

SIEMENS

SIMATIC S5

Working with S5-DOS/ST

Manual

C79000-G8576-C760-03

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Safety Guidelines

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:

Note

draws your attention to particularly important information on the product, handling the product or to a particular part of the documentation.

Qualified Personnel

Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground and to tag equipment, systems and circuits in accordance with established safety practices and standards.

Proper Usage

Note the following:



Warning

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

This product can only function correctly and safely if it is transported, stored and set up carefully and correctly, and operated and maintained as recommended.

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Disclaimer of Liability

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

Subject to change without prior notice.

C79000-G8576-C760

Preface

Software Package STEP 5, V 6.6

The STEP 5, V 6.6 software package runs under MS-DOS. STEP 5 can be started under MS-DOS or from Windows.

The package installed on your PG not only contains the STEP 5 application but also the program S5DRV.EXE for installing drivers and other programs.

Content of the Manual

This manual explains the software configurations within which STEP 5 and the appropriate applications and drivers (networks) can be run under MS-DOS or Windows.

Special hardware configurations and utilities required or useful with STEP 5 are also described.

The operating systems MS-DOS and Windows are not described in this manual.

The manual also contains chapters that are only of interest if you want to use a personal computer (PC) as a programming device (PG). If you order STEP 5 as a retrofit kit, note that different software packages are necessary for PCs and PGs. The functions provided by the packages are nevertheless the same.

You do not need to read this manual from cover to cover. Have a look at the list of contents or the index to see what you need to read to find the solution for your problem or task.

How to Use this Manual

The following information will help you to use the manual more efficiently.

Conventions

The conventions and symbols used in this manual are intended to draw your attention to particularly important information.

1. Individual steps in a procedure which should be performed in a set order are numbered.
- Steps in a procedure where the order is not important and items in a list are indicated by a bullet.

DOS commands (**DIR *.TXT /p/w**), keys (**CTRL**), key combinations (**ALT + D + S** or **ALT + TAB**), menu commands (**File** → **Save**) and buttons (**OK**) are shown in bold print and in brackets as in these examples.

DOS commands can also be typed in lower case letters. Commands are triggered by pressing the **Enter** key.

References to sections or chapters, dialog box titles and field names in dialogs are enclosed in “inverted commas”.

Note

Points to note are included in the text in this form.

Product Information

When your PG or retrofit kit is delivered, one of the items included is a Product Information. This contains supplementary information about special situations and restrictions to the manual or the product. It should be regarded as a separate part of this manual, and in case of doubt the information in the Product Information should be considered as being more up-to-date. The Product Information should always be kept together with the manual.

Catalog\INFO

After installing the software, you will find files of the type *.TXT (for example STEP5E.TXT) or of the type *.WRI (for example PRODINFE.WRI)¹ in the directory C:\INFO\. The *.WRI files contain the product information in electronic form. You can use the appropriate editor (for example WordPad) to read or print this information.

¹ The last letter in the file name is the language code (for example "D" for German, "E" for English, "F" for French, "S" for Spanish, "I" for Italian).

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Product Overview

1

The programming devices of the SIMATIC range with their **system software** are the standard devices for configuring, programming and assigning parameters in all SIMATIC S5 automation tasks.

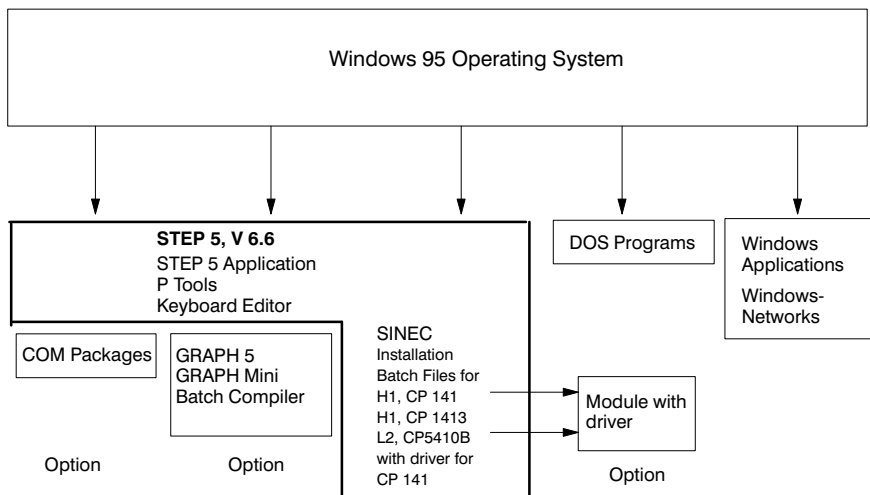
This chapter provides you with an overview of the components of the STEP 5, V.6.6 software package, the environment in which the software runs and additional programs you can order extra or can use from earlier STEP 5 versions.

Software Supplied with the PG

In the PG 740, for example, the system software Windows 95, STEP 5, V 6.6 etc. is installed on the hard disk in compressed form in five languages. The advantage of this for you is that you can use your STEP 5 software on the PG after making only a few basic entries. The first time you power up the PG, you can decide on the language in which the software is to be installed.

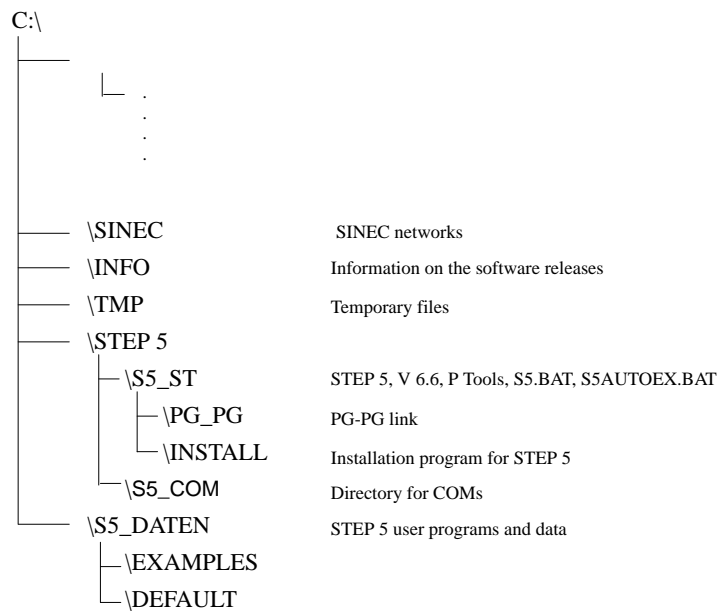
Components of the System Software

The following diagram shows you which components may be contained in the software on your PG. The actual configuration depends on the system configuration you have used to install the STEP 5 package, and on whether you own a PG or operate a PC as a PG.



Directory Structure

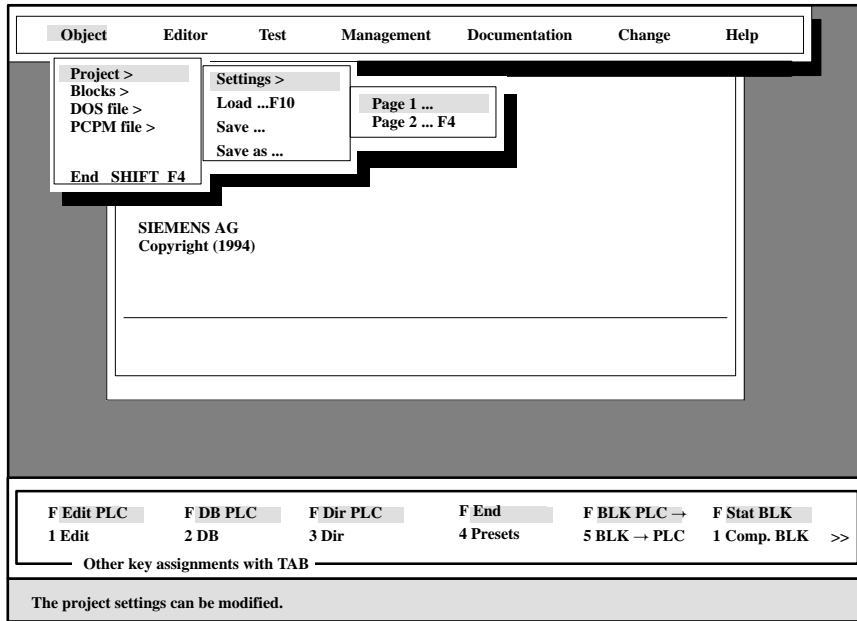
If you install STEP 5 on the same partition as MS-DOS and Windows, the directory structure includes the following components:



For the installation shown above, the partition in question should have a capacity of at least 200 Mbytes.

Main Menu
STEP 5

STEP 5, V 6.6 provides you with support in the form of a convenient graphic user interface. After starting STEP 5, a main menu appears on the screen together with submenus. You can select functions in these menus using the mouse or the keyboard.



With the STEP 5, V 6.6 user interface, you can select STEP 5 functions in these menus and the boxes they open using the mouse or the keyboard.

The functions and the user interface of the STEP 5 programming software are described in a separate manual.

Installing and Starting Up

2

This chapter is intended to help you:

- start up your PG for the first time, with the software on the hard disk in compressed form
- reinstall the system software
- install the retrofit package.

2.1 Contents of the Package

The exact content of your system software is listed in the Product Information which is supplied either with your new PG or with your retrofit package for STEP 5.

Display Detailed Information

After installing the software, you will find files of the type *.TXT (for example, STEP5E.TXT) or of the type *.WRI (for example PRODINFE.WRI) in the C:\INFO\ directory. You can use the appropriate editor (for example EDIT or WordPad) to read or print this information. These files contain detailed information on the individual software components.

Example:

Using the MS-DOS command

TYPE STEP5E.TXT | MORE

you can display the file **STEP5E.TXT** page by page.

Help Directly on the Screen

You can enter MS-DOS commands with the option */?* to display brief information about the function and the permitted options.

Under Windows, you can obtain help on the current function at any time by pressing **F1**. You can also obtain information from the entries in the **Help** menu.

On PGs, you can also display help texts on the current function under STEP 5 by pressing **SHIFT + F8** or the **Help** key (PG 730/750/770).

This **Help** key has been replaced on the PG 720 and PG 740 by the keys **F_n + F1**.

2.2 Installing the STEP 5 Basic Package

Startup

If you have purchased a new programming device from Siemens, the system software together with STEP 5 is already installed on the programming device in compressed form in five languages. After you have set up your programming device and turned it on, a menu is displayed in which you can select the language in which you want to install the system software. The remaining steps of the installation are also menu-driven.

The most important information about the retrofit package can be found in the accompanying Product Information.

When ordering, please remember that there are different packages for PGs and PCs.

2

Condition

The following conditions must be met if you want to install STEP 5 on your PG or PC:

- Hardware:
 - Hard disk:
You require a hard disk partition with at least 10 Mbytes of free memory.
 - RAM:
You need at least 640 Kbytes
(1 Mbyte is recommended)
- Operating system;
 - MS-DOS 5.0 or 6.2
 - Windows 3.1 or Windows for Workgroups 3.11
 - Windows 95

Files with the same name are overwritten when you install the newer version. The remaining STEP 5 data are retained.

**Installing STEP 5
under MS-DOS**

Installing the system software is described in detail in the **Product Information**. Here, only the principle is explained.

1. Switch on your PG and go to the command level of MS-DOS.
2. Insert the first diskette of the retrofit package in drive A.
3. Call the installation program by typing:
A:INSTALL

For all subsequent steps, the program displays menus in which you can make your selections.

Read the explanations which appear on the screen during the installation and follow the instructions.

**Installing STEP 5
in Windows 95**

If you use the Windows 95 operating system, you can also install STEP 5 from the Windows interface.

Proceed as follows:

1. Insert the installation diskette in drive A.
2. Open up **My computer** by double-clicking in the icon.
3. Select **Floppy (A:)**.
4. Open drive A.
5. Start the installation procedure by double-clicking on the file **INSTALL.PIF** (The file appears as an "Install" with the icon "Shortcut to an MS-DOS application").

Windows 95 will install the programs and icons for STEP 5 in the start menu under SIMATIC.

Setting Up STEP 5 in Windows 3.X

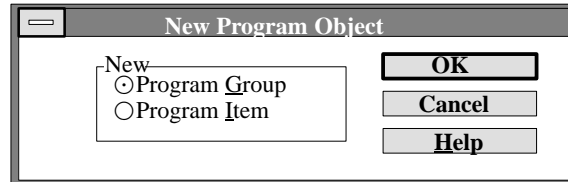
If you use the Windows operating system, you can also start STEP 5 from the Windows user interface by setting up STEP 5 as a Windows program.

Procedure

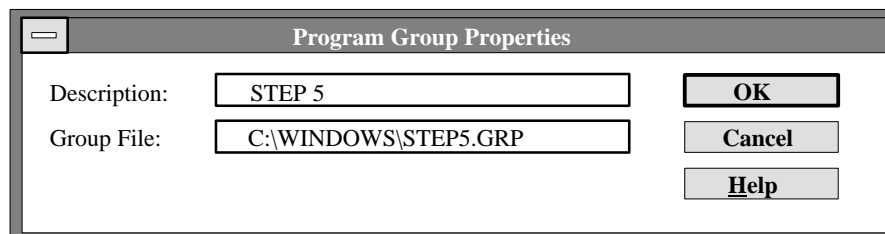
To set up a program group for STEP 5:

1. Menu command **File** → **New**.

The following dialog box is displayed:



2. Select **Program Group** and confirm with **OK**.
3. Complete the “Program Group Properties” dialog box as shown below and confirm with **OK**.



