

SAMBA 55/56

GSM/GPRS

User's guide



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Version history:

Version number	Author	Changes
1.00	F. Beqiri	Initial version
1.01	F. Beqiri	The modem driver and WellPhone “GPRS Controller” software as a test version added.
1.02	F. Beqiri	Added three different housing colours, see below . LED colour description removed due to the different colour provided on the different devices.
1.03	F. Beqiri	Chapter 3.1.1.1 updated. Chapters 2.3 and 2.4 added. Chapter 7.6 updated.

Cautions

Information furnished herein by FALCOM are accurate and reliable. However, no responsibility is assumed for its use.

Please read carefully the safety precautions.

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0 Introduction

This manual is focussed on the GSM/GPRS data solutions of the SAMBA USB modem from FALCOM GmbH.

The SAMBA is a Plug-and-Play device in extremely small size (88 x 37 x 12 mm), which provides a powerful state-of the art technologies (GSM, GPRS) and makes them available for a quick and easy way to plug in GSM and GPRS functionality to systems and modems. The SAMBA provides an integrated SIM card reader, an internal GSM antenna, an audio channel and a standard USB interface. The physical interface to the modem application is made through an embedded USB connector. It consists of 4 pins, required for controlling the unit, transferring data and audio signals and providing power supply lines. The embedded USB interface allows it direct connection to a USB serial port of desktop or notebook computers. The SAMBA is designed for use on any GSM network in the world, it is a Tri-Band GSM/GPRS engine that works in the three frequencies GSM 900, DCS 1800 MHz and PCS 1900 MHz or GSM 850, DCS 1800 MHz and PCS 1900 MHz. This full type approved integrated modem constitutes a self contained, fully integrated implementation of the GSM/GPRS standard. The SAMBA features GPRS multi-slot class 10 and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. The SAMBA equipment supports GPRS Class-B. This means, that the Mobile Station can set up a GSM call (voice, CSD or fax) while GPRS attached.

A standard SIM card has to be inserted into the integrated card reader. The SAMBA modem can send and receive data by GSM and GPRS network. It supports voice, SMS, fax as well and offers a choice of seven different ringing tones/melodies which are easily selectable using AT command. The SAMBA modem can be easily controlled by using AT command for all kinds of operations.

About GPRS:

GPRS is a high-speed, data-only service that is an add-on to the GSM (Global System for Mobile Communications) cellular network - a type of network used to provide cellular phone service.

The SAMBA Modem provides reliable data connections to GPRS 900 MHz (GSM), 1800 MHz (DCS) networks. When in regions where GPRS is not available, user can still access their important information with GSM 14.4 kbps data connections.

Users are advised to quickly proceed to the “Security” chapter and read the hints carefully.

0.1 Scope of delivery

Check the contents of the package. The following listed items should be included. In case of damaged or missing any item, please contact your dealer immediately.

Concerning the SAMBA, there are two different SAMBA modems which operate in the different frequencies:

1. The **SAMBA 55** Tri-band device which operates in the three frequencies GSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz, and is available to use in the European and Asia Networks.
2. The **SAMBA 56** Tri-band device which operates in the three frequencies GSM 850 MHz, DCS 1800 MHz and PCS 1900 MHz, and is available to use in the American Networks.

Please note that, according to your requirement you can choose the desired SAMBA device.



SAMBA-55-SET (included)



SAMBA-USB-KIT (accessories)

Name	Part	Quantity
SAMBA-55-SET	SAMBA 55	1
	Headset	1
	Software and driver CD-ROM	1
SAMBA-56-SET	SAMBA 56	1
	Headset	1
	Software and driver CD-ROM	1
SAMBA-USB-KIT*	USB-Docking station with cable extension	1
	USB-Tilt connector, around 180° turnable	1

* This is not part of SAMBA 55/56-SET's delivery package. Available upon request.

Up to three different housing colours of SAMBA are available upon request (see figures below). However, there is no difference in the hardware and software specification except their LED colors, which are not the same in all designed devices.



red colour



blue colour



orange colour

0.2 Used abbreviations

Abbreviation	Description
ETSI	European Telecommunications Standards Institute
GSM	Global System for Mobile communications
IMEI	International Mobile station Equipment Identity
ME	Mobile Equipment
GPRS	General Packet Radio Service
PLMN	Public Land Mobile Network
PIN	Personal Identification Number
PUK	Personal Unblocking Key
RP	Receive Protocol
RXQUAL	Received Signal Quality
SIM	Subscriber Identity Module
SMS	Short Message Service
SMS/PP	Short Message Service/Point-to-Point
TA	Terminal Adapter
TE	Terminal Equipment
TP	Transmit Protocol
MS	Mobile Station
USB	Universal Serial Bus
PTM	Point To Multipoint

Abbreviation	Description
NOM	Network Operation Mode
PPP	Point to Point Protocol
CSD	Circuit Switched Data
URC	Unsolicited Result Code

0.3 Related documents

- ETSI GSM 07.05 “Use of Data Terminal Equipment - Data Circuit terminating Equipment interface for Short Message Service and Cell Broadcast Service“
- ETSI GSM 07.07 “AT command set for GSM Mobile Equipment”
- AT-Command manual “Description of all supported AT-Command”

1 Security

IMPORTANT FOR THE EFFICIENT AND SAFE OPERATION OF YOUR GSM MODEM READ THIS INFORMATION BEFORE USE !

Your GSM modem is one of the most exciting and innovative electronic products ever developed. With it you can stay in contact with your office, your home, emergency services, and others, wherever service is provided.

1.1.1 GENERAL

Your modem utilises the GSM standard for cellular technology. GSM is a newer radio frequency (« RF ») technology than the current FM technology that has been used for radio communications for decades. The GSM standard has been established for use in the European community and elsewhere.

Your modem is actually a low power radio transmitter and receiver. It sends out and receives radio frequency energy. When you use your modem, the cellular system handling your calls controls both the radio frequency and the power level of your cellular modem.

1.1.2 EXPOSURE TO RF ENERGY

There has been some public concern about possible health effects of using GSM modem. Although research on health effects from RF energy has focused for many years on the current RF technology, scientists have begun research regarding newer radio technologies, such as GSM. After existing research had been reviewed, and after compliance to all applicable safety standards had been tested, it has been concluded that the product is fit for use.

If you are concerned about exposure to RF energy there are things you can do to minimise exposure. Obviously, limiting the duration of your calls will reduce your exposure to RF energy. In addition, you can reduce RF exposure by operating your cellular modem efficiently by following the below guidelines.

1.1.3 EFFICIENT MODEM OPERATION

For your modem to operate at the lowest power level, consistent with satisfactory call quality:

If your modem has an extendible antenna, extend it fully. Some models allow you to place a call with the antenna retracted. However your modem operates more efficiently with the antenna fully extended.

Do not hold the antenna when the modem is « IN USE ». Holding the antenna affects call quality and may cause the modem to operate at a higher power level than needed.

1.1.4 ANTENNA CARE AND REPLACEMENT

Do not use the modem with a damaged antenna. If a damaged antenna comes into contact with the skin, a minor burn may result. Replace a damaged antenna immediately. Consult your manual to see if you may change the antenna yourself. If so, use only a manufacturer-approved antenna. Otherwise, have your antenna repaired by a qualified technician. Use only the supplied or approved antenna. Unauthorised antennas, modifications or attachments could damage the modem and may contravene local RF emission regulations or invalidate type approval.

1.1.5 DRIVING

Check the laws and regulations on the use of cellular devices in the area where you drive. Always obey them. Also, when using your modem while driving, please: give full attention to driving, pull off the road and park before making or answering a call if driving conditions so require. When applications are prepared for mobile use they should fulfil road-safety instructions of the current law!

1.1.6 ELECTRONIC DEVICES

Most electronic equipment, for example in hospitals and motor vehicles is shielded from RF energy. However RF energy may affect some malfunctioning or improperly shielded electronic equipment.

1.1.7 VEHICLE ELECTRONIC EQUIPMENT

Check your vehicle manufacturer's representative to determine if any on board electronic equipment is adequately shielded from RF energy.

1.1.8 MEDICAL ELECTRONIC EQUIPMENT

Consult the manufacturer of any personal medical devices (such as pacemakers, hearing aids, etc...) to determine if they are adequately shielded from external RF energy.

Turn your modem **OFF** in health care facilities when any regulations posted in the area instruct you to do so. Hospitals or health care facilities may be using RF monitoring equipment.

