SIEMENS

SIMATIC

Programming Device PG 720

Manual

C79000-G7076-C720-02

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:

Danger

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

Warning

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

Caution

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

Note

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

Qualified Personnel

The device/system may only be set up and operated in conjunction with this manual.

Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons in the sense of the safety guidelines of this Manual 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. Other names in this document may be trade marks whose use by third persons for own purposes may violate the rights of the owner.

Correct 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.

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

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Siemens Aktiengesellschaft   Order No. 6ES7 720-0AA00-8BA0

Preface

What this Manual is About

This manual contains all the information you need for working with the PG 720 programming device. You can use this information to

- unpack the programming device and power it up.

- familiarize yourself with the functions and settings of the various components (display, keyboard, programming facilities etc.).

- connect the programming device to other units of equipment (programmable controllers, other programming devices).

- expand your system, provided you comply with the necessary conditions.

- analyze and eliminate simple problems.

Who is the Manual Intended For?

The following persons require the manual:

- Users commissioning the programming device themselves or working with it (editing, debugging).

- System administrators operating the programming device in a network.

- Service and maintenance personnel using the PG 720 for system expansion purposes or error/fault analysis.

Validity of the Manual

This manual describes the version of the PG 720 as available in March 1996. The Product Bulletin supplied with the PG 720 contains the latest technical specifications for the programming device.

Licences

The approvals, certificates and licenses for your device are supplied along with the Product Bulletin.

Where to Find Information

Along with your PG 720, you also receive the following documents which you require for commissioning the device:

- The Product Bulletin with the valid technical data of the PG 720.

- A Product Information leaflet about the software supplied with the PG 720.

For more detailed information about handling the software, please refer to the appropriate manuals (for example, the STEP 5 manual).

Plan of the Text   Chapters 1 to 4 of the manual contain the most important instructions for commissioning and using the PG 720. Chapters 5 to 8 are reference sections required in special situations.

Setting up and getting to know your device.
Before you start to use your programming device, you should read about setting up the device in Chapter 2 and about the components and functions of the PG 720 in Chapter 3.

Installation
Chapter 4 describes the basic steps necessary for starting up the PG 720. This chapter also contains instructions for working with submodules and memory cards for programmable controllers and for connecting the programming device to other devices.

Expansion
Chapter 5 describes how to expand your PG 720 (for example installation of memory expansions). Please observe the safety instructions in this section.

Configuration
Modifications made to the system hardware may make it necessary for you to adapt the original hardware configuration. This is described in Chapter 6.

Error/fault diagnostics
Chapter 7 explains how to deal with simple faults and problems that you can diagnose and, in some cases, eliminate yourself.

Reference data
Chapter 8 contains information about hardware addresses, interrupt assignments and connecting cables.

Glossary
The glossary defines and explains important terms.

Alphabetical index
The alphabetical index will help you to find passages in the text relating to important terms and key words quickly and reliably.

Queries   If you have any questions concerning subjects not covered in the manual, simply get in touch with the Siemens representative in your area or call the SIMATIC Hotline. The addresses are listed in your product bulletin.

If you have any questions about the manual itself or would like to make or suggestions, please complete the reply card at the end of the manual. We would also appreciate it if you would include your own opinion and appraisal of the manual on the reply card.

Contents

Product Overview

<div style="text-align: right; font-size: 3em; font-weight: bold;">1</div>

Application

The PG 720 programming device is a self-contained unit designed specifically for an automation environment. Its performance, ergonomic design and equipment make it a unit particularly suitable for maintenance and service as well as for programming/configuring and testing and installing SIMATIC programmable controllers.
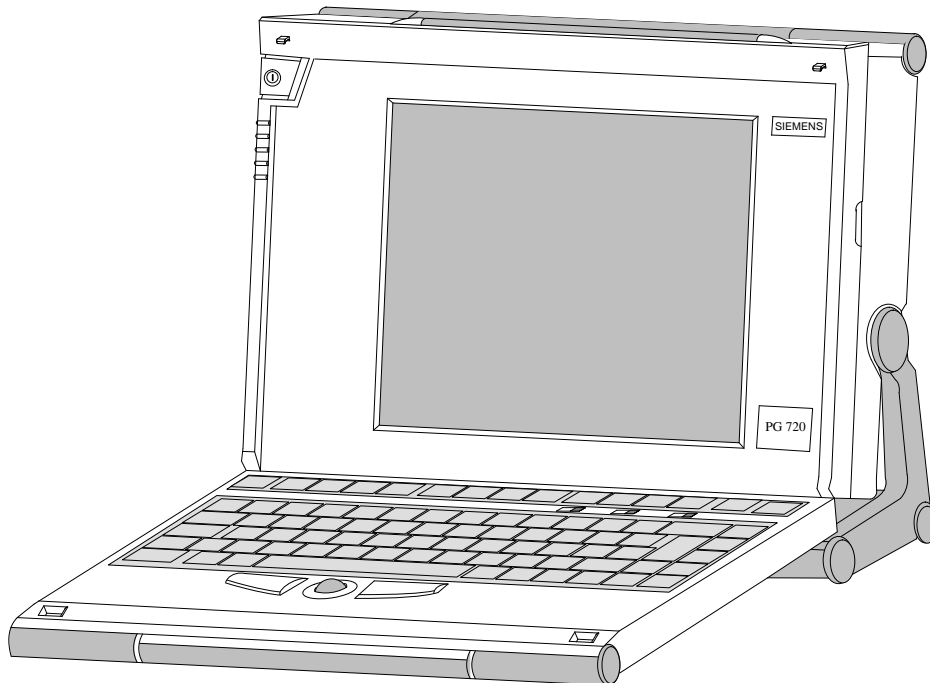
The PG's Hardware and Software

You can use the PG 720 programming device to program SIMATIC S5 and SIMATIC S7 programmable controllers. It has

- interface ports for connection to programmable controllers.

- programming facilities for S5 memory submodules and S5/S7 memory cards.

The PG 720 is supplied with system and automation software. The software components are listed in the Product Information leaflet.

Advantages of the PG 720

Compared with a PC with standard hardware and software, the PG 720 programming device of the SIMATIC family has numerous advantages:

- You can develop, debug and document user programs for SIMATIC S5 and SIMATIC S7 programmable logic controllers with the PG 720 without the need for additional hardware or software.

- The rugged design and practical functions of the PG 720 make it particularly suitable for use on-site under tough industrial conditions. It is extremely light and easy to transport. The PG 720 meets the specific requirements of industrial environments such as noise immunity, compliance with the relevant standards, ruggedness, simple transportation and startup.

- The PG 720 is equipped with a battery allowing it to be operated without a mains connection.

- The PG 720 can be set up and operated in a large number of different ways and positions, and can therefore be used practically anywhere it is needed.

- The PG 720 has all the integral ports necessary for connecting it to SIMATIC automation devices:

  – Programming interface for SIMATIC S5 memory submodules.

  – Programming interface for SIMATIC S5 and SIMATIC S7 memory cards in credit card format.

  – Communication interfaces for connection to S5 and S7 programmable controllers.

- The PG 720 is supplied with all the necessary system and automation software already installed on the hard disk in compressed format.

- Since MS-DOS and Windows are also already installed, you can, of course, also use the PG 720 as a stand-alone workstation, and run all the standard software available on the market that requires MS-DOS or Windows.

- In terms of performance and expansion capability, your programming device meets all the normal requirements of a PC. This means that the PG 720 can also be used as a fully-fledged personal computer.

Unpacking and Setting Up the PG 720

2

What Does this Chapter Contain?

This chapter contains important information about unpacking, setting up and transporting the PG 720, such as:

- opening and closing the keyboard,
- changing the angle of inclination of the device,
- using the extra pull-out support and
- how to move the unit.

Summary of Sections

In Section	You Will Find	On Page
2.1	Setting Up the PG 720	2-2
2.2	Moving the Programming Device	2-6

2.1   Setting Up the PG 720

**Unpacking Your
PG 720**

Unpack your PG 720 as follows:

1. Remove the packing.

2. Do not throw the original packing away. Keep it in case you have to ship or transport the unit again at some time in the future.

3. Check the packing list to make sure that no components are missing.

> **Caution**
>
> Risk of damage!
>
> Moisture inside the unit can cause serious damage.
>
> When transporting the unit in cold weather, when it may be submitted to extreme variations in temperature, make sure that the unit is allowed to reach room temperature slowly before you switch it on.
>
> If condensation has formed, this must be allowed to evaporate before you switch on. If, for example, the unit is subjected to a temperature change from –20° C to +20° (–4° F to +68° F) you should wait approximately 12 hours before switching on the unit.

**Setting up on a
Desk Top**

The PG 720 is used primarily on a desk or table top. To ensure a comfortable working position, the PG 720 can be adapted as follows to suit the work place:

1. Place the PG 720 on the desk or table top.

2. Open the keyboard lock by pulling up the gray handle.

3. Lower the keyboard into position.
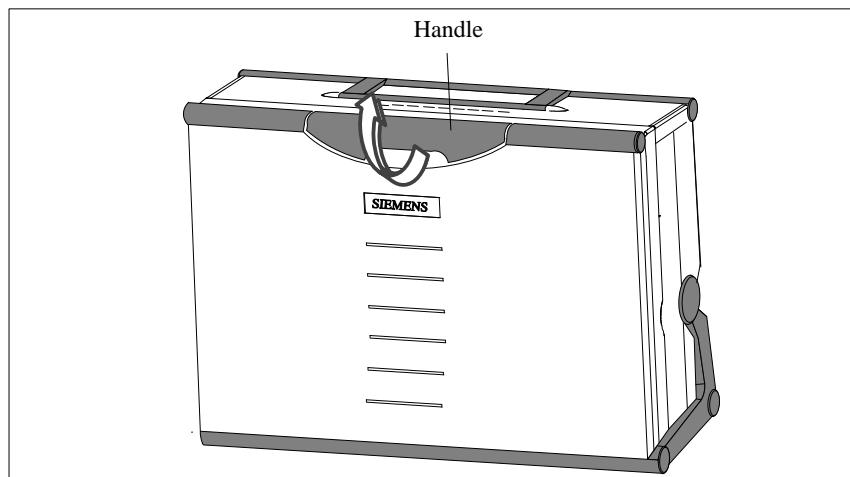
Figure 2-1   The Programming Device before Opening

Changing the Angle of Inclination

With the keyboard open, you can incline the unit to any angle between 0° and 90°. To adjust the angle, proceed as follows:

1. Lower the keyboard into position.

2. Pull the support (Figure 2-4) out of the rear of the stand and if necessary pull out the extra support hoop.

3. Incline the unit to an angle that will allow you to work comfortably.
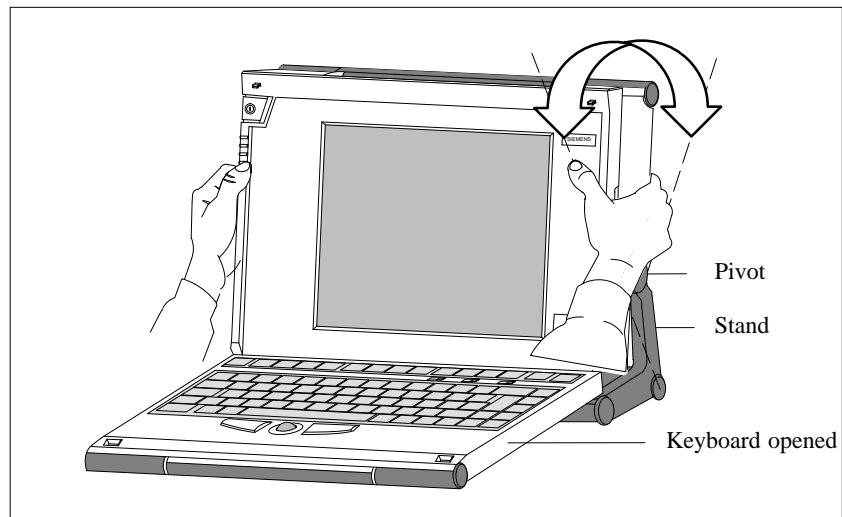
Figure 2-2   Changing the Angle of Inclination

Note

When you change the angle of inclination, make sure that the keyboard cable is **not trapped** between the device and the stand.

Caution

Risk of injury!

There is a danger of the unit tipping over if it is set up at an angle of inclination of more than 15° without using the pull-out support. This could lead to personal injury and also damage to the unit.

If the angle of inclination is greater than 15°, you must use the pull-out support and if necessary the extra support hoop in the stand.

Detaching the Keyboard

In certain situations, it is helpful to remove the keyboard.

Press in the catches in the middle of the hinges
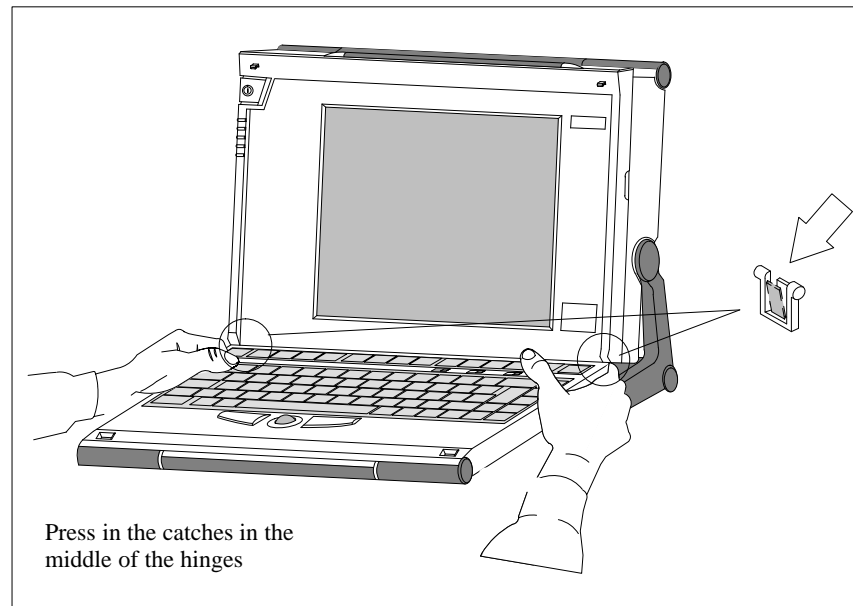
Figure 2-3   Detaching the Keyboard

⚠ **Caution**

Risk of tipping!

If the keyboard is detached, there is a risk of the unit tipping over. Before removing the keyboard, make sure that you pull out the support from the device stand (Figure 2-4) and pull out the additional hoop.

Detaching

You detach the keyboard as follows:

1. Grip the keyboard hinges in the stand behind the keyboard.

2. Pull the locks in the middle of the hinge assembly towards the keyboard.

3. Pull the keyboard up and out.

4. Place the keyboard on a suitable surface, using the hinge assembly as a stand.

Refitting

You attach the keyboard again as follows:

1. Place the keyboard cable in the cable conduit in the stand.

2. Snap the keyboard hinges into the receptacles in the stand.

Note

When attaching the keyboard, make sure that the cable is lying correctly in the cable conduit and is fixed in position.

Keyboard Angle   When the keyboard is attached to the unit, its angle of inclination is 6°, the height of the middle row of keys is 30 mm (about 1 inch). When it is detached, the angle of inclination is 4.5°, and the height of the middle row of keys is 27 mm. This is an ideal ergonomic design to allow a comfortable working position.

Horizontal Position Adjustment   If no table or desk is available, the unit can be operated on the floor. You can adjust the casing and display through approximately 90º into the horizontal plane.
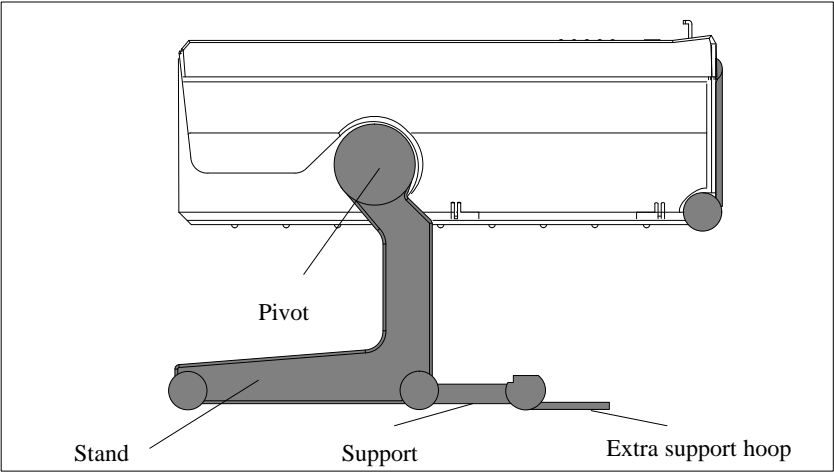
Figure 2-4   Horizontal Operating Position Without Keyboard

Wall Mounting   The basic unit can be attached to a wall. Four drilled holes (6 mm diameter) are provided in the unit stand for this purpose.

Figure 2-5   Drilling Template for Wall Mounting (dimensions in millimeters)

2.2   Moving the Programming Device

Preparations   The PG 720 is easy to carry. Before carrying it, however, you should take the following measures:

1. Switch the PG 720 off and wait about 20 seconds until the drives have come to a complete stop.

2. Unplug all the connecting cables.

3. Close the covers protecting the ports and connections on the right-hand and left-hand side panels.

4. Bring the unit into an upright position.

5. Raise the keyboard and lock it by pressing it against the front panel of the unit. The latches on the right and left snap in. Make sure that both catches are properly locked.

6. If you only want to carry the unit for a short distance use the handle.

7. If you want to move the PG 720 over larger distances, pack the unit and all its accessories in the carrying bag supplied.
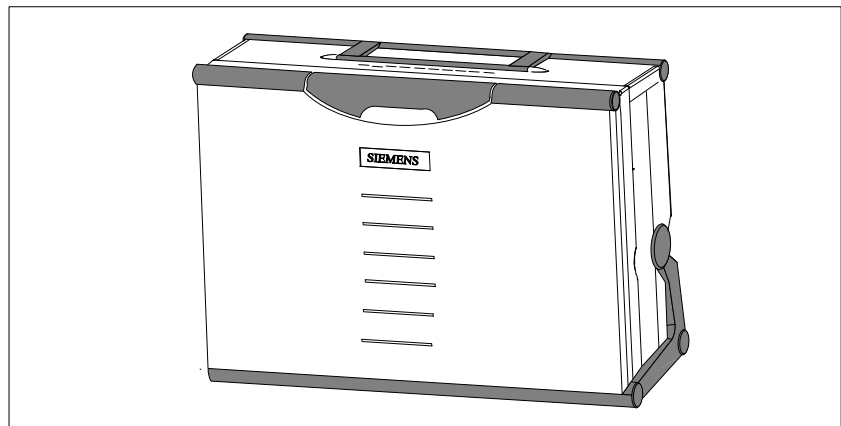
Figure 2-6   PG 720 Ready for Carrying

Carrying the PG 720   Despite the rugged design of the PG 720, its internal components are sensitive to severe vibration or jolts. When moving the PG 720 you must therefore make sure that it is protected from severe mechanical forces.

Use the **original packing material** if you have to ship the PG 720 from one location to another.

Getting to Know the PG 720

3

What Does this Chapter Contain?

This chapter contains all the information you require about the most important components of the device such as:

- LED displays

- drives

- keyboard

- programming facilities of the PG 720

- external power unit and battery.

Summary of Sections

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3.1　Hardware Components of the PG 720

Front　　　　　You can access all the important operator controls and displays from the front or sides of the unit. Figure 3-1 shows the front of the PG 720.

1	On/Off switch	**6**	Keyboard
2	Carrying handle	**7**	Cover for COM1, COM2, LPT1/printer, mouse, MPI interface
3	Liquid crystal display	**8**	Trackball
4	Cover for submodule, memory card, PCMCIA interfaces and floppy disk drive [1]	**9**	Catches for locking keyboard
5	Stand	**10**	Pivot
		11	Locking handle

[1] The covers protect the interface ports from dust and can be taken off and snapped back on again.

