SIEMENS

SIMATIC

PG 760
Programming Device

Manual

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C79000-G7076-C761-01

Safety Guidelines

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



Danger

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



Warning

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



Caution

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

Note

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

Qualified Personnel

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

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

Correct Usage

Note the following:



Warning

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

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

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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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Order No. 6ES7760-2AA00-8BA0

Preface

What this Manual is About

This manual contains all the information you need for working with the PG 760 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 to other units of equipment (programmable controllers, other programming devices).
- expand your system, provided you comply with the necessary conditions.
- analyze and eliminate simple problems.

Who is the Manual Intended For?

The following persons require the manual:

- Users commissioning the programming device themselves or working with it (editing, programming, debugging).
- System administrators operating the programming device in a network.
- Service and maintenance personnel using the PG 760 for system expansion purposes or error/fault analysis.

Validity of the Manual

This manual describes the version of the PG 760 as available from April 1996. The Product Information Bulletin supplied with the PG 760 contains the latest technical specifications of the programming device.

Licences

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

Where to Find Information

Along with your PG 760, you also receive the following documents which you require for commissioning the device:

- The Product Information Bulletin with the **valid technical data** of the PG 760.
- A Product Information leaflet about the software supplied with the PG 760.

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

Plan of the Text

This manual contains the most important instructions for commissioning and using the PG 760 required in special situations.

Setting up and getting to know your device
Before you start to use your programming device, you should read about setting up the device in Chapter 2 and about the components and functions of the PG 760 in Chapter 3.

Installation
Chapter 3 describes the basic steps necessary for starting up the PG 760. This chapter also contains instructions for working with SIMATIC memory cards and for connecting the programming device to other devices.

Expansion
Chapter 4 describes how to expand your PG 760 (for example installation of memory expansions). Please observe the safety instructions in this section.

Configuration
Modifications made to the system hardware may make it necessary for you to adapt the original hardware configuration. This is described in Chapter 5.

Error/fault diagnostics
Chapter 6 explains how to deal with simple faults and problems that you can diagnose and, in some cases, eliminate yourself.

Reference data
Chapter 7 contains information about hardware addresses, interrupt assignments and connecting cables.

Glossary
The glossary defines and explains important terms.

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

Queries

If you have any questions concerning subjects not covered in the manual, simply get in touch with the Siemens representative in your area. The addresses for the maintenance and repair centers and the SIMATIC hotline can be found in the Product Information Bulletin.

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

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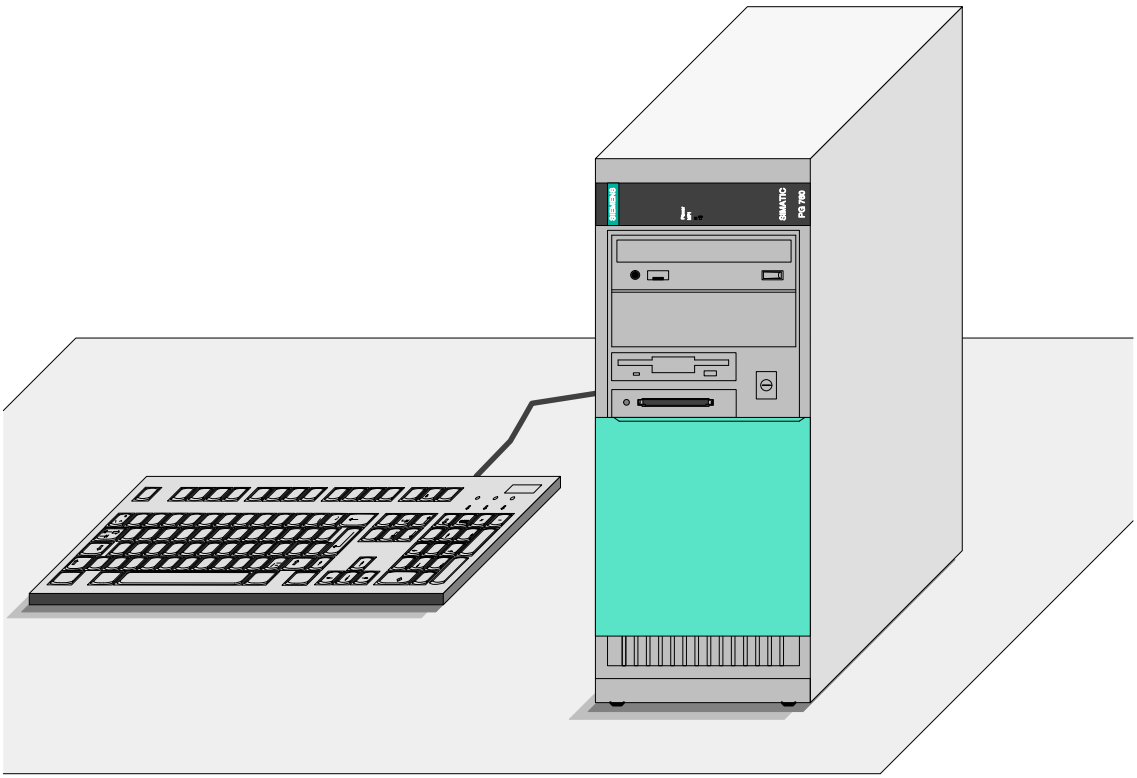
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Product Overview

1

Application

The PG 760 programming device is a high performance device designed specifically for an automation environment. Its performance and equipment make it a unit particularly suitable for programming/configuring with SIMATIC S5 and SIMATIC S7 programmable controllers in the office.



Hardware and Software

You can use the PG 760 programming device to program SIMATIC S5 and SIMATIC S7 programmable controllers. It has:

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

The PG 760 is supplied with system and automation software. The software components are listed in the Product Information leaflet.

Advantages of the PG 760

Compared with a standard PC, the PG 760 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 760 without the need for additional hardware or software.
- The robust design and practical functions of the PG 760 make it particularly suitable for office use. The PG 760 meets the specific requirements of industrial environments such as noise immunity, robustness, and simple startup.
- The PG 760 has all the SIMATIC interfaces necessary for a desktop device. These are:
  - Programming interface for SIMATIC S5 and SIMATIC S7 memory cards in credit card format.
  - TTY interface (max. 1000 m) as COM1
  - Floating MPI/DP interface for connection to S5 and S7 programmable controllers.
- The PG 760 is supplied with all the necessary system and programming software already installed on the hard disk in compressed format.
- Since WINDOWS 95 is already installed, you can use the PG 760 as a stand-alone PC workstation, and run all the standard software available on the market that requires MS-DOS or Windows 95.
- The PG 760 is fitted as standard with a CD-ROM drive, thus permitting easy updating of STEP 5 and STEP 7 software and of WINDOWS 95. The drive is operated via the second IDE interface (secondary IDE).
- The programming device has plenty of room for further hardware expansion, particularly when it comes to adding on extra disk drives. Thus the PG 760 can be used both as a complete personal computer and an efficient network server.
- 6 ISA slots and 2 PCI slots are available for expansions. The front panel contains a 5 1/4” slot; a second 3,5” hard disk drive can be retrofitted. A further drive can also be connected to each IDE interface on the basic module.
  Thus the device can be customized to meet your individual workplace needs and become a maximum performance computer.

Unpacking and Setting Up the PG 760

2

What Does this Chapter Contain?

This chapter describes how to install your PG 760. It provides you with comprehensive information on the major components of the PG 760, such as:

- drives,
- keyboard, and
- programming facilities.

Summary of Sections

In Section	You Will Find	On Page
2.1	Setup and Hardware Components of the PG 760	2-2
2.2	Components of the PG 760	2-3
2.3	Keyboard	2-5
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2.5	Transport	2-13

2.1 Setup and Hardware Components of the PG 760

Unpacking Your PG 760

Unpack your PG 760 as follows:

1. Remove the packing.
2. Do not throw the original packing away. Keep it in case you have to ship or transport the unit again at some time in the future.
3. Check the packing list to make sure that no components are missing.
4. Enter the serial numbers of all connected devices into the table (in the Product Bulletin, according to options). If a device is reported as stolen, it can only be recognized when submitted for repair by means of its serial number.



Caution

Risk of damage!

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

The unit must be allowed to reach room temperature before you switch it on. If condensation has formed, you should wait approximately 12 hours before switching on the unit.

Setting up a Tower

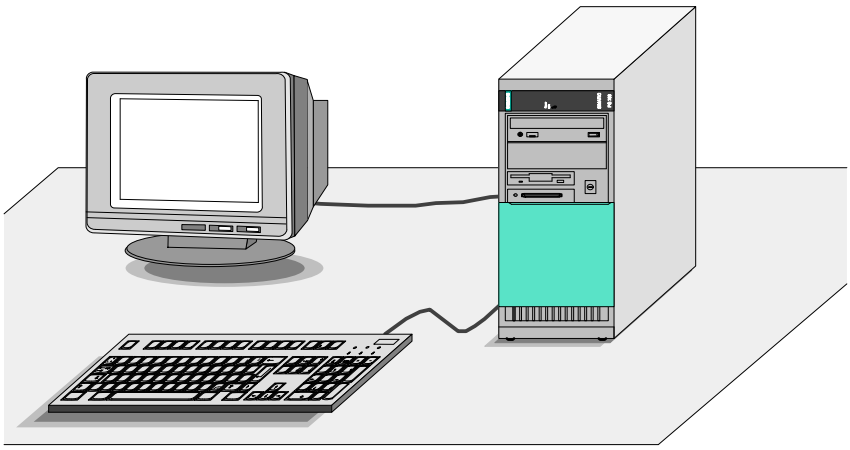


Figure 2-1 Setting up a Tower

Proceed as follows:

1. Place the PG 760 on a horizontal, flat surface.
   The ventilation slots on the front (with the slider open) and on the rear must not be covered.
2. Set up the monitor and keyboard as appropriate. Use the short or long keyboard cable depending on the situation.
3. Connect the monitor and keyboard.

2.2 Components of the PG 760

Front Side

All the important operator controls are accessible from the front of the PG 760.

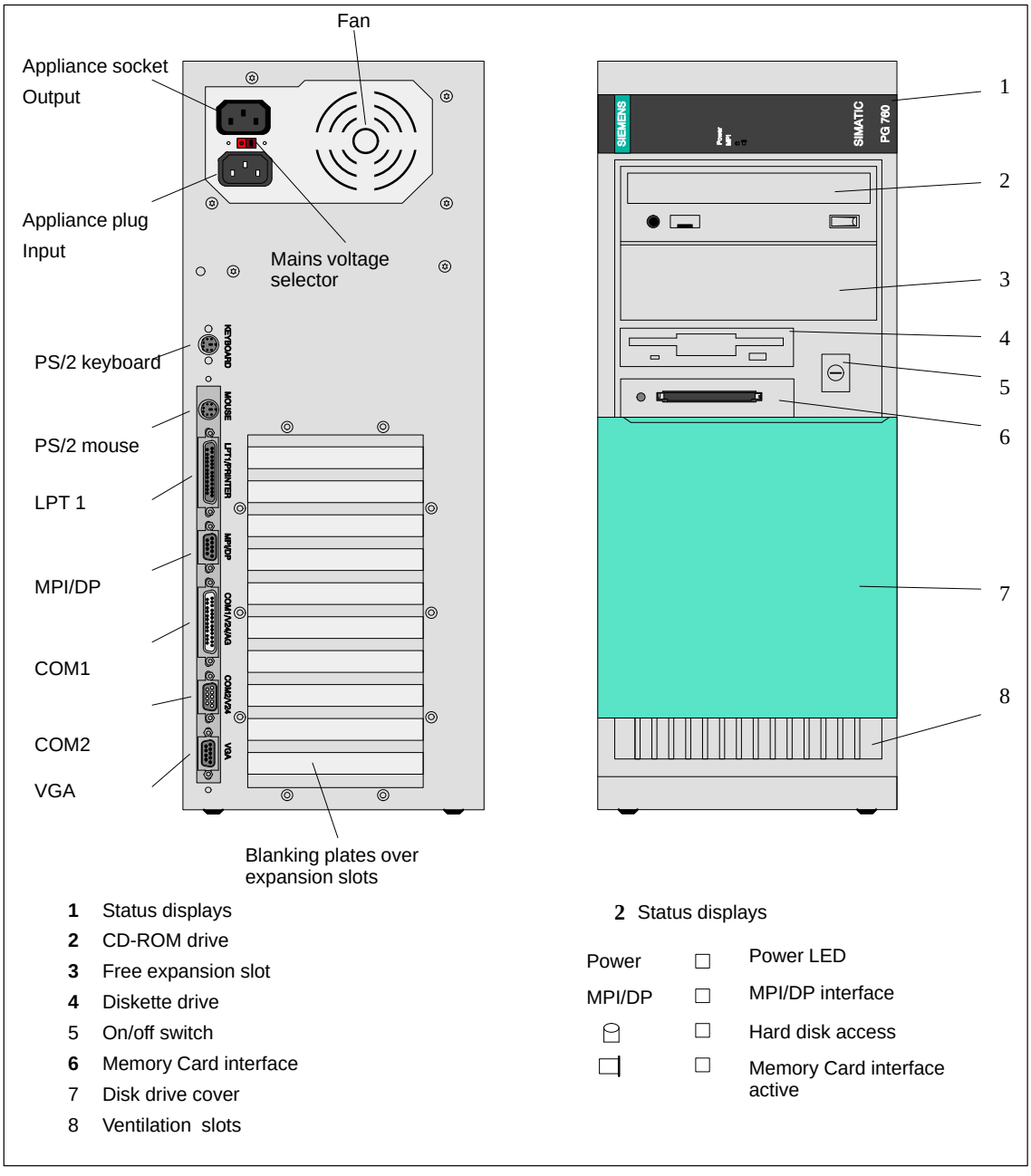


Figure 2-2 Rear Panel Housing with Connections and Interfaces and Front View of PG 760

Rear Panel (Connections)

On the rear side of the PG 760 are the connectors for the power supply and interfaces for connection to external devices.

Ports and Connectors

Summary of the ports and connectors on the rear panel of the housing:

Ports and Connectors	Function
Appliance plug, inlet Appliance socket, outlet	Connection for power supply Connection for power supply to monitor
PS/2 keyboard	Connection for keyboard
PS/2 mouse	Connection for PS/2 mouse
LPT1 printer Parallel interface	Connection for parallel printer
MPI/DP multipoint interface	Connection for S7 programmable controller and for distributed I/Os
COM1/V.24/AG MODEM Serial interface	Connection for S5 programmable controller
COM2/V.24 Mouse Serial interface	Connection for serial mouse
	Connection for serial printer
VGA	Connection for monitor

2.3 Keyboard

Keyboard Layout

The keyboard is divided into the following areas:

- Function keys
- Alphanumeric keyboard
- Cursor control keys
- Numeric keypad

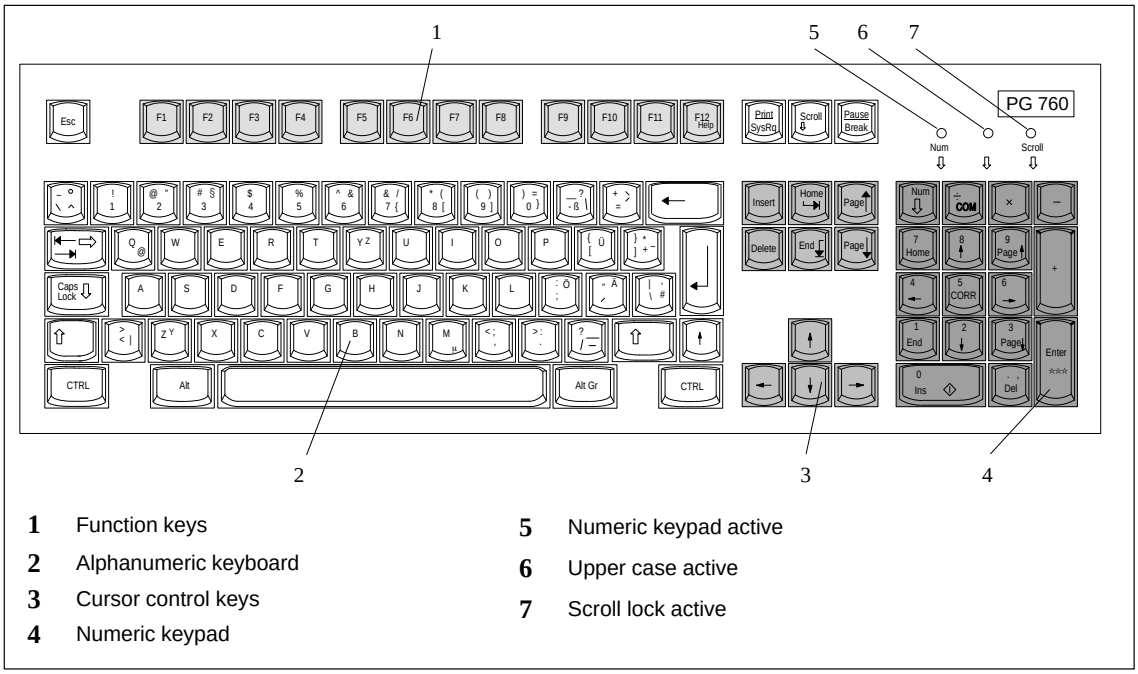


Figure 2-3 Keyboard

Repeat Function

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

Setup

The angle of inclination of the keyboard can be raised from 6° to 12° by using the swivel feet on the back of the keyboard.

Alphanumeric Keyboard

The largest block of keys on the keyboard is the alphanumeric keyboard with all the keys for the letters of the alphabet, numerals and special characters. The characters are arranged in basically the same way as on a normal typewriter. However, there are a number of special keys which have special functions for the PG 760.

Keyboard Labeling

The keyboard has an international/German labeling system.

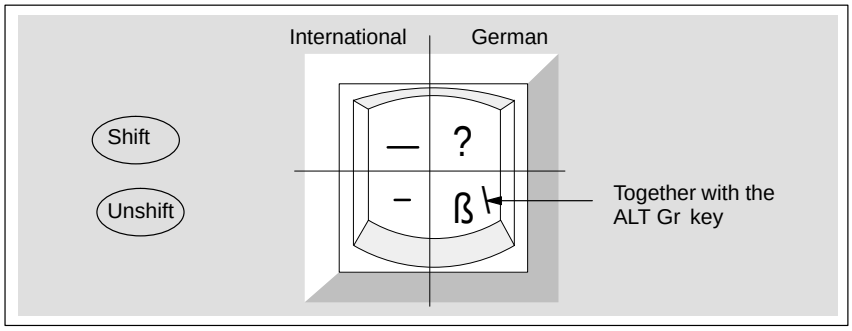
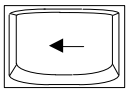
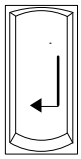
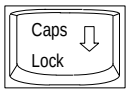
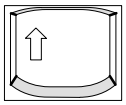
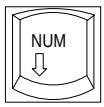
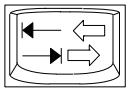
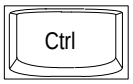


Figure 2-4 The Keyboard Labeling System

Special Keys

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

Key	Function
	**Backspace Key** This key moves the cursor one space to the left and deletes the character at this position.
	**Enter Key** (Return, Enter, Line Feed) The return or enter key is used mainly to terminate a command line in the operating system; that is, the command you have typed in is executed when you press this key. For other uses of this key, please refer to the user manual of the relevant application program.
	**CAPS LOCK Key** If you press this key, the middle LED at the top right-hand corner of your keyboard lights up. All upper case characters and other characters now print normally. If you want to type lower case letters in this position, you must first press the shift key. If you are using an international keyboard, press this key again to cancel the function. The LED then goes out.
	If you have a German keyboard, press the shift ⇑ key to cancel the function.
	**NUM Key** This key switches the numeric block to cursor control (NUM LED lights up). Press this key again to return to cursor control.
	**Tabulator Key** This moves the cursor according to the selected tabulator positions.

