

SSW7-TS PRO GSM

700-770-8GS41

User Manual

Edition 1 / 26.02.2009

HW 1-1-1 and FW 4.02 and higher



Order number of manual: 900-770-8GS41/en

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Note:

We have checked the content of this manual for conformity with the hardware and software described. Nevertheless, because deviations cannot be ruled out, we cannot accept any liability for complete conformity. The information in this manual is regularly updated. When using purchased products, please heed the latest version of the manual, which can be viewed in the Internet at www.helmholtz.de, from where it can also be downloaded.

Our customers are important to us. We are always glad to receive suggestions for improvement and ideas.

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1 Safety Information

For your own safety and for the safety of others, always heed the safety information given here. The safety information indicates possible hazards and provides information about how you can avoid hazardous situations.

The following symbols are used in this manual.



Caution, indicates hazards and sources of error



Gives information



Hazard, general or specific



*Danger of **electric shock***

1.1 General

The SSW7-TS PRO GSM is only used as part of a complete system.



The operator of a machine system is responsible for observing all safety and accident prevention regulations applicable to the application in question.



During configuration, safety and accident prevention rules specific to the application must be observed.



Emergency OFF facilities according to EN 60204 / IEC 204 must remain active in all modes of the machine system. The system must not enter an undefined restart.



Faults occurring in the machine system that can cause damage to property or injury to persons must be prevented by additional external equipment. Such equipment must also ensure entry into a safe state in the event of a fault. Such equipment includes electromechanical safety buttons, mechanical interlocks, etc. (see EN 954-1, risk assessment).



Never execute or initiate safety-related functions using an operator terminal.



Only authorized persons must have access to the modules!

1.2 Restriction of access

The modules are open equipment and must only be installed in electrical equipment rooms, cabinets, or housings. Access to the electrical equipment rooms, barriers, or housings must only be possible using a tool or key and only permitted to personnel having received instruction or authorization.

1.3 Information for the user

This manual is addressed to anyone wishing to configure, use, or install the SSW7-TS PRO GSM.



During configuration, safety and accident prevention rules specific to the application must be observed.

The manual demonstrates and explains to the user how to operate the SSW7-TS PRO GSM. It provides the installing technician with all the necessary data.

The SSW7-TS PRO GSM is intended for use exclusively with S7-300/S7-400 programmable controllers from Siemens.

The SSW7-TS PRO GSM is intended for use within a complete system only. For that reason, the configuring engineer, user, and installing technician must observe the standards, safety and accident prevention rules applicable in the particular application. The operator of the automation system is responsible for observing these rules.

1.4 Use as intended

The SSW7-TS PRO GSM must only be used as a communication system as described in the manual.



Make sure in the software that uncontrolled restarts cannot occur.

1.5 Avoiding use not as intended!

Safety-related functions must not be controlled via the SSW7-TS PRO GSM alone. Make sure in the software that uncontrolled restarts cannot occur.



Before you start installation work, all system components must be disconnected from their power source.

2 Installation and Mounting

Installation and mounting must be effected in compliance with VDE 0100 / IEC 364. Because the product in question is an IP 20 module, it must be installed in a cabinet.

A maximum ambient temperature of 60 °C must be ensured for reliable operation.

2.1 Mounting orientation

The SSW7-TS PRO GSM can be installed in any orientation.

2.2 Minimum clearance

Minimum clearances must be observed because

- then it is possible to insert and remove the SSW7-TS PRO GSM without having to remove other system components.
- there is enough space to connect existing interfaces and other contacts using standard commercial type accessories.
- there is room for any necessary cable routing.



For the SSW7-TS PRO GSM, a minimum clearance of 60 mm must be left above and below and 10 mm at the sides.

2.3 Installing the module

For mounting on level surfaces or on DIN mounting rails, the wall and rail holders supplied can be used.

This is clicked onto the rear of the housing without the use of tools.

3 System Overview

3.1 Requirements for a GSM connection via CSD

The SSW7-TS PRO GSM can be operated on all GSM-compliant networks with the frequencies 850 MHz, 900 MHz, 1800 MHz, and 1900 MHz. By selecting the provider whose SIM card is inserted in the SSW7-TS PRO GSM, the SSW7-TS PRO GSM should, after correct parameterization, automatically sign on to the available GSM network.

Please remember that existing SIM cards or SIM cards purchased without observing the rules below do not normally support incoming data services. That means, for example, it is not possible to select the SSW7-TS PRO GSM with the TeleService software of Siemens.

When purchasing a suitable SIM card, make sure the provider supports and specially activates the circuit-switched data (CSD) protocol. The CSD service can also be activated subsequently, that is, after you have purchased a SIM card.

A separate phone number is always assigned to the SIM card for the CSD service. At least two numbers are therefore activated for the SIM card: Telephone number and data number for incoming connections. There may also be a third number if a fax service is activated in addition to voice and data.

Experience has shown that the following contracts in their pure form can be chosen. However, mixed contracts are common, for example, where not only the voice but also the data service is released for incoming connections.

Function	Prepaid card	Contract for voice transmission	Contract for data transmission
Outgoing data connection	✓	✓	✓
Incoming data connection	-	-	✓
SMS	✓	✓	✓
Voice connection	✓	✓	-

CSD supports a maximum transmission rate of 9.6 kbps. Some providers also offer HSCSD data transmission (High Speed Circuit Switched Data --> up to 14.4 kbps without error correction) and. Dial-up via the HSCSD service is not supported by SSW7-TS PRO GSM.

GSM expansions, such as GPRS, EDGE, or UMTS are services that can actively establish connections, that is, from inside to outside (say, from a cell phone or laptop to the Internet). These services do not allow dial-up from outside and can therefore not be used for normal teleservice solutions.



For teleservice applications, the SIM card must be activated by the provider for incoming data traffic!



A remote connection to the SSW7-TS PRO GSM is not possible via GPRS.



An active USB link automatically deactivates the RS232 interface!



FM modules cannot be parameterized with the SSW7-TS PRO GSM.



The functions "PG-Dial" and "AS-Dial" for starting a call from an S7-CPU are not implemented.

3.2 Application and function description

The SSW7-TS PRO GSM is a gateway between the USB, RS232, or modem on the one side and an MPI or Profibus bus on the other. It is mainly designed for teleservice of S7-300 and S7-400 CPUs and supports transmission rates of up to 12 Mbps.

The internal modem can also be used independently of the MPI/PROFIBUS functions to communicate with other systems.

The RS232 or USB interface can be used for parameter setting directly on site or for SCADA or visualization systems.

Only the RS232 interface can be directly connected with an external modem to implement remote links independently of the internal modem modules.

The additional Mini-A USB interface has priority, that is, the RS232 interface is inactive when the USB link is active.

The integrated quadband GSM module of the SSW7-TS PRO GSM is suitable for industrial applications and supports all common GSM transmission standards.

Services such as GPRS, EDGE, and UMTS are not suitable for the usual teleservice applications, because for these services only outgoing and no incoming connections are possible.

The CSD protocol includes a transparent transmission service of 9.6 kbps. According to current information, it is supported by all GSM network operators.

If the equipment is destined for use abroad, please ask the telephone companies in the country of use whether and under what conditions the CSD protocol is supported.

Up to eight MPI/PROFIBUS links can be used simultaneously with the USB, RS232, or modem link.

At the MPI/PROFIBUS end, the baudrate to be used is automatically detected. On the USB and RS232 interface, the baudrate of the connected workstation is also automatically detected.

The SSW7-TS PRO GSM draws the power it required either from the MPI/PROFIBUS interface of the programmable controller or via an external power supply (see Section 3.6).

The MPI/PROFIBUS connecting cable has a 9-way SubD connector and is 1.2 meters long and active. A repeater is installed in it so that the connected SSW7-TS PRO GSM is not a spur line that could cause interference on the bus.

Using the null modem cable supplied, the SSW7-TS PRO GSM can be used for parameterization on site via a serial interface on the programmable controller.

With the appropriate software, it is possible to use the SSW7-TS PRO GSM as

- A programming adapter (TS or PC adapter),
- Teleservice unit, or
- Operator control and monitoring unit

All further information can be found in the manual for each programming software product.

A firmware update for the SSW7-TS PRO GSM can be transferred to the SSW7-TS PRO GSM adapter both locally and via a remote link.

For teleservice, an enabled SIM card for incoming data connections (CSD) and a GSM antenna are required (see Section 3.7.3).



For teleservice operation, a GSM antenna and a SIM card activated for incoming data connections are required.

3.3 Connections

The SSW7-TS PRO GSM has the following connections:

- Power supply socket for 24 V DC power supply.
This power supply option can be used, if the programmable controller used does not provide any or only insufficient power on the bus connector.
- RS232 connector for connecting the null modem cable supplied for direct operation as a programming adapter or use of the internal modem. Not active while the USB is being used.
- USB Mini A female connector as an alternative connection
- Bus connector with programming unit socket, switchable terminating resistor, and 1.2 m connecting cable. The programming unit socket of the bus connector allows further bus nodes to be plugged in.
The terminating resistor must be set to ON if the SSW7-TS PRO GSM is at the beginning or end of a bus segment. If this is not the case, the switch position must be OFF.
- SIM card slot with removable loading slide for 3V DC SIM cards.
- Antenna socket of type FME (male) for connecting commercial type GSM antennas (see Section 3.7.3).



The power cannot be drawn from the USB interface!

3.4 LED displays

For display of the operating status, the SSW7-TS PRO GSM has six LEDs. Two LEDs are implemented in two colors.

3.4.1 Status LEDs for standard functions

The three LEDs “Power”, “Online,” and “Connected” provide information about the current operating status of the SSW7-TS PRO GSM.

They also indicate an update process.

State of the LEDS	Power LED (green)	Online LED (green)	Connected LED (green)
Ready for operation	ON	OFF	OFF
Connection to MPI/PROFIBUS being established	ON	BLINK	OFF
Actively logged on to the MPI/PROFIBUS	ON	ON	OFF
Active connection with a programmable controller	ON	ON	ON
Data exchange with a programmable controller	ON	ON	BLINK
Firmware update being transmitted	BLINK	OFF	OFF

3.4.2 Status LEDs for modem functionality

The two LEDs “SQ” and “DCD” indicate the status of the integrated modem.

LED status for operating status	SQ LED (orange)	SQ LED (green)	DCD LED (orange)
SIM card either faulty or missing from device	ON	OFF	OFF
PIN either not transferred or incorrect	BLINK 0.5 Hz	OFF	OFF
PIN transfer incorrect --> PUK required!	BLINK 2.5 Hz	OFF	OFF
No GSM network, or network search	FLASHES every 3 secs.	OFF	OFF
Modem has signed onto GSM radio network - with very good reception quality	OFF	ON	OFF
Representation of signal quality of available GSM network (divided into 5 different flashing frequencies)	OFF	BLINK	OFF
GSM connection established. Modem ready for transmission of useful data	OFF	ON/BLINK	ON

3.4.3 Status LED for operating mode display

The LED “TS/MDM/PC” indicates which of the three possible modes the SSW7-TS PRO GSM is currently in.

LED status for operating status	LED (green)	LED (red)
The internal TS adapter is connected to the internal modem (microswitch setting “TS”). The USB and RS232 interface is inactive.	OFF	OFF
The internal TS adapter is connected to the USB/RS232 interface (microswitch setting “PC”). The internal modem is inactive.	ON	OFF
The internal modem is connected to the USB/RS232 interface (microswitch setting „MDM“). The internal TS adapter is inactive.	OFF	ON
The internal modem was not correctly initialized by the SSW7-TS PRO (e.g. incorrect AT command).	OFF	FLASH
The internal modem cannot be addressed (suggests a fault).	OFF	BLINK
The externally connected modem was not correctly initialized by the SSW7-TS PRO (e.g. incorrect AT command).	ON	FLASH

3.5 Function switch

3.5.1 Microswitch TS adapter

The “TS/MDM/PC,” which is located on the underside of the housing next to the external voltage socket, is used to switch between the three possible operating modes.

- In switch position “TS”, the SSW7-TS PRO GSM functions directly with the integrated modem.
This enables the SSW7-TS PRO GSM to be used for teleservice using the TeleService software (see Section 5.2).
The USB/RS232 interface does not have a function in this switch position.
- In switch position “PC”, the SSW7-TS PRO GSM functions directly with the USB or RS232 interface.
The SSW7-TS PRO GSM can be operated on the local computer as the TS adapter or as a PC adapter (Auto/MPI/PROFIBUS) (see Section 5.1).
The modem is inactive in this switch position.
- In switch position “MDM”, the internal modem functions directly with the USB or RS 232 interface.
In this way, the modem can be directly addressed via the USB/RS232 interface, for example, to parameterize it or to use it for teleservice purposes unconnected with MPI/PROFIBUS (see Section 5.3).
The SSW7-TS PRO GSM cannot perform MPI/PROFIBUS functions in this switch position.



