compatible with you

SSW7-TS with GSM-modem

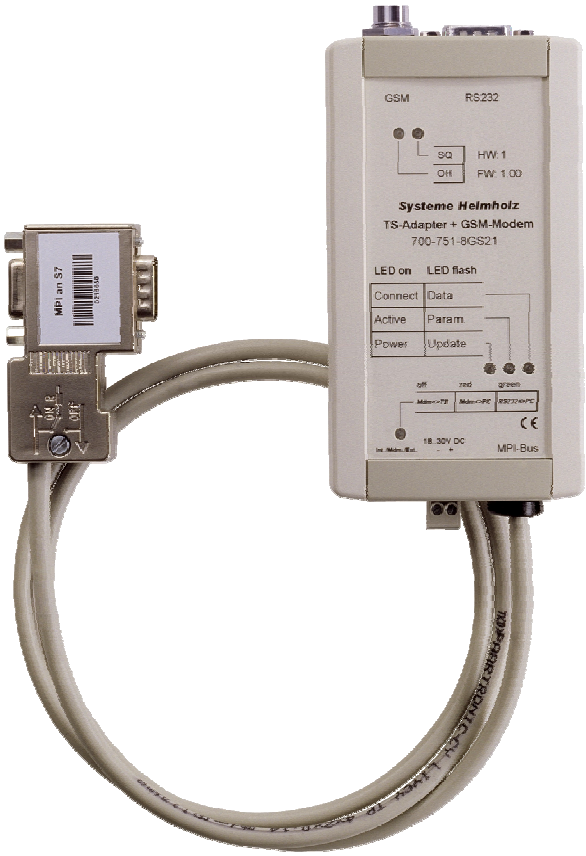
teleservice via the MPI Bus

700-751-8GS21

Manual

Version:1 / 21.03.2006

HW 1 / FW 3.10 and higher



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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 data in this manual have been checked regularly and any necessary corrections will be included in subsequent editions. We always welcome suggestions for improvement.

Contents

1	**Safety Information**	**1**
1.1	General	1
1.2	Restriction of access	1
1.3	Information for the user	2
1.4	Use as intended	2
1.5	Avoiding use not as intended!	2
2	**Installation and Mounting**	**3**
2.1	Mounting orientation	3
2.2	Minimum clearance	3
2.3	Installing the module	3
3	**System Overview**	**4**
3.1	Application and function description	4
3.2	Connections	5
3.3	Meaning of the LED displays	6
3.4	Items supplied	7
3.5	Accessories	7
3.5.1	Antennas	7
3.5.2	Manuals	7
3.5.3	Extension cables	7
3.5.4	Other accessories	7
4	**Preparation**	**8**
4.1	Connecting the antenna	8
4.2	Inserting the SIM card	9
4.3	Data transfer	10
4.4	PIN transfer options	10
5	**Installing the Local Modem**	**11**
5.1	Specific settings for GSM links with Systeme Helmholz modems	11
5.1.1	Analog	11
5.1.2	ISDN	12

6 Installing the SSW7-TS with GSM-modem in the System 13

6.1 Parameterization with teleservice 13
6.1.1 Modem setting / initialization string 15

6.2 Password protection and call-back 16
6.2.1 Call-back function with ISDN / initialization string 18

7 SSW7-Tool Parameterization Software 19

7.1 PIN transfer during direct modem operation 20

7.2 Activating the PIN with a personal unblocking key (PUK) 21

8 Technical Data 22

8.1 Pin assignment 23

8.2 Connecting cable 23

1 Safety Information

Please observe the safety information given for your own and other people's safety. 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 with GSM-modem 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 estimation).

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

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

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

The manual tells the user how to operate the SSW7-TS with GSM-modem and explains the signaling functions. It provides the installing technician with all the necessary data.

The SSW7-TS with GSM-modem is exclusively for use with a S7-300/S7-400 programmable controller from Siemens.

The SSW7-TS with GSM-modem is 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 with GSM-modem must only be used as a communication and signaling system as described in the manual.

1.5 Avoiding use not as intended!

Make sure in the software that uncontrolled restarts cannot occur.

Safety-related functions must not be controlled via the SSW7-TS with GSM-modem 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 it is an IP30 module, you must install it in a cabinet.

Please ensure a maximum ambient temperature of 60 ºC for reliable operation.

2.1 Mounting orientation

The SSW7-TS with GSM-modem 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 with GSM-modem 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 with GSM-modem, a minimum clearance from other modules of 60 mm must be left above and below, and 10 mm at the sides.

2.3 Installing the module

A wall or DIN rail bracket is available as an accessory for mounting on flat surfaces or on DIN rails.

3 System Overview

3.1 Application and function description

With the SSW7-TS with GSM-modem, remote maintenance of a system can be performed via the MPI bus. A GSM-modem, which is already used in many countries of the world, is integrated into the housing of the SSW7-TS.

The GSM-modem can be used throughout Europe for machine-to-machine (M2M) applications. Outside Europe, the GSM-modem can be used, for example, in: Australia, China, Hong Kong, Jamaica, Malaysia, New Zealand, Russia, South Africa, Taiwan, Thailand, U.S.A., Venezuela (as of 2005). For use outside Germany we recommend that you first obtain information about the radio networks and frequencies used in the country in question in advance. Detailed information can also be obtained from the providers in the country in question. Always remember to use antennas suitable for the application.

The SSW7-TS with GSM-modem can draw the necessary power either from the MPI bus interface of the programmable controller or from an external power source.

The connecting cable used to link the SSW7-TS with GSM-modem with the programmable controller is 1.2 meters long.

The 9-way SUB D connector can be connected for parameterization or for in-situ use as a PC adapter (MPI). The "Int./Mdm./Ext." switch switches between the internal modem and the RS232 interface. In switch position "Int.", the SSW7-TS works directly with the modem and the RS232 interface has no function.

In the "Ext." position, the LED lights up. In this mode, it is possible to use the SSW7-TS with Modem as a normal PC adapter (MPI) and the modem is deactivated.

In the "Mdm." Position, the LED is lit red and the modem can be used directly from the programming device or PC via the RS232 interface using the connecting cable described in Section 8.2. In this condition, MPI bus operation is deactivated.

1.) Microswitch “Int./Mdm./Ext”

2.) Connector for ext. power supply

3.) MPI connecting cable

1.) 2.) 3.)

FMx modules cannot be parameterized with the SSW7-TS.

With the appropriate software, the SSW7-TS with GSM-modem can be used as a

- Programming adapter,
- teleservice unit or
- Operator control and monitoring unit

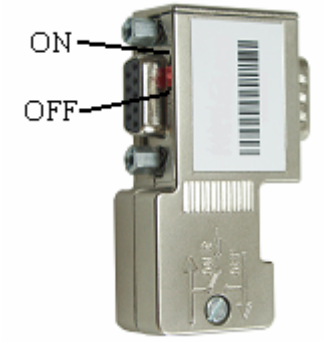
The functions "PG-Dial" and "AS-Dial" for starting a call from an S7-CPU are not yet implemented.

Please consult the programming software manuals for further information.

3.2 Connections

The SSW7-TS with GSM-modem 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.
- 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.



