SIEMENS

SIMATIC

Box PC 820
PC FI45 V2

Manual

Contents

Edition 03/2001
A5E00051531-03

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

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 manual, 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 Technical Specifications

1.1.1 Device Models

Box PC 820

The Box PC 820 is intended to be installed in switchgear cabinets, switchboxes, control consoles or directly in the machines.

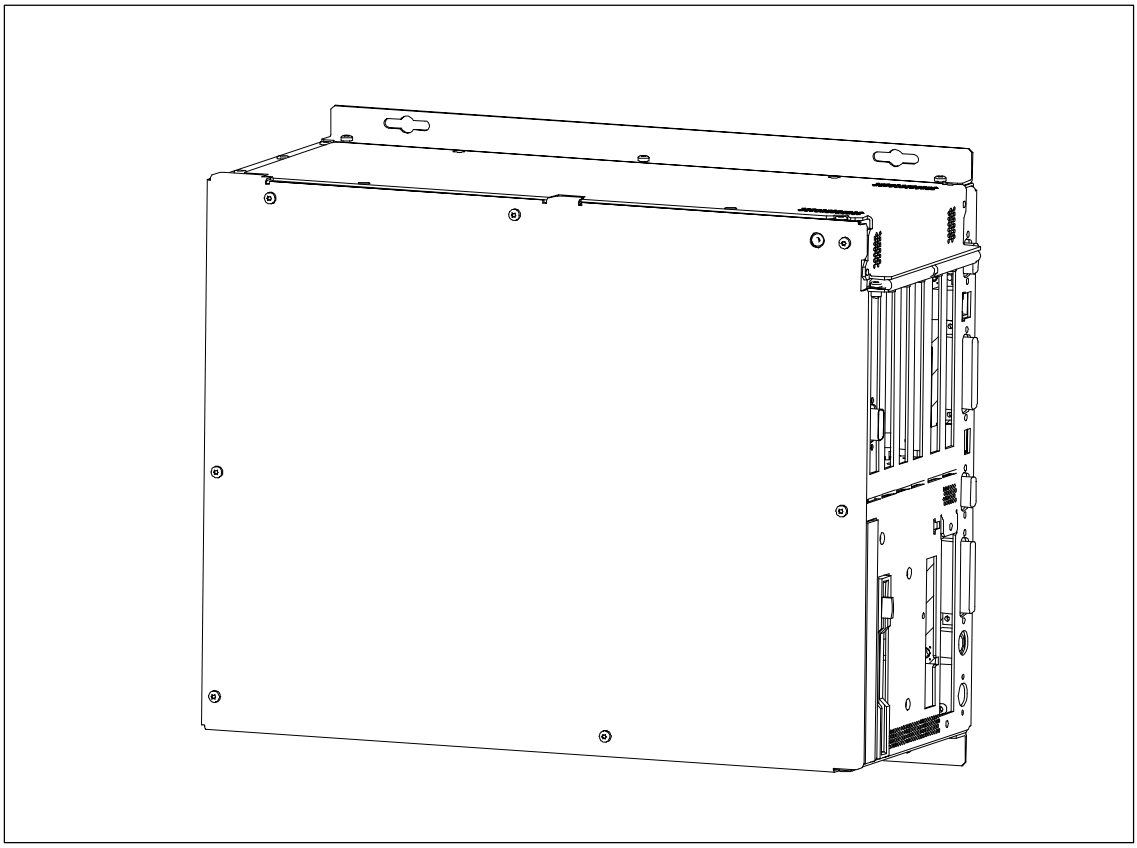


Figure 1-1 Box PC 820

PC FI45 V2

The PC FI45 V2 has a 19” housing with a flat display screen and membrane keyboard which make it especially suitable for installation where space is limited.