The USB interface has priority, that is, the RS232 interface is inactive when the USB link is active.

3.6 Items supplied

The scope of supply of the SSW7-TS PRO GSM includes:

- SSW7-TS PRO GSM ready for operation
- DIN rail adapter
- 2-meter 5-way USB 2.0 A/Mini-B cable
- 3-meter null modem cable
- SIM card slide
- 24 V plug-in element, 2-way, max. 1.5 mm² flexible with front connection
- Manual (German/English)
- CD-ROM with driver, parameterization tools, additional information

3.7 Accessories

3.7.1 Manuals

Manual, German	900-770-8GS41/de
Manual, English	900-770-8GS41/en

3.7.2 Software

S7/S5 OPC server with software license	800-880-OPC10
S7/S5 OPC server with USB dongle	800-880-OPC20

3.7.3 GSM antennas and antenna accessories

Stationary triband antenna	700-751-ANT01
Quadband magnetic mount antenna	700-751-ANT02
Patch triband antenna	700-751-ANT03
Portable quadband antenna	700-751-ANT04
GSM antenna extension cable, 5 m	700-751-ANK01
GSM antenna extension cable, 10 m	700-751-ANK02
GSM antenna extension cable, 15 m	700-751-ANK03

3.7.4 Miscellaneous

DIN mounting rail adapter as an accessory	700-751-HSH10
Power supply adapter with plug	700-751-SNT01
Input: 100-240 V AC / 47-63 Hz / 400 mA	
Output: 24 V DC / 625 mA	

4 Installation of the Driver Software and Service Tools

The CD-ROM supplied contains various drivers and service tools that have to be used for their respective purposes.

4.1 System requirements

To operate the driver and service tools of the SSW7-TS PRO GSM, a PC or laptop is required with a 32-bit Windows operating system and a CD-ROM drive. The Windows 2000, Windows XP, and Windows Vista operating systems can be used.

In the programming devices or PCs used, there should be one USB interface with the USB -1.1 or USB -2.0 specification. As an alternative, the RS232 interface can be used in conjunction with a standard COM port. Commercially available RS232 interface cards installed in the PC can also be used for this.

4.2 Installation of the USB driver

If this is the first time a SSW7-TS PRO GSM is being connected to the PC via USB, the operating system will try to install a suitable driver. The driver is a sort of interface between the USB interface and the operating system (Windows) and has nothing to do with the actual application.

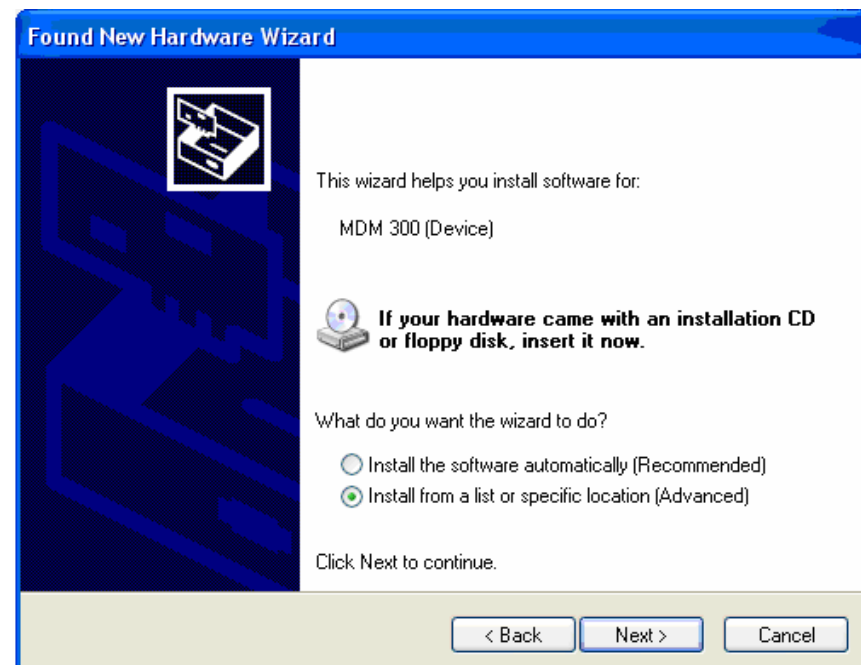
The USB driver is required for subsequent parameterization of use of the SSW7-TS PRO GSM on the local computer (not necessary for operation on a serial COM port).

This initialization can take a little time and goes through the following steps:

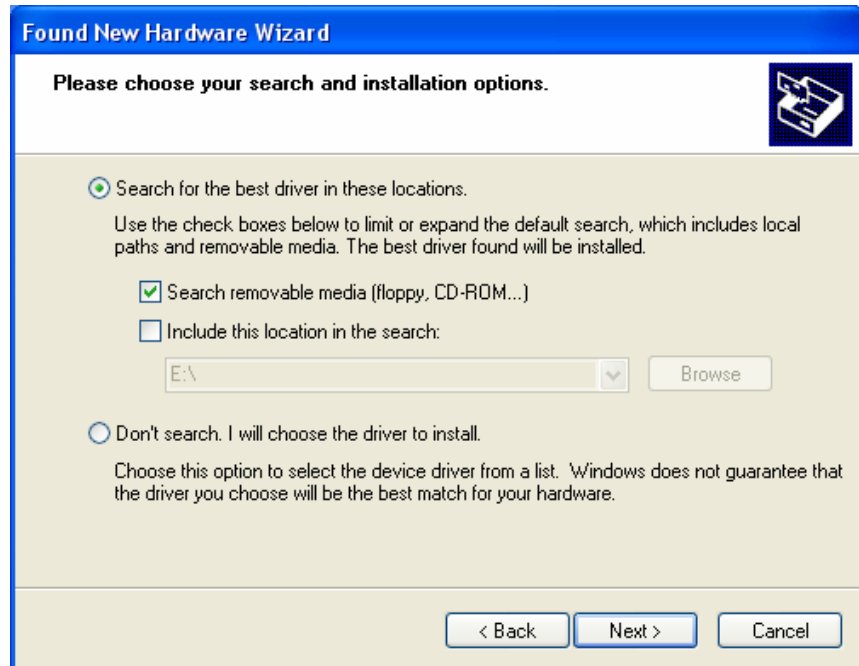
- The operating system starts an installation wizard that performs the installation, which is largely automatic. In the first step, you must enter whether the driver is to be searched for online or locally.



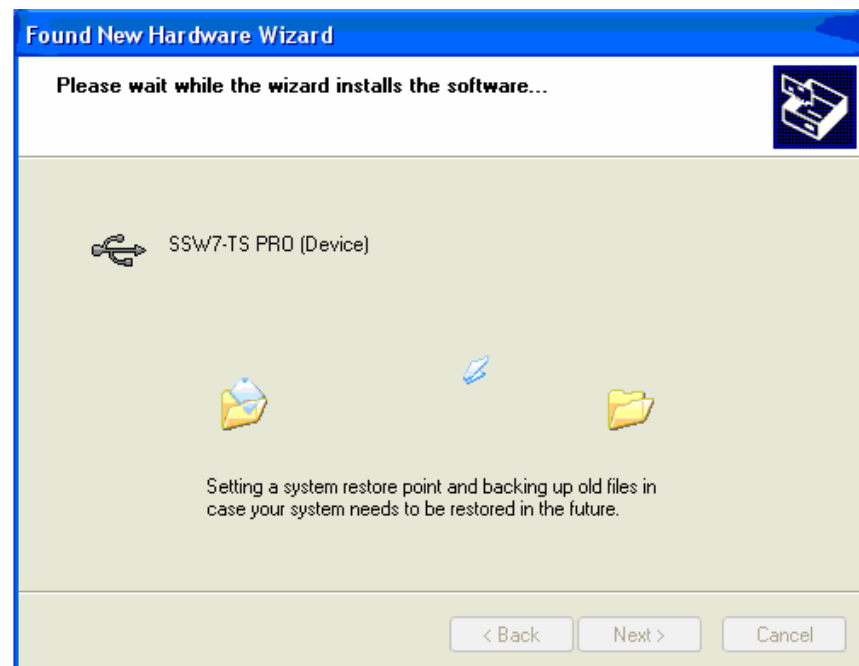
- To be able to specify the search path for the driver (generally the CD-RTOM supplied), it is necessary to make the following setting and confirm it with “Next.”



- The next step is a prompt to specify the location of the driver. It is generally enough to set a checkmark next to “*Search removable media...*” and then to click the “*Next*” button.



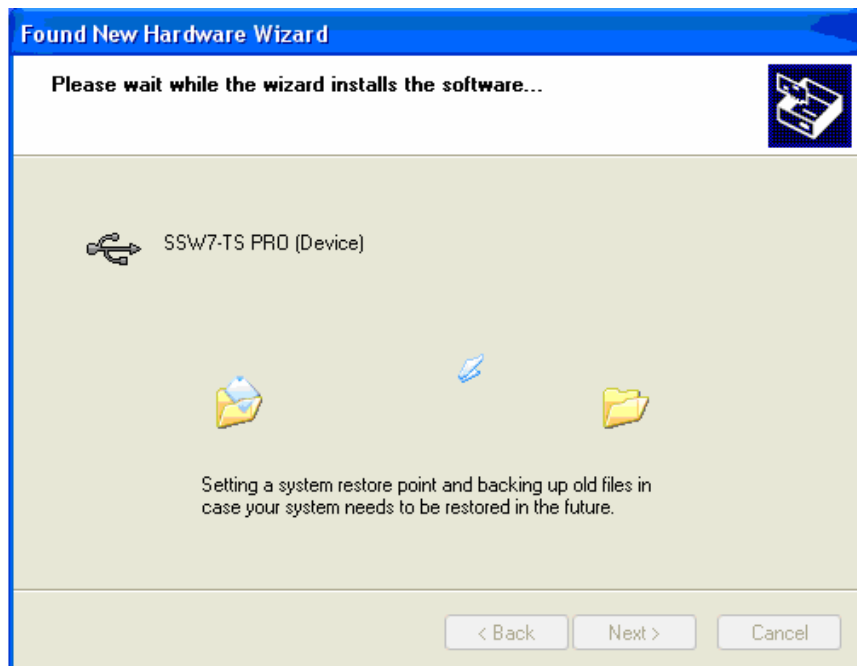
- If the SSW7-TeleService-Modem CD-ROM is in a local drive, the search for the driver now begins.



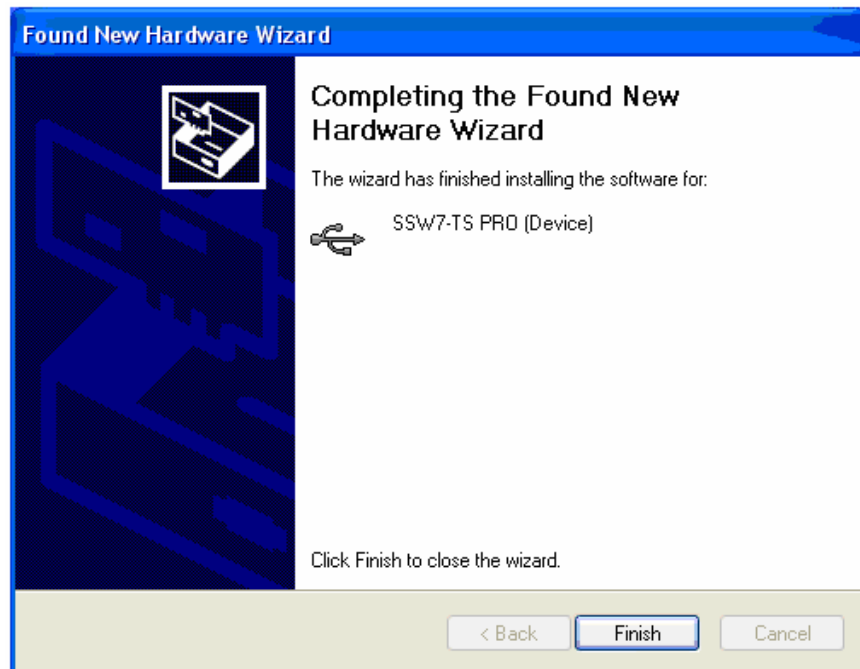
- If the driver is found, a WindowsXP logo compatibility query appears.