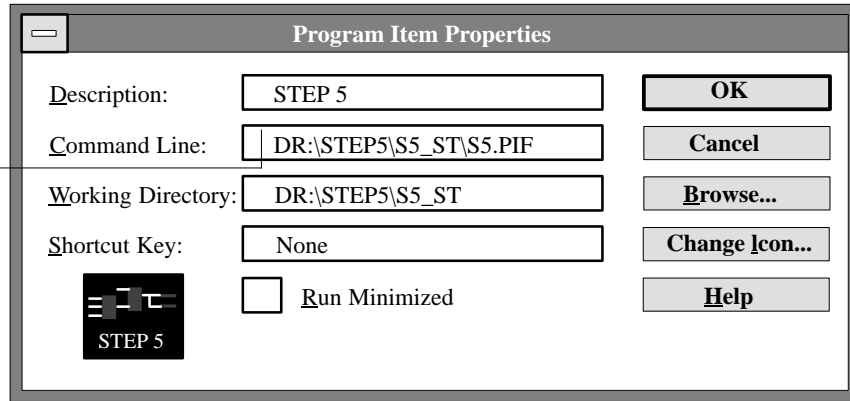
Creating the icon for STEP 5:

4. Menu command **File** → **New**.

The “New Program Object” dialog box is opened.

5. Select **Program Item** and confirm with **OK**.
6. Complete the “Program Item Properties” dialog box as shown below and confirm with **OK**.

[DR:] is the drive on which STEP 5 is installed.

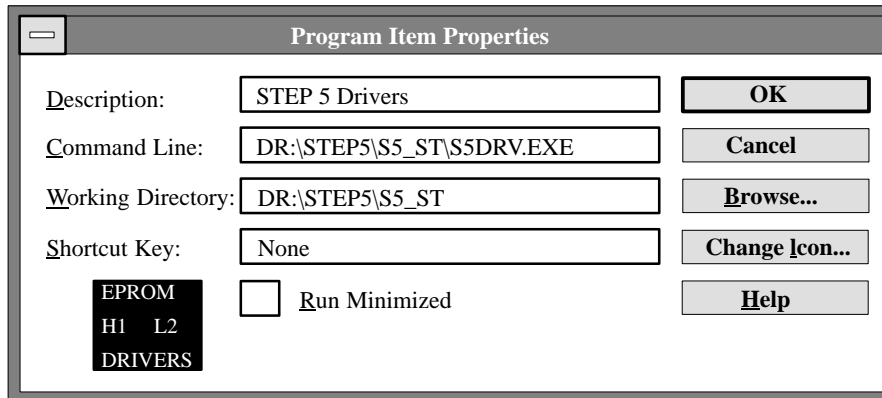


Creating the icon for the STEP 5 driver:

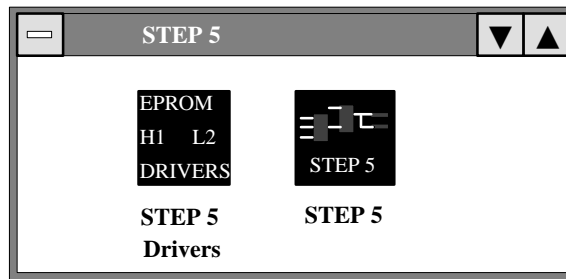
7. Menu command **File** → **New**.

The “New Program Object” dialog box appears.

8. Select **Program Item** and confirm with **OK**.
9. Complete the “Program Item Properties” dialog box as shown below and confirm with **OK**.



Your STEP 5 window then appears as shown below:



2

Note

Under Windows, you must under no circumstances use the MS-DOS call for STEP 5. To call STEP 5 under Windows, double-click on the icon.

2.3 Installing STEP 5 Drivers

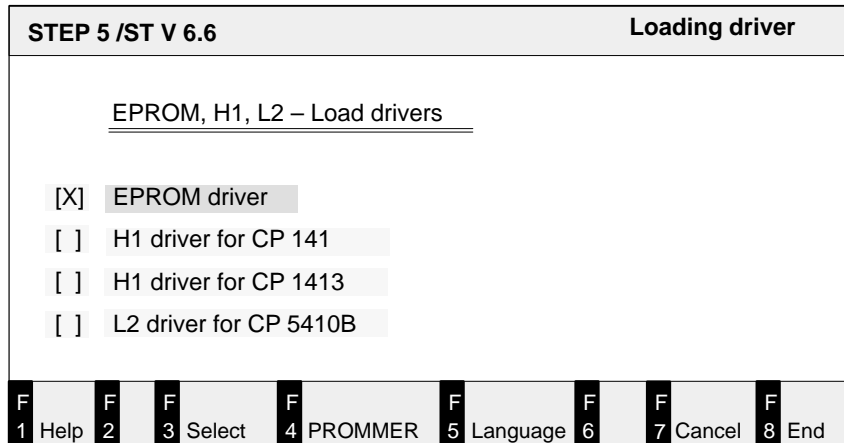
Loading Drivers

The program **S5DRV.EXE** can be found on PG 7xx programming devices in the subdirectory

- DR:\STEP5\S5_ST\INSTALL.

S5DRV.EXE offers the the following options:

1. Loading or not loading drivers for EPROM, H1 and L2 network functions.
2. Language selection and deselection for STEP 5, V 6.6 when more than one language is installed.
3. Selection between internal and external EPROM interface modules (see also *Installing EPROM Drivers*):
 - Internal EPROM programming interface (only in PG 7xx programming devices)
 - Parallel external Prommer on an LPT port
 - Serial Prommer on a COM port (only on PCs)



Defaults

- The network drivers for the H1 and L2 buses are not loaded.
- All installed language versions of STEP 5 are activated.
- PG: the EPROM driver for the internal EPROM programming interface is loaded.
- PC: the driver for the parallel external Prommer is loaded.

Note

Loaded drivers (for example, EPROM driver) reduce the working memory available to STEP 5. To make more space available in the working memory, you should not load the EPROM driver unless you need it.

Procedure

Start the program **S5DRV.EXE** as follows:

MS-DOS:

- Type in the command **S5DRV**.

Windows:

- Start the program by double-clicking on the icon **STEP 5 Drivers** in the **STEP 5** program group window.

The program **S5DRV.EXE** is menu-driven. You can work through the program using either a mouse or trackball, if you have one connected, or the function keys.

How to Use the Program

The first page of **S5DRV.EXE** offers you the choice of language in which you want to run the program (German, English, French, Spanish, Italian). In the menus which follow you can load or unload EPROM, H1 and L2 drivers.

In the submenu **PROMMER** the drivers can be adapted to match the EPROM programming hardware facilities, and in the submenu **Language** you can select which language you want for STEP 5/ST, V 6.6. Help is provided in the menu bar on all menus except the startup menu.

Executing the Selections

If you have selected one of the network drivers for H1 or L2, this is loaded in the S5AUTOEX.BAT file when the PG (PC) is next started. If the EPROM driver is selected, it is loaded when the STEP 5 application is started.

Installing the EPROM Driver

The PG 7xx is supplied with the internal EPROM programming interface already installed. With PCs, the files for the parallel external Prommer are loaded when the STEP 5/ST for PC software is installed for the first time.

The following steps are necessary to activate a parallel EPROM programming interface, for example, or to activate a serial interface on a PC:

- Start the program **S5DRV.EXE**.
- Select the submenu **PROMMER**.

In this menu you can select between:

- an internal programming interface (only in PG 7xx programming devices)
- a parallel external Prommer on an LPT port
- a serial external Prommer on a COM port (only on PCs)

Note

Selecting the EPROM driver in the window entitled “Loading driver” (see page 2–14) will not affect the installation of the external serial prommer.

When selecting the parallel LPT port, a selection for LPT 1, LPT 2 and LPT 3 are displayed in addition. The existing LPT port can be specified here.

When selecting the serial port, a selection for COM 1, COM 2, COM 3 and COM 4 are displayed in addition. The existing COM port can be specified here.

2.4 STEP 5 Language Selection

If more than one language is installed, when you start STEP 5, you are asked to select the language you want to work in. If you only want to use one language version of STEP 5, you can deactivate all the other installed languages via the submenu **Language**. Active language versions are displayed when this menu is called. The next time you start STEP 5, the language selection screen is no longer displayed and the program goes straight to the main STEP 5 menu. Installed but inactive language versions can be reactivated again by calling the **Language** submenu in the **S5DRV.EXE** program.

Procedure

The program for changing the language selection is started under MS-DOS:

- Type in the command **S5DRV**.

From the **Language** submenu you can decide which language is to be used to start STEP 5.

User Memory Management

3

The management of the user memory is already optimized on a PG supplied with STEP 5.

If you install STEP 5 later or if you change the configuration of your system or load other drivers or programs, it may be necessary to change the assignment of the user memory to avoid errors.

This chapter describes the structure of the user memory and the standard assignment and explains how to change the assignment.

In the MS-DOS environment, the most important system resources are the user memory and the storage space on a hard disk or diskette. The memory configuration and management can affect the following:

- Which programs can be run
- How fast programs can be run
- How much data a program can work with
- How much data can be stored between one working session and the next.

The basic configuration of the user memory is on the motherboard of your programming device. This can be extended by a memory expansion card. All programs must be loaded in the user memory before they can be run.

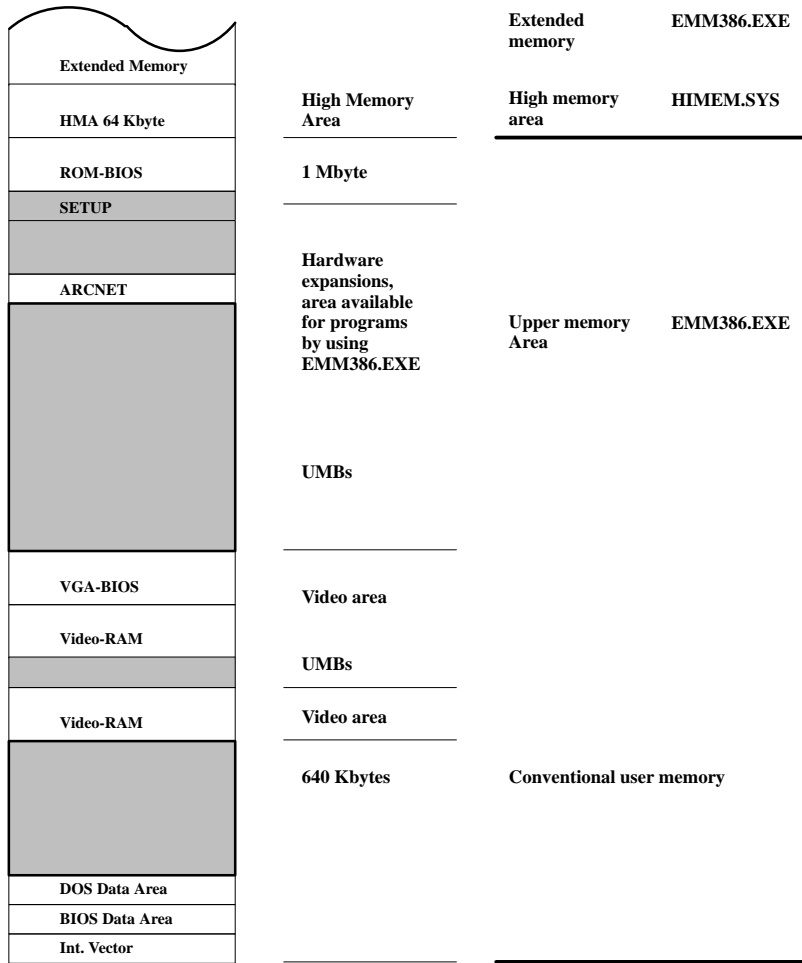
Your PG has two different types of user memory:

- Conventional user memory
- Extended memory.

Programs running under MS-DOS normally use the PG's conventional memory. To allow programs to use the extended memory, you must install a memory manager to coordinate access to this memory.

3.1 Memory Distribution

Example



3

Conventional User Memory

The conventional user memory has a standard capacity of 640 Kbytes in all PGs. Programs can use the conventional user memory without the special commands required for other types of memory.

MS-DOS occupies part of the conventional user memory. The device drivers and commands specified in the CONFIG.SYS and AUTOEXEC.BAT files take up further user memory space. The remaining memory is available for user programs.

Upper Memory Area

In addition to the conventional user memory, your PG also has a 384 Kbyte memory known as the *upper memory area*. This area is immediately next to the 640 Kbytes of the conventional user memory. This area is normally reserved for your additional hardware, however parts of it can be made available by a memory manager.

High Memory Area

The **high memory area** (HMA) is a special 64 Kbyte field in the additional memory located directly above the 1 Mbyte address.

Extended Memory, XMS

Most programs use the conventional user memory. They cannot use the extended memory because the *addresses* which identify the locations of the programs in the extended memory are too high for these programs to recognize. Only the addresses in the 640 Kbyte area of the conventional user memory are recognized by all programs.

