

# SIEMENS

## SIMATIC

### Programming Device PG 740

#### Manual

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## Safety Guidelines

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

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### Danger

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

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### Warning

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

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### Caution

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

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### Note

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

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## 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.

## Correct Usage

Note the following:

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### 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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### Disclaimer of Liability

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

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# Preface

## **What this Manual is About**

This manual contains all the information you need for working with the PG 740 programming device. You can use it 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 up to other units of equipment (programmable controllers, other programming devices).
- expand your system, provided you comply with the necessary conditions.
- analyze and eliminate simple faults.

## **Who is the Manual Intended For?**

The following persons require the manual:

- Users commissioning the programming device themselves or working with it (editing, programming or debugging).
- System administrators operating the programming device in a network.
- Service and maintenance personnel using the PG 740 for system expansion purposes or error/fault analysis.

## **Other Manuals**

This manual does not contain information on the operating system or programming software. You will find this information in the relevant software manuals.

## **Product Information Bulletin**

The Product Information Bulletin supplied with the PG 740 contains the latest technical specifications of the programming device, and the addresses and telephone numbers of the repair and maintenance centers and the hotline.

## **Product Information**

When your PG 740 is delivered, you also receive a Product Information leaflet with information on the latest software release.

<b>Queries</b>	<p>If you have any questions concerning subjects not covered in the manual, just get in touch with the Siemens representative in your area.</p> <p>If you have any questions on the manual itself or would like to make remarks or suggestions, please complete the reply card at the end of the manual. We would also appreciate it if you would include your own personal opinion on, and appraisal of, the manual on the reply card.</p>
<b>Pointers through the Manual</b>	<p>The manual contains both the most important instructions for starting up and using the programming device, as well as reference sections you will only require in special cases.</p>
<b>Installation</b>	<p>Before you use the PG 740 for the first time, read Chapter 2 on the PG 740's components and functionality.</p>
<b>Startup</b>	<p>Chapter 3 describes the basic steps necessary for starting up the PG 740. This section also contains instructions for working with memory cards for programmable controllers and for connecting the programming device to other devices.</p>
<b>Expansion</b>	<p>Chapter 4 describes how to expand your PG 740 (installation of memory expansion or additional modules). Please observe the safety notes.</p>
<b>Configuration</b>	<p>Modifications to the system hardware may make it necessary for you to adapt the original hardware configuration. Chapter 5 tells how to proceed in this case.</p>
<b>Error/Fault Diagnostics</b>	<p>Chapter 6 will tell you how to deal with simple faults that you can diagnose and, in some cases, eliminate yourself.</p>
<b>Reference Data</b>	<p>Chapter 7 contains hardware addresses, interrupt assignments and information on connecting cables.</p>
<b>Glossary</b>	<p>The glossary explains important terms.</p>
<b>Alphabetical Index</b>	<p>The index will enable you to quickly find passages in the text pertaining to important keywords.</p>

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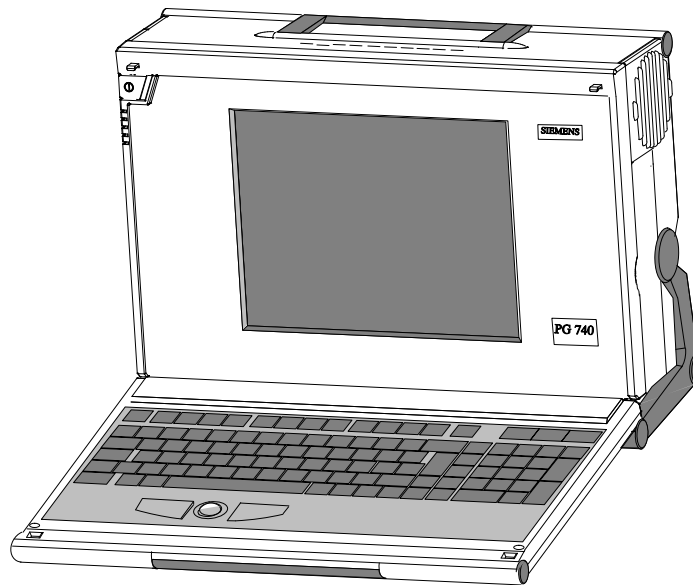
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# Product Overview

# 1

## Application

The PG 740 programming device is a high-performance device, equipped with the optimum hardware features and software for programming, debugging, and starting up programmable controllers in an automation environment.



## Hardware/Software Complement

You can use the PG 740 programming device to program SIMATIC S5 and SIMATIC S7 programmable controllers. It has

- interface ports for connection to the programmable controllers
- programming facilities for S5 and S7 memory cards.

The PG 740 is shipped with the software listed in the Product Information leaflet.

**Advantages of the PG 740**

**Compared to a PC with standard hardware and software, the PG 740 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 740 without the need for additional hardware or software.
- The rugged design and functionality of the PG 740 make it particularly suitable for use on site under hostile industrial conditions. The PG 740 meets the specific requirements of industrial environments, such as noise immunity, compliance with the relevant standards, ruggedness, simple transportation and startup.
- The PG 740 can be set up and operated in a large number of different ways and positions, and can therefore be used practically everywhere it is needed.
- The PG 740 has all the integral ports necessary for connecting it to SIMATIC automation devices:
  - Programming interface for SIMATIC S5 EPROMs and EEPROMs
  - Programming interface for SIMATIC S5 and SIMATIC S7 memory cards in credit-card format
  - Interfaces for connection to S5 and S7 programmable controllers.
- The PG 740 is supplied with all the necessary system and automation software already installed on the hard disk.
- Since MS-DOS and Windows are also already installed, you can, of course, also use the PG 740 as a stand-alone workstation, and run all the standard software available on the market that requires MS-DOS or Windows.
- The PG 740 has the power and expansion capability of normal PCs, and can therefore also be used as a fully-fledged personal computer.



# 2

## Installing the PG 740

### What Does this Chapter Contain?

This chapter describes how you install your PG 740. It provides you with comprehensive information on the major components of the PG 740, such as:

- drives
- keyboard, and
- programming facilities.

### Summary of Sections

In Section	You Will Find	On Page
2.1	Setting up the PG 740	2-2
2.2	Hardware Components of the PG 740	2-6
2.3	Display	2-9
2.4	Keyboard	2-10
2.5	Trackball	2-16
2.6	Drives	2-18
2.7	Transport	2-20

### What Will You Know at the End of this Chapter?

When you have worked through this chapter, you will be familiar with

- the procedures to follow when unpacking your PG 740
- the major components of the PG 740 and their functions, and
- the right way to transport the unit.

## 2.1 Setting up the PG 740

### Unpacking the PG 740

Unpack your PG 740 as follows:

1. Remove the packing.
2. Do not throw the original packing away. Keep it in case you have to transport the unit again sometime in the future.
3. Check with the packing list to make sure no components are missing.



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#### Caution

Risk of damage!

When transporting the unit in cold weather, when it may be submitted to extreme variations in temperature, make sure that no condensation is allowed to form on or in the unit.

The unit should be allowed to reach room temperature slowly before it is started up. If condensation has formed, the unit should be left for approximately 12 hours (with a temperature difference of  $-20^{\circ}\text{C}$  to  $+20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$  to  $+68^{\circ}\text{F}$ )) before being switched on.

---

### Desk-Top Mounting

The PG 740 is usually mounted on a desk or table top. To make working with the PG 740 easier, it can be adapted as follows to the particular workplace:

1. Set the PG 740 down on the desk or table top.
2. Open the keyboard lock by pulling up the anthracite-colored handle.
3. Swing the keyboard down into position.

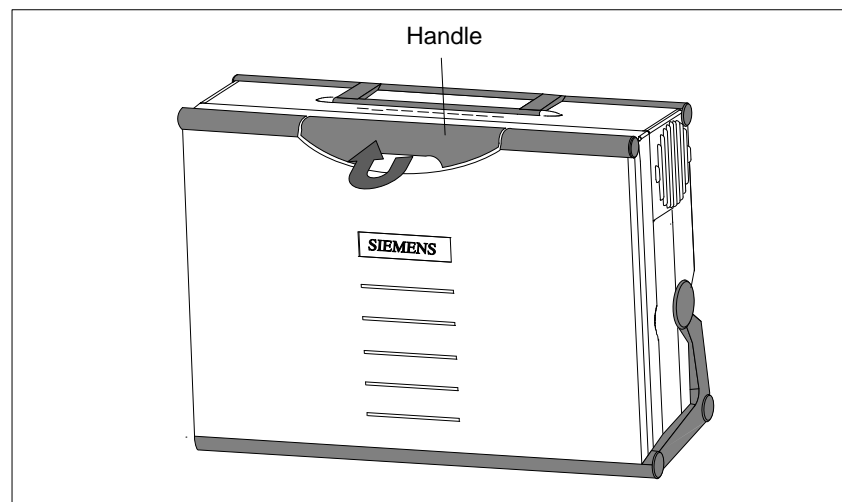


Figure 2-1 Handle for Unlocking Keyboard

## Changing the Angle of Inclination

With the keyboard open, you can incline the unit to any angle between 0 and 90° around the axis of rotation of its stand. Proceed as follows:

1. Swing the keyboard down.
2. Pull the extra support (Figure 2-3) out of the rear of the stand.
3. Incline the unit to the angle you prefer.

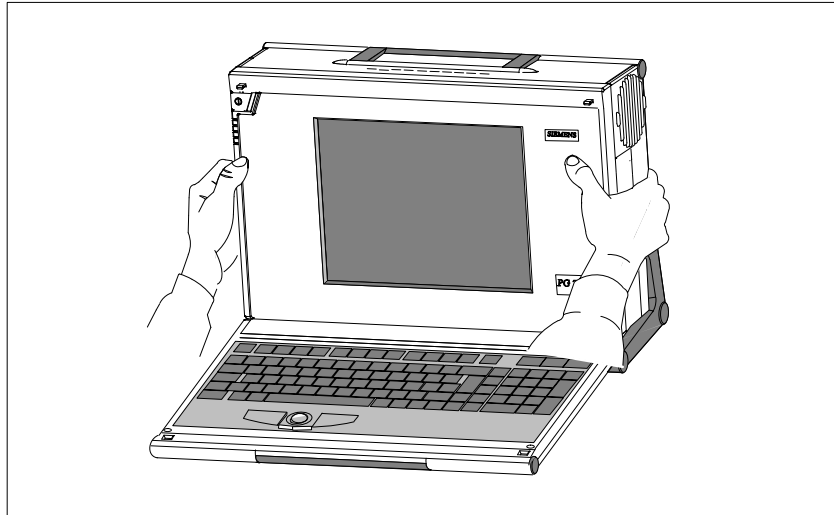
**2**

Figure 2-2 Changing the Angle of Inclination



### Caution

Risk of injury!

There is a danger of the unit tipping over if it is set up without extra support and at an angle of inclination of more than 15°. 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 extra slide-out support in the stand.

## Horizontal Mounting

If you do not have a desk or table on which to mount the unit, you can work with it standing on the floor. You can swing the casing with display through about 90° into the horizontal plane.

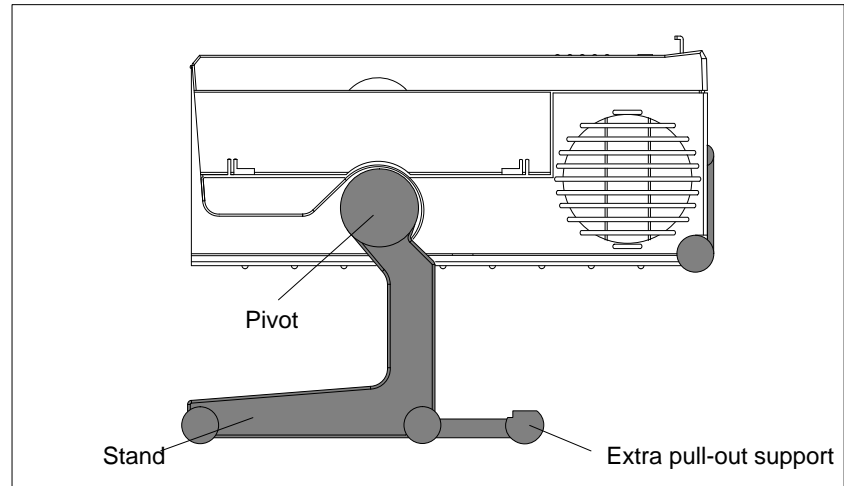


Figure 2-3 Horizontal Operating Position without Keyboard

## Detaching the Keyboard

You can remove the keyboard if you are operating the unit in the position shown in Fig. 2-3.

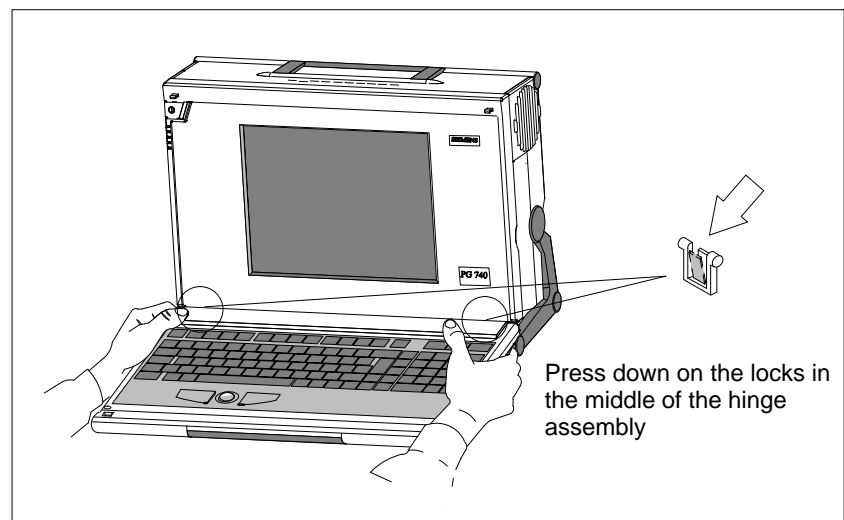


Figure 2-4 Detaching the Keyboard



### Caution

If the keyboard is detached, there is a risk of the unit falling over. Pull out the extra support.

---

You detach the keyboard as follows:

1. Grip the keyboard hinges in the stand behind the keyboard as shown in Figure 2-4.
2. Pull the locks in the middle of the hinge assembly toward the keyboard.
3. Pull the keyboard up and out.
4. Set the keyboard down on a suitable surface, using the hinge assembly as a stand.
5. Make sure the cable is not pinched or squashed in any way.
6. To attach the keyboard again, snap the keyboard hinges into the matching receptacles in the stand.

### Wall Mounting

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

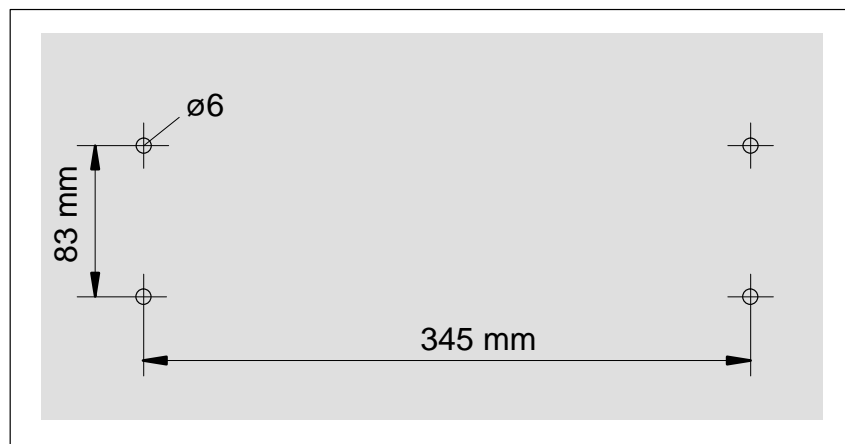


Figure 2-5 Drilling Template for Wall Mounting

## 2.2 Hardware Components of the PG 740

### Front

You can access all important operator controls and displays from the front or sides of the unit.

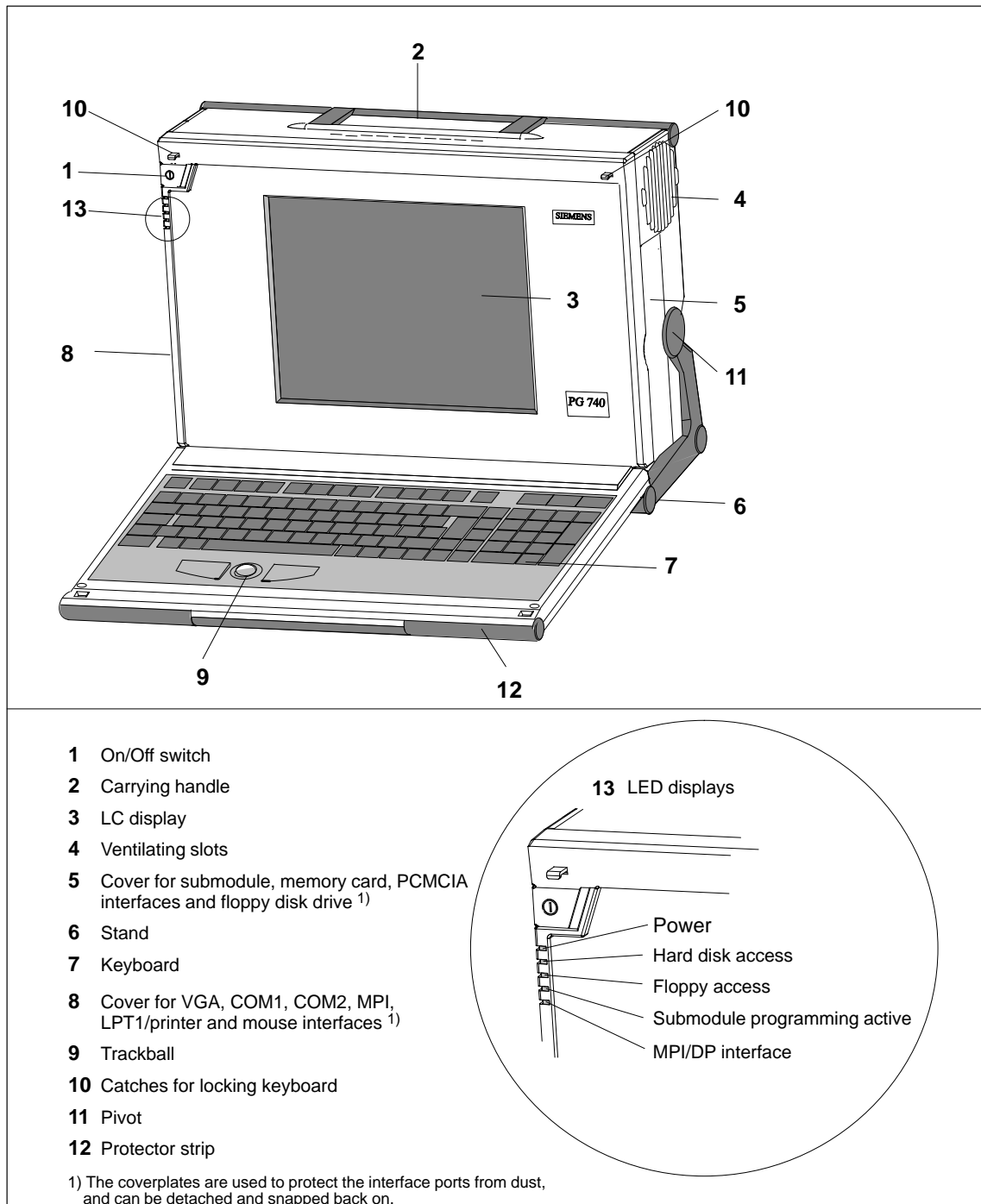


Figure 2-6 The Front of the PG 740

**Left Hand Casing Side Panel (Communications Side)**

All the connectors and interface ports for connecting to external devices are located on the left-hand side panel of the PG 740 (communications side).

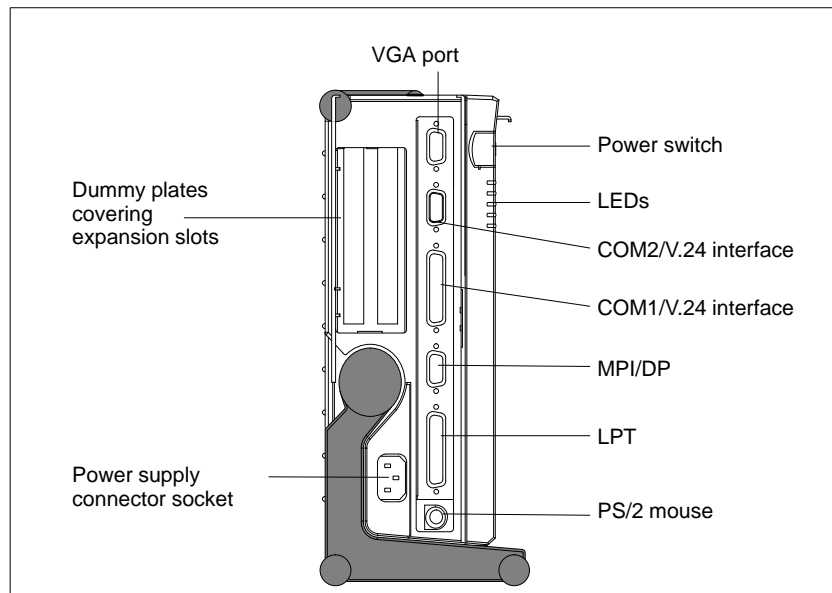


Figure 2-7 Left-Hand Casing Side Panel with Coverplates Removed

**Connectors and Ports**

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

Ports and Connectors	Function
VGA port	Connection for external monitor
Serial port COM2 V.24/mouse Serial port	Connection for serial mouse Connection for serial printer
COM1 V.24/MODEM/PLC Serial port	Connection for S5 programmable controller
MPI /DP (Multipoint interface/ distributed I/Os)	Connection for S7 programmable controller and for distributed I/Os
LPT1 Printer Parallel interface	Connection for parallel printer
PS/2 mouse	Connection for PS/2 mouse
Connector for power supply	Connection for power supply

**Right-Hand Casing Side Panel (Processing Side)**

You access the slots for S5/S7 memory submodule programming, the PCMCIA port and the disk drive from the right-hand side panel of the PG 740's casing (processing side).

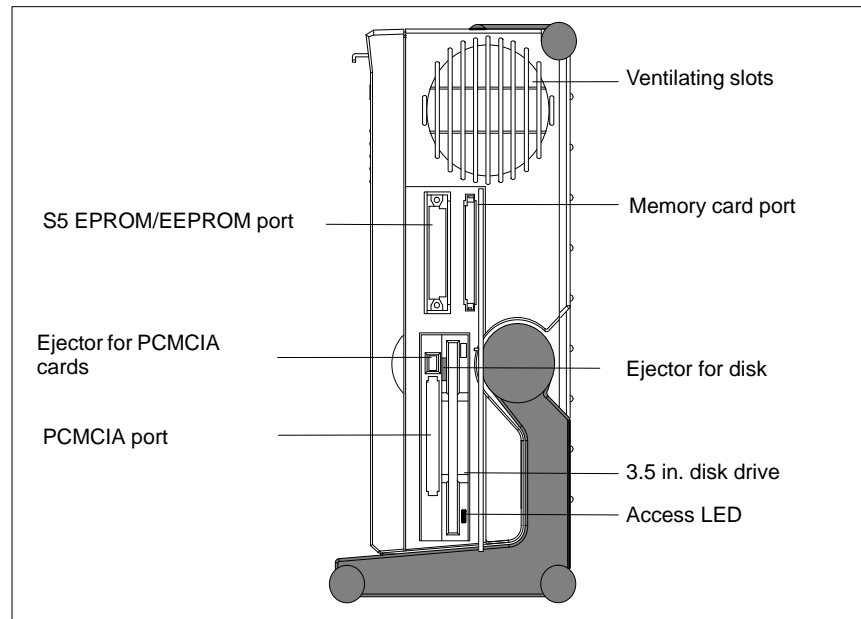


Figure 2-8 Right-Hand Casing Side Panel

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

Interface Port	Function
S5 module interface	Programming of SIMATIC S5 memory submodules
Memory card interface	Programming of SIMATIC memory cards
PCMCIA port	Connection for PCMCIA cards
Disk drive	Processing of 3.5 in. disks

**Ventilating Slots**

The raised air outlet slots for ventilation are located above the interface ports. There are also ventilating slots on the underside of the base. These slots must not be covered or blocked in any way (by carpeting, for instance).



