

SIEMENS

SIMATIC

TeleService S7 Library V6.1

Manual

Preface,
Contents

TeleService S7 Library

Establishing a Remote
Connection from the AS to
PG/PC: FB 46 "PG_DIAL"

Establishing a Remote
Connection from AS to AS:
FB 47 "AS_DIAL"

Example Program for the
AS-AS Remote Link

Sending an SMS from the
S7 Automation System:
FB 48 "SMS_SEND"

Sending an E-mail from the
S7 Automation System:
FB 49 "AS_MAIL"

Glossary,
Index

1

2

3

4

5

6

01/2007

A5E00921382-01

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.



Danger

indicates that death or severe personal injury **will** result if proper precautions are not taken.



Warning

indicates that death or severe personal injury **may** result if proper precautions are not taken.



Caution

with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution

without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Notice

indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:



Warning

This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Preface

Purpose of the Manual

This electronic manual provides you with a comprehensive overview of working with TeleService S7 Library V6.1. It supports you when working with the function blocks contained in the TeleService S7 Library.

The following functions are available once you have installed the TeleService S7 Library:

- Connection establishment from and to remote plants (PG-AS remote link)
- Data communication between remote plants (AS-AS remote link)
- Sending an SMS from a plant
- Sending an e-mail from a plant

This TeleService S7 Library manual also provides tables find which should help you in troubleshooting problems if they occur. An example program for AS-AS remote link supplements the information already available.

This manual is intended for plant programmers and service personnel.

Required Knowledge

Readers are assumed to have general knowledge in the field of automation engineering.

It is also assumed that readers have experience working with computers or devices similar to PCs (such as programming devices) under the operating systems MS Windows 2000, MS Windows XP Home, MS Windows XP Professional or Windows Server 2003 Standard Edition.

Validity of the Manual

This manual is valid for the TeleService S7 Library V6.1 software package.

Online Documentation for the TeleService S7 Library V6.1

The following table provides an overview of the online documentation for TeleService S7 Library V6.1:

Electronic manual (PDF)	Purpose	Order number
TeleService S7 Library V6.1 Function blocks and examples for STEP 7	Provides basic information about working with the function blocks contained in the TeleService S7 Library V6.1.	A5E00921382-01

Online help	Purpose	Order number
Help on TeleService S7 Library V6.1 Function blocks and examples for STEP 7	Provides basic information about working with the function blocks contained in the TeleService S7 Library V6.1 in the form of online help.	Part of the TeleService S7 Library V6.1 software package

Calling up the Help Functions

You can open the online help for a selected object by pressing F1. From there you can use the "Contents" or "Search" tabs to search for help topics related to the active software (a dialog box, for example). This way you obtain exactly the information that is relevant to the process at hand.

Menu Commands in the Help Menu

The online help offers you information on topics you require at a specific location. You can look up specific information quickly, without having to search through a manual. In the online help you can find:

- **Help topics:** offers different ways of accessing help topic information.
- **Context-sensitive help** (F1 key): displays information on the selected object, active dialog box or window.
- **Introduction:** provides an overview of working with TeleService
- **Getting Started:** enables you to quickly familiarize yourself with TeleService
- **Using Help:** provides detailed instructions for using the online help.
- **Info:** provides information on the current version of the application.

The Context-sensitive Help

- This offers information on the current context, an open dialog box or an active window, for example. You can "Help" button or the F1 key to open the help.
- The status bar offers another form of context-sensitive help. Placing the mouse pointer over a menu command displays a brief explanation for it.
- A brief explanation is also displayed for the icons in the toolbar when you place the mouse pointer on them.

Additional Support

If you have question about using the products described in this manual that are not answered here, contact your local Siemens representative or agent responsible.

You can find a contact under:

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

You will find a guide to the technical documentation offered for the individual SIMATIC Products and Systems here at:

<http://www.siemens.de/simatic-tech-doku-portal>

The online catalog and order system are available at:

<http://mall.automation.siemens.com/>

Training Center

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:

Tel.: +49 (911) 895-3200.

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

Technical Support

You can reach the Technical Support for all A&D products

- Using the Web formula for the Support Request
<http://www.siemens.de/automation/support-request>
- Tel. + 49 180 5050 222
- Fax: + 49 180 5050 223

Service & Support in the Internet

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There you will find:

- The newsletter, which continually 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.
- Information on field service, repairs, spare parts. Much more is available under "Services".

Contents

1	TeleService S7 Library	1-1
1.1	Introduction to the TeleService S7 Library	1-1
2	Establishing a Remote Connection from the AS to PG/PC: FB 46 "PG_DIAL"	2-1
2.1	Requirements for Establishing a Connection	2-1
2.2	How FB 46 "PG_DIAL" Works	2-2
2.3	Parameters of FB 46 "PG_DIAL"	2-4
2.4	Return Values of FB 46 "PG_DIAL"	2-5
2.5	Call Example for the FB 46 "PG_DIAL"	2-7
3	Establishing a Remote Connection from AS to AS: FB 47 "AS_DIAL"	3-1
3.1	Hardware and Software Requirements	3-1
3.2	How FB 47 "AS_DIAL" Works	3-3
3.3	Overview of the AS-AS Remote Link	3-5
3.4	Parameters of FB 47 "AS_DIAL"	3-6
3.5	Return Values of FB 47 "AS_DIAL"	3-8
3.6	Typical Error Codes and Their Causes	3-10
3.7	The STEP 7 User Program	3-11
4	Example Program for the AS-AS Remote Link	4-1
4.1	Introduction to the Example Program	4-1
4.2	How FB10 Works	4-3
4.3	How FB 5 Works	4-4
4.4	Parameters for Calling FB47 "AS_DIAL"	4-5
4.5	Controlling and Monitoring the Example	4-6
4.6	Working with the Example	4-7
5	Sending an SMS from the S7 Automation System: FB 48 "SMS_SEND"	5-1
5.1	Requirements for Sending an SMS	5-1
5.2	How FB 48 "SMS_SEND" Works	5-2
5.3	Parameters of FB 48 "SMS_SEND"	5-4
5.4	Return Values of FB 48 "SMS_SEND"	5-5
5.5	Call Example for the FB 48 "SMS_SEND"	5-7
5.6	Transferring the PIN to the Radio Modem	5-9
5.7	Sending a Fax	5-9
5.8	Sending an E-mail	5-9

6	Sending an E-mail from the S7 Automation System: FB 49 "AS_MAIL"	6-1
6.1	How FB 49 "AS_MAIL" Works	6-1
6.2	Parameters of FB 49 "AS_MAIL"	6-4
6.3	Return Values of FB 49 "AS_MAIL"	6-7
6.4	SMTP Authentication	6-10
6.5	Determining the IP Address of the Mail Server	6-11
6.6	Call Example for the FB 49 "AS_MAIL"	6-12
Glossary		Glossary-1
Index		Index-1

1 TeleService S7 Library

1.1 Introduction to the TeleService S7 Library

TeleService S7 Library

The independent TeleService S7 Library setup make available the function blocks FB 46 "PG_DIAL", FB 47 "AS_DIAL", FB 48 "SMS_SEND" and FB 49 "AS_MAIL" as well as examples for S7-300, S7-400 and C7. The TeleService S7 Library integrates itself in an existing STEP 7 installation. The installation requires STEP 7 V5.0 or higher.

You can only use the function blocks contained in the TeleService S7 library in combination with the employed TS Adapter:

- for TS Adapter I/II:
FB 46 "PG_DIAL", FB 47 "AS_DIAL" and FB 48 "SMS_SEND"
- for TS Adapter IE:
FB 49 "AS_MAIL"

The following functions are provided when these are is used together with TeleService:

1. Access to remote plants (remote maintenance):
You can centrally manage, control and monitor distributed plants via remote connection.
Possible with: S7-200, S7-300, S7-400 and C7.
2. Connection establishment from and to remote plants (PG-AS remote link):
Using PRODAVE MPI, you can establish a remote connection to a remote plant and with the FB 46 "PG_DIAL" function block you can establish a remote connection from a remote plant.
Possible with: S7-300, S7-400, C7 and TS Adapter I/II.
3. Data communication between plants (AS-AS remote link):
Using the FB 47 "AS_DIAL" function block, two SIMATIC automation systems can exchange process data via the telephone network.
Possible with: S7-200 (restricted), S7-300, S7-400, C7 and TS Adapter I/II.
4. Sending an SMS from a plant:
Using the FB 48 "SMS_SEND" function block, a SIMATIC automation system can send a message (SMS) via a GSM radio modem.
Possible with: S7-300, S7-400, C7 and TS Adapter I/II.
5. Sending an e-mail from a plant
Using the FB 49 "AS_MAIL" function block, a SIMATIC automation system can send an e-mail.
Possible with: S7-300, S7-400 and TS Adapter IE.

The following components are required to be able to use the TeleService functionality for remote maintenance:

- SIMATIC TeleService and the following extra components that are not included in the TeleService package are:
- A TS Adapter IE or TS Adapter II or TS Adapter I and an external modem at the automation system end
- An analog modem, ISDN adapter or radio modem for the GSM network the PG/PC end.

You also need the following for a PG-AS remote link:

- The PRODAVE MPI V5.0 product
PRODAVE MPI is a toolbox for the process data traffic between a PG/PC and SIMATIC S7/C7. It handles the data traffic autonomously over the MPI interface.
- The supplied "PG_DIAL" function block from the TeleService S7 Library

You also need the following for an AS-AS remote link:

- A second TS Adapter II, or a TS Adapter I and an external modem
- An additional modem with cable, if required
- The supplied FB 47 "AS_DIAL" function block from the TeleService S7 Library

You also need the following for sending an SMS:

- A radio modem for the GSM network
- The supplied FB 48 "SMS_SEND" function block from the TeleService S7 Library

You also need the following for sending an e-mail:

- The supplied FB 49 "AS_MAIL" function block from the TeleService S7 Library

2 Establishing a Remote Connection from the AS to PG/PC: FB 46 "PG_DIAL"

2.1 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 requires are described below.

Hardware requirements:

The hardware required to establish a remote connection to a PG/PC from a remote plant is the same as that required by the PG/PC for accessing the remote plant.

Your user program calls a function block to establish the connection. 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 later.

Software requirements at the plant end:

Function block FB 46 "PG_DIAL" is included in the TeleService software package; it is copied into the STEP 7 library when the TeleService S7 Library is installed. a remote plant is to establish a remote connection to a PG/PC, the user program of the plant has to call the "PG_DIAL" function block.

Software requirements at the PG/PC end:

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

Your user program interfaces with the interface provided by PRODAVE MPI. PRODAVE MPI allows you not only to accept calls, but also to establish remote connections. You can find information on the features and a description of the interface in the product description of PRODAVE MPI V5.0 (or later).

