SIEMENS

SIMATIC PC

Panel PC 870
Computing Unit

Equipment Manual

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Edition 12/01

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 an imminently hazardous situation which, if not avoided, will result in death or serious injury.

Warning

indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Caution

used with the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Caution

used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Notice

indicates a potential situation which, if not avoided, may result in an undesirable result or state.

Note

is an important piece of information about the product, the handling of the product or the respective part of the documentation which should be noted in particular.

Qualified Personnel

Equipment may be commissioned and operated only by **qualified personnel**. Qualified personnel within the meaning of the safety notices in this manual are persons who are authorized to commission, ground and identify equipment, systems and circuits in accordance with safety engineering standards.

Correct Usage

Note the following:

Warning

The equipment may be used only for the applications stipulated in the catalog and in the technical description and only in conjunction with other equipment and components recommended or approved by Siemens.

Startup must not take place until it is established that the machine, which is to accommodate this component, is in conformity with the guideline 98/37/EEC.

Faultless and safe operation of the product presupposes proper transportation, proper storage, erection and installation as well as careful operation and maintenance.

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For your notes

Preface

About this manual

The SIMATIC Panel PC 870 Equipment Manual is part of the SIMATIC HMI documentation and consists of two parts: operating unit and computing unit. It provides information for operators, mechanics, planning engineers and maintenance personnel about the computing unit's installation, functionality, operation and technical design.

Where to find what

The Computing Unit equipment manual contains the following chapters:

Chapter	Content
1	Overview of the computing unit's performance features
2 - 3	Starting up, connecting and operating the computing unit
4 - 5	Servicing, expanding and configuring the computing unit in the BIOS setup
6	Fault diagnosis
7	Hardware information
8	Remote mount form factor
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	Glossary
	Index

Notation

The following conventions are used in this manual:

`Motor off`	Text that is displayed on the operating unit is printed in Courier type face.
`Variable`	Symbolic names that stand for variable quantities that appear on the screen are printed in Courier italic type face.
Screens	Selectable functions are printed in standard italic type face.
ESC	Names of keys and buttons are shown in a different type face.

History

Release	Comments
07/01	Initial release of the SIMATIC Panel PC 870 – Computing Unit equipment manual.
12/01	Extension to include ”Remote mount form factor” option of the SIMATIC Panel PC 870 – Computing Unit equipment manual.

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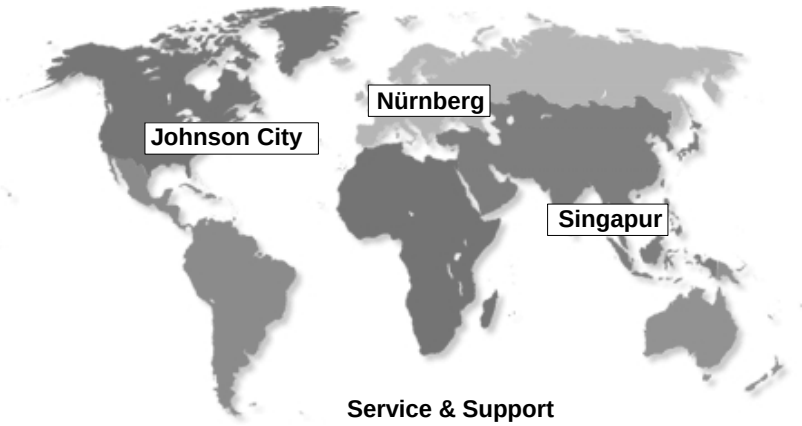

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  - at fax polling no. +49 (0) 8765-93 02 77 95 00
- For current product information, FAQs, tips and hints and downloads which may be helpful for your application, see:
  - On the Internet: address `http://www.siemens.de/automation/service&support`
  - From the bulletin board system (BBS) in Nuremberg (*SIMATIC Customer Support Mailbox)* at the number +49 (0) 911 895-7100.

    To dial the mailbox, use a modem with up to V.34 (28.8 Kbaud), with the following parameters: 8, N, 1, ANSI, or dial on ISDN (x.75, 64 Kbits).

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You will find the addresses:

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- on the Internet http://www.siemens.de/automation/partner
- in our interactive catalog CA01
  http://www.siemens.de/automation/ca01
- on our quick–start CD

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Product Overview

1

Overview

The computing unit is the basic component both for the PC-based HMI devices (Panel PC) and (in special configurations) and for custom-configured devices.

The computing unit is intended for use in industry as well as in the residential, business and commercial areas and can also be used in building system automation or in public facilities, in addition to industrial applications.

The computing unit is an especially high–performance industrial PC designed in Celeron/Pentium III technology.

Features

The computing unit is characterized by:

- extensive climatic, vibration and shock tests to ensure industrial compatibility;
- electromagnetic compatibility conforming to CE and FCC;
- UL/CSA approvals;
- user support by hotline, service, spare parts;
- quality assurance conforming to ISO 9001;
- compliance with the requirements for a fire enclosure to EN60950/UL1950 – in other words, it may be used without an additional fire enclosure;
- compact dimensions;
- suitability for use in a wide ambient temperature range;
- a design that is easy to service and maintain.

Field of applications

The computing unit is equipped with software which allows it to be used universally. It includes the Windows operating system in the standard variant.

The computing unit additionally allows the use of:

- SIMATIC supplementary software
- software from the entire world of automation
- software from the PC world

Additional applications:

The computing unit can also be used in other areas of automation engineering (SIMATIC HMI; TELEPERM; SINUMERIK; SIROTEC, etc.).

Remote mount form factor

As an alternative to the integrated standard configuration, Remote mount form factor is possible. The advantages are that

- The control unit can be installed closer to the machine and inclined at an angle of up to 70 degree – for example, in a swivel arm (”boom”),
- The more sensitive computing unit (hard disk!) can be installed vertically some distance away from the machine where vibration is low – for example, in a cabinet.

With this configuration, additional components are required for communication between the control unit and the computing unit:

- The transmitter, which is mounted on the computing unit.
- The receiver, which is mounted on the control unit; and
- The cable, which links the two of them.

The present equipment manual describes

- Chapters 2 to 7 basically describe the specific characteristics of the computing unit, but also make reference to the complete unit where necessary – for example, with regard to the dimensions for mounting, maintenance and technical specifications.
- Chapter 8 describes the Remote Mount form factor of the Panel PC.

Advantages of the computing unit

- The computing unit is rugged in design and its functions make it particularly suitable for use on site under harsh industrial conditions. It meets the specific requirements of an industrial environment, such as noise immunity, compliance with standards, ruggedness and continuous operation.
- Owing to the variable operating location and the many options for installation, the computing unit can be used virtually anywhere.
- The computing unit includes all ports and interfaces required for automation with SIMATIC. These are, in particular:
  - parallel port (LPT 1)
  - serial ports (1x V.24, 1x V.24/TTY)
  - PS/2 keyboard port (supports PG720/740 keyboard with trackball)
  - PS/2 mouse port
  - USB port (2x external)
  - MPI/Profibus DP (max. 12 MBaud, CP5611 compatible)
  - Ethernet interface for external monitor
  - VGA controller at AGP bus mit 8 MB SDRAM integrated
  - Single–chip LVDS interface for flat–screen display (TFT, resolution up to XGA)
  - Simple expansion possible via plug–in PCI and ISA–slot modules

- Further features
  - AC 230/120 V power supply without mains switch, optional DC 24 V
  - Reset button (laterally on the device), protected against inadvertent actuation
  - Start–up Guide in electronic form, in 5 languages

Starting Up the Computing Unit

2

Chapter Overview

In Section	You Will Find	on Page
2.1	Unpacking and Checking the Item Delivered	2-2
2.2	Ensuring Readiness for Operation	2–3
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2.1 Unpacking and checking the item delivered

Unpacking the item

Unpack the item delivered to you as follows:

1. Remove the packaging.
2. Do not throw the original packaging away. Keep it in case you have to transport your PC at some time in the future.
3. Please keep the enclosed documentation in a safe place. You will require it when you first start up the item delivered to you and it is part of the device.
4. Check the packaging and the package contents for any visible damage.
5. Check the delivered item against the packaging list for completeness. When doing so, you should also take into observe accessories which you can order separately.
6. Should you detect any transport damages or inconsistencies between packaging contents and packaging list, please inform your sales office.

Recording the serial number (F-No.)

1. Record the serial number of your computing unit in the table; you will find it on the nameplate above the floppy disk drive on the side of the device.

   The repair center will be able to identify the device by the F-No. if it is submitted for repair.

Recording the Microsoft Windows product key of the Certificate of Authenticity

2. Record the Microsoft Windows product key of the Certificate of Authenticity (COA) in the table; you will need it if the operating system needs to be reinstalled. The key is to be found on the device.

F–No.	
Order number	
Microsoft Windows product key	

2.2 Ensuring readiness for operation

Connecting and turning on the computing unit

Before you connect the computing unit to the mains, connect the operating unit (see Equipment Manual “Operating Unit”) and, as applicable, appropriate peripherals (see Chapter 3):

1. Plug the connecting cables into the appropriate female connectors on the interface side of the computing unit (see Sections 3.1 and 3.2).
2. Before you connect the device to the mains, observe the following information with regard to the power supply and the equipotential bonding.
   Since the computing unit does not possess a mains switch, it will be ready for service immediately after the mains plug has been connected.

Power supply

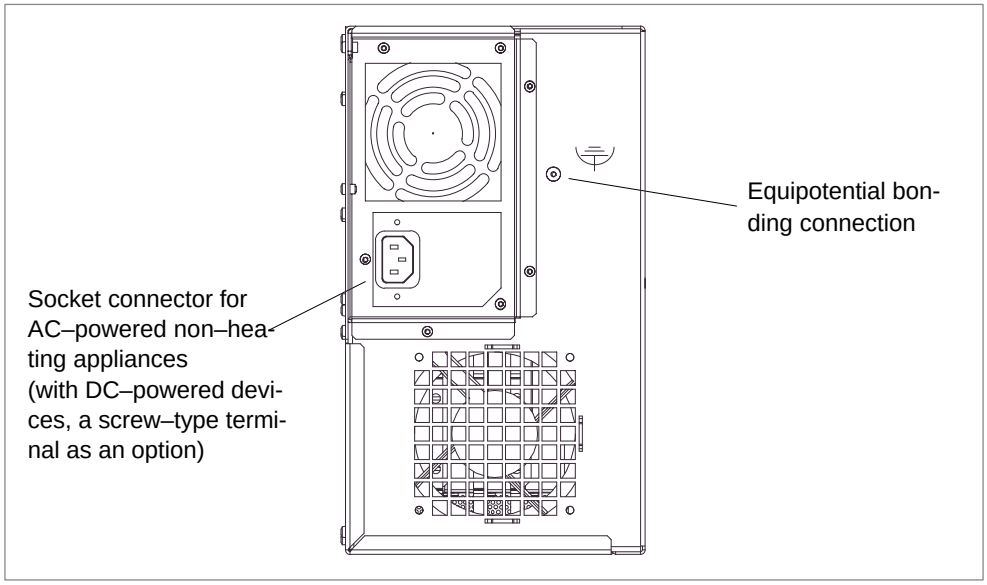

Figure 2-1 Power supply connection

The **AC** power supply of the computing unit is designed for 120/240V systems.

The power supply has a wide–range input; therefore, no setting of the voltage range is required.

The **DC** power supply of the computing unit is designed for 24V systems.

Mains supply

The device is intended for connection to grounded power supply systems (TN systems to VDE 0100, Part 300, or IEC 364-3).

No provision is made for connection to non-grounded or impedance-grounded power supply systems (IT networks).

The power cable should comply with the safety guidelines of the country concerned.

Lay the cables so that no one can step on or trip over them. When connecting the device, carefully study the pertinent information given in Chapter 2.

Never connect or disconnect power cables or data transmission lines during a thunderstorm.

In an emergency situation (for instance, damage to the housing, controls or power cable, penetration by liquids or foreign bodies), pull the power plug and contact the authorized service department.

Check to make sure that the rated voltage for the device is the same as the local mains voltage.

The computing unit must be switched off before connecting/disconnecting I/O devices (keyboard, mouse, printer, etc.). Failure to do so can result in damage to the computing unit.

A connector safety interlock is supplied with a 120 V/230 V power supply.

Caution

The computing unit with AC power supply is equipped with a safety–tested mains cable and may only be connected to a grounding outlet.

Make sure that the outlet on the device or the grounding outlet–socket of the building installation is not obstructed and is installed as close as possible to the device.

The computing unit does not possess a mains switch. To disconnect the device from mains completely, remove the mains plug. This place must not be obstructed.

When installing the device in a cubicle, a central mains switch must be provided.

Country–specific notes

For USA and Canada:

For the operation in Canada and the United States, use a CSA or UL-listed mains cable.

The plug must comply to the NEMA 5-15 standard.

120 V supply voltage

Use a flexible UL–approved and CSA–marked cable featuring the following design properties: three–wire SJT design, conductor cross section at least 18 to AWG, max. 4.5 m in length and parallel grounding–type plug 15 A, at least 125 V.

230 V supply voltage

Use a flexible UL–approved and CSA–marked cable featuring the following design properties: three–wire SJT design, conductor cross section at least 18 to AWG, max. 4.5 m in length and tandem grounding–type plug 15 A, at least 250 V.

230 V supply voltages outside the U.S.A. and Canada

Use flexible cable featuring the following design properties: conductor cross section at least 18 to AWG and grounding–type plug 15 A / 250 V. Make sure that the cable set complies with the safety standards of the country where the devices will be installed and that they bear the relevant markings.

Equipotential bonding

Low-resistance grounding connections ensure that the user of the installation is protected against electric shock (for example, if a short-circuit occurs or if there are defects in the system). Moreover, they discharge interference transmitted by external power supply cables, signal cables or cables to I/O devices.

You should therefore create a low-resistance connection (a large surface acting as the contact) between the grounding point on the system housing and the central grounding point of the cabinet or the installation in which the computer is to be installed. The minimum cross-section should not be less than 5 mm^2.

The grounding terminal is located on the side of the device and is identified by a  symbol.

Turning off the computing unit

The computing unit does not have a mains switch and is isolated from the mains supply only by detaching the mains supply plug.

2.3 Transportation

Shipping

Despite the rugged design of the computing unit, its built-in components are sensitive to severe vibrations and shock. You must therefore protect your computing unit from severe mechanical stress when it is in transit.

The computing unit should therefore only be transported in its original package.

Caution

Risk of computing unit suffering damage

When transporting the device in cold weather and it is subjected to extreme differences in temperature, care must be taken to ensure that moisture is not deposited on or in the device (moisture condensation).

Allow the device slowly to rise to room temperature before taking it into operation. If condensation has formed, wait for approximately 12 hours before turning the device on.

Connecting and Operating the Computing Unit

3

Chapter Overview

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3.2	Connecting I/O devices	3-6
3.3	Drives with interchangeable media	3-8
3.4	Reset button	3-10

3.1 Ports, interfaces and connections

3.1.1 Left device side (interface/port side)

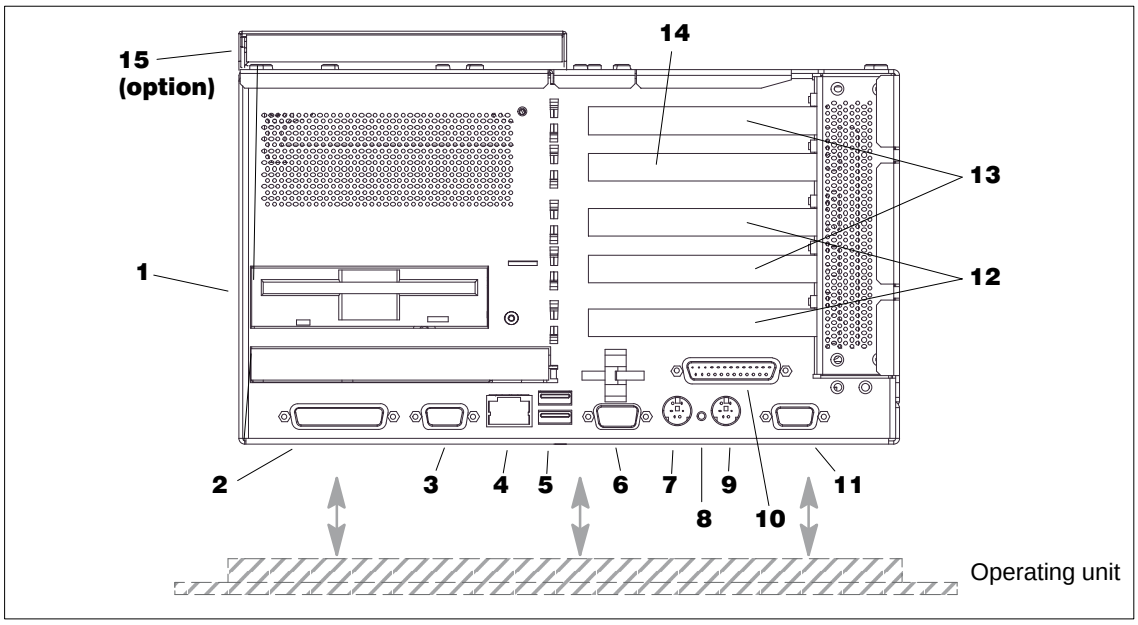


Figure 3-1 Left side of device with ports/interfaces

Explanations with regard to Fig. 3-1

1 Floppy disk drive

Using the floppy disk drive, you can save programs and data to floppy disks and load from floppy disks into the PC 870.

2 COM1 V.24 / MODEM / PLC [1)]

PLSc, e.g. of the S5 series, can be connected via the COM 1 (TTY) port.

3 MPI/DP Multipoint Interface [2)]

You can connect the PC 870 either to an S7 PLC or a PROFIBUS network via the floating MPI/DP interface.

4 Ethernet

RJ 45-Ethernet connection. The Ethernet is a local network with bus structure for data communication featuring data transfer rates of 10 or 100 Megabit per second (Mbps).

5 USB

Connection for the Universal Serial Bus. You can connect here external devices, such as CD–ROM drives, printers, modems, as well as mouse and keyboard.

6 COM2

Serial interface 2 (V.24) for connecting devices with a serial interface, such as modem, mouse or printer.

7 Keyboard

Connection for a PS/2 keyboard

7 Reset

The Reset key can only be pressed with the aid of a pointed object (for example, elongated paper clip). Pressing the Reset key triggers a hardware reset. The computing unit restarts.

Caution

There may be a loss of data with a hardware reset.

9 Mouse

PS/2 connector for connecting a PS/2 mouse

10 LPT1 / Printer

The parallel interface is intended to connect devices with parallel interface, such as printers.

11 VGA

An external VGA monitor can be connected to this port (configuration in the BIOS SETUP, submenu “Hardware Options”, parameter CRT / LCD selection; see Chapter 5).

12 PCI slots

Internal slots for PCI expansion modules

13 PCI/ISA slots

Internal slots for expansion modules

14 ISA slot

Internal slot for an ISA expansion slot

15 CD-ROM drive (piggyback version, option)

Using the CD–ROM drive, you can read data from CD–ROM.

If expansion modules are plugged in the computing unit, then there are further interfaces. For their meaning, please refer to the description of the appropriate module.

1): By plugging on the “Gender Changer” (part of the documentation package), you will change the connection into a 25-way V.24 standard interface for connecting devices with serial interface, such as modem, mouse or printer.

2): Equipotential bonding within a safety extra–low voltage circuit (SELV). MPI/DP do not exist in the computing unit basic variant.

Note

When connecting I/O devices devices, use shielded cables and metalized connectors; otherwise, the permission for operation will extinguish! Use a screw driver to fix the connectors of the interface cables on the housing of the computing unit. You will thus improve the electrical shielding.

Connections	Function
COM1/V24/AG	By plugging the adapter plug supplied as accessories (”Gender Changer”), you will change the connection into a socket connector.
MPI/DP (RS 485)	Equipotential bonding within the safety extra–low voltage circuit (SELV).

If expansion modules are plugged into the computing unit, then there are further interfaces. For their meaning, please refer to the description of the appropriate module.

3.1.2 Right device side (fan side)

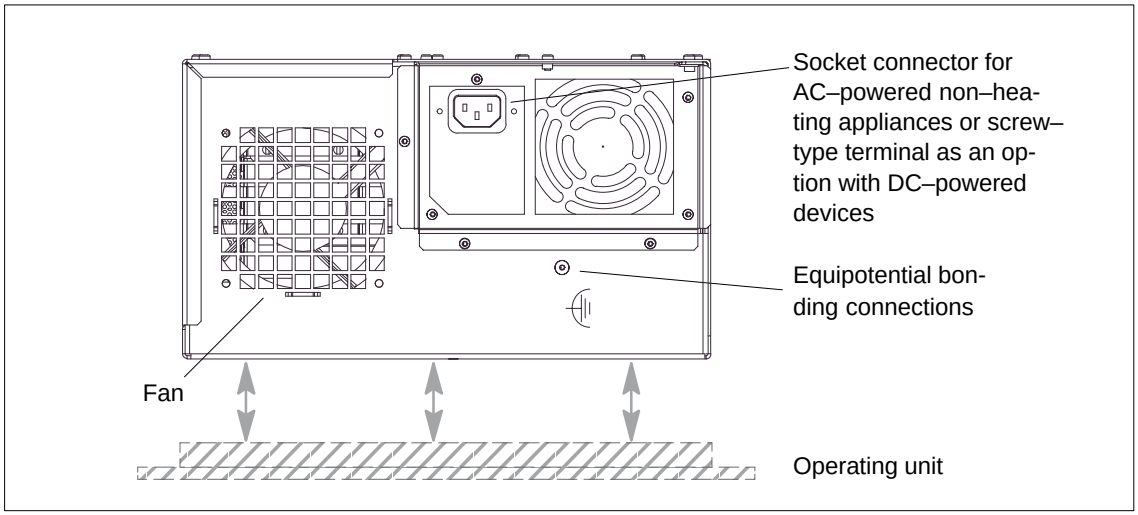


Figure 3-2 Right side of device with fan, power supply, RESET button and equipotential bonding

3.1.3 Front side (front interfaces)

The following front ports are located behind the cover sheet on the device front side:

- I/O port for connecting front components
- LVDS display port

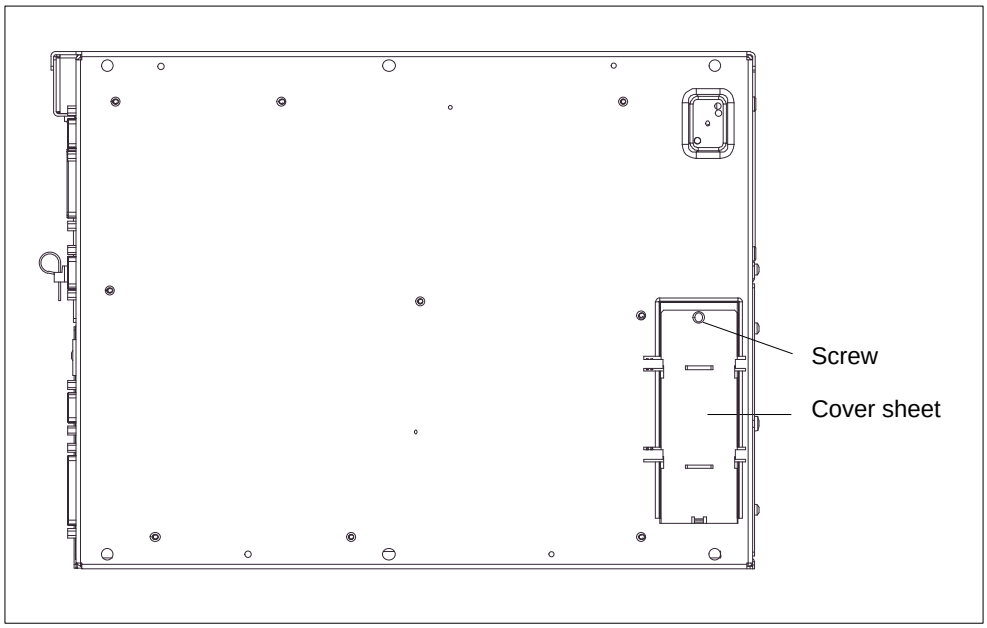


Figure 3-3 Front interfaces

Access to the front interfaces is as follows:

1. Loosen the screw on the cover sheet.
2. Pull off the cover sheet from the guide.

Note

Keep the cover sheet and the screw in the case you will need it later.

3.2 Connecting I/O devices

Note

Make sure the components you insert exhibit industrial compatibility when connecting peripheral devices

3.2.1 Printer connection via parallel port

To connect your printer, perform the following steps:

1. Disconnect the computing unit from the mains and turn off the printer.
2. Plug the printer cable onto the parallel port, LPT 1.
3. Connect the printer cable to the printer.
4. Tighten (screw) the connector on the port.

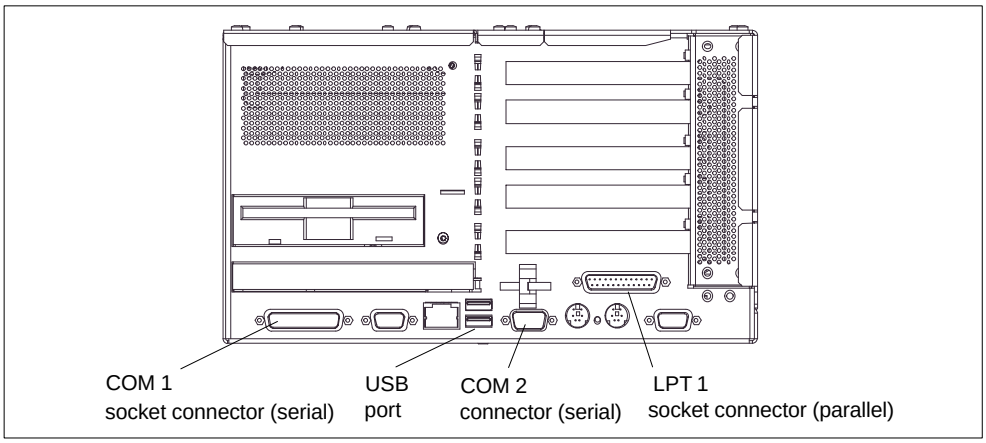


Figure 3-4 Printer connection

Caution

Connect printers to the parallel port only when the device on the LPT 1 port is turned off (printer likewise turned off).

Make sure you are using the correct port. If you interchange the connectors, or use wrong connecting cables, the port might be damaged.

Before inserting the connecting cables, the static charge of your body, the device and the connecting cables must be brought to the same level. You can do this by briefly touching the metal housing. Use the original cable to establish the connection.

3.2.2 Printer connection via serial port

Alternatively, you can connect your printer via a serial COM interface to the PC 870. You will find information on how to adapt and set your port and on the connecting cable you should use in the user manual for your printer.

3.2.3 Connecting USB devices

You can connect devices having a USB interface to the USB interface (see Fig. 1–4) without interrupting the power supply.

- Plug in the USB cable.

The device is detected automatically by a “plug and play” operating system such as Windows 98 and is then available.

A USB keyboard can be operated to run BIOS setup.