**Caution**

Risk of overheating!

If you cover up the slots for the inlet and outlet air in any way, there is a risk that your PG 740 will be damaged.

Do not place any objects over, or lay them on, the ventilating slots.



## 2.3 Display

### The PG 740's Color Display

The PG 740 has a TFT (thin-film transistor) color display with a 10.4 in. diagonal and a resolution of 800 x 600 pixels.

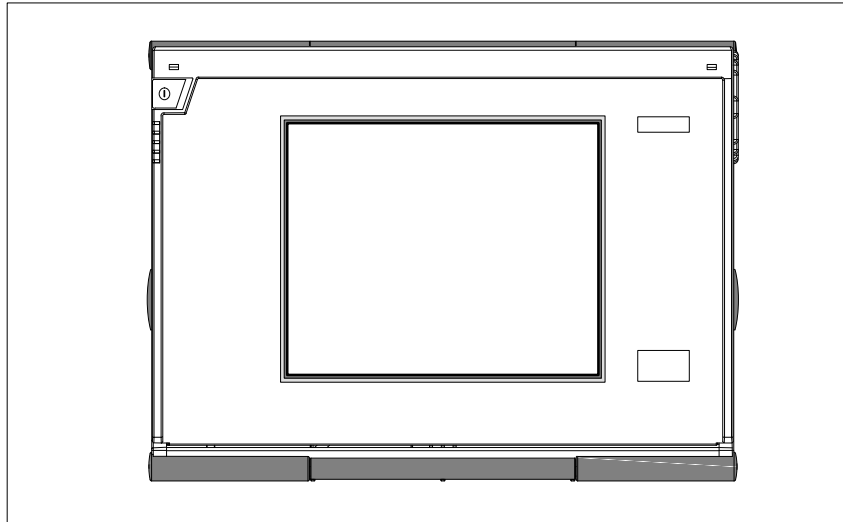
**2**

Figure 2-9 The PG 740's Color Display

### Color Shades

The three primary colors, red, green and blue, can each be displayed in six different shades. This means that, including all secondary colors formed, a maximum of 65535 from 262144 different colors can be displayed, where the number of colors can be set in the respective graphic driver. The display has automatic contrast control.



#### Caution

Risk of injury!

If a display is damaged, liquid crystal may escape. Do not touch this liquid or allow it to come into contact with your skin in any way, and do not breathe 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 right away.

Use only a cotton cloth and a neutral cleansing agent to clean the display. Do not use water or aggressive solvents (like alcohol or acetone, for instance). Never touch the display with hard, pointed objects.

## 2.4 Keyboard

### Keyboard Layout

The keyboard is divided into the following three areas:

- Alphanumeric or typewriter keyboard
- Numeric keypad with cursor control keys
- Function keys

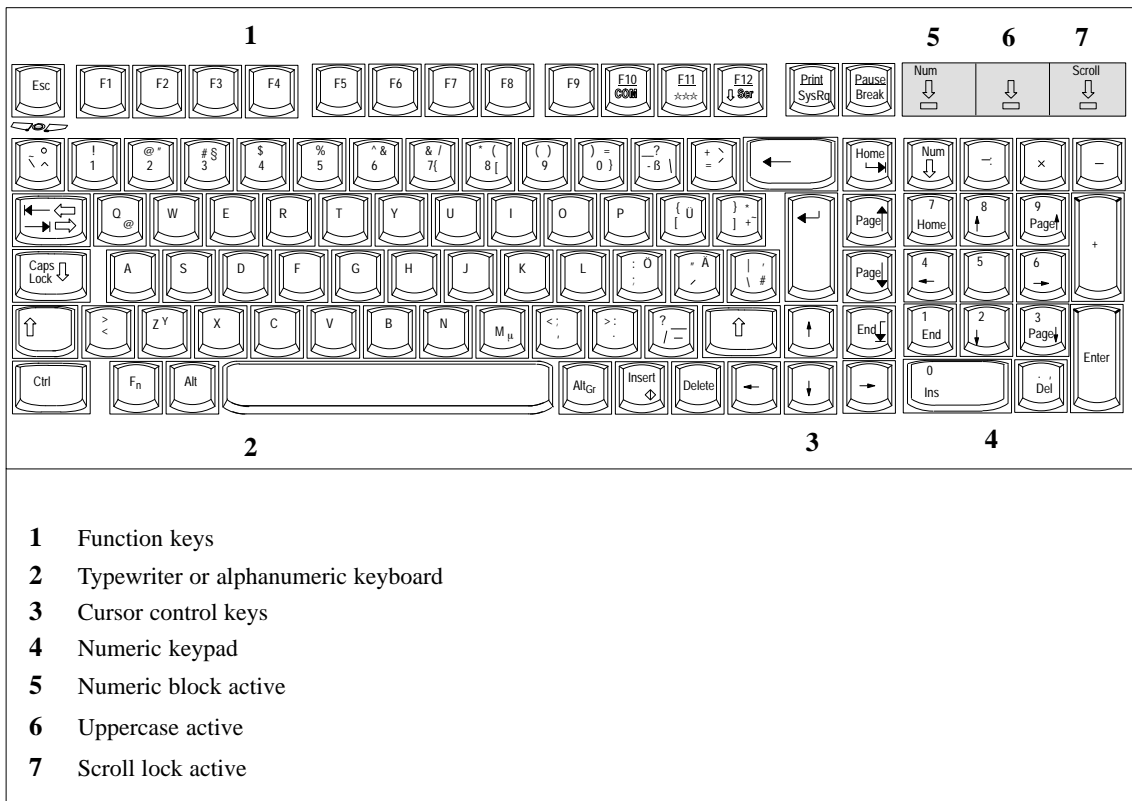


Figure 2-10 Keyboard

All keys on the keyboard are of the autorepeat type. That is, the relevant character is repeated as long as you keep the key depressed.

### Setting Up the Keyboard

When the keyboard is attached to the casing, it has an inclination of 6°, and the middle row of keys is at a height of 30 mm. When the keyboard is detached from the casing, its angle of inclination is 4.5° and the middle row of keys is at a height of 27 mm. Ergonomically, these are the ideal positions for the keyboard.

## Typewriter or Alphanumeric Keyboard

The largest block of keys on the keyboard is the alphanumeric or typewriter keyboard with all the keys for the letters of the alphabet, numerals and special characters. The characters (letters, numerals and special characters) are arranged in generally the same way as on a normal typewriter. However, there are a number of special keys which have specific special functions for the PG 740.

## Keyboard Labeling

The keyboard has international labeling.

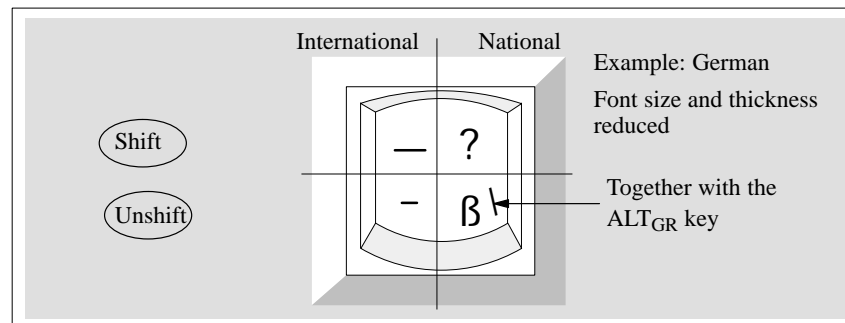
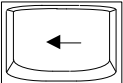
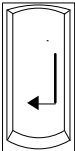
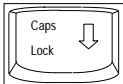

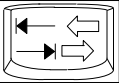








Figure 2-11 The Keyboard Labeling System

## Special Keys

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

Key	Function
	<p><b>Backspace Key</b></p> <p>This key moves the cursor one space to the left and deletes the character at this position</p>
	<p><b>Return Key</b></p> <p>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.</p>
	<p><b>CAPS-LOCK Key</b></p> <p>If you press this key, the middle LED at the top right-hand corner of your keyboard lights up. All letters then appear in uppercase and the upper of the two characters on the individual keys applies. If you wish to type in lowercase letters in this position, you must first strike the Shift key.</p> <p>If you are using an international keyboard, you cancel this function by pressing the CAPS-LOCK key again. The LED goes out. If you have a German keyboard, you must strike the Shift key to cancel this function.</p>

Key	Function
	<p><b>NUM Key</b> You switch from the numeric block to cursor control with this key (Num LED lights up). Press the key again to return to cursor control.</p>
	<p><b>Tabulator Key</b> This key moves the cursor by one or more positions to the right.</p>
	<p><b>“Fn” Special key (combination key)</b> Together with a second key (key combination), you activate other key codes for specific applications with this key (see Fig. 2-13 Function Keys).</p>
	<p><b>CTRL Key (combination key)</b> This key is only used in combination with other keys. For example, you press Ctrl + ALT + DEL to reset and restart the operating system. For other uses of this key, please refer to the user manual of the relevant application program.</p>
	<p><b>ALT Key (combination key)</b> This key is only used in combination with other keys. For instance, you can enter the hexadecimal value of an ASCII character (and consequently additional special characters) using this key and the numeric keypad.</p>
<p>ALT + 123 corresponds to "€".</p>	
	<p><b>ALT<sub>Gr</sub> Key (combination key)</b> 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 striking ALT<sub>Gr</sub> + ß.</p>
	<p><b>PRINT Key (combination key)</b> You can output the current screen display to a printer by pressing the PRINT key.</p>
	<p><b>PAUSE Key (combination key)</b> The PAUSE key interrupts program execution in the majority of applications.</p>

**Location and Labeling of the LED**

There are three LEDs on the keyboard. They are located to the right of the function keys in the top row of the keyboard directly above the numeric keypad.

- NUM LOCK
- CAPS LOCK
- SCROLL LOCK

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

**Cursor keys**

The keyblock shown below is used for cursor control.

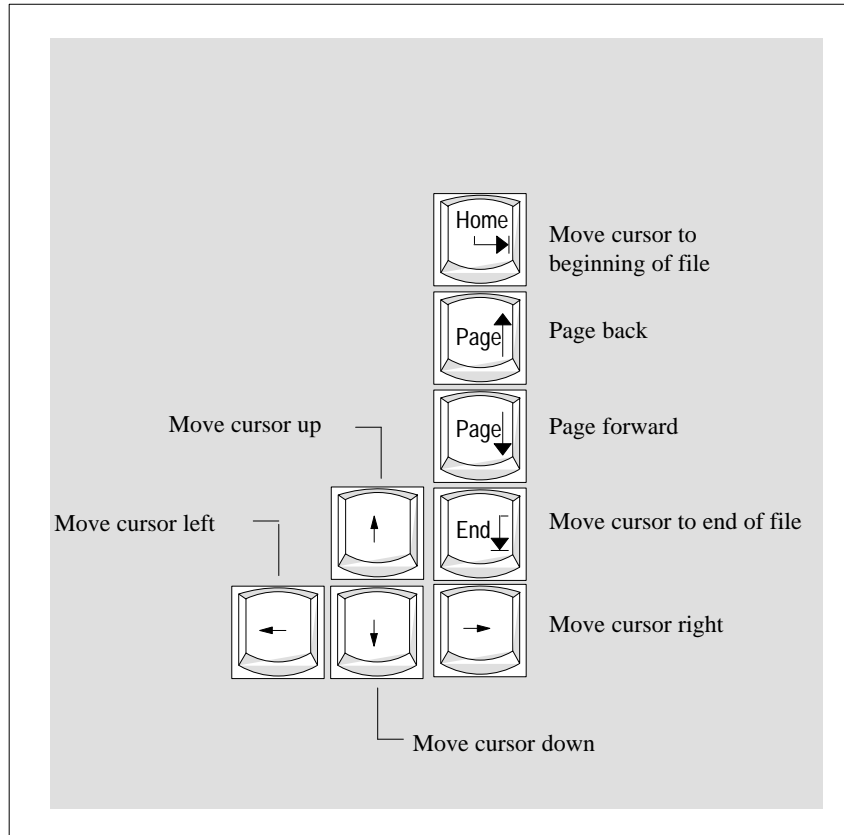


Figure 2-12 Cursor Control Keypad

**Keys for Functions Specific to S5**

The following function keys have specific functions in conjunction with the STEP 5 programming software (see STEP 5 Manual).




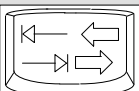

























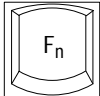









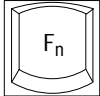

		Horizontal expand	
		Vertical expand	
		Enter key	
		Cursor right/ cursor left	
	+		Title/comment input for segment
	+		End of segment
	+		Help
	+		Insert segment 
	+		Delete segment (X   )
	+		Edit mode (CORR)
	+		Zoom (with Graph 5)
			Zoom (with Graph 5)
			Half screen (with Graph 5)

Figure 2-13 Function Keys (STEP 5)

**Key Combinations** The various key combinations are shown in Table 2-1.

Table 2-1 Key Combinations

Key Combination	Function
 +  + 	Warm restart
 +  +  	Changeover to international character set  Changeover to German character set; the German character set must have already been loaded.
 +         	By pressing the Fn key and a cursor control key in the numeric keypad simultaneously, you can change over to the cursor control functions of the key.
 + 	Trackball active/passive

## LEDs

The LEDs for the NUM LOCK, CAPS LOCK and SCROLL LOCK keys are located at the top right of the keyboard, and indicate the current status of these keys.

## 2.5 Trackball

### Trackball

The trackball serves as an input device for cursor control and menu selection in many programs (with mouse operation). By moving the trackball, the cursor can be repositioned on the screen.

By pressing the left-hand button, you set a marker. The right-hand button is assigned differently according to the application. You can select objects or items in a menu, and start functions with the trackball.

### Cleaning the Trackball

The trackball runs in a self-cleaning roller housing which is capable, under normal conditions, of preventing dust collecting on the trackball and transfer mechanism. However, you should clean the trackball from time to time.

Proceed as follows:

1. Switch off your programming device.
2. Remove the cover of the trackball housing by turning it counterclockwise; for example, by inserting tweezers or a similar gadget in the holes in the ring.
3. You can now lift the trackball out of its housing.
4. Wash the trackball with tap water to which a mild cleansing agent has been added (Figure 2-14).
5. Clean the trackball housing (Figure 2-15).
6. Clean the rollers (Figure 2-16).
7. Dry the trackball and return it to its housing.
8. Replace the cover and tighten it by screwing it clockwise.



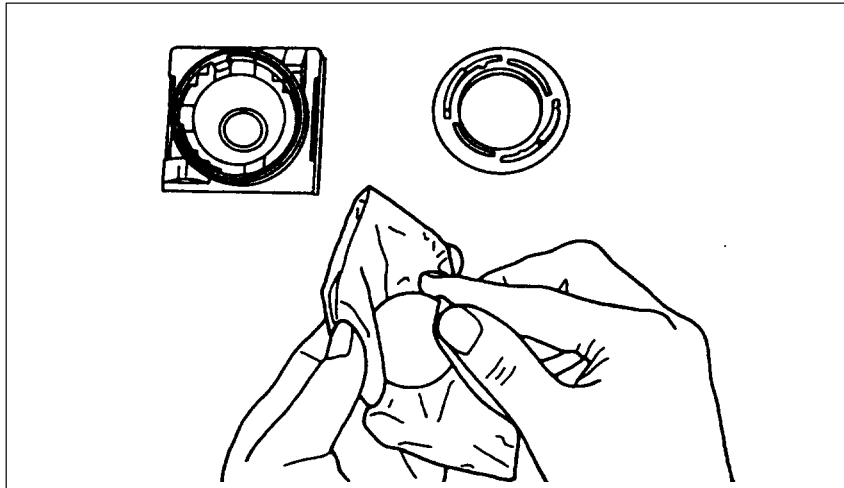


Figure 2-14 Cleaning the Trackball

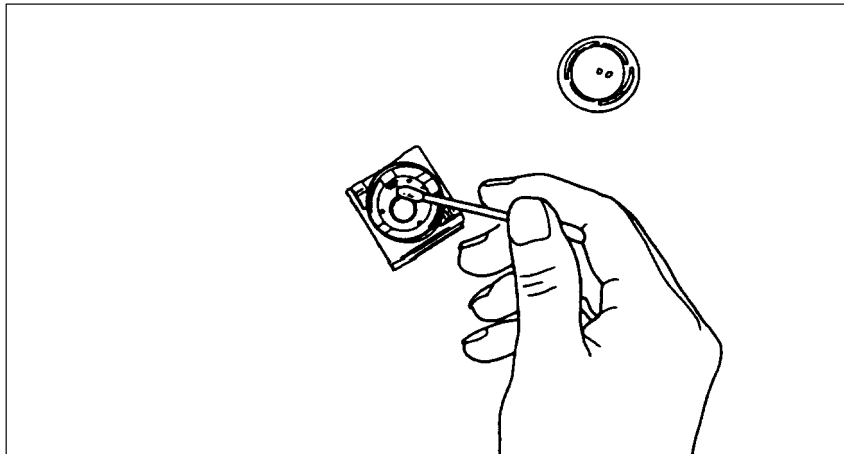


Figure 2-15 Cleaning the Trackball Housing

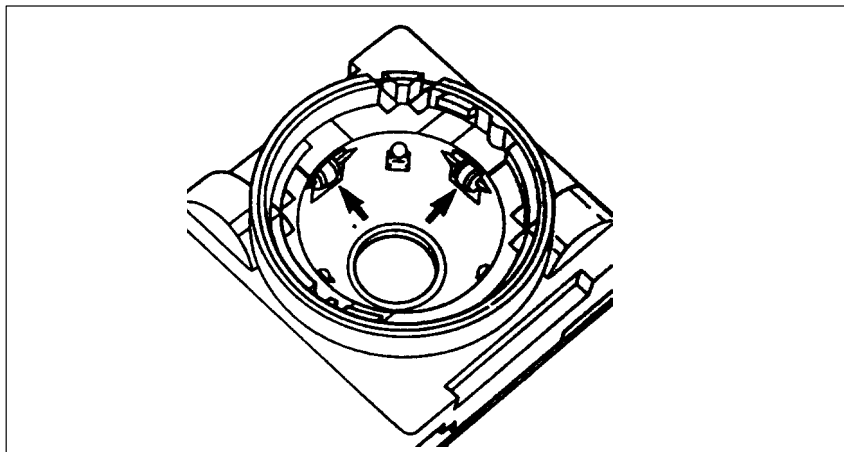


Figure 2-16 Cleaning the Rollers

## 2.6 Drives

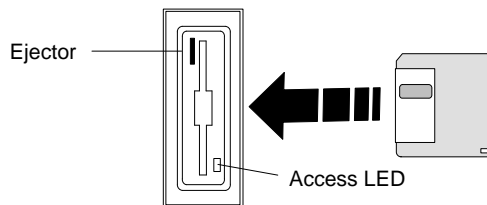
**Drive Types** The PG 740 is equipped as standard with a 3.5" diskette drive and a 3.5" hard disk drive.

**Diskette Drive** You can store programs and data on diskettes with the diskette drive and load them from diskettes into the PG 740.

**Types of Diskette** You can use the following diskettes:

Double-Sided High-Density Diskette	Double-Sided Double-Density Diskette
3.5 in.	3.5 in.
1.44 MB (135 TPI)	720 KB
80 tracks per side	80 tracks per side
Programming device recognizes diskettes by their coding	Programming device recognizes diskettes by their coding

**Handling Diskettes** The diskette is inserted in the diskette drive as shown below:




---

### 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 of the PG 740 has gone out.

---

**Hard Disk Drive** You can use a number of different hard disk drives in your PG 740. The memory capacity of the particular type of hard disk can be found in the Product Information Bulletin and SETUP program.

**Self-Test**

Every time the PG 740 is switched on or reset, the hard disk drive performs 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 vibrations and shock. Any vibrations occurring during operation can lead to the loss of data or damage to the drive.

If you intend transporting the unit, switch it off, and wait until the drive has come to rest (about 20 seconds) before you move it.

---

## 2.7 Transport

### Preparatory Measures

The PG 740 is easy to transport. Before transporting it, however, you should take the following measures:

1. Switch the PG 740 off.
2. Unplug all connecting cables.
3. Close the covers protecting the ports and connections on the right-hand and left-hand casing side panels.
4. Bring the unit into an upright position.
5. Swing the keyboard up and press it against the front plate of the unit. Make sure that the latches on the left and right sides snap in.
6. Use the carrying handle if you only intend transporting the unit over a short distance.
7. If you are transporting the PG 740 over large distances, pack the unit with all its accessories in the carrying bag supplied.

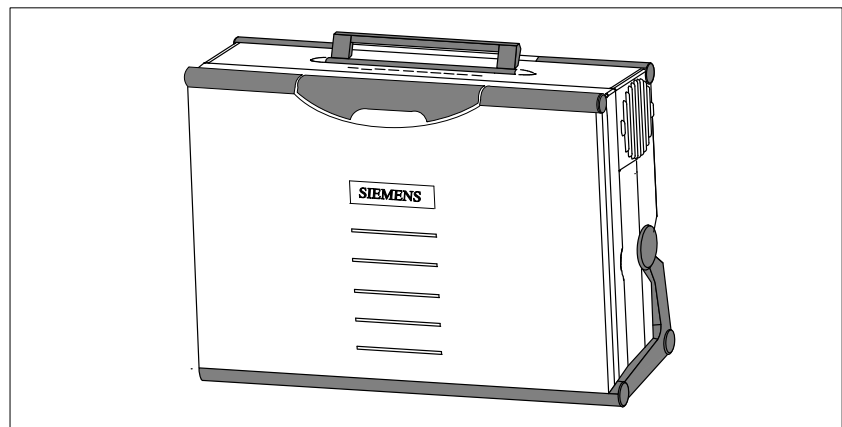


Figure 2-17 Prepared for Transport

### Transport

Despite the fact that the PG 740 is of rugged design, its internal components are sensitive to severe vibrations or impact. You must therefore protect your PG 740 against severe mechanical stressing when transporting it.

Use the **original packing material** if you have to ship the PG 740 from one location to another.



---

**Caution**

Risk of mechanical damage!

Moisture or condensation in the unit can result in defects.

When transporting your PG 740 in cold weather when it may be exposed to extreme variations in temperature, make sure that no moisture or condensation can form on or in the unit.

The unit should be allowed to reach room temperature slowly before it is started up. If condensation has formed, the unit should be left for about 12 hours (with a temperature difference of  $-20^{\circ}\text{C}$  to  $+20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$  to  $+68^{\circ}\text{F}$ )) before being switched on.

---

## Starting Up the PG 740

### What does this Chapter Contain?

This chapter describes what you have to do to set up your PG 740 successfully for operation. This includes

- the basic steps for starting up your PG 740
- working with memory submodules and cards for the programmable controllers
- connecting your PG 740 to other devices.

### Summary of sections

In Section	You Will Find	On Page
3.1	Connecting the PG 740 to the Power Supply	3-2
3.2	Connecting I/O Devices	3-3
3.3	Working with SIMATIC S5 Memory Submodules	3-9
3.4	Working with SIMATIC Memory Cards	3-10
3.5	Working with PCMCIA Cards	3-11
3.6	PG 740 Connections (Point-To-Point Connections)	3-12
3.7	Multipoint Interface (MPI/DP)	3-16
3.8	SINEC L2	3-18
3.9	SINEC H1	3-19

### 3.1 Connecting the PG 740 to the Power Supply

#### Connecting to the Power Supply

You can operate the PG 740 on 115 V and 230 V power systems. The voltage is selected automatically.

1. Plug the power supply cable supplied with the unit into the connector labeled "Power".
2. Connect the unit to a socket outlet with grounded protective conductor.