You can activate more user memory in your programming device by installing a memory manager. These programs allow access to the extended memory and the upper memory area.

3.2 MS-DOS Memory Manager

A memory manager is a device driver that allows access to or manages certain types of memory.

MS-DOS (5.0 and 6.2) has the following installable memory managers:

- HIMEM.SYS manages access to the extended memory
- EMM386 allows access to the extended memory. It also allows access to the **upper memory blocks** (UMBs).

To install a memory manager, use the **DEVICE** command in your CONFIG.SYS file. Although memory managers occupy a part of the conventional user memory, they make up for this by allowing access to far greater areas of memory in the extended memory or upper memory area than they themselves occupy.

Running MS-DOS in the High Memory Area

MS-DOS is usually run in the conventional user memory. This restricts the conventional user memory available for user programs. MS-DOS can also be run in the extended memory. In this case, it uses the 64 Kbytes of the *high memory area* (HMA). Since few programs use this area it may prove useful to run MS-DOS here.

Running MS-DOS in the extended memory area has the following advantages:

- Approximately 40 Kbytes of conventional user memory are released
- It uses the high memory area, part of the extended memory used by very few programs.

The command **DOS=HIGH,UMB** specifies the area of the user memory in which MS-DOS will be located and determines whether or not upper memory blocks will be used.

Using the Upper Memory Area

Another way to gain more memory over and above the 640 Kbytes of user memory is to install the memory manager EMM386.EXE.

The memory manager can make available part of the extended memory area from 640 Kbytes to 1 Mbyte reserved for hardware. These parts are known as the *upper memory blocks* or UMBs.

Use: with the command **DEVICEHIGH**<driver file> in the CONFIG.SYS file, you load drivers in the high memory area.

Setting up a Larger User Memory

Even when your memory capacity is adequate, you may not be able to run a program. Memory-resident programs often occupy part of the user memory so that there is not enough user memory free.

Normally this results from having too little conventional user memory.

In this situation, making use of HIMEM.SYS has the following advantages:

- It makes the extended memory available to programs which use this memory according to XMS (the **EX**tended **M**emory **S**pecification).
- It prevents system errors caused by programs with contradictory memory requirements.
- It allows you to run MS-DOS in the high memory area of the extended memory.
- It allows EMM386 to use the extended memory.
- It allows the use of the upper memory areas (UMBs) in conjunction with EMM386.EXE.

Order of the Drivers

The order of the drivers in your CONFIG.SYS file can be important. It can have an effect on the rational utilization of memory and the problem-free running of various programs.

The following list shows the order in which you should load device drivers in your CONFIG.SYS file (with the command **DEVICE** or **DEVICEHIGH**):

1. HIMEM.SYS.

Example:

DEVICE=C:\DOS\HIMEM:SYS /M:1

The option /M:1 stipulates the ROM-BIOS used.

The driver HIMEM.SYS should be the first driver to be loaded in CONFIG.SYS.

2. EMM386.EXE

Example:

**DEVICE=C:\DOS\EMM386.EXE RAM I=B000-B7FF
I=C800-DFFF X=E000-E0FF I=E100-F5FF FRAME=D000**

This command loads the MS-DOS memory manager EMM386.EXE from the \DOS directory in the user memory. It manages the extended memory and the upper memory area.

3. All device drivers which use the extended memory.

Parameters

RAM	This parameter provides you with an EMS window.
FRAME	This parameter indicates the place in the memory at which the EMS window should be located.
I=B000-B7FF	This 32-Kbyte area is normally intended for the Hercules software video interface. Since this area is not occupied on your programming device, it can be used as user memory.
I=C800-DFFF	When your programming device is shipped, this area is not occupied by hardware. It can therefore be used as user memory.
X=E000-E0FF	If this area is occupied by hardware, it must be excluded (not for the PG 740 and PG 760).
I=E100-F5FF	The area for the SETUP program can be used since EMM386 activates the protected mode and SETUP cannot be run in this mode (not for the PG 740 and PG 760).
Explanation:	I = Include, X = Exclude

3.3 Optimizing Hard Disk Access

DEVICEHIGH=C:\DOS\SMARTDRV.SYS 2048

SMARTDRIVE is an optimizer program that uses part of the extended memory to accelerate hard disk access.

The above command loads SMARTDRV.SYS in the upper memory area of the user memory above the 640 Kbyte boundary. The number 2048 stipulates the maximum size of the cache as 2048 Kbytes. Values between 128 Kbytes and 8182 Kbytes (8 Mbytes) can be selected.

Installing Hardware

4

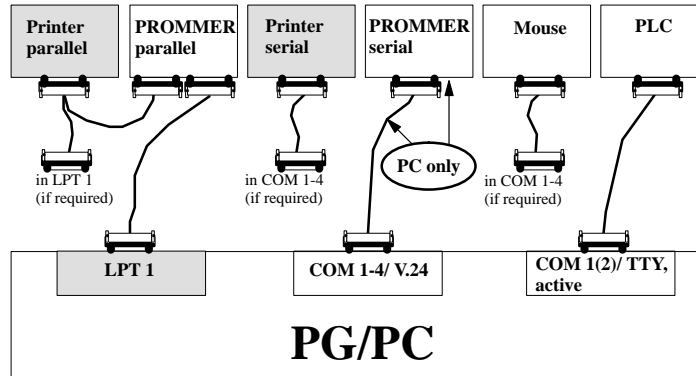
This chapter is intended for users operating a personal computer (PC) as a programming device (PG).

It explains how to connect devices to be used with STEP 5.

4.1 Connecting a Printer

Printer Ports

For parallel operation of a printer, use the port LPT 1 (PORT 1, Centronics, Printer) and for serial operation the ports COM 1 to COM 4.



Which Printers Can Be Used with the Software?

The software supports Siemens printers (known as standard printers) and printers from other manufacturers (non-standard printers). The printer parameters for these printers must be set by loading *DR.INI or using a printer selection box. A description of how to do this can be found in the STEP 5 manual (Chapter 3, Documentation / Settings / Setting Printer Parameters).

Note

The devices must only be connected together using the cables when both devices are switched off.

Secure the cable connectors (screw or locking device) whenever possible. This prevents transmission errors.

4.2 Connecting a PLC to the PG

PLC Port

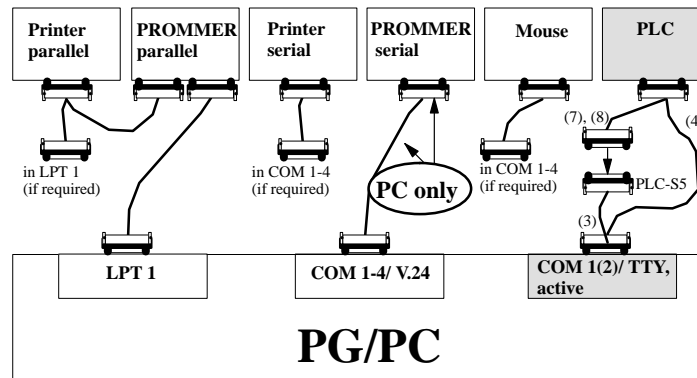
To be able to link up with a PLC, your PG must have an **active** TTY port (20 mA).

If the COM 1 port available is a V.24 interface, the AG-S5 interface must be simulated by means of an S5 converter

PG with Active TTY COM 1 Port

The programmable controller (PLC) and the PG are connected via a direct connection (4) or by two connecting cables. If the port assignment described in section 4.4 is not used, the connections will have to be adapted accordingly.

4



**Connecting a PG
with an Active TTY
Port to a PLC**

The PG is switched off.

PG - PLC Connection with connecting cable (4) direct or via (3), (7) or (8):

The connectors on the connecting cable (3) with the order no. 6ES5 731-6AG00 are labelled with "PG 7xx COM 1" and "PLC-S5".

1. Plug the connector labelled "PG 7xx COM 1" into the COM 1 port of the PG.
2. Plug the other end of the connecting cable labelled "PLC-S5" into the matching end of the connecting cable (7) or (8) leading to the PLC.

It is impossible to mix up the connectors on this cable because they are of different types.

3. Connect the PLC to the remaining free connector.
Screw or clip the connectors in place for safety.

**Connecting Cables
for a PG with an
Active TTY Port**

Connecting cable (3), order no. 6ES5 731-6AG00

Connecting cable (4), order no. 6ES5 734-2xxx0¹⁾

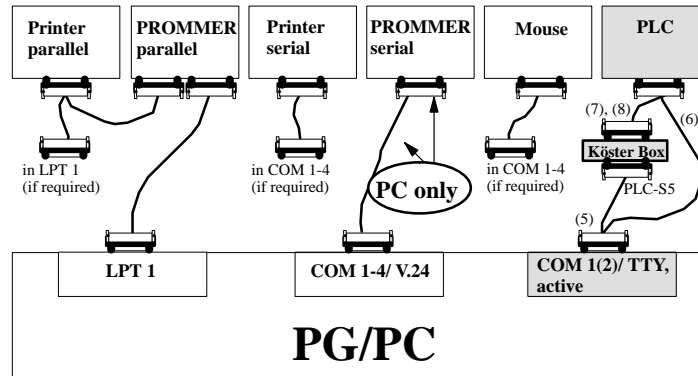
Connecting cable (7), order no. 6ES5 731-0xxx0¹⁾

Connecting cable (8), order no. 6ES5 731-1xxx0¹⁾

¹⁾ xxx is the length key. The cables are available in lengths ranging from 1 m to 1000 m. Please refer to the Programmers catalog ST 59 for details on the length key.

PG with V.24 Port

For a PG with a V.24 port, the port must be converted into an “PLC-S5” port using a V.24/TTY converter (Köster box). The PG is connected to the Köster box via a direct connecting cable with an integrated V.24/TTY converter (6) or via the connecting cable (5). Depending on the type of PLC, the Köster box is connected using connecting cable (7) or (8). These connecting cables must be ordered separately.



4

**Connecting a PG
with a V.24 Port to
a PLC**

The PG is switched off.

PG - PLC Connection with connecting cable (6) direct or via (5), (7) or (8):

The V.24/TTY converter (Köster box) is configured as described in Chapter 8 V.24/TTY Converter (Köster box).

1. Establish the connection between the COM 1 port of the PG and the Köster box using the connecting cable (5).
2. Plug the connecting cable (7) or (8) into the 25-pin socket on the Köster box and establish the connection to the PLC.
3. Screw or clip the connectors in place for safety.

**Connecting Cables
for a PG with a
V.24 Port**

Connecting cable (5), order no. Köster 224 22x²⁾

Connecting cable (6), order no. 6ES5 734-1BD20 (length 3.2m)

Connecting cable (7), order no. 6ES5 731-0xxx¹⁾

Connecting cable (8), order no. 6ES5 731-1xxx¹⁾

¹⁾ xxx is the length key. The cables are available in lengths ranging from 1m to 1000 m. Please refer to the Programmers catalog ST 59 for details on the length key.

²⁾ x stands for the connector type of the PG - Köster box connecting cable (see Chapter 8, page 0-2).

4.3 Connecting an EPROM Programmer to the PG

The PGs have an integrated EPROM programming interface. If you are using a PC as a PG, you can connect an external EPROM programmer. Various devices are available for connection to the parallel or serial port.

The device connected to the parallel port is known as the “**external prommer**”, the device connected to the serial COM port is simply called “**prommer**”.

Parallel Prommer

Port: LPT 1

The cable for the parallel connection is supplied with the “external prommer”. The external prommer has a connection which extends the parallel port for a parallel printer.

Serial Prommer (only with PCs)

Port: COM 2 or other COM port

The prommer does not have to be connected to operate the PC. The prommer is supplied with an instruction manual which you should read before installing and using the prommer.

Select Other COM Port

To set a different COM port (the default value is COM 2), use the program S5DRV.EXE (see section 2.3).

Loading the Driver

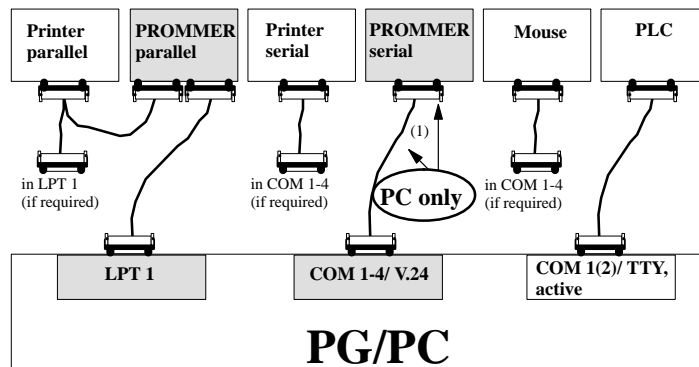
When supplied, the STEP 5 software for the PC is set so that the external prommer is loaded. If you want to change this setting, start the program:

DR:\STEP5\S5_ST\S5DRV.EXE

You can then select the driver to be loaded when STEP 5 is started in the submenu **PROMMER**:

- Internal programming interface (only with PG 7xx).
- Parallel external prommer on an LPT port.
- Serial external prommer on a COM port (only for PCs).

Connection PG-Prommer



Connecting your PG to the Prommer

The PG and the prommer are both switched off.

1. Parallel prommer: using the supplied LPT cable, connect the “LPT 1” port on the PG with the “PC” port on the external prommer and, if applicable, connect your parallel printer to the “Printer” port of the external prommer.

