

GPRS modem (FTI06011)

Hardware Installation Manual

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NOTICE

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References

Falcom TANGO hardware description

http://www.falcom.de/uploads/media/tango-man_1_04.pdf

Introduction

The hardware installation manual provides instructions for installing and mounting the GPRS modem as used within FT NavVision®. The chapters and sections are organized in chronological order in which the specific components must be installed and mounted (where applicable).

About the hardware installation manual

The installation manual contains the following chapters:

- Chapter "Safety instructions" presents warning, caution and note information, which the user should pay attention to
- Chapter "Receiving, unpacking and checking" contains instructions on how to receive, unpack or check the modem
- Chapter "Installation and mounting" contains instructions on how to install and/or mount the modem
- Chapter "Technical specifications" contains an overview of the main features and technical data.

Abbreviations list

CHAP	Challenge Handshake Authentication Protocol
COM	Communication
DCS	Digital Cellular System
DTMF	Dual Tone Multi Frequency
EFR	Ethernet Fabric Routing
FME	For Mobile Equipment
FR	Full rate
GND	Ground
GPRS	General Packet Radio Service
GSM	Global System for Mobile communications
HR	Half Rate
IGN	Ignition
LED	Light Emitting Diode
MNP	Mobile Number Portability
PAP	Password
PBCCH	Packet Switched Broadcast Control Channel
PDU	Protocol Data Unit
RF	Radio Frequency
Rx	Receive direction
SMB	SubMiniature version B
SIM	Subscriber Identification Module
SMS	Short Message Service
Tx	Transmit direction
USSD	Unstructured Supplementary Service Data

Revision history

Revisions issued since publication.

Issue	Date	Revision	Reason
1.0	August 24, 2010		First release

Safety instructions

The indications NOTE, CAUTION and WARNING have the following significance:

NOTE:

An operating procedure, practice or condition etc., which it is essential to emphasize.

CAUTION

An operating procedure, practise or condition etc., which, if not strictly observed, may damage or destroy equipment.

WARNING

An operating procedure, practise or condition etc., which, if not carefully observed may result in personal injury or loss of life.

Exposure to RF energy

There has been some public concern about possible health effects of using GSM or GSM/GPRS 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.

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. Receiving, unpacking and checking

1.1 Procedure

NOTE:

Notify your sales representative if any of the items mentioned below are missing or damaged.

1. Remove transport casing
2. Visually inspect the respective parts
3. Check that all items are included in accordance with the delivery documents.
4. Check for transport damages.
In case of transport damage appropriate action must be taken against the latest carrier and the nearest certified dealer or representative should be informed.
5. Store the part in the original transport package in a dry and dust free place, if the unit is not to be installed immediately. Observe the environmental requirements stated in the specifications.

2. Installation and mounting

2.1 Overview

This modem is a Quad-Band GSM/GPRS engine that work on four frequencies GSM 850/900 MHz, DCS 1800 MHz and PCS 1900 MHz. It is designed for use on any GSM network in the world. This modem constitutes a self contained, fully integrated implementation of the GSM/GPRS.

It features GPRS class B, class 10 (making download at speeds up to 85 kbps) and supports GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. It incorporates all you need to create high-performance GSM/GPRS solutions; base band processor, power supply ASIC, complete radio frequency circuit including a power amplifier, integrated internal SIM interface, pins for audio connection and an SMB or FME connector for connecting a GSM antenna.

The physical interface to the cellular application is made through a RS-232 connector or through a RJ45 connector. Both interfaces couldn't be used at the same time. Once one interface is put in use (Rx, Tx) the other one (Rx, Tx) stay deactivated. The first communication interface consists of 9-pin RS-232 interface, required for controlling the unit and transferring data. It can be directly connected via a RS-232 serial cable to a serial port of your desktop or notebook computer.

While the second RJ45 interface provides two lines Rx and Tx for serial communication to the modem. This interface provides also an audio channel for connecting a microphone and speaker and making and receiving voice calls via a headset or hands-free kit. You can connect such devices (headset or hands-free kit) with RJ45 connector directly to interface. Additionally, a 4-pin connector provided on the modem's front panel allows applying power from different external power sources via the included power cable. An external dual-band, tri-band or a quad-band GSM antenna can be connected directly to the integrated 50 Ω SMB or FME connector on the modem. The modem can be used for transmission of voice, data calls and FAX as well as short messages (SMS - Short Message Service) in any GSM Network.

2.2 SIM card installation

CAUTION

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

The SIM card and its contacts can be damaged by scratches or bending, so be careful when handling, inserting or removing the SIM card.

