serial* cable connection from the receiver to the mobile phone by a wireless ***bluetooth* connection.

Therefor *bluetooth* is becoming more popular nearly every modern mobile phone has a build in *bluetooth* connector.

8.3 Required Hardware:

On the receiver side there is a (dependant on the manufacturer) adapter needed to get a real 9 pin serial com port plug (rs232).

For this plug there are many *bluetooth rs232 adapter* on the market.

8.4 Tested Equipement:

We have tested the following combinations:

- Leica Receiver System 1200 (put to RTCM 3.1 data output).
- *LinTech RS232 MINI V4.03:1 bluetooth adapter
- SonyEricsson k800i mobile phone
- Siemens S68 mobile phone

8.5 Bluetooth Wizard:

This wizard should only show one solution. It is of course possible/needed to vary some entries to be conform to the local environment.

8.5.1 Receiver:

At first configure your Receiver (Example shows the Leica properties):

- RT mode rover
- RT data RTCM x.x
- Port 1
- Device „Bluetooth“ to be created by you.

Attention: Take care of the connection parameter to the com-port, they have to equals the bluetooth adapter parameters)

- baudrate (115200)
- parity (no)
- data bits (8)
- stop bits (1)
- flow control (RTS/CTS)

Do not forget to charge the *bluetooth* adapter.

Connect the *serial* rs232 connector of the receiver (Example: port 1) to the *bluetooth* adapter.

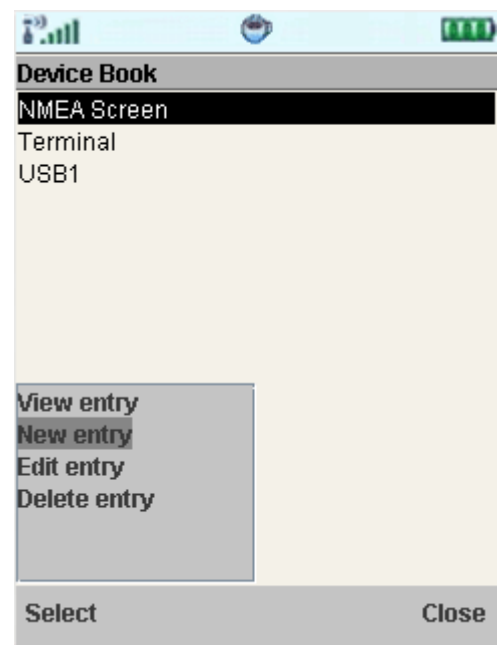
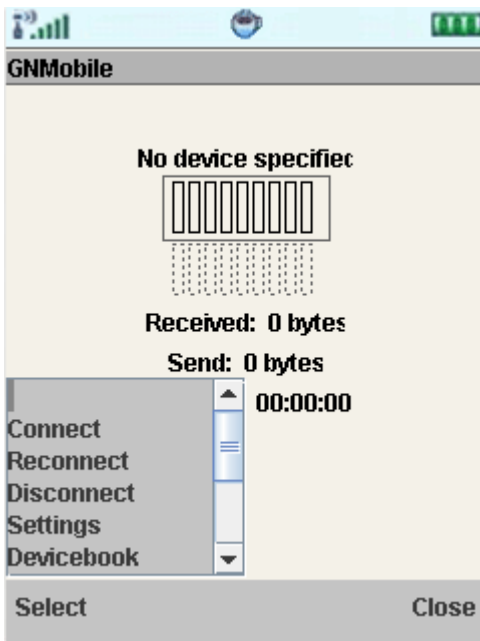
8.5.2 Mobile Phone:

Search in your mobile phone the *bluetooth* environment and select the found adapter in our example the

Name:
LinTech RS232 MINI V4.03:1

Remark: Allow your mobile phone to communicate to the Net e.g. via **GPRS**.

Run the **GNMobile** application.