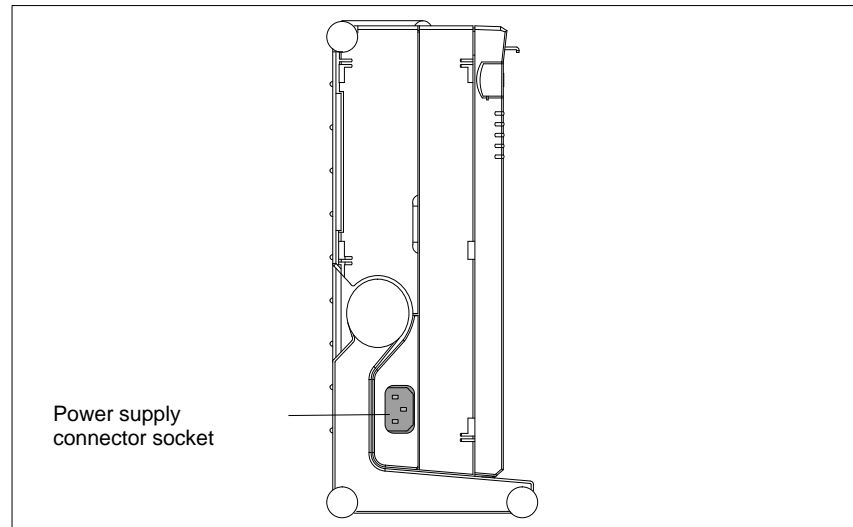


Figure 3-1 Connecting the Power Supply

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#### Note

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

---

#### Note

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

The unit is intended for operation with normal grounded power supply networks (referred to as TN systems according to IEC 364-3).

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

---

## 3.2 Connecting I/O Devices

### Recommended Printers

Siemens printers with parallel interface and IBM character set are recommended for use with the PG 740 programming device.

### Printer Connection Via the Parallel Port

To connect your printer, proceed as follows:

1. Switch off the PG 740.
2. Open the cover over the interface ports on the left-hand casing side 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.

3

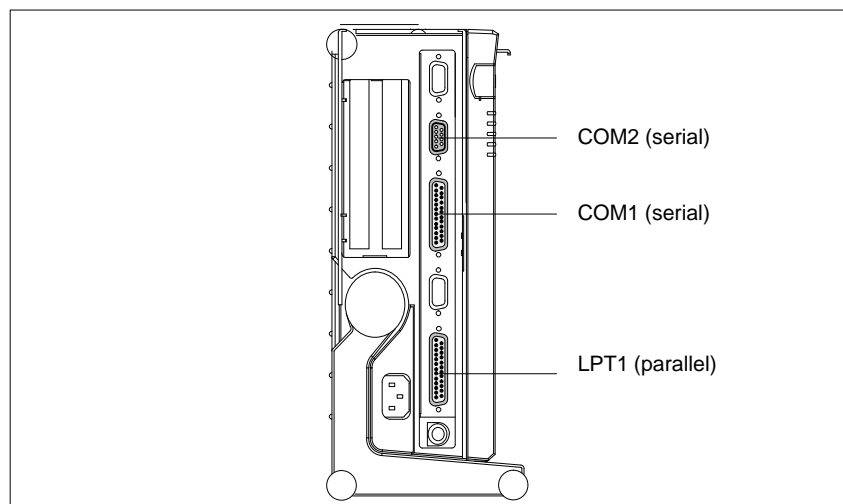


Figure 3-2 The Printer Ports



### Caution

Risk of damage to the unit!

Switch the unit off before connecting the parallel printer to the LPT1 port. (The printer should also be switched off.)

Make sure you use the right interface port. If you use the wrong port, the printer or PG 740 may be damaged.

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

Before plugging in the cables, you must discharge the electrostatic charge in your body and the connecting cables by briefly touching a grounded object (ESD guideline). Only use original connecting cables.



**Printer Connection  
Via a Serial Port**

You can also connect your printer to the PG 740 through a serial COM port. You will find information on how to adapt and set your interface and on the connecting cable you require in your printer manual.

**Rerouting Printer  
Outputs**

The standard interface for printer output is LPT1. You can reroute printer outputs to another interface port (COM2). The following table lists examples of how to change over the interface with the

Mode

command of the MS-DOS operating system:

Interface	Command	Effect
Reroute LPT1 parallel interface to COM2/V24/V28 serial interface	C:MODE LPT1:=COM2	Printer is assigned to communication port 2
Configure COM2 for printer	C:MODE COM2:96,n,8,1,p Mode:9600 bps, no parity, 8 databits, 1 stopbit	COM2 is initialized for printer
Switch LPT1 interface back to parallel interface	C:MODE LPT1:	The LPT1 is switched back to the parallel interface

---

**Note**

To prevent your having to type in the command sequence every time you restart or reset the hardware, you are advised to store the command sequence in your AUTOEXEC.BAT file or another BATCH file.

---

**Recommended Monitors**

You connect external multisynchronous monitors to the right-hand casing side panel with the standard VGA connector. We recommend you use Siemens monitors.

**Connecting Monitors**

You must switch the PG 740 off before connecting the monitor cable. You will find more details in the connector pinout in Chapter 7.

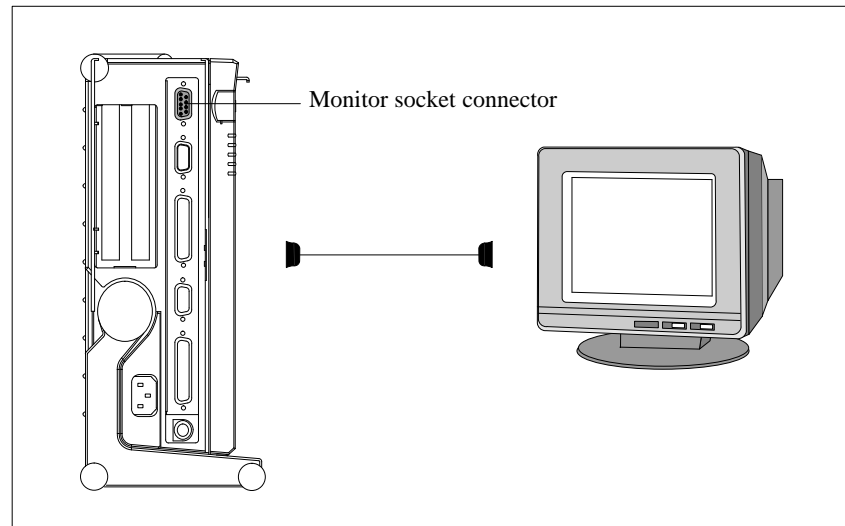
**3**

Figure 3-3 Connecting the Monitor

Connect the monitor as follows:

1. Switch off the PG 740 and the monitor.
2. Open the port cover on the left-hand casing side panel.
3. Plug the monitor cable into the VGA socket connector.
4. Plug the other end of the monitor cable into the monitor.
5. Adjust the monitor settings with the SETUP program.

**Additional Graphics Card**

You can plug an additional graphics card into one of the two ISA slots for special applications.

**Connecting Monitors to Additional Graphics Cards**

Proceed as follows:

1. Switch off the PG 740 and the monitor.
2. Open the cover for the expansion module connectors on the left-hand casing side panel.
3. Plug the monitor cable into the VGA socket of the graphics card.
4. Connect the monitor cable to the monitor.
5. Adjust the monitor settings with the SETUP program.

### Switching Additional Graphics Cards On and Off

When the PG 740 is powered up, the system automatically recognizes the additional graphics card. The display and the built-in VGA graphics interface module are switched off. To switch the display and the built-in VGA graphics interface module back on, proceed as follows:

1. Switch on the PG 740.
2. While the PG 740 is being powered up, keep the INSERT key depressed until you hear two signal tones.

The additional graphics card is reactivated the next time you switch the PG 740 on without pressing the INSERT key.

### Using a Mouse

You can connect both a PS/2 and a serial mouse to the PG 740. The PG 740 is delivered with the mouse driver for the trackball and PS/2 mouse 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.

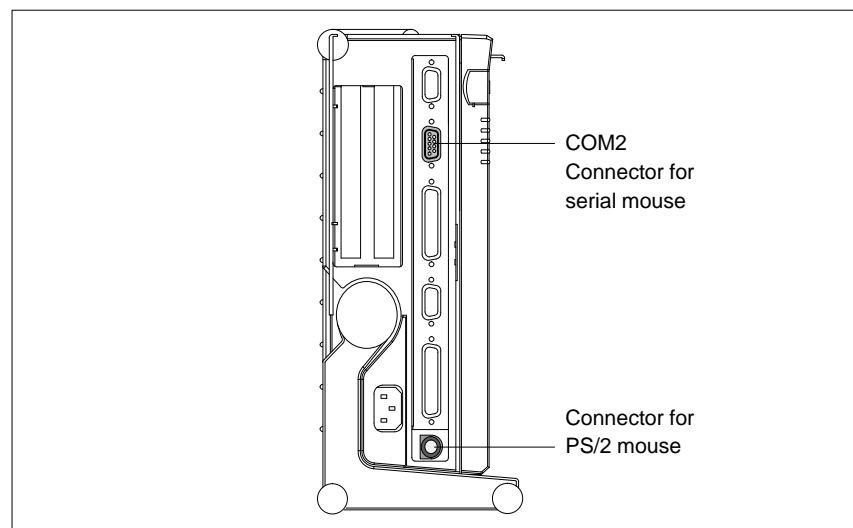


Figure 3-4 Connecting a PS/2 Mouse

Connect the mouse as follows:

1. Switch off your PG 740.
2. Open the port cover on the left-hand casing side panel.
3. Plug the cable of the PS/2 mouse or another external pointing device into the mouse connector.
4. Switch your PG 740 on again.

### Switching over between Internal Trackball and PS/2 Mouse

Once you have plugged in the external mouse and restarted your PG 740, the internal trackball is inactive, and remains inactive until the PG 740 is powered up again without the external mouse.

Table 3-1 Trackball/External Mouse Mode

Situation	Internal Trackball	External PS/2 Mouse
No mouse	Active	
External mouse	Passive	Active

### Connecting a Serial Mouse

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

Proceed as follows:

1. Switch off your PG 740.
2. Open the cover of the interface ports on the left-hand casing side panel.
3. Plug the serial mouse into the mouse connector labeled COM2.
4. Switch your PG 740 on again.

### Choosing Another Keyboard

You can connect another PS/2 keyboard to the PG 740 instead of the one supplied with it.

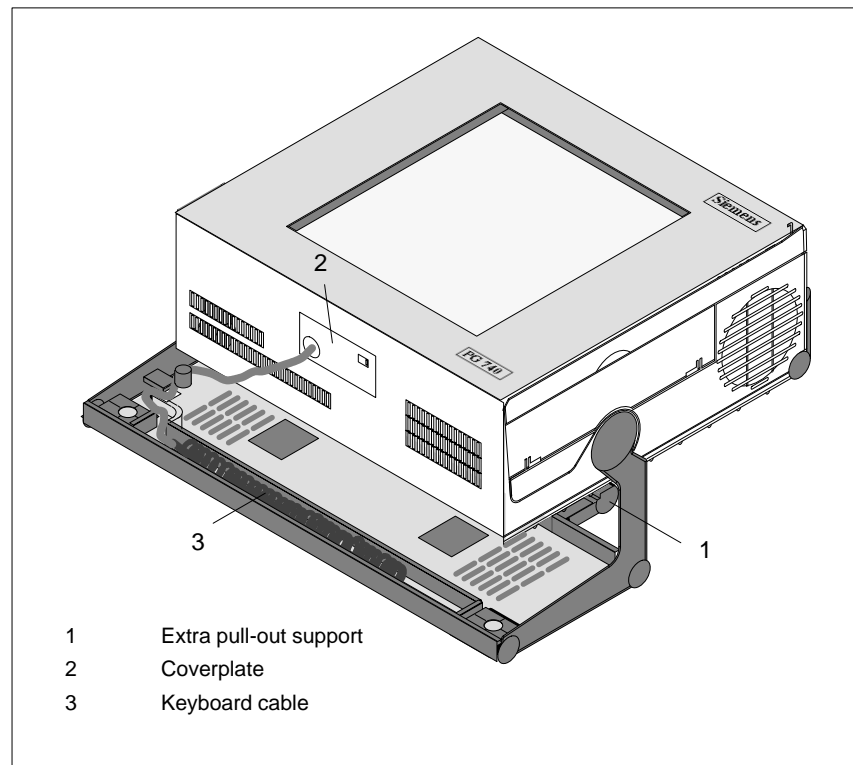


Figure 3-5 Connecting a PS/2 Keyboard

### Connecting a PS/2 Keyboard

You connect the keyboard as follows:

1. Switch off your PG 740.
2. Pull out the extra support.
3. Turn the casing through 90°.
4. Open the cover on the underside of the unit, using a screwdriver.
5. Unplug the keyboard connector and cable.
6. Plug in the PS/2 keyboard connector and cable.
7. Close the cover.

---

#### Note

It is advisable to use a keyboard cable with angled connector. If the connector is straight, you will not be able to close the cover and this will restrict the swivel range of the unit.

---

### 3.3 Working with SIMATIC S5 Memory Submodules

#### Working with SIMATIC S5 EPROMs and EEPROMs

You can read and program SIMATIC S5 EPROMs and EEPROMs via the 48-pin S5 EPROM and EEPROM programming port. You will find details on how to use the programming software in the STEP 5 Manual.

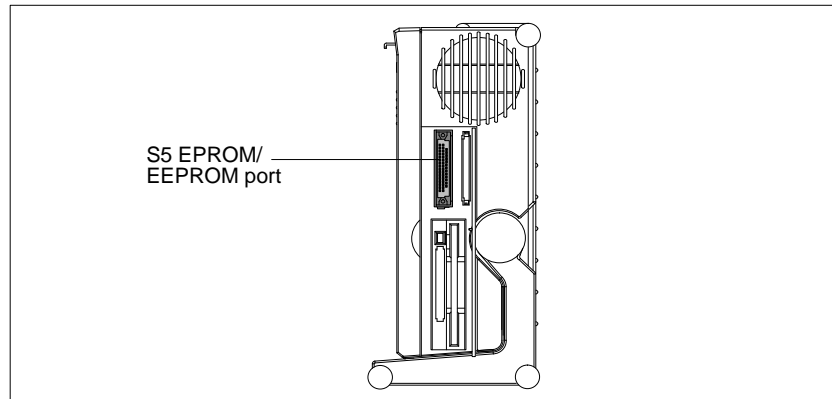


Figure 3-6 S5 EPROM and EEPROM port

Proceed as follows when working with the S5 EPROM and EEPROM programming ports:

1. Switch on your PG 740. Start the function "EPROM management" in your STEP 5 software of version V 6.x or later.
2. Start the "EPROM" function in your STEP 5 software (from Version V 6.x).
3. Plug the S5 EPROM or EEPROM into the 28-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 EEPROM
6. Terminate the EPROM programming package of your STEP 5 software.



#### Caution

Risk of damage to EPROMs or EEPROMs!

If you plug the EPROM or EEPROM in or take it out while its processing software is running, there is a danger that it will be damaged.

You must not take out the S5 EPROM or EEPROM while the LED showing that the EPROM or EEPROM is being read etc. is lit. You cannot work simultaneously with S5 EPROMs or EEPROMs and memory cards.

Before plugging in or taking out S5 EPROMs or EEPROMs, you must discharge the electrostatic charge of your body by briefly touching a grounded object (ESD guideline).

#### Note

In order to be able to program the SIMATIC S5 EPROM or EEPROM, "Programming Interface" must be set to "Enabled" in the SETUP program in submenu "PG 740 Hardware Option".

### 3.4 Working with SIMATIC Memory Cards

#### Working with Memory Cards

You can read, program or erase SIMATIC memory cards via the 68-pin programming port.

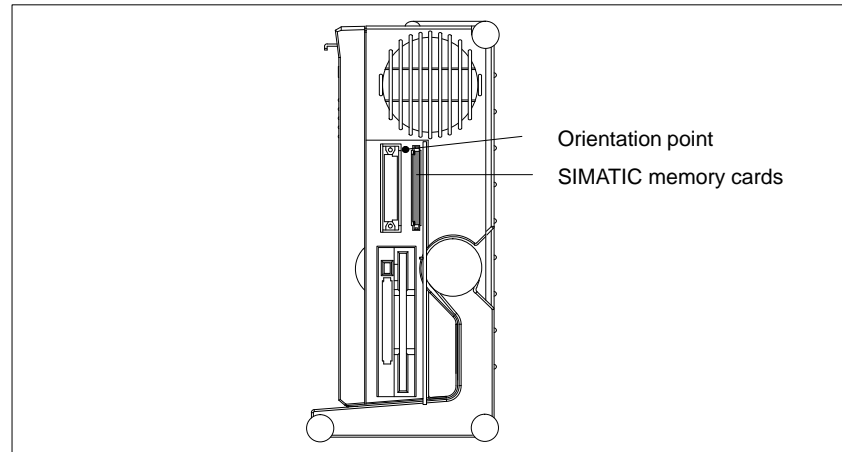


Figure 3-7 SIMATIC Memory Cards

Proceed as follows when working with the SIMATIC memory cards:

1. Switch on your PG 740, start your SIMATIC programming function.
2. Plug a SIMATIC memory card into the 68-pin connector.
3. Read, program or erase the memory card with the programming function of your SIMATIC programming software.
4. Terminate the programming function of your SIMATIC programming software.
5. Take the SIMATIC memory card out of the programming port for further use in a programmable controller.



---

#### Caution

Risk of damage to memory cards!

If you try to plug the memory card in the wrong way around, your PG 740 or memory card may be damaged!

You must not take out the memory card while the LED showing that the card is being read etc. is lit. You cannot work simultaneously with S5 EPROMs or EEPROMs and memory cards.

Before plugging in or taking out memory cards, you must discharge the electrostatic charge of your body by briefly touching a grounded object (ESD guideline).

---

#### Note

In order to be able to program the SIMATIC S5 EPROM or EEPROM, "Programming Interface" must be set to "Enabled" in the SETUP program in submenu "PG 740 Hardware Option".

---

### 3.5 Working with PCMCIA Cards

#### PCMCIA Cards

The PG 740 has a PCMCIA interface port of type II. You can plug communications cards for MODEM, FAX-MODEM, ISDN, token ring, ETHERNET, memory expansion and SCSI interface cards in credit-card format into this port.

3

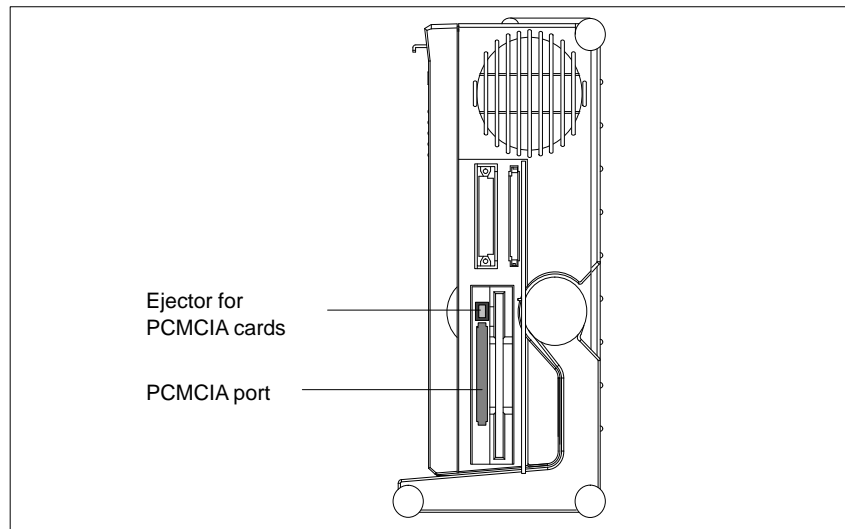


Figure 3-8 PCMCIA Port



#### Caution

Risk of damage!

You must insert the PCMCIA card with the front side pointing to the rear of your PG 740. This side generally bears a company or product designation and the wording “This side up” or a similar labeling.

If you try to insert the PCMCIA card the wrong way around, your PG 740 and the PCMCIA card may be damaged.

Before plugging in or taking out memory cards, you must discharge the electrostatic charge of your body by briefly touching a grounded object (ESD guideline).

#### Note

In order to use the PCMCIA card, “PCMCIA Slot” must be set to “Enabled” in the SETUP program in submenu “PG 740 Hardware Option”.



## 3.6 PG 740 Connections (Point-To-Point Connections)

### Point-to-Point Connection

In this section, you will learn how to connect your PG 740 to a programming device or programmable controller over a point-to-point connection.

You establish a point-to-point connection by connecting the PG 740 to another programming device or a programmable controller via

- a V.24 connection
- a TTY connection

### Suggestions for Configuring TTY (20 mA) Interfaces

Reliable data transfer depends on several factors. The data transfer rate you can achieve depends on the distance, the type of cable, the type of interface and any interference present.

### Rules

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

- Use a shielded cable with a low line resistance ( $< 130 \Omega / \text{km}$ ) and low capacitance ( $< 90 \text{ pF/m}$ ). Twisted-pair cables enhance immunity to noise due to inductance. A low surge impedance results in reduced voltage excursions and shorter charge reversal times. The surge impedance 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 be run together. Signal lines must be installed as far away as possible from strong interference sources (400 V three-phase power cables, for example).
- The active TTY interface with 12 V no-load voltage has been tested on a 1000 m (3300 ft.) long cable at a transmission rate of 9600 bps in a normal noisy environment. If a shielded LiYCY 5x1x0.14 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 contaminating field of the interference source decreases exponentially with the distance.

---

## Connecting the PG 740 to Other Programming Devices

If you want to connect your PG 740 to another programming device, you can plug the appropriate connecting cable into the V.24 or TTY interface port. You will find the necessary information on the connecting cables listed below in Chapter 7.

Interface	Link	Connecting Cable	Adapter
V.24 interface	PG 7xx with PG 7xx	6ES5 733-5BD20	
TTY interface	PG 7xx with PG 6xx	Series connection of 6ES5 733-2xxx0 and 6ES5 731-6AG00 <sup>1)</sup>	6ES5 731-6AG00

3

### Note

<sup>1)</sup>When connecting the programming devices in series, make sure you connect the cable the right way around (see Figure 3-9).

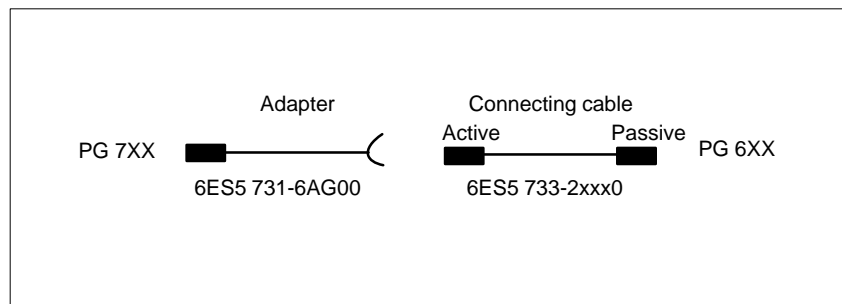


Figure 3-9 Direction of Connection: Adapter - Connecting Cable

### Note

When connecting two programming devices via the TTY interface, you must deactivate the COM1/TTY interface by changing the switch position (see Chapter 4). When the PG 740 leaves the factory, this interface is always set to active.