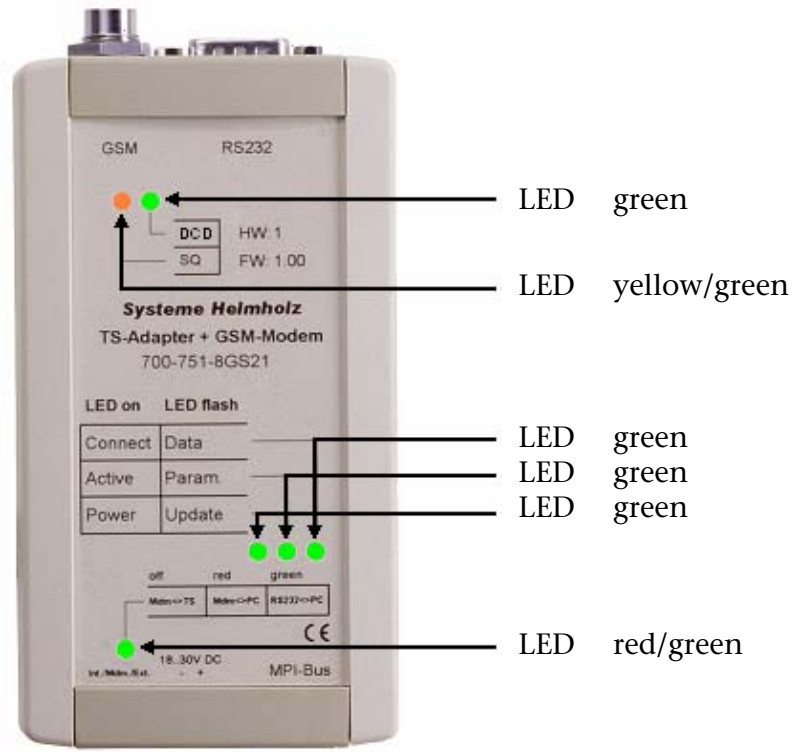
  The terminating resistor must be connected (ON) if the SSW7-TS with GSM-modem is at the beginning or end of a bus segment. If this is not the case, the switch position must be OFF.
- FME connector (male) for connecting telecommunications antennas with the FME socket (female). Systeme Helmholz GmbH offers different types of antenna for different installation locations and ambient conditions.

3.3 Meaning of the LED displays

The SSW7-TS with GSM-modem has six LEDs, including two two-color LEDs. The LEDs are all located on the top of the device and provide information about the operating status of the SSW7-TS with Modem. They also used to locate malfunctions more quickly.

The LEDs have three different states: off, on, and blinking.

“Power" off:	The adapter has no power or is faulty
"Power" on:	Adapter is being powered with 24V and processor is running
"Active" on:	The SSW7-TS has parameterized the modem and signed on in the MPI network
"Connect" on:	The SSW7-TS has established a connection
"Connect" is blinking:	The SSW7 is transmitting data
"DCD" on:	The carrier signal has been detected –> GSM connection is active
“SQ” yellow: blinking:	Radio network detected and ready to receive
“SQ” green:	Signal quality after signing on to GSM network. The faster the blinking frequency, the better the reception
"RS232" off:	The modem is connected internally with the SSW7-TS; the RS232 interface has no function.
"RS232" green:	The internal modem has no function and the RS232 interface can be used (for parameterization or use as a SSW7-PC adapter)
“RS232” red:	The internal modem can be used directly from the PC via the RS232 interface.



3.4 Items supplied

The scope of supply of the SSW7-TS with GSM-modem includes:

- SSW7-TS with GSM-modem ready for operation
- 3-meter null modem cable
- CD with driver, parameterization tool, additional information
- Manual (German/English)
- DIN mounting rail bracket
- SIM card holder

3.5 Accessories

3.5.1 Antennas

Stationary outdoor antenna (for wall mounting) with 5m connecting cable	700-751-ANT01
Magnetic antenna with 2.5 m connecting cable	700-751-ANT02
Adhesive patch Antenna with 3 m connecting cable	700-751-ANT03
Portable antenna for direct connection	700-751-ANT04

Prefabricated antenna extensions up to 20 m are available on request.

3.5.2 Manuals

Manual, German	900-751-8GS01/de
Manual, English	901-751-8GS01/en

3.5.3 Extension cables

MPI bus extension cable, 5m	700-751-6VK11
MPI bus extension cable, 10m	700-751-6VK21
MPI bus extension cable, special lengths	700-751-6SO11

When extending the MPI bus, please follow the relevant configuring guidelines as defined in the documentation of your PLC.

3.5.4 Other accessories

DIN mounting rail bracket	700-751-HSH10

The DIN rail bracket is for mounting the SSW7-TS with GSM-modem on DIN standard mounting rails. The DIN rail bracket and SSW7-TS with GSM-modem can be separated without the use of tools. The DIN rail bracket can also be used as a wall bracket for mounting on flat surfaces.

Null modem cable for direct operation or use of a modem			700-751-7VK81
Plug-in PSU:	Input:	100-240 V AC / 47-63 Hz / 400 mA	
	Output:	24 V DC / 625 mA	
			700-751-SNT01

Further technical information is available at www.helmholz.de

4 Preparation

4.1 Connecting the antenna

The antenna connector on the end of the SSW7-TS with GSM-modem is a telecommunications type (male) connector and is firmly connected to the antenna socket by a screw connection.

Example: Connection of the Porti-antenna with bending joint:

4.2 Inserting the SIM card

To access a GSM network you require a SIM card from the network provider. The SIM card provides identification to the network operator.

The SIM card must only ever be inserted and changed while the device is switched off.

Remember to de-energize the device before inserting the SIM card!

The drawer for the SIM card is located at the side of the housing. To unlock and remove the drawer, press the yellow recessed button next to the card reader and remove it.

Release button

SIM card reader

The SIM card must be inserted in the card holder with the contacts facing upward. Then push the card holder with the contacts on the left into the card reader until it is again flush with the top of the cover.

SIM card inserted

System ready for operation

Only 3-volt SIM cards may be used.

4.3 Data transfer

For teleservice applications, please have your SIM card enabled for data communication by your provider!

The GSM provider must activate the requested services for the SIM card. Voice and data services can be activated simultaneously on a single SIM card. The following cards and contracts are commonly available:

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

Generally, each type of service (voice, data transmission at 2400, 4800, and 9600 bit/s) is assigned a different telephone number. For example, the GSM network does not switch a data call to a telephone number for voice connections.

Data connections can be established between:

	analog	ISDN	GSM
analog	yes	no	yes
ISDN	no	yes	yes
GSM	yes	yes	yes

4.4 PIN transfer options

The SSW7-TS with GSM-modem is supplied with microswitch setting “ext”. This makes it possible to parameterize the device with the Siemens teleservice software (see Parametrization with teleservice).

With microswitch setting “Mdm”, direct access to the modem is possible with a terminal program or the SSW7 Tool software (see PIN transfer in direct modem operation).

5 Installing the Local Modem

If you have already installed a modem under Windows, you can also use this modem for teleservice.

