SIEMENS

SIMATIC

RI 45 PIII

Manual

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Release 01

Safety Guidelines

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

Danger

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

Warning

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

Caution

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

Note

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

Qualified Personnel

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

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

Correct Usage

Note the following:

Warning

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

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

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Disclaimer of Liability

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

Contents

System Unit

1

Chapter Overview

1.1 General Information on the Device

1.1.1 Device Models

The RI 45 PIII is available in the following two models:

Rack This model is designed to be installed in a 19” cabinet or mounting rack; it is equipped with a module retainer and an air filter.

Tower This model is designed for office use; it is equipped with a sound card and is also supplied with a keyboard and a mouse.

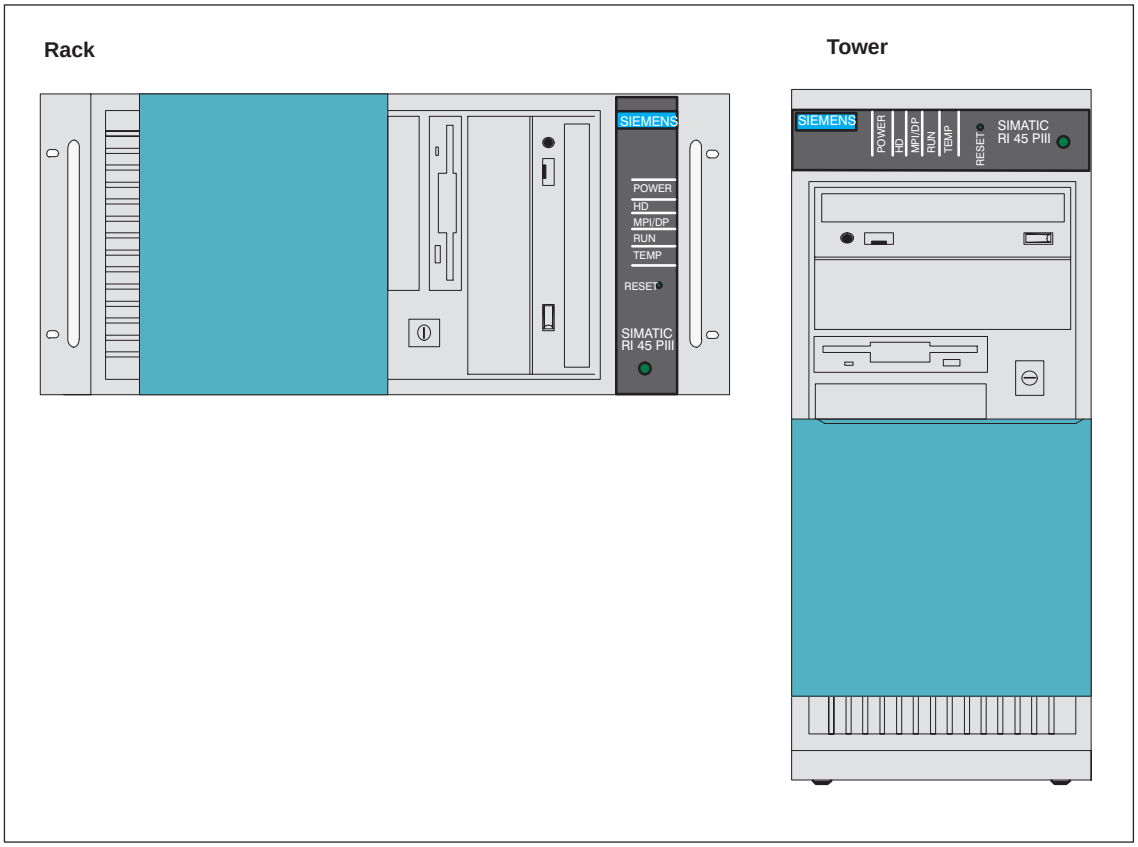


Figure 1-1 Device Models of the RI 45 PII

1.1.2 Dimensions of Expansion Modules

Information on Modules

The RI 45 PIII is designed for modules according to AT/PCI specifications. The size of the modules should not exceed the dimensions indicated. If the given height is exceeded, this may cause contacting problems, functional disorders or difficulties with installation. The figures below illustrate two cards with full AT/PCI overall length. Individual slots may require different card dimensions.

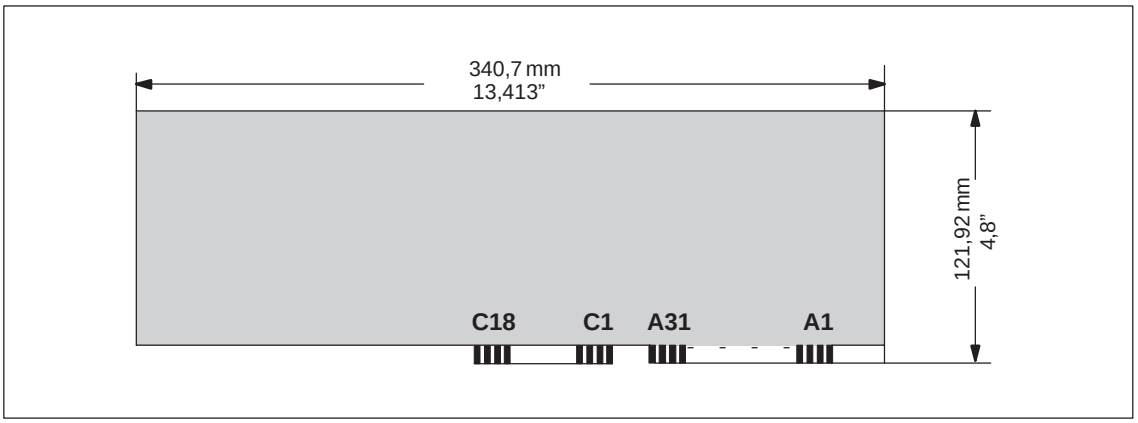


Figure 1-2 AT Module

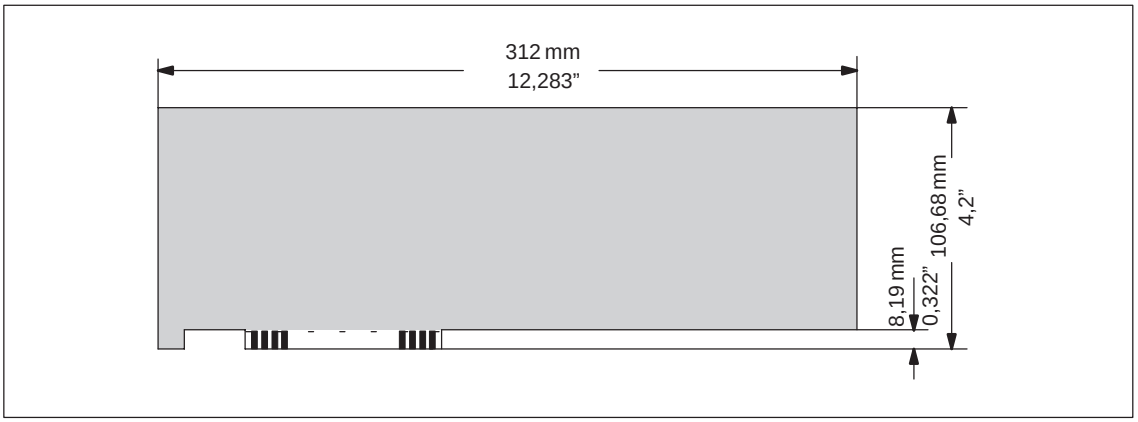


Figure 1-3 Maximal Large for PCI Modules

Note on Large PCI Modules

Large PCI modules have to be equipped with a so-called extender (usually included with large PCI modules) which serves to guide them along the rails of the ventilator case. The extender guides large PCI modules along the rails of ISA modules.

1.2 Power Requirements of the Components (Maximum Values)

Basic System

Component	+ 5 V	– 5 V	+ 12 V	– 12 V	+ 3.3 V
Motherboard	7 A	0.01 A	0.1 A	0.02 A	1.5 A
Front fan	–	–	0.5 A	–	–
3.5” floppy disk drive Startup Operation	 0.7 A 0.4 A				
LS120-drive Operation	 1.7 A				
EIDEHard disk drive Startup Operation	 0.6 A 0.5 A		 1.5 A 0.4 A		
CD-ROM drive Startup Operation Inactive	 0.8 A 1.2 A 0.19 A		 1 A 1.2 A 0.006 A		
SCSI-Hard disk drive Startup Operation	 0 A 1.1 A		 2.5A 0.5 A		

Restrictions on Power Supply

Due to thermal stress, the maximum capacity of the power supply is restricted to:

Power supply	Restriction
Standard power supply (200 V)	Maximum load 175 W

1.3 Removing and Installing Components

Requirements

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

Warning

Please read the warnings at the front of the User's Guide before you open the housing of the system unit.

- Do not open the housing unless you need to install or remove components, or to replace the battery.
- Write down your configuration parameters.
- Disconnect the unit from the power supply by unplugging the power plug.

Caution

Risk of damage to the unit!

Note that only qualified personnel should be allowed to work on the open unit, so the warranty on the device is not affected. Authorized Siemens maintenance and repair centers offer you a specialist maintenance service. The User's Guide contains the addresses.

Caution

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

Limitation of Liability

All technical specifications and licenses apply only to expansion functions approved by SIEMENS. No liability can be assumed for functional constraints caused by the use of devices and components of other manufacturers.

All modules and components in the PC are electrostatically sensitive. Please read the ESD guidelines. The following sign warns that electrostatically-sensitive modules are present.

Before Opening the Unit

Observe the following rules when opening the unit:

- Before you disconnect the power supply cable, discharge any electrostatic charge on your body. You can do this by touching metallic parts, such as screws, on the rear panel of the PC.
- Discharge any electrostatic charge from tools that you are using.
- Wear a grounding wrist strap if you are handling components.
- Leave components and modules in their packing until you are ready to install them.
- Disconnect the PC from its power supply before plugging in or removing any modules or components.
- Touch components and modules only on their edges. Above all, do not touch the connecting pins and printed conductors.
- Do not operate the PC with the cover open.

Tools

Use a suitable Philips (no. 1) or Torx screwdriver (T10, T15, and T20) to remove or install components.

1.3.1 Changing the Air Filter (Racksystem)

Important Information

The rack systems are equipped with an air filter which must be changed when dirty. Note the following steps while replacing the air filter:

- The protective cover has to be locked completely (snapped in place on the right side).
- The fan cover can be lifted off (there is no need to remove the cover of the system unit); it is simply snapped in place.
- The air filter is not attached to anything and can easily be removed.

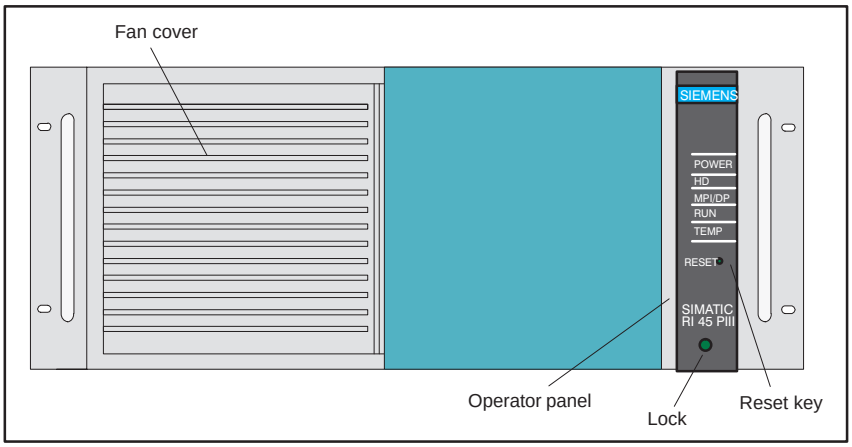


Figure 1-4 Operator Elements of the RI

- The protective grid prevents the filter from being drawn into the fan, and should not be removed.

Caution

When the fans are operating, particles can be drawn into the system unit. The protective grid may only be removed with the PC switched off.

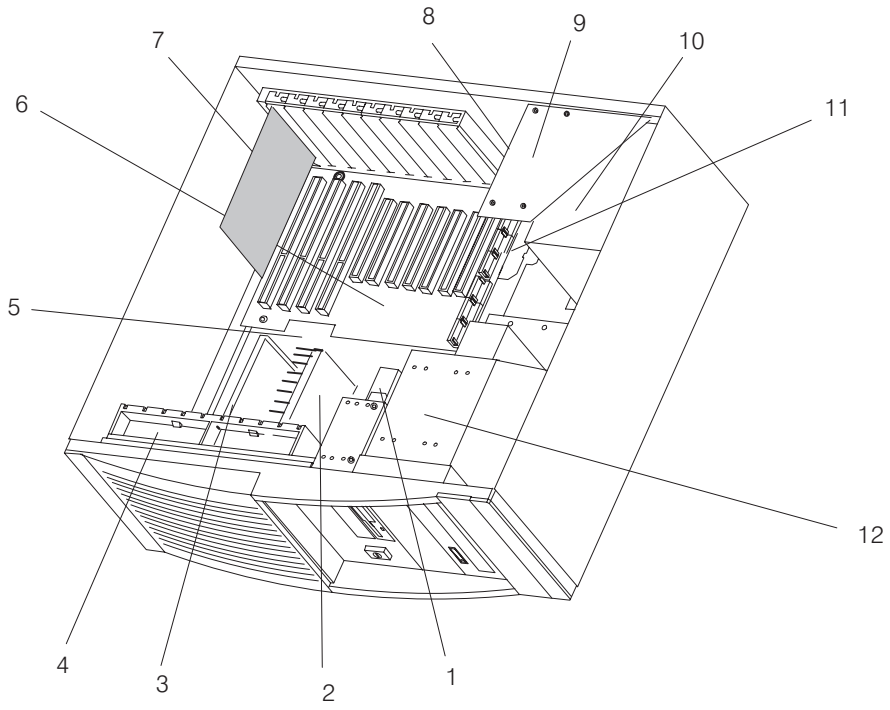
1.3.2 Opening the System Unit

Opening the System Unit

First remove the screws at the top. Hold the cover at its front left and right edges, lift it up and off by sliding it back a little.

Overview of the Functional Units

Figure 1-5 illustrates the arrangement of units in the open housing of the system unit:



1	LS120 or disk drive	7	AGP-graphic module
2	PIII-CPU with heat sink	8	Sound interface module under the hard disk drive switch
3	DIMM-memory (max 3)	9	Hard disk drive support
4	fan	10	Power supply
5	Motherboard	11	Backup battery under bus board
6	Bus board with expansion slots	12	Disk drive support

Represented without crossbeam with retainers

Figure 1-5 RI 45 PIII open

1.3.3 Changing processors

Proceed as follows when changing processors:

1. Loosen the fastening nut on the processor bracket (one turn maximum).
2. Vertically extract the processor from the bracket.
3. Tighten the processor bracket nut.
4. Carefully insert the new processor vertically downwards until it clicks into the bracket.

1.3.4 Removing and Installing Fans

Procedure

Proceed as follows to remove or install the fan:

- First disconnect the cables and write down their previous connections.
- Provided expansion modules are not installed or have previously been removed, the fan cage can be taken out. First remove the two clamps of the fan cage (see Figure 1-6) then push the top of the two side sections outward and lift the fan cage up.
- Carefully remove the connecting cables from the bottom of the cut-out, then remove the two fans.
- Proceed in reverse order to install the fans.

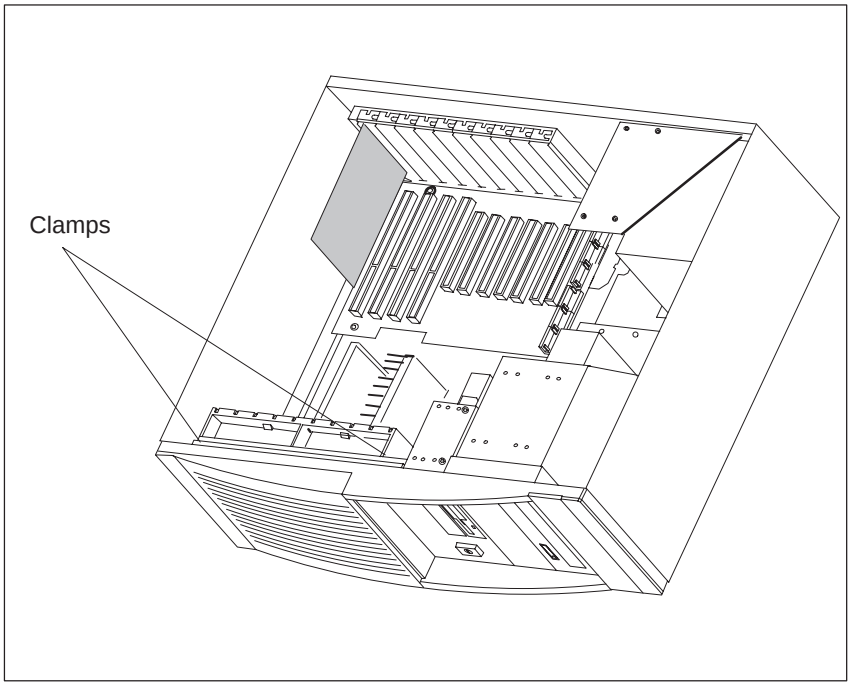


Figure 1-6 Removing the Fan Cage

1.3.5 Removing and Installing the 3.5” Floppy Disk Drive

Procedure

Proceed as follows to replace the floppy disk drive:

- Disconnect all the cables and write down their previous connections.
- Release the two screws at the top of the drive support (see arrows in Figure 1-7) and pull out the drive from the back.
- Unscrew the central screw (fixed at the front, to the side) from the diskette drive.

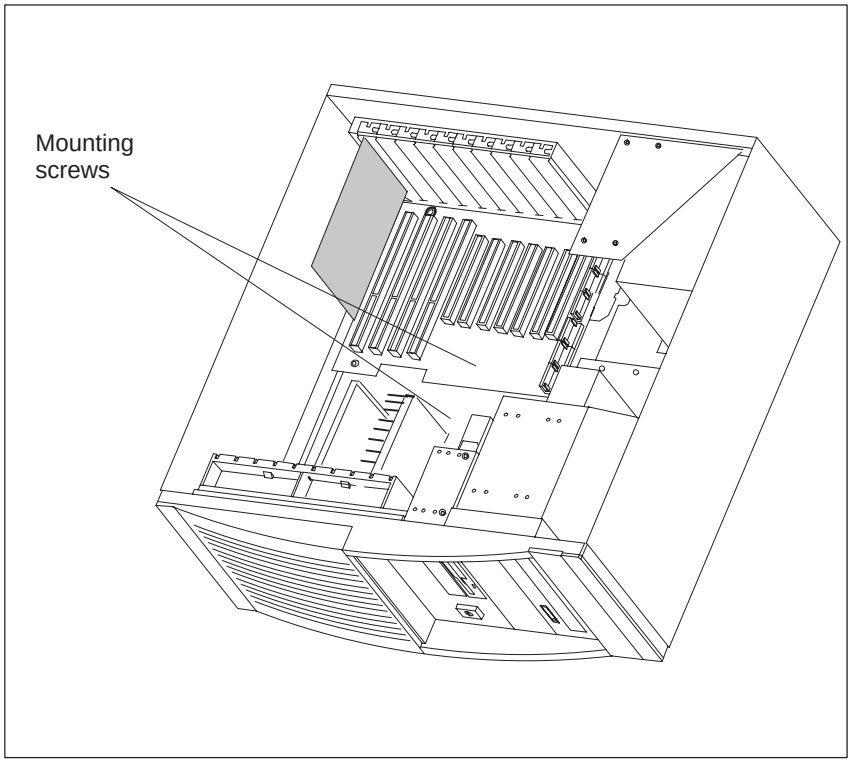


Figure 1-7 Removing the Floppy Disk Drive

- Proceed in reverse order to install a floppy disk drive.
  PIN 1 is distinguished by a coloring on the cable.

1.3.6 Removing and Installing Hard Disk Drives (Back)

Procedure

Proceed as follows to replace or install hard drives:

- You can install a hard disk drive in the support located at the back of your PC.

  The support is mounted with six screws (see Figure 1-8). Five of them are directly accessible at the back of the system unit. The third screw can only be reached inside the unit from the top. The hard disk drives must be fixed with screws at the upper and lower end of the support.

- Then connect the installed hard disk drives, CPU board and power supply by plugging in the corresponding connecting cables. Lay the cables so that the drive can move freely.

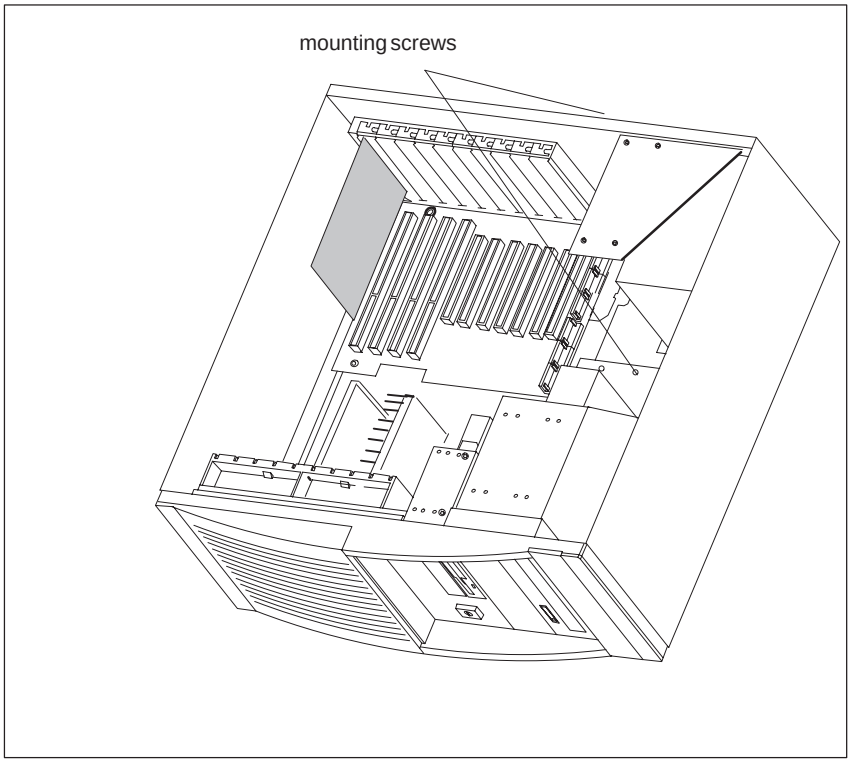


Figure 1-8 Removing and Installing Hard Disk Drives

1.3.7 Removing and Installing the Drive Block (Front)

Procedure

Proceed as follows to replace the drive block:

- Remove the back of the Hard Disk Drives (see section 1.3.6).
- Loosen the screws on the bottom of the housing (without removing them completely!).

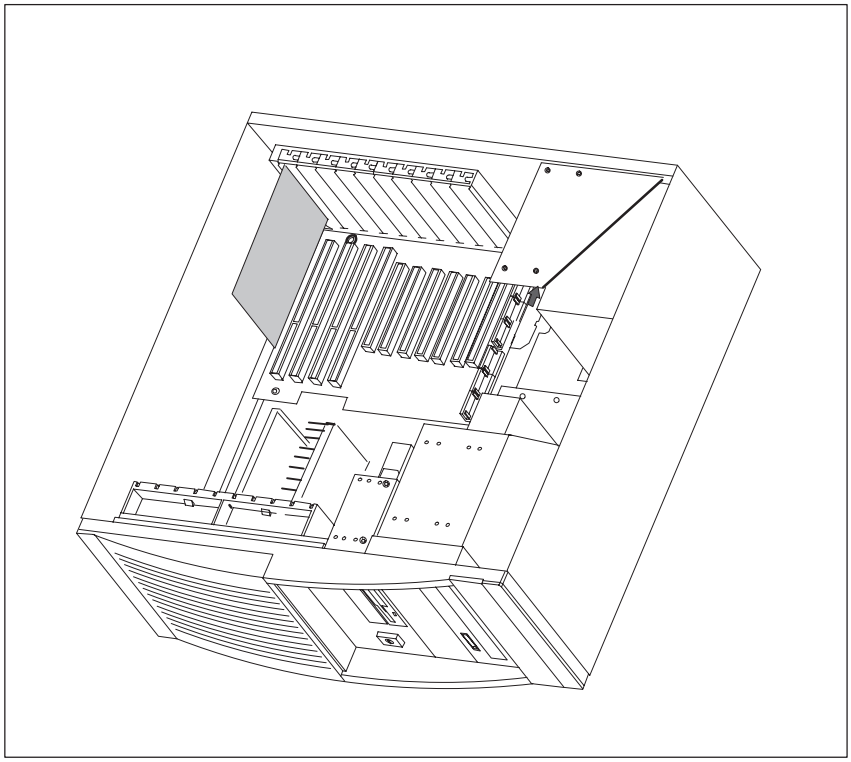


Figure 1-9 Mounting the Front Drive Block

- First pull the drive block two centimeters (0.8 inches) to the rear (see direction of arrow in Figure 1-9) then pull the front block out of the housing.
- To replace the drive, or to install a second drive, release the two upper and the two lower screws.
- To install the drive block, proceed in reverse order.