### Connecting the PG 740 to S5 Programmable Controllers

You can connect the PG 740 to a SIMATIC S5 programmable controller via the COM1/TTY interface port. The cable for establishing the connection to the SIMATIC S5 CPUs is included with the PG 740. (Order No. 6ES5734-2BF00)

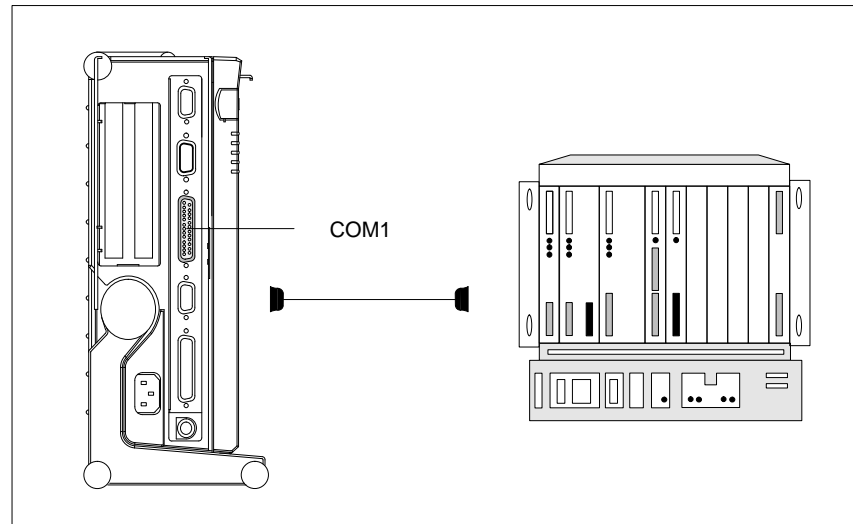


Figure 3-10 Connecting the PG 740 to an S5 Programmable Controller

You connect your PG 740 to a SIMATIC S5 programmable controller as follows:

1. Switch off the PG 740.
2. Open the cover over the interface ports on the left-hand casing side panel.
3. Plug the cable into the COM1/V.24 modem/PLC interface port.



---

#### Caution

Risk of damage to the PG 740!

The interface port may be damaged if you confuse the connections or use the wrong connecting cables. Make sure the TTY cable of the PG 740 is plugged into the COM1/TTY port and not into the LPT1 port.

Before plugging the cables in, you must discharge your body's electrostatic charge by briefly touching a grounded object (ESD guideline).

Use only original cables to establish the connection to the programmable controller.

---

### Connecting the PG 740 via an Adapter

The connecting cable 6ES5 734-2BD20 is supplied with the PG 740. An adapter is available for connecting the programmable controller using old standard cables.

Interface	Link	Connecting Cable	Adapter
TTY interface (COM1)	PG 740 to SIMATIC S5 programmable controller	6ES5 734-2BD20	
		6ES5 731-1xxx0 15-pin	6ES5 731-6AG00
		6ES5 731-0xxx0 25-pin	6ES5 731-6AG00

3

### Higher Data Transfer Rates at Distances of up to 1000 m (3300 ft.)

In order to maintain a data transfer rate of 9600 bps up to a distance of over 1000 m (3300 ft), the receiving diode is connected to ground (reference) via the connecting cable. Cables of various lengths are available under the Order No. 6ES5 734-2xxx0 (xxx stands for the length in metres).

### 3.7 Multipoint Interface (MPI/DP)

#### Connection of an S7 Programmable Controller via the MPI/DP Interface

You can connect your PG 740 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 740 (Order No.: 6ES7901-0BF00-0AA0).

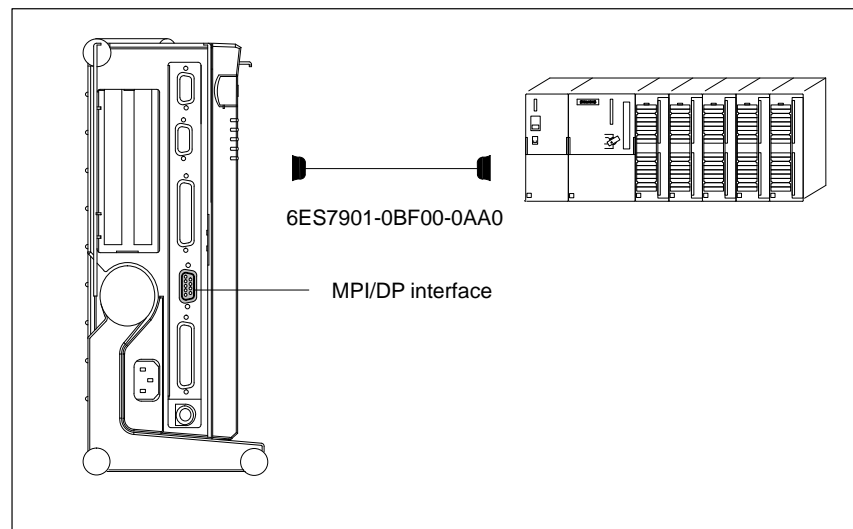


Figure 3-11 Multipoint Interface

You connect your PG 740 to a SIMATIC S7 programmable controller as follows:

1. Switch off the PG 740.
2. Open the cover over the interface ports on the left-hand casing side panel.
3. Plug the connecting cable into the MPI/DP port.



#### Caution

Risk of damage to the PG 740!

Before plugging the cables in, you must discharge your body's electrostatic charge by briefly touching a grounded object (ESD guideline).

#### Coupling

Via the MPI/DP interface, you can couple your PGs to the S7-200, S7-300 and S7-400 programmable controllers, and also to the PROFIBUS DP (limited extent).

**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 coupling of the MPI/DP interface to the PROFIBUS DP network is via a floating RS485 interface which is a component of the PG basic module.

Several PROFIBUS DP network segments can be coupled via repeaters. The complete 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.

**3**

---

**Note**

You can find information on establishment of a PROFIBUS DP network in the Manual "Setting up an S7-300", Order No.: 6ES 7030-0AA00-8BA0.

---

---

**Note**

In order to be able to use the MPI/DP interface, the corresponding address must be entered in the SETUP program in the submenu "PG 740 Hardware Options" "Configure MPI Address Range".

The MPI/DP interface does not occupy any hardware resources if it is disabled. The assigned interrupt can be set using the MPI/DP driver.

---

## 3.8 SINEC L2

### Networking PG 740s via SINEC L2 (PROFIBUS)

SINEC L2 is an open and ruggedly designed bus-type local area network (LAN) for industrial applications. It can be used to configure networks with up to 127 stations. SINEC L2 has a data transfer rate of 1.5 million bps.

### Principle of Operation

SINEC L2 operates on the master-slave principle with token passing (to DIN 19245, 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

You need the following components, for instance, for networking with SINEC L2:

- CP 5412
- RS 485 bus terminal
- RS 485 interface
- Shielded twisted two-wire cable (LAN cable)

---

### Note

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

For information on how to install the modules and make any modifications to the network configuration, please refer to the installation instructions for the various modules.

---

### 3.9 SINEC H1

#### Networking PG 740s via SINEC H1 (ETHERNET)

SINEC H1 is an industry-standard bus-type local area network (LAN) based on ETHERNET (ISO 8802/3), and has the following characteristic features: high speed (10 Mbps), simple expansion capability, open communications and widespread application.

#### Principle of Operation

SINEC H1 is the most professional product available for networks and network components operating on the CSMA/CD (ETHERNET) principle. SINEC H1 is a bus-type LAN that uses a triaxial cable (H1) as its transmission medium.

#### Hardware

You need the following module for networking with SINEC H1:

- CP 1413

---

#### Note

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

For information on how to install the modules and make any modifications to the network configuration, please refer to the installation instructions for the various modules.

---



# PG 740 Expansions

# 4

## What Does this Chapter Contain?

You can enhance the functionality of your PG 740 by installing additional modules or powerful processors. This chapter describes how to expand your PG 740. Please observe the relevant Safety Guidelines.

## Summary of Sections

In Section	You Will Find	On Page
4.1	Opening the Unit	4-2
4.2	Functional Units Visible after Opening the Unit	4-4
4.3	Installing Expansion Modules	4-10
4.4	Installing Memory Expansion Cards	4-12
4.5	Installing a Cache	4-15
4.6	Back-Up Battery	4-16
4.7	Processor Upgrade	4-17
4.8	Closing the Unit	4-17

## 4.1 Opening the Unit

### Prerequisites

The programming device is designed to enable any necessary maintenance work to be carried out quickly and at low cost.



---

### Caution

The electronic components of the printed-circuit boards are extremely sensitive to electrostatic discharge. When handling the boards, you must follow the guidelines for electrostatically sensitive components (ESD guidelines) at the end of this book.

---

### Limitation of Liability

All technical specifications and licenses apply only to expansion functions approved by Siemens.

No liability can be assumed for functional constraints caused by the use of devices and components of other manufacturers.

All modules and components in the PG 740 are electrostatically sensitive. Please read the ESD guidelines at the end of this book carefully. The following sign on cabinets, module racks or packaging warns that electrostatically sensitive modules are present.



### Before Opening the Unit

The following rules are mandatory when carrying out any work on the open unit, and should be read 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 metallic parts, such as screws, on the rear panel of the PG 740.
- 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 740 from its power supply 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.
- Do not operate the PG 740 with the cover open.

**Tools**

Use a suitable TORX or Phillips screwdriver to loosen the M3 combi TORX screws.

**Opening the PG 740**

Open your PG 740 as follows:

1. Switch off the PG 740, pull out the power plug and remove all connecting cables.
2. Swing the keyboard down into position.
3. Now undo the two screws on the rear panel. Bring the unit into the 90° (horizontal) position. Use the extra pull-out support in the stand to improve the stability of the unit.
4. Push in the snap catches at the bottom with a small screwdriver.
5. Pull off the rear panel to the rear using the carrying handle.
6. Swing the unit back into the vertical position.

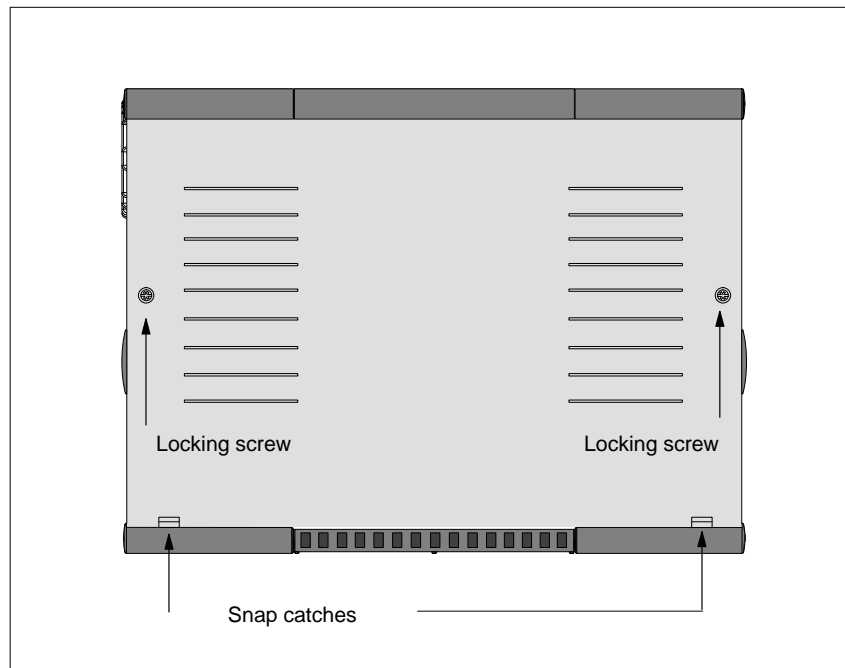
**4**

Figure 4-1 Rear View of the PG 740

## 4.2 Functional Units Visible after Opening the Unit

### Functional Units

The functional units are visible once you have removed the top section of the unit.

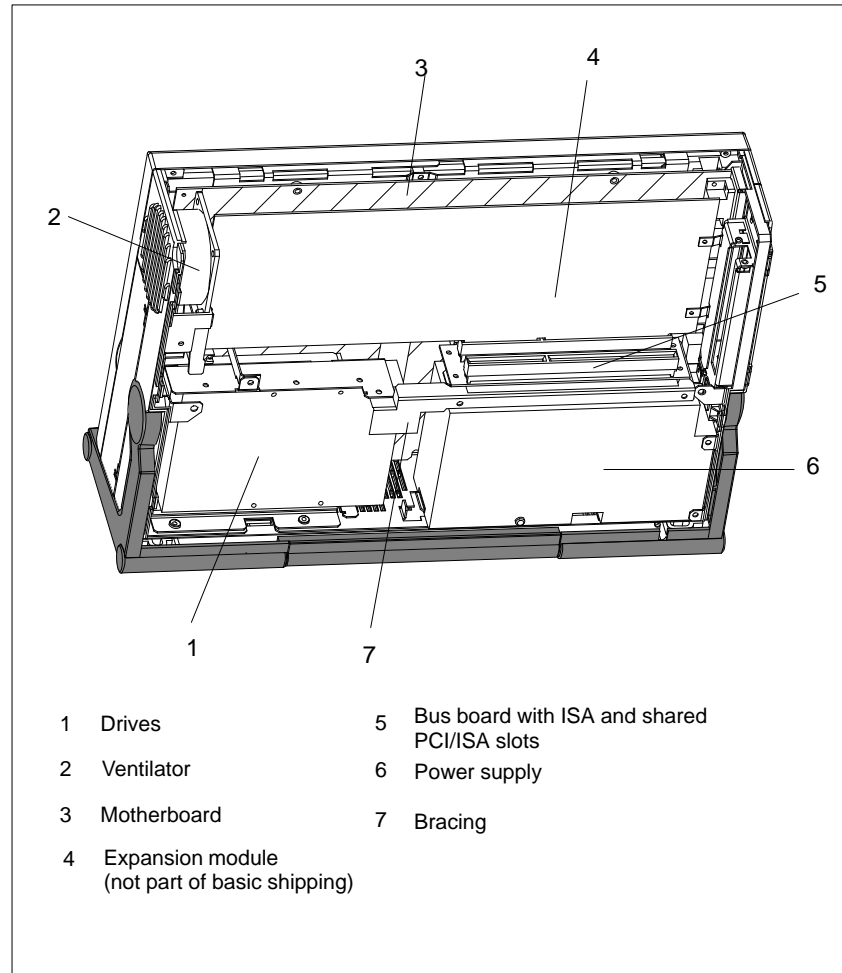


Figure 4-2 The PG 740 Opened

**Mother board**

The motherboard is the heart of the PG 740. Here, data are processed and stored, and interfaces and device I/Os controlled and managed.

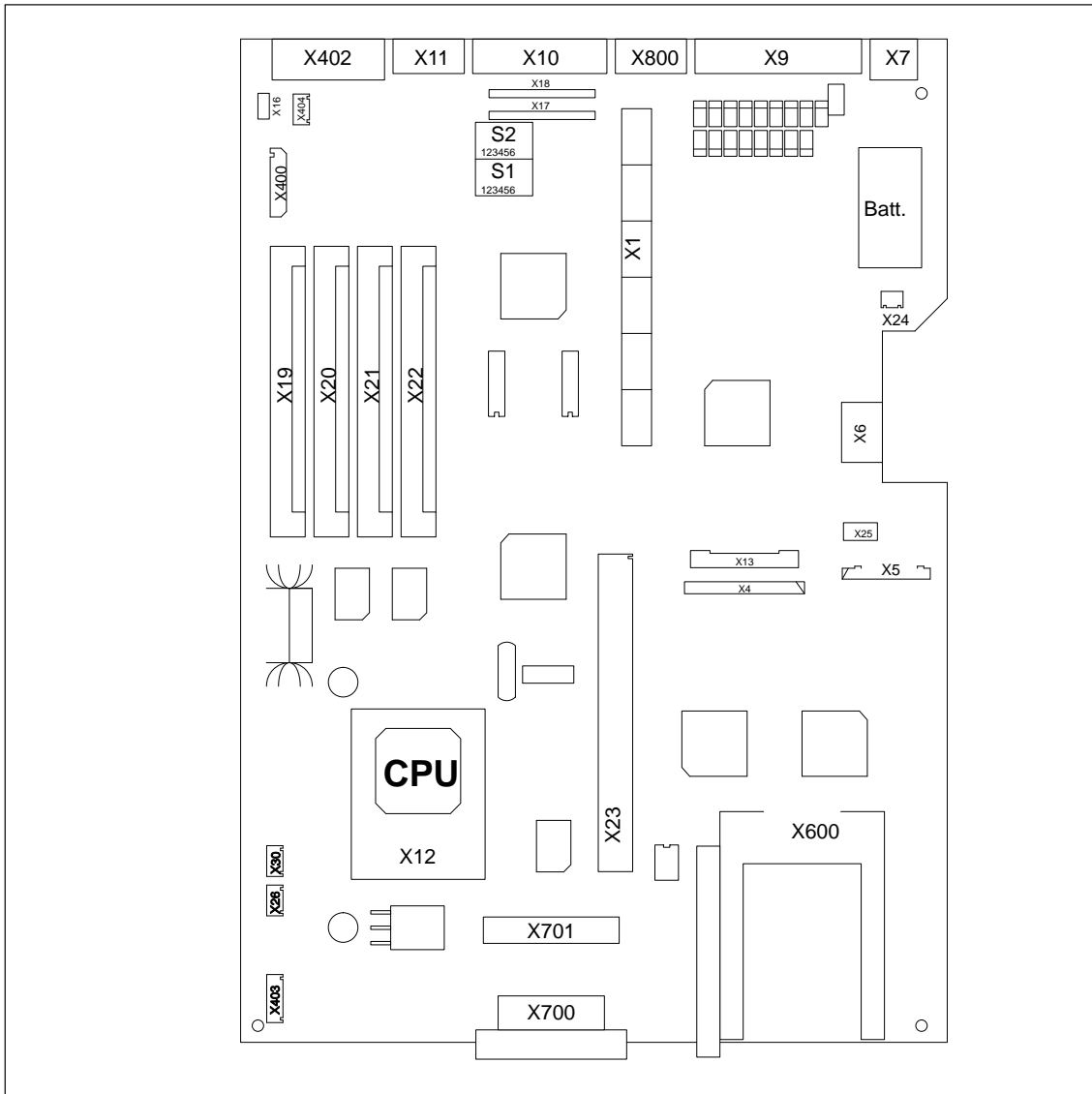


Figure 4-3 Motherboard

**Components on the Motherboard**

The following components are located on the motherboard of the PG 740:

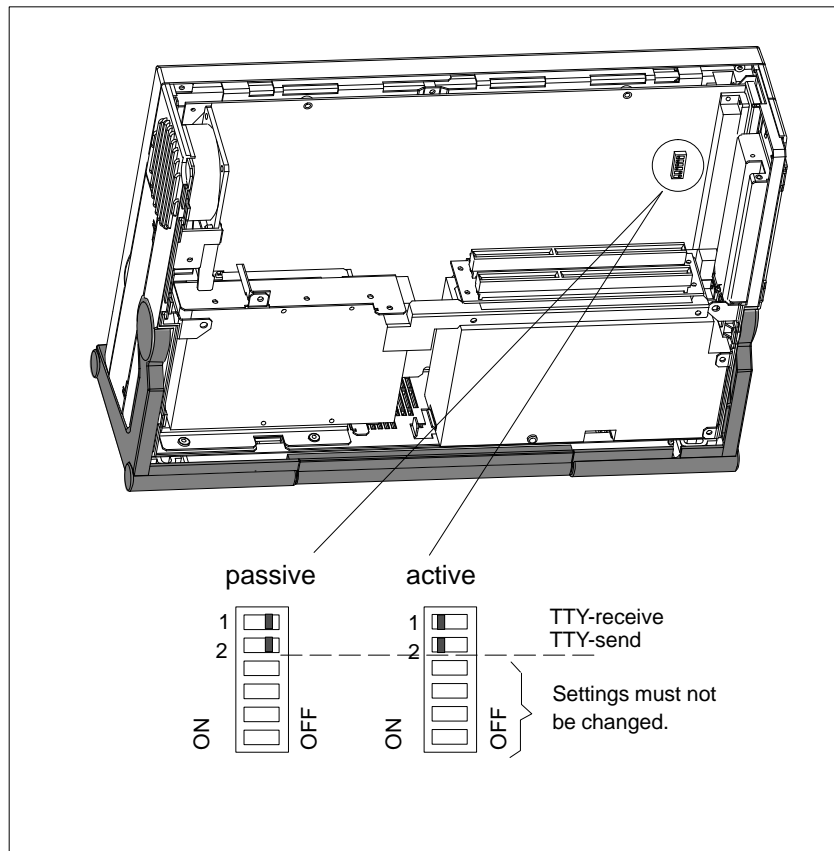
Designation	Name	Functions
X1	Slotbus	ISA/PCI connector between basic module and bus module
X4	HD prim.	Primary IDE interface, standard ribbon cable
X5	Floppy disk	Floppy disk interface
X6	Keyboard connection	DIN keyboard plug
X7	Mouse connection	PS/2 mouse plug
X9	LPT	Parallel interface for LPT1/printer connection (25-contact Centronics)
X10	COM 1	Serial port 1 (25-contact)
X11	COM 2	Serial port 2 (standard 9-contact)
X12	CPU	Processor with heat sink (Pentium socket 7)
X13	Power	Power supply connection for basic module
X16	Display module	Connection for flexible cable to display module
X17	Receptacle	Receptacle for TTY transmitter module
X18	Receptacle	Receptacle for TTY receiver module
X19	RAM bank 1.2 low	Receptacle for RAM
X20	RAM bank 1.2 high	Receptacle for RAM
X21	RAM bank 3.4 low	Receptacle for RAM
X22	RAM bank 3.4 high	Receptacle for RAM
X23	2nd level cache	Receptacle for cache submodule
X24	Battery	Plug for lithium battery
X25	Hard disk power supply	Power supply for hard disk drives
X26	Fan	Fan connection +12 V, device
X30	Fan	Fan connection +12 V, CPU
X400	PG 740 display	Connection for PG 740 display
X402	VGA	Standard VGA (15-contact)
X403	Display inverter	Plug connector for display inverter
X404	On/off switch	Plug connector for on/off switch
X600	PCMCIA PG 740	PCMCIA interface
X700	Programming submodule	SIMATIC programming submodule interface
X701	Memory card	SIMATIC memory card interface
X800	MPI/DP	MPI/DP interface
S1	Switch 1	Display type, clock
S2	Switch 2	CPU clock, flash EPROM, TTY interface

**Switching the PG 740 to Active/Passive**

When the PG 740 leaves the factory, the COM1 (TTY) serial port is switched to active (20 mA current loop). If you are connecting two programming devices via the COM1 (TTY) serial port, you must switch one of the ports to passive. The PG 740 has a switch on its motherboard for this purpose.

**Switch Position**

Change the switch position as shown in Fig. 4-4:



4

Figure 4-4 Switching the TTY Port to Active / Passive with the S1 Switch

**Switch Settings**

## S1 Manufacturer-specific settings

The following switch settings are only listed for information purposes. They are set in the factory and must not be changed.

x means that this switch is irrelevant to the described function.