1.1.9 AIRCRAFT

Turn your modem **OFF** before boarding any aircraft.

Use it on the ground only with crew permission.

Do not use in the air.

To prevent possible interference with aircraft systems, Federal Aviation Administration (FAA) regulations require you to have permission from a crew member to use your modem while the plane is on the ground. To prevent interference with cellular systems, local RF regulations prohibit using your modem whilst airborne.

1.1.10 CHILDREN

Do not allow children to play with your modem. It is not a toy. Children could hurt themselves or others (by poking themselves or others in the eye with the antenna, for example). Children could damage the modem, or make calls that increase your modem bills.

1.1.11 BLASTING AREAS

To avoid interfering with blasting operations, turn your unit **OFF** when in a « blasting area » or in areas posted : « turn off two-way radio ». Construction crew often use remote control RF devices to set off explosives.

1.1.12 POTENTIALLY EXPLOSIVE ATMOSPHERES

Turn your modem **OFF** when in any area with a potentially explosive atmosphere. It is rare, but your modem or its accessories could generate sparks. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.

Areas with a potentially explosive atmosphere are often, but not always, clearly marked. They include fuelling areas such as petrol stations; below decks on boats; fuel or chemical transfer or storage facilities; and areas where the air contains chemicals or particles, such as grain, dust, or metal powders.

Do not transport or store flammable gas, liquid, or explosives, in the compartment of your vehicle which contains your modem or accessories. Before using your modem in a vehicle powered by liquefied petroleum gas (such as propane or butane) ensure that the vehicle complies with the relevant fire and safety regulations of the country in which the vehicle is to be used.

1.1.13 NON-IONISING RADIATION

As with other mobile radio transmitting equipment, users are advised that for satisfactory operation and for the safety of personnel, it is recommended that no part of the human body be allowed to come too close to the antenna during operation of the equipment.

The radio equipment shall be connected to the antenna via a non-radiating 50Ohm coaxial cable.

The antenna shall be mounted in such a position that no part of the human body will normally rest close to any part of the antenna. It is also recommended to use the equipment not close to medical devices as for example hearing aids and pacemakers.

1.2 Safety standards

THIS CELLULAR MODEM COMPLIES WITH ALL APPLICABLE RF SAFETY STANDARDS.

This cellular modem meets the standards and recommendations for the protection of public exposure to RF electromagnetic energy established by governmental bodies and other qualified organisations, such as the following:

- Directives of the European Community, Directorate General V in Matters of Radio Frequency Electromagnetic Energy.

2 SAMBA Modem

2.1 Technical Data

2.2 General characteristics

2.2.1 General

- Tri-Band GSM/GPRS (SAMBA 55) Modem E-GSM900 + DCS1800 + PCS 1900MHz
- Tri-Band GSM/GPRS (SAMBA 56) Modem E-GSM850 + DCS1800 + PCS 1900MHz
- Class 4 (2W) for EGSM900 / EGSM850
- Class 1 (1W) for DCS1800 / PCS1900
- Small size and low power consumption
- Voice, SMS
- Fax and data transmission without extra hardware
- Internal 3V SIM interface
- Easy remote control by AT commands for dedicated applications.
- Fully Type Approved according to GSM Phase 2+ specifications
- Fully shielded and ready-to-use

2.2.2 Electrical

Power supply: +5 VDC (through USB interface)

2.2.3 Physical

Absolute maximum dimension: 88.7mm x 37.6mm x 12,6mm (L x B x H)

Weight: 79 gr.

Normal range temperature: -20°C to +55°C

Restricted operation: -25°C to -20°C and +55°C to +70°C

2.2.4 Basic Features

2.2.4.1 *Telephony*

- Telephony (TCH/FS) & Emergency calls
- Full Rate, Enhanced Full Rate, Half Rate and Adaptive Multi Rate (AMR)
- Dual Tone Multi Frequency function (DTMF)

2.2.4.2 *Short Message Service (GSM and GPRS mode)*

- Text and PDU
- Point to point MT & MO
- SMS Cell Broadcast

2.2.4.3 GSM circuit Data Features

- Non-transparent mode only
- Group 3: Class 1, Class 2
- Alternate speech and fax
- MNP2

2.2.4.4 GPRS Packet Data Features

- GPRS data downlink transfer: max. 85.6 kbps (see [Table 2](#))
- GPRS data uplink transfer: max. 42.8 kbps (see [Table 2](#))
- Coding scheme: CS-1, CS-2, CS-3 and CS-4
- Supports the two protocols PAP (Password Authentication Protocol) and CHAP (Challenge Handshake Authentication Protocol) commonly used for PPP connections
- Support of Packet Switched Broadcast Control Channel (PBCCH) allows you to benefit from enhanced GPRS performance when offered by the network operators
- CSD transmission rates: 2.4, 4.8, 9.6, 14.4 kbps, non-transparent, V.110
- Unstructured Supplementary Services Data (USSD) support
- WAP compliant
- Compliant with SMG31bis

2.2.4.5 GSM Supplementary services

- Call Forwarding
- Call Barring
- Multiparty
- Call Waiting and Call Hold
- Calling Line Identity
- Advice of Charge
- USSD
- Closed User Group

2.2.4.6 Other features

- SM, FD, LD, MC, RC, ON, ME +SIM phone book management
- Fixed Dialling Number
- SIM Toolkit Class 2
- SIM, network and service provider locks
- Real Time Clock
- Alarm management
- UCS2 character set management

2.2.5 Interfaces

Single antenna interface

Internal SIM interface: 3V only

For Data Operation: USB serial link
remote control by AT commands (GSM 07.07 and 07.05)
baud rate from 300 up to 115,200 bits/s

USB: Full USB and USB 2 compatibility

Firmware upgrade: Over USB interface and SIM interface.

2.2.6 Power consumption

Average current (in mA at 5 V ± 5%):				
GSM	900	1800	MHz	GSM band
	57	57	mA	in idle mode (base station sends at -85 dBm)
	195	143	mA	in transmit mode at power level 7/3
	232	166	mA	in transmit mode at power level 5/0 (maximum)
GPRS	423		mA	in receive/transmit mode at maximum power level 5 (3 x downstream +2 x upstream using Coding Scheme: CS-4)

Table 1: The average power consumption at 5V ± 5%

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

Table 2: Coding schemes and maximum net data rates over air interface

Please note that the values listed above are the maximum ratings which, in practice, are influenced by a great variety of factors, primarily, for example, traffic variations and network coverage.

2.3 Air interface of the SAMBA GSM/GPRS part

Test conditions:

All measurements have been performed at $T_{amb} = 25\text{ }^{\circ}\text{C}$, $V_{Input\ power} = 5\text{ V}$.
The reference points used on SAMBA are internal contacts.

Parameter		Min	Typ	Max	Unit
Frequency range Uplink (MS → BTS)	E-GSM 900	880		915	MHz
	GSM 900	1710		1785	MHz
Frequency range Downlink (BTS → MS)	GSM 1800	1850		1910	MHz

	E-GSM 1900	925		960	MHz
	GSM 1800	1805		1880	MHz
	1900	1930		1990	MHz
RF power @ ARP with 50 Ω load	E-GSM 900	31	33	35	dBm
	GSM 1800	28	30	32	dBm
	GSM 1900	28	30	32	dBm
	E-GSM 900		174		
	GSM 1800		374		
	GSM 1900		299		dBm
Duplex spacing	E-GSM 900		45		MHz
	GSM 1800		95		MHz
	GSM 1900		80		MHz
Carrier spacing			200		kHz
Multiplex, Duplex		TDMA/FTDMA, FDD			
Time slots per TDMA frame			8		
Frame duration			4.615		ms
Time slot duration			577		μ s
Modulation		GMSK			
Receiver input sensitivity @ ARP BER Class II < 2.4 %	E-GSM 900	-102	-107		dBm
	GSM 1800	-102	-106		dBm
	GSM 1900	-102	-106		dBm

Table 3: Air Interface

2.4 Reliability characteristics

The test conditions stated below are an extract of the complete test specifications.