Note

Operating systems which do not support “plug and play” (Windows NT 4.0, for example) generally do not allow operation of USB devices.

3.3 Drives with interchangeable media

3.3.1 Floppy disk drive

With the floppy disk drive, you can save programs and data on floppy disks and load from floppy disks into the computing unit.

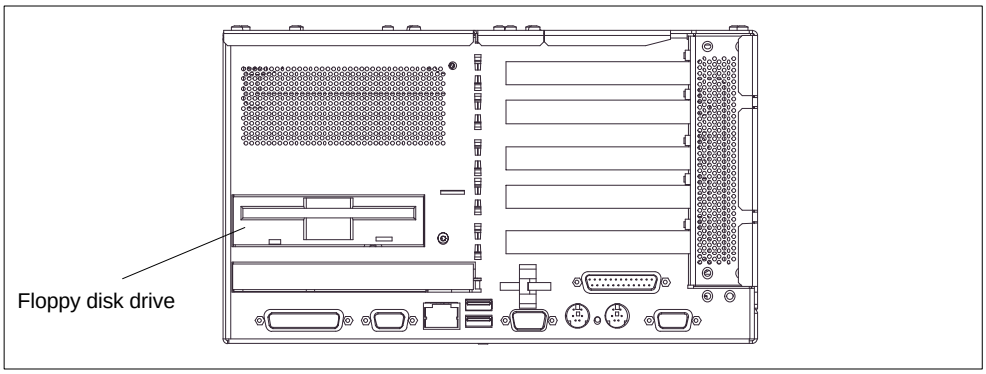


Figure 3-5 Floppy disk drive

Floppy disk types

With the floppy disk drive, you can use the following floppy disks:
Double Sided High Density, 3.5 in., 1.44 MB (135TPI).

Floppy disk handling with floppy disk drive

Insert the floppy disks into the drive as illustrated, depending on the installation location:

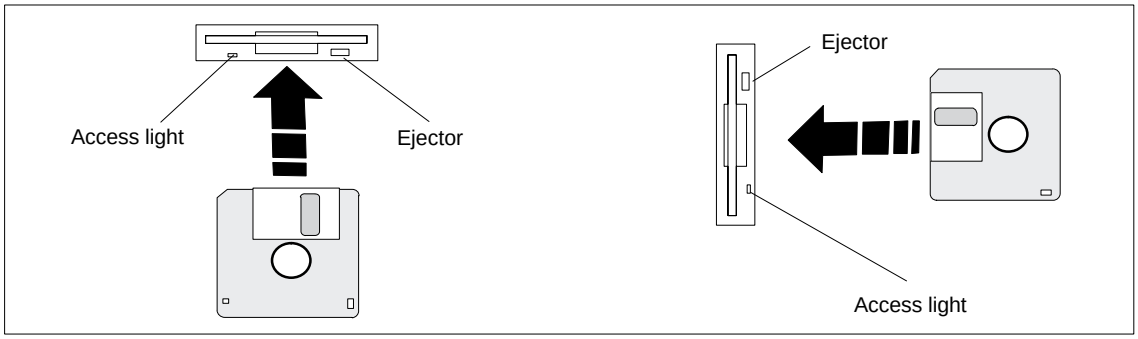


Figure 3-6 Diskette handling

The access light is lit when an access to the drive is carried out.

Caution

Loss of data!

Do not actuate the ejector when the green access LED of the drive is lit.

3.3.2 CD-ROM drive (option)

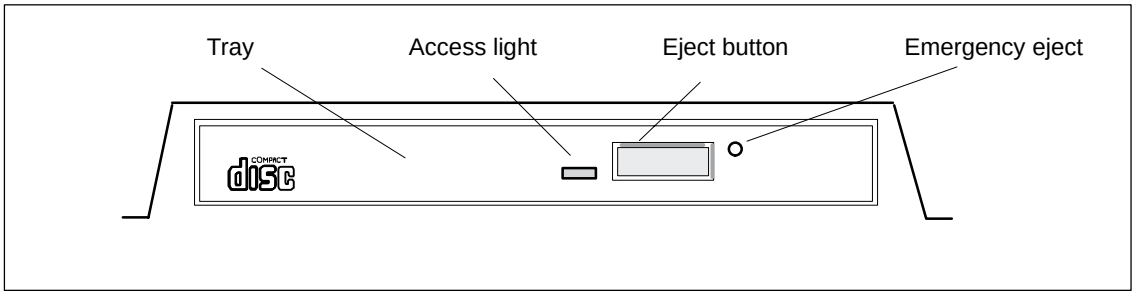


Figure 3-7 CD-ROM Front

Caution

Danger of data being lost and the drive damaged

CD-ROM drives are very sensitive to unacceptable vibrations. During operation, vibrations might damage the drive and/or the data medium. For permissible values, refer to Appendix B.

Note

After closing the tray, first the CD is tested and the access light on the drive starts flashing:

- flashes continuoulsy: bad, but still readable CD;
- is lit continuously after several flashing: CD defective, i.e. not readable any more;
- normally, the access light is lit when reading from CD.

The EJECT function offered by various applications for opening the CD-ROM tray has no effect with this drive.

Emergency eject

The following procedure is used to remove the data medium when the eject button is locked by software or no power is being supplied to the drive. Motor-driven opening is not possible in this case.

1. Make sure that there is no power supply to the drive (switch off the PC).
2. Insert a max. 1.3 mm thick and at least 55 mm long object (for example an elongated paper clip) into the emergency removal hole at the front of the drive. Careful pressure opens the drive tray and pushes the data medium out of the drive. Pull the CD tray manually further out of the housing and remove the CD.

3.4 Reset button

The RESET button on your device will initiate a hardware reset; this will restart your PC (cold restart).

In the case of the SIMATIC Panel PC 870, the Reset button is to be found on the interface side between the PS/2 sockets. The Reset button can only be actuated with a pointed object (e.g. ballpoint pin or a paper clip bent open).

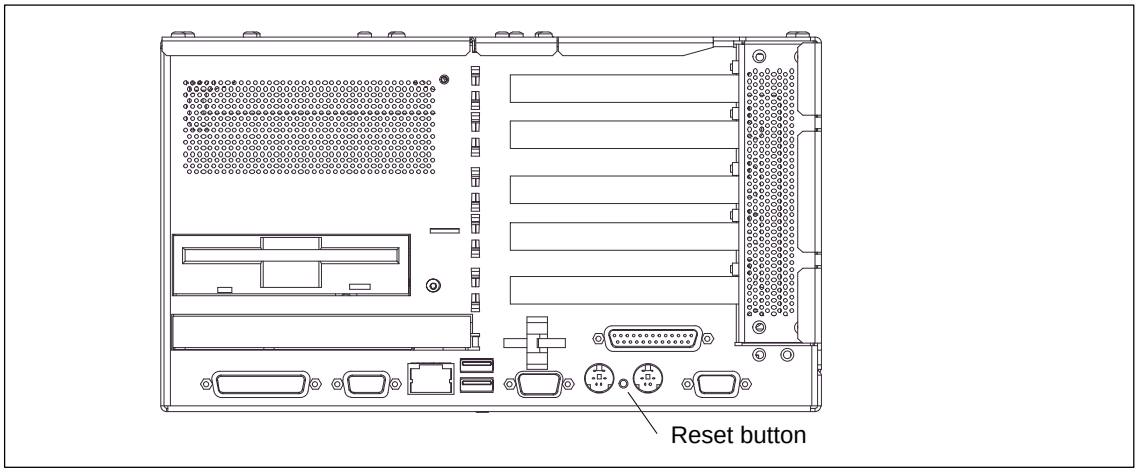


Figure 3-8 Reset button

Servicing and Expanding the Computing Unit

4

What does this chapter contain?

This chapter describes how to proceed when opening the device and changing various components to service your computing unit, as well as how to proceed when installing expansions.

Please observe the safety notes it contains.

Chapter Overview

In Section	You Will Find	on Page
4.1	Opening the device	4-2
4.2	Installing and removing drives	4-7
4.3	Installing and removing expansion boards	4-11
4.4	Installing and removing the power supply	4-13
4.5	Installing and removing the device fan	4-14
4.6	Installing and removing the backup battery	4-15
4.7	Installing and removing further components	4-16
4.8	Expanding the computing unit	4-16

4.1 Opening the device

4.1.1 Requirements

The device is designed for easy maintenance so that any work that may be necessary can be done quickly and economically.

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 electrostatic sensitive devices at the end of this manual (ESD Guidelines).

Limitation of liability

All technical specifications and approvals apply only to expansion modules approved by SIEMENS.

No liability can be accepted for impairment of functions caused by the use of non-Siemens devices or non-Siemens components.

All the modules and components are electrostatically sensitive. Please study the notes on electrostatic sensitive devices. The following symbol indicates that electrostatically sensitive modules are present.

Tools

You can perform all necessary installation work on the computing unit with screwdrivers of the type TORX T10 and TORX T8.

Before opening the device

Note the following rules before opening the device:

- Before you disconnect the power supply cable, discharge the electrostatic charge on your body. You can do this by briefly touching the mounting plate for the interfaces on the left side of the device.
- Discharge the electrostatic charge from tools you are using.
- Wear a grounding strap when handling components.

- Leave components and component parts in their packaging until you are ready to install them.
- Disconnect the device from its power supply before plugging in or removing any components or component parts.
- Touch components and module only on their edges. Do not touch contact pins or printed conductors.
- Never operate the device with the cover open.

4.1.2 Opening the computing unit

To open the computing unit, perform the following steps:

1. Turn off the computing unit by pulling out the mains connector.
2. Remove all interconnecting cables and connecting cables from the device.
3. Remove the computing nunits from the operating unit as described in the Equipment Manual, Chapter 4.
4. Loosen the two screws on the housing cover (see Fig. 4-1).
5. Lift the cover and remove it.

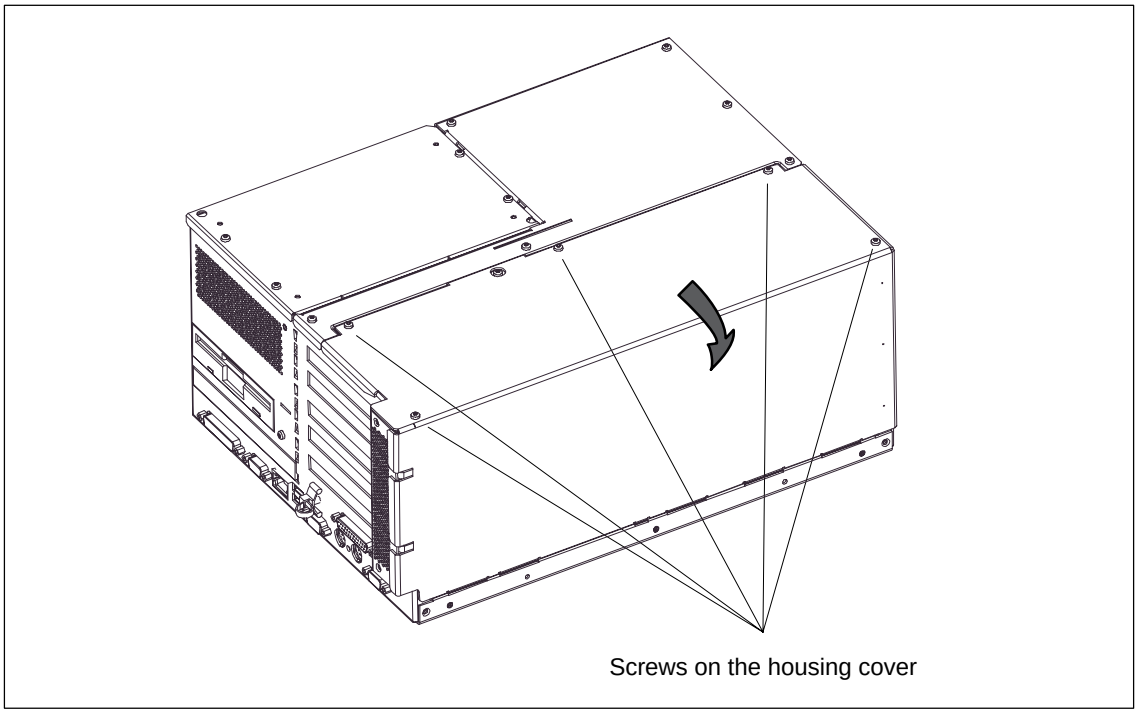


Figure 4-1 Computing unit prepared for opening

4.1.3 Functional units visible after opening the device

View

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

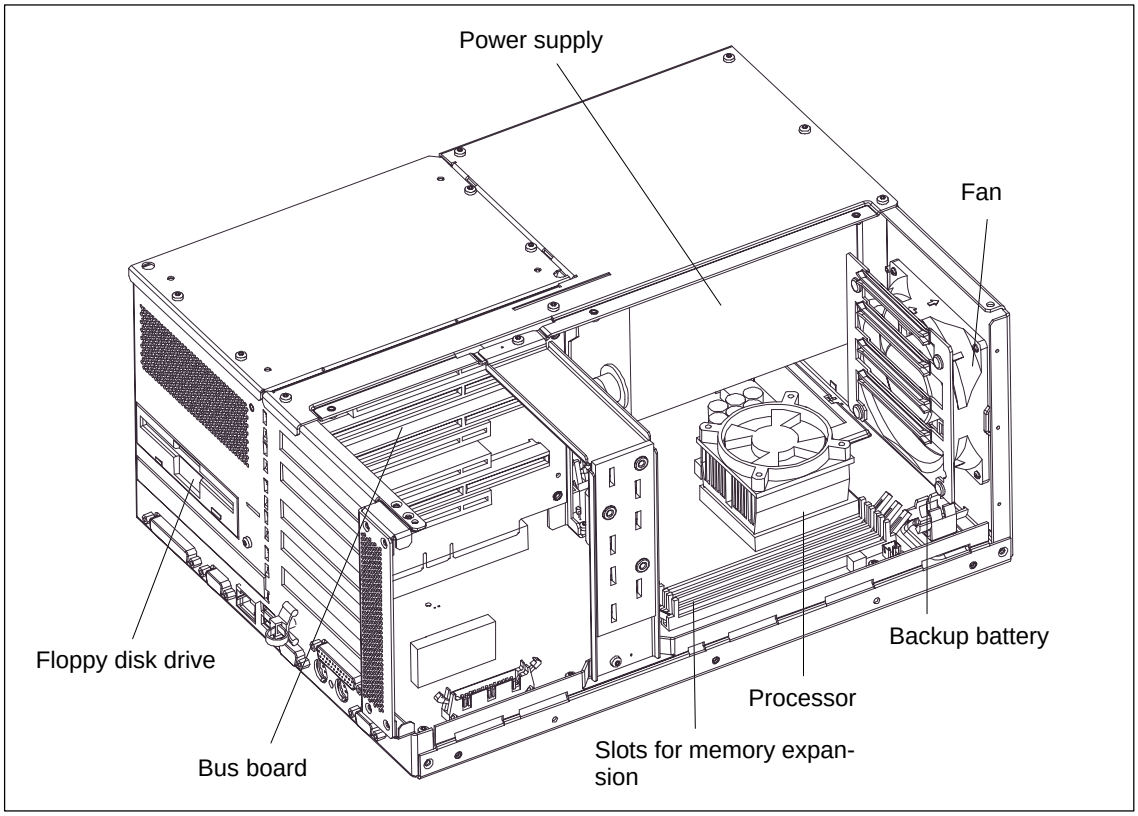


Figure 4-2 Computing unit opened

4.1.4 The motherboard

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

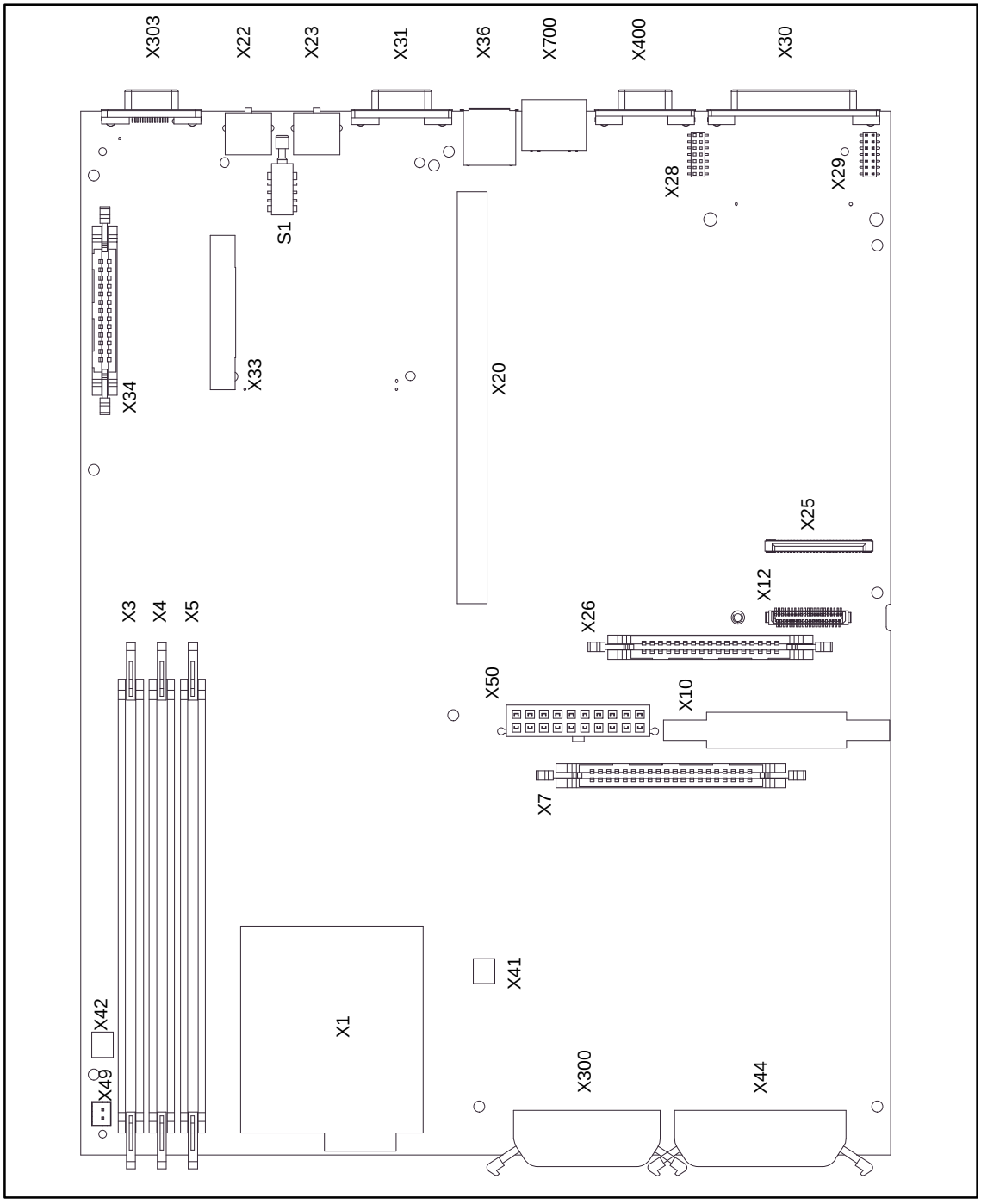


Figure 4-3 Motherboard

Components on the motherboard

The following components are located on the computing unit:

Slot	Port
X1	CPU socket (ZIF)
X3, X4, X5	DIMM socket for memory expansion
X7	2.54 mm primary IDE (HDD)
X10	2 mm secondary IDE
X12	Connector for FPC secondary IDE (CD-ROM)
X20	Socket connector for bus board
X22	PS/2 mouse
X23	PS/2 keyboard
X25	Connection for 1.44 MB slimline floppy
X26	Connection for standard floppy
X28	Internal socket connector for COM1 (V.24/TTY) module
X29	Internal socket connector for COM1 (V.24/TTY) module
X30	Serial interface COM1/TTY
X31	Serial interface COM2
X33	COM2, internal, for touch screen
X34	Parallel interface LPT 1
X36	USB port
X42	Device fan connection
X41	Processor fan
X44	I/O interface for connecting front components
X49	Connection of backup battery
X50	Power supply connection
X300	LVDS display interface
X303	VGA monitor connection
X400	MPI/DP 12
X700	Ethernet
S1	Reset button

4.2 Removing and installing drives

The basic configuration of the computing unit includes a 3.5” floppy disk drive and a 3.5” hard disk.

4.2.1 Removing and installing the hard disk

The hard disk is used to store large quantities of data. It is installed on a vibration-damped mounting that is easy to replace.

Caution

Danger of data being lost and the drive damaged

Drives are very sensitive to unacceptable vibrations. During operation, vibrations can result in a loss of data or damage to the drive or a data medium.

If you wish to ship the device, wait until the drive has come to rest after you turn off the device (approximately 20 s.).

Proceed as follows (see Fig. 1–4):

1. Loosen the 4 screws on the back of the system housing.
2. Swing open the drive cage.
3. Detach the drive cage from its mounting and place the drive cage face down on the system housing.
4. Make a note of the cable assignment and detach the cables.
5. Loosen the four screws fastening the hard disk drive in the vibration–damped part of the holder. Remove the hard disk drive from the holder.
6. Proceed in the reverse order to install the new drive. The new drive must be of the same type as the one removed.

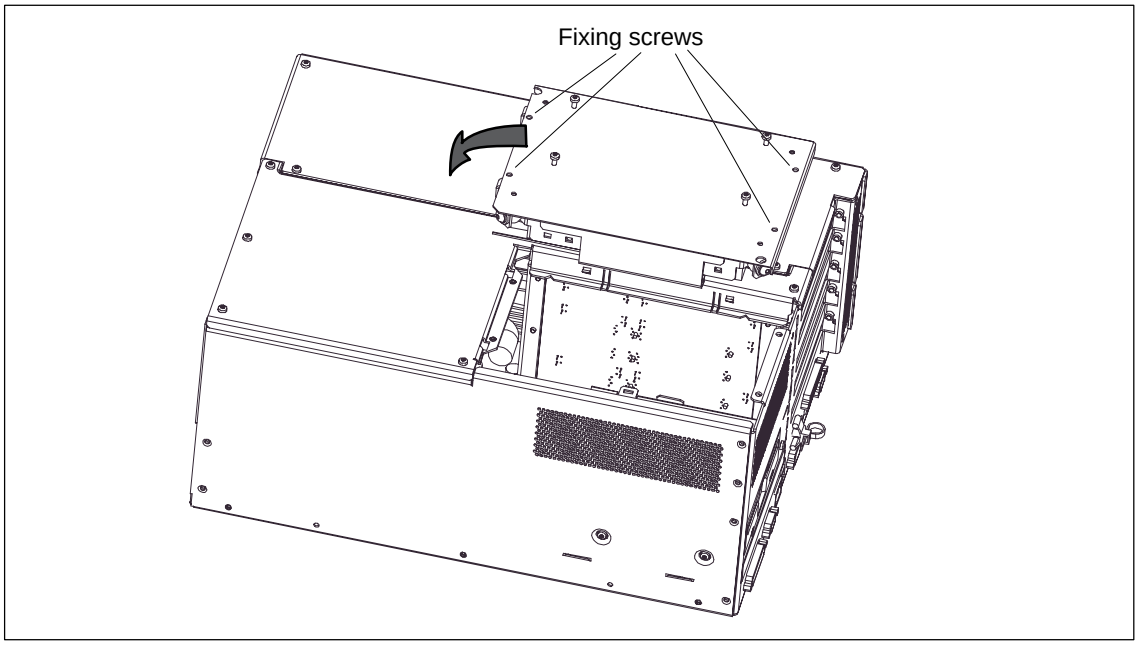


Figure 4-4 Removing and installing the drive cage

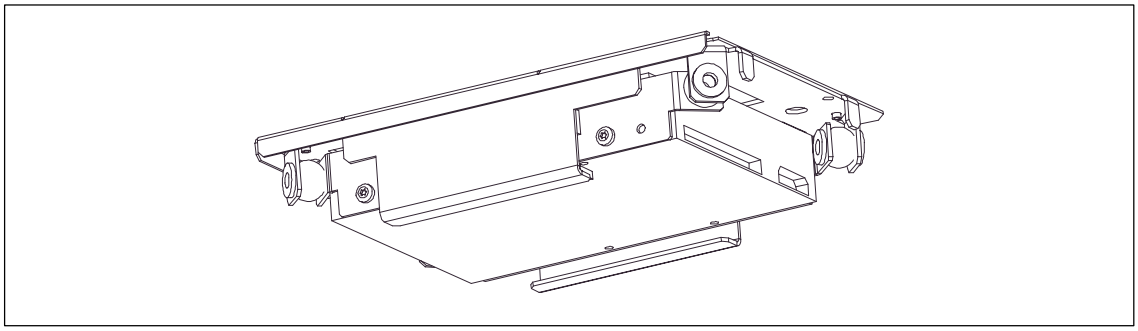


Figure 4-5 Hard disk with cage removed

4.2.2 Removing and installing the floppy disk drive

1. Open the housing as described in Section 4.1.
2. Remove the hard disk mounting as described in section 4.2.1.
3. make a note of the cable assignment and detach the data and power supply cables from the floppy disk drive.
4. Loosen the interlocking of the controller flexible cable on the motherboard and pull the flexible cable out of the plug connection.
5. Loosen the two fixing screws (TORX T8) on the system housing (see Fig. 1–6) and lift the drive cage out of the housing.
6. Proceed in the reverse order to install the new drive. The new drive must be of the same type as the one removed.