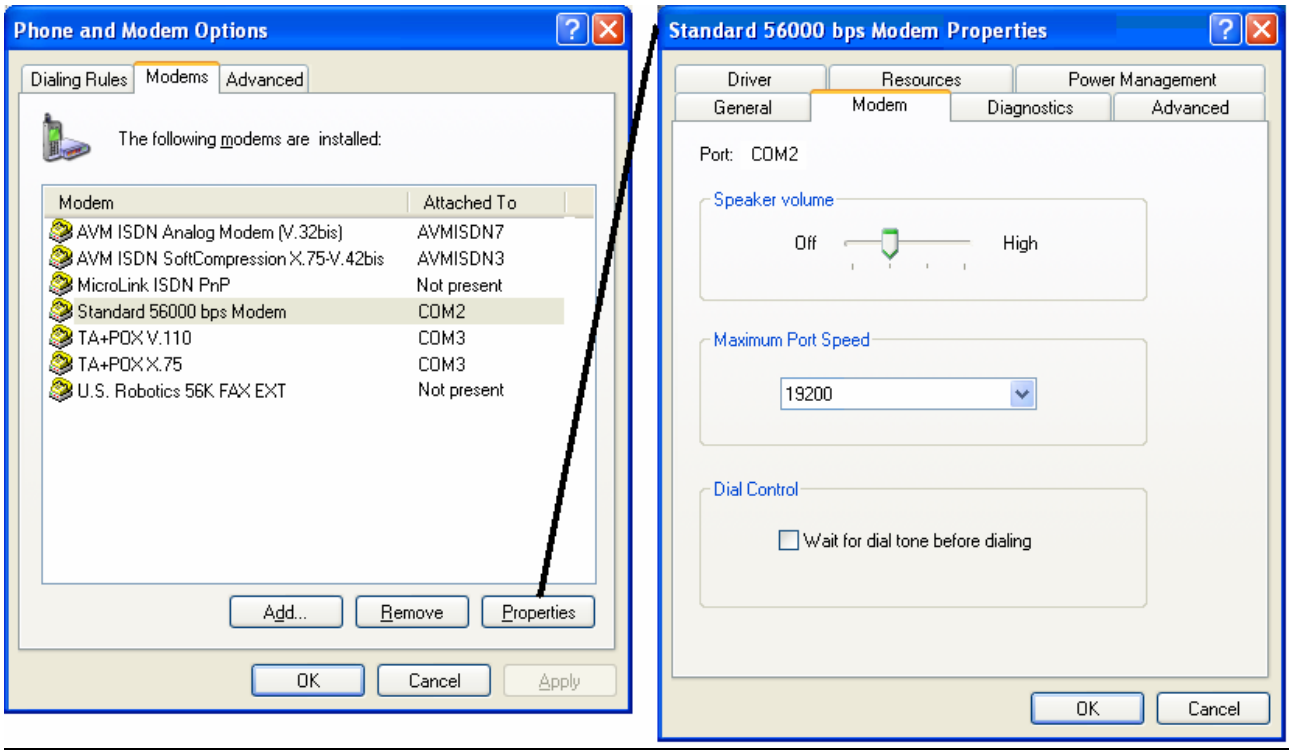
Plug-and-play modems are automatically recognized by the programming device or PC and integrated in the system as soon as they are connected. The driver supplied with the modem is required for this. You can manually install modems without plug-and-play capability via the control panel under the "Telephone 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 your programming device or PC. Select the installed mode in the parameterization of the programming software.

5.1 Specific settings for GSM links with Systeme Helmholz modems

5.1.1 Analog

Settings on the local Systeme Helmholz analog modem:

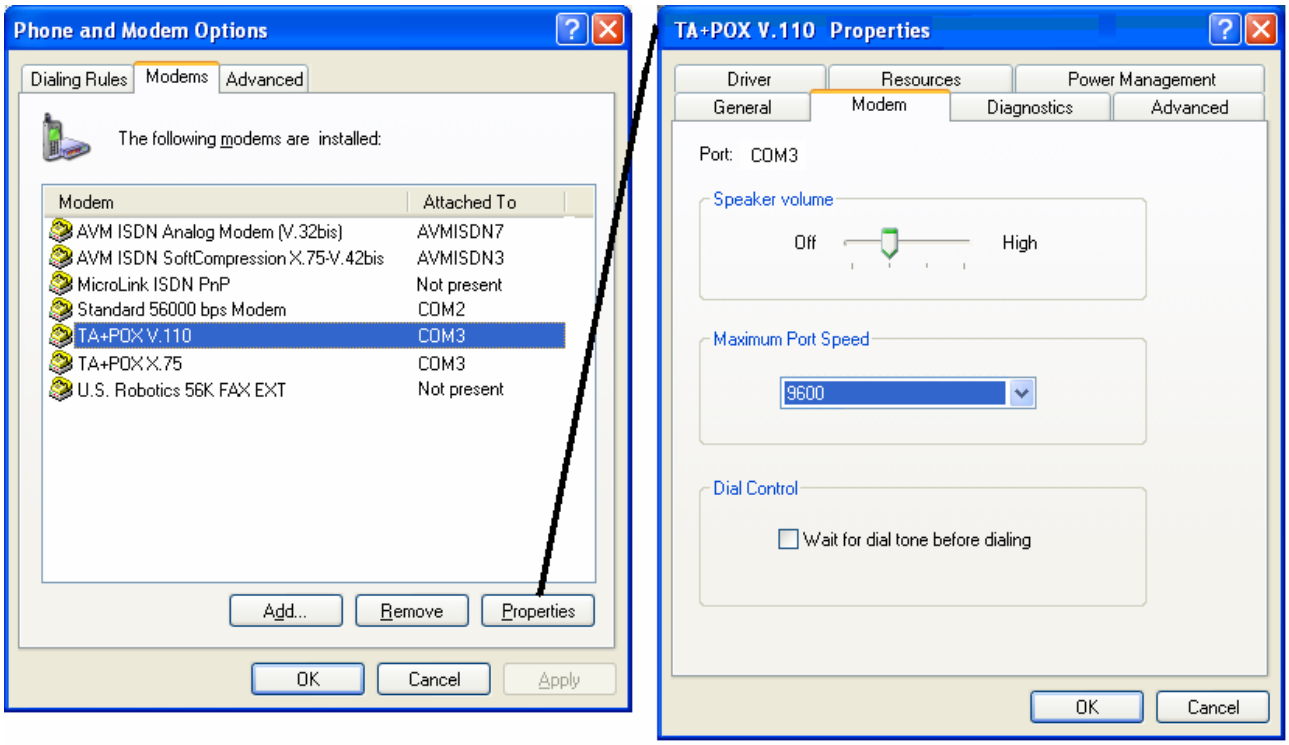


The following applies to analog connections with the GSM:

- All Transfer rates should be set to 19200 baud
- Type of transmission service V.32.

5.1.2 ISDN

Settings on the local Systeme Helmholz ISDN modem:



The following applies to ISDN connections with the GSM:

- All Transfer rates should be set to 9600 baud (important for callback functions).
- Type of transmission service V.110.

For the call-back function of the SSW7 TS adapter, please define an MSN (multiple subscriber number) for the data port on the local modem.

For further information about allocation of an MSN or conversion to the V.110 protocol please consult your modem manual.

To test your teleservice software and the modem on the programming device or PC, you can dial the SSW7-TS test system at Systeme Helmholz GmbH. The relevant numbers can be obtained from our Support.

6 Installing the SSW7-TS with GSM-modem in the System

The SSW7-TS with GSM-modem receives its power supply via the MPI socket of the CPU. Alternatively, the 24 V supply can be obtained from an external source. In this case, please make sure the polarity is correct and all technical data are complied with. The SSW7-TS with GSM-modem is supplied with microswitch setting “ext”. When the device is supplied with power only the “Power” LED and the green “RS232” LED should be active.