Type of test	Conditions	Standard
Vibration	Frequency range: 10-20 Hz; acceleration: 3.1 mm amplitude Frequency range: 20-500 Hz; acceleration: 5 g Duration: 2h per axis = 10 cycles; 3 axes	DIN IEC 68-2-6
Shock half-sinus	Acceleration: 500 g	DIN IEC 68-2-27

	Shock duration: 1 msec 1 shock per axis 6 positions ($\pm x, y$ and z)	
Dry heat	Temperature: $+70 \pm 2$ °C Test duration: 16 h Humidity in the test chamber: < 50 %	EN 60068-2-2 Bb ETS 300019-2-7
Temperature change (shock)	Low temperature: -40 °C ± 2 °C High temperature: $+85$ °C ± 2 °C Changeover time: < 30 s (dual chamber system) Test duration: 1 h Number of repetitions: 100	DIN IEC 68-2-14 Na ETS 300019-2-7
Damp heat cyclic	High temperature: $+55$ °C ± 2 °C Low temperature: $+25$ °C ± 2 °C Humidity: 93 % ± 3 % Number of repetitions: 6 Test duration: 12 h + 12 h	DIN IEC 68-2-30 Db ETS 300019-2-5
Cold (constant exposure)	Temperature: -40 ± 2 °C Test duration: 16 h	DIN IEC 68-2-1

Table 4: Summary of reliability test conditions

3 Interfaces in overview

The integrated modem has a sole USB connector which gathers all the interface signals in order to facilitate its integration.

It has an integrated SIM card reader as well as a internal GSM antenna.

The concept of the integrated modem has been defined to integrate on a sole device with follow interfaces:

Interface specifications	
Interface A	Standard USB plug serial interface
Interface B	Audio interface 2,5 mm (4-pin) connector (for included headset)
Interface C	SIM card reader for small SIM cards (3V)
Interface D	3 optical indicators LED's

Table 5: Interface specifications of the Modem

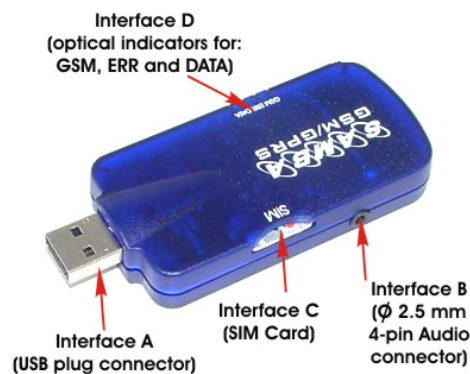


Figure 2: view of SAMBA interfaces.

3.1.1.1 Interface A (4-pin USB Type A connector)

The power supply for the GSM/GPRS part of the SAMBA modem has to be a single voltage source of +5 V. It must be able to provide sufficient current in a transmit burst which typically rises according to the USB 1.1 and 2.0 statements. Please refer to the USB 1.1 and 2.0 specifications.



Figure 3: Mini-USB pin-out (interface A)

Pin	Description
1	+ 5V
2	- DATA
3	+ DATA
4	GND

Table 6: Pin assignment of the standard USB connector

3.1.1.2 Interface B (4-pin audio connector)

The SAMBA modem provides this interface for a headset connection. For more details about headset see chapter 7.1 “Accessory”.



Figure 4: Audio interface pin-out (interface B)

3.1.1.3 Interface C (SIM-Card interface)

The SIM interface controls a 3V SIM card. This interface is fully compliant with GSM 11.11 recommendations concerning SIM functions.



Figure 6: SIM Card interface

3.1.1.4 Interface D (Optical interface)

The actual state of the SAMBA is displayed by three LED's (their functionality is described in the next chapter) on this interface, see figure below.



Figure 7: Status indicator of modem

3.2 Functional description

The GSM/GPRS modem SAMBA is a mobile station for transmission of voice, data and fax calls as well as SMS in GSM networks.

The GSM/GPRS modem SAMBA consists of the following components:

- GSM/GPRS transceiver
- USB 1.1 for power supply, data transmission and control.
- GPRS Class B, class 10.

The GSM/GPRS modem SAMBA allows control of the GSM/GPRS modem over the interface A.

If the GSM/GPRS modem SAMBA is registered in the network, it acts just like a regular fax/data modem. To control the GSM or GSM/GPRS Modem there is an advanced set of AT-commands according to GSM ETSI 07.07 and 07.05 implemented.

The actual state of the SAMBA is displayed by three LED's on the interface D of the Modem.

The table below shows the function of these LED's.

LED's		
Name	LED mode	Function
GSM (LED)	Off	Modem is off or run in SLEEP mode
	600 ms On / 600 ms Off	No SIM card inserted or no PIN entered, or network search in progress, or ongoing user authentication, or network login in progress.
	75 ms On / 3 s Off	Logged to network (monitoring control channels and user interactions). No call in progress.
	75 ms On / 75 ms Off/ 75 ms On / 3 ms Off	One or more GPRS contexts activated.
	Flashing	Flashing Indicates GPRS data transfer: When a GPRS transfer is in progress, the LED goes on within 1 second after data packets were exchanged. Flash duration is approximately 0.5 s.
	On	On Depending on type of call: <i>Voice call</i> : Connected to remote party. <i>Data call</i> : Connected to remote party or exchange of parameters while setting up or disconnecting a call.
	ERR (LED)	200 ms On / 200 ms Off
100 ms On / 3.2 s Off		No SIM card inserted, Modem On, USB On.
Off		Modem and USB are OK
Continually On		USB device initialization or USB device error.
DATA (LED)	flashes	Indicates incoming/outgoing Modem Data Traffic

Table 7: Modes of the LED's and associated functions

4 GSM/GPRS application interface

4.1 Description of operating modes

The chapter below briefly summarizes the various operating modes referred to in the following chapters.

Definition of the GPRS class B mode of operation:

The definition of GPRS class B mode is, that the MS can be attached to both GPRS and other GSM services, but the MS can only operate one set of services at a time. Class B enables making or receiving a voice call, or sending/receiving an SMS during a GPRS connection. During voice calls or SMS, GPRS services are suspended and then resumed automatically after the call or SMS session has ended.

4.1.1 **Normal mode operation**

4.1.1.1 ***GSM/GPRS SLEEP***

Various power save modes set with AT+CFUN command. Software is active to minimum extent. If the module was registered to the GSM network in IDLE mode, it is registered and paging with the BTS in SLEEP mode, too. Power saving can be chosen at different levels: The NON-CYCLIC SLEEP mode (AT+CFUN=0) disables the AT interface. The CYCLIC SLEEP modes AT+CFUN=5, 6, 7, 8 and 9 alternatively activate and deactivate the AT interfaces to allow permanent access to all AT commands.

4.1.1.2 ***GSM IDLE***

Software is active. Once registered to the GSM network, paging with BTS is carried out. The module is ready to send and receive.

4.1.1.3 ***GSM TALK***

Connection between two subscribers is in progress. Power consumption depends on network coverage individual settings, such as DTX off/on, FR/EFR/HR, hopping sequences, antenna.

4.1.1.4 ***GPRS IDLE***

Module is ready for GPRS data transfer, but no data is currently sent or received. Power consumption depends on network settings and GPRS configuration (e.g. multislot settings).

4.1.1.5 ***GPRS DATA***

GPRS data transfer in progress. Power consumption depends on network settings (e.g. power control level), uplink/downlink data rates and GPRS configuration (e.g. used multislot settings).

4.1.2 Power down

Normal shutdown after sending the AT^SMSO command. The Power Supply ASIC (PSU-ASIC) disconnects the supply voltage from the base band part of the circuit. Only a voltage regulator in the PSU-ASIC is active for powering the RTC. Software is not active. The serial interfaces are not accessible. Operating voltage (connected to GSM_BATT+) remains applied.

4.1.3 Alarm mode

Alarm mode restricted operation launched by RTC alert function while the module is in POWER DOWN mode. Module will not be registered to GSM network. Limited number of AT commands is accessible.

5 System Requirements

Check your hardware and software and see if they satisfy the requirements below. If you are not sure, please consult your dealer or operator.

5.1 Hardware & software requirements

Hardware & software requirements

- ✓ A valid SIM card.
- ✓ Free compatible USB port
- ✓ Approximately 6 Mb of free hard disk space.
- ✓ Pentium 90 or higher.
- ✓ Operating system: Windows® 98/Me/2000/XP
- ✓ CD-ROM drive.

For data applications.

- ✓ Browser and email client.

6 Getting started

6.1 Installing your SAMBA in a Laptop computer running Windows® 98, 2000, ME, XP

This chapter explains how to install the SAMBA in a laptop computer. It is recommended that all important files are backed up prior the installation.

1. Inserting the SIM card:

After the unpacking SAMBA requires a small SIM card, which is provided by your mobile phone service provider. This contains the telephone number of SAMBA will use, as well as other customer information.