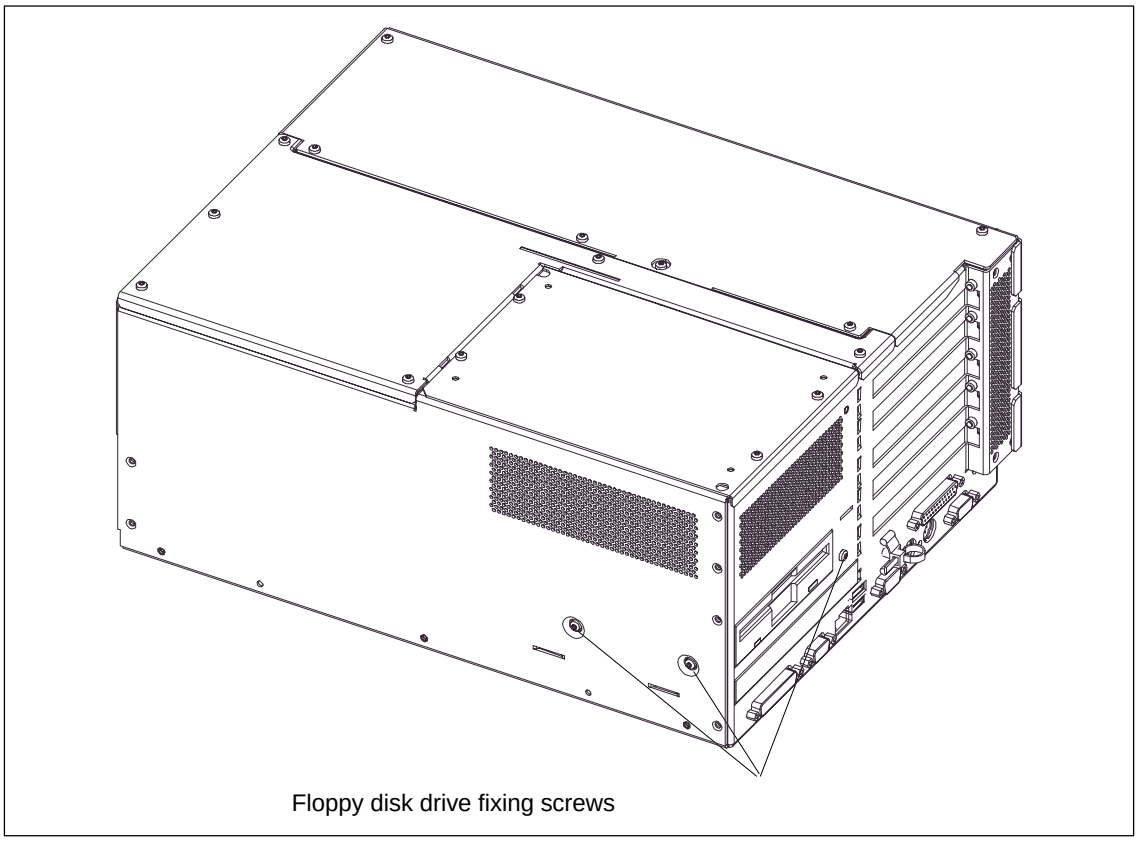


Figure 4-6 Installing and removing the floppy disk drive

4.2.3 Removing and installing a CD-ROM drive (option)

Depending on the hardware configuration of the device, a CD-ROM drive is mounted on the hard disk drive (piggy–back construction). The mounting depth of the Panel PC is increased by 20 mm as a result of its installation.

1. Remove the hard disk drive as described in Section 4.2.1.
2. After loosening the two screws (see Fig. 1–7), remove the cover from the CD–ROM drive.
3. Loosen the three screws which secure the CD-ROM on the mounting.
4. Remove the CD-ROM drive from the mounting and carefully pull off the data and power supply cables.
5. Proceed in the reverse order to install the new drive.

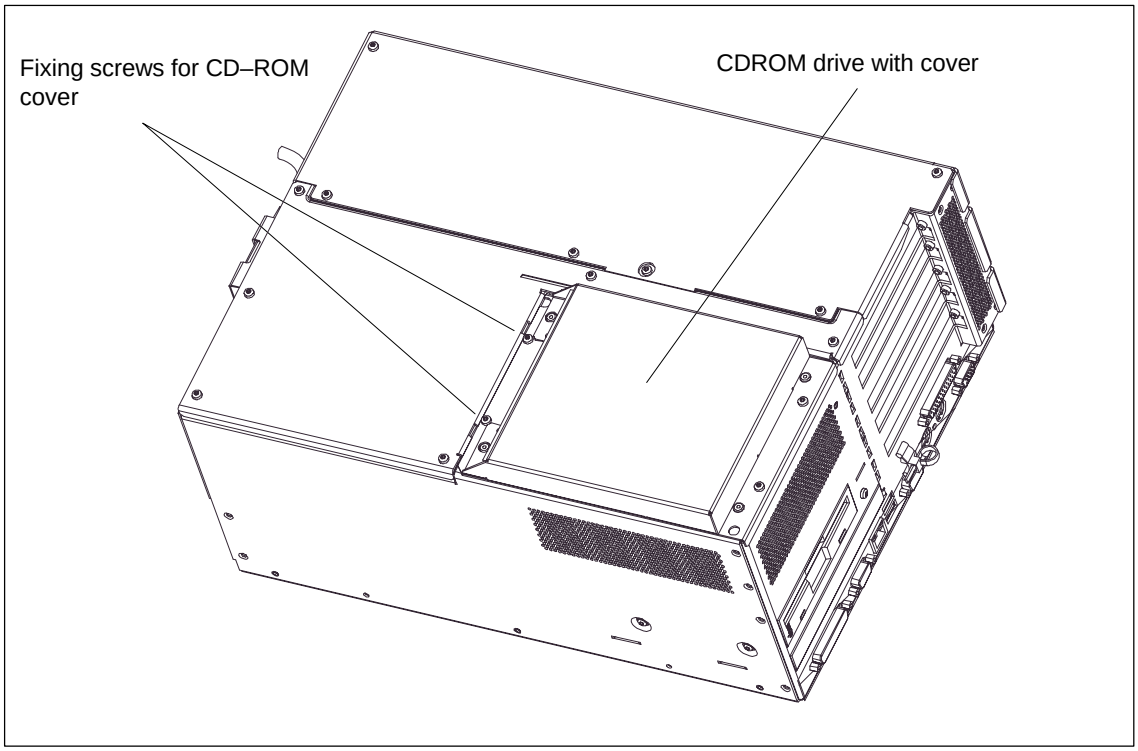


Figure 4-7 Computing unit with CD–ROM drive

4.3 Installing and removing expansion boards

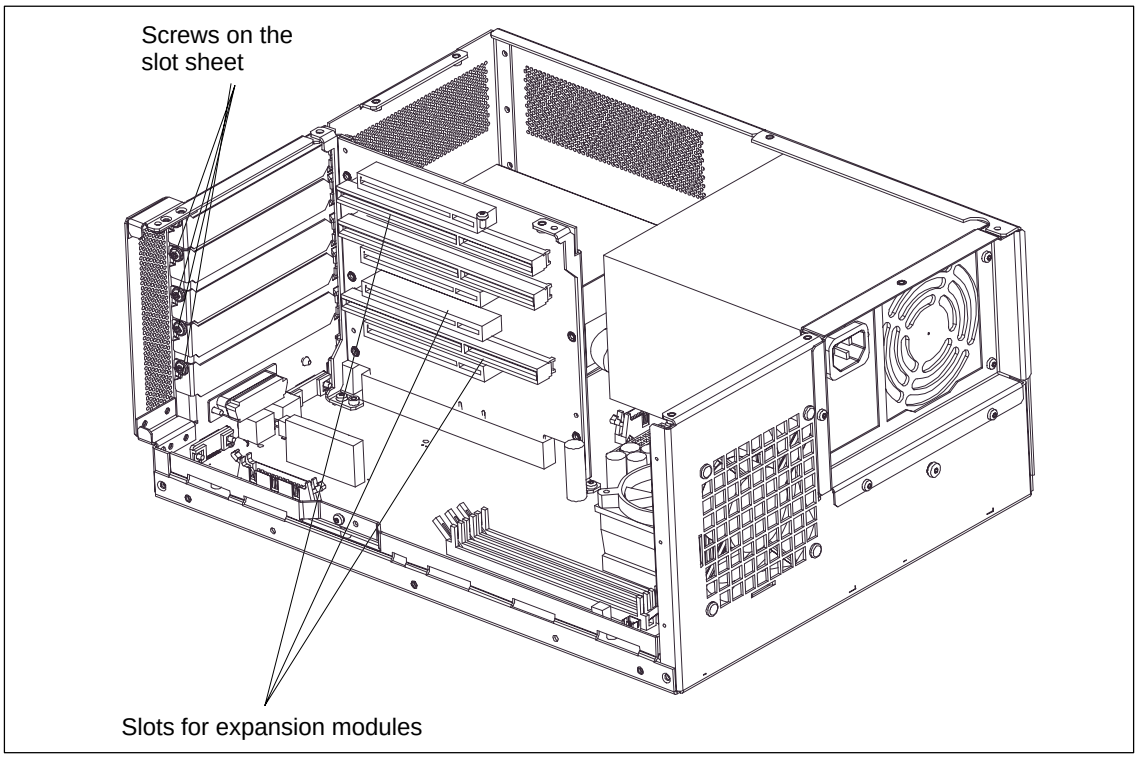


Figure 4-8 Installing and removing expansion boards

Proceed as follows:

1. Open the housing as described in Section 3.1.
2. Remove all connectors from the board and note down their assignment.
3. Remove the device for holding down the modules as dsescribed in Section 4.3.1.
4. Loosen the screws on the slot sheet of the board.
5. Remove the board from the slot.
6. To install the new board, proceed in the reverse order.

4.3.1 Removing and installing the device for holding down the modules

Use of devices for holding down the modules increases the resistance of the modules to vibration. The device for holding down the modules is attached to the system housing with a screw. It has three slits, through which the slide elements are inserted.

Proceed as follows:

1. Open the housing as described in Section 4.1.
2. Loosen the fixing screw of the device for holding down the modules.
3. During assembly, ensure that the device for holding down the modules is resting on the guide on the system housing.

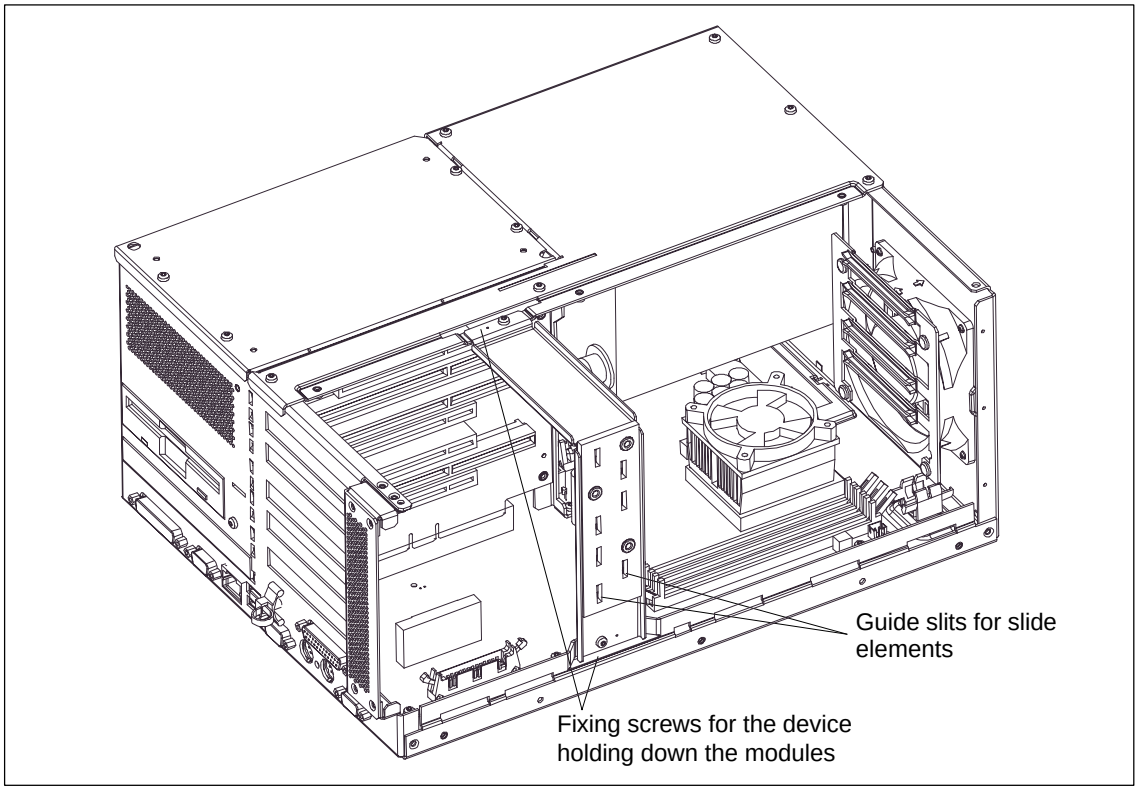


Figure 4-9 Installing and removing the device for holding down the modules

Note

The slide elements are in the enclosed bag.

Aligning the device for holding down the modules:

To install the device for holding down the modules, perform the following steps.

1. Insert the slide element through the guide slit until it is resting firmly on the module. The module must now be introduced into the notch.

Caution

Do not exert pressure on the module! Therefore, do not use force to press the slide module onto the module.

2. Remove the surplus slide element:
   – Score the slide element at the top edge of the support with a knife and snap it off.
   – Nip off the surplus with a sharp side cutter.

4.4 Removing and installing the power supply

1. Open the system housing as described in section 4.1.
2. Remove the drive mounting as described in section 4.2.1.
3. Make a note of the cable assignment and detach them from the motherboard and the drives.
4. Loosen and remove the six screws of the cover of the power supply unit from the system housing.
5. Loosen the three fixing screws (TORX T10) on the mounting plate of the power supply.
6. Pull the power supply unit laterally out of the system housing.
7. Proceed in the reverse order to install the new power supply unit.

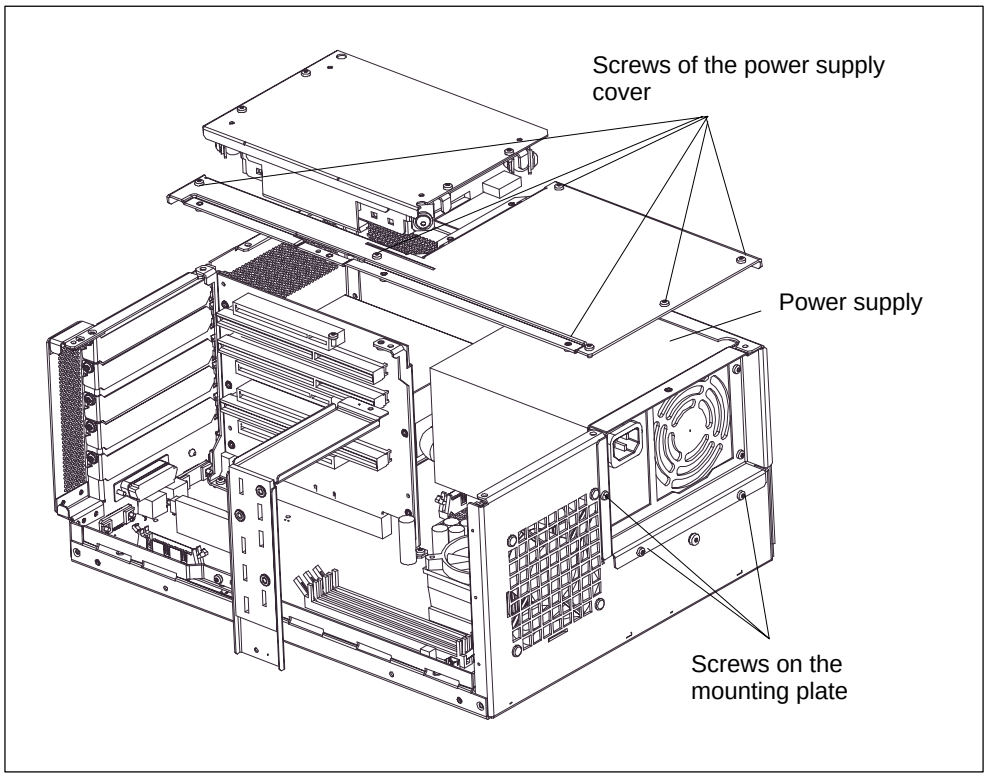


Figure 4-10 Installing / removing the power supply

4.5 Removing and installing the device fan

The Panel 870 is cooled by means of a fan, which extracts hot air out of the housing.

1. Open the system housing as described in Section 4.1.
2. Remove the fan cable connector from the motherboard.
3. Loosen the four plastic rivets (see Fig. 1–12) by pushing off the arbor from the rivet body from the rear, and remove the fan.
4. Loosen the four plastic rivets of the sheet plate with the guide rails.
5. Proceed in the reverse order for assembly.

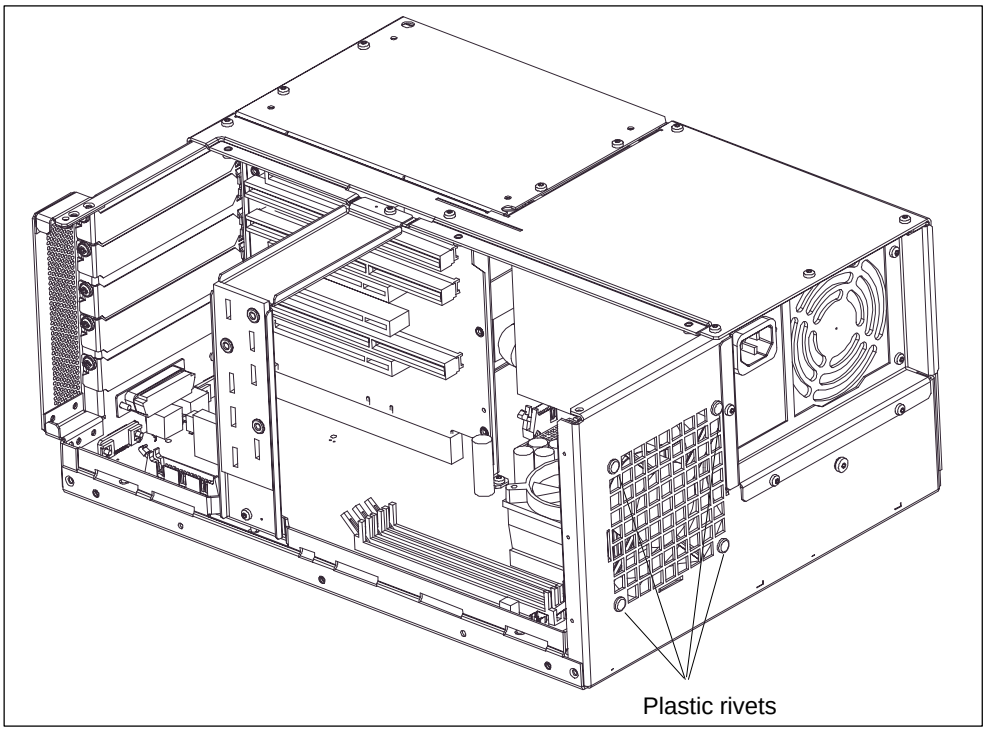


Figure 4-11 Installing and removing the fan

Note

Fit only a fan of the same type!

Caution

To ensure that the device is adequately cooled, take care that the running direction of the fan is correct when installing.

Ensure that the arrow on the fan is pointing towards the housing wall.

4.6 Installing and removing the backup battery

Battery supply for clock and configuration

A backup battery (3.6 V lithium battery on the motherboard; see Fig. 4-2) ensures that the hardware clock will also operate when the device is switched off. In addition to the time of day, the device configuration is also stored. In case of a failure of the backup battery or disconnection from the plug contact, these data are lost.

Thanks to the low current comsumption of the clock and the high capacity of the lithium battery, the battery is able to backup the clock over several years. It is therefore only seldom required to replace the battery.

Battery voltage too low

If the battery voltage is too low, the current time of day is lost, and no correct device configuration is guaranteed any more; in this case, the battery must be replaced.

Changing the battery

Proceed as follows:

1. Disconnect the device from the mains and remove all interconnecting cables.
2. Open the device as described in Section 3.1.
3. Change the backup battery by removing the connector from base X49 of the motherboard (see Fig. 4-3) and remove the battery from its holder.
4. Attach the new battery in its holder and connect the battery connector to the motherboard.
5. Close the device.

Warning

Risk of personal injuries and material damage; risk of emission of hazardous substances!

If handled not correctly, a lithium battery can explode; in case of disposal of old batteries not acc. to the relevant standards, hazardous substances can be emitted.

The lithium battery must only be replaced by identical types or types recommended by the manufacturer (Order No.: W79084-E1003-B1).

Do not throw new or discharged lithium batteires into the fire; do not solder at the cell body; never try to discharge lithium batteries and do not open them with violence.

As far as possible, exhausted lithium batteries should be returned to the battery manufacturer/recycler or be disposed of as special waste.

Changing the SETUP settings

After a battery change or after the battery connector has been removed, the configuration data of your device must also be changed using the program BIOS–SETUP (see Chapter 5).

4.7 Installing and removing further components

The installation and removal of any further components, such as processor, motherboard or bus board, must only be carried out by authorized service personnel.

4.8 Expanding the computing unit

You can enhance the functionality of your computing unit by installing additional main memory and expansion modules.

To do so, please observe the relevant safety notes.

4.8.1 Installing a memory expansion

Standard memory

Three slots for 144–pin SDRAM memory modules are provided on the motherboard, enabling you to expand the user memory of your computing unit up to 512 MB (see Fig. 4-2).

1, 2 or 3 slots can be completed (sockets X3, X4, X5 in Fig. 4-3).

Memory Capacity	Module		
	64 MB	128 MB	256 MB
64 MB	1	–	–
128 MB	2	–	–
128 MB	–	1	–
192 MB	1	1	–
192 MB	3	–	–
256 MB	2	1	–
256 MB	–	2	–
256 MB	–	–	1
384 MB	–	1	1
284 MB	2	–	1
512 MB	–	2	1
512 MB	–	–	2

Caution

The electronic modules on the p.c. boards are very sensitive to electrostatic discharge. You should therefore take appropriate precuations when handling them. Please refer to the directive for electrostatically sensitive devices (ESD guideline at the end of this Manual).

Installing the SDRAM modules

When plugging the modules, proceed as follows:

1. First open the device as described in Section 4.1.
2. Plug the modules into the socket. Please observe the recess (anti–rotation element) on the connector side of the SDRAM module.
3. Push the module down, exerting slight pressure on it until the locking snaps into place.
4. Close the device.

Caution

Risk of damage!

Make sure that the modules fit tight in the socket; otherwise, they can fall down or be damaged.

Installation

The memory configuration is detected automatically. When the device is turned on, the mapping of base memory and extended memory is displayed automatically.

4.8.2 Installing ISA/PCI cards

Notes about the cards

The computing unit is designed for the use of cards as per the AT/PCI specification. The dimensions of the cards must not exceed the stated dimensions. If the height is exceeded, contact problems, malfunctions and difficulties with installation cannot be ruled out. The illustrations show full length AT/PCI cards. Depending on the slot, there might be constraints concerning the overall length.

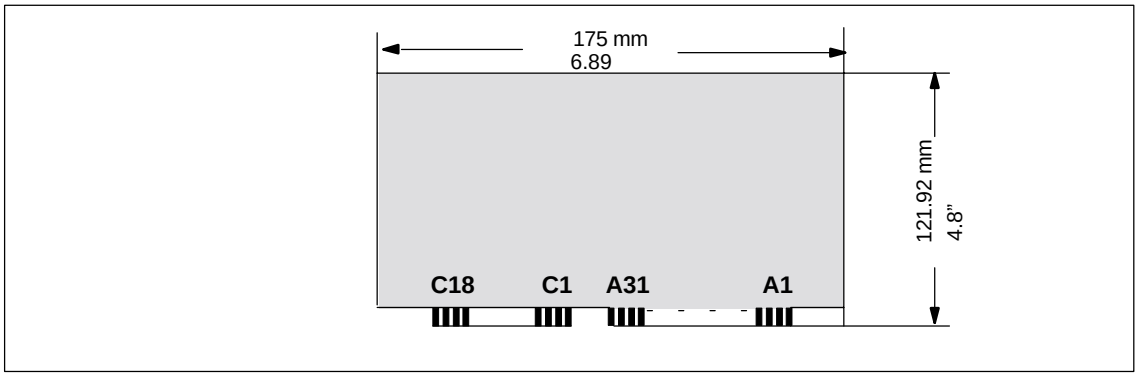


Figure 4-12 AT Card

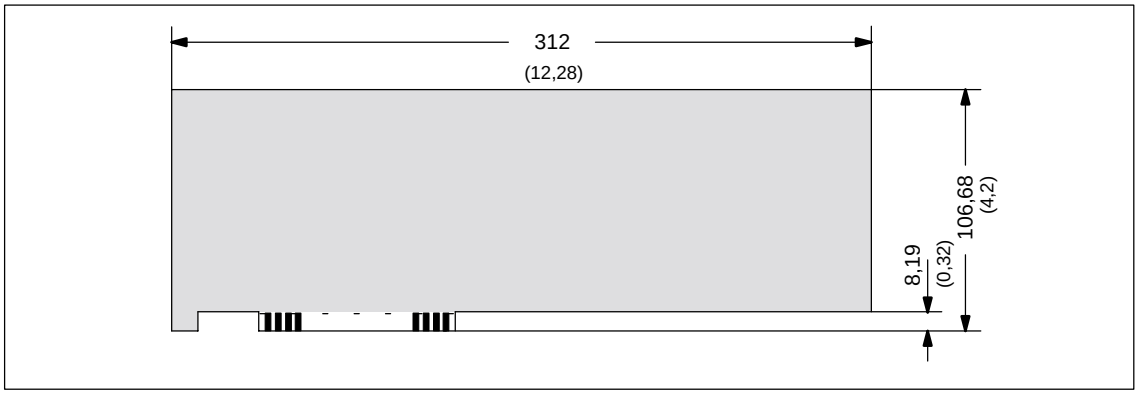


Figure 4-13 Long PCI card (5 V)

Note about long PCI cards

Before long PCI cards can be inserted in the guides of the fan trough, they must be fitted with an extender (this should be included with the long PCI board). Long PCI cards can be inserted in the guides of ISA modules by means of this extender.

Configuring the Computing Unit in the BIOS SETUP

5

What does this chapter contain?

In this chapter, you will learn how to configure your computing unit. You need to do this if you want to change your system by adding, removing, or exchanging an extension board, memory expansion module, or by replacing a system module.

Chapter Overview

In Section	You Will Find	on Page
5.1	Modifying the Device Configuration with SETUP	5-2
5.2	The *Main* Menu	5–4
5.3	The *Advanced* Menu	5–12
5.4	The *Security* Menu	5–17
5.5	The *Power* Menu	5–19
5.6	The *Boot Sequence* Menu	5–21
5.7	The *Version* Menu	5-23
5.8	The *Exit* Menu	5–24
5.9	SETUP default settings	5–25

5.1 Modifying the device configuration in the BIOS SETUP

Modifying the device configuration

The device configuration of your computing unit is preset for working with the software supplied to you. You should only modify the preset values if you have performed technical modifications to your device or if a fault occurs when the unit is powered up.

BIOS

The information with regard to the system configuration are stored in the battery–backed memory of the computing unit.

When the device is supplied, the default settings are effective which you can modify and save using the BIOS SETUP program (stored in the ROM BIOS).

BIOS–SETUP program

You can use Setup to define the hardware configuration (for example, hard disk type) and system properties. Setup is also used to set the system date and time on the clock module.

Starting BIOS SETUP

Start the BIOS SETUP as follows:

1. Reset your Panel PC 870 (warm or cold restart)

The PC 870 will boot automatically with the boot tests. During this process, the following message will appear on the display for some seconds:

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

2. To do so, press F2 while the message is displayed on the screen. Then you can change the BIOS settings with menu assistance.

After quitting the BIOS setup and the power–up has been completed, the changes are effective.

Incorrect BIOS data

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

- start the SETUP program by pressing F2 or
- continue booting by pressing F1.