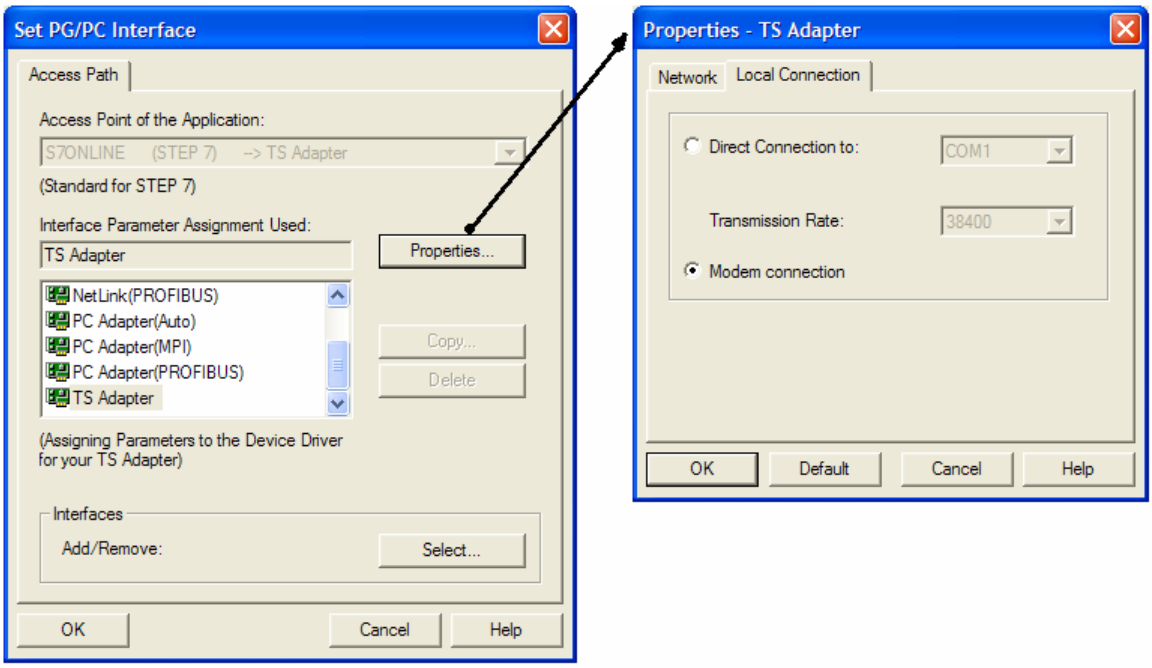
Now connect the supplied null modem cable to your programming device/PC interface. Now you can perform the modem-specific parameterization.

6.1 Parameterization with teleservice

The SSW7-TS with GSM-modem settings are defined in the software used for communication with the programmable controller.

In most cases, you will also need an additional software module for your programming software, e.g. teleservice from Siemens (version 3.0 and later), to manage the connections (telephone book of dial-up systems) and initiate the call to the controller.

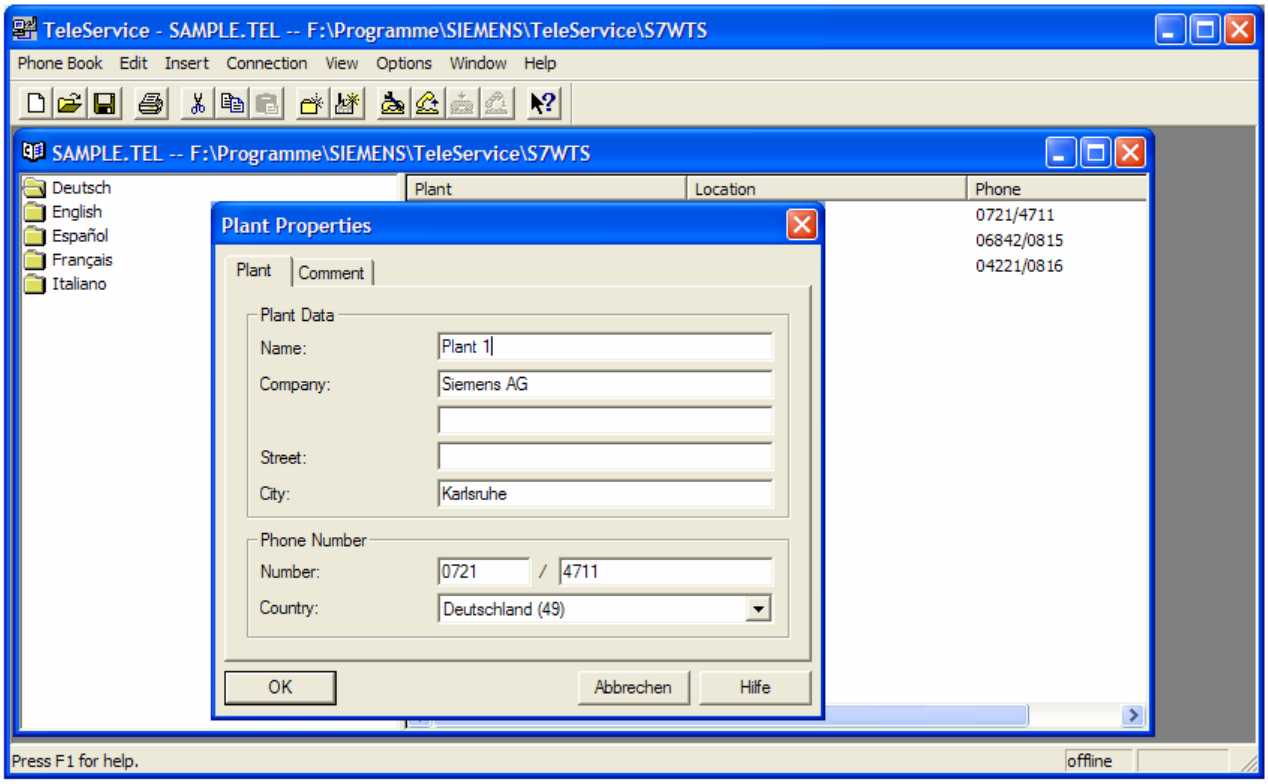
Example: Adapter selection in the programming device/PC interface module



For more information please refer to the relevant documentation of Help function.

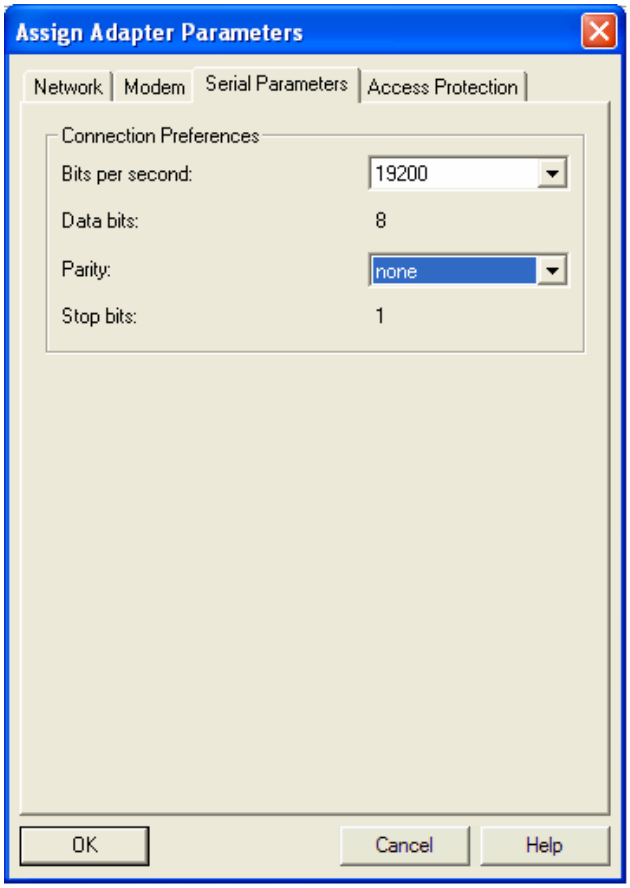
The SSW7-TS with GSM-modem can also be used as a normal “PC adapter (MPI)” without the teleservice software. The “Int./Mdm./Ext.” microswitch can switch from the internal modem to the RS232 interface. It is then possible to connect a programming device/PC with the supplied null modem cable. The SSW7-TS with GSM-modem detects the mode (“Modem mode” / “Direct connection” / “PC adapter”) from the microswitch position.