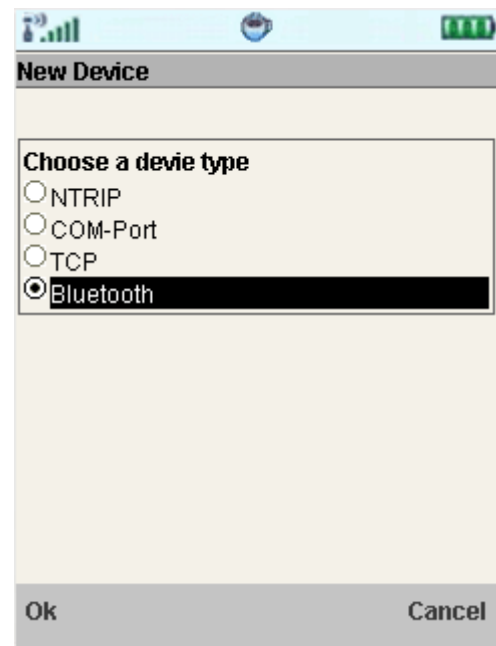
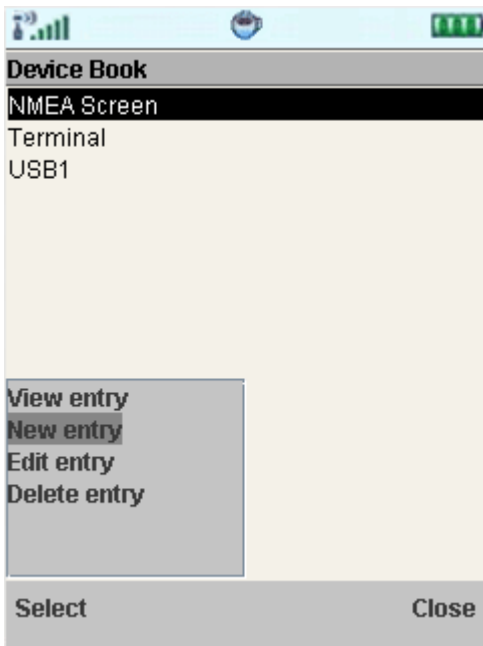


open the **Devicebook** and select **new entry** to define an NTRIP Mountpoint on the Netside by:

- choose **NTRIP**
- select **Import from Caster**
- choose **new**
- and then **select from sourcetable**
- input the **host** and **port** from the sourcetable you would like to connect to
- select in the easiest way **show all mountpoints**
- wait while **loading...**

then select the mountpoint you want to connect to.

After that you have to define the receiver (*bluetooth*) side:



select **New entry** and choose **Bluetooth**. After the mobile search all bluetooth devices select

your **Bluetooth Device**:

Name: LinTech RS232 MINI V4.03:1
--

and leave the menu settings as follows:

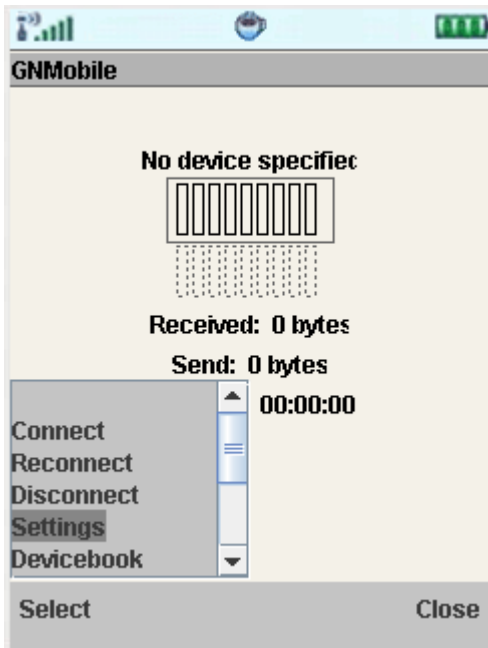
Connnection:

- leave the **Authentication true**
- and the **Encryption false**
- furthermore **Must be Master false**

the authentication of the **LinTech* is by default **1234** as seen in the manual of your bluetooth adapter.