S1 (3)	S1 (2)	S1 (1)	Function
on	on	on	640x480 SS-STN
on	on	off	640x480 STN monochrome
on	off	on	640x480 DS-STN
off	off	off	640x480 TFT
off	on	on	reserved
off	on	off	640x480 DS-STN specific
off	off	on	800x600 DS-STN
off	off	off	800x600 TFT (standard setting)

S1 (6)	S1 (5)	S1 (4)	Function
x	x	on	VGA Disabled
x	x	off	Onboard VGA (standard settings)
x	on	x	Clock ratio CPU-BUS/-CORE 1/2
x	off	x	Clock ratio CPU-BUS/-CORE 2/3
on	x	x	Clock ratio ISA/PCI 1/4
off	x	x	Clock ratio ISA/PCI 1/3

Jumper X34 open:

S2 (2)	S2 (1)	Function
on	on	Active TTY-interface (standard setting)
x	off	TTY-transmit loop isolated from current source (passive setting)
off	x	TTY-receive loop isolated from current source (passive setting)

S2 (4)	S2 (3)	Function
on	off	Hardware to normal function (standard setting)
x	on	Boot EPROM deactivated (boot module required)
off	x	Deactivate boot block; ROM pages are swapped at 32 KB

S2(6)	S2(5)	Function
off	on	66MHz CPU bus clock (standard setting)
on	off	66 MHz CPU bus clock
on	on	50 MHz CPU bus clock
off	off	Reserved (test mode setting)



**Standard Settings**

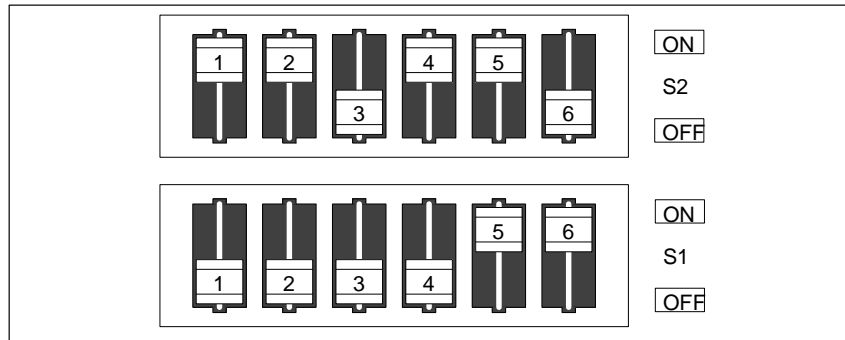


Figure 4-5 Standard Settings of Switches S1 (1..6) and S2 (1..6) for 133 MHz Pentium CPU

**Clock Settings**

S2(6)	S2(5)	S1(6)	S1(5)	ISA-Bus Clock	PCI-Bus Clock	CPU-Bus Clock	CPU-Core Clock (CPU internal)
off	on	on	on	8.25MHz	33MHz	66MHz	133MHz
on	off	on	on	7.50MHz	30MHz	60MHz	120MHz
on	on	off	on	8.33MHz	25MHz	50MHz	100MHz
off	on	on	off	8.25MHz	33MHz	66MHz	100MHz
on	off	on	off	7.50MHz	30MHz	60MHz	90MHz
on	on	off	off	8.33MHz	25MHz	50MHz	75MHz

### 4.3 Installing Expansion Modules

#### Installing Expansion Modules

You can extend the functionality of your PG 740 by installing additional modules. Two expansion slots are provided on the bus board for this purpose.

The following modules can be fitted:

Slot	Module
1	ISA $\leq$ 200 mm long
2	ISA or PCI full length

The current drawn per ISA or PCI module must not exceed the following values:

+ 5 V	2 A
+ 12 V	0.3 A
- 12 V	50 mA
- 5 V	50 mA
Signals	one TTL load

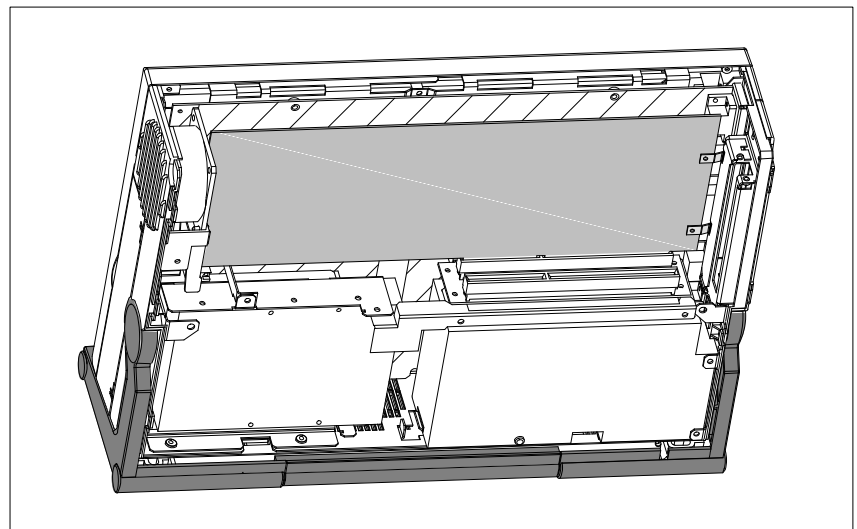


Figure 4-6 Open PG 740 with Expansion Module



---

**Caution**

Risk of damage!

The electronic components of the printed-circuit boards are extremely sensitive to electrostatic discharge. Please observe the guidelines for electrostatically sensitive devices (ESD guidelines), otherwise the module or device may be damaged.

---

**Plugging in the Module**

You plug expansion modules in as follows:

1. Open the unit as described in Section 4.1.
2. Remove the dummy plate on the casing side panel.
3. Plug the module into a free slot.
4. Bolt the module backplane to the casing side panel.
5. Close the unit (Section 4.8)

## 4.4 Installing Memory Expansion Cards

### Standard Memory

There are four slots for 36-bit SIMM memory expansion cards on the motherboard. You can expand the memory capacity of your PG 740 up to 128 MB using these memory banks. Pairs of cards must always be inserted. EDO RAMs, fast-page-mode, single-sided and double-sided SIMMs are supported.

The memory banks are fitted in pairs with the same SIMM type. X19 and X21 each for the Low double word, X20 and X22 each for the High double word. 72-pin SIMM cards without parity bit with 1Mx32, 2Mx32, 4Mx32 or 8Mx32 bits in 60 ns fast-page-mode or EDO types are used.

Memory	Slot			
	X19	X20	X21	X22
16 MB	—	—	2M x 32	2M x 32
32 MB	2M x 32	2M x 32	2M x 32	2M x 32
80 MB	8M x 32	8M x 32	2M x 32	2M x 32
128 MB	8M x 32	8M x 32	8M x 32	8M x 32

You will find the order numbers for the 36-bit SIMM memory expansion cards in the Product Information Bulletin.

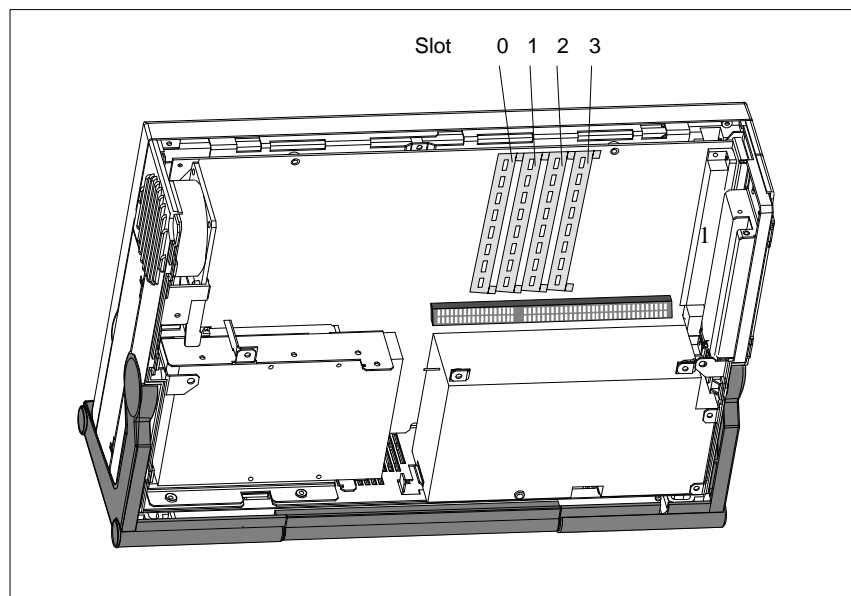


Figure 4-7 Location of the Memory Slots

**Caution**

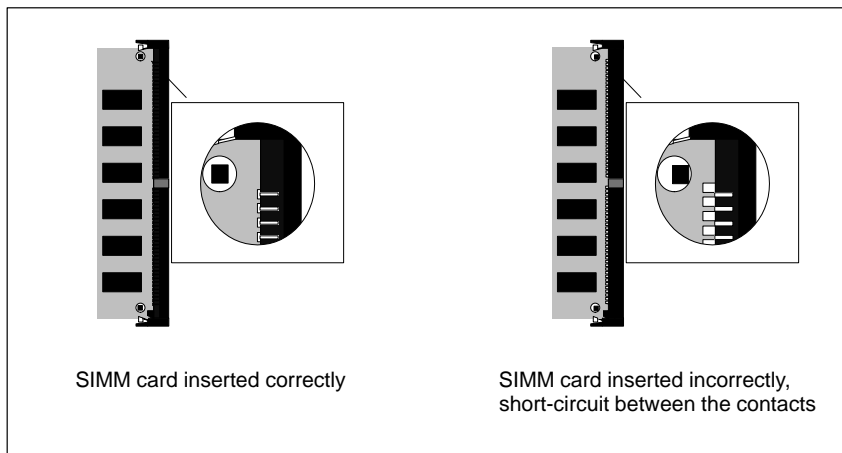
Risk of damage!

The electronic components of the printed-circuit boards are highly sensitive to electrostatic discharge. When handling the boards or cards, you must follow the guidelines for electrostatically sensitive components (ESD guidelines) at the end of this book.

## Installing the SIMM Cards

Plug the SIMM memory cards in as follows:

1. First open the unit as described in Section 4.1.
2. Before plugging the cards in, you must take out any expansion modules already installed, the bracing and the motherboard.
3. Plug the cards in vertically, making sure the cut-out on the connector end of the SIMM card engages properly.
4. Gently press the card downwards at an angle until it locks into place. Make sure that the contacts are positioned correctly (see Figure).

**Caution**

Risk of short-circuit!

Incorrect insertion of the SIMM card may result in destruction of the card and the motherboard.

Ensure that the contacts of the SIMM card and the receptacle are flush.



---

**Caution**

Expansion cards are sensitive components. It is essential that you observe the information in the manual (Section 4.4).

---

5. Close the device (see Section 4.8).
- 



---

**Caution**

Risk of damage!

The cards must sit firmly in their sockets, otherwise they might be damaged. Plug the cards into their sockets vertically before locking them in position.

---

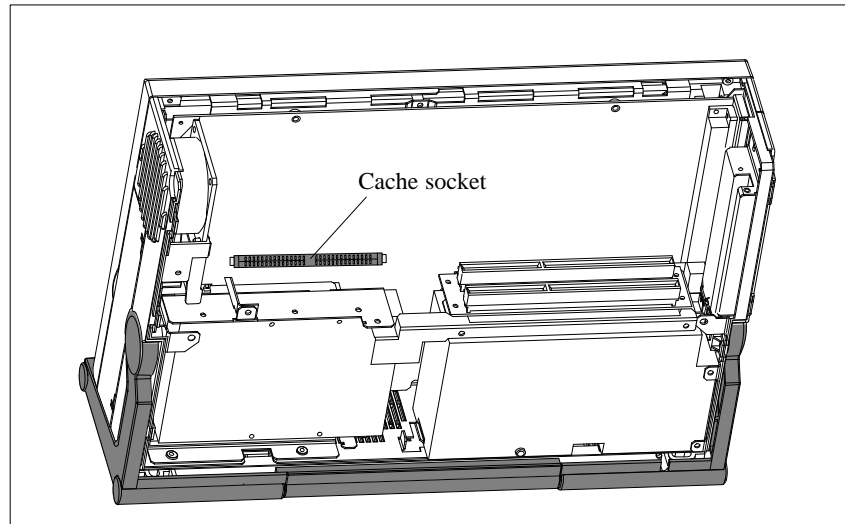
**Installation**

The system recognizes the new memory configuration automatically. When you power up the unit, the base and extended memory information appears automatically on the screen.

## 4.5 Installing a Cache

### Installing a Cache

The motherboard has a socket for an external second-level cache. You can use this cache to enhance your processor power.



4

Figure 4-8 Location of the Cache

You can obtain the order number for the second level module from the Product Bulletin.

### Plugging in the Cache

To plug in a cache, proceed as follows:

1. Open the unit as described in Section 4.1.
2. Plug the cache into its socket vertically, making sure that the cut-out on the cache card is pointing towards the ridge on the cache socket.
3. Press the cache down lightly into the cache socket.
4. Close the unit (Section 4.8)
5. The cache must be enabled (set to “active”) in the SETUP program in the submenu “Cache”.



#### Caution

Risk of damage!

The electronic components of the printed-circuit boards are highly sensitive to electrostatic discharge. When handling the boards or cards, you must follow the guidelines for electrostatically sensitive components (ESD guidelines) at the end of this book, otherwise the module or device may be damaged.

## 4.6 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 740 is switched off. In addition to the time of day, all the information about the PG 740's configuration is stored in RAM. If the back-up battery fails or is removed, all this data is lost.

Because the clock uses very little power and the lithium battery has a high capacity, the battery can provide back-up power for the real-time clock for several years.

### Battery too Low

If the battery voltage is too low, the current time and the configuration data stored in the RAM are lost.

### Changing the Battery

In this case, you must replace the back-up battery. The battery is located behind the power supply module on the motherboard.

To change the battery, proceed as follows:

1. Switch your PG 740 off, unplug the power cable and detach all connecting cables.
2. Open the unit as described in Section 4.1.
3. Undo the three screws of the bracing between the motherboard and the drive support.
4. Remove the power supply by undoing the two screws on its right-hand side and the two screws on the motherboard.
5. Unplug the power supply cable from the power supply.
6. Slide the power supply to the left as far as the stop. You can now lift the power supply out of the unit.
7. Now replace the back-up battery, which is attached to the motherboard by a short length of cable.
8. Fix the new battery to the motherboard with a cable binder.
9. Replace the power supply and close the unit as described in Section 4.8.



---

### Caution

Risk of damage!

You may only replace the lithium battery with an identical battery or a battery type recommended by the manufacturer of your PG 740 (Order No.:W79084-E1003-B1).

You should dispose of used batteries in keeping with local regulations. If returned to the manufacturer, the battery materials can be recycled.

---

### Resetting SETUP

If you change the back-up battery, you must reset your PG 740's configuration with the SETUP program (Chapter 5).



## 4.7 Processor Upgrade

You can increase the power of your PG 740 by installing other processors. Please contact your nearest service center or sales representative for more information.

## 4.8 Closing the Unit

**4**

### Closing the Unit

To close the unit, proceed as follows:

1. Bring the unit into its upright position.
2. Place the rear panel (top edge with guides) on the casing in an inclined position.
3. Swing the rear panel down over the casing until the catches on the underside of the casing engage.
4. Bolt the rear panel tight with the two screws.
5. The unit is now ready for operation again.

# 5

## Configuring the PG 740

### What Does this Chapter Contain?

In this chapter, you will learn how to configure your programming device. This will be necessary if you have made any changes to your system by adding, removing or replacing an adapter card, a memory expansion card or a system module.

### Summary of Sections

In Section	You Will Find	On Page
5.1	Changing the System Configuration with SETUP	5-2
5.1.1	The Main Menu	5-5
5.1.2	The Advanced Menu	5-15
5.1.3	The Security Menu	5-17
5.1.4	The Power Menu	5-18
5.1.5	The Exit Menu	5-20
5.2	PCI Configuration	5-22
5.3	Configuring the PCMCIA Interface	5-22

## 5.1 Changing the System Configuration with SETUP

### Changing the Configuration

Your PG 740 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 740 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 on the system configuration is stored in the battery-backed RAM of the PG 740.

You can use SETUP to set the hardware configuration (for example, type of hard disk) and define the system characteristics (for example, CPU speed). You can also use SETUP to set the time of day and date.

### Incorrect SETUP Data

If incorrect SETUP data are recognized when booting the system, the BIOS prompts you to

- start SETUP by pressing **F2** or
- continue booting by pressing **F1**.

### Starting SETUP

On completion of the startup test, the BIOS requests you to start the SETUP program with the following screen prompt:

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

Start SETUP as follows:

1. Reset your PG 740 (warm or cold restart).
2. Press the **F2** key as long as the BIOS prompt is on the screen.

### Default Setting

The **F9** key sets all the default parameters.

### SETUP Menus

The various menus and submenus are listed on the following pages. You can get all the necessary information you need for the SETUP entry selected from the “**Item Specific Help**” part of the relevant menu.

**Screen Display  
Following  
Power On**

With the standard setting of your programming device, the display shown below appears following power-on:

```
PhoenixBIOS Version 4.05
Copyright 1985-1995 Phoenix Technologies Ltd., All Rights
Reserved.
```

```
SIEMENS PG 740 Pentium

CPU = Pentium 100 MHz
0000640K System RAM Passed
0015360K Extended RAM Passed
System BIOS shadowed
Video BIOS shadowed
UMB upper limit segment address: F2xx
```

Press <F2> to enter SETUP

If you press the F2 key when the above display is shown, you select the ROM-based BIOS setup program. In this program you can set a number of system functions and hardware configurations of your programming device.

The standard settings are effective on delivery. You can change these settings using the BIOS setup. The modified settings become effective when you have saved them and terminated the BIOS setup.

The following screen form appears when you start the BIOS setup:

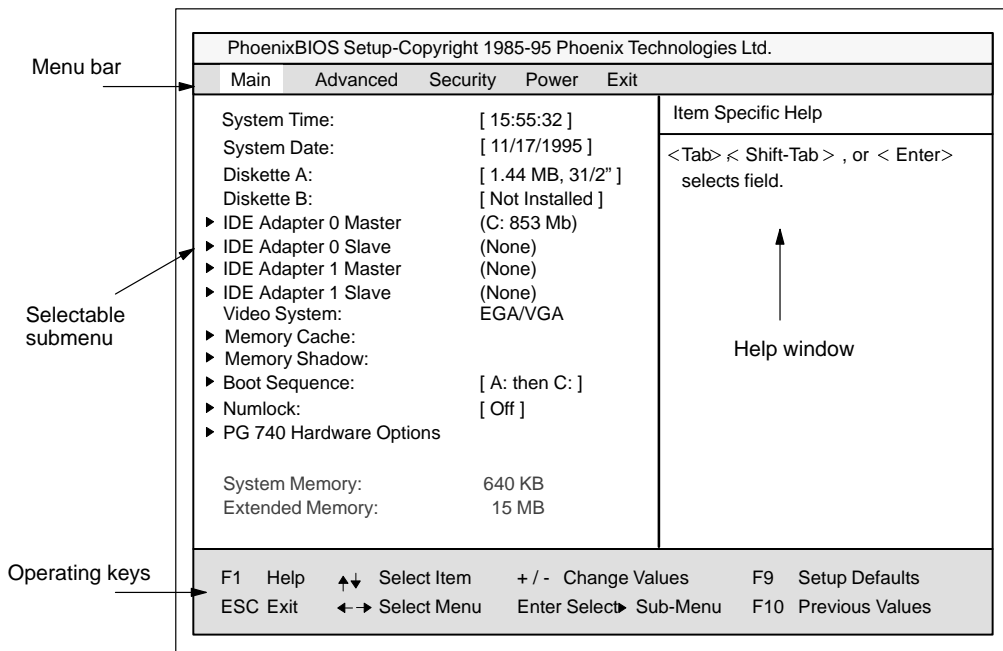


Figure 5-1 Main SETUP Menu

### Menu Structure

The screen is divided into four parts. In the top part, you can select the menu forms [Main], [Advanced], [Security], [Power], [Exit]. In the left of the center part you can select various settings or submenus. Brief help texts appear on the right for the currently selected menu entry. The bottom part contains information for operator inputs.

You can move between the menu forms using the cursor keys [←] and [→].

Menu	Meaning
Main	System functions are set here
Advanced	An extended system configuration can be set here
Security	Security functions are set here, for example a password
Power	Power saving functions can be selected here
Exit	Used for terminating and saving

### 5.1.1 The Main Menu

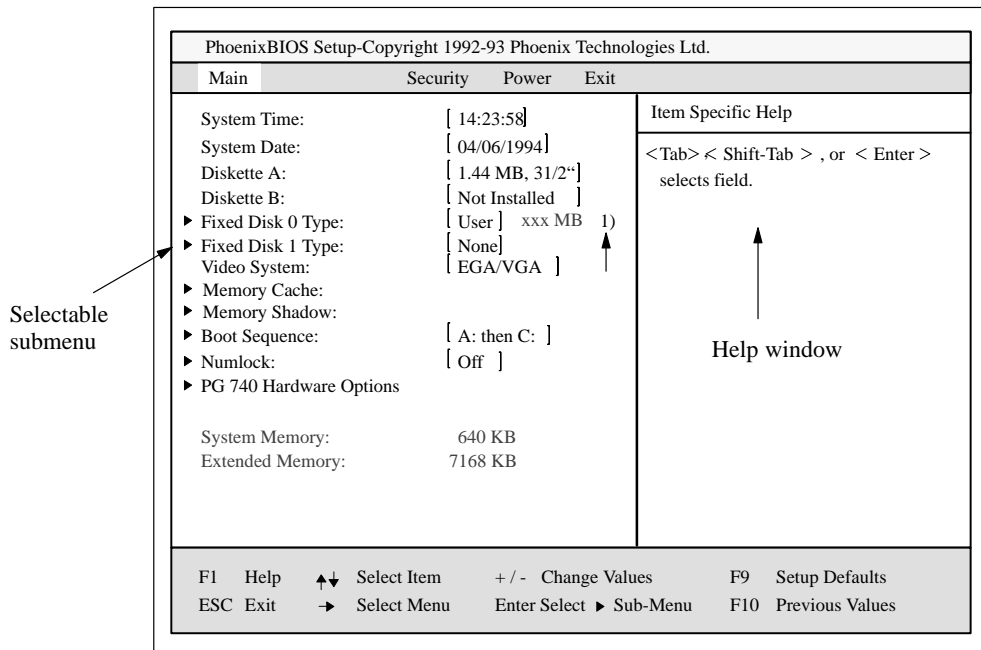


Figure 5-2 Main SETUP Menu

#### Settings in the Main Menu

In the **Main** menu you can move upwards and downwards using the cursor keys [↑] and [↓] to select the following system parameters:

Menu Item	Function
System Time	Used to display and set the current time
System Date	Used to display and set the current date
Diskette A	Name of installed diskette drive
Diskette B	Name of installed diskette drive
Video System	Display setting
<b>via submenus</b>	
IDE adapter	Type of installed hard disks
Memory Cache/Shadow	For setting of memory options
Boot Sequence/Numlock	For setting of boot options
PG 740 Hardware Options	For setting of PG 740 special functions

**System Time and System Date**

System Time and System Date indicate the current values. Once you have selected the appropriate option, you can use the [+] and [-] keys to modify the time setting

Hour : Minute : Second

and the date

Month / Day / Year .

You can move between the entries in the date and time options (for example, from hour to minute) using the tabulator key.

**Diskette A/  
Diskette B**

The names of the installed diskette drives in the programming device are set here. The following entries are possible:

[Not Installed]	If a diskette drive is not fitted (standard setting for diskette drive B)
[360 KB, 5 1/4"]	
[1.2 MB, 5 1/4"]	
[720 KB, 3 1/2"]	
[1.44 MB, 3 1/2"]	Standard setting for installed diskette drive A
[2.88 MB, 3 1/2"]	

**IDE Adapter**  
*Hard Disk Drive*

A branch is made to the following submenu when you select this type of menu option:

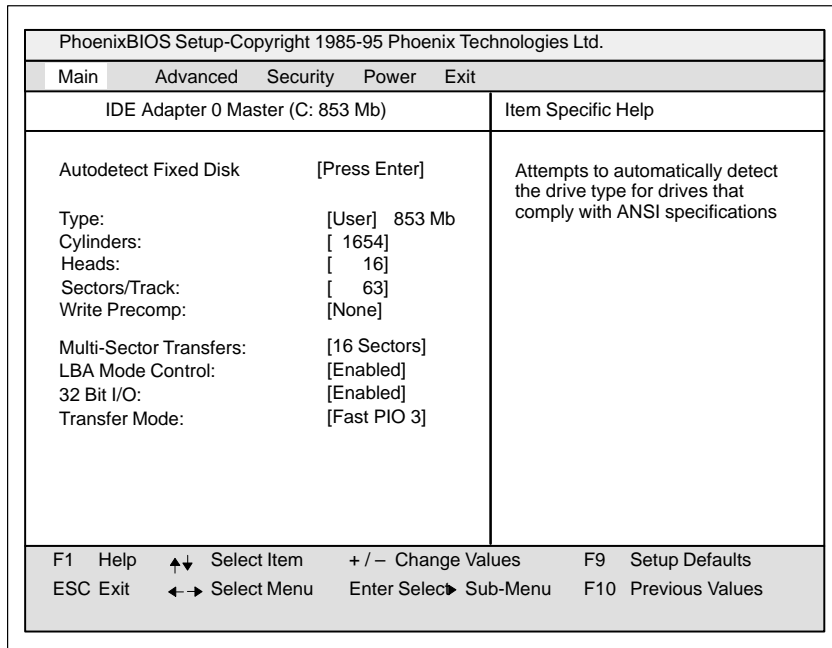


Figure 5-3 “Hard Disk Drive IDE Adapter” Submenu

The parameters which you can select here are usually saved on the respective IDE drive, and are read from the drive and entered into the form when you select the option “Autodetect Hard Disk”. **CD-ROM drives with IDE interface (ATAPI) are not entered here.**

*“Autodetect Hard Disk” Option*

If you select the option “Autodetect Hard Disk” for a hard disk which does not exist, an abort is executed after a maximum of five minutes as a result of a time-out, and the existing entries remain unchanged. It is therefore only meaningful to carry out an autodetect for hard disks present in the system.