Example: Setting up a system with teleservice

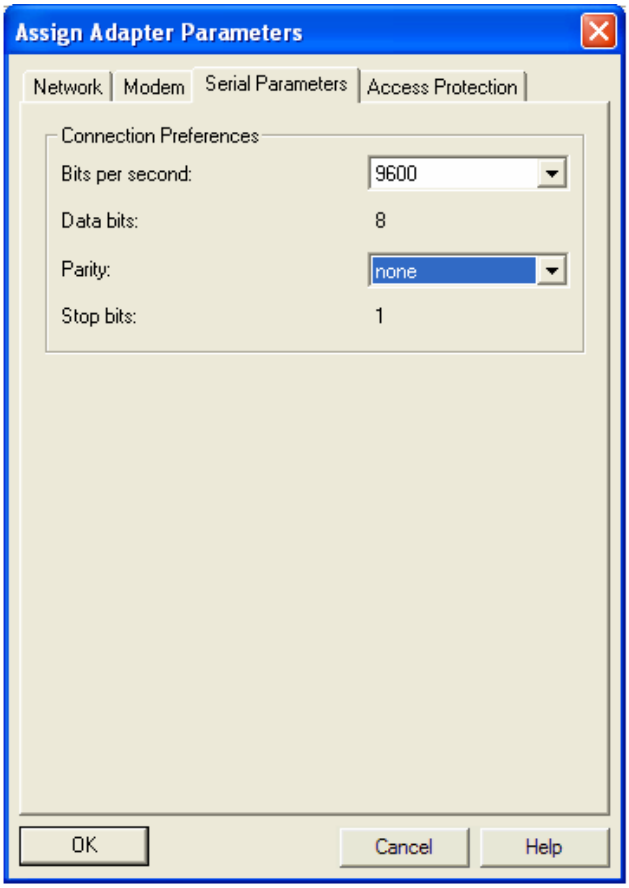


The following settings can be made for the SSW7-TS and GSM-modem via “Options” and “Parameterize Adapter”.

Example of transmission speed from SSW7-TS to modem:



19200 bit/s for analog and GSM dial-up



9600 bit/s for ISDN dial-up

6.1.1 Modem setting / initialization string

Every GSM-modem must sign onto the GSM radio network when it is switched on. This is done by entering a personal identification number (PIN). An initialization string is stored in the SSW7-TS for that purpose. This string can be changed with the software.

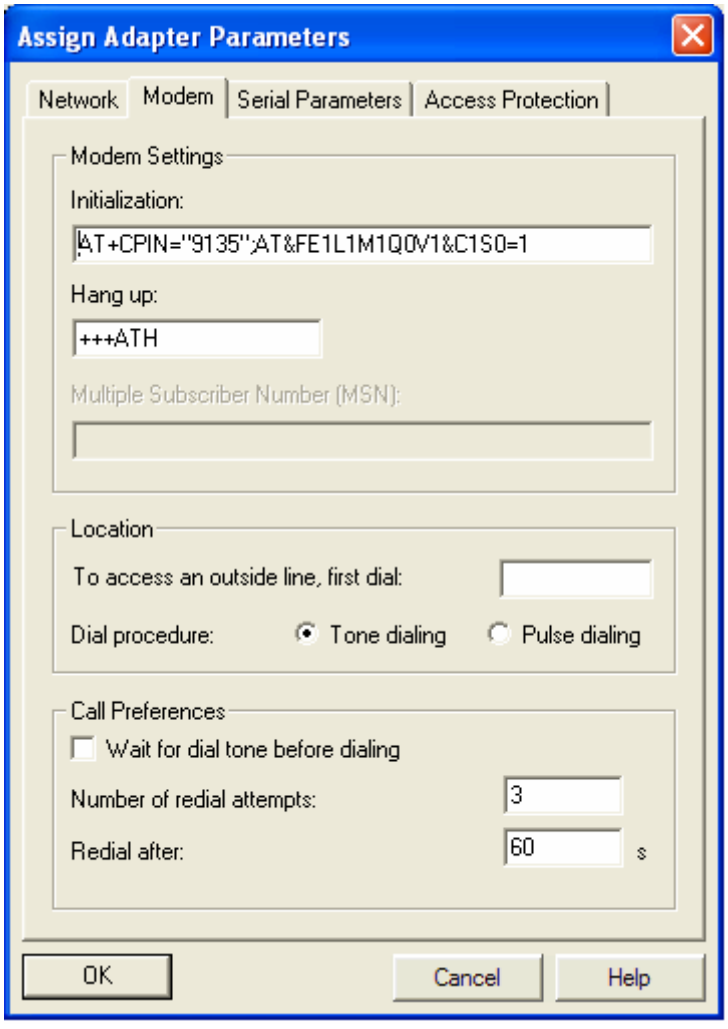
Assigning a PIN using the AT command:

AT+CPIN=“9135”

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

AT	Introducing 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 a bell signal

The PIN 9135 is only and example! Please enter your four-digit PIN here!



Always make sure the PIN is changed or cleared first before you replace a card. Otherwise the SIM card will be disabled after three sign-on attempts with an incorrect PIN.

The entire initialization string could look something like this:

AT+CPIN="9135";AT&FE1L1M1Q0V1&C1S0=1

It is made up of two command sequences (separated by a **semicolon**). The first part is only sent when the device is switched on. The second part is sent to the modem again each time the connection is terminated. Only change these settings if you are quite sure that the AT command sequence is correct and conclusive!

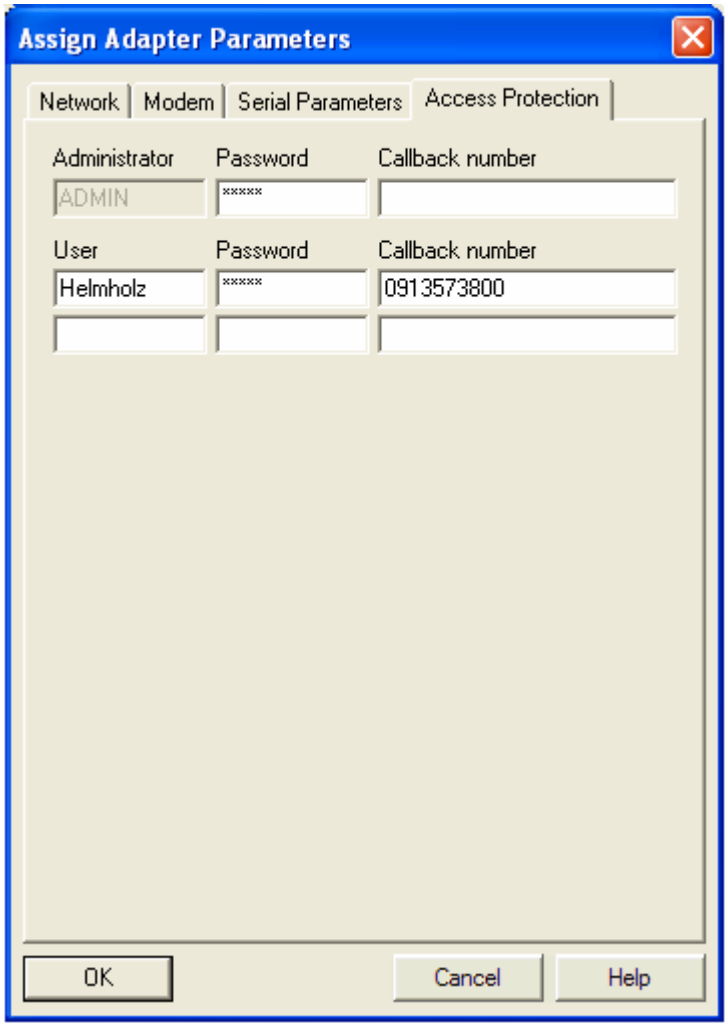
The PIN can also be assigned directly by a terminal program or via the SSW7 Tool software (microswitch setting "Mdm").

