

SIEMENS

SIMATIC

TeleService for S7, C7, and M7 Remote Maintenance for Automation Systems

Manual

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Safety Guidelines

This manual contains notices intended to ensure personal safety, as well as to protect the products and connected equipment against damage. These notices are highlighted by the symbols shown below and graded according to severity by the following texts:



Danger

indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.



Warning

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.



Caution

indicates that minor personal injury can result if proper precautions are not taken.

Caution

indicates that property damage can result if proper precautions are not taken.

Notice

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We have checked the contents of this manual for agreement with the hardware and software described. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the data in this manual are reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

Preface

Purpose of the Manual

This electronic manual provides you with an entire overview of how to work with TeleService. It supports you when installing and commissioning the software, as well as when establishing a remote link with TeleService.

The following describes in detail how to:

- access remote plants (remote maintenance),
- establish a connection to remote plants (programming device-PLC remote link),
- exchange data between remote plants (PLC-PLC remote link),
- send a message from a plant (Sending an SMS)

In this manual you will also find tables which will help you should problems occur.

An example program for PLC-PLC remote link contributes to the previous information.

This manual is intended for programmers and other persons involved in the maintenance and running of plants.

Required Basic Knowledge

In order to understand the manual, general knowledge about automation systems is required.

Additionally, knowledge about using computers or similar devices such as programming devices under the Windows 95/98/Me/NT/2000/XP operating systems is required. Since TeleService is based on STEP 7 as well as STEP 7 Lite software, you should also be familiar in working with this software.

Validity of the Manual

This manual is valid for the software package TeleService V5.2.

Documentation Packages for the STEP 7 Standard Software

The following table provides an overview of the documentation on STEP 7:

Manuals	Purpose	Order Number
STEP 7-Basic Information with <ul style="list-style-type: none"> • Working with STEP 7 V5.2 Getting Started • Programming with STEP 7 V5.2 • Configuring Hardware and Communication Connection STEP 7 V5.2 • STEP 7 From S5 to S7, Converter Manual 	Basic information for technical personnel describing the methods of implementing control tasks with STEP 7 and the S7-300/400 programmable controllers.	6ES7810-4CA06-8BA0
STEP 7 Reference with <ul style="list-style-type: none"> • Manuals LAD/FBD/STL for S7-300 and 400 • System and Standard Functions for S7-300 and 400 	Provides reference information and describes the programming languages LAD, FBD and STL and standard and system functions extending the scope of STEP 7 basic information.	6ES7810-4CA06-8BR0

Online Help	Purpose	Order Number
Help on TeleService	Basic and reference information on TeleService as online help	Part of the TeleService software package
Help on STEP 7	Basic information on programming and configuring hardware with STEP 7 as online help	Part of the STEP 7 software package
Reference help on LAD/FBD/STL Reference help on SFBs/SFCs Reference help on organization blocks Reference help on IEC functions Reference help on system attributes	Context-sensitive reference information	Part of the STEP 7 software package

Online Help

When using the software you will, in addition to the manual, obtain detailed support via the online help integrated in the software.

The help system is integrated in the software using several interfaces:

- In the **Help** menu several menu commands are available: **Help Topics** opens the contents of the help for TeleService. **Introduction** offers an overview about programming with TeleService, **Using Help** provides you with detailed instructions for using the online help.
- The context-sensitive help offers information on the current context, an open dialog box or an active window, for example. You can use "Help" in the menu bar or the F1 key to call it.
- The status bar offers another form of context-sensitive help. As soon as the cursor is placed on the menu command, a brief explanation is displayed for each menu command.
- A brief explanation is displayed for the icons in the function bar when the cursor is placed on them for a short time.

If you prefer to read the information on the online help as a printout, you can print individual help topics, books or the entire help file.

Further Support

If you have any technical questions, please get in touch with your Siemens representative or agent responsible.

<http://www.siemens.com/automation/partner>

Training Centers

Siemens offers a number of training courses to familiarize you with the SIMATIC S7 automation system. Please contact your regional training center or our central training center in D 90327 Nuremberg, Germany for details:

Telephone: +49 (911) 895-3200.

Internet: <http://www.sitrain.com>

A&D Technical Support

Worldwide, available 24 hours a day:



<p>Worldwide (Nuernberg) Technical Support</p> <p>24 hours a day, 365 days a year Phone: +49 (0) 180 5050-222 Fax: +49 (0) 180 5050-223 E-Mail: adsupport@siemens.com GMT: +1:00</p>		
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<p>The languages of the SIMATIC Hotlines and the authorization hotline are generally German and English.</p>		

Service & Support on the Internet

In addition to our documentation, we offer our Know-how online on the internet at:

<http://www.siemens.com/automation/service&support>

where you will find the following:

- The newsletter, which constantly provides you with up-to-date information on your products.
- The right documents via our Search function in Service & Support.
- A forum, where users and experts from all over the world exchange their experiences.
- Your local representative for Automation & Drives via our representatives database.
- Information on field service, repairs, spare parts and more under "Services".SIMATIC Documentation in the Internet / Intranet

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1 Introducing TeleService

1.1 Introduction to TeleService

TeleService allows you to operate your control system via a telecommunications connection. You can centrally manage, control, and monitor decentral plants by means of remote connections.

TeleService allows you to use the functional scope of STEP 7 or STEP 7 Lite via a phone network which is otherwise available via the PC Adapter. This means that you can easily reach remote sections of plants and include them in the overall system.

This provides the following advantages:

- You can provide fast service if faults occur in a plant.
- You can employ your resources effectively.
- Costs are reduced considerably.
- Down times are considerably shortened.
- The plant becomes much more economical.

1.2 Functionality of TeleService and Required Components

TeleService offers the following functionality:

1. Access to remote plants (teleservice):
You can centrally manage, control, and monitor decentral plants by means of remote connections.
2. Establishing connections from remote plants (programming-device to automation-system remote link):
You can use PRODAVE MPI to establish a remote connection to a remote plant and the "PG_DIAL" function block to establish a remote connection from a remote plant.
3. Data exchange between plants (automation-system to automation-system remote link):
The "AS_DIAL" function block allows two SIMATIC automation systems to exchange process data via the phone network.
4. Sending an SMS from a plant:
Using the function block "SMS_SEND", a SIMATIC automation system can send a message (SMS) via a GSM radion modem.

The following components are required so that you can use the TeleService functionality for teleservicing:

- The TeleService optional package and the following further components which are not included in the scope of delivery of the optional package:
- A TS Adapter,
- One Hayes-compatible modem each on the programming device/PC side and on the plant side
- Modem cable for connecting the modem and the TS Adapter,
- Modem cable for connecting the programming device/PC and the modem,
- Possibly a zero modem cable for direct operation and parameter assignment of the TS Adapter,
- Any Adapter connector you may require (for example, 9-pin/25-pin).

You require the following further components for a programming-device to automation-system remote link:

- The PRODAVE MPI V5.0 (or later) product
PRODAVE MPI is a toolbox for the process data traffic between SIMATIC S7, SIMATIC M7 and SIMATIC C7. It carries out the data traffic autonomously via the MPI interface.
- The supplied "PG_DIAL" function block

You require the following components for an automation-system to automation-system remote link:

- A second TS Adapter
- A further modem with cable
- The supplied "AS_DIAL" function block

Note the following when sending an SMS:

- You must use a GSM radio modem

1.3 What's New in TeleService V5.2?

Version 5.2 contains the following additional features or modifications compared to the previous version V5.1.

The new functionality automation system to is supplied with TeleService V5.2.

- **Sending an SMS:**
TeleService V5.2 comes with the new functionality of sending SMS from the user program in the automation system.
- **Windows XP:**
TeleService V5.2 can also run under MS Windows XP Home and MS Windows XP Professional.

1.4 Compatibility with Previous Versions

Both the TeleService software and the TS Adapter have been extended and are compatible upwards. The following applies for the overall functionality with regard to the compatibility in the interaction of the TeleService software and a TS Adapter:

The component with the lowest version determines the functionality, for example:

- TeleService V5.1 and TS Adapter V5.1 (With V5.1 functionality)
- TeleService V5.0 and TS Adapter V3.0 (With V3.0 functionality)
- TeleService V3.0 and TS Adapter V5.1 (With V3.0 functionality)

The operation and the configuration of the TS Adapter V5.1 with TeleService V3.0 is thus limited to the functionality of the TS Adapter V3.0.

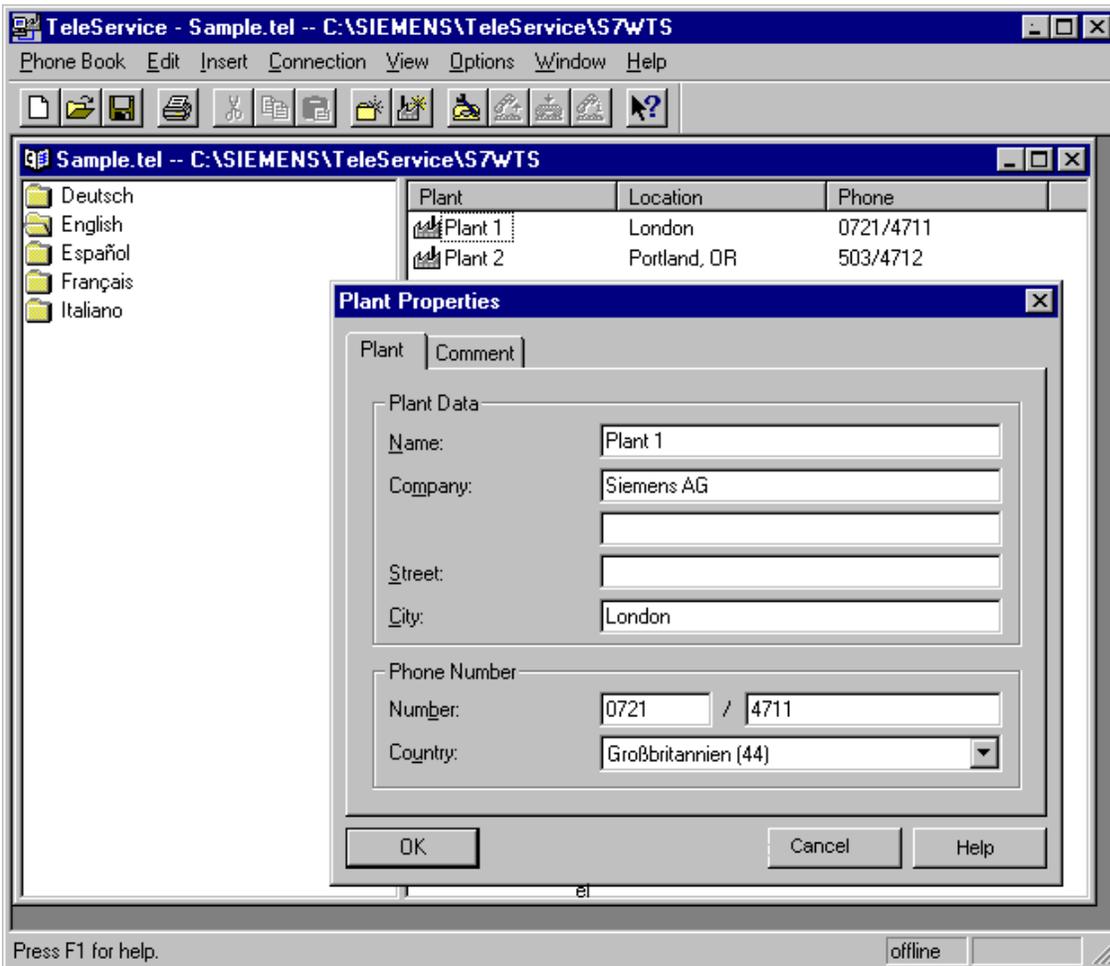
Note

If, for example, TeleService V5.1 is used to set up the access protection in a TS Adapter V5.x, it is no longer possible to access this TS Adapter with TeleService V3.0.

1.5 Phone Books, Folders and Plants at TeleService

In TeleService phone books, folders and plants are used to manage data for establishing remote connections to various users.

These management objects are also required if you only operate a connection to one plant. The following figure shows the main window of TeleService.



Phone books are the highest hierarchic level. When you create a phone book in TeleService, you can it in any directory. From there you can call it up again in order to edit it.

Phone books can contain any number of **folders** in a flat hierarchy, meaning that there are no further subfolders. Folders are used to structure the plant data. Various functions for editing folders can be accessed via the menu commands or via the right-hand mouse button.

You can create any number of **plants** in a folder. Plants contains the data which are required to establish a connection, for example the name of the user and the phone number to be dialed. As for folders plants can be edited via various menu commands and via the right-hand mouse button.

1.6 Getting Started with TeleService

In order for TeleService to establish a remote connection you should first inform yourself on the use of the TS Adapter for TeleService. You can operate the TS Adapter with a direct connection or with a modem connection.

Working in TeleService can be divided into several working steps as listed below:

Implementing the Prerequisites:

1. Install a modem under Windows.
2. Set the TeleService-specific modem properties.
3. Define the location and the corresponding dial parameters.

Working with a Direct Connection:

1. Call up "Set programming device/personal computer interface" and set the TS Adapter to direct connection. Also enter the COM port and the transfer speed.
2. Configure the TS Adapter for a direct connection. You can also export and import the configuration of a TS Adapter as well as set up the access protection for the configuration of the Adapter and for the remote plant.
3. You can now start the SIMATIC Manager and establish a connection to the connected automation system.

Working with a Modem Connection:

1. Call up "Set programming device/personal computer interface" and set the TS Adapter to modem connection.
2. Create phone books, folders and plants in TeleService. In plants you save the data which are required to establish a remote connection.
3. Establish the remote connection to the desired plant by using the **Connection > Establish** menu command or by double-clicking on a plant.
4. After the remote connection has been established, you can change to the SIMATIC Manager and edit the remote plant as for a direct connection. You can also have the properties of the active remote connection displayed.
5. Disconnect the remote connection after you have completed your work.

2 Installing the Software and Hardware

2.1 Installing TeleService

System Environment

The TeleService V5.2 optional package can be run on a programming device / personal computer with:

- Microsoft Windows 95/98/Me/NT/2000/XP operating system, called Windows in this document.
- STEP 7 Version 5.0 or higher or STEP 7 Lite Version 2.0 or higher.

Scope of the Installation

If the STEP 7 package is installed, the complete TeleService functionality can be installed.

If STEP 7 is not installed, only the TeleService component "Remote Link" is installed. TeleService Remote Link supports the operation with PRODAVE MPI V5.0 (or later).

Starting the Installation Program

TeleService contains a setup program which carries out the installation automatically. Input prompts on the screen guide you step-by-step through the entire installation process.

Proceed as follows:

1. Open the "Control Panel" window by using the taskbar in Windows (**Start > Settings > Control Panel**).
2. Double-click on the "Add/Remove Programs" icon.
3. Click on the "Install" command button.
4. Insert the data medium and click on "Continue". Windows now searches automatically for the installation program, "Setup.exe".
5. Follow the instructions displayed by the installation program step-by-step.
6. After the corresponding prompt install the authorization/license for use.
7. After the corresponding dialog box has been displayed, install the TS Adapter.
8. Set the programming device/personal computer interface directly afterwards or later on.
9. Install a local modem under Windows.

2.2 Installing the Authorization/License to Use

Authorization

You require a product-specific authorization (license to use) in order to use the STEP 7 TeleService software. The software thus protected can only be used if the required authorization for the program or software package is recognized on the hard disk of the respective programming device/personal computer.

Authorization Diskette

In order to authorize your software you require the read-only authorization diskette included in the scope of delivery. It contains the authorization for TeleService. The AUTHORSW program required to display, install and remove the authorization is located on the TeleService CD.



Caution

Observe the information contained in the README.TXT file in the installation directory of AUTHORSW. If you do not adhere to these guidelines, authorization may be irretrievably lost.

If You Lose Your Authorization ...

An authorization may, for example, be lost, if a hard disk defect occurs and you do not have the chance to remove the authorization from the defective hard disk.

If the authorization is lost, you can still use the emergency authorization which is also contained on the authorization diskette. The emergency authorization enables you to using the software for a limited period. In this case the remaining period of validity is displayed during the start. You should obtain a replacement for the lost authorization during this period from your local SIEMENS representative.

Note

For further information and instructions on installing and removing software please refer to the "Programming With STEP 7" manual.

Carrying Out the Authorization during the Initial Installation

You should carry out the authorization when you are prompted to do so during the initial installation.

Proceed as follows:

1. Insert the authorization diskette when you are prompted to do so.
2. Check and modify the displayed drive character, if required.
3. Click on the "Authorize" command button.

Result: The authorization is transferred to a physical drive.

2.3 Installing the TS Adapter

The TS Adapter is installed automatically when TeleService is installed. If you have removed the TS Adapter once, you can install it again as described below.

Proceed as follows:

1. Call up "Set programming device/personal computer interface".
2. Click on the "Select" command button. A further dialog box is then opened.
3. Select the option "TS Adapter" for TeleService under "Selection".
4. Click on the "Install" command button.
5. Close the dialog box after the installation process has been completed.
Result: The list under "Used Interface Configuration" in the "Set programming device/personal computer interface" dialog box now contains an entry for the TS Adapter.
6. Leave the dialog box by clicking on "OK".

2.4 Installing a Local Modem under Windows

If you have already installed a modem for data transfer under your operating system, you can also use this modem for TeleService. If a modem has not been implemented on your operating system, this section will provide information on installing a modem under Windows.

Modems with Plug-and-play Facilities

Proceed as follows:

1. Ensure that your programming device/personal computer and the modem are switched off.
2. Connect an external modem physically to a COM interface on your programming device/personal computer. You can also install an internal modem or a PCMCIA card in accordance with the manufacturer's specifications.
3. First switch on the external modem and then the programming device or the personal computer.

Plug-and-play modems are recognized and installed automatically by your programming device/personal computer. Only the dialog boxes for displaying and confirming the installation process are displayed.

Modems without Plug-and-play Facilities

If your modem is not recognized automatically when switched on, you have to install it yourself by using the Windows Control Panel.

Note

Before installing the modem you should install the latest modem driver on your system. The modem drivers are contained on the diskettes or CD included in the scope of delivery of the modem. Proceed as described in the documentation of the modem manufacturer.

The further procedure depends on the version of Windows which you have installed:

For Windows 95/98/Me/NT proceed as follows:

1. Call up the Control Panel in Windows and select the "Modems" option.
2. Install the desired modem by filling out the Windows dialog boxes correspondingly. For further information on the procedure please refer to the Windows help function.

For Windows 2000/XP proceed as follows:

1. Call up the Control Panel in Windows and select the "Phone and Modem Options" option.
2. Install the desired modem by filling out the Windows dialog boxes correspondingly. For further information on the procedure please refer to the Windows help function.

2.5 Connecting and Configuring the Remote Modem

Connecting a Remote Modem:

1. Switch the modem off.
2. Plug the TS Adapter into the programmable logic controller.
3. Connect the TS Adapter to the modem by means of a modem cable.
4. Connect the modem to the phone connection.
5. Switch on the components.