Serial prommer: plug the connector labelled “V.24” on the connecting cable into the COM port of the PC. Plug the 25-pin connector labelled “PROMMER” into the socket on the rear side of the prommer.

The connecting cable (1) connects the PG with the prommer (25-pin).

2. Any connectors fitted with screws or clips must be secured.

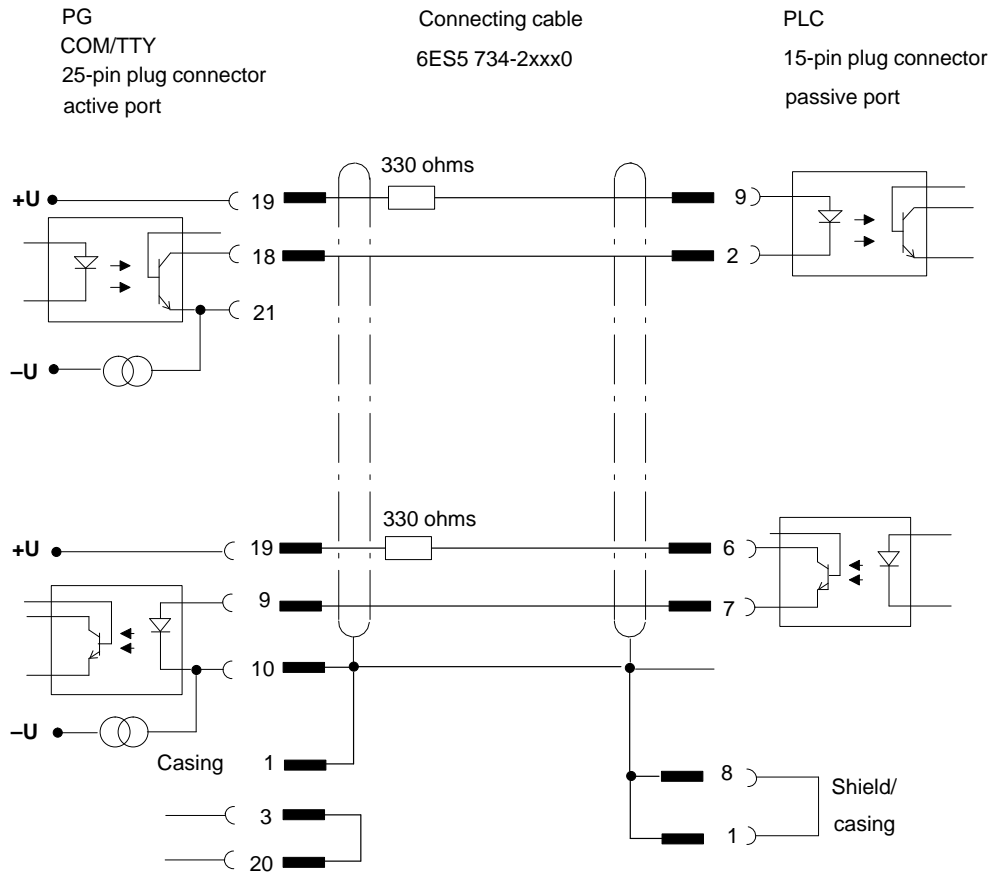
4

4.4 Overview – Connecting Cables to PLC, Partner PG, Prommer

Connecting cable no.	Order number	Connection	
		from	to
1	6ES5 733-4xxx0 ¹⁾ 6ES5 733-5xxx0 ¹⁾ 6ES5 733-6xxx0 ¹⁾ 6ES5 733-7xxx0 ¹⁾	PC COM 2	PROMMER
3	6ES5 731-6AG00	PC COM 1 (PG 7xx: 25-pin male)	Connecting cable 7 or 8 (PLC) Connecting cable 10 (Partner-PG)
4	6ES5 734-2xxx0 ¹⁾	PC COM 1, 2 25-pin female	PLC 15-pin female
5	Köster 224 22x	PC COM 1, 2	Köster box
6	6ES5 734-1BD20	PC COM 1, 2 25-pin female	PLC 15-pin female
7	6ES5 731-0xxx0 ¹⁾	Connecting cable 3 or Köster box	PLC 25-pin male
8	6ES5 731-1xxx0 ¹⁾	Connecting cable 3 or Köster box	PLC 15-pin female
10	6ES5 733-2xxx0 ¹⁾	Connecting cable 3 or Köster box	Partner-PG COM 1

¹⁾ xxx is the length key. The cables are available in lengths ranging from 1m to 1000 m. Please refer to the Programmers catalog ST 59 for details on the length key. A maximum cable length of 3 m is permitted for use with a prommer.

**Connector
Assignment of the
Active TTY Port**



Editing PCP/M Files in MS-DOS

5

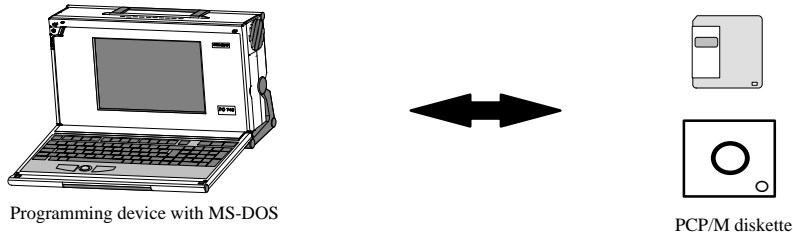
STEP 5 user programs and files which you generated in S5-DOS (PCP/M) can also be processed on your PG/PC under the operating system MS-DOS. To be able to access a data medium formatted and managed in S5-DOS from DOS and to copy files from the DOS data medium, there are several commands (the P Tools) available.

5.1 What the P Tools Do

With the P Tools, you can access PCP/M data media under MS-DOS. PCP/M data media are hard disk partitions or diskettes formatted with S5-DOS (PCP/M). This allows you to work with:

- STEP 5 user programs/data created under S5-DOS (PCP/M) using MS-DOS, or
- STEP 5 user programs/data created under MS-DOS using S5-DOS

An emulator allows the S5-DOS basic package with STEP 5 applications to run under MS-DOS (refer to the STEP 5 manual).



The following P Tools are available:

PCOPY	copies files from or to PCP/M media.
PDEL	deletes files on PCP/M media.
PDIR	displays the PCP/M media directory.
PFORMAT	formats diskettes for PCP/M.
PSET	changes file attributes to PCP/M media.
PTYPE	displays the contents of a PCP/M file.

Alternative

If the programming device you are operating under S5-DOS (PCP/M) has an ARCNET interface and the program FTARC is available, you can connect it directly to the ARCNET hardware running under MS-DOS and transfer files with the FTARC program (see Chapter 6).

5.2 Using the P Tools

The P Tools are in the \STEP5\S5_ST directory and are started at the MS-DOS operating system level.

Copying an S5 File from S5-DOS (PCP/M) to MS-DOS

It is assumed that the programs are on diskette, in which case you should proceed as follows:

1. Insert diskette with or for the S5-DOS (PCP/M) files in a drive, for example, **A**.
2. Type in command and parameters on the PG/PC keyboard, for example, copy an S5 file with the name EXAMPLE from diskette = user 0 to the hard disk in the directory \STEP5:

PCOPY 0A:EXAMPLE.COMD C:\STEP5.

3. Press **Return**. The file is copied from diskette to the hard disk.

5

HELP Function

You should be familiar with the PCP/M and MS-DOS file conventions. You can also get help to explain the syntax via the help function. Enter the utility program name (for example, **PCOPY**). The corresponding text then appears on the screen.

The square brackets listed in the command should not be entered; these are to distinguish optional parameters. Be careful always to enter any blanks which are required.

When copying data from PCP/M media to MS-DOS media and vice versa, no **disk cache program** should be in use, as is often the case under MS-DOS. This will lead to errors and possibly also to loss of data.

5.3 Command Syntax

<p>PCOPY</p>	<p>Copies files from or to PCP/M media. You always copy from source to target. PCOPY nDR:[name][.ext] DR:[path][file] [-Q] or PCOPY DR:[path][file] nDR:[name][.ext] [-Q] n: user area, 0 to 15 DR: drive, for example, A:, B: for diskettes and C: for the hard disk. name: file name, in accordance with PCP/M conventions. ext: file extension, in accordance with PCP/M conventions. path: path info., in accordance with MS-DOS conventions. file: file name, in accordance with MS-DOS conventions. Q: optional parameter, scanning mode if a file already exists.</p> <p>Example: PCOPY 0A:TEST@@ST.S5D C:\\$5_DATA\DEFAULT This example copies the TEST@@ST.S5D file from the PCP/M diskette in drive A to the hard disk drive C, into the MS-DOS directory C:\\$5_DATA\DEFAULT.</p> <p>Note: If you press CTRL+C, the copying procedure will stop and the destination file will be deleted.</p>
<p>PDEL</p>	<p>Deletes files on PCP/M media PDEL [n]DR:[name][.ext] [-Q] n: user level, 0 to 15 or * for all user levels DR: drive, for example, A:, B: for diskettes and C: for the hard disk. name: file name, in accordance with PCP/M conventions. ext: file extension, in accordance with PCP/M conventions. Q: optional parameter, scanning to see if a deletion is needed</p>
<p>PDIR</p>	<p>Displays the PCP/M media directory PDIR [n]DR:[name][.ext] n: user level 0 to 15 or * for all user levels DR: drive, for example, A:, B: for diskettes and C: for the hard disk name: file name, in accordance with PCP/M conventions. ext: file extension, in accordance with PCP/M conventions.</p>

PFORMAT	<p>Formats diskettes for PCP/M (DD diskettes) PFORMAT DR: [-4][-V] DR: drive A: or B: -4: optional parameter required for the PG 675; this parameter generates a 40-track diskette format. -V: optional parameter for checking the diskettes.</p>
PSET	<p>Changes file attributes to PCP/M media PSET [n]DR:[name][.ext][-RO][-RW][-SYS][-DIR] n: user level, 0 to 15 or * for all user levels DR: drive, for example, A:, B: for diskettes and C: for the hard disk. name: file name, in accordance with PCP/M conventions. ext: file extension, in accordance with PCP/M conventions. RW: read/write attribute should be set. RO: read-only attribute should be set. SYS: SYS attribute should be set. DIR: DIR attribute should be set.</p> <p>Note: the -RO and -RW attributes and the -SYS and -DIR attributes are mutually exclusive.</p>
PTYPE	<p>Displays the contents of a PCP/M file PTYPE [n]DR:[name][.ext] [-H] n: user level, 0 to 15 or * for all user levels DR: drive, for example, A:, B: for diskettes and C: for the hard disk. name: file name, in accordance with PCP/M conventions. ext: file extension, in accordance with PCP/M conventions. H: optional parameter, output in hex</p>

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File Transfer

This chapter is intended for users operating a personal computer (PC) as a programming device (PG).

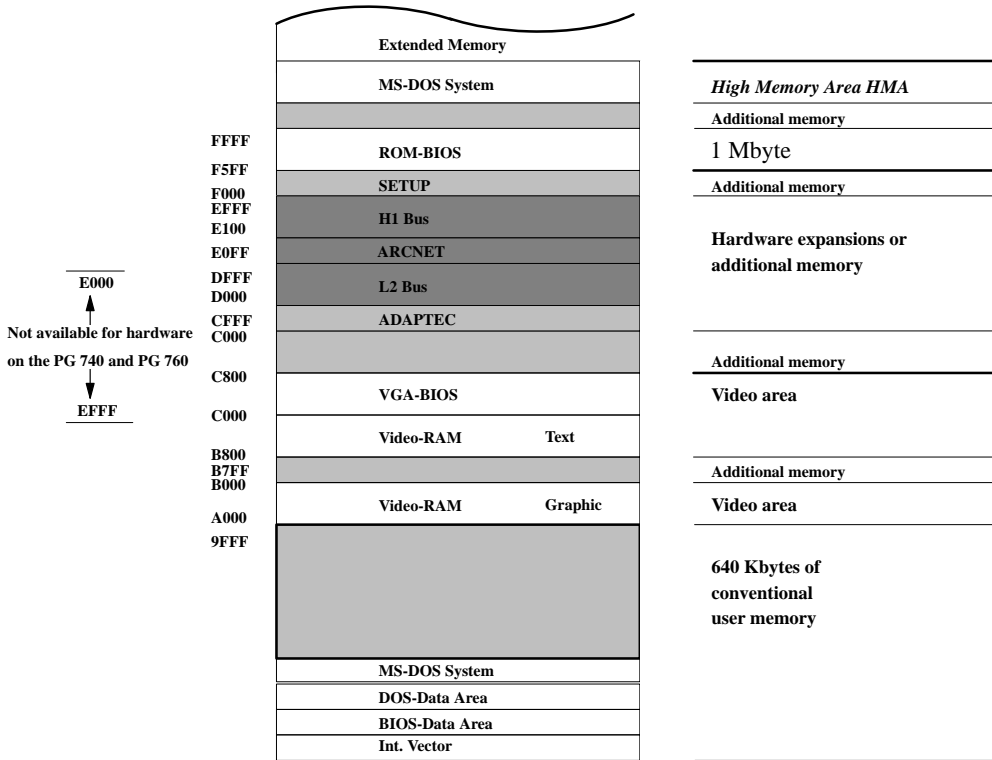
The chapter contains information about the configuration of various networks and about the software for data exchange between PGs. Users of Siemens PGs will find the relevant information in the hardware description of their PG.