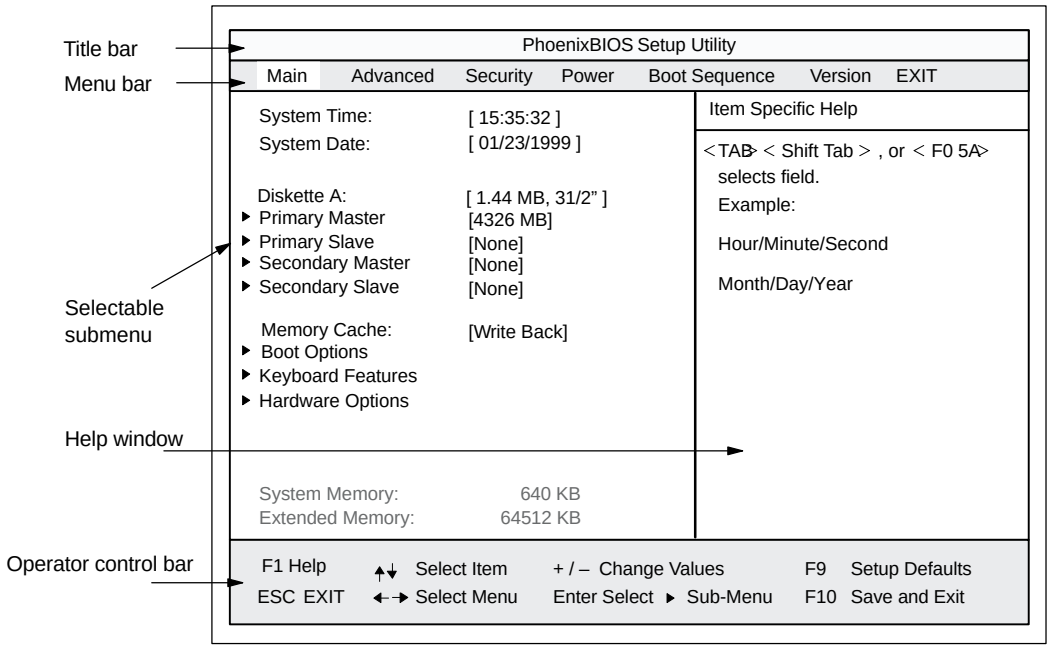


Figure 5-1 *Menu* SETUP Main

The screen is split into four sections. In the top section, you can choose between various menu screenforms “Main”, “Advanced”, “Security”, “Power”, “Boot Sequence”, “Version” or “Exit”. In the left of center section, you can choose the different settings or submenus. In the right of center section, you are given small pieces of help information on the menu option you have currently chosen. The bottom section contains notes with regard to the operation.

Yellow starts to the left of the interface description (e.g. COM1) indicate a resource conflict of the interface used by the BIOS. In this case, either rectify the conflict or press F9 to restore the default settings.

You can move between the menu screens using the arrow keys ← LEFT and → RIGHT.

Menu	Meaning
Main	System functions are set here
Advanced	An extensive system configuration can be performed here
Security	Security functions are set here, for example a password
Power Savings	Power conservation functions can be chosen here
Boot Sequence	The boot priorities are set here
Version	Here you will find information about the version of the computing unit
EXIT	Used for exiting and saving

5.2 The *Main* menu

Settings in the *Main* menu

On the *Main* menu (see Fig. 1–1), you can choose between the following system settings boxes using the arrow keys ↑ and ↓:

Field	Meaning
System Time	Current time
System Date	Current calendar date
Diskette A	Type of the installed floppy disk drive
Memory Cache	Cache options
via submenus	
Primary Master	Type of the installed drives
Primary Slave	
Secondary Master	
Secondary Slave	
Boot Options	Boot-options
Keyboard Features	Keyboard interface (e.g. NUM-Lock, Typematic Rate)
Hardware Options	Hardware options

System Time and System Date *Time and date*

System Time and *System Date* display the current values. Once you have selected the appropriate box, you can use the + and – keys to modify the `Hour:Minute:Second` and `Month/Day/Year` settings.

You can move between the entries in the *System Time* and *System Date* boxes (for example, from Hour to Minute) using the tabulator key.

Diskette A Floppy *disk drive*

Here you set the type of floppy disk drive installed on the computing unit. The following entries are possible:

[Disabled]	If no floppy disk drive is installed
[1.44 MB, 3 1/2"]	Default setting for an installed disk drive A

5.2.1 The submenus *Primary Master*, *Primary Slave, Secondary Master, Secondary Slave*

The system goes to the following submenu, for example, when you select one of these menu options:

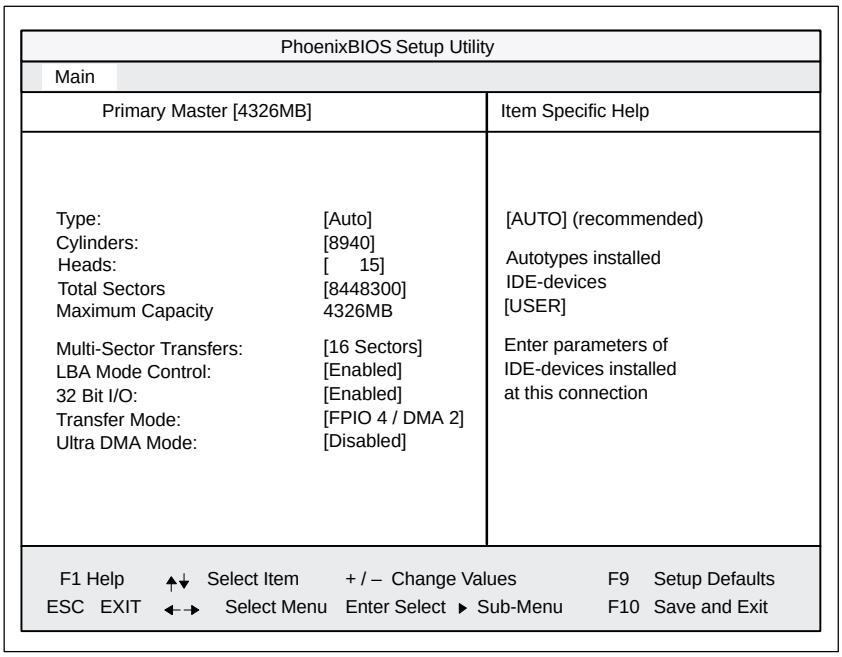


Figure 5-2 Example: Primary Master

Type

The parameters you can select here are normally stored on your IDE drive. The `Auto` setting in the *Type* field means that these values are automatically read from the drive and saved (**Autodetect**).

If the *Type* field is selected for a drive that does not exist, a timer times out in approximately 1 minute and the entries remain unchanged. It is sensible to set `Auto` only for those interfaces to which a drive is connected.

Select `User` if you want to define the hard-disk type yourself. In addition, you will also then have to set the other fields, such as *Cylinder*, *Heads*, to the correct values for the type of hard disk concerned.

Multi-Sector Transfer

The entry in the *Multi-Sector Transfer* box defines the number of blocks (sectors) transferred per interrupt. The value depends on the drive and should be set only by setting the *Type* field to `Auto`.

`Disabled`

`2,4,8,16 Sectors`

LBA Mode Control

If the *LBA Mode Control* field is set to `Enabled`, the system supports hard disk capacities greater than 528 Mbytes. The value depends on the drive and should be set only by setting the *Type* field to `Auto`.

32 Bit I/O

The setting in the *32 Bit I/O* field defines the mode of access to the drive:

`Disabled`	16-bit access
`Enabled`	`32`-bit access (default)

Transfer Mode, Ultra DMA Mode

The settings in these fields define the interface's data transfer rate. The value depends on the drive and should be set only by setting the *Type* field to `Auto`.

Press ESC to exit the submenu.

5.2.2 The *Memory Cache* submenu

The following shortcut menu when you choose this menu option:

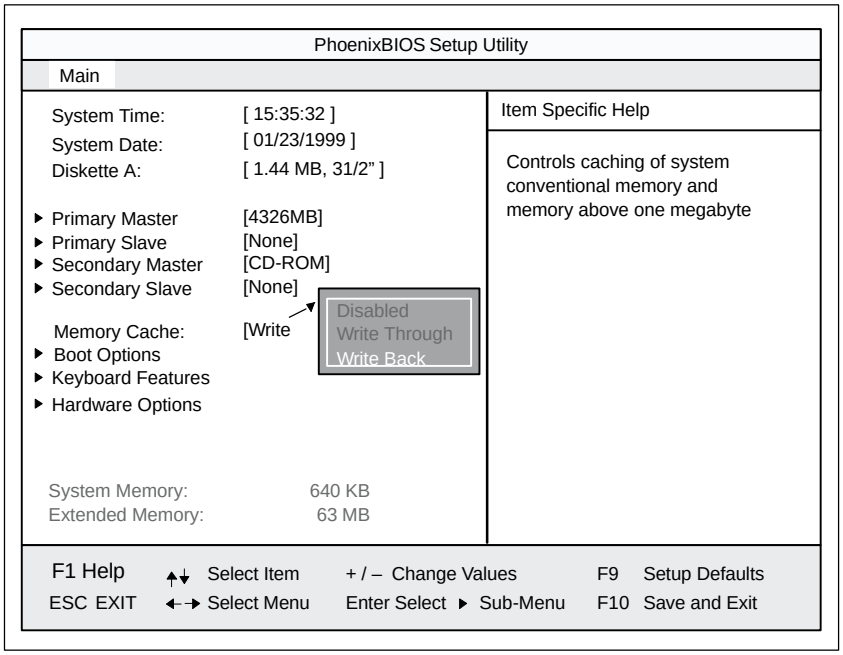


Figure 5-3 *Memory Cache* menu

A cache is a fast memory buffer between the CPU and main memory (DRAM). Recurrent memory access operations are executed in the fast cache, instead of main memory, if the function is enabled.

In rare instances involving some hardware and software combinations, it may be necessary to disable the cache because the program execution times or delays are too short on account of the fast cache.

[Disabled]	Cache is disabled
[Write Through]	Write access is not completed until the entry has been made in main memory.
[Write Back]	Write access is completed immediately. The entry in main memory takes place in the background (default)

5.2.3 The *Boot Options* submenu

The system goes to the following submenu when you select this menu option:

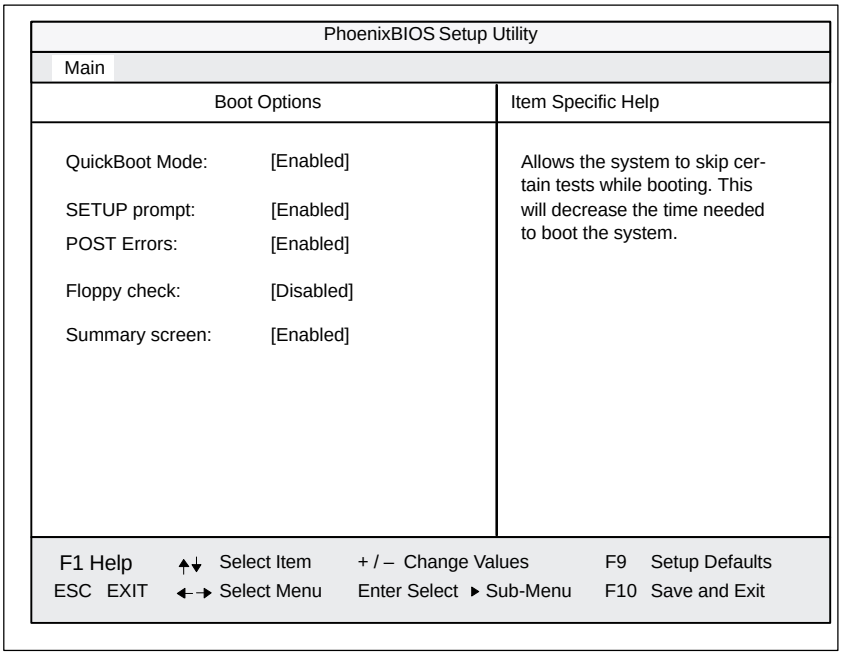


Figure 5-4 *Boot Options* Submenu

Quick Boot Mode	Some hardware tests are skipped when the system starts up, thus speeding up the boot procedure.
SETUP prompt	The message `PRESS` to enter Setup appears at the bottom of the screen during the system load phase.
POST Errors	The load operation is stopped if an error is detected during the system load phase, and you must press F1 to acknowledge. Enter `Disabled` to avoid the necessity of acknowledging this error, for example if no keyboard is connected.
Floppy check	The floppy head is stepped inward and then back to its original position in the system load phase. This test is useful because it reinitializes the drive.
Summary screen	The most important system parameters are displayed on the screen when the system load phase is completed.

The entry `Enabled` means that the function has been active; `Disabled` means it is inactive.

Example of a summary screen:

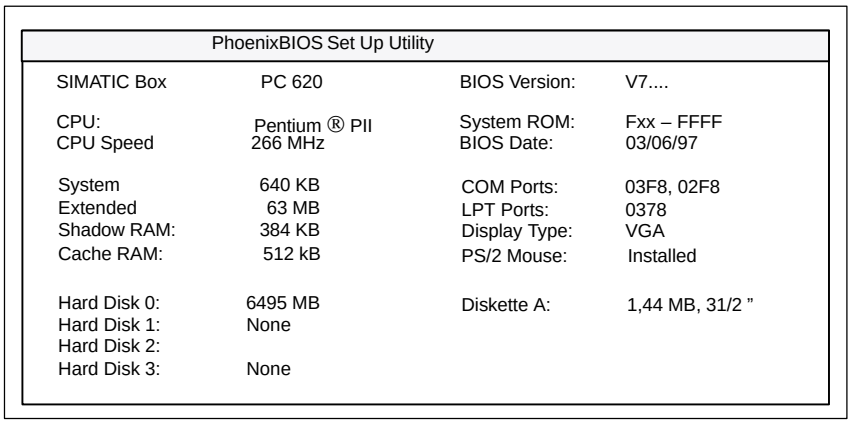


Figure 5-5 Summary Screen

5.2.4 The *Keyboard Features* submenu

The system goes to the following submenu when you select this menu option:

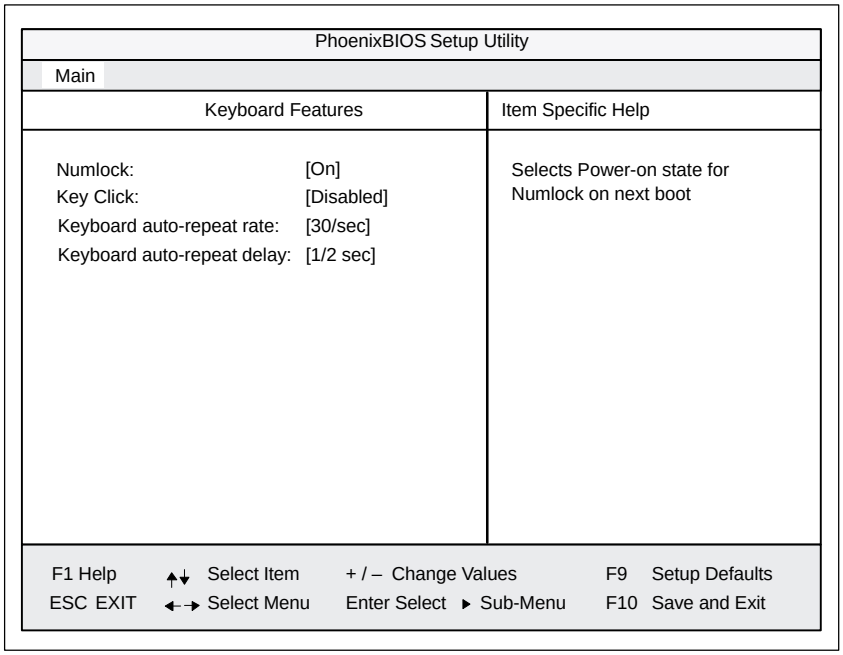


Figure 5-6 *Keyboard Features* Submenu

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

5.2.5 The *Hardware Options* submenu

The system goes to the following submenu when you select this menu option:

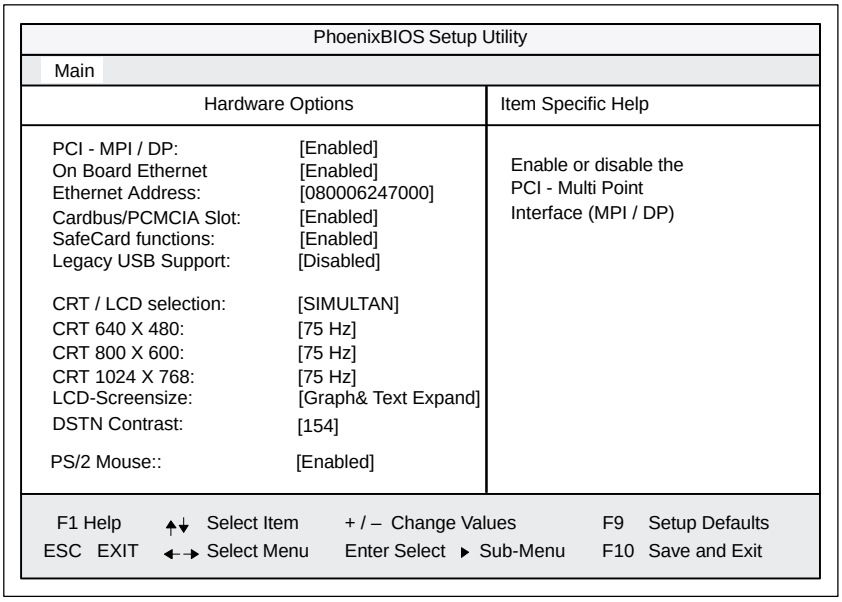


Figure 5-7 *Hardware Options* Submenu

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

Entry	Meaning
PCI-MPI/DP	Enables the CP5611-compatible MPI/DP interface. The resources are managed by the BIOS PCI Plug&Play mechanism.
On Board Ethernet	`Enabled` The Ethernet port on the basic board is enabled. `Disabled` The Ethernet port on the basic board is disabled.
Ethernet Address	The individual Ethernet address is entered here.
LAN Remote Boot	(is not supported by Siemens)
Legacy USB Support:	`Disabled` Default setting for USB–enabled operating system `Enabled` allows the use of USB interfaces for operating operating systems not USB–enabled (only for mouse and keyboard)
SafeCard functions	`Enabled` On-board monitoring functions are enabled. `Disabled` No monitoring functions. The relevant driver and application must be started for operation of the monitoring functions.
Fan Control	`Enabled` Fan speed is temperature–controlled. `Disabled` Fan always rotates at full speed.

Entry	Meaning	
CRT / LCD selection	`LCD Enabled`	All data are output only to the internal LCD, the 15-pin VGA port is disabled
	`CRT Enabled`	For maximum resolution, the display signals are output only to the 15-pin VGA port; the LCD interface of the VGA controller is disabled
	`SIMULTAN`	Both display interfaces are operated simultaneously. However, the LCD does not support all resolutions.
LCD screen-size	`Normal`	The display window in Text and Graphic modes is not expanded to full screen size.
	`Text expand`	Only the Text modes are expanded to full screen size.
	`Graph&Text expand`	The Text and Graphic modes are expanded to full screen size.
PS/2 mouse	`Enabled`	The PS/2 interface is enabled (default). The trackball is thus enabled. IRQ 12 is occupied.
	`Disabled`	The PS/2 port is disabled; IRQ 12 is available.
	Note:	Any change to this interface will not come into effect until the computing unit is switched off and on again.

* not available in the PC870 basic variant

5.3 The *Advanced* menu

Menu structure

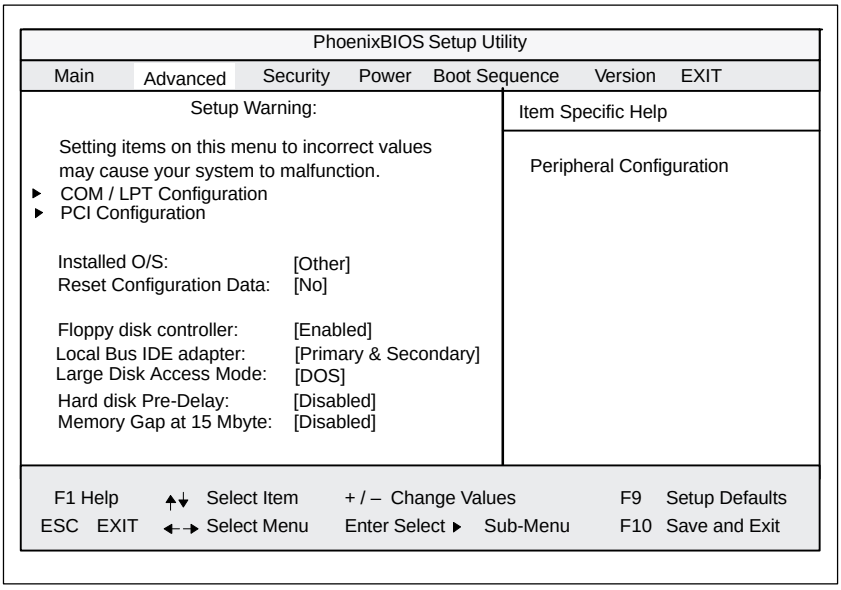


Figure 5-8 The *Advanced* menu

Settings in the *Advanced* menu

Field	Meaning	
Installed O/S	Plug&Play means that fitted modules are automatically detected and installed, providing they support Plug&Play functions.	
	`Other`	The BIOS handles the entire Plug&Play capability, (default setting),
	`Win95`	The operating system handles some of the Plug&Play functions.
	`Win98`	
	`WinMe`	
	`Win2000`	
Reset Configuration Data	`Yes`	All installations under Plug&Play are deleted and the configuration is triggered the next time the system boots. Then entry is then reset to `No`. System components that do not support Plug&Play have to be entered manually.
Floppy disk controller	`Disabled`	The floppy disk controller is enabled.
	`Enabled`	The floppy disk controller is disabled.
Local Bus IDE adapter	`Primary`/ `Secondary`	One IDE interface for a maximum of two drives.
	`Primary & Secondary`	Two IDE interfaces for a maximum of four drives.
	`Disabled`	No local IDE interface

Large Disk Access Mode	`DOS` `Other`	The drive tables will be structured acc. to Enhanced IDE so that they are compatible for DOS drive accesses. The tables will not be adapted.
Memory Gap at 15 MByte	`Disabled` `Enabled`	The whole onboard RAM area is available. A 1–MB area of the main memory beginning from 15 MB (addresses F00000 – FFFFFF) can be occupied by supplementary ISA modules.

5.3.1 The *COM / LPT Configuration* submenu

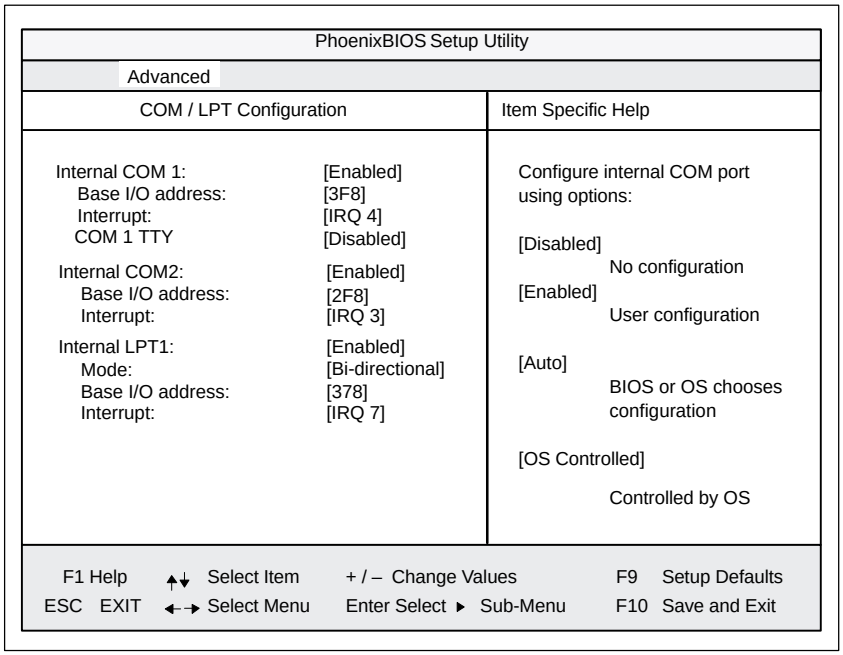


Figure 5-9 *COM/LPT Configuration* submenu

Setting an interface to “disabled” makes the resources occupied by it free.

The I/O addresses and interrupts are recommended default settings.

Printer port *Internal LPT1*

Field	Meaning
Mode:	Use this setting to set the operating mode of the printer interface. Make sure that the setting matches the data terminal you connected. Refer to the documentation for the device for the setting.

5.3.2 The PCI *Configuration* submenu

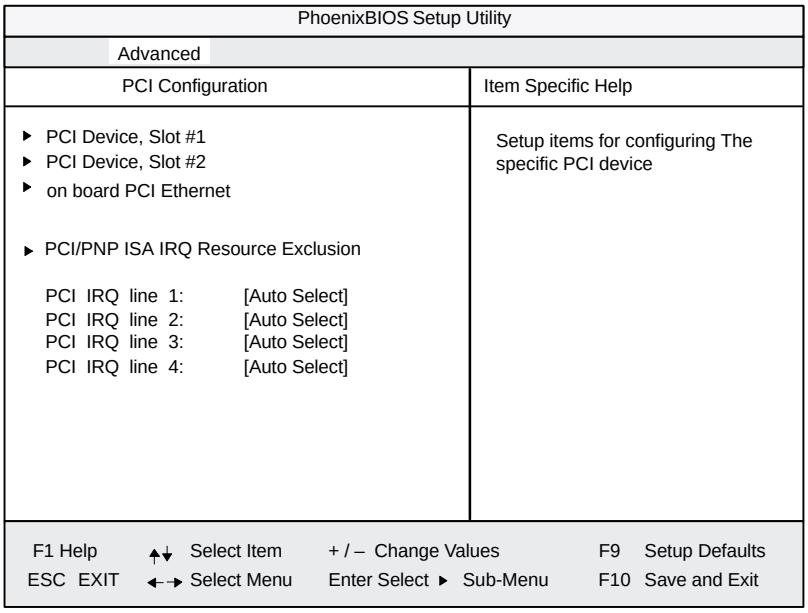


Figure 5-10 *PCI Configuration* Submenu

The *PCI Device* submenu

The system goes to the following submenu when you select this menu option:

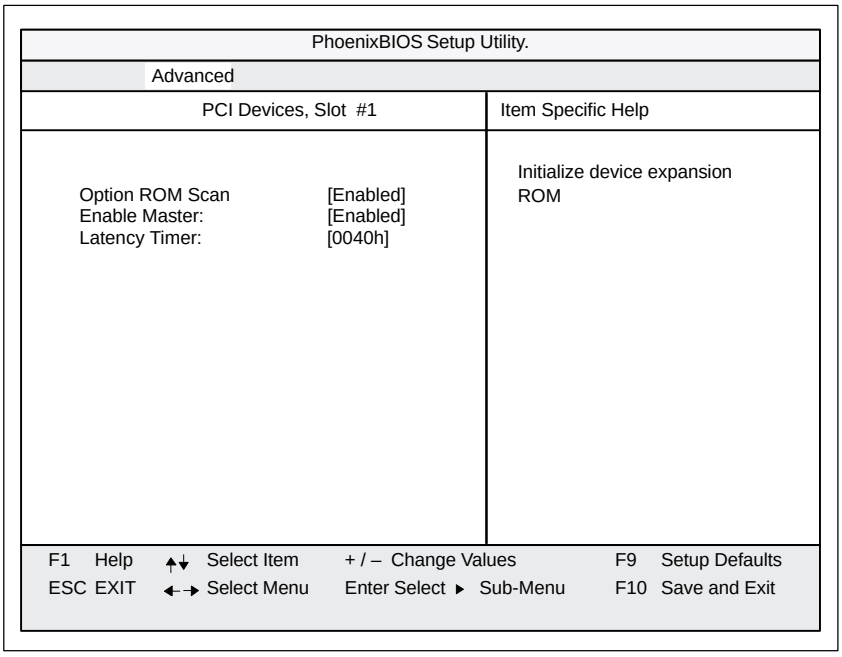


Figure 5-11 *PCI Devices submenu, Slot #1* submenu

Field	Meaning	
Option ROM Scan	`Enabled`	The option ROM of the PCI module (if present) is enabled
	`Disabled`	The option ROM of a PCI module is disabled.
Enable Master	`Enabled`	This slot can assume the PCI master function
	`Disabled`	This slot can only operate as a PCI slave.
Latency Timer	`Default`	The number of active PCI clock cycles of the master modules are determined by the module
	`0020H – 00E0H`	With these settings, the maximum active PCI clock cycles are set to the selected value.