Configuring a Remote Modem:

The modem receives all the parameters required for operation from the TS Adapter. These are data for initializing the modem and settings for the serial transfer between the TS Adapter and the modem.

The data are specified during the configuration of the TS Adapter. This is described below.

Note

The parameters for the modem and the serial interface preset in the TS Adapter should ensure successful operation in most cases, so that re-configuration will only be required in rare cases.

Re-configuration of the TS Adapter is only necessary if a modem connection is not established or if works settings have to be adapted or optimized.

3 Basic Information on TeleService

3.1 Calling TeleService

TeleService is an optional package which can be executed with STEP 7 as well as with STEP 7 Lite. TeleService integrates itself in the STEP 7 software existing at the time TeleService is installed. You can call TeleService via the Start bar as described below.

Calling TeleService from STEP 7

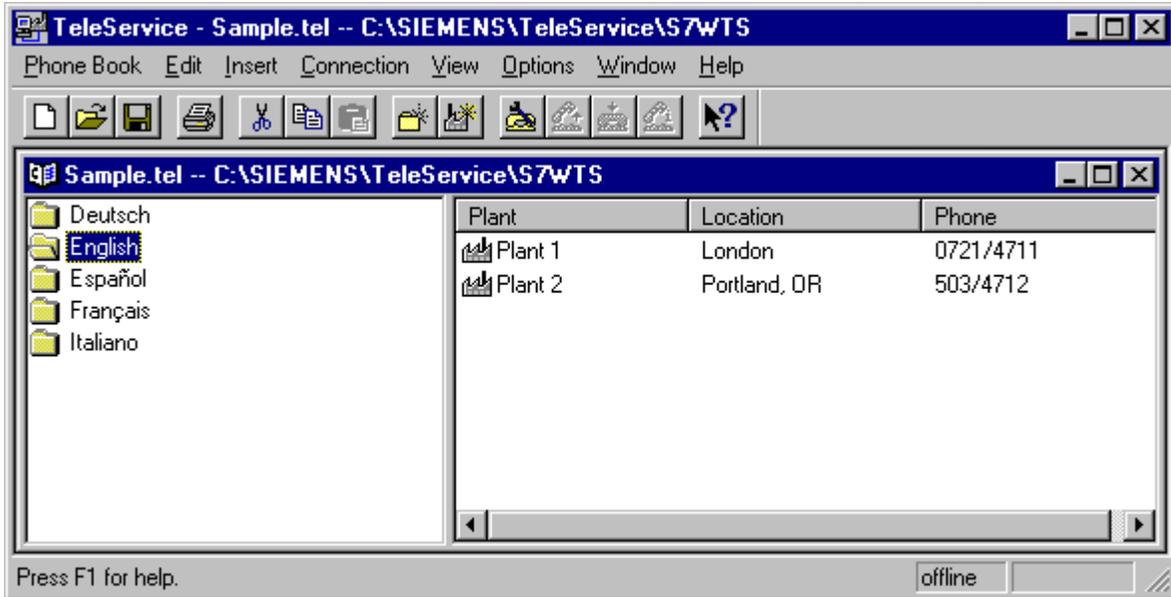
After you have installed the TeleService software on your programming device/personal computer, you can call up the TeleService via the "Start" command button on the Windows task bar (entry under "SIMATIC/STEP 7/TeleService").

Calling TeleService from STEP 7 Lite

After you have installed the TeleService software on your programming device/personal computer, you can call up the TeleService via the "Start" command button on the Windows task bar (entry under "SIMATIC/STEP 7 Lite/TeleService").

3.2 The User Interface of TeleService

The user interface of TeleService consists of the following standard components:



1. **Title bar:**
Contains the window title and icons for controlling the window.
2. **Menu bar:**
Contains all the menus which are available in the window.
3. **Toolbar:**
Contains icons with which you can carry out commands which are often used quickly.
4. **Work area:**
Shows one or more two-section windows with the opened phone books.
5. **Status bar:**
Displays the status and further information on the selected object.

Below the menu bar and the toolbar the TeleService user interface shows one or more two-section windows which display the opened phone books. If you have started TeleService for the first time, the sample phone book (Sample.tel) is opened and displayed – otherwise the last phone books which were opened.

- The left-hand section displays the folders existing in the respective phone book. After you have selected a folder, the right-hand section displays the plants, locations and numbers entered in the selected folder.

Changing and Sorting Plants:

- You can change the plants by selecting a plant and then calling up the "Object Properties" pop-up menu via the right-hand mouse button. The "**Plant Properties**" dialog box is opened with the "Plant" and "Comment" tab cards. Enter the desired changes here and leave the dialog box by clicking on "OK".
- You can sort the data displayed on the right alphabetically or in ascending order by clicking on the "Plant", "Location" or "Phone" command button.

Establishing a Connection:

- You can establish a connection to a displayed plant by double-clicking on the desired plant and then clicking on the "Dial" command button in the subsequent dialog box.

3.3 Phone Networks, Modems and Data Throughput

TeleService is used to establish a remote connection to a remote plant via a phone network. The on-line connection makes it possible to edit the dialed plant as usual with STEP 7.

Phone Networks Which Can Be Used

TeleService can be used with digital networks (ISDN), analog networks and radio networks (with GSM technology). The subsequent table shows the respective transfer duration normalized to the transfer duration of the MPI board (1 s) and as a function of the set TS Adapter:

Connection:	With TS Adapter V5.0:	With TS Adapter V5.1/V5.2:
Direct connection (19.2 Kbps)	4 s	4 s
ISDN network (64 Kbps)	8 s	5 s
Analog network (28.8 Kbps)	32 s	8 s
Radio network (9.6 Kbps)	150 s	30 s

Limitations

Communication with the TS Adapter via the CAPI interface is not possible in case of internal ISDN boards and PCMCIA boards, unless you are equipped with a virtual COM interface of the modem manufacturer.

Modem Support

TeleService was implemented to be independent of the modem. This means that all the common modems (Hayes-compatible/AT commands) which can be installed in the Control Panel of Windows can also be used by TeleService.

Basic requirement is that a physical/virtual COM interface must exist. The choice of the modem types is determined primarily by the existing hardware of the programming device/personal computer and the phone network to be used.

A selection of the following modem types/media is supported:

- Modems (external modems at COM interface, internal modems and PCMCIA boards),
- External ISDN adapter at the COM interface
- Internal ISDN adapter with virtual COM interface (for example, AVM CAPI port)
- External ISDN modems (ISDN adapter with integrated analog modem functionality) at the COM interface
- Radio network modems with GSM technology, PCMCIA adapter board or data cable and mobile phone

Network Transitions

Network transitions such as from an ISDN modem to an M1 module at a radio network are possible. From and to an ISDN adapter however, only one remote connection can be established to and from another ISDN adapter or ISDN modem.

Performance in Phone Networks

The data throughput of a remote connection depends on the modem used, the phone network used and on the quality of the phone line.

The properties of an active remote connection can be displayed in TeleService.

A maximum of one remote connection to a TS Adapter is supported in this version. The following figure provides an impression of the performance of the various transmission methods. The duration of a transfer under ISDN is scaled to the value of 100.

3.4 Functionality of the TS Adapter

Configuration

Depending on the configuration the TS Adapter connects the serial interface of your programming device/personal computer (direct connection) or the serial interface of a modem (modem connection) to the MPI-/PROFIBUS network of your automation system.

The TS Adapter disposes of a non-volatile memory. Parameters for the following functions are saved in this memory:

- The MPI/PROFIBUS network (network parameters)
- The operation of the modem used
- The serial interface to the Modem
- The access protection

Standard Configuration

The TS Adapter is supplied with a standard configuration. The parameters can be set during a parameter configuration session and are written back to the non-volatile memory of the TS Adapter.

In the direct connection configuration the TS Adapter only uses the network parameters for the access to the MPI/PROFIBUS network.

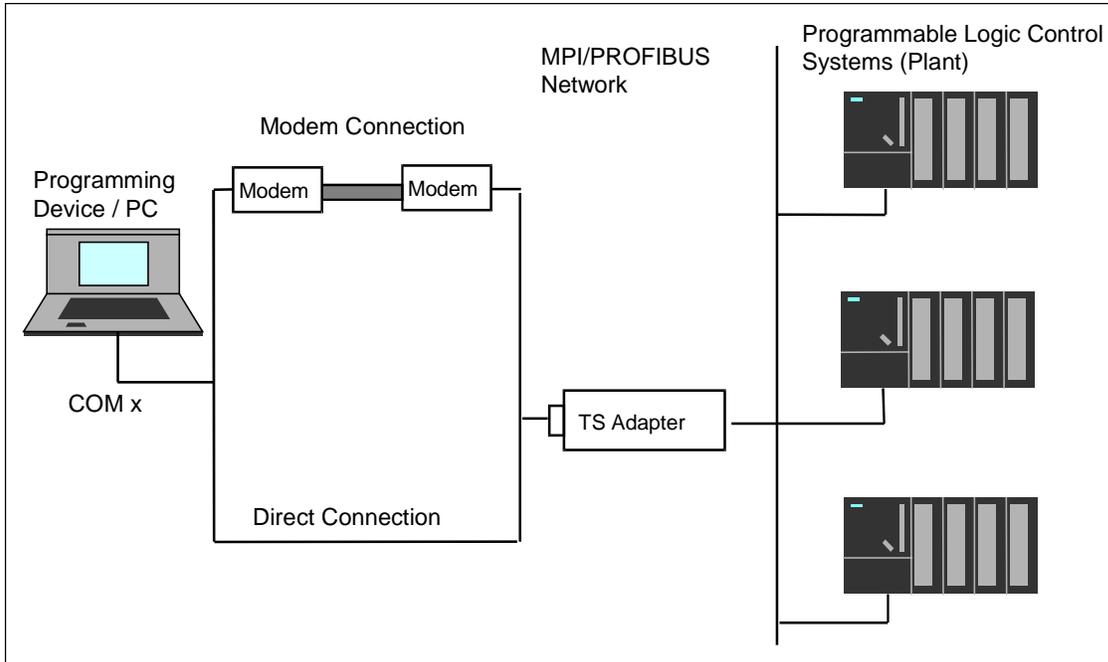
In the modem connection configuration all the parameters saved on the TS Adapter are activated.

3.5 Using the TS Adapter for TeleService

Connection Possibilities

A TS Adapter is required in order to use TeleService.

This offers various connection possibilities as shown in the figure below: Modem Connection



Modem Connection

The possibility of accessing an automation system via a modem from a programming device/personal computer (modem connection).

By this means the programming device/personal computer is connected to the MPI/PROFIBUS network of the automation system via the remote connection and the TS Adapter. This configuration allows you to dial directly into a remote plant.

Direct Connection

The possibility of connecting a programming device or a personal computer directly (without modem) to an automation system (direct connection).

By this method it connects the programming device/personal computer to the MPI-DP interface of an S7/M7/C7 system without occupying a slot in the programming device/personal computer.

Changing Over

In order to change over the operating modes use "Set programming device/personal computer interface".

3.6 Using the TS Adapter in a Direct Connection

Direct Connection

The direct connection is used essentially to configure the TS Adapters. In the same configuration you can also go online in STEP 7 and thus check the configured MPI/PROFIBUS parameters for bus compatibility. This means that (as for a PC adapter) S7/M7/C7 systems can be accessed via the MPI/DP interface without an MPI/PROFIBUS-B occupying a slot for a programming device/personal computer.

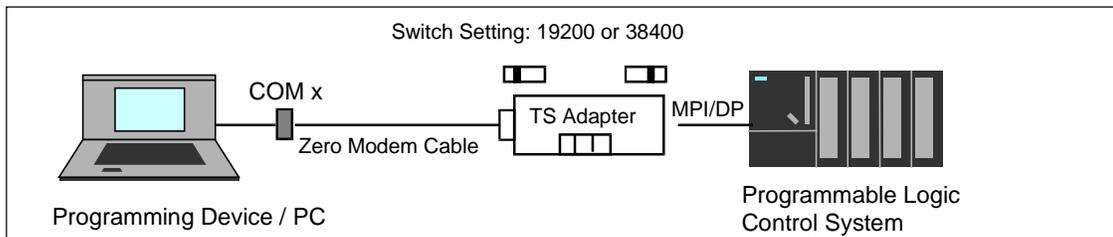
Access protection for the TS Adapter is not active in the direct connection. This means that the configuration of the TS Adapter can be changed without any problems, for example by importing adapter parameters.

Configuration of the Direct Connection

In the case of a direct connection there is a direct connection between the programming device/personal computer on which TeleService is installed and the automation system via the TS Adapter. A modem is not required.

Either 19200 bits/s or 38400 bits/s can be used in a direct connection. In order to change the speed you have to change over the switch at the TS Adapter and also adapt the parameter with "Set programming device/personal computer interface".

The following figures shows the configuration of the TS Adapter in a direct connection.



Information on Cabling

There is a 9-pin connector at the optional zero-modem cable of the TS Adapter. A suitable adapter may be required for a connection to a COM interface of the programming device/personal computer.

The table below shows the cable connection at the programming device/personal computer.

Device:	Connection:	Cable connection:
Programming device	COM 2 as 9-pin connector	Additional zero-modem cable
Programming device	COM 1 as 25-pin socket	Additional adapter and zero-modem cable
PC	COM 1 or COM 2 as 9-pin connector	Additional zero-modem cable
PC	COM 1 or COM 2 as 25-pin connector	Additional adapter and zero-modem cable

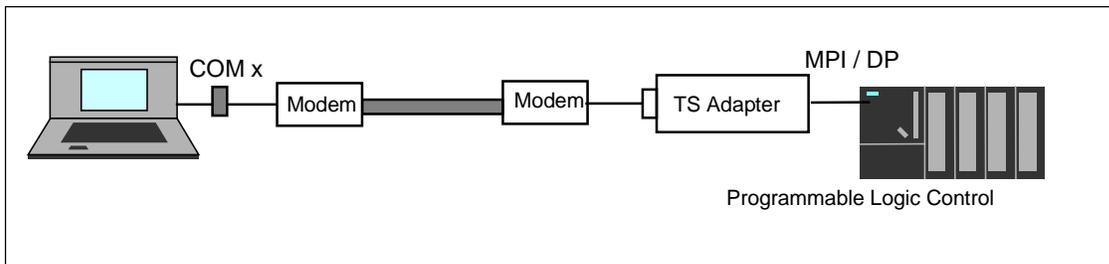
3.7 Using the TS Adapter in a Modem Connection

Configuration of a Modem Connection

The connection between the programming device or PC on which the TeleService is installed and the automation system onto whose MPI/DP interface the TS Adapter is plugged is implemented via a modem connection.

The configuration thus connects the programming device or the personal computer via the phone network and the TS Adapter to the MPI/DP interface of the automation system.

The following figure shows the TS Adapter in a modem connection:



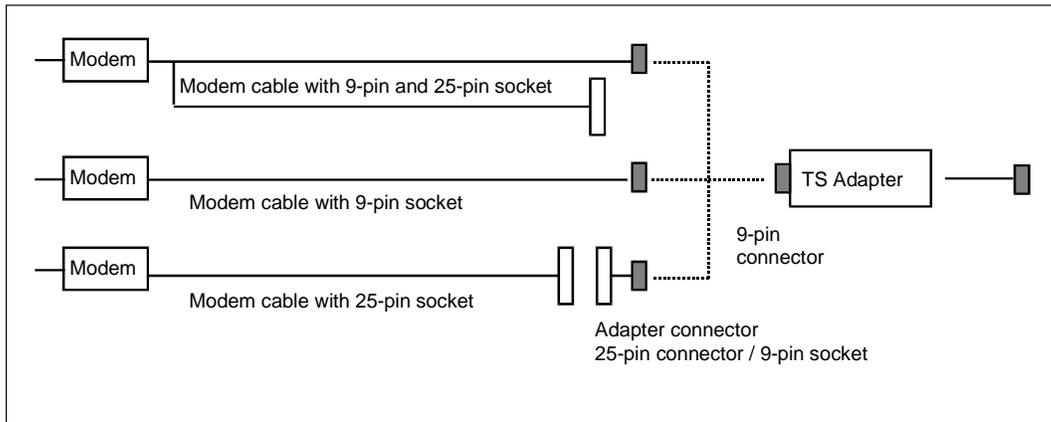
Purpose

This configuration allows you to dial directly into a remote plant. To this purpose you use TeleService to establish a remote connection to a remote plant via a phone network. The established modem connection can then be used to process the dialed plant as usual with STEP 7.

Information on Cabling

The components to be cabled have to be switched off. There has to be a 9-pin socket at the modem cable in order to connect the TS Adapter. Otherwise a suitable adapter connector is required.

The following figure shows connectable modem cables (if necessary via an adapter connector).



3.8 Further Information on the Access Protection for the TS Adapter

Access Protection

During the configuration of your TS Adapter you can protect access to the configuration of the adapter as well as the access to the remote plant.

This access protection exists only for remote connections. In direct connection you can access the configuration of the adapter at any time.

The protection is a multi-stage access protection with one administrator and a maximum of two users who can each define an own password and/or a callback number. The password has to be entered when the administrator or the user logs in. If a callback number is configured, the modem connection is disconnected. The adapter calls back the specified number.

This results in the following advantages:

- Access to the adapter is possible from a maximum of three phone connections.
- Unauthorized access by outside persons is almost impossible.
- An extremely high degree of security is attained.
- The plant operator bears the main part of the phone costs.

The access protection is not activated ex works when the TS Adapter is supplied. The first user who configures this adapter can thus activate the access protection by defining the password for the administrator and/or a callback number.

Note

In order to ensure the callback functionality you must ensure that the settings in the "Modem" tab card corresponds to the conditions at the plant.

Setting Up the Access Protection

In case of a modem connection only the administrator may set up the two users, can change their settings and also delete them again, if required. If you log in as a user, you can only change your own password and your own callback number. All the other parameters of the TS Adapter can only be read.

3.9 Information Functions in TeleService

Status Bar

The status bar of the TeleService dialog box displays whether a remote connection is active (ONLINE) or not (OFFLINE).

If ONLINE is displayed, the period which has passed since the connection was established is indicated in the adjacent field.

Task Bar

The task bar of Windows displays an icon with which the current connection data can be called up.

Display of the Modem Status

Carry out the following preparatory measures:

1. Select the **Options > Settings** menu command.
2. Select the modem and click on the "Properties" command button.
3. Select the "Options" tab card.
4. Activate the "Display Modem Status" option.

After the connection has been established, the modem icon is displayed with two LED's in the Windows task bar.

Evaluating the Modem Status

The two LED's in the icon for the modem status represent the send and receive LED's.

- Both LED's red: No data transfer is taking place at present.
- LED green: Data are being sent or received at present.

The following information is displayed when you click on the modem icon.

- Number of sent bytes
- Number of received bytes
- Transfer rate: As a rule the speed with which the data are transferred between the modems
- Time which has passed since the last connection was established

Displaying the Data on the Current Connection

In TeleService you can have information on the current connection displayed by using the **Connection > Current Connection** menu command or by clicking on the corresponding command button.