In the standard configuration of your PG, only one hard disk is entered as the master at IDE adapter 0. [none] is entered as the type for the other drives.

Under certain circumstances it may be necessary to deviate from the proposed hard disk parameters. In this case, select the corresponding menu option and then the desired value using the [+] and [-] keys. Enter “none” in the option “Type” if an IDE hard disk or an IDE CD-ROM is not connected, or a number from 1 to 39 if a predefined type of hard disk is to be used.

Select “User” if you wish to define your own type of hard disk; you must then additionally enter the hard disk parameters in the options “Cylinders”, “Heads”, “Sectors/Track”, “Write Precomp”.



*“Multi-Sector Transfers” Option*

The number of sectors which are transmitted per interrupt are transferred in the option “Multi-Sector Transfers”. The value depends on the drive and should only be set using the autodetect function.

Disabled     1 sector  
2,4,6,8,16   Sectors

*LBA Mode Control Option*

“Enabled” in the option “LBA Mode Control” (enabled, disabled) means that hard disk capacities greater than 528 MB are supported. The value depends on the drive and should only be set using the autodetect function.

*32 Bit-IO Option*

The type of access to the drive is defined in the option “32 Bit I/O”:

Disabled     16-bit-access  
Enabled      32-bit-access

*Transfer Mode Option*

The transmission rate to the IDE drive is set in the option “Transfer Mode”. The value depends on the drive and should only be set using the autodetect function.

Standard     up to 2Mbyte/s  
Fast PIO 1   up to 4Mbyte/s  
Fast PIO 2   up to 5Mbyte/s  
Fast PIO 3   up to 10Mbyte/s  
Fast PIO 4   up to 16.6Mbyte/s

We recommend that you use the autodetect function. You should only select a manual setting with older hard disks which cannot handle the autodetect function.

Leave the submenu using the ESC key.

**“Memory Cache” Option**

The following submenu appears when you select the option “Memory cache” in the main menu:

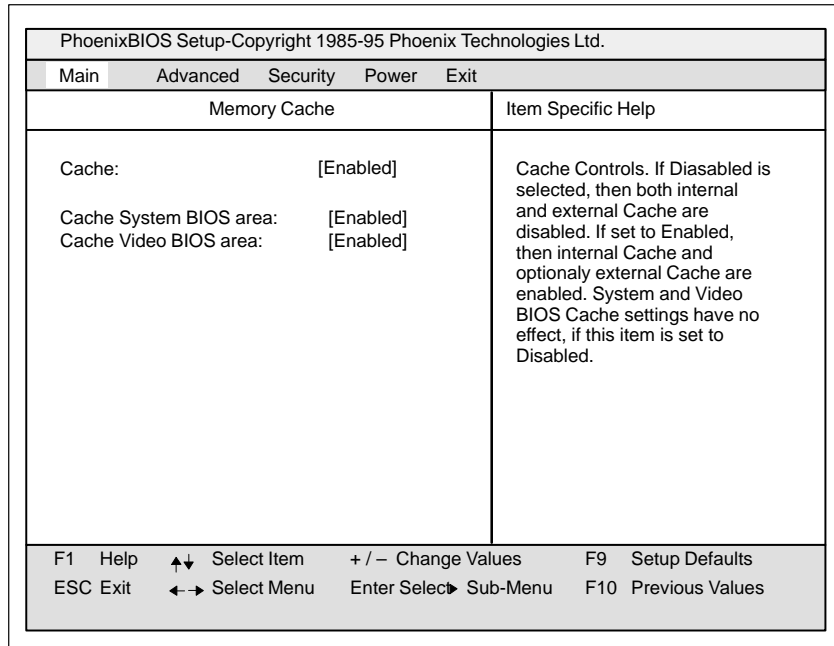


Figure 5-4 “Memory Cache” Submenu

A cache is a fast intermediate memory located between the CPU and the main memory (DRAM). Repeated memory access operations are executed in the fast cache, and not in the main memory, provided the feature is enabled. It may be necessary to disable the cache with certain hardware and software because intentional program runtimes or delay times are prevented by the fast cache.

**“Memory Shadow” Option**

The following submenu appears when you select the option “Memory shadow” in the main menu:

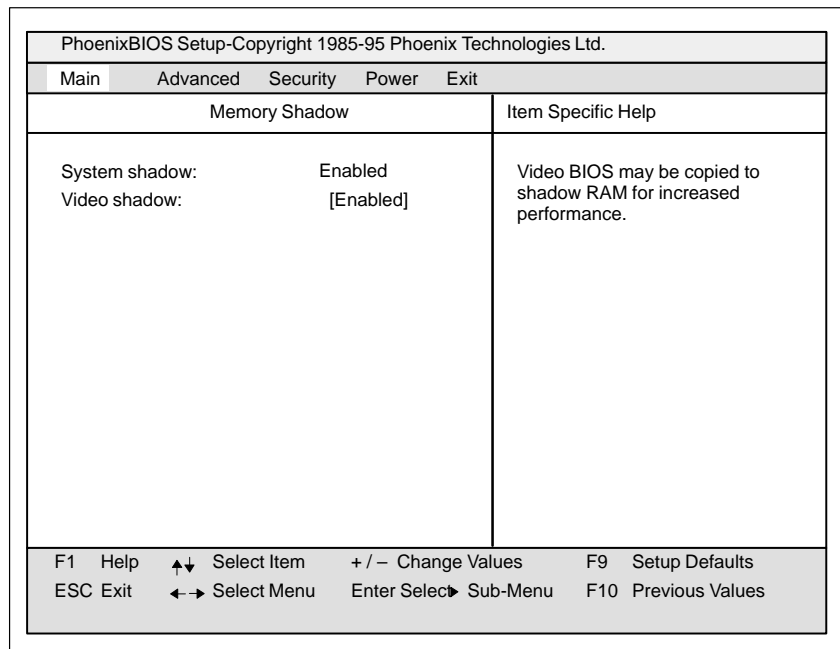


Figure 5-5 “Memory Shadow” Submenu

Parts of the EPROM, for example, those which contain the power-on selftests and the basic input/output system, are copied into the faster DRAM (shadow memory).

System Shadow always indicates “Enabled” since the system BIOS is always copied into the faster RAM.

Video Shadow enabled	The BIOS expansion for display outputs is copied into the RAM
Video Shadow disabled	The BIOS expansion for display outputs is <b>not</b> copied into the RAM

The Video Shadow setting is only effective if an external VGA interface module is used.

**“Boot Sequence” Option**

The following submenu appears when you select the option “Boot Sequence” in the main menu:

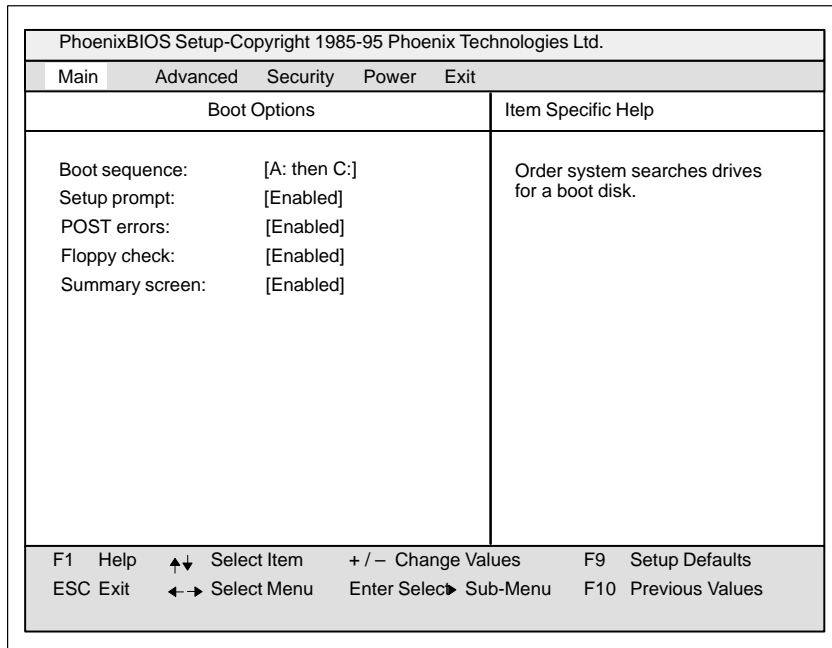


Figure 5-6 “Boot Options” Submenu

Boot sequence	Here you can define the device sequence from which a system start (boot attempt) is to be carried out first. A: then C: First from floppy A: then from drive C: C: then A: First from drive C: then from floppy A: C: only Only from drive C:
SETUP prompt	During the system loading phase, the message “Press <F2> to enter SETUP” is output at the bottom of the screen.
POST Errors	The loading procedure is aborted if an error is detected during the system loading phase.
Floppy check	During the system loading phase, the floppy head is moved by a number of steppings to the inside, and then returned again. This test is useful because the drive is initialized again in the process.
Summary screen	The most important system parameters are output on the display at the end of the system loading phase.

Example of a summary screen:

PhoenixBIOS 1985-95 Phoenix Technologies Ltd.			
CPU [100MHz]:	Pentium	System ROM:	F28C - FFFF
Coprocessor:	Installed	BIOS Date:	11/14/95
System RAM:	640 Kb	COM Ports:	03F8, 02F8
Extended RAM:	15360 Kb	LPT Ports:	0378
Shadow RAM:	384 Kb	Display Type:	EGA / VGA
Cache RAM:	None	PS/2 Mouse:	Installed
Hard Disk 0:	853 Mb	Diskette A:	1,44 MB, 3 1/2 "
Hard Disk 1:	None	Diskette B:	None
Hard Disk 2:	None		
Hard Disk 3:	None		

**“Numlock” Option**

The following Submenu appears if you select the option “Numlock” in the main menu:

PhoenixBIOS Setup-Copyright 1985-95 Phoenix Technologies Ltd.			
Main	Advanced	Security	Power Exit
Keyboard Features		Item Specific Help	
Numlock:	[Off]	Selects Power-on state for Numlock	
Key Click:	[Disabled]		
Keyboard auto-repeat rate:	[30/sec]		
Keyboard auto-repeat delay:	[1/2 sec]		
F1 Help	↑↓ Select Item	+ / - Change Values	F9 Setup Defaults
ESC Exit	←→ Select Menu	Enter Select Sub-Menu	F10 Previous Values

Figure 5-7 “Keyboard Features” Submenu

Numlock	Switches Numlock on or off following power on
Key Click	A keystroke can be heard
Keyboard auto-repeat rate	Increase in automatic key repeat rate
Keyboard auto-repeat delay	Switch-on delay in automatic key repeat

**“Hardware Options” Option**

The following submenu appears when you select the option “Hardware Options” in the main menu:

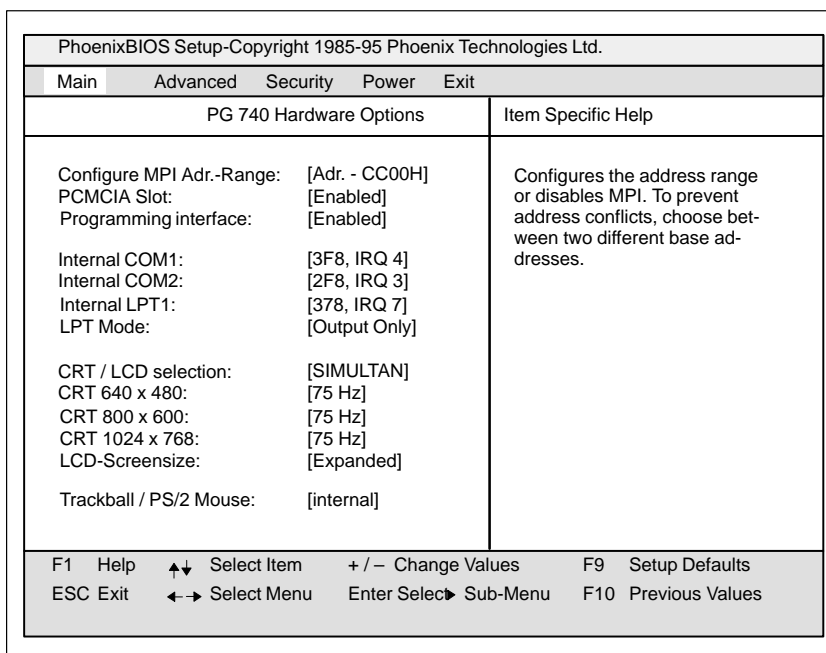


Figure 5-8 “PG 740 Hardware Options” Submenu

The parameters of the interfaces present on the basic module are set here.

Entry	Function
Configure MPI Adr.-range	Address range in which the multipoint interface is selected. “0CC00H” or “0DC00H” are memory addresses. The MPI occupies an address area of 2 KB. “Disabled” enables the address area and disables the interface.
PCMCIA Slot	Enables or disables the PCMCIA interface. PCMCIA occupies the I/O address range 3E0h - 3E1h.
Programming interface	Enables or disables the S5 module interface and the interface for S7 memory cards. This interface occupies the I/O address range 300h - 31fh.
Internal COM1	Enables or disables the COM1/TTY interface
Internal COM2	Enables or disables the COM2 interface
Internal LPT1	Enables or disables the printer port
LPT Mode	The mode can be selected here if the LPT1 interface is enabled.
	Output Only      Standard mode Bi-directional      Printer port can also be used as an input port or for EPP support

Entry	Function	
CRT/LCD selection	LCD enabled	All data are only output on the internal LCD, the 15-contact VGA interface is switched off.
	CRT enabled	For highest resolution, the display signals are only output on the 15-contact VGA interface, the LCD interface of the VGA controller is switched off.
	SIMULTAN	The two display interfaces are operated simultaneously. However, not all resolutions are possible on the LCD.
CRT 640 x 480	Image refresh rate with resolution of 640 x 480 pixels	
CRT 800 x 600	Image refresh rate with resolution of 800 x 600 pixels	
CRT 1024 x 768	Image refresh rate with resolution of 1024 x 76,8 pixels	
LCD Screen Size	Automatic adaptation of resolution of 640 x 480 pixels to the display resolution of 800 x 600 pixels	
Trackball / PS/2 Mouse	Internal	The PS/2 interface is active. The IRQ 12 is occupied.
	External	The PS/2 interface is active. The IRQ 12 is occupied. The keyboard trackball is disabled.
	Disabled	The PS/2 interface is inactive, IRQ12 is available.

### 5.1.2 The Advanced Menu

#### Menu Structure

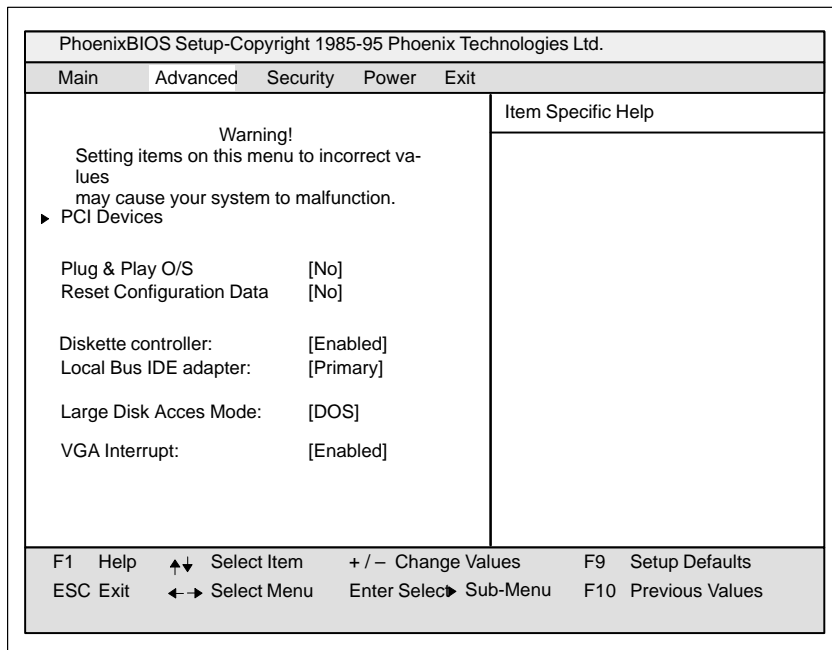


Figure 5-9 “Advanced” Menu

#### Settings in the Advanced Menu

Plug & Play O/S	Plug & Play means that fitted modules are automatically recognized and installed provided they support Plug & Play functions. [No] The BIOS handles the complete Plug & Play facilities [Yes] The operating system handles some of the Plug & Play functions
Reset Configuration Data	[Yes] All previous functions under Plug & Play are deleted, and the configuration is retriggered the next time the system is loaded. The entry is then set to [No]. System components which have no Plug & Play facilities must be entered manually. [No] The system components with Plug & Play facilities are initialized the next time the system is loaded.
Diskette controller	Enable or disabled the floppy controller of the basic module.
Local Bus IDE adapter	[Primary] One IDE interface for up to two drives. [Primary and Secondary] Two IDE interfaces for up to four drives. [Disabled] No local IDE interface



Large Disk Access Mode	[DOS]	The drive tables are designed according to DOS drive access operations compatible with enhanced IDE.
	[OTHER]	The tables are not adapted.
VGA Interrupt	[Enabled]	IRQ 9 is reserved for the VGA card.
	[Disabled]	IRQ 9 is reserved for other devices.

**“PCI Devices” Option**

The following Submenu appears when you select the option “PCI Devices” in the advanced menu:

PhoenixBIOS Setup-Copyright 1985-95 Phoenix Technologies Ltd.			
Main	Advanced	Security	Power Exit
PCI Devices		Item Specific Help	
PCI Device, Slot #1: Enable Master: [Enabled] Default Latency Timer: [Yes] Latency Timer: [0040]		Enable selected device as a PCI bus master.	
F1 Help	↑↓ Select Item	+ / - Change Values	F9 Setup Defaults
ESC Exit	← → Select Menu	Enter Select Sub-Menu	F10 Previous Values

Figure 5-10 “PCI Devices” Submenu

Here you can set the properties of the PCI expansion slots. If master modules are enabled for the PCI slot, the entry [Yes] for Default Latency Timer transfers the number of PCI clock cycles during which the PCI master may remain active on the bus from the PCI module, and the value set for Latency Timer is ignored.

### 5.1.3 The Security Menu

#### Summary

You can only edit the options enclosed in square brackets. Two passwords are assigned to protect your programming device from unauthorized use. You can use the supervisor password to prevent use of diskettes for the normal user and to limit use of the hard disk.

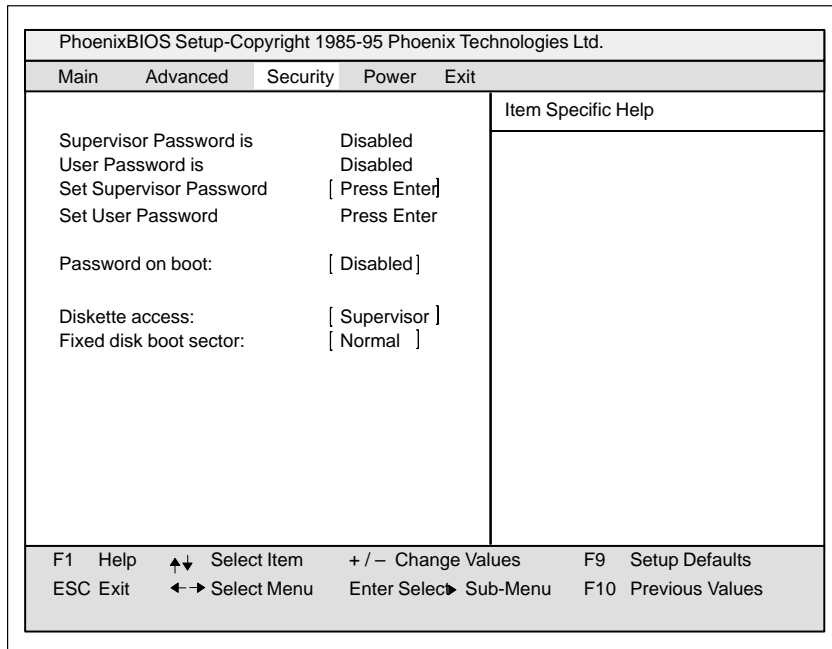


Figure 5-11 “Security” Submenu

### 5.1.4 The Power Menu

**Summary**

This menu has the following structure:

PhoenixBIOS Setup-Copyright 1985-95 Phoenix Technologies Ltd.			
Main	Advanced	Security	Power
APM: [ Enabled ]		Item Specific Help	
Power Savings: [ Disabled ]		APM (Advanced Power Management) allows APM aware software to better manage power savings.	
Standby Timeout:	Disabled		
Suspend Timeout:	Disabled		
Standby CPU Speed:	MAX		
Fixed Disk Timeout:	Disabled		
CRT Standby-Mode:	ON		
F1 Help	↑↓ Select Item	+ / - Change Values	F9 Setup Defaults
ESC Exit	←→ Select Menu	Enter Select ▶ Sub-Menu	F10 Previous Values

Figure 5-12 “Power” Submenu

In accordance with “Green PC” considerations, the following power saving modes can be set using the power menu:

APM	[Enabled]	Permits the switching off of system resources not required by the operating system.
	[Disabled]	APM (advanced power management) access not permissible for operating system.
Power Savings	[Disabled]	No power saving functions
	[Maximum][Medium][Minimum][Customize]	Preset power saving functions by maximum, medium and minimum amounts. The settings for Standby/Suspend Timeout, Standby CPU Speed, Fixed Disk Timeout and CRT Standby Mode are set accordingly.

Standby Timeout	[Disabled] [30min] [1hr][2hr][3hr][4hr]	No standby mode Minutes after your programming device goes to standby mode Hours after your programming goes to standby mode provided no mouse or keyboard operations have been carried out
Suspend Timeout	[Disabled] [30min] [1hr][2hr][3hr][4hr]	No suspend mode Minutes after your programming device goes to suspend mode Hours after your programming device goes to suspend mode provided no mouse or keyboard operations have been carried out

5

In suspend mode, the CPU is stopped and can only be restarted by an interrupt, for example keyboard, mouse, COM 1/2, hard disk.

Standby CPU Speed	[Low] [Medium] [High] [Max]	CPU speed in standby mode: 1/16 CPU clock 1/8 CPU clock 1/4 CPU clock 1/1 CPU clock
Fixed Disk Timeout	[1 min] [2 min] [3 min] [4 min] [5 min][10 min] [16 min]	Minutes after the hard disk drive is switched off, if the hard disk is not accessed. If the hard disk is accessed after it has been switched off, an access delay occurs while the hard disk is booted up again.
CRT	[OFF in Standby]  [ON]	This means that the color display and the sync signals to the VGA interface are switched off in standby mode thus also causing the monitor itself to enter standby mode.  Monitor or display always remain in operation.

## 5.1.5 The Exit Menu

### The Exit Menu

The setup program is always terminated using this menu.