If your SIM is larger credit-card size, it may have a snap-out area that allows the small SIM to be removed by gentle twisting. Otherwise apply to your service provider for a small SIM.

The SIM card must be enabled for all the service that you want to use – VOICE, DATA, and/or FAX; if in doubt contact your service provider.

a) To insert the SIM card:

- ❖ Insert the SIM card into the corresponding SIM card reader of modem and slide it forward until it stop. The bevelled corner of SIM card has to be on the left side of SIM card reader and the golden contact area is facing downwards. Make sure that the SIM card is sit firmly into the SIM card reader slot. See also figures below.



Figure 9: Place the SIM Card.



Figure 10: Push it forward into the SIM-Card reader.

b) To remove the SIM card:

- ❖ To remove the SIM card please just push it forward, it jumps out, so you can take it out.

Important: Do **not** insert or remove the SIM card when the device is under power.

Keep all miniature SIM cards out small children's reach. The SIM card and its contacts can be damaged by scratches or bending, so be careful when handling, inserting or removing the SIM card.

2. Plug the headset to the Modem:

If you are using the included headset (refer to the chapter Appendix), then plug the 2.5 mm connector of the headset to the 2.5 mm connector of the modem.



Figure 15: Connect the headset to the modem

3. Connecting the SAMBA:

- ❖ Close all open applications.
- ❖ Insert the SAMBA phone into one of your computer's PC USB slots. Plug fully in the USB slot of your computer as shown below but do not use force. The SAMBA is automatically switched on when you insert it in the USB slot of your computer. The SAMBA is then active and the middle LED labelled "ERR" lights. The insertion of the SAMBA phone should trigger a feature of Windows called "Plug and Play" which launches the **Found New Hardware** wizard. The wizard displays a message indicating that it will search for a driver for the **Falcom SAMBA**. Click **Next**.

CAUTION - Use caution when inserting the SAMBA into the USB slot. Forcing the SAMBA may damage the connector pins. If you feel resistance while inserting the SAMBA into the USB slot of your computer, remove it immediately and check for any damage of its connector or bend pins.

Additionally, the Status LED labelled "ERR" will flash during the internal initialization. This effect will happen after the user has installed the corresponding driver. See next item (install the driver). After internal initialization is implemented (approx. 3-5 sec.) the Status LED labelled "ERR" will be turned off. After a few seconds and after the user has entered the PIN number (if needed) the GSM LED will start flashing slowly (which means,

the registration into the network is successfully), refer also to the Table 4 for more details.

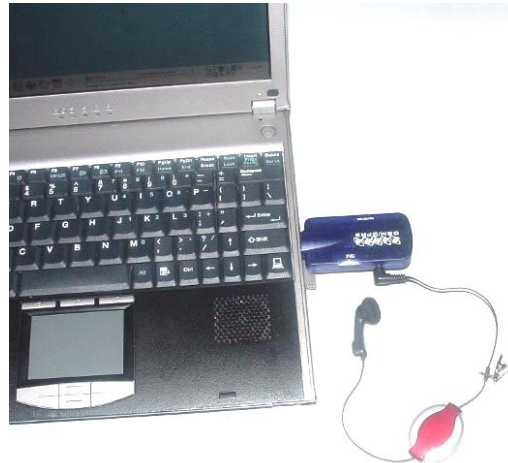


Figure 17.a: Connect USB connector of SAMBA to the USB serial port of PC.

4. Install the driver:

The instructions below describe how to use the SAMBA to a laptop Computer running Windows 2000 to make a GPRS internet Dial-up. During the installation of the SAMBA driver, please follow the on-screen instructions.

- ❖ Insert the CD-ROM into your computer's CD drive
- ❖ The SAMBA is already plugged into the USB interface of your PC. The PC has automatically detected the connected hardware device. Just click the “**Next>**” button on the displayed dialog box.



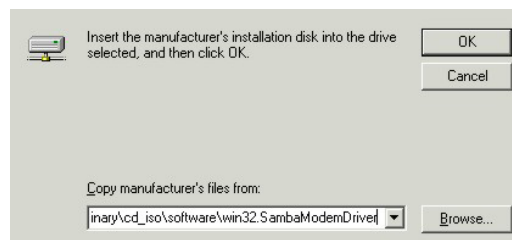
- ❖ Select on the opened wizard window the “**Search for a suitable driver for my device**” radio button, and click **Next** button.



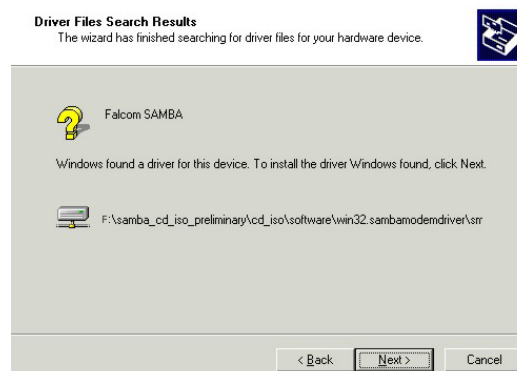
- ❖ On the next appeared screen select the **Specific a location** check box, and then click the **Next** button.



- ❖ Use **Browse** button to select the path ('x:/SAMBA_cd_iso_preliminary/cd_iso' X means **CD-ROM drive**, in or installation example is "F"). Select the "**Driver**" folder and click the **Open** button. You will be back to the dialog box, and then click **OK**.



- ❖ The selected manufacturer's installation driver are being installed. When the button **Next >** is enabled click on it.



- ❖ To the next window click the **Finish** button, the modem driver for the SAMBA device is now installed.



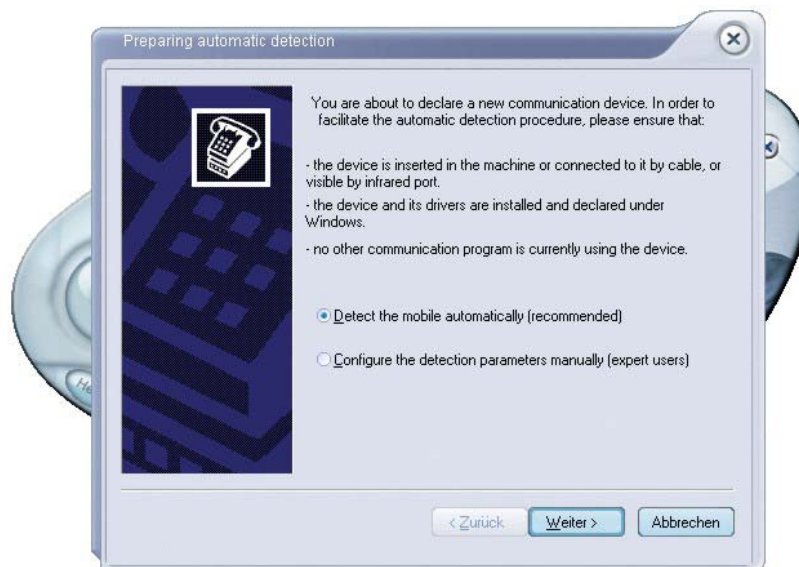
- ❖ The SAMBA status LED labelled “**ERR**” will be turned off.
- ❖ Close all opened windows.
- ❖ Do not remove the CD from drive, the configuration software has to be also installed.
- ❖ Click **Start** button, point to **Settings**, then click **Control Panel**.
- ❖ Double-click the **System** icon.
- ❖ Select the **Hardware** register and click on the **Device Manager** button, open the item **Modems** and select the **SAMBA USB Modem Driver**, click to the properties button by using the right-mouse click.
- ❖ On the next opened window screen select the **Diagnosis** tab, to test the modem, if it works properly , just click the **Query modem** button. If the modem response then the modem is ready for use. Click **OK** buttons to close the opened windows. Now you have to install the WellPhone software, which is also included into the delivered CD-ROM.

Note: Engineering samples of the SAMBA55-SET include limited version of the “WellPhone” configuration software with a licence key that is valid for 3 months after installation. Unlimited version of the “WellPhone” application software is available for all production units. Please contact your local FALCOM supplier for further details.

5. Install the configuration software:

The instructions below describe how to use the SAMBA to a laptop Computer running Windows 2000 to make a GPRS internet Dial-up. The “GPRS Controller” is a software that enables you to make Internet connections. It is available in two different forms with similar functions. Please refer to the corresponding user manual. If desired to use Microsoft Windows tools please see attached section 7.2. During the installation of the SAMBA software, please follow the on-screen instructions.