1.3.8 Removing and Installing the Display Board

- First disconnect the cables and write down the previous connections.
- Then prise the display board out of the catches (see Figure 1-10).

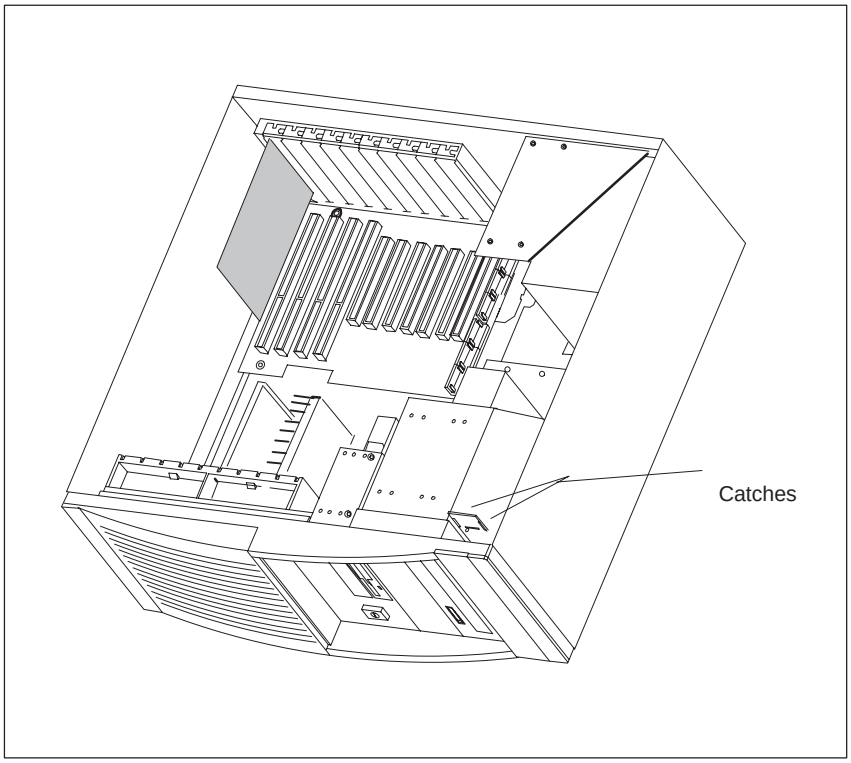


Figure 1-10 Removing the Display Board

- After unscrewing (two hexagonal socket screws) the right handle and the front plate, the panel covering can be taken off.

1.3.9 Removing and Installing Module Retainers

First remove the crossbeam on which the modules are mounted.

- Bend the two notched spring clips slightly inwards to release the snap-in lockings.
- Grip the crossbeam and push it about 1 centimeter (half an inch) backward and then lift it out with the retainers.

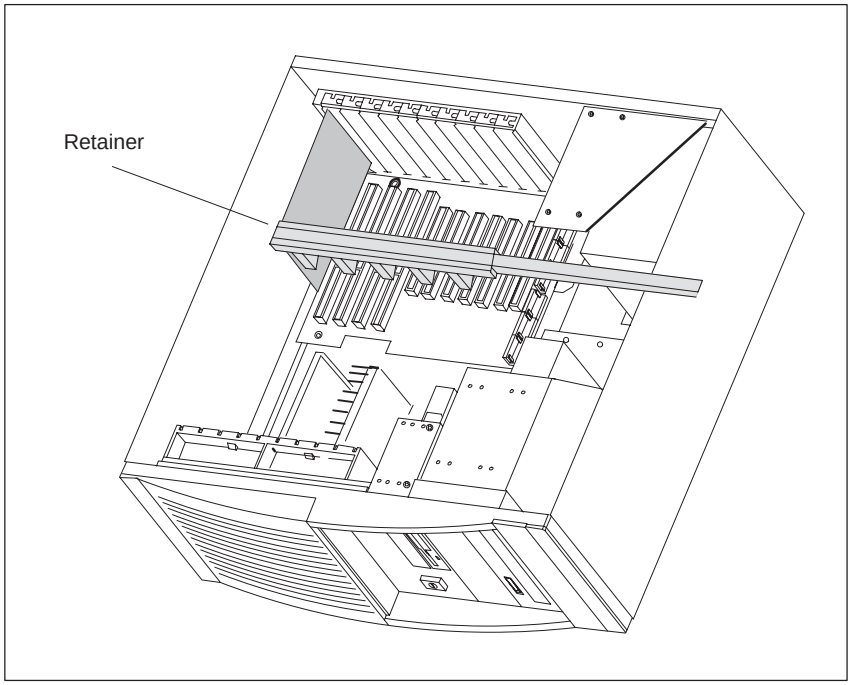


Figure 1-11 Module Retainers and Crossbeam

Proceed in reverse order to install the retainers.

Adjusting retainers:

- Insert the sliding element at the top and push it down until it covers the module. Then guide the module into the notch.

Caution

Do not exert pressure on the module. This means that you should *not* push down or force the retainers in any way.

- Cut off the part of the sliding element that sticks out as described below:
  - Scratch a notch in the top of the sliding element on the upper edge of the retainer using a knife and bend it over to break it off.
  - Cut off any leftover part using a sharp side cutter.

1.3.10 Removing and Installing Expansion Modules

- Disconnect all connectors. Write down previous connections.
- Release the screw which mounts the modules on the back of the system unit.
- Carefully remove the module without bending it.
- To install the new module, proceed in reverse order.

1.3.11 Removing and Installing the Bus Board

- First remove all expansion modules.
- Disconnect all connecting cables or connectors and write down their previous connections.
- Release the 5 screws (2 at the front with the spacer between the CPU board and 3 screws at the back).
- Lift the bus board out of the connector to the CPU board.
- To install a new board, proceed in reverse order.

1.3.12 Removing and Installing the CPU Board

- Remove module supports
- Remove all expansion modules and slot plates.
- Disconnect all cables from the CPU board and the bus board and write down their previous connections.
- Remove the back drive support (see chapter 1.3.6)
- Release the 2 screws at the back of the system unit (see arrows in Figure 1-12), then push forward the CPU board and its baseplate until it comes to a stop and lift it out. You can now remove the bus board if necessary.

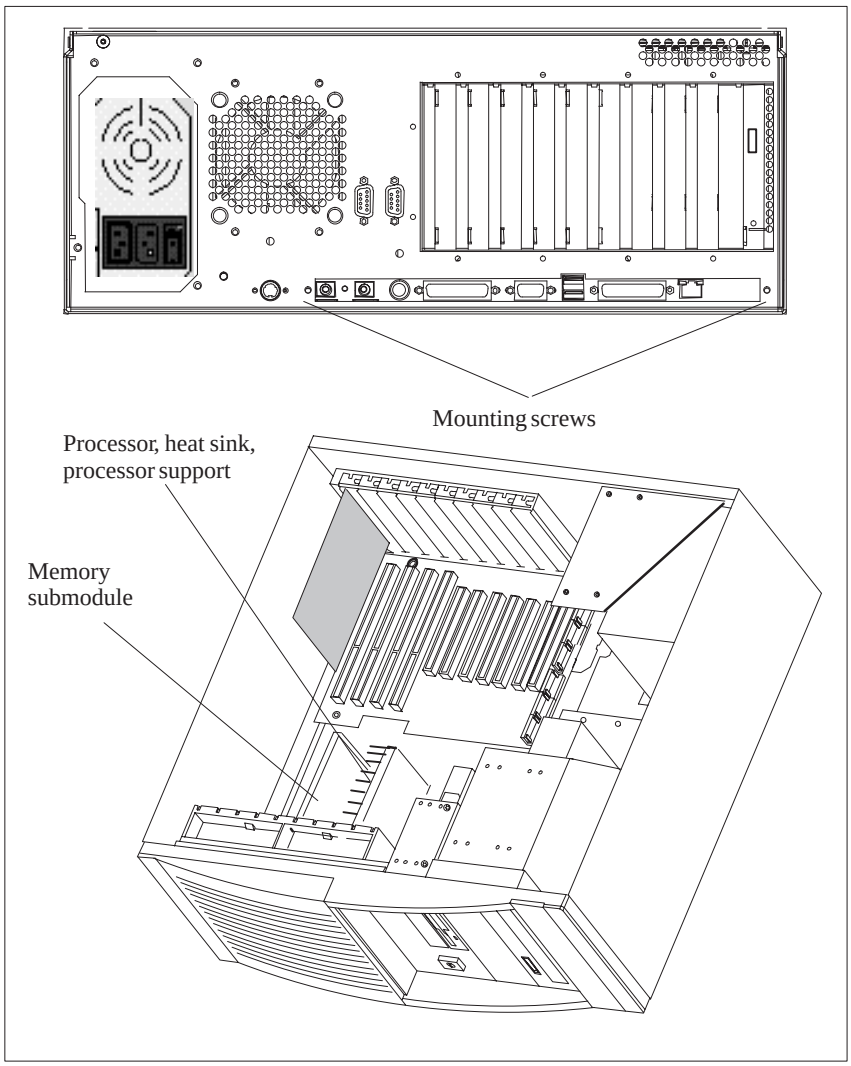


Figure 1-12 Removing the CPU Board

To install the board, follow the instructions in reverse order.

The processor, memory submodules, bus board and supporting plate are not included with the CPU board when it is supplied as a spare part.

1.3.13 Connecting the Multipoint Interface (MPI/DP)

Connecting a PROFIBUS-DP Network Via MPI /DP Interface

You can connect your IPC to a PROFIBUS-DP network via the optically-isolated* MPI/DP interface. The connection is established via any stationary connecting PROFIBUS components or via an MPI connecting cable (5 m) (order no.: 6ES7001-0BF00-0AA0). The PROFIBUS components are not included with the IPC and have to be ordered separately. The MPI connecting cable (5 m) can only be employed for data transfer rates up to 187.5 Kbps.

You connect your IPC to a PROFIBUS-DP network as follows:

1. Switch off your IPC.
2. Plug the connecting cable (of the SINEC-L2 components or MPI connecting cable) into the MPI/DP socket of your IPC and tighten the connector by means of screw-type locking.
3. Switch on your IPC.

Caution

Risk of damage to the unit!

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

PROFIBUS-DP Network

You can network up to 32 devices (PC, programming device, programmable logic controller, or DP components) via the MPI/DP interface in one segment. The interconnection to the PROFIBUS-DP segments is established via an optically-isolated* RS 458 port, which is part of the interface.

You can interconnect several PROFIBUS-DP segments via a repeater.

The entire PROFIBUS-DP network has a maximum capacity of 127 stations. The data transfer rate of the MPI network is 187.5 Kbps. The data transfer rate that can be achieved via the MPI/DP interface in the PROFIBUS-DP network ranges from 9.6 Kbps up to 12 Mbps.

Note

For further information on configuring a PROFIBUS-DP network, please refer to the “S7-300 Programmable Controller, Hardware and Installation” manual, order no.: 6ES7030-0AA00-8BA0.

*Optically isolated within safety extra-low voltage circuit (SELV)

1.3.14 Point-to-Point Connections

Point-to-Point Connection

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

You can establish a point-to-point connection by connecting the RI to a programming device or a programmable controller via:

- A V.24 connection.
- A TTY connection.

Suggestions for Configuring TTY (20 mA) Interfaces

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

Rules

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

- Use a shielded cable with a low surge impedance (< 130 Ω / km) and low capacitance (< 90 pF/m). Twisted-pair cables enhance noise immunity due to inductance. A low surge impedance results in reduced voltage excursions and shorter charge reversal times. The larger the conductor cross-section, the lower the surge impedance for the same length of cable.
- The shorter the transmission link, the higher the maximum possible data transfer rate.
- If there is an active sender and an active receiver at the same end of the transmission link, the sequence of access priority to the transmission circuit must be taken into account in order to achieve the longest possible transmission link.
- Signal lines and power lines must not be run together. Signal lines must be installed as far away as possible from strong interference sources (for example, 400 V three-phase power cables).
- The active TTY interface with 12 V no-load voltage has been tested on a 1000 m (3300 ft.) long cable at a transmission rate of 9600 bps in a normal noisy environment (field strength < 3 V/m or 1 V/ft.). If a shielded LiYCY 5x1x0.14 is used, reliable transmission is possible over a distance of up to 1000 m (3300 ft.). The AS511 protocol (only one transmitter at a time) was used for testing.

Note

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

Connecting the RI to S5 Programmable Controllers

You can connect the RI to a SIMATIC S5 programmable controller via the COM1/TTY interface port.

Connect your RI to a SIMATIC S5 programmable controller as follows:

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

Caution

Risk of damage to the RI!

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

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

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

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

Connecting the RI via an Adapter

An adapter is available for connecting the programmable controller using older standard cables.

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

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

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

1.4 Error Diagnostics

Table 1-1 Errors/Faults in PC Operation

Error/Fault	Cause	Remedy
Power-ON LED does not light up	• PC is switched off • Power supply is not properly connected	• Switch on the PC • Check the power supply connections, power cable, and power plug
The message "Invalid configuration information... Press the F1 key for continue, F2 to run SETUP utility" appears on the screen	• Incorrect configuration data • Backup battery is low or defective	• Press the "F2" key, check the configuration data in SETUP, enter any default values, and check error messages in the first SETUP menu. • Activate the menu point "Reset Configuration Data" in the "Advanced" menu
The "No boot device available" appears on the screen	• Diskette in drive A: is not a boot diskette • Wrong hard disk type entered in SETUP	• Use the "Fixed disk function" in SETUP
"Keyboard stuck; key failure" message	• A key has become blocked during the system keyboard self-test	• Check the keyboard • Restart the system
Booting of the PC aborted after several beeps	• An error has occured during the system self-test	• Check the hardware
Every time a key is pressed, a beep is heard and no characters appear	• Keyboard buffer overflow	• <CTRL> <PAUSE>
Not-ready message when trying to write to a diskette	• No diskette has been inserted • Diskette has not been formatted	• Insert diskette • Format diskette
Write-protect error when trying to write to a diskette	• Diskette write-protect activated	• Cancel write protection
COM 1, COM 2, LPT 1 or MPI/DP do not respond	• Ports have been disabled in SETUP	• Enable COM 1, COM 2, LPT 1 or MPI in SETUP under submenu "RI Hardware Options"
< / > key labeling missing	• No original keyboard	• German keyboard: <ALTGR> <ß> or <ALT> <9> <2> • International keyboard: <ALT> <9> <2>
< / > key is not displayed	• Wrong keyboard driver is being used	• Load correct keyboard driver • <ALT> <9> <2>
Mouse not working	• Trackball will not rotate • Missing or wrong mouse driver	• Clean trackball and housing • Load the right mouse driver
Mouse pointer cannot be moved	• PS/2 port has been disabled in SETUP	• Check SETUP settings
Mouse pointer moving erratically	• Trackball dirty	• Clean trackball and housing

Table 1-1 Errors/Faults in PC Operation

Error/Fault	Cause	Remedy
Drive cover cannot be opened	• Filter cap not properly fixed	• Push filter cap into correct position
USB-Device does not function	• USB interface is not supported by the operating system.	• The USB is only supported by Windows 98 at the present time. Additionally, the BIOS setup can be controlled with a USB keyboard.

Motherboard

2

Chapter Overview

2.1 Components and Interfaces

Component/ Interface	Description	Parameters
CPU - base	Slot 1 for micro processor card, up to 550 MHz	• Can be upgraded via SLOT 1 • Multimedia support • On-board L2 cache with 512K • ECC
Memory	DIMM module up to max. 256MB/DIMM	• Data width 64 Bit + ECC • Module with ECC possible • 3.3V • Chips up to 128Mbits on the modulel • 100 MHz bus clock • 3 DIMMs can be inserted • easy to replace • variable from 64-256B/DIMM
Chipset	Single chip set 440BX	• DRAM and SDRAM • ECC support
Hard Disk	ATA-33 mode	• Ultra DMA-capable
DP12	Communication port SIMATIC S7	• optically isolated DP12[2]) DP12 (CP 5611 compatible) • 12Mbps
TTY	Communication with SIMATIC S5 CPUs	• Range up to 1000 m
USB	Universal serial Bus	• two high current (500mA)-USB-Ports
Ethernet	10BaseT/100Base-TX	• 10/100 MBaud, potentialgetrennt [2)]
Floppy [1)]	Standard 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
Parallel	Standard, bidirectional, EPP and ECP mode	• 25-pin sub-D
BIOS	Update via software	• 512K in 4 pages
CDROM	Master an Secondary EIDE-Schnittstelle	• 40x-speed
LS120	Slave an Secondary EIDE-Schnittstelle	• 1,44MB Standarddiskettes • 120MB SuperDisk

1) for PCS7-devices

2) Electrical isolation within the safety extra-low voltage (SELV)

2.2 Processor

Which Processor Type can be Used?

Pentium II 450/500/550 MHz in slot 1.

Clock Setting S2

S2(4)	ISA Bus Freq.	PCI Bus Freq.	CPU Bus Freq.
off	8.25MHz	33MHz	66MHz
off	8.25MHz	33MHz	100MHz

Caution

If you change the CPU type, you must also update the appropriate BIOS for the CPU type. Information on suitable combinations can be found in the Product Information Bulletin or obtained from the relevant hotline.

Standard Settings

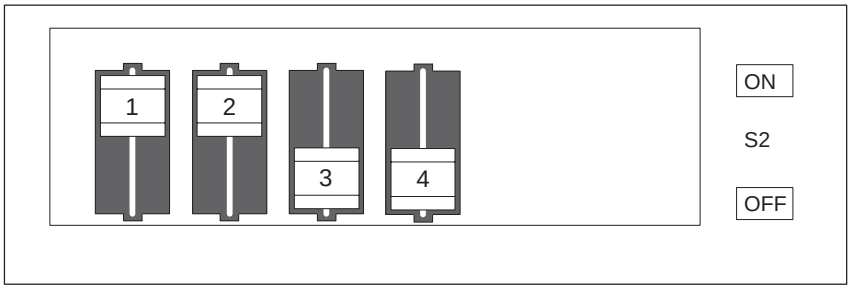


Figure 2-1 Standard Setting of the Switches S2 for 100 MHz Pentium PIII CPU

2.3 Memory

If ECC submodules are mixed with non-ECC submodules, the memory will work without an ECC algorithm or correction.

Organization	Size in Mbytes	Type	Access Time/Freq.
8Mx64	64	SDRAM	PC100
16Mx64	128	SDRAM	PC100
32Mx64	256	SDRAM	PC100
8Mx72	64	SDRAM with ECC	PC100
16Mx72	128	SDRAM with ECC	PC100
32Mx72	256	SDRAM with ECC	PC100

Modules with a chip size up to 128Mbit are supported.

Replacing / Upgrading Memory Cards How to Proceed

Please refer to the notes in Chapter 1 of the User's Guide supplied and read carefully the ESD guidelines.

1. Switch off the device and separate from the supply voltage.
2. Unscrew the housing and remove the cover (it is not necessary to remove the two screws on top of the front, just release them).
3. Plug or unplug the DIMM submodules. The submodules can easily be removed by pressing down the levers on the left and right of the base.
4. Make sure that the modules are correctly plugged in.
5. Reassemble the unit in reverse order.

Caution

Risk of short circuit!

The cards must be installed correctly, otherwise the motherboard or the card might be destroyed.

Make sure that the contacts of the card and socket are on top of each other.

2.4 Changing the Backup Battery

Battery Power Supply for Real-Time Clock and Configuration

A backup battery powers the real-time clock even after the PC is switched off. In addition to the time of day, all information about the SIMATIC PC (configuration) is stored. If the backup battery fails or is removed, these data are lost.

Because of the clock's low power consumption and the lithium battery's high capacity, the battery can provide backup power for the real-time clock for several years. Therefore, changing the battery is only seldom required.

Battery Voltage Too Low

If the battery voltage is too low, the current time setting is lost and a correct configuration can no longer be guaranteed.

Changing the Battery

In this case, you must replace the battery. The battery is located underneath the bus board.

To change the battery, please proceed as follows:

1. Switch off your PC and unplug all connecting cables.
2. Open the unit as described in Section 1.3.
3. Remove the drive support and bus module.
4. Now replace the backup battery, which is attached to the mother board by a short length of cable.
5. Reassemble the drive support and bus module and close the unit.

Caution

You may only replace the lithium battery with an identical battery or a battery type recommended by the manufacturer.

Dispose of used batteries in keeping with local regulations (special waste). If returned to the manufacturer, the battery materials can be recycled.

Resetting SETUP

After having changed the backup battery, you have to reset the configuration data of your PC using the SETUP program.

2.5 Block Diagram of the Motherboard

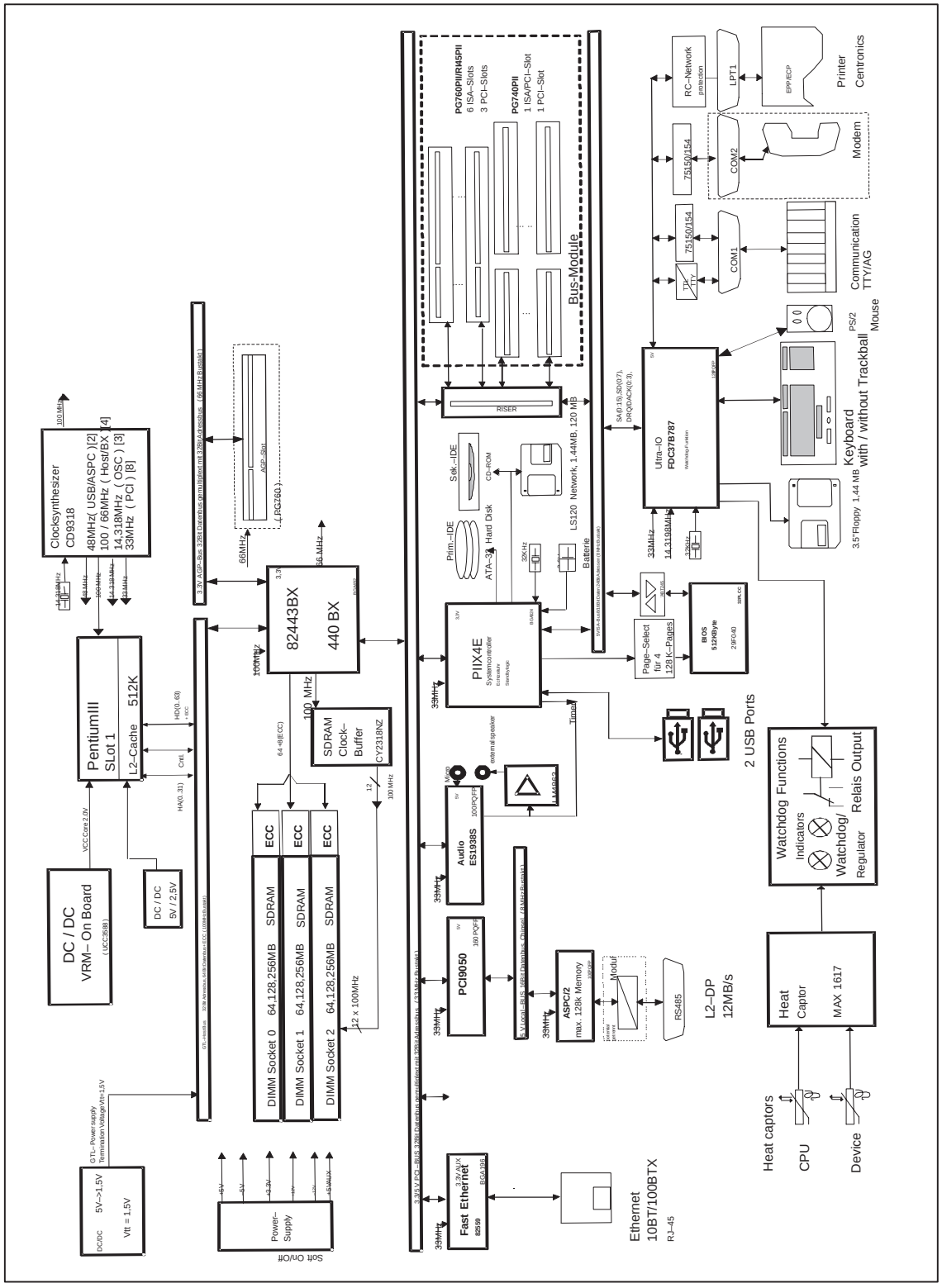


Figure 2-2 Mother board

2.6 Hardware Ports

Position of Connectors and Switches

The following figure illustrates the connector and switch positions of the components on the motherboard.