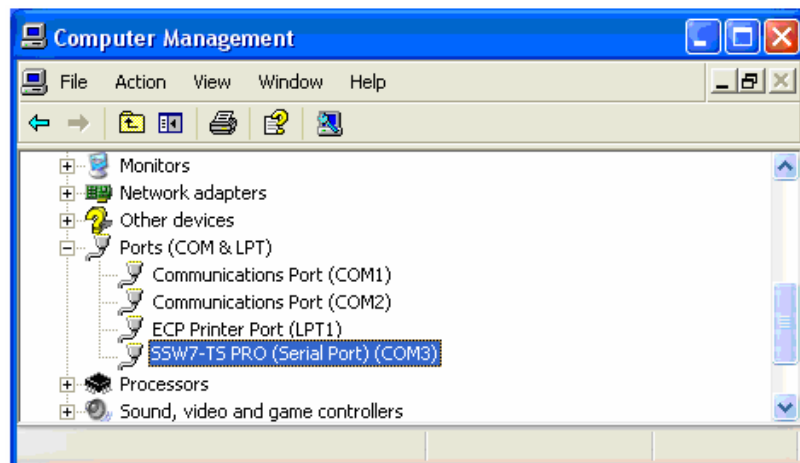
- Confirm with the button "*Continue installation.*" The driver is then installed.



- After successful installation, the operation is completed by clicking the “*Finish*” button.



- The operating system starts the installation wizard a second time to install the virtual COM port driver, too. The installation routine is identical to that described above.
- A new COM port is now added in the device manager. This must be selected as the type of access for all further applications.

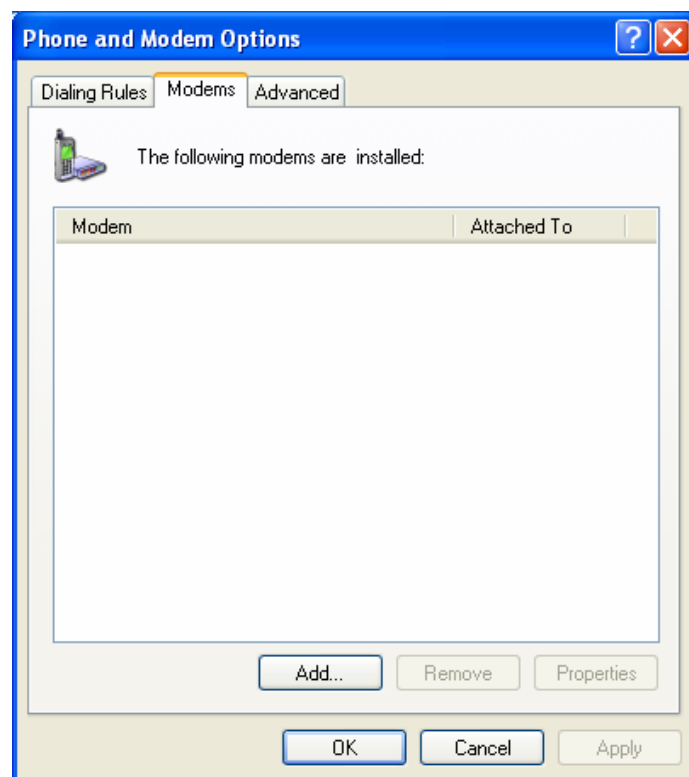


If several USB interfaces are available, but the SSW7-TeleService-Modem CD-ROM is not at hand, we recommend copying the driver files onto the local hard disk because it is possible that a separate instance of the driver for the SSW7-TS PRO GSM has to be installed on the PC for each USB interface.

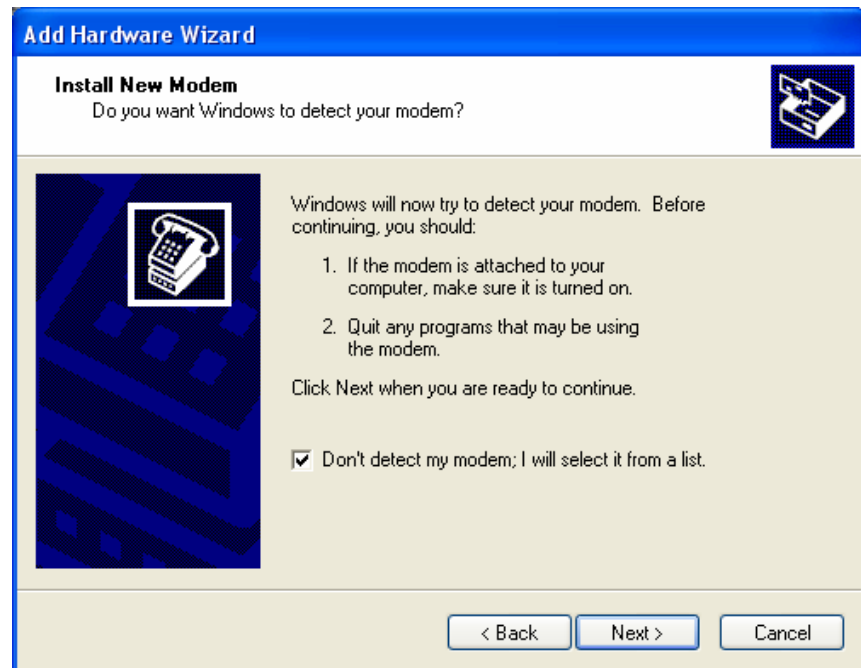
4.3 Installation of the modem driver

If the internal modem of the SSW7-TS PRO GSM is to be operated directly on a programming device or PC via RS232 or USB, the corresponding modem driver must be installed. For this purpose, the micro-switch must be put in the central position "MDM" and the cable plugged into the SSW7-TS PRO GSM.

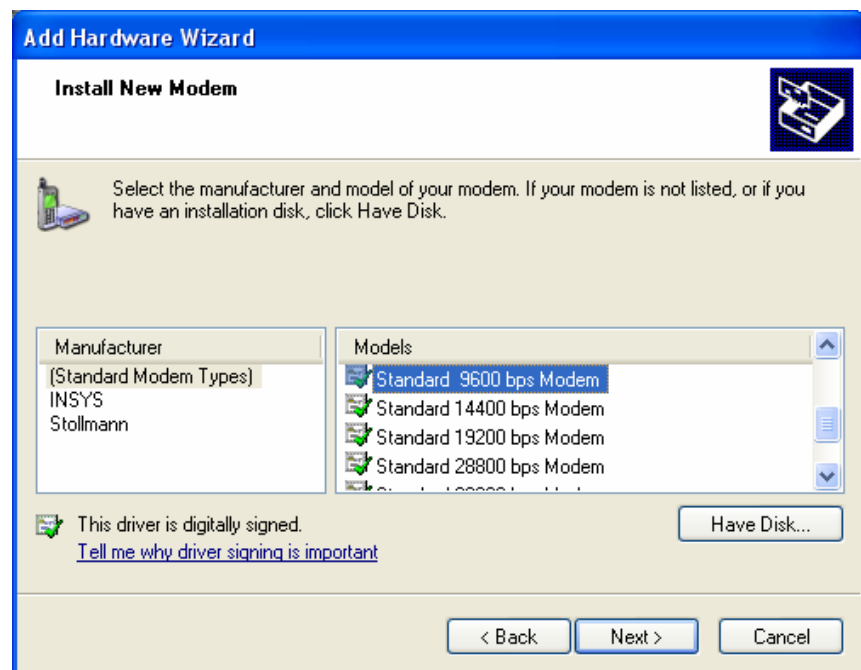
- The internal GSM module does not support plug & play functionality. The "*Telephone and Modem Options*" in the Control Panel are used to install the modem manually.



- The hardware wizard is called with the “Add...” button.

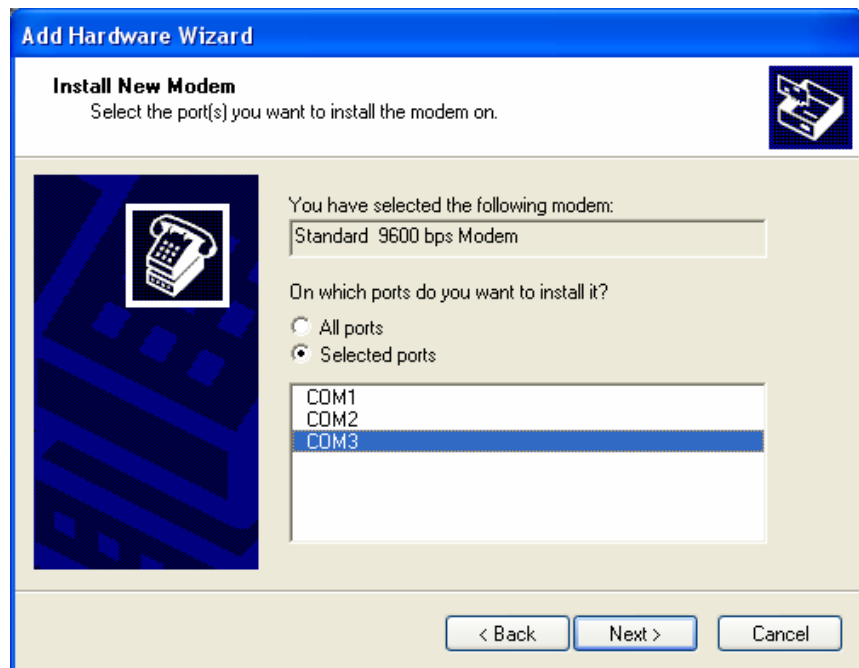


- Setting the “Don’t detect my modem” checkmark causes the system’s own standard modem drivers to be listed. These can be selected once you have pressed the “Next” button.

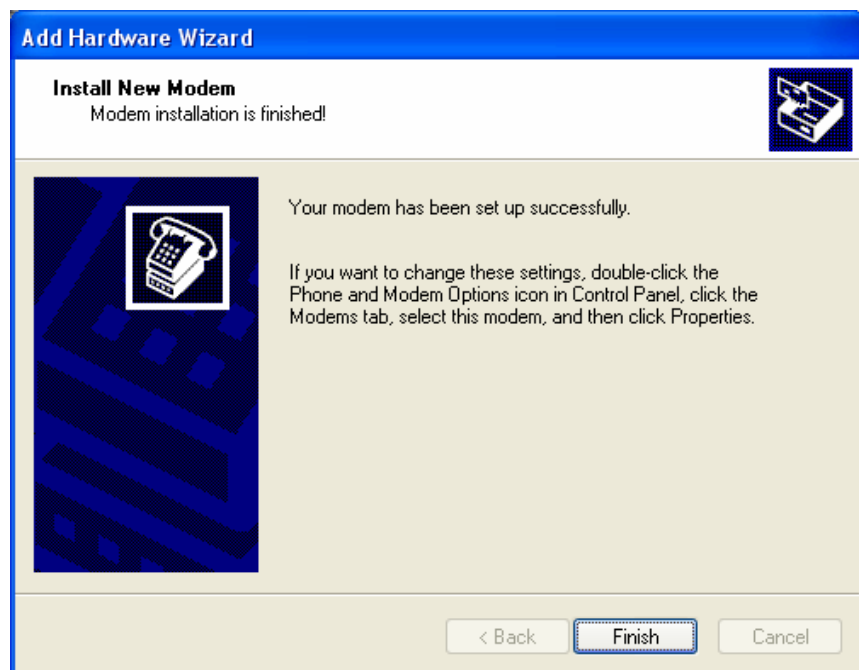


- Under Models, select “Standard 9600 bps Modem.”

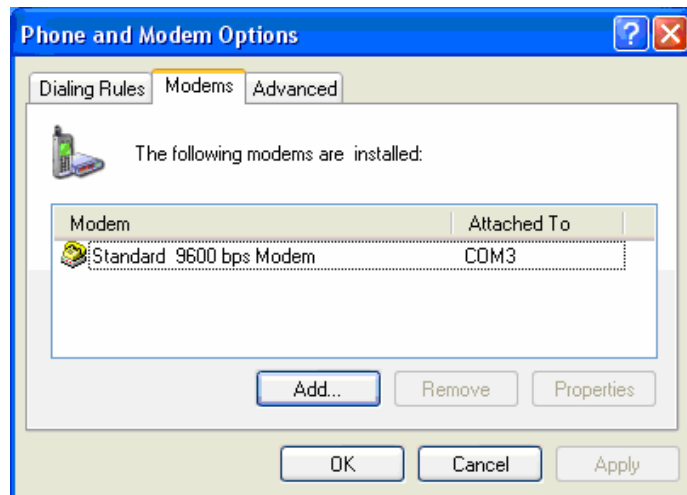
- The next step is to assign the COM port. Select the COM port to which the SSW7-TS PRO GSM is to be connected.