Displaying the Version of the TS Adapters

After you have established a connection select the **Connection > Current Connection** menu command or click on the corresponding command button. In addition to the other data the version of the TS Adapter is also displayed.

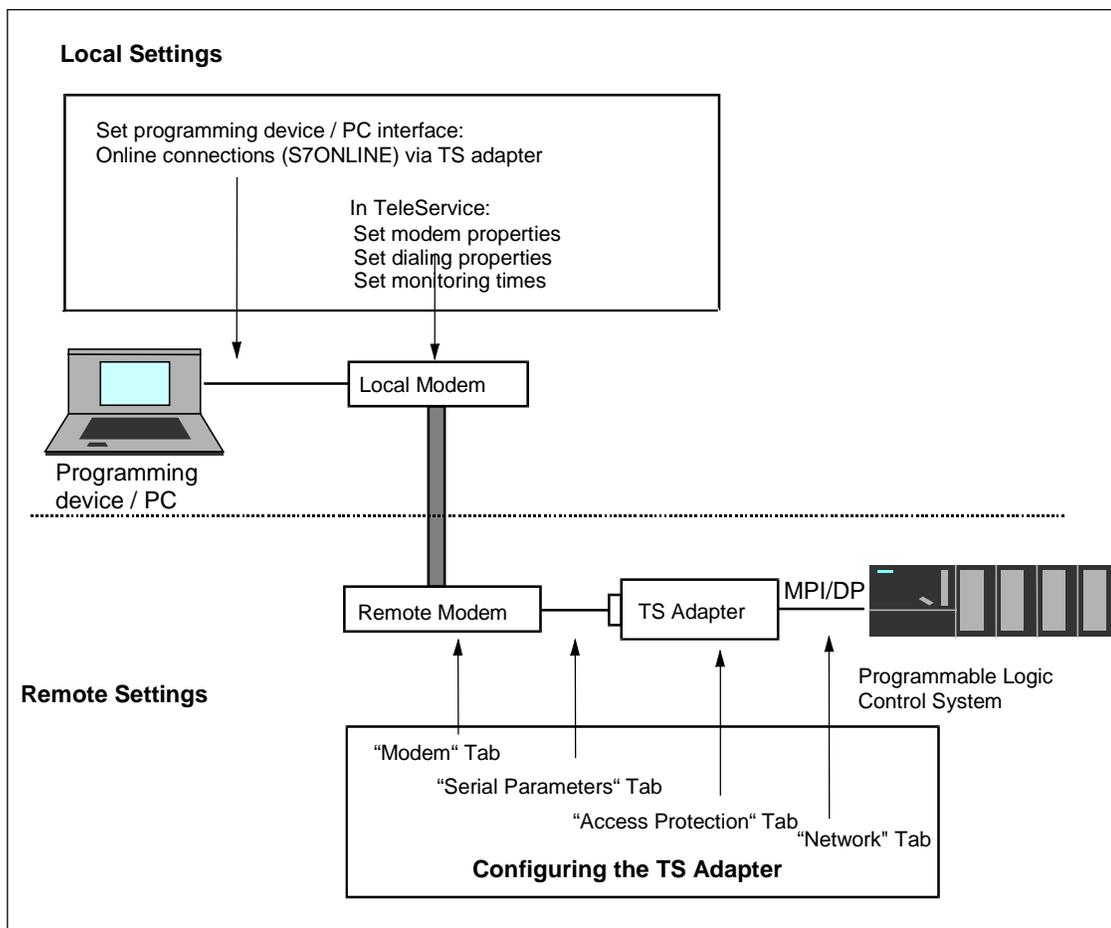
4 Setting the Parameters for TeleService

4.1 Overview of Local and Remote Settings

If you want to carry out teleservicing, you have to operate the TS Adapter as a modem connection. To this purpose you have to carry out local settings in TeleService and to configure the TS Adapter.

The following figure provides an overview of the required settings.

The arrows identify the components of the transfer path to which the respective settings refer.



4.2 Local Settings on the Programming Device/PC

4.2.1 Local Parameters in TeleService

The following local parameters can be set in TeleService:

- The TeleService-specific modem properties,
- The locations and corresponding dial parameters and
- The monitoring times for the transfer protocol.

4.2.2 Further Information on Setting Modem Properties

Saving the Modem Properties in TeleService

When you define the settings of the modem connected locally under TeleService, the defined settings are saved by TeleService and are used when the next remote connection is established via TeleService.

TeleService-internal saving of the modem properties offers the advantage that TeleService always uses the same saved settings when establishing a remote connection. TeleService is thus not influenced by the question which application the modem last used, or whether the modem settings have been changed via the Control Panel in the meantime.

Note

The following particular points have to be observed for the respective version of Windows you use!

Particular Points for Windows 95/98/Me/NT

If you enter additional AT commands for the modem initialization in the properties dialog box of the modem, these are valid for the whole system. This means that these settings are used when the modem is used, irrespective of whether these settings were specified via TeleService or via the Control Panel.

Particular Points for Windows 2000/XP

You can use the **Control Panel in Windows 2000/XP** to set the modem properties specified below, whereby these have different effects on the system and on TeleService:

- **General modem properties:**
Changes which you carry out on the general modem properties (volume of the modem loudspeaker, maximum transfer rate and dial option "Wait for dial tone before dialing") act directly on TeleService.
- **Settings for the log file and further initialization commands at the modem:**
These settings which are carried out in the Control Panel act directly on TeleService.
- **Standard settings:**
Standard settings which are carried out in the Control Panel do **not** act on TeleService. You should therefore always set the standard settings by means of TeleService. You can only carry out these standard settings in TeleService.

Note

The general modem properties, the settings for the log file as well as further initialization commands to the modem should only be changed via the Control Panel, "Phone and Modem Options" option in Windows 2000/XP.

You can only change the standard settings of the modem by means of **TeleService > Options > Settings**.

4.2.3 Setting the General Modem Properties under Windows 2000/XP

Proceed as follows in order to change the settings:

1. Call up the "Phone and Modem Options" option in the Control Panel.
2. Select the "Modems" tab card.
3. Select the modem whose general properties you want to change.
4. Click on the "Properties" command button. The "Properties ..." dialog box then opens.
5. Select the "General" tab card.
6. Carry out the desired changes to the general modem properties.
7. Then close the dialog box by clicking on the "OK" command button.
8. Terminate the "Phone and Modem Options" options by clicking on the "OK" command button.

4.2.4 Setting the TeleService-Specific Modem Properties (Windows 95/98/Me/NT)

Proceed as follows:

1. Select the **Options > Settings** menu command in TeleService. The "Settings" dialog box in which the local parameters for TeleService can be defined are then opened.
2. Select the modem to be used for the remote connection from a pull-down list box. Only the modems installed in Windows are listed.
3. Click on the "Properties" command button in order to define the TeleService-specific properties of the modem. A dialog box with the properties of the selected modem opens. Fill out the General, Settings and Options tab cards. For help on filling out these Windows-specific tab card press F1 or click on one of the following:
 - "General" Tab Card of the "Settings of ..." Dialog Box
 - "Settings" Tab Card of the "Settings of ..." Dialog Box
 - "Options" Tab Card of the "Settings of ..." Dialog Box

Note

The "**Properties of ...**" dialog box can also be called up via the Control Panel of Windows. However, the changes entered there do not have any effect on the database in TeleService and have to be entered once again here.

Always define the properties of the TeleService modem as described here directly in TeleService. This has the advantage that any changes carried out in the Control Panel for other programs do not have any effect on the settings selected in TeleService. As a rule the required parameters are already set so that the entries only have to be checked.

4. Click on "OK" for TeleService to save the settings carried out by you when exiting the "**Properties of ...**" dialog box.
5. Leave the dialog box by clicking on "**OK**".

4.2.5 Setting the TeleService-Specific Modem Properties (Windows 2000/XP)

Proceed as follows:

1. Select the **Options > Settings** menu command in TeleService. The "Settings" dialog box in which the local parameters for TeleService can be defined are then opened.
2. Select the modem to be used for the remote connection from the list box. Only the modems installed in Windows are listed.
3. Click on the "Properties" command button in order to define the TeleService-specific properties of the modem. A dialog box with the connection settings of the selected modem opens. Fill out the General and Extended Options tab cards.
For help on filling out these Windows-specific tab card press F1:

Note

The "**Connection Settings**" dialog box can also be called up via the Control Panel of Windows. However, the changes entered there do not have any effect on the database in TeleService and have to be entered once again here.

Always define the properties of the TeleService modem as described here directly in TeleService. This has the advantage that any changes carried out in the Control Panel for other programs do not have any effect on the settings selected in TeleService. As a rule the required parameters are already set so that the entries only have to be checked.

4. Click on "OK" for TeleService to save the settings carried out by you when exiting the "**Connection Settings**" dialog box.
5. Leave the dialog box by clicking on "**OK**".

4.2.6 Defining the Location and the Corresponding Dial Parameters (Windows 95/98/Me/NT)

Proceed as follows:

1. Call up the "Dial Parameters" dialog box by:
 - Selecting the **Options > Settings** menu command in TeleService. The "Settings" dialog box is then opened.
 - or**
 - Calling up the Control Panel in Windows 95/98/Me/NT and selecting the "Modems" option. The "Properties for Modems" dialog box is then opened.
2. Click on the "Dial Parameters" command button.
Result: The "Dial Parameters" dialog box of Windows 95/98/Me/NT is displayed.

Note

It is irrelevant by which method you specify the settings in this dialog box. Your settings are always saved in the current system data and displayed as the default setting when the dialog box is called up again.

3. Select a location from the list box or define a new location by using the **"New"** command button. Enter the corresponding area code and the country in the case of a new location.
4. Set the correct access code:
If your modem is operated from a **main connection**, you may not specify an access code in the "Dial parameters" dialog box. The fields for the access code for local calls and remote calls have to be empty then.
If you are operating your modem at an extension, specify the number that must be dialed to obtain a direct exchange line.
For example, you can specify:
 - "0W": During dialing there is a pause for the dial tone after the "0"
 - "0," or "9,,": for private branch exchange systems that do not produce any original dial tone, there is a dialing pause of 1 s (" ,") or 2 s (" ,,") after the "0" or "9" during dialing, with no waiting for a dial tone.You may then **under no circumstances** activate the "Wait for dial tone before dialing" check box on the "Settings" tab card in the "Properties" Windows dialog box.
 - If you use the modem at a main connection, you may not enter an access code.
5. Set the dialing method (tone or pulse dialing) common for your phone connection. During pulse dialing you hear crackling noises. During tone dialing you hear noises with varying tone heights.

4.2.7 Defining the Location and the Corresponding Dial Parameters (Windows 2000/XP)

Proceed as follows:

1. Select the **Options > Settings menu** command in TeleService and click on the "Dial Parameters" command button.

or

Start the "Phone and Modem Options" option in the Control Panel.

Result: The "Phone and Modem Options" dialog box of Windows 2000 is displayed.

Note

It is irrelevant by which method you specify the settings in this dialog box. Your settings are always saved in the current system data and displayed as the default setting when the dialog box is called up again.

2. In the "Dial Rules" tab card select the desired location and click on the "Edit" command button or create a new location by using the "New" command button.
Result: The "Edit Location" dialog box is opened.

3. Enter the corresponding area code and the country or region in the case of a new location.

4. Set the correct access code for local/remote calls:
If your modem is operated from a **main connection**, you may not specify an access code in the "Dial parameters" dialog box. The fields for the access code for local calls and remote calls have to be empty.
If you are operating your modem at an **extension**, specify the number that must be dialed to obtain a direct exchange line.

For example, you can specify:

- "0," or "9,,": for private branch exchange systems that do not produce any original dial tone, there is a dialing pause of 1 s (" ,") or 2 s (" ,,") after the "0" or "9" during dialing, with no waiting for a dial tone.
 - You may then **under no circumstances** activate the "Wait for dial tone before dialing" check box on the "General" tab card in the "Properties" Windows dialog box.
 - If you use the modem at a main connection, you may not enter an access code.
5. Set the dialing method (tone or pulse dialing) common for your phone connection. During pulse dialing you hear crackling noises. During tone dialing you hear noises with varying tone heights.

4.3 Configuring the TS Adapter

4.3.1 Overview of the Configuration Possibilities of the TS Adapter

You have the following configuration possibilities for the TS Adapter:

- Procedure for Configuring the TS Adapter
- Restoring the Default Configuration of a TS Adapter
- Exporting Adapter Parameters
- Importing Adapter Parameters

4.3.2 Further Information on Configuring the TS Adapter

The TS Adapter can be configured both in direct connection mode as well as via an existing remote connection.

Note

If you change the current parameters in the modem connection mode, there is the risk that it will no longer be possible to establish a modem connection with the modified parameters. In this case the TS Adapter can only still be configured in direct connection mode.

This means that the configuration has to be carried out with a programming device/personal computer at the site of the plant or that the TS Adapter has to be brought to the location of the local programming device/personal computer in order to be configured.

Positive Acknowledgement

During configuration the data are written into the non-volatile memory of the TS Adapter. The configuration process is not acknowledged positively until all precautions have been taken to ensure that parameter changes have been carried out correctly and thus survive a power failure.

Changes become effective ...

The serial parameters, the modem parameters and the parameters for the access protection are activated after the remote connection has been disconnected.

The modified network parameters are activated immediately.

4.3.3 Procedure for Configuring the TS Adapter

You can configure the TS Adapter both in direction mode connection and via an established remote connection in modem connection mode.

1. Select the **Options > Assign Adapter Parameters** menu command. The "Assign Adapter Parameters" dialog box is opened.
2. Set the required parameters in the tab cards of the dialog box.
3. Confirm your entries with **"OK"**. The parameters are then saved in the non-volatile memory of the TS Adapter.

Press F1 while you are in the dialog box in order to obtain detailed help on the individual options in the tab cards.

4.3.4 Changing Over between Direct and Modem Connections

Proceed as follows:

1. Call up "Set programming device/personal computer interface" in the SIMATIC Manager (Options > Set programming device/personal computer interface) by means of the Start bar (Start/Simatic/STEP 7/Set programming device/personal computer interface) or by means of the Control Panel.
2. Set the "Application access point" to S7ONLINE.
3. Select the TS Adapter in the "Used interface configuration" field. Note that this changes the assignment in STEP 7 of the module with which STEP 7 goes online.
4. Use the "Properties" command button to define the further parameters for the TS Adapter. Specify whether the TS Adapter is to be operated with a modem or direct connection.
5. In the case of a direct connection also specify the local COM connection of your programming device/personal computer to which the TS Adapter is connected as well as the transfer speed between the programming device/personal computer and the TS Adapter (19,200 bits/s or 38,400 bits/s).
6. Then confirm both dialog boxes by clicking on "OK".

Detailed help on "Set programming device/personal computer interface" can be accessed by pressing F1 while you are positioned in the corresponding dialog box.

Note

TeleService functions are not supported by the PC/MPI cable and by the PC Adapter.

4.3.5 Setting Up the Access Protection

In TeleService you can set up an access protection for configuring the TS Adapter and for the connection to a remote plant when you configure the adapter.

Proceed as follows:

1. Select the **Options > Assign Adapter Parameters** menu command. The "Assign Adapter Parameters" dialog box is opened.
2. Open the "Options "Protection" tab card.
3. Enter a password and/or a number for your user name. This number is to be called back by the modem after logging in.

Note

If you are logged in as an administrator, you can change all the settings for administrators and users as well as set up or delete users.

If you are logged in as a user, you can only change your own settings (password and callback number).

4. Confirm by clicking on "OK". The parameters are then saved in the non-volatile memory of the TS Adapter.

4.3.6 Parameter Dialog Boxes of the TS Adapter

The parameter data of the TS Adapter can be displayed and changed by using the **Options > Assign Adapter Parameters** menu command. The "Assign Adapter Parameters" dialog box with four tab cards is opened, in which the parameter configuration data shown below have a default setting.

- "Modem" Tab Card (**Options > Assign Adapter Parameters**)
- "Network" Tab Card (**Options > Assign Adapter Parameters**)
- "Serial Parameters" Tab Card (**Options > Assign Adapter Parameters**)
- "Access Protection" Tab Card (**Options > Assign Adapter Parameters**)

4.3.7 Exporting Adapter Parameters

You can export the configuration of a TS Adapter to a file (*.tap). The configuration saved in this file can be imported into any number of TS Adapters. This is advisable, for example, if you want to configure several TS Adapters identically or if you want save, document or distribute the parameter record. In order to export you can either work in direct mode or log on as an administrator.

Proceed as follows:

1. Select the **Options > Export Adapter Parameters** menu command.
2. A dialog box is then opened in which you can select the file into which you wish to export the configuration of the TS Adapter.
3. Confirm with "Save". The parameters of the TS Adapter are saved in the specified file (*.tap).

4.3.8 Importing Adapter Parameters

You can import the configuration of a TS Adapter from an existing export file (*.tap). The configuration saved in this file can be imported into any number of TS Adapters. This is advisable, for example, if you want to configure several TS Adapters identically. In order to import you can work in direct mode or log on as an administrator.

Proceed as follows:

1. Select the **Options > Import Adapter Parameters** menu command.
2. A dialog box is then opened in which you can select the file whose configuration you wish to import into the TS Adapter.
3. Confirm by clicking on "Open". The parameters are then saved in the non-volatile memory of the TS Adapter.

4.3.9 Restoring the Default Configuration of a TS Adapter

You can restore the default configuration with which the TS Adapter is supplied at any time.

Proceed as follows:

1. Select the **Options > Import Adapter Parameters** menu command.
2. A dialog box is then opened in which you can select the file whose configuration you wish to import into the TS Adapter.
3. Select the file which corresponds to the version of your TS Adapter (for example, V51_std.tap for the TS Adapter V5.1).
4. Confirm by clicking on "Open". The default parameters are then saved in the non-volatile memory of the TS Adapter.

4.4 Modem Initialization String

4.4.1 Properties of the Modem Initialization String

The initialization string is a string consisting of AT commands (quasi-standard commands for modems) with which the modem connected to the TS Adapter is initialized. The initialization string is displayed and set in the "Modem" tab card of the "Assign Adapter Parameters" dialog box.

The "Initialization" field contains a default value that is read from the non-volatile memory of the TS Adapter. Although you can change the character string, it must satisfy certain requirements for initialization.

Requirements

The following modem properties have to be set with the initialization string:

- The modem provides feedback messages.
- The feedback is output in clear text.
- The DCD signal is only activated when a connection exists.
- The interface speed between the TS Adapter and the Modem is not changed after the connection has been established.
- The RTS/CTS protocol is active as a flow control between the TS Adapter and the programming device or PC respectively.
- The automatic call acceptance by the modem is activated.

4.4.2 Preset Modem Initialization String

The TS Adapter is supplied with a standard value for the initialization.

Note

The initialization string is selected so that most of the modems are configured and initialized correctly. It is not optimized for a specific modem.

The exceptions are listed in the table below.