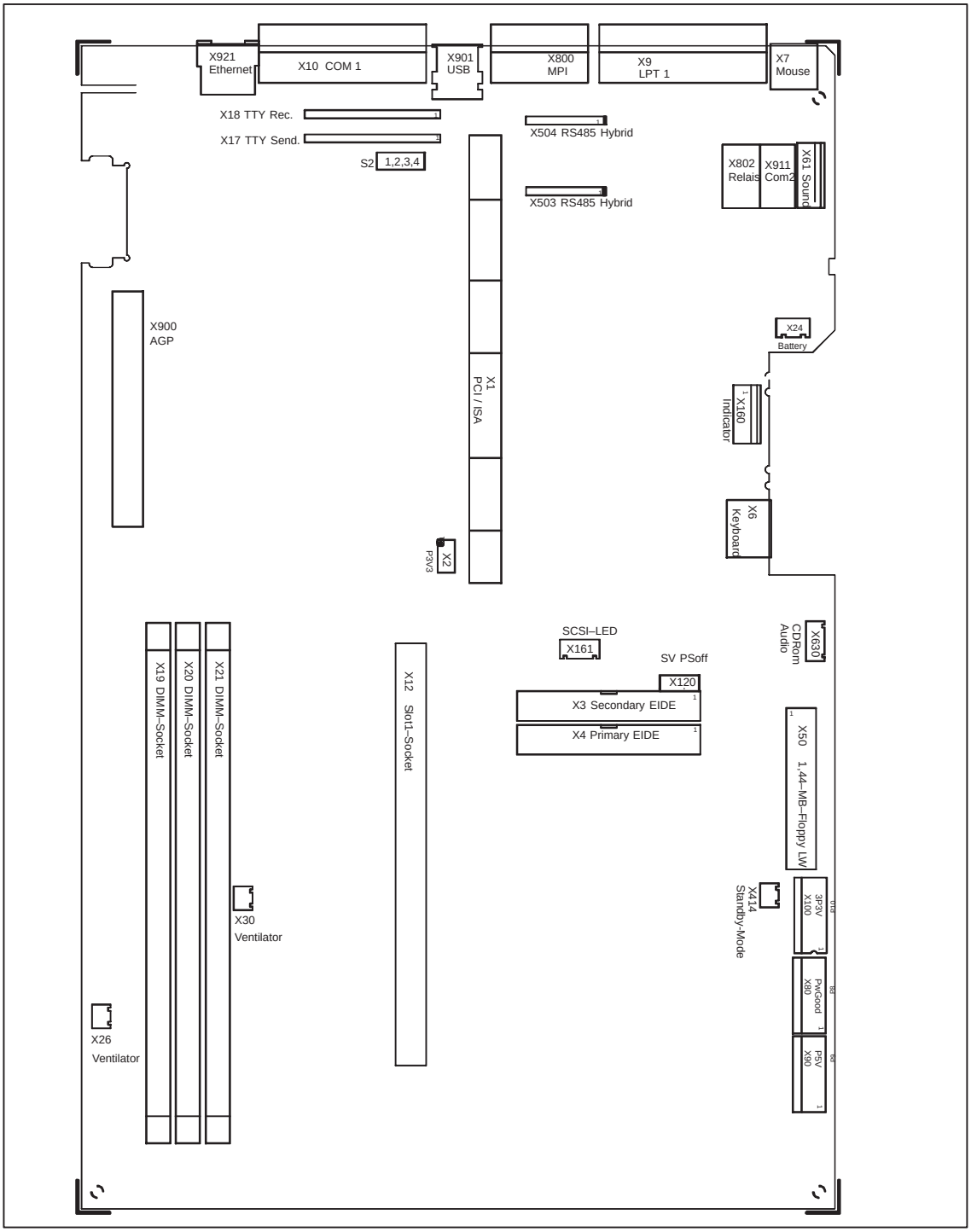


Figure 2-3 Motherboard

Ports		
Floppy X50	internal	Two-drive capacity 360kB, 720kB, 1.2MB, 1.44MB 3F0h-3F7h, 370h-377h, disconnectable IRQ 6, edge triggered 34-pin, standard connector
Hard disks X4 CD-ROM X3 120MB floppy	internal	170h-177h, 1F0h-1F7h, disconnectable IRQ14, IRQ15, edge triggered 2*40-pin in standard connector, 4 drives are possible
COM1 X10	at rear	3F8h-3FFh, disconnectable IRQ4, edge triggered 25-pin, socket connector, V24/V28 and 20mA (TTY)
COM2 X911	at rear	2F8h-2FFh, disconnectable IRQ3, edge triggered 9-pin, standard connector
LPT1 X9	at rear	378h-37Fh, disconnectable IRQ7, edge triggered 25-pin, standard socket connector
MPI/DP X800	at rear	disconnectable PCI PNP supported 9-pin, standard socket connector (CP 5611-compatible)
Keyboard, integrated trackball X6	internal	060h-064h IRQ1, edge triggered 6-pin, mini Din socket Trackball connection integrated
Mouse X7	at rear	060h-064h IRQ12, edge triggered 6-pin, mini Din socket
Power supply X80,90,100,120	internal	PS/2 connector (P8, P9, P10), 6-pin 3-pin connector for auxiliary voltage 5 V
USB X901	at rear	Highcurrent, PCI PNP is supported two 4 Pin USB-interfaces Type A
Relay interface X802	at rear	9pin Sub-D-socket with flat cable X802 connections
Ethernet X921	at rear	PCI PNP is supported RJ45-socket with two LEDs (active, Token)

Special Connector		
X1	internal	EISA socket connector for direct connector (ISA; PCI signals)
X12	internal	Slot 1 for Pentium III
X15	internal	Status bar indicators (only SafeCard option)
X17	internal	Socket for TTY send submodule
X18	internal	Socket for TTY receive submodule
X19, X20, X21	internal	3 DIMM sockets, 64 bit + 8 bit ECC (X21 comes already fitted)
X24	internal	Connector for lithium battery
X26, X30	internal	Fan supply, 2 connectors (2-pin)
X27	internal	Voltage regulator submodule for Slot 1, 40-pin plug connector
X40	internal	Internal universal serial bus connector for USB sound module
X61	intern	Microphone-, speaker connector for sound interface module

Special Connector		
X630	intern	Connector for CD-ROM-Line output in RI 45 PIII Tower
X160	intern	Reset key, speaker, status display, power supply. front electronics,
X414	intern	Connector for standby/operation mode switch
X503	intern	10 pin socket connector for RS485 hybrid of the MPI/DP interface
X504	intern	10 pin plug connector for RS485 hybrid of the MPI/DP interface
X161	intern	4 pin plug connector for SCSI-active LED connector for a SCSI-module
S2	switch 2	CPU clock, flash EPROM, TTY interface

2.7 Assignment of Connectors and Ports

2.7.1 Assignment of the IDE Ports, X3 Secondary, X4 Primary

Pin No.	Description	Pin No.	Description
1	RSTDRV	21	PDREQ
2	Ground	22	Ground
3	D7	23	IOW_N
4	D8	24	Ground
5	D6	25	IOR_N
6	D9	26	Ground
7	D5	27	IORDY
8	D10	28	CS
9	D4	29	NC
10	D11	30	Ground
11	D3	31	ISAD7
12	D12	32	NC
13	D2	33	AD_1
14	D13	34	reserved
15	D1	35	AD_0
16	D14	36	AD_2
17	D0	37	CS1_N
18	D15	38	CS3_N
19	Ground	39	HDACT_N
20	NC	40	Ground

2.7.2 Assignment of the EISA Riser X1 on the motherboard

ISA Bus Signals								PCI Bus Signals							
	Signal		Signal		Signal		Signal		Signal		Signal		Signal		Signal
A	name	B	name	C	name	D	name	E	name	F	name	G	name	H	name
1	iochk#	1	gnd	1	sbhe#	1	memcs#	1	gnd	1	clk (slot3)	1	sdone	1	serr#
2	sd7	2	rstdrv	2	la23	2	iocs16#	2	gnd	2	gnd	2	sbo#	2	ad15
3	sd6	3	+5V	3	la22	3	irq10	3	inta#	3	intc#	3	c/be1#	3	ad14
4	sd5	4	irq9	4	la21	4	irq11	4	intb#	4	intd#	4	par	4	ad12
5	sd4	5	-5V	5	la20	5	irq12	5	+5V	5	+5	5	gnd	5	gnd
6	sd3	6	drq2	6	la19	6	irq15								
7	sd2	7	-12V	7	la18	7	irq14	7	+5V	7	+5V	7	gnd	7	gnd
8	sd1	8	Ows#	8	la17	8	dack0#	8	rst#	8	clk (slot1)	8	ad13	8	ad10
9	sd0	9	+12V	9	memr#	9	drq0	9	gnt# (slot1)	9	gnd	9	ad11	9	ad8
10	iochrdy	10	gnd	10	menw#	10	dack5#	10	req# (slot1)	10	gnt# (slot2)	10	ad9	10	ad7
11	aen	11	smemw#	11	sd8	11	drq5	11	gnd	11	gnd	11	c7be0#	11	ad5
12	sa19	12	smemr#	12	sd9	12	dack6#	12	clk (slot2)	12	req# (slot2)	12	ad6	12	ad3
13	sa18	13	iow#	13	sd10	13	drq6	13	gnd	13	ad31	13	ad4	13	ad1
14	sa17	14	ior#	14	sd11	14	dack7#	14	ad30	14	ad29	14	ad2	14	ad0
15	sa16	15	dack3#	15	sd12	15	drq7	15	Req# (slot3)	15	GNT_# Slot3				
16	sa15	16	drq3	16	sd13	16	+5V					16	+5V	16	+5V
17	sa14	17	dack1#	17	sd14	17	master#	17	rth_3V	17	3.3V	17	+5	17	-5V
18	sa13	18	drq1	18	sd15	18	gnd	18	ad28	18	ad27	18	gnd	18	gnd
19	sa12	19	refresh#					19	ad26	19	ad25	19	gnd	19	gnd
20	sa11	20	sysclk					20	ad24	20	c/be3#				
21	sa10	21	irq7					21	ad22	21	ad23				
22	sa9	22	irq6					22	ad20	22	ad21				
23	sa8	23	irq5					23	ad18	23	ad19				
24	sa7	24	irq4					24	3.3V *	24	3.3V *				
25	sa6	25	irq3												
26	sa5	26	dack2#					26	3.3V *	26	3.3V *				
27	sa4	27	t/c					27	ad16	27	ad17				
28	sa3	28	bale					28	frame#	28	irdy#				
29	sa2	29	+5V					29	c/be#	29	devsel#				
30	sa1	30	osc					30	trdy#	30	plock#				
31	sa0	31	gnd					31	stop#	31	pme#				

* 3,3V if Jumper X2 pin 1, 3, 5, 7 is connected with pin 2, 4, 6, 8.

2.7.3 Battery Connection, X24

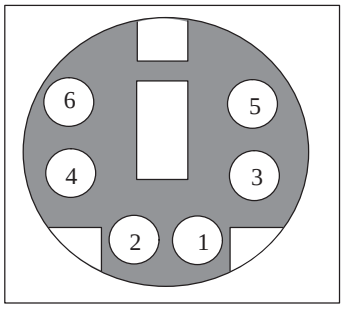
Pin No.	Description
1	+
2	-

2.7.4 PS/2 Mouse Connection, X7

Pin No.	Description
1	Trackball data
2	NC
3	Ground
4	+5V, fused
5	Trackball clock
6	NC

2.7.5 Keyboard-Mouse Connection, X6

Pin No.	Description
1	Keyboard data
2	Trackball data
3	Ground
4	+5V, fused
5	Keyboard clock
6	Trackball clock



View of socket connector

Figure 2-4 Mini DIN Socket X6, X7

2.7.6 Assignment of the COM 1 Port, X10

Pin No.	Description	Direction	Pin No.	Description	Direction
1	Shield	Ground	14	unassigned	
2	Transfer data (TxD/D1)	Output	15	unassigned	
3	Receive data (RxD/D2)		16	unassigned	
4	Request to send (RTS/S2)	Output	17	unassigned	
5	Clear to send (CTS/M2)	Input	18	+TTY transfer data (TxD)	Output
6	Data set ready (DSR/M1)	Input	19	Current source, isolated	positive potential
7	Functional ground (GND/E2)	Ground	20	Data terminal ready (DTR/S1)	Output
8	Data carrier detect (DCD/M5)	Input	21	-TTY transfer data (TxD)	Output
9	+TTY Receive data (RxD)	Input	22	Incoming call (RI/M3)	Input
10	-TTY Receive data (RxD)	Input	23	unassigned	
11	unassigned		24	unassigned	
12	unassigned		25	unassigned	
13	unassigned		Housing	Ground	

2.7.7 Gender Changer for COM1

With the enclosed gender changer (25-pin plug/25-pin plug) you can), you can convert the COM1/RS232/programming device port for the SIMATIC PC family device to the standard 25-pin plug connector.
All you have to do is insert the gender changer into the COM1 socket and screw tight with the two hexagonal screws.

Pin-No.	Meaning	Pin-No.	Meaning
1	Shield		
2	Send data (TxD/D1)	14	Unassigned
3	Receive data (RxD/D2)	15	Unassigned
4	Switch on sender (RTS/S2)	16	Unassigned
5	Sender ready (CTS/M2)	17	Unassigned
6	Data set ready (DSR/M5)	18	TTY_TXD +
7	Functional ground (GND/E2)	19	+ 12 V
8	Receiver signal carrier (DCD/M5)	20	End device ready (DTR/S1)
9	TTY_RXD +	21	TTY_TXD -
10	TTY_RXD -	22	Incoming call (R1/M3)
11	Unassigned	23	Unassigned
12	Unassigned	24	Unassigned
13	Unassigned.	25	Unassigned

2.7.8 Assignment for the Floppy, X50

Pin No.	Description	Pin No.	Description
1	Ground	2	DENSEL
3	Ground	4	NC
5	Ground	6	DRAME0
7	Ground	8	INDEX_N
9	Ground	10	MOT_N0
11	Ground	12	DS_N1
13	Ground	14	DS_N0
15	Ground	16	MOT_N0
17	Ground	18	DIR_SL_N
19	Ground	20	STEP_N
21	Ground	22	WR_DAT_N
23	Ground	24	WR_GAT_N
25	Ground	26	TRACK_N0
27	Ground	28	WR_PRT_N
29	MED_IDO	30	RD_DAT_N
31	Ground	32	SIDE_1_N
33	MED_ID1	34	DCHG_N

2.7.9 Assignment of the COM 2

The interface is controlled by means of a ribbon cable from the basic module (X911) to the back panel.

Pin-No.	Meaning	Pin-No. X911
1	DCD	1
2	RxD	3
3	TxD	5
4	DTR	7
5	Ground	9
6	DSR	2
7	RTS	4
8	CTS	6
9	R1	8
Housing	Ground	

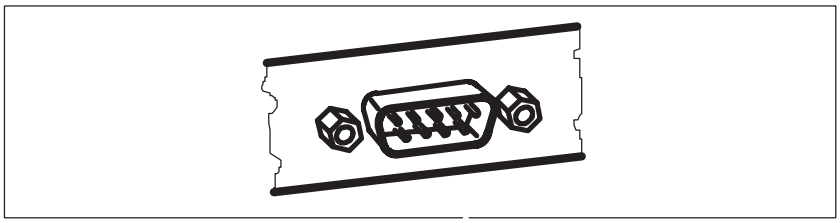


Figure 2-5 Serial COM 2 port on the rear panel

2.7.10 Assignment of the Parallel Port, X9

Pin No.	Description
1	CLK_N
2	DAT0
3	DAT1
4	DAT2
5	DAT3
6	DAT4
7	DAT5
8	DAT6
9	DAT7
10	ACK_N
11	BUSY
12	PE
13	SLCT
14	Auto Feed
15	ERR_N
16	INI_N
17	Select in
18-25	Ground
Housing	Ground

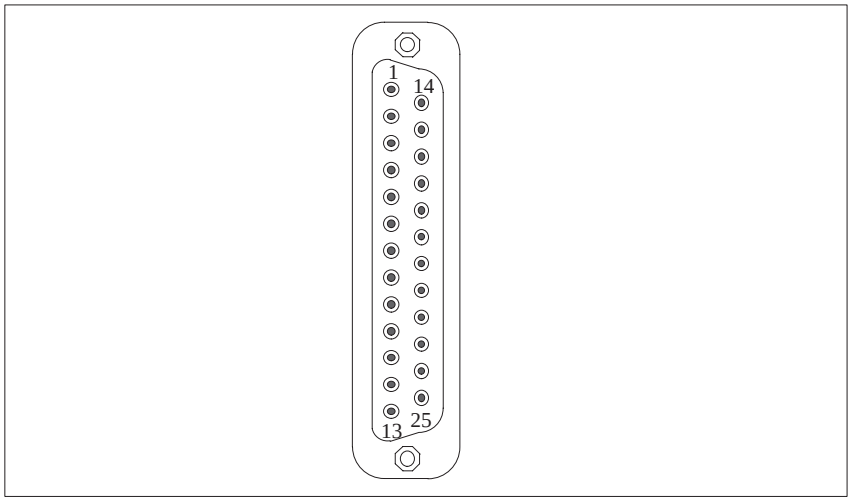


Figure 2-6 LPT 1 Parallel Port

2.7.11 Assignment of the Relay Interface, Rear Panel, X802

The interface is controlled by means of a ribbon cable from the basic module (X802) to the back panel.

Pin-No.	Meaning	Pin-No. X802
1	NC	1
2	Power Error	3
3	NC	5
4	Mid-position Contact	7
5	Power Good	9
6	Ground	2
7	+5V with current limitation (max. 2A)	4
8	NC	6
9	NC	8
Housing	Ground	Housing

2.7.12 Assignment of the Tableau Display, X160

Pin No.	Description
1	GROUND
2	Reset, 10 mA
3	DP12 LED, 10 mA
4	NC
5	+5V, current limitation
6	HD-LED, 10 mA
7	Standby/Power LED, 10 mA
8	Speaker negative
9	Watchdog LED green
10	Watchdog LED red
11	Temperature monitor LED green
12	Temperature monitor LED red

2.7.13 Assignment of the PS/2 Power Connector, X80

Pin No.	Description
1	Power Good
2	5V
3	12V
4	-12V
5	Ground
6	Ground

2.7.14 Assignment of the PS/2 Power Connector, X90

Pin No.	Description
1	Ground
2	Ground
3	-5V
4	5V
5	5V
6	5V

2.7.15 Assignment of the PS/2 Power Connector, X100

Pin No.	Description
1	Ground
2	Ground
3	Ground
4	3V
5	3V
6	3V

2.7.16 Assignment of the PS/2 Power Connector, X120

Pin No.	Description
1	AUX-5V
2	PSOFF
3	Ground

2.7.17 Assignment of the Fan Supply, X26, X30

Pin No.	Description
1	12V
2	0V Fan, switched

2.7.18 Assignment of the Standby-Operation Switch Connector X414

Pin-No.	Description
1	Switch power
2	Ground

2.7.19 Assignment of the MPI/DP D Sub-Socket Connector, X800

Pin No.	Description
1	NC
2	NC
3	LTG_B
4	RTSAS
5	Ground optically-isolated
6	5V optically-isolated
7	NC
8	LTG_A
9	RTS_PG

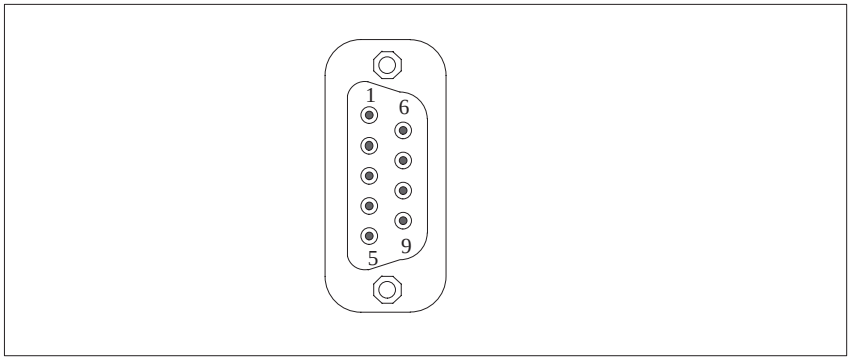


Figure 2-7 MPI/DP Socket Connector

2.7.20 Microphone, 3.5 mm plug

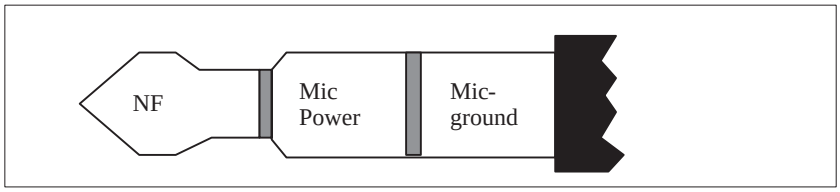


Figure 2-8 Appropriate 3.5 mm Active Microphone plug

2.7.21 Loudspeaker, 3.5 mm plug

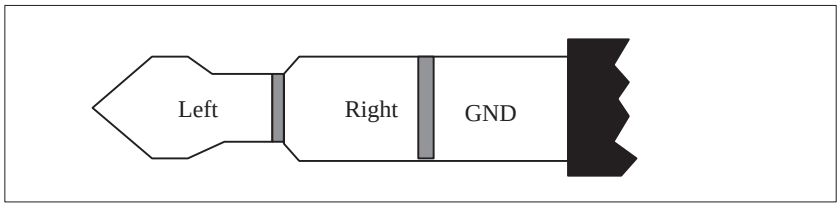


Figure 2-9 Loudspeaker plug

2.7.22 Ethernet RJ45 Connection

Pin-Nr.	Bedeutung
1	TD+
2	TD-
3	RD+
4, 5 *	internally terminated
6	RD-
7, 8 *	internally terminated
LED yellow	Link
LED green	Activity

* not necessary for data transfer.

2.7.23 USB (two high current USB Interfaces Type A)

Pin-No.	Meaning
1	VCC (500 mA max. current)
2	- Data

Pin-No.	Meaning
3	+ Data
4	Ground

2.7.24 Description of the Switch Positions S2 (TTY, BIOS)

Switch Settings

The following switch settings are for your information only. They are set in the factory and may not be changed.

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

BIOS Source S2

S2 (3)	Function
off	Boot EPROM activated (standard setting)
on	Boot EPROM not activated (boot module required)

TTY Setting S2

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

Setting the Frequency Frontsidebus S2

S2(4)	ISA Bus Freq.	PCI Bus Freq.	CPU Bus Freq
off	8.25MHz	33MHz	66MHz
off	8.25MHz	33MHz	100MHz

2.8 Interrupt Assignments

Interrupt Assignments

Two integral interrupt controllers of the type 82C59 handle the 16 hardware interrupts (IRQ 0 to IRQ 15).

The INT output of the slave controller is connected to the IRQ 2 input of the master controller. Interrupt 9 (IRQ 9) can be used on the bus for the assigned interrupt 2 (IRQ 2). In the initialization phase, IRQ 9 is programmed for the software interrupt vector 0A H (IRQ 2) by the ROM-BIOS.

Priority

The interrupts are priority-scheduled in reverse number order. Interrupt IRQ 0 has the highest priority and interrupt IRQ 7 the lowest. For triggering IRQ 2, interrupt IRQ 8 has the highest priority and interrupt IRQ15 the lowest.

Interrupts IRQ 8 to IRQ 15 therefore have priority over interrupts IRQ 3 to IRQ 7. The interrupt vectors are initialized and masked when the PC is powered up.

I/O Addresses of the Interrupt Controllers

Interrupt	Assignment	Remark	Vector
SMI	System management interrupt, cannot be masked	-	-
NMI	Signal IO channel check 2	Fixed	INT2H
IRQ 0	Timer output 0	Fixed	INT8H
IRQ 1	Keyboard (keyboard buffer full)	Fixed	INT9H
IRQ 2	Cascaded (slave interrupt controller)	Fixed	INTAH
IRQ 3	Serial port 2	Can be switched off *)	INTBH
IRQ 4	Serial port 1	Can be switched off *)	INTCH
IRQ 5	Sound	P&P **)	INTDH
IRQ 6	FD controller	Can be switched off *)	INTEH
IRQ 7	Parallel port 1	Can be switched off *)	INTFH
IRQ 8	Real-time clock (RTC)	Fixed	INT70H
IRQ 9	VGA (generally not used)	Vacant (AT 9 = XT 2)	INT71H
IRQ 10	Onboard MPI / DP	P&P **)	INT72H
IRQ 11	Vacant	Vacant	INT73H
IRQ 12	PS/2 mouse	Can be switched off *)	INT74H
IRQ 13	Numeric processor	Fixed	INT75H
IRQ 14	1st HD controller (primary)	Fixed	INT76H
IRQ 15	2nd HD controller (secondary)	Can be switched off *)	INT77H

Do not use interrupts already assigned in the system.