Detail 12

Other LEDs

Power LED

green:　In operation, battery is charged

orange:　In operation, battery being charged

red:　Battery run down to minimum, the unit will soon switch off

Hard disk access
Floppy disk access
Submodule programming active
MPI port

Figure 3-1　　The Front of the PG 720

Left-Hand Side Panel (Communications Side)

All the connectors and interface ports for connecting to external devices are located on the left side panel of the PG 720 (communications side).
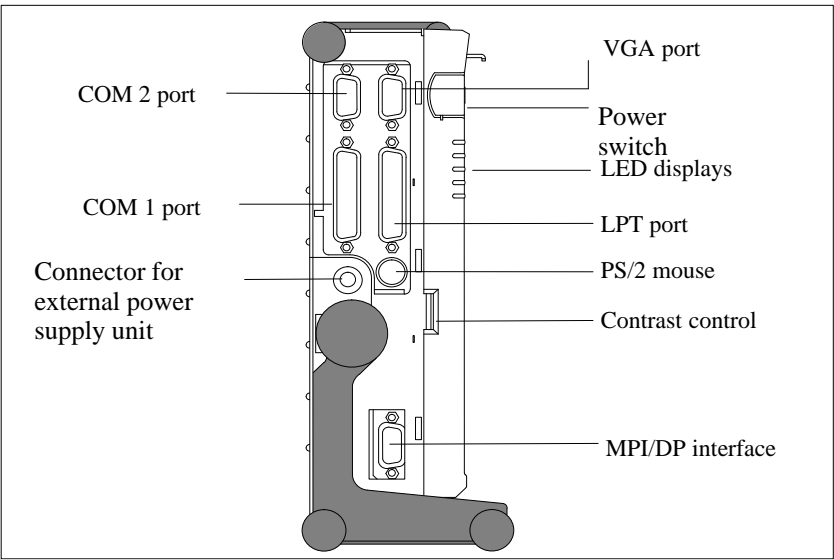
Figure 3-2   Left-Hand Side Panel with Cover Plates Removed

Connectors and Ports

The following table contains an overview of the various interface ports and connectors.

Table 3-1   Connectors on the Left Panel of the Unit

Ports and Connectors	Function
VGA port	Connection for external monitor
COM 2 Serial port V.24 / mouse Serial port	Connection for serial mouse
	Connection for serial printer
COM 1 V.24 /MODEM /PLC Serial port	Connection for S5 programmable controller
MPI (multipoint interface)	Connection for S7 programmable controller
LPT 1 printer Parallel port	Connection for parallel printer
PS/2 mouse	Connection for PS/2 mouse
External power supply unit	Connection for 17 V DC from external power supply unit

3

Right-Hand Side Panel (Processing Side)

You access the slots for programming S5 submodules, S5/S7 memory cards, the PCMCIA port, and the disk drive from the right-hand side of the unit (processing side).
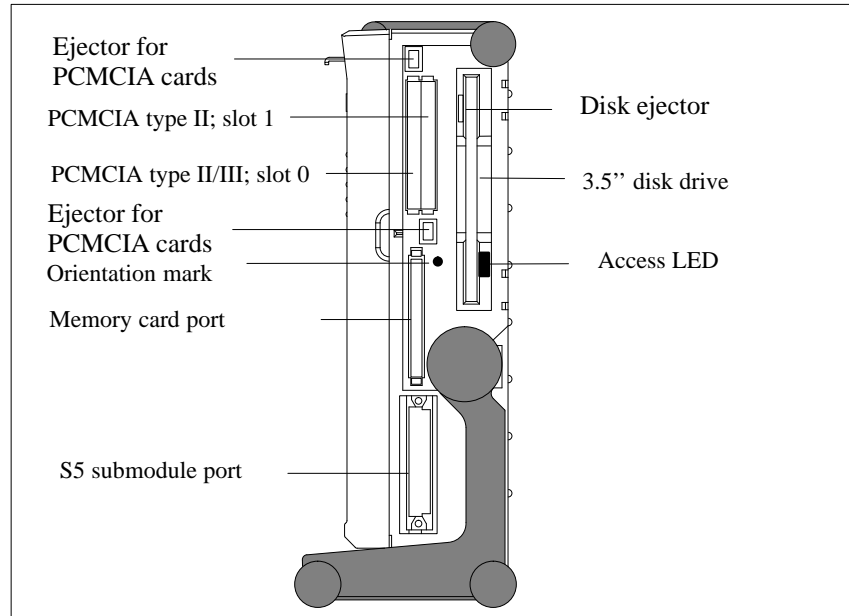
Figure 3-3   Right-Hand Side Panel (with Port Covers Removed)

The following table contains an overview of the ports and connectors on the right-hand panel:

Table 3-2   Connectors on the Right Panel of the Unit

Interface Port	Function
PCMCIA type II port ; slot 1	Connection for PCMCIA type II cards
PCMCIA type III port; slot 0	Connection for PCMCIA type II/III cards
S5 submodule port	Programming SIMATIC S5 submodules
Memory card port	Programming SIMATIC memory card
Disk drive	Working with 3.5" disks

Ventilation Slits

There are ventilation slits on the top and bottom panels of the unit. These slits must not be covered or blocked in any way (for example by carpeting).

⚠

Caution

Risk of overheating!

If you cover the inlet or outlet ventilation slits, you may cause damage to the PG 720.

Do not place any objects so that they obstruct the ventilating slits in any way.

3

3.2 Display

Available Displays   The PG 720 has a monochrome or color display.
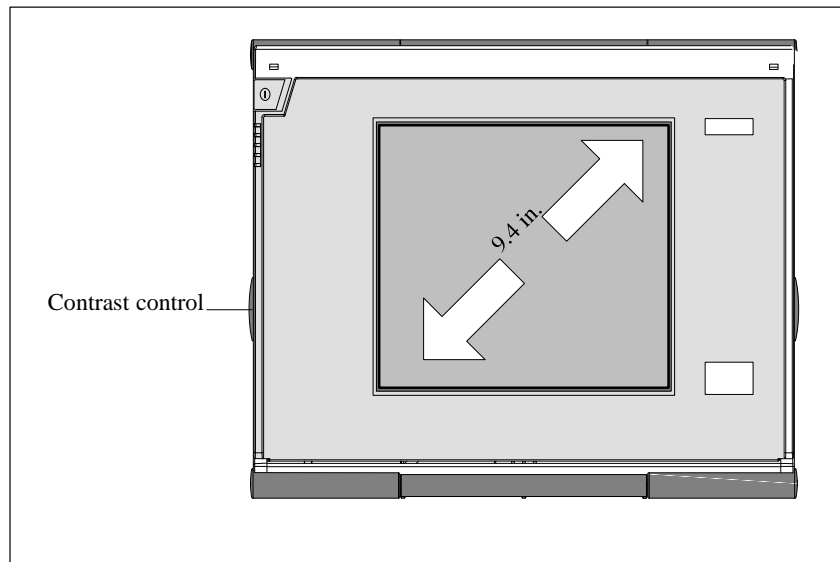
Figure 3-4   Display PG 720 / PG 720 C

Monochrome PG 720 Display

The display is an STN (STN = Super Twist Nematic) monochrome display with a 9.4 in. diagonal and a resolution of 640 x 480 pixels. With the monochrome device, up to 64 gray half-tones can be displayed. The contrast can be adjusted with a control to the left of the display.

Color PG 720 C Display

The display of the color PG 720 is an STN color display with a diagonal of 9.4 in. and a resolution of 640 x 480 pixels.

The three primary colors, red, green and blue, can each be displayed in eight different shades. This means that, including all the secondary colors, a maximum of 256 different colors can be displayed. The contrast can be adjusted with a control to the left of the display.

Note

Depending on the gray tone or color shade in the display, passive STN displays are subject to varying degrees of interference known as the Moiré effect. This is a physical characteristic and is not a fault.

Caution

Risk of injury!

If a display is **damaged**, liquid crystals may escape. Do not touch this liquid or allow it to come into contact with your skin in any way, and do not breath in the vapors. If you do come into contact with the liquid, wash those parts of the skin affected immediately with alcohol, and rinse with plenty of water. Then consult a physician immediately.

Use only a cotton cloth and a neutral cleansing agent to clean the display. Do not use water or aggressive solvents (such as alcohol or acetone). Never touch the display with hard, sharp objects. Avoid asserting any pressure on the display surface.

3

3.3   Keyboard

Keyboard Layout   The keyboard is divided into the following areas:

- Alphanumeric or typewriter keyboard with special keys

- LED displays

- Function keys

- Cursor control keys.

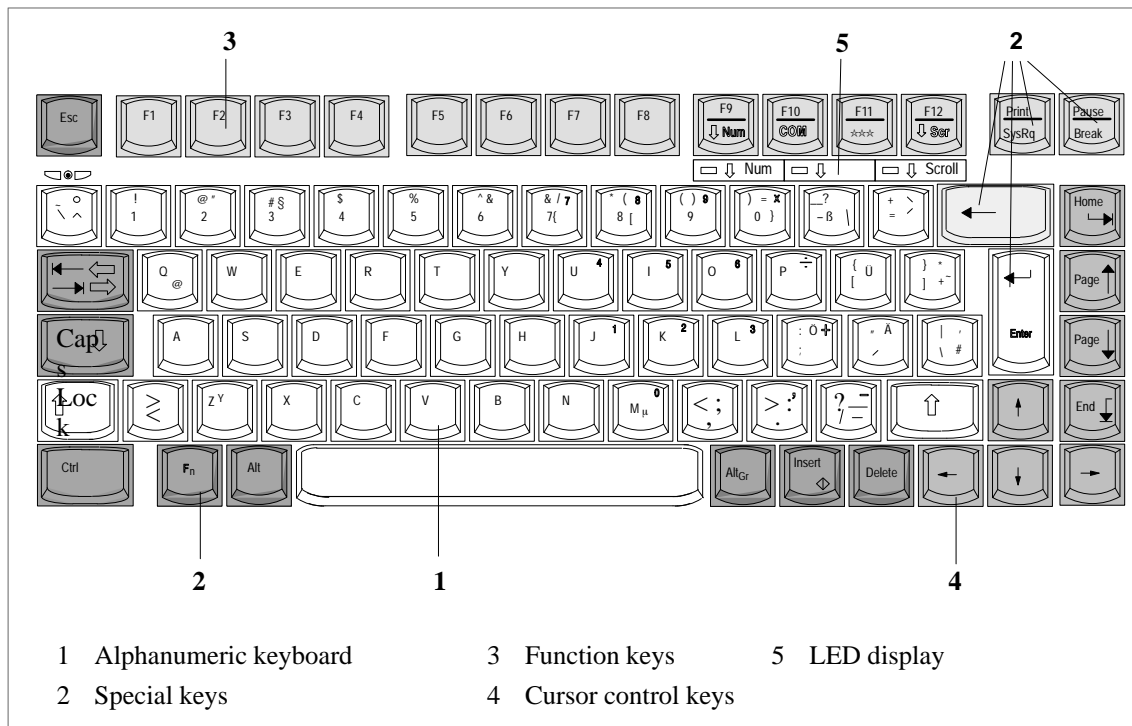| 1	Alphanumeric keyboard	3	Function keys	5	LED display
2	Special keys	4	Cursor control keys		

Figure 3-5   Keyboard Layout

Repeat Function   All the keys on the keyboard are of the autorepeat type. The character is repeated as long as the key is pressed.

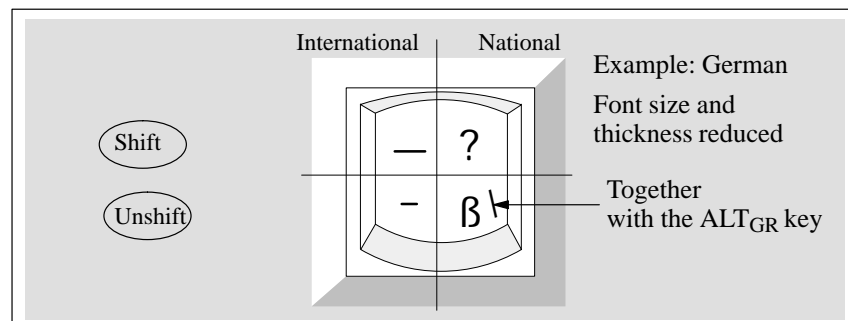**Keyboard Labeling**   The keyboard has international labeling.

Figure 3-6   The Keyboard Labeling System

Alphanumeric Keyboard

The largest block of keys on the keyboard is the alphanumeric keyboard with all the keys for the letters of the alphabet, numerals and special characters. The characters are arranged in basically the same way as on a normal typewriter. However, there are a number of special keys which have special functions for the PG 720.

Special Keys

The special keys in the alphanumeric keyboard have the following functions:

Table 3-3   Functions of the Special Keys
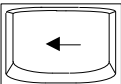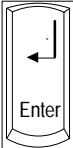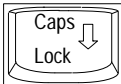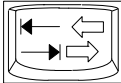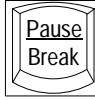
Key	Function
←	**Backspace Key** This key moves the cursor one space to the left and deletes the character at this position.
↵ Enter	**Enter Key** (Return, Enter, Line Feed) The return or enter key is used mainly to terminate a command line in the operating system; that is, the command you have typed in is executed when you press this key. For other uses of this key, please refer to the User Manual of the relevant application program.
Caps Lock ⇩	**CAPS LOCK Key** If you press this key, the middle LED at the top right-hand corner of your keyboard lights up. All upper case characters and other characters are output normally. If you want to type lower case letters in this position, you must first press the shift key. If you are using an international keyboard, you cancel this function by pressing the CAPS LOCK key again. The LED then goes out. If you have a German keyboard, you must press the shift ⇧ key to cancel this function.
F9 ⇩ NUM	**NUM Key** With these keys F_n+ ⇓ NUM , the emulated numeric block is switched from the alphanumeric keyboard to numeric keys. The LED display lights up. Press this key again to return to cursor control.
← ⇐ → ⇒	**Tabulator Key** This moves the cursor depending on the selected tabulator positions.
F_n	**"Fn" Special Key** (combination key) In conjunction with a second key (key combination), you activate other key codes for special applications with this key (see Figure 3-9 Function Keys). This key is also used to emulate the numeric block (Figure 3-8 Numeric Block).

3

Table 3-3   Functions of the Special Keys

Key	Function
Ctrl	**CTRL Key** (combination key) This key is only used in combination with other keys. For example, you press CTRL + ALT + Delete to reset and restart the operating system. For other uses of this key, please refer to the User Manual of the relevant application program.
Alt	**ALT Key** (combination key) This key is only used in combination with other keys. For example, you can enter the hexadecimal value of an ASCII character using this key and the numeric keypad for example, F_n + ALT + 123 corresponds to "{".
Alt$_{Gr}$	**ALT$_{Gr}$ Key** (combination key) You can use this key together with the other combination keys to generate other key codes. For example, you can generate the "\" character on the German keyboard by typing ALT$_{Gr}$ + ß.
Print SysRq	**PRINT** (combination key) Using the Print key, you can output the current screen display to a printer.
Pause Break	**PAUSE** (combination key) The Pause key interrupts program execution in the majority of applications.

LED Displays

The LED displays for the keys NUM LOCK and SCROLL LOCK are located below the function keys F9 to F12 and display the current status of the keys.

• NUM LOCK

• CAPS LOCK

• SCROLL LOCK

When the programming device is powered up, the NUM LOCK, CAPS LOCK and SCROLL LOCK light up briefly twice. The keyboard is then ready for operation.

Cursor Keys   The key block shown in the picture below is used for cursor control.
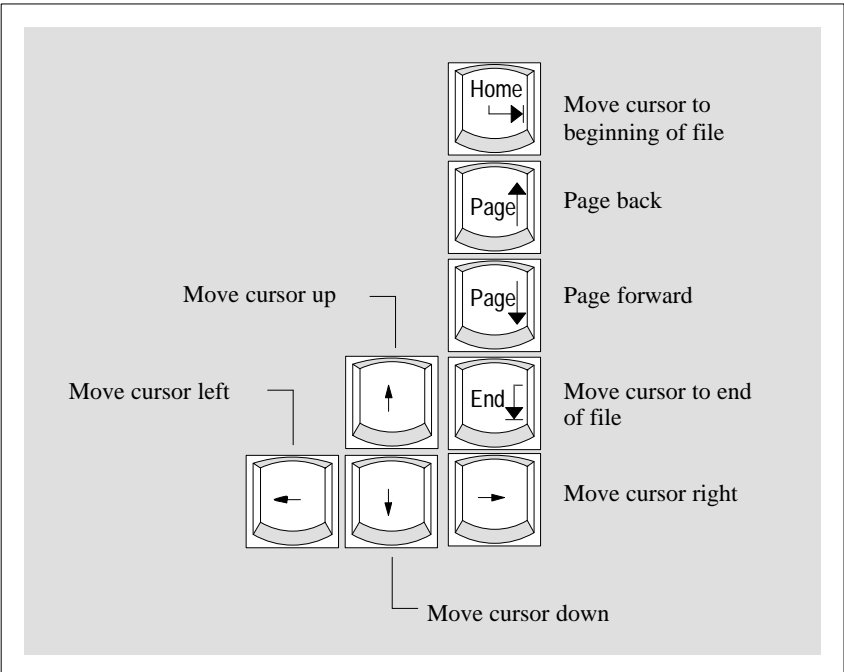
Figure 3-7   Cursor Control Keys

Numeric Keypad with Fn Key   By pressing F_n and one of these keys, the numbers and characters can be used provided Num Lock is switched on.
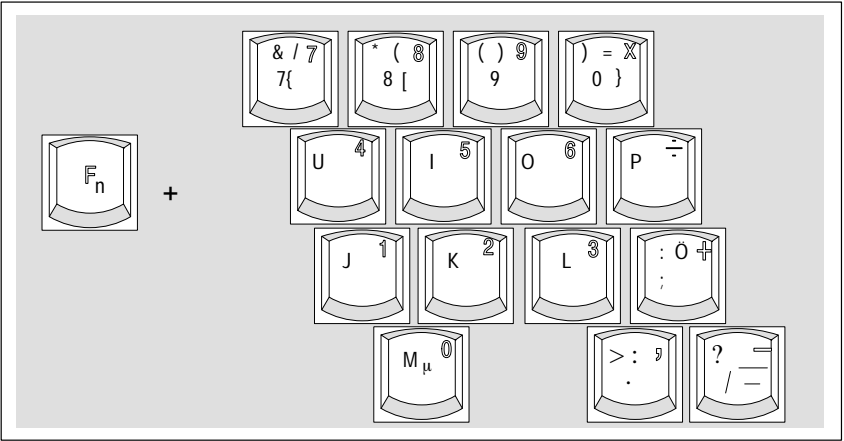
Figure 3-8   Numeric Keypad

Function Keys   There is a row with twelve function keys located above the alphanumeric keyboard. The assignment of the individual functions keys depends on the software you are working with.

F_n + F9 can also be used to switch the numeric keypad from alphanumeric keys to numeric keys.

Keys with Specific Functions for S5   The following function keys have specific functions in conjunction with the STEP 5 programming software.

Home ↳		Horizontal expand
End ↓		Vertical expand
Insert ◇		Enter key
← ⇐ → ⇒		Cursor right/ cursor left
Fn + F10 COM		Title/comment input in segments
Fn + F11 ✩✩✩		End of segment
Fn + F1		Help
Fn + F2		Insert segment ⇉
Fn + F3		Delete segment (X ⌐)
Fn + F4		Correction (CORR)
Fn + F9 ↓NUM		Switch the emulated numeric keypad from alphanumeric to numeric keys
⇧ + F10 COM		Zoom (in Graph 5)
CTRL + End ↓		Zoom (in Graph 5)
Pause Break		Half screen (in Graph 5)

Figure 3-9   Function Keys (STEP 5)

Key Combinations   A selection of some of the most important key combinations are shown in the
following table.

Table 3-4   Key Combinations

Key Combination	Effect
Ctrl + Alt + Delete	Soft restart
Ctrl + Alt + F1	Switch over to international character set
Ctrl + Alt + F2	Switch over to German character set: the German keyboard driver must be loaded.
Fn + (trackball)	Trackball active / passive

3

3.4 Trackball

Trackball

The trackball is a pointing device for cursor control and menu selection in many programs that support mouse operation. By moving the trackball, the cursor can be positioned anywhere on the screen.

By pressing the left-hand button, you set a marker. The function of the right-hand button depends on the particular application you are using. You can select objects or items in a menu and start functions with the trackball.