Modem:	Replace ...	By ...
US Robotics Sportster 28.8 Vi	&F	&F1
US Robotics Sportster 33.6	&F	&F1
US Robotics 56K Message	&F	&F1

For further special settings please refer to the SIMATIC hotline, if necessary.

4.4.3 Initialization after Return of Power

As from TeleService V5.0 the configurable initialization string is subdivided into two logical partial strings:

- <Initstring1>;<Initstring2>

Initstring1 is transferred once from the TS Adapter to the connected modem after the restart/return of power. Irrespective of whether the modem acknowledges Initstring1 with "OK" or with "ERROR", Initstring2 is then transferred for the actual initialization of the modem.

This configuration possibility enables initializations which may/must only be carried out once.

An example is the PIN transfer to a radio component, such as the Siemens M1 module. The initstring can be configured as follows to this purpose:

- AT+CPIN="4711";AT&F.....

After the power has returned the TS Adapter sends the string "AT+CPIN="4711" once with the PIN for the SIM card used in the M1 module to the connected component. The component is then initialized with "AT&F...".

Note

The character ";" is used to separate Initstring1 and Initstring2 and may therefore only be inserted to this purpose in the initialization string.

5 Access to Remote Plants (Remote Maintenance)

5.1 Establishing a Remote Link

Prerequisites

You can establish a remote link to a plant after you have installed a modem, made all necessary settings and saved the plant data. These plants can then be edited as usual with STEP 7.

Proceed as follows:

1. Start TeleService.
2. Open a phone book.
3. Select in a folder the plant to which you want to establish a remote link.
4. Call up the "Establish Connection" dialog box by:
 - Selecting the **Connection > Establish** menu command or
 - Clicking on the corresponding command button in the toolbar or
 - Double-clicking on the plant to which you wish to establish a remote link.
5. In the dialog box enter the modem that is to be used for the remote link and the location.
6. Click on the "Dial" command button.
7. If you have set up access protection for the TS Adapter, the "Log Onto TS Adapter" dialog box is displayed. The user name and password have to be entered in this dialog box. The remote link is then established.
Result: The dialog box disappears when the remote link has been established. The "ONLINE" status and the connection time are displayed in the status bar. An icon is furthermore displayed in which you can call up the connection properties.
8. You can now use the remote connection with STEP 7 and so communicate with the programmable logic controller.

If the connection cannot be established ...

If the connection cannot be established, try to find the cause by using the Troubleshooting checklists".

Editing the remote plant

Once the remote link has been established, you can change to the SIMATIC Manager, create an on-line connection (Window with "On-line View" of the project or "Available Users" window) and edit the remote plant.

Disconnecting the connection

Once you have completed editing the remote plant with STEP 7, close the windows in which the on-line views were displayed in STEP 7.

Then change back to TeleService and disconnect the remote link by using the **Connection > Disconnect** menu command.

5.2 Setting the Programming Device/Personal Computer Interface

Prerequisites

Certain parameters have to be set up in "Set programming device/personal computer interface" if you want to use a remote connection with STEP 7. These settings configure the local interface.

Proceed as follows:

1. Call up the "Set programming device/personal computer interface" in the SIMATIC Manager by using the **Options > Set programming device/personal computer interface** menu command or by means of the Control Panel.
If you use the Control Panel, select "S7ONLINE (STEP 7)" additionally in the "Application access point" list field.
2. Select the TS Adapter in the "Used interface configuration" field.
3. Use the "Properties" command button to define the further parameters for the TS Adapter. You can, for example, set modem or direct connection.
4. In the case of a direct connection specify the local interface to which your TS Adapter is connected (for example, COM1).
5. Leave the "Properties" dialog box by clicking on "OK".
6. Then confirm by clicking on "OK".
7. Detailed help on "Set programming device/personal computer interface" can be accessed by pressing F1 while you are positioned in the corresponding dialog box.

5.3 Using the Remote Connection with STEP 7

Requirements

After you have used TeleService to establish a remote connection to a remote plant you can edit this plant as usual with STEP 7.

Prerequisite is that you have configured the application access point correctly.

Proceed as follows:

1. In STEP 7 you have to use "Set programming device/personal computer interface" to set the application access point "S7ONLINE (STEP 7)" to "TS Adapter".
2. Call up the "Set programming device/personal computer interface" in the SIMATIC Manager by using the **Options > Set programming device/personal computer interface** menu command or by means of the Control Panel.

5.4 Displaying the Properties of a Remote Link

Requirements

Once you have established a remote link to a plant, you can then display the properties of this active connection.

Proceed as follows:

1. Select the **Connection > Current Connection** menu command or click on the appropriate command button in the toolbar.
2. The "Current Connection" dialog box with the data for the active connection then opens. You cannot edit the properties.
3. Click on the "Close" command button if you want to close this dialog box.

5.5 Disconnecting a Remote Link

You have several means of disconnecting an active remote link.

Proceed as follows:

Disconnect the active remote link by:

1. Selecting the **Connection > Disconnect** menu command or by clicking on the appropriate command button in the toolbar. The link is disconnected immediately.
2. Closing the window that contains the plant to which the remote link exists. A prompt message asks you whether you really want to disconnect the link. Confirm by clicking on "OK".

The "OFFLINE" status is redisplayed in the status bar once the remote link has been disconnected.

Note

You should switch to offline in STEP 7 before you disconnect the remote link.

5.6 Troubleshooting Modem Problems

The following list is intended to help you find the possible cause when problems arise with the modem. For information on how and in which dialog boxes the settings are defined please refer to the help topics below.

The modem connection was not established:

- Check the cabling and the connections.
- Have you set the correct dialing method (tone/pulse)?
- If your modem does not react after several attempts to dial, the dial disable function may be active. Find out how the dial disable is implemented on your modem.
- Are you operating your modem at a main connection or at an extension? Set up the properties and dial parameters of the modem correspondingly.
- Activate the option which records a log file in the extended properties. The next establishing of a connection is then logged in a file in the Windows directory, for example in the file "ModemLog.txt" in the case of Windows 95.

The modem connection is disconnected:

- Metering pulses can act negatively on a connection. Have the pulse de-activated by your phone company.
- Set fixed monitoring times.
- De-activate the option which disconnects an existing connection automatically after a specified without data transfer.
- Ensure that you have activated the RTS/CTS protocol for data flow control.

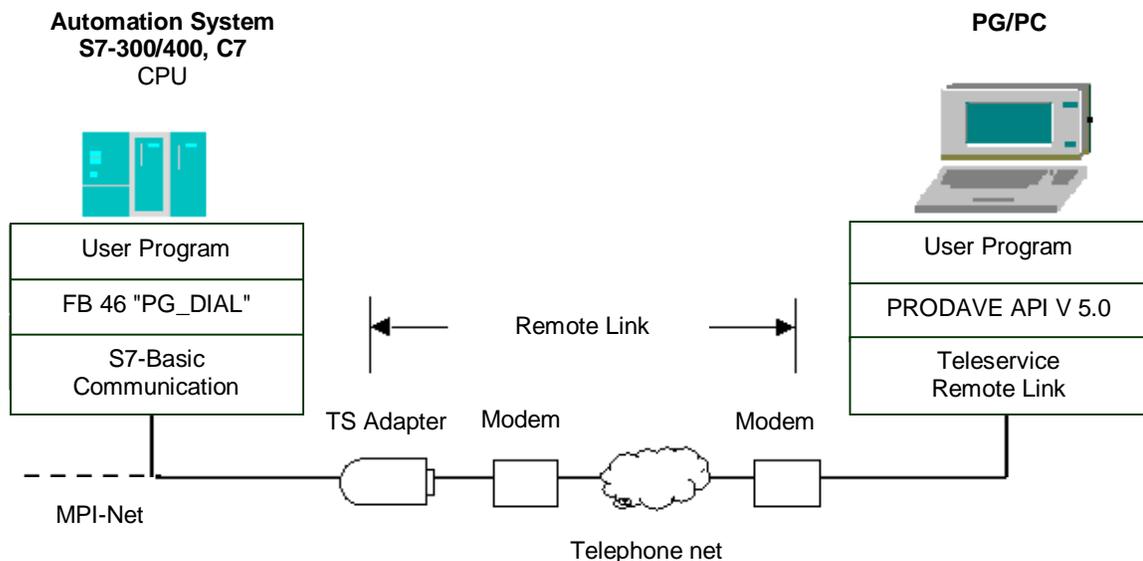
6 Establishing a Connection to Remote Plants (Programming Device to PLC Remote Link)

6.1 Accessing Programming Devices/Personal Computers from Remote Plants

You can use the TeleService application and a TS Adapter to establish a remote connection to a remote plant and thus to communicate with this plant. The initiative for establishing the remote connection comes from the programming device/personal computer.

However, events which require rapid intervention often occur at a remote plant. In such cases, when an asynchronous event occurs, the automation system can initiate a remote connection to a programming device / personal computer.

The following figure shows a graphical representation of the components which are required to establish a connection from a plant to a programming device / personal computer.



6.2 Requirements for Establishing a Connection

Certain hardware and software requirements have to be fulfilled if it has to be possible for a remote plant to establish a remote connection to a programming device / personal computer. These requirements are described below.

Hardware Requirements:

In order to establish a remote connection you do not require any additional hardware to that also needed to access the remote plant from the programming device / personal computer.

In order to establish a connection your application program calls up a function block. This FB can only be executed on an S7-300 or S7-400 CPU on which the S7 basic communication is implemented.

The TS Adapter used must be version 5.0 or a later version

Software Requirements on the Plant Side:

The scope of delivery of TeleService includes the "PG_DIAL" function block which is included in the library of STEP 7 when the software package is installed. If a remote plant is to establish a remote connection to a programming device / personal computer, the application program of the plant has to call up the "PG_DIAL" function block.

Software Requirements on the Programming Device / Personal Computer Side

You require a software component of the programming device / personal computer which together with TeleService waits for the call of a remote plant, recognizes it and informs your application program. In the first stage this functionality is implemented by the product PRODAVE MPI.

Your application program interfaces with the interface provided by PRODAVE MPI. PRODAVE MPI allows you not only to accept calls, but also to establish remote connections. For detailed information on its functionality as well as on the interface description please refer to the product description of PRODAVE MPI V5.0 (or later).

Note

Prerequisite for working with PRODAVE MPI V5.0 is the component "SIMATIC TeleService Remote Link".

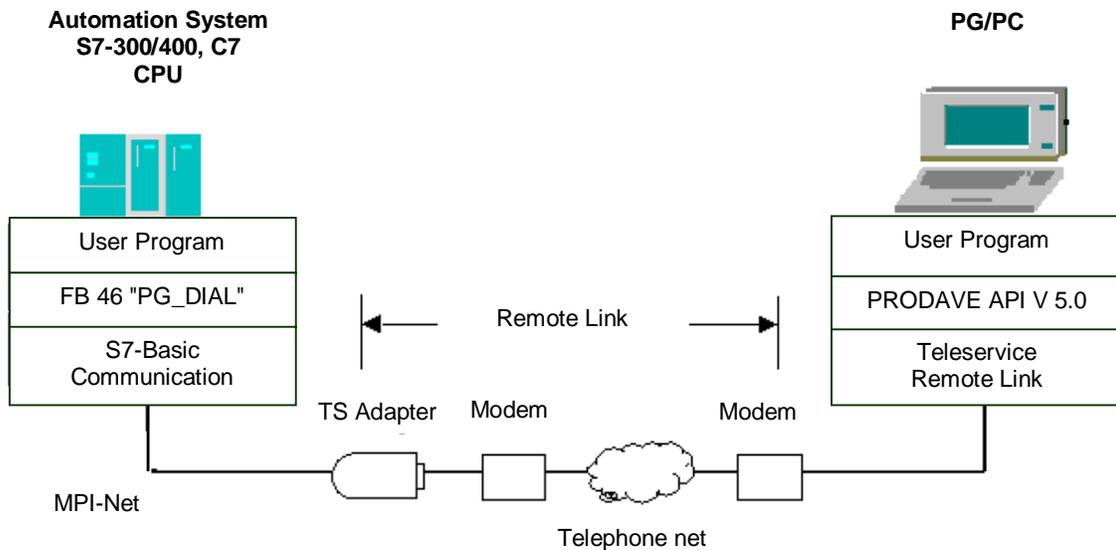
6.3 Functionality of the FB 46 "PG_DIAL"

Description

The "PG_DIAL" function block transmits a telephone number and an event ID to a TS Adapter. The TS adapter uses the specified telephone number to establish a remote connection to a programming device/PC. The event ID is transmitted to the programming device/PC and passed on to a waiting application.

If the event ID has been successfully passed on to the application, the TS Adapter receives an acknowledgement message which is passed on to the "PG_DIAL" function block. Processing of "PG_DIAL" is then completed and the status is reported to the caller of "PG_DIAL". The application on the programming device/PC is responsible for cutting the remote connection.

If an error occurs during processing which causes processing to be stopped, "PG_DIAL" communicates the error code to the caller. The TS Adapter shuts down any remote connection that has been established.



Calling "PG_DIAL"

The PG_DIAL function block is called statically (conditionally) for data transfer in a cycle or in a time-monitored program. A number of calls are necessary in order to process "PG_DIAL". "PG_DIAL" needs an instance data block for actual parameters and static data.

For detailed information on the parameters and return values of the "PG_DIAL" FB please refer to the FB 46 on-line help.

Breaking Off Communications

If the CPU switches to STOP operating state while PG_DIAL is active, this will break off communications with the TS Adapter. The communication link with the TS Adapter is also lost if there are serious communication problems with the MPI bus, or, for example, if the power supply to the CPU is switched off.

In such cases, the TS Adapter does not discard the telephone number and event ID it has already received. The TS Adapter creates the remote connection with the programming device/PC and passes on the event ID. However, the TS Adapter discards the acknowledgement message that it receives from the programming device/PC.

If a user program on the CPU tries to create a remote connection while the TS adapter is in the state described above, "PG_DIAL" closes with the return value W#16#B10A. The user program can then recreate the remote connection later on. You also receive the return value W#16#B10A if a number of CPUs are trying at the same time to create a remote connection via the same TS Adapter.

6.4 Changing the STEP 7 User Program



Caution

You may only change those parts of your STEP 7 user program that directly affect "PG_DIAL" or "AS_DIAL" calls in STOP operating mode of the CPU. This refers in particular to deleting and replacing program blocks that contain calls for "PG_DIAL" or "AS_DIAL". If you do not do so, connection resources may remain assigned. The automation system can go into an undefined state at the communication SFCs for non-configured S7 connections.

After the changes have been transferred, you have to carry out a warm or cold restart at the CPU.

Data Consistency

The input parameters of the function block are copied to an internal buffer when you first call "PG_DIAL" or "AS_DIAL". Do not change these data before the first call has been completed (return value W#16#7001), as otherwise inconsistent data may be transferred.

6.5 FB 46 "PG_DIAL" Parameters

Description

FB 46 "PG_DIAL" allows you to create a remote connection with a programming device/PC and to communicate an event ID to an application running on the programming device/PC. The event ID is passed on unchanged by the communications components involved. It can be given any kind of structure by the application and can contain any kind of data, including binary.

Parameters:	Declaration:	Data type:	Memory area:	Description of error:
MPI_TS_ADAPTER	INPUT	INT	I, Q, M, D, L, Const.	Input parameter: MPI address of the TS Adapter
PHONE_NO	INPUT	ANY	D	Input parameter: Reference to a data string with a maximum length of 31 characters
EVENT_ID	INPUT	ANY	I, Q, M, D	Input parameter: Reference to a byte array with a maximum length of 16 characters
BUSY	OUTPUT	BOOL	I, Q, M, D, L	Output parameter: BUSY=1: Establishing of the remote connection is not yet complete. BUSY=0: "PG_DIAL" processing completed.
STATUS	OUTPUT	INT	I, Q, M, D, L	Output parameter: Return value from "PG_DIAL"

Virtual Block Parameters EN and ENO and the BIE Bit

The virtual block parameters EN and ENO only occur when "PG_DIAL" is included in the LAD or SFC display of the STEP 7 Editor. They are closely linked to the BIE bit (binary result) of the status word.

- Input parameter EN: The state of the result of logic operation RLO is saved in the BIE bit during the block call.
- Output parameter ENO:

If "PG_DIAL" has been executed free of errors, the state of the BIE bit which existed when the block was called is restored at the end of the block call.

If an error message is output via the STATUS output parameter, the BIE bit is set to 0 immediately after "PG_DIAL" has been left.

6.6 PHONE_NO Input Parameter

The PHONE_NO input parameter specifies the telephone number you want to establish the remote connection with. Enter the entire telephone number, including the country code, area code and actual number. The string is passed unchanged to the modem. If you use non-numerical characters, make sure that your modem supports these characters.

The TS Adapter uses the following configured values to establish a remote connection:

- Location: Dialing procedure, access code
- Call preferences: "Wait for dial tone before dialing", "Number of redial attempts" and "Redial after"

6.7 EVENT_ID Input Parameter

The EVENT_ID input parameter specifies the event ID. The event ID is transferred transparently from the user program of the programmable logic controller to the user program on the programming device/PC via "PG_DIAL", the TS Adapter and the TeleService application on the programming device/PC. You can structure the event ID as you like and transfer any kind of information from the programmable logic controller to the programming device/PC.

If less than 16 characters are conveyed with a "PG_DIAL" call, the remaining bytes in the array are filled up with B#16#00.

6.8 STATUS and BUSY Output Parameters

"PG_DIAL" is an asynchronously operating function block, meaning that processing extends across a number of function block calls. If output parameter BUSY = 1, output parameter STATUS indicates the internal "PG_DIAL" status. If processing is complete, this is indicated by the output parameter BUSY = 0. The output parameter STATUS then indicates whether completion of the request was error-free (STATUS = W#16#0000) or whether errors occurred.

6.9 Return Values of the FB 46 "PG_DIAL"

"PG_DIAL" return values can be classified as follows:

- W#16#0000: "PG_DIAL" completed successfully
- W#16#7xxx: Status of "PG_DIAL"
- W#16#8xxx: Error reported during internal call of a communication SFC
- W#16#9xxx: Parameter error while calling "PG_DIAL"
- W#16#Bxxx: Error reported by TS Adapter

The following table shows all "PG_DIAL" return values except the error codes for the communication SFCs employed.

Return Value (W#16#...):	Explanation:	Notes:
0000	"PG_DIAL" processing completed without errors.	
7000	"PG_DIAL" has been reset (communication with the TS Adapter has been disconnected).	Call "PG_DIAL" again.
7001	"PG_DIAL" is active (BUSY = 1).	
8xxx	An error code referring to the internally called communication SFCs appeared on completion of "PG_DIAL" processing.	Consult the System and Standard Functions Reference Manual for further details.
9001	The PHONE_NO length is = 0 or > 31	The phone number must have a min. of 1 and a max. of 31 characters.
9002	The event ID length is = 0 or > 16	The event ID must have a min. of 1 and a max. of 16 characters.
B000	The remote connection with the programming device/PC could be established. However, no program for the transferred event ID responded on the TeleService side.	
B10A	The TS Adapter already has an event on board that still has to be transferred to a programming device/PC.	Call "PG_DIAL" again.
B10B	After the remote connection was created, the communications partner broke the connection before the event ID could be transferred.	Call "PG_DIAL" again.
B206	The remote connection with the programming device/PC could not be created.	Check the configuration of the modem in the TS Adapter (local and remote).
B305	There is an existing remote connection with a programming device/PC.	Call the "PG_DIAL" again later.