The*PCI/PNP ISA IRQ Resource Exclusion* submenu

The system goes to the following submenu when you select this menu option:

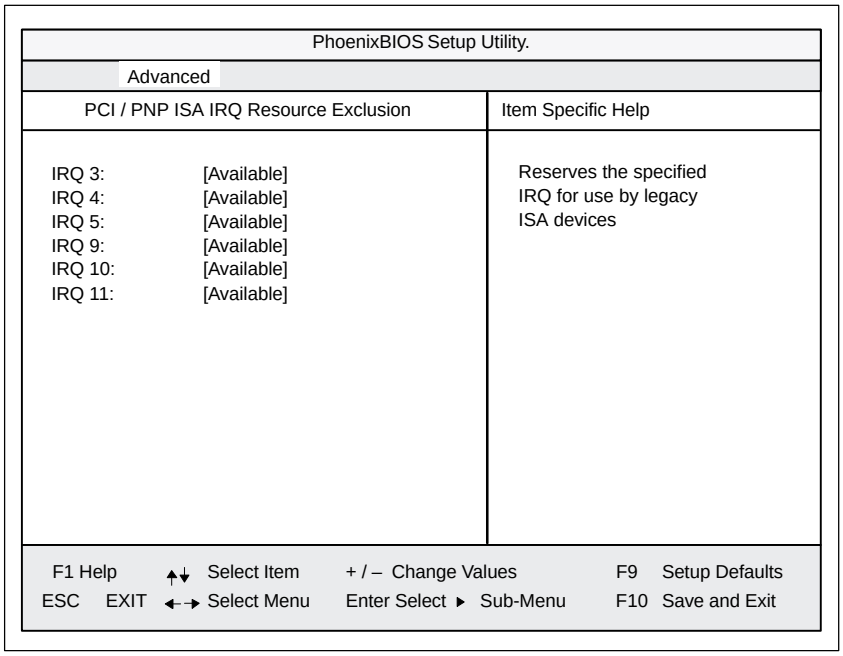


Figure 5-12 *PCI/PNP ISA IRQ Resource Exclusion* submenu

`Available`	The Plug&Play mechanism in BIOS can allocate the IRQ to plug&play modules or motherboard functions.
`Reserved`	Use only if the interrupt concerned has to be assigned specifically to PCMCIA modules without plug&play capability.

PCI IRQ line

The system goes to the following submenu when you select this menu option:

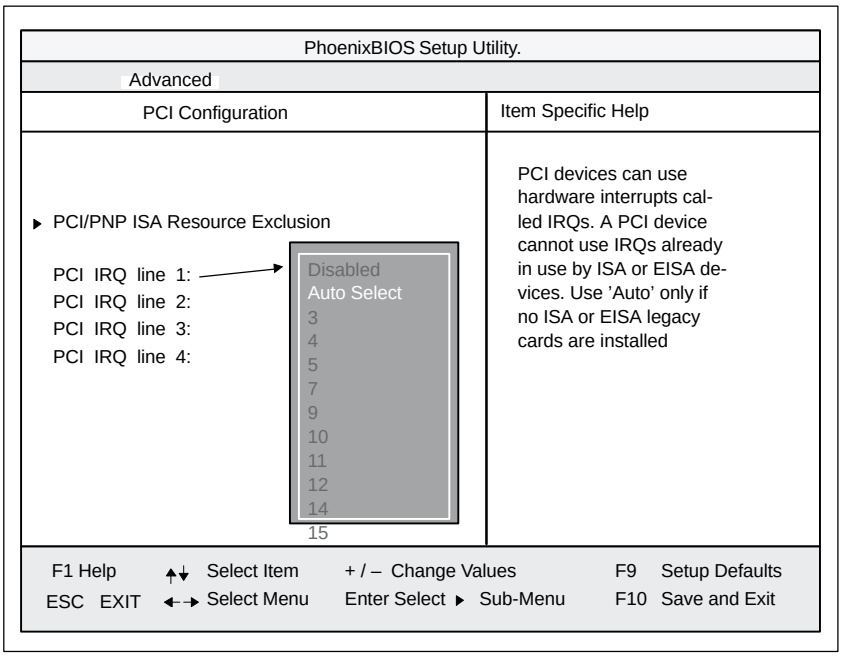


Figure 5-13 *PCI Configuration* submenu

`Disabled`	No interrupt possible for this PCI-IRQ line.
`Auto Select`	The plug&play mechanism in BIOS selects unassigned interrupts and allocates them to the on-board PCI device.
`3` bis `15`	The PCI-IRQ line is permanently assigned to the selected interrupt. Do not use this setting unless it is specifically required in your application's documentation.

Assignment of the PCI-IRQ lines to the PCI slots:

PC 870	PCI modules Interrupt assignment (PCI-IRQ) in:			
Module int. (pin no.)	Slot 1	Slot 2	Slot 3	Slot 4
INT – A (A6)	line 1	line 2	line 3	line 4
INT – B (B7)	line 2	line 3	line 4	line 1
INT – C (A7)	line 3	line 4	line 1	line 2
INT – D (B8)	line 4	line 1	line 2	line 3

grey background means main interrupt of the slot module

5.4 The *Security*menu

Only the fields in brackets can be edited. To protect your PC from unauthorized use, you can assign two passwords. With the supervisor password, you can prevent the use of floppy disks for the normal user and restrict the use of the hard disk.

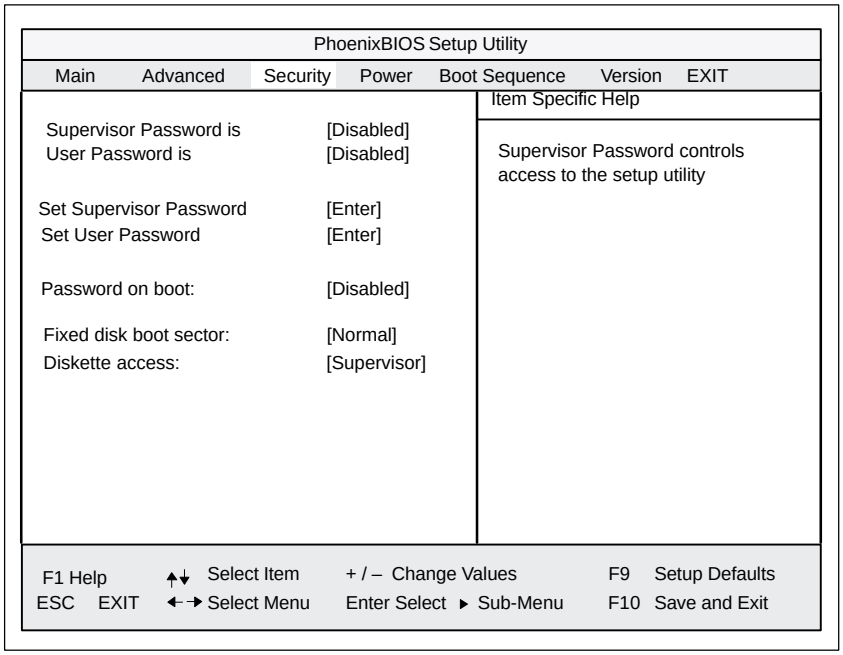


Figure 5-14 *Security* submenu

Field	Meaning	
Supervisor Password is	`Disabled`	Password is active. Used of floppy disks is prevented, and use of hard disk is restricted.
	`Enabled`	Certain Setup fields can be configured by the user, including the supervisor password.
User Password is	The field resets automatically from `Disabled` to `Enabled` when the password is entered.	
Set Supervisor Password	This field opens the dialog box for entering a password. Once it has been entered, the supervisor password can be changed by entering a new password or deleted by pressing Return and thus deactivated.	
Set User Password		
Password on boot	`Disabled`	No password required for system boot.
	`Enabled`	Supervisor or user password must be entered for system boot.
Fixed disk boot sector	`Normal`	All types of hard-disk access are permitted.
	`Protected`	No operating system can be installed. This is a way of protecting against boot viruses.

Field	Meaning
Diskette access	This mode of protection is not active unless *Password on boot* is set to `Enabled`. `Supervisor` Diskette access is not possible unless the supervisor password was entered during system boot. `User` Diskette access is not possible unless the user password was entered during system boot. **Note**: This function can no longer be used under Windows NT/2000, since this operating system does not access to the floppy disk via BIOS routines. To do so, please use the Windows NT/2000 system programs.

5.5 The *Power* menu

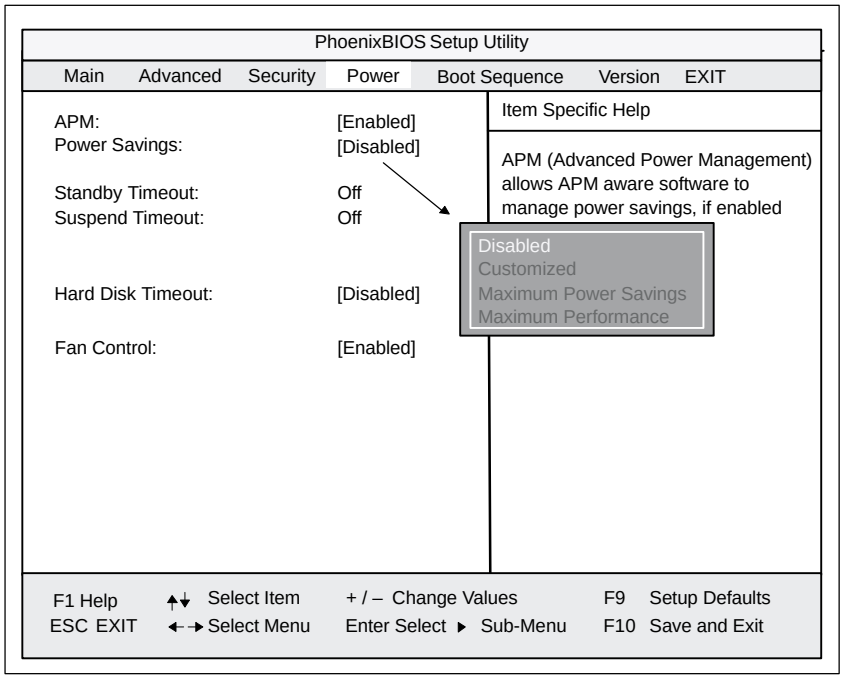


Figure 5-15 *Power* menu

In the terms of “green PC”, the *Power* menu offers a number of power saver modes for environmentally friendly computing:

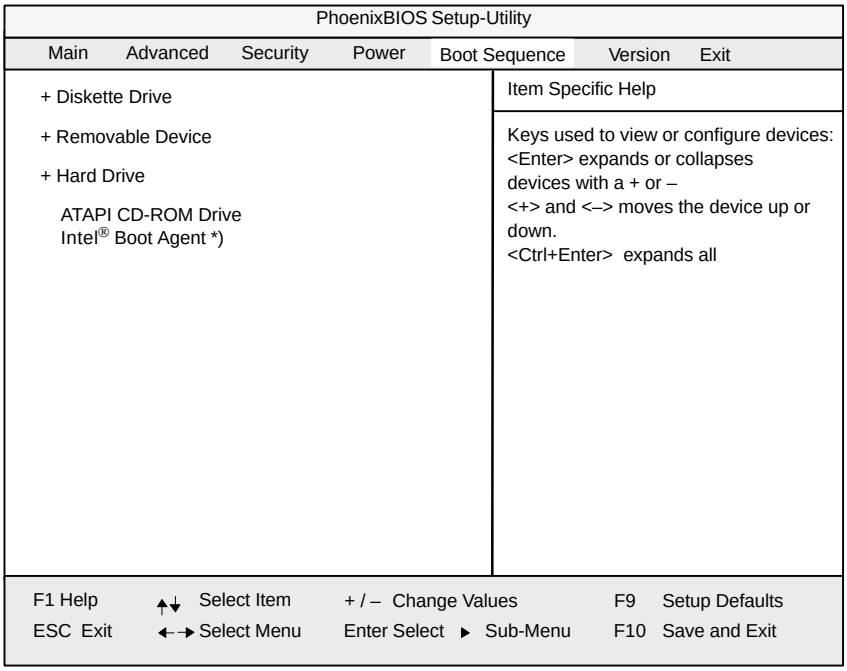
Field	Meaning	
APM (Advanced Power Management)	`Enabled`	The operating system can shut down system resources when they are not needed.
	`Disabled`	The operating system is denied APM access.
Power Savings	`Disabled`	No power-saving functions
	`Customized`, `Maximum Power Savings`, `Maximum Performance`	User-selectable and preset power saving functions for maximum and minimum power saving. You can set the parameters for Standby/Suspend Timeouts and Fixed Disk Timeout, or they are set automatically or set to their defaults.
Standby Timeout	`OFF`	No Standby mode
	`30` seconds or `1`, `2`, `4`, `8`, `12`, `16`	minutes after your computing unit goes to Standby mode.
Suspend Timeout	`OFF`	No Suspend mode
	`1`, `2`, `5`, `10`, `15`, `20`, `30`	minutes after the computing unit goes to Suspend mode.

Field	Meaning
Hard Disk Timeout	`Disabled` The hard disk does not shut down. `10, 15, 30, 60` minutes after the last hard-disk access the hard disk is shut down. The next time it is accessed, the hard disk starts spinning again after a brief delay.

* can only be set if Power Savings is set to “Customized”

5.6 The *Boot Sequence* menu

This menu lists the boot devices in prioritized groups.



*) only iof the function “LAN Remote Botot” has been set to “Enabled” in the ***Hardware Options*** menu beforehand

Figure 5-16 The *BOOT Sequence* menu

This menu lists the boot devices in prioritized groups.

The boot sources are displayed in groups. The group with the highest priority is at the top. The procedure for changing the sequence is as follows:

Use the ↑, ↓ keys to select a group. Use the +, – keys to move the group to its new position in the sequence.

Note

During startup the boot drive can be selected with ESC.

Groups marked + contain more than one device. When you select a group marked in this way, hit Enter to view the list of devices in the group. See the figure below for an illustration:

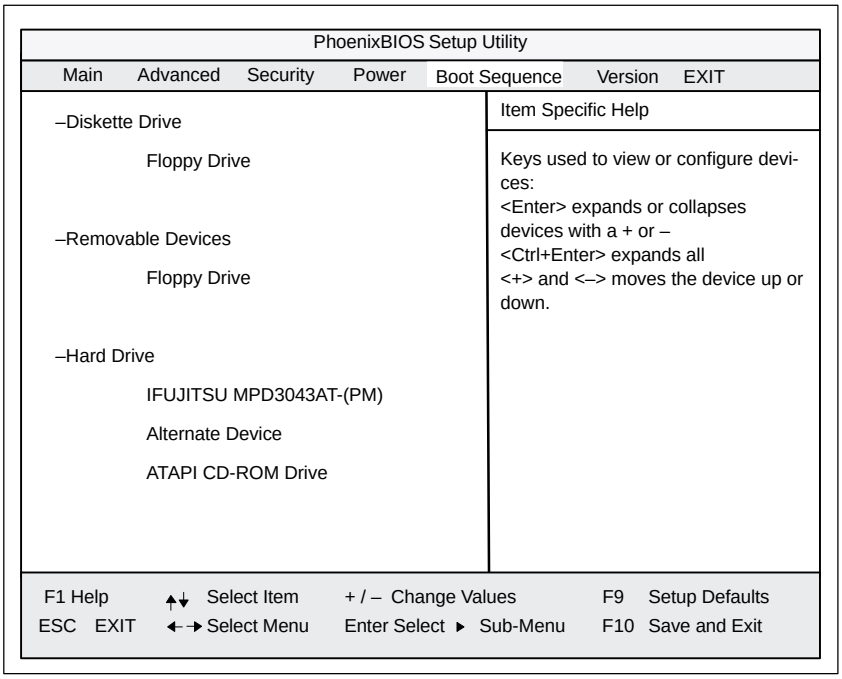


Figure 5-17 *BOOT-Sequence* menu

This screen shows all possible boot sources. Within a given group the highest priority device is always listed first. Here again, you can change the sequence as described above.

If a boot device is not available, the next device in the sequence is automatically checked to ascertain whether it is bootable.

5.7 The *Version* menu

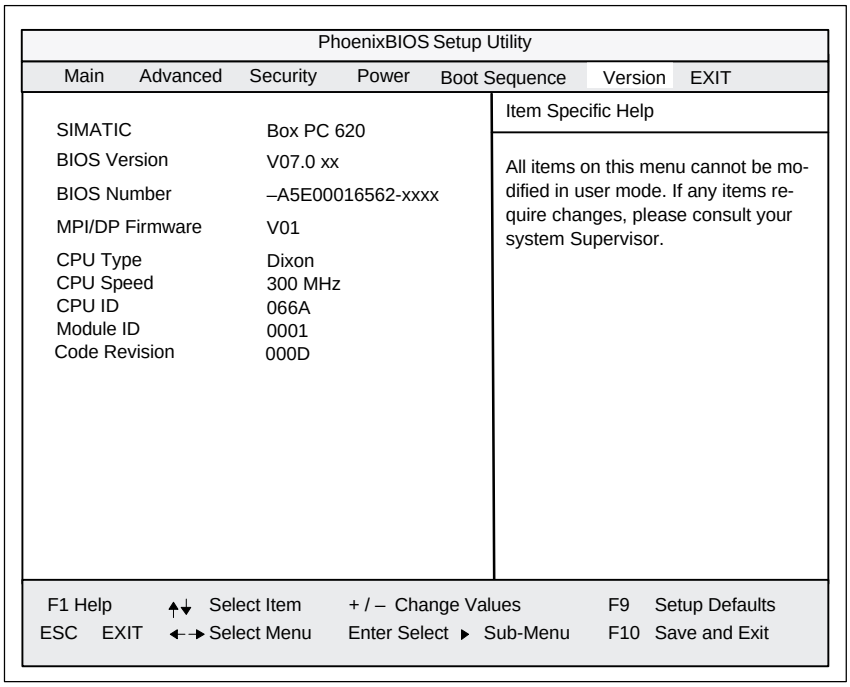


Figure 5-18 Example of the *Version* menu

Note

You should keep this information at hand whenever you have technical queries about your system.

5.8 The *Exit* menu

The setup program is always quitted using this menu.

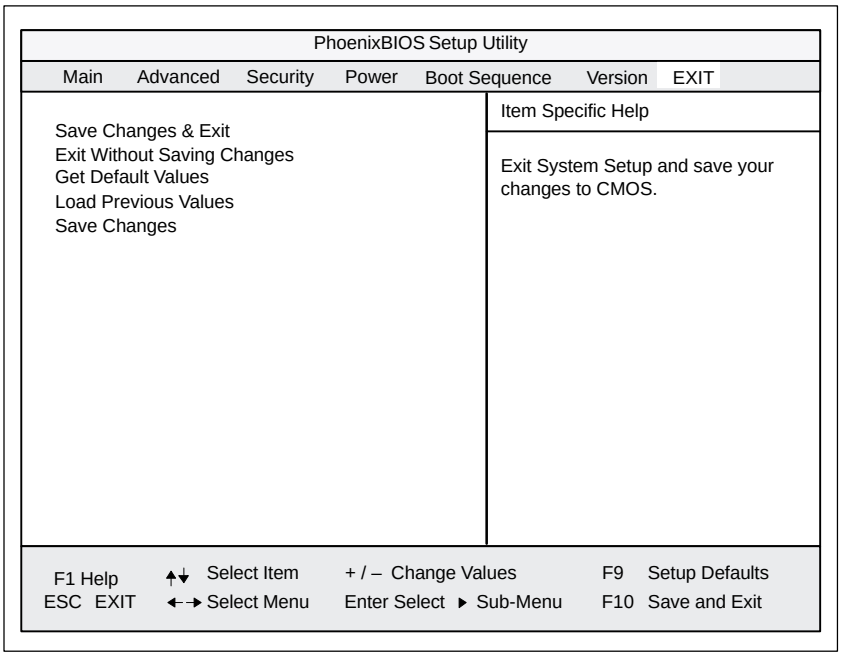


Figure 5-19 *Exit* Submenu

Field	Meaning
Save Changes & Exit	All changes are saved; a system restart is then carried out with the new parameters.
Exit Without Saving Changes	All changes are rejected; a system restart is then carried out with the old parameters.
Get Default Values	All parameters are set to safe values.
Load Previous Values	The last saved values are reloaded.
Save Changes	Save all Setup settings

5.9 SETUP default settings

Documenting your device configuration

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

System Parameters	Deafult Settings	Your Entries
Main		
System Time	hh:mm:ss	
System Date	MM/TT/JJJJ	
Diskette A	1,44 MB, 3 1/2”	
Primary Master	C: 20496 MB	
Primary Slave	None	
Secondary Master	None	
Secondary Slave	None	
Memory Cache	Write back	
Boot Options		
Quick Boot Mode	Enabled	
SETUP prompt	Enabled	
POST Errors	Enabled	
Floppy check	Disabled	
Summary screen	Enabled	
Keyboard Features		
Num Lock	On	
Key Click	Disabled	
Keyboard auto-repeat rate	30/s	
Keyboard auto-repeat delay	1/2s	
Hardware Options		
PCI-MPI/DP	Enabled	
On Board Ethernet	Enabled	
Ethernet Address	08000624xxxx	
LAN Remote Boot	Disabled	
Legacy USB Support	Disabled	
SafeCard Functions	Enabled	
Fan Control	Enabled	
CRT/LCD Selection	SIMULTAN	
LCD Screensize	Graph&Text Expanded	
PS2 Mouse	Auto	
Advanced		
Installed O/S	Other	
Reset Configuration Data	No	
COM/LPT Configuration		
Internal COM1	Auto	
Internal COM2	Auto	

System Parameters	Deafult Settings	Your Entries
Internal LPT1	Auto	
Mode	ECP	
PCI-Configuration		
PCI Device Slot 1		
Option ROM Scan	Enabled	
Enable Master	Enabled	
Latency timer	0040 h	
PCI Device Slot 2		
Option ROM Scan	Enabled	
Enable Master	Enabled	
Latency timer	0040 h	
on board PCI Ethernet		
Option ROM Scan	Disabled	
Enable Master	Disabled	
Latency timer	0040 h	
PCI / PnP ISA IRQ Exclusion		
IRQ3	Available	
IRQ4	Available	
IRQ5	Available	
IRQ9	Available	
IRQ10	Available	
IRQ11	Reserved	
PCI IRQ Line 1	Auto Select	
PCI IRQ Line 2	Auto Select	
PCI IRQ Line 3	Auto Select	
PCI IRQ Line 4	Auto Select	
Floppy disk controller	Enabled	
Large Disk Access Mode	DOS	
Local Bus IDE adapter	Primary & Secondary	
Memory Gap at 15 Mbyte	Disabled	
Default Primary Video Adapter	AGP	
Security		
Supervisor Password is	Disabled	
User Password is	Disabled	
Set Supervisor Password	Enter	
Set User Password	Enter	
Password on boot	Disabled	
Fixed disk boot sector	Normal	
Diskette Access	Supervisor	
Power		
APM	Enabled	
Power Savings	Disabled	
Standby Timeout	off	
Suspend Timeout	off	
Hard Disk Timeout	Disabled	

System Parameters	Deafult Settings	Your Entries
Boot Sequence		
Diskette Drive		
Removable Devices		
Hard Drive		
ATAPI CD-ROM Drive		
Intel® Boot Agent		
Version		
SIMATIC	Panel PC 870	
BIOS Version	V7.xx	
BIOS Number	A5E16562-ESxx	
MPI/DP Firmware	V01	
CPU Type	PIII	
CPU Speed	xxx MHz	
CPU ID	0683	
Code Revision	0010	

For your notes

Fault Diagnosis

6

Chapter overview

In this Chapter, we will give you some tips how to locate and rectify frequently occurring problems.

- For error messages of the operating system, please refer to the documentation of your operating system.
- In this Manual, you will find error messages that occur during the self–test (screen messages, sound sequences) in the Sections 6.5 and 6.6.)

In Section	You Will Find	on Page
6.1	Problems when using non–Siemens modules	6-2
6.2	The display remains dark	6-2
6.3	System time and/or date of the PC are not correct	6-3
6.4	USB device does not function	6-3
6.5	An error message is displayed on the screen	6-4
6.6	Self–test of the SIMATIC Panel PC 870 before booting	6-6

6.1 Problems when using non–Siemens modules

Response

The PC crashes when booting.

Cause

The following causes are possible:

- Double assignment of I/O addresses
- Double assignment of hardware interrupts and/or DMA channels
- Signal frequencies or signal level are not observed
- Connector pin assignment other than specified

Remedy

Check the configuration of your PC:

- If the configuration of your PC corresponds to the works default settings, please contact your technical service department.
- If the configuration of your PC has been changed, restore the default status; to do so, remove all non–Siemens modules, and then restart the computer:
  - If the problem persists, call the hotline.
  - If the error has dispappeared, the installed non–Siemens module was the cause of the fault. Replace it with a Siemens module or consult the supplier of the non–Siemens module.

6.2 The display of the operating unit remains dark

Cause/remedy

The following causes are possible:

Interconnecting cable connected not correctly

- Check the connections.

Incorrect BIOS settings

- Check the BIOS settings.

Note

For further information, please refer to the Start–up Guide.

6.3 System time and/or date of the PC are not correct

Remedy

Use the Setup menu to set system time and/or date (see Chapter 5).

While the computer is booting, press <F2> to call the setup.

Note

If time and date are repeatedly incorrect when the system after power off / power on, the battery is empty. Replace the battery as described in Section 4.3.

6.4 USB device does not function

The USB port is not found by the operating system. It is currently only supported by Windows ME and Windows 2000. The BIOS setup can be operated from the USB keyboard.

6.5 An error message is displayed on the screen

Error messages

All error messages output by the system BIOS are described below. For error messages output by the operating system or by the program, please refer to the manuals for the relevant programs.

To call the setup, press <F2> while the computer is booting.