- After successful installation, the operation is completed by clicking the “*Finish*” button.



- A new modem with the corresponding COM port is now added in the telephone and modem options.



The SSW7-TS PRO GSM can now be used as the local modem for a telecommunication link. Parameterization functions to the modem can also be used.

4.4 Service tools

4.4.1 Parameterizing and updating with SHTools

With the SHTools software, it is possible to perform a firmware update of the SSW7-TS PRO GSM, if required. The SSW7-TS PRO GSM can also be pre-parameterized with SHTools without the TeleService software having to be installed on the computer. SHTools also provides tools for using the additional functions in the SSW7-TS PRO GSM.

The tool is freeware and has been tested under Windows 2000, Windows XP, and Windows Vista. It is included on the CD-ROM that is contained in the scope of supply.

The most up-to-date version can also be downloaded in the Internet under <http://www.helmholz.de>.

After installation, SHTools is available in the start menu under *"Start/Programs/Systeme Helmholtz."*

The most important program functions are described below.

4.4.2 Firmware update

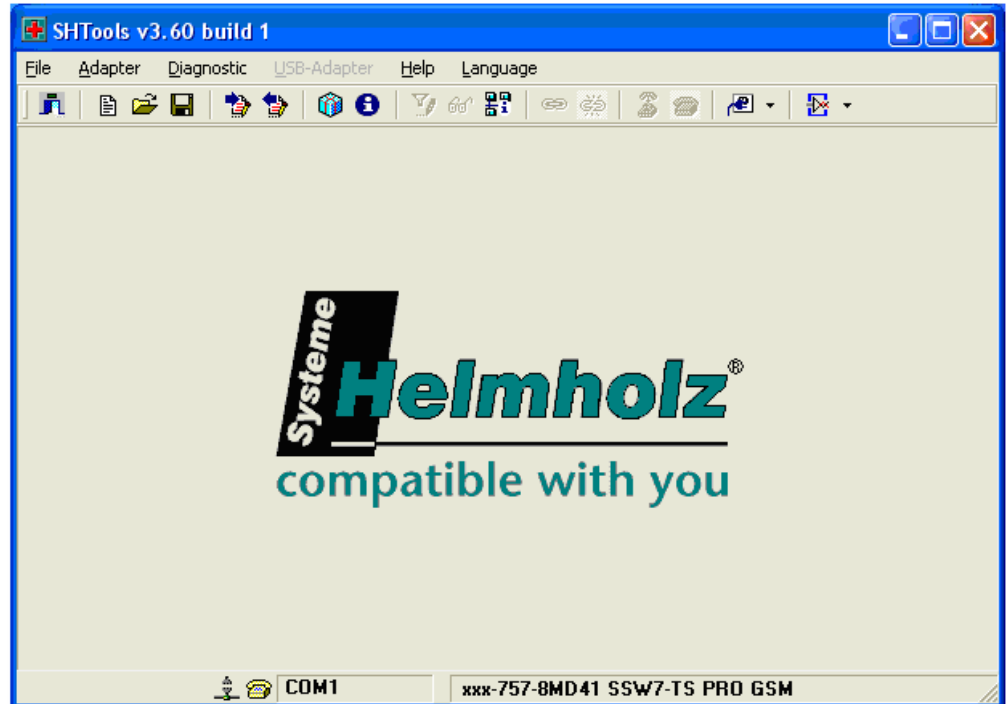
If required, it is possible to update the firmware of the SSW7-TS PRO GSM locally or via modem link.

For the local update, a link must be established between the SSW7-TS PRO GSM and a USB or RS232 interface on the PC on which SHTools is installed. The micro-switch on the SSW7-TS PRO GSM must be put into the "PC" position. The "PC" operating mode is indicated by the lit green "TS/MDM/PC" LED.

For the remote update of a ready-to-run SSW7-TS PRO GSM, an analog modem, for example, is also required on the local computer, which is addressed via a COM port.

The SHTools contain update functions for many adapters of Systeme Helmholtz GmbH.

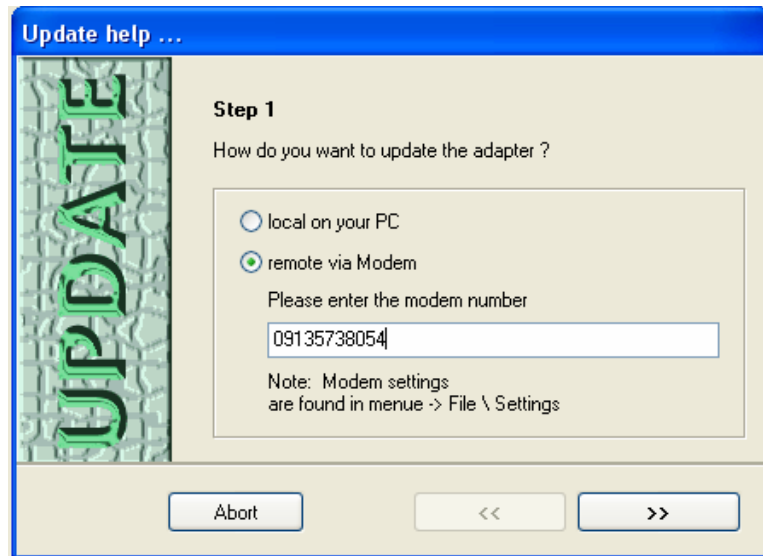
How to perform an update is explained below.



- Via menu item “*Adapter / ... select,*” the required device is selected by its order number (in this case, the SSW7-TS PRO GSM).
- Via menu item “*Adapter / Select COM port/serial number,*” the required interface is selected.

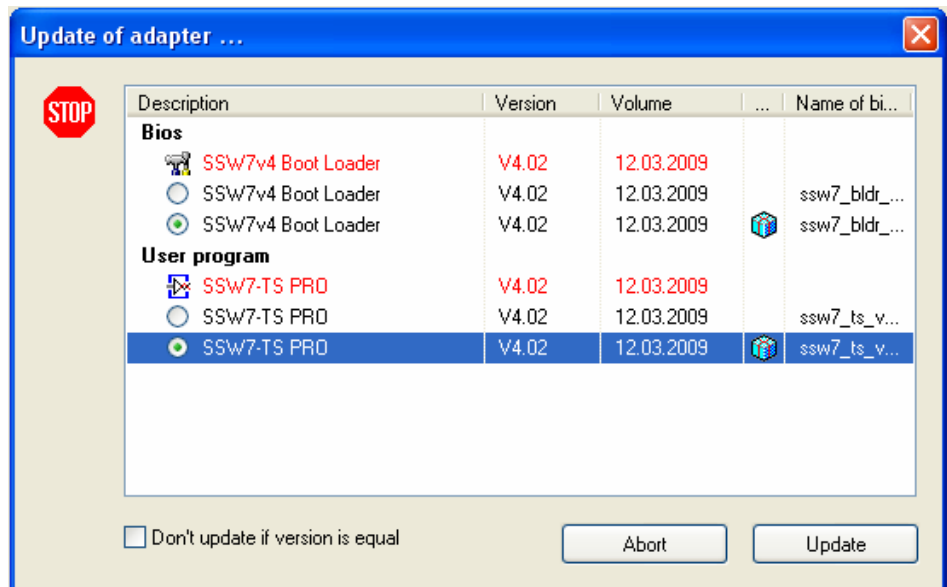
The selection is shown on the status bar on the lower edge of the application window.

- After selection of the “*Adapter / Update adapter*” menu item, it is possible to define the access path in step 1 (local or remote).



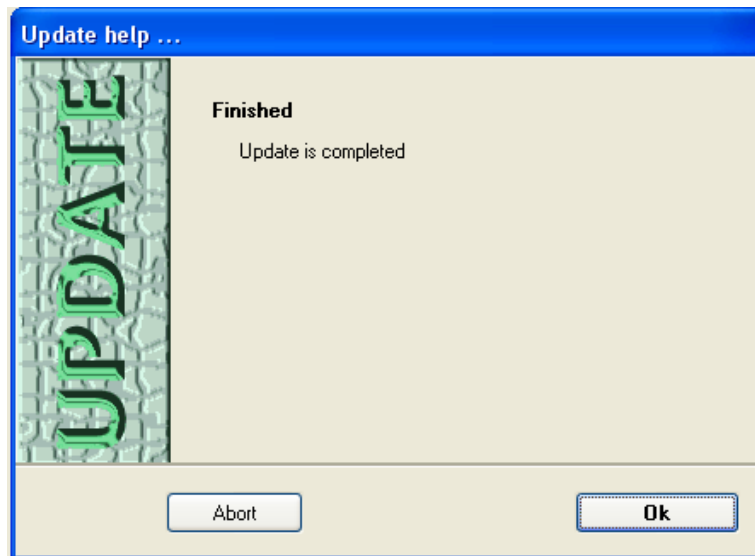
22

- After *step 1* is confirmed, an attempt to establish a link to the SSW7-TS PRO GSM follows. If this is successful, updating of the firmware sections, of which later versions are available, begins automatically.
- If, under “*File / Settings*” the “*Automatic update*” option is deselected, the user can select the components that will be updated. The update process is started by pressing the “*Update*” button.

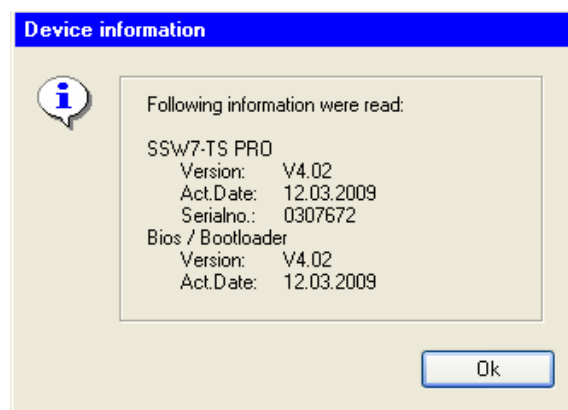


Transmission of the new firmware can take several minutes depending on the transmission rate of the link and should not be interrupted!

- *Finished* shows that the update has been successful.



- If the update is performed locally, the current version of the imported firmware can be read with menu item “*Adapter / Read out information from the adapter.*”



4.4.3 Parameterization with SHTools

SHTools is an alternative to the TeleService software for parameterizing the SSW7-TS PRO GSM.

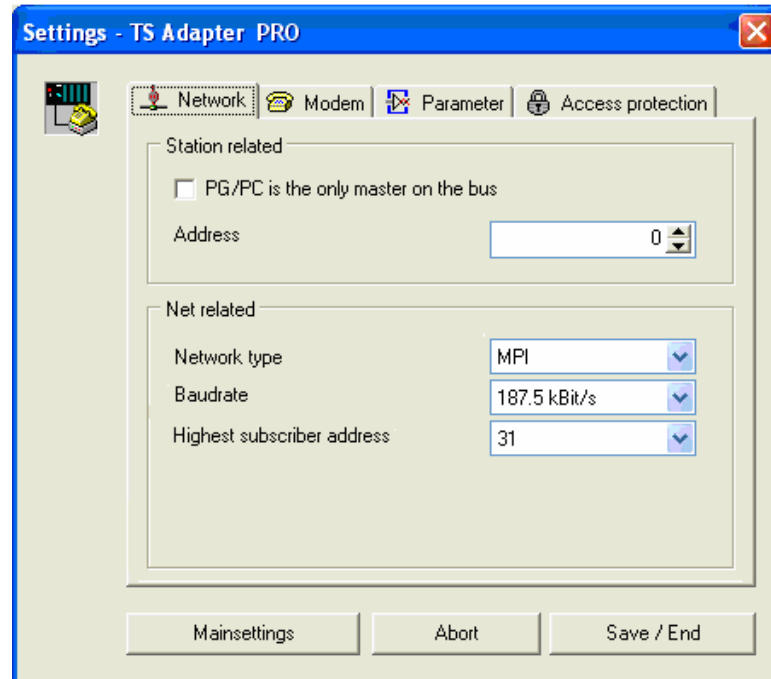
For parameterization, a link must be established between the SSW7-TS PRO GSM and an RS232 or USB interface on the PC on which SHTools is installed. The micro-switch on the SSW7-TS PRO GSM must be put into the “PC” position. The “PC” operating mode is indicated by the lit green “TS/MDM/PC” LED.

With the “*Adapter / Read parameters from the adapter*” menu item, it is possible to read the current parameterization out of the SSW7-TS PRO GSM.