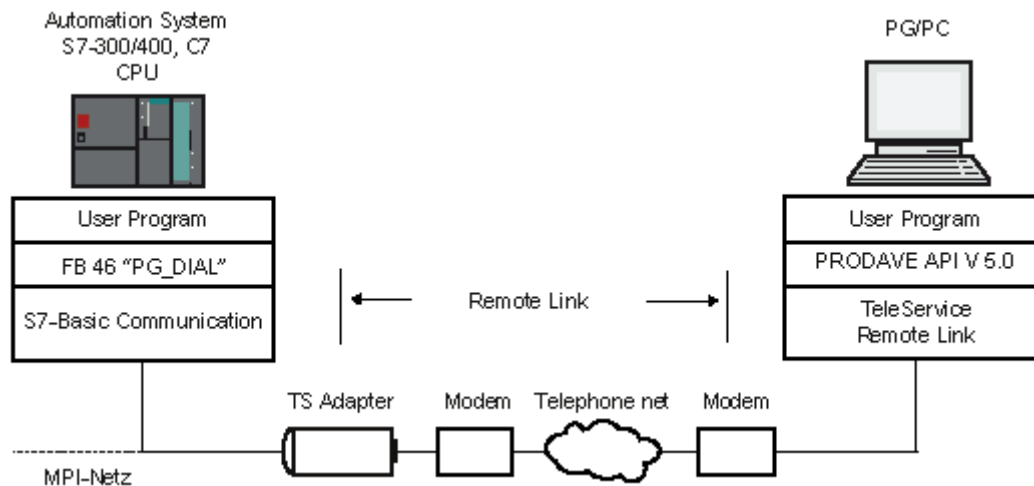
2.2 How FB 46 "PG_DIAL" Works

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 PG/PC. The event ID is transmitted to the PG/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 acknowledgment, which is forwarded to the "PG_DIAL" function block. Execution of "PG_DIAL" is then completed and the status is reported to the caller of "PG_DIAL". The application on the PG/PC is responsible for terminating the remote connection.

If an error occurs during the execution that results in an abort, the error code is passed by "PG_DIAL" to the caller. Any established remote connection is closed by the TS Adapter.



Calling "PG_DIAL"

You can call the "PG_DIAL" function block in the cycle or in a time-controlled program.

An instance DB must always be specified when calling "PG_DIAL".

Several calls of "PG_DIAL" are required in order to process a block function. It therefore does not make sense to call "PG_DIAL" in a "waiting loop". The completion of the block function is signaled with BUSY = 0.

Terminating the communication connection

If the CPU switches to STOP operating state while PG_DIAL is active, this will terminate the communication connection to the TS Adapter. The communication connection to the TS Adapter is also lost if there are serious communication problems on 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 PG/PC and passes on the event ID. However, the TS Adapter discards the acknowledgment that it receives from the PG/PC.

If a user program on the CPU tries to establish 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 reestablish the remote connection later. You also receive the return value W#16#B10A if a number of CPUs are simultaneously attempting to establish a remote connection via the same TS Adapter.

Changing user programs



Caution

You may only change those parts of your STEP 7 user program that directly affect "PG_DIAL" or "AS_DIAL" calls in the STOP operating mode of the CPU. This relates especially to deleting or exchanging program blocks containing calls for "PG_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 need to perform a warm or cold restart for the CPU.

Data consistency

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

2.3 Parameters of FB 46 "PG_DIAL"

Parameter	Declaration	Data type	Memory range	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
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: The establishment of the remote connection is not yet completed. BUSY=0: Execution of "PG_DIAL" is 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 without error, 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.

2.4 Return Values of FB 46 "PG_DIAL"

The return values from "PG_DIAL" can be classified as follows:

- W#16#0000: "PG_DIAL" was successfully completed
- W#16#7xxx: Status of "PG_DIAL"
- W#16#8xxx: Error reported during internal call of a communication SFC or SFC 20 BLKMOV
- W#16#9xxx: Parameter error calling "PG_DIAL"
- W#16#Bxxx: An error has been reported by the TS Adapter

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

Return value (W#16#...):	Meaning:	Notes:
0000	Execution of "PG_DIAL" has completed without error.	
7000	"PG_DIAL" has been reset (communication with the TS Adapter has been disconnected).	Call "PG_DIAL" again.
7001	"PG_DIAL" is active (first call, BUSY = 1). The function has just started.	
7002	"PG_DIAL" is active (subsequent call, BUSY = 1). The execution of the function is not yet completed.	
8xxx or 8zxx	Execution of "PG_DIAL" was completed with an error code of the internally called communication SFCs. If the error message originates from the SFC 20 BLKMOV, the following applies z = 2 Error copying the PHONE_NO parameter to the internal buffer z = 3 Error copying the EVENT_NO parameter to the internal buffer	You can find additional information in the documentation for "System Software for S7-300/400 System and Standard Functions". In the SIMATIC Manager, select a system function block (X_ABORT; X_GET; X_PUT; X_RCV and X_SEND) and press the F1 key. Inform yourself about the error information in the online help.
9001	Length of PHONE_NO = 0 or > 31	The telephone number must include at least 1 character and a max. of 31 characters.
9002	Length of Event-ID = 0 or > 16	The event ID must include at least 1 character and a max. of 16 characters.
B000	The remote connection to the PG/PC was established. However, no program for the forwarded event ID responded at the TeleService end.	
B10A	The TS Adapter already has a job that still has to be executed.	Call "PG_DIAL" again.
B10B	After the remote connection was created, the communications partner closed the connection before the event ID could be transferred.	Call "PG_DIAL" again.

Return value (W#16#...):	Meaning:	Notes:
B206	The remote connection to the PG/PC could not be established..	Check the configuration of the modem in the TS Adapter (local and remote).
B302	The TS Adapter is connected directly with a PG/PC (direct connection).	Terminate communication on the direct connection.
B305	There is still a remote connection to a PG/PC.	Call "PG_DIAL" again at a later point in time.

2.5 Call Example for the FB 46 "PG_DIAL"

```
FUNCTION_BLOCK FB 1
TITLE =Call example for PG_DIAL
//This example call for "PG_DIAL" is
// called cyclically (e.g. in OB1).
//The call condition is set during execution
//in 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 to be
sent
END_VAR
BEGIN
NETWORK
TITLE =

// Check the call condition
  U      #Call condition;
  JCN   End;

// Call of PG_DIAL
  CALL FB 46, DB 46 (
    MPI_TS_ADAPTER := 6,
    PHONE_NO       := #Programmiergeraet,
    EVENT_ID       := #Nachricht,
    BUSY           := M      46.0,
    STATUS         := MW     48 );

// Check call results at end of execution
  U      M      46.0; // is BUSY == 0 ?
  JC   End;         // no, PG_DIAL still processing job
  L      0;         // yes, execution is completed
  L      MW     48;
  ==I   ;          // STATUS == 0 ?
  JC   ok;         // yes, no error has occurred
  L      W#16#7000; // no,
  ==I   ;          // Was PG_DIAL reset ?
  JC   End;         // yes, call PG_DIAL again
```

```
// (in the next cycle)
    NOP    0;          // no, an error has occurred
                // add error evaluation here if needed
    R      #Call condition; // Delete the call condition
    SPA    End;

//FB PG_DIAL execution completed without error
ok:  R      #Call condition; // Delete the call condition

End: BE;
END_FUNCTION_BLOCK
```

3 Establishing a Remote Connection from AS to AS: FB 47 "AS_DIAL"

3.1 Hardware and Software Requirements

If a local automation system is to make a remote connection to a remote automation system, certain hardware and software requirements must be fulfilled. These requires are described below.

Hardware requirements

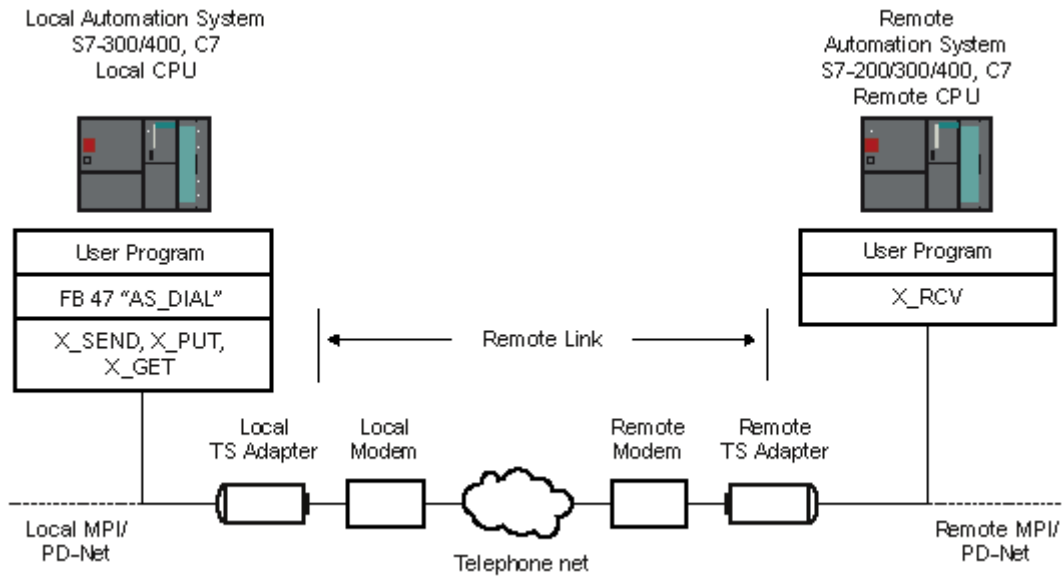
The hardware required for sending process data from a local to a remote automation system is the same as that required by the PG/PC for accessing the respective automation system.

To establish and close a remote connection, your STEP 7 user program calls a function block from the local CPU. This FB can run on an S7-300/400-CPU or C7 CPU. The FB requires that S7 basic communication is installed in the CPU. The remote CPU must also support S7 basic communication .

The version of the two employed TS Adapters must be at least V5.1.

Software requirements

Function block FB 47 "AS_DIAL" is included in the TeleService software package; it is copied into the STEP 7 library when the TeleService S7 Library is installed. Function block "AS_DIAL" is called in your STEP 7 user program of the local CPU to establish or close a remote connection from a local automation system to a remote automation system.



3.2 How FB 47 "AS_DIAL" Works

Description

You can use FB 47 "AS_DIAL" to establish a remote connection from a local S7 automation system to a remote S7 automation system and then exchange process data. You can exchange the process data using the SFCs "X_GET", "X_PUT" and "X_SEND".

"AS_DIAL" has two functions:

- DIAL Function: Establish a remote connection to a remote TS Adapter. You request this function with the input parameter REQ_DIAL.
- HANGUP Function: Close an established remote connection to a remote TS Adapter. You request this function with the input parameter REQ_HANGUP.

Only one of the functions can be active at any given time. The DIAL function is canceled when you request the HANGUP function.

If an error occurs during the execution that results in an abort, the error code is passed to the caller from "AS_DIAL". Any established remote connection is closed by the TS Adapter.

Connection establishment

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. The local TS Adapter performs the legitimization on the remote TS Adapter if required.
3. The first communication SFC for non-configured S7 connections addressed on the local TS Adapter, initiates the establishment of the S7 connection to the remote CPU. Once this S7 connection has been successfully established, process data are exchanged.

If this communication SFC ends with the "Temporary lack of resources of the communication partner" error code, you can call the communication SFC again. The local TS Adapter then attempts again to establish the S7 connection to the remote CPU. The remote connection does not close with this.

Closing one of the S7 connections or the remote connection automatically results in the termination the remote connection by both TS Adapters.

Calling "AS_DIAL"

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

An instance DB must always 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 completion 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. In the local STEP user program, therefore, ensure that no communication SFC for non-configured S7 connections started with DEST_ID = "MPI address of the local TS Adapters" is active during the establishment or closing of a remote connection with "AS_DIAL".