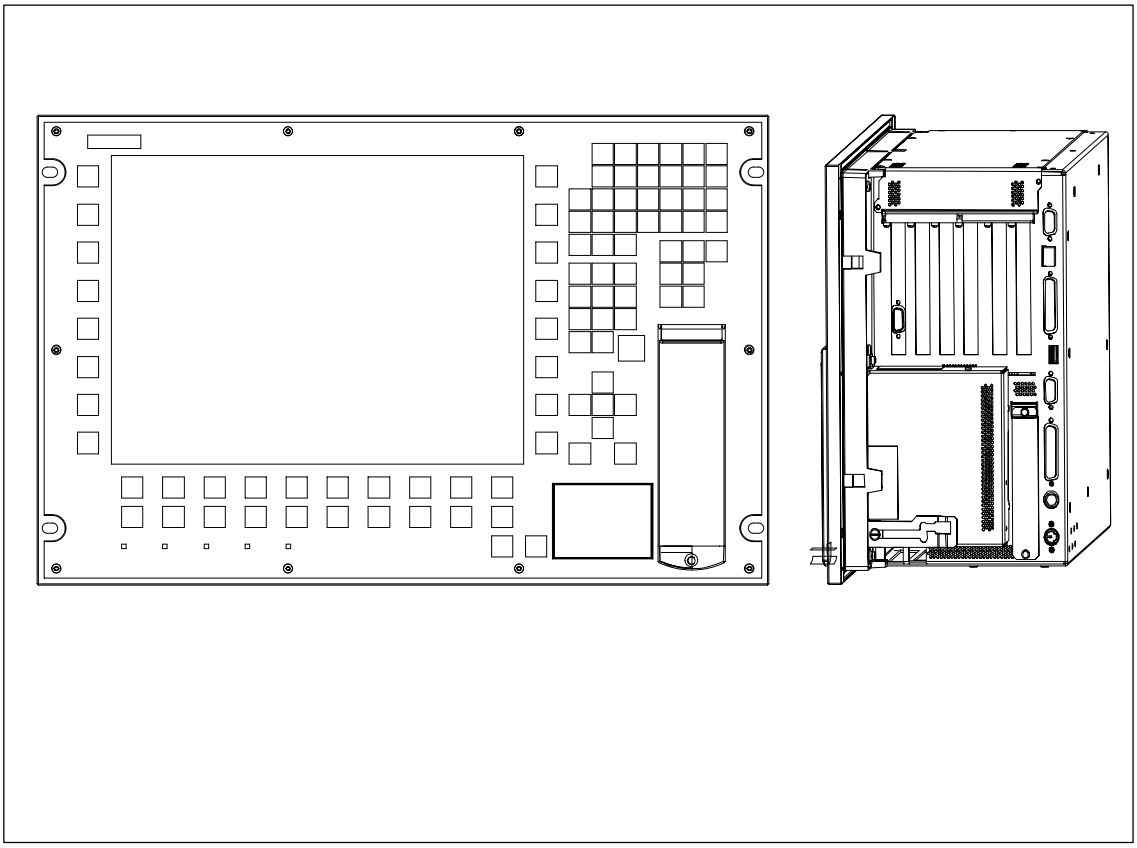


Figure 1-2 PC FI45 V2

1.1.2 Maximum Dimensions of Expansion Modules

Information on Modules

The Box PC 820 / PC FI45 V2 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.