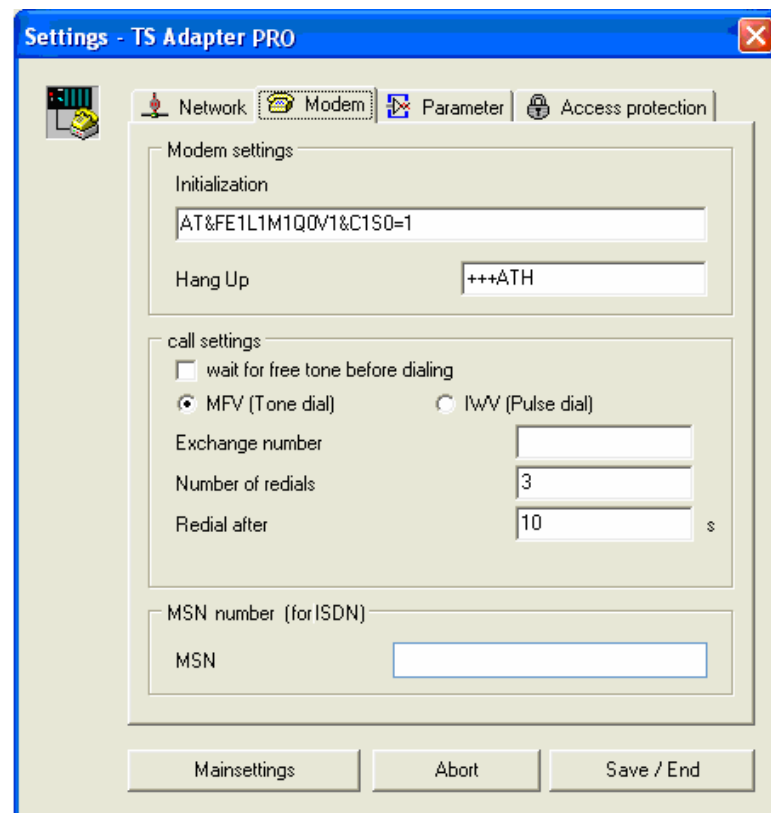
The read parameters are displayed in the “*Settings – TS adapter*” window.

The window contains four tabs providing access to functionally independent parameterization options:

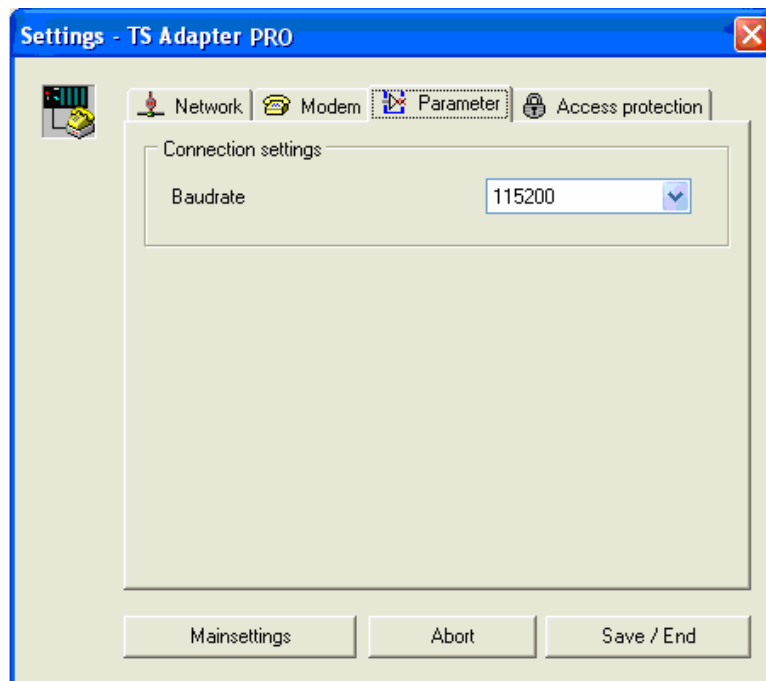
- Setting the MPI/PROFIBUS-specific parameters



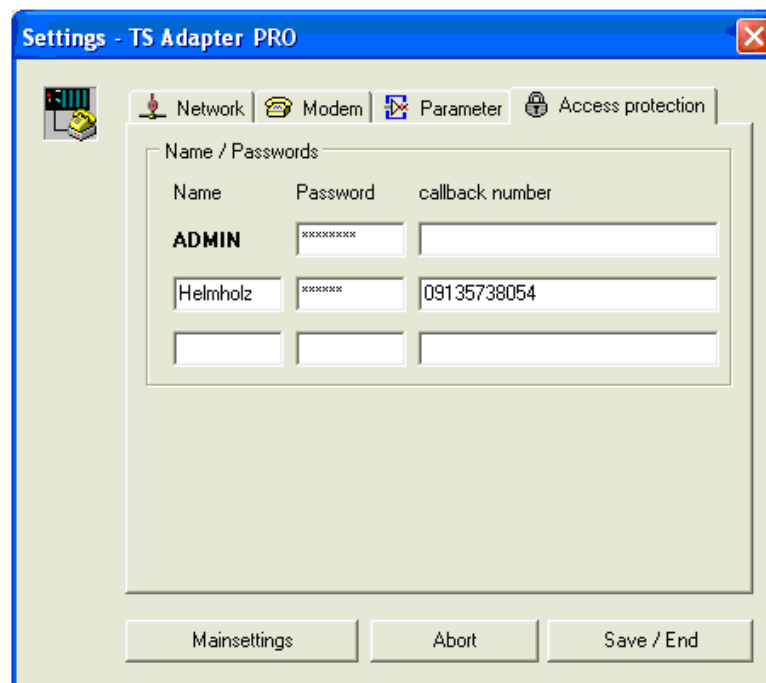
- Setting the modem-specific parameters



- Setting the transmission rate between the GSM modem and the SSW7-TS



- Setting the access protection for remote access



With the “Save / End” button, the edited contents of the four tab cards are transferred to the SSW7-TS PRO GSM.

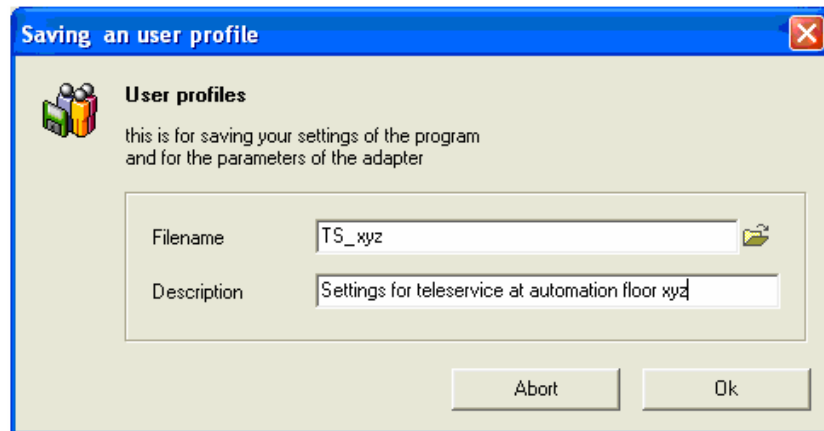
Pressing the “Cancel” button closes the setting window without making the changes.

You can display the basic settings (as-delivered state) by pressing the “Basic settings” button.

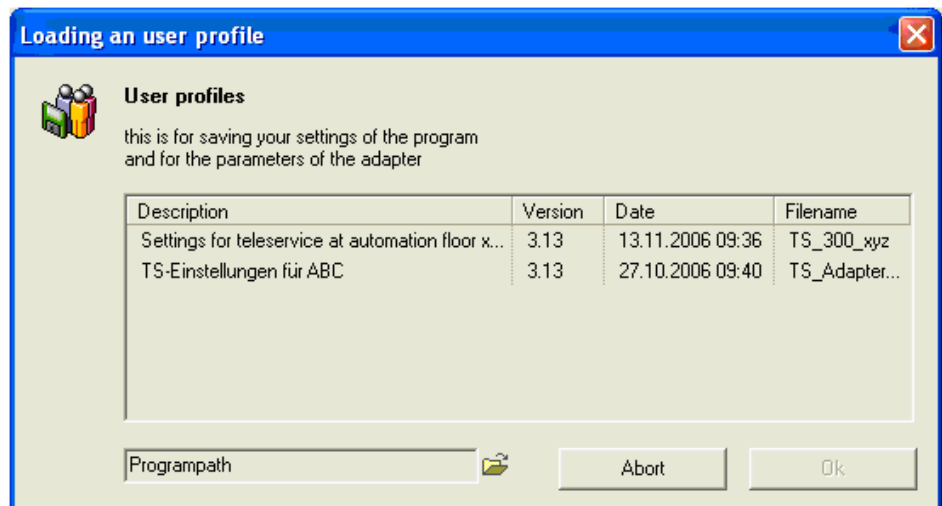
Once set, TeleService parameters can be stored on the computer in a file and transmitted to further SSW7-TS PRO GSMs.

To save the changes made as a file on the PC in the last step, select menu item *“File / Save profile.”*

In the *“Saving a user-defined profile”* window, it is possible to specify a meaningful file name with a short description.



To open a user-defined profile, choose the menu item *“File / Open stored profile.”* In the *“Loading a user-defined profile”* window, which then opens, you can select the required profile.



With the *“Adapter / ... Settings”* menu item, it is possible to view and change the current profile.

4.4.4 PIN transfer during direct modem operation

In the micro-switch setting “MDM,” direct access to the modem of the SSW7-TS PRO GSM is possible. However, in many cases a PIN is necessary to be able to use and query functions of the GSM network and the SIM card used.

In SHTools, an input box appears under “Activate adapter/GSM modem with PIN” in which the PIN can be transferred.



To parameterize the GSM modem, it is usually necessary to enter a PIN first.

When the modem has successfully transferred the PIN and signed onto the radio network the current signal strength is displayed as a bar.

The “Query Data Mode” button is used to check whether your SIM card is activated for incoming data transfer (CSD). If this is not the case, the SSW7-TS PRO GSM can only be used for limited tele-service in a system.

To query the data mode, it is necessary to select the SSW7-TS PRO GSM through an analog or ISDN modem during the query by clicking the “*Query Data Mode*” button.

The dialog box has a blue title bar with the text "Please enter the PIN for the modem" and a close button. The main area has a yellow background. On the left, there is a key icon and the heading "Security". Below this, text reads: "Here you can log on the GSM-Modem with your PIN to the network. Attention : After a Voltage drop the modem has to be logged on with the PIN to the network again!". In the center, there is a text input field with the placeholder "Enter the four digit PIN now" and a small "XXXX" label. On the right, there is a vertical bar representing "Measured field strength" with levels "excellent", "normal", and "bad" (indicated by a red bar). Below this is the text "Gauging active ...". At the bottom, there is a status bar showing "max. PIN ??", "max. PUK ??", "Data mode", and "confirmed". Below the status bar is a "Status" label. At the bottom right, there are two buttons: "Request data mode" and "End".

4.4.5 Activating the PIN with a personal unblocking key (PUK)

If the SIM card is blocked or the PIN was repeatedly entered incorrectly, SHTools automatically prompts for entry of the PUK (personal unblocking key) and a new PIN to unblock the modem again.

The dialog box has a blue title bar with the text "Please enter the PUK for modem" and a close button. The main area has a yellow background. On the left, there is a key icon and the heading "Security". Below this, text reads: "Enter the PUK from your SIM card". Further text states: "The modem has not detected a SIM card in the device, or the PIN has been entered false, so the device is locked. For reactivating, the PUK is necessary, which you can find in the documents, you got from your GSM provider." In the center, there is a text input field for "PUK for unlocking the modem" with the value "12345678". Below this, there are two text input fields for "Please enter new PIN" and "Please reenter new PIN", both with "XXXX" labels. At the bottom right, there are two buttons: "set PUK" and "End".

5 Operation on a Programmable Controller

There are different ways of connecting the SSW7-TS PRO GSM to the programmable controller on one side and the telephone network or programming device or PC on the other side.

As a special function, the SSW7-TS PRO GSM offers the option of communicating with the modem via the USB or RS232 interface. The MPI/PROFIBUS functionalities are deactivated in this case.

5.1 USB or RS2323 direct operation on a programming device or PC

To be able to use the SSW7-TS PRO GSM like a local TS adapter, in addition to the existing USB or RS232 link to the local computer, the micro-switch for the operating modes must be in the “PC” position. The LED with the name “TS/MDM/PC” is lights up green in this switch position.