Key	Function
	**CTRL Key** (combination key) 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.
	**ALT Key** (combination key) This key is only used in combination with other keys. For example, you can enter the hexadecimal value of an ASCII character using this key and the numeric keypad and thus obtain additional special characters. For example, Alt + 123 corresponds to "{".
	**ALT Gr Key** (combination key) You can use this key together with the other combination keys to generate other key codes. For example, you can generate the "\" character on the German keyboard by typing ALT Gr + ß.
	**PRINT** (combination key) Using the Print key, you can output the current screen display to a printer.
	**PAUSE** (combination key) The Pause key interrupts program execution in the majority of applications.

Location and Labeling of the LEDs

There are 3 LED displays on the keyboard, which are located along the function keys above the numeric keypad.

- NUM LOCK
- CAPS LOCK
- SCROLL LOCK

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

Cursor Keys

The keypad shown below is used for cursor control.

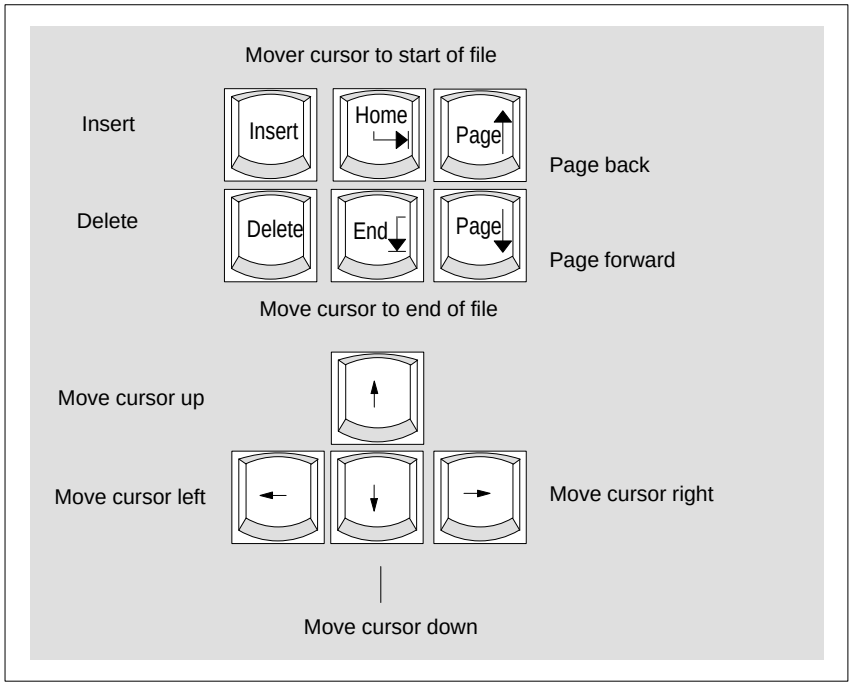


Figure 2-5 Cursor Control Keypad

Numeric Keypad

The numeric keypad shown below is used to enter numerical data or for cursor control.

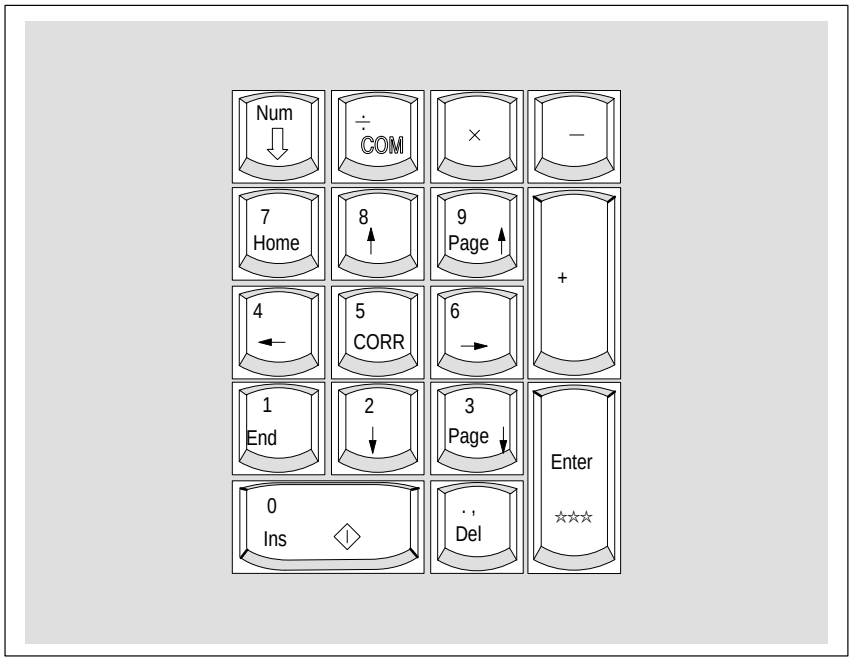


Figure 2-6 Numeric Keypad

Function Keys

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

Within the STEP 5 programming software the following keys have specific functions (refer to STEP 5 manual).

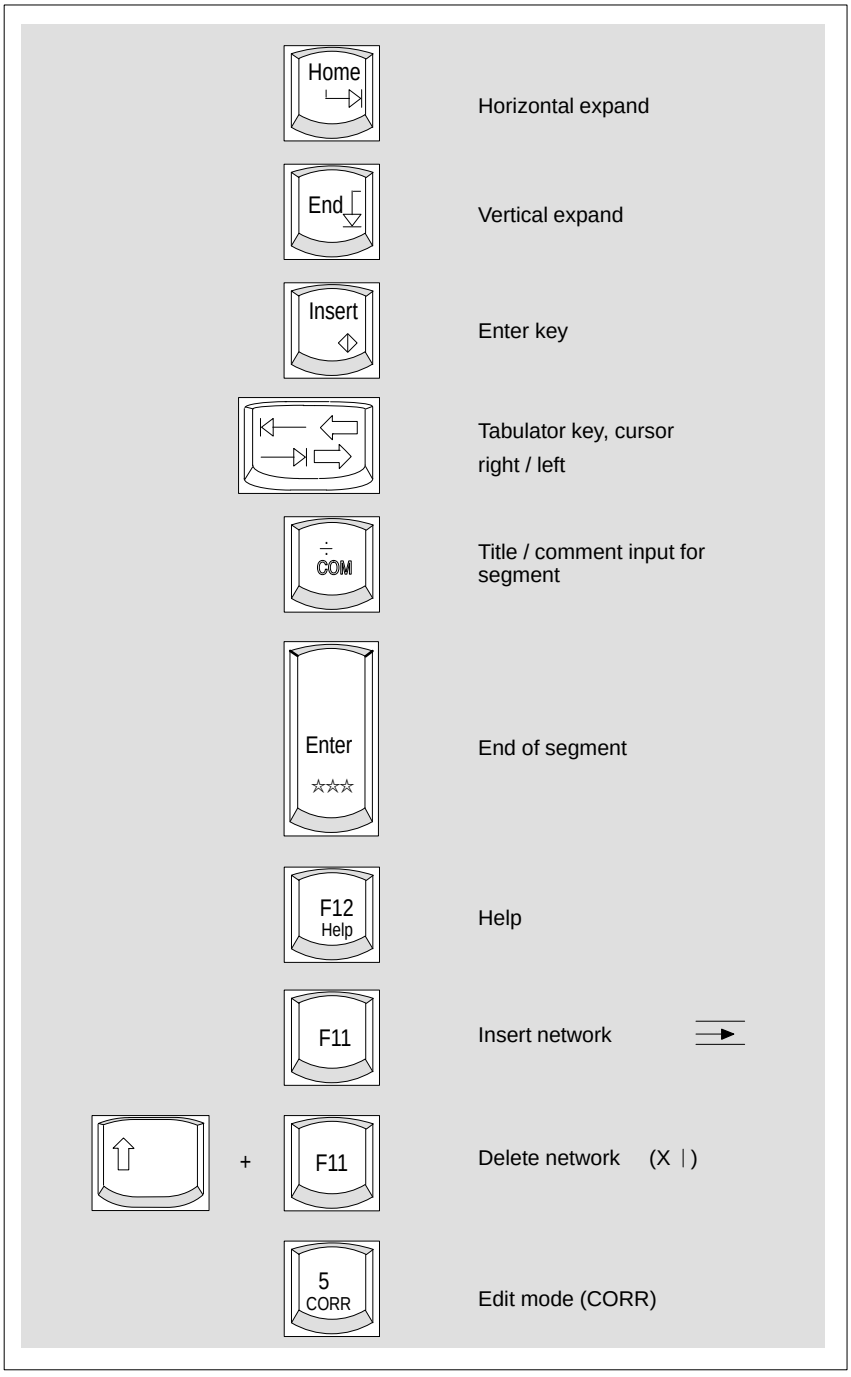


Figure 2-7 Function Keys (STEP 5)

Key Combinations

Various key combinations are shown in the table below.

Table 2-1 Key Combinations

Key Combination	Function
CTRL + Alt + Del	Warm restart
CTRL + Alt + F1	Change to international character set
CTRL + Alt + F2	Change to German character set; the German keyboard driver must have already been loaded

LED Displays

The LED displays 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.

2.4 Drives

Disk Drive Cover

The disk drives of your PG 760 are protected against dirt penetration by a sliding cover.

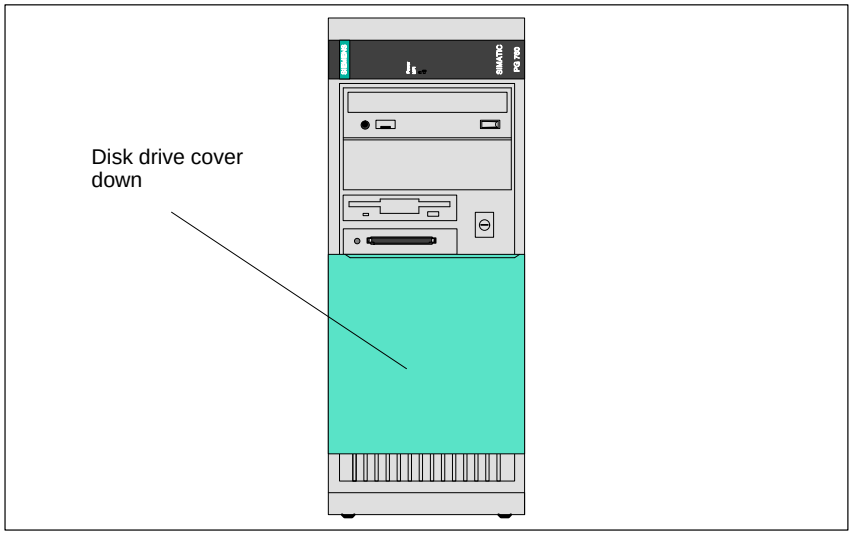


Figure 2-8 Disk Drive Cover

- Slide the cover down, so that the disk drives and the power switch are accessible.
- For improved ventilation and protection against dirt, the cover should be closed during operation.

Drive Types

The PG 760 is equipped with the following drives as standard:

Table 2-2 Standard Drives

Type of Drive	Format	Capacity
Floppy (diskette) drive	3.5 inch	1.44 Mbytes
Hard disk drive	3.5 inch	See Product Information Bulletin
CD-ROM drive	5.25 inch	See Product Information Bulletin

Floppy Disk Drive

Using the floppy disk drive you can save programs and data on diskettes or load them on the PG 760.

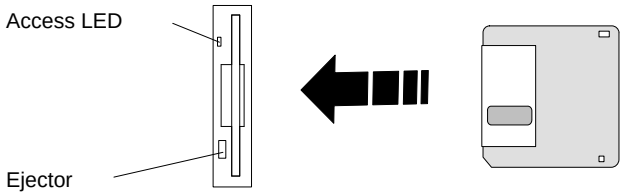
Types of Diskette

You can use the following diskettes:

Double-Sided High-Density Diskette	Double-Sided Double-Density Diskette
3.5 inch	3.5 inch
1.44 Mbytes (135 TPI)	720 Kbytes
80 tracks per side	80 tracks per side
PG 760 recognizes disks by their coding	PG 760 recognizes disks by their coding

Handling Diskettes

You insert diskettes into the drive as shown below:



Caution

Risk of data loss!

You must not remove the diskette while 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 has gone out.

Hard Disk Drive

You can use a number of different hard disk drives in your PG 760. The memory capacity of the hard disk can be found in the Product Information Bulletin and SETUP program.

The hard disk drive is connected to the first IDE interface (primary IDE). A second drive can also be connected to this interface as a slave.

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



Caution

Risk of data loss and damage to drive!

Drives are sensitive to vibration and shock. Any vibration occurring during operation can lead to loss of data or damage to the drive.

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

CD-ROM Drive

The CD-ROM drive permits easy updating of STEP 5 and STEP 7 software and of WINDOWS 95.

The drive is operated via the second IDE interface (secondary IDE). A second drive can also be operated on this interface. If the second drive is a hard disk drive, the CD ROM drive should be set as the slave, and the hard disk drive as the master.

The Product Information Bulletin contains a description, and explains handling.



Caution

Risk of data loss and damage to drive!

CD-ROM drives are very sensitive to vibration and shock. Any vibration occurring during operation can lead to damage to the drive or the data medium.

Additional Module Slots

The PG 760 is equipped with further module slots for the installation of additional disk drives. For further information, see Chapter 4.6.

2.5 Transport

Carrying the PG 760

Despite the robust design of the PG 760, its internal components are sensitive to severe vibrations or jolts. When moving the PG 760, you must therefore make sure that it is protected from severe mechanical forces.

Use the **original packing material** if you have to ship the PG 760 from one location to another.



Caution

Risk of damage!

When transporting the unit cold weather, when it may be submitted to extreme variations in temprature, make sure that there is no moisture (condensation) on or in the unit.

The unit must be allowed to reach room temperature slowly before you switch it on. If condensation has formed, you should wait approximately 12 hours before switching on the unit.

Installing and Operating the PG 760

3

What Does This Chapter Contain?

This chapter describes what you have to do to set up your PG 760 correctly for operation. This includes:

- the basic steps for starting up your PG 760,
- working with memory cards for the programmable controllers, and
- connecting your PG 760 to other devices.

Summary of Sections

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3.1 Connecting the PG 760 to the Power Supply

Connecting to the Power Supply

The PG 760 can be operated at 120 V or 230 V. Voltage selection is carried out via the mains voltage selector.



Caution

Risk of damage to the unit!

Operating the PG 760 with the incorrect mains voltage can damage the unit. When switched on, the same voltage is present on the appliance socket (outlet) as on the appliance plug (mains inlet). To operate the monitor, please observe the manufacturer's specifications. Only a monitor with the following rated currents may be connected to the appliance socket:

- 115 V 1 A max.
- 230 V 0.5 A max.

Selecting Mains Voltage

If the set voltage does not correspond to your local voltage, you must select the correct voltage by moving the mains voltage selector either to 115 V or 230 V. Proceed as follows:

Proceed as follows to switch over the voltage:

1. For 120 V, using a normal screwdriver push the mains voltage selector **right**. 115 V appears above the switch.
2. For 230 V, using a normal screwdriver push the mains voltage selector **left**. 230 V appears below the switch.

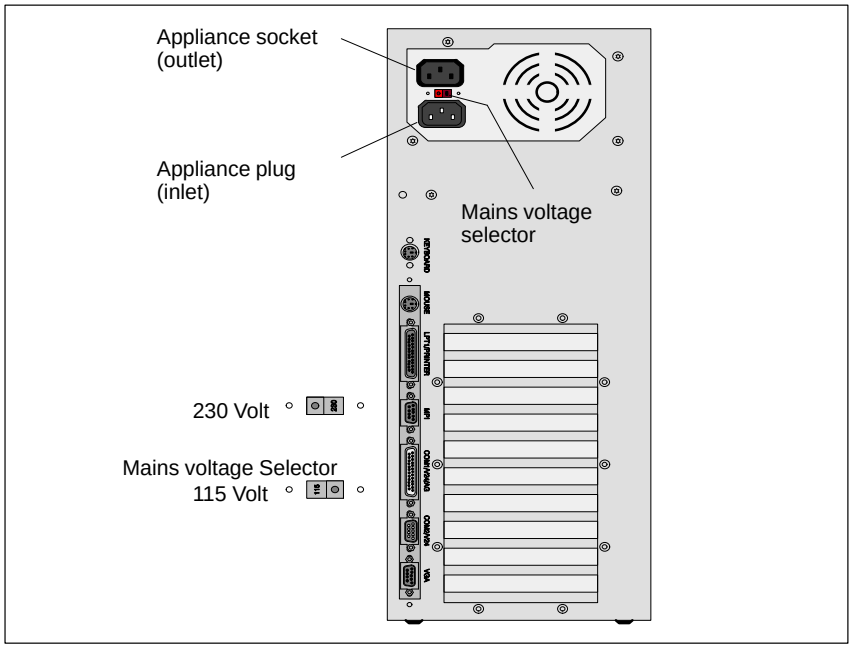


Figure 3-1 Mains Voltage Selector

Connecting the Power Cable

Proceed as follows:

1. Check that the correct voltage has been selected.
2. Plug the supplied power cable into the power supply connector.
3. Connect the unit to a socket outlet with a grounded protective conductor.
4. Plug the power supply cable for the monitor into the power supply connector socket.

Note

Please note that the power supply connector must be unplugged to completely isolate the unit from the mains supply.

Note

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

The computer is intended for operation with grounded power supply networks (TN networks according to VDE 0100 part 300 or IEC 364-3).

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

Use a power cable consisting of at least an AWG cable with a 15 A, 250 V grounded plug. The cable must fulfil the necessary safety requirements in the appropriate country.

3.2 Connecting I/O Devices

Connecting a PS/2 Keyboard

Connect the keyboard as follows:

1. Switch off your PG 760.
2. Plug in the PS/2 keyboard connector.

Using a Mouse

You can connect both a PS/2 and a serial mouse to the PG 760. When the PG 760 is supplied, the mouse driver for the PS/2 mouse is already loaded.

Note

A PS/2 mouse and a serial mouse cannot be operated at the same time.

Connecting a PS/2 Mouse

Connect a PS/2 mouse or another pointing device to the mouse connector.