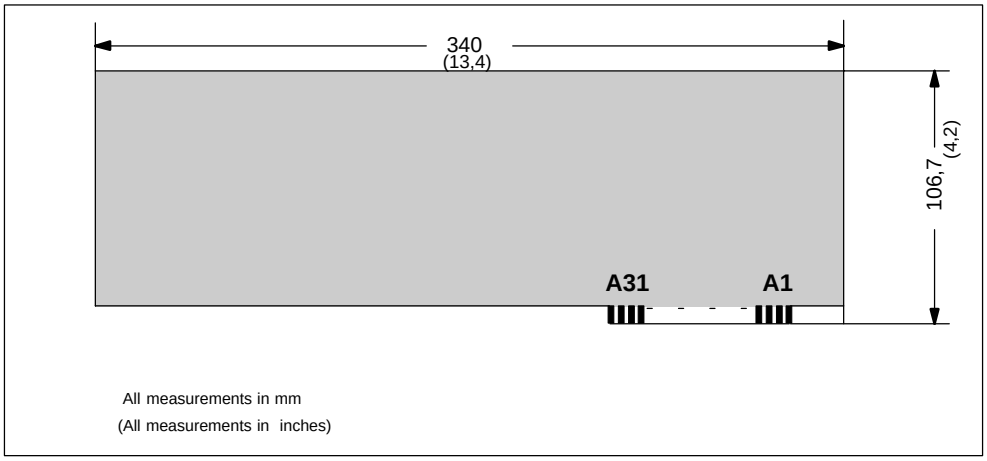


Figure 1-3 XT Module

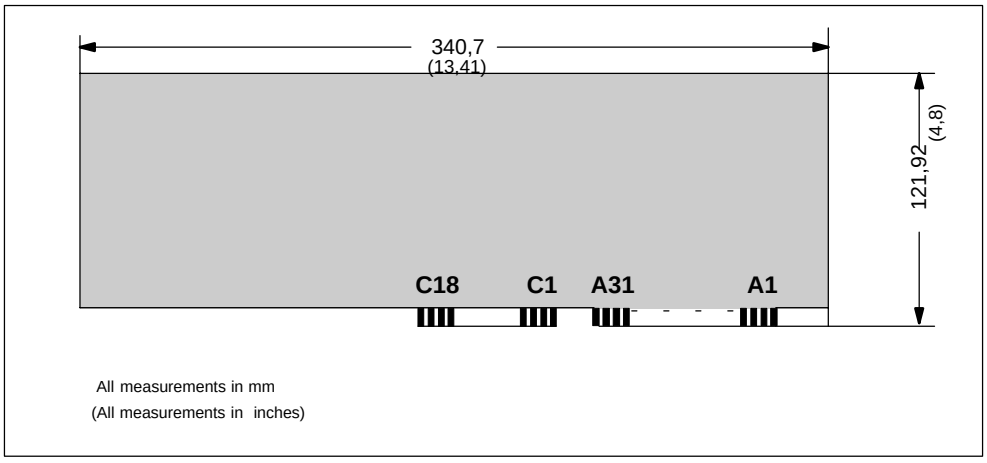


Figure 1-4 AT Module

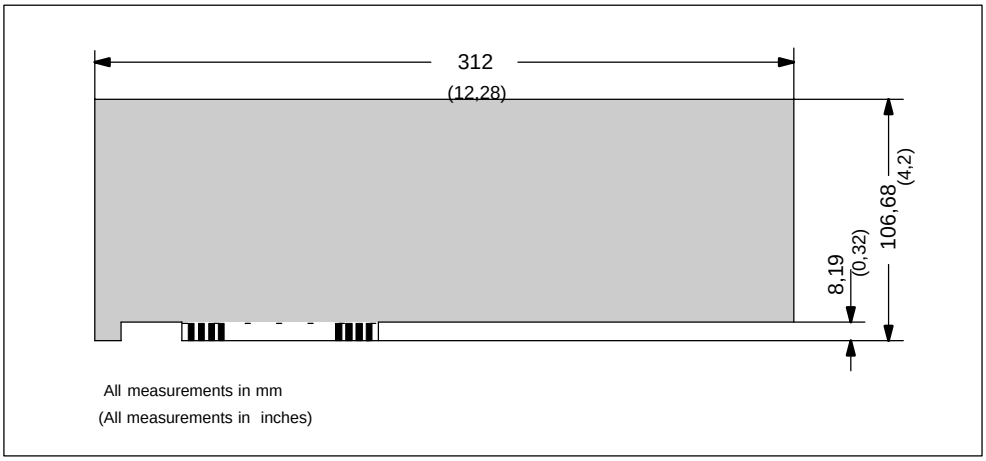


Figure 1-5 Large PCI Module (5 V)

Information 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	Voltage					
	+5V	**+3.3V**	**+12V**	**–5V**	**–12V**	**AUX5V**
Pentium III motherboard	8 A	1.5 A	0.1 A	0.01 A	0.02 A	0.05 A
Floppy disk drive	0.45 A					
Hard disk	0.6 A		0.66 A			
CD-ROM drive	0.7 A					
Fan			0.3 A			
Sum Box PC 820 (basic configuration)	**9.75 A**	**1.5 A**	**1.06 A**	**0.01 A**	**0.02 A**	**0.05 A**
Keyboard controller (only for PC FI45 V2)	0.15 A					
Touch pad (only for PC FI45 V2)	0.05 A					
TFT display (only for PC FI45 V2)		0.7 A				
Inverter (incl. backlight, only for PC FI45 V2)			0.5 A			
Sum Box PC 820 (max. for basic configuration)	**9.95 A**	**2.2 A**	**1.56 A**	**0.01 A**	**0.02 A**	**0.05 A**
ISA slots (sum for 3 slots)	5 A		2 A	0.3 A	0.3 A	
PCI slots (sum for 3 slots)	5 A		2 A	0.2 A	0.2 A	
Sum (max. for maximum configuration)	**20 A**	**10 A**	**8 A**	**0.5 A**	**0.5 A**	**0.05 A**

Options

Component	Voltage					
	+5V	**+3.3V**	**+12V**	**–5V**	**–2V**	**AUX5V**
WinAC FI Station Pro (SlotPLC)	0.35 A		1.3A			
Direct key module	0.5 A					
‘SafeCard’ monitoring module	0.35A		0.05 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 (220 W)	maximum load 150 W

1.3 Removing and Installing Components

Prerequisites

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 before starting the procedure.