3.3 Overview of the AS-AS Remote Link

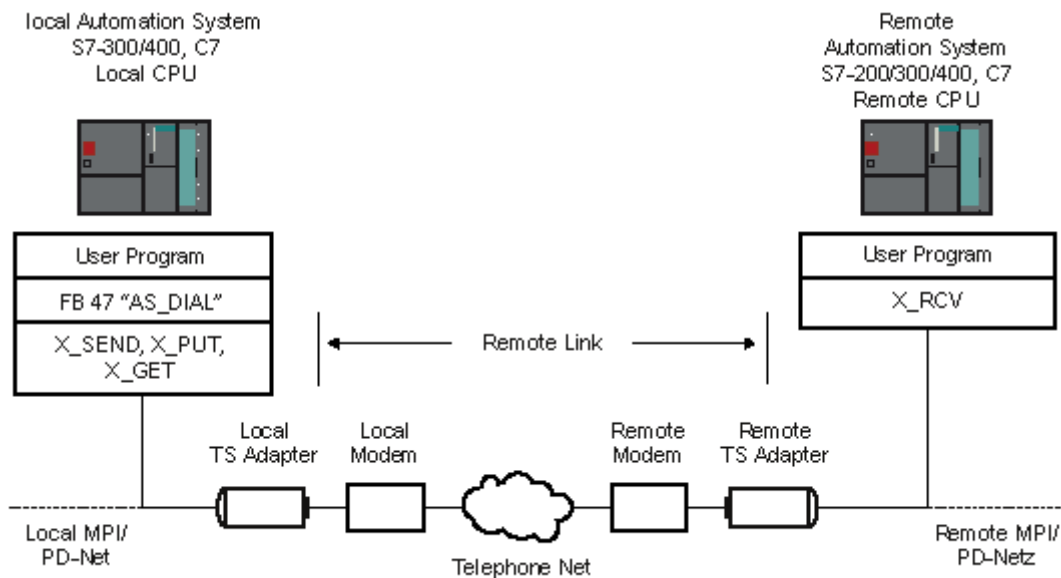
Using the AS-AS remote link, two S7 automation systems can exchange process data via the telephone network. The S7 automation system is referred to as **local** in the following. It takes the initiative for establishing and disconnecting the remote connection. The automation system to which the remote connection is established, is referred to as the **remote** automation system.

The data exchange is performed 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 referred to as the communication SFCs in the following.

The following figure is a graphic representation of the components required for establishing the connection to a remote automation system from a local automation system.



If the remote CPU is an S7-200, only X_GET and X_PUT can be called on the local automation system. X_GET and X_PUT are basic functions of the remote S7-200 CPU, which are made available without any additional programming work.

3.4 Parameters of FB 47 "AS_DIAL"

Parameter	Declaration	Data type	Memory range	Description
ADDR_TS_ADAPTER	INPUT	INT	I, Q, M, D, L, Const.	Input parameters of the DIAL and HANGUP functions: MPI address of the TS Adapter in the local MPI network
PHONE_NO	INPUT	ANY	D	Input parameter of the DIAL function: Telephone 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: Closing an established remote connection to a remote TS Adapter
STATUS	OUTPUT	INT	I, Q, M, D, L	Output parameter: Return value from "AS_DIAL"
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 is not yet completed. BUSY = 0: Processing of 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.

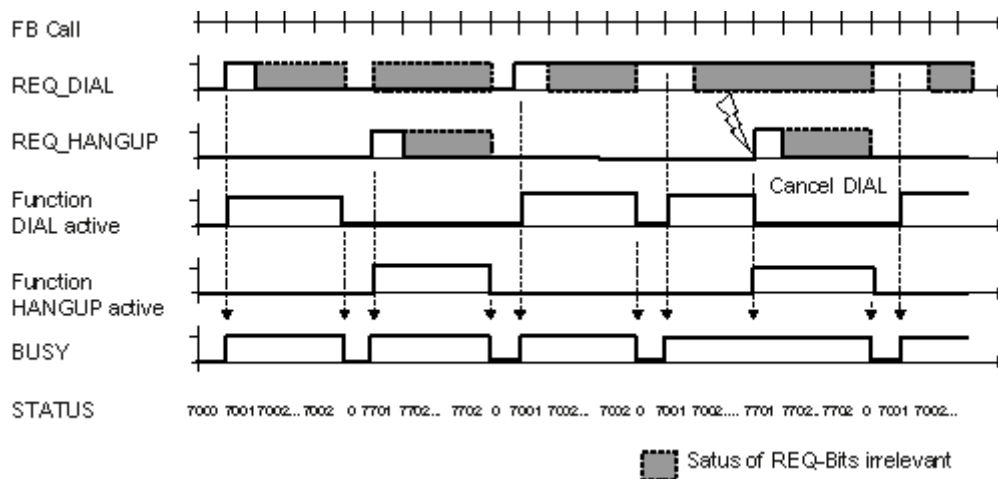
- Input parameter EN: The state of the result of logic operation (RLO) is saved in the BIE bit during the block call.
- Output parameter ENO:

If "AS_DIAL" has been executed without error, 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 a remote connection..



3.5 Return Values of FB 47 "AS_DIAL"

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

- W#16#0000: "AS_DIAL" was completed without error
- W#16#3xxx: Most recent 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 calling "AS_DIAL"
- W#16#Bxxx: Error 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#...)	Meaning	Notes
0000	No function is active.. Execution of "AS_DIAL" has completed without error.	This message is displayed only once after the respective function is successfully completed.
3007	The local TS Adapter has hung up.	Only displayed by the HANGUP function.
3008	The remote connection has crashed spontaneously or the remote TS Adapter has disconnected.	Only displayed by the HANGUP function.
7000	No function is active.	No function is being executed or requested via the input parameters.
7001	DIAL function is active (first call, BUSY =1). The function has just started.	The REQ_DIAL input parameter is not evaluated until the end of the function (BUSY = 0).
7002	DIAL function is active (subsequent call, BUSY = 1). The execution of the function is not yet completed.	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 started.	The REQ_DIAL and REQ_HANGUP input parameters are not evaluated until the end of the function (BUSY = 0).
7702	HANGUP function is active (subsequent call). The execution of the function is not yet completed.	The REQ_DIAL and REQ_HANGUP input parameters are not evaluated until the end of the function (BUSY = 0).
8xxx	Error message: The execution of the active block function was aborted due to an error message (RET_VAL < 0) of an SFC called inside the block.	Refer to the description of the error information for communication SFCs for non-configured S7 connections.
9001	Length of PHONE_NO = 0 or > 31	The telephone number must include at least 1 character and a max. of 31 characters.
9003	Length of LOGIN > 8	The user name for the legitimization at the remote TS Adapter can have max. 8 characters..
9004	Length of PASSWORD > 8	The password for the legitimization at the remote TS Adapter can have max. 8 characters..

Return value (W#16#....)	Meaning	Notes
B100	TS Adapter cannot establish a remote connection at present.	TS Adapter cannot establish a connection to the modem at this time. 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 AS-AS remote link.	Use a TS Adapter that supports the AS-AS remote link.
B20B	The FB 47 "AS_DIAL" and the version of the TS Adapter are incompatible.	Use a TS Adapter that supports the AS-AS remote link.
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 AS-AS remote link.	Use a TS Adapter that supports the AS-AS remote link.
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 access protection (callback number) and 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 you called "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: Unknown password	Check the call parameters of "AS_DIAL" in your STEP 7 user program.
B302	The TS Adapter is connected directly with a PG/PC (direct connection).	Terminate communication on the direct connection.
B305	There is still a remote connection from the local TS Adapter to a PG/PC.	Call "AS_DIAL" again at a later point in time.

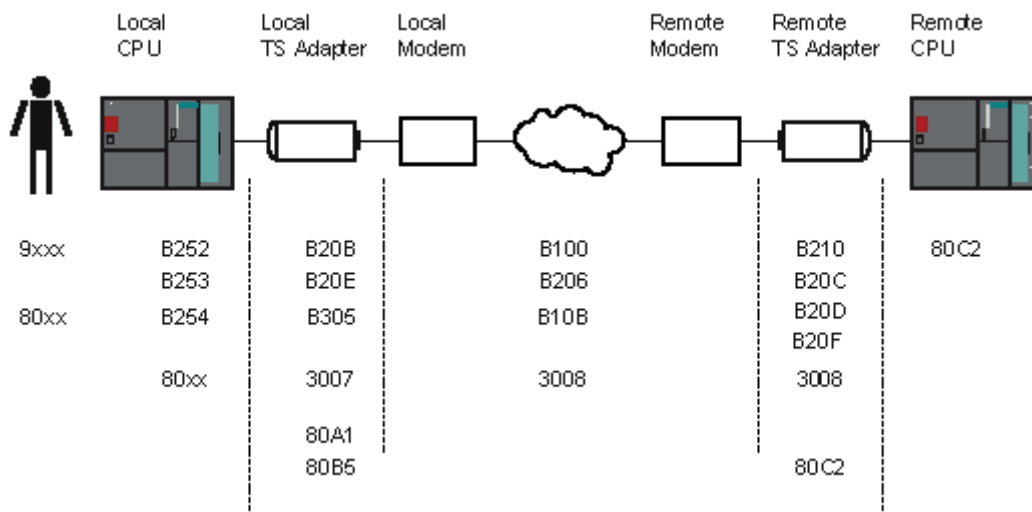
3.6 Typical Error Codes and Their Causes

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

Error code (W#16#...):	Cause:
80A1	<ul style="list-style-type: none"> The execution of a communication SFC was rejected by the local TS Adapter because no remote connection through FB 47 "AS_DIAL" is set up. The remote connection to the remote TS Adapter was disconnected during the execution of the communication SFC .
80B5	<ul style="list-style-type: none"> The execution of a communication SFC was rejected by the local TS Adapter because the DIAL function of FB 47 "AS_DIAL" was not yet completed. The DIAL function of FB 47 "AS_DIAL" was requested although a remote connection was already set up for the AS-AS 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 from the status or error code

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

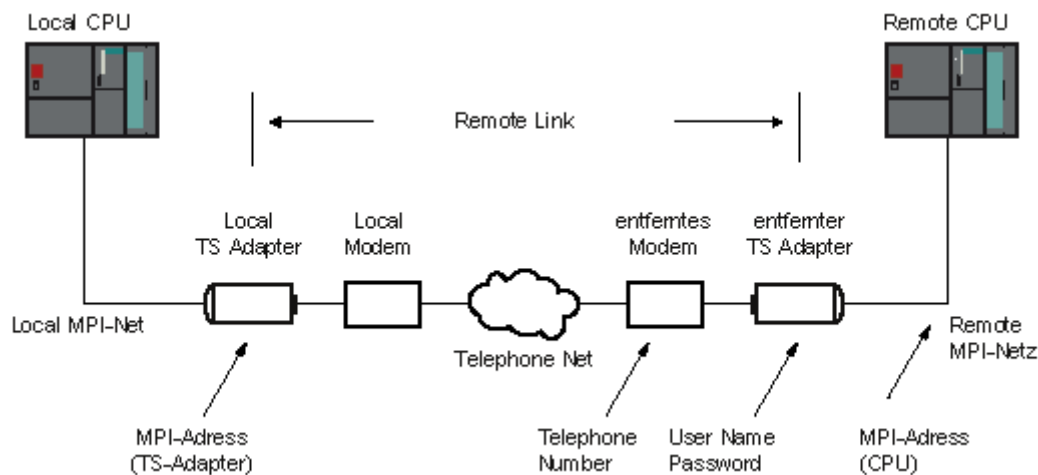


3.7 The STEP 7 User Program

Establishing a remote connection

To establish a remote connection, your user program calls the function "DIAL" of FB 47 "AS_DIAL" with the required parameters. FB 47 "AS_DIAL" sends the parameters forwarded by the user program (telephone 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. The local TS Adapter performs the legitimization on the remote TS Adapter if required. FB 47 "AS_DIAL" informs the user program about the result of the connection establishment using the output parameter. If an error occurs, the HANGUP function of the 47 "AS_DIAL" does not need to be called.