*) These components can be disabled via the BIOS SETUP. The functions are then no longer available and the resources are released for other components.

**) The on-board MPI/DP interface is plug&play-capable, the occupied resources are managed by the BIOS.

2.9 Hardware Addresses

2.9.1 I/O Address Assignment

Table 2-1 I/O Address Assignment

Address From	To	Assignment	Remark
0000	000F	DMA controller 1	
0020	0021	Interrupt controller 1	
0040	0043	Timer 1	
0060	0060	Keyboard controller, data	
0061	0061	NMI, loudspeaker settings	
0064	0064	Keyboard controller, command, status	
0070	0070	NMI-enable, real-time clock index	
0071	0071	Real-time clock date	
0072	0073	CMOS external RAM	
0080	008F	DMA page register	
00A0	00A1	Interrupt controller 2	
00C0	00DE	DMA controller 2	
00EA	00EA	PM-Port Ultra IO Index	
00EB	00EB	PM-Port Ultra IO Data	
00ED	00ED	reserved	
00F0	00F0	Reset numeric error	
00F8	00FF	Numeric processor	
0100	010F	Generally not used (alternative for CP 1413)	
0170	0177	Second IDE channel	Can be switched off
01F0	01F7	First IDE channel	
0200	020F	Reserved for game port, otherwise vacant	Reserved / vacant
0220	022F	Sound	Can be switched off
0240	0243	Reserved for SINEC L2 (5412(A2)), otherwise vacant	Reserved / vacant
0278	027B	Reserved for LPT 2, otherwise vacant	Reserved / vacant
02E8	02EF	Reserved for COM4, otherwise vacant	Reserved / vacant
02F0	02F8	Reserved for BGIP	Reserved / vacant
02F8	02FF	COM2	Can be switched off
0300	031F	Vacant	
0330	033F	Sound	Vacant
0340	035F	Reserved for HIGRAPH Host interface, otherwise vacant	Reserved / vacant

Table 2-1 I/O Address Assignment

Address From	To	Assignment	Remark
0360	036F	Generally not used	Vacant
0376	0376	Second IDE channel command	Can be switched off
0377	0377	Second IDE channel status	Can be switched off
0378	037F	LPT 1	Can be switched off
0380	0387	Generally not used	Vacant
0388	038C	Sound synthesizer	Can be switched off
03A0	03AF	Generally not used	Vacant
03B0	03BB	Monochrome video or EGA/VGA	
03BC	03BF	Reserved for LPTn, otherwise vacant	Reserved / vacant
03C0	03CF	VGA control register	
03D0	03DF	CGA / VGA control register	
03E8	03EF	Reserved for COM 3, otherwise vacant	Reserved / vacant
03F0	03F5	FD controller	
03F6	03F6	First IDE channel, command	
03F7	03F7	First IDE channel, status	
03F8	03FF	COM 1	Can be switched off
0390	0397	Reserved for SINEC H1 (CP1413), otherwise vacant	Reserved / vacant
0400	+LPT	ECP LPT	PCI BUS
0CF8	0CFB	PCI config index	PCI BUS
0CFC	0CFF	PCI config data	PCI BUS
FF00	FF07	IDE bus master register	PCI BUS
1000	1037	Power management	
1080	108F	Sound	PCI-IO
10C0	10EF	Sound	PCI-IO

2.9.2 Assignment of the Memory Addresses

There are two kinds of address areas:

- Memory address area
- I/O address area.

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

Table 2-2 Assignments of the Memory Addresses

From Address	To Address	Size	Assignment	Remark
0000 0000	0007 FFFF	512k	Conventional system memory	
0008 0000	0009 FBFF	127k	Conventional system memory extended	
0009 FC00	0009 FFFF	1k	Conventional system memory extended BIOS data	
000A 0000	000A FFFF	64k	Graphics refresh memory	VGA
000B 0000	000B 7FFF	32k	SW graphics interface module	Vacant
000B 8000	000B FFFF	32k	Graphics refresh memory	VGA/CGA
000C 0000	000C C7FF	32k	VGA BIOS expansion	VGA
000C C800	000D FFFF	96k	Vacant	
000E 0000	000E BFFF	48k	System BIOS	
000E C000	000E CFFF	4k	System BIOS BootMessageLogo	
000E D000	000E DFFF	4k	System BIOS Plug & Play Area	
000E E000	000E FFFF	8k	System BIOS Boot Block	
000F 0000	000F FFFF	64k	System BIOS	
0010 0000	00EF FFFF	14M	Extended system memory	
00F0 0000	00FF FFFF	1M	Extended system memory or Memory hole	Via BIOS SETUP
0100 0000	2FFF FFFF	768M	Extended system memory	
3000 0000	FFEF FFFF	4G-768M-1023k	PCI expansion; resources are assigned by the operating system.	
FFF0 0000	FFFD FFFF	1023k-128k	ISA memory, reserved for dual-port RAM	Vacant
FFFE 0000	FFFF FFFF	128k	Shadow of System BIOS (000E 0000 .. 000F FFFF)	

Memory Decoding Function

The Pentium II CPU has a memory address area of 64 Gbytes; 4 Gbytes of this can be used. The CPU has a 64-bit wide data bus, 33 address lines, and 8 bus enable lines (BE0...BE7) which code the non-existent byte address lines A0, A1 and A2. The CPU address bus is mapped on the PCI address bus via the PAC (system controller). Excluded from this are the memory addresses from 0000 0000h to 0009 FFFFh (640 Kbytes) and from 0010 0000h to 2FFF FFFFh (768MByte)).

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

- The CPU address area from FFF0 0000h to FFFD FFFFh (1024k - 128k BOIS = 896 KB) is mapped into the ISA address area 00F0 0000h to 00FD FFFFh and is always addressed in the CPU address area. Decoding of the address lines A24 to A31 missing on the ISA bus is achieved using special hardware on the basic module.
- The CPU address area from 00F0 0000 to 00FF FFFF is mapped into the ISA address area from 00F0 0000 to 00FF FFFF (16 Mbyte memory window). This setting can be switched on and off in the setup.

2.10 DMA Channels

DMA Channel	Data Transfer	Description
0	8/16 bit	Sound*
1	8/16 bit	Sound*
2	8/16 bit	Floppy
3	8/16 bit	
4		Cascading of DMA controller
5	16 bit	Free
6	16 bit	Free
7	16 bit	Free

* Can be switched off by deactivating the sound card

2.11 Monitoring Functions

2.11.1 Overview

Funktion

The following individual functions are available:

- Temperature monitoring and over/under temperature display
- Watchdog
- Relay interfaces

Monitoring module messages can be forwarded to an application.

SFC program devices as well as Windows NT and Windows 98 drivers are available for this purpose. Using these you can display status or parameterize limiting values.

You can find descriptions of the drivers and the SFC programs on this CD *Documentation and Drivers* in the directory SafeCard.

2.11.2 Status displays

LED Indicators

The LEDs have the following meanings:

LED	OFF	GREEN	RED
Run	Watchdog inactive	Watchdog active	Watchdog executed
Temp	System OFF	Normal internal temperature	Internal temperature beyond acceptance level or cable towards temperature sensor unplugged or interrupted.

2.11.3 Temperature Monitoring/Display

Temperature Monitoring

The temperature is measured by means of two temperature detectors. One detector monitors the processor temperature, the second internal housing temperature. The temperature is measured via a sensor and its status is indicated via a green LED for normal temperature and via a red LED for errors. The following conditions may cause errors:

- Overrange of the acceptance limit of excess temperature
- Underflow of the acceptance limit of insufficient temperature

The temperature status for processor and intern area can be installed separatly (per Treiber or programm SFC).

An error causes one of the following reactions:

Reaction	Option
TempLED changes from GREEN to RED	always
Relay output falls in quiet state	always
Initiate IRQ	can be set

2.11.4 Watchdog (WD)

Function

The watchdog monitors the program execution. The watchdog has the task of informing the user about different reactions to a program crash.

When you switch on your PC, or when you execute a cold restart (HW RESET) the watchdog remains in its quiet state, that means that it does not trigger any reaction and the RUN LEDs remain dark. If the watchdog is actve, this is indicated by the green RUN LED (per Treiber or SFC-Programm).

Watchdog Reactions

If the watchdog is not triggered within a preset time interval, the following reactions occur:

Reaction	Option
RUN LED changes from GREEN to RED	always
Canceling WD	always
Relay output falls in quiet state (False contact with middle contact)	always
Initiating of PC reset	to be set
Transmitting IRQ to PC	to be set

If an executed watchdog is retriggered, the green LED is illuminated again. Options are set via the configuration register bits 6 and 7.

Watchdog Monitoring Times TWD

Monitoring times are set in steps (from 3 to 255) in the configuration register.

In order to secure the recognition of a fail-state from an interrupt-evaluating unit which is connected to the relay interface, the SafeCard guarantees an error hold time of at least 500 ms. This also applies if the PC is reset, for example, after the watchdog has been executed.

Note

If you modify the watchdog time after the watchdog has been activated (that is during watchdog execution), the watchdog is retriggered.

2.11.5 Relays Output

Switching ON/OFF Conditions

External units such as alarm indicators, horns and signal lights can be notified about the system condition of the PC with the relay changeover contact.

In case of failure the error contact (De-energized position) is connected with the mid-position contact.

A fault stop time of 500 ms is guaranteed so that the alarm analysis units connected to the relay interface recognize the error condition. This is also true when the executed PC Watchdog is reset.

The following table shows you the operating status and the corresponding switch position.

Condition	switch position
Normal operation	Working condition
Watchdog executed	De-energized position
Watchdog activated by software	De-energized position
Watchdog acknowledged by software	working position
Temperature error	De-energized position
Power failure	De-energized position
PC turned off	De-energized position

Switching the relay from fail-state to error-free status via the software is impossible if a fail-state occurs (that is temperature error or watchdog executed).

Technical Specifications of the Relays

The following table lists the technical specifications of the relays:

Switching voltage DC	max. 60 V
Switching current DC	max. 1 A
Switching capacity DC	max. 30 W
Limiting continuous current DC	max. 1 A

Connection for Relay output on the back plane

Version: D-SUB-connector, 9-pin, female

Pin	Signal
1	N.C.
2	Power Error (Working condition)
3	N.C.
4	Mid-position Contact
5	Power Good (De-energized position)
6	GND
7	+5V (fused)
8	N.C.
9	N.C.

2.11.6 SW Interfaces

Overview

The monitoring function can be called up by driver or SFC program. The included driver and the functions of the SFC program are described in the documentation. You can find this documentation on the included CD *Documentation and Drivers*.

2.12 Changing the Device Configuration with BIOS SETUP

Changing the Device Configuration

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

The **changes** you make **will not become effective until the device is restarted. When you exit the setup program, the device is automatically rebooted.**

SETUP Program

The SETUP program is in the ROM-BIOS. Information on the system configuration is stored in the battery-backed RAM of the PC RI 45 PIII.

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

Incorrect SETUP Data

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

- Start SETUP by pressing **F2** or
- Continue booting by pressing **F1**.

Starting SETUP

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

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

Start SETUP as follows:

1. Reset your PC RI 45 PIII (warm or cold restart).
2. Press the **F2** key as long as the BIOS prompt is on the screen.

Default Setting

The **F9** key or “Set Default Values” command in the exit menu sets the default parameters in the screen forms.

SETUP Menus

The various menus and submenus are listed on the following pages. You can obtain information on the SETUP entry selected from the **Item Specific Help** part of the relevant menu.

Screen Display Following Power-On

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

```
PhoenixBIOS Release 6.0 - A5E-Number
Copyright 1985-1997 Phoenix Technologies Ltd., All Rights
Reserved.


SIEMENS PC RI 45 Pentium III V06.A5E (version number)

CPU = Pentium III  450 MHz
0000640K System RAM Passed
0064512K Extended RAM Passed
0512K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed
UMB upper limit segment address: F1xx
Fixed Disk 0: [name of installed disk drive]
ATAPI CD-ROM: [name of installed CD-ROM drive]

Press F2> to enter SETUP
```

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

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

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

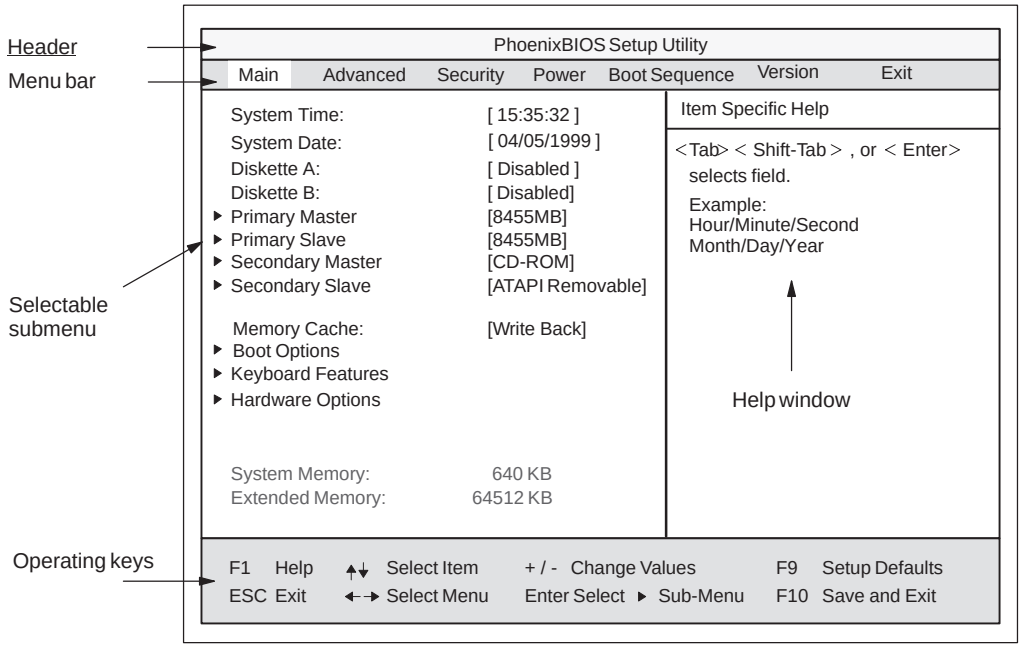


Figure 2-10 Example: Main SETUP Menu

Menu Structure

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

Yellow stars to the left of the interface designation (for example, Internal COM 1) indicate a resource conflict between the interfaces managed by the BIOS. In this case you should select the default settings (F9) or eliminate the conflict.

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

Menu	Meaning
Main	System functions are set here
Advanced	An extended system configuration can be set here
Security	Security functions are set here, for example, a password
Power	Power saving functions can be selected here
Version	Device-specific information is displayed here
Boot Sequence	The order of possible bootable devices is determined here.
Exit	Used for terminating and saving

ENTER Key

Press the Enter key to open a pop-down menu in which you can use the cursor keys to move and make selections. To exit one of these menus, press either ESC (exit without changes) or Return (selected setting becomes effective when device is rebooted).

If a line is marked with a triangle it contains a submenu. You can exit a submenu by pressing ESC. The changes you have selected will become effective when the device is rebooted.

2.12.1 The Main Menu

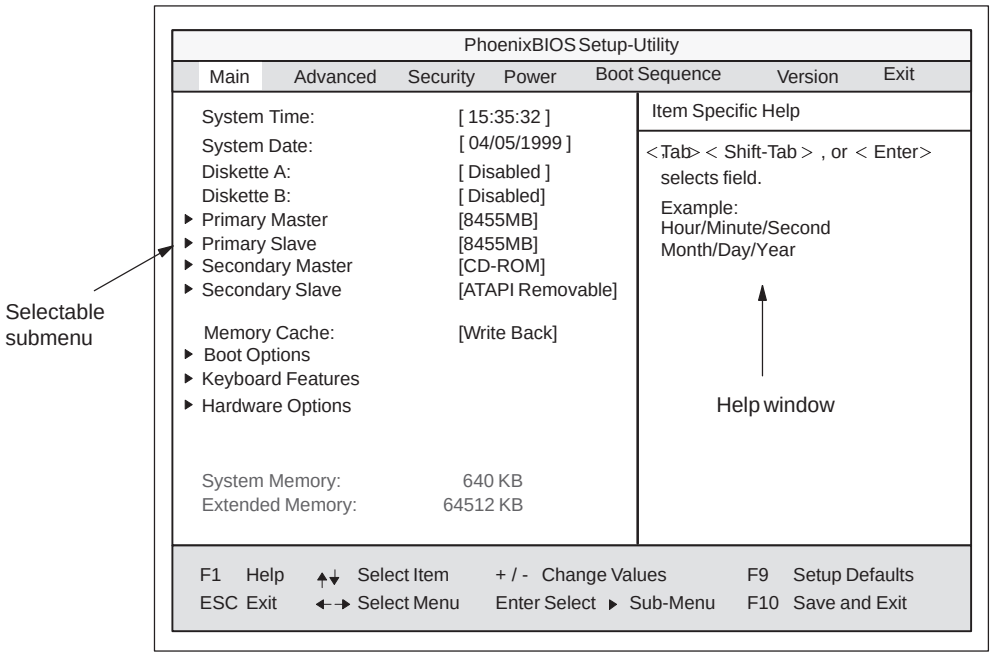


Figure 2-11 Example: Main SETUP Menu

Settings in the Main Menu

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

Menu Item	Function
System Time	Used to display and set the current time
System Date	Used to display and set the current date
Diskette A	Name of installed disk drive
Diskette B	Name of installed disk drive
Memory Cache	For setting memory options
Via submenus	
Primary Secondary	Type setting of installed EIDE drives Type setting of installed EIDE drives
Memory Cache	For setting memory options
Boot Options	For setting boot options
Keyboard Features	For setting keyboard interface (for instance, NUM-LOCK, auto report rate)
Hardware Options	For setting PC RI 45 hardware options

System Time and System Date
Time and Date

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

`Hour:Minute:Second` and the date

`Month/Day/Year`.

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

Diskette A/ Diskette B
Floppy Disk Drive

The names of the installed disk drives in the PC are set here. The following entries are possible:

[Disabled]	If a disk drive is not installed (standard setting for disk drive B or by LS120)
[360 KB,5 1/4”]	
[1.2 MB,5 1/4”]	
[720 KB,3 1/2”]	
[1.44 MB, 3 1/2”]	Standard setting for installed disk drive A
[2.88 MB, 3 1/2”]	

Option "Primary / Secondary"

The system jumps to the following submenu when you select this type of menu option:

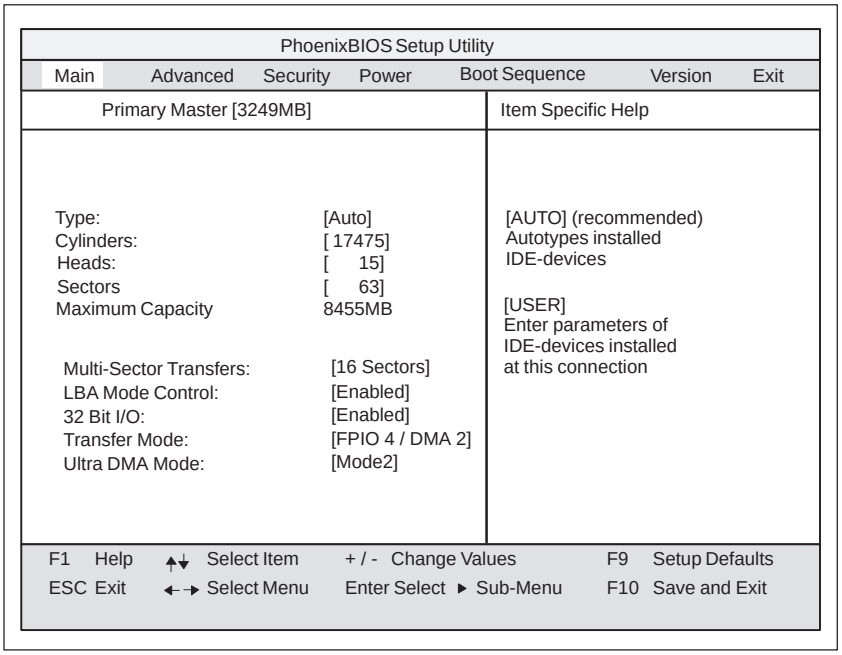


Figure 2-12 Example: "Primary Master"

The parameters which you can select here are usually saved on the respective IDE drive, and are read from the drive and entered into the form when you select the option "Autodetect Hard Disk."

Option "Type"

If you select the option "Type" for a drive which does not exist, an abort is executed after approximately one minute as a result of a timeout and the existing entries remain unchanged. It is therefore only meaningful to carry out an autodetect for interfaces to which drives are connected.

Under certain circumstances it may be necessary to deviate from the proposed hard disk parameters. In this case, select the corresponding menu option and then the desired value using the [+] and [-] keys. Enter "none" in the option "Type" if no drive is connected, or a number from 1 to 39 if a predefined type of hard disk is to be used.

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

Option "Multi-Sector Transfers"

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

```
Disabled
2,4,8,16    sectors
```

Option "LBA Mode Control"

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

Option "32 Bit I/O"

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

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

Option "Transfer Mode" or Ultra DMA Mode

The interface transmission rate is set in the option "Transfer Mode." The value depends on the drive and should only be set using the autodetect function.

You leave the submenu using the ESC key.

Maximum Capacity

Here the total drive capacity is indicated for "Logical (L) x Block (B) x Adressing (A). The maxiumum capacity displayed is up to 2 TB (block size is 512 bytes).

Option “Memory Cache”

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

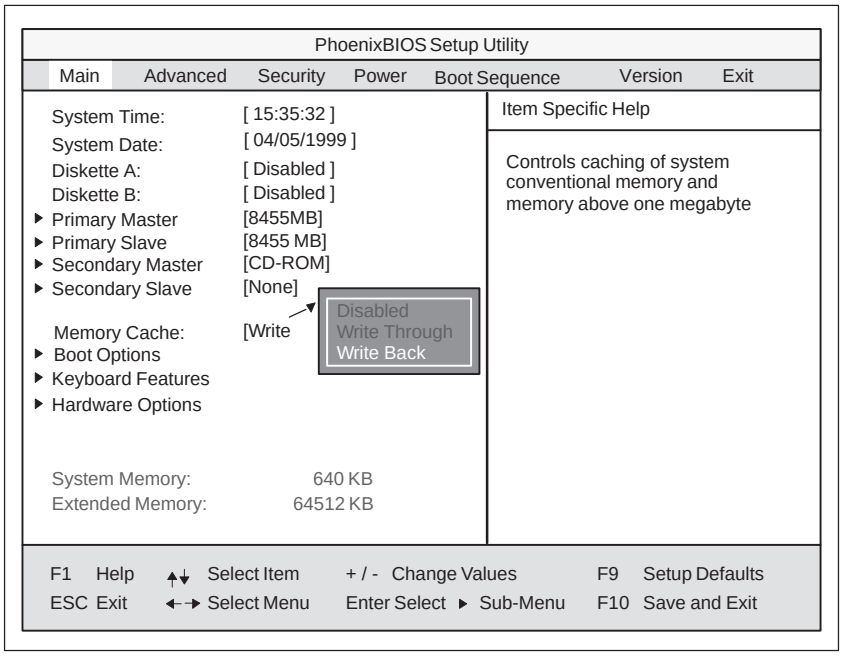


Figure 2-13 “Memory Cache” Submenu

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

[Disabled]	Cache is disabled.
[Write Through]	Write access is only concluded when an entry is made in the main memory.
[Write Back]	Write access is concluded immediately, the entry in the RAM takes place in the background.

Option “Boot Options”

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

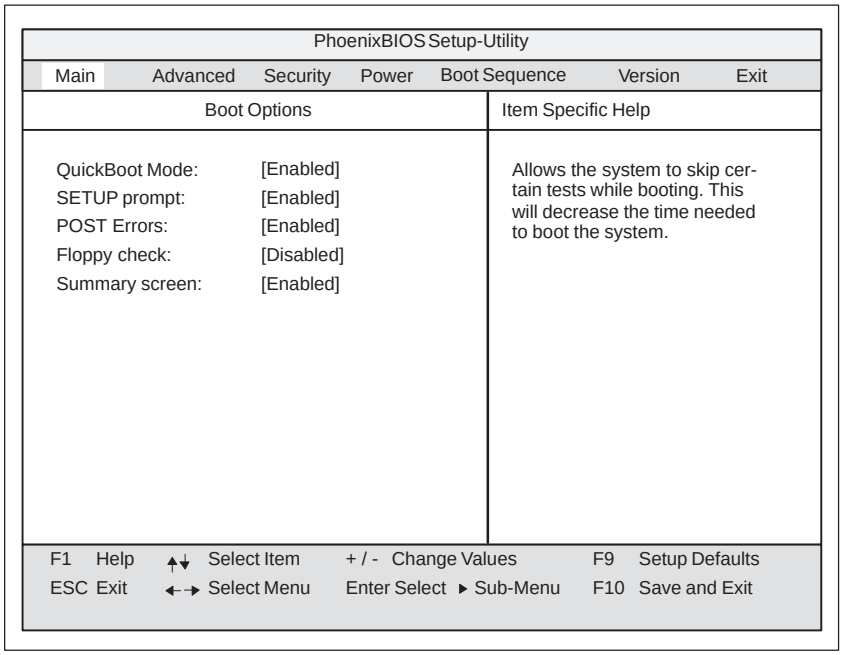


Figure 2-14 “Boot Options” Submenu

Quick Boot Mode	Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.
SETUP prompt	During the system loading phase, the following SETUP prompt is output at the bottom of the screen: *PRESS <F2> to enter Setup.*
POST Errors	The loading procedure is aborted if an error is detected during the system loading phase.
Floppy check	During the system loading phase, the floppy head is moved by a number of steppings to the inside, and then returned again. This test is useful because the drive is initialized again in the process.
Summary screen	The most important system parameters are output on the display at the end of the system loading phase.