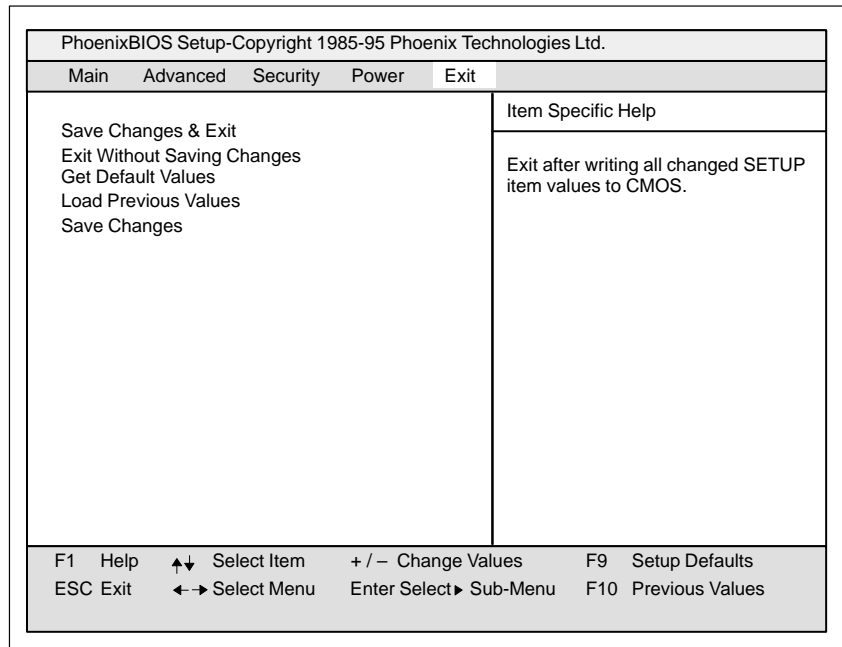


Figure 5-13 “Exit” Submenu

Save Changes & Exit	All changes are saved; a system restart is carried out with the new parameters.
Exit Without Saving Changes	All changes are rejected; a system restart is carried out with the old parameters.
Get Default Values	All parameters are set to safe values. The hard disk must be entered explicitly.
Load Previous Values	The last saved values are coded again.
Save Changes	Saving of all setup entries.

### Documenting your System Configuration

If you have made any modifications to your standard SETUP settings, you can enter them in the following table. You then have ready access to the values you have set if you have to make any hardware modifications later.

Table 5-1 Modifications in Device Configuration

System Parameter	Standard Settings	Your Entries
Diskette A	3.5", 1.44 MB	
Diskette B	Not Installed	
Hard Disk 1	Submenu: Autodetect Fixed Disk user xxx MB	
Hard Disk 2	Not Installed	
Memory Cache	Submenu: Enabled Cache: Enabled	
Memory Shadow	Submenu: Enabled System: Enabled Video: Enabled	
Boot Sequence	A: then C:	
Numlock	OFF	
PG 740 Hardware Options		
MPI Address	Addr. - CC00H	
PCMCIA Slot	Enabled	
Programming Interface	Enabled	
Internal COM 1: Internal COM 2: Internal LPT1: LPT Mode	3F8, IRQ4 2F8, IRQ3 378, IRQ7 Bi-Directional	
CRT/LCD selection: CRT 640 x 480: CRT 800 x 600: CRT 1024 x 768:	LCCD enabled 75 Hz 75 Hz 75 Hz	
Trackball/PS2 Mouse	Internal	

## 5.2 PCI Configuration

The system is configured automatically when you switch it on.

The following table lists the default settings.

Bus No.	Device No.	Function No.	Description
00h	00h	00h	Intel 82437F <sub>x</sub> (TSC)
00h	07h	00h	Intel 82371FB(PIIX) PCI/ISA jumper
00h	07h	01h	Intel 82371FB(PIIX) IDE-PCI interface
00h	0Dh	00h-07h	GD7543 Cirrus LCD-SVGA
00h	12h		PCI slot 1

## 5.3 Configuring the PCMCIA Interface

You can obtain the software you require for using PCMCIA cards under MS-DOS, such as

- Socket Services
- Card Services
- Client Drivers
- Flash File System

from your nearest Siemens sales office or representative.

Windows 95 which is already installed on delivery supports use of the PCMCIA interface.

# 6

## Error Diagnostics

### **What Does this Chapter Contain?**

Chapter 6 will support you in handling simple errors and faults that you yourself can diagnose and, in some cases, eliminate. The chapter describes all the possible errors and faults, explains their causes and makes suggestions as to how to eliminate them.



Table 6-1 Errors/Faults in PG 740 Operation

<b>Error/Fault</b>	<b>Cause</b>	<b>Remedy</b>
<b>Power-ON LED does not light up</b>	<ul style="list-style-type: none"> <li>PG 740 is switched off</li> <li>Power supply not properly connected</li> </ul>	<ul style="list-style-type: none"> <li>Switch the PG 740 on</li> <li>Check the power supply connections, power cable and power plug</li> </ul>
<b>Display remains dark after power on</b>	<ul style="list-style-type: none"> <li>Back-lighting is not active</li> <li>Additional graphics card installed</li> </ul>	<ul style="list-style-type: none"> <li>Wait 3 to 5 s until back-lighting becomes active</li> <li>Switch PG 740 on with the "INSERT" key depressed</li> </ul>
<b>External monitor remains dark</b>	<ul style="list-style-type: none"> <li>LCD enabled is entered in SETUP</li> </ul>	<ul style="list-style-type: none"> <li>Enter CRT enabled or SIMULTAN in SETUP</li> </ul>
<b>The "Invalid configuration information"... "Press F1 key to continue, F2 to run SETUP utility" message appears on the screen</b>	<ul style="list-style-type: none"> <li>Incorrect configuration data</li> </ul>	<ul style="list-style-type: none"> <li>Press "F2" key, check the configuration data in SETUP, enter any default values, and check error messages in the first SETUP menu</li> </ul>
<b>The "No boot device available" message appears on the screen</b>	<ul style="list-style-type: none"> <li>Diskette in drive A: is not a boot diskette</li> <li>Wrong hard disk type entered in SETUP</li> </ul>	<ul style="list-style-type: none"> <li>Insert boot diskette</li> <li>Use "Autodetect Fixed Disk" function</li> </ul>
<b>"Keyboard stuck; key failure" message</b>	<ul style="list-style-type: none"> <li>A key has become blocked during the system keyboard self-test</li> </ul>	<ul style="list-style-type: none"> <li>Check the keyboard</li> <li>Restart the system</li> </ul>
<b>Booting of the PG 740 aborted after several beeps</b>	<ul style="list-style-type: none"> <li>An error has occurred during the system self-test</li> </ul>	<ul style="list-style-type: none"> <li>Check the hardware</li> </ul>
<b>Every time a key is pressed, a beep is heard and no characters appear</b>	<ul style="list-style-type: none"> <li>Keyboard buffer overflow</li> </ul>	<ul style="list-style-type: none"> <li>&lt;CTRL&gt; &lt;PAUSE&gt;</li> </ul>
<b>Not-ready message when trying to read a diskette</b>	<ul style="list-style-type: none"> <li>No diskette has been inserted</li> <li>Diskette has not been formatted</li> </ul>	<ul style="list-style-type: none"> <li>Insert diskette</li> <li>Format diskette</li> </ul>
<b>Write-protect error when trying to write to a diskette</b>	<ul style="list-style-type: none"> <li>Diskette write-protect activated</li> <li>Write-protect hole open on 3.5 in. diskette</li> </ul>	<ul style="list-style-type: none"> <li>Cancel write protection</li> </ul>
<b>&lt;\&gt; key missing</b>	<ul style="list-style-type: none"> <li>Wrong keyboard driver is being used</li> </ul>	<ul style="list-style-type: none"> <li>German keyboard: &lt;ALT<sub>Gr</sub>&gt; &lt;ß&gt;</li> <li>International keyboard: &lt;\&gt; key</li> </ul>
<b>Mouse pointer cannot be moved with the trackball</b>	<ul style="list-style-type: none"> <li>Trackball will not rotate</li> <li>No/wrong mouse driver</li> </ul>	<ul style="list-style-type: none"> <li>Clean trackball and housing</li> <li>Load the right mouse driver</li> </ul>
<b>Mouse pointer moving erratically</b>	<ul style="list-style-type: none"> <li>Trackball dirty</li> </ul>	<ul style="list-style-type: none"> <li>Clean trackball and housing</li> </ul>
<b>Trackball not working</b>	<ul style="list-style-type: none"> <li>Trackball is switched off</li> <li>External mouse is plugged in</li> <li>The PS/2 interface is set to external or disabled in the SETUP</li> </ul>	<ul style="list-style-type: none"> <li>Activate trackball with key combination Fn + ^</li> <li>Check SETUP entry</li> </ul>

# Hardware Information

# 7

## What Does this Chapter Contain?

This chapter contains important reference data:

- Hardware addresses
- Interrupt assignments
- Information on connecting cables

## Summary of Sections

In Section	You Will Find	On Page
7.1	Hardware Address Table	7-2
7.2	Interrupt Assignments	7-7
7.3	PG 740 Video Modes	7-8
7.4	Connector Pinouts	7-9
7.5	Connecting Cables	7-16

## 7.1 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 will give you an overview of the address areas used. Please refer to the descriptions of the individual functional groups for more details.

Table 7-1 Assignment of the Memory-Addresses

From Address	To Address	Size	Basic Function Described	Possible Alternative Function
0000 0000	0007 FFFF	512k	Conventional system memory	
0008 0000	0009 FBFF	127k	Conventional system memory extended	Via Setup ISA memory
0009 FC00	0009 FFFF	1k	Conventional system memory extended BIOS data	Via Setup ISA memory
000A 0000	000A FFFF	64k	VGA graphics refresh memory	Shared SMM for power management
000B 0000	000B 7FFF	32k	B/W graphics/text refresh memory	Shared SMM for power management
000B 8000	000B FFFF	32k	VGA graphics/text refresh memory	Shared SMM for power management
000C 0000	000C BFFF	48k	VGA BIOS expansion	
000C C000	000C C7FF	2k	MPI if enabled	Via EMM high DOS memory
000C C800	000C FFFF	12k	ISA memory normally BIOS expansion	Via EMM high DOS memory
000D 0000	000D FFFF	64k	PCMCIA if enabled, normally BIOS expansion	Via EMM high DOS memory
000E 0000	000E BFFF	48k	System BIOS	Via EMM high DOS memory
000E C000	000E CFFF	4k	System BIOS BootMessageLogo	Via EMM high DOS memory
000E D000	000E DFFF	4k	System BIOS ECSD (plug & play configurations area)	Via EMM high DOS memory
000E E000	000E FFFF	8k	System BIOS Boot Block	Via EMM high DOS memory
000F 0000	000F FFFF	64k	System BIOS	
0010 0000	00EF FFFF	14M	Extended system memory	
00F0 0000	00FF FFFF	1M	Extended system memory	Via Setup ISA memory
0100 0000	07FF FFFF	112M	Extended system memory	
0800 0000	FFF7 FFFF	4G-128M - 512k	PCI expansion	
FFF8 0000	FFFD FFFF	512-128k	ISA memory, dual-port memory application	
FFFE 0000	FFFF FFFF	128k	System BIOS (shadow of 000E 0000 .. 000F FFFF)	

**Memory decoding function**

The Pentium CPU has a memory address area of 4 Gbytes. The CPU has a 64-bit wide data bus, 29 address lines (A3...A31) and 8 bus enable lines (BD0...BE7) which code the non-existent byte address lines A0, A1 and A2. The CPU address bus is mapped on the PCI address bus via the TSC (system controller). Excluded from this are the memory addresses from 0000 0000h to 0009 FFFFh (640 Kbytes) and from 0010 0000h to 07FF FFFFh (127 Mbytes).

The ISA bridge via the PIIX chip (PCI ISA IDE accelerator) maps the ISA address bus exactly once on the PCI address bus. The ISA address bus for 8-bit modules covers the address area from A0 to A19, corresponding to the CPU addresses 0000 0000h to 000F FFFFh (1 Mbytes). For 16-bit ISA modules, the address bus is extended by the address lines A20...A23 and therefore addresses from 0000 0000h to 00FF FFFFh (16 Mbytes). The differentiation between the 1 Mbyte and 16 Mbyte ISA address areas is achieved using special memory read/write signals which are only activated if the address lines A20, A21, A22 and A23 have a level of logical "0". If the CPU addresses areas which are occupied by the main memory, no ISA bus control signals are generated. This means that an ISA bus module is not addressed in these memory areas. On the contrary, an ISA bus master cannot reach addresses above 16 Mbytes. In order to achieve a larger address area for dual-port RAM extensions than the memory address area between 640 Kbytes and 1 Mbyte, special decoder hardware is provided on the Pentium programming device basic module:

- The CPU address area from FFF8 0000h to FFFD FFFFh (512k - 128k BOIS = 384 Kbytes) is mapped into the ISA address area 00F8 0000h to 00FD FFFFh and is always addressed in the CPU address area. Decoding of the address lines A24 to A31 missing on the ISA bus is achieved using special hardware on the basic module.

Table 7-2 I/O Address Assignments

Address		Size	Function	
from	to	Byte	Basic Function	Possible Alternative Function
0000	000F	16	PiiX DMA 1	
0020	0021	2	PiiX PIC 1 (interrupt controller)	
002E	002F	2	Configuration port Ultra I/O	
0040	0043	4	PiiX Timer1 (SW clock/refresh/speaker)	
0060	0060	1	Keyboard controller date	
0061	0061	1	PiiX NMI, speaker control	
0063	0063	1	Write-only PG configuration port	
0064	0064	1	Keyboard controller CMD/STATUS	
0070	0070	1	PiiX NMI enable, RTC index	
0071	0071	1	RTC date	
0080	008F	16	PiiX DMA page register	
00A0	00A1	2	PiiX PIC2 interrupt controller	
00B2	00B3	2	PiiX power management control, status	
00C0	00DE	31	PiiX DMA 2	
00F0	00F0	1	Reset numeric error	
0100	010F	16	Not used	
0170	0177	8	Secondary IDE channel	
01F0	01F7	8	Primary IDE channel	
0200	020F	16	Game I/O expansion card	Otherwise vacant
0278	027B	4	LPT 2 not used	
02F0	02F7	8	GBIP adapter expansion card	Otherwise vacant
02F8	02FF	8	COM 2	
0300	031F	32	Programming equipment can be switched off in SETUP	Then vacant
0320	033F	32	Not used	(XT hard disk), SCSI adapter (AHA1540B)
0340	035F	8	HighGraph (CPU) host interface expansion card	Otherwise vacant
0360	036F	16	PC-Net expansion card	Otherwise vacant
0370	037F	16		Floppy 2 not used
0376	0376	1	Second IDE command	
0377	0377	1	Second IDE status	
0378	037F	8	LPT 1	
0380	038F	16	SDLC 2 expansion card	Otherwise vacant
03A0	03AF	16	SDLC 1 expansion card	Otherwise vacant
03B0	03BB	12	B/W monitor interface/VGA	
03BC	03BF	4	LPT x not used	Not used
03C0	03CF	16	VGA control register	

Table 7-2 I/O Address Assignments, continued

Address		Size	Function	
from	to	Byte	Basic Function	Possible Alternative Function
03D0	03DF	16	CGA/VGA control register	
03E0	03E1	2	PCMCIA-controller can be switched off in SETUP	Then vacant
03E8	03EF	2	COM 3 not used	
03F0	03F5	6	Floppy 1 on board	
03F6	03F6	1	Primary IDE-command	
03F7	03F7	1	Primary IDE-status / Floppy Chg.	
03F8	03FF	8	COM 1 / TTY	
04D0	04D1	2	PiiX PIC 1,2 Interrupt controller edge/level control	
0778	077A	3	ECP LPT1	
0CF8	0CFB	4	PCI config index (TSC)	0CF9h PiiX CPU System Reset
0CFC	0CFF	4	PCI config data (TSC)	
FCF0	FCF2	2	Bus master interface primary IDE register Command & Status	
FCF4	FCF7	4	Bus master interface primary IDE Register Memory descriptor table base address	
FCF8	FCFA	2	Bus Master Interface prim.IDE register Command & Status	
FCFC	FCFF	4	Bus master interface primary IDE register Memory descriptor table base address	

Table 7-3 DMA Assignments

DMA Channel	Data Transfer	Description
0	8 / 16 bits	Vacant
1	8 / 16 bits	Vacant
2	8 / 16 bits	Floppy
3	8 / 16 bits	Vacant
4		Cascading of DMA controllers
5	16 bits	Vacant
6	16 bits	Vacant
7	16 bits	Vacant

## I/O and Memory Assignments

Below are listed the I/O and memory assignments of a number of expansion modules set in the factory. Please consult the relevant hardware descriptions since you can also select other settings.

Table 7-4 I/O and Memory Assignments

I/O Address	Memory Address	Module	HW Interrupt	DMA Channel
03B0 H-03DF H 0340 H-0347 H	000A 0000 H - 000C 7FFF H	HIGRAPH	IRQ 11* IRQ 9	–
03E0 H-03E3 H	FFFF 0000 H - FFF3 FFFF H 0000 0000 H - 000D FFFF H	CP1413 (H1)	IRQ 10*	–
–	000D 0000 H - 000D FFFF H	CP5410 (L2)	IRQ 12*	–
–	0000 0000H - 00DF FFFF H	CP5412A1	IRQ 12*	–
0240H-03E7H	00D0 0000H - 00DF FFFF H	CP5412A2	IRQ12*	–
4040 H-4061 H	–	DF20	IRQ 10*	–
0330 H-0333 H	000D C000 H - 000D FFFF H	SCSI AHA1542	IRQ 12*	DRQ 5

\*) Default; you can select IRQ 10, 11, 12 or 15, depending on the module.



### Caution

Malfunction!

You must not select IRQ 12 for the PG 740 since this interrupt is already assigned to the trackball and/or PS/2 mouse.

---

## 7.2 Interrupt Assignments

### Interrupt Assignment

The PG 740 uses two integral 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 programmed for the software interrupt vector 0A H (IRQ 2) by the ROM-BIOS.

### Priority

The interrupts are priority-scheduled in the reverse order of their numbering. Interrupt IRQ 0 has the highest priority and interrupt IRQ 7 the lowest. For triggering IRQ 2, interrupt IRQ 8 has the highest priority and interrupt IRQ15 the lowest. Interrupts IRQ 8 to IRQ 15 therefore have priority over interrupts IRQ 3 to IRQ 7. The interrupt vectors are initialized and masked when the PG 740 is powered up.

Table 7-5 I/O Addresses of the Interrupt Controllers

### I/O Addresses of the Interrupt Controllers

List of Hardware Interrupts		Programmed Interrupt Vector; Memory Address
SMI	System management interrupt; cannot be masked	-
NMI	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 (COM2)	INT B H
IRQ 4*)	V.24/V.28 interface; serial port (COM1/TTY)	INT C H
IRQ 5*)	Parallel port 2 (LPT2) / MPI	INT D H
IRQ 6*)	Diskette	INT E H
IRQ 7*)	Parallel port, printer 1 (LPT1)	INT F H
IRQ 8*)	Real-time clock (RTC), low active	INT 70 H
IRQ 9*)	Software interrupt rerouted to 0AH (IRQ 2) (VGA)	INT 71 H
IRQ 10*)	ETHERNET (CP1413)*)	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*)	IDE interface primary	INT 76 H
IRQ 15*)	IDE interface secondary	INT 77 H

\*) These signals are fed to the two I/O connectors and can also be used by the PCMCIA interface.

Do not use interrupts already assigned in the system.



### 7.3 PG 740 Video Modes

Table 7-6 PG 740 Video Modes

Mode No. (hex)	VESA-Mode No.	Video Mode (text/graphics)	Colors	CRT	LCD	Simultaneous
00+/01+	—	Text 40x25	16	70Hz	60Hz	60Hz
02+/03+	—	Text 80x25	16	70Hz	60Hz	60Hz
04/05	—	Gr.320x200	4	70Hz	60Hz	60Hz
6	—	Gr.640x200	2	70Hz	60Hz	60Hz
07+	—	Text 80x25	2 (b/w)	70Hz	60Hz	60Hz
0D	—	Gr.320x200	16	70Hz	60Hz	60Hz
0E	—	Gr.640x200	16	70Hz	60Hz	60Hz
0F	—	Gr.640x350	2 (b/w)	70Hz	60Hz	60Hz
10	—	Gr.640x350	16	70Hz	60Hz	60Hz
11	—	Gr.640x480	2 (b/w)	60/72/75Hz	60Hz	60Hz
12	—	Gr.640x480	16	60/72/75Hz	60Hz	60Hz
13	—	Gr.320x200	256	70Hz	60Hz	60Hz
14	—	Text 132x25	16	70Hz	—	—
54	10A	Text 132x43	16	70Hz	—	—
55	109	Text 132x25	16	70Hz	—	—
58, 6A	102	Gr.800x600	16	56/60/72/75Hz	60Hz	60Hz
5C	103	Gr.800x600	256	56/60/72/75Hz	60Hz	60Hz
5D	104	Gr.1024x768	16	43il/60/72/75Hz	—	—
5E	100	Gr.640x400	256	70Hz	60Hz	60Hz
5F	101	Gr.640x480	256	60/72/750Hz	60Hz	60Hz
60	105	Gr.1024x768	256	43il/60/72/75Hz	—	—
64	111	Gr.640x480	64K	60/72/75Hz	60Hz	60Hz
65	114	Gr.800x600	64K	56/60Hz	60Hz	60Hz
66	110	Gr.640x480	32K	60/72/75Hz	60Hz	60Hz
67	113	Gr.800x600	32K	60Hz	60Hz	60Hz
71	112	Gr.640x480	16M	60Hz	—	—

## 7.4 Connector Pinouts

### Connecting a PS/2 Mouse

You can connect a PS/2 mouse to your PG 740. The connector has the following pinout:

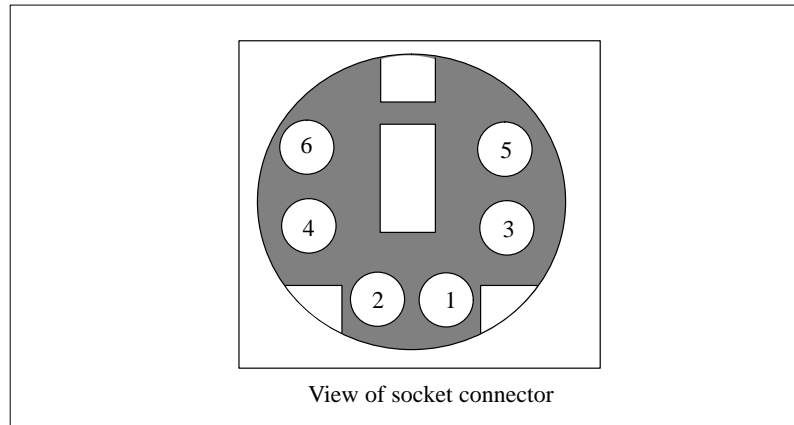


Figure 7-1 Connector Pinout for a PS/2 Mouse Connecting Cable

Pin No.	Designation	Input/Output
1	Data line	Input/output
2	Unassigned	-
3	0 V	-
4	Current-limited 5 V power supply	Output
5	Clock line	Input/output
6	Unassigned	-

**Connecting a Keyboard**

You can connect an external keyboard to your PG 740. The connector has the following pinout:

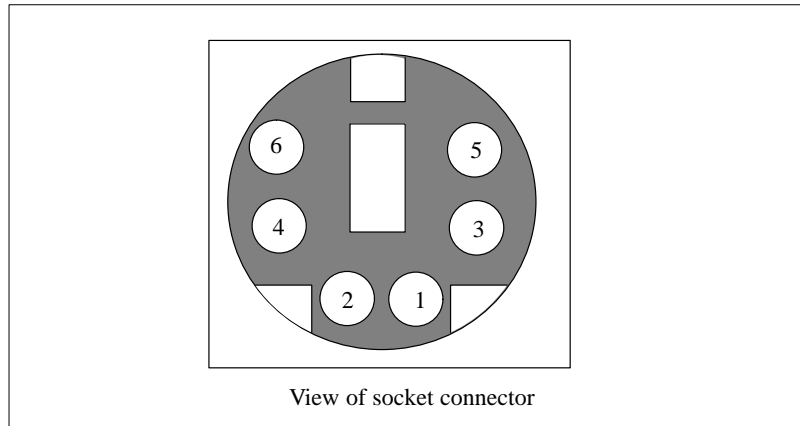


Figure 7-2 Connector Pinout for an External Keyboard Connecting Cable

Pin No.	Designation	Input/Output
1	Data line, keyboard	Input/output
2	Data line	Input/output
3	0 V	-
4	Current limited, 5 V power supply	Output
5	Clock line, keyboard	Input/output
6	Clock line, trackball	Input/output