6.2 Password protection and call-back

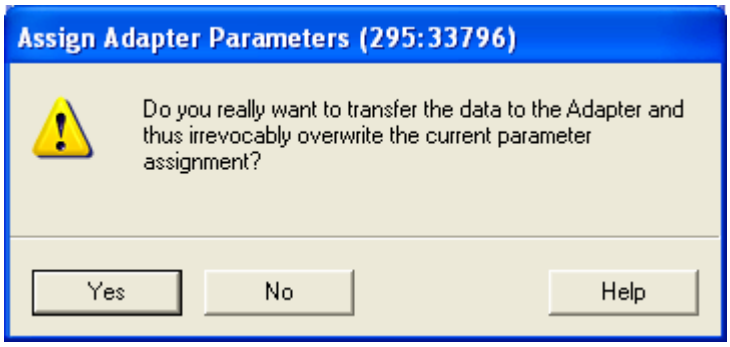
If you store an incorrect call-back number under the user "ADMIN", you can no longer access the SSW7-TS via a remote link. In that case, it can only be started up again by intervening locally!

Example: Assigning an administrator password/user with call-back number

If you store an incorrect call-back number under the user "ADMIN", you can no longer access the SSW7-TS via a remote link. In that case, it can only be started up again by intervening locally!



Example: Storing the modem and SSW7-TS settings



Because of an internal property of the system, it may be necessary to dial up the controller again after changing the AT initialization command.

Parameterization is now complete. Now activate the internal modem and SSW7-TS function (microswitch setting “int”). The modem is automatically initialized whenever the power supply is applied or switched over. During initialization, the initialization string that has been entered in the teleservice software is sent to the modem and a positive response is awaited.

When the LEDs "Power" and "Active" are lit, the SSW7-TS with GSM-modem is ready to accept a call.

If the SSW7-TS adapter is connected to the MPI connection of the PLC, it will establish contact with the MPI bus as soon as the internal modem has been successfully initialized. The LED “Active” should light up after a short time

If only the LED "Power" lights up, either the modem has not responded to initialization, or the SSW7-TS with GSM-modem has not joined the MPI bus (e.g. wrong MPI address?).

Parameterization is possible both via the teleservice software locally at the workstation (“Direct connection”) and for an existing phone connection (“Modem connection”).

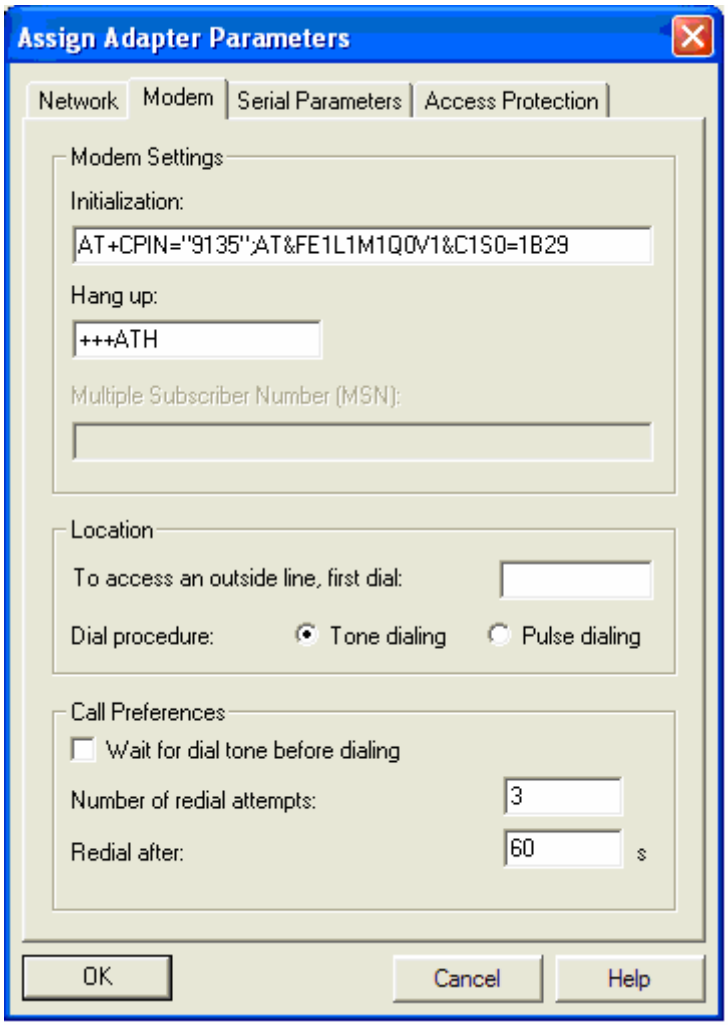
6.2.1 Call-back function with ISDN / initialization string

Call-back 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 assigned to the GSM-modem via an AT command in the SSW7-TS.

Assigning the V.110 transmission service via the AT command:

ATB29

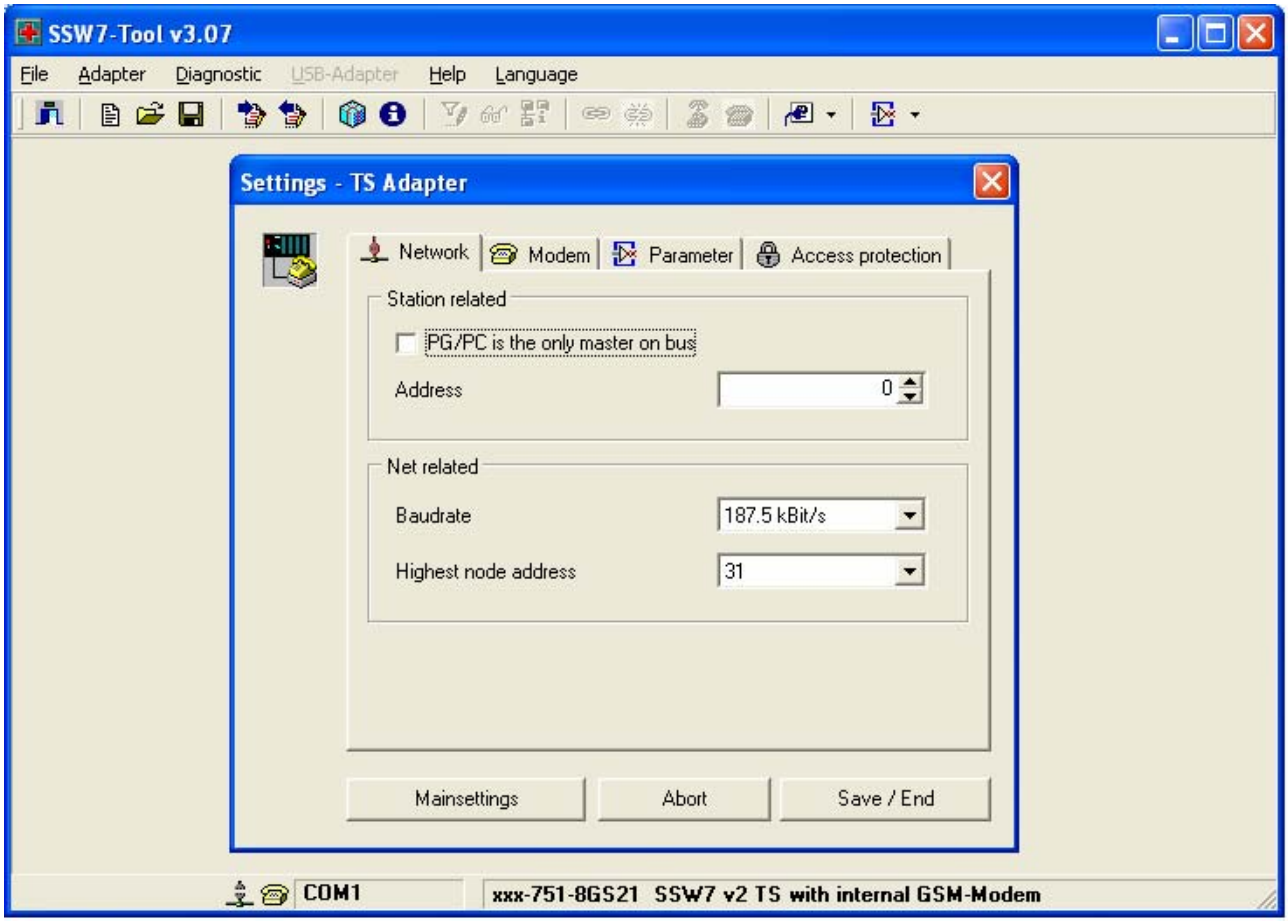
The PIN 9135 is only and example! Please enter your four-digit PIN here!
Complete the initialization line with: B29