6.10 Call Example for the FB 46 "PG_DIAL"

```
FUNCTION_BLOCK FB 1

TITLE =Sample call for PG_DIAL

// This sample call for "PG_DIAL" must be called up
// cyclically (e.g. in OB1).

// The call condition is set during processing of the
// user program.

VERSION : 0.1

VAR

Call condition : BOOL ;

Programming device : STRING [32 ] := '07214711';

//Telephone number to be dialed

Message : ARRAY [1 .. 16 ] OF BYTE := B#16#53, B#16#49,
B#16#45, B#16#4D, B#16#45, B#16#4E, B#16#53; // message for
// transfer

END_VAR

BEGIN

NETWORK

TITLE =

// Call condition check

U #Call condition;

SPBN End;

// Call for PG_DIAL

CALL FB 46, DB 46 (

MPI_TS_ADAPTER := 6,

PHONE_NO := #Programming device,

EVENT_ID := #Message,

BUSY := M 46.0,

STATUS := MW 48 );
```

```
// Checking call results at end of processing
U   M   46.0; // is BUSY == 0 ?

SPB End;      // no, PG_DIAL is still processing the request
L   0;        // yes, processing is complete

L   MW  48;

==I ;         // STATUS == 0 ?

SPB ok;       // yes, no error occurred

L   W#16#7000; // no,

==I ;         // Was PG_DIAL reset?

SPB End;      // yes, call PG_DIAL again
                // (in the next cycle)

NOP 0;        // no, an error occurred.

SPA End;

//FB PG_DIAL processing completed without error
ok: R   #call condition; // deleting call condition

End: BE;

END_FUNCTION_BLOCK
```


7 Data Exchange between Remote Plants (PLC to PLC Remote Link)

7.1 Overview of Automation System to Automation System Remote Link

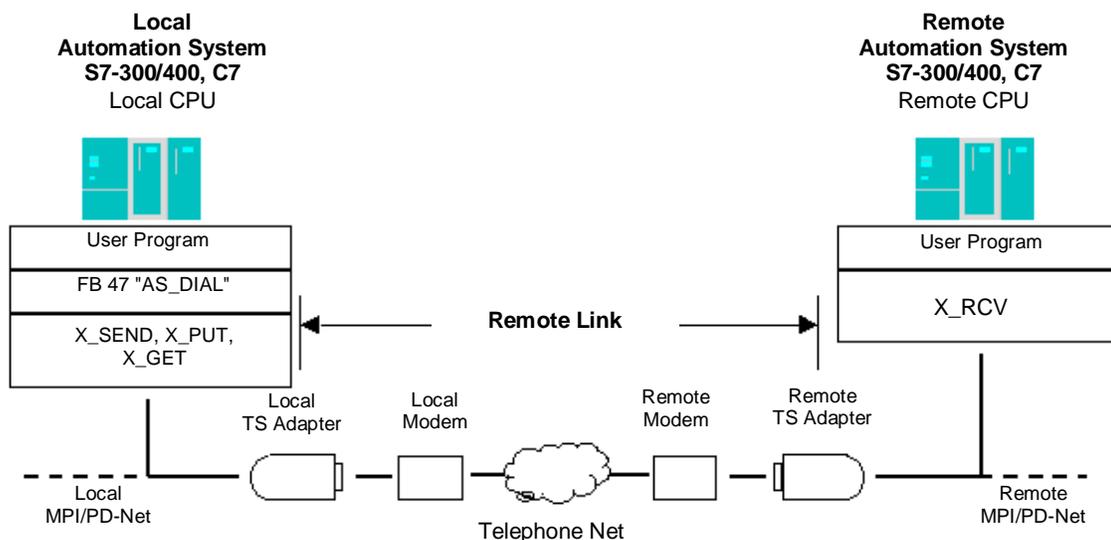
The automation system to automation system (PLC) remote link allows two S7 automation systems to exchange process data via the phone network. The S7 automation system from which the initiative for establishing and disconnecting the remote connection is designated as the **local** one below. The automation system to which the remote connection is to be established is designated as the **remote** one.

The data exchange is carried out with the communication SFCs for non-configured S7 connections.

- SFC 65 "X_SEND",
- SFC 66 "X_RCV",
- SFC 67 "X_GET" and
- SFC 68 "X_PUT".

These SFCs are also called communication SFCs in this document.

The following figure shows a graphics representation of the components which are required to establish the connection from a local to a remote automation system.



7.2 Hardware and Software Requirements

Certain hardware and software requirements have to be fulfilled so that a local automation system can establish a remote connection to a remote automation system. These requirements are described below.

Hardware Requirements

In order to transfer process data from a local to a remote automation system you do not require any additional hardware to that also needed to access the respective automation system from the programming device / personal computer.

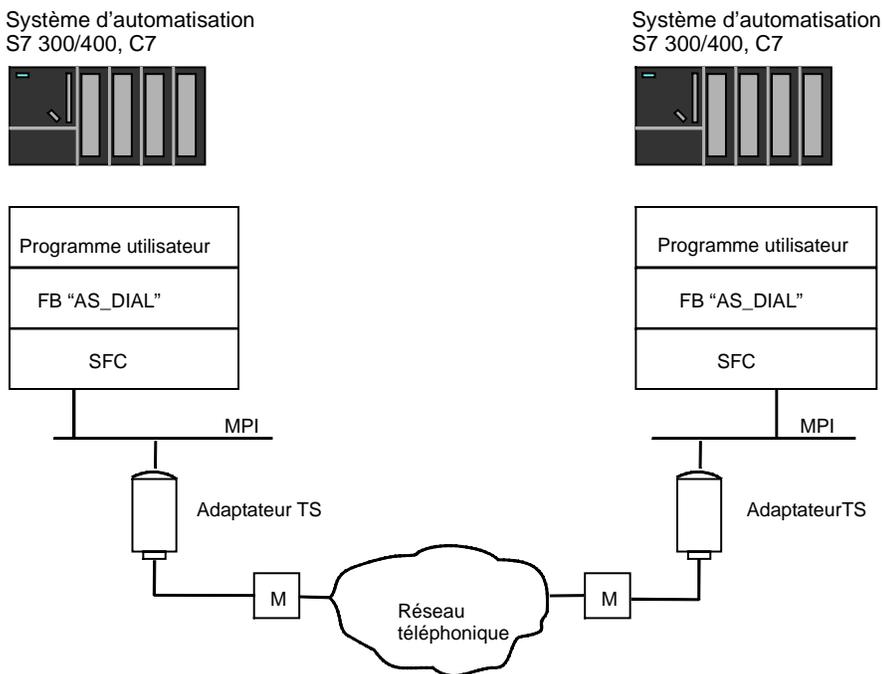
In order to establish and disconnect the remote connection the STEP 7 user program of the local CPU calls a function block. This FB can be executed on an S7-300/400 CPU or also C7 CPU. The function block assumes that the S7 Basic communication is implemented on the CPU. The remote CPU must also support S7 Basic communication.

Both TS Adapters used must be version 5.1 or a later version

Software Requirements

The scope of delivery of TeleService includes the FB 47 "AS_DIAL" function block which is included in the library of STEP 7 when the software package is installed. In order to establish and disconnect a remote connection from a local automation system to a remote automation system the "AS_DIAL" function block must be called up in your STEP 7 user program of the local CPU.

Connexion AS - AS à distance



7.3 Functionality of the FB 47 "AS_DIAL"

Description

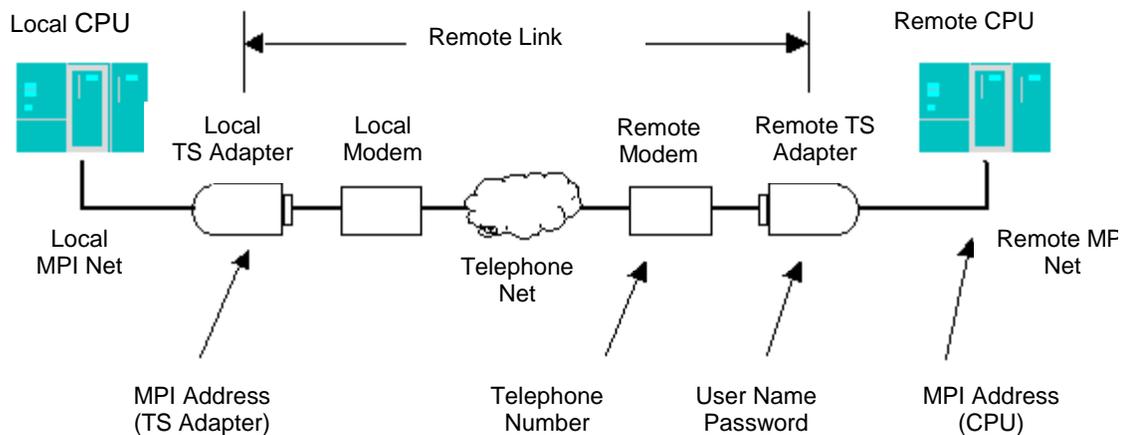
The FB 47 "AS_DIAL" is used to establish a remote connection from a local S7 automation system to a remote S7 automation system and then exchange process data. The process data can be exchanged by means of the SFCs "X_GET", "X_PUT" and "X_SEND".

"AS_DIAL" disposes of two functions:

- DIAL function: Establishing a remote connection to a remote TS adapter. This function is requested by means of the REQ_DIAL input parameter.
- HANGUP function: End an existing remote connection to a remote TS adapter. This function is requested by means of the REQ_HANGUP input parameter.

Only one of the functions can be active at any time. The DIAL function is aborted when the HANGUP function is called.

If an error occurs during processing which causes processing to be stopped, "AS_DIAL" communicates the error code to the caller. The TS Adapter shuts down any remote connection that has been established.



Establishing a Connection

The connection to the remote S7 automation system is established as follows:

1. The local TS Adapter establishes the remote connection to the remote TS Adapter.
2. If necessary, the local TS Adapter carries out the legitimization at the remote TS Adapter.
3. The first communication SFC for non-configured S7 connections which is addressed to the local TS Adapter initiates the establishment of the S7 connection to the remote CPU). If this S7 connection is established successfully, the process data are also exchanged.
4. If this communication SFC is terminated with the error "Temporary lack of resources at communication partner" the communications SFC can be called up again. The local TS Adapter then tries again to establish the S7 connection to the remote CPU. The remote connection is not terminated.
5. The abortion of one of the S7 connections or of the remote connection automatically leads to termination of the remote connection by the two TS Adapters.

Calling "AS_DIAL"

You can call "AS_DIAL" in the cycle or in a time-monitored program. If you call "AS_DIAL" in different priority classes, you must ensure mutual call inhibiting.

An instance DB must be specified when calling "AS_DIAL". You must always use the same instance for a remote connection. **Exception:** If the local CPU communicates via several local TS Adapters, you have to assign a separate instance to each TS Adapter.

Several calls of "AS_DIAL" are required in order to process a block function. It therefore does not make sense to call "AS_DIAL" in a "waiting loop". The end of the block function is indicated by BUSY = 0.

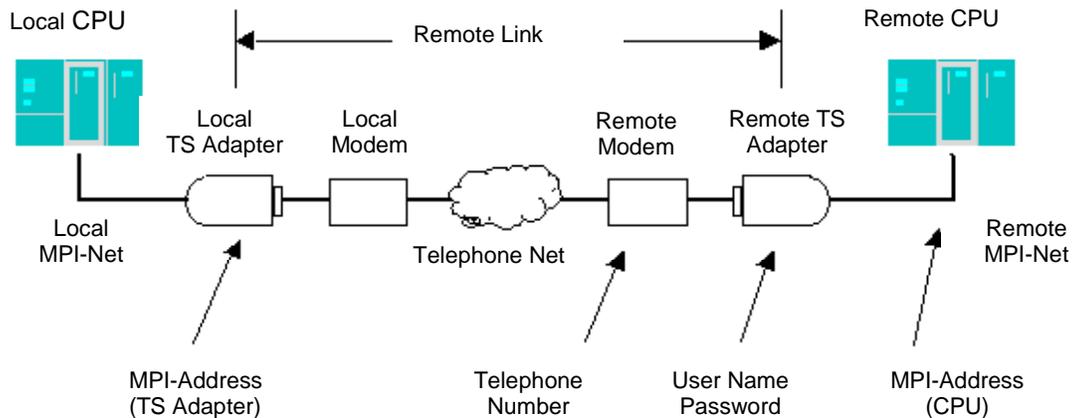
"AS_DIAL" also uses communications SFCs for non-configured S7 connections in order to communicate with the TS Adapter. Therefore ensure in the local STEP 7 user program that no communication SFC for non-configured S7 connections is active which was started with DEST_ID = "MPI address of the local TS Adapter" while a remote connection is being established or disconnected by "AS_DIAL".

7.4 The STEP 7 User Program

Establishing of the remote connection

In order to establish a remote connection your user program calls the DIAL function of the FB 47 "AS_DIAL" with the required parameters. The FB 47 "AS_DIAL" transfers the parameters provided by the user program (phone number, user name and password, as well as the MPI address of the remote CPU) to the local TS Adapter.

With these parameters the local TS Adapter establishes the remote connection to the remote TS Adapter. If necessary, the local TS adapter carries out the legitimization at the remote TS adapter. The FB "AS_DIAL" uses the output parameters to send the results of the connection being established to the user program. In case of errors the HANGUP function of the FB "AS_DIAL" does not have to be called up.



Transferring the Process Data

After the remote connection has been established successfully the STEP 7 user program in the local CPU carries out the transfer of the process data with the remote CPU. The communication SFCs for non-configured S7 connections (SFC 65 "X_SEND", SFC 67 "X_GET" and SFC 68 "X_PUT") are available in the local CPU.

If your user program in the local CPU operates exclusively with SFC 67 "X_GET" and SFC 68 "X_PUT", no special user program for data exchange is required in the remote CPU. These functions are executed by the operating system of the remote CPU.

If you call up the SFC 65 "X_SEND" for data transfer on the local CPU, this requires a user program on the remote CPU. The process data can be received on the remote CPU by means of the SFC 66 "X_RCV".

Disconnection of the Remote Connection

In order to disconnect the remote connection the user program activates the HANGUP function of the FB 47 "AS_DIAL". This cuts the S7 connection to the remote CPU and disconnects the remote connection. The end of the HANGUP function is signaled to the user program by means of the output parameters of the FB "AS_DIAL".

Rules for Calling Communication SFCs in the User Program

When the communication SFCs in your STEP 7 user program are called, the following rules have to be observed in connection with the FB 47 "AS_DIAL":

- When the communication SFCs is called the parameter DEST_ID has to be supplied with the MPI address of the local TS Adapter and not with the MPI address of the remote CPU.
- The parameter CONT of the communication SFCs must always be set to TRUE. If you call the communication SFCs with CONT = FALSE, the remote connection is disconnected by the TS Adapter after the data transfer.
- Ensure in the local STEP 7 user program that no communication SFC for non-configured S7 connections is active which was started with DEST_ID = "MPI address of the local TS Adapter" while a remote connection is being established or disconnected by the FB 47 "AS_DIAL".
- Only one SFC can be processed at a particular time of the communication SFCs (SFC 65 "X_SEND", SFC 67 "X_GET" and SFC 68 "X_PUT").
- The values W#16#FFFFFFF0 to W#16#FFFFFFF7 for the parameters REQ_ID of the SFC 65 "X_SEND" are reserved for the FB 47 "AS_DIAL" and may not be used in the STEP 7 user program.

Calling the First Communication SFCs in the User Program

The first call of a communication SFC after a remote connection has been established successfully has a particular meaning. This SFC call initiates the establishment of an S7 connection between the local TS Adapter and the remote CPU. If the SFC call is terminated with the error code W#16#80C2 "Temporary Lack of Resources at the Communication Partner", you can repeat the SFC call. The local TS adapter then tries again to establish the S7 connection to the remote CPU. The remote connection is not terminated.

7.5 Parameters of the FB 47 "AS_DIAL"

Parameter	Declaration	Data type	Memory Area	Description
ADDR_TS_ADAPTER	INPUT	INT	I, Q, M, D, L, Const.	Input parameter of the DIAL and HANGUP function: MPI address of the TS Adapter at the local MPI network
PHONE_NO	INPUT	ANY	D	Input parameter of the DIAL function: Phone number of the modem from the remote automation system (max. 31 characters)
LOGIN	INPUT	ANY	D	Input parameter of the DIAL function: User name for the legitimization at the remote TS Adapter (max. 8 characters)
PASSWORD	INPUT	ANY	D	Input parameter of the DIAL function: Password for the legitimization at the remote TS Adapter (max. 8 characters)
ADDR_CPU	INPUT	INT	I, Q, M, D, L, Const.	Input parameter of the DIAL function: MPI address of the CPU at the remote MPI network to which the connection is to be established
REQ_DIAL	INPUT	BOOL	I, Q, M, D	Input parameter for requesting the DIAL function: Establishing a remote connection to a remote TS Adapter
REQ_HANGUP	INPUT	BOOL	I, Q, M, D	Input parameter for requesting the HANGUP function: Hang up an existing remote connection to a remote TS Adapter.
STATUS	OUTPUT	INT	I, Q, M, D, L	Output parameter: "AS_DIAL" return value
BUSY	OUTPUT	BOOL	I, Q, M, D, L	Output parameter: BUSY = 1: The DIAL or HANGUP function is still active. This means that the dialing/hanging up of the remote connection has not been completed yet. BUSY = 0: Processing of the FB 47 "AS_DIAL" has been terminated. No function is active.

BIE and the Virtual Block Parameters EN and ENO

The virtual block parameters EN and ENO only occur when "AS_DIAL" is included in the LAD or SFC display of the STEP 7 Editor. They are closely linked to the BIE bit (binary result) of the status word.