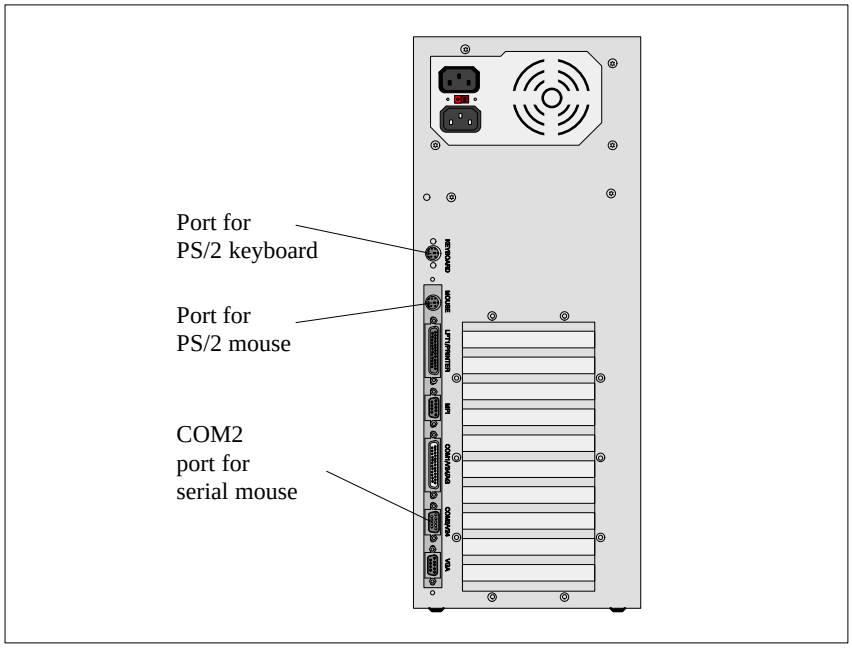


Figure 3-2 Connections for Keyboard, PS/2 Mouse and Serial Mouse

Connect the mouse as follows:

1. Switch off your PG 760.
2. Plug the cable of the PS/2 mouse or another pointing device into the mouse connector.
3. Switch on your PG 760 again.

Connecting a Serial Mouse

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

Proceed as follows:

1. Switch off your PG 760.
2. Plug the serial mouse into the mouse connector labeled COM2.
3. Switch on your PG 760 again.

Recommended Monitors

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

Connecting Monitors

You must switch off the PG 760 before connecting the monitor cable. You will find further information about the connector pinout in Chapter 7.

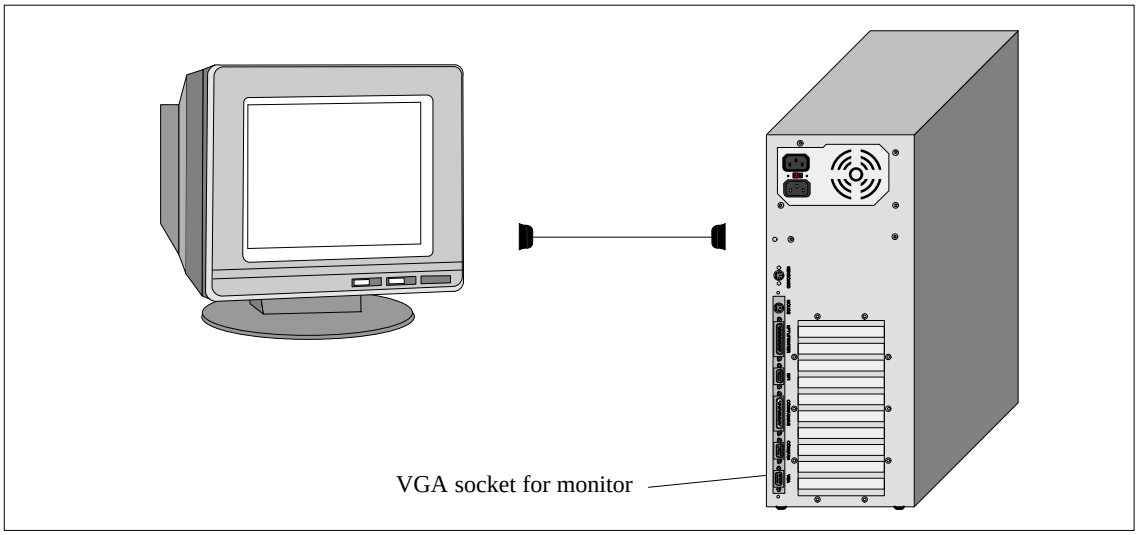


Figure 3-3 Connection to Monitor

Connect the monitor as follows:

1. Switch off the PG 760 and the monitor.
2. Plug the monitor cable into the VGA socket.
3. Plug the other end of the monitor cable into the monitor.

The VGA interface on the basic module permits a resolution up to 1024 x 768 with 256 colors and an image refresh rate of max. 75 Hz.



Caution

Danger of damaging the monitor!

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

If the frequency is too high, this may damage the monitor.

Additional Graphics Card

You can plug an additional graphics card into one of the ISA or PCI slots on the bus board for special applications (see Chapter 4.3).

A PCI graphics card should be used because it provides a faster image building rate.

Connecting Monitors to Additional Graphics Cards

Proceed as follows:

1. Switch off the PG 760 and the monitor.
2. Plug the monitor cable into the VGA socket of the graphics card.
3. Connect the monitor cable to the monitor.

Switching Additional Graphics Cards On and Off

When the PG 760 is switched on, the system automatically recognizes the additional graphics module. The built-in VGA graphics interface module on the mother board is switched off. To switch the built-in VGA graphics interface module back on, proceed as follows:

1. Switch on the PG 760.
2. While the PG 760 is being powered up, keep the INSERT key depressed until you hear two signal tones.

The additional graphics module is reactivated the next time you switch the PG 760 on without pressing the INSERT key.

Recommended Printers

Siemens printers with a parallel interface and IBM character set are recommended for use with the PG 760 programming device.

Connecting the Printer to the Parallel Port

To connect your printer, proceed as follows:

1. Switch off the PG 760 and printer.
2. Plug the printer cable into the LPT1 parallel port.
3. Plug the printer cable into the parallel port of the printer.
4. Screw the connector tight at the interface port.

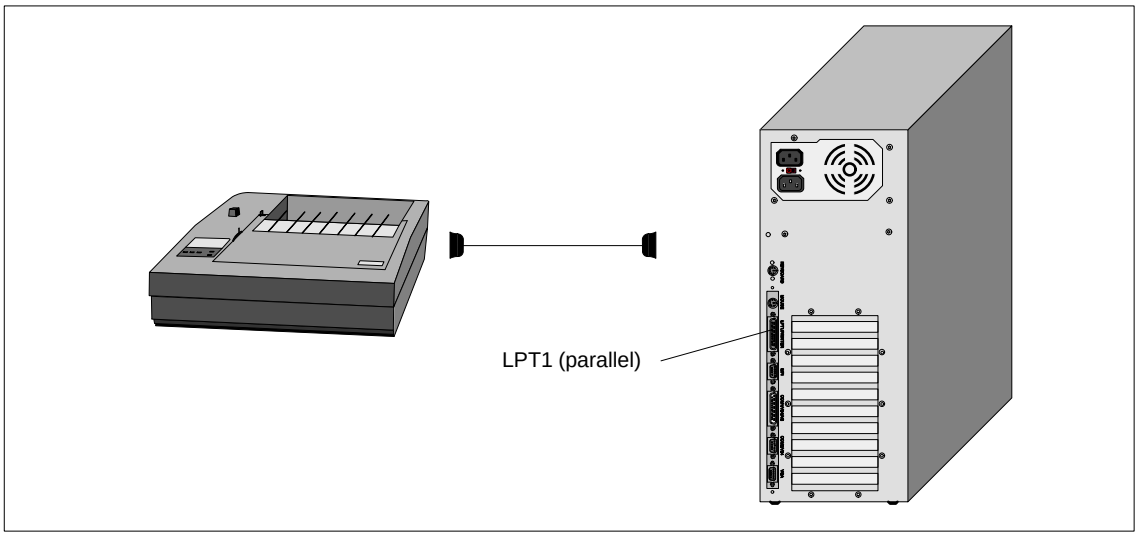


Figure 3-4 Location of Printer Interface Ports

Caution

Risk of damage to the unit!

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

Make sure that you use the right port, otherwise you may damage the printer or the programming device.

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

Before plugging in the cables, the electrostatic charge of your body, the unit and the cables must be equalized. To do this, briefly touch an earthed object (ESD Guidelines).

Only use the original connecting cables.

3.3 Working with SIMATIC Memory Cards

Working with SIMATIC Memory Cards

SIMATIC memory cards can be read, programmed and erased using the 68-pin connector.

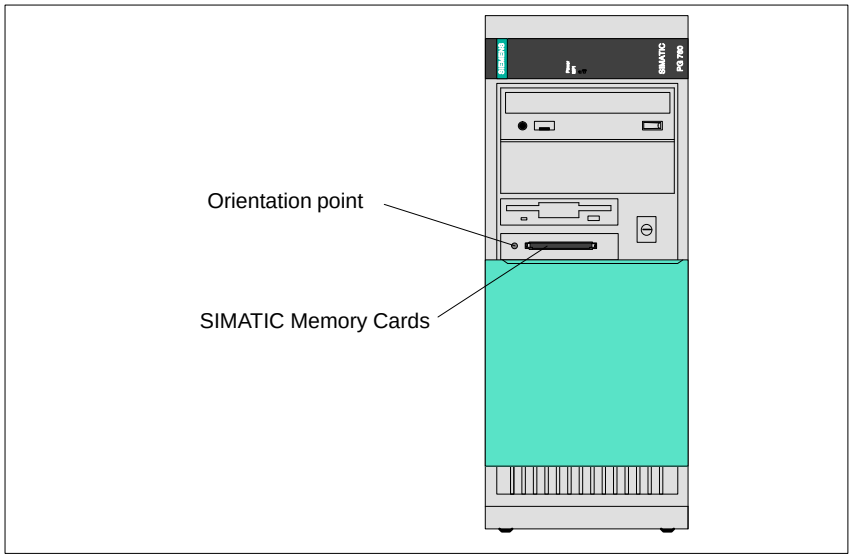


Figure 3-5 SIMATIC Memory Card Port

Proceed as follows when working with SIMATIC memory cards:

1. Switch on your PG 760.
2. Start your SIMATIC programming function.
3. Plug the SIMATIC memory card into the 68-pin connector.
4. Read, program or erase the memory card with the programming function of your SIMATIC software.
5. Terminate the programming function of your SIMATIC software.
6. Remove the SIMATIC memory card from the programming port for further use in a programmable logic controller.



Caution

Risk of damage to memory cards and the PG 760!

You must insert the memory card into the 68-pin connector with the type label pointing to the power switch. Make sure that the orientation points on are matching those of the card.

You must not remove the SIMATIC memory card while the LED display for the programming EPROM is lit.

You must set the **Programming Interface** to **Enabled** in the submenu **PG 760 Hardware Options** before you can program the SIMATIC memory card.

3.4 PG 760 Connections (Point-to-Point Connections)

Point-to-Point Connection

In this section, you will learn how to connect your PG 760 to a programming device or programmable controller using a point-to-point connection.

You can establish a point-to-point connection by connecting the PG 760 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 surge impedance (< 130 Ω / km) and low capacitance (< 90 pF/m). Twisted-pair cables enhance noise immunity due to inductance. A low surge impedance results in reduced voltage excursions and shorter charge reversal times. The larger the conductor cross-section, the lower the surge impedance 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 (for example, 400 V three-phase power cables).
- 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 (field strength < 3 V/m or 1 V/ft.). 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 760 to Other Programming Devices

If you want to connect your PG 760 to another programming device, you can plug the appropriate connecting cable into the V.24 or TTY interface port. You will find more detailed information 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[1)]	6ES5 731-6AG00

Note

[1)] When connecting the programming devices in series, make sure you connect the cable the right way around (see Figure 3-6).

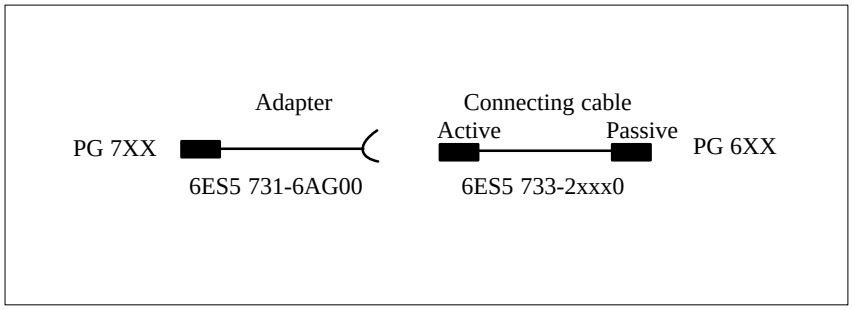


Figure 3-6 Direction of Connection: Adapter - Connecting Cable

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 760 leaves the factory, this interface is always set to active.

Connecting the PG 760 to S5 Programmable Controllers

You can connect the PG 760 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 760.
(Order No. 6ES5734-2BD20)

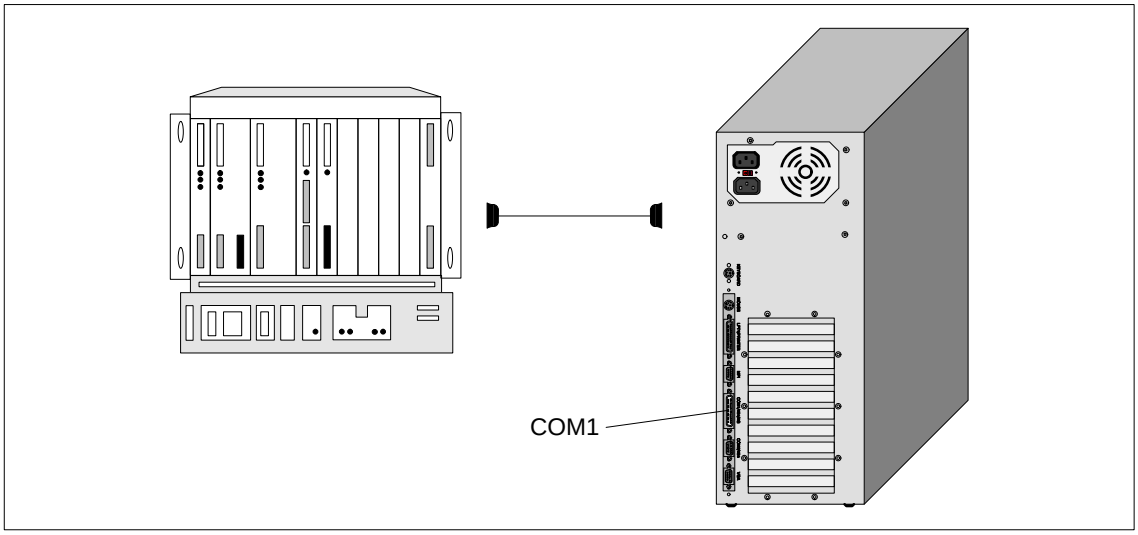


Figure 3-7 Connecting to the S5 Programmable Controller

Connect your PG 760 to a SIMATIC S5 programmable controller as follows:

1. Switch off the PG 760.
2. Plug the cable into the COM1/V.24 PLC interface port.

Caution

Risk of damage to the PG 760!

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 760 is plugged into the COM1/TTY port and not into the LPT1 port.

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

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

The PG 760 and the programmable controller must be operated at the same protective ground potential.

Connecting the PG 740 via an Adapter

The connecting cable 6ES5 734-2BD20 is supplied with the PG 760. An adapter is available for connecting the programmable controller using older standard cables.

Interface	Link	Connecting Cable	Adapter
TTY interface (COM1)	PG 760 to SIMATIC S5 programmable controller	6ES5 734-2BD20	
		6ES5 731-1xxx0 15-pin	6ES5 731-6AG00
		6ES5 731-0xxx0 25-pin	6ES5 731-6AG00

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 meters).

3.5 Multipoint Interface (MPI/DP)

Connecting an S7 Programmable Controller via the MPI/DP Interface

You can connect your PG 760 to a SIMATIC S7 programmable logic controller using the floating MPI/DP interface. The MPI cable (5 m long) for connection to SIMATIC S7 CPUs is supplied with the PG 760. (Order No.: 6ES7901-0BF00-0AA0)

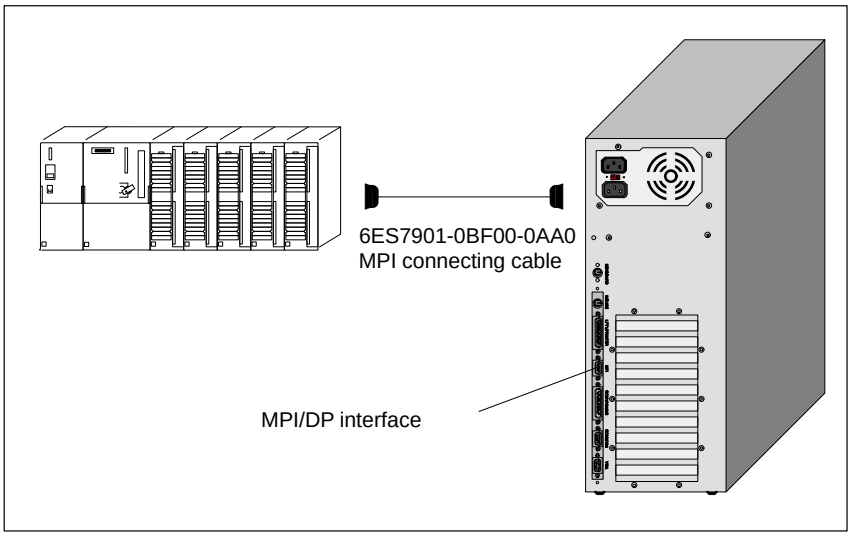


Figure 3-8 Connection via Multipoint Interface

Connect your PG 760 to a SIMATIC S7 programmable controller as follows:

1. Switch off the PG 760.
2. Plug the connecting cable into the MPI/DP port.



Caution

Risk of damage to the PG 760!

Before plugging in the cables, 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 programming devices to

- MPI networks (S7-200, S7-300 and S7-400) or
- PROFIBUS DP networks (DP components).

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

MPI/PROFIBUS DP Network

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

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

Note

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

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 760 Hardware Options” under “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.

3.6 SINEC L2

Networking PG 740s via SINEC L2 (PROFIBUS)

SINEC L2 is an open and robustly 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 (corresponds 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 Requirements

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.

3.7 SINEC H1

Networking PG 760s 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 applications.

Principle of Operation

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

Hardware Requirements

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.

For the dual port RAM of the CP 1413 module, the address area D000-DFFF Hex on PG 760 has been reserved (see also Table 7-4).

PG 760 Expansions

4

What Does this Chapter Contain?

You can enhance the performance of your PG 760 by adding additional modules. This chapter describes how to expand your PG 760. 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	Components Visible after Opening the Unit	4-4
4.3	Installing Expansion Modules	4-10
4.4	Installing Memory Expansion Cards	4-11
4.5	Installing a Cache	4-14
4.6	Installing and Removing Disk Drives	4-15
4.7	Replacing the Back-Up Battery	4-19
4.8	Closing the Unit	4-20

4.1 Opening the Unit

Prerequisites

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



Caution

Risk of damage to the unit!

Please note that only qualified personnel should be allowed to work on the open unit, so that the warranty on the device is not affected. Authorized Siemens maintenance and repair centers offer you a specialist maintenance service. The addresses are listed at the end of the Product Information Bulletin. Consult Chapter 5 in the manual.



Caution

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

Limitation of Liability

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

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

All the modules and components in the PG 760 are electrostatically sensitive. Please read the ESD guidelines at the end of this book carefully. The following symbol warns that electrostatically sensitive modules are present.



Before Opening the Unit

Please observe the following rules before opening the unit:

- Before you disconnect the power supply cable, discharge any electrostatic charge on your body. You can do this by touching the metal mounting plate for the interfaces on the rear panel of the unit.
- Discharge any electrostatic charge from tools that you are using.
- Wear a grounding wrist-strap if you are handling components.
- Leave components and modules in their packing until you are ready to install them.
- Disconnect the PG 760 from its power supply and remove the battery before plugging in or removing any modules or components.
- Only touch components and modules on their edges. Above all, do not touch the connecting pins and printed conductors.
- Never operate the PG 760 with the cover open.