Transferring process data

Once the remote connection is successfully established, your STEP 7 user program in the local CPU performs the process data exchange with the remote CPU. 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 only works with SFC 67 "X_GET" and SFC 68 "X_PUT", no special user program is needed in the remote CPU for data communication. These functions will be handled by the operating system of the remote CPU.

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

Closing a remote connection

To close the remote connection, your user program activated the HANGUP function of FB 47 "AS_DIAL". This terminates the S7 connection to the remote CPU and closes the remote connection. The completion of the HANGUP function is reported to the user program with the output parameter of FB 47 "AS_DIAL".

Rules for calling the communication SFCs in the user program

You should adhere to the following rules regarding FB 47 "AS_DIAL" when calling the communication SFCs in your STEP 7 user program:

- The DEST_ID parameter should be supplied with the MPI address of the local TS Adapter and not with the MPI address of the remote CPU when calling the communication SFCs.
- The CONT parameter of the communication SFCs must always be set to TRUE. If you call the communication SFCs with CONT = FALSE, the remote connection will be closed by the TS Adapter after the data transfer.
- In the local STEP 7 user program, ensure that no communication SFC started with DEST_ID = "MPI address of the local TS Adapters" is active during the establishment or closing of a remote connection with FB 47 "AS_DIAL".
- Only one SFC can be processed at any given time by the communication SFCs (SFC 65 "X_SEND", SFC 67 "X_GET" and SFC 68 "X_PUT").
- The values W#16#FFFFFFF0 to W#16#FFFFFFF for the REQ_ID parameter of SFC 65 "X_SEND" are reserved for FB 47 "AS_DIAL" and should not be used in the STEP 7 user program.

Calling the first communication SFC in the user program

The initial call of a communication SFC after remote connection has been successfully established has a special meaning. This SFC call initiates the establishment of the S7 connection between a local TS Adapter and remote CPU. If the SFC call ends with the error code W#16#80C2 "Temporary lack of resources of the communication partner", you can repeat the SFC call. The local TS Adapter then attempts again to establish the S7 connection to the remote CPU. The remote connection does not close with this.

4 Example Program for the AS-AS Remote Link

4.1 Introduction to the Example Program

This example program shows you how you can use FB47 "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 is supplied with TeleService. After installing TeleService S7-Library, the example is in the installation folder of STEP 7 in the examples and is called Zen12_01_TELESER_AS_DIAL1.

Hardware and software requirements

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

- PG/PC with installed STEP 7
- SIMATIC TeleService V5.1 (or higher)
- 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 (or later) and a Hayes-compatible modem

Note

The example overwrites the memory byte MB 0 on the CPU on the remote automation system. Instead of MB 0, a different variable can also be used. See also the section "How FB10 Works".

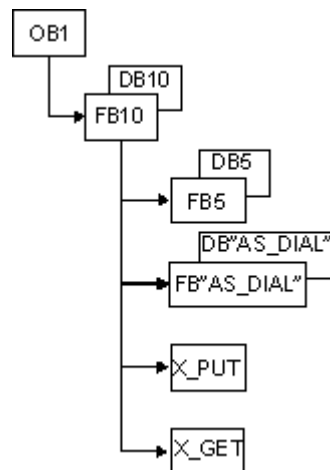
Block overview:

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
FB10	Example_Manager	Establishing and terminating the remote connection and exchanging process data
DB 10	Example_Data	Data of the example
FB5	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	Controlling and Monitoring Program Execution

Call hierarchy of the blocks

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



4.2 How FB10 Works

FB10 is a template for implementing the function of automation-system to automation-system remote connection. It contains the following functionality:

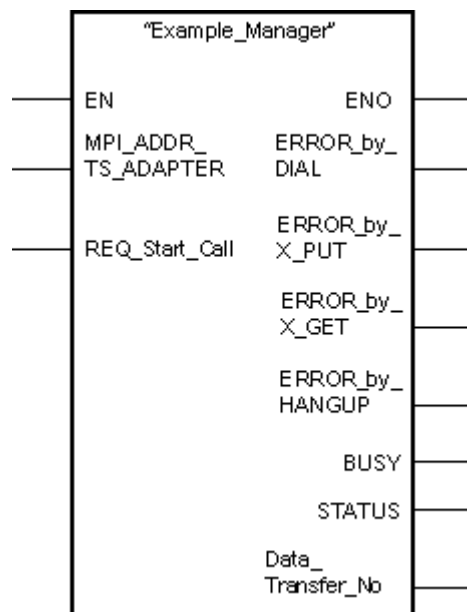
- Establishing the remote connection to the remote SIMATIC S7 automation system,
- Exchanging the process data and
- Terminating the remote connection.

Complete execution of FB10 covers several OB1 cycles. If an error is recognized, the execution of FB10 is aborted.

When exchanging process data, the content of the variable "X_PUT_Data" of DB 10 is written to memory byte MB 0 of the remote CPU, read back from there and incremented. This is repeated until a counter reaches value of the variable "Max_Data_Transfers" of DB 10.

If the memory byte MB 0 on the remote CPU must not be exceeded, you can also use a different variable. If you want to do this, modify the calls for SFCs "X_PUT" and "X_GET" in FB 10.

FB10:



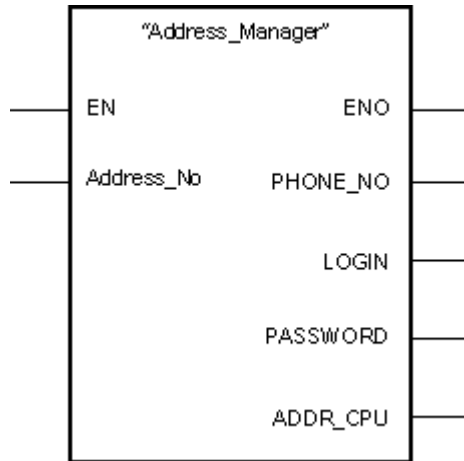
The block comment for FB10 contains a detailed description of the individual networks and their functions.

4.3 How FB 5 Works

FB 5 is a template for selecting various SIMATIC S7 automation systems. In the instance DB for this block, you can store the various parameter records.

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

FB5:

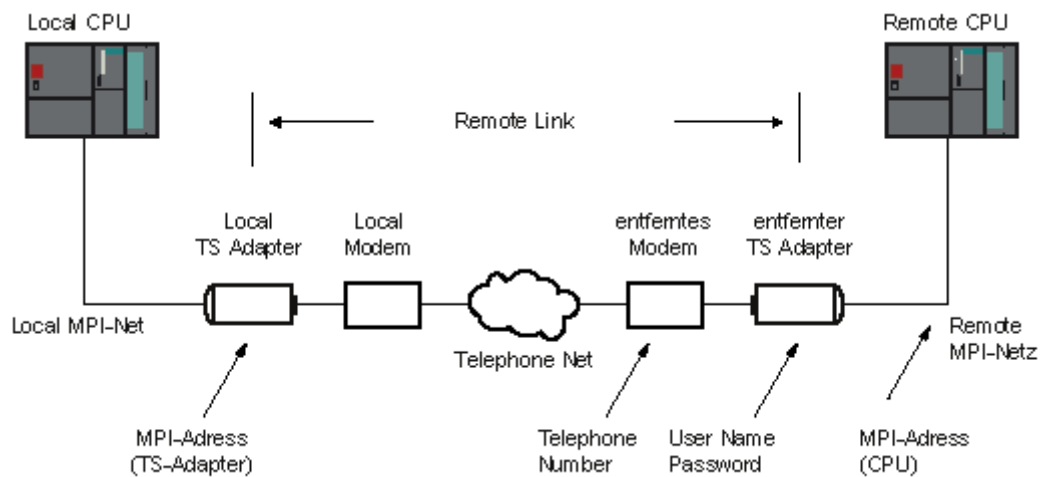


If you want to use FB 5 "Address_Manager", remove the comment lines in the network 5 of FB 10 "Example_Manager".

4.4 Parameters for Calling FB47 "AS_DIAL"

You enter the parameters for calling FB47 "AS_DIAL" in DB 10 (data view with the LAD/STL/FBD Editor in STEP 7).

Default value:	DB address:	Comment:
6	DB10.DBW 0	MPI_ADDR_LOC_TS_ADAPTER: MPI address of the local TS Adapter
2	DB10.DBW 2	MPI_ADDR_REM_CPU: MPI address of the remote CPU
-	DB10.DBB 4	AS_DIAL_PHONE_NO: Phone number of the remote modem, STRING[31]
-	DB10.DBB 38	AS_DIAL_LOGIN: User name of the remote TS Adapter, STRING[8]
-	DB10.DBB 48	AS_DIAL_PASSWORD: Password of the remote TS Adapter, STRING[8]
7	DB10.DBW 58	Max_Data_Transfers: Maximum value of the transferred counter when exchanging process data



4.5 Controlling and Monitoring the Example

You monitor and control the example with the variable table VAT 1. The relevant variables are listed in the following table.

DB address:	Comment:
	CONTROL INPUTS:
DB10.DBX59.0	//Control bit: Start AS-AS remote connection
	DISPLAY:
DB10.DBX59.1	Error in the "DIAL" function: Establishment of the remote connection
DB10.DBX59.2	Error in "X_PUT" function: Data exchange write job
DB10.DBX59.3	Error in "X_GET" function: Date exchange read job
DB10.DBX59.4	Error in "HANGUP" function: Disconnection of the remote connection
DB10.DBX59.5	FB10 active
DB10.DBW60	Status and error messages of FB10 Possible statuses: 1 = DIAL function active 2 = X_PUT function active 4 = X_GET function active 8 = HANGUP function active 0 = Function completed successfully Other value: Error message; refer to the documentation of FB "AS_DIAL" or the error information of the communication SFCs for non-configured S7 connections.
DB10.DBB 62	Current value of the counter

4.6 Working with the Example

Commissioning the example program without FB5:

1. Set parameters for your local and remote TS Adapters.
2. Create a STEP 7 project for both your local and your remote system.
3. Copy the example program to the block folder of your local system.
4. Enter the parameters to suit your system in DB 10 of the example program (refer to the section "Parameters for Calling FB47 "AS_DIAL").
5. Download the system data and the example program to your CPUs.
6. Switch the local CPU to "RUN".
7. Open the variable table VAT1 of the example program.
8. Activate the "monitor variables" function.
9. Set the "Control bit: Start AS-AS remote connection" with the "Modify Variable" function.
10. Follow the execution of the example program.
The "FB10 active" bit indicates whether or not FB10 is still active (= 1) or already completed (= 0).
While FB10 is still active, the "Status and error messages" variable indicates the current block status. For information on interpreting the display, refer to the section "Controlling and Monitoring the Example".
During the exchange of process data, the "Current value of the counter" variable shows the progress of the data transfer.
When FB10 has completed, the "Error of function ..." bits indicate any error that may have occurred. Troubleshooting the function is displayed in the "Status and error messages" variable.