Open the cover cap on the underside of the modem, push the SIM card holder forwards on the inscription "PUSH ▲ OPEN", flap the holder upwards and insert the SIM card into the SIM card holder and then push it down (ensure that the beveled corner is on the top right and the golden contact area is facing downwards). Make sure that the SIM card is fit in the SIM card holder. Push the cap of SIM card holder down until it closed. Close the opening with the cover cap.



Figure 2-1: Open cover cap

- "PUSH ▲ OPEN" to open SIM card holder.



Figure 2-2: SIM card holder

- Open SIM card holder and insert card.

2.3 Mounting the terminal

NOTE:

If you want to mount the modem on a wall or vehicle, first attach the cradle to the wall or vehicle as described on the chapter below before placing the modem on the cradle.

Place the modem (if needed) on the cradle (see Figure 2-3) and push it down, make sure that the modem does not move up and down inside the cradle, the cradle is in the sales package. After that, the user has to use the cables ties (see Figure 2-4) for fixing the modem and the power supply cable. For power supply cable use the small cable ties and for modem use one of the length cable ties. The dimensions of cable ties are 200 x 3.5 mm and 140 x 3.5 mm.



Figure 2-3: Cradle

CAUTION

- In order to comply with Radio Frequency (RF) exposure requirements, install the modem so that a minimum distance of 20 cm can be maintained between the antenna and all persons. If you use an external antenna, install the antenna so that a minimum distance of 20 cm can be maintained between the antenna and all persons, with antenna gain not exceeding 3 dBi.
- Choose a location far enough from electronic devices so that no interference occurs.

Place the modem in a proper location e.g. on a desk far enough from your PC. It is also possible to install the terminal to a wall. Drill appropriate screws through the indentations on the cradle.

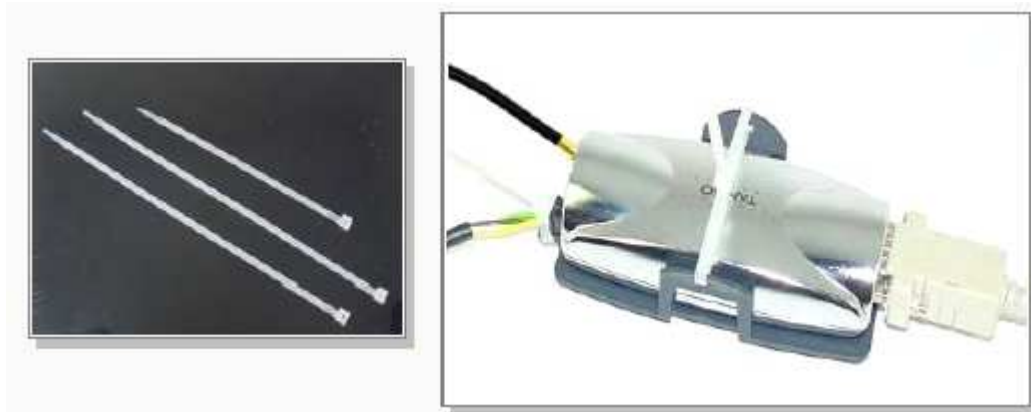


Figure 2-4: Cradle firmly fixed with cable ties

2.4 Antenna connection

The antenna interface provides an antenna with FME connector interface. The antenna cable can be connected to a central antenna system or FME antenna.

2.4.1 Other antennas

There are no antennas included in the deliver package, but the antennas designed below can be used for antenna connection. The antennas as shown below are provided by Falcom GmbH. The order numbers are:

- ANT-001-M (with FME-male connector)
- Dual-band GSM antenna (with SMB-female connector)
- KA08-F (antenna cable with SMB-female and FME-female connectors)

The external antenna connector can be a SMB or a FME connector, dependent on the TANGO version (on all versions of TANGO with the following string;

- TANGO xxx/xxx-1(-xx) using a SMB-male antenna connector and other versions
- TANGO xxx/xxx-2(-xx) using a FME female antenna connector see table 1).

The TANGO modem with SMB connector incorporates a “Snap on” latching action in order to make the connection easier with an excellent RF performance.

If your TANGO modem provides an external SMB connector on the antenna interface both GSM/GPRS antennas can be used.

In case of using the ANT-001-M with FME connector, FALCOM GmbH provides a special adapter cable between the TANGO and FME antenna connector.

The type code of this adapter cable is KA08-F. If your TANGO modem provides an external FME connector on the antenna interface only a GSM/GPRS antenna with FME connector (ANT-001-M) can be used.



Figure 2-5: Antennas (from left to right) - ANT001-M, KA08-F and Dual-band GSM antenna

2.5 Connecting the DC power supply

Connect the open ending of the power supply cable to a power adapter (10.8...31.2 VDC). Refer to Table 2-1 for power supply requirement.