Tools

For undoing combi TORX, normal or Phillips screws, use the appropriate screwdriver.

Opening the PG 760

Open your PG 760 as follows:

1. Switch off the PG 760, pull out the power supply connector and remove all connecting cables from the unit.
2. Place your programming device onto the right side on a flat, horizontal surface. All components are then accessible from above.
3. Loosen both the front casing screws by about 1 cm.
4. Hold the front of the casing on either side, lift it and slide it back slightly.
5. Lift off the casing.

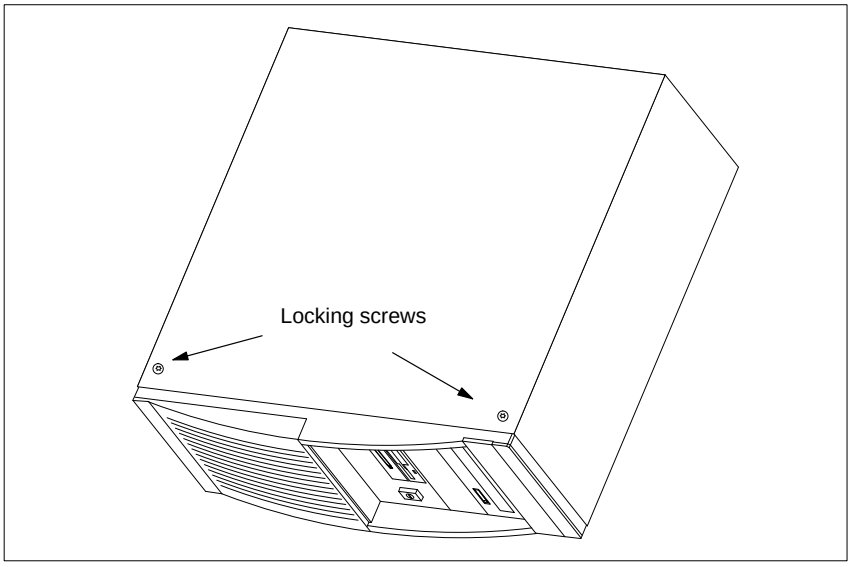
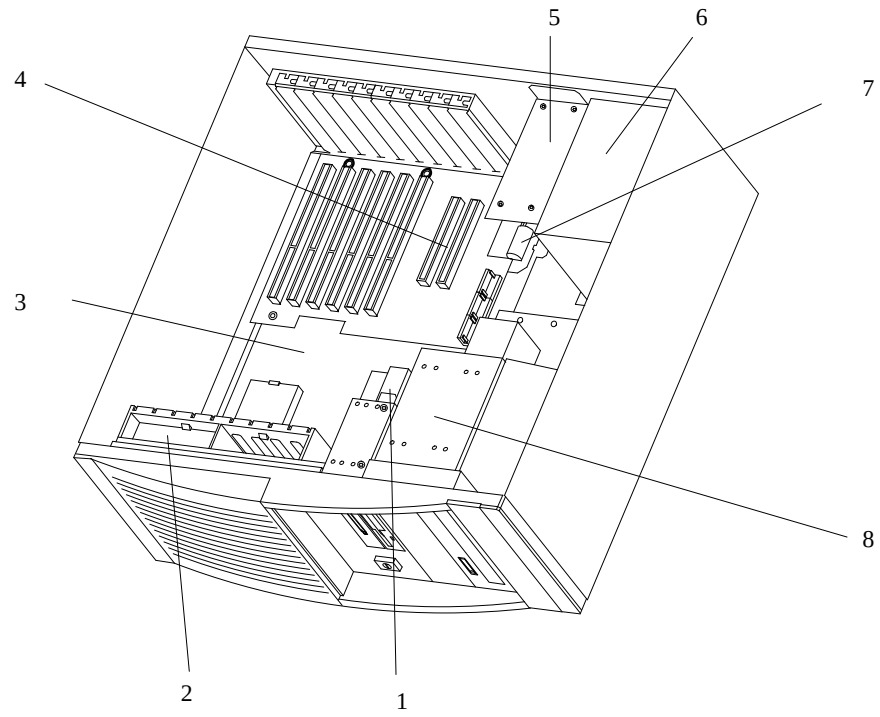


Figure 4-1 PG 760 Locking Screws

4.2 Components Visible After Opening the Unit

View

Once you have removed the top cover of your unit, the components are visible.



1	Floppy disk drive / Memory card holder	4	Bus board with expansion slots
2	Fan	5	Hard disk drive support
3	Motherboard	6	Power supply
		7	Back-up battery
		8	Disk drive support

Figure 4-2 The PG 760 Opened up

Motherboard

The motherboard is the heart of the PG 760. Here, data are processed and stored, and interfaces and device I/Os are controlled and managed.

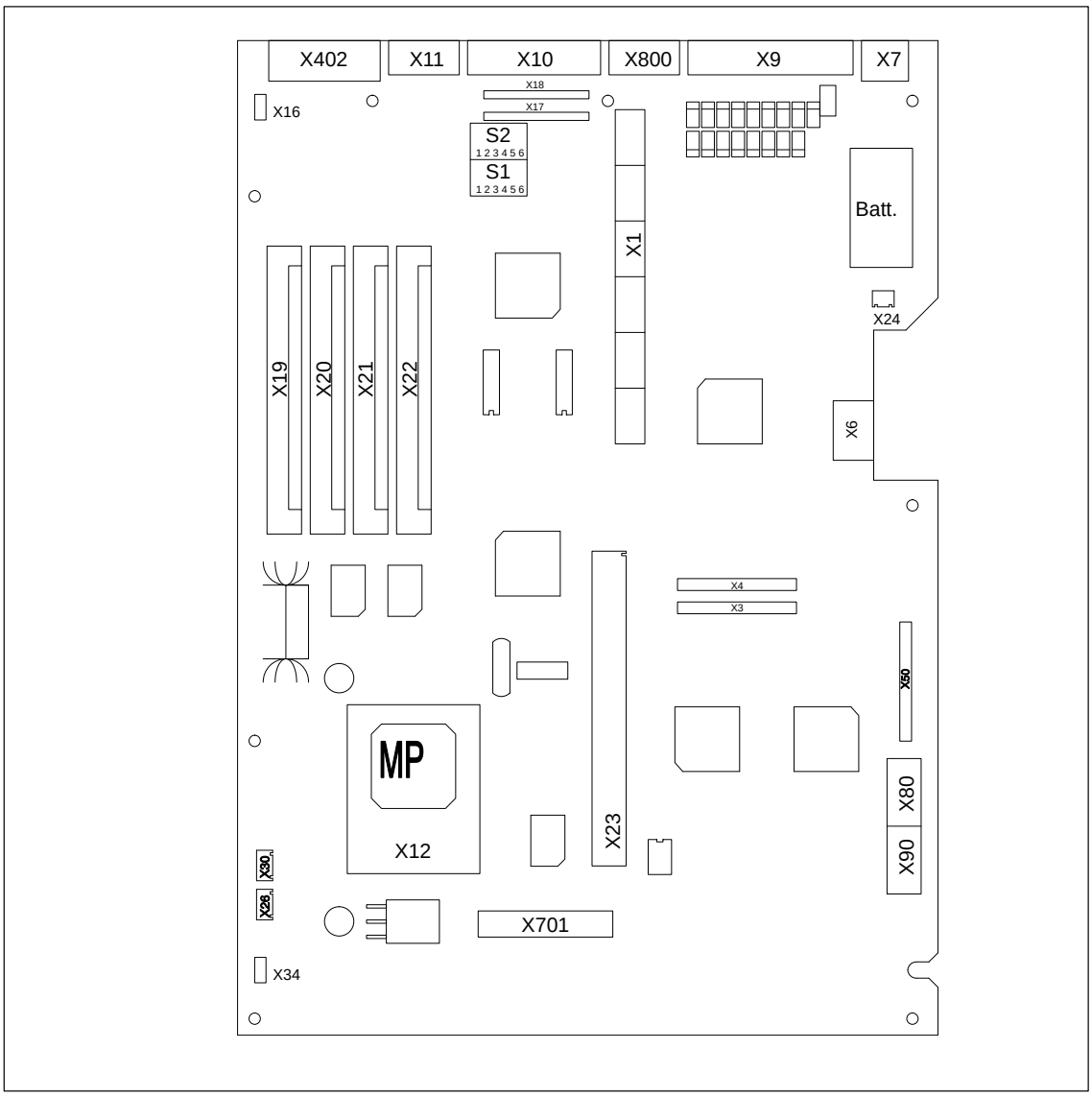


Figure 4-3 Motherboard

Components on the Motherboard

The following components are located on the motherboard of the PG 760:

Designation	Name	Functions
X1	Slotbus	ISA/PCI connector between basic module and bus module
X3	IDE secondary	Secondary IDE interface, standard ribbon cable
X4	IDE primary	Primary IDE interface, standard ribbon cable
X6	Keyboard connection	MINI DIN keyboard plug
X7	Mouse connection	MINI DIN PS/2 mouse plug
X9	LPT1	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)
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
X26	Fan	Fan connection +12 V
X30	Fan	Fan connection +12 V
X34	Processor type	Pentium 133 jumper open
X50	Floppy disk	Floppy disk interface
X80	Power	6-pin power supply connection of basic module
X90	Power	6-pin power supply connection of basic module
X402	VGA	Standard VGA (15-contact)
X701	Memory card	SIMATIC memory card interface
X800	MPI/DP	MPI/DP interface
S1	Switch 1	Manufacturer-specific settings
S2	Switch 2	CPU clock, flash EPROM, TTY interface

Switching the PG 760 to Active/Passive

When the PG 760 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 760 has a switch on its motherboard for this purpose. You must remove the bus card in order to reach this switch.

Switch Position

Change the switch position as shown in the diagram below:

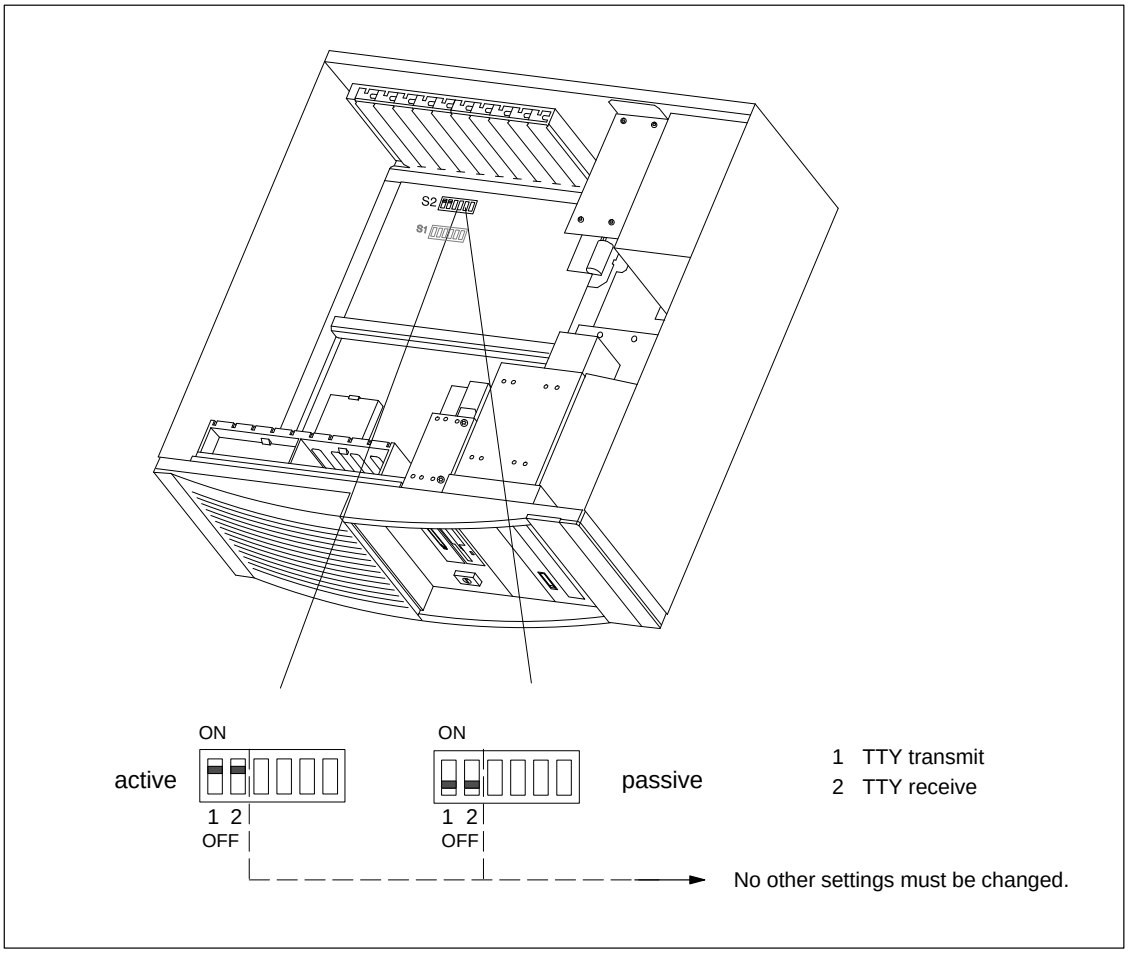


Figure 4-4 Switching the TTY Port to Active/Passive

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 (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

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

Standard Settings

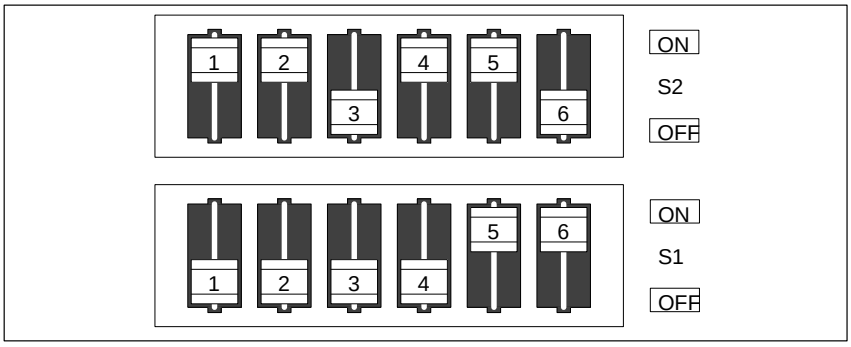


Figure 4-5 Standard Settings of Switches S1 (1..6) and S2 (1..6) for 133 MHz Pentium CPU

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)

4.3 Installing Expansion Modules

Installing Expansion Modules

You can extend the functionality of your PG 760 by installing additional modules. Six expansion slots for long ISA modules are provided on the mother board for this purpose. The current drawn per ISA module must not exceed 9 A at +5 V.

In addition, two PCI slots are available for modules with a high data transfer rate. The current drawn per PCI module must not exceed the values in the following table:

	ISA Bus	**PCI Bus**
+ 5 V	2 A	2 A
+ 12 V	0.3 A	0.5 A
- 12 V	50 mA	0,1 A
- 5 V	50 mA	0,1 A
Signals	One TTL load	One PCI load



Caution

Risk of damage!

The electronic components on 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.

Limitations of PCI Bus

The following functions of the PCI bus specification are not supported:

- **Boundary scan;** the signals required for this are not connected to the basic module.
- **Measurement of module power losses;** the signals required for this are not connected to the basic module.
- **64-bit data access operations;** the signals required for this are not available.

Plugging in the Module

Plug expansion modules in as follows:

1. Turn off the unit and unplug the power cable.
2. Open the unit as described in chapter 4.1.
3. Remove the dummy plate on the rear panel casing.
4. Plug the module into a free slot.
5. Bolt the module backplane to the rear panel casing.
6. Close the unit (Section 4.8).

4.4 Installing Memory Expansion Cards

Standard Memory

There are four slots for 32-bit SIMM memory expansion modules on the motherboard. The current memory configuration is 16 MB. You can extend it to 32, 64, 80 and 128 MB. The memory comes supplied with EDO RAM modules.

Since the processor data bus is 64 bits wide, modules must always be fitted in pairs. X19, X20 and X21, X22 constitute pairs. The same type of module must be used in a pair.

Memory	Slot 0	Slot 1	Slot 2	Slot 3
16 Mbyte	2 Mbit x 32	2 Mbit x 32		
32 Mbyte or	2 Mbit x 32	2 Mbit x 32	2 Mbit x 32	2 Mbit x 32
32 Mbyte	4 Mbit x 32	4 Mbit x 32		
48 Mbyte	2 Mbit x 32	2 Mbit x 32	4 Mbit x 32	4 Mbit x 32
64 Mbyte or	4 Mbit x 32	4 Mbit x 32	4 Mbit x 32	4 Mbit x 32
64 Mbyte	8 Mbit x 32	8 Mbit x 32		
80 Mbyte	2 Mbit x 32	2 Mbit x 32	8 Mbit x 32	8 Mbit x 32
128 Mbyte	8 Mbit x 32	8 Mbit x 32	8 Mbit x 32	8 Mbit x 32

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

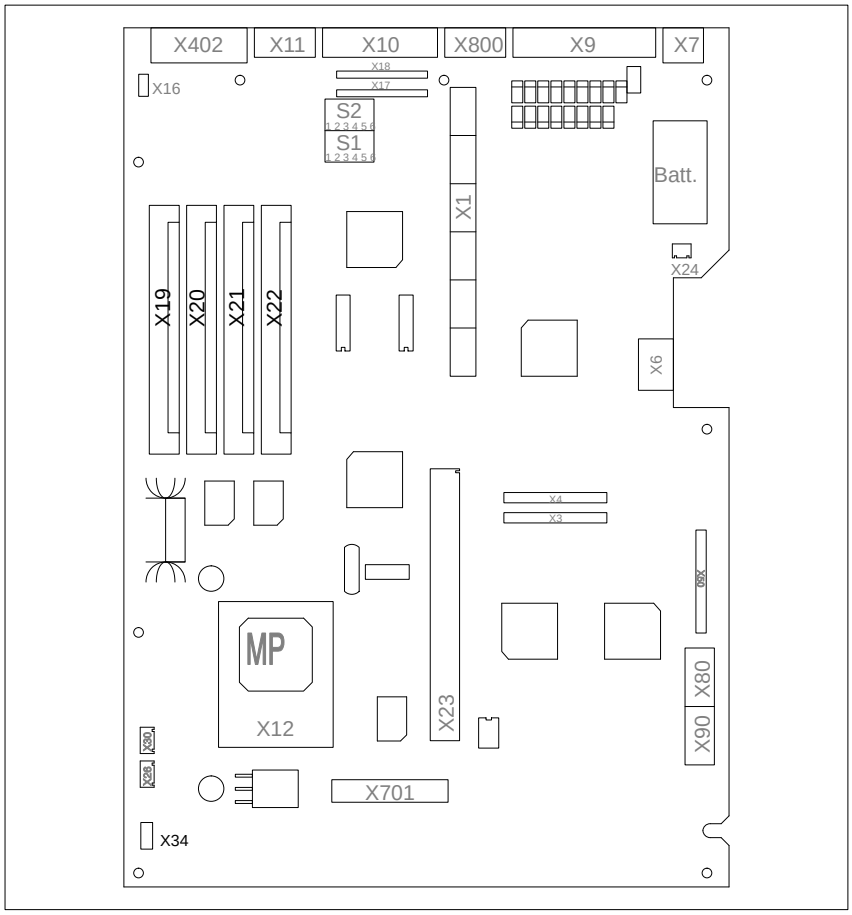


Figure 4-6 Location of the Memory Slots

Caution

Risk of damage!