Cleaning the Trackball

The trackball is in a roller housing which normally prevents dust collecting on the ball or transmission mechanism. Nevertheless, you should clean the trackball at regular intervals.

Cleaning the trackball:

1. Switch off your programming device.

2. Remove the cover of the trackball housing by turning it counter-clockwise, for example by inserting tweezers or a similar tool into the holes in the ring.

3. You can now take the trackball out of its housing.

4. Wash the trackball in a solution of tap water and mild cleansing agent.

5. Blow any residual dust out of the trackball housing.

6. Dry the trackball and return it to its housing.

7. Replace the cover and tighten it by turning it in a clockwise direction.

3.5   Drives

Drive Types

The PG 720 is equipped with the following drives as standard:

Table 3-5   Standard Drives

Type of Drive	Format	Capacity
Floppy (diskette) drive	3.5 inch	1.44 Mbytes
Hard disk drive	2.5 inch	See Product Bulletin

Floppy Disk Drive

Using the floppy disk drive you can save programs and data on diskettes or load them on the PG 720.

Types of Diskette

You can use the following diskettes:

Table 3-6   Types of Diskette

Double-Sided High-Density Diskette	Double-Sided Double-Density Diskette
3.5 inch	3.5 inch
1.44 Mbytes (135 TPI)	720 Kbytes
80 tracks per side	80 tracks per side
PG 720 recognizes disks by their coding	PG 720 recognizes disks by their coding

Handling Diskettes

You insert diskettes into the drive as shown below:
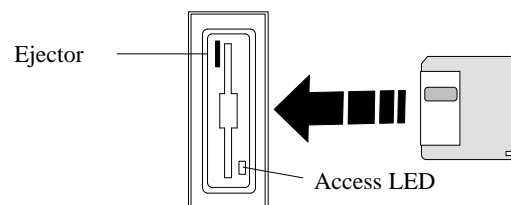
The access LED for the diskette drive lights up on the front of the device when the diskette is being accessed.

⚠	**Caution**
	Risk of data loss!
	You must not remove the diskette as long as the access LED is lit. Otherwise, you may lose the data on the diskette.
	Do not remove the diskette until the access LED on the drive or on the front panel of the PG 720 has gone out.

Hard Disk Drive
You can use a number of different hard disk drives in your PG 720. The memory capacity of the particular type of hard disk can be found in the Product Information Bulletin and SETUP program.

Self-Test
Whenever the PG 720 is switched on or reset, the hard disk drive runs through a self-test which is repeated during operation.

Whenever the hard disk drive is accessed, the access LED on the front of the unit lights up.

⚠	**Caution**
	Risk of data loss and damage to drive!
	Drives are sensitive to vibration and shock. Any vibration occurring during operation can lead to loss of data or damage to the drive.
	If you intend to move the unit, switch it off and wait until the drive has come to a stop (after about 20 seconds) before you move it.

3.6   External Power Unit and Battery

External Power Unit

The external power unit is used to supply the PG 720 with power when it is being operated with 115 V or 230 V mains supplies. The voltage is set automatically. In mains power supply operation, the integrated battery is charged at the same time. The connecting cable to the PG 720 has an external power supply unit. For connection to the power system, the external power supply unit has a connector for non-heating appliances.
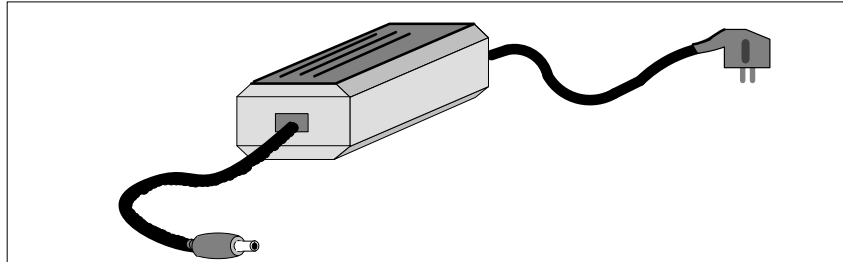
Figure 3-10   External Power Supply Unit

3

⚠ **Caution**

Danger of overheating!

The external power supply unit can be damaged if the ventilation slits are covered.

Do not place any objects on the ventilation slits.

Battery

The PG 720 has an integrated nickel-cadmium battery. This makes the unit a portable device that can be used when no mains power supply is available. The battery also prevents loss of data if there is a power outage.

Once the external power supply unit is connected, the battery is charged. The following conditions are important:

• When charging, the battery temperature must be between + 5° C and + 40° C (40° F and 100° F).

• Charging stops as soon as the battery is fully charged.

• In storage, a fully charged battery runs down in approximately 2 months. It must then be re-charged.

Note

Whenever possible, avoid running down the battery too far. Switch off the unit when it is not in use.

Before the battery is completely discharged, the red power LED lights up.

Installing and Operating the PG 720

4

What Does This Chapter Contain?

This chapter describes what you have to do to set up your PG 720 correctly for operation. This includes

- the basic steps for starting up your PG 720

- working in the battery mode and changing the battery

- working with memory submodules and cards for the programmable controllers and

- connecting your PG 720 to other devices.

Summary of Sections

In Section	You Will Find	On Page
4.1	Connecting the PG 720 to the Power Supply	4-2
4.2	Battery Operation	4-3
4.3	Connecting I/O Devices	4-5
4.4	Working with SIMATIC S5 Memory Submodules	4-11
4.5	Working with SIMATIC Memory Cards	4-13
4.6	Working with PCMCIA Cards	4-15
4.7	Connecting the PG 720 to other SIMATIC S5 Units	4-16
4.8	Connecting the PG 720 to a SIMATIC S7 Network (MPI/DP)	4-20
4.9	Networking the PG 720 with Other Stations on SINEC L2	4-22
4.10	Networking the PG 720 and Other Computers on SINEC H1	4-23

4.1   Connecting the PG 720 to the Power Supply

Connecting to the Power Supply

You can operate the PG 720 on 115 V and 230 V power systems using the external power supply unit. The voltage is selected automatically.

1. Plug the power supply cable supplied with the unit into the connector on the external power supply unit.

2. Connect the power cable to a socket outlet with a grounded protective conductor.

3. Connect the low voltage connector to the connection for the external power supply unit on the unit. The power supply cable to the PG 720 is integrated in the external power supply unit.

4. The device is now ready for power supply operation and if the battery is not fully charged it will be charged.

Connection for
external power unit
$U_N = 17$ V DC
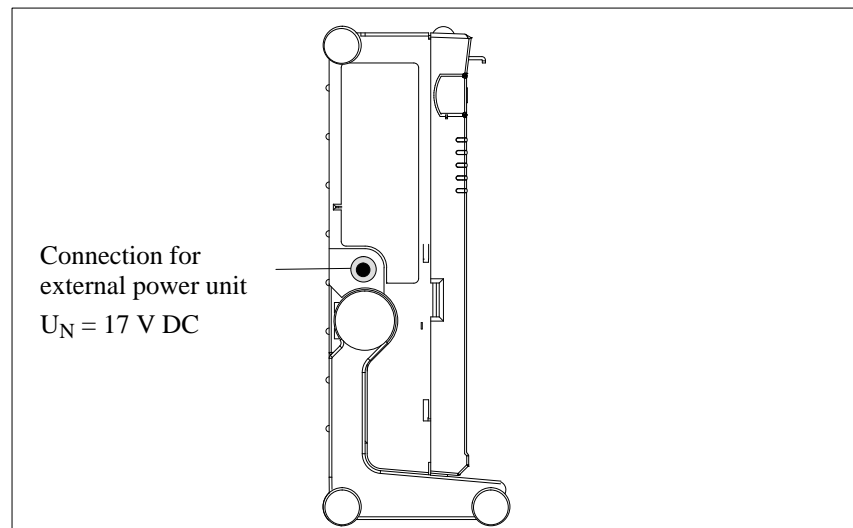
Figure 4-1   Power Supply Connection

Note

The power plug must be disconnected to isolate the unit completely from the supply.

For operation in Canada and the US, a CSA or UL listed power supply cable must be used.

The external power supply unit is intended for operation with grounded power supply networks.

The unit is not intended for operation with non-grounded or impedance-grounded systems.

4.2   Battery Operation

Battery Operation   If no external power supply unit is connected, you can operate the PG 720 using the integrated battery.

1. Switch on the device. Make sure that the battery is sufficiently charged before you start work. The power LED is lit green as long as the battery is sufficiently charged.

2. Work as normal with your PG 720.

3. As soon as the power LED lights up red in battery operation, this indicates that the battery is almost run down. Stop working and save your data.

Note

You should only begin working in the battery mode when the battery is completely charged. Only then can you be sure that the full operating time is available and that the battery running down will be indicated in good time. The battery is fully charged when the power LED changes from charging (orange) to charged (green) after switching on with the unit connected to the mains power system.

When you first start up, the battery may be partly or completely discharged. Connect the programming device to the power supply using the power supply unit to charge the battery.

Replacing the Battery   You can replace a discharged or faulty battery with a fully charged spare battery (order number see Product Information Bulletin), as follows:

1. Switch off the device.

2. Pull out the support from the stand and open out the extra support.

3. Tilt the unit through approximately 90°.

4. Open the battery cover on the bottom of the device by pushing it down.

5. Disconnect the battery connections and remove the battery.

6. Insert the new battery and connect it.

7. Close the cover.

1 Battery connector   3 Support
2 Battery   4 Battery compartment cover
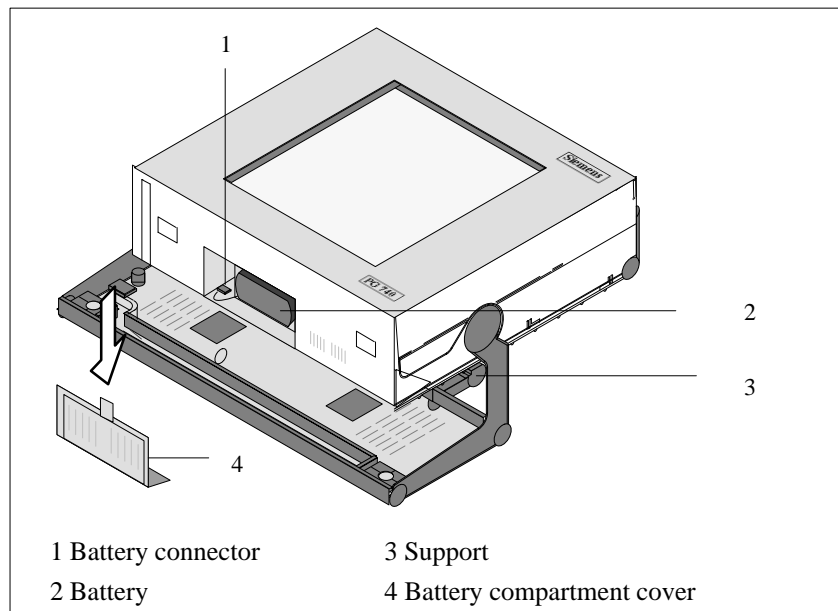
Figure 4-2   Changing the Battery

Note

Whenever possible, avoid running down the battery to a low level. Switch
off the unit after use. Once the device is connected to the power supply using
the external power supply unit, a discharged battery is recharged, even if the
programming device itself is not switched on.

**Disposal of Used
Batteries**

Nickel-cadmium batteries can be completely recycled. Their components can
be used as materials for new batteries or other products. Effective recycling
of batteries is only possible when the used batteries are collected according
to type.

Note

Observe the local regulations for disposal of materials.

4.3   Connecting I/O Devices

**Recommended
Printers**

Siemens printers with a parallel interface and IBM character set are
recommended for use with the PG 720 programming device.

**Connecting the
Printer to the
Parallel Port**

To connect your printer, proceed as follows:

1. Switch off the PG 720 and the printer.

2. Open the cover to the interface ports on the left-hand panel.

3. Plug the printer cable into the LPT1 parallel port.

4. Plug the printer cable into the printer.

5. Screw the connector tight at the interface port.
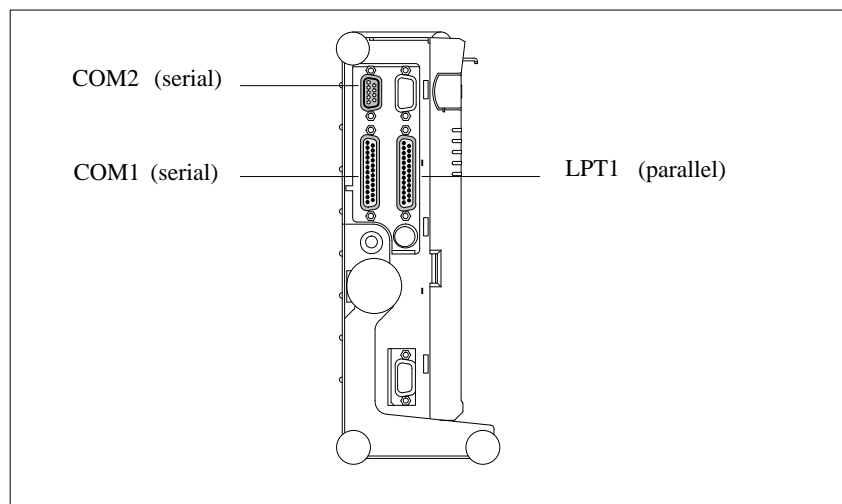
Figure 4-3   The Printer Ports

Caution

Risk of damage to the unit!

Switch the unit off before connecting the parallel printer to the LPT 1 port
(the printer should also be switched off).

**Make sure that you use the correct port. If you use the wrong port or
wrong connecting cables, the port may be damaged.**

Before plugging in the cables, the electrostatic charge of your body, the unit
and the cables must be equalized. To do this, touch the mounting plate for the
ports on the left-hand side of the unit.

Only use original connecting cables.

Connecting the Printer to the Serial Port

You can also connect your printer to the PG 720 using a serial COM port. You will find information about how to adapt and set your interface and which connecting cable you require in the description of your printer.

Redirecting Printer Output

The standard interface for printer output is LPT1. you can redirect printer output to another interface port (COM2). Table 4-1 shows examples of how to change the ports using the Mode MS-DOS command.

Table 4-1   Changing Ports in MS-DOS

Port	Command	Effect
Redirect LPT 1 parallel port to COM 2 / V.24 / V.28 / serial port	MODE LPT1:=COM2	Printer is assigned to communication port 2
Configure COM 2 for printer	`MODE COM2:96,n,8,1,p*`	COM 2 is initialized for printer
Switch LPT 1 port back to parallel port	MODE LPT1:	LPT 1 is switched back to the parallel port

*Mode: 9600 bps, no parity, 8 data bits,1 stop bit

Note

It is advisable to write the required command in the AUTOEXEC.BAT file or another BATCH file to avoid having to type in the command every time you restart or reset the hardware.

**Recommended
Monitors**

You connect external multisynchronous monitors using the standard VGA connector on the left-hand panel of the unit. We recommend that you use Siemens monitors.

**Connecting
Monitors**

You must switch the PG 720 off before connecting the monitor cable. You will find further information about the connector pinout in Chapter 8.
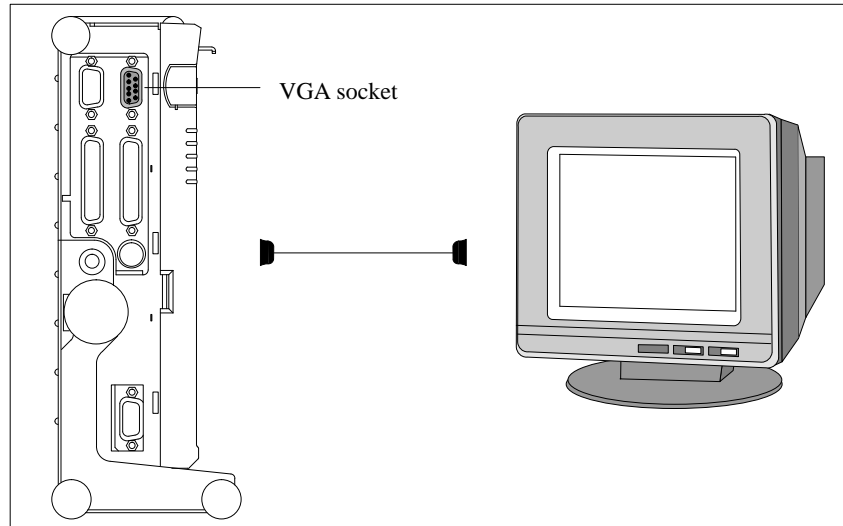
Figure 4-4   Connecting the Monitor

Connect the monitor as follows:

1. Switch off the PG 720 and the monitor.

2. Open the port cover on the left-hand panel.

3. Plug the monitor cable into the VGA socket connector.

4. Secure the connector with the screws.

5. Plug the other end of the monitor cable into the monitor.

6. Switch on the PG 720 and the monitor.

7. Make the necessary changes in the SETUP program (menu "SIEMENS PG 720 Hardware Control", CRT/LCD selection: "Simultaneous " or with higher resolutions "CRT").

Caution

Danger of damaging the monitor!

If you want to set higher clock frequencies and resolutions, first make sure that the monitor you are using is suitable for a higher clock frequency and resolution.

If the clock frequency is too high, this can cause damage to the monitor.

Using a Mouse

You can connect both a PS/2 and a serial mouse to the PG 720. When the PG 720 is supplied, the mouse driver for the trackball and PS/2 mouse is already loaded.

Connecting a PS/2 Mouse

You can connect an external PS/2 mouse or another external pointing device to an additional PS/2-compatible mouse connector.

COM2
Port for
serial mouse

Port for
PS/2 mouse
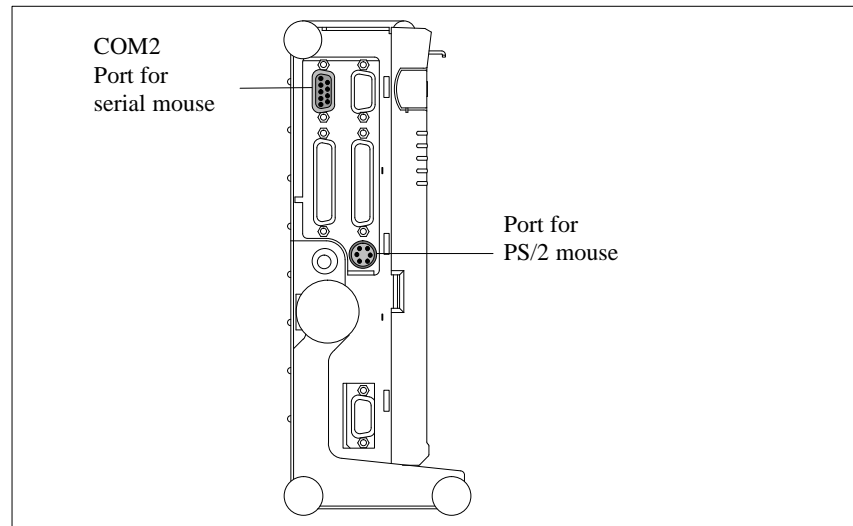
Figure 4-5   Connecting a PS/2 Mouse

Connect the mouse as follows:

1. Switch off your device.

2. Open the port cover on the left-hand panel.

3. Plug the cable of the PS/2 mouse or another external pointing device into the mouse connector.

4. Secure the connector with the screws.

5. Switch on your PG 720 again.

Switching over between Internal Trackball and PS/2 Mouse

Once you have plugged in the external mouse and restarted your PG 720, the internal trackball is deactivated and remains inactive until the PG 720 is powered up again without the external mouse.

Table 4-2   Trackball/External Mouse Mode

Situation	Internal Trackball	External PS/2 Mouse
No mouse	Active	
External mouse connected	Deactivated	Active

**Connecting a
Serial Mouse**

You can connect a serial mouse to the COM2 serial port. To operate a serial
mouse, the appropriate mouse driver must be initialized and assigned
parameters. You will find the information you need to do this in the
description of your mouse or in the description of the operating system.

1. Switch off your device.

2. Open the cover of the interface ports on the left-hand panel.

3. Plug in the serial mouse into the mouse connector labeled COM2.

4. Secure the connector with the screws.

5. Switch on your PG 720 again.

**Choosing Another
Keyboard**

You can connect another PS/2-type keyboard to your PG 720 instead of the
one supplied with it.