The FTARC program described in Section 6.2 can only be used if your PG has an ARCNET interface module.

6.1 Network Configurations and Hardware Expansions

The MS-DOS operating system on your programming device has been optimized to the requirements of the supplied software. Above all, this means that the existing memory is put to its best possible use.

Optimizing the memory resources is achieved by a special parameter assignment (EMM386.EXE). The parameters are set for the hardware configuration of the standard programming device, and could be as follows.



The memory assignment for your PG is described in detail in the hardware description of your PG (for example, the PG 740 manual).

Memory Addressing

Normally the memory area from 640 Kbytes to 1 Mbyte (upper memory) is available for hardware expansions. By using EMM386.EXE, this area can be accessed on your PG as a user memory for STEP 5.

If you install additional hardware in the programming device, you must once again enable the address range that the hardware uses in the upper memory area. This involves modifying the CONFIG.SYS file.

Please refer to the information about modifying the CONFIG.SYS file in Section 5.1 (STEP 5 Manual).

EMM386.EXE provides two optional parameters (**eXclude** and **I**nclude) with which you can manage the upper memory area. You can obtain more information with the on-line help function (HELP EMM386.EXE).

The setting of EMM386.EXE parameters is explained below based on a few configuration lines (see figure on page 6-2).

Configuration Line for SINEC L2

If you want to plug in an L2 interface module in the standard address area D000, the configuration line for EMM386.EXE in your CONFIG.SYS file must be adapted as follows:

Example:

```
DEVICE = EMM386.EXE NOEMS      I=B000-B7FF  I=C800-CFFF
                                x=D000-DFFF  X=E000-E0FF
                                I=E100-F5FF
```


Configuration Line for SINEC H1

If you want to plug in an H1 interface module in the standard address area E000 (not on the PG 740 + PG 720), the configuration line for EMM386.EXE in your CONFIG.SYS file must be adapted as follows:

Example:

```
DEVICE = EMM386.EXE NOEMS          I=B000-B7FF I=C800-DFFF  
                                   X=E000-EFFF I=F000-F5FF
```

The address area for the H1 interface module overlaps with the internal ARCNET interface module. The ARCNET node number in SETUP must be set to 0 to release the address area occupied by the internal ARCNET interface.

Note

On the PG 740 and PG 760, for example, the address area E000 is not available for interface modules. Only the address area D000 is available.

Configuration Line for H1 and L2 Interface Module

If you want to plug an H1 and an L2 interface module (with the PG 740 and PG 760 only one is possible) in their standard address areas, the configuration line for EMM386.EXE in your CONFIG.SYS file must be adapted as follows:

Example:

```
DEVICE = EMM386.EXE NOEMS          I=B000-B7FF I=C800-CFFF  
                                   X=D000-EFFF I=F000-F5FF
```

Once again the internal ARCNET interface must be switched off by setting the ARCNET node to 0. In this configuration, you have 128 Kbytes less user memory available.

Graphics Memory

Under certain conditions, you can compensate for this reduction in the user memory by using the video memory. This 64 Kbyte area is only used by graphics programs and is located between addresses A000 and AFFF (see figure on page 6-2).

You can only use this address area if you do not run any programs in the graphics mode.

You can activate this area with the following configuration line:

Example:

```
DEVICE = EMM386.EXE NOEMS      I=A000-AFFF I=B000-B7FF
                                I=C800-CFFF X=D000-EFFF
                                I=F000-F5FF
```

MSNET / PG-NET

Users of MSNET or PG-NET can modify the load batch of their network software so that as many network drivers as possible run in the upper memory area. To do this, precede each load command for the network drivers with the command **LOADHIGH (LH)**. This makes more memory available in the conventional user memory.

Configuring the CP 141

The Ethernet address is no longer entered in the batch file STARTCP, but via the configuration program ECONFIG.EXE.

Change to the directory C:\SINEC\BIN using the following command:

```
c:\>cd SINEC\BIN
```

Start the ECONFIG program with the following command:
ECONFIG

With the ECONFIG program, you can assign parameters to the driver EPORTSCI.EXE (enter node number etc.).

Note

On the PG 740/PG 760, the **DEVICE** command in the CONFIG.SYS file must also be extended so that D = 128.

6.2 FTARC for File Transfer via ARCNET

This section is intended for users whose PG has an ARCNET interface module and who still have the FTARC program from the previous operating system S5-DOS/ST.

Uses of FTARC

The FTARC program is used to transfer files between two computers directly linked together via the ARCNET interface with fiber optic cables (point-to-point link).

FTARC versions were previously available for the operating systems S5-DOS (PCP/M), S5-DOS/ST (MS-DOS) and S5-DOS/MT (FlexOS). This means that you can also communicate with PGs operating under S5-DOS, S5-DOS/ST or S5-DOS/MT.

Installation

- Hardware requirements:

Both devices must have a suitable ARCNET connector.

- Connecting cables

FTARC is designed for a straightforward point-to-point link. The devices are linked via fiber optic cables.

- ARCNET node number

The ARCNET node number of older interface modules is set using a DIP switch on the module, whereas the node number is set on the PG 7xx programming devices with an integrated ARCNET interface module using the SETUP function (ARCNET node nos. 1 through 255, 0 = not installed).

- Software requirements
 - There must be no ARCNET network software already installed on the device.
 - For FTARC under MS-DOS, the device driver ANSI.SYS must be installed (entry “device=[dr:] [path]ansi.sys” in the CONFIG.SYS file).
 - Windows SMARTDRV must not be installed.

To start FTARC, you require one of the following program files depending on the operating system:

- FTARC.EXE for MS-DOS
- FTARC.286 and ARC.DRV for FlexOS
- FTARC.COM for PCP/M

Starting the Program

Start FTARC on both devices by

- Typing the command **FTARC** at the command level or
- Double-clicking on the program file **FTARC.EXE** under Windows.

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The FTARC main menu appears on the screen (see page 6-10).

The program must only be operated on the local device; the partner program (on the remote device) runs independently.

As long as FTARC is not started on the partner device, the message line at the bottom of the main menu shows the status “currently no connection”. As soon as FTARC is started on the partner device, the link between the two devices is established.

If the link is established successfully, FTARC displays the status “connected” at both devices and determines, for both the local and remote partner, the type of device, the ARCNET node number set, the operating system and the path (user area under PCP/M) under which FTARC was started. This information is displayed in the lower part of the main menu.

If the status “connected” is not displayed, although FTARC is started on both devices, or if an error message appears at the start, check the installation.

Additional Parameters

When you start FTARC you can also specify additional parameters (from FTARC V 1.4):

ftarc [-tim=<sec>] [-v]

-tim=<sec>	watchdog time interval in seconds (standard = 30 secs). The parameter must be entered identically at both devices.
-v	verify function on (form checksum). Checksum is formed for source and destination. If the comparison is negative, the error information is reported to an error file. The parameter must be entered identically at both devices.
-?	display help text
-h	display help text

Notes on operation:

- Functions are started by pressing the function keys indicated.
- In fields where you can type in an entry, the **DEL** key can be used for correction purposes.
- To jump between fields, use the **TAB** key and cursor control keys.

- To switch a toggle (y/n), either type the appropriate letter or press the space bar.

If you select **F1** “Transfer” in the menu for Send mode or Receive mode, only files will be transferred. If you wish to transfer all selected directories together with their contents, you should use the key combination **ALT + F1**.

Note

FTARC supports the transfer of files and complete directory structures. Files with the attributes **SYSTEM** and **HIDDEN** are also included.

Main Menu

FTARC is ready when the main menu shows the status “connected” (in the message line at the bottom of the screen).

F T A R C		File Transfer Program Version 1.4	
		Filename specification	*.* _____
<input type="checkbox"/> F1	→	Send mode	
<input type="checkbox"/> F3	→	Receive mode	
<input type="checkbox"/> F5	→	Preset drives	
<input type="checkbox"/> F8	→	Exit this program	
local:	PG7x0	#193 MS-DOS	C:\DOS
remote:	PG7x0	# 88 MS-DOS	C:\
Status: connected			

Do not make any inputs at the remote partner device, make your entries for the program at the local device.

Filename Specification (Filter for File Names)

In the field “Filename specification:”, you can restrict the file names which are to be shown in the menu if you wish. To do this overwrite the default *.* (all files) with the required filter, for example, *.txt.

You can use alphanumeric characters, the period “.” and the wildcards “*” and “?”. You cannot, however, use the drive identifiers or complete path names. These must be specified in the menu “Preset drives”.

**Preset Drives
(Function Key F5)**

In the lower part of the main menu the working area set is displayed;

local: ... "drive: path /" for the local device and

remote: ... "drive: path /" for the remote device

To set the drive/path required, select the corresponding menu via the function key **F5**. You will find more details in the section "Selecting the Preset Drives" on page 6-12.

**Send
Mode/Receive
Mode (Function
Keys F1/F3)**

If the correct drive/path for the local and remote devices is displayed in the main menu, select either

F1 Send mode (local → remote) or

F3 Receive mode (remote → local)

to get the relevant menu for the function.

More details can be found in the section "Send Mode and Receive Mode" on page 6-13.

**Exit this Program
(Function Key F8)**

You exit the FTARC program with the function key **F8**.

Selecting the Preset Drives

You can modify the standard settings for drive and path for the local and remote device by selecting the function **F5** "Preset drives".

F T A R C		File Transfer Program Version 1.4	
Preset drives			
Local drive:	A B C D E F G		
Local path:	\TEST		
Remote drive:	A B C		
Remote path:	\		
F1	→ Switch local/remote	F8	→ Make preset valid and return to main menu
local:	PG7xx #193 MS-DOS C:\		
remote:	PG7xx # 88 MS-DOS C:\		
Status: connected			

In this submenu FTARC first displays the names of the drives permitted and the path set for the current drive (shown in reverse video) for the local device.

Selecting the Device

With the function key **F1** you select the device (local or remote) for which you wish to modify the drive/path. The line selected for the device currently selected is shown in reverse video (for example, "Local/remote drive" or "Local/remote path").

Selecting a Drive

Use the cursor keys "cursor left/cursor right" to select the drive you require.

Use the cursor key "cursor down" to move to the selection for path/user area.

Note

With FTARC, drives A: through P: can be addressed, assuming they exist.

Return to Main Menu

Press the function key **F8** to validate your selections and return to the main menu.

Send Mode and Receive Mode

The send and receive modes are both described here because the operator input is very similar for both functions.

In both cases you can:

- transfer some or all of the files you selected in the main menu,
- exclude (deselect) certain files from the transfer,
- start the transfer of the required files,
- abort the transfer before it is complete.

What is the Send Mode?

Some or all of the files which were entered in the field **Filename specification** are transferred from the local drive to the remote drive. (Sending from the local device to the remote device.)

What is the Receive Mode?

Some or all of the files which were entered in the field **Filename specification** are transferred from the remote drive to the local drive. (Receiving from the remote device to the local device.)

- If the drive/path for the local or remote device is not set as required, you can modify this setting via **F8** (Return to main menu) and **F5** (Preset drives).

Note

If more than 372 objects are contained in the set path (the sum of files and subdirectories), you will be given the error message

more than 372 files to transfer

In this case only the first 372 files/directories (taken alphabetically) will be displayed and processed. The limit of 372 does **not** apply to the number of files/directories in subdirectories.

Remedy

Set the path for "Preset drives" at the highest level in the directory structure hierarchy

e.g. instead of

D:\TEST

set the root directory

D:\

Select "Send mode/Receive mode" and deselect all files/directories apart from the one required (in the above example \TEST) by using **F5** in the Transfer menu.

Start the transfer with **ALT + F1**.

Starting Point

The drive/path is set as required and the file filter has been selected.

- Press **F1** (Send mode), or
- Press **F3** (Receive mode).

The device displays the selected files and further function keys on the screen.

Menu “Send Mode”

F T A R C		File Transfer Program Version 1.4			
Transfer	from	local file	to	remote file	owr
		REP01.TXT :	:	REPORT.93	: :y
		REP02.TXT :	:	REPORT.94	: :y
F1	→ Transfer				
	(ALT/F1 inc. directories)				
F3	→ Select				
F5	→ Deselect				
F8	→ Return to main menu				
local:	PG7xx #193 MS-DOS	D:\TEST			
remote:	PG7xx # 88 MS-DOS	C:\REPORTS			
Status: connected			files/directories found: 2		

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Menu “Receive Mode”

F T A R C		File Transfer Program Version 1.4			
Transfer	from	remote file	to	local file	owr
		PROEXAZ0.SEQ:	:	:	:
F1	→ Transfer	PROEXAZ1.INI :	:	:	:
	(ALT/F1 inc. direct.)	PROEXAZ2.INI :	:	:	:
F3	→ Select	PROEXAZF.SEQ:	:	:	:
		S5DEMOJ.INI :	:	S5DEMOJ.INI :	:y
F5	→ Deselect	S5DEMOST.S5D :	:	S5DEMOST.S5D :	:y
		S5DEMOXR.INI :	:	S5DEMOXR.INI :	:y
F8	→ Return to	S5DEMOZ0.INI :	:	S5DEMOZ0.INI :	:y
	main menu	S5DEMOZ0.SEQ:	:	S5DEMOZ0.SEQ:	:y
		S5DEMOZ1.INI :	:	S5DEMOZ1.INI :	:y
		S5DEMOZ2.INI :	:	S5DEMOZ2.INI :	:y
		S5DEMOZ1.SEQ:	:	S5DEMOZ1.SEQ:	:y
local:	PG7xx #193 MS-DOS	D:\S5_DATEN\BACKUP			
remote:	PG7xx # 88 MS-DOS	C:\S5_DATEN\DEFAULT			
Status: connected			files/directories found: 93		

How to Continue

As a rule, all the files are transferred from the source computer to the destination computer. In the destination computer, the files have the same name as in the source computer. It is assumed that files with the same name in the destination computer can be overwritten.