The electronic components on 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:

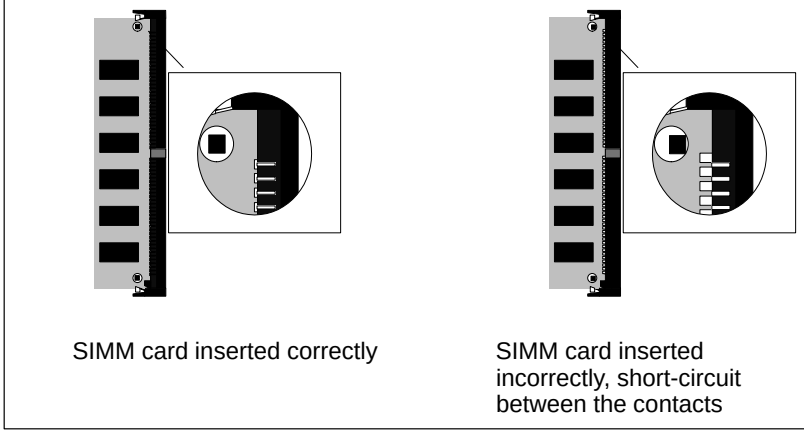
1. Turn off the unit and unplug the power cable.
2. Open the unit as described in Section 4.1.
3. Remove all inserted ISA, PCI modules.
4. Remove the bus module by loosening 5 screws and pulling out vertically upwards.
5. Plug the cards in vertically, making sure the cut-out on the connector end of the SIMM card engages properly.
6. Press the card lightly to the right until it locks into place.
7. Close the unit (see Section 4.8).



Caution

Risk of damage!

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





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.

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 slot for an external second-level cache. You can use this cache to enhance your processor power.

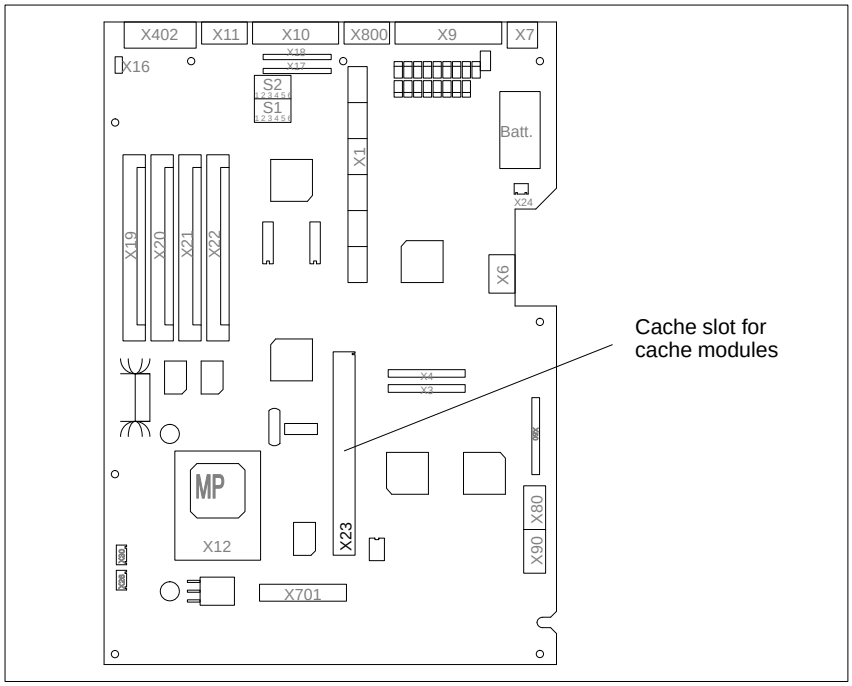


Figure 4-7 Location of the Cache Modules

Plugging in the Cache

To plug in a cache, proceed as follows:

1. Turn off the unit and unplug the power cable.
2. Open the unit as described in Section 4.1.
3. Plug the cache into its slot vertically, making sure that the cut-out on the module aligns with the ridge on the socket.
4. Press the cache down lightly into its slot.
5. Close the unit (Section 4.8).
6. The cache must be enabled (set to “active”) in the SETUP program.

Caution

Risk of damage!

The electronic components on the printed circuit boards are extremely 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 Installing and Removing Disk Drives

Installing and Removing Floppy Disk Drives

The floppy disk drive is installed on the front of the unit. If necessary, you can replace it with another.

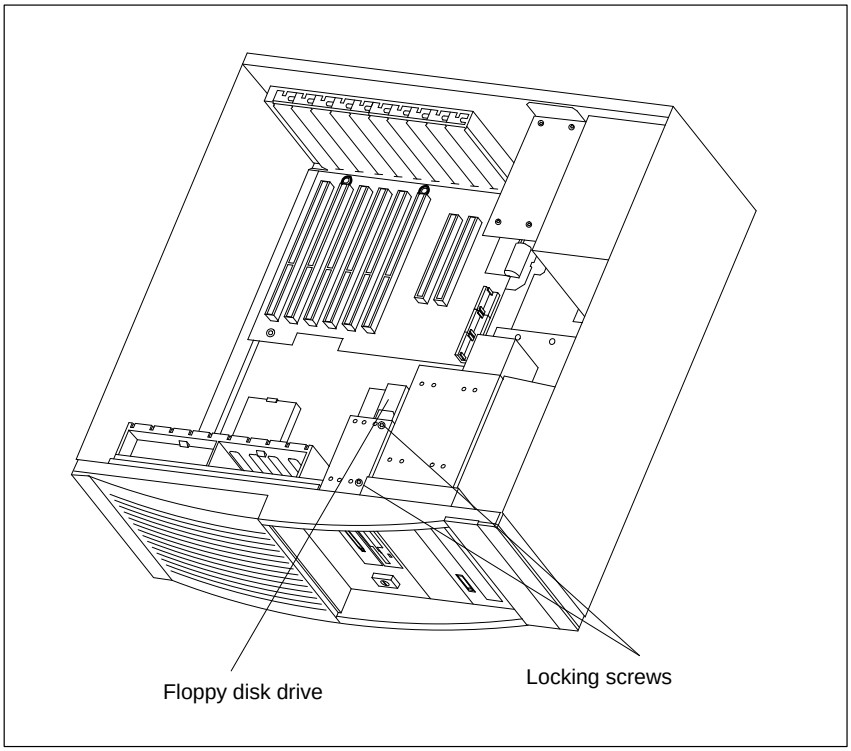


Figure 4-8 Location of the Floppy Disk Drive

Installation of Floppy Disk Drives

To install or remove the disk drive, proceed as follows:

1. Turn off the unit and unplug the power cable.
2. Open the unit as described in Section 4.1.
3. Unplug the connecting cable from the disk drive.
4. Loosen the screws on top of the disk drive support.
5. Pull the disk drive backwards out of the disk drive support.
6. To install disk drives, follow the above procedure in reverse.
7. Close the unit (see Section 4.8).

Removal and Installation of Disk Drive Block (Front)

The CD-ROM drive is fitted in a disk drive block on the front of the unit. A vacant slot is present in the block for an additional drive.

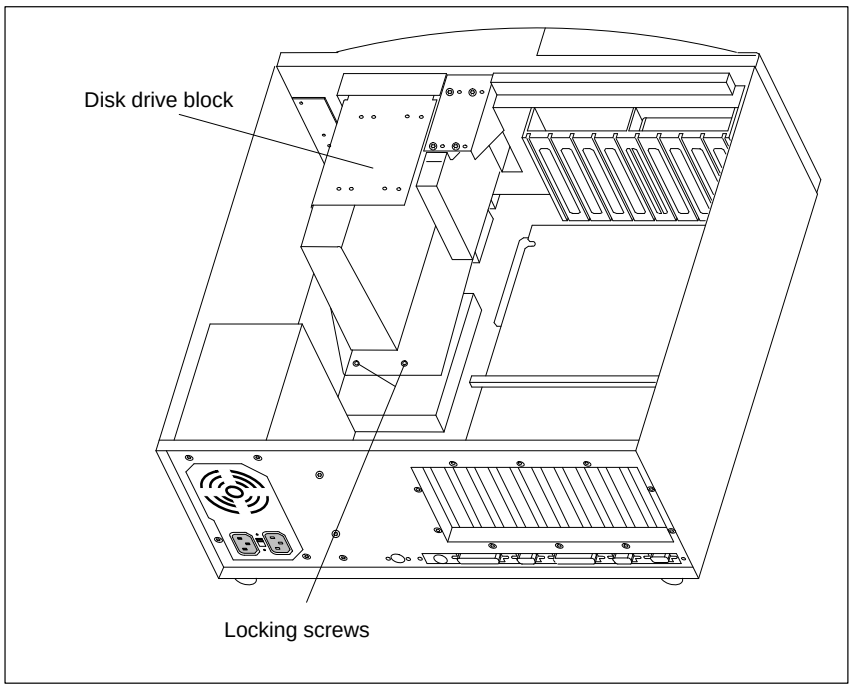


Figure 4-9 Disk Drive Block with Free Slot

Installation of the Disk Drive Block

To install or remove the disk drive block, proceed as follows:

1. Turn off the unit and unplug the power cable.
2. Open the unit as described in Section 4.1.
3. Unplug the connecting cable from the integrated disk drives.
4. Loosen the locking screws on the disk drive block.
5. Slide the disk drive block back by approximately 2 cm.
6. Lift the disk drive block out of the casing.
7. To install disk drive blocks, follow the above procedure in reverse.
8. Close the unit as described in Section 4.8.



Caution

Risk of damage!

The electronic components on the printed circuit boards are extremely 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.

Installing Hard Disk Drives at the Back of the Unit

You can install a further 3.5 inch IDE hard disk drive in the disk drive block at the back of your PG 760. Provisions for the necessary wiring have already been made. Only a disk drive recommended by the manufacturer may be installed as a second disk drive. For the relevant drives and their settings, please refer to the Product Information Bulletin.

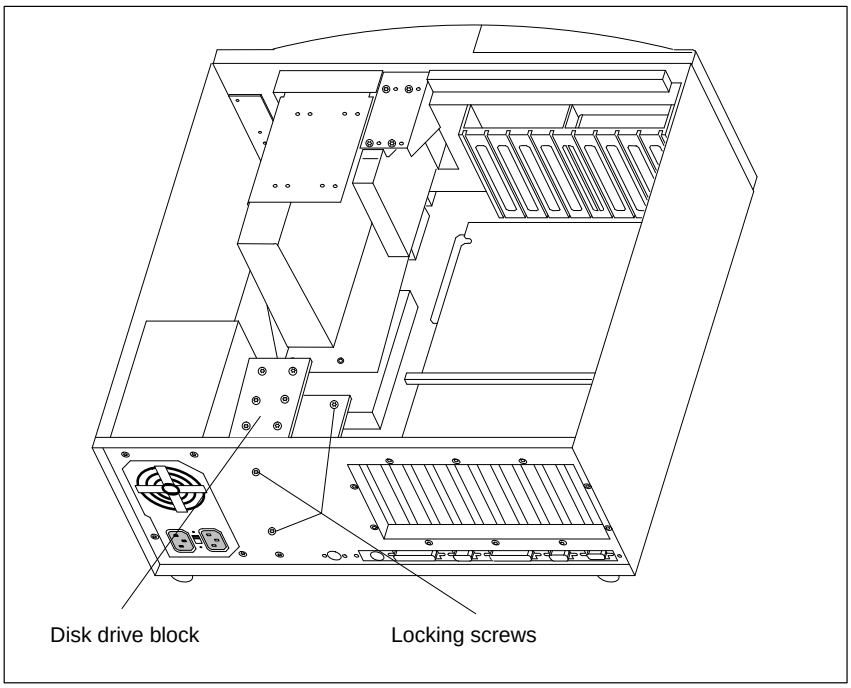


Figure 4-10 Slot for an Additional Disk Drive

Installation of the Hard Drive (Back)

To install an additional hard drive in the back of the unit, proceed as follows:

1. Turn off the unit, unplug the power cable and open the unit as described in Section 4.1.
2. Configure the disk drives for two-disk operation. Only the master drive on the first ISA interface (primary) can be booted (see Product Information Bulletin).
3. Disconnect the 40-pin IDE interface cable and the power cable from the disk drive.
4. Screw the disk drive into the disk drive block with the 4 screws. Only screws sent with the disk drive may be used.
5. Reinstall the disk drive block and screw it together with three screws inside and one on the back of the unit.
6. Plug the 40-pin IDE interface cable and the power cable into the disk drive block.
7. Close the cover and switch on the unit again.
8. Register the disk drive with the help of the automatic disk drive identification in the SETUP program (see Chapter 5).



Caution

Risk of damage!

The electronic components on the printed circuit boards are extremely 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.

4.7 Changing the Back-Up Battery

Battery Power Supply for Real-Time Clock and Configuration

A back-up battery (3.6 V lithium battery) powers the real-time clock even after the PG 760 is switched off. In addition to the time of day, all the information about the PG 760 system configuration is stored. 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. Thus the battery rarely needs to be changed.

Battery too Low

If the battery voltage is too low, the current time and the configuration data stored 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 (see Figure 4-3).

To change the battery, proceed as follows:

1. Turn off the unit, unplug the power cable.
2. Open the unit as described in Section 4.1.
3. Now replace the back-up battery, which is attached to the motherboard by a short length of cable.
4. Fix the new battery to the motherboard with a cable binder.
5. Close the unit as described in Section 4.8.



Warning

Risk of severe personal injury or property damage, danger of release of harmful substances.
There may be a danger of explosion if the battery is not handled properly. Incorrect disposal of used batteries can cause the release of harmful substances.
Do not throw a new or discharged battery into an open fire. Do not solder onto the cell container. Do not recharge the battery and do not open the battery by force.
The correct lithium battery can only be ordered from Siemens (Order No.: W79084-E1003-B1).
Return used lithium batteries to the manufacturer/recycler or dispose of them as special waste according to local regulations.

Resetting SETUP

If you change the back-up battery, you must reset the configuration of your PG 760 with the SETUP program (see Chapter 5).

4.8 Closing the Unit

Closing the Unit

To close the unit, proceed as follows:

1. Put the cover on the back of the unit and slide it forwards.
2. Lift the cover slightly and attach it to the front panel (upper edge with guides).
3. Screw the cover together with both screws.
4. The machine is ready for operation again.

Configuring the PG 760

5

What Does this Chapter Contain?

In this chapter, you will learn how to configure the BIOS of your PG 760 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	5-14
5.1.3	The Security Menu	5-16
5.1.4	The Power Menu	5-17
5.1.5	The Exit Menu	5-19
5.2	PCI-Configuration	5-21

5.1 Changing the System Configuration with SETUP

Changing the Configuration

The configuration of your programming device is set for working with the software supplied with the unit. You should only change the preset values if you have modified your PG 760 in any way, or if a fault occurs when the unit is powered up.

You can enter modificatioins to the SETUP standard values in the table on page 5-8, so that you will always have your most important values to hand.

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 760.

You can use SETUP to set the hardware configuration (for example, type of hard disk) and define the system characteristics. You can also use SETUP to set the time 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 760 (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 obtain all the 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 760 Pentium

CPU = Pentium  133 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:

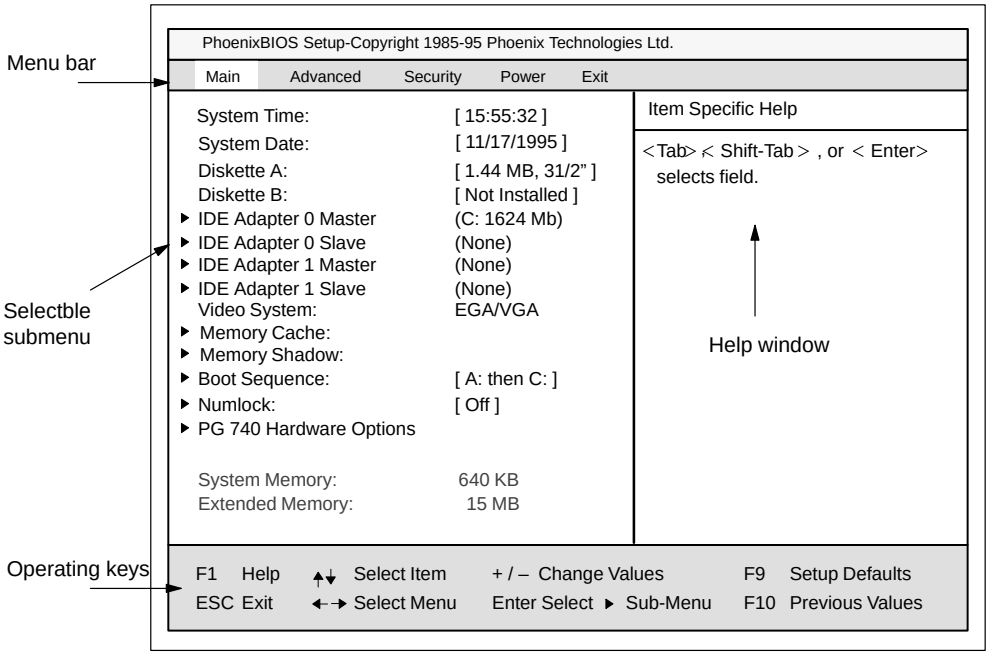


Figure 5-1 Main SETUP Menu

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

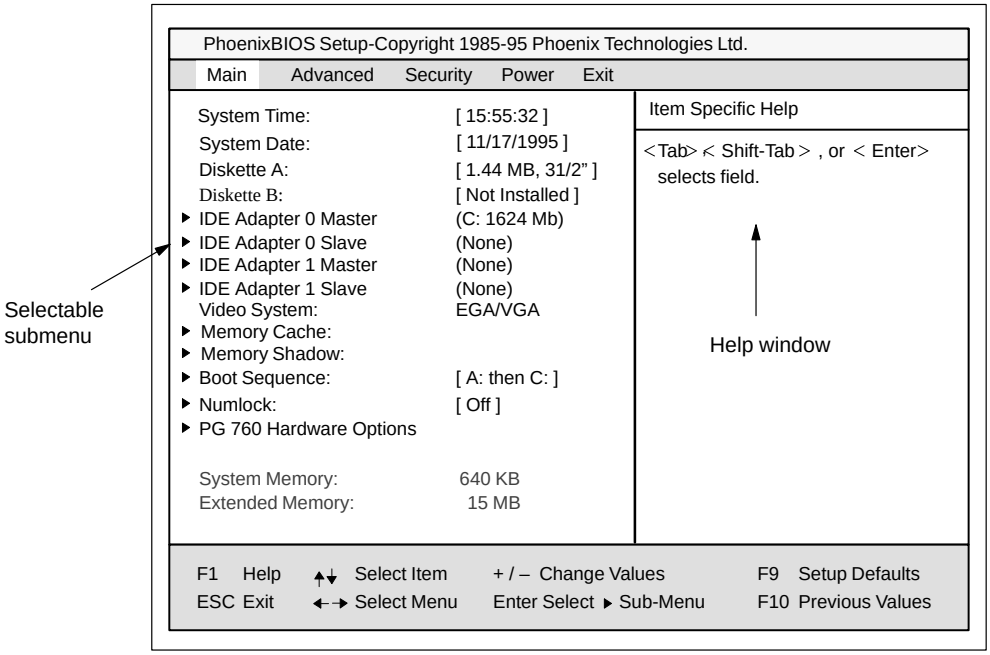


Figure 5-2 Main SETUP Menu

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
Via submenus	
IDE adapter	Type of installed hard disks
Memory Cache/Shadow	For setting of memory options
Boot Sequence/Numlock	For setting of boot options
PG 760 Hardware Options	For setting of PG 760 hardware options

System Time and System Date
Time and 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
Floppy Disk Drive

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:

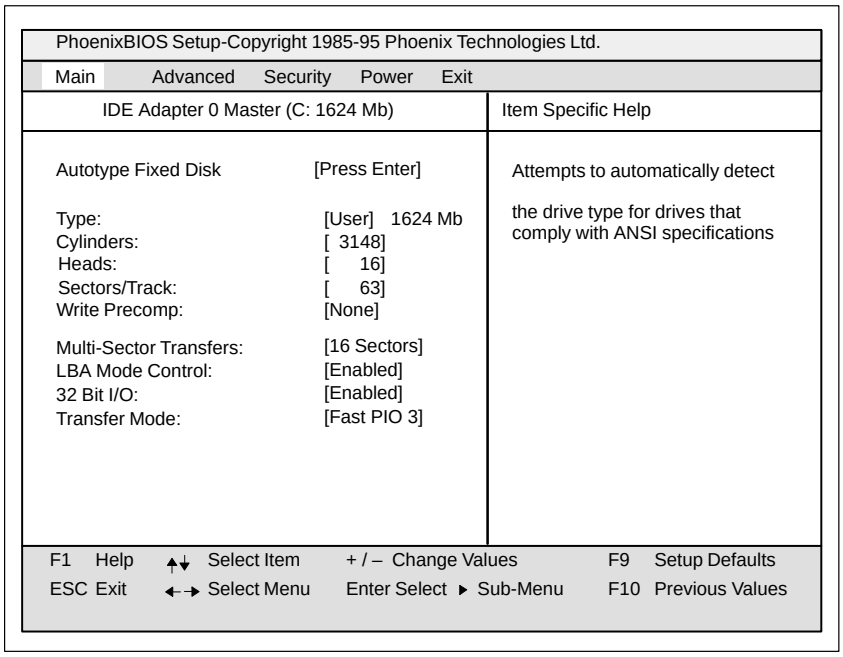


Figure 5-3 “Hard Disk Drive IDE Adapter” Submenu

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.**

Option “Autodetect Hard Disk”

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 timeout, 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 programming device, 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”.