Error message on the screen	Meaning/tip
Address conflict	Plug&play problem Contact the technical customer service.
Combination not supported	Plug&play problem Contact the technical customer service.
IO device IRQ conflict	Plug&play problem Contact the technical customer service.
Invalid System Configuration Data	Plug&play problem Please set the option RESET CONFIGURATION.DATA in the Setup menu “Advanced”. Contact the technical customer service.
Allocation Error for ...	Plug&play problem Please undo the last hardware change. Contact the technical customer service.
System battery is dead Replace and run SETUP	The battery on the CPU module is defective or empty. Change the battery as described in Section 4.3.
System CMOS checksum bad Run SETUP	Call SETUP (see Section 5), make the appropriate settings and save them. If this message always occurs whenever the PC boots, contact the technical customer service.
Incorrect Drive A type Run SETUP	Check the SETUP entries of drive A.
Incorrect Drive B type Run SETUP	Check the SETUP entries of drive B.
Diskette drive A error	Error accessing drive A Contact the technical customer service.
Diskette drive B error	Error accessing drive B Contact the technical customer service.
Failure Fixed Disk	Error accessing the hard disk Check the SETUP settings. Contact the technical customer service.
Keyboard error	Check whether the keyboard is connected correctly.
Stuck Key	Check whether a key of the keyboard is jammed.
System RAM Failed at offset:	Memory error Contact the technical customer service.
Shadow RAM Failed at offset:	Memory error Contact the technical customer service.
Extended RAM Failed at offset:	Memory error Contact the technical customer service.

Error message on the screen	Meaning/tip
Failing Bits:	Memory error Contact the technical customer service.
Operating system not found	Possible causes: No operating system installed. Wrong drive accesses (floppy disk in drive A/B) Wrong active boot partition Wrong drive entries in SETUP
Previous boot incomplete Default configuration used	Previous BOOT process has been terminated, e.g. due to mains power failure; correct the entries in SETUP (see Sec. 5).
System cache error Cache disabled	Error of the cache module of the CPU module Contact the technical customer service.
Monitor type does not match CMOS Run SETUP	Monitor does not match with the SETUP entries (see Sec. 5). Match the SETUP entires with the monitor.
System timer error	Hardware error Contact the technical customer service.
Real time clock error	Clock module error Contact the technical customer service.
Keyboard controller error	Keyboard error Contact the technical customer service.

6.6 Self–test of the SIMATIC Panel PC 870 before booting

After the PC has been turned on, a self–test (POST = Power On Self Test) is carried out. If an error is detected during the POST, the appropriate sound sequence (beep code) corresponding to the POST is output. The beep code consists of 2 x 2 sequences each.

Conversion table of the beep codes using the hexadecimal representation:

Beep Tones		Hex Code
B	B	0
B	BB	1
B	BBB	2
B	BBBB	3
BB	B	4
BB	BB	5
BB	BBB	6
BB	BBBB	7
BBB	B	8
BBB	BB	9
BBB	BBB	A
BBB	BBBB	B
BBBB	B	C
BBBB	BB	D
BBBB	BBB	E
BBBB	BBBB	F

Example:

B	BBBB	BBB	BBB	Sound Sequence
3		6		Hex code
Check the shutdown code				Meaning

The POST codes in the order of their occurrence:

Display (hex)	Meaning	Decsription
02	TP_VERIFY_REAL	Test whether CPU in Real mode
1C	TP_RESET_PIC	Reset interrupt controller
12	TP_RESTORE_CRO	Restore control register
13	TP_PCI_BM_RESET	PCI Bus Master Reset
36	TP_CHK_SUTDOWN	Check shutdown code
24	TP_SET_HUGE_ES	Switch ES to special mode
03	TP_DISABLE_NMI	Disable NMI
0A	TP_CPU_INIT	Early initialization of the CPU
04	TP_GET_CPU_TYPE	Determine CPU type
AE	TP_CLEAR_BOOT	Process boot flag
06	TP_HW_INIT	Initialize basic hardware
18	TP_TIMER_INIT	Initialize timer
08	TP_CS_INIT	Initialize chipset
C4	TP_PEM_SIZER_INIT	Reset system error
0E	TP_IO_INIT	Initialize IO
0C	TP_CACHE_INIT	Initialize cache
16	TP_CHECKSUM	EPROM checksum test
28	TP_SIZE_RAM	Determine RAM size
3A	TP_CACHE_AUTO	Determine cache size
2A	TP_ZERO_BASE	Set basic RAM 512k to 0
2C	TP_ADDR_TEST	Test basic RAM address lines
2E	TP_BASERAML	Check basic RAM, 1. 64k
38	TP_SYS_SHADOW	BIOS Shadow
20	TP_REFRESH	Refresh block test
29	TP_PMM_INIT	Initialize post–memory manager
33	TP_PDM_INIT	Initialize dispatch manager
C1	TP_7xx_INIT	Initialize PG 7xx I/Os
09	TP_SET_IN_POST	Start Power On self–test
0A	TP_CPU_INIT	Initialize CPU
0B	TP_CPU_CACHE_ON	Enable Cache
0F	TP_FDISK_INIT	Initialize hard disk
10	TP_PM_INIT	Initialize power management
14	TP_8742_INIT	Initialize block 8742
1A	TP_DMA_INIT	Initialize DMA blocks
1C	TP_RESET_PIC	Reset interrupt controller
32	TP_COMPUTE_SPEED	Determine clock rate
C1	TP_740_INIT	Initialize PG 7xx I/Os
34	TP_CMOS_TEST	Test CMOS RAM
3C	TP_ADV_CS_CONFIG	Configure advanced chipset
42	TP_VECTOR_INIT	Initialize interrupt vectors

Display (hex)	Meaning	Decsription
46	TP_COPYRIGHT	Check copyright
49	TP_PCI_INIT	Initialize PCI interface
48	TP_CONFIG	Check configuration
4A	TP_VIDEO	Initialize video interface
4C	TP_VID_SHADOW	Copy video BIOS to RAM
24	TP_SET_HUGE_ES	Switch ES to special mode
22	TP_8742_TEST	Test block 8742
52	TP_KB_TEST	Keyboard existing ?
54	TP_KEY_CLICK	Turn on / turn off keyboard click
76	TP_KEYBOARD	Check keyboard
58	TP_HOT_INT	Test for unexpected interrupts
4B	TP_QUIETBOOT_START	Disable any boot messages
4E	TP_CR_DISPLAY	Display copyright note
50	TP_CPU_DISPLAY	Display CPU type
5A	TP_DISPLAY_F2	Display message F2 for ”Setup”
5B	TP_CPU_CACHE_OFF	Disable cache if necessary (setup setting)
5C	TP_MEMORY_TEST	Test system memory
60	TP_EXT_MEMORY	Test extended memory
62	TP_EXT_ADDR	Test A20 address line
64	TP_USERPATCH1	Entry for your own initializations
66	TP_CACHE_ADVNCD	Determine and enable cache size
68	TP_CACHE_CONFIG	Configure and test cache
6A	TP_DISP_CACHE	Display cache configuration
6C	TP_DISP_SHADOWS	Display Shadow configuration and size Display RAM
6E	TP_DISP_NONDISP	Non–disposable segment displays
70	TP_ERROR_MSGS	Display POST error
72	TP_TEST_CONFIG	Check setup inconsistencies
7C	TP_HW_INTS	Set IRQ vectors
7E	TP_COPROC	Check whether a co-processor exists
96	TP_CLEAR_HUGE_ES	Switch ES back
80	TP_IO_BEFORE	Disable I/O modules
88	TP_BIOS_INIT	Various initializations
8A	TP_INIT_EXT_BDA	Initialize external BIOS data area
85	TP_PCI_PCC	Determine PCI blocks
82	TP_RS232	Determine serial interface
84	TP_LPT	Determine parallel interface
86	TP_IO_AFTER	Re–enable I/O modules
83	TP_FDISK_CFG_IDE_CTRLR	Configure IDE controller
89	TP_ENABLE_NMI	Enable NMI
8C	TP_FLOPPY	Initialize floppy controller

Display (hex)	Meaning	Decsription
90	TP_FDISK	Initialize hard disk controller
8B	TP_MOUSE	Test internal mouse interface
95	TP_CD	Check CD
92	TP_USERPATCH2	Entry for your own initializations
98	TP_ROM_SCAN	Search for BIOS expansions
69	TP_PM_SETUP	Initialize power management
9E	TP_IRQS	Enable hardware IRQ
A0	TP_TIME_OF_DAY	Set date and time
A2	TP_KEYLOCK_TEST	Set keylock default settings
C2	TP_PEM_LOCK	Stop error manager
C3	TP_PEM_DISPLAY	Display errors (if any)
A8	TP_ERASE_F2	Clear F2 message
AA	TP_SCAN_FOR_F2	Was F2 pressed?
AC	TP_SETUP_CHEK	Output F1/F2 message (if any)
AE	TP_CLEAR_BOOT	Clear self–test flag
B0	TP_ERROR_CHECK	Check for errors
B2	TP_POST_DONE	End of self–test
BE	TP_CLEAR_SCREEN	Clear screen
B6	TP_PASSWORD	Password query (option)
BC	TP_PARITY	Clear parity flag
BD	TP_BOOT_MENU	Display boot menu (option)
B9	TP_PREPARE_BOOT	Prepare booting
C0	TP_INT19	Booting via interrupt 19
00		Message after complete power up

If the <INSERT> key is pressed when booting, three short beeps are output, indicating that the initialization of the specvial PC hardware is skipped.

If your SIMATIC Panel PC 870 does not boot correctly, you can tell the hotline the hexadecimal POST code.

Hardware Information

7

Chapter Overview

In Section	You Will Find	on Page
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7.1 Spare parts and accessories

Available spare parts and accessories are listed in the following.

The order numbers depend on the release and are therefore not listed here.

You will obtain the order number of the appropriate part or component from your Siemens branch office after you have specified the order numnber (MLFB) of your complete device.

Note

Any further components not listed below, such as processor, motherboard or bus board, must only be installed / removed by authorized service personnel.

7.1.1 Spare parts

Spare parts (see Chapter 4) are:

- Hard disk module or CDROM / hard disk module
- Floppy disk drive
- Power supply
- Device fan
- Backup battery

7.1.2 Accessories

Accessories (see Chapter 4) are:

- Memory expansion
- Expansion modules

7.2 Overview of the Components and Ports

Component/Port	Description	Parameters
Chipset	Single chipset 440BX	• SDRAM • ECC support
BIOS	Update via software	• 512 K in 4 pages
CPU	Pentium III / Celeron (type FC PGA370)	• Upgradeable • Multimedia support • On-board L2 cache with 128 k/256 k
Memory	DIMM modules up to max. 256 MB/DIMM	• Data capacity of 64 bits + ECC • Modules with ECC possible • 3.3 V • SDRAM to PC100 specification • Up to 128 Mbit chip size on the module • 66/133 MHz bus speed • 3 DIMMs can be used • Easy to replace • Variable from 64 to 512 MB/DIMM
Graphics	UXGA-LCD controller on AGP bus (ATI)	• 8 MByte SDRAM graphics memory • CRT: up to 65535 colors or up to 256 colors
Hard disk	ATA-33 mode	• Ultra DMA capable
CDROM	Master on secondary EIDE channel	• 24 speed
Floppy	Notebook port for 34-pin ribbon cable	• 1.44 MB
Keyboard	Port for PS2 keyboard	• Standard • Trackball supported
Mouse	PS2 mouse port	• Standard
Serial	COM1, 25-pin COM2, 9-pin	• TTY and V24 • Standard
TTY	Communication with SIMATIC S5 CPU	• Range up to 1000 m
Parallel	Standard, bidirectional, EPP and ECP modes	• 25-pin SUB-D
DP12	Communication port SIMATIC S7	• Isolated DP12 1) (CP 5611 compatible) • 12 Mbaud
USB	Universal Serial Bus	• Two high current (500 mA) USB ports
Ethernet	10BaseT/100Base-TX	• 10/100 Mbaud, isolated 1)

*1) Electrically isolated in a safety extra-low voltage circuit (SELV)

7.3 System resources

All system resources (hardware addresses, memory mapping, interrupt assignment, DMA channels) are specified by the Windows operating system dynamically, depending on the hardware equipment, the drivers and connected external devices. For the current assignment of the system resources or any conflicts, refer to the following menus:

Windows 2000

Start > Settings > Control Panel > Administrative Tools > Computer Management > System Information

Windows NT 4.0 (option)

Start > Programs > Management (Gneeral) > Windows NT Diagnosis

Windows 98 SE/ME (option)

Start > Programs > Accessories > System Programs > System Information

7.4 Monitoring functions

The LEDs described in the following sections are only available on specific versions of the device. The basic configuration of the computing unit does not have any LEDs. The hardware signals are described in section 7.5.2.

7.4.1 Overview

Function

The following individual functions are implemented:

- temperature monitoring with error signal
- watchdog with error signal
- fan control

Messages of the monitoring modules can be passed on to applications.

The program SOM (Safecard on Motherboard) and Windows drivers are available on the devices for this purpose. These tools can be used to display the status and assign parameters to limit values.

7.4.2 Temperature monitoring and display

Temperature monitoring

The temperature is acquired by three sensors. One sensor monitors the processor temperature, the second monitors the temperature in the processor module area and the expansion boards, while the third monitors the temperature in the drive area.

If one of the three temperature values exceeds the set temperature threshold, an interrupt is triggered, starting an action parameterized in the SOM program.

The temperature drift will not occur if the device is used acc. to its intended purpose. If it nonetheless occurs, check whether the following fault causes apply:

- Are the vent slots covered?
- Did the fan fail to operate?
- Is the ambient temperature above the permitted value?
- Has the total output power of the power supply been exceeded?

The temperature drift remains stored until the temperature falls under the threshold value again and is reset by one of the following measures:

- Acknowledgement of the error message by the SOM program
- Restart of the device

7.4.3 Watchdog (WD)

Function

The watchdog monitors the execution of a program. The purpose of the WD is to report a program crashing to the user by means of different reactions.

The watchdog is idle when you turn on the computing unit or following a HW RESET(cold restart) – in other words, no reaction by the WD is initiated.

WD reactions

If the WD is not retriggered within the set time (by driver or SOM program), the following reactions are triggered:

Reaction	Option
Acknowledge WD	–
Initiate reset on the computing unit	adjustable
Send IRQ on computing unit	adjustable
SOM application is displayed	adjustable

The reactions you want to have triggered can be set by drivers or the SOM program.

WD monitoring times, TWD

The monitoring times can be adjusted in increments of one second over the range from 3 to 255 seconds.

Note

If the watchdog time is modified after the watchdog has been activated – in other words, while the watchdog is running – the watchdog will be retriggered as a result!

7.4.4 Fan control

The fan control is carried out using a temperature sensor on the motherboard. Another temperature sensor is installed on the processor module that triggers an error signal when a settable temperature threshold is exceed (see Section 7.4.2). This will cause the device fan to run at maximum speed.

Note

The fan control can be disabled in the BIOS SETUP (in the *Main* menu, *Hardware Options* submenu, parameter *Fan Control*, see Chapter 5). In this case, the fan will always run at maximum speed.

7.5 Ports

The mainboard of the computing unit features the following ports:

- ports for connecting external devices
- ports for connecting displays
- ports for internal connections (drives, wiring backplane, etc.)

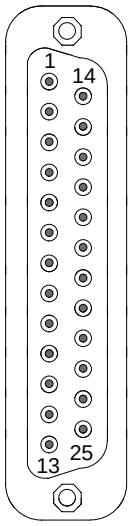
The connector pin assignments of the individual ports are described in the sections below.

7.5.1 External ports

Interface	Position	Connec-tor	Description
COM 1	external	X30	25-pin, socket, V.24/V.28 and 20mA (TTY isolated)
COM 2	external	X31	9-pin, standard connector
LPT1	external	–	25-pin, standard socket
PS/2 mouse	external	X22	6-pin, mini DIN socket
PS/2 keyboard/ PS/2 trackball	external	X23	6-pin, mini DIN socket
USB	external	X36	First and second USB port, additionally third USB port for front-side port
MPI /DP12	external	X400	9-pin, standard socket, isolated port
Ethernet	external	X700	RJ45
VGA	external	X303	15-pin, standard socket

Serial port COM1 (PLC/V24/Modem), X30

The serial port (COM 1) on the computing unit is assigned as follows:

Connector	Pin No.	Short Name	Meaning	Input / Output
	1	–	Shield	–
	2	TxD (D1)	Serial send 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	
	7	GND (E2)	Station Ground (reference potential)	-
	8	DCD (M5)	Data Carrier Detect (carrier)	Input
	9	+TTY RxD	TTY Receive	Input
	10–17	NC	Not Connected	–
	18	+TTY TxD	TTY Send	Output
	19	+20 mA	Isolated power supply	-
	20	DTR (S1)	Data Terminal Equipment Ready	Output
	21	-TTY TxD	TTY Send	
	22	RI (M3)	Incoming call	Input
	23-25	NC	Not Connected	-

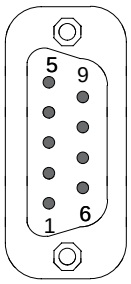
Gender changer for COM1

You can convert the COM1/V24/PLC port of the SIMATIC PC family into a 25-pin male connector by means of the enclosed gender changer (25-pin/25-pin). Plug the gender changer onto the COM1socket and secure it with the two hexagon head screws.

The V24 and TTY interfaces of COM1 can be used alternatively.

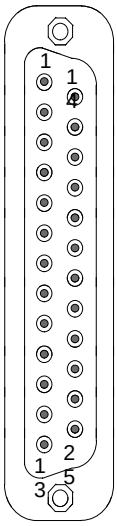
Serial port COM2 (V24/mouse), X31

The serial port on the computing unit is assigned as follows:

Connector	Pin No.	Short Name	Meaning	Input Output
	1	DCD (M5)	Data Carrier Detect (carrier)	Input
	2	RxD (D2)	Received data	
	3	TxD (D1)	Transmission data	Output
	4	DTR (S1)	Data Terminal Ready	
	5	GND (E2)	Station ground (reference potential)	-
	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	

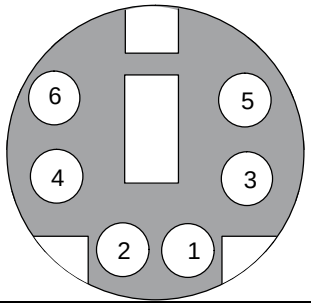
Parallel port LPT1

The parallel port on the computing unit is assigned as follows:

Connector	Pin No.	Short Name	Meaning	Input / Output
	1	/ Strobe (CLK)	Data message	Output (Open Collector)
	2	Data bit 0	Data line 0	Output (TTL level)
	3	Data bit 1	Data line 1	
	4	Data bit 2	Data line 2	
	5	Data bit 3	Data line 3	
	6	Data bit 4	Data line 4	
	7	Data bit 5	Data line 5	
	8	Data bit 6	Data line 6	
	9	Data bit 7	Data line 7	
	10	/ ACK (Acknowledge)	Data acknowledgement	Input (4,7 kΩ pull up)
	11	BUSY	Not ready for receiving data	
	12	PE (PAPER END)	End of paper	
	13	SELECT	Device selection	
	14	/ AUTO FEED	automatically a new line	Output (Open Collector)
	15	/ ERROR	Device error	Input (4,7 kΩ pull up)
	16	/ INIT	Reset / initialize	Output (Open Collector)
	17	/ SELECT IN	Printer selection	
	18 - 25	GND	Ground	-

PS/2 mouse port

You can connect an external PS/2 mouse to your computing unit. The port is assigned as follows:

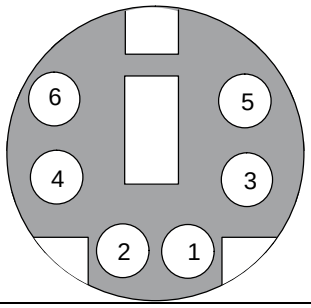
View at the Female Connector	Pin-No.	Short Name	Designation	Input / Output
	1	DAT	Mouse data line	Input / output
	2	NC	Not onnected	-
	3	GND	Ground	-
	4	P5VFK	+ 5 V fused	Output
	5	CLK	Mouse clock line	Input / output
	6	NC	Not connected	-

PS/2 mouse port, X22

You can connect an external PS/2 mouse to your computing unit. The port is assigned as follows:

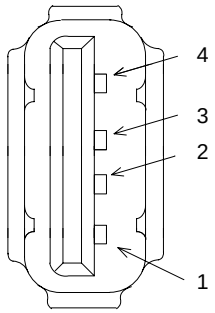
PS/2 keyboard port, X23

You can connect an external keyboard to your computing unit. The port is assigned as follows:

View at the Female Connector	Pin-No.	Short Name	Designation	Input / Output
	1	DAT	Mouse data line	Input / output
	2	NC	Not onnected	-
	3	GND	Ground	-
	4	P5VFK	+ 5 V fused	Output
	5	CLK	Mouse clock line	Input / output
	6	NC	Not connected	-

USB port, X36

The Universal Serial Bus port is assigned as follows:

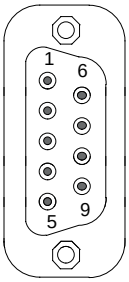
View at the Female Connector	Pin-No.	Short Name	Designation	Input / Output
	1	VCC	+ 5 V fused supply	Output
	2	- Data	Data line	Input/output
	3	+ Data		
	4	GND	Ground	–

The connector is a type A connector.

The port is rated as a high current USB (500 mA).

MPI/DP port, X400

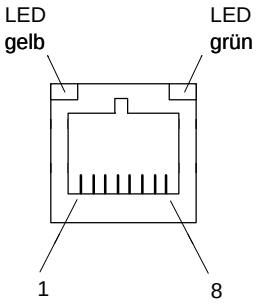
The MPI/DP port on the computing unit is assigned as follows:

Connector	Pin No.	Name	Meaning	Input/ Output
	1	NC	Pin 1 is not assigned	-
	2	NC	Pin 2 is not assigned	-
	3	LTG_B	Signal lead B of MPI module	Input/ Output
	4	RTS_AS	RTSAS, control signal for received data stream. The signal is ’1’ active when the directly connected AS is sending.	Input
	5	M5EXT	M5EXT return conductor (GND) of 5 V supply.	Output
	6	P5 EXT	P5EXT supply (+5 V) of 5 V supply.	Output
	7	NC	not assigned	-
	8	LTG_A	Signal lead A of MPI module	Input/ Output
	9	RTS_PG	RTS output signal of the MPI module. The signal is ’1’ when the PU is sending.	Output
	Shield		On connector casing	

Note

The current load by an external load connected between P5EXT and M5EXT may be max. 90 mA.

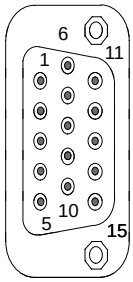
Ethernet RJ45 connection, X700

Connector	Pin No.	Short Name	Meaning	Input / Output
	1	TD+	Transmission data	Output
	2	TD–		
	3	RD+	Receive data	Input
	4, 5 *	SYMR	internally terminated with 75 Ω	-
	6		Receive data	Input
	7, 8 *	SYMT	internally terminated with 75 Ω	-
	S		Shield	-
		LED yellow	Connection	-
		LED green	Activity	-

* Not required for data transmission

VGA port, X303

The VGA socket on the computing unit is assigned as follows:

Connector	Pin No.	Designation	Meaning	Input/ Output
	1	R	Red	Output
	2	G	Green	
	3	B	Blue	
	4	NC	Not connected	-
	5	GND	Ground	–
	6			
	7			
	8			
	9	5 V	+5 V fused	Output
	10	GND	Ground	–
	11	NC	Not connected	-
	12	DDC_DAT	DDC data line	Input / output
	13	EXT_H	Horiz. synchron. signal	Output
	14	EXT_V	Vert. synchron. signal	
	15	DDC_CLK	DDC clock line	Input / output

7.5.2 Assignment of the front ports on the motherboard

Interface	Position	Connec-tor	Description
Display IF (LVDS)	internal	X300	Connection of LC display with single chip, LVDS port
I/O front-panel IF		X44	Port for front-panel I/O
COM 2		X33	Internal COM2 port

Display port (LVDS), X300

The TFT displays of the PC 670/870 with LVDS interface are connected to this port. The display clock rate is between 20 MHz and 66 MHz.

Connector pin assignment:

Pin No.	Short Name	Meaning	Input / Output
1	P5V_D_fused	+5V (fused) Display VCC	Output
2	P5V_D_fused	+5V (fused) Display VCC	
3	RXIN0–	LVDS output signal, bit 0 (–)	
4	RXIN0+	LVDS output signal, bit 0 (+)	
5	P3V3_D_fused	+3,3V (fused), display VCC	
6	P3V3_D_fused	+3,3V (fused), display VCC	
7	RXIN1–	LVDS output signal, bit 1 (–)	
8	RXIN1+	LVDS output signal, bit 1 (+)	
9	GND	Ground	-
10			
11	RXIN2–	LVDS output signal, bit 2 (–)	Output
12	RXIN2+	LVDS output signal, bit 2 (+)	
13	GND	Ground	-
14			
15	RXCLKIN–	LVDS clock signal (–)	Output
16	RXCLKIN+	LVDS clock signal (+)	
17	GND	Ground	-
18			
19	Reserved		
20	Reserved		

Assignment of a display to Display Select pins

Automatic configuration of one of 15 possible displays is performed by means of the Display Select inputs. The Display Select inputs have pull-up resistors – in other words, if these inputs are not connected, they go to High. The input has to be connected to GND for them to go Low.

Pin-Nr.	LCD_SEL3	LCD_SEL2	LCD_SEL1	LCD_SEL0	Display-Typ
0	low	low	low	low	reserved
1				high	
2			high	low	
3				high	
4		high	low	low	640 x 480 (VGA), TFT, 18 Bit
5				high	reserved
6			high	low	1024 x 768 (XGA), TFT, 18–bit
7				high	800 x 600 (SVGA), TFT, 18–bit
8	high	low	low	low	reserved
9				high	
10			high	low	
11				high	
12		high	low	low	
13				high	
14			high	low	
15				high	No display / DDC selected display

I/O port for front control elements

All the signals necessary for the connection of front control elements, in addition to the display and USB ports, are applied to this port.