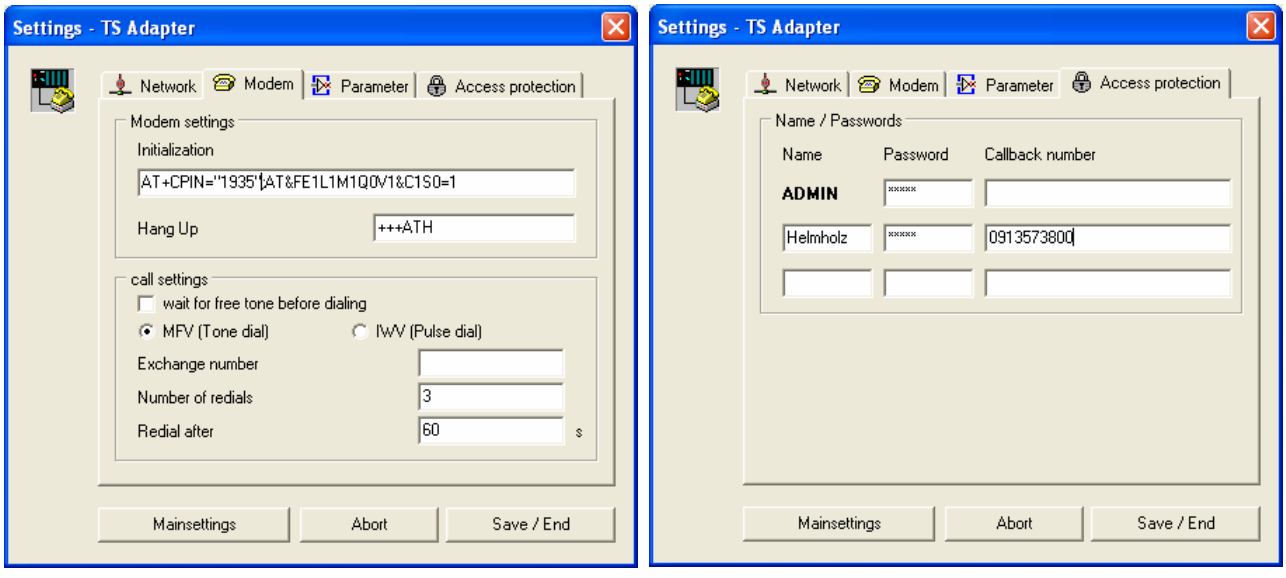
Please also note: Please define an MSN (multiple subscriber number) for the data port for the call-back function of the SSW7-TS on your local programming device/PC modem.

7 SSW7-Tool Parameterization Software

With SSW7-Tool V3.07 and later, it is possible to pre-parameterize a SSW7-TS with GSM-modem via any computer, even if teleservice software is not installed on that computer. You will find the program on the CD ROM included in the scope of supply.



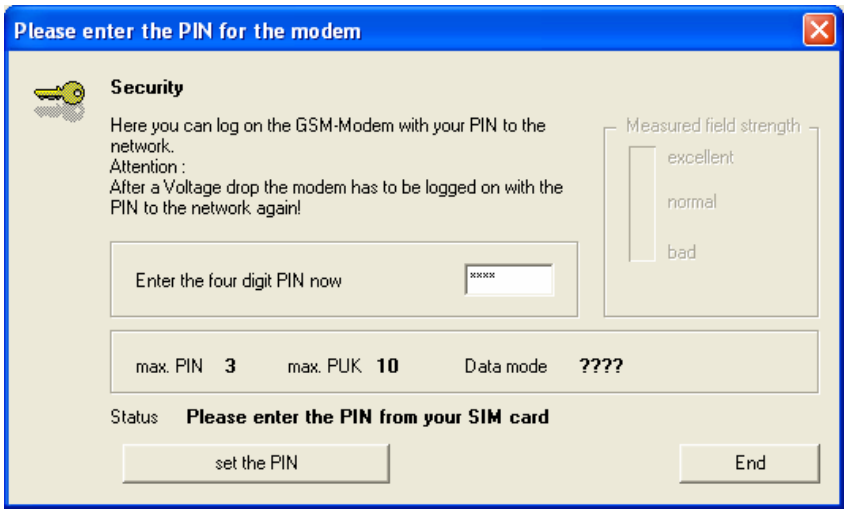
Once set, parameters can be stored on the computer in a file and transmitted to further SSW7-TS's.



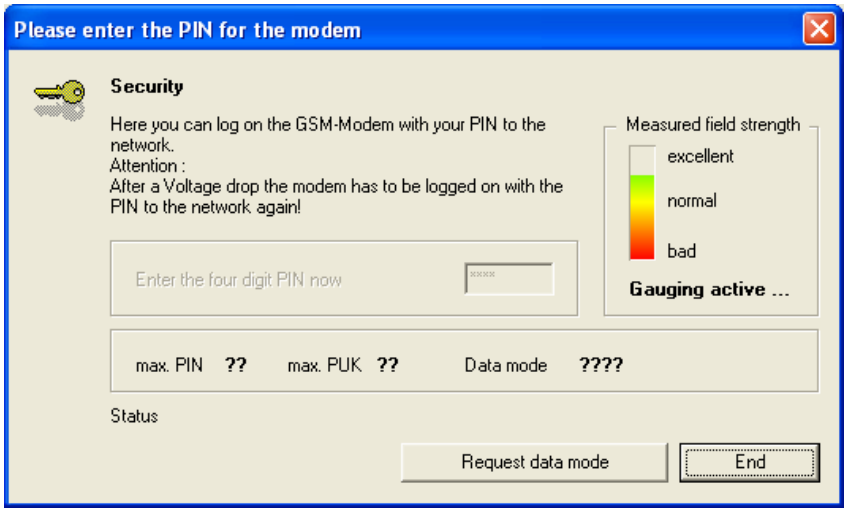
Example: Setting dialogs same as teleservice