Option "Multi-Sector Transfers"

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  sectoren
```

Option "LBA Mode Control"

"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.

Option "32 Bit I/O"

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

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

Option "Transfer Mode"

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
```

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.

Option “Memory Cache”

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

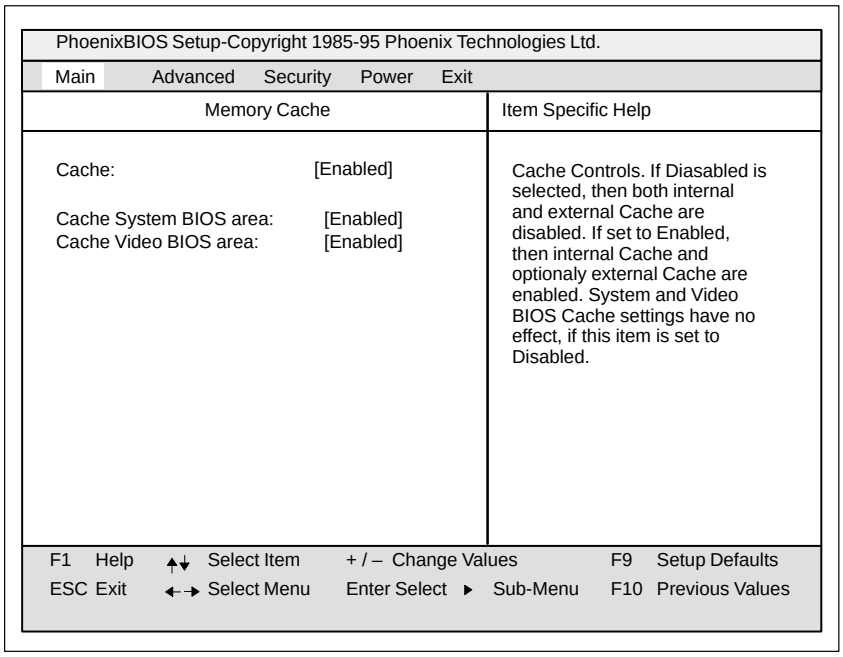


Figure 5-4 “Memory Cache” Submenu

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.

Option “Memory Shadow”

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

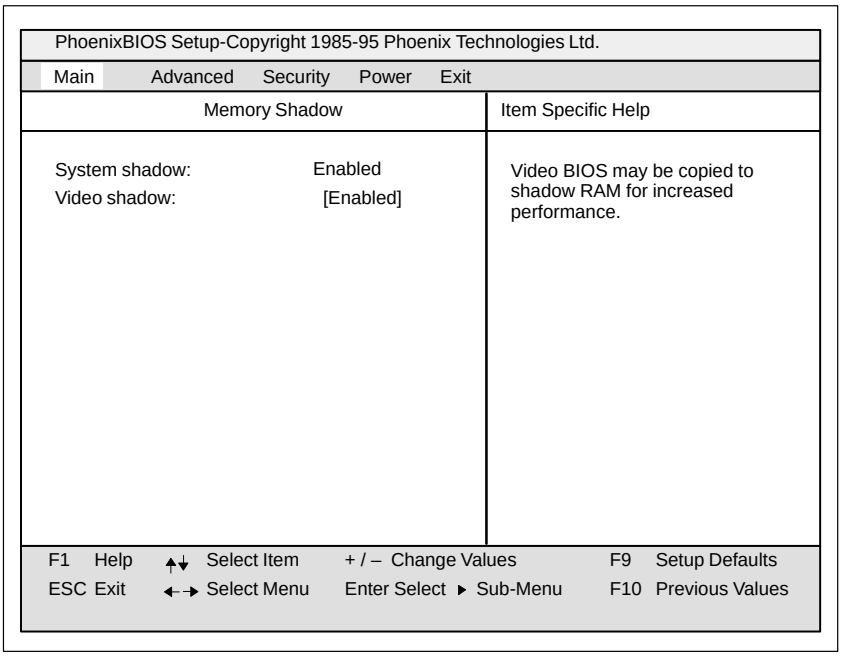


Figure 5-5 “Memoy Shadow” Submenu

Parts of the EPROM, for example, those which contain the power-on self-tests 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 **not** copied into the RAM

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

Option “Boot Sequence”

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

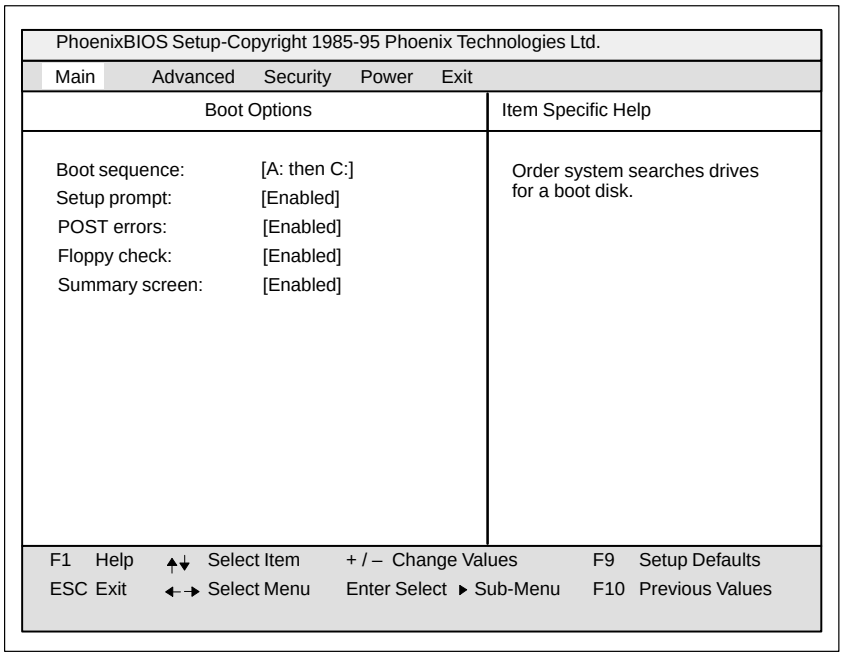
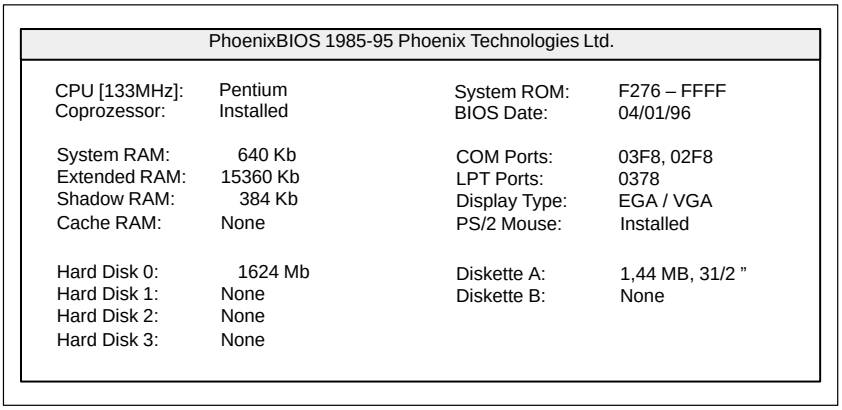


Figure 5-6 Submenu “Boot Options”

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, a SETUP prompt 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:



Option “Numlock”

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

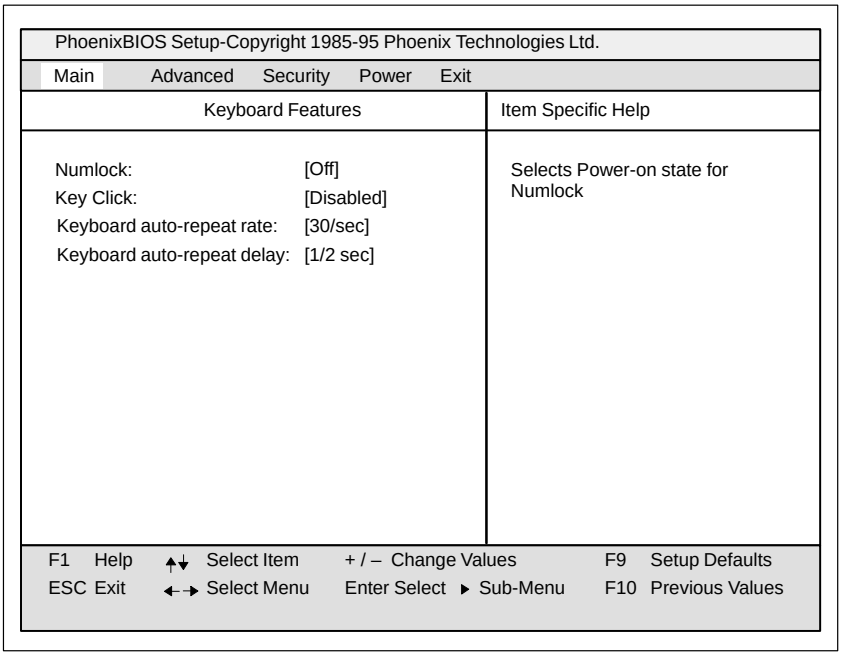


Figure 5-7 “Keyboard Features” Submenu

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

Option “Hardware Options”

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

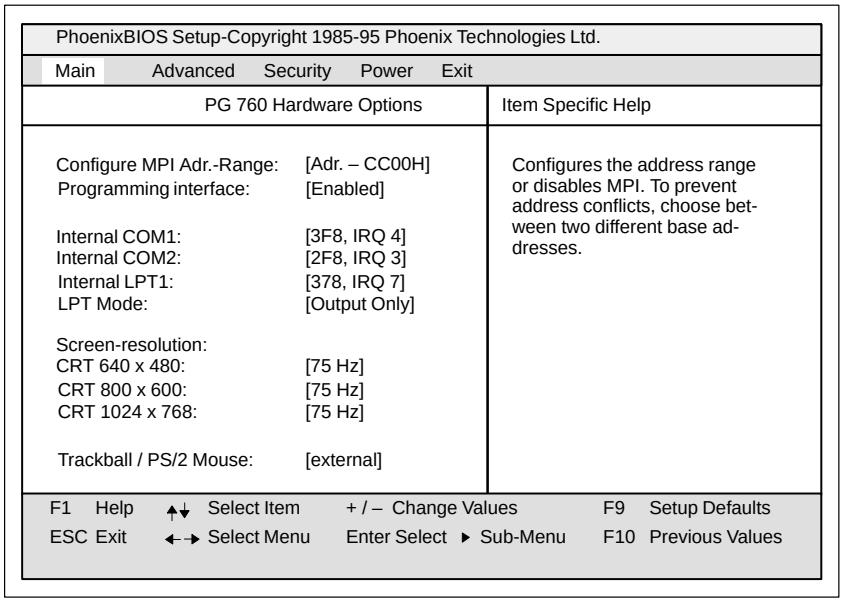


Figure 5-8 “PG 760 Hardware Options” Submenu

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

Entry	Function	
Configure MPI Address 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.	
Programming Interface	Enables or disables 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 for EPP support	Printer port can also be used as an input port or
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 768 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

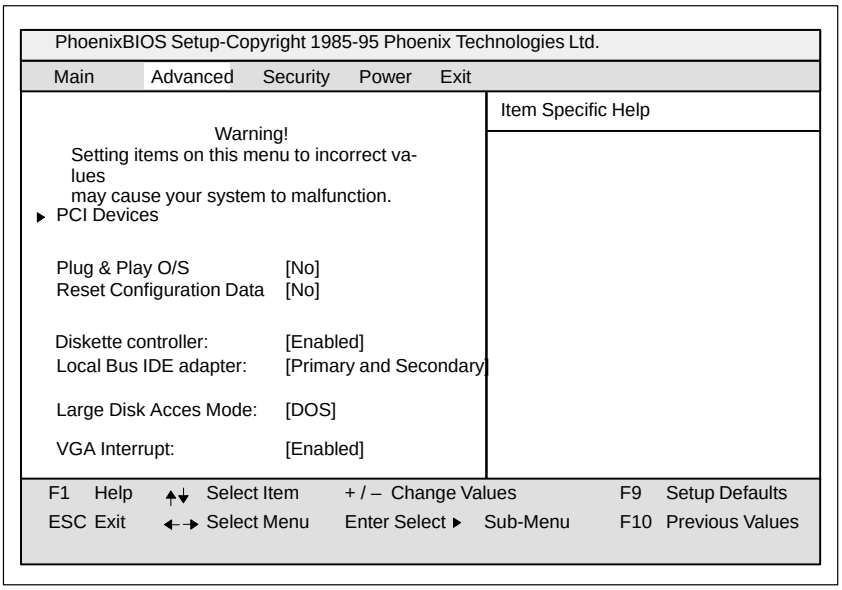


Figure 5-9 “Advanced” Menu

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 disable 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.

Option “PCI Devices”

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

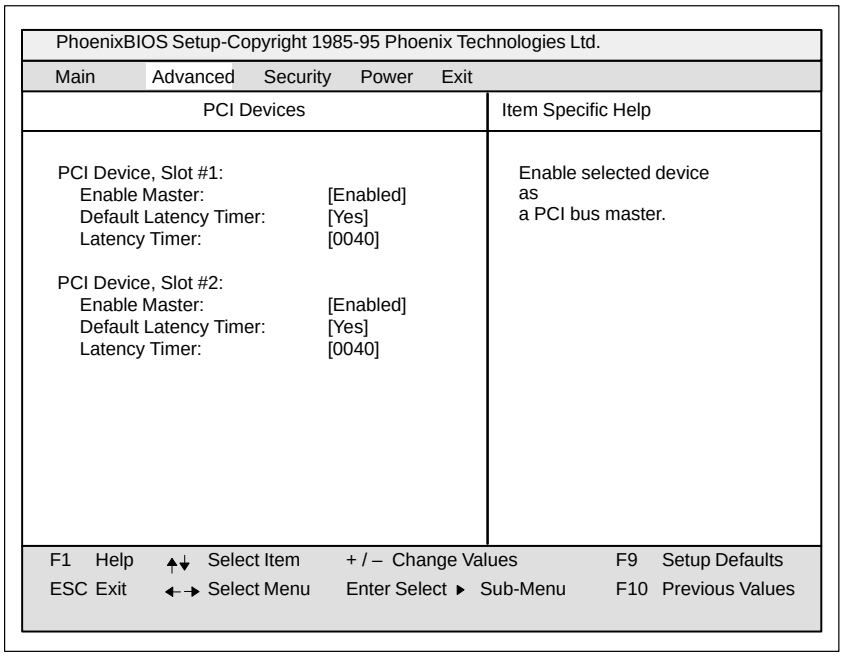


Figure 5-10 “PCI Devices” Submenu

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.

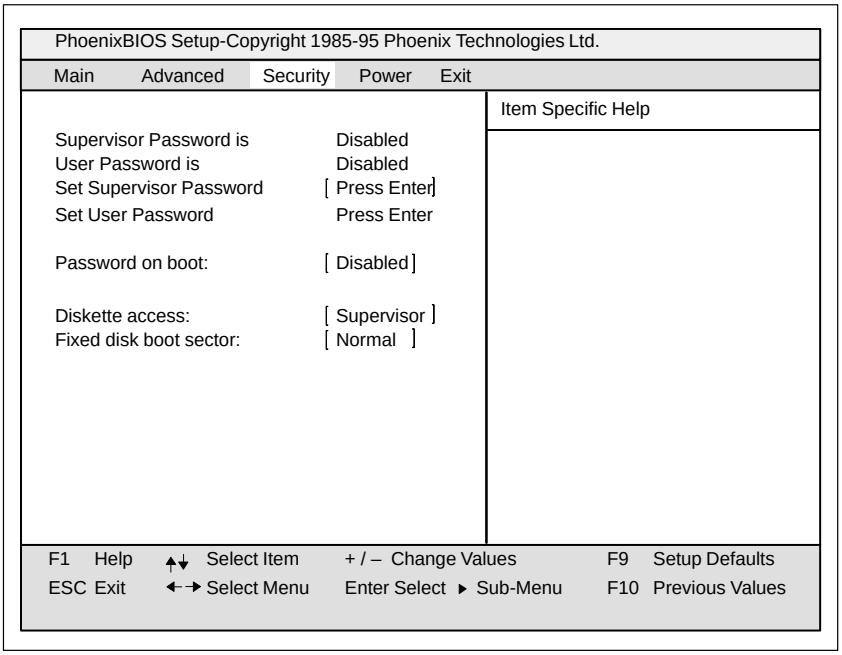


Figure 5-11 “Security” Submenu

5.1.4 The Power Menu

Summary

This menu has the following structure:

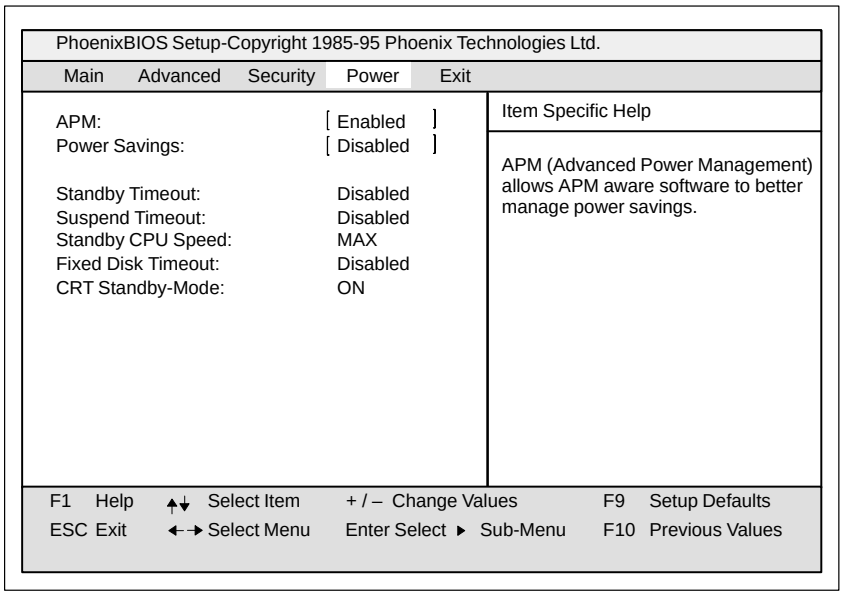


Figure 5-12 “Power” Submenu

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 Mode are set accordingly.
Standby Timeout	[Disabled]	No standby mode
	[30min]	...minutes after your PC goes to standby mode
	[1hr][2hr][3hr][4hr]	hours after your PC goes to standby mode provided no mouse or keyboard operations have been carried out
Suspend Timeout	[Disabled]	No suspend mode
	[30min]	...minutes after your PC goes to suspend mode
	[1hr][2hr][3hr][4hr]	hours after your PC goes to suspend mode provided no mouse or keyboard operations have been carried out

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

5.1.5 The Exit Menu

Summary The setup program is always terminated using this menu.