Parameters	Min.	Typical	Max.	Unit
Supply voltage	10.8	12	31.2	VDC

Table 2-1: Power supply requirement

Wire colour	Connected to
Yellow	V+ pole of battery
White	V+ pole of battery
Brown	V- pole of battery

Table 2-2: Wiring

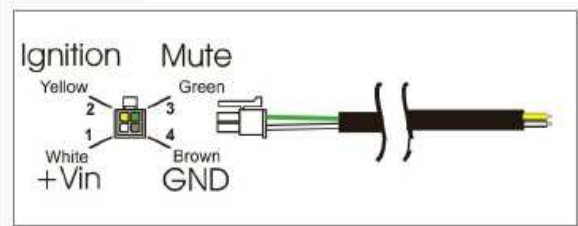
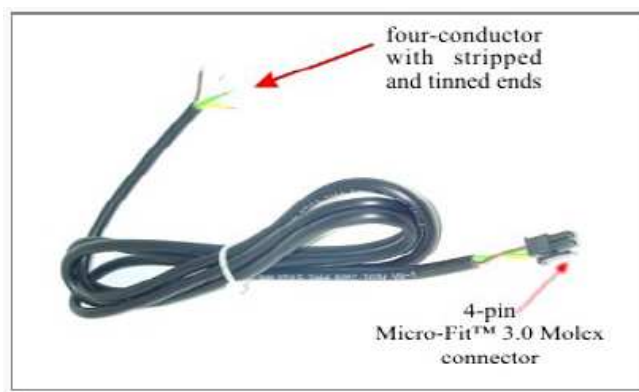


Table 2-3: Power supply cable



Table 2-4: Pin out of 4-pin power supply connector

Power input: 10,8 ...31,2 V DC		
Pin number	Name	Functions
1	POWER (+ Vin)	DC power positive input
2	IGN	Ignition (connected to positive DC power)
3	Mute	Do not connect
4	GND	DC power negative input

Table 2-5: Modem power connector description

2.6 Connection to a PC



Table 2-6: Interface B (DB9 connector)

You can use the optional RS232 serial cable to connect the D-Sub connector (Interface B) to an external controller/computer. Connect the 9-pin Sub D-female serial cable to COM1 or COM2 on your PC (or to another free serial interface port), as shown in Figure 2-6. Connect the other end of the 9-pin Sub D-male serial cable to the 9-pin serial interface port on the TANGO modem, as shown in Figure 2-6.

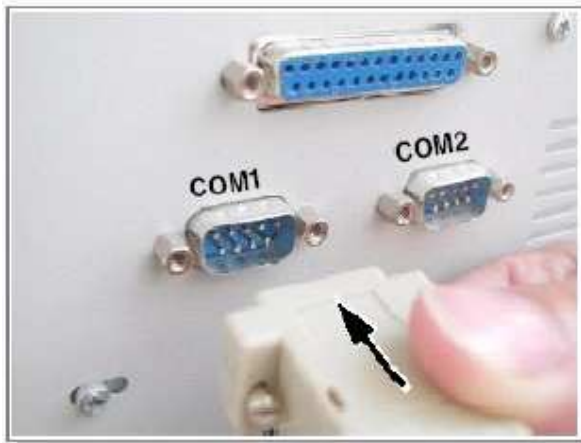


Figure 2-6: Connect 9-pin serial to PC and modem

When the modem is turned on, the status indicator (green and yellow) on the top of RJ45-audio interface will be lit when power is on (see Figure 2-7 and Table 2-7). The green LED will go flashing slowly (that means registration into the network is successfully).

LED's (interface F)	Description
Green & yellow light off	Modem is switched off
Green light on	Power on, not registered in network
Green light flashes	Power on, registered in network
Green light flashes quickly	Call in progress
Yellow light off	Power off or interface C in use
Yellow light on	Power on, interface B in use or both interfaces (B & C) are not connected.

Table 2-7: LED status



Figure 2-7: Status indicator (yellow and green)

3. Technical specifications

3.1 General

- Dual Band GSM/GPRS modem E-GSM 900/1800 MHz or E-GSM 850/1900 MHz
- Class 4 (2 W at 850/900 MHz)
- Class 1 (1 W at 1800/1900 MHz)
- Small size and low power consumption
- Voice, SMS
- Fax and data transmission without extra hardware
- Tricodec (FR/EFR/HR)
- Internal 3 V 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.