Note

For more detailed information, refer to the documentation of FB47 "AS_DIAL" or the documentation of the "System software for S7-300/400 System and Standard Functions". Select a system function block (X_ABORT; X_GET; X_PUT; X_RCV, and X_SEND) in the SIMATIC Manager and press the F1 key. The online help provides you with information on the errors.

Commissioning the example program with FB5:

In step 4 of the sequence described above, the following extra actions are necessary:

- Set the parameters "PHONE_NO, LOGIN, PASSWORD, and ADDR_CPU" for the connection establishment to the remote system in DB 5 instead of in DB 10.
- Remove the comment character in FB10 in front of the FB5 "Address_Book_Manager" call.
- Enter the number of the required parameter record of DB 5 in the call parameter "Address_No".
Instead of entering a fixed number, you can also leave this entry empty in the "Address_No" parameter and instead specify the parameter in DB 5 using the "Modify Variable" function.

5 Sending an SMS from the S7 Automation System: FB 48 "SMS_SEND"

5.1 Requirements for Sending an SMS

If a plant should 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 at the plant end:

Function block FB 48 "SMS_SEND" is included in the TeleService software package; it is copied into the STEP 7 library when the TeleService S7 Library is installed. If a plant should send an SMS, the user program of the plant must call the FB 48 "SMS_SEND" function block.

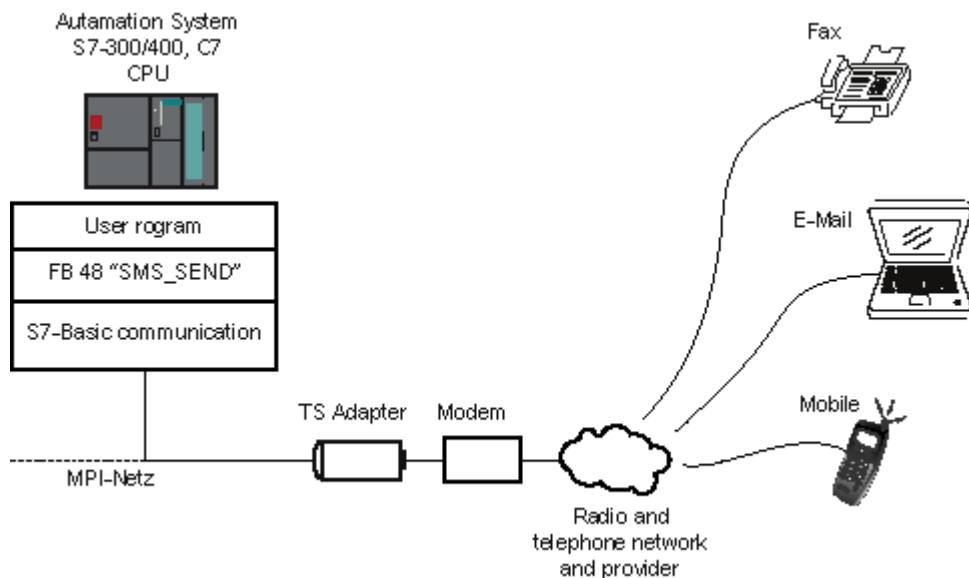
5.2 How FB 48 "SMS_SEND" Works

Description

The FB 48 "SMS_SEND" transfers a telephone number, a service center number and an SMS message to a TS Adapter. The TS adapter passes these data to a radio modem via GSM command.

After the SMS message has been sent, the TS adapter receives an acknowledgment that will be forwarded to FB 48 "SMS_SEND". Execution of "FB 48 "SMS_SEND" is then completed and the status is reported to the caller. This status message only represents an acknowledgment for having sent the SMS, it is **not receive acknowledgment**.

If an error occurs during the execution that results in an abort, the error code is passed to the caller from "SMS_SEND".



Calling FB 48 "SMS_SEND"

You can call FB 48 "SMS_SEND" in the cycle or in a time-controlled program.

An instance DB must always be specified when calling FB 48 "SMS_SEND".

Several calls of FB 48 "SMS_SEND" are required in order to process a block function. It therefore does not make sense to call FB 48 "SMS_SEND" in a "waiting loop". The completion of the block function is signaled with BUSY = 0.

Terminating the communication connection

If the CPU switches to STOP operating state while FB 48 "SMS_SEND" is active, this will terminate the communication connection to the TS Adapter. The communication connection to the TS Adapter is also lost if there are serious communication problems on the MPI bus, or, for example, if the power supply to the CPU is switched off.

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

When a user program in the CPU attempts to send an SMS message while the TS adapter is in the state described above, "SMS_SEND" is terminated via the return value W#16#B10A. The user program can then send an SMS later. You also receive the return value W#16#B10A if a number of CPUs are simultaneously attempting to send an SMS via the same TS Adapter..

5.3 Parameters of FB 48 "SMS_SEND"

Parameter	Declaration	Data type	Memory range	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: The sending the SMS is not yet completed BUSY=0: Processing of FB 48 "SMS_SEND" is completed
STATUS	OUTPUT	INT	I, Q, M, D, L	Output parameter: Return value from "SMS_SEND"

Virtual block parameters EN and ENO and the BIE bit

The virtual block parameters EN and ENO only occur when "SMS_SEND" 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 FB 48 "SMS_SEND" has been executed without error, 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 FB 48 "SMS_SEND" has been left.

5.4 Return Values of FB 48 "SMS_SEND"

The return values from FB 48 "SMS_SEND" can be classified as follows:

- W#16#0000: FB 48 "SMS_SEND" was successfully completed
- W#16#7xxx: Status of FB 48 "SMS_SEND"
- W#16#8xxx: An error was reported with an internal call of a communication SFC or SFC 20 BLKMOV
- W#16#9xxx: Parameter error calling FB 48 "SMS_SEND"
- W#16#Bxxx: An error has been reported by the TS Adapter
- W#16#Cxxx: An error has been reported by the radio modem

The following table shows the FB 48 "SMS_SEND" return values except the error codes for the communication SFCs and the radio modem employed:

Return value (W#16#...):	Meaning:	Notes:
0000	Execution of "SMS_SEND" has completed without error.	
7000	"SMS_SEND" has been reset (communication with the TS Adapter has been disconnected).	Call "SMS_SEND" again.
7001	"SMS_SEND" is active (first call, BUSY = 1). The function has just started.	
7002	"SMS_SEND" is active (subsequent call, BUSY = 1). The execution of the function is not yet completed.	
8xxx or 8zxx	Execution of "SMS_SEND" was completed with an error code of the internally called communication SFCs or SFC 20 BLKMOV. If the error message originates from the SFC 20 BLKMOV, the following applies z = 2 Error copying the PHONE_NO parameter to the internal buffer z = 3 Error copying the SCENTER_NO parameter to the internal buffer z = 4 Error copying the MESSAGE parameter to the internal buffer	For details refer to the system and standard functions reference manual.
9001	Length of PHONE_NO = 0 or > 31	The telephone number must include at least 1 character and a max. of 31 characters.
9002	Length of SCENTER_NO = 0 or > 20	The service center number must include at least 1 characters and a max. of 20 characters.
9003	Length of MESSAGE = 0 or > 160	The SMS message must include at least 1 character and a max. of 160 characters.
B10A	The TS Adapter already has a job that still has to be executed.	Call "SMS_SEND" again.
B301	There is still a remote connection to a PG/PC.	Call "SMS_SEND" again at a later point in time.

Return value (W#16#...):	Meaning:	Notes:
B302	The TS Adapter is connected directly with a PG/PC (direct connection).	Connect the TS Adapter with a GSM radio modem
B303	The TS Adapter is connected to neither a radio modem nor a PG/PC.	Connect the TS Adapter with a GSM radio modem
B304	The port to the radio modem is currently not ready to send SMS.	Call "SMS_SEND" again at a later point in time.
B614	The connected modem has not responded to an SMS-specific command within the monitoring time.	Check if a GSM radio modem is connected. Call "SMS_SEND" again at a later point in time.
B615	The TS adapter has received a non-specific error message from the connected modem.	Check if a GSM radio modem is connected.
Cxxx	Execution of "SMS_SEND" was completed with an error code of the GSM modems. Xxx: Error number	You can find a list of error IDs in the manual of your radio modem or in the GSM standards GSM 04.11, GSM 03.40 and GSM 07.05. Examples: C136 = SIM card missing in the GSM modem C137 = Incorrect PIN for GSM modem (see Transferring the PIN to the Radio Modem) C001 = Wrong service center number

5.5 Call Example for the FB 48 "SMS_SEND"

```
FUNCTION_BLOCK FB 1
TITLE =Call example for SMS_SEND
//This call example for "SMS_SEND" is
// called cyclically (e.g. in OB1).
//The call condition is set during execution
//in the user program.
VERSION : 0.1

VAR
  Call_condition : BOOL ;
  Phone_No : STRING [31] := '07214711'; //Telephone number to be
dialled
  Scenter_No : STRING [20] := '+491710760000'; //Service center
number
  //message to be sent
  Message : STRING [160] := 'CPU battery failure';
END_VAR
BEGIN
NETWORK
TITLE =

// Check the call condition
U      #Call_condition;
JCN   End;

// Call 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 call results at end of execution
U      M      46.0; // is BUSY == 0 ?
JC   End;         // no, SMS_SEND still processing job
L      0;         // yes, execution is completed
L      MW     48;
==I   ;          // STATUS == 0 ?
JC   ok;         // yes, no error has occurred
L      W#16#7000; // no,
```

```
    ==I    ;           // Was SMS_SEND reset ?
    JC    End;         // yes, call SMS_SEND again
// (in the next cycle)
    NOP    0;         // no, an error has occurred
// add error evaluation here if needed
    R      #Call condition; // Delete the call condition
    SPA    End;

//FB SMS_SEND execution completed without error
ok:   R      #Call condition; // Delete the call condition

End: BE;
END_FUNCTION_BLOCK
```

5.6 Transferring the PIN to the Radio Modem

When you are using a SIM card with enabled PIN verification, the PIN must be transferred to the radio modem during the initialization phase. This can be done using the initialization string of the TS adapter, which you can configure in TeleService. Configure the initialization 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 radio modem's SIM card to the connected component. Then, the radio modem is initialized with "AT&F..."..

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

5.7 Sending a Fax

By adding a special prefix to a fax 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 network provider service and does not represent a function of the TS adapter

The user must specify the fax number with the corresponding supplement at the PHONE_NO parameter.

Example for D1 network with the fax number 07214711:

- PHONE_NO = '9907214711'

5.8 Sending an E-mail

An SMS can be sent to an e-mail address by dialing a special network provider number (e.g. "8000" in the German D1 network) and prefixing the SMS message with an e-mail address. This is a network provider service and does not represent a function of the TS adapter

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

Separator characters (D1) for example are ":" (D2). Instead of the "@" character. some network providers require a "*".