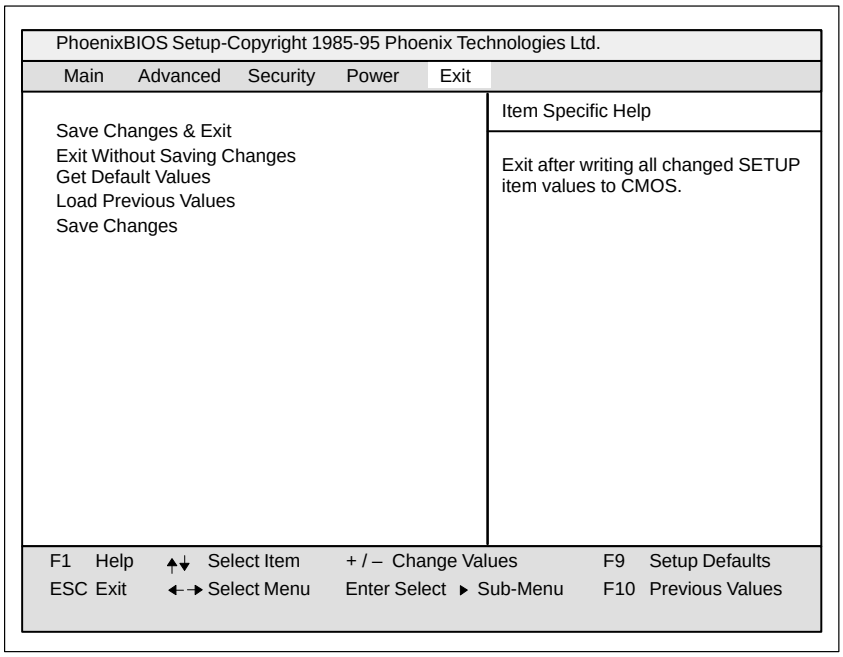


Figure 5-13 “Exit” Submenu

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 save values. The hard disk must be entered explicitly.
Load Previous Values	The last saved values are loaded 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.

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 760 Hardware Options	**Submenu**	
MPI Address	Addr. - CC00H	
Programming Interface	Enabled	
Internal COM 1: Internal COM 2: Internal LPT1: LPT Mode	3F8, IRQ4 2F8, IRQ3 378, IRQ7 Bi-Directional	
CRT 640 x 480: CRT 800 x 600: CRT 1024 x 768:	75 Hz 75 Hz 75 Hz	
Trackball/PS2 Mouse	External	

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 82437Fx(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	11h		PCI slot 1
00h	13h		PCI slot 2

Error Diagnostics

6

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 760 Operation

Error	Cause	Remedy
Power-ON LED does not light up	• PG 760 is switched off • Power supply not properly connected	• Switch the PG 760 on • Check power supply connections, power cable and power plug
Message: "Invalid configuration information.... Press F1 key to continue, F2 to run SETUP utility"	• Incorrect configuration data • Back-up battery is flat/does not work	• Press **F2**, check the configuration data in SETUP, enter any default values, and check error messages in the first SETUP menu
Message: "No boot device available"	• Diskette in drive A: is not a boot diskette • Wrong hard disk type entered in SETUP	• Insert boot diskette • Use "Autodetected Fixed Disk" function • Use "Fixed Disk Function" in SETUP program
Message: "Keyboard stuck; key failure"	• A key has become blocked during the system keyboard self-test	• Check keyboard • Restart system
Booting of the PG 760 aborted after several beeps	• An error has occurred during the system self-test	• Check hardware
Every time a key is pressed, a beep is heard and no characters appear	• Keyboard buffer overflow	• <CTRL> <PAUSE>
Not-ready message when trying to read a diskette	• No diskette has been inserted • Diskette has not been formatted	• Insert diskette • Format diskette
Write-protect error when trying to write to a diskette	• Diskette write-protect activated • Write-protect hole open on 3.5 in. diskette	• Cancel write protection
Message: "EPROM TSR Interface disabled, check Power Management"	• **Programming Interface** in the SETUP program is set on **disabled**	• Go to submenu **PG 760 Hardware Options** in the SETUP program and set the **Programming interface** to **enabled**
Interface ports COM1, COM2, LPT1 or MPI are not responding	• Interfaces are **disabled** in SETUP program	• Go to submenu **PG 760 Hardware Options** in the SETUP program and set the **COM1**, **COM2**, **LPT1** and **MPI** to **enabled**.
<\> key inscription missing	• Not original keyboard	• With German keyboard driver: <ALTGr> <ß>, or <ALT> <9> <2> • With international keyboard driver: <ALT> <9> <2>
<\>key not displayed	• Wrong keyboard driver is being used	• Load correct keyboard driver· <ALT> <9> <2>
Mouse does not function	• The PS/2 interface is set to disable	• Check setup entry
Mouse pointer cannot be moved with the trackball	• Trackball will not rotate • No/wrong mouse driver	• Clean trackball and housing • Load the right mouse driver
Mouse pointer moving erratically	• Trackball dirty	• Clean trackball and housing
Disk drive cover will not open	• Filter cover incorrectly fitted	• Press on filter cover

Hardware Information

7

What Does This Chapter Contain?

This chapter contains important reference data about the following:

- Hardware addresses
- Interrupt assignments
- Information about connecting cables.

Summary of Sections

In Section	You Will Find	On Page
7.1	Hardware Address Table	7-2
7.2	Interrupt Assignments	7-7
7.3	Connector Pinouts	7-8
7.4	Connecting Cables	7-15

7.1 Hardware Address Table

There are two kinds of address areas:

- Memory address area
- I/O address area.

Different read/write signals (I/O WR, I/O RD, MEMR, MEMW) are used to reference these areas. The following tables provide you with an overview of the address areas used. Please refer to the descriptions of the individual functional groups for more details.

Table 7-1 Assignments 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	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	512k-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 Gbyte. 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 KB) and from 0010 0000h to 07FF FFFFh (127 Mbyte).

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 Mbyte). 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 MB). 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 MB. In order to achieve a larger address area for dual-port RAM extensions than the memory address area between 640 KB 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 KB) 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 assignment

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	COM2	
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	
03D0	03DF	16	CGA / VGA control register	

From	to	Byte	Basic Function	Possible Alternative Function
Address		**Size**	**Function**	
03E0	03E1	2	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 Change	
03F8	03FF	8	COM 1 / TTY	
0778	077A	3	ECP LPT1	
04D0	04D1	2	PiiX PIC 1,2 interrupt controller edge/level control	
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 prim. IDE register Memory descriptor Table Base Adress	
FCF8	FCFA	2	Bus master interface prim. IDE register Command & Status	
FCFC	FCFF	4	Bus master interface prim. IDE Register Memory descriptor table base address	

Table 7-3 DMA assignment

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 Controller
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	-
4010 H-4017 H	0000 0484 H-0000 0487 H	CP141 (H1)	IRQ 10*	DRQ 6
03E0 H-03E3 H	000D 0000 H-000d FFFF H	CP1413 (H1)	IRQ 10*	-
-	000D 0000 H-000D FFFF H	CP5410 (L2)	IRQ 12*	-
4040 H-4061 H	-	DF20	IRQ 10*	-
0330 H-0333 H	000D C000 H-000D FFFF H	SCSI (AHA1540B)	IRQ 12*	DRQ 5

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



Caution

Malfunction!

** IRQ 12 must not be selected with the PG 760 if it is occupied by the PS/2 mouse.

IRQ 15 must not be selected with the PG 760 if it is occupied by the CD-ROM drive (secondary IDE).

7.2 Interrupt Assignments

Interrupt Assignments

The PG 760 uses two integral interrupt controllers of the 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 9 is programmed for the software interrupt vector 0A H (IRQ 2) by the ROM-BIOS.

Priority

The interrupts are priority-scheduled in reverse number order. 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 760 is powered up.

I/O Addresses of the Interrupt Controllers

List of Hardware Interrupts		Programmed Interrupt Vector; Memory Address
SMI	System management interrupt; cannot be masked	-
NMI	RAM parity; I/O channel parity	INT 2 H
IRQ 0	Timer output 0; I/O controller (ISP), internal	INT 8 H
IRQ 1	Keyboard (output buffer full)	INT 9 H
IRQ 2	Interrupt from slave interrupt controller	INT A H
IRQ 3	Serial port (COM2)	INT B H
IRQ 4	V.24/V.28 interface; serial port (COM1)	INT C H
IRQ 5	Parallel port 2 (LPT2) / MPI (depends on driver used)	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), depends on driver used	INT 72 H
IRQ 11		INT 73 H
IRQ 12	PS/2 mouse	INT 74 H
IRQ 13	Numeric processor	INT 75 H
IRQ 14	Winchester; IDE interface	INT 76 H
IRQ 15	CD-ROM drive, secondary IDE interface	INT 77 H

Do not use interrupts already assigned in the system.

7.3 Connector Pinouts

PS/2 Mouse Socket Connector

The connector has the following pinout:

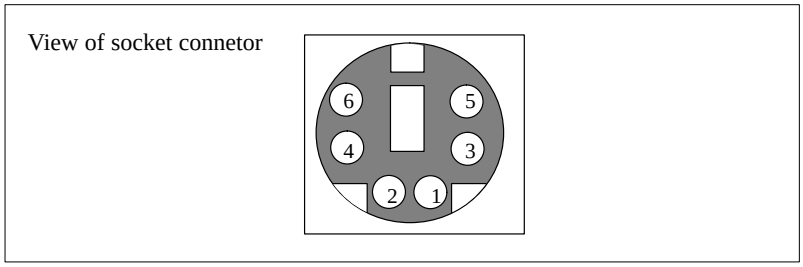


Figure 7-1 Connector Pinout for a PS/2 Mouse

Pin No.	Designation	Input/Output
1	Data line	Input/output
2	Unassigned	-
3	0 V	-
4	5 V power supply (short-circuit proof)	Output
5	Clock line	Input/output
6	Unassigned	-

Connecting a Keyboard

The connector has the following pinout:

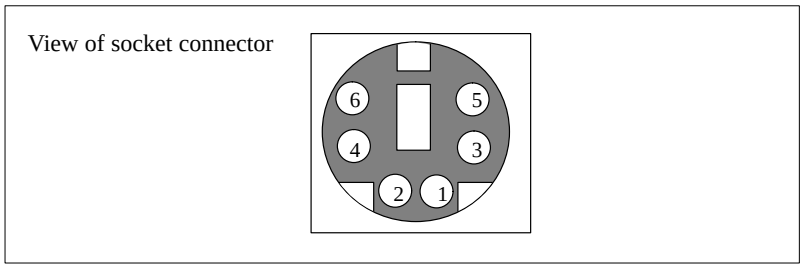


Figure 7-2 Connector Pinout for an External Keyboard

Pin No.	Designation	Input/Output
1	Keyboard data line	Input/Output
2	Trackball data line	Input/Output
3	0V	-
4	5V power supply (short-circuit proof)	Output
5	Clock line keyboard	Input/Output
6	Clock line trackball	Input/Output

VGA Socket Connector

The VGA socket connector on the PG 760 has the following pinout:

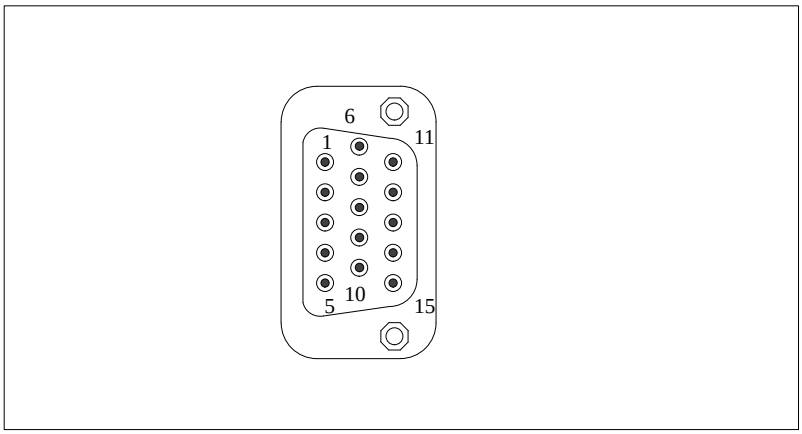


Figure 7-3 VGA Socket Connector

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	-
6	M	Ground	-
7	M	Ground	-
8	M	Ground	-
9	-	NC	-
10	M	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 760 has the following pinout. The interface is electrically isolated.

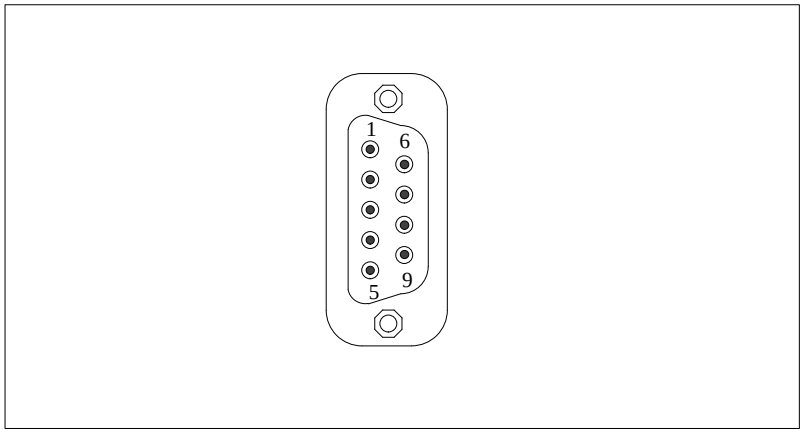


Figure 7-4 MPI/DP Socket Connector

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.	In-/Output
4	RTS_AS	RTSAS, control signal for received data stream. The signal is ”1” active when 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.	In-/Output
9	RTS_PG	RTS output signal of the MPI module. The control signal is ”1” when programming device is sending.	Output
Screen		On connector casing	

Parallel Port

The parallel port (LPT1) on the PG 760 has the following pinout:

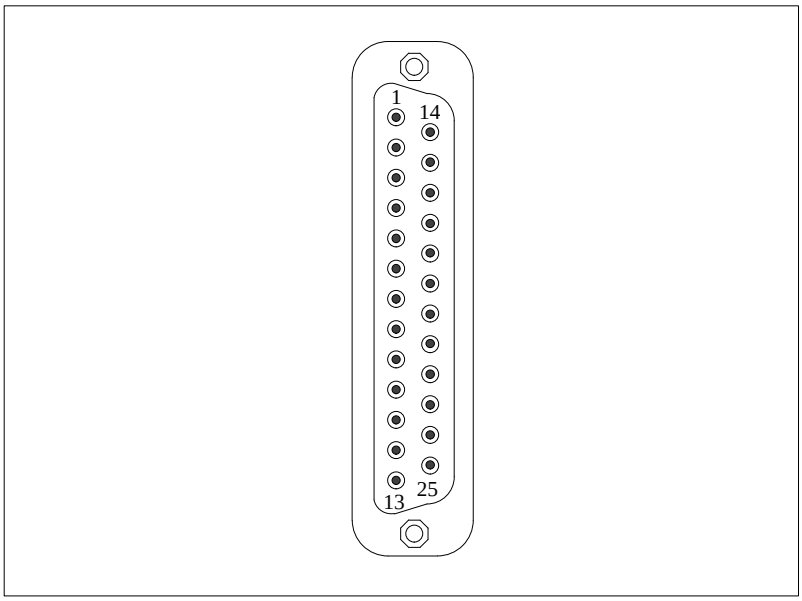


Figure 7-5 Parallel Port LPT1 (Socket Connector)

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

Serial Port (PLC/V.24/Modem)

The serial port (COM1) on the PG 760 has the following pinout:

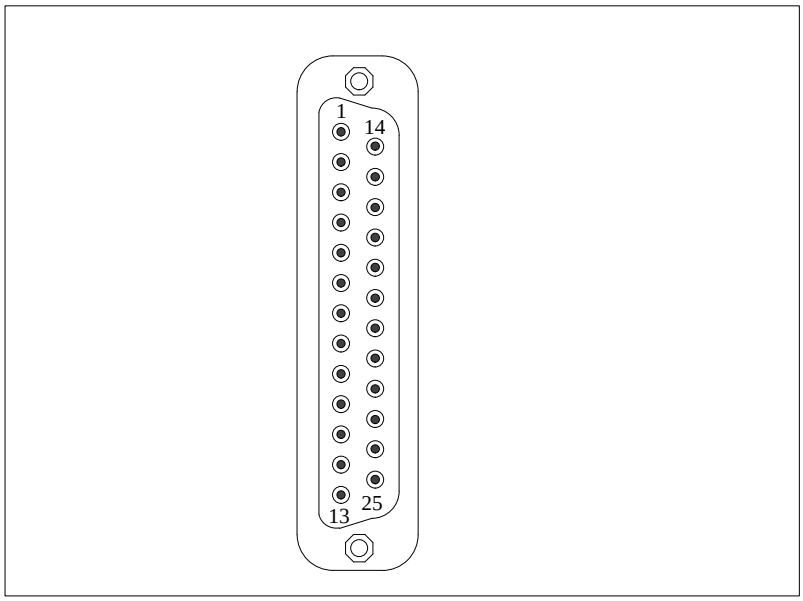


Figure 7-6 Serial Port COM1 (Socket Connector)

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 760 has the following pinout:

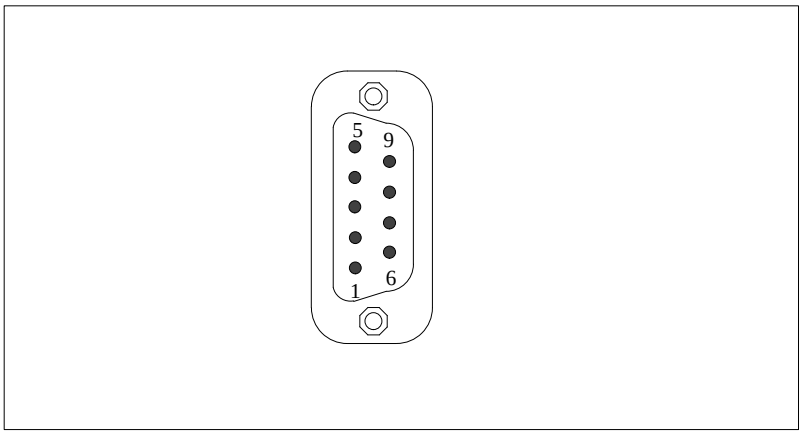


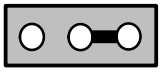
Figure 7-7 Serial Port COM2 (Plug Connector)

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

Settings on the Bus Module

Two different pairs of the address/bus lines of the local PCI bus can be selected as select signals for the two PCI slots using the pin connectors J300, J302.