The transfer is started using **F1** or **ALT + F1**.

Positioning the Cursor

You can move the cursor to a different line or column using the “double arrow” and “single arrow” cursor keys.

Finding a File Name

1. Position the cursor on the first character of the file name.
2. Type in the first letter of the required file.

Any files with the selected initial letter are displayed on the screen.

Stopping Destination Files with the same Name being overwritten

As standard, a destination file with the same name as the source file is overwritten. If you want to avoid this, you can stop the destination file being overwritten.

1. Position the cursor in the “OWR” (OverWRite) column.
2. Press the space bar.

The character **n** (no) is displayed on the screen. If you press the space bar again, the character **y** is displayed and the destination files with the same names can once again be overwritten.

Changing the Name of the Destination File

1. Position the cursor in the field of the destination file you wish to rename.
2. Change the file name.

Excluding Files from the Transfer

1. Position the cursor in the line of the file you want to exclude from the transfer.
2. Press **F5** (Deselect).

The line is displayed in reverse video and the file is not transferred. If you press **F3** (Select) an excluded file is once again included in the transfer.

6**Aborting the Transfer Preparations**

You can abort the preparations for transfer.

1. Press **F8** (Return to main menu).

All the selections you have made are lost.

If you have completed the file list, you can send or receive the file by starting the “Transfer” function.

Starting the Transfer

You start the actual transfer by pressing **F1** in the “Send mode” or “Receive mode” menu.

Transferring a Directory (Function Key F1)

By pressing **F1** the transfer is started for files in the set path/user area. Files in subdirectories (under MS-DOS/FlexOS) are not transferred.

Transferring a Directory and Subdirectories (ALT + F1)

With the key combination **ALT + F1** the transfer is started for files in the set path (directory) and all files in any subdirectories. This function is available from version V1.4 in FTARC.EXE (for MS-DOS) and in FTARC.286 (for FlexOS). An older version may not be used on either of the two computers.

Abort/Return to Main Menu (Function Key F8)

With **F8** you return to the main menu. If you press F8 during a transfer process, the file being transferred is completed and then the transfer is aborted with the error message “abort after current transfer”.

A message is displayed in the status line at the bottom of the screen after a transfer has been completed successfully or aborted.

“transfers completed (all OK)”

No errors have occurred.

“transfers completed (not OK)”

Errors have occurred (see ...).

Errors and Error Messages

Error messages are entered in the directory TEMP in the file FTARC.ERR.

You can output these messages, for example, with:
TYPE FTARC.ERR.

6.3 Exchanging S5 Program Data between PGs/PCs

Uses of the PG Link Package

With the PG Link package, you can exchange STEP 5 blocks and files between PGs or PCs. For this function, one of the PGs is set to passive. The active PG can then send STEP 5 blocks or files to the passive PG or fetch them from it. The PG Link package is described in detail in the STEP 5 manual.

What is Required for the PG Link?

To exchange STEP 5 blocks and files between PGs, you require the following:

1. A point-to-point link via the TTY interface (COM 1) of the two devices using a connecting cable. This is described in the PG manual for your device.
2. The software package "PG Link". This is part of the STEP 5 basic package and is described in the STEP 5 manual.

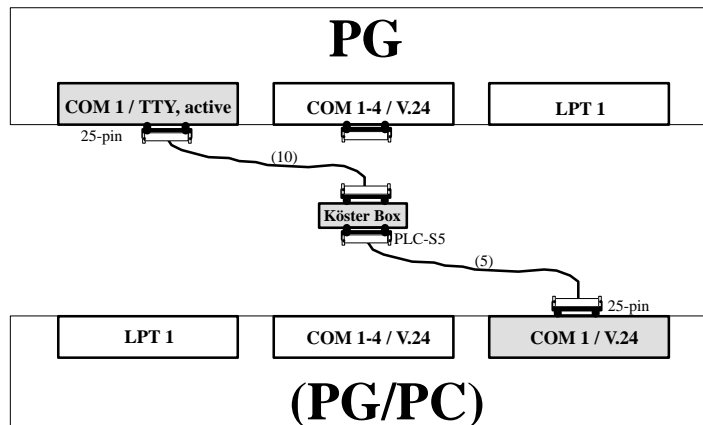
PG Interface COM 1

The data exchange with the partner PG requires an **active** TTY interface (20 mA).

If the existing COM 1 port is a V.24 interface (PC), the S5 port must be simulated with a converter (for example, a Köster box).

Connecting PGs with V.24 and TTY Interface

The cable (5) connects the V.24 interface to the Köster box and cable (10) connects the box to the active TTY interface. The cables are **not** supplied with the PG.



Procedure

The PGs are switched off.

The V.24/TTY converter (Köster box) is configured as described in Chapter 8 *V.24/TTY Converter* (Köster box):

1. Connect the cable (5) between the COM 1 (V.24) port and the port of the Köster box.
2. Plug the connector of cable (10) into the 25-pin socket of the Köster box.
3. Establish the connection to the TTY interface of the partner PG.
4. Secure the connectors (screw or clip).

Cables for the V.24 Interface

Cable (5), Order no. Köster 224 22x²⁾

Cable (10), Order no. 6ES5 733-2xxx0¹⁾

1) xxx is the length key. Refer to the Programmiers catalog ST 59.

2) x stands for the connector type of the cable PG - Köster box (see Chapter 8).

Keyboard Editor

7

You will only need the keyboard editor if you want to operate a personal computer (PC) as a programming device (PG).

Using the keyboard editor, you can adapt the key assignment to match STEP 5. You can add key combinations or modify existing combinations.

If you want to use an external color monitor with a PG which has an internal monochrome monitor, you can switch over the driver in this editor.

7.1 Introduction

Why Change Key Assignments?

If your PC has a keyboard other than the international standard keyboard or if you wish to assign additional key combinations for STEP 5, for example add the key combination **ALT + N** for segment end, it may be useful to be able to change the key assignments. If your PC has a standard keyboard (MFII keyboard), you will be able to work comfortably with the existing key assignments.

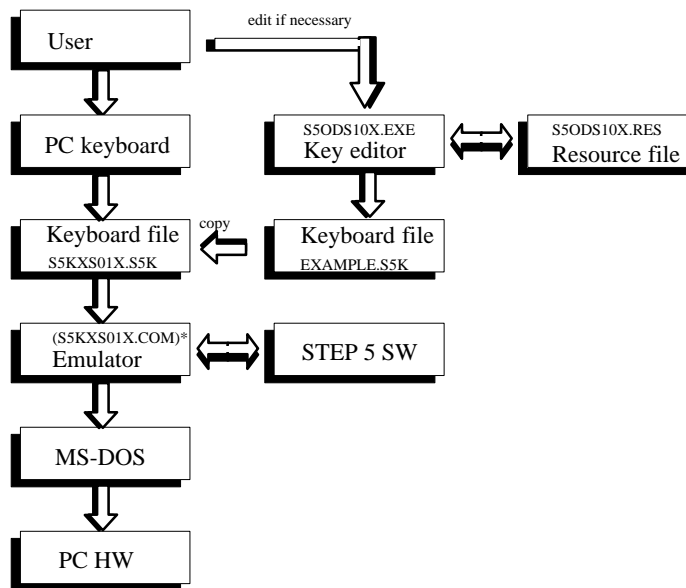
In the default setting of the editor the keyboard assignments are given in German; you can, however, select another language.

Files

The files are found in the directory DR:\STEP5\S5_ST.

File	Description	Content
S5ODS10X.EXE	Keyboard editor	Editor; manages and documents user interface
S5ODS10X.RES	Resource file	Selects preset keytop texts (the respective keyboard driver must be loaded)
EXAMPLE.S5K	Keyboard file	File with new keyboard assignment (must be copied to the directory DR:\STEP5\S5_ST)
S5KXS01X.S5K or S5KXS01K.S5K	Keyboard file	Keyboard assignment (in the directory \STEP5; if this file is not present, STEP 5 loads the default setting)

Data Flow



- * S5KXS01X.COM → PG Emulator
 S5KXS01X.EXE → PC Package Emulator (Basic Package)
 S5KXS01K.EXE → PC Package Emulator (Mini PLCs)

7

Requirements

If you wish to load another keyboard assignment for STEP 5, it is advisable that you are familiar with the following:

- the S5 keyboard itself,
- the functions of the S5 keyboard, and
- the file structure of the S5 software.

You will find an explanation of the S5-specific keys in the STEP 5 manual, in Appendix 4.

Cursor Control

MFII Keyboard
(IBM-AT)

S5 Assignment

Num Lock	/	.	-
7 Home	8 ↑	9 Pg Up	+
4 ←	5	6 →	
1 End	2 ↓	3 Pg Dn	Enter
0 Insert		.	
	÷ COM	X CURS	-1
7 ↘	8 ↑	9 ⏏	+1
4 ←	5 CORR	6 →	
1 ↙	2 ↓	3 ⏏	Enter ***
0 Insert		DEL	

7

Function Keys

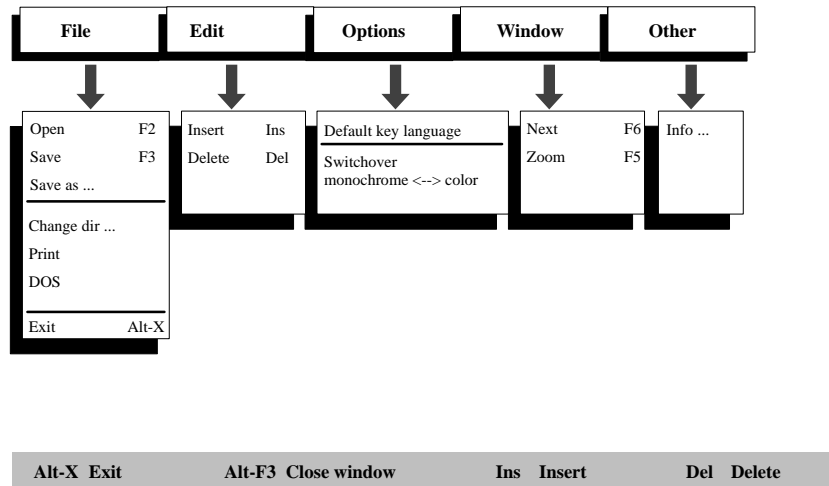
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
F1	F2	F3	F4	F5	F6	F7	F8	(/) (#)	FB	XI ⇒	Help

7.3 Activating the Keyboard Editor

Calling the Keyboard Editor

1. Change to the directory DR:\STEP5\S5_ST.
2. Type in the command **S5OES10X**.

Keyboard Editor Menu



User Interface

Menu	Menu options	Function	Display
File	Open F2	Opens the keyboard for editing	Selection box "Open file"
	Save F3	Saves the current keyboard file	Current window
	Save as ...	Saves the current file under another name in the same directory or in another directory	Selection box "Save file as"
	Change directory	Opens another directory	Selection box "Directory..."
	Print	Prints current file	Unchanged
	DOS	Changes back to DOS command level (return using EXIT and Return)	DOS command line
	Exit ALT + X	Exits the editor	DOS level
Edit	Insert Ins	Inserts or changes keytop texts at the cursor position	A further window "Assign S5 function to another key combination"
	Delete Del	Deletes keytop text at cursor position	Window with deleted assignment
Options	Default key language	Selects a resource file in another language (S5OnS10X.RES)	Selection .RES "Open file"
	Switchover monochrome/color	Switches the screen from monochrome display to color display	Screen in black/white or color
Window	Next F6	Updates the bottom window when several are open at once	Current window
	Zoom	Increases size of current window	Current window
Other	Info ...	Information on the release	Information screen

7.4 Opening File for Key Assignment

Default Keyboard Language

You will need to use this language selection for a new file and if you require a keyboard language other than German.

Otherwise, German is the default keyboard language for any new file.

Language Selection

1. Select **Default key language** in the menu **Options**.

The dialog box “Open File for Resource Files” (file type *.RES) appears with a selection of the existing resource files.

2. Select the resource file for the required language or enter a new name in the following syntax:

S5O x S10X.RES

x = D German

E English

F French

I Italian

S Spanish

3. Click on the **Open** button.

The keyboard language is set.