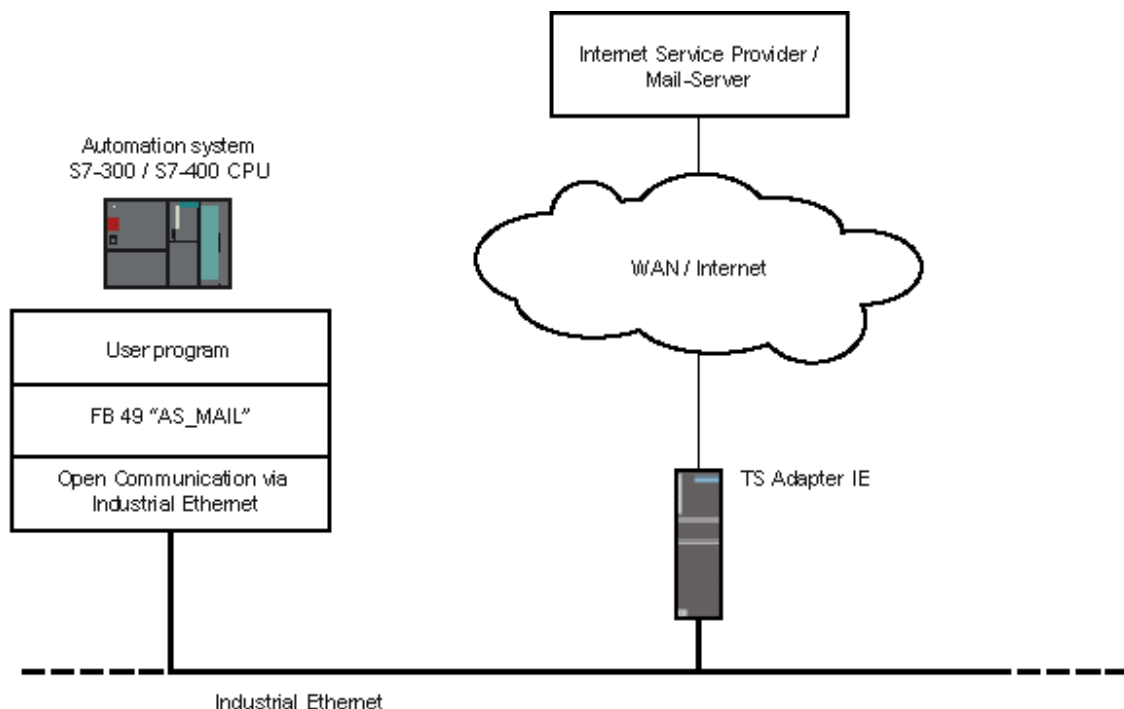
Example for D1 network:

- The text 'CPU battery failure' is to be sent to the e-mail address 'JohnDoe*universal.com'.
- PHONE_NO = '8000'
- MESSAGE = 'JohnDoe*universal.com CPU battery failure'

6 Sending an E-mail from the S7 Automation System: FB 49 "AS_MAIL"

6.1 How FB 49 "AS_MAIL" Works

FB 49 "AS_MAIL" uses the Simple Mail Transfer Protocol (SMTP) to send e-mail from a CPU to a mail server.



Requirement

FB 49 "AS_MAIL" can only be executed on the following S7-300 and S7-400 CPUs with integrated PROFINET interface:

- CPUs 31x-2 PN/DP as of firmware version V2.5
- CPUs 41x-3 PN/DP

In addition, the "Use gateway / router" property must be set for the Ethernet interface in the configuration of the CPU on which FB 49 "AS_MAIL" is executed. (This is found under: Hardware Configuration > PROFINET IO (PN-IO) > General > Properties > Parameters). The IP address of the Ethernet interface of the TS Adapter IE should be specified as the "Address".

Required program blocks

FB 49 "AS_MAIL" requires the following FCs from the standard library of STEP 7 in the "IEC Function Blocks" folder:

- FC 10 "EQ_STRNG",
- FC 11 "FIND",
- FC 17 "INSERT",
- FC 20 "LEFT",
- FC 21 "LEN" and
- FC 32 "RIGHT".

You need to copy these blocks from the standard library of STEP 7 into your project and to your CPU.

Method of operation

FB 49 "AS_MAIL" is an asynchronously operating function block, meaning that processing extends across a number of function block calls. An instance DB must always be specified when calling FB 49 "AS_MAIL".

You initialize the block by calling "COM_RST = 1".

You start the sending of an e-mail with an edge transition from 0 to 1 at the "REQ" parameter.

The status of the job is shown with the output parameters "BUSY", "DONE", "ERROR" and the output parameters "STATUS" and "SFC_STATUS". "SFC_STATUS" corresponds here to the "STATUS" output parameter of the called communication blocks or the SFC 20 "BLKMOV".

The output parameters "DONE", "ERROR", "STATUS" and "SFC_STATUS" are only shown for one cycle when the state of the "BUSY" output parameter changes from 1 to 0.

The following table shows the relationships among "BUSY", "DONE" and "ERROR". You can use this table to determine the state FB 49 "AS_MAIL" is in and when the sending of an e-mail is completed.

BUSY	DONE	ERROR	Description
1	Irrelevant	Irrelevant	The job is being executed.
0	1	0	The job was successfully completed.
0	0	1	The job ended with an error. For troubleshooting, refer to the "STATUS" and "SFC_STATUS" parameters.
0	0	0	No (new) job allocated to FB 49 "AS_MAIL".

Terminating the communication connection

If the CPU switches to STOP operating state while "AS_MAIL" is active, this will terminate the communication connection to the mail server. The communication connection to the mail server is also lost if there are serious communication problems on the Industrial Ethernet bus.

In such situation, the sending of the e-mail is aborted and it will not reach the recipient.

Changing user programs



Caution

You may only change those parts of your STEP 7 user program that directly affect FB 49 "AS_MAIL" calls:

- When CPU is in the "STOP" operating state or
- No mail is being sent (REQ = 0 and BUSY = 0).

This relates especially to deleting or exchanging program blocks containing calls for FB 49 "AS_MAIL" or calls for the instance DBs of FB 49 "AS_MAIL"

If you do not do so, connection resources may remain assigned. The automation system can go into an undefined state at the TPC/IP communication functions via Industrial Ethernet

After you have transferred your changes, restart (warm start) or reboot the CPU or set the "COM_RST" parameter of FB 49 "AS_MAIL".

Data consistency

The "ADDR_MAIL_SERVER" input parameter of the function block is read from the FB 49 "AS_MAIL" each time the sending of an e-mail is triggered. If you make a change during the execution, the "new" value only takes effect the next time an e-mail is triggered.

In contrast, the "WATCH_DOG_TIME", "TO_S", "CC", "FROM", "SUB", "TEXT", "ATTACHMENT" parameters as well as "USERNAME" and "PASSWORD" are read from FB 49 "AS_MAIL" during its execution and therefore may only be changed with the job is completed (BUSY = 0).

Configuration of the TS Adapter IE

The parameters for outgoing calls must be specified on the TS Adapter IE so that it can establish a connection to the dial-up server of your Internet service provider.

If you set the connection establishment to "on demand", the connection is only established when the e-mail is to be sent.

It make take longer to establish a connection with an analog modem (approx. one minute). The time for establishing a connection must be included in the "WATCH_DOG_TIME" parameter for FB 49 "AS_MAIL".

6.2 Parameters of FB 49 "AS_MAIL"

Parameter	Declaration	Data type	Memory range	Description
COM_RST	INPUT/ OUTPUT	BOOL	I, Q, M, D, L	Input/output parameter "COMPLETE" RESTART: The block has an initialization routine which is executed when the COM_RST input is set. The "COM_RST" parameter of FB 49 "AS_MAIL" must be set to "1": <ul style="list-style-type: none"> • Once at the first call and • Always when the corresponding instance DB is newly loaded. Following the initialization, FB 49 "AS_MAIL" resets the "COM_RST" parameter.
REQ	INPUT	BOOL	I, Q, M, D, L	Control parameter "REQUEST": Triggers the sending of an e-mail with a rising edge.
ADDR_MAIL_SERVER (see: Determining the IP Address)	INPUT	DWORD	I, Q, M, D, L	Input parameter IP address of the mail server: Specified as a data word in HEX format, e.g.: IP address = 192.168.0.200. ADDR_MAIL_SERVER = DW#16#C0A800C8, whereby: <ul style="list-style-type: none"> • 192 = 16#C0, • 168 = 16#A8 • 0 = 16#00 and • 200 = 16#C8
WATCH_DOG_TIME	INPUT	TIME	I, Q, M, D, L	Input parameter max. time period: FB 49 "AS_MAIL" should establish a connection within the specified time (WATCH_DOG_TIME). If this time is exceeded, the block ends with an error. The time until the block ends and output the error may exceed the WATCH_DOG_TIME since closing the connection also takes time. 2 minutes should be added to the time at first. This time can be set much lower for an ISDN telephone connection.
USERNAME (see SMTP Authentication and Point 1 in the note)	INPUT	ANY	D	Input parameter user name: Reference to a variable from the STRING type with a maximum length of 180 characters. USERNAME is mandatory for the authentication procedure.
PASSWORD (see "SMTP Authentication" and Point 1 in the note)	INPUT	ANY	D	Input parameter password: Reference to a variable from the STRING type with a maximum length of 180 characters. PASSWORD is mandatory for the authentication procedure.

Parameter	Declaration	Data type	Memory range	Description
TO_S (see Point 2 in the note)	INPUT	ANY	D	Input parameter recipient addresses: Reference to a variable from the STRING type with a maximum length of 240 characters (see call example).
CC (optional, see Points 2 and 3 in the note)	INPUT	ANY	D	Input parameter CC recipient addresses: Reference to a variable from the STRING type with a maximum length of 240 characters (see call example).
FROM (see Point 2 in the note)	INPUT	ANY	D	Input parameter sender address: Reference to a variable from the STRING type with a maximum length of 240 characters (see call example).
SUB	INPUT	ANY	D	Input parameter RE of the e-mail: Reference to a variable from the STRING type with a maximum length of 240 characters.
TEXT (optional, see Point 3 in the note)	INPUT	ANY	D	Input parameter text of the e-mail: Reference to a data string with a maximum length of 240 characters.
ATTACHMENT (optional, see Points 3 and 4 in the note)	INPUT	ANY	I, Q, M, D, L	Input parameter attachment of the e-mail: Reference to a byte / word / double word field with a maximum length of 65534 bytes.
BUSY	OUTPUT	BOOL	I, Q, M, D, L	Output/status parameter "BUSY": BUSY = 1: The sending the e-mail is not yet completed BUSY = 0: Processing of FB 49 "AS_MAIL" is completed.
DONE	OUTPUT	BOOL	I, Q, M, D, L	Output/status parameter "DONE": DONE = 0: Job is not yet started or is still running. DONE = 1: Job completed successfully.
ERROR	OUTPUT	BOOL	I, Q, M, D, L	Output/status parameter "ERROR": ERROR = 1: An error has occurred during execution. STATUS and SFC_STATUS provide detailed information about the type of error.
STATUS	OUTPUT	WORD	I, Q, M, D, L	Output/status parameter "STATUS": Return value or error information of FB 49 "AS_MAIL".
SFC_STATUS	OUTPUT	WORD	I, Q, M, D, L	Output/status parameter "SFC_STATUS": Error information of the called communication blocks or of SFC 20 "BLMOV".