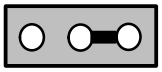
Pin connector: J300



Setting:

Jumper 1-2: IDSEL PCI-slot 1 = AD 28 *(standard setting)*
Jumper 2-3: IDSEL PCI-slot 1 = AD 27

Pin connector: J301



Setting:

Jumper 1-2: IDSEL PCI-Slot 2 = AD 30 *(standard setting)*
Jumper 2-3: IDSEL PCI-Slot 2 = AD 29



Warning

The standard setting must not be changed by the user.

7.4 Connecting Cables

Overview

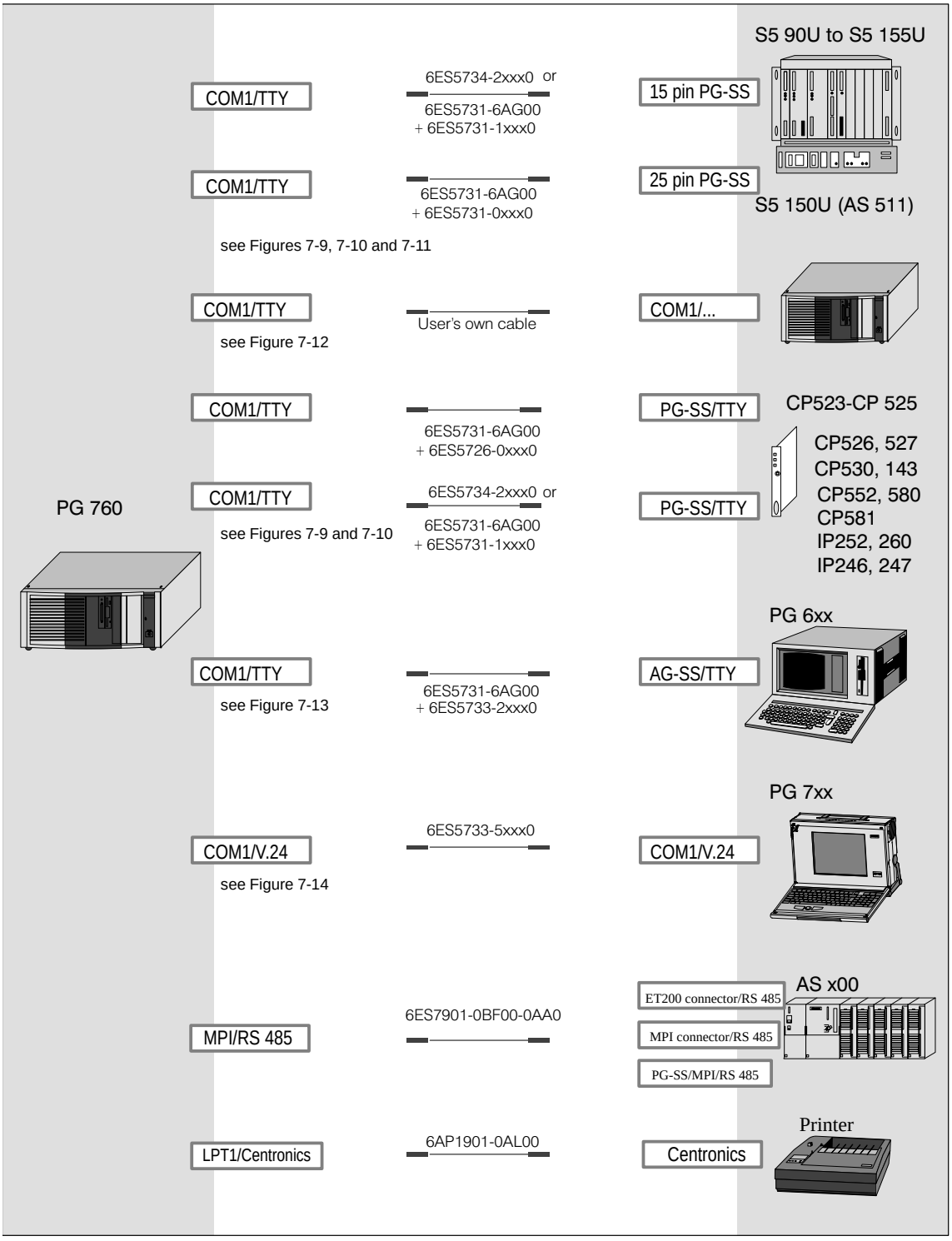


Figure 7-8 Connecting Cables

PG7xx - PLC Standard Connection

You can use the standard connecting cable (supplied along with your PG 760) to connect your PG 760 to a Siemens programmable controller. Please read the notes in Chapter 3.

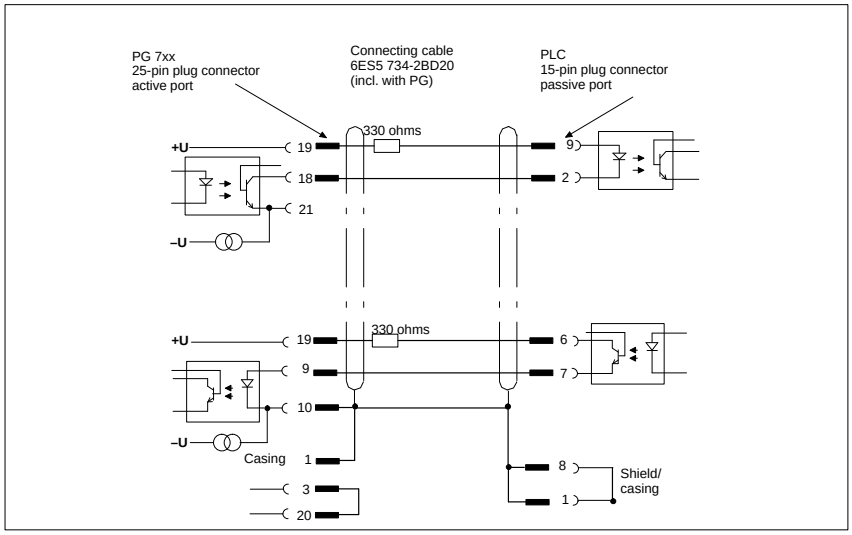


Figure 7-9 PG 7xx - PLC Standard Connection

PG 7xx-PLC Connection to PG 6xx 15-pin Connecting Cable

If you want to connect your PG 760 to a programmable controller with the standard connecting cable of a PG 6xx programming device, you will need an adapter.

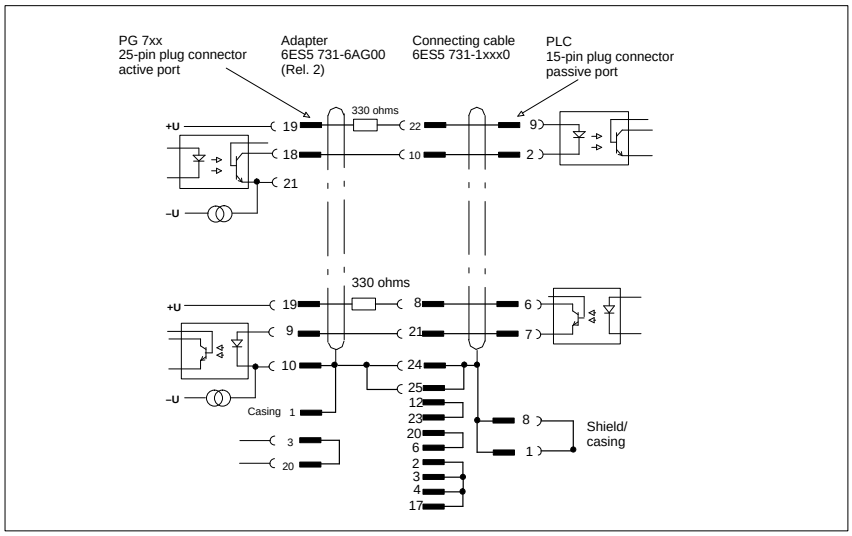


Figure 7-10 PG 7xx-PLC Connection to PG 6xx 15-pin Connecting Cable

PG 7xx - PLC Connection via PG 6xx Connecting Cable with 25-Pin Socket Connector

With the 25-pin plug connecting cable, you can connect your programming device via an adapter to a PLC, for example PLC 150U (AS 511).

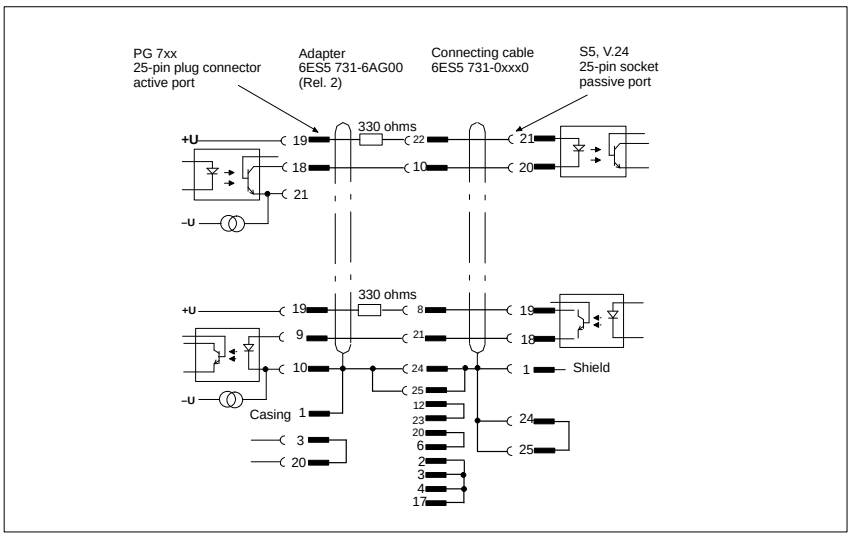


Figure 7-11 PG 7xx - PLC Connection via PG 6xx Connecting Cable with 25-pin Socket Connector

Cable for Interconnecting Programming Devices

You can connect your PG 760 to other programming devices via the TTY/COM 1 interface with this cable. This cable does not have an order number. Please read the notes in Chapter 3.

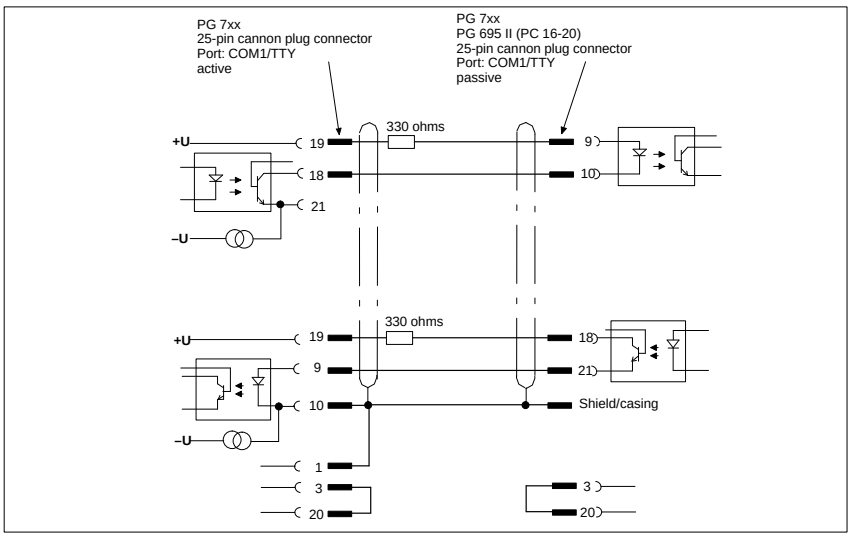


Figure 7-12 Cable for Interconnecting Programming Devices

PG 7xx - PG 6xx Connection to PLC-S5 Port

If you want to connect your PG 760 to the PLC-S5 port of a PG 6xx programming device, you will need an adapter. In this case, the PG 760 must be switched to active. Please read the notes on changing over the TTY/COM 1 port to active in Chapter 4.

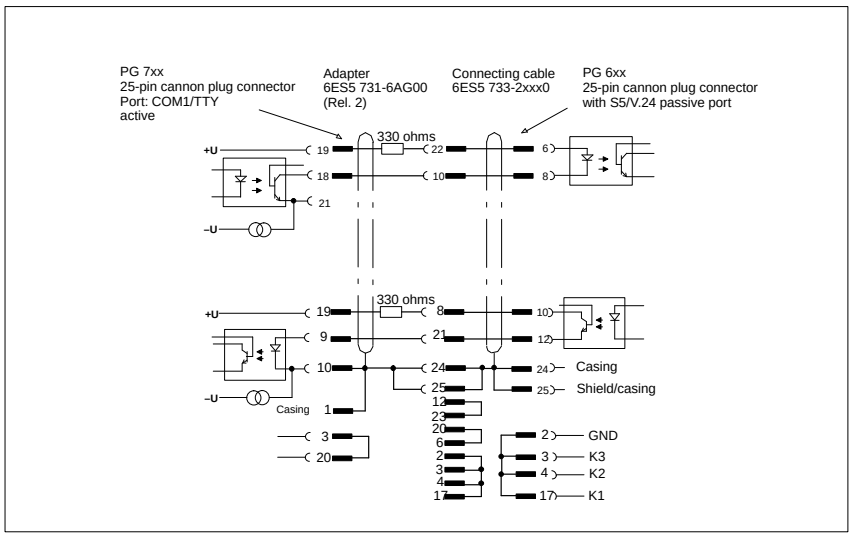


Figure 7-13 PG 7xx - PG 6xx Connection to PLC-S5 Port

PG 7xx - PG 7xx Connection in V.24 Operation

With this connecting cable you can connect to any PG 7xx.

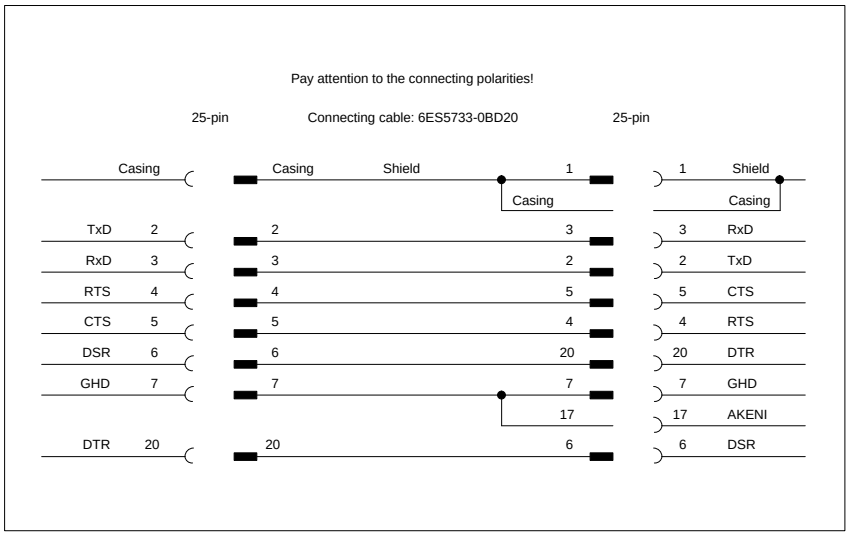


Figure 7-14 PG 7xx - PG 7xx Connection in V.24 Operation

Note

The Product Information Bulletin enclosed with your computer contains further technical information.

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 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.

BIOS — BASIC Input Output System.

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

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

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

C

Cache — Fast intermediate memory.

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

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

COM2 port

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

Configuration Files

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

Configuration Software

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

Cursor

Collective term for mouse pointer and text cursor.

Cursor Control

Keypad on the keyboard for controlling the cursor.

D

Diskette

The diskette (floppy disk) is an external direct access memory on which all types of files and programs can be stored. The storage medium is a round magnetic disk in a plastic cover to protect it from being scratched.

Diskette Drive

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

Display

The monitor of the PG 720 and PG 740.

Double-Click

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

Drives

The PG 760 programming device is equipped with one hard disk drive and one disk 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 the hard disk, printers and monitors.

Drop-Down Menu

In graphics-supported programs, a menu line is positioned at 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

Extended Memory

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

F

File

A file is a 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 (Port)

- 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

K

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

L

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

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

M

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

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

Modem

Communications device that enables a computer to send and receive data over a telephone line. **Mo**dulator and **dem**odulator of a signal transmission facility. It converts the digital pulses from a computer into analog signals (and vice versa).

Module

Modules are boards (printed circuit boards) which can be plugged into a programmable controller or programming device. They are available, for instance, as central controller modules, interface modules or as bulk memory modules.

Monitor

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

Motherboard

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

Mouse

The mouse is an input device with which the user inputs coordinates (x,y). By moving the mouse, the mouse pointer can be moved at will around the screen. By pressing the left mouse button, the position is marked. The other mouse keys may have different assignments according to the application. With the mouse, objects can be selected, menus processed and functions started.

Mouse Pointer

The mouse pointer is moved across the worktop (screen) by means of the mouse. The mouse pointer selects, for example, objects which are to be processed.

MPI/DP

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

MS-DOS

(Microsoft Disk Operating System) is one of the standard operating systems for personal computers. It is a single-user system and is supplied with all our programming devices.

N

Network

Link between programming devices and programmable controllers by means of interface modules, physical cables and the corresponding software to allow data exchange between 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 one 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).

PG Programming device.

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

PLC SIMATIC S5 programmable controller.

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

The PLCs of the SIMATIC S7 system (for example, S7-200, S7-300) consist of one or more CPUs and various I/O modules.

Pull-Down Menu See Drop-Down Menu.

R

RAM

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

ROM

ROM (**R**ead **O**nly **M**emory) is a memory in which every memory location can be addressed individually. The stored programs and data are permanently programmed at the factory before delivery and are not lost in the event of a power failure.

RTC

Real-Time Clock

S

SCSI Interface

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

Serial Interface

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

SETUP

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

SIMATIC Memory Cards

Memory submodules in credit-card format for SIMATIC S5 to SIMATIC S7 which are programmed with the PG 760 and can be plugged into an S5 or S7 programmable controller.

SINEC L2

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

SINEC H1 (ETHERNET)

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

Software

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

STEP 5 Basic Package

This is a software package which is the basis for all other STEP 5 software packages. With the programming device (PG 760), this package is used to program PLCs from the SIMATIC S5 family. The language used is known as STEP 5.

System Configuration

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

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

T

Text Cursor

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

U

User Interface

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

User Program

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

V

V.24 Interface

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

VGA

(Video Graphics Array) Color graphics control mode.

W

Warm Restart

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

Working Memory

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

Write Protection

Write protection for files or diskettes.

- Write protection for files; this type of write protection is stored in the computer and is allocated by the system manager.
- Diskette write protection; for 5 1/4 in. diskettes by blanking out the hole on the right-hand edge with an adhesive label; for 3 1/2 in. diskettes or EOD disks by opening the write protection hole.

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