7.1 PIN transfer during direct modem operation

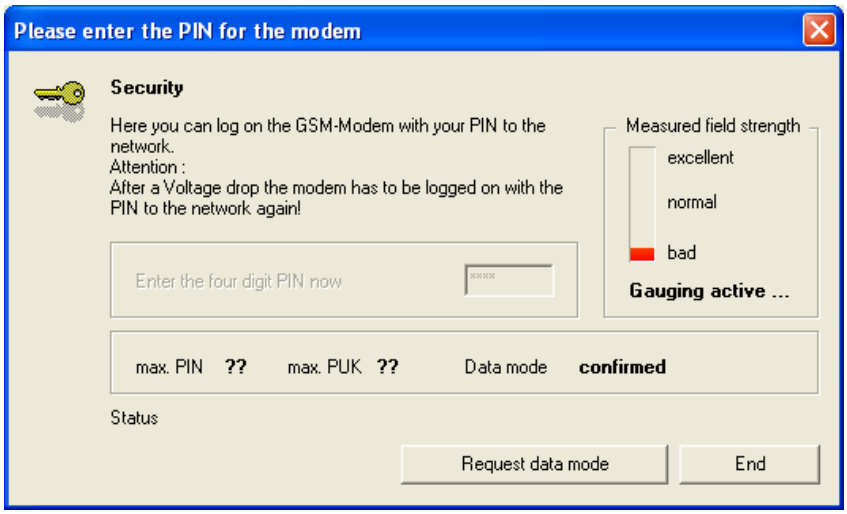
With microswitch setting “Mdm”, direct access to the SSW7-TS with GSM-modem is possible using the SSW7-Tool software. The following window appears under “Adapter”, “Activate GSM-modem with the PIN”:



When the modem has successfully signed onto the radio network the current signal strength is displayed as a bar:

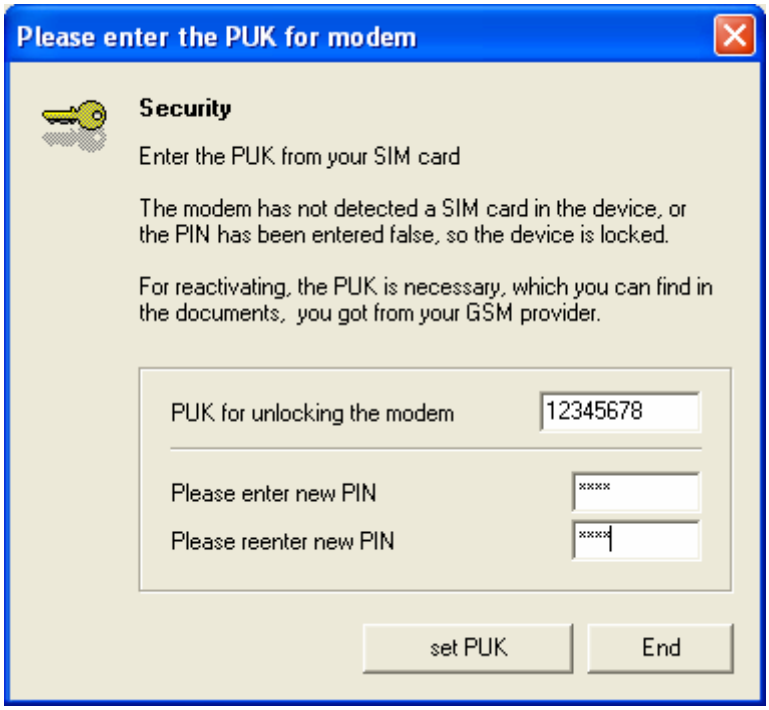


The function “Request data mode” checks whether your SIM card is activated for data transfer.



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

If your SIM card is disabled or you have forgotten its PIN you can reset the card with a PUK (Personal Unblocking Key) in SSW7-Tool.



The latest version of the SSW7-Tool parameterization software can be downloaded free of charge at www.Helmholz.de.

8 Technical Data

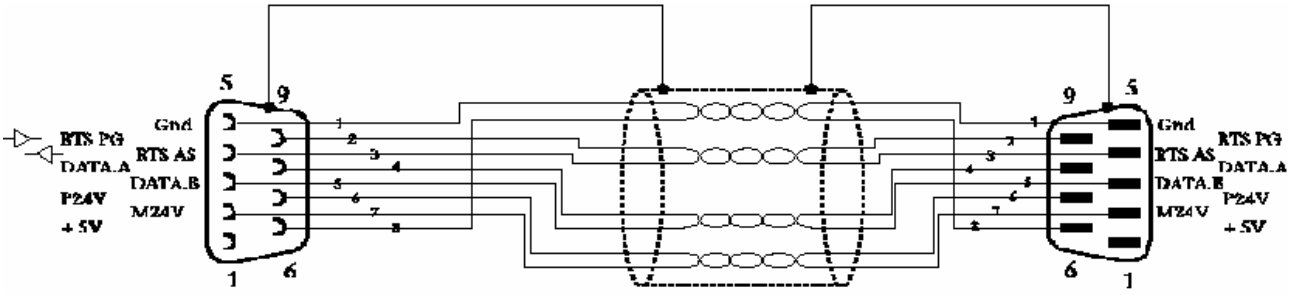
Dimensions	135 x 67 x 30 mm (LxWxH)
Weight	approx. 240g (incl. MPI cable/connector)
Operating voltage	+24V DC ±25%, from the programmable controller or an external power source
Current consumption	150 mA (max)
MPI interface	RS485, electrically isolated
Transmission rate	19.2 kbit/s to 187.5 kbit/s
Cable	1,2m
MPI Connector	SUB D 9-way with PG socket
Modem connection	FME antenna connector, GSC-F male
Card type	3V SIM card for data transfer
For modem operation only	Connector, SUB D 9-way, V.24/V.28
GSM frequency bands	GSM 850, EGSM 900, DCS 1800, PCS 1900
Transmission performance	Class 4 (2W) for GSM 850 / EGSM 900 Class 1 (1W) for DCS 1800 / PCS 1900
GSM/DCS certification GCF-CC	V.3.16.0 and GT.01
PCS certification	NAPRD.03 (V.2.10.1)
Communication interface	RS232, serial asynchronous
Transmission rate	9.6 kbit/s to 115 kbit/s
Connector	SUB D 9-way, V.24/V.28
Degree of protection	IP 30
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)

8.1 Pin assignment

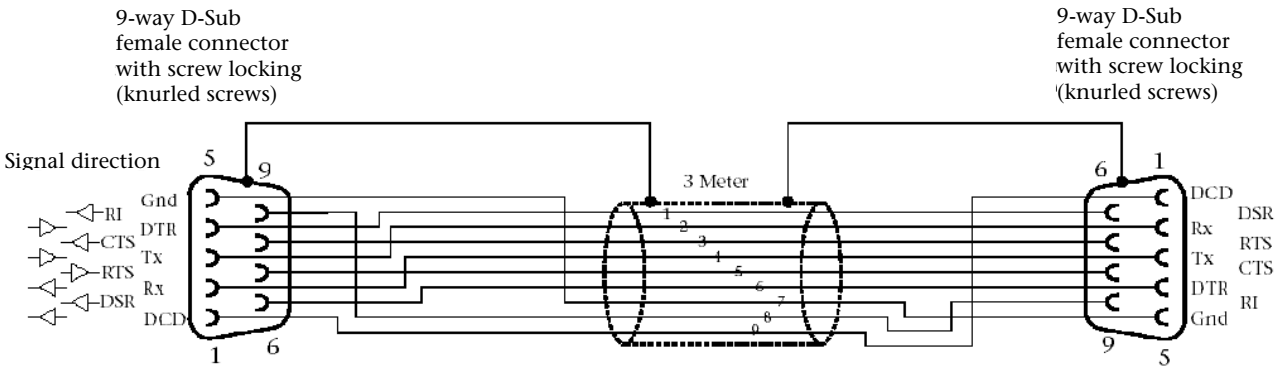
Pin	SUBD connector PC	SUBD connector MPI
1	DCD	n.c.
2	Rx	M24V
3	Tx	DATA.B
4	DTR	RTS AS
5	GND	0V (M5V)
6	DSR	n.c.
7	RTS	+24V
8	CTS	DATA.A
9	RI	RTS PG

8.2 Connecting cable

MPI extension cable (700-751-6VKx1):



PG/PC to SSW7-TS for direct operation or use of the modem (700-751-7VK81):



Notes