By ‘enabled’ the Feature is free, by ‘disabled’ inhibited.

Option “Keyboard Features”

The following submenu appears if you select the option “Keyboard Features” in the main menu:

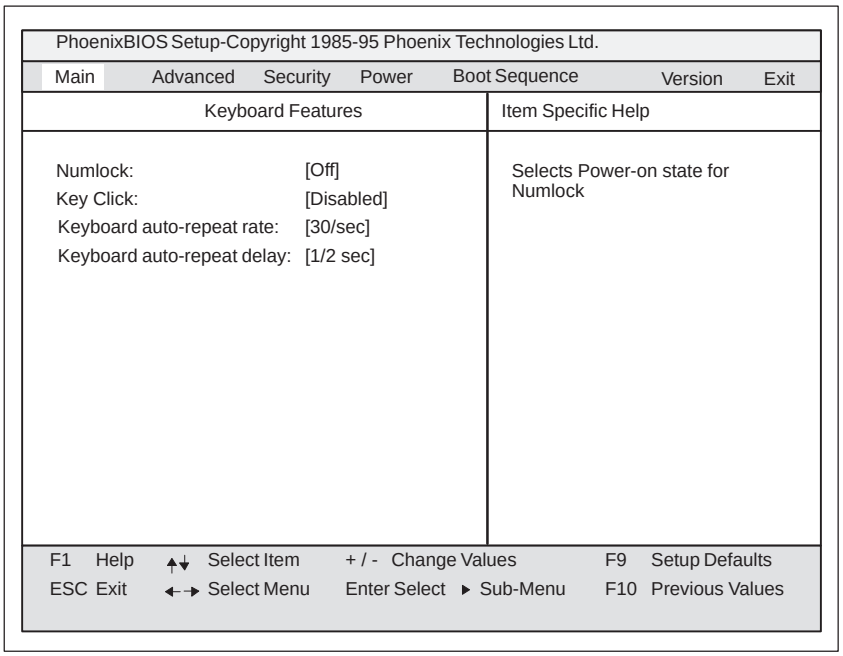


Figure 2-15 “Keyboard Features” Submenu

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

Option “Hardware Options”

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

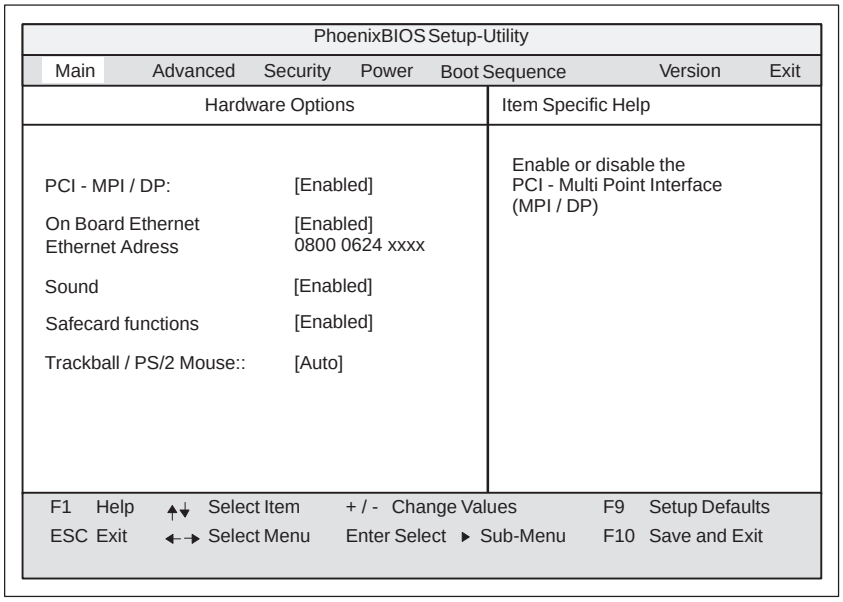


Figure 2-16 “Hardware Options” Submenu

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

Entry	Function	
PCI-MPI/DP	Enables the CP5611-compatible MPI/DP interface. The resources are managed by the BIOS PCI plug & play mechanism.	
On Board Ethernet	Enables the On Board Ethernet interface. The resources are managed by BIOS PCI Plug & Play Mechanism	
Ethernet Adress	The individual, specific Ehternet address of your computer. The areas marked with xxxx are device dependent. If an invalid address is displayed, (for example: FFFF FFFF FFFF) please notify the service center for your area.	
SafeCard functions	Enables the On Board SafeCard. The resources are managed by BIOS PCI Plug & Play Mechanism	
Sound	Enables or disables the basic module sound chip. The resources are managed by BIOS PCI Plug & Play Mechanism	
Trackball / PS/2 mouse	Internal	The PS/2 interface is active. IRQ 12 is occupied.
	External	The PS/2 interface is active. IRQ 12 is occupied. The keyboard trackball is disabled.
	Disabled	The PS/2 interface is inactive, IRQ12 is available.
	Auto	System recognizes whether a mouse or a key board with a trackball is connected.

2.12.2 The Advanced Menu

Menu Structure

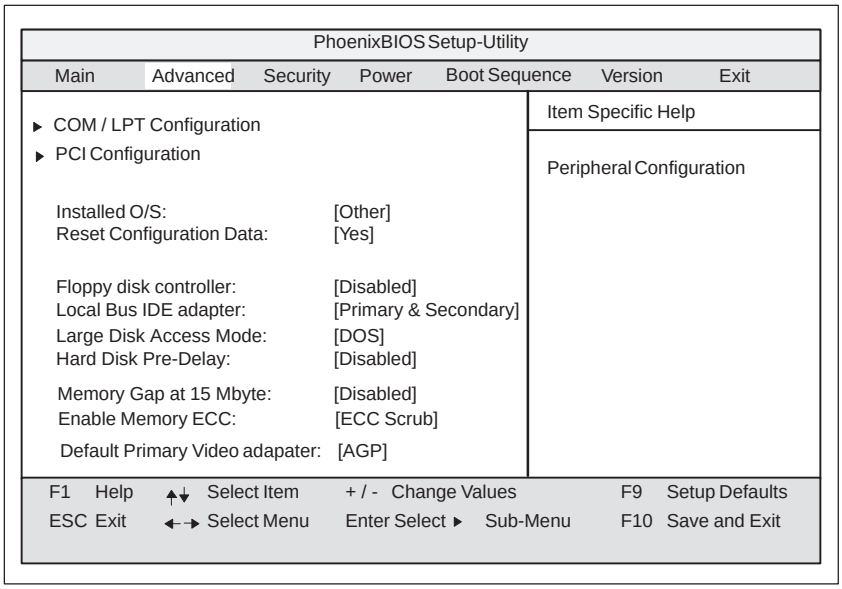


Figure 2-17 "Advanced" Menu

Settings in the Advanced Menu

Installed O/S	means that fitted modules are automatically recognized and installed provided they support plug & play functions.	
	[No]	The BIOS handles the complete plug & play facilities
	[Yes]	The operating system handles some of the plug & play functions
Reset Configuration Data	[Yes]	All previous functions under plug & play are deleted, and the configuration is retriggered the next time the system is loaded. The entry is then set to [No]. System components which have no plug & play facilities must be entered manually.
	[No]	The system components with plug & play facilities are initialized the next time the system is loaded.
Floppy disk controller	freigeben oder sperren des Floppy-Controllers der Grund-baugruppe (bei LS120 disabled)	
Local Bus IDE adapter	[Primary] [Secondary]	One IDE interface for up to two drives.
	[Primary and Secondary]	Two IDE interfaces for up to four drives.
	[Disabled]	No local IDE interface
Large Disk Access Mode	[DOS]	The drive tables are designed according to DOS drive access operations compatible with enhanced IDE.
	[OTHER]	The tables are not adapted.
Hard Disk Delay	[Disabled]	No additional startup time for hard disk
	3 to 30	Additional startup time for the hard disk can be selected

Memory Gap at 15 MBytes	[Disabled] [Enabled]	The area from 15 to 16 Mbytes is not available for ISA RAM The area from 15 to 16 Mbytes is enabled for the ISA memory.
Enable Memory ECC	[ECC Scrub] [Disabled]	One bit memory error is automatically corrected. This option turns off the correction function.
Enable memory ECC	[Disable] [Enable]	No “Error checking and correction” “Error checking and correction” is active Only meaningful in connection with DIMM cards with ECC
Default Primary Video Adapter	[AGP] [PCI]	Module in AGP-Slot is VGA output interface Module in PCI-Slot is VGA output interface

Submenu COM/LPT Configuration

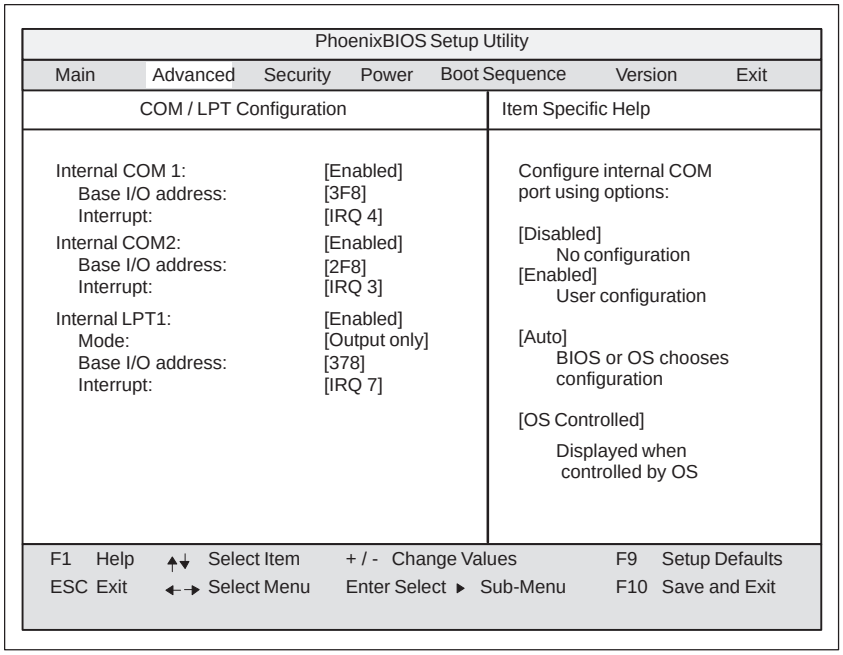


Figure 2-18 “COM / LPT Configuration” Submenu

If you set an interface to Disabled, the resources occupied by it are released.

Printer Port Internal LPT1

Mode:	You can use this setting to select the operating mode of the printer interface. You must adapt this setting to match the data terminal device which you have connected. You can find the setting in the corresponding device documentation.

Submenu PCI Configuration

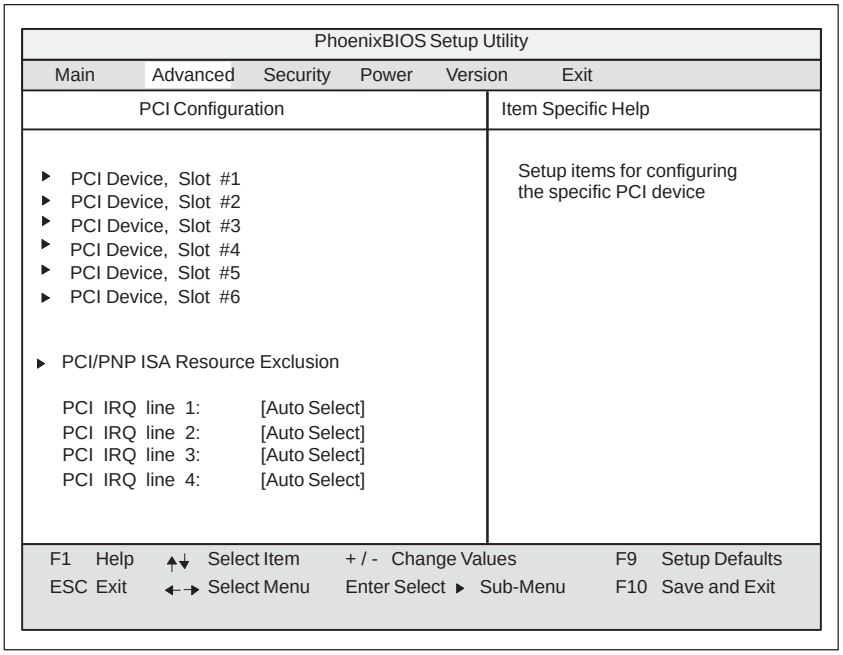


Figure 2-19 “PCI Configuration” Submenu

Option “PCI Devices”

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

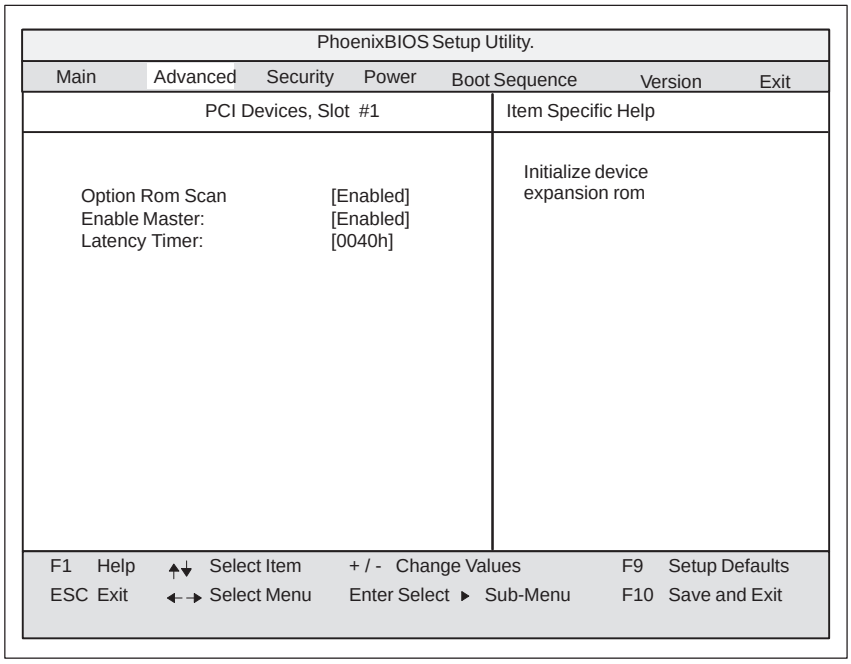


Figure 2-20 “PCI Devices, Slot #1” Submenu

Option ROM Scan:	[Enabled] [Disabled]	The ROM option of the PCI module (if present) is enabled The ROM option of a PCI module is disabled.
Enable Master:	[Enabled] [Disabled]	This slot can assume the PCI master function This slot can only work as a PCI slave.
Latency Timer	[Default] [0020H to 00E0H]	The number of active PCI clock cycles of the master modules are determined by the module. You can use these settings to set the maximum number of active PCI clock cycles to the chosen value.

Submenu PCI/PNP ISA IRQ Resource Exclusion

Available means that the IRQ can be allocated to Plug and Play modules or given a motherboard function by the plug and play mechanism of the BIOS.

You should only use the Reserved setting if the interrupt does not have to be assigned to plug and play ISA modules in the application software. If the interrupt is “Reserved,” it cannot be assigned a PCI slot by the plug & play mechanism.

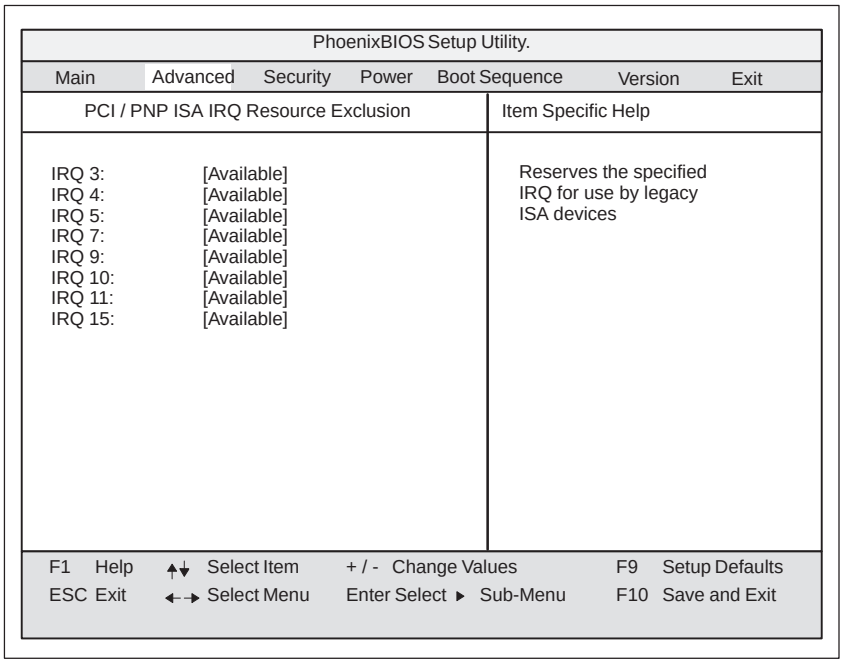


Figure 2-21 “PCI / PNP ISA IRQ Resource Exclusion” Submenu

Option "PCI IRQ Line"

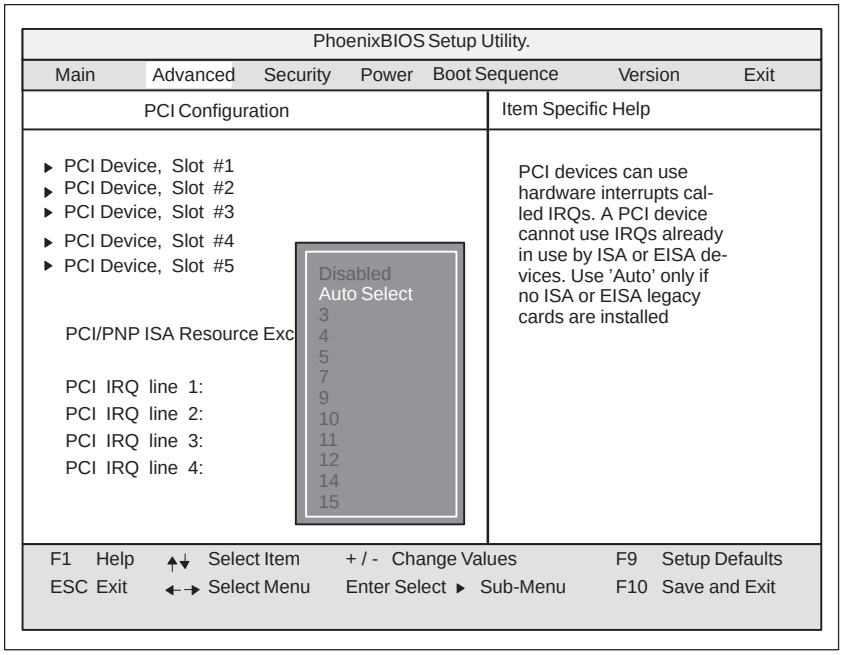


Figure 2-22 "PCI Configuration" Submenu

Disabled 1	No interrupt possible for the selected PCI IRQ line
AutoSelect	Plug & play mechanism of the BIOS selects free interrupts and assigns them to the PCI module.
3 to 15	The selected PCI IRQ line is assigned to the selected interrupt. You should only select this setting if it is specifically required in the documentation for your PCI module or application.

Assignment of the PCI IRQ lines to the PCI slots.

	PCI Module interrupts in					
PCI IRQ Line	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
1	INT - A	INT -B	INT - A	INT - B	INT - C	INT - D
2	INT - B	INT -C	INT - B	INT - C	INT - D	INT - A
3	INT - C	INT -D	INT - C	INT - D	INT - A	INT - B
4	INT - D	INT -A	INT - D	INT - A	INT - B	INT - C

2.12.3 The Security Menu

Overview

Only system parameters in brackets can be edited. In order to prevent unauthorized use of your PC, you can define two passwords. The supervisor's password prevents the use of the floppy disk drive by any other user.

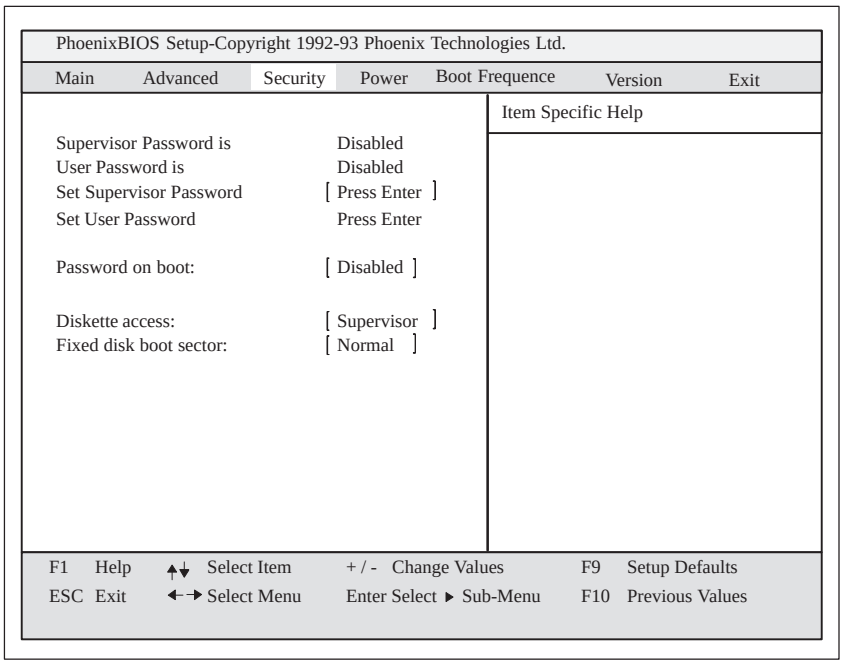


Figure 2-23 Submenu "Security"

Settings

Supervisor Password is	[Disabled] Password is not active [Enabled Password is active. Changes the BIOS Setup can only be made after the password has been entered. A user password can be entered. When the password is entered, the field is automatically switched from [Disabled] to [Enabled] .
User Password is	[Disabled] Password is not active [Enabled] Password is active. BIOS-Setup can only be opened after the password is entered. No changes can be made, except to the user password. When the password is entered, the field is automatically switched from [Disabled] to [Enabled] .
Set Supervisor Password	This field opens the ” Enter Password” dialog box. After the supervisor password has been entered, it can be modified, deleted with the ” Return” key and deactivated.
Set User Password	This field opens the ” Enter Password” dialog box. After the user password has been entered, it can be modified, deleted with the ” Return” key and deactivated.
Password on boot	[Disabled] No password required on booting. [Enabled] Supervisor- oder user-password must be entered on booting.
Fixed disk boot Sector	Normal All types of access to the hard disk are permitted. protected No operating system can be installed. This also provides protections against boot viruses.
Diskette access	This protection is only active, if Password on boot ” is [enabled]. Supervisor: Access to the diskette is only possible if the supervisor password was entered on booting. User Access to the diskette is only possible if the user password was entered on booting.