Keyboard connection
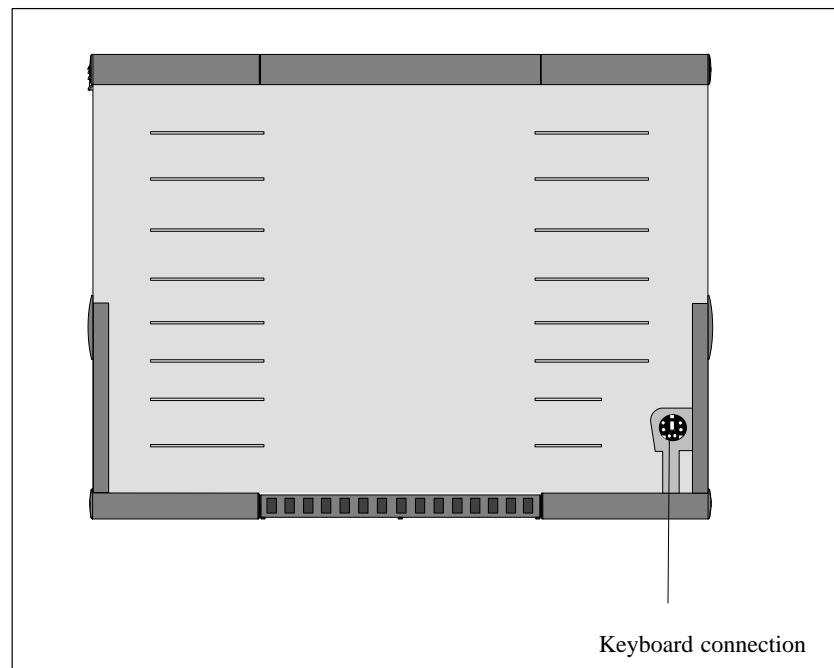
Figure 4-6   Connecting a PS/2 Keyboard

**Connecting a PS/2
Keyboard**

You connect the keyboard as follows:

1. Switch off your device.

2. Unplug the keyboard connector and cable from the unit.

3. Plug in the PS/2-type keyboard connector.

Note

It is advisable to use a keyboard cable with an angled connector, so that the connector does not extend beyond the back panel.

The keyboard cable must be inserted in the cable conduit on the back panel of the unit otherwise the connector can work loose when the device is tilted.

4.4   Working with SIMATIC S5 Memory Submodules

**Working with
SIMATIC S5
Submodules**

You can read and program SIMATIC S5 EPROMs and EEPROMs using the 48-pin S5 EPROM and EEPROM programming port. You will find information about using the programming software in the STEP 5 Manual.

S5 EPROM/
EEPROM port
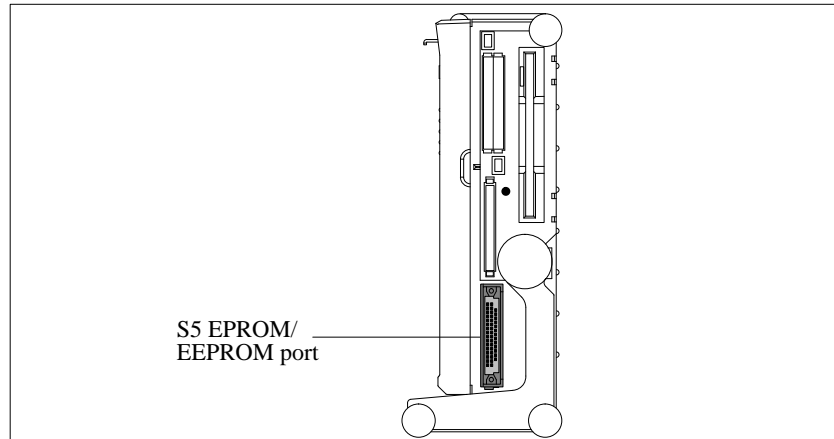
Figure 4-7   S5 Submodule (EPROM/EEPROM) Programming Port

4

Proceed as follows when working with the S5 submodule programming ports:

1. Switch on your device.

2. Start the EPROM function in your STEP 5 software (version V 6.x and higher).

3. Plug the S5 memory submodule into the 48-pin programming port.

4. Read, program or erase (EEPROMs only) your S5 memory submodule with the EPROM programming package of your STEP 5 software.

5. Remove the S5 memory submodule.

6. Terminate the EPROM programming package of your STEP 5 software.

Note

Only program SIMATIC S5 submodules when you are operating using the power supply system (the external power supply unit must be plugged in). Only then can you be sure that the programming will not be interrupted by a power outage if the battery is low.

⚠

Caution

Risk of damage to EPROMs or EEPROMs!

If you insert or remove the EPROM or EEPROM while it is in use, there is a danger that it will be damaged.

You must not remove the S5 EPROM or EEPROM while the LED indicating that the EPROM or EEPROM is being read etc. is lit. You **cannot** work simultaneously with S5 memory submodules and memory cards.

Before inserting or removing S5 EPROMs or EEPROMs, you must equalize the static charge on your body with the potential on the unit. You can do this by briefly touching the metal mounting plate of the ports on the left-hand panel of the unit.

4.5   Working with SIMATIC Memory Cards

Working with SIMATIC Memory Cards

SIMATIC memory cards can be read, programmed and erased using the 68-pin connector. SIMATIC memory cards are available for SIMATIC S5 and SIMATIC S7 software.

Orientation point

SIMATIC memory cards
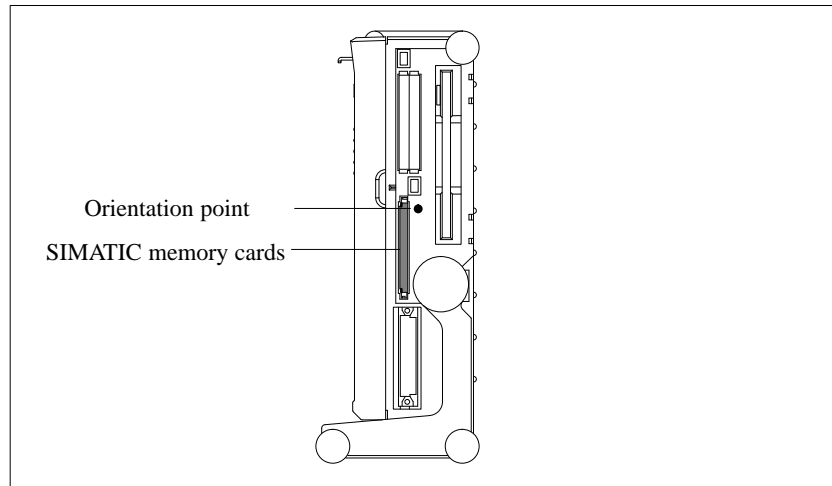
Figure 4-8   Slot for SIMATIC Memory Cards

Proceed as follows when working with SIMATIC memory cards:

1. Switch on your device.

2. Start your SIMATIC programming function.

3. Plug the SIMATIC memory card into the 68-pin connector.

4. Read, program or erase the memory card with the programming function of your SIMATIC programming software.

5. Terminate the programming function of your SIMATIC software.

6. Remove the SIMATIC memory card from the programming port for further use in a programmable logic controller.

4

⚠

Caution

Risk of damage to memory cards and the PG 720!

You must insert the memory card into the 68-pin connector with the type label pointing to the rear of the unit. Make sure that the orientation point beside the slot matches the point on the card.

If you attempt to plug in the memory card the wrong way round, you may damage your PG 720 or memory card.

You must not remove the memory card while the LED indicating that the card is being read etc. is lit. You **cannot** work simultaneously with S5 memory submodules and memory cards.

4.6   Working with PCMCIA Cards

PCMCIA Cards   The PG 720 has two PCMCIA interface ports. You can plug communication cards for MODEM, FAX-MODEM, ISDN, token ring, ETHERNET, memory expansion and SCSI interface cards in credit-card format into this port. Either two cards of type II or one card of type III can be plugged in.

PCMCIA port type II
(Slot 0)

PCMCIA port type II/III
(Slot 1)

Ejector for
PCMCIA cards
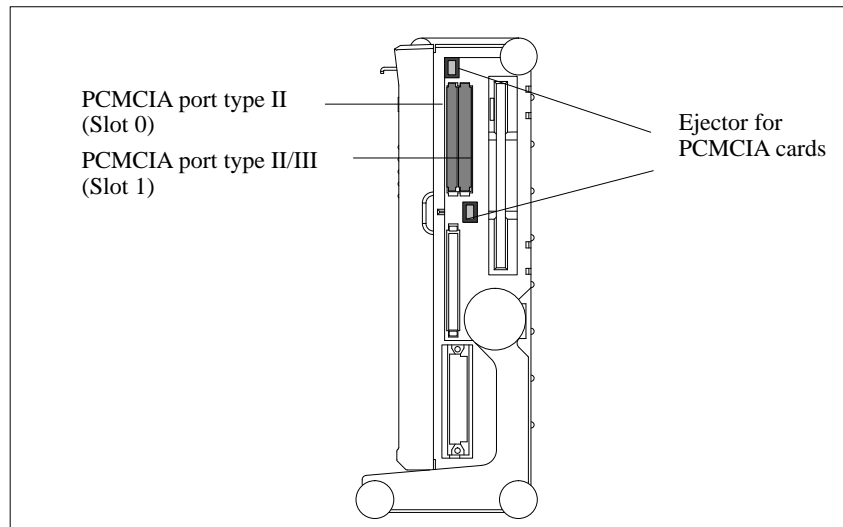
Figure 4-9   PCMCIA Port

> **⚠ Caution**
>
> Risk of damage to the PCMCIA cards and the PG 720!
>
> You must insert the PCMCIA card with the front side pointing the rear of your PG 720. This side is generally labeled with a company or product designation and the wording "this side up" or words to that effect.
>
> If you attempt to insert the PCMCIA card the wrong way round, you may damage your PG 720 and the PCMCIA card.

> **Note**
>
> PCMCIA cards must not be used along with a SIMATIC S5 memory submodule or a SIMATIC memory card. Please read the notes in your Product Bulletin!

4.7   Connecting the PG 720 to other SIMATIC S5 Units

Point-To-Point Link

In this section, you will learn how to connect your PG 720 to a programming device or programmable control using a point-to-point link.

You can establish a point-to-point link by connecting the PG 720 to another programming device or a programmable controller using

- a V.24 connection

- a TTY connection

Suggestions for Configuring TTY Interfaces (20 mA)

To ensure reliable data transfer, several factors must be taken into account.

Rules

You can reduce interference by choosing the right transmission cable and connecting it properly and by observing the following guidelines.

- Use a shielded cable with a low DC resistance (130 Ω / km) (about 40 Ω kft) and low capacitance (90 pF/m) (about 27 pF/ft). Twisted-pair cables are less susceptible to noise and interference. A low DC resistance results in reduced voltage excursions and shorter charge reversal times. The DC resistance decreases with increasing conductor cross-section for the same length of cable.

- The shorter the transmission link, the higher the maximum possible data transfer rate.

- If there is an active sender and an active receiver at the same end of the transmission link, the sequence of access priority to the transmission circuit must be taken into account in order to achieve the longest possible transmission link.

- Signal lines and power lines must not run together. Signal lines must be installed as far away as possible from sources of strong interference (for example, 400 V 3-phase power cables).

- The active TTY interface with a 12 V no-load voltage has been tested on a 1000 m (3300 ft) long cable at a transmission rate of 9600 bps in an environment with normal levels of noise (field strength 3 V/m or 1 V/ft). If a shielded LiYCY 5 x 1 x 0.14 shielded cable is used, reliable transmission is possible over a distance of up to 1000 m (3300 ft). The AS511 protocol (only one transmitter at a time) was used for testing.

Note

The interference field of the source decreases exponentially with the distance.

**Connecting the
PG 720 to S5
Programmable
Controllers**

You can connect the PG 720 to a SIMATIC S5 programmable logic controller
using the COM1/TTY interface port. The required cable is supplied with the
PG 720 (Order no.: 6ES5734-2BD20).

COM 1
(socket)
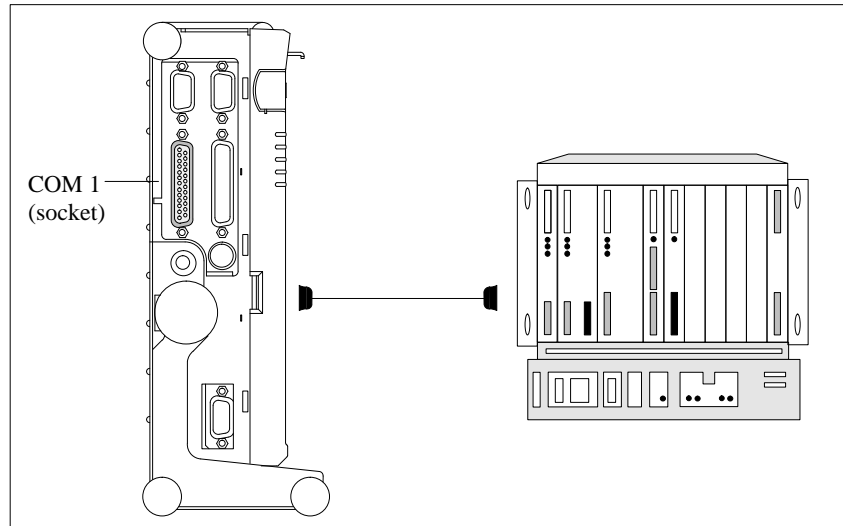
Figure 4-10   Connecting the PG 720 to an S5 Programmable Logic Controller

4

You connect your PG 720 to a SIMATIC S5 programmable logic controller as
follows:

1. Switch off your device.

2. Open the cover of the interface ports on the left-hand panel.

3. Plug the cable into the COM1/V.24 modem/PLC interface port.

4. Secure the connector with screws.

5. Plug the cable into the corresponding port on the CPU of the
    programmable logic controller.

⚠ **Caution**

Risk of damage to the PG 720.

The interface port may be damaged if you confuse the connections or use the
wrong connecting cables.

**Make sure that the TTY cable of the PG 720 is plugged into the
COM1/TTY port and not into the LPT1 port.**

Before plugging the cable in, the static charge on your body, on the unit and
on the connecting cables must be equalized. You can do this by briefly
touching the metal mounting plate for the interfaces on the left panel of the
device.

Only use original cables to connect up with the programmable logic
controller.

Connecting the PG 720 Using an Adapter

The connecting cable 6ES5 734-2BD20 is supplied with the PG 720. An adapter is available for connecting the programmable logic controller using older standard cables.

Table 4-3   Adapter for the PG 720 Connecting Cable.

Port	Link	Connecting Cable Order No.	Adapter
COM1 as TTY interface	PG 720 with SIMATIC S5 programmable controller	6ES5 734-2BD20	
		6ES5 731-1xxx0 15-pin	6ES5 731-6AG00
		6ES5 731-0xxx0 25-pin	6ES5 731-6AG00

To allow a data transfer rate of 9600 bps up to a distance of 100 m (1100 ft), the receiving diode is connected to ground (reference) via the connecting cable.

Note

Cables of various lengths are available under Order No. 6ES5 734-2xxx0 (xxx stands for the length in meters).

Connecting the PG 720 to Other Programming Devices (V.24, TTY)

If you want to connect your PG 720 to another programming device, you can plug the appropriate connecting cable into the V.24 or TTY interface port. You will find more detailed information about the connecting cables listed below in Chapter 8.

Table 4-4   Connecting the PG 720 to Other Programming Devices

Port	Link	Connecting cable order no:	Adapter
COM1 as V.24 interface	PG 7xx with PG 7xx	6ES5 733-5BD20	
COM1 as TTY interface	PG 7xx with PG 6xx	Series connection of 6ES5 733 -2xxx0 and 6ES5 731-6AG00[1]	6ES5 731-6AG00

Note

[1] When connecting the programming devices in series, make sure you connect the cable the right way round (see Figure 4-11).
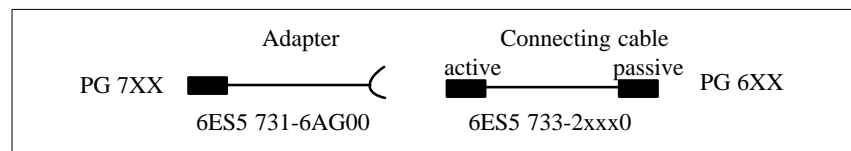
Figure 4-11   Direction of Connection: Adapter-Connecting Cable

Note

If you connect two programming devices using the TTY interface, you must deactivate the TTY interface (COM1) on one of the devices by changing the jumper settings. When supplied, this interface is always active.

Activating/ Deactivating the PG 720

When your PG 720 is supplied, the COM1 (TTY) serial port is active (20 mA current loop). When you connect two programming devices using the COM1 (TTY) serial port, you must deactivate the port on one of these devices. The PG 720 has jumpers on the motherboard for this purpose.

These jumpers are accessible if you open the battery compartment cover.

Jumper Settings

Change the jumper settings as shown in Figure 4-12.
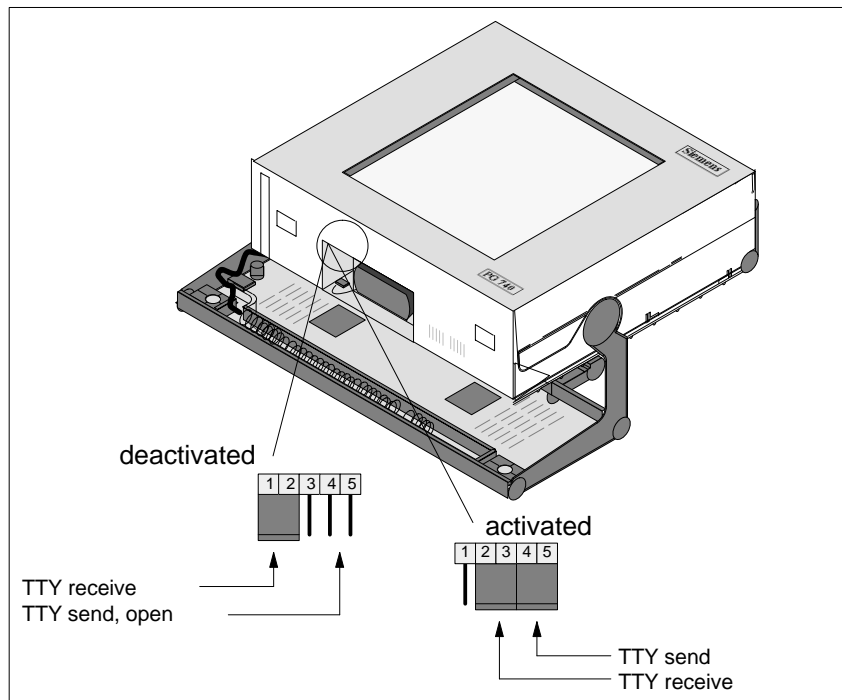
Figure 4-12   Activating/Deactivating the TTY Port Using Jumpers

Changing the Jumper Setting

Proceed as follows to deactivate the port on the PG 720:

1. Switch off your device.

2. Adjust the position of the PG 720 so that it is horizontal.

3. Open the battery compartment cover.

4. Remove jumpers 2-3 and 4-5 at the top left beside the battery.

5. Insert the jumper in location 1-2 (see Figure 4-12).

6. Close the battery compartment cover.

4.8   Connecting the PG 720 to a SIMATIC S7 Network (MPI/DP)

Connection of an S7 Programmable Controller via MPI/DP Interface

You can connect your PG 720 to a SIMATIC S7 programmable logic controller using the floating MPI/DP interface. The MPI cable for connection to SIMATIC S7 CPUs is supplied with the PG 720.
(Order No.: 6ES7901-0BF00-0AA0)

In a high-interference area:
Bus connector
6ES5762-1AA21

6ES7901-0BF00-0AA0
5 m long (about 16 ft.)