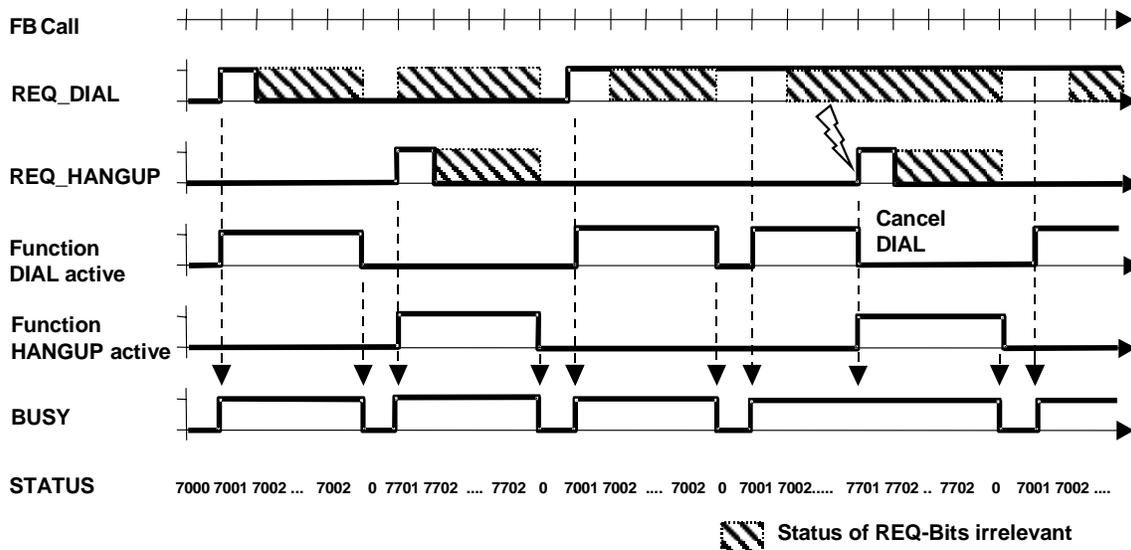
- Input parameter EN: The state of the result of logic operation RLO is saved in the BIE bit during the block call.
- Output parameter ENO:

If "AS_DIAL" has been executed free of errors, the state of the BIE bit which existed when the block was called is restored at the end of the block call.

If an error message is output via the STATUS output parameter, the BIE bit is set to 0 immediately after "AS_DIAL" has been left.

Relationship between REQ_DIAL, REQ_HANGUP, STATUS and BUSY

The following pulse diagram shows the error-free course of the dialing and hanging up of a remote connection.



7.6 Return Values of the FB 47 "AS_DIAL"

The "AS_DIAL" return values can be classified as follows:

- W#16#0000: "AS_DIAL" was terminated without errors
- W#16#3xxx: Last state of the remote connection in the TS Adapter
- W#16#7xxx: Status of "AS_DIAL"
- W#16#8xxx: Error reported during internal call of a communication SFC
- W#16#9xxx: Parameter error while calling "AS_DIAL"
- W#16#Bxxx: Error while establishing the connection

The following table shows the "AS_DIAL" return values except the error codes for the communication SFCs employed.

Return Value (W#16#...)	Explanation	Information
0000	No function is active. "AS_DIAL" processing completed without errors.	This message is displayed only once after the respective function has been completed successfully.
3007	The local TS Adapter has hung up.	Is only displayed by the HANGUP function.
3008	The remote connection has crashed spontaneously or the remote TS Adapter has disconnected.	Is only displayed by the HANGUP function.
7000	No function is active.	No function was being executed or requested via the input parameters.
7001	DIAL function is active (first call). The function has just been started.	The REQ_DIAL input parameter is not evaluated until the end of the function (BUSY = 0).
7002	DIAL function is active (subsequent call). Execution of the function is not yet complete.	The REQ_DIAL input parameter is not evaluated until the end of the function (BUSY = 0).
7701	HANGUP function is active (first call). The function has just been started.	The REQ_DIAL and REQ_HANGUP input parameters is not evaluated until the end of the function (BUSY = 0).
7702	HANGUP function is active (subsequent call). Execution of the function is not yet complete.	The REQ_DIAL and REQ_HANGUP input parameters is not evaluated until the end of the function (BUSY = 0).
8xxx	Error message: Execution of the active block function was aborted due to an error message (RET_VAL < 0) of an SFC called block-internally.	Refer to the description of the error information of the communication SFC for non-configured S7 connections.
9001	The PHONE_NO length is = 0 or > 31	The phone number must have a min. of 1 and a max. of 31 characters.
9003	Length of LOGIN > 8	The user name for the legitimization at the remote TS Adapter may have a max. of 8 characters.

Return Value (W#16#...)	Explanation	Information
9004	Length of PASSWORD > 8	The password for the legitimization at the remote TS Adapter may have a max. of 8 characters.
B100	TS Adapter cannot establish a remote connection at present.	The TS Adapter cannot establish a connection to the modem at present. Call "AS_DIAL" again.
B10A	The TS Adapter already contains an event ID of a "PG_DIAL" function or an "AS_DIAL" function is active which still has to be transferred.	Call "AS_DIAL" again.
B10B	After the remote connection has been established successfully, the remote connection was disconnected again.	Call "AS_DIAL" again.
B206	The remote connection to the remote TS Adapter could not be established.	Check the configuration of the modem in the TS Adapter (local and remote).
B20A	The type of the remote TS Adapter does not support automation-system to automation-system remote coupling.	Use a TS Adapter which supports automation-system to automation-system remote coupling.
B20B	The FB 47 "AS_DIAL" and the version of the TS Adapter are incompatible.	Use a TS Adapter which supports automation-system to automation-system remote coupling.
B20C	The remote TS Adapter is not included in the MPI network. Cause: Network parameter error	Check the configuration of the network parameters in the remote TS Adapter.
B20D	The version of the remote TS Adapter does not support automation-system to automation-system remote coupling.	Use a TS Adapter which supports automation-system to automation-system remote coupling.
B20E	The data transfer to the remote TS Adapter was aborted. Cause: Transfer error	Call "AS_DIAL" again.
B20F	The remote TS Adapter has not called back.	Check the configuration of the security level (callback number) and of the modem in the remote TS Adapter.
B210	The data transfer to the remote TS Adapter is faulty. Cause: Timeout	Call "AS_DIAL" again.
B252	The remote TS Adapter rejects the job execution since the legitimization does not exist.	You did not specify a user name and password when calling "AS_DIAL".
B253	The remote TS Adapter rejects the legitimization. Cause: Unknown user name	Check the call parameters of "AS_DIAL" in your STEP 7 user program.
B254	The remote TS Adapter rejects the legitimization. Cause: Incorrect password	Check the call parameters of "AS_DIAL" in your STEP 7 user program.
B305	A remote connection to a programming device/PC has not been established yet by the local TS Adapter.	Call the "AS_DIAL" again later.

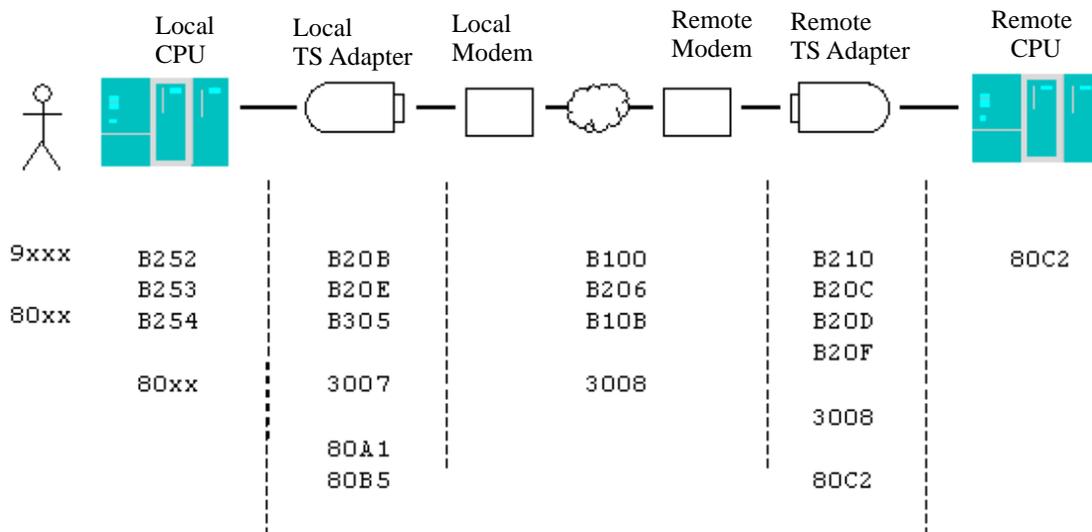
7.7 Typical Error Codes and Their Causes

The following table shows error codes of the communication SFCs and of the FB 47 "AS_DIAL" as well as the possible causes:

Error code (W#16#...):	Cause:
80A1	<ul style="list-style-type: none"> The processing of a communication SFC was rejected by the local TS Adapter because no remote connection through FB 47 "AS_DIAL" is set up. While the communication SFC is being processed, the remote connection to the remote TS Adapter is disconnected.
80B5	<ul style="list-style-type: none"> The processing of a communication SFC was rejected by the local TS Adapter because the DIAL function of FB 47 "AS_DIAL" has not been completed yet. The DIAL function of the FB 47 "AS_DIAL" was requested although a remote connection has already been set up for the automation-system to automation-system remote link.
80C2	<ul style="list-style-type: none"> Temporary lack of resources on the remote CPU. The remote CPU with the MPI address is not available or does not exist yet.

Determining the Error Location on the Basis of the Status or Error Code

The following figure assigns a typical error location to the possible error codes of the communication SFCs and of the FB 47 "AS_DIAL".



8 Example Program for the PLC to PLC Remote Link

8.1 Introduction to the Example Program

This example program shows you how you can use the FB 47 "AS_DIAL" to establish a remote connection to a remote SIMATIC S7 automation system and to exchange process data. The process data exchange is illustrated by the transfer of a counter reading between the local and the remote CPU.

This example forms part of the scope of supply of TeleService and is included in the example project of STEP 7 when the software package is installed.

Hardware and Software Requirements

The following hardware and software components must be available so that the example can be programmed and tested as described:

- Programming device/personal computer with installed STEP 7 or STEP 7 Lite
- TeleService V5.1 optional package (or later)
- MPI connection to the local automation system with a CPU with S7 basic communication, a TS Adapter V5.1 (or later) and a Hayes-compatible modem
- Remote automation system with a CPU with S7 basic communication, a TS Adapter V5.1 and a (or later) Hayes-compatible modem

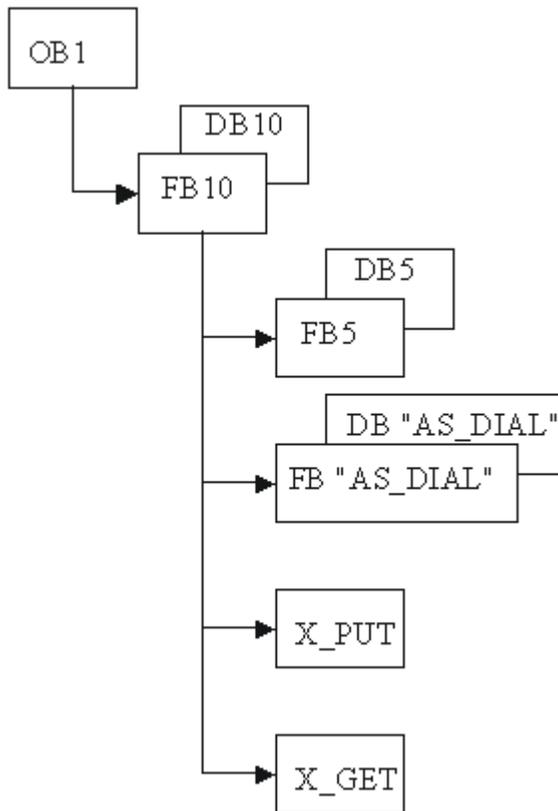
Block Overview:

The following table provides an overview of the blocks used in the example program and of their functions.

Block:	Designation:	Function:
OB 1	PLC_Cycle	Cyclic execution of the user program
FB 10	Example_Manager	Establishing and disconnecting of the remote connection and exchange of the process data
DB 10	Example_Data	Data of the example
FB 5	Address_Book_Manager	Selection of the parameters for FB "AS_DIAL"
DB 5	Address_Book	Address book of the parameters for FB "AS_DIAL"
VAT 1	Variable table	Monitoring of the data in DB 10 and in the instance DB of the FB "AS_DIAL"
VAT 2	Variable table	Monitoring of the counting state in the DB 10
VAT 3	Variable table	Monitoring of the parameter data in the DB 5

Call Hierarchy of the Blocks

The graphic below shows the call hierarchy of the blocks used in the example:



Symbol Table for the Example Program

The table below shows the symbol table for the example program:

	Symbol:	Address:	Data type:	Comment:
1	Address_Book	DB 5	FB 5	Address book with parameters for FB "AS_DIAL"
2	Address_Book_Manager	FB 5	FB 5	Address book manager for FB AS_DIAL
3	AS_DIAL	FB 47	FB 47	FB for AS-to-AS remote link
4	AS_DIAL_Instance	DB 47	FB 47	Instance DB for FB AS_DIAL
5	BLKMOV	SFC 20	SFC 20	Standard function: Transfer data within the CPU
6	CYCL_EXC	OB 1	OB 1	Cyclic program execution
7	Example_Data	DB 10	FB 10	Instance DB for FB Example_Manager
8	Example_Manager	FB 10	FB 10	Example program for FB AS_DIAL
9	VAT1	VAT 2		
10	VAT47	VAT 1		
11	VAT5	VAT 3		
12	X_ABORT	SFC 69	SFC 69	Standard function: Disconnect connection to the communication partner
13	X_GET	SFC 67	SFC 67	Standard function: Read data directly from the communication partner
14	X_PUT	SFC 68	SFC 68	Standard function: Send data directly to the communication partner
15	X_RCV	SFC 66	SFC 66	Standard function: Read data which have to be accepted from the communication partner
16	X_SEND	SFC 65	SFC 65	Standard function: Send data which have to be accepted from the communication partner

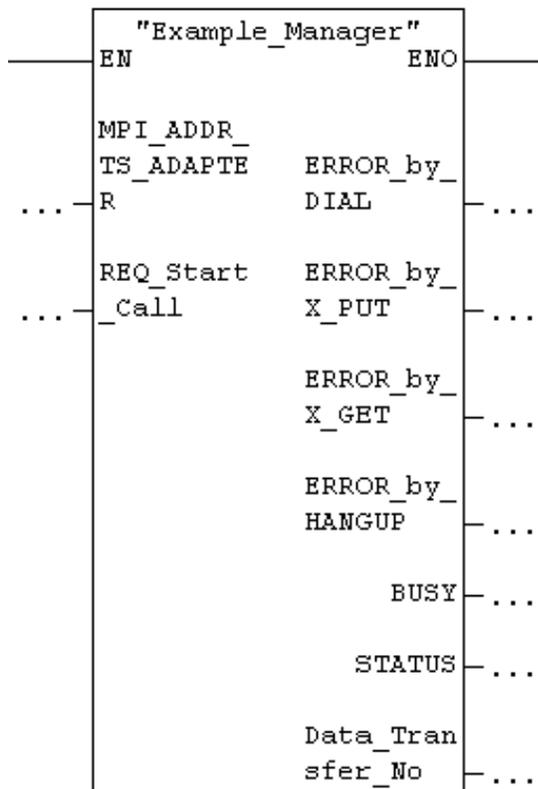
8.2 Functionality of the FB 10

The FB 10 is a template for implementing the function of automation-system to automation-system remote link. It contains the following functionality:

- Establishing the remote connection to the remote SIMATIC S7 automation system,
- Exchanging the process data and
- Terminating the remote connection.

Complete execution of the FB 10 covers several OB-1 cycles. If an error is recognized, the execution of FB 10 is aborted.

Structure of the FB 10:



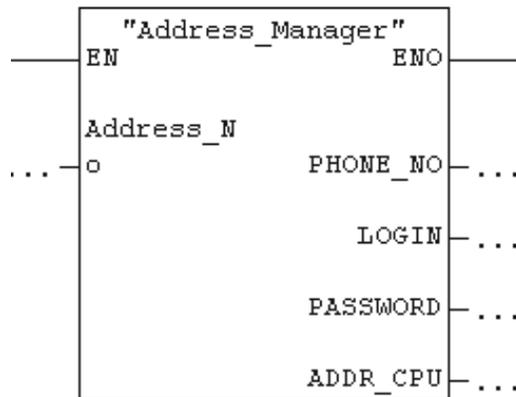
The block comment for this block contains a detailed description of the individual networks and their function.

8.3 Functionality of the FB 5

The FB 5 is a template and shows you how you can manage several remote SIMATIC S7 automation systems. The instance DB of this block contains the data for the input parameters for calling the FB 47 "AS_DIAL".

The input parameter "Address_No" of the FB 5 is used to select one of the remote SIMATIC S7 automation systems.

Structure of the FB 5:



If you want to use the FB 5 "Address_Manager", remove the comment lines in the network 5 of the FB 10 "Example_Manager".

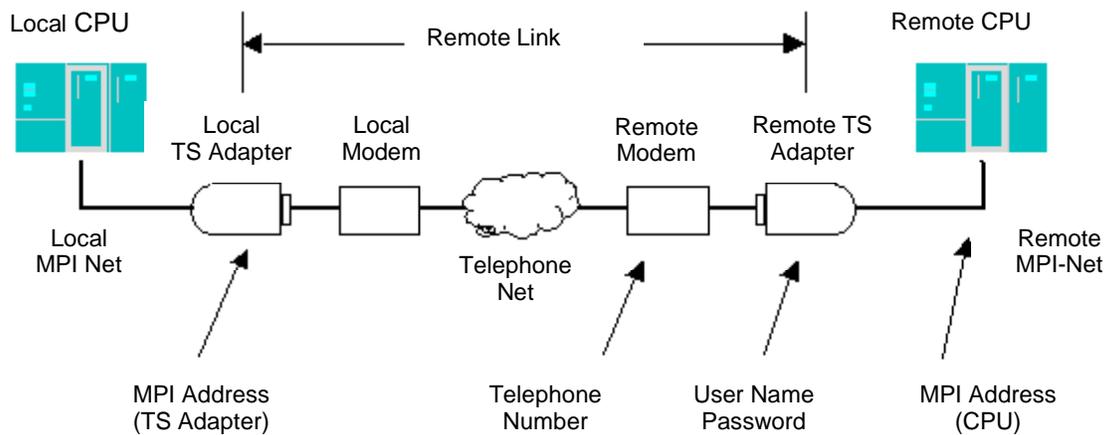
8.4 Defining Inputs and Outputs

The corresponding inputs and outputs for this example are listed in the table below.

Address:	DB address:	Comment:
		CONTROL INPUTS:
I 0.0	DB10.DBX 2,0	Start switch: 1 = Start of the example
		DISPLAY:
Q 0.0	DB10.DBX 4,1	Error at "DIAL" function: Establishing of the remote connection
Q 0.1	DB10.DBX 4,4	Error at "X_PUT" function: Data exchange write job
Q 0.2	DB10.DBX 4,5	Error at function "X_GET": Data exchange read job
Q 0.3	DB10.DBX 4,6	Error at "HANGUP" function: Disconnection of the remote connection
Q 0.7	DB10.DBX 4,7	FB 10 active
AW 4	DB10.DBW 6	Status message of the FB 10 or error message of a function
AB 8	DB10.DBB 8	Current value of the counter

Instead of the inputs and outputs you can also use the corresponding addresses of the DB 10. To do so the corresponding addresses have to be removed from the call of the FB 10 in the OB 1.