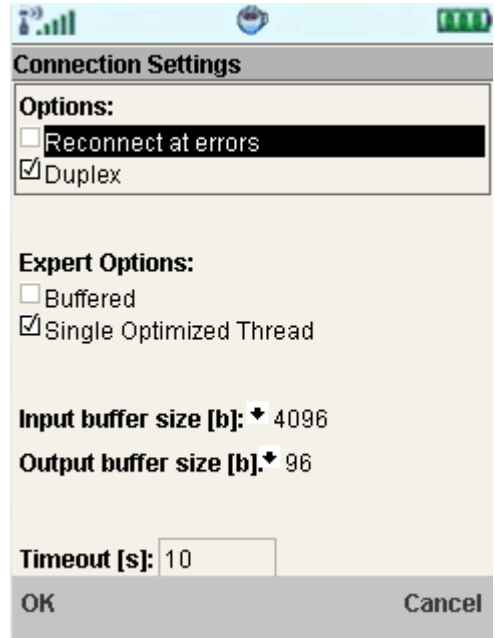
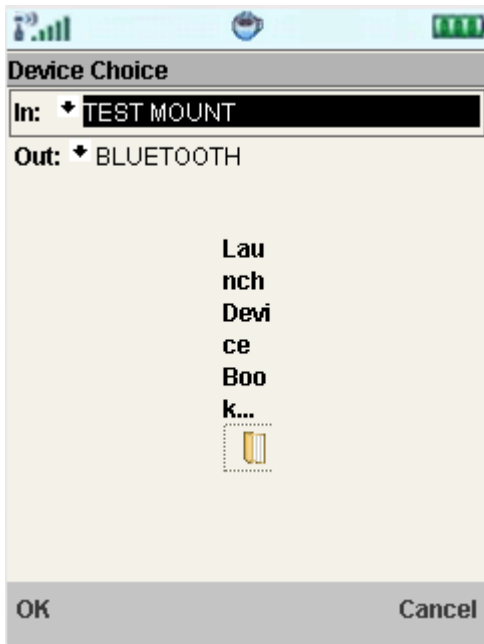
Take care that the **Bluetooth services:** is **SDP true** and press **OK** !

Then choose from the main menu



Settings and go into the Application Mode, choose single connection and leave with OK

Select the next point Device Choice:

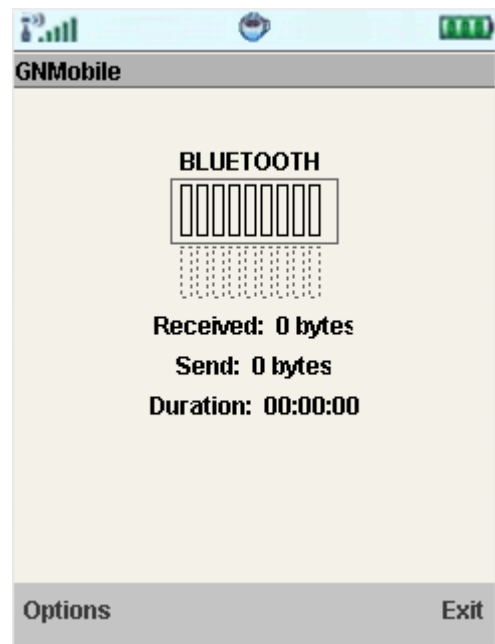
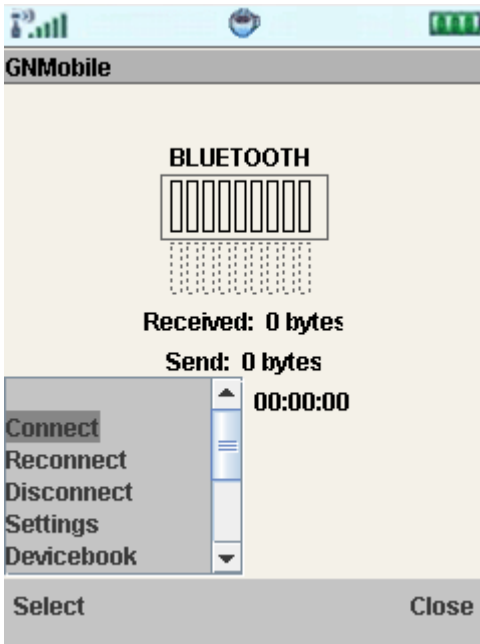


and select as **IN** the NTRIP Mountpoint you have chosen from the sourcetable and as **OUT** the bluetooth Adapter you specified.

Leave with **OK** and select the last step: **Connection Settings**

Select the options like shown above and press **OK**.

Last Step:



from the main window choose **Connect**

If everything runs fine the progress bar show some traffic and the bytes send and received are growing up and the receiver will fix after a while.

The pictures shows only one example to configure the GNMobile bluetooth connection.

Depending on the various mobile phones and bluetooth adapters on the market the pictures may look little different and the settings may vary on your equipment.

*LinTech is a product of LinTech GmbH, Berlin Germany

**Bluetooth is a trademark owned by Bluetooth SIG, Inc., USA.