MPI port
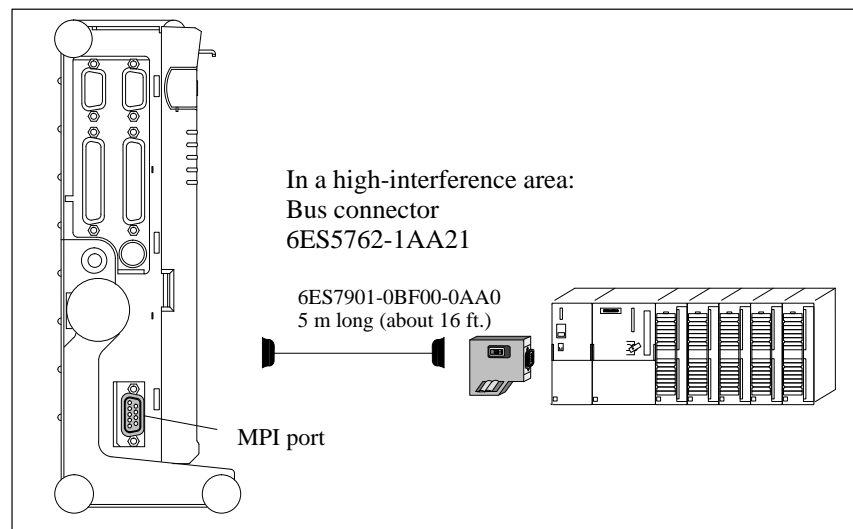
Figure 4-13   Connection Using the Multipoint Interface

Proceed as follows when connecting to a SIMATIC S7 programmable controller:

1. Switch off your device.

2. Open the interface cover on the left side of the device.

3. Connect the cable to the MPI/DP interface.

⚠ **Caution**

Risk of damage to the PG 720!

Before plugging in the cables, the static charge on your body, the unit and the cables must be equalized. You can do this by briefly touching the metal mounting plate for the interfaces on the left-hand panel.

Connecting

Via the MPI/DP interface, you can connect your programming devices to

- MPI networks (S7-200, S7-300 and S7-400) or

- PROFIBUS DP networks (DP components).

The supplied MPI cable can be used for connection to MPI networks with transmission rates up to 187.5 Kbps.

**MPI/PROFIBUS DP
Network**

Up to 32 devices (PC, programming device or programmable controller) can
be connected to the MPI/DP interface to form a network segment. The
physical connection to the MPI/PROFIBUS DP network is via a floating
RS485 interface which is a component of the programming device basic
module.

Several MPI/PROFIBUS DP network segments can be connected via
repeaters. The complete MPI/PROFIBUS DP network can comprise up to
127 stations. The data transmission rate in the MPI network is 187.5 Kbps.
Data transmission rates from 9.6 Kbps to 1.5 Mbps are possible in the
PROFIBUS DP via the MPI/DP interface.

Note

You can find information on setting up an MPI/DP network in the manual
"Setting up an S7-300", Order No.: 6ES 7030-0AA00-8BA0.

4

4.9   Networking the PG 720 with Other Stations on SINEC L2

**Networking the
PG 720 on SINEC
L2 (PROFIBUS)**

SINEC L2 is an open and robust bus system for industrial applications. It can be used to configure networks with up to 32 stations per segment. The data transfer rate for SINEC L2 is 1.5 Mbps.

**How the Network
Functions**

The SINEC L2 network operates on the master-slave principle with token passing (complying with DIN19245, PROFIBUS). It distinguishes between active and passive stations. An active station receives the token and passes it on to the next station within a specified time.

Hardware

Using the following components, for example, you can connect or network the PG 720 with SINEC L2:

- PCMCIA interface module (in development)

- RS485 interface (adapter for PCMCIA)

- Shielded, twisted pair (bus cable or connecting cable to network).

Note

You will find more detailed information about the SINEC modules in the SINEC Catalog IK 10 (Order No.:E86060-K6710-A101-Ax-7600).

For information about installing the modules and making modifications to the network configuration, please refer to the installation instructions for the appropriate modules.

Make absolutely sure that you do not use interrupt 12 since this interrupt is assigned to the integrated trackball.

4.10   Networking the PG 720 and Other Computers on SINEC H1.

**Networking the
PG 720 on
SINEC H1
(ETHERNET)**

SINEC H1 is a bus system for industrial applications based on ETHERNET
(ISO 8802/3). The main features of SINEC H1 are speed (10 Mbps), simple
expansion, open communication and widespread application.

**How the Network
Functions**

SINEC H1 is the name of Siemens networks and network components
operating according to the CSMA and / CD (ETHERNET) principle. SINEC
H1 is a bus-type LAN that uses a triaxial cable (H1) as its transmission
medium.

Hardware

To connect or network the PG 720 with SINEC H1, a PCMCIA-ETHERNET
interface module is required:

*   PCMCIA-ETHERNET interface module (Order No.: 6GK1151-1AA00).

Note

You will find more detailed information about the SINEC modules in the
SINEC Catalog IK 10 (Order No.: E86060-K6710-A101-Ax-7600).

For information about installing the modules and making any modifications
to the network configuration, please refer to the installation instructions for
the various modules.

4

PG 720 Expansions

5

What Does this Chapter Contain?

You can enhance the performance of your PG 720 by adding additional memory. This chapter describes how to expand your PG 720. Please observe the relevant safety guidelines.

Summary of Sections

5.1 Opening the Unit

Prerequisites

The device is designed for easy maintenance so that any work that is necessary can be done quickly and at low cost.

Caution

The electronic components on the cards are extremely sensitive to electrostatic discharge. Certain precautionary measures are therefore necessary when handling such components. These measures are explained in the guidelines for handling electrostatically sensitive devices at the end of this manual.

Limitation of Liability

All technical specifications and licences apply only to expansion functions approved by SIEMENS.

No liability can be accepted for impairment of functions caused by the use of devices and components of other manufacturers.

All the modules and components in the PG 720 are electrostatically sensitive. Please read the ESD guidelines at the end of this book carefully. The following symbol warns that electrostatically sensitive modules are present.

Before Opening the Unit

It is essential that the following rules are adhered to when carrying out any work on the open unit and you should read them carefully before opening the unit.

*   Before you disconnect the power supply cable, discharge any electrostatic charge on your body. You can do this by touching the metal mounting plate for the interfaces on the left panel of the unit.

*   Discharge any electrostatic charge from tools that you are using.

*   Wear a grounding wrist-strap if you are handling components.

*   Leave components and modules in their packing until you are ready to install them.

*   Disconnect the PG 720 from its power supply and remove the battery before plugging in or removing any modules or components.

*   Touch components and modules only on their edges. Above all, do not touch the connecting pins and printed conductors.

*   Never operate the PG 720 with the cover open.

Tools   Use a screwdriver to open the unit.

Opening the   Open your PG 720 as follows:
PG 720

1. Switch off the PG 720, pull out the power supply connector and remove all connecting cables from the unit, including the keyboard cable.

2. Lower the keyboard and detach it.

3. Incline the unit to 90°. To stabilize the unit, pull out the extra support and the fold down bracket.

4. Open the cover of the battery compartment and disconnect the battery.

5. Push in the snap-catches at the bottom with a small screwdriver.

6. Open the front section and lift it out of the main casing.

7. Lay the front section with the display on a soft, flat surface.
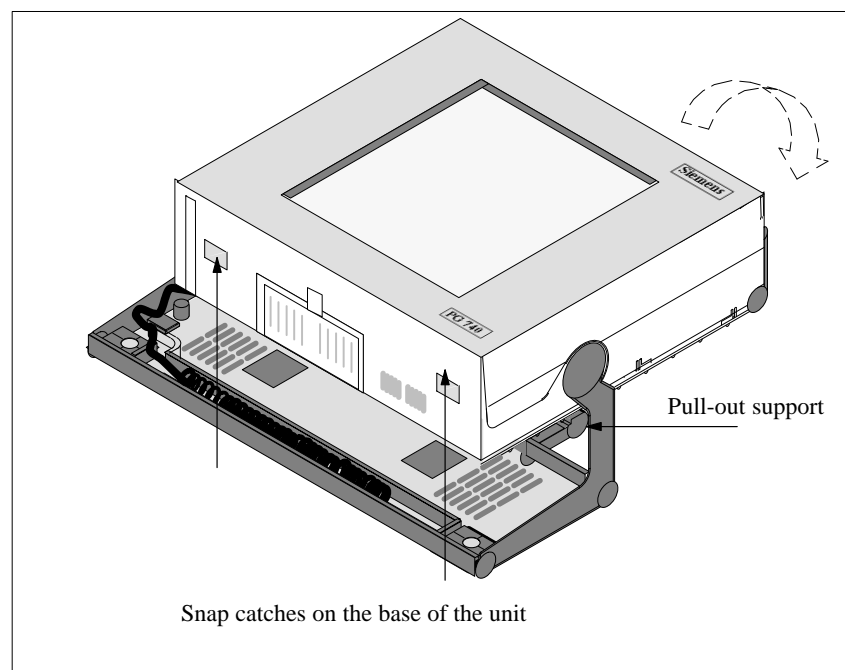
Figure 5-1   PG 720 Prepared for Opening

5.2   Components Visible After Opening the Unit

Components   Once you have removed the top cover of your unit, the components are
                        visible.
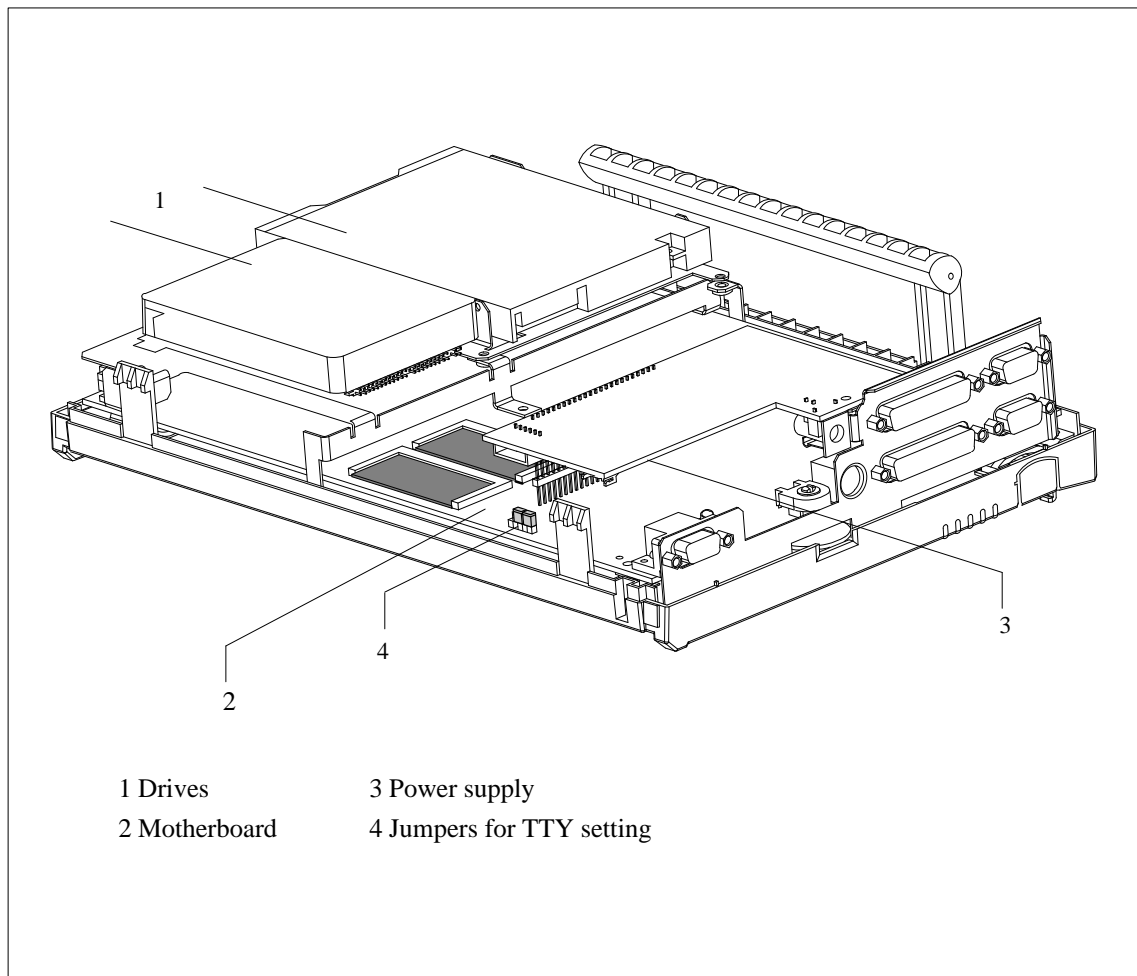
Figure 5-2   PG 720 Opened

Motherboard   The motherboard is the heart of the PG 720. Here, data are processed and stored, and interfaces and device I/Os controlled and managed.
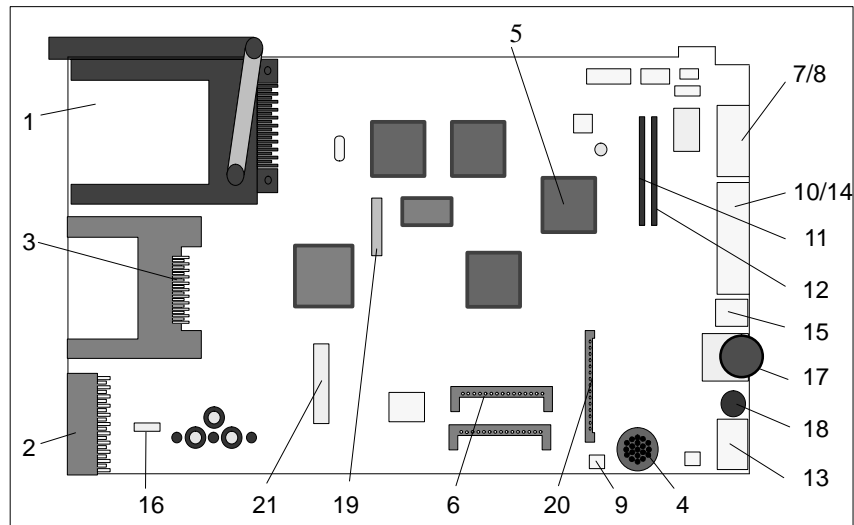
Figure 5-3   Motherboard

Components on the Motherboard   The following components are located on the motherboard of the PG 720.

Table 5-1   Components of the Motherboard

No.	Functions
1	PCMCIA slots
2	S5 submodule slot
3	Memory card port
4	Loudspeaker
5	CPU 80486
6	System memory, slot 0, slot 1
7	External VGA port
8	COM2 serial port
9	TTY jumpers
10	COM1/TTY serial port
11	TTY receiver
12	TTY transmitter
13	MPI port
14	LPT1 parallel port
15	PS/2 mouse port
16	Battery connector
17	Contrast
18	Keyboard and trackball connector
19	Floppy disk drive connector
20	Power supply connector (from DC converter)
21	IDE Winchester connector

5.3 Installing Memory Expansion Modules

Standard Memory   There are two slots on the motherboard for DIMM memory modules. This allows you to expand the memory capacity of your PG 720 to up to 32 MB.

Table 5-2   Slots for Memory Expansion

Memory	Slot 0	Slot 1
16 MB [1]	8 MB	8 MB
16 MB [2]	16 MB	--
20 MB	16 MB	4 MB
24 MB	16 MB	8 MB
32 MB	16 MB	16 MB
32 MB	32 MB	--
64 MB	32 MB	32 MB

1) or 2) standard configuration

You will find the order numbers for the DIMM memory expansion modules in the Product Bulletin.
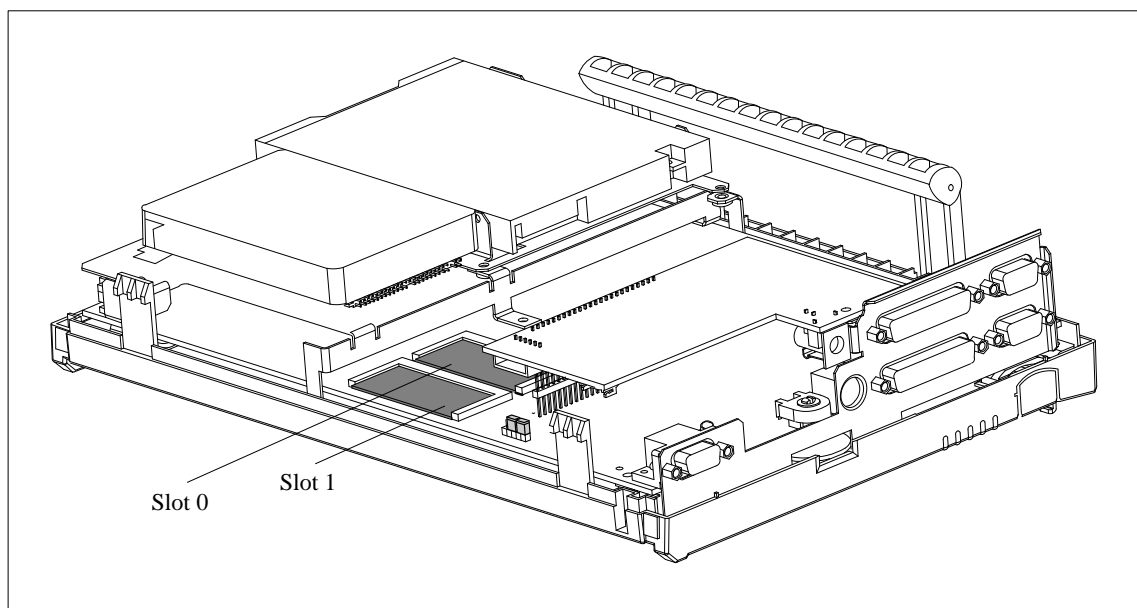
Figure 5-4   Position of the DIMM Memory Modules

⚠ **Caution**

Risk of damage.

The electronic components of the printed circuit boards are extremely sensitive to electrostatic discharge. Please observe the guidelines for handling electrostatically sensitive devices at the end of this manual.

Installing the DIMM Cards

You plug in expansion modules as follows:

1. Open the unit as described in Section 5.1.

2. Plug the cards into the slots. Note the safety recess on the connector side of the DIMM card.

3. Push the card down applying light pressure until it locks into place.

4. Close the unit (see Section 5.5).

⚠ **Caution**

Risk of damage.

Make sure that the cards sit securely in the slots otherwise they can fall out and be damaged.

5

Installation

The memory configuration is detected automatically. When you switch on the unit, the distribution of base and extended memory is displayed on the screen.

5.4   Replacing the Back-Up Battery

**Battery Power
Supply for
Real-Time Clock
and Configuration**

A back-up battery (3.6 V lithium battery) powers the real-time clock even
after the PG 720 is switched off. In addition to the time of day, all the
information about the PG 720s configuration is stored in RAM. If the
back-up battery fails or is removed, all this data is lost.

The clock uses very little power and the lithium battery has a high capacity
so that the battery can provide back-up power for the real-time clock for
many years and seldom needs to be replaced.

**Battery Voltage
too Low**

If the battery voltage is too low, the time of day and the device configuration
data in the RAM are lost.