Note

1. If the values of "USERNAME" and "PASSWORD" parameters are removed, newly entered or changed in the block in which FB 49 "AS_MAIL" is called, the change only becomes effective when the corresponding instance DB is loaded again and the "COM_RST" parameter is reset. Otherwise, the pointer to the corresponding parameter remains set in the instance DB.
 2. For reasons relating to the run time and memory capacity, FB 49 "AS_MAIL" does not perform a syntax check for the "TO_S", "CC" and "FROM" parameters. Use correct syntax for the parameters, see: Call Example for the FB 49 "AS_MAIL".
 3. The optional "CC", "TEXT" and "ATTACHMENT" parameters are only sent with the e-mail if they are specified in the block in which FB 49 "AS_MAIL" is called. If such a specification is removed from the call interface of FB 49 "AS_MAIL", the change only becomes effective when the corresponding instance DB is loaded again and the "COM_RST" parameter is reset. Otherwise, the pointer to the corresponding parameter remains set in the instance DB.
Note that empty strings are not allowed for assigning the parameters.
 4. If the "ATTACHMENT" parameter points to an array in a data block and if the size of this array is changed and saved, the ANY pointer of the "ATTACHMENT" parameter must be reentered at the call interface of FB 49 "AS_MAIL".
-

6.3 Return Values of FB 49 "AS_MAIL"

The return values of FB 49 "AS_MAIL" can be classified as follows:

- W#16#0000:FB 49 "AS_MAIL" was successfully completed
- W#16#7xxx: Status of FB 49 "AS_MAIL"
- W#16#8xxx: An error was reported during an internal call of a communication block, SFC 20 "BLKMOV" or from the mail server.

The following table shows the F 49 "AS_MAIL" return values except the error codes for the communication blocks called internally and SFC 20 "BLKMOV".

Return value STATUS (W#16#...):	Return value SFC_STATUS (W#16#...):	Meaning:	Notes:
0000		Processing of FB 49 "AS_MAIL" has completed without error.	If FB 49 "AS_MAIL" is completed without error, this does not mean that the sent e-mail has arrived (see Point 1 in the note)
7001		FB 49 "AS_MAIL" is active (BUSY = 1).	
7002	7002	FB 49 "AS_MAIL" is active (BUSY = 1).	
8xxx	xxxx	Execution of FB 49 "AS_MAIL" was completed with an error code of the internally called communication SFCs or SFC 20 BLKMOV.	You can find detailed information about evaluating the "SFC_STATUS" parameter in the documentation under "Open Communication via Industrial Ethernet" or "Copying Memory Areas with SFC 20 "BLKMOV"

Return value STATUS (W#16#...):	Return value SFC_STATUS (W#16#...):	Meaning:	Notes:
800z	xxxx	<p>The error message originates from the SFC 20 BLKMOV and means:</p> <p>z = 1 Error copying the "TO_S" parameter to the internal buffer</p> <p>z = 2 Error copying the "CC" parameter to the internal buffer</p> <p>z = 3 Error copying the "FROM" parameter to the internal buffer</p> <p>z = 4 Error copying the "SUB" parameter to the internal buffer</p> <p>z = 5 Error copying the "TEXT" parameter to the internal buffer</p> <p>z = 6 Error copying the "ATTACHMENT" parameter to the internal buffer</p> <p>z = 7 Error copying the "USERNAME" parameter to the internal buffer</p> <p>z = 8 Error copying the "PASSWORD" parameter to the internal buffer</p>	
8010	xxxx	Error establishing the connection.	COM_RST may not have been reset after the instance DB was loaded.
8011	xxxx	Error sending data.	You can find detailed information about evaluating the SFC_STATUS in the documentation under "Open Communication via Industrial Ethernet" or "FB 65 TCON", "FB 63 TSEND", "FB 64 TRCV", "FB 66 TDISCON".
8012	xxxx	Error receiving data.	
8013	xxxx	Error establishing the connection.	

Return value STATUS (W#16#...):	Return value SFC_STATUS (W#16#...):	Meaning:	Notes:
8014		Cannot establish a connection.	You may have specified an incorrect mail server IP address (ADDR_MAIL_SERVER) or too short a time period (WATCH_DOG_TIME) for establishing the connection. It is also possible that the CPU does not have a connection to the network or that the CPU is configured incorrectly.
82xx, 84xx, or 85xx		The error message originates from the mail server and corresponds to the error number of the SMTP protocol except for the "8". The following columns list a few error codes that can occur:	See Point 3 in the note.
8450		Action not performed: Mailbox not available.	Try again later.
8451		Action aborted: Local error in the execution	Try again later.
8500		Syntax error: Unknown error. This also includes error when command string is too long. It may also be mean that the e-mail server does not support the LOGIN authentication procedure.	Check the parameters of FB 49 "AS_MAIL". Try sending an e-mail without authentication. Replace the USERNAME parameter with an empty string.
8501		Syntax error: Wrong parameter or argument	You may have specified an incorrect address in "TO_S" or "CC".
8502		Unknown or non-implemented command.	Check your entries, especially the "FROM" parameter. Perhaps they are incomplete or you have forgotten "@" or ".".
8535		SMTP authentication incomplete.	You may have specified an incorrect user name or incorrect password.
8550		Cannot reach mail server, you have no access rights.	You may have specified an incorrect user name or password or the mail server does not support your LOGIN. Another cause could be incorrect specification of the domain name after the "@" in TO_S or CC.
8552		Action aborted: Allotted memory exceeded	Try again later.
8554		Transmission failed.	Try again later.

Notes

1. Incorrect specification of the recipient address does not generate a status error of FB 49 "AS_MAIL". The sending of the e-mail to other recipients, even when their address is correct, is not ensured in this case.
 2. You can find additional information on the SMTP error codes and other error codes in the SMTP protocol in the Internet or in the error documentation of the mail server. You can also view the most recent error message sent by the mail server in text form in the "buffer1" parameter of your instance DB. There, you will find the data last sent from FB 49 "AS_MAIL" under "Data".
-

6.4 SMTP Authentication

Authentication is a procedure for ensuring identity, for example, by requesting a password.

FB 49 "AS_MAIL" supports AUTH-LOGIN SMTP authentication procedure, that is required by most mail servers. You can find information on the authentication procedure of your mail server from the documentation of the mail server or from the Web site of your Internet service provider.

To use the AUTH-LOGIN authentication procedure, FB 49 "AS_MAIL" needs the user names with which you log on to the mail server. This user name corresponds to the user name you use for a mail account you have set up on your mail server. It is made known to FB 49 "AS_MAIL" with the "USERNAME" parameter.

FB 49 "AS_MAIL" also need the corresponding password to log on. This password corresponds to the password assigned when you set up your mail account. It is made known to FB 49 "AS_MAIL" with the "PASSWORD" parameter.

If no user name is specified in the DB, the AUTH-LOGIN authentication procedure is not used. The e-mail is then sent without authentication.

6.5 Determining the IP Address of the Mail Server

Note

The following instructions apply to the Windows XP operating system.

First, configure a dial-up connection to your Internet service provider on your PC.

To do this, use the menu commands listed below:

1. Start > Control Panel > Network Connections
2. Menu "File > New Connection" > "Next" button
3. "Dial-up to the Internet" > "Next" button
4. "I want to set up my Internet connection manually" > "Next" button
5. "I connect through a phone line and modem" > "Next" button
6. Enter the required parameters in the subsequent dialogs.

Setting the properties of the dial-up connection

Set "Use standard gateway for remote network" as a property of this dial-up connection. To do this, use the menu commands listed below:

1. Start > Control Panel > Network Connections.
2. Right-click on the connection, and select the menu command **Properties**.
3. Open the "Network" tab.
4. Internet protocol (TCP/IP) > "Properties" button.
5. "Advanced" button.
6. Activate "Use standard gateway for remote network".
7. Close all dialogs with "OK".

Starting the dial-up connection

Use the following menu commands to start the dial-up connection:

1. Start > Control Panel > Network Connections
2. Double-click on the connection
3. "Dial" button
4. Open the command prompt window with Start > Run.
5. Enter "cmd" and click "OK".
6. Enter the following command in the command prompt window:
- "ping <name>"
name = Name of the mail server". The name of the mail server is usually available in your registration documents or can be requested from the service hotline of the ISP.
Example: ping "mailto.t-online.de"
7. The result of the "ping" command includes the IP address of the mail server.
8. Cancel the output with CTRL +C.

6.6 Call Example for the FB 49 "AS_MAIL"

Data stored using the ANY pointer are made known to the FB 49 "AS_MAIL" in a data block. DB 2 is used for this in the following example.

For reasons relating to the run time and memory capacity, FB 49 "AS_MAIL" does not perform a syntax check for the "TO_S", "CC" and "FROM" parameters.

The "TO_S", "CC" and "FROM" parameters are ANY pointers to strings with the following content, for example:

- TO: <wenna@mydomain.com>, <ruby@mydomain.com>,
- CC: <admin@mydomain.com>, <judy@mydomain.com>,
- FROM: <admin@mydomain.com>

Adhere to the following rules for specifying the "TO_S", "CC" and "FROM" parameters:

- The characters "TO:", "CC:" and "FROM:" must be specified.
- A space and open bracket "<" must be placed before each address.
- A close bracket ">" must be placed after each address.
- A comma must be placed in "TO_S" and "CC" after each address.
- Only one e-mail address can be entered under "FROM", no comma can be placed at the end

Initialization / startup in the OB 100

The "COM_RST" parameter of FB 49 "AS_MAIL" must be set before the initial call of FB 49 "AS_MAIL" or always after the corresponding instance DBs is newly loaded.

The following is an example for the initialization in which DB 1 is the instance DB of FB 49 "AS_MAIL".

SET		//set RLO
R	DB1.REQ	//REQ is reset so that FB 49 "AS_MAIL" //does not begin to //send an e-mail immediately after COM_RST is set,.
S	DB1.COM_RST	//COM_RST is set, this must be performed before the //initial call of FB 49 "AS_MAIL" for one-time //initialization or always after the corresponding //instance DB is newly loaded.

Cyclic call

This call example for FB 49 "AS_MAIL" is called cyclically (e.g. in OB1). You need to set the "REQ" parameter to "1" in the user program using "Control Variable".