2.12.4 The Power Menu

Overview

This menu has the following structure:

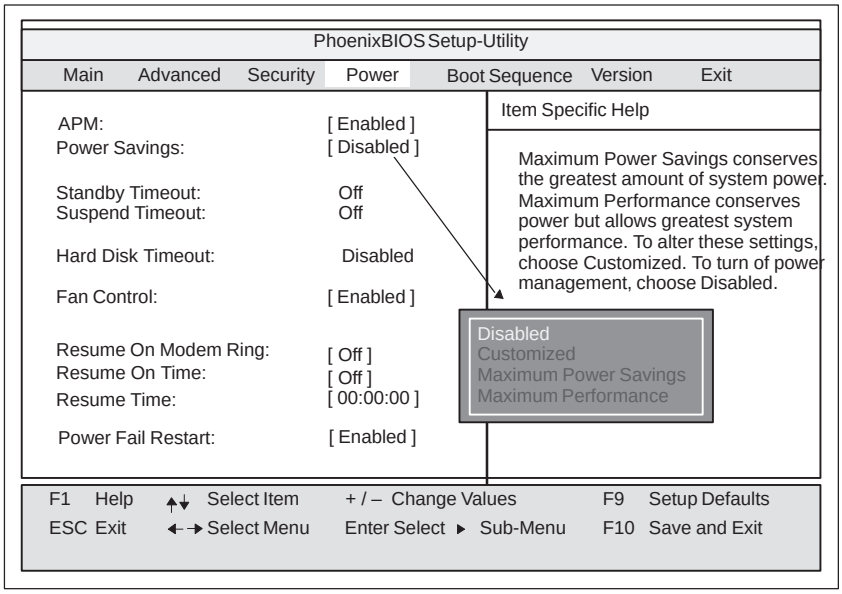


Figure 2-24 “Power” Submenu

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

APM (Advanced Power Management)	[Enabled] [Disabled]	Permits the switching off of system resources not required by the operating system. APM (advanced power management) access not permissible for operating system.
Power Savings	[Disabled] [Customize, Maximum Power Savings, Maximum Performance]	No power saving functions Customized or preset power saving functions by maximum and minimum amounts. The settings for Standby/Suspend Timeout, and Fixed Disk Timeout can be customized or are set accordingly.
Standby Timeout	[Off] [1, 2, 4, 6, 8, 12,] [16]	No standby mode ...minutes after your PC goes to standby mode
Suspend Timeout	[Off] [5, 10, 15, 20, 30] [40, 60]	No suspend mode ...minutes after your PC goes to suspend mode In Suspend Mode the CPU is stopped and can only be restarted by an interrupt: for example keyboard, mouse, Com1/2, Hard Disk.

Hard Disk Timeout	[Disabled]	Hard disks are not switched off.
	[10, 15, 30, 60]	Minutes after which the hard disk drive is switched off, provided it is not being accessed. If you attempt to access the hard disk after it has been switched off, there will be an access delay while the disk is run up again.

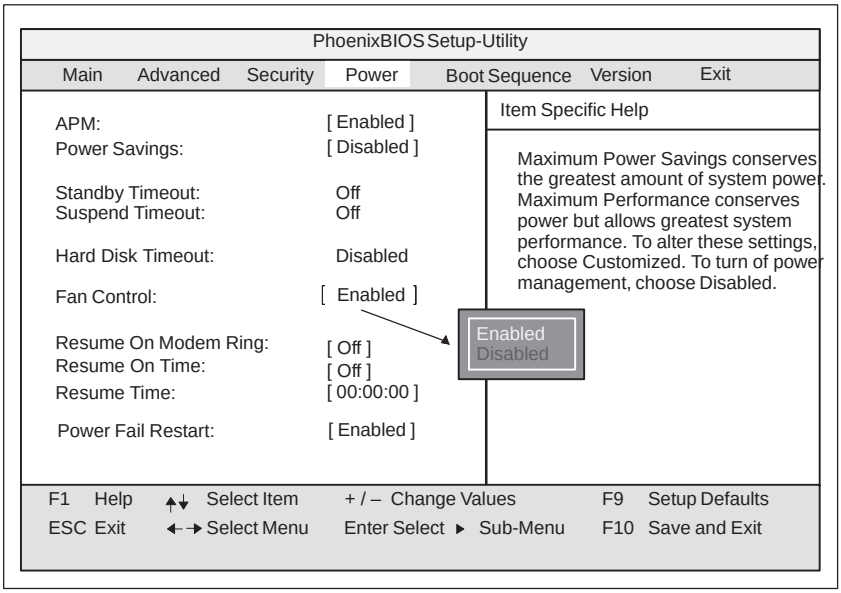


Figure 2-25“Power” Submenu

Fan Control	Enabled	Fan RPM vary according to temperature.
	Disabled	Fan always runs at a high RPM.
Power Fail Restart	Enabled	The device turns itself back on after a power outtage if the device was on at the time.
	Disabled	The device does not turn itself back on after a power outtage.
Resume on Modem Ring	[On]	The “RING” signal allows a modem to be woken up from Suspend Mode.
Resume On Time	[On]	This function allows the PLC to be automatically turned back on at a time entered below.
	[Off]	This function is disabled with Off
Resume Time		Time of automatic startup.

2.12.5 The Boot Sequence Menu

The order in which each bootable device is loaded during a system start (bootup) is set in this menu.

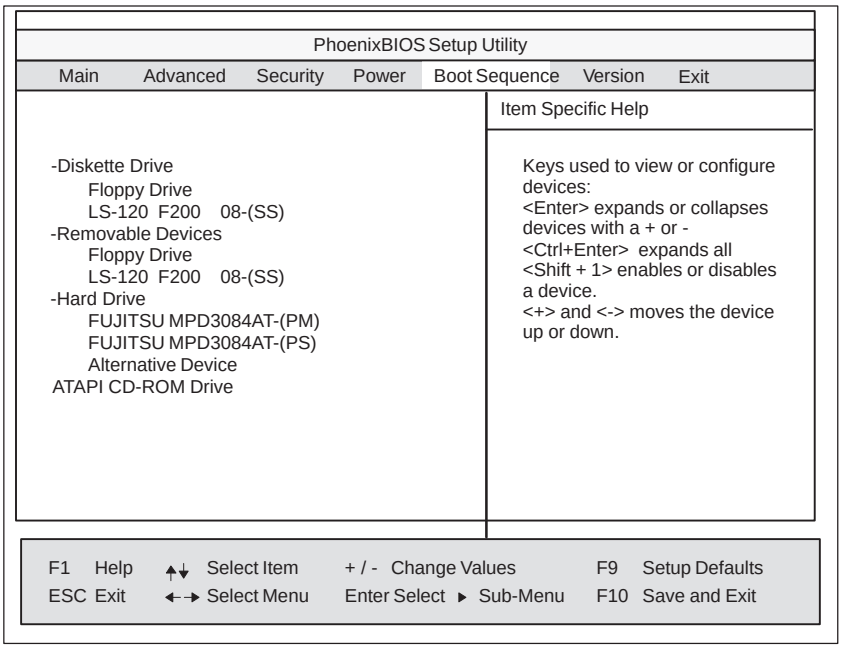


Figure 2-26Menu “Boot Sequence”

Removable Devices	Describes ATAPI drives such as the LS120.

2.12.6 System Version Menu

You should have the information in following menu readily available in case of technical questions about your system.

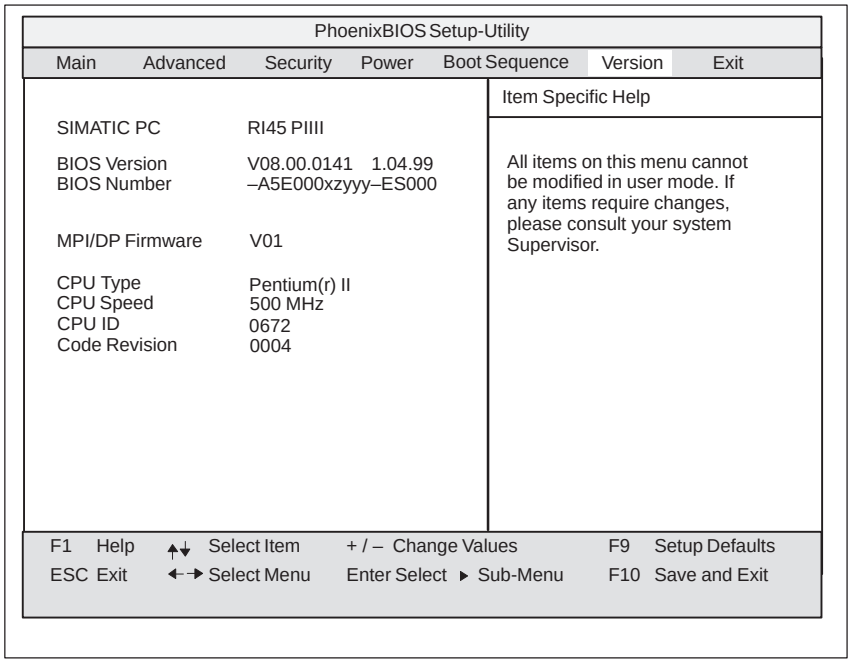


Figure 2-27 “Version” Submenu

2.12.7 The Exit Menu

Summary

The setup program is always terminated using this menu.

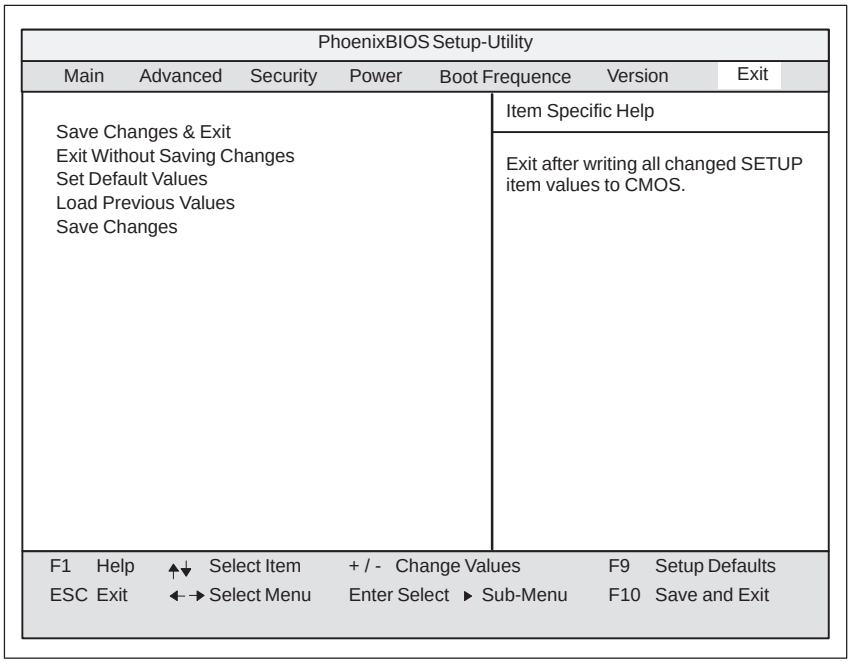


Figure 2-28 “Exit” Submenu

Save Changes & Exit	All changes are saved; a system restart is carried out with the new parameters.
Exit Without Saving Changes	All changes are rejected; a system restart is carried out with the old parameters.
Set Default Values	All parameters are set to safe values.
Load Previous Values	The last saved values are loaded again.
Save Changes	Saves all setup entries.

Documenting your Device Configuration

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

System Parameter	Standard Settings	Your Entries
Diskette A (Rack) Floppy Disk Controller disabled	3.5" , 1,44 MB	
Diskette A (Tower) Floppy Disk Controller disabled	disabled	
Diskette B	Not installed	
Hard Disk 1	Submenu: Autotype Fixed Disk user xxx MB	
Hard Disk 2	Not installed	
Memory Cache	Submenu: Enabled Cache: Enabled	
Memory Shadow	Submenu: Enabled System: Enabled Video Enabled:	
Boot Sequence	A: then C:	
Numlock	On	
RI Hardware Options PCI-MPI/DP Internal COM1: Internal COM2: Internal LPT1: LPT Mode: CRT resolution: CRT 640 x 480: CRT 800 x 600: CRT 1024 x 768: Internal mouse:	**Submenu** Enabled 3F8, IRQ4 2F8, IRQ3 378, IRQ7 output only 75 Hz 75 Hz 75 Hz External	
Advanced ISA IRQ Resource Exclusion PCI IRQ line 1 PCI IRQ line 2 PCI IRQ line 3 PCI IRQ line 4	**Submenu** all available auto select auto select auto select auto select	

2.13 Diagnostic Messages (Port 80)

When the RI 45 PIII is powered up, it runs a self-test (POST = Power On Self Test). If the POST detects a fault, it outputs the sequence of beeps (beep code) assigned for the fault. Each beep code consists of 2 x 2 sequences.

In addition, the individual self-test steps are output at I/O port 80h. The optional SafeCard allows these outputs to be displayed in hexadecimal code at the front of the device.

Conversion table for the beep codes to hexadecimal representation:

Beeps		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	BB	BBB	Beeps
3		6		Hexadecimal code
Check shutdown code				Meaning

The POST Codes in order of occurrence:

Display (hex)	Meaning	Description
02	TP_VERIFY_REAL	Test whether the CPU is in real mode
1C	TP_RESET_PIC	Reset the interrupt controller
12	TP_RESTORE_CRO	Restore the controller register
13	TP_PCI_BM_RESET	Reset the PCI bus master
36	TP_CHK_SUTDOWN	Check the shutdown code
24	TP_SET_HUGE_ES	Switch the ES to special mode
03	TP_DISABLE_NMI	Switch off the NMI
0A	TP_CPU_INIT	Initialize the CPU
04	TP_GET_CPU_TYPE	Determine the CPU type
AE	TP_CLEAR_BOOT	Edit the boot flag
06	TP_HW_INIT	Initialize the main hardware
18	TP_TIMER_INIT	Initialize the timer
08	TP_CS_INIT	Initialize the chip set
C4	TP_PEM_SIZER_INIT	Reset system error
0E	TP_IO_INIT	Initialize IO
0C	TP_CACHE_INIT	Initialize the cache
16	TP_CHECKSUM	EPROM checksum test
28	TP_SIZE_RAM	Determine the RAM size
3A	TP_CACHE_AUTO	Determine the cache size
2A	TP_ZERO_BASE	Set 512k base RAM to 0
2C	TP_ADDR_TEST	Test the base RAM address cables
2E	TP_BASERAML	Check the 1.64k base RAM
38	TP_SYS_SHADOW	BIOS shadow
20	TP_REFRESH	Refresh circuit test
29	TP_PMM_INIT	Initialize the post memory manager
33	TP_PDM_INIT	Initialize the dispatch manager
C1	TP_7xx_INIT	Initialize the PG 7xx I/Os
09	TP_SET_IN_POST	Start power ON self-test
0A	TP_CPU_INIT	Initialize the CPU
0B	TP_CPU_CACHE_ON	Switch on the cache
0F	TP_FDISK_INIT	Initialize the hard disk
10	TP_PM_INIT	Initialize the power management
14	TP_8742_INIT	Initialize the 8742 circuit
1A	TP_DMA_INIT	Initialize the DMA circuits
1C	TP_RESET_PIC	Reset the interrupt controller
32	TP_COMPUTE_SPEED	Determine the clock pulse speed
C1	TP_740_INIT	Initialize the PG 740 I/Os
34	TP_CMOS_TEST	Test the CMOS RAM
3C	TP_ADV_CS_CONFIG	Configure the advanced chip set
42	TP_VECTOR_INIT	Initialize the interrupt vectors
46	TP_COPYRIGHT	Test the copyright
49	TP_PCI_INIT	Initialize the PCI interface
48	TP_CONFIG	Check the configuration

Display (hex)	Meaning	Description
4A	TP_VIDEO	Initialize the video interface
4C	TP_VID_SHADOW	Copy the video BIOS to RAM
24	TP_SET_HUGE_ES	Switch the ES to special mode
22	TP_8742_TEST	Test circuit 8742
52	TP_KB_TEST	Keyboard available?
54	TP_KEY_CLICK	Switch the keyboard click on/off
76	TP_KEYBOARD	Check the keyboard
58	TP_HOT_INT	Test for unexpected interrupts
4B	TP_QUIETBOOT_START	Switch off any boot messages
4E	TP_CR_DISPLAY	Display the copyright notice
50	TP_CPU_DISPLAY	Display the CPU type
5A	TP_DISPLAY_F2	Display the F2 message for “SETUP”
5B	TP_CPU_CACHE_OFF	Switch off the cache if applicable (SETUP setting)
5C	TP_MEMORY_TEST	Test the system memory
60	TP_EXT_MEMORY	Test the extended memory
62	TP_EXT_ADDR	Test the A20 address line
64	TP_USERPATCH1	Test point for own initializations
66	TP_CACHE_ADVNCD	Determine and enable the cache size
68	TP_CACHE_CONFIG	Configure and test the cache
6A	TP_DISP_CACHE	Display the cache configuration
6C	TP_DISP_SHADOWS	Configuration and size of the shadow Display RAM
6E	TP_DISP_NONDISP	Display non-disposable segment
70	TP_ERROR_MSGS	Display post error
72	TP_TEST_CONFIG	Check SETUP irregularities
7C	TP_HW_INTS	Set the IRQ vectors
7E	TP_COPROC	Check whether the CO processor is present
96	TP_CLEAR_HUGE_ES	Switch the ES back
80	TP_IO_BEFORE	Disable IO circuits
88	TP_BIOS_INIT	Initialize the BIOS data area
8A	TP_INIT_EXT_BDA	Initialize the external BIOS data area
85	TP_PCI_PCC	Determine the PCI circuits
82	TP_RS232	Determine the serial interfaces
84	TP_LPT	Determine the parallel interface
86	TP_IO_AFTER	Re-enable the IO circuits
83	TP_FDISK_CFG_IDE_CTRLR	Configure the IDE controller
89	TP_ENABLE_NMI	Enable the NMI
8C	TP_FLOPPY	Initialize the floppy controller
90	TP_FDISK	Initialize the hard disk controller
8B	TP_MOUSE	Test the internal mouse interface
95	TP_CD	Test the CP
92	TP_USERPATCH2	Area for own initializations
98	TP_ROM_SCAN	Search for BIOS expansions
69	TP_PM_SETUP	Initialize the power management
9E	TP_IRQS	Enable the hardware IRQ

Display (hex)	Meaning	Description
A0	TP_TIME_OF_DAY	Set the clock time and date
A2	TP_KEYLOCK_TEST	Preset the keylock
C2	TP_PEM_LOCK	Stop the error manager
C3	TP_PEM_DISPLAY	Display any possible errors
A8	TP_ERASE_F2	Delete the F2 message
AA	TP_SCAN_FOR_F2	Check whether to activate setup
AC	TP_SETUP_CHEK	Output any F1/F2 message
AE	TP_CLEAR_BOOT	Cancel the self-test flag
B0	TP_ERROR_CHECK	Check for any possible errors
B2	TP_POST_DONE	End of the self-test
BE	TP_CLEAR_SCREEN	Clear the screen
B6	TP_PASSWORD	Password query (option)
BC	TP_PARITY	Cancel the parity memory bit
BD	TP_BOOT_MENU	Display the boot menu (option)
B9	TP_PREPARE_BOOT	Prepare the boot
C0	TP_INT19	Boot via Interrupt 19
00		Message after startup is complete

Bus Board/Operator Panel/Sound Module 3

Chapter Overview

3.1 Technical Specifications

Slots	3 AT slots 1 shared ISA / PCI 5 PCI slots
Ambient temperature during operation	max. 60 °C
Dimensions	L x W 226 x 173 mm
Module ID on component side	BBG-4 ISA / 7 PCI (Spare part order no. ASE00030046)

3.2 Installation and Functional Specifications

The bus board is a passive connecting element between the mother board and the expansion board with a sandwich structure. It is mounted on top of the mother board by five screws. The connection to the mother board is established by a 198-pin connector.

There are two PCI busses on the module which are separated by a PCI / PCI bridge. Slots 1 and 2 are connected to the primary PCI bus. and slots 3 to 6 to the secondary PCI bus. Slot 7 cannot be used on the RI 45 PIII.

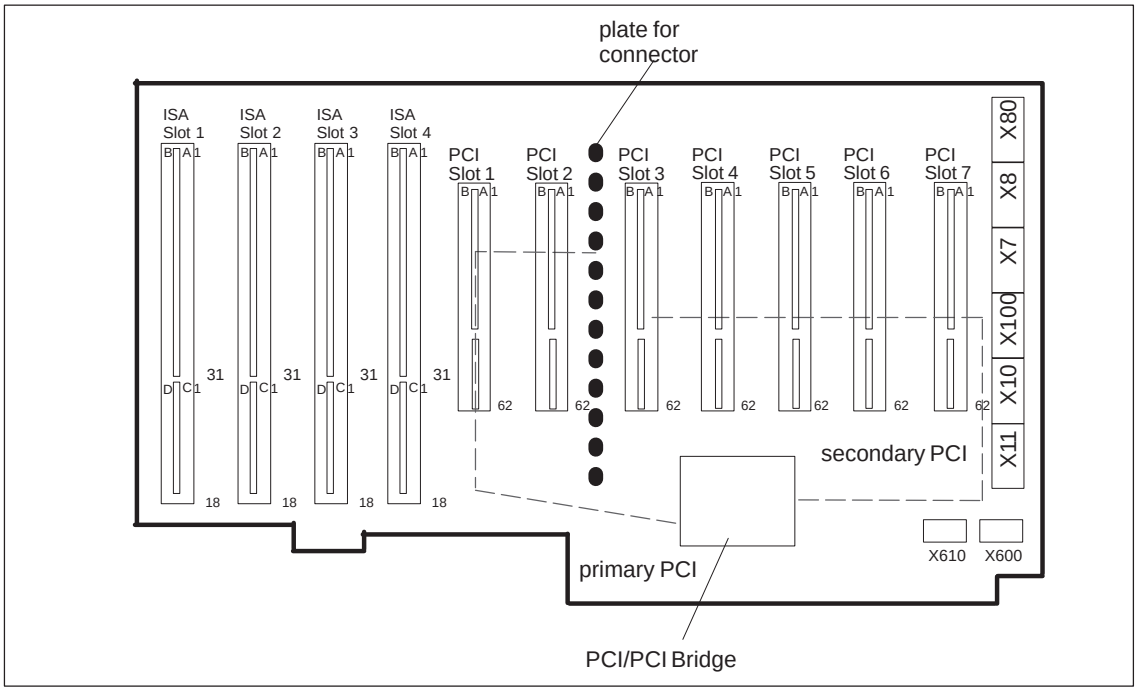


Figure 3-1 Connector Positions on the BBG-6ISA/3PCI bus board

3.2.1 Power Supply Connection

Input 6-pin power plug type Molex 8619 coded for AT power supply.

Output 6-pin power plug type Molex 8619 coded for AT power supply.

Plug Connector X10, X100

Pin	Description
1	GND
2	GND
3	GND
4	+ 3.3V
5	+ 3.3V
6	+ 3.3V coding

Plug Connector X7, X11

Pin	Description
1	+ 5V
2	+ 5V
3	+ 5V
4	GND
5	GND coded
6	GND

Plug Connector X8, X80

Pin	Description
1	PWRGD-IN
2	+ 5V
3	+ 12V
4	– 12 V coded
5	GND
6	GND

3.3 RI 45 PIII Operator Panel

The operator panel of the IPC RI 45 is connected to the mother board via an 12-pin connection cable.

The operator panel features

- **2 LEDs**

  Single LED green, red, yellow, 5 x 2.5 mm rectangular

- **Reset switch**

  1-pin push button

- **Speaker**

  Miniature speaker designed for mounting on a printed-circuit board.

- **12-pin socket connector**

Pin Assignment RI25 PIII Operator Panel

x1	Assignment
1	Ground
2	Reset
3	MPI
4	–
5	RP5V dual LED green
6	HD
7	Standby LED green
8	Speaker
9	Watchdog LED green
10	Watchdog LED red
11	Temperature LED green
12	Temperature LED red

3.4 Sound Card Module

This module accepts the following connections:

- Microphones with an impedance of less than 600Ω
- Active stereo loudspeakers or headphones with an impedance greater than 30Ω

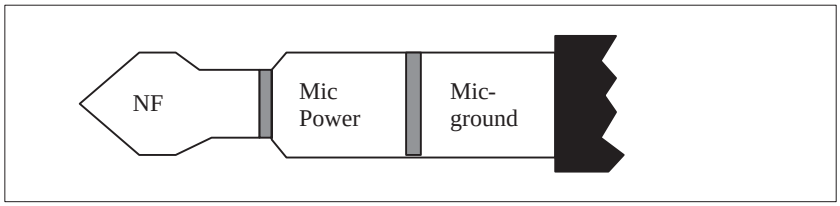


Figure 3-2 Appropriate 3.5 mm Audio Plug for Active Microphone

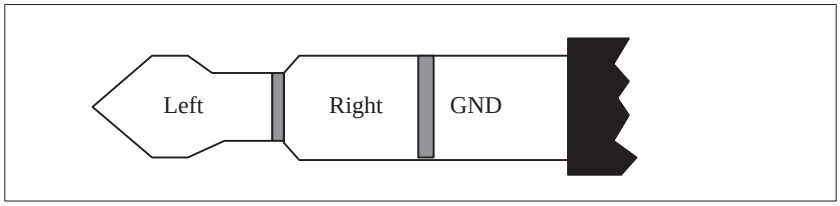


Figure 3-3 Appropriate 3.5 mm Plug for Loudspeakers

CD-ROM Drive

4

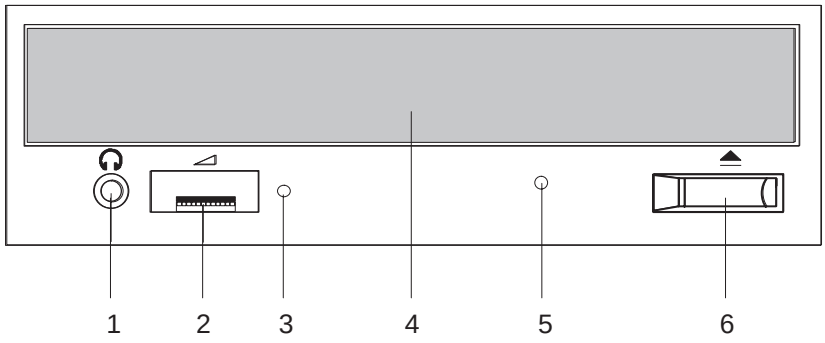
Chapter Overview

Section	Description	Page
4.1	How the CD-ROM Drive Works	4-2

4.1 How the CD-ROM Drive Works

The CD-ROM drive is connected to the secondary IDE interface.