**Replacing the
Battery**

In this case, you must replace the back-up battery. The battery is located
below the drive mounting.
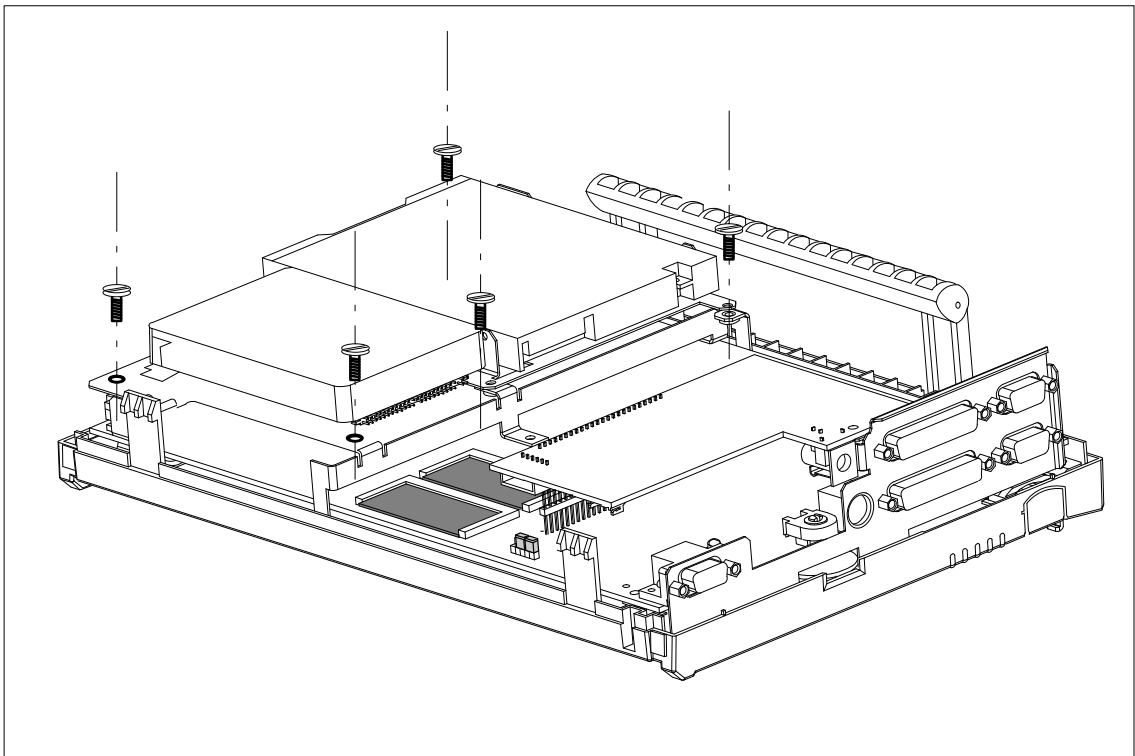
Figure 5-5   Screws Securing the Drive Mounting

You change the battery as follows:

1. Switch off your PG 720 and remove the power cable and all the connecting cables.

2. Open the unit as described in Section 5.1.

3. Undo the five screws holding the drive mounting.

4. Disconnect the wires connected to the drives.

5. Lift out the drives along with the mounting.

6. Now change the back-up battery on the motherboard.

7. Fix the new battery to the motherboard with a cable binder.

8. Reconnect the wires to the drives and secure the drive mounting with the five screws.

9. Close the unit as described in Section 5.5.

Caution

Risk of damage.

Only replace the lithium battery with an identical battery or with a type recommended by the manufacturer (Order No.: W79084-E1003-B1).

You should dispose of used batteries in keeping with local regulations.

5

SETUP
After you have changed the battery, you must set the configuration data of your unit again using the SETUP program (see Chapter 6).

5.5   Closing the Unit

Closing the Unit   Close the unit as follows:

1. Tilt the unit to the horizontal position.

2. Place the front section on the casing at an angle (the guide studs at the top edge must fit into place).

3. Press the front section onto the lower edge of the casing until the catches in the base engage.

4. Insert the battery into the battery compartment and connect it up.

5. Close the battery cover.

6. Connect the keyboard connector to the back of the unit. Make sure that the cable is inserted in its channel.

7. Tilt the unit back to the operating position.

Your PG 720 is now ready for operation again.

Configuring the PG 720

6

What Does this Chapter Contain?

In this chapter, you will learn how to configure your programming device. You need to do this if you change your system by adding a memory expansion card or after you have replaced the back-up battery.

Summary of Sections

In Section	You Will Find	On Page
6.1	Changing the System Configuration with SETUP	6-2

6.1　Changing the System Configuration with SETUP

Changing the System Configuration

Your PG 720 configuration is set for working with the software supplied with the unit. You should only change the preset values if you have modified your PG 720 in any way or if a fault occurs when the unit is powered up.

SETUP Program

The SETUP program is in the ROM-BIOS. Information about the system configuration is stored in the battery backed RAM of the PG 720.

You can use SETUP to set the hardware configuration and define the system characteristics. You can also use SETUP to set the time of day and date.

Incorrect SETUP Data

If incorrect SETUP data are detected when you boot the system, the BIOS prompts you to

- start SETUP by pressing **F2** or

- continue booting by pressing **F1**.

Starting SETUP

On completion of the start-up test, the BIOS gives you the opportunity of starting the SETUP program by displaying the following screen prompt:

```
PRESS <F2> to enter SETUP
```

Start SETUP as follows:

1. Reset your PG 720.

2. Press the **F2** key when the BIOS prompt appears on the screen.

SETUP Menus

Three menu pages are available in which you can set the values for your system configuration. Press **F1** to obtain information about the selected SETUP entries.

Table 6-1　　　SETUP　Menu

Menu Page	Function
page 1 of 3	SETUP main menu *"Standard System Parameters"*
page 2 of 3	*"Siemens PG 720 Hardware Control"* for setting the interface ports
page 3 of 3	*"Power Management-Feature Control"* for setting the power consumption

**Main SETUP Menu
(Page 1 of 3)**

Once your PG 720 has started up, the SETUP menu appears with the standard system parameters. Here, you can specify various system settings such as the time of day and date, drives and values for memory.

```
Phoenix SETUP Utility (Version X.XX)

(c) Phoenix Technologies Ltd. 1985, 1994    All Rights Reserved

                                                        Page 1 of 3
                ** Standard System Parameters **
System Time:            15:22:48
System Date:            Dec 31, 1994
Diskette A:             3.5", 1.44 MB
Diskette B:             Not Installed      Cyl  Hd  Pre  LZ  Sec  Size
Hard Disk 1:            AUTO               524  16   0   524  63   257
Hard Disk 2:            Not Installed
Base Memory:            640 KB
Extended Memory:        7168 KB
Boot order:             A: then C:
NumLock on at boot:     No
Cache Control:          Enabled


   ESC      F1                            ↑↓       + / -    PgUp/Dn
   Menu     Help                         Field     Value     Page
```

Figure 6-1   Main SETUP Menu

**Working with the
Menu**

You work with the SETUP menu using the following keys:

Table 6-2   Keys for Working in the SETUP Menu

Key	Function
F1	Help with operating SETUP
ESC	Calls the EXIT menu
↑ ↓	Moves you from one menu field to another
± or space bar	The SETUP program proposes values you can select and changes the values in the selected menu
Page ↑ Page ↓	You select menu pages

6

System Parameters

The following table lists the system parameters you can set in the main menu.

Table 6-3   System Parameters and Settings in the Main Menu.

Menu Item	Default	Function
System Time		Time setting: Hour:Minute:Second
System Date		Date: Month:Day:Year.
Diskette A:	3.5 ", 1.44 MB	Standard entry for drive A.
Diskette B:	Not Installed	Drive B not installed
Hard Disk 1:	AUTO	If you select the "AUTO" function, the hard disk is recognized automatically
Hard Disk 2:	Not Installed	Second hard disk not installed
Base Memory	640 KB	
Extended Memory	7168 KB [1]	
Boot order:	A: then C:	Boot sequence is searched for first in drive A and then in drive C. C: then A: accelerates startup.
NumLock on at boot:	No	Switches Numlock on or off when you start up
Cache Control:	Enabled	Enables or disables the internal cache

[1] Refer to the PG 720 Product Bulletin for information about memory.

Defining Hardware (Page 2 of 3)

In the *Siemens PG 720 Hardware Control* submenu, you can define the interface functions. These values must be re-entered particularly when you have re-assigned interfaces or when you want to connect I/O devices (for example an external monitor).

```
                    Phoenix SETUP Utility (Version X.XX)
            (c) Phoenix Technologies Ltd. 1985, 1994    All Rights Reserved
                                                              Page 2 of 3
                     ** Siemens PG 720 Hardware - Control **

     MPI Adr.-Range:         Adr.- CC00H         Backlight:      Full on
     PCMCIA Slot:            Enabled             Internal Mouse: Internal
     Programming Interf.:    Enabled

     Internal COM1:          COM1  03F8h   4
     Internal COM2:          COM2  02F8h   3
     Internal LPT1:          UNI-Directional

     CRT / LCD selection:    SIMULTANEOUS
     CRT   800 x 600:        72 Hz
     CRT   1024 x 768:       Non Interlaced
     LCD - Screensize:       Expanded

     ┌────────┬────────┬────────┬────────┬────────┬────────┬────────┐
     │  ESC   │  F1    │        │        │  ↑↓    │  + / -  │ PgUp/Dn│
     │  Menu  │  Help  │        │        │  Field │  Value  │  Page  │
     └────────┴────────┴────────┴────────┴────────┴────────┴────────┘
```

Figure 6-2   Siemens PG 720 Hardware Control Submenu

⚠ **Caution**

Risk of damaging the monitor!

If you are using a monitor with a higher resolution, switch CRT/LCD selection to "CRT enabled" in the SETUP program. The higher resolution must be set on the monitor you are using.

Setting a resolution that is too high in the SETUP program can damage the monitor.

6

Define Power Management

In the *"Power Management Feature Control"* menu, you can set the power management functions. This allows you to regulate the power consumption of your PG 720 to suit the mode you are working in. This function is particularly important in making best use of the battery.

```
┌─────────────────────────────────────────────────────────────────────┐
│              Phoenix SETUP Utility (Version X.XX)                     │
│         (c) Phoenix Technologies Ltd. 1985, 1994   All Rights Reserved│
├─────────────────────────────────────────────────────────────────────┤
│                                                          Page 3 of 3  │
│                ** Power Management Feature Control **                  │
│                                                                       │
│                   Power Management: Battery only                      │
│                                                                       │
│   Standby Timeout:         6 minutes       Fixed Disk Timeout:  Disabled│
│   Suspend Timeout:         10 minutes      Resume Modem Ring:   Enabled │
│   LCD\CRT Mode:            Standby Off                                  │
│   Maximum CPU Speed:       Full Speed                                  │
│                                                                       │
│                                                                       │
│                                                                       │
│  ┌──────┬──────┬──────┬──────┬──────┬──────┬──────┐                  │
│  │ ESC  │  F1  │  F2  │  F3  │  ↑↓  │ +/-  │PgUp/Dn│                 │
│  │ Menu │ Help │PM Min│PM Max│ Field│ Value│ Page │                  │
│  └──────┴──────┴──────┴──────┴──────┴──────┴──────┘                  │
└─────────────────────────────────────────────────────────────────────┘
```

Figure 6-3   "Power Management" Menu Page

Defaults

With the power management menu, the SETUP program provides you with several defaults that make it easier to set the power management values. The following table shows the possible settings.

Table 6-4   Selectable Parameters in Power Management

Parameter	Setting	Effect
Disabled		No power management high-performance mode
Enabled	F 2 PM Min.	Minimum power management - maximum power consumption; high-performance mode
	F 3 PM Max.	Maximum power management - low power consumption; long life mode (slower)
Battery only	F 2 PM Min.	Only in battery operation; minimum power management - maximum power consumption - high-performance mode
	F 3 PM Max.	Only in battery operation; maximum power management - low power consumption; long life mode

Power Management Values

Apart from the power management values proposed by the SETUP program, you can also set the menu items individually. The following table explains the function of the menu items.

Table 6-5   Menu Items in Power Management

Menu Item	Default	Function
Standby Timeout:	6 minutes	If no input is made using the keyboard or mouse during the selected time, the PG 720 changes to the standby mode. The clock frequency of the processor is reduced and the system I/Os switched off.
Suspend Timeout:	10 minutes	As soon as the PG 720 changes to the standby mode, the "suspend timeout" function comes into effect. If there is still no input during this time, the programming device switches to the suspend mode.
LCD \CRT Mode:	Standby Off	This parameter decides whether or not the monitor or external monitor is switched off. The options are as follows: -Always on -Suspend Off -Standby Off
Maximum CPU Speed:	Full Speed	This decides the speed of the processor: – Reduced Speed – Full Speed
Fixed Disk Timeout:	5 minutes	This sets a time limit after which the motor of the hard disk drive is switched off if it has not been accessed. The drive is activated again as soon as it is accessed.
Resume Modem Ring:	Disabled	This function can be activated or deactivated here.

6

Exiting SETUP

You save the new settings in the BIOS and exit the SETUP menu using the "Exit" menu. You can make the following settings.
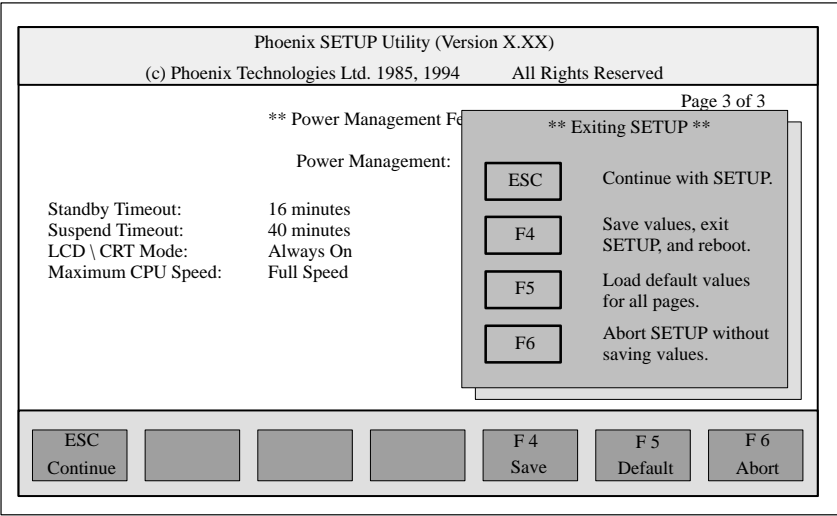

Figure 6-4   Main SETUP Menu

System Parameters

When you exit SETUP, you can set the following system parameters:

Table 6-6   Options When Exiting SETUP

Parameter	Meaning
ESC	Return to SETUP
F4	Save settings and exit SETUP
F5	Use the default settings
F6	Cancel the settings and exit SETUP

Documenting Your Configuration   If you have made any modifications to your standard SETUP settings, you can enter them in the following table. You can then refer to these entries if you need to make any hardware modifications later.

Table 6-7   Table of the System Configuration

System Parameter	Standard Settings	Your Entries
Diskette A	3.5" , 1.44 MB	
Diskette B	Not Installed	
Hard Disk 1	AUTO	
Hard Disk 2	Not Installed	
Boot Order	A: then C:	
Numlock on at boot	No	
Cache Control	Enabled	
Hardware Control MPI Addr. Range: PCMCIA Slot Programming Interface: Internal COM 1: Internal COM 2: Internal LPT 1: CRT / LCD selection: CRT 800 x 600: CRT 1024 x 768: LCD Screen Size: Internal Mouse:	 Addr. - CC00H Enabled Enabled COM 1 03F8h COM 2 02F8h UNI-Directional SIMULTANEOUS 72 Hz Non-Interlaced Expanded Internal	

6

Error Diagnostics

7

What Does this Chapter Contain?

This chapter will help you to locate, identify, and in some cases eliminate simple errors and faults. The symptoms of the problem, possible causes and remedies are listed in the form of a table.

Table 7-1   Errors/Faults in PG 720 Operation

Error/Fault	Cause	Remedy
Power-ON LED does not light up	• PG 720 is switched off • Power supply not properly connected • Battery run-down	• Switch the unit on • Check the power supply, power cable, and power connector • Charge or replace battery
Display remains dark after power up	• Contrast incorrectly set • Back lighting is not active • Additional monitor connected	• Adjust the contrast • Wait 3 to 5 seconds until the back lighting is active • Switch on the programming device while pressing the "INSERT" key.
External monitor remains dark after power up	• LCD is entered in SETUP	• Enter CRT or SIMULTAN in SETUP
Message on the display: "Invalid configuration information... Press the F1 key for continue, F2 to run Setup utility"	• Incorrect configuration data	• Press "F2" key, check the configuration data in the SETUP program, if necessary adopt the default values, and check the error messages in the first SETUP menu
Message on the display: "No boot device available"	• Diskette in drive A: is not a boot diskette • Wrong hard disk type entered in SETUP	• Replace diskette with boot diskette • Use the "Fixed Disk" function in the SETUP program
Message: "Keyboard stuck key failure"	• A key became blocked during the self-test of the keyboard	• Check the keyboard • Restart the system
Booting of the PG 720 aborted with a series of beeps	• Error occurred during the self-test	• Check hardware
Every time a key is pressed, a beep is heard and no character appears	• Keyboard buffer overflow	• <CTRL> <PAUSE>
Not ready message when attempting to read a diskette	• No diskette inserted • Diskette is not formatted	• Insert diskette • Format diskette
Read-only error when attempting to write to a diskette	• Diskette is read-only • Read-only hole open on 3.5'' diskette	• Cancel the write protection
<\> key does not exist	• Wrong keyboard driver is being used	• German keyboard: <ALTGr> <ß> • International keyboard : <\> key
Mouse pointer cannot be moved with the trackball	• The ball is not rotating • No or wrong mouse driver	• Clean the trackball and its housing • Load the correct mouse driver

Table 7-1   Errors/Faults in PG 720 Operation

Error/Fault	Cause	Remedy
Mouse pointer moving erratically	• Trackball dirty	• Clean the trackball and its housing
Trackball not working	• Trackball is switched off • External mouse plugged in	• Activate trackball with key combination Fn + ⬚

7

Hardware Information

8

**What Does This
Chapter Contain?**

This chapter contains important reference data about the following:

- Hardware addresses

- Interrupt assignments

- Information about connecting cables

**Summary of
Sections**

In Section	You Will Find	On Page
8.1	Hardware Address Table	8-2
8.2	Interrupt Assignments	8-5
8.3	Connector Pinouts	8-6
8.4	Connecting Cables	8-13

8.1 Hardware Address Table

There are two kinds of address area:

- Memory address area
- I/O address area.

Different read/write signals (I/O WR, I/O RD, MEMR, MEMW) are used to reference these areas. The following tables provide you with an overview of the address areas used.

Table 8-1   Assignment of the 4 Gbyte Memory Address Area.

Memory Adresses	Memory Address Assignment
0000 0000 to 0009 FFFF	640 KB system memory on the motherboard System data, operating system, drivers, and programs
000A 0000 to 000B FFFF	128 KB refresh memory for monitor interface module. Only part or the whole of the memory area is used depending on the interface module and operating mode.
000C 0000 to 000C BFFF	Not assigned
000C C000 to 000C CFFF	Reserved for the MPI
000C D000 to 000C FFFF	Not assigned
000D 0000 to 000D FFFF	Not assigned or reserved for PCMCIA, when the PCMCIA driver is loaded.
000E 0000 to 000F FFFF	128 KB max. ROM on the motherboard (VGA BIOS, Power Management)
0010 0000 to 003F FFFF	3 MB DRAM system memory in the basic configuration (virtual diskette or "protected mode" operating systems)
0040 0000 to 01FF FFFF	32 MB DRAM system memory expansion (virtual diskette or "protected mode" operating systems)
0200 0000 to FFDF FFFF	Reserved
FFFE 0000 to FFFF FFFF	128 KB shadow of the area 000E 0000 to 000F FFFF

Table 8-2   I/O Address Assignments

I/O Addresses	Chip/Module	Hardware Interrupt Used
0000 H-001F H	DMA controller 1 (8237)	
0020 H-0021 H	Interrupt controller 1 (master/8259)	
0022 H-0023 H	Not used	
0024 H-0025 H	Configuration index	

Table 8-2　　I/O Address Assignments

I/O Addresses	Chip/Module	Hardware Interrupt Used
0026 H/0027 H	Configuration data	
0040 H-0043 H	Timer/counter 1 (8254)	IRQ 0
0044 H-004F H	Not used	
0050 H-005F H	Not used	
0060 H/0064 H	Keyboard controller (8042)	IRQ 1, IRQ 12
0061 H	Port B: Timer/loudspeaker/parity system bus/ RAM	NMI
0062 H	Reserved	
0063 H	Reserved	
0065 H-006F H	Not fully decoded	
0070 H-0071 H	Real-time clock (146818) NMI enable	
0072 H-007F H	Not used	
0080 H-008F H	DMA page register (74 612)	
0090 H-0091 H	Not used	
0092 H	Port A: Fast reset, A20	
0093 H-009F H	Not used	
00A0 H-00A1 H	Interrupt controller 2 (slave/8259A)	IRQ 2
00A2 H-00BF H	Reserved	
00C0 H-00DF H	DMA controller 2 (8237)	
00E0 H-00EF H	Not used	
00F0 H	Numeric processor Cancel Busy	
00F1 H	Numeric processor Reset	
00F2 H-00F3 H	Not used	
00F4 H-00FB H	Not used	
00FC H-00FF H	Numeric processor ('486)	IRQ 13
0100 H-016F H	Not used	
0170 H-0177 H	Reserved (Winchester controller 2)	
0178 H-01EF H	Not used	
01F0 H-01FF H	Winchester controller 1; IDE interface of motherboard	IRQ 14
0200 H-020F H	Not used (game I/O)	
0210 H-0277 H	Not used	
0278 H-027F H	Not used	
0280 H-02AF H	Not used	
02B0 H-02DF H	Not used	
02F0 H-02E7 H	Not used	

8

Table 8-2   I/O Address Assignments

I/O Addresses	Chip/Module	Hardware Interrupt Used
02F8 H-02FF H	Serial port 2 (COM 2)	IRQ 3
0300 H-031F H	Programming interface module	
0320 H-033F H	Not used (XT: 320-32F: fixed disk)	
0340 H-035F H	Not used (HIGRAPH host interface)	
0360 H-036F H	Not used (IBM-PC-Net)	
0370 H-0377 H	Reserved (floppy controller 2-)	
0378 H-037F H	Parallel port (LPT 1)	IRQ 7
0380 H-038F H	Not used (SDLC, bisynchronous 2)	
03A0 H-03AF H	Not used (SDLC, bisynchronous 1)	
03B0 H-03BF H	Monochrome monitor interface module or EGA/VGA	
03C0 H-03CF H	Color graphics interface module EGA/VGA	IRQ 9
03D0 H-03DF H	Color graphics interface module CGA/EGA/VGA	
03E0 H-03E1 H	PCMCIA controller	*)
03E2 H-03EF H	Not used	
03F0 H-03F7 H	Floppy controller 1	IRQ 6, DRQ-/DACK2
03F8 H-03FF H	Serial port 1 (V.24/V.28) (COM 1)	IRQ 4

*) No interrupt. Depending on the PCMCIA driver used, one or two interrupts can be used

---

Caution

Malfunction!