You can copy and compile these lines in an STL source. This requires that you enter the DB 1 and DB 2 blocks in the symbol table of the project.

```
//Global data block with the data for FB 49 "AS_MAIL"
DATA_BLOCK "DB2"
TITLE =
VERSION : 1.0

STRUCT
  TO_S : STRING [240 ] := 'TO: <wenna@mydomain.com>,
<ruby@mydomain.com>,';
//Recipient
address
  CC: STRING [240 ] := 'CC: <admin@mydomain.com>,
<judy@mydomain.com>,';
//CC
Recipient address
  FROM: STRING [60 ] := 'FROM: <admin@mydomain.com>';
//Sender
address
  SUB : STRING [60 ] := 'Status plant 7'; //Subject
  TEXT : STRING [240 ] := 'Fault in plant 7 sector 2';
//Text
  USERNAME : STRING [60 ] := 'admin'; //User name
for LOGIN
//authentication
  PASSWORD : STRING [60 ] := 'test'; //Password
for LOGIN
//authentication
  ATTACHMENT : ARRAY [1 .. 178 ] OF //Attachment
  BYTE ;
END_STRUCT ;
BEGIN
END_DATA_BLOCK

//Instance DB of FB 49 "AS_MAIL"
DATA_BLOCK "DB1"
TITLE =
AUTHOR : TELESERV
FAMILY : TELESERV
VERSION : 1.0

"AS_MAIL"
```

```
BEGIN
END_DATA_BLOCK

FUNCTION_BLOCK FB 1
TITLE =Call example for AS_MAIL
//The COM_RST parameter of FB 49 "AS_MAIL" must
//be set before initial call of "AS_MAIL" or always after the
corresponding
//instance DB is newly loaded.
//The call condition is set during execution
//in the user program.
VERSION : 1.0
VAR
    Call condition : BOOL ;
END_VAR
BEGIN
NETWORK
//Call of AS_MAIL
    CALL FB49, DB1 (
        REQ                := #Aufrufbedingung,           //Auftragsanstoß
bei                                                                //rising edge
                                                                //corresponds to
        ADR_MAIL_SERVER := DW#16#C0A800C8,               //address
the IP                                                                //in HEX format
192.168.0.200                                                       //time period of
        WATCH_DOG_TIME := T#2M,                          //in which
2 min.                                                                //must be
                                                                //Pointer to user
        USERNAME        := DB2.USERNAME,                 //name of the
sender                                                                //Pointer to
        PASSWORD        := DB2.PASSWORD,                 password
//If DB2.USERNAME is omitted, i.e. no parameter is assigned,
//the LOGIN authentication procedure is not used.
        TO_S           := DB2.TO_S,                       //Pointer to
recipient                                                         //address
                                                                //Pointer to
        CC              := DB2.CC,                         //address
CC recipient                                                         //DB2.CC is
(optional). If                                                       //i.e. not
omitted
```

```

assigned,
not
FROM          := DB2.FROM,
sender
SUB           := DB2.SUB,
mail
TEXT         := DB2.TEXT,
mail
(optional). If
omitted,
assigned,
sent
ATTACHMENT   := DB2.ATTACHMENT,
mail
(optional). If
assigned,
sent
attachment.
//Example 101 bytes in the mail attachment
//ATTACHMENT := P#DB2.DBX974.0 BYTE 101 // (Example based
on
//DB above)
BUSY         := M    46.0, //Output/status parameter
BUSY
DONE         := M    46.1, //Output/status parameter
DONE
ERROR        := M    46.2, //Output/status parameter
ERROR
STATUS       := MW   48,   //Output/status parameter
STATUS
SFC_STATUS   := MW   50   //Output/status parameter
//SFC_STATUS
);

//Check call results at end of execution
U M 46.0; // is BUSY == 0 ?

```



```

                                JC End;      //no, BUSY ==1, AS_MAIL still
executing                        //the job
                                U M 46.1;    //Was execution of
                                JC End;      //FB 49 "AS_MAIL" completed
without error?
                                NOP 0;       //No, an error has occurred
                                //during the execution, BUSY
==0, BIE ==0
    //add error evaluation here if needed, STATUS, SFC_STATUS
End:BE;
END_FUNCTION_BLOCK
```

Note

The following applies to the optional "USERNAME", "PASSWORD", "CC", "TEXT" and "ATTACHMENT" parameters:

If such a specification is removed or inserted, the change only becomes effective when the corresponding instance DB (DB 1 in the example) is loaded again and the "COM_RST" parameter is reset.

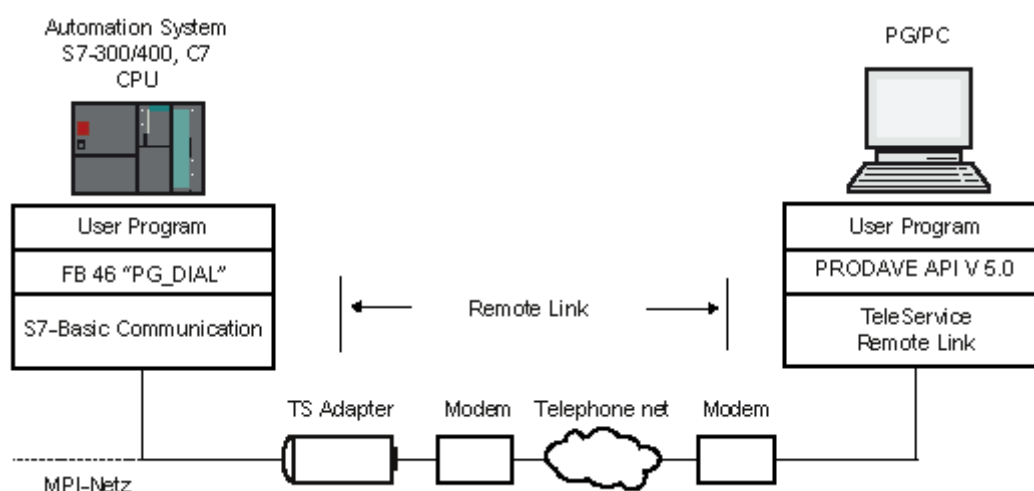
Glossary

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 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.



Changing the STEP 7 User Program for FB 46 "PG_DIAL" or FB 47 "AS_DIAL"



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 "PG_DIAL" or "AS_DIAL". This relates especially to deleting or exchanging program blocks containing 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 need to perform a warm or cold restart for the CPU.

Changing the STEP 7 User Program for FB 48 "SMS_SEND"



Caution

You may only change those parts of your STEP 7 user program that directly affect FB 48 "SMS_SEND" calls in the STOP operating mode of the CPU. This relates especially to deleting or exchanging program blocks containing calls for FB 48 "SMS_SEND". 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 need to perform a warm or cold restart for the CPU.

Communication SFCs for Non-configured Connections

Communication SFCs for non-configured S7 connections are the SFCs "X_GET", "X_PUT", "X_SEND", "X_RCV" and "X_ABORT".

Data consistency for FB 46 "PG_DIAL" or FB 47 "AS_DIAL"

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), otherwise inconsistent data may be transferred.

Data consistency for FB 48 "SMS_SEND"

The input parameters of the function block are copied to an internal buffer when you first call FB 48 "SMS_SEND". Do not change these data before the first call has been completed (return value W#16#7001), otherwise inconsistent data may be transferred.

Definition: Local and Remote

Local: The S7 automation system from which the initiative for establishing the remote connection is referred to as local.

Remote: The automation system to which the remote connection is established, is referred to as remote.

DIAL Function

You start the DIAL function with the REQ_DIAL input parameter. "AS_DIAL" checks the parameters for plausibility and transfers this to the local TS Adapter.

Result: The result of the connection establishment is indicated with BUSY = 0 in the return value.

If an error is detected during the execution of the DIAL function, the processing of the DIAL function is aborted. "AS_DIAL" automatically executes the HANGUP function and then outputs the error message in the STATUS return value.

HANGUP Function

You start the HANGUP function with the REQ_HANGUP input parameter. The HANGUP function terminates the remote connection to the remote TS Adapter previously established with the DIAL function.

Result: The most recent state of the remote connection is indicated with BUSY = 0 in the STATUS return value..

The cause for termination of the remote connection is indicated in the STATUS return value:

Value	Meaning
W#16#0000	The remote connection was terminated regularly by the HANGUP function.
W#16#3007	The remote connection was terminated by the local TS Adapter because an error occurred.
W#16#3008	The remote connection has crashed spontaneously or the remote TS Adapter has disconnected.

Input Parameter EVENT_ID

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

Input Parameter MESSAGE

The input parameter MESSAGE specifies the SMS message. This message is transferred to the network provider via FB 48 "SMS_SEND", the TS Adapter and the GSM radio modem.

Input Parameter PHONE_NO

The PHONE_NO input parameter specifies the telephone number with which you want to establish the remote connection. 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, code for outside line
- Call preferences: "Wait for dial tone before dialing", "Number of redial attempts" and "Redial after"

Input Parameter REQ_DIAL

The REQ_DIAL input parameter is level-triggered. REQ_DIAL triggers the DIAL function of FB 47 "AS_DIAL". The DIAL function can only be requested if "AS_DIAL" BUSY = 0 was signaled during the last FB 47 call.

The end of the DIAL function is signaled via the BUSY = 0 output parameter. The STATUS output parameter then supplies the result of the function execution.

Input Parameter REQ_HANGUP

The REQ_HANGUP input parameter is level-triggered. REQ_HANGUP triggers the HANGUP function of "AS_DIAL". The HANGUP function can also be started if the DIAL function has already been started.

The end of the HANGUP function is signaled via the BUSY = 0 output parameter. The STATUS output parameter then supplies the result of the function execution.

Input Parameter SCENTER_NO

Input parameter SCENTER_NO specifies the number of the service center to be used for sending the SMS. The string is passed to the radio modem without changes.

Output Parameters STATUS and BUSY for FB 46 "PG_DIAL"

"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.

Output Parameters STATUS and BUSY for FB 47 "AS_DIAL"

"AS_DIAL" is an asynchronously operating function block, meaning that processing extends across a number of function block calls..

If BUSY = 1, the internal status of "AS_DIAL" is output in the STATUS output parameter. At least one more call of "AS_DIAL" is required.

If BUSY = 0, execution is completed. The output parameter STATUS then indicates whether completion of the request was error-free or whether errors occurred.

Output Parameters STATUS and BUSY for FB 48 "SMS_SEND"

FB 48 "SMS_SEND" 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 FB 48 "SMS_SEND". 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.

Index

"

"AS_DIAL" 3-3, 3-4
"PG_DIAL" 2-2, 2-3
"SMS_SEND" 5-2, 5-3

A

ADDR_TS_ADAPTER 3-6

B

BIE 3-7
BIE bit 2-4, 5-4
BUSY 2-4, 3-6, 5-4

C

Call example 2-7, 5-7
Call Example for the FB 49 AS_MAIL 6-12
Calling 2-2, 5-2
Changing the STEP 7 user program 2-2,
3-3, 5-2
Closing the communication connection 2-2,
5-2
Communication functions 2-2, 5-2
Connection establishment 3-3
controlling and monitoring the example 4-6

D

Data consistency 2-2, 3-3, 5-2
Description 2-2, 3-3, 5-2
Determining the IP address of the mail
server 6-11

E

EN input parameter 2-4, 3-6, 5-4
ENO output parameter 2-4, 3-6, 5-4
EVENT_ID 2-4
Example of AS-AS remote connection 4-6
Example program for FB47 "AS_DIAL" 4-1

F

FB 46 "PG_DIAL" 2-2
FB 47 "AS_DIAL" 3-3
FB 48 "SMS_SEND" 5-2, 5-3

FB10 in example program 4-3
FB5 example program 4-4

H

Hardware and software requirements 3-1
How FB 47 "AS_DIAL" works 3-3
How FB 48 "SMS_SEND" works 5-2
How FB 49 AS_MAIL works 6-1
How FB10 works 4-3
How FB46 "PG_DIAL" works 2-2
How FB5 works 4-4

I

Integration in STEP 7 user program 3-3
Introduction to example program 4-1
Introduction to the
TeleService S7 Library 1-1

M

Message 5-4
MPI_TS_ADAPTER 2-4, 5-4

O

Overview of the AS-AS remote link 3-5

P

Parameter 5-4
Parameters 2-4, 3-6, 3-7
Parameters for Calling
FB47 "AS_DIAL" 4-5
Parameters of FB 49 AS_MAIL 6-4
PHONE_NO 2-4, 5-4
PIN 5-9
Pulse diagram 3-7

R

REQ_DIAL 3-7
REQ_HANGUP 3-7
Requirements for establishing
a connection 2-1
Requirements for sending an SMS 5-1
Return values 2-5, 3-8, 5-5
Return values of FB 49 AS_MAIL 6-7

S

SCENTER_NO 5-4
SMTP Authentication 6-10
STATUS 2-4, 3-7, 5-4
STEP 7 user program 3-11, 3-12

T

The STEP 7 user program 3-12

Transferring the PIN
to the radio modem 5-9

W

Working with the Example 4-7