Pin No.	Signal Name	Remark	Input/Output
1	GND	Chassis ground	–
2	P12V	Power supply for inverter	Output
3	BL_ON	Backlight on (5 V = On)	
4	P5V_fused	+5 V (fused)	
5	GND	Ground	–
6	P3V3_fused	+3.3 V (fused)	Output
7	K_CLK	Keyboard clock line	
8	K_DATA	Keyboard data line	Input / output
9	M_CLK	Mouse clock	Output
10	M_DATA	Mouse data line	Input / output
11	P5V_fused	+5 V (fused)	Output
12	USB_D1M	USB data– port 1	Input / output
13	USB_D1P	USB data+ port 1	
14	GND	Chassis ground	–
15	LCD_SEL0	Display type select signal 0	Intput
16	LCD_SEL1	Display type select signal 1	
17	LCD_SEL2	Display type select signal 2	
18	LCD_SEL3	Display type select signal 3	
19	RESET_N	Reset signal (Low active)	
20	SPEAKER	Connection for system loudspeaker	Output
21	HD_LED	HD LED*)	
22	DP_LED	MPI/DP LED*)	
23	Ethernet_LED	Ethernet LED*)	
24	TEMP_ERR	Temperature drift*)	
25	RUN_R	WatchDog error*)	
26	RUN_G	WatchDog OK*)	

*) anode with series–coinnected 1 kΩ resistor on the motherboard

7.5.3 Assignment of the internal ports on the motherboard

Interface	Position	Connector	Description
Memory	internal	X3, X4, X5	3 SO-DIMM sockets, 64 bit
Processor		X1	Socket for FCPGA processor
Bus expansion		X20	Socket for bus expansion, assigned with ISA and PCI bus signals)
Power supply		X50	20-pin cable connector for power supply
Floppy		X26	Two drives are possible (82078 compatible) 360 kB, 720 kB, 1.2 MB, 1.44 MB 3F0h – 3F7h, 370h – 377h, can be disabled IRQ 6, edge-triggered 34-pin, socket for standard floppy drive
3.5” hard disk		X7	170h-177h, 1F0h-1F7h, can be disabled IRQ 14, IRQ 15, edge-triggered 40-pin, 2.54 mm plug connector (3.5” HD, primary); a maximum of 2 drives is possible
CD-ROM drive		X10	170h-177h, 1F0h-1F7h, can be disabled IRQ 14, IRQ 15, edge-triggered 44-pin, 2 mm plug connector (CDROM, secondary master); a maximum of one drive is possible
V.24/TTY module		X28, X29	Connection for V.24/TTY hybrid (physical interface)
Power supply connection for CPU fan		X41	Power supply for CPU fan 3-pin, plug connector
Power supply connection for device fan		X42	Power supply for device fan 3-pin, plug connector
Backup battery		X49	Connection for backup battery 2-pin, plug connector

Port to bus module (X20)

The computing unit has a bus module with a PCI expansion slot and a shared ISA/PCI slot. Expansion boards can be installed complying with ISA specification (Rev. 3.1) and PCI specification (Rev. 2.0) with a maximum length of 265 mm (175 mm for shared ISA/PCI modules). All PCI slots can be used as masters. Only 5 V PCI modules can be operated.

The bus module is designed as a truly passive module – in other words, there are only receptacles for the expansion boards and any backup capacitors that may be present. The power supply of the expansion boards runs via the connection of the bus module to the basic board. The -5 V voltage is not provided by the power supply and is generated from the -12 V on the bus module using in-phase control.

The connection to the basic board is established by a gold-plated ’EISA’ type two-part connector. All the necessary bus signals (ISA and PCI) are applied to this connector. The following table shows the connector pin assignment.

Pin assignment of the connector to the bus board

Pin No.	5V System Environment	
	Side B	Side A
1	–12V	TRST#
2	TCK	+12V
3	Ground	TMS
4	TDO	TDI
5	+5V	+5V
6	+5V	INTA#
7	INTB#	INTC#
8	INTD#	+5V
9	PRSNT1#	Reserved
10	Reserved	+5V
11	PRSNT2#	Reserved
12	Ground	Ground
13	Ground	Ground
14	Reserved	AUX3V
15	Ground	RST#
16	CLK	+5V
17	Ground	GNT#
18	REQ#	Ground
19	+5V	ME#
20	AD[31]	AD[30]
21	AD[29]	+3.3V
22	Ground	AD[28]
23	AD[27]	AD[26]
24	AD[25]	Ground
25	+3.3V	AD[24]
26	C/BE[3]#	IDSEL
27	AD[23]	+3.3V
28	Ground	AD[22]
29	AD[21]	AD[20]
30	AD[19]	Ground
31	+3.3V	AD[18]
32	AD[17]	AD[16]
33	C/BE[2]#	+3.3V
34	Ground	FRAME#
35	IRDY#	Ground
36	+3.3V	TRDY#
37	DEVSEL#	Ground
38	Ground	STOP#
39	LOCK#	+3.3V
40	PERR#	SDONE
41	+3.3V	SBO#
42	SERR#	Ground
43	+3.3V	PAR
44	C/BE[1]#	AD[15]
45	AD[14]	+3.3V
46	Ground	AD[13]
47	AD[12]	AD[11]
48	AD[10]	Ground

Pin No.	5V System Environment	
	Side B	Side A
49	Ground	AD[09]
50	CONNECTOR KEY	
51	CONNECTOR KEY	
52	AD[08]	C/BE[0]#
53	AD[07]	+3.3V
54	+3.3V	AD[06]
55	AD[05]	AD[04]
56	AD[03]	Ground
57	Ground	AD[02]
58	AD[01]	AD[00]
59	+5V	+5V
60	Reserved	Reserved
61	+5V	+5V
62	+5V	+5V
	CONNECTOR KEY	
	CONNECTOR KEY	
63	Reserved	Reserved
64	Reserved	Reserved
65	Reserved	Reserved
66	Ground	Ground
67	Reserved	Reserved
68	Reserved	Reserved
69	Reserved	+3.3 V
70	Ground	PCI_GND_N1
71	PCI1_PCLK	Ground
72	Ground	PCI_GND_N2
73	PCI_REQ_N1	Ground
74	Ground	PCI6_PCLK
75	PCI2_PCLK	RISER_ID1
76	Ground	Reserved
77	PCI_REQ_N2	RISER_ID2
78	Ground	NO_GO
79	PCI_REQA_N	+12V
80	PCI_GNTA_N	SERIRQ_N
81	–3.3V	+3.3V
82	PCI3_PCLK	Ground
83	Ground	PCI_GNT.N3
84	PCI_REQ_N3	Ground
85	Ground	PCI4_PCLK
86	PCI_REQ_N4	Ground
87	Ground	PCI_GNT_N4
88	PCI5_PCLK	+3.3V
89	+3.3V	PCI_GNT_N5
90	PCI_REQ_N5	+3.3V
91	Ground	ISA_OSL
92	+12V	+12V
93	+12V	+12V
94	–12V	–5V

low active

Pin assignment of the ATX power supply connector, X50

Pin No.	Short Name	Meaning	Input / Output
1	3.3V	3.3 V power supply	Input
2			
3	GND	Ground	-
4	5V	5 V power supply	Input
5	GND	Ground	-
6	5V	5 V power supply	Input
7	GND	Ground	-
8	PowerGood		Input
9	AUX-5V	5 V auxiliary voltage	
10	12V	12 V power supply	
11	3.3V	3,3 V power supply	
12	–12V	-12 V power supply	
13	GND	Ground	-
14	PSOFF		Output
15	GND	Ground	-
16			
17			
18	–5V	-5 V power supply	Input
19	5V	5 V power supply	
20			

Port to the floppy disk drive, X26

This port is designed for connecting a Notebook floppy disk drive. The maximum connection length of the data cable must not be longer than 40 cm.

Pin No.	Short Name	Meaning	Input / output
1	GND	Ground	-
2	DENSEL	High density disk selection	Output
3	GND	Ground	-
4	NC	Not connected	-
5	GND	Ground	-
6	DRAME0	Datenrate-Signal	Output
7	GND	Ground	-
8	INDEX_N	Index hole detection	Input
9	GND	Ground	-
10	MOT_N0	Turn on motor 0	Output
11	GND	Ground	-
12	DS_N1	Select drive 1	
13	GND	Ground	-
14	DS_N0	Select drive 0	
15	GND	Ground	-
16	MOT_N0	Turn on motor 1	Output
17	GND	Ground	-
18	DIR_SL_N	Stepper motor direction	Output
19	GND	Ground	-
20	STEP_N	Pulse for stepper motor	
21	GND	Ground	-
22	WR_DAT_N	Data write signal	Output
23	GND	Ground	-
24	WR_GAT_N	Data enable signal	Output
25	GND	Ground	-
26	TRACK_N0	Track 0 signal	Output
27	GND	Ground	-
28	WR_PRT_N	Write protection signal	Input
29	GND	Ground	-
30	RD_DAT_N	Data read signal	Input
31	GND	Ground	-
32	SIDE_1_N	Side selection	Output
33	MED_ID1	High density disk detection	Input
34	DCHG_N	Diskette change display	

Assignment of the IDE ports (X7, X10)

The primary IDE port is designed for alternatively installing a 3.5” hard disk (connection via a 40-pin 2.54 mm pitch connector). The secondary IDE port is provided for the optional connection of a CD-ROM (connection via 44–pin 2 mm pitch connector. Maximum connection length of the data cables: 40 cm.

Pin No.	Short Name X7	Meaning	Input/Output
1	RESET	Reset signal	Output
2	GND	Ground	-
3	D7	Data signal D7	Input / output
4	D8	Data signal D8	
5	D6	Data signal D6	
6	D9	Data signal D9	
7	D5	Data signal D5	
8	D10	Data signal D10	
9	D4	Data signal D4	
10	D11	Data signal D11	
11	D3	Data signal D3	
12	D12	Data signal D12	
13	D2	Data signal D2	
14	D13	Data signal D13	
15	D1	Data signal D1	
16	D14	Data signal D14	
17	D0	Data signal D0	
18	D15	Data signal D15	
19	GND	Ground	-
20	NC	Not connected	–
21	DREQ	DMA request	Eingang
22	GND	Ground	-
23	IOW_N	Write signal	Ausgang
24	GND	Ground	-
25	IOR_N	Read signal	Ausgang
26	GND	Ground	-
27	IORDY	Ready signal	Eingang
28	Reserved	Reserved	–
29	DACK_N	DMA confirmation	Ausgang
30	GND	Ground	-
31	IRQ	Interrupt signal	Eingang
32	NC	Not connected	–
33	AD_1	Address line 1	Ausgang
34	Reserved	Reserved	–
35	AD_0	Address line 0	Ausgang
36	AD_2	Address line 2	
37	CS1_N	Selection signal 1	
38	CS3_N	Selection signal 3	
39	HDACT_N	Hard disk activity	Input
40	GND	Ground	-

Pin No.	Short Name X10	Meaning	Input/Output
1	RESET	Reset signal	Output
2	GND	Ground	-
3	D7	Data signal D7	Input / output
4	D8	Data signal D8	
5	D6	Data signal D6	
6	D9	Data signal D9	
7	D5	Data signal D5	
8	D10	Data signal D10	
9	D4	Data signal D4	
10	D11	Data signal D11	
11	D3	Data signal D3	
12	D12	Data signal D12	
13	D2	Data signal D2	
14	D13	Data signal D13	
15	D1	Data signal D1	
16	D14	Data signal D14	
17	D0	Data signal D0	
18	D15	Data signal D15	
19	GND	Ground	-
20	NC	Not connected	-
21	DREQ	DMA request	Input
22	GND	Ground	-
23	IOW_N	Write signal	Output
24	GND	Ground	-
25	IOR_N	Read signal	Output
26	GND	Ground	-
27	IORDY	Ready signal	Input
28	CSEL	Master/slave signal	
29	DACK_N	DMA confirmation	Output
30	GND	Ground	-
31	IRQ14/15	Interrupt signal	Input
32	IOCS16	Selection signal 16bit	
33	AD_1	Address line 1	Output
34	Reserved	Reserved	-
35	AD_0	Address line 0	Output
36	AD_2	Address line 2	
37	CS1_N	Selection signal 1	
38	CS3_N	Selection signal 3	
39	HDACT_N	Drive activity	Input
40	GND	Ground	-
41/42	P5V	+5V power supply	Output
43	GND	Ground	-
44	Reserved	Reserved	-

Assignment of the CPU power supply connector, X41

Pin No.	Short Name	Meaning	Input / Output
1	GND	Ground	–
2	+12V	Switched power supply	Output
3	CPU FAN_CLK	Clock signal	Input

Assignment of the main fan power supply connector, X42

Pin No.	Short Name	Meaning	Input / Output
1	GND	Ground	–
2	+12V	Switched power supply	Output
3	PG1 FAN_CLK	Clock signal	Input

Backup battery connector, X49

The CMOS–RAM backup battery is connected to this connector. A 3.6 V lithium battery with a capacity of 750 mAh is used.

Pin No.	Short Name	Meaning	Input / Output
1	+	Plus pole	Input
2	–	Minus pole	–

7.6 Bus board

7.6.1 Design and theory of operation

The bus module is designed as a passive link between the basic board and the expansion boards. It is mounted with two screws.

The bus module has two PCI expansion slots (1 x short, 1 x long), two long shared ISA/PCI and one long ISA slot. Expansion boards acc. to the ISA specification (Rev. 3.1) and PCI specification (Rev. 2.0) can be installed. All PCI slots are master–enabled. The power supply of the expansion boards is provided via the connection of the bus module to the motherboard.

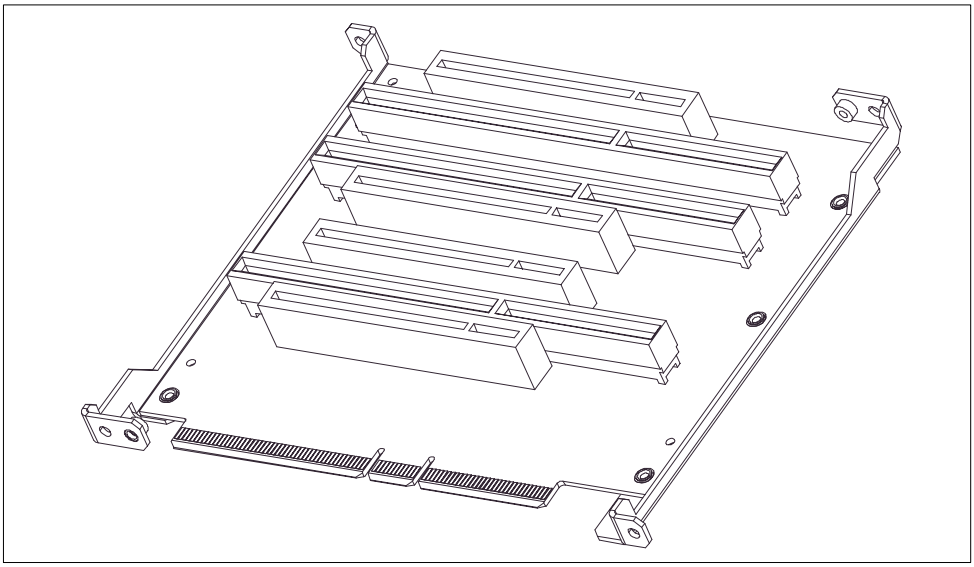


Figure 7-1 Bus board

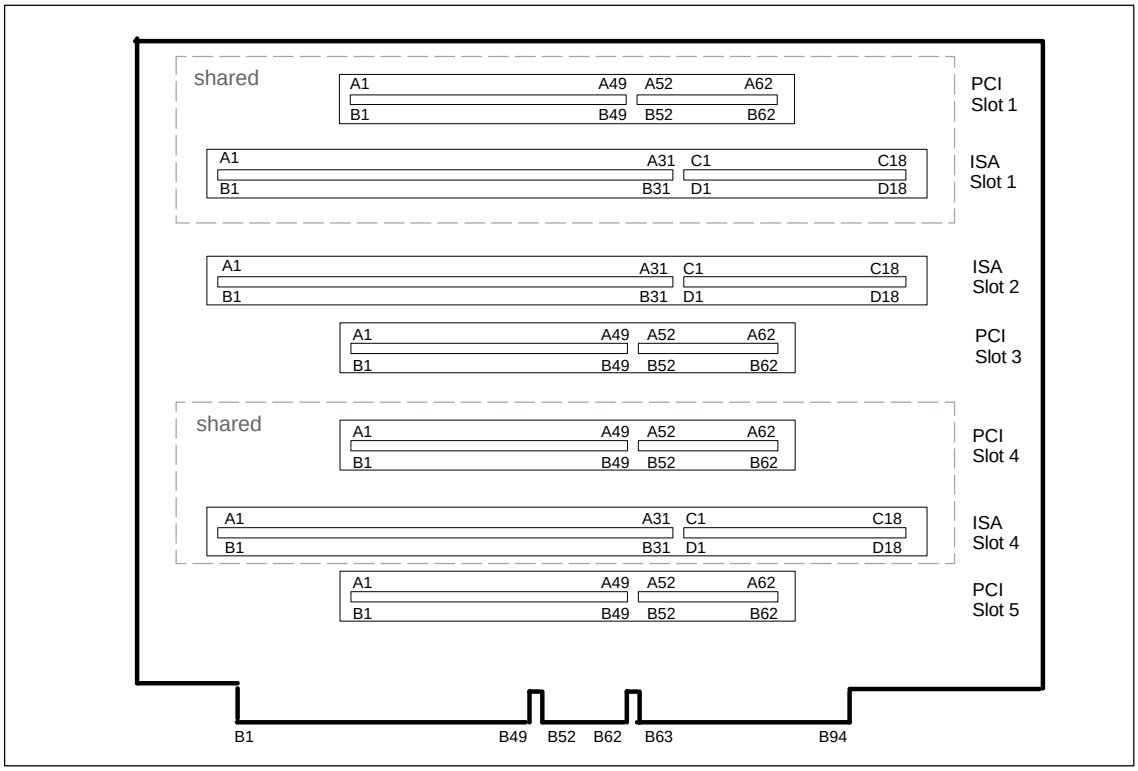


Figure 7-2 Connector assignment on the bus module

7.6.2 Interface to the motherboard

The connection to the motherboard is established by a gold-plated 64–bit PCI two-part connector. All the necessary bus signals (ISA and PCI) are applied to this connector.

Pin-Nr.	5V System Environment Side B	Side A
1	–12V	TRST#
2	TCK	+12V
3	Ground	TMS
4	TDO	TDI
5	+5V	+5V
6	+5V	INTA#
7	INTB#	INTC#
8	INTD#	+5V
9	PRSNT1#	Reserved
10	Reserved	+5V
11	PRSNT2#	Reserved
12	Ground	Ground
13	Ground	Ground
14	Reserved	Reserved
15	Ground	RST#
16	CLK	+5V

Pin-Nr.	5V System Environment Side B	Side A
17	Ground	GNT#
18	REQ#	Ground
19	+5V	Reserved
20	AD[31]	AD[30]
21	AD[29]	+3.3V
22	Ground	AD[28]
23	AD[27]	AD[26]
24	AD[25]	Ground
25	+3.3V	AD[24]
26	C/BE[3]#	IDSEL
27	AD[23]	+3.3V
28	Ground	AD[22]
29	AD[21]	AD[20]
30	AD[19]	Ground
31	+3.3V	AD[18]
32	AD[17]	AD[16]
33	C/BE[2]#	+3.3V
34	Ground	FRAME#
35	IRDY#	Ground
36	+3.3V	TRDY#
37	DEVSEL#	Ground
38	Ground	STOP#
39	LOCK#	+3.3V
40	PERR#	SDONE
41	+3.3V	SBO#
42	SERR#	Ground
43	+3.3V	PAR
44	C/BE[1]#	AD[15]
45	AD[14]	+3.3V
46	Ground	AD[13]
47	AD[12]	AD[11]
48	AD[10]	Ground
Pin-Nr.	**5V System Environment** **Side B**	**Side A**
49	Ground	AD[09]
50	CONNECTOR KEY	
51	CONNECTOR KEY	
52	AD[08]	C/BE[0]#
53	AD[07]	+3.3V
54	+3.3V	AD[06]
55	AD[05]	AD[04]
56	AD[03]	Ground
57	Ground	AD[02]
58	AD[01]	AD[00]
59	+5V	+5V
60	Reserved	Reserved
61	+5V	+5V
62	+5V	+5V

Pin-Nr.	5V System Environment Side B	Side A
	CONNECTOR KEY	
	CONNECTOR KEY	
63	Reserved	Reserved
64	Reserved	Reserved
65	Reserved	Reserved
66	Ground	Ground
67	Reserved	Reserved
68	Reserved	Reserved
69	Reserved	+3.3 V
70	Ground	PCI_GND_N1
71	PCI1_PCLK	Ground
72	Ground	PCI_GND_N2
73	PCI_REQ_N1	Ground
74	Ground	PCI6_PCLK
75	PCI2_PCLK	RISER_ID1
76	Ground	Reserved
77	PCI_REQ_N2	RISER_ID2
78	Ground	NO_GO
79	PCI_REQA_N	+12V
80	PCI_GNTA_N	SERIRQ_N
81	–3.3V	+3.3V
82	PCI3_PCLK	Ground
83	Ground	PCI_GNT.N3
84	PCI_REQ_N3	Ground
85	Ground	PCI4_PCLK
86	PCI_REQ_N4	Ground
87	Ground	PCI_GNT_N4
88	PCI5_PCLK	+3.3V
89	+3.3V	PCI_GNT_N5
90	PCI_REQ_N5	+3.3V
91	Ground	ISA_OSL
92	+12V	+12V
93	+12V	+12V
94	–12V	–5V

low active

ISA slot connector pin assignment

Pin No.	Short Name	Type*	Pin No.	Short Name	Type
A1	IOCHCK#	I	B1	0 V	GND
A2	SD 07	I/O	B2	RESET DRV	O
A3	SD 06	I/O	B3	+ 5V	V_{CC}
A4	SD 05	I/O	B4	IRQ 9	I
A5	SD 04	I/O	B5	– 5V	V_{CC}
A6	SD 03	I/O	B6	DRQ 2	I
A7	SD 02	I/O	B7	– 12V	V_{CC}
A8	SD 01	I/O	B8	OWS#	I

Pin No.	Short Name	Type*	Pin No.	Short Name	Type
A9	SD 00	I/O	B9	+ 12V	V_{CC}
A10	IOCHRDY#	I	B10	0 V	GND
A11	AEN	O	B11	SMEMW#	O
A12	SA 19	I/O	B12	SMEMR#	O
A13	SA 18	I/O	B13	IOW#	I/O
A14	SA 17	I/O	B14	IOR#	I/O
A15	SA 16	I/O	B15	DACK3#	O
A16	SA 15	I/O	B16	DRQ 3	I
A17	SA 14	I/O	B17	DACK1#	O
A18	SA 13	I/O	B18	DRQ 1	I
A19	SA 12	I/O	B19	REFRESH	I/O
A20	SA 11	I/O	B20	CLK	O
A21	SA 10	I/O	B21	IRQ 7	O
A22	SA 09	I/O	B22	IRQ 6	O
A23	SA 08	I/O	B23	IRQ 5	O
A24	SA 07	I/O	B24	IRQ 4	O
A25	SA 06	I/O	B25	IRQ 3	O
A26	SA 05	I/O	B26	DACK2#	O
A27	SA 04	I/O	B27	TC	O
A28	SA 03	I/O	B28	BALE	O
A29	SA 02	I/O	B29	+ 5V	V_{CC}
A30	SA 01	I/O	B30	OSC	O
A31	SA 00	I/O	B31	0 V	GND

*) I/O defines the direction of the signals from the view of the CPU module

low active

Pin	Signal Name	Type *	Pin	Signal Name	Type
C1	–SBHE	O	D1	–MEMCS16	I
C2	LA 23	I/O	D2	–IOCS16	I
C3	LA 22	I/O	D3	IRQ 10	I
C4	LA 21	I/O	D4	IRQ 11	I
C5	LA 20	I/O	D5	IRQ 12	I
C6	LA 19	I/O	D6	IRQ 13	I
C7	LA 18	I/O	D7	IRQ 14	I
C8	LA 17	I/O	D8	–DACK0	O
C9	–MEMR	I/O	D9	DRQ 0	I
C10	–MEMW	I/O	D10	–DACK5	O
C11	SD 08	I/O	D11	DRQ 5	I
C12	SD 09	I/O	D12	–DACK6	O
C13	SD 10	I/O	D13	DRQ 6	I
C14	SD 11	I/O	D14	–DACK7	O
C15	SD 12	I/O	D15	DRQ 7	I
C16	SD 13	I/O	D16	+ 5V	V_{CC}
C17	SD 14	I/O	D17	–MASTER	I
C18	SD 15	I/O	D18	0 V	GND

low active

Under normal conditions, the signals –SBHE, LA17 – LA23, –MEMR and MEMW are operated as outputs (sending from CPU). Only CPU modules that are suitable for use as a master CPU for system bus access send and receive these signals. A minus sign, "–", in front of the signal name shows that the signal is LOW active.

PCI slot pin assignment

Pin No.	5V System Environment Side B	Side A
1	–12V	TRST#
2	TCK	+12V
3	Ground	TMS
4	TDO	TDI
5	+5V	+5V
6	+5V	INTA#
7	INTB#	INTC#
8	INTD#	+5V
9	PRSNT1#	Reserved
10	Reserved	+5V
11	PRSNT2#	Reserved
12	Ground	Ground
13	Ground	Ground
14	Reserved	Reserved
15	Ground	RST#
16	CLK	+5V
17	Ground	GNT#
18	REQ#	Ground
19	+5V	Reserved
20	AD[31]	AD[30]
21	AD[29]	+3.3V
22	Ground	AD[28]
23	AD[27]	AD[26]
24	AD[25]	Ground
25	+3.3V	AD[24]
26	C/BE[3]#	IDSEL
27	AD[23]	+3.3V
28	Ground	AD[22]
29	AD[21]	AD[20]
30	AD[19]	Ground
31	+3.3V	AD[18]
32	AD[17]	AD[16]
33	C/BE[2]#	+3.3V
34	Ground	FRAME#
35	IRDY#	Ground
36	+3.3V	TRDY#
37	DEVSEL#	Ground
38	Ground	STOP#
39	LOCK#	+3.3V
40	PERR#	SDONE
41	+3.3V	SBO#
42	SERR#	Ground
43	+3.3V	PAR
44	C/BE[1]#	AD[15]
45	AD[14]	+3.3V
46	Ground	AD[13]
47	AD[12]	AD[11]
48	AD[10]	Ground
Pin No.	**5V System Environment Side B**	**Side A**
49	Ground	AD[09]

Pin No.	5V System Environment Side B	Side A
50	CONNECTOR KEY	
51	CONNECTOR KEY	
52	AD[08]	C/BE[0]#
53	AD[07]	+3.3V
54	+3.3V	AD[06]
55	AD[05]	AD[04]
56	AD[03]	Ground
57	Ground	AD[02]
58	AD[01]	AD[00]
59	+5V	+5V
60	Reserved	Reserved
61	+5V	+5V
62	+5V	+5V

low active

Platz für Notizen

Remote mount form factor

8

This chapter describes the specific features of Remote mount form factor to the extent that they vary from the integrated configuration (described in Chapters 2 to 6).

The present document concentrates on the computing unit.

The part of the description referring to the Remote mount form factor of the control unit will be found in the ”SIMATIC Panel PC 670/870 Control Unit” manual.

Overview You will find general information about the Remote mount form factor concept in Section 5.1 of the ”SIMATIC Panel PC 670/870 Control Unit” manual.

8.1 Description

8.1.1 Overview

Figure 8-1 shows a PC 870 computing unit (distributed configuration) with the transmitter fitted between mounting brackets.