## VGA Socket Connector

The VGA socket connector on the PG 740 has the following pinout:

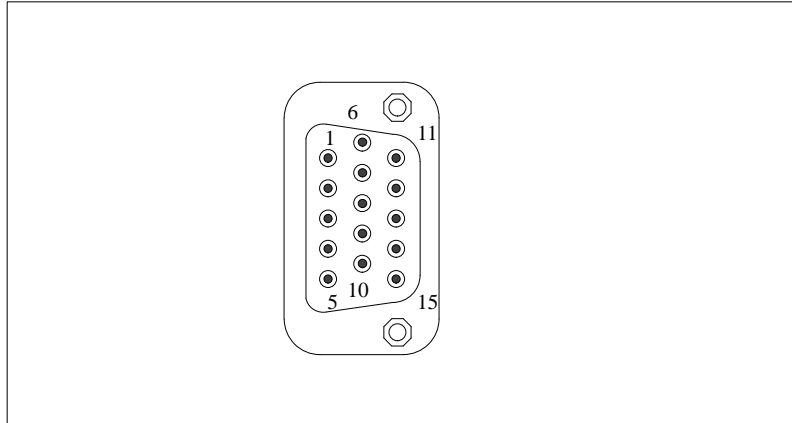


Figure 7-3 VGA Socket Connector

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	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 740 has the following pinout:

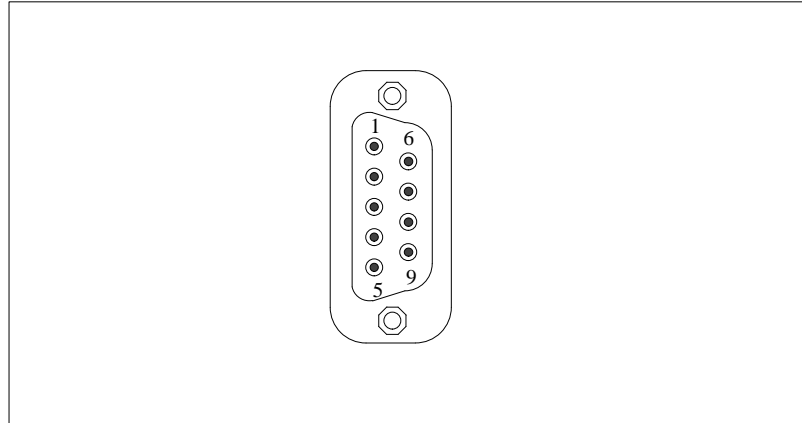
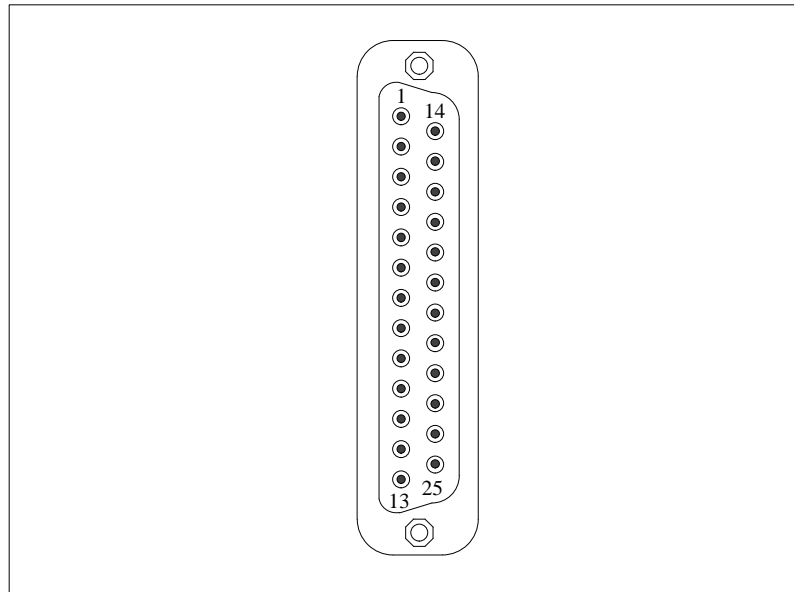


Figure 7-4 MPI/DP Socket Connector

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 MPI module	Input/output
4	RTS_AS	RTSAS, control signal for received data stream. The signal is “1” active when the programmable controller 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 (+5 V) 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
Screen		On connector casing	

**Parallel Port**

The parallel port (LPT1) on the PG 740 has the following pinout:



7

Figure 7-5 LPT1 Parallel Port (Socket Connector)

Pin No.	Signal Designation	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	/ INIIT	Output (open collector)
17	/ SELECT IN	Output (open collector)
18	GND	-
:	:	:
25	GND	-

**Serial Port (PLC/  
V.24/Modem)**

The serial port (COM1) on the PG 740 has the following pinout:

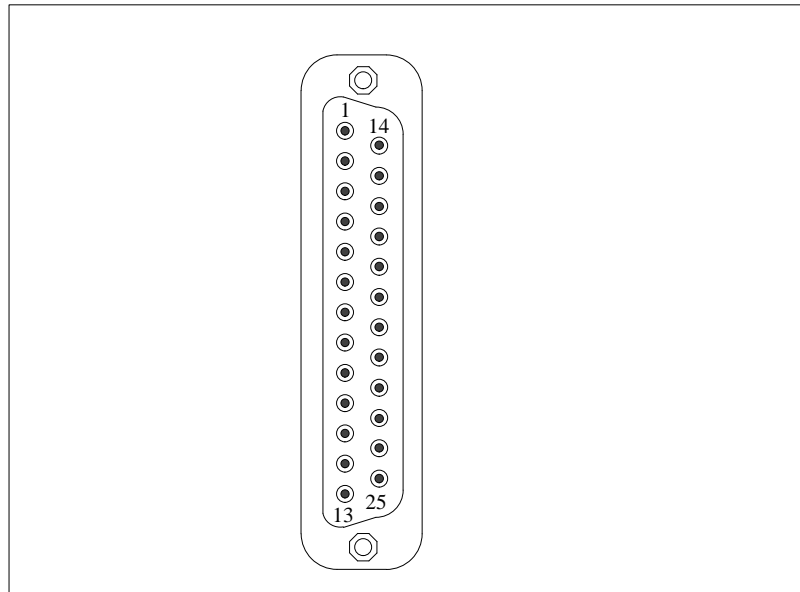


Figure 7-6 COM1 Serial Port (Socket Connector)

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)	Functional ground (reference potential)	-
8	DCD (M5)	Data carrier detect	Input
9	+TTY RxD	TTY receive	Input
10	-TTY RxD	TTY receive	Input
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	-	Unassigned	-
23-25	-	Unassigned	-

### Serial Port (V.24/ Mouse)

The serial port (COM2 on the PG 740 has the following pinout:

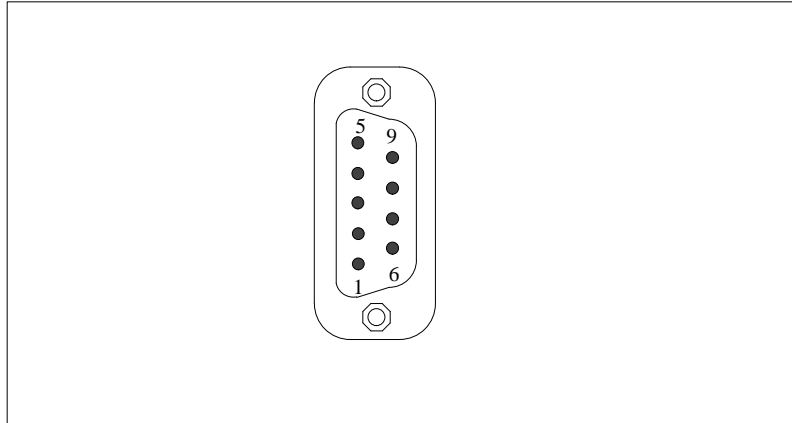


Figure 7-7 COM2 Serial Port

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)	Functional 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



## 7.5 Connecting Cables

### Overview

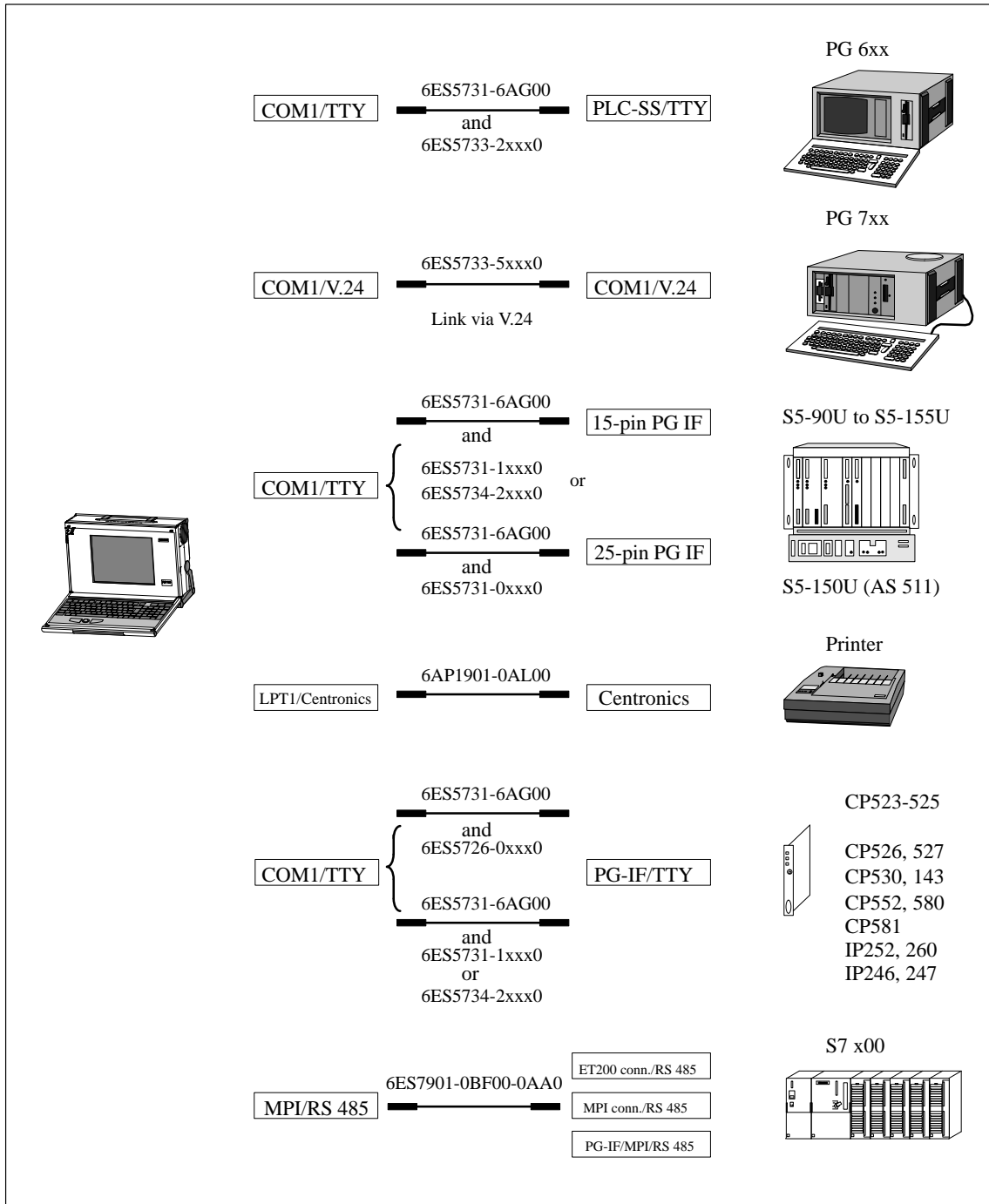


Figure 7-8 Connecting Cables

### Standard Connecting Cable

You can use the standard connecting cable (supplied along with your PG 740) to connect your PG 740 a Siemens programmable controller. Please read the notes in Chapter 3.

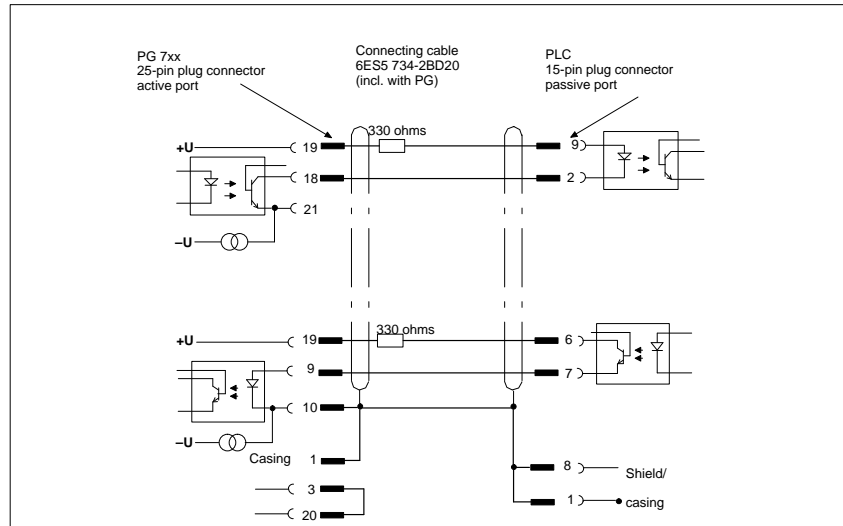


Figure 7-9 Standard Connecting Cable

### Adapter for PG 6xx Cable

If you want to connect your PG 740 to a programmable controller with the standard connecting cable of a PG 6xx programming device, you will need an adapter.

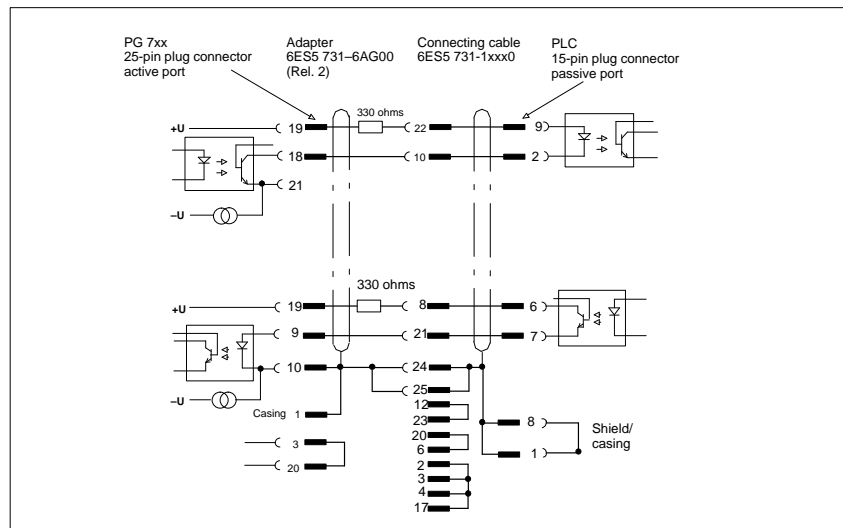


Figure 7-10 Adapter for a PG 6xx Cable

### Connecting Cable with 25-Pin Socket Connector

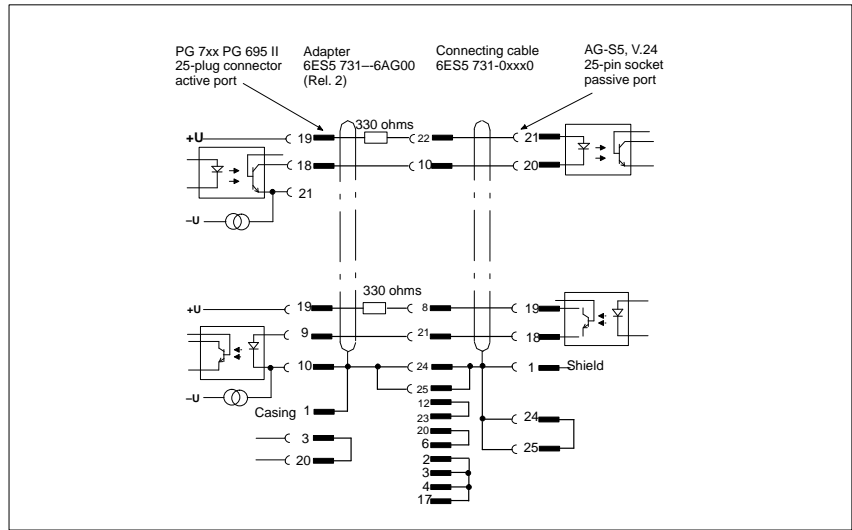


Figure 7-11 Connecting Cable with 25-Pin Socket Connector

### Cable for Interconnecting Programming Devices

You can connect your PG 740 to other programming devices with this cable. This cable does not have an order number. Please read the notes in Chapter 3.

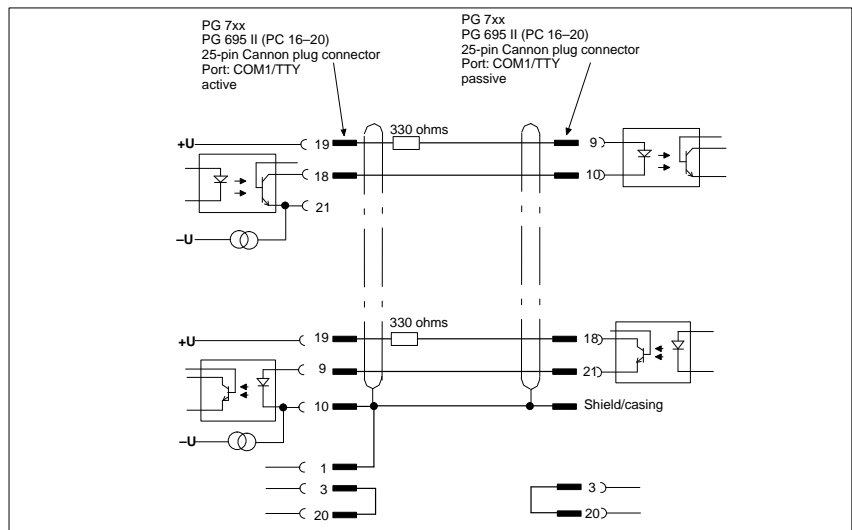


Figure 7-12 Cable for Interconnecting Programming Devices

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

If you want to connect your PG 740 to the S5/V.24 port of a PG 6xx programming device, you will need an adapter. In this case, the PG 740 must be the active programming device. Please read the notes on changing over the TTY/COM1 port to active/passive in Chapter 4.

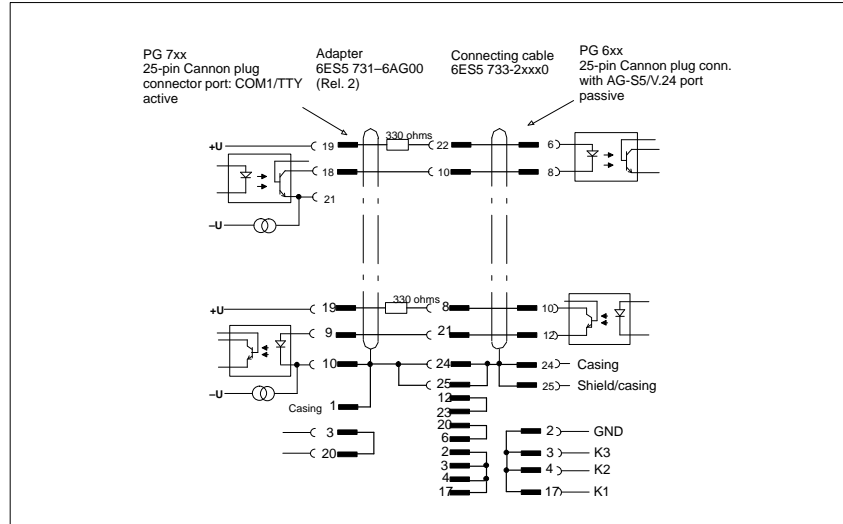


Figure 7-13 Connecting to the S5/V.24 and COM1/TTY Ports of a PG 6xx Programming Device

# 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 KB 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.

**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.

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

## C

**Cache** Fast intermediate memory.

**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.

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<b>COM2 Port</b>	The COM2 port is a serial V.24 interface which can be used to connect a mouse or a printer.
<b>Configuration Files</b>	These are files which define the configuration after booting. Examples of such files are CONFIG.SYS and AUTOEXEC.BAT.
<b>Configuration Software</b>	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.
<b>Cursor</b>	Collective term for mouse pointer and text cursor.
<b>Cursor Control</b>	Keypad on the keyboard for controlling the cursor.
<b>D</b>	
<b>Device Configuration</b>	<p>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.</p> <p>If changes are made to the hardware configuration, the user can change entries in the configuration file using the SETUP program.</p>
<b>Diskette</b>	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.
<b>Diskette Drive</b>	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).
<b>Display</b>	The monitor of the PG 740.
<b>Double-Click</b>	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.
<b>Drives</b>	The PG 740 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/EEPROM Submodules** These are plug-in submodules with EPROM/EEPROM chips. S5 user programs can be stored on them. These programmed submodules are then 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.

**IRQ**

Interrupt Request

**ISA**

Industrial Standard Architecture (bus for expansion module)

## 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

<b>Main Memory</b>	The main memory is the complete RAM memory of a programming device.
<b>Memory Card</b>	Memory submodule in credit-card format containing RAMs or EPROMs.
<b>Modem</b>	Communications device that enables a computer to send and receive data over a telephone line. <b>Mod</b> ulator and <b>dem</b> odulator of a signal transmission facility. It converts the digital pulses from a computer into analog signals (and vice versa).
<b>Module</b>	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.
<b>Monitor</b>	The monitor or screen is a visual display unit via which the programming device communicates with the user.
<b>Motherboard</b>	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.
<b>Mouse</b>	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.
<b>Mouse Pointer</b>	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.
<b>MPI/DP</b>	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.
<b>MS-DOS</b>	(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.

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**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

**PCI** Peripheral Component Interconnect (fast expansion bus).

**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

<b>Programmable Controller</b>	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.
<b>Pull-Down Menu</b>	See Drop-Down Menu
<b>R</b>	
<b>RAM</b>	RAM ( <b>R</b> andom <b>A</b> ccess <b>M</b> 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.
<b>ROM</b>	ROM ( <b>R</b> ead <b>O</b> nly <b>M</b> 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.
<b>RTC</b>	Real-time clock
<b>S</b>	
<b>SCSI Interface</b>	Small Computer System Interface. Interface for connecting SCSI devices (hard disk drives, CD-ROM drives).
<b>Serial Interface</b>	Data is transmitted one bit at a time via a serial interface (port); serial interfaces are therefore slower than parallel interfaces.
<b>SETUP</b>	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.
<b>SIMATIC Memory Cards</b>	Memory submodules in credit-card format for SIMATIC S5 and SIMATIC S7 which are programmed with the PG 740 and can be plugged in an S5 or S7 programmable controller.

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<b>SINEC L2</b>	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.
<b>SINEC H1 (ETHERNET)</b>	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.
<b>Software</b>	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".
<b>STEP 5 Basic Package</b>	This is a software package which represents the basis for all other STEP 5 software packages. With the programming device (PG 740), this package is used to program PLCs of the SIMATIC S5 family. The language used is known as STEP 5.
<b>T</b>	
<b>Text Cursor</b>	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.
<b>TFT Display</b>	Thin-film-transistor color display
<b>Trackball</b>	The trackball is used as an input device for programs serviced by a mouse. On the PG 740, the trackball is integrated in the keyboard.
<b>U</b>	
<b>User Interface</b>	The software-controlled menus and screens on the monitor through which the user communicates with the program.
<b>User Program</b>	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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