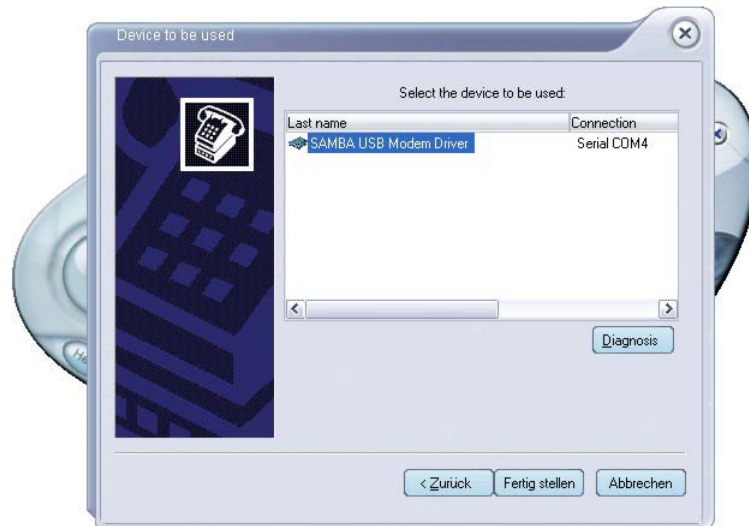
- ❖ Insert the CD-ROM into your computer's CD drive, if it was removed else double-click the CD drive, open the folder named **SambaWellPhone**, start the installation by double-click on the **Install_new_falcom.exe**. The serial key is also included in the same folder in the file named **serial.txt** when the software requests it. When the software is successfully installed, it starts automatically to detect the connected SAMBA phone. Select on the opened screen **Detect the mobile automatically** radio button, and click **Next** button.



- ❖ The software is started for searching the devices.



- ❖ When the searching devices is completed, the results are appeared on the next displayed screen. Select the **SAMBA USB Modem Driver**, and click the **Finish** button.



- ❖ The request of PIN code window will automatically be started. Enter a correct PIN code, which you have got from your operator. The entering of PIN code enables the SAMBA phone to register itself into the GSM network, and also enables the user of SAMBA a full access into the GSM/GPRS functionalities.



- ✓ Now you can configure the SAMBA modem according to your requirements. Click **Help** icon on the main screen to get more information about using this communication software. This software gives you a comprehensive overview as well as an easy and quickly way to start up an application or access an Internet address automatically when the Internet connection is made.



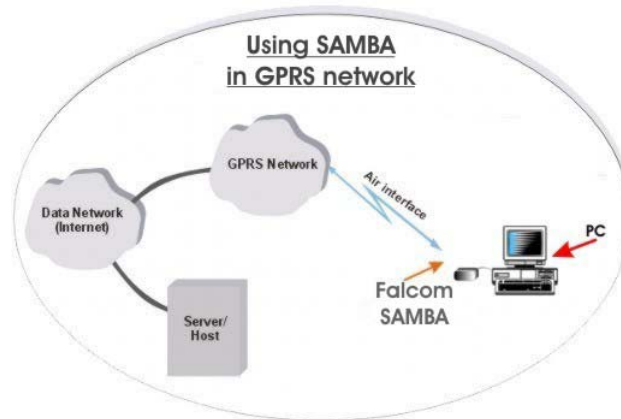
6.1.1 Getting started to GPRS Network

This section with following instructions are available only for SAMBA versions providing GPRS Class-B.

- ❖ What is GPRS:
 - ✓ GPRS is a complete new part of the existing GSM network.
 - ✓ GPRS is packed switched high speed mobile data.
 - ✓ GPRS is an efficient approach to upgrade the existing GSM to a packet switched system.
 - ✓ GPRS is an important step in direction to mobile internet.
- ❖ What you need to accomplished connection to the GPRS network ?
 - ✓ GPRS settings from your network provider
 - APN (name of access point that connects the mobile network to the Internet)
 - Primary and secondary DNS (Domain Name Server)
 - IP header compression
 - IP address (DHCP or static)
 - User name and password (may be optional)
 - Dial number
 - ✓ Modem installation and configuration
 - ✓ Dial-Up Network installation and configuration
- ❖ What does the GPRS Class 10, Class B mean ?
 - ✓ GPRS Class 10:
 - Mobile telephones differ in the number of channels that they can bundle. The reason for this is simple. The more time slices allocated, the more energy consumed by the device sending the signal. The higher is the GPRS class, the higher is the data speed (transfer or receive). The highest class of GPRS (Global Packet Radio Service) you have, the more efficient services you get. Class 10 means the ability to manage 4 time slots for downloads or 2 time slots for uploads simultaneously. Today, class 10 is the highest class used for mobile phones.
 - ✓ GPRS Class B:
 - The definition of mobile telephones supporting GPRS class B is, that the mobile telephones can be attached to both GPRS and other GSM services, but the mobile telephones can support either a voice connection or a data connection. Trying to establish a simultaneous connection with both does not work. Switching between one service and the other happens automatically.

6.1.1.1 *Making a dial-up networking*

This brief guide aims to explain the basic steps for getting started with GPRS to the internet. It is supposed that you are a bit familiar with GPRS concepts, like network attachment, session or PDP context.



This guide is not intended to give full details about how GPRS works, all GPRS-specific AT commands (check out the GPRS AT command manual). The GPRS AT command manual is available on the Falcom's Website for download: → http://www.falcom.de/services/download/Falcom_SAMBA

6.1.2 Communications software

To connect to the Internet, or to send and receive e-mail or faxes transmit data from your computer, you need the appropriate data and fax communications software. You can use the SAMBA modem with most commercially available communications applications, such as Microsoft Exchange, Microsoft Outlook, Netscape Navigator.

6.1.3 PIN & PUK

You may have to enter the PIN (Personal Identity Number) if the PIN code request is activated in the SIM card. The PIN code is usually supplied with the SIM card. If you enter an incorrect PIN code three times in a row, you will need a PUK (Personal Unblocking Key) code to unblock the SIM card. The PUK code may be supplied with the SIM card. If not, contact your service provider. For more details about using the SAMBA please read carefully the chapters below.

6.1.4 Text messages

The Short Message Service (SMS) is a network service that enables you to send and receive short text messages over the digital cellular network. Messages can be read on any mobile phone that has SMS capability. The sending and receiving of text messages requires that the Short Message Service (SMS) be available in the network you are using and activated for your SIM card. Contact your service provider for details. Before you can send text messages, you must store the SMS message centre number in the Settings window, Messages tab. The included software supports also a comprehensive overview, and an easy and quickly way to start up this application when the SAMBA is already registered into the GSM network.

6.1.5 Voice calls

It is possible to make voice calls from your PC with the headset which is available as an included accessory (see chapter "Package contents"). The included software supports also an easy and quick way to start up this application when the SAMBA is already registered into the GSM network.

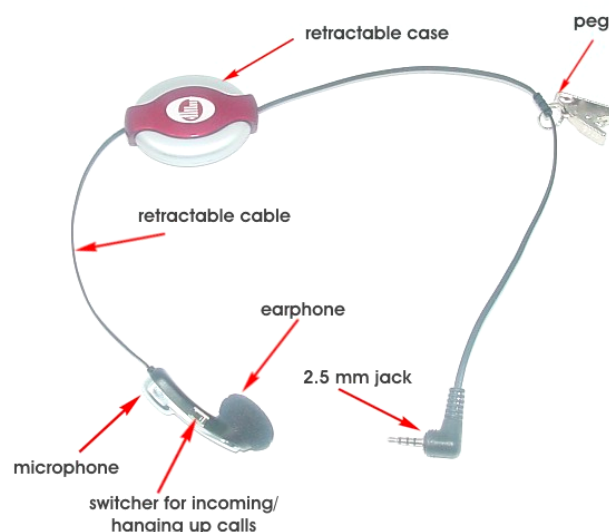
6.1.6 Data and fax communication

The SAMBA phone provides the functionality of a cellular modem. To send and receive e-mail and faxes, connect to remote computers and access the Internet, you also need the appropriate data and fax communications software. You can use the SAMBA phone with a variety of commercially available Windows 98, Windows NT 4.0, Windows 2000 and XP compatible data and fax communications applications. These applications must be correctly configured for use with the SAMBA phone, according to the instructions given in the documentation of these applications and your computer. Remember to select the SAMBA phone as the modem in each application. The data transfer and fax functions depend on the applications you have chosen, not on the computer or the SAMBA phone. For information on how to use an application, please refer to that application's documentation. The SAMBA phone supports three PC Fax standards. EIA/TIA Class 1, Class 2. If you have problems with using the SAMBA phone for fax transmissions, make sure that the remote end fax machine is Group 3 compatible. The SAMBA phone can also be controlled with AT Commands. For more information, refer to the AT-Command manual, which is free available on the Falcom's homepage. The included software provides an easy and quickly way to start up an application or access an Internet address automatically when the Internet connection is made. But the included software does not support fax communication.