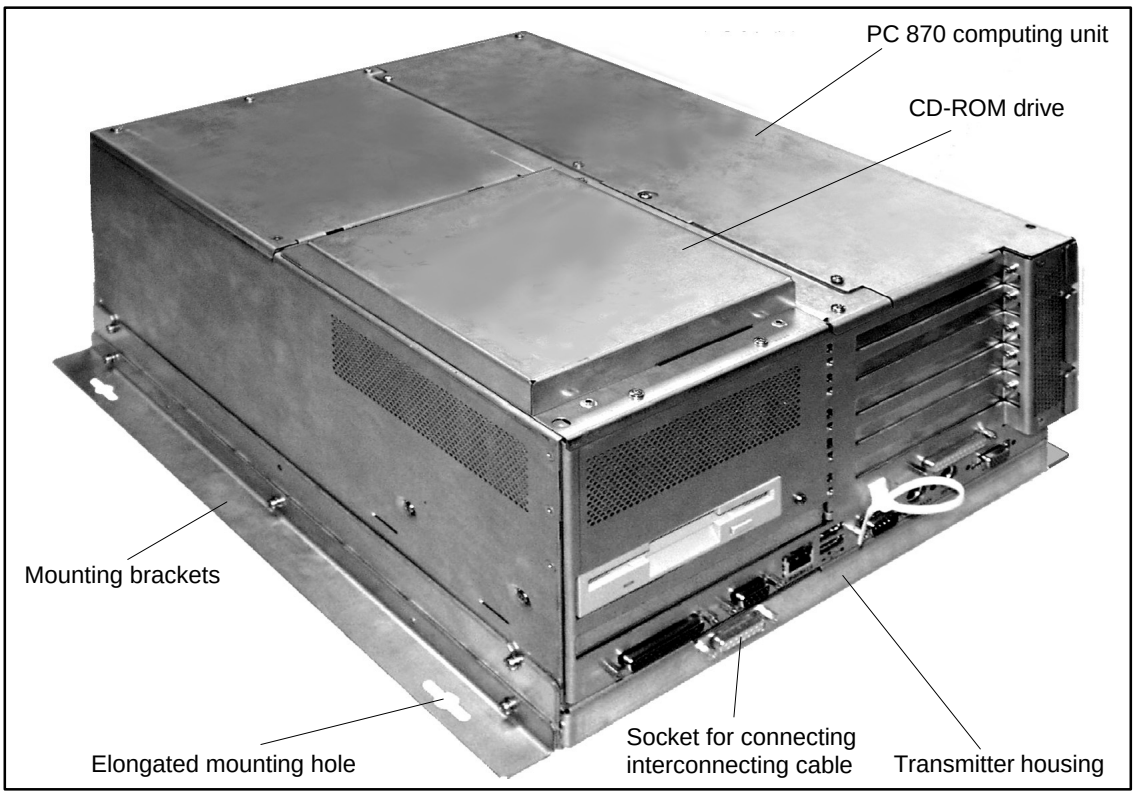


Figure 8-1 Computing unit with attached transmitter

You can see the fitted transmitter pcb in Figure 8-4.

8.1.2 Dimensions

The dimensions of the PC 870 computing unit with transmitter can be seen in Figure 8-2.

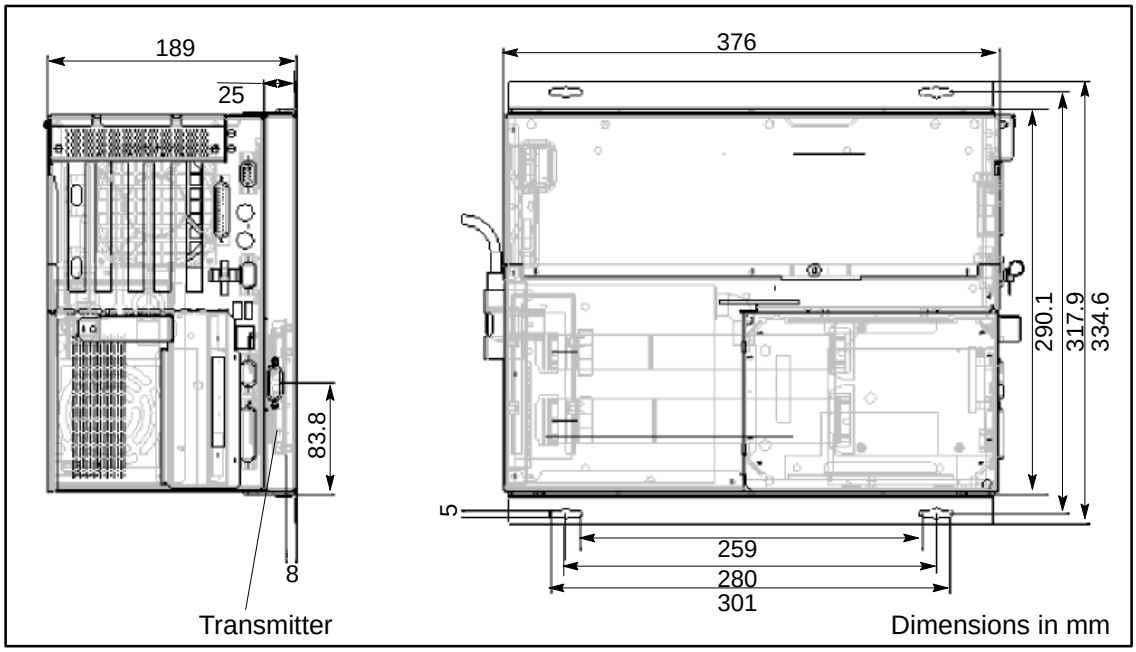


Figure 8-2 Dimensions of the PC 870 computing unit with attached transmitter

8.1.3 Mounting

The computing unit is supplied as a complete combination with the transmitter installed.

The device is fitted with the help of four elongated holes in the mounting brackets (refer to Figures 8-1 and 8-2).

Installation The computing unit can be fitted horizontally or vertically. An inclined position of ±5 ° is allowed; vertical installation is recommended.

Positioning with the interfaces at top is not allowed (downward airflow).

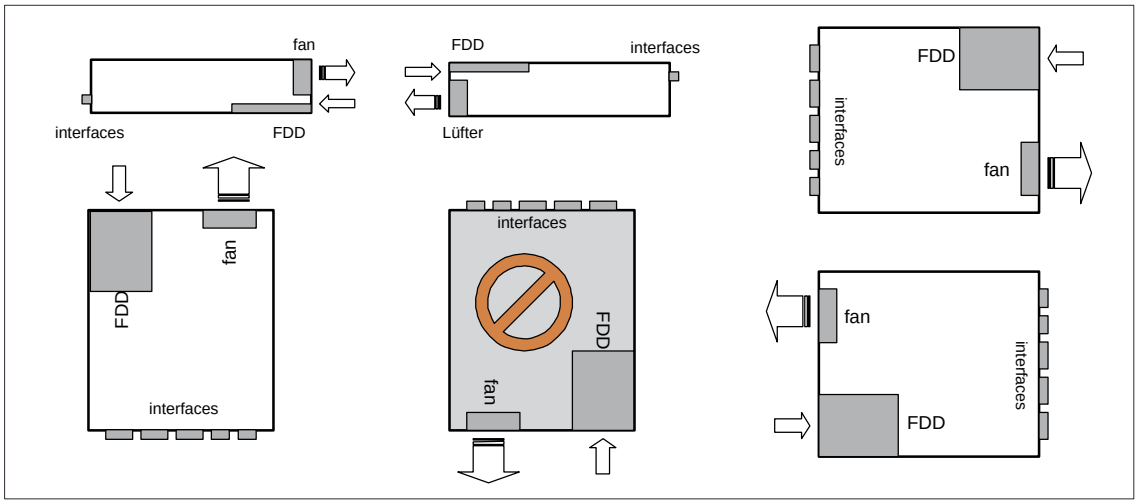


Figure 8-3 Installation of the computing unit

8.2 Cable connection

The transmitter and receiver are interconnected by a cable no longer than 20 m.

For operation, the angled cable connector is inserted in the socket of the transmitter.

For further details refer to the ”SIMATIC Panel PC 670/870 Control Unit” manual, Chapter 5.

8.3 Spare parts

The following are available as spare parts:

- The computing unit
- The interconnecting cable (refer to the ”SIMATIC Panel PC 670/870 Control Unit” manual).

8.4 Technical Data

Of relevance to the user, in addition to the technical specifications listed in Appendix A, are only the:

- Dimensions: see Figure 8-2.
- the S30 encoder setting of the transmitter:
  the transmitter setting to the display you are using is performed before it is supplied.

Display code

Should it be necessary to check or modify the setting, perform the following steps:

1. Unscrew the computing unit from the installation wall.
2. Unscrew the six fastening screws on the transmitter housing so that the two screws at the rear are only loosened (Figure 8-1).
3. Swing back the transmitter housing from the computing unit (Figure 8-4).

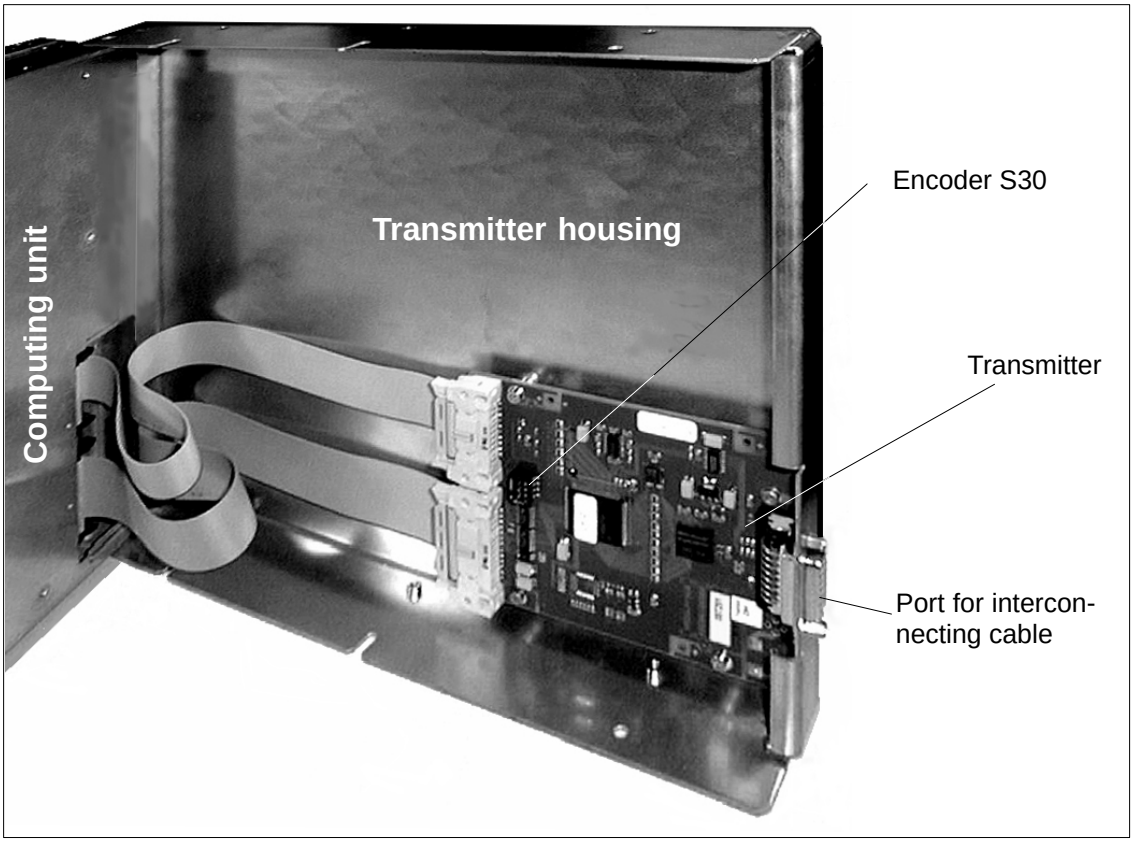


Figure 8-4 Transmitter in swung–open transmitter housing

4. Check (or set) the switch setting as shown in the table below:

Table 8-1 Display type setting using encoder S30

Type	Resolution	S30/4	S30/3	S30/2	S30/1
VGA	640 x 480	OFF	ON	OFF	OFF
SVGA	800 x 600	OFF	ON	ON	ON
XGA	1024 x 768	OFF	ON	ON	OFF

5. Install in reverse order.

Technical Specifications

A

In this Appendix

You will find here the following technical data for the computing unit of the Panel PC 870:

- General
- Safety
- Power supply
- Power requirements of the components
- Electromagnetic compatibility (EMC)
- Climatic conditions
- Mechanical environmental conditions
- Motherboard
- Drives
- Graphics
- Ports

General		
Overall dimensions (W x H x D)	390 x 285 x 166 mm without CDROM	390 x 285 x 186 mm with CDROM
Weight	Central configuration: approx. 10 kg Remote mount: approx. 11,5 kg	
Noise emission	< 55 dB(A) to DIN 45635	
Quality assurance	according to ISO 9001	

Safety	
Degree of protection	IP20
Class of protection	Class of protection I to IEC 60536
Approvals	EN 60950/IEC 950, UL/cUL1950

Power supply	AC	DC (option)
Supply voltage (U_N)	120-240 V AC, ± 10 %	24 V DC
Frequency	47 – 63 Hz	–
Maximum power consumption	Central configuration: 265 W Remote mount: 268 W	
Bypassing in case of mains failure	20 ms at 0.85 U_N	1 ms at U_N
Maximum continuous output power	180 W	

Power requirements of the components (maximum values)	Voltage [1]					
	+5V	+3,3V	+12V	–5V	–12V	5Vaux
Voltage tolerance	± 3 %	± 3 %	± 4 %	± 5 %	± 6%	± 5 %
	Current values in A					
Pentium III motherboard	1.3	4.8	0.2		0.03	0.3
Pentium III processor with fan	5.0	2.7	0.2			
Floppy disk drive	0.6					
Hard disk drive	0.5		0.4			
CD–ROM drive	0.7					
Fan			0.2			
Summe (max. for basic configuration)	**8.1**	**7.5**	**1.0**	**0**	**0.03**	**0.3**
Total of ISA/PCI slots	10	[2]	1.5	0.5	0.25	0.25
Front–side ports	1.8	0.9	1.1			
Total (maximum configuration)	**19.9**	**8.6**	**3.6**	**0.5**	0.28	**0.55**
Individual currents (max. perm.)	**22** [3]	**16** [3]	**4.4**	**0.5**	**0.5**	**1**
Total power of computing unit (max. permissible)	**180 W**					

Power requirements of the components (maximum values)	+5V	+3,3V	+12V	–5V	–12V	5Vaux
Power of computing unit	**typ. approx. 13 W**			**max. approx. 21 W**		

1) The output voltages of the AC and DC power supplies are identical.
2) Alternatively to the 5 V, the ISA/PCI slots can also be operated with the same total power at 3.3 V.
3) The total power of the +5V and +3.3V voltages may amount to max. 140 W.

Electromagnetic compatibility (EMC)	
Noise emission	EN 55022 class B, EN 61000–3–2 classes D and EN 61000–3–3
Interference immunity: Conducted interference on the supply cables	± 2 kV (to IEC 61000-4-4; burst) ± 1 kV (to IEC 61000-4-5; surge symm.) ± 2 kV (to IEC 61000-4-5; surge asymm.)
Interference immunity on the signal cables	± 1 kV (to IEC 61000-4-4; burst; length < 3 m) ± 2 kV (to IEC 61000-4-4; burst; length > 3 m) ± 2 kV (to IEC 61000-4-5:1995; surge asymm; length > 20 m)
Interference immunity against the discharge of static electricity	± 6 kV contact discharge (to IEC 61000-4-2) ± 8 kV air discharge (to IEC 61000-4-2)
Interference immunity against high–frequency radiation	10 V/m 80-1000 MHz, 80% AM (to IEC 61000-4-3) 10 V/m 900 MHz and 1.89 GHz, 50% ED (to IEC 61000-4-3) 10 V 9 kHz – 80MHz (to IEC 61000-4-6)
Magnetic field	30 A/m 50 Hz (to IEC 61000-4-8)

Climatic conditions	
Temperature	tested to DIN EN 60068-2-2:1994, DIN IEC 60068-2-1, DIN IEC 60068-2-14
– operation	+ 5°C to +45°C + 5°C to +55°C *)
– storage/transport	- 20°C to +60°C
– gradient	max. 10 K/h; no condensation
Relative humidity	tested to DIN IEC 60068-2-3, DIN IEC 60068-2-30, DIN IEC 60068-2-56
– operation	5 % to 80 % at 25°C (no condensation)
– storage/transport	5% to 95% at 25°C (no condensation)

*) when using the Celeron 566 processor;
not when using floopy disk and CD–ROM drive

Mechanical environmental conditions	
Vibration (vibration)	tested to DIN IEC 60068-2-6
– operation	10 to 58 Hz: 0.075 mm, 58 to 500 Hz: 9.8 m/s^2 or 2.5 m/s^2 +)
– storage/transport	5 to 9 Hz: 3.5 mm, 9 to 500 Hz: 9.8 m/s^2
Stoßfestigkeit (shock)	tested to DIN IEC 60068-2-29
– operation	50 m/s^2 bzw. 15 m/s^2, 30 ms +)
– storage/transport	250 m/s^2, 6 ms

+) alternative value for device with CDROM

Motherboard		
Processor	Intel Pentium III / Celeron(Bauform FCPGA), (see ordering data)	
Internal processor cache	2 x 16 kB first level, 128/256 kB second level, depending on the processor used	
Main memory	3 sockets, max. 512 MB SDRAM (see ordering data)	
Chipset	Intel 815E	
Free expansion slots	• 2 x PCI (max. 265mm long) • 2 x shared ISA/PCI • 1 x ISA	
Max. permissible power requirement	• per ISA slot • per PCI slot • Total of all slots	5 V: 2 A, 12 V: 0.3 A, 12 V: 0.05 A 5 V or 3.3 V: 2 A, 12 V: 0.3 A, -12 V: 0.05 A 50 W

Drives	
Floppy disk drive	3.5”, (1.44 MB), can be operated from the side
Hard disk drive	3.5”, EIDE, UDMA33/66, vibration damped Hard disk capacity see orderiung data
CD–ROM drive	Piggyback, optional

Graphics	
Graphics controller	SXGA-LCD controller at AGP bus; ATI Rage Mobility 128
Graphics memory	8 MB SDRAM, integrated in the graphics memory
Resolutions / frequencies / colors	CRT: up to 1,280x1,024 / 85 Hz / 16.7 million colors LCD: up to 1024x768 / 262143 colors

Ports	
COM1	Serial port 1 (V.24 / TTY), 25–pin SUB-D connector
COM2	Serial port 2 (V.24), 9–pin SUB-D connector
LPT1	Parallel port (standard, EPP and ECP modes) Connection for printer with parallel interface
VGA	Connection for external monitor
Keyboard	PS/2 keyboard connection
Mouse	PS/2 mouse connection
USB	2 x external
Ethernet	Ethernet port (RJ45), Intel 82562 controller
MPI/DP12-port, isolated • Transfer rate • Mode • Physical port • Memory address space • Interrupts	9–pin Sub-D connector • 9.6 kBaud up to 12 MBaud, can be parameterized via software • electrically isolated 1): - Data lines A,B - Control lines RTS AS, RTS_PG - 5V supply voltage (max. 90 mA) • earth–coupled: - Shield of the DP12 connection cable • RS485, electrically isolated 1) • is configured automatically • are configured automatically

1) electrically isolated in the extra–low voltage circuit (SELV)

For your notes

ESD Guidelines

B

What does ESD mean?

Virtually all present-day modules incorporate highly integrated MOS devices or components. For technological reasons, these electronic components are very sensitive to overvoltages and consequently therefore to electrostatic discharge:

These devices are referred to in German as Elektrostatisch Gefährdeten Bauelemente/ Baugruppen: “EGB”

The more frequent international name is:

“ESD” (Electrostatic Sensitive Device)

The following symbol on plates on cabinets, mounting racks or packages draws attention to the use of electrostatic sensitive devices and thus to the contact sensitivity of the assemblies concerned:

ESDs may be destroyed by voltages and energies well below the perception threshold of persons. Voltages of this kind occur as soon as a device or an assembly is touched by a person who is not electrostatically discharged . Devices exposed to such overvoltages cannot immediately be detected as defective in the majority of cases since faulty behavior may occur only after a long period of operation.

Precautions against electrostatic discharge

Most plastics are capable of carrying high charges and it is therefore imperative that they be kept away from sensitive components.

When handling electrostatic sensitive devices, make sure that persons, workplaces and packages are properly grounded.

Handling ESD assemblies

A general rule is that assemblies should be touched only when this cannot be avoided owing to the work that has to performed on them. Under no circumstances should you handle printed-circuit boards by touching device pins or circuitry.

You should touch devices only if

- you are grounded by permanently wearing an ESD wrist strap or
- you are wearing ESD shoes or ESD shoe-grounding protection straps in conjunction with an ESD floor.

Before you touch an electronic assembly, your body must be discharged. The simplest way of doing this is to touch a conductive, grounded object immediately beforehand – for example, bare metal parts of a cabinet, water pipe etc.

Assemblies should not be brought into contact with charge-susceptible and highly insulating materials such as plastic films, insulating table tops and items of clothing etc. containing synthetic fibers.

Assemblies should be deposited only on conductive surfaces (tables with an ESD coating, conductive ESD cellular material, ESD bags, ESD shipping containers).

Do not place assemblies near visual display units, monitors or television sets (minimum distance to screen > 10 cm).

Measuring and modifying ESD assemblies

Perform measurements on ESD assemblies only when

- the measuring instrument is grounded – for example, by means of a protective conductor – or
- the measuring head has been briefly discharged before measurements are made with a potential-free measuring instrument – for example, by touching a bare metal control cabinet.

When soldering, use only grounded soldering irons.

Shipping ESD assemblies

Always store and ship assemblies and devices in conductive packing – for example, metallized plastic boxes and tin cans.

If packing is not conductive, assemblies must be conductively wrapped before they are packed. You can use, for example, conductive foam rubber, ESD bags, domestic aluminum foil or paper (never use plastic bags or foils).

With assemblies containing fitted batteries, make sure that the conductive packing does not come into contact with or short-circuit battery connectors. If necessary, cover the connectors beforehand with insulating tape or insulating material.

Glossary

A

Application

An application is a program directly linked to the MS-DOS or Windows operating system. Applications on SIMATIC PCs are, for example, the visualization packages SIMATIC ProTool/Pro, SIMATIC WinCC and others.

Automation system (AS)

A controller in the SIMATIC S7 series (for example, SIMATIC S7-200/300/400).

B

Base memory

Base memory is a part of main memory. It is 640 KB on all SIMATIC PCs. This size is set on the SETUP menu at the *Base Memory* option and is not modified even if memory is upgraded.

BIOS

(**B**asic **I**nput **O**utput **S**ystem) Lowest operating system level on which elementary functions are carried out required to start a computer.

C

Cache

Buffer between working memory and central processing unit.

COM1 port

Serial V.24/modem port, 25-pin, sub-D connectors, sockets. The port is suitable for asynchronous data transmission. It can also be used to connect printers having a serial interface.

COM2 port

Serial V.24 port, 9-pin, sub-D connectors, pins. Preferred for connecting a mouse of other external devices (for example, a printer).

Configuration file

Contains data which define the appearance of a configuration following a complete restart. These files are CONFIG.SYS, AUTOEXEC.BAT and register files.

Configuration software

Configuration software updates the device configuration when modules are fitted. This is done either by copying the configuration files supplied with the device of by manual configuration.

D

Device configuration

The device configuration of a SIMATIC PC contains details about its features and options such as memory capacity, drive types, monitor, network address, etc. The data are stored in a configuration file and are used by the operating system to select the correct drivers and device parameters.

When the basic configuration changes, the user can modify the settings using a program that configures the system (SETUP).

Drivers

Program parts of the operating system. They convert the data of applications into specific formats required by the peripheral devices (for example, hard disks, monitors, printers).

E

Ethernet port

For connecting a local area network (bus structure) for text and data communications at a data transfer rate of 100 Mbaud.

Expanded memory

Expansion memory modules can be installed to expand the default working memory of a SIMATIC PC.

I

Interface module

Module for connecting hardware I/O.

Interface, multipoint

The multipoint interface (MPI) is the SIMATIC PC interface to the SIMATIC S7/M7. This enables programmable modules, (module, programmable), text displays and operator panels to be reached from a central point. The nodes on the MPI can communicate with each other.

Interrupt

Discontinuation in the processor of a programmable controller by an interrupt event.

IRQ

Interrupt request.

ISA

Industrial Standard Architecture (bus for expansion board)

K

Keyboard port

PS/2 keyboard connector Keyboards with an integrated trackball can be connected.

L

LPT 1 port

The LPT 1 port (Centronics interface) is a parallel interface which can be used for attaching a printer.

M

Main memory

Main memory is the whole RAM on a SIMATIC PC.

Motherboard

The motherboard is the heart of SIMATIC PCs. Data are processed and saved from here, and interfaces and device peripherals are controlled and managed.

Mouse port

PS/2 mouse connector.

MPI/DP port

(Multi-Point-Interface/Profibus-DP) for connecting an S7 programmable controller.

P

Parallel port

Information is transferred on a byte by byte basis through a parallel port. High data transfer rates are achieved as a result. SIMATIC PCs have one parallel port (LPT) for attaching a printer.

PC card interface

For connecting PC cards (types I/II/III).

PCI or PCI/ISA slot

(Peripheral Component Interconnect) for expansion boards.

PCMCIA

(Personal Computer Memory Card International Association). Association of computer manufacturers formed with the aim of defining an international standard for memory modules and PC expansion cards. Cooperates with JEIDA.

Port, parallel

Information is transferred on a byte by byte basis through a parallel port. High data transfer rates are achieved as a result. SIMATIC PCs have one parallel LPT1 port.

Port, serial

Data are transferred bit by bit through serial ports. They are used in instances where large distances have to be traversed with minimum cabling.

Printer interface

Parallel port, 25-pin, sub-D connectors, sockets. For attaching printers.

Programmable logic controller (PLC)

A controller in the SIMATIC S5 series (for example, AG S5-115U/135U).

R

RTC

Real time clock

S

SCSI interface

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

SETUP (BIOS Setup)

A program which defines information about the device configuration. The device configuration of the SIMATIC PC is preset. Changes have to be made when a memory expansion module, new modules or drives have to be activated.

SINEC L2

Bus system on the basis of the Profibus standard. SINEC L2 supports direct interconnection of components in the SIMATIC S5/S7 series (for example, programming units, PLCs, automation systems, etc.).

SINEC H1 (Ethernet)

Bus system on the basis of the Ethernet standard. SINEC H1 interface modules support direct interconnection of components in the SIMATIC S5/S7 series (for example, programming units, PLCs, automation systems).

T

TFT display

Thin-film transistor color display

U

USB port

(Universal Serial Bus) for connecting devices to the USB port.

V

V.24 interface

The V.24 interface is a standard interface for data transmission, and printers, modems, etc. can be connected to it.

VGA port

(Video Graphics Array) for connecting an external monitor, 15-pin, sub-D connectors, sockets.

W

Warm restart

By warm restart we mean a restart after a program abort. The operating system is reloaded and started. A warm restart is performed by pressing the keys CTRL+ ALT+ DEL.

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