You must not select IRQ 12 for the PG 720 since this interrupt is already assigned to the integrated trackball or the external PS/2 mouse.

8.2   Interrupt Assignments

Interrupt Assignment

The PG 720 uses the two integrated interrupt controllers of type 82C59 to handle the 16 hardware interrupts (IRQ 0 to IRQ 15).

The INT output of the slave controller is connected to the IRQ 2 input of the master controller. Interrupt 9 (IRQ 9) can be used on the bus for the assigned interrupt 2 (IRQ 2).

In the initialization phase, IRQ is assigned to the software interrupt vector 0A H (IRQ 2) by the ROM-BIOS.

Priority

The priority of the interrupts is in the reverse order of their numbering. This means the following:

- Interrupt IRQ 0 has the highest priority and interrupt IRQ 7 the lowest.
- For triggering IRQ 2, interrupt IRQ 8 has the highest and IRQ 15 the lowest priority. Interrupts IRQ 8 to IRQ 15 therefore have higher priority than interrupts IRQ 3 to IRQ 7.
- The interrupt vectors are initialized and masked when the PG 720 is powered up.

I/O Addresses of the Interrupt Controllers

The following table provides you with an overview of the hardware interrupts.

Table 8-3   I/O Addresses of the Interrupt Controllers

List of Hardware Interrupts		Assigned Interrupt Vector, Memory Address
SMI	System management interrupt, cannot be masked	–
NMI	RAM parity; I/O channel parity	INT 2 H
IRQ 0	Timer output 0, I/O controller (ISP), internal	INT 8 H
IRQ 1	Keyboard (output buffer full)	INT 9 H
IRQ 2	Interrupt from slave interrupt controller	INT A H
IRQ 3	Serial port (COM 2)	INT B H
IRQ 4	V.24/V.28 interface, serial port (COM 1)	INT C H
IRQ 5	Parallel port 2 (LPT 2)/MPI	INT D H
IRQ 6	Floppy disk	INT E H
IRQ 7	Parallel port printer 1 (LPT 1)	INT F H
IRQ 8	Real-time clock (RTC) low active	INT 70 H
IRQ 9	Software interrupt re-routed to 0AH (IRQ2) (VGA)	INT 71 H
IRQ 10	*)	INT 72 H
IRQ 11	*)	INT 73 H
IRQ 12	Trackball or PS/2 mouse	INT 74 H
IRQ 13	Numeric processor	INT 75 H
IRQ 14	Winchester; IDE interface	INT 76 H
IRQ 15		INT 77 H

*) Depending on the PCMCIA driver, one or two interrupts may be assigned.

8

8.3 Connector Pinouts

Socket Connector for the External Power Unit

The socket for the external power supply unit has the following potentials:
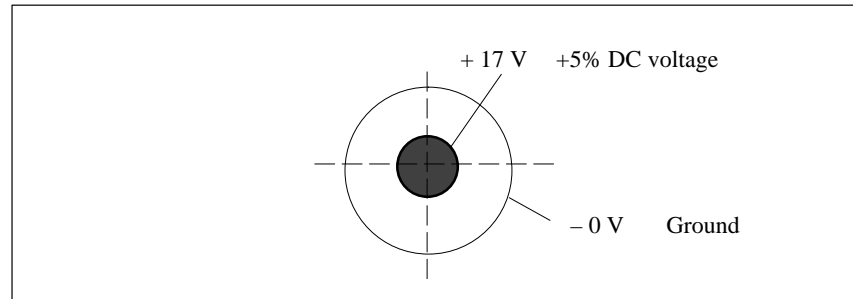
Figure 8-1   Power Supply Connector

Connecting a PS/2 Mouse

You can connect a PS/2 mouse to your PG 720. The connector has the following pinout:

View of the socket connector

Figure 8-2   Connector Pinout for the PS/2 Mouse Cable

Table 8-4   Pinout Table of the PS/2 Mouse Connecting Cable

Pin No.	Designation	Input/Output
1	Data line	Input/output
2	Not assigned	–
3	0 V	–
4	Current-limited 5V power supply	Output
5	Clock line	Input/output
6	Not assigned	–

**Connecting an
External Keyboard**

You can connect an external keyboard to your PG 720. The connector has the
following pinout:

View of the socket connector
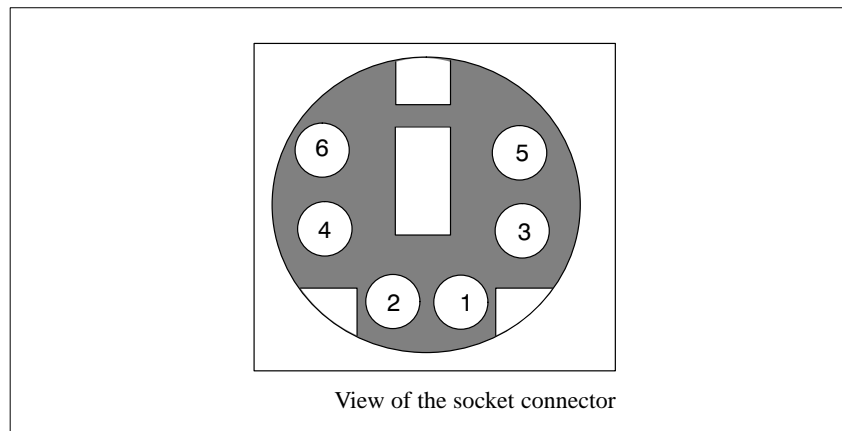
Figure 8-3   Connector Pinout for an External Keyboard

Table 8-5   Pinout Table of the Keyboard Connecting Cable
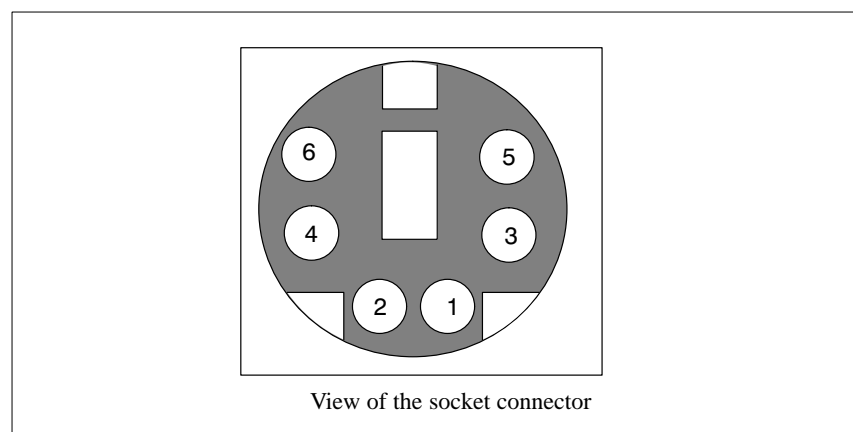
PinNo.	Designation	Input/Output
1	Data line, keyboard	Input/output
2	Data line, trackball	Input/output
3	0V	–
4	Current-limited 5V power supply	Output
5	Clock line, keyboard	Input/output
6	Clock line, trackball	Input/output

8

VGA Socket Connector

The VGA socket connector on the PG 720 has the following pinout:
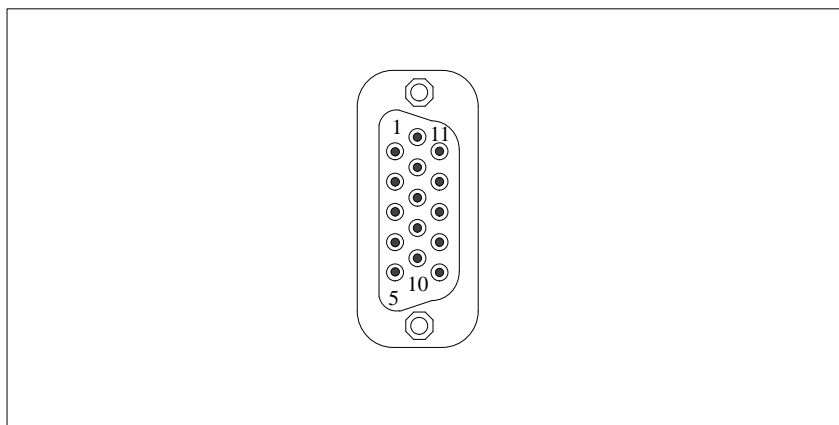
Figure 8-4   VGA Socket Connector

Table 8-6   Pinout Table of the VGA Socket Connector

Pin No.	Designation	Description	Input/Output
1	R_EXT	Red	Output
2	G_EXT	Green	Output
3	B_EXT	Blue	Output
4	–	NC	–
5	M	Ground	–
6	M	Ground	Ground
7	M	Ground	Ground
8	M	Ground	Ground
9	–	NC	–
10	M	Ground	Ground
11	–	NC	–
12	–	NC	–
13	EXT_H	Horizontal sync	Output
14	EXT_V	Vertical sync	Output
15	–	NC	–

MPI/DP Socket Connector

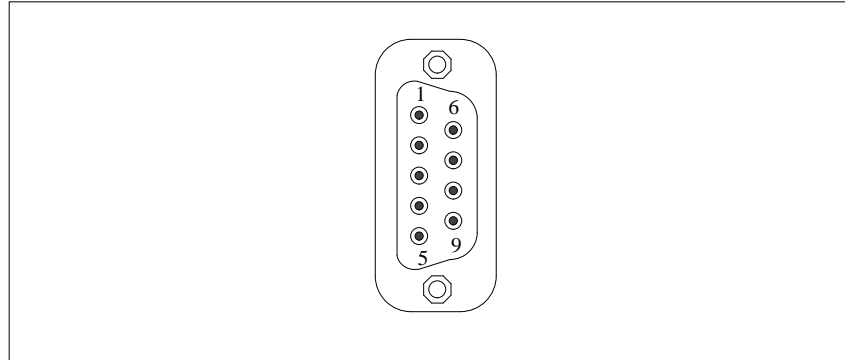The MPI/DP socket connector on the PG 720 has the following pinout:

Figure 8-5   MPI/DP Socket Connector

Table 8-7   Pinout Table of the MPI/DP Socket Connector.

Pin No.	Designation	Description	Input/ Output
1	NC	Pin 1 is not assigned	–
2	NC	Pin 2 is not assigned	–
3	LTG_B	Signal line B of the MPI module	Input/output
4	RTS_AS	RTSAS, control signal for received data stream. The control signal is "1" active when PLC is sending.	Input
5	M5EXT	M5EXT return line (GND) of the 5 V power supply. The current load caused by an external user connected between P5EXT and M5EXT must not exceed max. 90 mA.	Output
6	P5 EXT	P5EXT power supply (+5V) of the 5 V power supply. The current load caused by an external user connected between P5EXT and M5EXT must not exceed max. 90 mA.	Output
7	NC	Pin 7 is not assigned	–
8	LTG_A	Signal line A of the MPI module	Input/output
9	RTS_PG	RTS output signal of the MPI module. The control signal is "1" when the programming device is sending	Output
Shield	–	On connector casing	–

8

Parallel Port   The parallel port (LPT1) on the PG 720 has the following pinout:
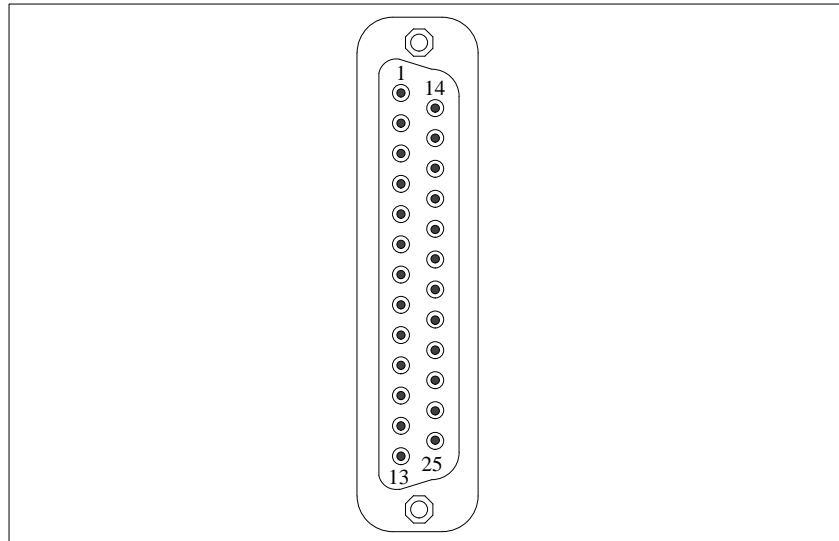
Figure 8-6   LPT1 Parallel Port

Table 8-8   Pinout Table of the Parallel Port

Pin No.	Signal Description	Input/Output
1	/Strobe	Output (open collector)
2	Data - bit 0	Output (TTL level)
3	Data - bit 1	Output (TTL level)
4	Data - bit 2	Output (TTL level)
5	Data - bit 3	Output (TTL level)
6	Data - bit 4	Output (TTL level)
7	Data - bit 5	Output (TTL level)
8	Data - bit 6	Output (TTL level)
9	Data - bit 7	Output (TTL level)
10	/ACK (Acknowledge)	Input (4.7 kΩ pull up)
11	BUSY	Input (4.7 kΩ pull up)
12	PE (PAPER END)	Input (4.7 kΩ pull up)
13	SELECT	Input (4.7 kΩ pull up)
14	/AUTO FEED	Output (open collector)
15	/ERROR	Input (4.7 kΩ pull up)
16	/INIT	Output (open collector)
17	/SELECT IN	Output (open collector)
18	GND	–
:		
25	GND	–

Serial Port (PLC/V24/Modem)

The serial port (COM1) on the PG 720 has the following pinout:
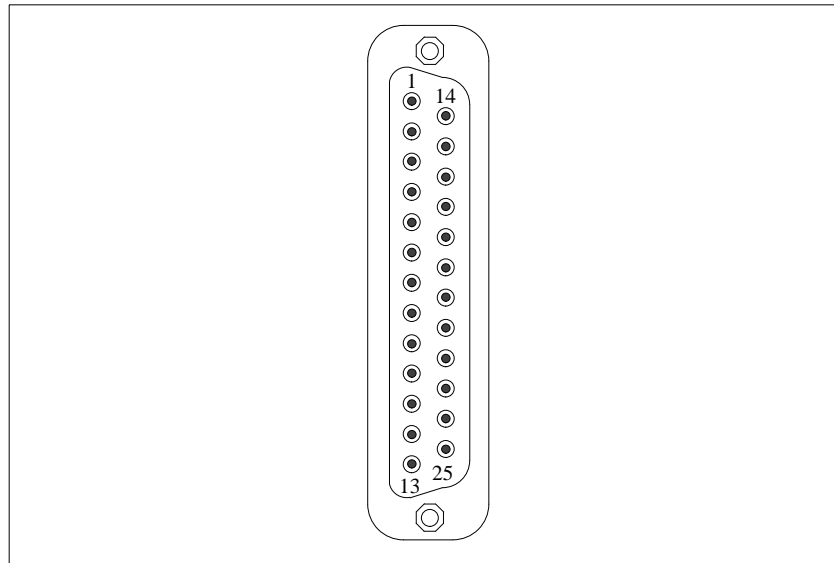
Figure 8-7   COM1 Serial Port

Table 8-9   Pinout Table of the COM1 Serial Port

Pin No.	Designation	Description	Input/Output
2	TxD (D1)	Serial transmit data	Output
3	RxD (D2)	Serial receive data	Input
4	RTS (S2)	Request to send	Output
5	CTS (M2)	Clear to send	Input
6	DSR (M1)	Data set ready	Input
7	GND (E2)	Ground (reference potential)	–
8	DCD (M5)	Data carrier detect	Input
9	+TTY RxD	TTY receive	Input
10	–TTY RxD	TTY receive	Input
11	M20 RxD	Isolated current source	–
18	+TTY TxD	TTY send	Output
19	+20mA	Isolated current source	–
20	DTR (S1)	Data terminal ready	Output
21	–TTY TxD	TTY send	Output
22	RI (M3)	Incoming call	Input
1	–	Shield	–
11-17	–	Not assigned	–
23-25	–	Not assigned	–

8

**Serial Port
(V24/Mouse)**

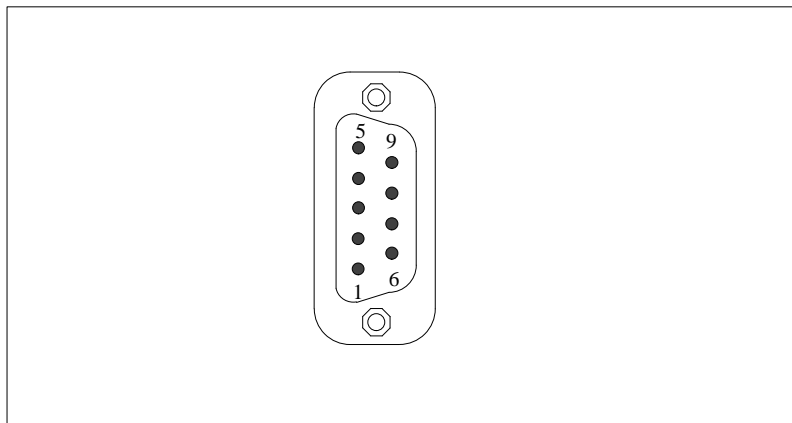The serial port (COM2) on the PG 720 has the following pinout:

Figure 8-8   COM2 Serial Port

Table 8-10   Pinout Table of the COM2 Serial Port

Pin No.	Designation	Description	Input/Output
1	DCD (M5)	Data carrier detect	Input
2	RxD (D2)	Receive data	Input
3	TxD (D1)	Transmit data	Output
4	DTR (S1)	Data terminal ready	Output
5	GND (E2)	Ground	–
6	DSR (M1)	Data set ready	Input
7	RTS (S2)	Request to send	Output
8	CTS (M2)	Clear to send	Input
9	RI (M3)	Incoming call	Input