7 Appendix

7.1 Accessory headset for SAMBA

A different microphone inputs and a different speaker outputs are supported by the SAMBA modem. The retractable Headset included in the package (see also figure below) fully compatible with SAMBA phone which supports a 2.5mm headset jack connector is designed to do two things at once, if those two things are driving and talking on the cell phone. The retractable Headset is lightweight, super-easy to use, comfortable, and has great incoming and outgoing sound quality. Retractable quality earpiece and microphone pulling out to desired length independently. The retractable cord length is 78 mm. The headset length is 1 m. You have just to connect it to the corresponded connector of SAMBA. To wear the earpiece, simply pull it out of its casing slowly until you reach the sufficient length and sit it inside the ear. Should the length of the cable too long/short, pull the cable slowly out or retract while holding the both sides onto the cable until the length is suitable.



If the user is using other external headset please follow the characteristics for different microphone inputs and different speaker outputs:

Items to be inspected	Acceptance criterion		
Sensitivity	-41 ±3dB (0dB=1 V/Pa @ 1kHz)		
Frequency response	Limits		
	Freq. (Hz)	Lower limit	Upper limit
	100		-38
	200		-38
	300	-50	-38
	1000	-44	-38
	2000	-44	-34
	3000	-44	-34
	3400	-44	-34
4000	-47	-34	
Current consumption	1 mA (max.)		

Operating voltage	DC 1 to 3 V (min.)
S/N ratio	55 dB minimum (A-Curve at 1 kHz, 1 Pa)
Directivity	Omni-directional
Max. input sound pressure level	100 dB SPL (1 kHz) Maximum distortion 1 %
Radio frequency protection	Over 800-1200 MHz and 1700-2000MHz, S/N ratio 500 dB minimum (signal 1 kHz, 1 Pa)

7.2 Making a dial-up networking

The following description is focussed on the SAMBA phone using the Microsoft Windows® tools such as Dial-up Networking. It is assumed that the delivered USB driver has already been installed. During the network installation, please follow the on-screen instructions, too.

- ❖ Click **Start** button, point to **Program**, go to **Accessories**, **Communication** then click **Dial-up Networking**.
- ❖ Double click to the **Make New Connection** icon.

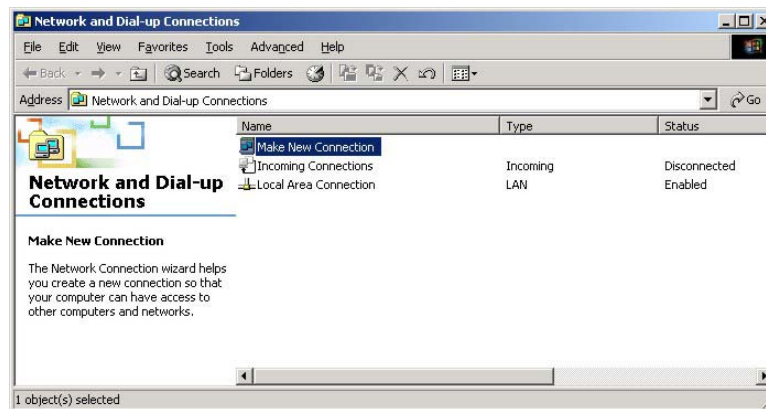


Figure 29: Make new connection.

- ❖ The next dialog box click the **Next** button.



Figure 30: Continue the new connection.

- ❖ Activate the **Dial-up to private network** radio button, then click **Next**.

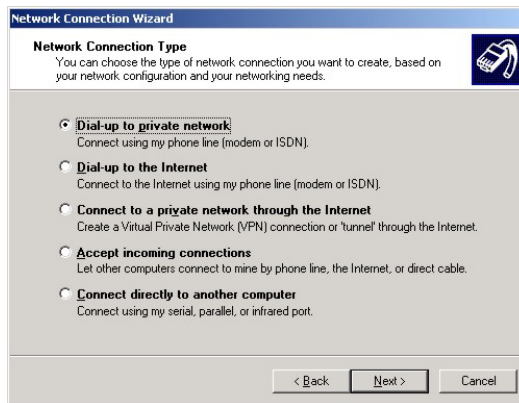


Figure 31: Network connection type.

- ❖ On the **Phone Number** field enter the phone number, e.g T-D1 has (**99***1#) or (*99#) or (*99***1#) phone number, then press **Next** button.

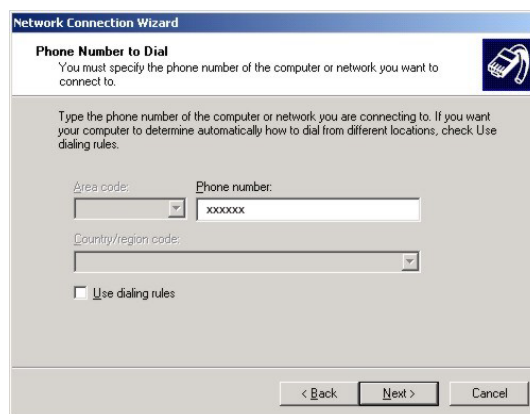


Figure 32: Enter the access number for your Network Operator.

- ❖ Enter the name of the dial-up profile (e.g “GPRS”). Press the **Finish** button and you have make a GPRS dial-up profile.



Figure 33: Type the name of connection.

- ❖ Now you need to edit some more settings, Right-click just-made GPRS dial-up icon, then click **Properties**.

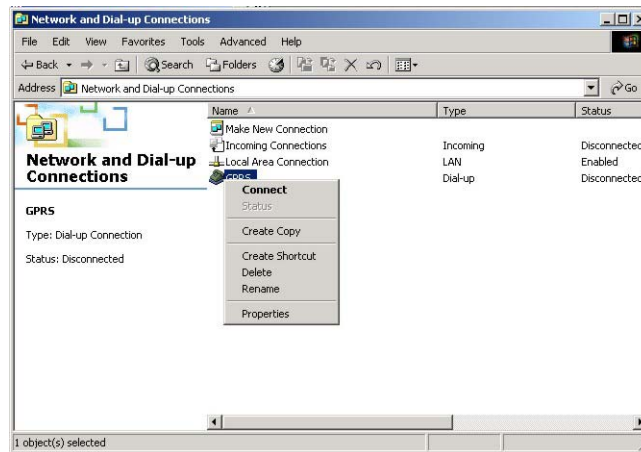


Figure 34: Some more settings.

- ❖ In the opened dialog box, please, select **General** tab, then press **Configure ...** button.



Figure 35: Modem properties.

- ❖ The dialog box below is displayed. Please activate the check boxes as shown in the figure below. When the settings are done then press **OK** button.



Figure 36: Modem configuration.

- ❖ As next, select the **Networking** tab, choose on the Internet Protocol (TCP/IP) component, then press **Properties** button.

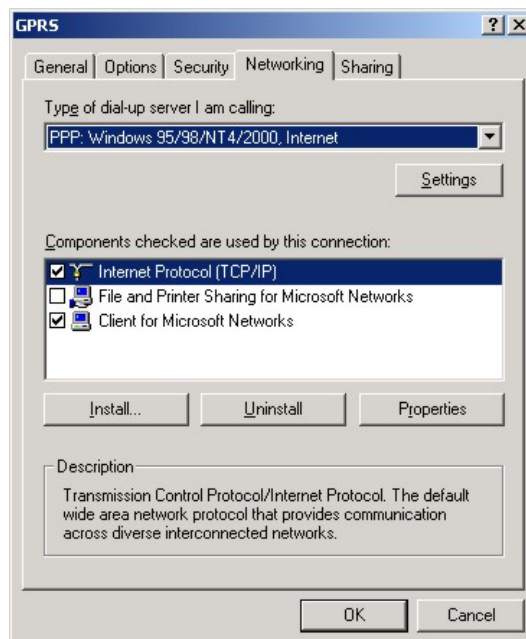


Figure 37: Components (TCP/IP) configuration.