The addresses in the data block can then, for example, be tracked with the monitoring/controlling variable function.



8.5 Parameters for Calling the FB 47 "AS_DIAL"

The parameters for the FB 47 "AS_DIAL" call can be entered in the DB 10 (data view with the STEP 7 Editor) or also loaded with the FB 5 "Address_Manager" from the DB 5 "Example_Data".

Default value:	DB address:	Comment:
		PARAMETER FOR THE FB "AS_DIAL":
6	DB10.DBW 0	ADDR_TS_ADAPTER: MPI address of the local TS Adapter
-	DB10.DBB 12	PHONE_NO: Phone number of the remote modem, STRING[31]
-	DB10.DBB 46	LOGIN: User name of the remote TS Adapter, STRING[8]
-	DB10.DBB 56	PASSWORD: Password of the remote TS Adapter, STRING[8]
3	DB10.DBW 66	ADDR_CPU: MPI address of the remote CPU
		DATA EXCHANGE RANGES:
3	DB10.DBW 10	MAXIMUM VALUE OF THE COUNTER
0	DB10.DBB 68	Current counter state (send range for SFC 68 "X_PUT")
0	DB10.DBB 69	Read counter state (receive range for SFC 67 "X_GET")

8.6 Working with the Example

Preparations

1. First switch the local CPU to "STOP".
2. Then download the example program to the CPU.
3. When the program has been loaded completely, the local CPU switches to "RUN".

Adapting the Call Parameters in the OB 1

First adapt the call parameter of the FB 10 in the OB 1.

You can now enter the following parameter data for calling the FB "AS_DIAL" in the DB 10 (data view)

- The phone number of the remote plant,
- User name and password for the remote TS Adapter and
- The MPI address of the remote CPU.

If you want to use the FB 5, enter the following data in the DB 5 "Address Book"

- The phone number of the remote plant,
- User name and password for the remote TS Adapter and
- The MPI address of the remote CPU.

Adapting the Inputs and Outputs of the Local/Remote CPU

This example uses specific inputs and outputs of the local and the remote CPU. These can be adapted to your configuration or replace them by global variables or not specify the corresponding parameters at the FB 10 call and start the function of FB 10 by monitoring/controlling variables of the corresponding data in the DB 10.

Execution of the Example:

The example carries out the following three phases:

1. Establishing the remote connection to the remote automation system by using the DIAL function of the FB "AS_DIAL".
2. Exchanging the process data:
 - Writing into the output byte 0 of the remote CPU with the SFC 68 "X_PUT"
 - Reading of the output byte 0 of the remote CPU with the SFC 67 "X_GET".
If the value is read successfully, the read value is increased by one and saved as the new counter value for the SFC 68 "X_PUT".
As long as the read value has not reached the set maximum value, the data exchange is repeated with the respective new value.
3. Disconnecting the remote connection with the HANGUP function of the FB "AS_DIAL"

Output Byte QB 0 of the Remote CPU

Instead of the output byte QB 0 of the remote CPU you can use any other unused global address of the remote CPU. To this purpose the supply of the parameter "RD" of the SFC 67 "X_GET" and "SD" of the SFC 68 "X_PUT" have to be adapted correspondingly in the local user program.

9 Sending a Message from a Plant (Sending SMS)

9.1 Requirements for Sending an SMS

If a plant is to send an SMS, certain hardware and software requirements must be fulfilled. These requirements are described below.

Hardware requirements:

To send an SMS from a plant, you require a GSM radio modem and a TS adapter. The version of the TS adapter used must be at least V5.2.

Software requirements on the plant side:

The function block "SMS_SEND" is contained in the TeleService V5.2 scope of supply and is entered into the STEP 7 library when the software package is installed. If a plant is to send an SMS, the user program of the plant must call the "SMS_SEND" function block.

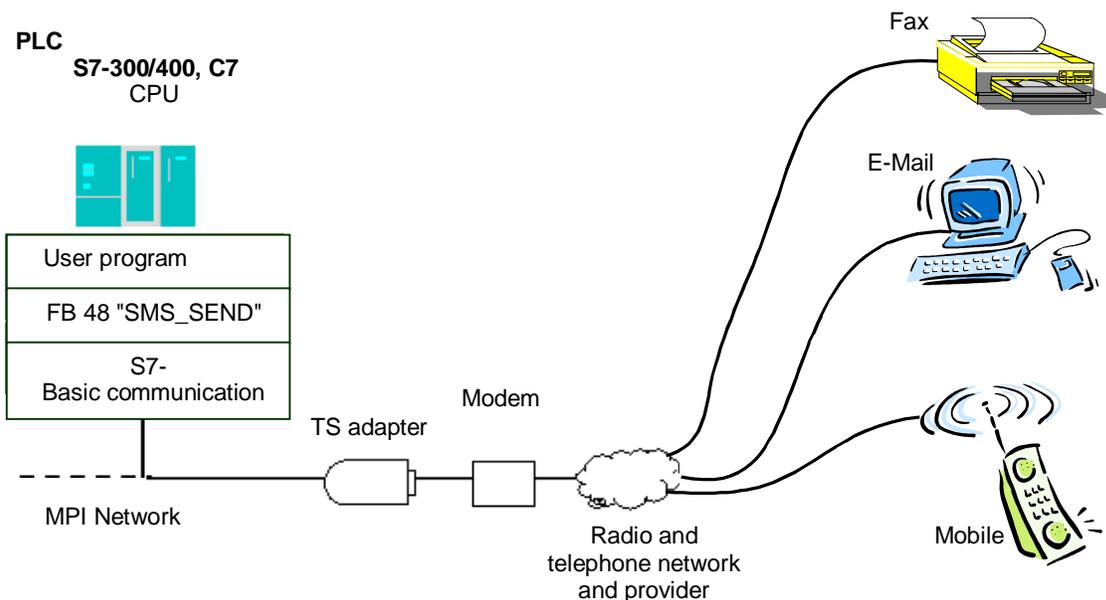
9.2 Functionality of the FB 48 "SMS_SEND"

Description

FB "SMS_SEND" transfers a phone number, a service center number and an SMS message to a TS adapter. The TS adapter passes these data to a wireless modem via GSM command.

After the SMS message has been sent, the TS adapter receives an acknowledgement that will be passed on to FB "SMS_SEND". Then processing of "SMS_SEND" will be terminated and the status is transmitted to the caller of "SMS_SEND". This status message only represents an acknowledgement for having sent the SMS; **it is not a receive acknowledgement**.

If processing is aborted after an error has occurred during processing, the caller of "SMS_SEND" will receive the error code.



Call of "SMS_SEND"

You can call FB "SMS_SEND" cyclically or in a time controlled program.

It is always required to specify an instance DB when calling FB.

To edit a block function, you need to call "SMS_SEND" several times. It is therefore not practical to call "SMS_SEND" in "Waiting loop". BUSY = 0 indicates the end of the block function.

Communication shutdown

When the CPU changes to STOP mode while SMS_SEND is busy, communication to the TS adapter will be shut down. Communication to the TS adapter will also be lost if fatal communication errors occur on the MPI bus or, for example, if anyone switches off the CPU.

In such cases the TS adapter will not discard phone numbers, service center numbers and SMS messages it has already received, and the TS adapter passes the data to the modem. However, the TS adapter will discard the acknowledgement it receives from the modem.

When a user program in the CPU attempts to send an SMS message while the TS adapter is in a state as described above, "SMS_SEND" is terminated via the return value W#16#B10A. The user program can then repeat the attempt to send the SMS at a later time. You will also receive the return value W#16#B10A if different CPUs attempt to send SMS across the same TS adapter.

9.3 Changing the STEP 7 User Program



Caution

The CPU must be in STOP mode before you modify any parts in your user program that have an immediate effect on the call of "SMS_SEND". This refers primarily to the removal and replacement of program blocks that contain calls of "SMS_SEND". Communication resources may remain occupied if you neglect this point. The PLC might change into an undefined state of the communication SFCs for non-configured S7 communication.

After you have transferred your changes, restart (warm start) or reboot the CPU.

Data consistency

The input parameters of the FB will be copied to an internal buffer at the initial call of "SMS_SEND". Do not modify these data before the first call has been completed (return value W#16#7001). Otherwise, the transferred data may be inconsistent.

9.4 FB 48 "SMS_SEND" Parameters

Parameter	Declaration	Data type	Memory area	Description
MPI_TS_ADAPTER	INPUT	INT	I, Q, M, D, L, Const.	Input parameter: MPI address of the TS Adapter
PHONE_NO	INPUT	ANY	D	Input parameter: Reference to a data string with a maximum length of 31 characters
SCENTER_NO	INPUT	ANY	D	Input parameter: Reference to a data string with a maximum length of 20 characters
MESSAGE	INPUT	ANY	D	Input parameter: Reference to a data string with a maximum length of 160 characters
BUSY	OUTPUT	BOOL	I, Q, M, D, L	Output parameter: BUSY=1: SMS send is still busy BUSY=0: "SMS_SEND" processing is terminated
STATUS	OUTPUT	INT	I, Q, M, D, L	Output parameter: Return value of "SMS_SEND"

Virtual block parameters EN and ENO and the BIE bit

The virtual block parameters EN and ENO only occur when implementing "SMS_SEND" in the LAD or FBD view of the STEP 7 editor. They are closely linked to BIE bit (binary result) of the status word.

- Input parameter EN: The status of the link result (VKE) is stored in the BIE bit during the block call.
- Output parameter ENO:
If "SMS_SEND" was processed without error, the BIE bit is returned to the status it had at the end of the block call.
When an error message is output via the output parameter STATUS, the BIE bit is reset to 0 immediately before "SMS_SEND" is closed.

9.5 Return values of the FB 48 "SMS_SEND"

The return values of "SMS_SEND" can be classified as follows:

- W#16#0000: "SMS_SEND" completed successfully
- W#16#7xxx: Status of "SMS_SEND"
- W#16#8xxx: An error was reported when a communication SFCs or SFC 20 BLKMOV was called internally
- W#16#9xxx: Parameter assignment error at the call of "SMS_SEND"
- W#16#Bxxx: The TS adapter has reported an error
- W#16#Cxxx: The modem has reported an error

The table below shows the return values of "SMS_SEND", with exception of error codes of the implemented communication SFCs as well as the modem.

Return value (W#16#...):	Explanation	Note:
0000	"SMS_SEND" was processed without error.	
7000	"SMS_SEND" was reset (meanwhile, communication with the TS adapter was shut down).	Call "SMS_SEND" again.
7001	"SMS_SEND" is busy (BUSY = 1).	
7002	"SMS_SEND" is busy (BUSY = 1).	
8xxx or 8zxx	"SMS_SEND" was terminated with error code from the internally called communication SFC or SFC 20 BLKMOV. If the error message originates from SFC 20 BLKMOV, then z = 2 An error has occurred when the attempt was made to copy the parameter PHONE_NO to the internal buffer z = 3 An error has occurred when the attempt was made to copy the parameter SCENTER_NO to the internal buffer z = 4 An error has occurred when the attempt was made to copy the parameter MESSAGE to the internal buffer	For details refer to the system and standard functions reference manual.
9001	Length of PHONE_NO = 0 or > 31	Length of the phone number: min. 1 character, max. 31 characters.
9002	Length of SCENTER_NO = 0 or > 20	Length of the service center number: min. 1 character, max. 20 characters.
9003	Length of MESSAGE = 0 or > 160	Length of the SMS message: min. 1 character, max. 160 characters.
B10A	The TS adapter is still processing a job.	Call "SMS_SEND" again.
B301	A remote connection to a PG/PC is still busy.	Call "SMS_SEND" again at a later time.

Return value (W#16#...):	Explanation	Note:
B302	The TS adapter is connected directly to a PG/PC (direct connection)	Connect the TS Adapter to a GSM modem
B303	The TS adapter is not connected to a modem or a PG/PC.	Connect the TS Adapter to a GSM modem
B304	The interface to the modem is currently not ready to send an SMS.	Call "SMS_SEND" again at a later time.
B614	The connected modem has not responded to an SMS-specific command within the monitoring time.	Verify that you have connected a GSM modem. Call "SMS_SEND" again at a later time.
B615	The TS adapter has received a non-specific error message from the connected modem.	Verify that you have connected a GSM modem.
Cxxx	"SMS_SEND" processing was aborted by an error code from the GSM modem. xxx: Error ID	A list of error IDs is found in the modem manual or in the GSM standards GSM 04.11, GSM 03.40 und GSM 07.05. Examples: C136 = Missing SIM card in GSM -modem C137 = Incorrect PIN for GSM modem (see "Passing the pin to the modem") C001 = Wrong service center number

9.6 Passing the PIN to the modem

When you are using a SIM card with enabled PIN verification, the PIN must be transferred to the modem within the initialization phase. This can be done via the init string of the TS adapter. You can configure this string via TeleService. Configure the init string as follows (Example for PIN = 4711):

- `AT+CPIN="4711";AT&F.....`

After power is returned, the TS adapter sends the string "AT+CPIN="4711" and the PIN for the modem's SIM card to the connected component. Then, the modem is initialized with "AT&F...".

Caution: A faulty PIN is not reported during initialization, but rather when an SMS is sent via the return value from FB SMS_SEND.

9.7 Sending a Fax

When you add a fax number prefix to a specific provider phone number (e.g. "99" in the German D1 network), the network provider converts the SMS into a fax and sends it to a fax device. This is a provider service and does not represent a function of the TS adapter.

The user must enter the fax number with the corresponding prefix at parameter PHONE_NO.

Example of a D1 network and the fax number 07214711:

- `PHONE_NO = '9907214711'`

9.8 Sending an e-mail

To send an SMS to an e-mail address, the user must select a specific provider call number (e.g. "8000" for the D1 -network) and add an e-mail address prefix to the SMS message. This is a provider service and does not represent a function of the TS adapter.

The user must enter the corresponding dial-in number in PHONE_NO. The e-mail prefix is added to the actual message text of the SMS, separated from the text by delimiters. This reduces the maximum length of the user text in the SMS by the e-mail address + delimiters.

Delimiters are, for example, empty strings (D1) or ":" (D2). Some network providers demand a "*" instead of the "@" character.

Example of the D1 network:

- The text 'CPU battery failure' is to be sent to the e-mail address 'Smith*t-online.de'.
- `PHONE_NO = '8000'`
- `MESSAGE = 'Smith*t-online.de CPU battery failure'`

9.9 Call Example for the FB 48 "SMS_SEND"

```
FUNCTION_BLOCK FB 1
TITLE =Sample call of SMS_SEND
// This sample call of "SMS_SEND" is to be called
// cyclically (e.g. in OB1).
// The call condition is set during des
// user program processing.
VERSION : 0.1

VAR
    Call condition : BOOL ;
    Phone_No : STRING [31] := '07214711'; // the dial-in number
    Scenter_No : STRING [20] := '+491710760000'; // Service center
                                                // number

    // message to be transmitted
    Message : STRING [160] := 'CPU battery fault';
END_VAR

BEGIN
NETWORK
TITLE =

// Verification of call conditions
    U #call condition;

    SPBN End;

// Call of SMS_SEND
    CALL FB 48, DB 48 (
        MPI_TS_ADAPTER := 6,
```

```
PHONE_NO      := #Phone_No,
SCENTER_NO    := #Scenter_No,
MESSAGE       := #Message,
BUSY          := M    46.0,
STATUS        := MW   48 );

// Check of caller results for end of processing
U   M    46.0; // is BUSY == 0 ?

SPB  End;     // no, SMS_SEND is still processing
           // the request

L   0;        // yes, processing is completed

L   MW   48;

==I  ;        // STATUS == 0 ?

SPB  ok;      // yes, no error has occurred

L   W#16#7000; // no,

==I  ;        // has SMS_SEND reset itself ?

SPB  End;     // yes, call SMS_SEND again
           // (in the next cycle)

NOP  0;      // no, an error has occurred.

SPA  End;

// FB SMS_SEND was processed and closed without error
ok:  R   #Call condition; // Deleting the call conditions

End: BE;

END_FUNCTION_BLOCK
```


10 Managing Plant Data in Phone Books

10.1 Creating and Managing Phone Books

10.1.1 Creating Phone Books

Proceed as follows:

1. Select the **Phone Book > New** menu command or click the appropriate button in the toolbar. The "New Phone Book" dialog box then opens.

Note

Phone books are created by default in the directory in which you have installed TeleService. However, you can also save phone books in a different directory.

2. Enter a name for the new phone book.
3. Confirm with "Save". The phone book is created.

Result:

You can now create folders in the new phone book. You save the data for the various plants in these folders.

10.1.2 Opening Phone Books

Proceed as follows:

1. Select the **Phone Book > Open** menu command or click the appropriate command button in the toolbar. The "Open" dialog box is opened.
2. Select the number of the phone book that you wish to open.
3. Confirm by clicking on "Open".

The phone book is opened so that you can edit the folders and plant data contained in it.

10.1.3 Saving Phone Books

You can save a phone book either under the current name or under a new name.

To save under the existing name:

- Select the **Phone Book > Save** menu command or click the appropriate command button in the toolbar. The phone book is saved under its current name.

To save under a new name:

1. Select the **Phone Book > Save As** menu command. The "Save As" dialog box is opened.
2. Enter the name under which you wish to save the phone book.
3. Confirm with "Save". The phone book is saved under the new name.

10.1.4 Specifying the Page Format for Printing

In TeleService you can set the page format for the printout of a phone book, a folders or a plant

Proceed as follows:

- Select the **Phone Book > Page Setup** menu command. The "Page Setup" dialog box is opened.
- Select the desired options for your printout.
- Confirm your entries with "OK".

Information

- If you click on the "Headers/Footers" command button, a dialog box is displayed where you can define the headers and footers for the printout.
 - The selected settings can be checked in the page preview by using the **Phone Book > Print Preview** menu command.
-

10.1.5 Displaying the Print Preview

You can check in the print preview the print setup that you have defined for a specific phone book, folder, or plant before it is actually printed.

Proceed as follows:

1. Open or select the phone book to be printed.
2. Select the **Phone Book > Print Preview** menu command. The print setup is then displayed in the page view.

Note

If the printout has more than one page, two periods are printed after the page number in the bottom right corner of the page. The last page does not have these periods, indicating that no more pages are to follow.

10.1.6 Printing Phone Books

You can print either the complete data of a phone books or just a specific part of a phone book.

Proceed as follows:

1. Select the number of the phone book that you wish to print.
2. Select the **Phone Book > Print** menu command or click on the appropriate command button in the toolbar. The Print" dialog box is opened.
3. Specify here whether you wish to print the complete phone book or just part of the phone book and set all other options.
4. Start the print job with "OK".

Result:

The phone book data are output at the default printer. If the printout has more than one page, two periods are printed after the page number in the bottom right corner of the page. The last page does not have these periods, indicating that no more pages are to follow.

Information

- You use the **Phone Book > Print Setup** menu command to set the printer and the further print options.
-

10.2 Creating and Editing Folders

10.2.1 Creating Folders

You can create several folders in a flat hierarchy in a phone book.