Locally, we recommend using the SSW7-TS PRO GSM as a PC adapter (Auto/MPI/PROFIBUS). So it is not necessary to have the TeleService software for local access installed in every PC.

5.2 Modem operation on a GSM network

To use the SSW7-TS PRO GSM for teleservice of a S7-300 or S7-400 controller, it must be correctly parameterized and wired in the system.






On the local computer that is to communicate with the SSW7-TS PRO GSM via a telephone link, a functioning modem link to the outside world and, for example, the TeleService software from Siemens are required.

In addition to inserting a SIM card activated for incoming data traffic (CSD) and entering the PIN in the initialization string (see Section 6.2.3.2), please pay attention to the position of the microswitch for the operating modes. The switch must be put in the “TS” position, which is indicated by the “TS/MDM/PC” LED going out.

When the device is supplied with power only the “Power” LED and, after some time, also the “Online” LED should be active. The SSW7-TS PRO GSM is now signed onto the MPI/PROFIBUS and has parameterized the internal modem. The signing-on phase is indicated by the various states of the orange “SQ” LED. When the LED goes out, this is an indication that the modem has signed onto a GSM network

The quality of the received GSM signals is displayed by a green “SQ” LED.

The longer the LED is lit during every 3-second interval, the better the reception. If the LED stays on permanently, this means the reception quality with the GSM network is excellent.

Signal	Periodic flashing frequency over 3 seconds	Ratio	Corr. to signal strength
ON OFF		1:7	SQ=0
ON OFF		2:6	SQ=1
ON OFF		4:4	SQ=2
ON OFF		6:2	SQ=3
ON OFF		8:0	SQ=4

5.3 USB or RS232-to-modem operation

To use the GSM modem of the SSW7-TS PRO GSM as a simple modem that does not provide TS adapter functionality, the microswitch can be put in the “MDM” Position. This switch position is indicated by the red “TS/MDM/PC” LED.

In this mode, it is possible to access the modem directly via the USB or RS232, for example, to parameterize the modem.

In this mode, a link to another modem via the telephone network is also possible, for example, to connect to SCADA systems etc.

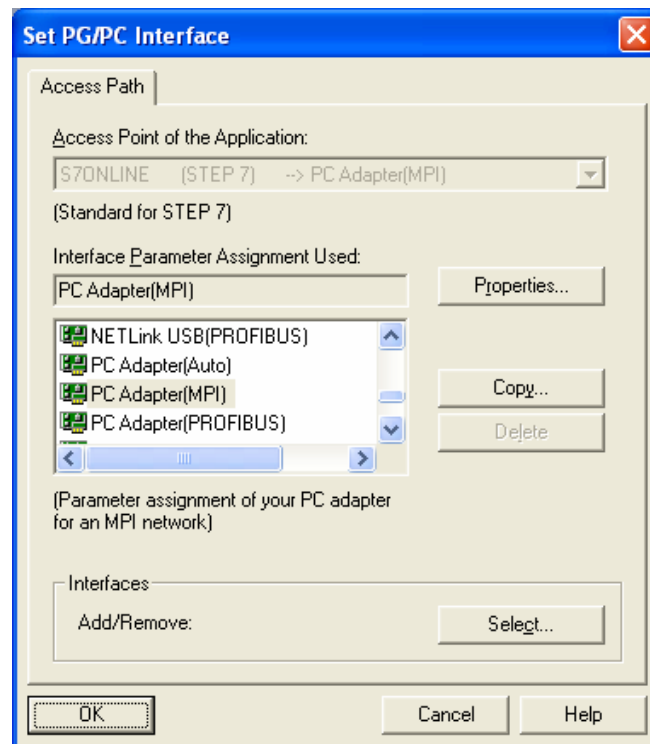
6 Configuration of Simatic Tools

6.1 Direct operation as a PC adapter (Auto/MPI/PROFIBUS)

For direct operation, the SSW7-TS PRO GSM is connected to a programming device or PC via the USB or null modem cable supplied.

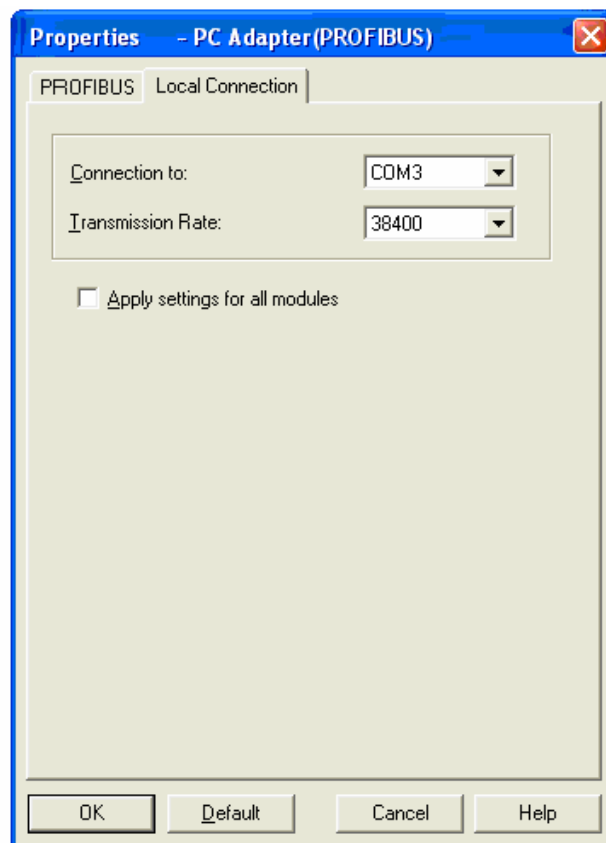
If the micro-switch is in the “PC” position, which is indicated by a green “TS/MDM/PC” LED, the SSW7-TS PRO GSM is used as a TS adapter in direct operation or as a PC adapter (Auto/MPI/PROFIBUS).

On computers on which TeleService is not installed, the TS adapter in the programming device or PC interface cannot be selected. However, the PC adapter (Auto/MPI/PROFIBUS) can always be used for direct operation.

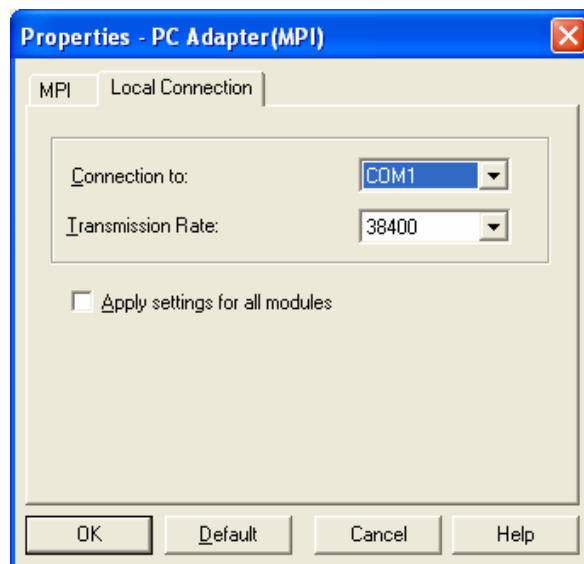


Under the “*Properties*” of the MPI or PROFIBUS settings, the appropriate COM port must be selected before first use. On connection via USB, the previously installed virtual COM Port must be set (see Section 4.2).

Example of PROFIBUS interface selection when connecting the USB cable to the virtual COM port:



Example of MPI interface selection when connecting the null modem cable via RS232:



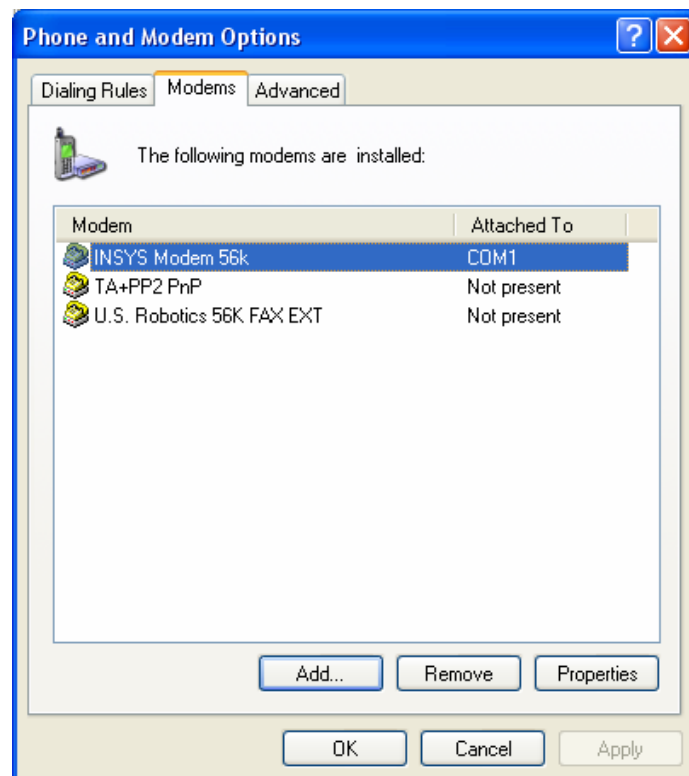
After the MPI or PROFIBUS-specific parameters have been adapted, it is possible to access the connected application in the usual way.

6.2 SSW7-TS PRO GSM for teleservice (modem operation)

To select a SSW7-TS PRO GSM, an analog, GSM, or ISDN modem is required on the programming device or PC. If a modem is already installed under Windows, this can also be used for teleservice.

Plug-and-play modems are automatically recognized by the programming device or PC and integrated in the system as soon as they are connected. The driver supplied with the modem is required for this.

You can manually install modems without plug-and-play capability via the control panel under *“Telephone and modem options”* in the *“Modems”* dialog box.



It should be possible to address the modem as soon as you have installed it on one of the COM interfaces of the programming device or PC. It can then be selected in the parameterization of the programming software.

To test the TeleService and modem settings on the programming device or PC, you can select the TeleService test system of Systeme Helmholtz GmbH. The relevant telephone numbers can be obtained from the technical support of Systeme Helmholtz GmbH.

In the case of a modem connection between different technologies, i.e. analog and GSM or ISDN and GSM, further aspects must be taken into account:

a) Connections between analog and GSM modems

- The transmission rate of the Windows modem driver must be set to at least 9.6 kbps.
- The transmission protocol may have to be set to V.32 (default in Windows driver and in the SSW7-TS PRO GSM)

b) Connections between ISDN and GSM modems

- The transmission rate of the Windows modem driver must be set to 9.6 kbps.
- As a rule the call-back function must be assigned an MSN (Multiple Subscriber Number) for the data port on the local ISDN modem.
- Call-back of the SSW7-TS PRO GSM to an ISDN modem is only possible if the B channel protocol in the GSM modem is set to V.110. This setting can be made in the initialization string (see Section 6.2.3.2).

The information on the settings must be taken from the relevant modem manuals.



Before initial start-up, the SIM-specific PIN must be added to the initialization string.

6.2.1 Settings on the SSW7-TS PRO GSM

On the SSW7-TS PRO GSM, the micro-switch position “TS” is set, which is indicated by the “TS/MDM/PC” LED going out.

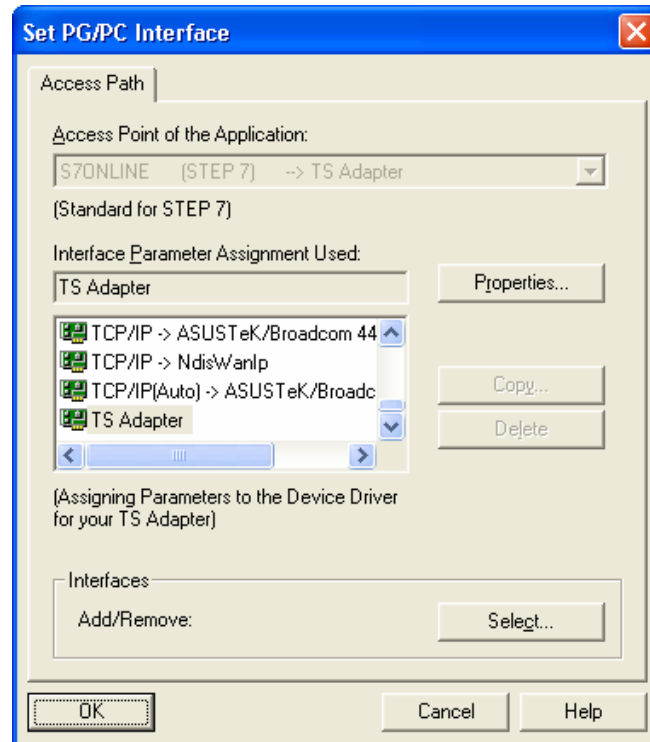
When the device is supplied with power only the “Power” LED and, after some time, also the “Online” LED should be active. The SSW7-TS PRO GSM is now signed onto the MPI/PROFIBUS and has parameterized the internal modem.