Part Names and Functions



1 Phones Jack — This jack is used to connect a set of headphones. Please use headphones with a stereo mini-jack plug.

2 Volume Control — This control is used to adjust the headphone volume. This control has no effect on the left and right audio outputs from the LINE OUT connector on the back of the unit.

3 BUSY Indicator — This indicator lights while data is being read.

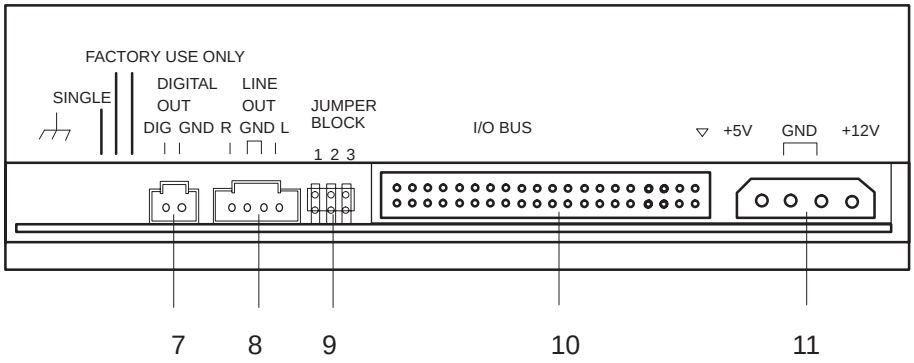
4 Drawer — This drawer prevents dust from getting inside the CD-ROM reader and should not be left open. If your device is not switched on you can manually push the tray and close the door of your CD-ROM drive.

5 Emergency Eject Hole — Use a clip or any other device to remove the cartridge from the CD-ROM reader if the electrical eject is disabled by software or if power failure occurs (See ”Emergency Eject” for details).

6 Open / Close Button — This button is pressed to open or close the CD tray when the power of your device is on.

Rear of the Drive, Configuration

The drive is configured as a Single. If you want to operate a second drive on this bus, you have to set either one of them as Master and the other as Slave or vice versa.



7 DIGITAL OUT Connector

Connect a cable to this output to transfer Digital Audio data to appropriate audio devices.

8 Line Out Connector

Connect a cable to this output to transfer analog Audio data.

9 Jumper Block B

This block of jumper locations sets the configuration for the CD-ROM drive. These plug-in jumpers are used to configure the CD-ROM drive.

10 I/O-Bus Connector

This BUS connector is used to connect a data/control line. Use a flat ribbon cable to connect your CD-ROM drive to the IDE controller.

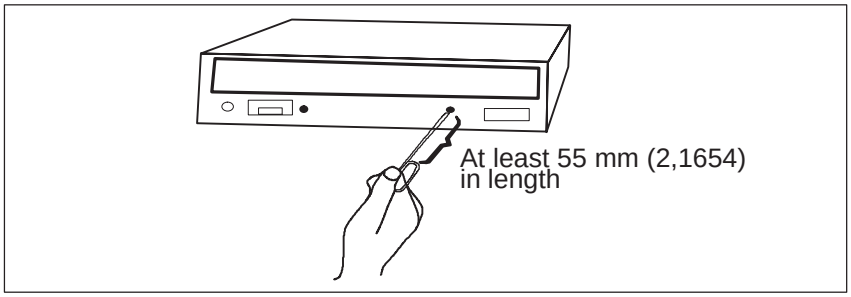
11 Power Connector

Connect the power supply cable to this connector.

Emergency Eject

The procedure described below can be used to remove a disc from the CD-ROM reader if the Open/Close button is disabled by software or a power failure occurs. In this case the CD tray cannot be opened automatically.

1. Turn off the power to the CD-ROM reader (switch off your device if necessary).
2. Insert a steel rod or a stiff paper clip (with a maximum diameter of 1.3 mm and a minimum length of 55 mm) into the emergency eject hole at the front of the drive and push lightly. The CD tray is ejected by about 10 mm. Pull it all the way open by hand and lift the disc out carefully.



Operating your CD-ROM drive

By pushing the Open/Close button the CD tray is smoothly opened. Place the CD with the labeled side upward into the tray. Do not use the built-in clips. The tray is closed automatically after a short push or after having pushed the Open/Close button.

Caution

Risk of data loss and damage to the drive!

CD-ROM drives are sensitive to vibrations and shock. Any vibrations occuring during operation can lead to damage to the drive or CD.

Additional Slots

The PC is equipped with additional slots for disk drives and expansion modules. For further information refer to Chapter 4 of the manual.

Power Supply

5

Chapter Overview

5.1 Technical Specifications

Voltage

Voltage	Max. Current	Voltage Stability
+ 12 V	8.0 A	± 4 %
– 12 V	0.5 A	± 6 %
+ 5 V	20 A	± 3 %
– 5 V	0.5 A	± 5 %
+ 3.3 V	10.0 A	± 5 %

Voltage

Input voltage	120/240 VAC, ± ×10 %
Frequency	47 to 63 Hz
Power consumption	≤ 320 Watt
Jumpering on power failure	20 ms at 175 W
Output power	220 VDC to T_U = 32C / 180 VDC to T_U = 45°C
Degree of protection	IP20
Protection class	VDE 0106
Certification	EN 60950/IEC 950, UL

Power-Good Signal

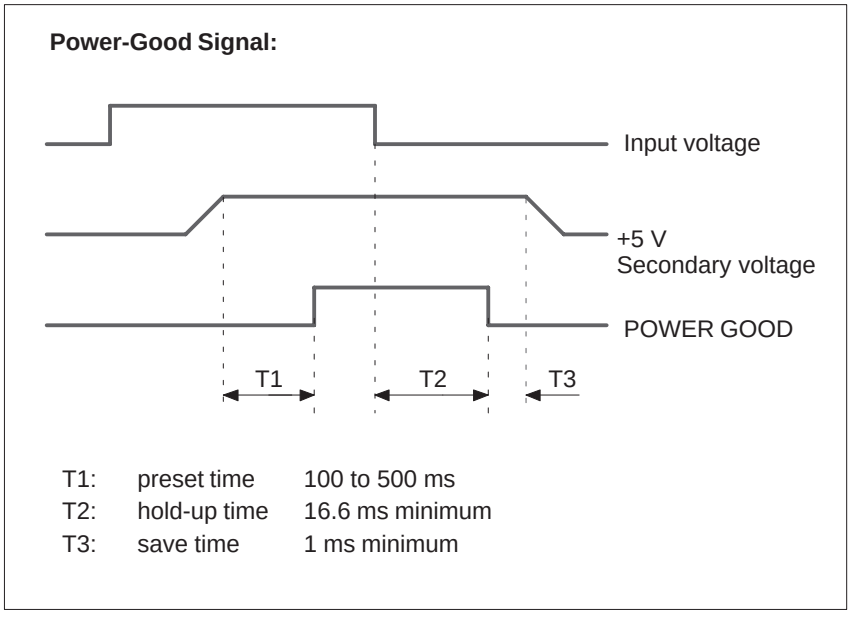


Figure 5-1 Time Characteristics of the Power-Good Signal

Connecting Cables

6

Chapter Overview

Section	Description	Page
6.1	Connecting Cables	6-2

6.1 Connecting Cables

Overview

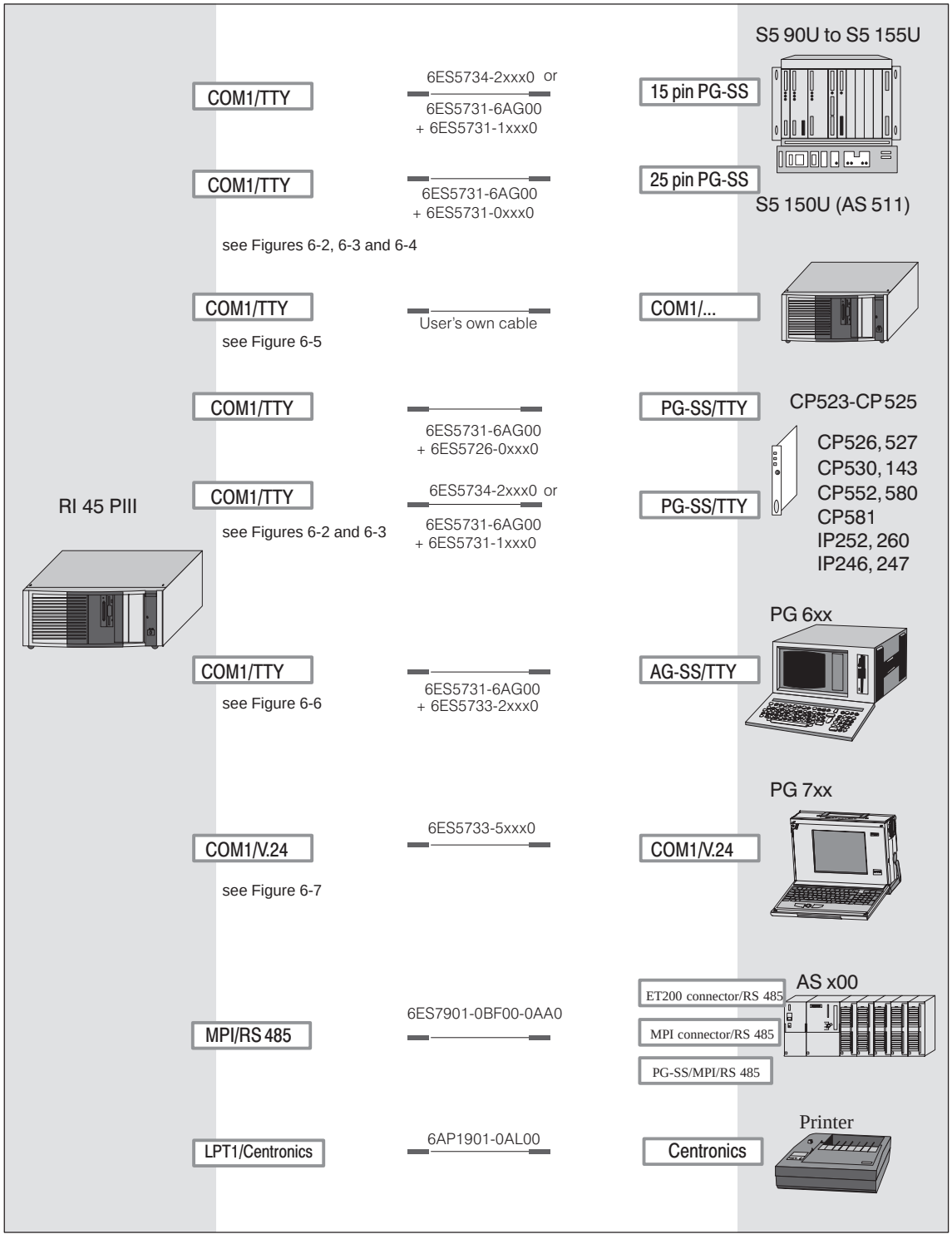


Figure 6-1 Connecting Cables

RI - PLC Standard Connection

You can use the standard connecting cable to connect your device to a Siemens programmable controller. Please read the notes in Section 1.3.

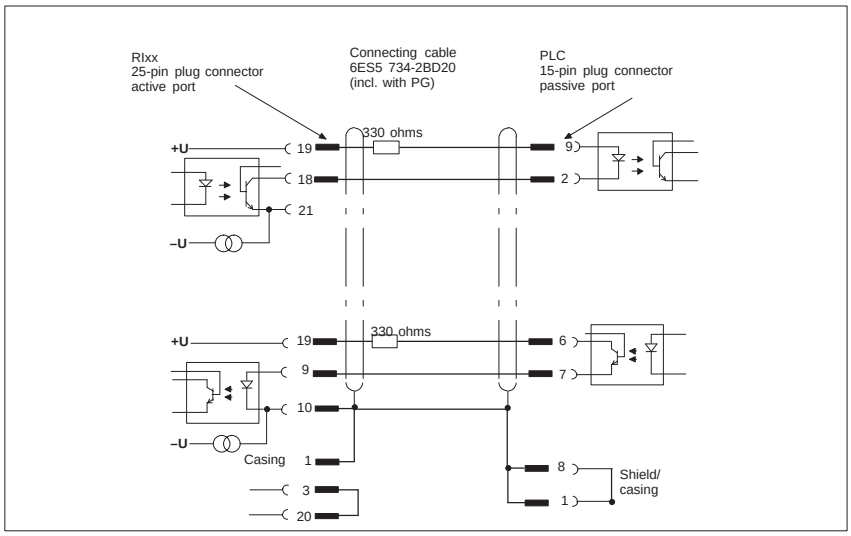


Figure 6-2 RIxx - PLC Standard Connection

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

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

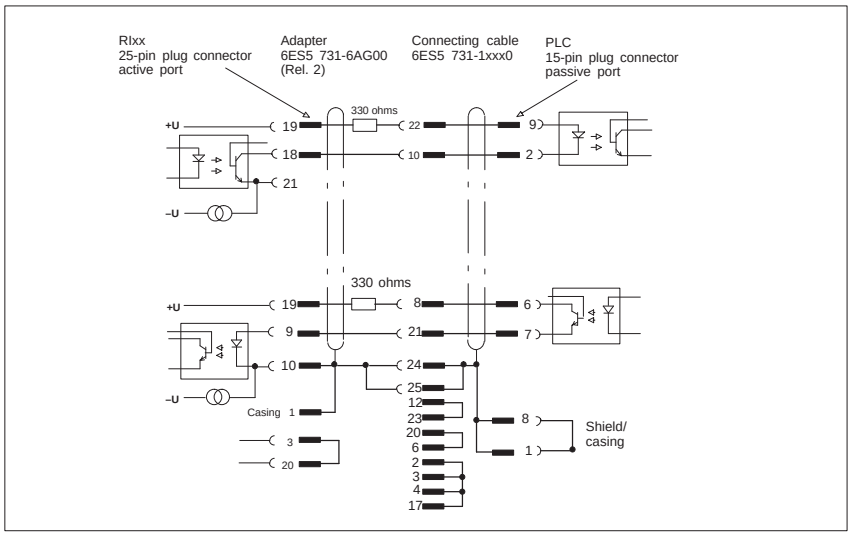


Figure 6-3 RIxx-PLC Connection to PG 6xx 15-pin Connecting Cable

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

With the 25-pin plug connecting cable, you can connect your device via an adapter to a PLC, for example S5-150U (AS 511).

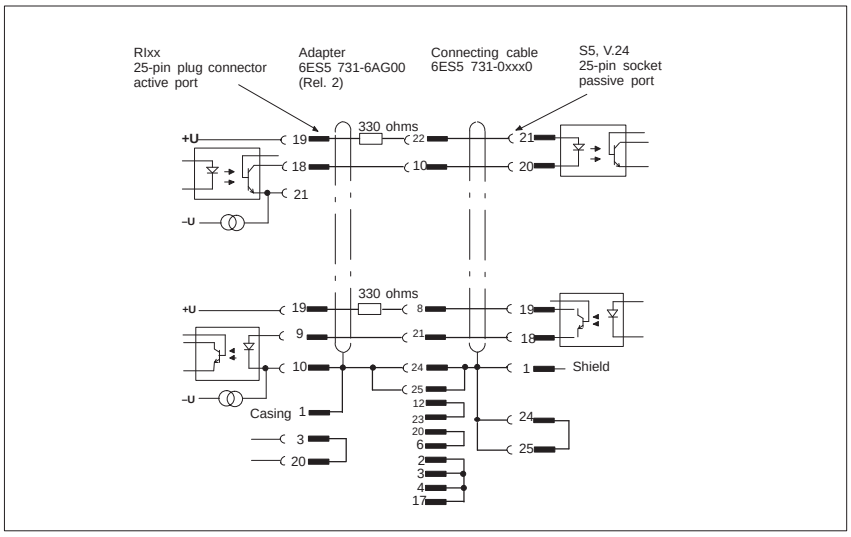


Figure 6-4 RIxx - PLC Connection via PG 6xx Connecting Cable with 25-pin Socket Connector

Cable for Interconnecting Programming Devices

You can connect your device to programming devices via the TTY/COM 1 interface with this cable. This cable does not have an order number. Please read the notes in Section 1.3.11.

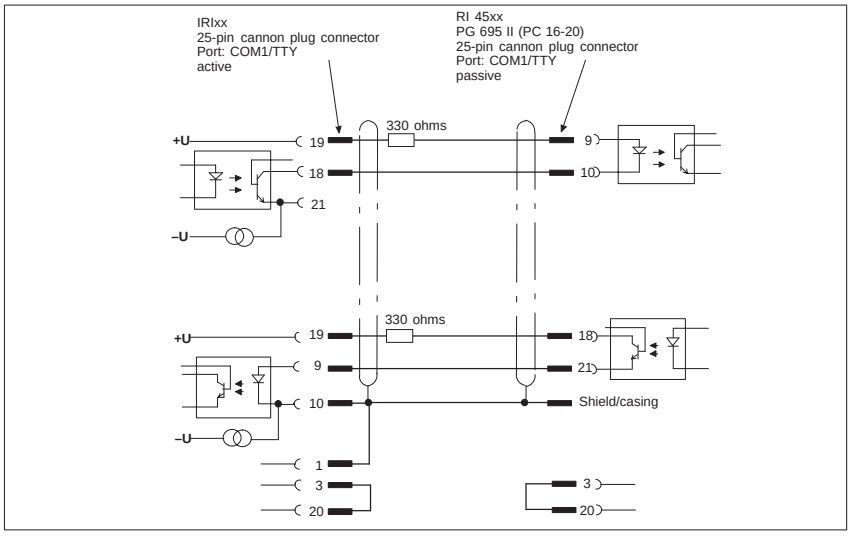


Figure 6-5 Cable for Interconnecting Programming Devices

RIxx - PG 6xx Connection to PLC-S5 Port

If you want to connect your device to the PLC-S5 port of a PG 6xx programming device, you will need an adapter. In this case, the RI must be switched to active. Please read the notes on changing over the TTY/COM 1 port to active in Section 1.3.

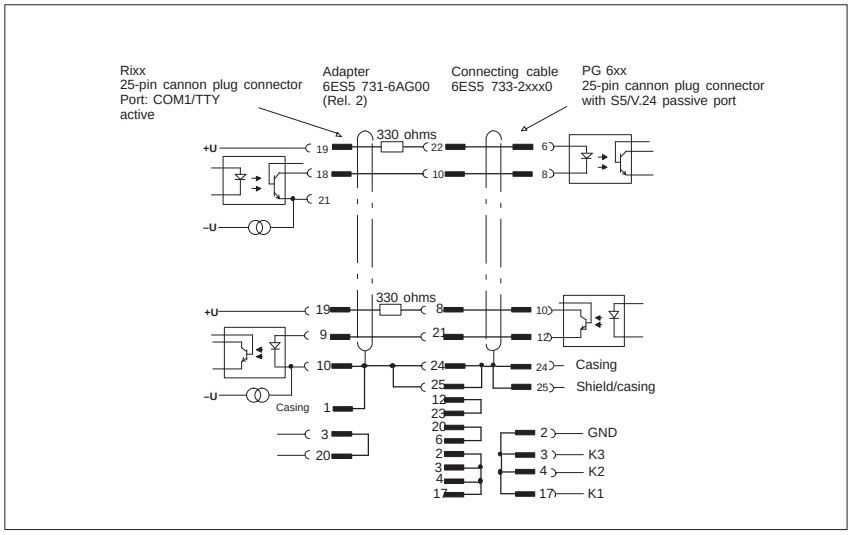


Figure 6-6 RIxx - PG 6xx Connection to PLC-S5 Port

RIxx - PG 7xx Connection in V.24 Operation

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

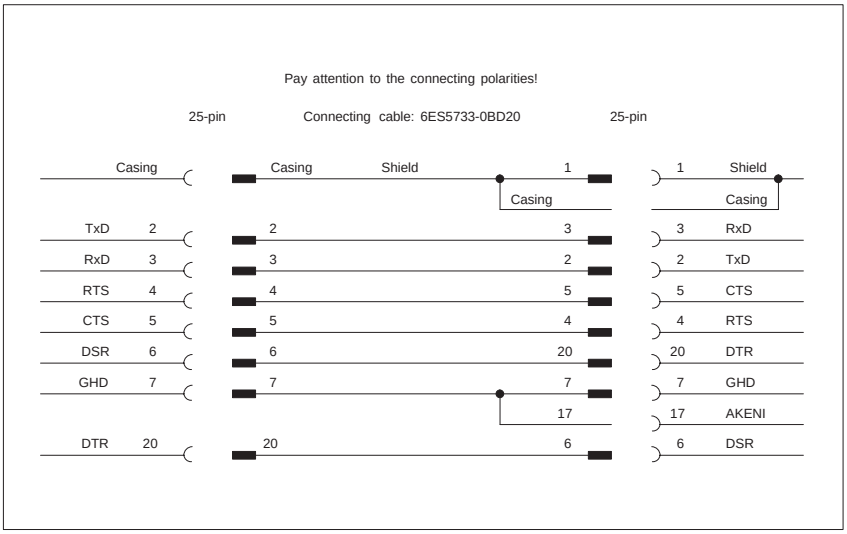


Figure 6-7 RIxx - PG 7xx Connection in V.24 Operation

SCSI Option

7

Chapter Overview

7.1 Overview

SCSI stands for **S**mall **C**omputer **S**ystem **I**nterface.

The SCSI controller (host adapter) acts as an interface between the internal bus (PCI bus) and devices with an SCSI interface, called SCSI devices in the rest of this document.

Every SCSI device, including the SCSI controller, has an SCSI bus address which is its ID. Each ID is unique to that particular device. This description tells you how to set up and display IDs.

The SCSI controller is a PCI module which uses PCI bus master technology. This means that the controller can transfer data to and from the PC's working memory to the SCSI device quickly and without any help from the CPU (Central Processing Unit).

Your SCSI device documentation tells you how to install and operate your SCSI device.

7.1.1 Setting SCSI Addresses (IDs)

Each SCSI device that is connected to the SCSI controller must be given its own address (ID 0 to ID 15).

The SCSI controller supports standard SCSI and ultrawide SCSI. With standard SCSI, devices with ID 0 to ID 7 can be connected; with ultrawide SCSI, devices with ID 0 to 15 can be connected. ID 15 has the highest priority. The controller itself has ID 7, so it can support both types of SCSI.

- Make sure that each SCSI device has its own unique SCSI ID.

More details about setting the SCSI address are contained in your SCSI device documentation.

7.1.2 Connecting SCSI Devices

SCSI devices and the SCSI controller are connected via a common bus (SCSI bus).

Termination (terminal resistance) must be enabled (or installed) on the SCSI devices connected at the ends of the SCSI cable. Termination must be disabled (or removed) on all other SCSI devices.

Your SCSI device documentation tells you how to enable or disable termination on SCSI devices that have been added on later.

- Make sure that termination is properly installed.
- Connect the devices via the SCSI cable to the SCSI connector on the system module.
- The SCSI controller terminator must be disabled when you connect devices with the external SCSI bus.

Caution

Only SCSI devices with a single ended interface may be connected to the SCSI controller. Most SCSI devices meet this requirement. Contact your supplier or our customer service staff if in doubt.

Connectors and Cables

The integrated SCSI controller has the following connectors.

- Internal 16-bit 68-pin connector socket (UW SCSI bus)
- Internal 8-bit 50-pin connector plug (U SCSI bus)
- 4-pin LED connection plug
- External 16-bit 68-pin connector socket (UW SCSI bus)

Only two of the controller's SCSI connections may be assigned at the one time.

The integrated hard disk is connected at the internal 16–bit connector.

Read "Connecting Other SCSI Devices" for more information on expanding the system.