3.2 Telephony

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

3.3 Short Message Service (GSM and GPRS mode)

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

3.4 GSM circuit data features

- Data circuit asynchronous, transparent and non transparent up to 14,400 bits/s
- Automatic fax group 3 (Class 1 & 2)
- Alternate speech and fax
- MNP2, V.42bis

3.5 GPRS packet data features

- GPRS Class B Class 2 (up to 28.8 kbps) or GPRS Class B Class 10 (up to 56 kbps)
- Coding schemes: CS1 to CS4
- Compliant with SMG31bis

3.6 GSM supplementary services

- Call forwarding
- Call barring
- Multiparty
- Call waiting and call hold
- Calling Line Identity
- Advice of charge

- USSD
- Closed User Group
- Explicit Call Transfer

3.7 Other features

- ME + SIM phone book management
- Fixed dialing number
- SIM toolkit Class 2
- SIM, network and service provider locks
- Real Time Clock
- UCS2 character set management

Detail	Description
Power supply	Supply voltage 10.8 ... 31.2 VDC Voltage must stay within min/max values
Power saving (GSM)	Minimizes power consumption in SLEEP mode to 16 mA
Temperature range	Normal operation: -20°C to +55°C
Dimensions	Terminal: 115 x 52 x 26.6 mm (L x W x H) Cradle: 119 x 67 x 32 mm (L x W x H)
Weight (terminal)	<u>Terminal:</u> 83.0 g (with SMB connector) 88.0 g (with FME connector) <u>Cradle:</u> 21 g
Mounting	Through 2 screw holes on the cradle (accessory) Casing: complete shielding (chromium-plate ABS)
GSM core	TELIT GE864-Quad module 850/900/1800/1900 GPRS class 10, class B TCP/IP (accessible via PFAL commands)
GPRS features	GPRS multi-slot class 10 GPRS mobile station class B Data downlink: max. 85.6 kbps Data uplink: max. 42.8 kbps Coding schemes: CS-1, CS-2, CS-3, CS-4 Protocols: PAP, CHAP, PBCCH
Audio features	Speech code modes: half rate, full rate, enhanced full rate, adaptive multi rate, echo cancellation, noise reduction
Interfaces	D-Sub (9 pin female): serial interface RS-233 for AT commands RJ-45 (8 pin shielded): analogue audio external antenna interface SMB or FME SIM card reader: small SIM cards
Temperature range	Operating: Min. -20°C Max. +55°C Functional: Min. -20°C Max. +70°C Storage: Min. -30°C Max. +85°C Not functional: Min. -40°C Max. +85°C

Interface	Specifications
A	4-pin Micro-Fit 3.0 Molex (power supply)
B	RS-232 female connector for connection with PC
C	RJ45 connector for horn connection
D	FME/SMB antenna connector for GSM antenna
E	SIM card reader for small SIM cards (3 V)
F	<p><u>LED status:</u></p> <p>Green and yellow off: Modem is switched off</p> <p>Green light: Power on, not registered in network</p> <p>Green flashes: Power on, registered in network</p> <p>Green flashes quickly: Call in progress</p> <p>Yellow off: Power off or interface C in use</p> <p>Yellow light: Power on, interface B in use or both interfaces (B & C) are not connected.</p>

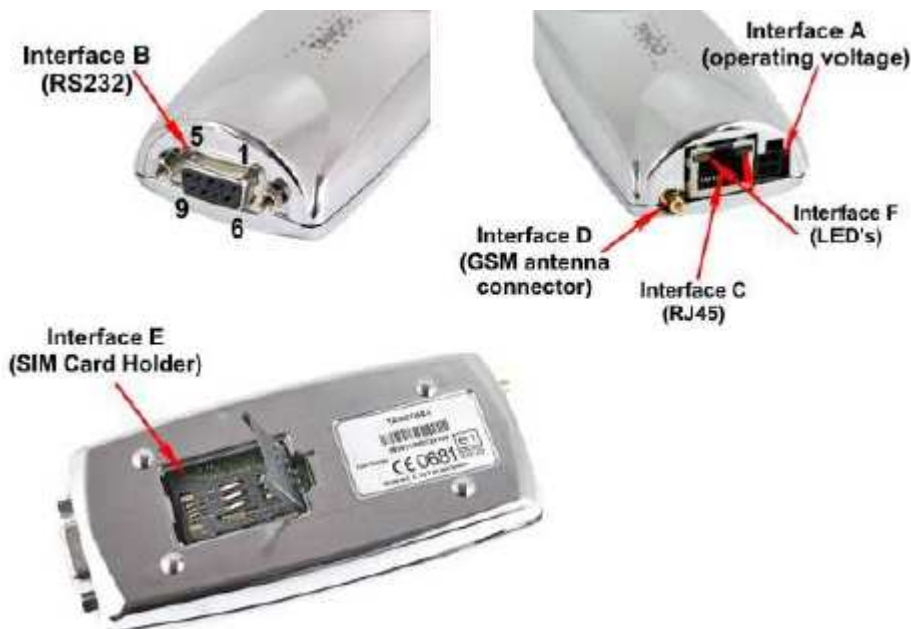


Figure 3-1: Connector specifications



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