Open File

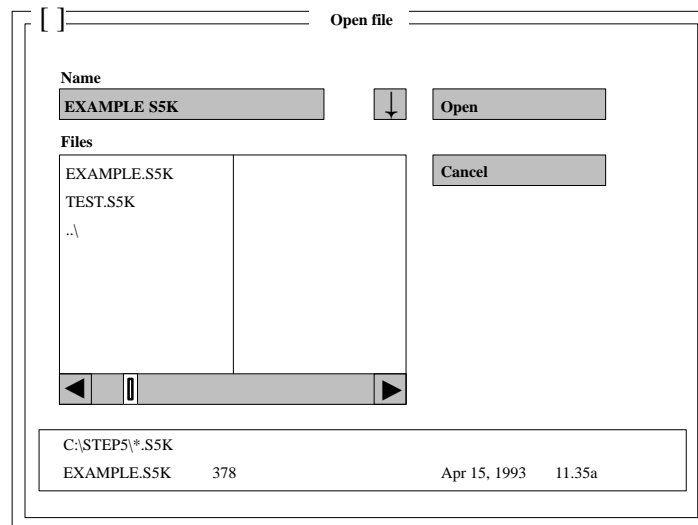
1. Select the menu command **File** → **Open (F2)**.

A list of files of the type *.S5K is displayed.

2. Select file or enter a file name.
3. Click on the **Open** button.

The file is opened for editing. For a new file the default assignment is displayed.

4. Open any additional file(s) as in steps 1 to 3.

Dialog Box “Open File”**7**

7.5 Editing the Key Assignment

Inserting a Key Assignment

Requirement: you have opened a key assignment file (see Section 7.4).

1. Select the required key in the current file using the mouse or cursor keys.

The selected line is highlighted on a colored or gray background, the line number is shown in the lower left corner of the window.

2. Select **Edit** → **Insert** or press the **Insert** key.

In the lower third of the screen an additional window appears “Assign S5 function to another key combination”. The description of this function is shown in the first line of this window.

Note: After using the **PRINT** and **PAUSE** keys, the input must be enabled again via the keyboard with the key combination **CTRL + SHIFT**.

3. Select the new key combination by pressing the corresponding keys.

The “Save assignment” window appears or the message “The key (combination) is already assigned internally”.

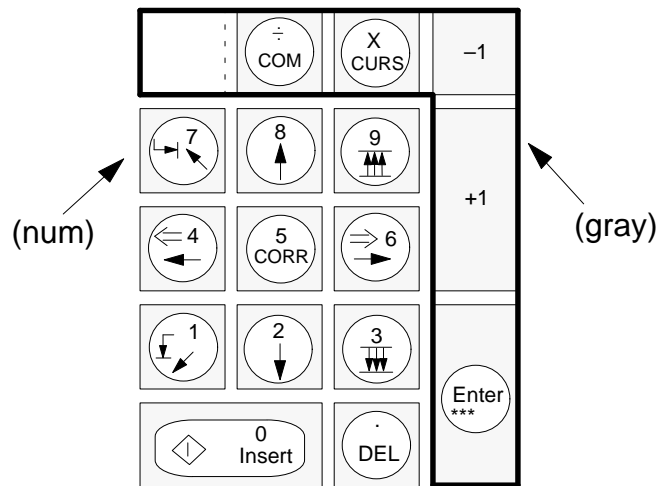
4. Assign the new key combination by **overwriting** or **inserting** the new key combination.

Restrictions

For some key combinations the keytop text displayed does not correspond to the printed alphanumeric key.

- The “D” key on the PG keyboard cannot be assigned any function.
- Hotkeys which are preassigned by resident programs at the time when the key editor is being used cannot be assigned.

**Key Descriptions
in the Editor**



**Default
Assignments**

- Keytops which are only present on a 101/102 keyboard are marked with “(101)”.
- Keytops which are only present on a PG keyboard are marked with “(PG)”.
- S5 functions which are only for GRAPH 5 are marked with “(GRAPH 5)”.

7

Deleting a Key Assignment

Requirement: You have opened a key assignment file.

1. Select the key assignment you want to delete.

The selected line is highlighted on a colored or gray background, the line number is shown in the lower left corner of the window.

2. Select **Edit** → **Delete** or press the **Del** key.

The key assignment in the selected line is deleted from the screen.

Note: After using the **PRINT** and **PAUSE** keys, the input must be enabled again via the keyboard with the key combination **CTRL + SHIFT**.

3. If necessary, undelete the assignment by clicking on the square box in the top left of the window frame and clicking on **No**.

With “No”, all the changes made since you last saved are lost.

Saving Key Assignments

- Select **File** → **Save** or
- Select **File** → **Save as** to save the file under another name or in another directory.

7.6 Changing the Working Directory

Change Working Directory

1. Select the menu command **File** → **Change dir...**
2. Browse through the displayed tree structure. If you double-click on a directory, its subdirectories are displayed.
3. Click on the required directory and the **Chdir** button.
4. Save the setting by clicking on the **OK** button.

7.7 Copying an Edited Assignment

Activating the Key Assignment

Using the menu function **File** → **Save as** you can copy your file (assignment) to a new file. When you want to activate your new key assignment for STEP 5, you must copy it into the directory DR:\STEP5\S5_ST under the name S5KXS01X.S5K or S5KXS01K.S5K.

Copying the Assignment

1. Open the key assignment with the menu command **File** → **Open** and open the file of the type *.S5K.
2. Select **File** → **Save as**.
3. Open the directory DR:\STEP5\S5_ST.
4. In place of the asterisk, enter the name of the keyboard file **S5KXS01X** or **S5KXS01K**.
5. Click on the **OK** button or press **ALT + O**.

7.8 Printing an Edited Assignment

Printing the Assignment

1. Open the key assignment with the menu command **File** → **Open** and open the file of the type *.S5K.
2. Select **File** → **Print**.

7.9 Inserting DOS Commands

Switching to the DOS Level

You can only call the DOS command level when there is sufficient free user memory.

1. Select **File** → **DOS**.
The command line of the DOS level is shown.
2. Type in a DOS command.
3. To get back to the editor, type in the **EXIT** command and press **Return**.

7.10 Switching Between a Color and Monochrome Screen

In the keyboard editor, select the menu items **Options** → **Switchover monochrome ↔ color**.

7.11 Checking the Assignment of the Resource File for Errors

Testing the Resource File

1. Open a new file of the type *.S5K with the keyboard editor menu **File** → **Open** → **Enter file name**.
2. Save without any changes with **File** → **Save**.
3. Close the window with **ALT + F3**.
4. Open the same file again.

Result: if no error occurs when the file is read, the assignment is correct.

If an error occurs, check whether any key combinations are occupied by two or more assignments.

7.12 Other

Information

Information about the release of the software can be obtained by selecting “Other” and then “Info...” in the menu.

You quit the screen by clicking on **OK**.

7.13 Exiting the Editor

Returning to the DOS Level

You can return to DOS by pressing the keys **ALT + X** or by selecting the menu command **File → Exit**.

V.24/TTY Converter

8

This chapter is only intended for specialists interested in the structure and technical data of the interface converter required to convert the V.24 port of a PC used as a PG to an active TTY interface.

The data exchange with the programmable logic controller or the point-to-point link with another PG requires an **active** TTY interface (20 mA current loop) as the COM interface.

If the existing COM 1 port is a V.24 port, the “PLC-S5” interface must be simulated by an S5 converter.

The company Köster GmbH has developed a special V.24/TTY converter for PCs (known as the Köster box).

Connection

The V.24/TTY converter is connected between the PC with a V.24 port and the PLC. The port on the PC (male or female connector, 9-pin or 25-pin) should be stated when ordering the box. The second port corresponds to the normal PLC output of the S5 programming devices, so that existing PLC connecting cables can be plugged in directly.

Order Nos.

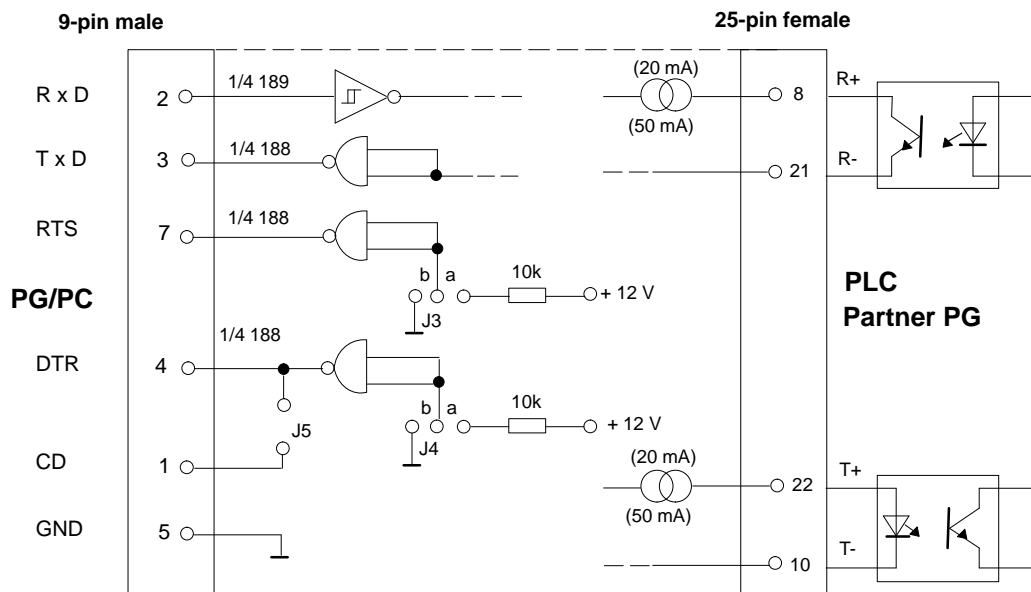
- V.24/TTY converter 224 221
and, as required:
- Connecting cable type 1 224 221
(COM 1 of the PC is a 9-pin male connector)
- Connecting cable type 2 224 222
(COM 1 of the PC is a 9-way female connector)
- Connecting cable type 3 224 223
(COM 1 of the PC is a 25-pin male connector)
- Connecting cable type 4 224 224
(COM 1 of the PC is a 25-way female connector)

Technical Data

Operating voltage:	115/230 VAC +/- 10%, selectable
Secondary voltage:	+/- 12 V, electrically isolated
Fuse:	2 x 5000 mA (medium blow)
Ambient temperature:	0 to 45° C (32 to 113° F)
Mains frequency:	48 to 63 Hz
Power input:	max. 5 VA
TTY current:	20/50 mA selectable with jumpers
Dimensions:	(WxHxD) 138 x 46 x 195 mm
Weight:	approx. 750 g incl. power cable
Connecting cable:	approx. 2 m (ground-protected connector)
PC connection:	9-pin male connector (V.24 serial)
PLC connection:	25-pin female connector with slide-in connection
Indicators:	2 LEDs for Rx/D and Tx/D

Address Fa. Köster & Hesse GmbH
 Reinickendorfer Str. 2
 D-58611 Iserlohn

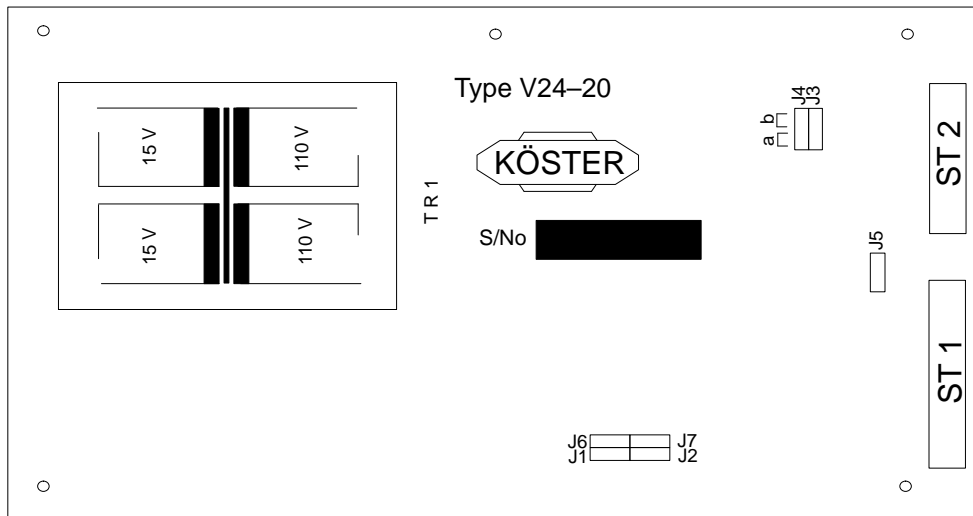
**Pin Assignment of
 the V.24/TTY
 Converter (Köster
 Box)**



By inserting J3 and J4 in position b, RTS and DTR become log. "1" (pos. a means log "0").

8

**Layout of the
Jumpers (Köster
Box)**



By plugging J1, J2, J6 and J7 the loop current can be increased from 20 mA to 50 mA.

Glossary

A

- Acoustic Signals** When you switch on your PG, the BIOS firmware performs a self-test. If a serious fault occurs at the beginning of this self-test, a series of acoustic signals (beeps) are sounded to enable you to identify the fault. In some cases, an error message will be displayed on the screen in addition to the acoustic signals.
- Active Window** The window that you are currently using or that is currently selected. Windows always applies the next keystroke or command you select to the next active window. If a window is active, its title bar changes color to differentiate it from other windows. You can activate another window by clicking on it with the mouse or by selecting it via the application menu.
- Application** An application is a program which lies directly on the operating system. The operator (user) is able to work with this program. One application on your PG/PC is the STEP 5 Basic Package.
- ARCNET** ARCNET (Attached **R**esource **C**omputer **N**etwork) is a network for office use. Programming devices can be linked together in an ARCNET network using fiber-optic cable.
- ASCII Editor** With an ASCII editor you can process (that is, edit) text files which are stored in ASCII code (**A**merican **S**tandard **C**ode of **I**nformation **I**nterchange).