The internal modem has to be initialized before it is ready to accept calls. An initialization string is stored in the SSW7-TS PRO GSM for this.

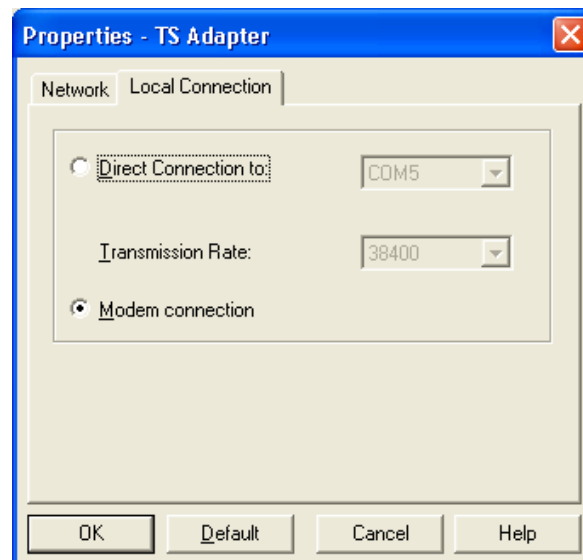
If no further user-specific settings have to be made, the SSW7-TS PRO GSM is then ready for teleservice.

6.2.2 Settings in the programming device or PC interface

In the programming unit or PC interface, the “*TS adapter*” must be selected as the access point to be able to communicate with the remote programmable controller after selecting the SSW7-TS PRO GSM through TeleService.



For teleservice, the “*Modem connection*” mode must be selected on the “*Local connection*” tab card in the properties of the TS adapter.

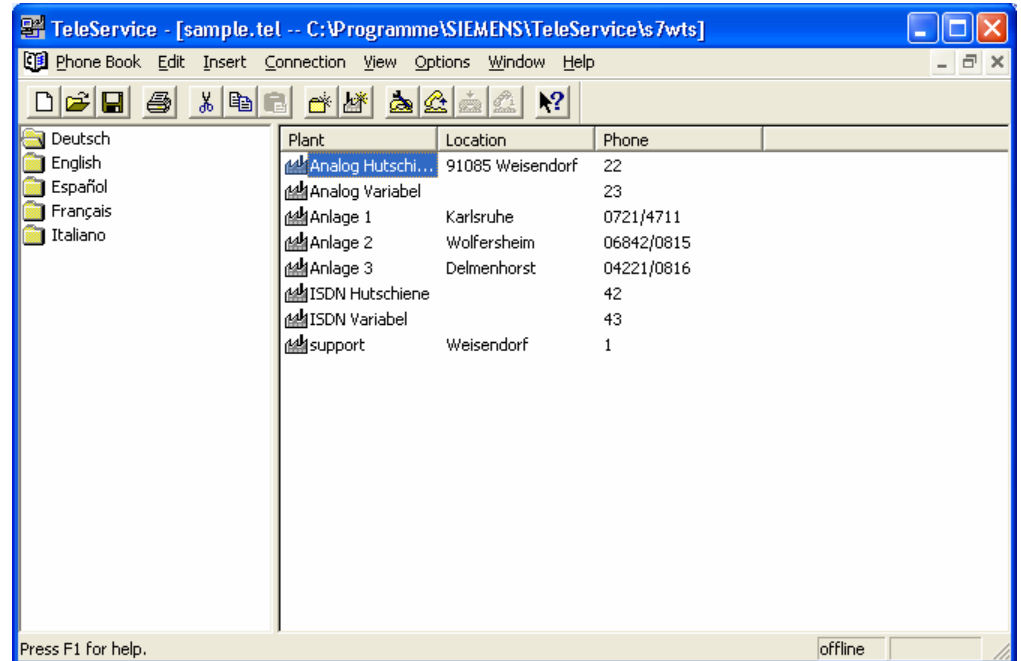


6.2.3 Settings through TeleService

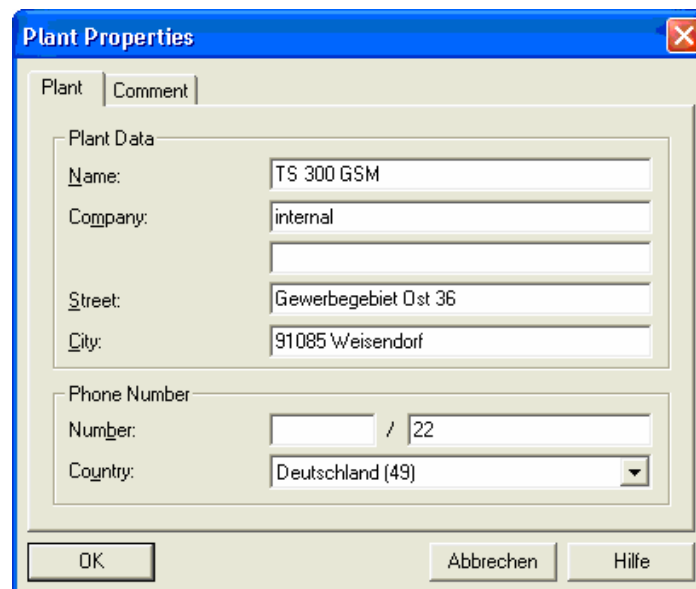
For teleservice, you will also need an additional software module for your programming software, e.g. TeleService from Siemens (version 5.2 and later), to establish a link and manage further links (telephone book of stored systems).



Parameterization using Teleservice 5.x or older is currently not possible!



After you have created a telephone book entry for a system, a telecommunication link can be established via the telephone network.



System or network-specific settings of the SSW7-TS PRO GSM can be made with the TeleService software or SHTools (see Section 4.4.3).

The specific settings can be changed locally by TeleService or via the telecommunication link.

Via the SHTools, parameterization can only be performed locally.

Local parameterization using the null modem cable supplied on the programming device or PC interface and the TeleService software is described below.

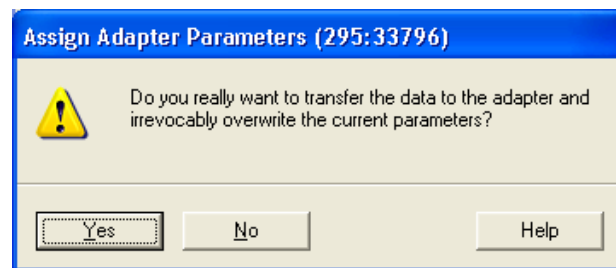
The micro-switch on the SSW7-TS PRO GSM must be in the “PC” position, which is indicated by the lit green “TS/MDM/PC” LED.

In the TeleService software, the settings for the SSW7-TS PRO GSM can be made via the “Tools / Parameterize adapter” menu item.

After parameterization in the “Parameterize adapter” window, the data are transferred to the SSW7-TS PRO GSM with the “OK” button. Prior to this, confirmation that the existing parameterization may be overwritten is required.



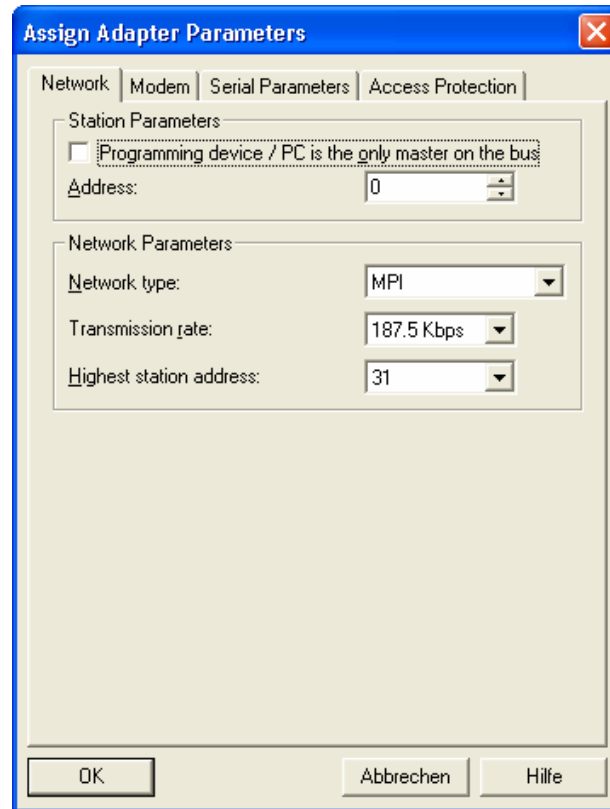
It may be necessary to redial the controller via a telecommunication link after making a change.



6.2.3.1 Bus parameters

The “Network” tab of the “Parameterize adapter” window contains all bus-specific parameters that can be influenced.

The SSW7-TS PRO GSM supports the network types *MPI*, *PROFIBUS*, and *AUTO* with a transmission rate of up to 12 Mbps.



If the network settings are different, access to the CPU via a telecommunication link is not possible!

If the network type setting “AUTO” has been deselected, the

- Network type
- Transmission rate
- Highest station address

must match the hardware configuration of the connected CPU. Moreover, it is important that an MPI/PROFIBUS address is assigned to the SSW7-TS PRO GSM that has not yet been used in the connected network.

6.2.3.2 Modem parameters

The “Modem” tab of the “Parameterize adapter” window contains all modem-specific parameters that can be influenced.



The semicolon separates the first and second AT command sequence and must not be omitted!



For call-back from GSM to an ISDN modem, further parameters must be set.

The internal modem of the SSW7-TS PRO GSM is initialized automatically after switch-on. For this purpose, the initialization string is sent to the modem so that it can make settings.

The following sequence of commands is the default setting and affects the modem as follows:

AT	Initiate modem commands
&F	Load factory settings of the modem
E1	Echo of the ON command
L1	Volume level 1
M1	Loudspeaker ON
Q0	Feedback from the modem ON
V1	Feedback in plain text
&C1	DCD signal shows carrier connected
S0=1	Accept after one bell signal

To use the GSM functions of a particular SIM card, it is necessary to pass on the relevant PIN (Personal Identification Number) to the SIM card in the initialization string before regular operation.



If the PIN query is not deactivated, transfer of a PIN is mandatory for TeleService.

The command sequence for passing on the PIN is added to the initialization string and separated off by a separator.

The command sequence for passing on the PIN has the following meaning:

AT	Initiate modem commands
+CPIN=	Command identifier for PIN transfer
"9135"	The actual PIN that is placed in quotation marks
;	Separator between two AT command sequences.

The PIN is generally four digits long, for example "9135" or "1111".

As the figure above shows, the initialization string of GSM modems generally consists of two command sequences (separated by a semicolon). The first part is transmitted only when the device is switched on so that the modem is activated by transfer of the PIN. The second part is sent to the modem again each time the connection is terminated.



When the SIM card is exchanged, the PIN will also have to be changed.

If you change the SIM card, you must make sure that the PIN the initialization string of the SSW7-TS PRO GSM is changed or deleted first. Otherwise the SIM card will be disabled after three failed sign-on attempts with an incorrect PIN.

Call-back from GSM to an ISDN modem is only possible if the B channel protocol in the GSM modem is set to V.110. This setting can also be made using an AT command. The command sequence is:

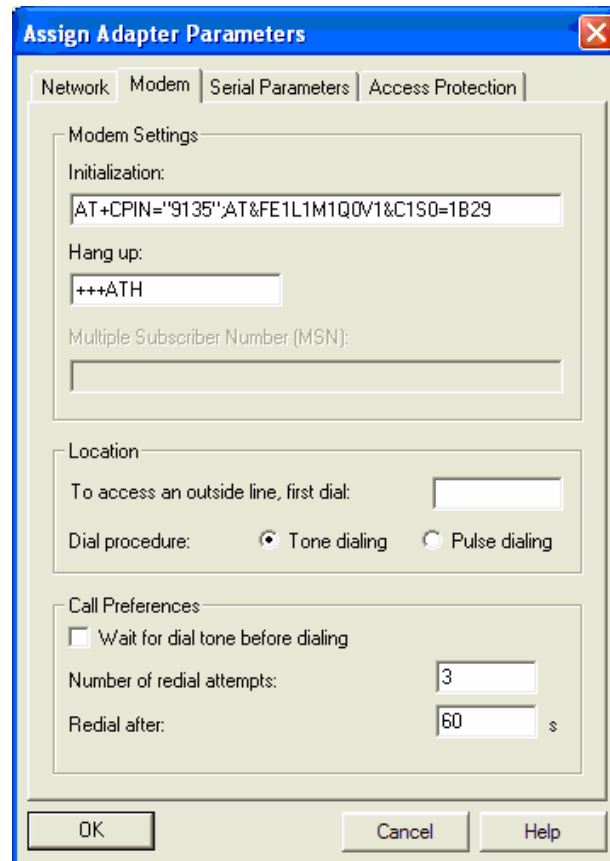
AT	Initiate modem commands
+CBST	Set data service
=71	V.110 asynchronous with 9600 bps

When combined with the standard initialization string, the AT can be omitted. The number of characters that can be entered in the input field is limited.