8.4 Connecting Cables

Overview   The following connections can be established with existing standard cables:
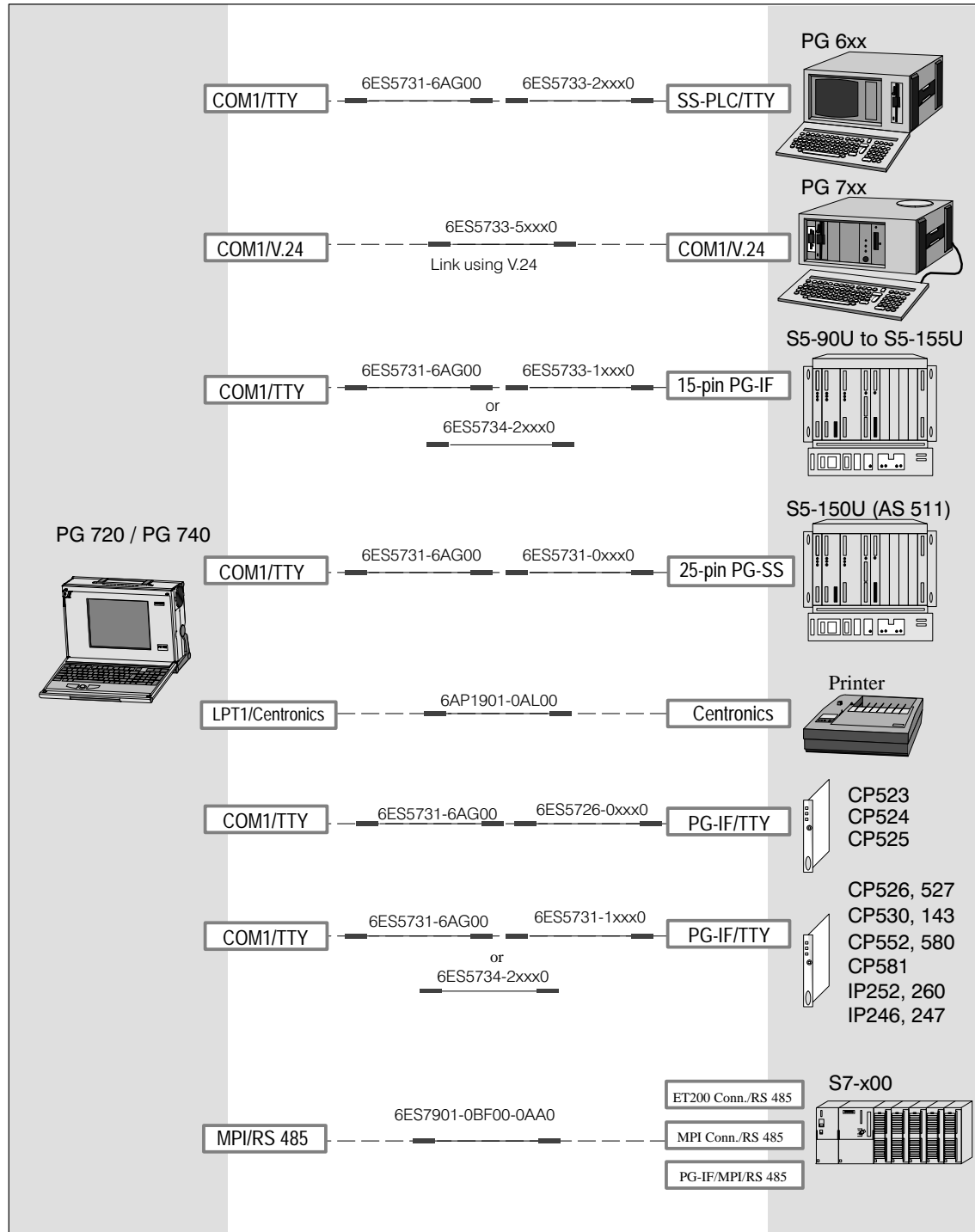

Figure 8-9   Connecting Cables

**Standard
Connecting Cable**

Using the standard connecting cable (supplied with the unit) you can connect your PG 720 to a Siemens programmable logic controller. Please refer to the information in Chapter 3.
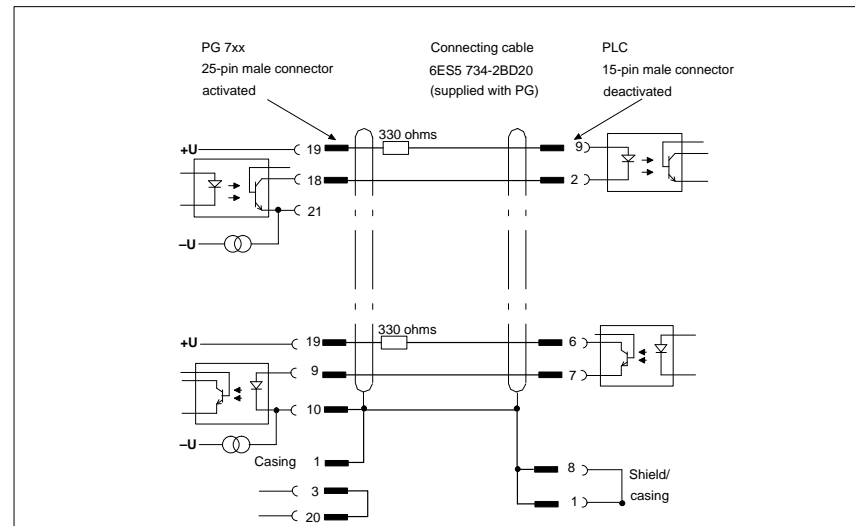

Figure 8-10   Standard Connecting Cable

**Adapter for
PG 6xx Cable**

If you want to connect your PG 720 to a PLC using the standard connecting cable of a PG 6xx, please use an adapter.
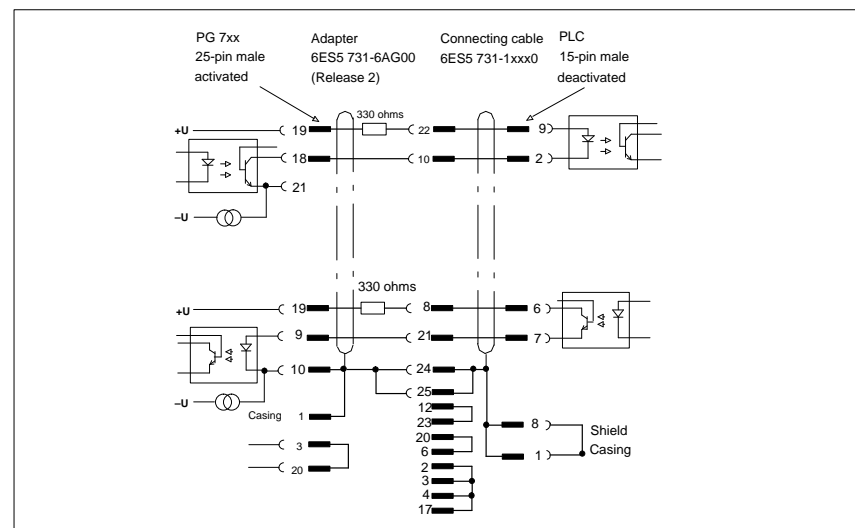
Figure 8-11   Adapter for PG 6xx Cable

**Connecting Cable
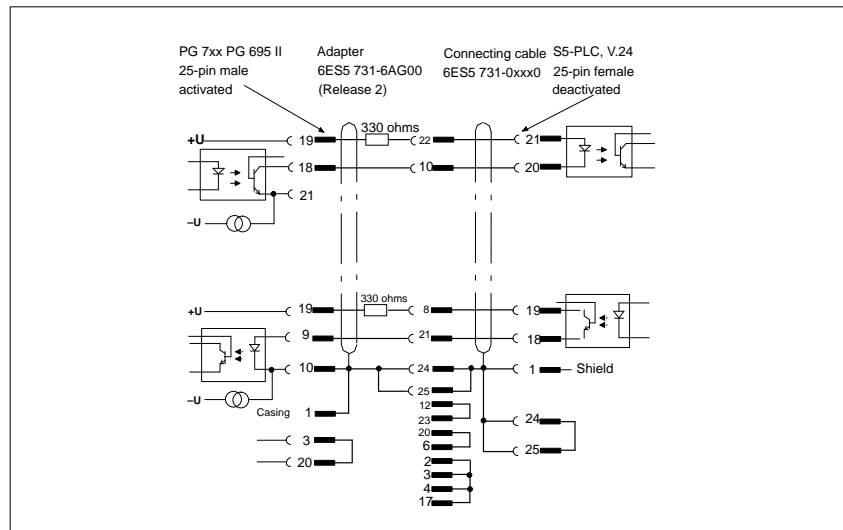With 25-Pin Socket
Connector**

Figure 8-12   Connecting Cable With 25-Pin Socket Connector

**Cable for
Interconnecting
Programming
Devices**

You can connect your PG 720 to other programming devices with this cable using the TTY/COM1 interface. This cable does not have an order number. Please read the notes in Chapter 4.
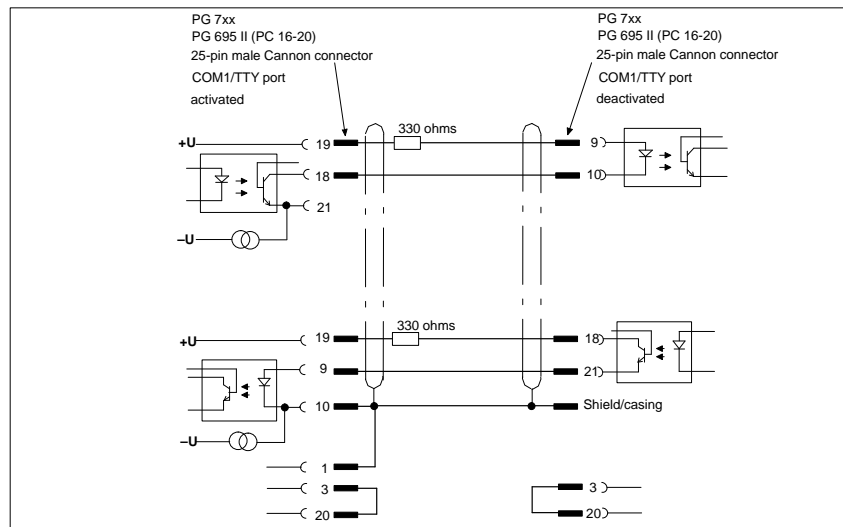
Figure 8-13   Cable for Interconnecting Programming Devices

**Connection to S5
PLC/V.24 and
COM1/TTY of a
PG 6xx**

If you want to connect your PG 720 to the S5/V.24 port of a PG 6xx
programming device, you require an adapter. In this case, the PG 720 must
be the active programming device. Please read the information about
activating and deactivating the TTY/COM1 port in Chapter 4.
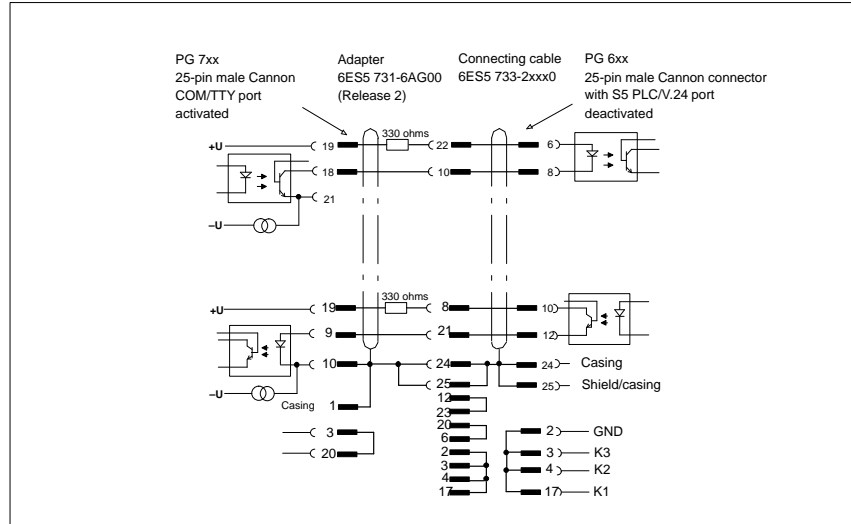
Figure 8-14   Connecting to the S5/V.24 and COM1/TTY Ports of a PG 6xx
               Programming Device

Note

The Product Bulletin supplied with your device contains further technical
information about the PG 720.

Glossary

What does this Chapter Contain?
This chapter contains a glossary in which you will find a list of the terminology used in conjunction with the Siemens range of programming devices and a brief explanation of each of the terms.

A

Access Protection   Access to the programs and data of a programming device can be protected by passwords.

Application   An application is a program which builds directly on, for example, the operating system. Applications on your programming device are MS-DOS/Windows, the STEP 5 Basic package, GRAPH 5 etc.

ASCII Editor   With an ASCII editor you can process (that is, edit) text files which are stored in ASCII code (American Standard Code of Information Interchange).

B

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

Basic Package STEP 5   This is a software package which represents the basis for all other STEP 5 software packages. With the programming device (PG 720), this package is used to program PLCs of the SIMATIC S5 family. The language used is known as STEP 5.

Bps   The speed (in bits per second) with which information is transmitted over a data link.

BIOS   BASIC Input Output System

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

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

C

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

COM1 Port   The COM1 port is a serial V.24/modem interface. This interface is suitable for asynchronous data transmission. It can also be used to connect printers with a serial interface.

COM2 Port   The COM2 port is a serial V.24 interface which can be used to connect a mouse or a printer.

Configuration Files These are files which define the configuration after booting. Examples of such files are CONFIG.SYS and AUTOEXEC.BAT.

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

Cursor   Collective term for mouse pointer and text cursor.

Cursor Control   Keypad on the keyboard for controlling the cursor.

D

Device Configuration The configuration of a programming device contains information on the hardware and options of the device, such as memory configuration, drive types, monitor, network address etc. The data are stored in a configuration file and enable the operating system to load the correct device drivers and assign the correct device parameters.

If changes are made to the hardware configuration, the user can change entries in the configuration file using the SETUP program.

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.

Diskette Drive   The diskette drive (floppy disk drive) is used to store programs and data on diskette (write access) or to load from diskette to the computer (read access).

Display   The flat monitor of the PG 720.

Double-Click   Pressing and releasing the left mouse button very quickly twice in succession without moving the mouse. This action is normally to open an object or program.

Drives   The PG 720 programming devices are usually equipped with one hard disk drive and one diskette drive.

Drivers   These are programs which are part of the operating system. They adapt the data from user programs to the specific formats required by the I/O devices such as hard disk, printers and monitors.

Drop-Down Menu   In graphics-supported programs, a menu line is positioned on the top edge of the screen. The menu titles contained in this line can be set either as drop-down or pull-down menus. Drop-down menus "roll" down as soon as the mouse pointer passes over a menu title. Pull-down menus only "roll" down when the menu title is clicked on. Different functions can then be called from these menus by moving the mouse and clicking on an item in a menu.

E

EPROM/   These are plug-in submodules with EPROM/EEPROM chips. S5 user
EEPROM   programs can be stored on them. These programmed submodules are then
Submodules   plugged in specially designed receptacles in the programmable controller.

Extended Memory   A memory extension can be installed in a programming device to increase the size of the memory.

F

File A file is the collection of data under one name.

Formatting Formatting divides the memory area on a magnetic data medium into tracks and sectors. Formatting deletes all the data on a data medium. Every data medium must be formatted before it is used for the first time.

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 Copy The output of the complete contents of the screen on a printer is called a hard copy.

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.

I

Interface

- An interface is the connection between individual hardware elements such as PLCs, programming devices, printers or monitors via physical connections (cables).
- An interface is also the connection between different programs, to enable them to work together.

Interface Module Module which controls and extends the hardware periphery.

Interrupt The interruption of program processing in the processor of a programmable controller by an interrupt event.

J

JEIDA
(Japanese Electronics Industry Development Association) Association of Japanese electronics manufacturers whose aim is to set up standards worldwide for the miniaturization and flexible application of PC expansion cards. Cooperates with PCMCIA.

K

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

L

LED
Light-emitting diode (for display and indicating purposes).

LPT1 Port
The LPT1 port (Centronics port) is a parallel interface that can be used to connect a printer.

M

Main Memory
The main memory is the complete RAM memory of a programming device.

Memory Card
Memory submodule in credit-card format containing RAMs or EPROMs.

Modem
Communications device that enables a computer to send and receive data over a telephone line. **Mo**dulator and **dem**odulator 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 plugged into a programmable controller or programming device. They are available, for instance, as central controller modules, interface modules or as bulk memory modules.

Monitor
The monitor or screen is a visual display unit via which the programming device communicates with the user.

Motherboard   The motherboard is the core of the programming device. From here data are processed and stored, interfaces and device I/Os are controlled and managed.

Mouse   The mouse is an input device, with which the user inputs coordinates (x,y). 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 moved across the worktop (screen) by means of the mouse. The mouse pointer selects, for example, objects which are to be processed.

MPI/DP   The multipoint interface (MPI) is the programming device interface of SIMATIC S7. It permits the simultaneous operation of several programming devices, text, displays, operator panels on one or more central processing units. The stations on the MPI are connected together via a bus system.

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 programming devices.

N

Network   Link between programming devices and programmable controllers 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 execution of the user programs, the distribution of resources among the individual user programs and the maintenance of the operating mode (for example, MS-DOS).

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 (LPT1).

Password   See Access Protection

PC   Personal computer

PCMCIA   (Personal Computer Memory Card International Association). Association of about 450 computer companies with the aim of setting worldwide standards for miniaturizing PC expansion cards and making their use more flexible, offering the market a basis for development. Cooperates with JEIDA.

PG   Programming device

PG LINK   Linking two programming devices via a special connecting cable.

PLC   SIMATIC S5 programmable controller

Programmable Controller The programmable logical controllers (PLC) of the SIMATIC S5 system consist of a central controller, one or more CPUs and various I/O modules. The PLCs of the SIMATIC S7 system (for example, S7-200, S7-300) consist of one or more CPUs and various I/O modules.

Pull-Down Menu   See Drop-Down Menu

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 changed. RAM is used to store data and programs.

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 are permanently programmed at the factory before delivery and are not lost in the event of a power failure.

S

SCSI Interface   Small Computer System Interface. Interface for connecting SCSI devices (hard disk drives, CD-ROM drives).

Serial Interface   Data is transmitted one bit at a time via a serial interface (port); serial interfaces are therefore slower than parallel interfaces.

SETUP   A program in which information about the device configuration (that is, the configuration of the programming device's hardware) is defined. The device configuration of the programming device is preset with defaults. Changes must therefore be entered in the SETUP if a memory extension, new modules, or a new drive are added to the hardware configuration.

SIMATIC Memory Cards   Memory submodules in credit-card format for SIMATIC S5 and SIMATIC S7 which are programmed with the PG 720 and can be plugged in an S5 or S7 programmable controller.

SINEC L2   Bus system on the basis of the PROFIBUS standard. Components of the SIMATIC S5 and S7 series (for example, programming device, programmable controller, remote I/O) can be networked directly using SINEC L2.

SINEC H1 (ETHERNET)   Bus system on the basis of the ETHERNET standard. Components of the SIMATIC S5 and S7 series (for example, programming device, programmable controller, remote I/O) can be networked directly using SINEC H1 interface modules.

Software   The collective term for all programs which are used on a computer. The operating system and the user programs are part of the concept "software".

STN Display   Super Twist Nematic passive display

T

Text Cursor   The cursor shows where text may be entered, for example, in text editors and in dialog windows. In many applications the position of the cursor can be changed by moving and clicking the mouse pointer.

Trackball   The trackball is used as an input device for programs serviced by a mouse. On the PG 720, the trackball is integrated in the keyboard.

U

User Interface
The software-controlled menus and screens on the monitor through which the user communicates with the program.

User Program
A collection of all the instructions and declarations for signal processing, by which a system (or process) is controlled or influenced.

V

V.24 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)
Color graphics control mode

W

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

Working Memory
The memory in which a program is stored which can be processed. The working memory is a direct access memory. Also known as main memory.

Write Protection
Write protection for files or diskettes

- Write protection for files; this type of write protection is stored in the computer and is allocated by the system manager.

- Diskette write protection; for 5 1/4 in. diskettes by blanking out the hole on the right-hand edge with an adhesive label, for 3 1/2 in. diskettes or EOD disks by opening the write protection hole.

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Siemens AG
AUT E 146

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Federal Republic of Germany

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❒   Chemical   ❒   Plastic
❒   Electrical Machinery   ❒   Pulp and Paper
❒   Food   ❒   Textiles
❒   Instrument and Control   ❒   Transportation
❒   Nonelectrical Machinery   ❒   Other _ _ _ _ _ _ _ _ _ _ _ _
❒   Petrochemical

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