- ❖ The dialog box below is displayed. Activate the **Use the following DNS server addresses** and type the DNS address of your Operator Network (e.g T-D1 has the following DNS address 193.254.160.001), then press **OK** button and go back to the GPRS dial-up icon see upon and follow next step below (Refer also to the chapter 5.2).

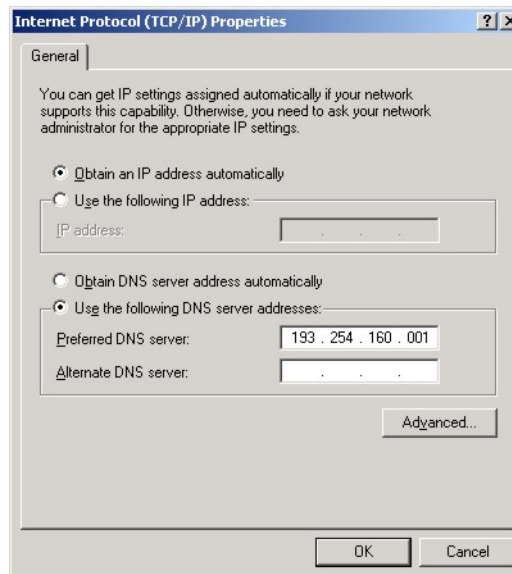


Figure 38: Use the DNS server addresses.

- ❖ Before you start GPRS dial-up make sure that SIM card is inserted and is registered into the GSM network. Registration into the GSM network can be done by entering the PIN number using the command **AT+CPIN="xxxx"** via **HyperTerminal** program (if this one is required). After a successful registration into the GSM network you can make a GPRS dial-up by double click the **GPRS** icon. Remember to enter User name, Password blank and Dial number on the corresponding input field (or refer to your network operation's instruction).



Figure 39: The dialog box of registration.

- ❖ After you have started GPRS dial-up by clicking on the **Dial** button, the **Pre-Dial Terminal Screen** will be displayed. See figure here below.
 Activate by right-click the opened **Pre-Dial Terminal Screen** screen and type the command **AT+CGATT=1** on the black screen input field. The GPRS attach is triggered by using this AT Command.
 The user can check whether the SAMBA is GPRS attached by entering:
AT+CGREG? which is the counter-part command of **AT+CREG?** (GSM attachment status).

There are three possible response of SAMBA:

+CGREG:0,1 means the SAMBA is successfully attached.

+CGREG:0,0 means the SAMBA is trying to attach.

+CGREG:0,2 has failed to attach and stopped trying to attach.

This occurs approx. within 1-3 min of powering up.

+CGREG:0,3 Registration denied. The GPRS service is disabled, the MS is not allowed to attach for GPRS if requested by the user.

+CGREG:0,4 unknown

+CGREG:0,5 Registered, roaming

Alternatively, the registration status can be retrieved using:

AT+CGATT?

There are two possible response of SAMBA:

+CGATT:1 means the MS is successfully attached.

+CGATT:0 means the MS is not attached, or has failed to attach.

This command is somewhat less accurate than AT+CGREG? .

If the SAMBA Modem is attached to the GPRS Network the user have to click the **Continue** button, the other steps have to done. Normally, if everything is going smoothly the SAMBA modem within 2 or 3 seconds will be able to build a connection to the Internet.

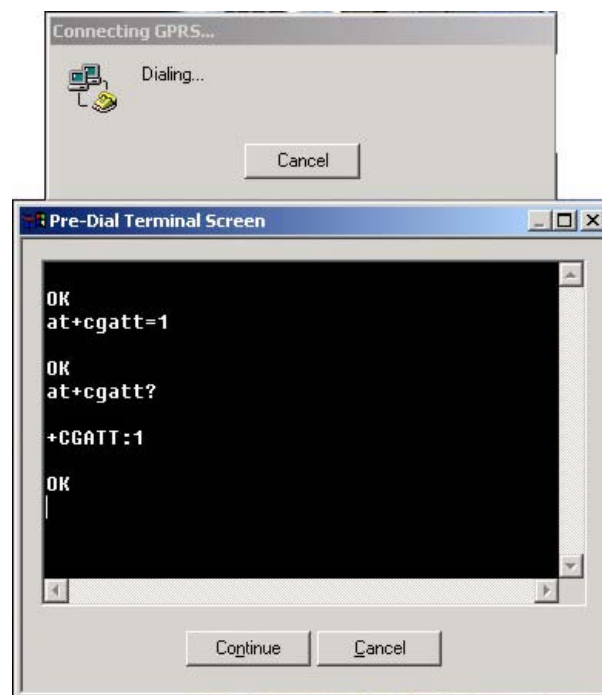


Figure 40: Pre-Dial Terminal Screen.

- ❖ The next opened dialog box shows the registering to the GPRS (it takes ca. 2..3 sec.).

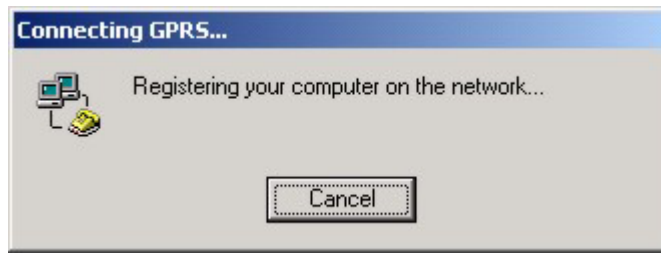


Figure 41: Message of registering and logging onto the GPRS network

- ❖ The modem is now connected to the GPRS network. Click **OK** button. Connection to the internet is completed, so the user can start by clicking the installed internet software.



Figure 42: Message of GPRS connection.

- ❖ Right-click its icon on the taskbar (if present) or in the **Network Connection** folder to check the status of this connection. To disconnect the connection click the **Disconnect** Popup menu.

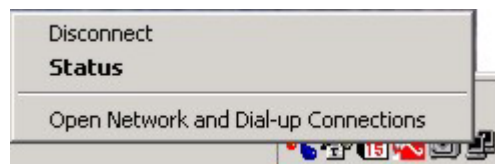


Figure 43: Popup menu of Dial-up connection.

Now the user can start the installed web browser, see section 6.1.2.

7.3 Basis Operation

Followings are examples of some AT-commands. Please refer to the AT Command manual for a full description.

The AT Command manual is available on the Falcom's Website
 → www.falcom.de/download/

NOTE: Issue AT+CMEE=1 to have extended error code (+CNE ERROR)

	AT Commands	Modem response	Comments
Network	AT+CREG?	CREG=<mode>, 1	Modem registered to the network

registration checking		CREG=<mode>, 2	Registration lost, re-registration attempt
		CREG=<mode>, 0	Modem not registration on the network, no registration attempt
Receiving an incoming call		RING	An incoming call is waiting
	ATA		Answer the call
		OK	
Make a call	ATD0123456789;		Do not forget the < ; > at the end for < voice > call
		OK	Communication established
		CME ERROR: 11	PIN code not entered (with + CMEE=1 mode)
		CME ERROR: 3	AOC credit exceeded or a communication is already established
Make an emergency call	ATD112;		Do not forget the < ; > at the end for < voice > call
		OK	
Communication loss		NO CARRIER	
Hang up	ATH		
		OK	
Enter PIN code	AT+CPIN="0123"		
		OK	PIN code accepted
		CME ERROR: 16	Incorrect PIN Code (with + CMEE=1 mode)
		CME ERROR: 3	PIN already entered (with + CMEE=1 mode)
Save parameter non-volatile memory	AT&W		
		OK	The configuration settings are stored

Table 8: AT-commands for basis operation

7.4 GPRS parameters of German service providers

The following table presents GPRS parameters of selected German service providers and operators.

	T-D1	D2 Vodafone	E-Plus	VIAG
Primary DNS	193.254.160.1	139.7.30.125	212.23.97.2	195.182.96.28
Secondary DNS	free	139.7.30.126	212.23.97.3	195.182.96.61
IP address	Automatic	Automatic	Automatic	Automatic
APN	internet.t-d1.de	volume.d2gprs.de	internet.eplus.de	internet
IP header compression	no	no	no	no
Dial phone number	**99***1#	**99***1#	**99***1#	**99***1#
Default QoS	Precedence 3 Delay 4 Reliability 3 Peak 0 Mean 0	Precedence 3 Delay 4 Reliability 3 Peak 7 Mean 31	Precedence 2 Delay 4 Reliability 3 Peak 9 Mean 31	Precedence 2 delay 4 reliability 3 peak 4 mean 31

Table 9: Service provider information, valid 16.10.2001

Note: These settings may be subject to regular changes by the network providers.