B

Base Memory The base memory is a part of the main memory. It is 640 Kbytes for all programming devices. This size is entered in the SETUP menu under the entry "Base Memory" and this entry is not changed even if the memory is extended.

Boot Diskette A diskette which includes a boot sector on track 0, enabling it to load the operating system.

Booting A loading operation which transfers the operating system to the system memory.

C

Click Pressing and immediately releasing the left mouse button; this selects objects or commands.

COM 1 Port The COM 1 port is a serial V.24/modem interface. On the PG, this is also an active TTY interface with a 20 mA current loop. This interface is suitable for asynchronous data transmission. It can also be used to connect printers or prommers with a serial interface.

COM 2 Port The COM 2 port is a serial V.24 interface which can be used to connect a mouse, a printer, or a prommer with a serial interface.

Configuration Files These are files which define the configuration after booting.

Configuration Software The configuration software brings the device configuration up to date when EISA modules are installed. This is done either by copying the configuration files supplied with the module or by manual configuration using the configuration utility.

Co-Processor	In the SETUP menu under “Co-processor” the system indicates automatically whether the 80387 arithmetic processor is present or absent. The arithmetic processor allows faster and more accurate calculation of arithmetic, logarithmic and trigonometric operations.
CPU	See <i>Microprocessor</i>
Current Directory	The directory that you are currently working in.
Cursor	Collective term for mouse pointer and text cursor.
D	
Device Configuration	See <i>SETUP</i>
Dialog Box	This is a square window in the Windows graphical user interface that appears temporarily to request or supply information. Many dialog boxes have options you must select before Windows can carry out a command. Some dialog boxes also contain warnings or explanations as to why a command cannot be carried out.
Directory	A directory is a list where the names of and references to files and to subdirectories are stored.
Disk Drive	Disk drives are used to store programs and data on diskette (write access) or to load from the diskette to the computer (read access).
Diskette	The diskette (floppy disk) is an external direct access memory on which all types of files and programs can be stored. The storage medium is a round magnetic disk in a plastic cover to protect it from getting scratched.

Double-Click	To rapidly press and release a mouse button twice without moving the mouse. The interval during which the second click must be made to be recognized as a double-click can be set under Windows.
Drives	The programming devices are usually equipped with one hard disk drive and one or two floppy disk drives.
Drivers	These are programs belonging to the operating system. They allow various hardware components such as printers and monitors to be used.
E	
Editing	Processing texts and/or graphics using an editor.
Editor	The component of a data processing system for the processing of texts and/or graphics in a dialog. Texts can be figures, programs, correspondence, tables, documents and any other types of data.
Emulator	A microprogram for the STEP 5 software for adaptation to the operating system MS-DOS.
EPROM/EEPROM Submodules	These are printed circuit boards which can be plugged in, with ROM memory submodules. S5 user programs can be stored on them. These programmed submodules are then plugged into specially designed slots in the programmable controller.
ETHERNET	A local network for text and data communication with a bus topology (structure).

Expanded Memory	Expanded memory is used to describe the possibility for a program to access up to 32 Mbytes of memory above its conventional memory.
Expansion Memory	Expansion memories can be installed to expand the standard memory of a PG. After installation, the new memory size is entered in the SETUP menu.
Extended Memory	The extended memory is the memory which lies beyond the 1 Mbyte memory limit. The size of the extended memory must be entered in the SETUP menu and is compared with the existing extended memory. An add-on memory can be installed in a PG to increase the size of the memory. The entry in the SETUP must, however, be changed if a memory extension is added.
F	
Fiber-Optic Cable	This is a medium for transmitting electronic data via fiberglass or plastic cables. Fiber-optic cables are interference-free and allow extremely fast data transmission using modulated light.
File	A file is the collection of like data under one name. A file contains data required by the user to program for specific purposes and tasks.
Floppy Disk Drive	The floppy disk drive is used to store programs and data on diskette (write access) or to load from diskette to the computer (read access).
Formatting	Formatting divides the memory area on a magnetic data medium into tracks and sectors.

Function Keys	Function keys can be divided into two different types: the normal function keys which are assigned a particular function of the computer (for example, delete key), and programmable function keys (softkeys).
H	
Hard Disk Drive	Hard disk drives (Winchester drives) are a form of magnetic disk memory where the magnetic disks are permanently built into the drive.
Hardware	The hardware is the technical equipment of a computer or PG.
I	
I/O Modules	Input/output modules
Icon	A graphical representation of an element in Windows, such as a disk drive, directory, group, application, or document. You can enlarge an application icon to a window when you want to use the application. Some elements on the screen or in a window are also used as icons in the tool bar of a drive or a directory, for example, in the File Manager.
Interface	<p>An interface is:</p> <ul style="list-style-type: none">• The connection between individual hardware elements such as PLC, PG, printer or monitor via physical connections (cables).• The connection between different programs, to enable them to work together. Program modules are used for this purpose. They specify the access to files and the representation of data and adjust the operation mode of the program.
Interface Module	Module controlling or extending the hardware peripherals.

K

Keyboard

The keyboard is the collection of keys which are used to input data, text, characters, letters, numbers and special characters and control commands in a computer. The keyboard forms the input interface between the user and the computer.

L

Logging Off

The process of interrupting the logical connection for a network user between the PG/PC and server is known as logging off. The user can then no longer access the drives and the printer of the server.

Logging On

A user must log on in a network in order to establish the logical connection to another computer within that network.

M

Main Memory

The main memory is the complete physical memory of the CPU in a computer.

Menu

A list of available commands in an application window. Menu names appear in the menu bar near the top of the window. The Control menu, represented by the Control menu box at the left end of the title bar, is common to all Windows applications. You open a menu by selecting the menu name and then choosing the menu command. You can also trigger a menu command by holding down the **ALT** key and then typing the underscored letter in the menu title. See also *Menu Command*.

Menu Bar	The horizontal bar containing the names of all the menus in the application. It appears below the title bar.
Menu Command	An element in a menu that you select to execute a particular activity, for example, to copy a selected object (file, text, graphic, pixel picture etc.). See also <i>Menu</i> .
Menu Title	An element in the menu bar which identifies a group of related commands. When you select a menu title, the corresponding command menu is displayed.
Microprocessor	This term describes a complete central processing unit (CPU) as regards its functions, but without any register array in the form of a chip. In the programming devices the 80x86 microprocessors made by Intel are used.
Modem	Modulator and demodulator of a signal transmission facility. It converts the digital pulses from a computer into analog signals (and vice versa).
Module	Modules are boards (printed circuit boards) which can be slotted into a programmable controller or programming device. They are available as, for example, CPUs, interface modules or memory modules.
Mouse	The mouse is an input device. By moving the mouse, the mouse pointer can be moved at will around the screen. By pressing the left mouse button, the position is marked. The other mouse keys may have different assignments according to the application. With the mouse, objects can be selected, menus processed and functions started.

Mouse Pointer	The mouse pointer is a control element. It is moved across the desktop (screen) by means of the mouse. In applications running under the graphical user interface of Windows, the mouse pointer selects, for example, objects to be processed and menu commands.
MS-DOS	(Microsoft Disk Operating System) is one of the standard operating systems for personal computers. It is a single user system and is supplied installed on all our PGs.
N	
Network	Link between computers and end devices (PC, PG, PLC) by means of interface modules, physical cables and the corresponding software to allow data exchange between the devices.
O	
Operating System	Collective term for all programs which, in conjunction with the hardware, control and monitor <ul style="list-style-type: none">• the execution of the user programs,• the distribution of the operational equipment among the individual user programs and• the maintenance of the operating mode.

P

Parallel Interface	Information is transmitted a byte at a time via a parallel interface (port). This means that the transmission rate is very fast. The programming devices have one parallel interface (LPT 1).
Partition	A partition is a formatted area on the hard disk.
PC	Personal computer
Peripheral Modules	Input/output modules
PG	Programming device
PG LINK	Linking two programming devices directly via a special connecting cable is known as PG LINK.
PLC	See <i>Programmable Controller</i>
Printer	Output device for data, texts and graphics. Several printers are defined as standard printers for PGs. These are, for example, the Siemens printers DR 201, DR 211-N, DR 230-N and DR 231-N.
Programmable Controller	The programmable logical controller (PLC) of the SIMATIC S5 system consists of one central controller, one or more CPUs and various I/O modules.
Programming	For SIMATIC S5 the term programming means writing a STEP 5 program.
P Tools	These are utilities which allow STEP 5 user programs/files, which were generated under MS-DOS, Windows, S5-DOS/ST or S5-DOS/MT, to be copied to PCP/M media and vice versa.

R

RAM RAM (**R**andom **A**ccess **M**emory) is a read/write memory in which every memory location can be addressed individually and its contents be changed. RAM is used to store data and programs.

Read Only

- File security; this file attribute can be assigned with a DOS command or in the file manager.
- Diskette security; for 5 1/4" diskettes by sticking a tab over the notch at the right-hand edge, for 3 1/2" diskettes or EOD disks by opening the read-only slot.

ROM ROM (**R**ead **O**nly **M**emory) is a memory in which every memory location can be addressed individually. The stored programs and data have been programmed at the factory before delivery and cannot be changed by the user.

S

S5-DOS S5-DOS is an operating system based on PCP/M.

S5-DOS/ST S5-DOS/ST is an operating system based on MS-DOS.

S5-DOS/MT S5-DOS/MT is an operating system based on FlexOS. This is the standard operating system for all S5/MT applications. Due to its multitasking capabilities in conjunction with the fully-graphic user interface (X/GEM and PlantTop), the basis for data management (Btrieve) as well as the network software FlexNet and SINEC, all the tools are present which are required.

S5 Package	The complete programming device software cannot be loaded into the working memory (RAM). Thus it is divided according to its functions into so-called packages. These packages are displayed by the S5 command interpreter and loaded into the working memory only when they have been selected. In addition to the LAD, CSF, STL package there are other packages, for example, SYMBOLS EDITOR, EPROM/EEPROM, GRAPH 5 etc.
S5 Tools	All S5 packages which are based on S5-DOS use the operating system utilities by calling up "tools". The tools are a collection of subroutines which make complex tasks such as reading a file on diskette or communicating with the PLC possible. The tools do this by accessing the S5 drivers and functions of the basic operating system.
Serial Interface	Data is transmitted one bit at a time via a serial interface (port), therefore serial interfaces are slower than parallel interfaces.
SETUP	The SETUP is a program for transferring information about the device configuration (that is, the configuration of the PG hardware) to the battery-backed memory. The device configuration of the PG is preset with defaults. Changes must therefore be entered in the SETUP if a memory extension, modules, a new drive or a co-processor are added to the hardware configuration or if the ARCNET interface (PG 750) is to be activated.
SINEC H1	The SINEC H1 network (bus system) is intended for use in industry according to IEEE 802.3 (ETHERNET). Programming devices, personal computers and programmable controllers can all be connected.

Software The collective term for all programs which are used on a computer. The operating system, the firmware (resident parts of the operating system), the user programs and also any on-line documentation belonging to the programs are all part of the concept “software”.

STEP 5 The programming language STEP 5 with the types of representation ladder diagram (LAD), control system flowchart (CSF) and statement list (STL) is part of the STEP 5 Basic Package. Programs can be generated off-line at the PG and transferred to the PLC memory on-line and tested. User programs can be transferred to EPROM/EEPROM submodules via an EPROM programming interface module. Programs and plant statuses can be documented via the printer and the user programs stored on diskette or hard disk.

Symol See *Icon*.

T

Title Bar In a Windows application, the title bar is the horizontal bar (at the top of a window) that contains the title of the window or dialog box. On many windows, the title bar also contains the Control menu box and Maximize and Minimize buttons.

U

User Interface A user interface is the collective term for the points where the user comes in direct contact with the system he is working with (i.e. an interface between user and computer). This means specifically the operation of the computer using commands which are displayed on the screen.

User Level An area on diskette or hard disk under the operating system PCP/M-86.

User Program All the statements and logic for the signal processing with which a system (process) is controlled.

Utility Utilities belong to the operating system of the computer. They mainly serve to make working with the computer easier, faster or more comfortable for the user, for example, formatting diskettes, copying files, outputting the contents of directories/disk drives.

V

V.24/V.28 Interface The V.24 interface is a standardized interface for data transmission. Printers, modems and other hardware modules can be connected to a V.24 interface.

VGA (Video Graphics Array)
High-resolution color graphics module, replacing EGA

W

Warm Restart

A warm start is a restart after a program has been aborted. The operating system is reloaded and restarted. A warm start is performed with the key combination **CTRL + ALT + DEL**.

Window

In the Windows graphical user interface, a window is a rectangular area on your screen in which you view an application or document. You can open, close, and move windows, and change the size of most windows. You can open several windows at a time, and you can often reduce a window to an icon or enlarge it to fill the entire desktop. The window in which you are currently working is the active window.

Working Memory

The memory in which a program is stored which can be processed. The working memory is a direct access memory.

Write Protection

See Read Only

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