As the following screenshot shows, unimportant commands can then be omitted.

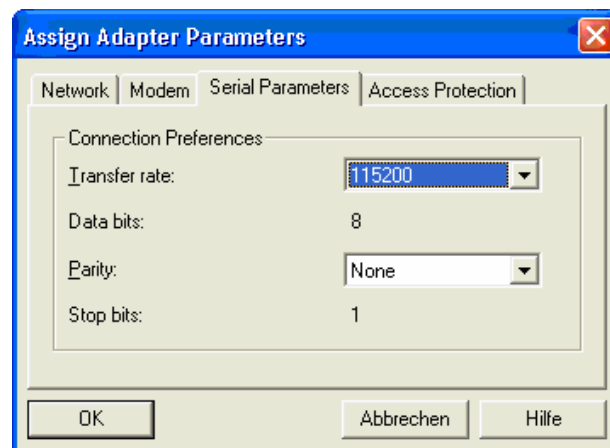


For call-back from GSM to an ISDN modem, further parameters must be set.



6.2.3.3 Serial parameters

The “Serial parameters” tab of the “Parameterize adapter” window contains all parameters for serial communication with the modem that can be influenced.



6.2.3.4 Access protection and the call-back function

The “Access protection” tab of the “Parameterize adapter” window contains all user-specific parameters that can be influenced.

Via this tab card, the SSW7-TS PRO GSM can be configured to permit teleservice via the TeleService software only with the relevant authorization.

The screenshot shows a dialog box titled "Assign Adapter Parameters" with a close button (X) in the top right corner. It has four tabs: "Network", "Modem", "Serial Parameters", and "Access Protection". The "Access Protection" tab is selected. It contains two sections for user configuration. The first section has labels "Administrator", "Password", and "Callback number". The "Administrator" field contains "ADMIN", the "Password" field contains "xxxxxx", and the "Callback number" field is empty. The second section has labels "User", "Password", and "Callback number". It contains two rows of data: the first row has "Martin" for User, "xxxxxx" for Password, and "08154711" for Callback number; the second row has "Konrad" for User, "xxxxxx" for Password, and an empty field for Callback number. At the bottom of the dialog are three buttons: "OK", "Abbrechen", and "Hilfe".

Administrator	Password	Callback number
ADMIN	xxxxxx	

User	Password	Callback number
Martin	xxxxxx	08154711
Konrad	xxxxxx	

Please note that “Users” created via a telecommunication line can only reparameterize their own access protection. The administrator, on the other hand, can make all changes via a telecommunication link.



A call-back number should not be stored for the user "ADMIN"!

If an incorrect call-back number is saved under the user "ADMIN", it will be very difficult to reparameterize the SSW7-TS PRO GSM via a telecommunication link. Any “Users” you have created can change the user-specific but not the user-dependent settings.

Local reparameterization is possible at any time.

7 Troubleshooting

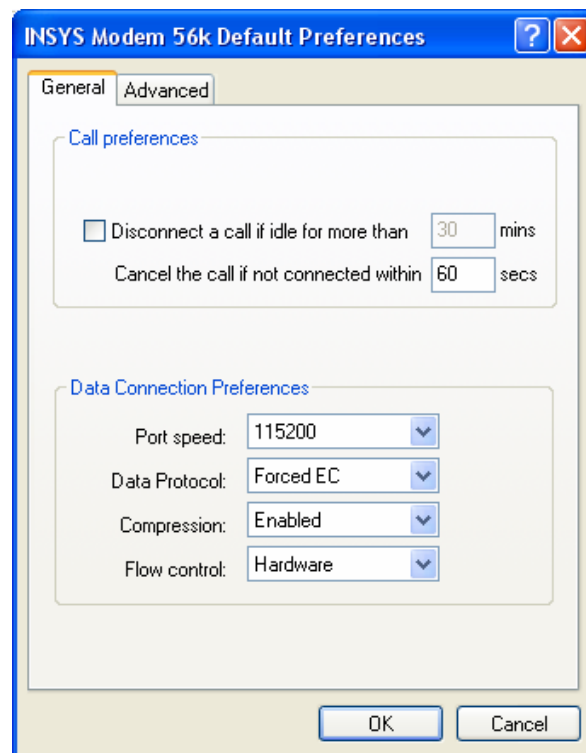
The points described here show some typical errors that can occur in day-to-day work with the SSW7-TS PRO GSM.

If a particular operating condition is not described and no information on how to remedy it is provided in this manual, the support of Systeme Helmholtz GmbH is available to help you.

Q: The link sporadically breaks off on my computer with the operating system Windows 2000.

A: For reliability reasons, "Forced EC" error detection must always be activated on your local modem. In a link without error checking, sporadic broken connections can occur!

The following settings must be made in the modem properties of the TeleService software.



Q: I use a laptop with an internal modem as my programming device. Broken connections occur again and again during teleservice with the TeleService software.

A: The standards (e.g. V.34 for links up to 33,600 baud) require a constant carrier frequency. Some laptop soft modems do not comply with the standards in this respect.

Laptop modems are primarily designed for dialing into the Internet via various providers. The Internet providers provide a precise reference frequency with a master clock so that a variable modem link hardly causes problems.

Broken connections with soft modems depend on the design of the laptop and occur sporadically. In this case, you can use, for example, the pocket modem from Systeme Helmholtz GmbH on your laptop to remedy the problem.

Q: I have problems operating my standard modem with a USB-to-serial converter on my PC when I want to perform teleservice.

A: Many converters available on the market cannot emulate all status signals of a real RS232 interface. We do not recommend using such devices for the functions described in this manual.

Q: I have installed the USB driver for the SSW7-TS PRO GSM to use directly on my PC. COM port "9" that I selected is displayed on the programming device/PC interface. Unfortunately Step7 does not work with the SSW7-TS PRO GSM.

A: The programming device/PC interface displays all available COM ports but only works reliably with the first eight. Please set the COM port you are using manually to a COM port less than or equal to "8" in the device manager to ensure the function works.

F: I normally use my SIM card for phoning with the cell phone. Can I also use this card for the SSW7-TS PRO GSM?

A: Most SIM cards are only valid for voice communication. If you cannot establish a GSM-to-GSM connection, your provider must assign you another data number. Theoretically one SIM card can have up to three different numbers. For example:

1st number: 0151/12345678912 for voice comm. only
2nd number: 0151/12345678913 for data services only
3rd number: 0151/12345678914 for fax services only

Data connections can be established between:

	analog	ISDN	GSM
analog	yes	no	yes
ISDN	no	yes	yes
GSM	yes	yes	yes (even without CSD)

Q: Teleservice to the SSW7-TS PRO GSM always worked better with analog modem dial-up. Now the device incl. SIM card has been installed for a customer abroad. I am now no longer able to establish a connection with TeleService.

A: It is possible that the roaming partner abroad of your provider does not recognize the "*modem dial-up connection*" and relays it to the terminal.

We recommend establishing a pure GSM-to-GSM connection (with or without activated CSD service). For this you can use a

standard cell phone with connection facility to a TeleService computer (Bluetooth, infrared, or cable connection).

Q: What must I observe when calling your technical support?

A: Please have all relevant data of your system constellation with the connected stations and program modules at hand when you contact technical support at Systeme Helmholtz GmbH.

8 Appendix

8.1 Technical data

Device type	700-770-8GS41 (GSM)
Degree of protection	IP 20
Dimensions	135 x 67 x 30 mm (LxWxH)
Weight	Approx. 240 g
Operating voltage	+24 V DC \pm 25%, external or from the programmable controller
Current consumption	Approx. 140 mA
Temperature during operation	0 °C to +60 °C
Temperature during storage/transportation	-20 °C to +60 °C
Relative humidity during operation	5 % to 85 % at 30 °C (no condensation)
Relative humidity during storage	5 % to 93 % at 40 °C (no condensation)
Quality assurance	according to ISO 9001:2000
Maintenance	Maintenance-free (no battery)
MPI/PROFIBUS	
- Interface	9-way Sub D socket / RS485 repeater, isolated
- Connecting cable	1.2 flexible control cable with copper braided shield
- Transmission rates	19.2 kbps to 12 Mbps
USB	
- Interface	USB-Mini-A socket / USB -1.1 compliant
- Transmission rate	9.6 kbps to 115.2 kbps through virtual COM port
RS232	
- Interface	RS232, serial asynchronous
- Transmission rate	9.6 kbps to 115.2 kbps
Modem	
- Interface (internal)	RS232, V.24/V.28
- Transmission rate	9.6 kbps to 115.2 kbps
- Antenna connection	FME connector
- SIM card type	3V SIM card
- Transmission performance	Class 4 (2 W) for GSM 850 / EGSM 900 Class 1 (1 W) for DCS 1800 / PCS 1900
- GSM frequency bands	GSM 850, EGSM 900, DCS 1800, PCS 1900
- GSM/DCS certification GCF-CC	V.3.16.0 and GT.01
- PCS certification	NAPRD.03 (V.2.10.1)

8.2 Pin assignments

8.2.1 MPI/PROFIBUS interface pin assignments

Connector	Signal	Meaning
1	-	unused
2	-	unused
3	RxD- / TxD-P	receive / transmit data-P
4	RTS_AS	CPU transmit ID
5	DGND	Ground for bus termination (looped through)
6	DVCC	5 V DC for bus termination (looped through)
7	-	unused
8	RxD / TxD-N	receive / transmit data-N
9	RTS_PG	Programming device transmit ID

8.2.2 Assignment of the USB interface



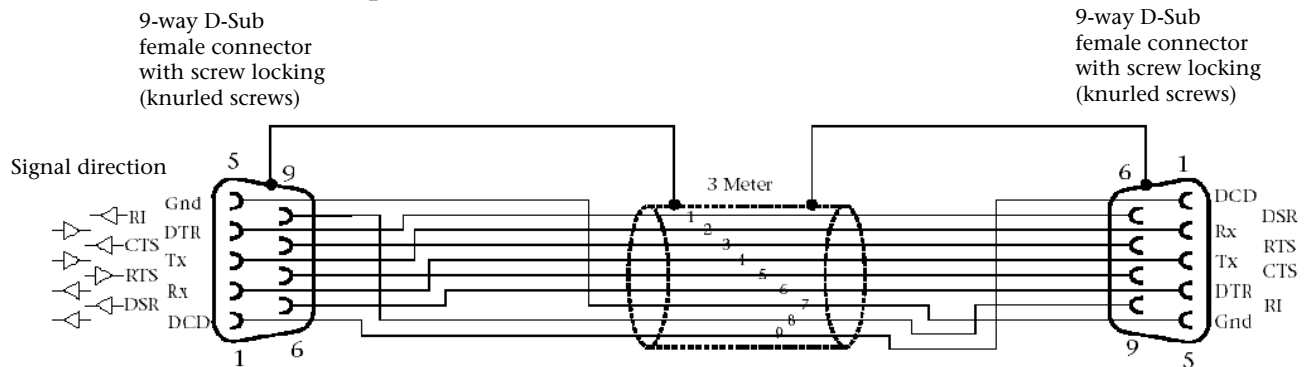
USB A	Signal	Meaning	Mini USB 5P
1	VCC	+5 V DC	1
2	D-	Data signal -	2
3	D+	Data signal +	3
4	GND	Ground	5
Shield		Shield	Shield

The SSW7-TS PRO GSM comes with a shielded USB -2.0 cable with a length of two meters. The cable has a standard Mini-A and a standard B connector.

Where distances of more than three meters have to be covered, we recommend using USB hubs with an external power supply.

8.2.3 Connecting cable

Programming device or PC to SSW7-TS PRO GSM for direct operation or use of the modem (700-751-7VK81):



8.2.4 Power supply socket

If an external power supply is used, please make sure the polarity is correct and all technical data are complied with.

8.3 Further documentation

Internet:

<http://www.helmholz.de>

<http://www.siemens.com>

Notes