7.5 Examples: Using Class-B functionality via the serial interface

This chapter provides step-by-step instructions of how to make use of the mobiles Class-B capabilities in a Network Operation Mode II (NOM II) or Network Operation Mode I (NOM I) network. The examples proceed from the fact that the MS is already in PPP online mode and either engaged in a GPRS data transaction (= in PTM) or not engaged (= not in PTM). While the SAMBA is in PTM, GSM calls can only be accepted if the network is type NOM I.

For using the Class-B functionality the Multiplex Mode is not necessary. The scenarios described below are executed on one single logical channel. Please note that URCs, for example **.RING.** can only be displayed if the SAMBA is in command mode.

1. Making a voice call while MS is in PPP online mode, but not in PTM

- ✓ Use +++ to change from PPP online mode to command mode
- ✓ Set up a voice call with ATD<target number>;
- ✓ End the voice call with AT+CHLD=1
- ✓ Go back to PPP online mode with ATO

2. Making a CSD / fax call while MS is in PPP online mode, but not in PTM

- ✓ Use +++ to change from PPP online mode to command mode
- ✓ Set up a CSD call with ATD< target number>
- ✓ After the CSD / fax call was established, change from data mode to command mode with +++
- ✓ End the CSD / fax call with AT+CHLD=1
- ✓ Go back to PPP online mode with ATO

3. Answering a voice call while MS is in PPP online mode, but not in PTM

- ✓ Hardware ring indicates incoming voice call
 - ✓ Use +++ to change from PPP online mode to command mode
 - ✓ URC .RING. is displayed
 - ✓ Accept the voice call with ATA or reject with AT+CHLD=0
 - ✓ After the voice call was accepted, you can end the voice call with AT+CHLD=1
 - ✓ Go back to PPP online mode with ATO
- 4. Answering a CSD / fax call while MS is in PPP online mode, but not in PTM**
- ✓ Hardware ring indicates incoming data call
 - ✓ Use +++ to change from PPP online mode to command mode
 - ✓ URC .RING. is displayed
 - ✓ Accept the data call with ATA or reject with AT+CHLD=0
 - ✓ After the CSD / fax call was accepted, change from data mode to command mode with +++
 - ✓ You can end the data call with AT+CHLD=1
 - ✓ Go back to PPP online mode with ATO
- 1. Answering a voice call while MS is in PPP online mode and in PTM**
- This scenario can only be ensured in Network Operation Mode I, since Paging Coordination is necessary¹⁾.
- ✓ Hardware ring indicates incoming data call
 - ✓ Use +++ to change from PPP online mode to command mode
 - ✓ URC .RING. is displayed
 - ✓ Accept the data call with ATA or reject with AT+CHLD=0
 - ✓ End the voice call with AT+CHLD=1
 - ✓ Go back to PPP online mode with ATO
- 6. Answering a CSD / fax call while MS is in PPP online mode and in PTM**
- This scenario can only be ensured in Network Operation Mode I, since Paging Coordination is necessary¹⁾.
- ✓ Hardware ring indicates incoming data call
 - ✓ Use +++ to change from PPP online mode to command mode
 - ✓ URC .RING. is displayed
 - ✓ Accept the CSD / fax call with ATA or reject with AT+CHLD=0
 - ✓ After the CSD / fax call was accepted, change from data mode to command mode with +++
 - ✓ End the voice call with AT+CHLD=1
 - ✓ Go back to PPP online mode with ATO

¹⁾ When you attempt to follow these steps in a NOM II network, be aware that the .RING. URC usually does not appear since no Paging coordination is done in PTM. However, in a bursty traffic flow where data packets are transferred discontinuously paging messages and, thus, the .RING. URC, may be received. In this case, the scenarios 5) and 6) might be successful even though the network only supports NOM II

7.6 RF Exposures

This device contains 1800 MHz GSM functions that are not operational in U.S. Territories. This filing is only applicable for 850MHz GSM/1900 MHz PCS operations.

This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

Statement according to FCC part 15.19:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Statement according to FCC part 15.105:

NOTE: 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

RF exposure FCC:

Tests for SAR are conducted using standard operating positions specified by the FCC with the phone transmitting at its highest certified power level in all tested frequency bands.

Although the SAR is determined at the highest certified power level, the actual SAR level of the phone while operation can be well below the maximum value. This is because the phone is designed to operate at multiple power levels so as to use only the power required to reach the network. In general, the closer you are to a wireless base station antenna, the lower the power output. Before a phone model is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the limit established by the government-adopted requirement for safe exposure. The tests are performed in positions and locations (e.g., at the ear and worn on the body) as required by the FCC for each model. (Body-worn measurements may differ among phone models, depending upon

available accessories and FCC requirements). While there may be differences between the SAR levels of various phones and at various positions, they all meet the government requirement for safe exposure. For body worn operation, to maintain compliance with FCC RF exposure guidelines, use only accessories that contain no metallic components and provide a separation distance of 5mm (0.2 inches) to the body. Use of other accessories may violate FCC RF exposure guidelines and should be voided.

Health and Safety Information FCC:

Exposure to Radio Frequency (RF) Signals Your GSM/GPRS-Stick-Phone is a radio transmitter and receiver. It is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. The guidelines are based on the safety standards previously set by both U.S. and international standards bodies:

This EUT has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE Std. C95.1-1992 and had been tested in accordance with the measurement procedures specified in FCC/OET Bulletin 65 Supplement C (2001) and IEEE Std. 1528-2003 (December 2003).

The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health. The exposure standard for wireless mobile phones employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6W/kg*.

7.7 Instructions to OEM

This manual includes specific warnings and cautions in order to ensure that OEMs are aware of their responsibilities, with regards to RF exposure compliance, for products into which the modem is integrated. With this guidance, the OEM will be able to incorporate into their documentation the necessary operating conditions and warnings.

OEMs need to provide a manual with the “final” product that clearly states the operating requirements and conditions and that these must be observed to ensure compliance with current FCC RF exposure requirements / MPE limits. This will enable the OEM to generate (and provide the end-user with) the appropriate operating instructions, warnings and cautions, and/or markings for their product.

* In the U.S. and Canada, the SAR limit for mobile phones used by the public is 1.6 watts/kg (W/kg) averaged over one gram of tissue. The standard incorporates a substantial margin of safety to give additional protection for the public and to account for any variations in

7.8 Troubleshooting

In the unlikely event that you have problems using your SAMBA phone, the following may solve or help to identify the problem; if not, if you have access to the Internet for more technical support the Falcom Web pages at "<http://www.falcom.de/service/>" have additional information about the SAMBA phone.

1. General Checks

If SAMBA phone does not appear to be working correctly:

- Check there is a SIM installed and a headset for voice calls is also connected.
- The delivered driver must be installed before begin to work.
- Check if the USB connector is properly plugged.

If the modem status indicators (labelled ERR) continually light:

- Maybe, the included USB driver which allocate a USB serial port is not installed to the control host device yet, if that is true, disconnect the SAMBA from host device and plug it again, and then install the included driver.

If the modem does not response to the terminal program:

- Check if the USB connector is properly plugged.
- Disconnect it and connect it again.

2. It does not work when I travel.

- To use a GSM network outside your own country your account needs to be enabled for International Roaming. If this has not been down, contact your GSM provider.
- When in regions where GPRS is not available, a user can still access their important information with GSM 14.4 kbps data connections.

3. I can not make data or fax calls

Some GSM networks require your SAMBA phone account to be enabled for data and/or fax. If you do not know whether this applies to you, please check with your GSM provider.

4. I can not receive data or faxes

- Check your application is running. To receive faxes you will need special software, for example, WinFax™ software.
- Most GSM networks supply different phone numbers for voice, fax and data. Contact your GSM provider for the numbers and ensure that the fax and data calls being made to these, not to the voice call number.

5. GPRS connection is slow and unstable

- Disconnect and connect again. You may be switched to a better network trunk line with better communication quality.

- If the problem persists, avoid using GPRS connection during the time when network traffic is heavy, or move to a location where signal reception is better.

6. Can not use certain call functions

To use some advanced call functions (such as call divert, call barring or call waiting), you need to subscribe them to your operator.

7. There is noise during a call

- Avoid using the SAMBA phone near a TV, microwave oven, speaker or other devices that emits strong electromagnetic energy.
- Is the reception of signal in good condition? If not, move to a location where signal reception is better.