Proceed as follows:

1. Select the **Insert > Folder** menu command or click with the right-hand mouse button and select the "New Folder" command.
2. Name the created folder and confirm with RETURN.

10.2.2 Cutting Folders

You can cut out a folder and insert it at another location, for example, in another phone book.

Proceed as follows:

1. Select the folder that you wish to cut out.
2. Select the **Edit > Cut** menu command or click on the appropriate command button in the toolbar, or click the right-hand mouse button and select the "Cut" command.

Result: The folder is then stored in the clipboard from where you can paste it at any location.

10.2.3 Copying Folders

You can copy a folder and insert it at another location, for example, in another phone book.

Proceed as follows:

1. Select the folder that you wish to copy.
2. Select the **Edit > Copy** menu command or click on the appropriate command button in the toolbar, or click the right-hand mouse button and select the "Copy" command.

The folder is then stored in the clipboard from where you can paste it at any location.

10.2.4 Pasting Folders

You can paste a folder contained in the clipboard at any location.

Proceed as follows:

1. Select the location at which you wish to paste the folder.
2. Select the **Edit > Paste** menu command or click on the appropriate command button in the toolbar, or click the right-hand mouse button and select the "Paste" command.

The folder is then inserted at the selected location.

10.2.5 Renaming Folders

You can assign a new name to an existing folder.

Proceed as follows:

1. Select the folder that you wish to rename.
2. Select the **Edit > Rename** menu command or click with the right-hand mouse button and select the "Rename" command.
3. Enter the new name and terminate with RETURN.

The folder is then displayed with its new name.

10.2.6 Deleting Folders

If you delete a folder, all the plant data contained in it are also deleted.

Proceed as follows:

1. Select the folder that you wish to delete.
2. Select the **Edit > Delete** menu command or click with the right-hand mouse button and select the "Delete" command.

The folder including the plants is then deleted from the phone book.

10.2.7 Printing Folders

You can print the data for a specific folder.

Proceed as follows:

1. Select the folder that you wish to print.
2. Click the right-hand mouse button and select the "Print" command. The Print" dialog box is opened.
3. Set the required options in the "Print" dialog box.
4. Start the print job with "OK".

Result:

The folder data are output at the default printer. If the printout has more than one page, two periods are printed after the page number in the bottom right corner of the page. The last page does not have these periods, indicating that no more pages are to follow.

Information

You use the **Phone Book > Print Setup** menu command to set the printer and the print options.

10.3 Creating and Editing Plants

10.3.1 Creating Plants

You can create several plants in a folder of a phone book to save data.

Proceed as follows:

1. Call the "Insert New Plant" dialog box by:
Selecting the **Insert > Plant** menu command or
selecting a plant and then using the right-hand mouse button to select the "New Plant" command.
2. Enter the appropriate data for the plant in the "Plant" tab card. You have to specify the "Name" field and can enter data on the phone connection immediately or afterwards. All other fields are optional.
3. You can enter a comment on the plant in the "Comment" tab card.
4. Confirm your entries with "OK".

The plant is then created in the appropriate folder.

10.3.2 Changing Plant Data

Existing plant data can be changed at any time.

Proceed as follows:

1. Select the plant whose data you want to change.
2. Select the **Edit > Object Properties** menu command or click with the right-hand mouse button and select the "Object Properties" command. The "Plant Properties" dialog box then opens.
3. Change the required plant data in the "Plant Data" tab card. The "Name" field and the phone number fields must contain data. All other fields are optional.
4. You can edit a comment on the plant in the "Comment" tab card.
5. Confirm your changes with "OK".

10.3.3 Cutting out Plants

You can cut out a plant and insert it at another location, for example, in another folder.

Proceed as follows:

1. Select the plant that you wish to cut out.
2. Select the **Edit > Cut** menu command or click on the appropriate command button in the toolbar, or click the right-hand mouse button and select the "Cut" command.
3. The plant is then stored in the clipboard from where you can paste it at any location.

10.3.4 Copying Plants

You can copy a plant and insert it at another location, for example, in another folder.

Proceed as follows:

1. Select the plant that you wish to copy.
2. Select the **Edit > Copy** menu command or click on the appropriate command button in the toolbar, or click the right-hand mouse button and select the "Copy" command.
3. The plant is then stored in the clipboard from where you can paste it at any location.

10.3.5 Inserting Plants

You can paste a plant contained in the clipboard at any location.

Proceed as follows:

1. Select the location at which you wish to paste the plant.
2. Select the **Edit > Paste** menu command or click on the appropriate command button in the toolbar, or click the right-hand mouse button and select the "Paste" command.
3. The plant is then inserted at the selected location.

10.3.6 Deleting Plants

If you delete a plant, all the plant data contained in it are also deleted.

Proceed as follows:

1. Select the plant that you wish to delete.
2. Select the **Edit > Delete** menu command or click with the right-hand mouse button and select the "Delete" command.
3. The plant including all the data is deleted from the phone book.

10.3.7 Printing Plants

You can print the data for a specific plant.

Proceed as follows:

1. Select the plant that you wish to print.
2. Click the right-hand mouse button and select the "Print" command. The Print dialog box is opened.
3. Set the required options in the "Print" dialog box.
4. Start the print job with "OK".

Result:

The plant data are output at the default printer. If the printout has more than one page, two periods are printed after the page number in the bottom right corner of the page. The last page does not have these periods, indicating that no more pages are to follow.

Information

You use the **Phone Book > Print Setup** menu command to set the printer and the print options.

11 Troubleshooting

11.1 General Information on Troubleshooting

The cause of modem problems can often be found more easily by observing the following two points:

1. Activate the recording function for a log file for recording the data traffic between the programming device/personal computer and the modem. The entries in this file can provide valuable information for determining the cause of errors.
2. Switch on the loudspeaker at your local modem. Select a volume which is loud enough to be heard well.

You can then hear whether:

- There is a dial tone at the connection,
- The called modem is busy or
- The called modem accepts the call.

Common Modem Problems

The most common modem problems include:

- Modem connection is not established
- Modem connection is interrupted

The sections below contain tables which describe common causes and provide information on eliminating the respective fault or error.

11.2 Recording a Log File

Procedure for Windows 95/98/Me/NT:

Activate the "Record Log File" option in the dialog box of the extended modem properties. The next establishing of a connection is then logged in the log file in the Windows directory (for example in the file "Modemlog.txt" in the case of Windows 95).

Procedure for Windows 2000/XP:

Activate the properties dialog box of the modem used via the Control Panel, "Phone and Modem Options" option. Check the settings of the "Log" option in the "Diagnosis" tab card and change the settings for the log file, if necessary.

Result:

The activities between the programming device/personal computer and the modem are entered in the log file. If there are problems in establishing the connection, you can evaluate the recordings in the log file in order to find the causes for the fault.

11.3 Remote Link to the TS Adapter is not Established

Error:	Possible cause:	Check / Remedy:
Remote connection is not established	Cabling faulty	<ul style="list-style-type: none"> • Are all the connecting cables connected correctly? • Are the connectors loose?
	Dial parameters for main connection and extension set incorrectly	<ul style="list-style-type: none"> • Are the set properties and dial parameters of the modem suitable for the phone connection (main connection or extension)? • If your modem is operated from a main connection, you may not specify an access code in the "Dial parameters" dialog box. The fields for the access code for local calls and remote calls have to be empty.
	Dialing process set correctly	<ul style="list-style-type: none"> • Is the correct dialing method (tone/pulse) set in the dialog box for the dial parameters of your modem? • Use a connected phone to check the connection at the modem which you wish to operate. During pulse dialing you should be able to hear crackling noises. During tone dialing you should hear noises with varying tone heights. Set the corresponding dialing process at the modem dial parameters.

Error:	Possible cause:	Check / Remedy:
	Dial disable active	<ul style="list-style-type: none"> • The dial disable function is modem property specified country-specifically, which, depending on the modem, comes into action after one or more attempts to establish a connection. • If your modem does not react after several attempts to dial, the dial disable function may be active. After the dial command characters are sent to the modem, but the modem does not start the dialing process. The driver receives a general error message. • Refer to the modem documentation for information on how the dial disable function is implemented for your modem. • Ensure that a log file (modemlog.txt) is created in which the activities between the programming device/personal computer and modem are recorded. Then check whether the file contains an entry caused by the dial disable (for example, DELAYED).
Remote connection is not established	Phone connection defective or busy	<ul style="list-style-type: none"> • Connect a phone and check whether a dial tone can be heard at this connection. • If an analog phone is connected at the same connection, it has to be not busy. You cannot establish an additional modem connection at this connection if there is an existing phone connection.
	Serial parameters set incorrectly	<ul style="list-style-type: none"> • Are the correct values entered in the "Settings" tab card of the modem properties (8 data bits, no parity, 1 stop bit)? • Is the correct COM interface set in the "General" tab card of the modem properties?
	Initialization string of the TS Adapters is not suitable for the modem	<ul style="list-style-type: none"> • Set the modem initialization string in accordance with the following requirements:
	Setting for error correction between the modem at the TS Adapter and the modem at the PC/programming device are not compatible	<ul style="list-style-type: none"> • Adapt the modem settings.

11.4 Remote Link from the TS Adapter is not Established

Error:	Possible cause:	Check / Remedy:
Callback from TS Adapter not carried out:	Location or call settings in the TS Adapter are incorrect	<ul style="list-style-type: none"> • Check the configuration of the TS Adapter: • Are the dialing method and access code set in accordance with the phone connection? • Does the modem at the TS Adapter support the characters configured for the access code? • Is "Wait for dial tone before dialing" de-activated at an extension?
	Initialization of the modem insufficient	<ul style="list-style-type: none"> • Check the string for initializing the modem. The modem may require a further initialization in order to establish a remote connection.
	Callback number is incorrect	<ul style="list-style-type: none"> • Check the configuration of the callback number assigned by you.
Call from TS Adapter not carried out:	Phone number is incorrect	<ul style="list-style-type: none"> • Is the desired number transferred to the "PG_DIAL" FB?
	Configuration of the TS Adapter is incorrect	<ul style="list-style-type: none"> • Check the configuration of the TS Adapter: • Are the dialing method and access code set in accordance with the phone connection? • Does the modem at the TS Adapter support the characters configured for the access code? • Is "Wait for dial tone before dialing" de-activated at an extension?

11.5 Modem Connection is Interrupted

Error:	Possible cause:	Check / Remedy:
Modem connection is interrupted:	Metering pulse in the line	<ul style="list-style-type: none"> • If you have applied for a metering clock at the phone company, metering pulses are generated. This may mean that the modem no longer recognizes the carrier signal and switches off. • Set a longer waiting or disconnecting time at the modem. • Have the metering pulse de-activated by the phone company.
	Shielding	<ul style="list-style-type: none"> • Are the connection cables used shielded sufficiently? • Ensure that the modem cables do not run next to power cables and that they have the greatest distance to the power supply units and screens.
	Protocol timeouts	<ul style="list-style-type: none"> • Set fixed monitoring times.
	Automatic connection disconnection	<ul style="list-style-type: none"> • De-activate the option which disconnects an existing connection automatically after a specified without data transfer ("Disconnect after no data transfer of ...").
	Data flow control de-activated	<ul style="list-style-type: none"> • Click on the "Extended" command button in the "Settings" tab card of the modem properties and activate the following options in the displayed dialog box (if offered and not yet set): <ul style="list-style-type: none"> - Data flow control, - Hardware (RTS/CTS), - Data compression, - Error control
	Initialization string of the TS Adapters is not suitable for the modem	<ul style="list-style-type: none"> • Set the modem initialization string in accordance with the following requirements:

11.6 Modem Messages

The modem messages are entered in a log file if you have activated the recording function.

Message:	Possible Cause:	To Correct or Avoid Error:
NO DIALTONE	It is possible that a phone call is being carried out on this line.	<ul style="list-style-type: none"> Repeat the process when the phone call has been terminated.
NO CARRIER	The user dialed is not ready, is not a modem or cannot establish a connection with the set operating mode.	<ul style="list-style-type: none"> Check the numbers and the settings.
BUSY	The user dialed is busy.	<ul style="list-style-type: none"> Try again later.
DELAYED: ...	Dial disable	<ul style="list-style-type: none"> Refer to the modem documentation for information on how the dial disable function is implemented for your modem.

Glossary

A

Access Rights

In case of a modem connection only the administrator may set up the two users, can change their settings and also delete them again, if required. If you log in as a user, you can only change your own password and your own callback number. All other parameters of the TS Adapter are only displayed and cannot be changed.

Acknowledgement Monitoring Time

The acknowledgement monitoring time or also the acknowledgement delay time is used to monitor the arrival of a procedural acknowledgement from the driver.

C

Callback number

If a callback number is configured, the modem connection is disconnected after the login and the TS Adapter then calls the callback number. This almost excludes unauthorized access to a modem connection so that a high degree of safety is reached.

CAPI

Common Application Programming Interface: Interface which can access ISDN devices via programs.

Character Monitoring Time

The character transfer time is used to monitor the arrival of characters in the data transfer phase.

D

Data Flow Control

During the course of a connection the data flow has to be stopped briefly if, for example, the modem buffer is full. There are two possibilities for controlling the data flow:

- Software protocol XON/XOFF
- Hardware protocol RTS/CTS

In the software protocol one of the connected devices sends an XOFF control character when it is no longer possible able to take up further data. The sending device then waits with the transfer until the receiving device sends an XON control character.

In the hardware protocol RTS and CTS are changed over at the serial interface in order to interrupt the signals of the RS232 control cables.

As a rule both the modem-to-modem flow control and the end-device-to-end-device flow control can be set with the Hayes command set.

DCD

Data Carrier Detect: RS232 interface circuit which becomes active (ON) when a remote connection is established.

DCE

Data Carrier Equipment: Data circuit-terminating equipment: Modem

Dialing Method

Set the dialing method (tone or pulse dialing) common for your phone connection. During pulse dialing you hear crackling noises. During tone dialing you hear noises with varying tone heights.

Direct Connection (Definition)

In the case of a direct connection there is a direct connection between the programming device/personal computer on which TeleService is installed and the automation system via the TS Adapter. No modem is required to this purpose. The direct connection is used essentially to configure the TS Adapter.

F

Folder

Folders are used in TeleService to manage plants in which specific data on establishing remote connections are saved. Folders are managed in phone books.

G

GSM

Global System for **M**obile Communication.

I

Initialization String

The initialization string is a string consisting of AT commands (quasi-standard commands for modems) with which the modem connected to the TS Adapter is initialized.

The initialization string is displayed and set in the "Modem" tab card of the "Assign Adapter Parameters" dialog box.

Interface Speed

The interface speed is the speed with which the data are transferred between two devices, for example between the modem and the TS Adapter.

ISDN

Integrated **S**ervices **D**igital **N**etwork: Service of a service provider for the digital transfer of data and speech.

ISDN Adapter

An ISDN adapter is an ISDN device which is connected to a serial PC/programming device interface in order to transfer data via the digital network.

ISDN Modem

An ISDN modem (**M**odulator/**D**emodulator) is an ISDN adapter with integrated analog modem functionality.

M

Modem

Modulator/Demodulator: A modem is a communication device which allows a computer to send and receive data via phone lines. It converts the digital pulses of the computer into analog signals and vice versa.

Modem Connection

In the case of a modem connection the connection between the programming device or PC on which the TeleService is installed and the automation system onto whose PMI/DP interface the TS Adapter is plugged is implemented via a modem connection. By this means the programming device/personal computer is connected to the MPI/PROFIBUS network of the automation system via the remote connection and the TS Adapter. The modem connection is the usual configuration for working with the TeleService.

P

Password

After a modem connection has been established the administrator or the users have to enter a password during logging in.

PG_DIAL

The function block 46 "PG_DIAL" transfers a phone number and a freely assignable event ID for error identification or for identifying a message number to a TS Adapter.

Phone Book

Phone books are used in TeleService to manage the plant data. Phone books are the highest hierarchic level. They contain folders in which plants with specific data for establishing remote connections are saved.

Plant

Plants contain plant-specific data for establishing remote connections. Plants are located in folders, which in turn are managed in phone books.

R

Remote Link

A remote link is an asynchronous connection build-up from a plant to a programming device/personal computer. The call is initiated by calling the function block 46 "PG_DIAL".

Remote Link

A remote link is an asynchronous connection build-up from a plant to a programming device/personal computer. The call is initiated by calling the function block 46 "PG_DIAL".

Remote Link

A remote connection (link)/teleservice connection arises when you use TeleService to dial into a remote plant via a phone network. To this purpose the programming device/personal computer with TeleService connected via a modem to the phone network. At the other end the automation system is connected via a configured TS Adapter and a modem to the phone line. A remote connection makes it possible to edit the dialed plant as usual with STEP 7 (teleservicing).

Requirements Placed on the Initialization String

The following properties have to be specified in the string for initializing the modem:

- The modem provides feedback messages.
- The feedback is output in clear text.
- The DCD signal is only activated when a connection exists.
- The transfer speed between the TS Adapter and the modem is not changed after the connection has been established.
- The RTS/CTS protocol is active as a flow control between the TS Adapter and the programming device or PC respectively.
- The automatic call acceptance by the modem is activated.

S

Safety Function for MPI/PROFIBUS Interfaces

If you activate an on-line function on your programming device/personal computer without a safety function, the interface begins to send messages. If you connect the interface to a network at such a moment, it is disturbed briefly by the messages. This can lead to network connections being disconnected.

A safety function is therefore normally activated at the communication drivers:

- The interface can only send messages, if messages (from other masters) have been heard free of errors.
- If it was not possible to hear a message (free of errors), the driver outputs an error message.

A passive station (slave) can only send data if it is prompted to do so by active station (master). If you have connected only slaves to the programming device/personal computer, you must therefore de-activate this safety function by activating the "Programming device / PC is the only master on the bus" check box. If the "Programming device / PC is the only master on the bus" check box is de-activated and all further masters fail, communication is no longer possible from the programming device/personal computer to the slaves.

Setting the Programming Device/Personal Computer Interface

"Set programming device/personal computer interface" is an application in STEP 7 in which you can set up various settings for your programming device or your personal computer.

For TeleService you set up the TS Adapter or the modem connection, depending on the configuration, and enter the interface (for example, COM 1) in "Set programming device/personal computer interface".

As from TeleService V5.1 there is an automatic changeover from a direct connection to a modem connection if the local connection of the TS Adapter is set to direct connection and a remote connection is to be established.

SMS

An SMS (**S**hort **M**essage **S**ervice) is a message of limited length (max. of 160 characters), which can be sent via a radio network to a GSM receiver.

T

Transfer Speed

The transfer speed is the rate at which data are transferred on the phone line. The transfer speed which can be reached is the main criterion for performance of a modem. The faster the data can be transferred, the lower the phone costs are.

TS Adapter (Definition)

The TS Adapter is used to connect an automation system via a modem to a phone network in order to prepare it for the use of TeleService.

To this purpose the TS Adapter encompasses a parameter memory in which various parameter records are saved for TeleService operation. In addition the TS Adapter has a switch at which you specify the transfer speed for the direct connection.

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