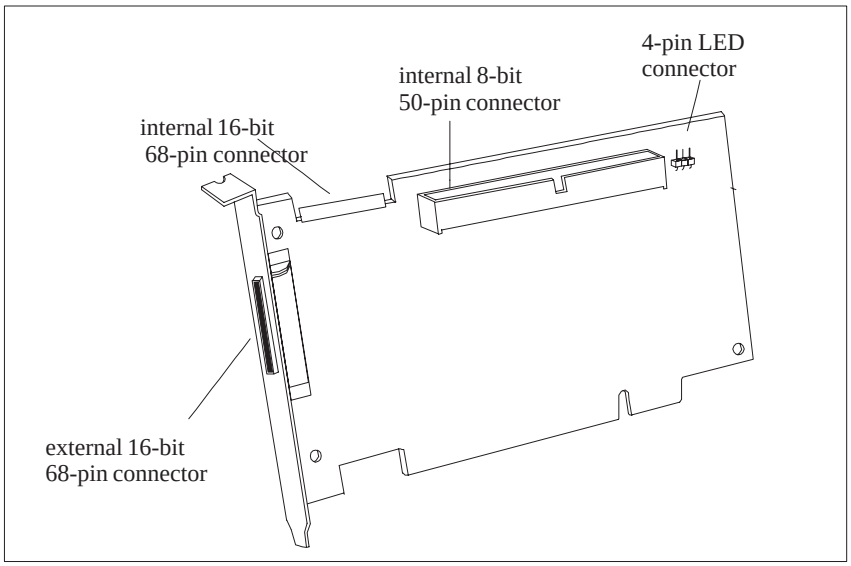


Figure 7-1

8-bit SCSI devices have a 50-pin connector, and 16-bit SCSI devices have a 68-pin connector.

You need an adapter (68-pin to 50-pin) if you want to connect 8-bit SCSI devices to the SCSI controller.

If you are operating an 8-bit SCSI device as the final device on the SCSI cable you need an adapter (68-pin to 50-pin) with high-byte termination.

Caution

Use top-quality SCSI cables only as otherwise you may have problems transferring data.

7.2 SCSI Setup

The BIOS of the SCSI controller contains an *SCSI Setup* program controlled by menu commands. This program allows you to select settings for the SCSI controller and SCSI devices connected to it.

When the system starts up, an SCSI BIOS message appears with a list of the SCSI devices connected.

Note

If an SCSI BIOS error message appears or problems with SCSI devices occur, read the ”Trouble with the SCSI Controller” and ”SCSI BIOS Messages” sections.

7.2.1 Starting SCSI Setup

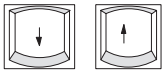
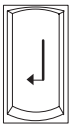
- Start the device and press the key combination Ctrl and A when the following message appears on your screen:

  ```
  Press <Ctrl> <A> for SCSI Select (TM) Utility!
  ```

The first menu of *SCSI-Setup, Configure/View Host Adapter Settings* and *SCSI Disk Utilities* is displayed.

Using Keyboard Commands

Use the following keys to operate the program:

	to select an entry
	to confirm a selection
	to call the previous menu and exit *SCSI Setup*.
	to restore default settings
	to toggle between black+white and color display

Note also the status bar at the bottom margin of the screen.

7.2.2 Exiting SCSI Setup

When you press the ESC key, the previous menu from the current menu level is displayed. If you have made changes in the current menu, you will be asked if you want to save the changes you have made.

- Repeatedly press the ESC key until you have reached the first menu level (*Configure/View Host Adapter Settings*).
- Press the ESC key in the first menu and follow subsequent screen prompts to exit SCSI Setup.

7.2.3 SCSI Setup Default Settings

SCSI-Bus Interface Definitions	**Default Setting**
Host Adapter SCSI ID	7
SCSI Parity Checking	Enabled
Host Adapter SCSI Termination	LowON/HighON
Additional Options	**Default Setting**
Boot device Options	
Boot Target ID	0
Boot LUN Number*	0
SCSI Device Configuration (for each SCSI device)	
SCSI Device ID	1 to 15
Initiate Sync Negotiation	Yes
Maximum Sync Transfer Rate	40 Mbyte/s
Enable Disconnection	Yes
Initiate Wide Negotiation	Yes
Send Start Unit Command**	No
Multiple LUN Support**	No
Include in BIOS Scan	Yes
Advanced Configuration Options	
Plug and Play SCAM Support	Disabled
Reset SCSI Bus at IC Initialization	Enabled
Extended BIOS Translation for DOS Drives > 1 Gbyte**	Enabled
Host Adapter BIOS	Enabled
Support Removable Disk Under BIOS as Fixed Disks**	Boot only
Display Ctrl + A message During BIOS Initialization**	Enabled
BIOS Support for Bootable CD-ROM**	Enabled
BIOS Support for Int 13 Extensions**	Enabled

* The setting is only effective if *Multiple LUN Support* is active (*Enabled*).

** The setting is only effective if the BIOS of the SCSI controller is active (*Enabled*).

7.3 Meaning of the Setup Parameters

7.3.1 SCSI Bus Interface Definitions

Host Adapter SCSI ID

All SCSI devices connected to an SCSI bus, including the SCSI controller, must have different SCSI addresses.

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15

The SCSI controller is set to the displayed SCSI address (default entry: 7)

SCSI Parity Checking

The SCSI controller uses default parity checking on the SCSI bus for monitoring data transfer. Older SCSI devices may not support parity checking. If this is the case, you must disable this option.

Enabled Parity checking is activated (default setting)

Disabled Parity checking is deactivated.

Note

If parity checking is disabled, this applies to all devices connected to the SCSI bu

---

Host Adapter SCSI Termination

If the Ultra Wide SCSI controller is the final device on the SCSI cable, termination must be enabled. If the Ultra Wide SCSI controller is not the final device on the SCSI cable, termination must be disabled.

Automatic Host adapter is terminated automatically

LowON/HighON Termination is enabled (default setting)

LowOFF/HighOFF Termination is disabled.

7.3.2 Additional Options: Boot Device Options

Boot Target ID

The Ultra Wide SCSI controller can start the operating system from a drive with any SCSI address (ID). The selected SCSI ID must match the one configured on the drive.

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15

The Ultra Wide SCSI controller boots from the drive with the SCSI ID that is displayed (default setting: 0).

Boot LUN Number

If your startup drive has several LUNs (Logical Unit Numbers) and the *Multiple LUN Support* function is enabled, you can select which LUN you want to use as the boot drive.

0, 1, 2, 3, 4, 5, 6, 7

The SCSI controller boots with the LUN that is displayed (default setting: 0)

7.3.3 SCSI Device Configuration

SCSI Device ID

This row contains the SCSI device IDs (0-15)

Initiate Sync Negotiation

SCSI devices, including the SCSI controller, communicate with each other via a common SCSI bus. Before data are sent via the SCSI bus, the SCSI controller and the connected SCSI devices negotiate and agree on the transmission rate and number of data packages to be sent in a specific space of time.

If you have operating problems with older SCSI devices, you should disable *Initiate Sync Negotiation*. You may have to change some settings on your SCSI devices (read your SCSI device documentation).

Even if the *Sync Negotiation* function is disabled, the SCSI controller switches automatically to fast synchronous mode if requested to do so by an SCSI device. However, it can also exchange data with slow SCSI devices.

Yes The function is enabled (default setting).

No The function is disabled.

Note

Synchronous data transmission is required for fast and ultra SCSI operations.

Initiate Wide Negotiation

When *Initiate Wide Negotiation* is set, the SCSI controller uses fast 6-bit data transfer (wide SCSI) instead of the slower 8-bit data transfer.

Disable *Initiate Wide Negotiation* only if you are not using wide SCSI devices or if there are operating problems with 8-bit SCSI devices. You may have to change some settings on your SCSI devices (read your SCSI device documentation).

Fast SCSI devices, including the SCSI controller, can cope with data transmission rates to and from the SCSI bus of up to 40 Mbytes/s.

Yes The function is enabled (default setting).

No The function is disabled.

Maximum Sync Transfer Rate

Fast SCSI devices (Ultra Wide) including the SCSI controller, support a data transfer rate on the SCSI bus of up to 40 Mbytes/s with synchronous data transfer. If you select *Enabled* in the *Support for Ultra SCSI Speed* menu option, a transfer rate of 40 Mbytes/s is set automatically.

Enable Disconnection

This function allows SCSI devices to release the SCSI bus while a command is being carried out. A typical example for use of this function is a tape drive that does not need to access the SCSI bus while being rewound and can be disconnected from the SCSI bus during this process.

You can disable the function if you have only one SCSI device connected. In this case, disabling will improve performance.

Yes The function is enabled (default setting).

No The function is disabled.

Send Start Unit Command

If this function is enabled, SCSI devices supporting this function will not be started until you receive the Start Unit Command from the SCSI BIOS. In this way the SCSI devices can be switched on one after the other. This function is used if the power supply to your system is not sufficient to start a number of drives at the same time or in order to avoid peak turn-on currents.

You may have to change the settings on your SCSI devices so that this function is supported (read your SCSI device documentation).

Yes The function is enabled.

No The function is disabled.

Multiple LUN Support

You use this setting to decide whether an SCSI device with multiple LUNs (Logical Unit Numbers) can or cannot be used as a start drive.

Enabled The SCSI device is used as start drive.

Disabled The SCSI device is not used as start drive (default setting).

Include BIOS Scan

If this function is enabled, the SCSI device can be used as a boot drive. The SCSI device is contacted by the SCSI BIOS and receives a drive name. A message is displayed on the screen.

Yes The SCSI device can be a boot drive and is given a drive name (default setting).

No The SCSI device is not contacted by the SCSI BIOS.

Note

In the case of drives which you know will never be used as a boot drive (DAT drive, for example), you should set this function to No. This saves time when starting the system.

7.3.4 Advanced Configuration Options

Plug and Play SCAM Support

You can use this setting to specify whether or not the ID management at the SCSI bus is to be carried out automatically by the host controller. (SCSI Configured Automatically protocol (SCAM))

Disabled No automatic ID management (default setting).

Enabled The SCSI controller sends SCAM commands. Most devices without SCAM capabilities tolerate SCAM commands. If problems should arise, reset to Disabled.

Reset SCSI Bus at IC

If you have enabled this menu option, the SCSI bus is reset.

Enabled SCSI bus is reset (default setting).

Disabled SCSI bus is not reset.

Extended BIOS Translation for DOS Drives > 1Gbyte

When this function is enabled, you can operate drives of up to 8 Gbyte capacity (2 Gbytes per partition) under MS-DOS 5.0 or a later version. The SCSI BIOS must be enabled for this purpose.

Formerly, only drives with a capacity of up to 1 Gbyte could be operated under DOS 5.0.

Enabled Drives of up to 8 Gbytes can be operated under MS-DOS 5.0 (default setting).

Disabled Drives of up to 1 Gbyte can be operated under MS-DOS 5.0.

Note

Save the data on your hard disk before you change the default setting. After switching on you must repartition and format the hard disk with the MS-DOS programs *FDISK* and *FORMAT.*

Host Adapter BIOS

If the SCSI devices can only be operated using additionally loaded drivers, you can disable the SCSI-BIOS. This saves 16 Kbytes of system memory and saves time starting the system.

Warning

If the SCSI BIOS is disabled, you cannot boot up from the SCSI devices connected to the SCSI bus.

If you disable the SCSI BIOS, you can still call *SCSI Setup* using the Ctrl + A keys when starting the system and make changes.

Enabled The SCSI BIOS is activated (default setting).

Disabled The SCSI-BIOS is deactivated.

Note

Remember that you must install special SCSI drivers for your SCSI devices if you disable the SCSI BIOS.

Support Removable Disks under BIOS as Fixed Disks

If you enable this function, you can treat removable disk drives such as MO drives just like fixed disk drives without having to install additional software.

Boot Only Only the selected boot removable disk drive is treated like a fixed disk drive (default setting).

Alls Disks All removable disk drives supported by the BIOS are treated as fixed disk drives.

Disabled No removable disk drive is treated as a hard disk drive. You need special drivers for the removable disk drives as they are not supported by the BIOS.

Caution

When using this function you may not remove the disk from the removable disk drive while the server is on.

Display Ctrl + A Message During BIOS Initialization

This setting determines whether the message

```
Press <Ctrl> <A> for SCSISelect (TM) Utility!
```

appears when you power up the system.

Even if you disable display of this message, you can still call *SCSI Setup* using the Ctrl + A key combination when starting the system.

Enabled The message is displayed when powering up (default setting).

Disabled The message is not displayed when powering up.

BIOS Support for Bootable CD-ROM

This setting enables booting from a bootable CD-ROM

Enabled Booting from a CD-ROM is possible (default setting).

Disabled Booting from a CD-ROM is not possible.

BIOS Support for Int 13 Extensions

This setting determines whether the SCSI BIOS supports a hard disk drive with more than 1024 cylinders. *Enabled* is the default setting.

Enabled Hard disk drives with more than 1024 cylinders are supported (default setting).

Disabled Hard disk drives with more than 1024 cylinders are not supported.

7.3.5 SCSI Disk Utilities

If you call the menu item *SCSI Disk Utilities*, you obtain a list of all devices connected to the SCSI bus. You also get to select from two menus for hard disk drives: *Verify* and *Format Disk*.

Verify

You can use *Verify* to verify a selected hard disk drive. All defects thus identified are entered in the hard disk's existing error list.

Format Disk

You can use *Format Disk* to format a selected hard disk drive in low-level format. Hard disks are usually already formatted in low-level format. Use this menu item only if you want to delete the entire hard disk and create a new error list.

7.4 Connecting Other SCSI Devices

7.4.1 Notes

The cable supplied with the product has 3 UW SCSI connections. The cable end is plugged into the integrated SCSI drive.

The controller and the cable are terminated. If you want to connect up other devices, observe the general information in Section 7.1.2.

You can connect up another two SCSI devices internally. Possible expansions:

Number: Internal	Type	ID-Range 2)	Number: External	Type 1)	ID-Range 2)
1	UW	0-15	14	UW	0-15
2	UW	0-15	13	UW	0-15
3	UW	0-15	12	UW	0-15
1	UW	0-15	7	W	0-6
2	UW	0-15	7	W	0-6
3	UW	0-15	7	W	0-6

1) UW means 16-bit SCSI, W means 8-bit SCSI

2) ID 7 is intended for the SCSI controller

The customer is responsible for determining the extent to which the connection of external SCSI devices is compatible with the device. Devices with FCC, UL and CE labeling should be connected.

7.4.2 Terminating the AHA-2940 Ultra Wide

Termination on the AHA-2940Ultra Wide itself is controlled by software comands via the SCSISelect utility. The default setting is set to Automatic. When set to Automatic, if the AHA-2940Ultra Wide detects that SCSI cables are connected to any of its three SCSI connectors, it automatically sets the termination setting for the low and high bytes of the 16-bit Wide SCSI bus. The low byte controls 8-bit SCSI; the low and high bytes together control 16-bit Wide SCSI.

We recommended that you leave the AHA-2940Ultra Wide set to its default setting of Automatic. If you want to manually set the AHA-2940Ultra Wide termination setting, see the chapters and this description. The following table lists the termination configurations. Figures 7-2 and 7-3 show termination examples for the AHA-2940Ultra Wide.

Device Connected to AHA-2940Ultra Wide	**Low**	**High**
68-pin internal connector only	ON	ON
68-pin external connector only	ON	ON
68-pin internal and 68-pin external connectors	OFF	OFF
50-pin internal connector only	ON	ON
50-pin and 68-pin internal connectors	OFF	ON
50-pin internal and 68-pin external connectors	OFF	ON

Caution

Do not connect SCSI devices to all three connectors of an AHA-2940 Ultra Wide host adapter!

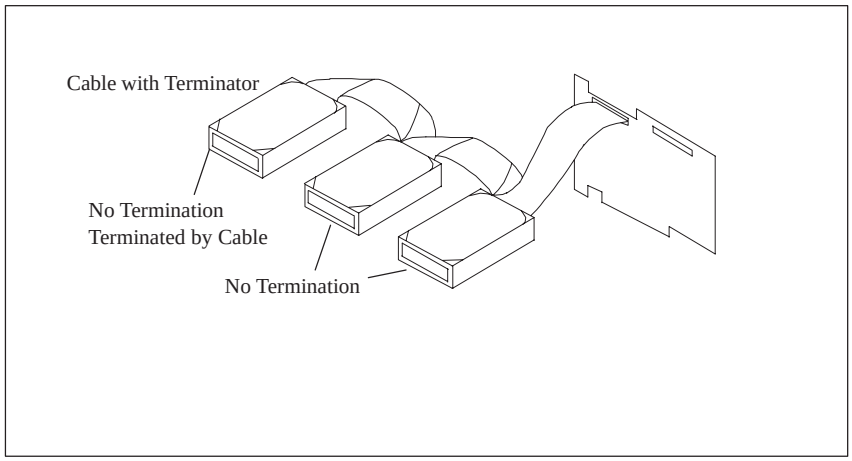


Figure 7-2 Internal Termination

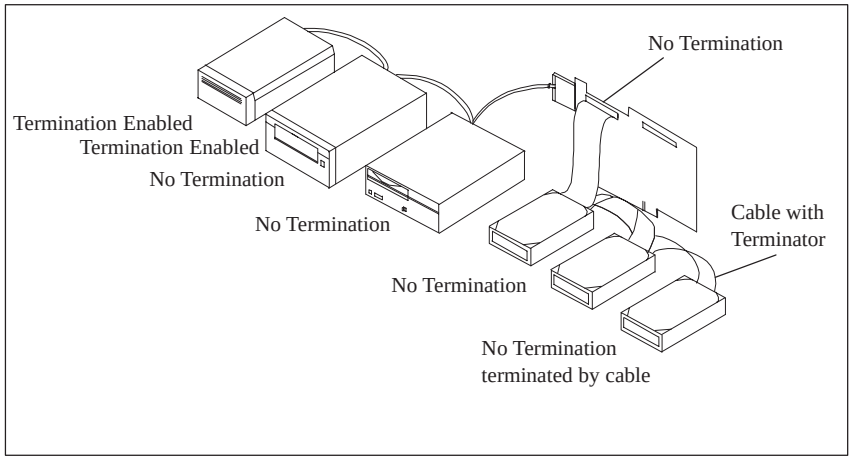


Figure 7-3 Internal and External Termination

7.4.3 Terminating SCSI Devices

Read the device's documentation to determine how to enable or disable termination on your particular SCSI device(s). On most internal SCSI devices the termination setting is controlled by a jumper or a switch. On other internal SCSI devices you must physically remove or install resistor module(s). On most external SCSI devices, a terminating plug (a resistor pack embedded in a small plug) is installed or removed to control termination (see Figure 7-4).

7.4.4 SCSI Cables

You should only use the integrated cable for internal extensions. Another two 16-bit SCSI devices may be connected up to this cable. The cable is terminated on the drive-side.

You should only use top quality 68-pin external SCSI cables for external extensions. The total external cable length may not exceed 2 meters.

7.4.5 Connecting External SCSI Devices

If you are connecting external SCSI devices to your host adapter, you must obtain an external SCSI cable for each external device you install.

1. Prepare each SCSI device for installation; configure the SCSI ID and attach a terminating plug into the last external device. For instructions, see the device's documentation.
2. Plug the connector at one end of the external SCSI cable into the host adapter's external SCSI connector.
3. Plug the connector at the other end of the cable to either one of the SCSI connectors on the external SCSI device.
4. To connect other external SCSI devices, daisy-chain each device to the previous device until all external SCSI devices have been connected (see Figure 7-4).

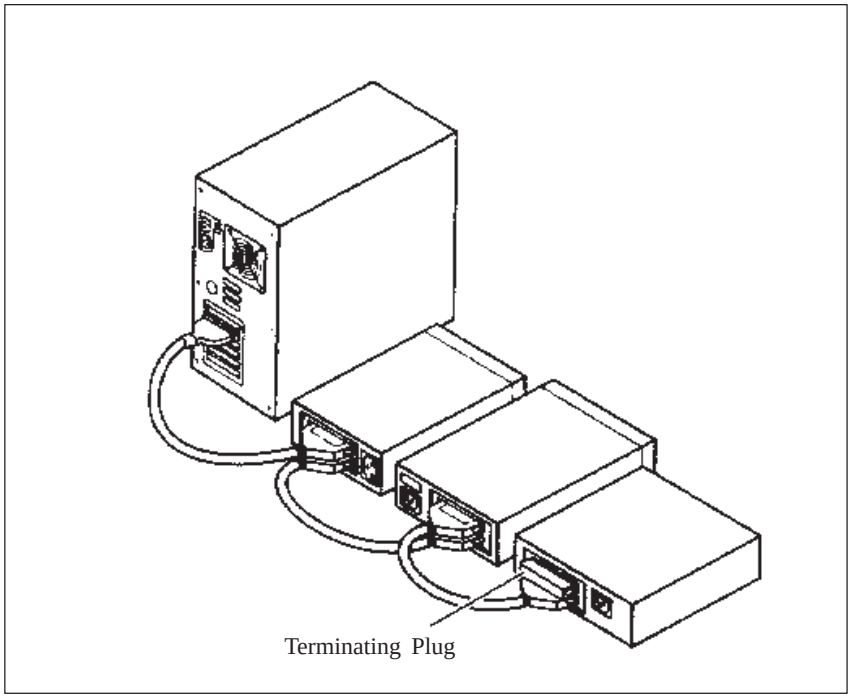


Figure 7-4 External Termination

7.5 Troubleshooting on the SCSI Controller

Most problems with the SCSI controller occur when new SCSI devices are connected up to the SCSI bus (termination problems, for example). If you are having problems with the SCSI controller or SCSI devices connected to it, check the following:

- Do all the SCSI devices have a power supply?
- Are the SCSI and power supply cables correctly plugged into the SCSI device?
- Is the SCSI cable correctly plugged into the SCSI connection of the controller?
- Does each SCSI device, including the SCSI controller, have its own SCSI ID?
- Are the SCSI devices and SCSI controller properly terminated?
- Is parity checking either enabled or disabled on all SCSI devices connected up to the SCSI bus?
- Was the device switched off and on again after any changes to the BIOS setup or SCSI setup or SCSI device settings?

7.5.1 SCSI BIOS Messages

When you switch on the SCSI-BIOS, the following messages may appear during system startup:

`Device connected, but not ready`

The SCSI device connected to the Ultra Wide SCSI controller is not reacting to commands from the SCSI controller. Switch *Send Start Unit Command* in *SCSI-Setup* for the relevant SCSI device to *Yes*. If the message continues to appear, read your SCSI device documentation to find out how to set the SCSI device.

`Start unit request failed`

The SCSI-BIOS was unable to pass on a power up command (Start Unit) to the SCSI device. Call SCSI Setup and send the *Send Start Unit* for the relevant SCSI device to *No*.

`Time-out failure during ...`

A time limit has been exceeded. Check the SCSI bus termination. Disconnect the SCSI cables from the Ultra Wide SCSI controller and restart the system. If the system starts successfully, check the SCSI cable. One of the SCSI devices may also be faulty. Check the SCSI devices.

7.5.2 Other Problems and Solutions

- If you are booting from a SCSI hard disk drive, make sure the Drives setting (in your computer's setup program) that corresponds to the drive is set to None or No Drives Installed, as is required for SCSI hard disk drives (for further information, refer to the documentation for your computer).

Note

If both SCSI and non-SCSI (e.g. IDE) disk drives are installed, then the non-SCSI disk drive is always the boot device.

- If you changed any values on a host adapter, in a setup program, or on a SCSI device, did you turn the power OFF and ON to ensure that the new values are loaded?
- If you tried to use the format/verify utility on a disk device and got an Unexpected SCSI Command Failure pop-up bow with error information, the utility probably encountered a problem with the disk device or the media and therefore cannot run.

  You can probably determine from the Sense Key information (e.g. 06h – Unit Attention) both the cause of the problem and its solution. Here are some of the more common Sense Key values and their meanings:

  – 02h – Not ready – The media is not ready to format. Be sure that media is inserted in the drive and that the media is spun up.

  – 03h – Medium error – The disk media may be defective. If it is a removable-media drive, try using a different disk media. If it is a fixed disk drive, the disk may be physically damaged. Verify and format the media with SCSISelect.

  – 04h – Hardware error – The disk drive may be defective. Consult the hardware documentation and contact the manufacturer.

  – 05h – Illegal request – The Adaptec formatting utility does not support a low-level format of this device; however, the device may already be low-level formated by the manufacturer. (This error rarely occurs).

  – 06h – Unit attention – The removable media may be write-protected. Disable write protection and run the utility again.

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Siemens AG
A&D AS E 81

Oestliche Rheinbrueckenstr. 50
D-76181 Karlsruhe
Federal Republic of Germany

From:

Your Name: _

Your Title: _

Company Name: _

Street: _

City, Zip Code_ _

Country: _

Phone: _

Please check any industry that applies to you:

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

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