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 take appropriate safety precautions. These are set out in the guidelines for electrostatically sensitive components (ESD guidelines) in the appendix of this manual and in the operating instructions.

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.

The following sign warns that electrostatically sensitive modules are present. Please read the ESD guidelines.

Before Opening the Unit

Before opening the unit, you should read the following rules carefully:

- Before you disconnect the power supply cable, discharge any electrostatic charge on your body. You can do this by touching metallic parts, such as screws, on the rear panel of the PG.
- 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 packaging 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 crosstip or TORX screwdriver to remove or install components.

1.3.1 Opening and Closing the Housing of the Box PC 820

- Close the application you are using.
- Remove the diskette or CD-ROM from the drive.
- Pull out the power supply connector.
- Remove the PC from its support.
- Remove the seven screws on the rear housing plate.

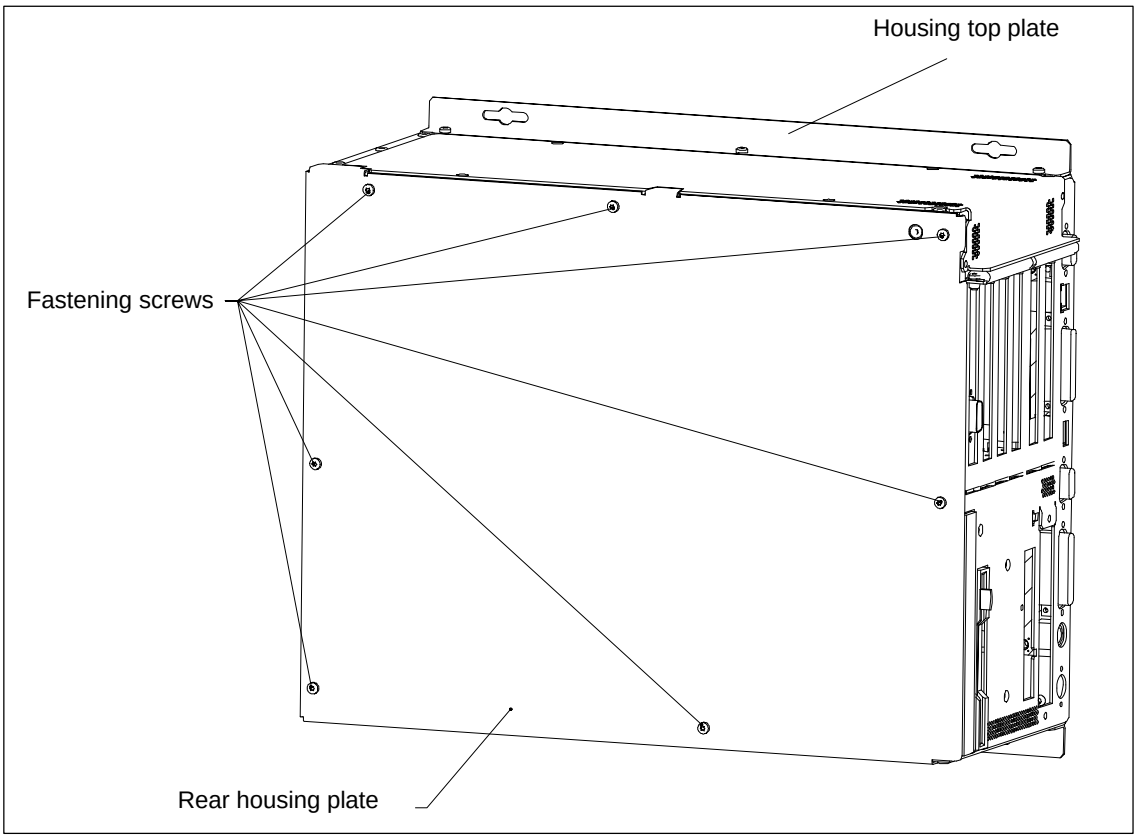


Figure 1-6 Opening the Housing of the Box PC 820

When the rear housing plate is removed, you see the following components/function units:

- Power supply
- Floppy disk drive and CD-ROM drive
- Motherboard
- Bus board with expansion slots
- Fan
- Processor
- RAM memory module(s)
- Hard disk drive

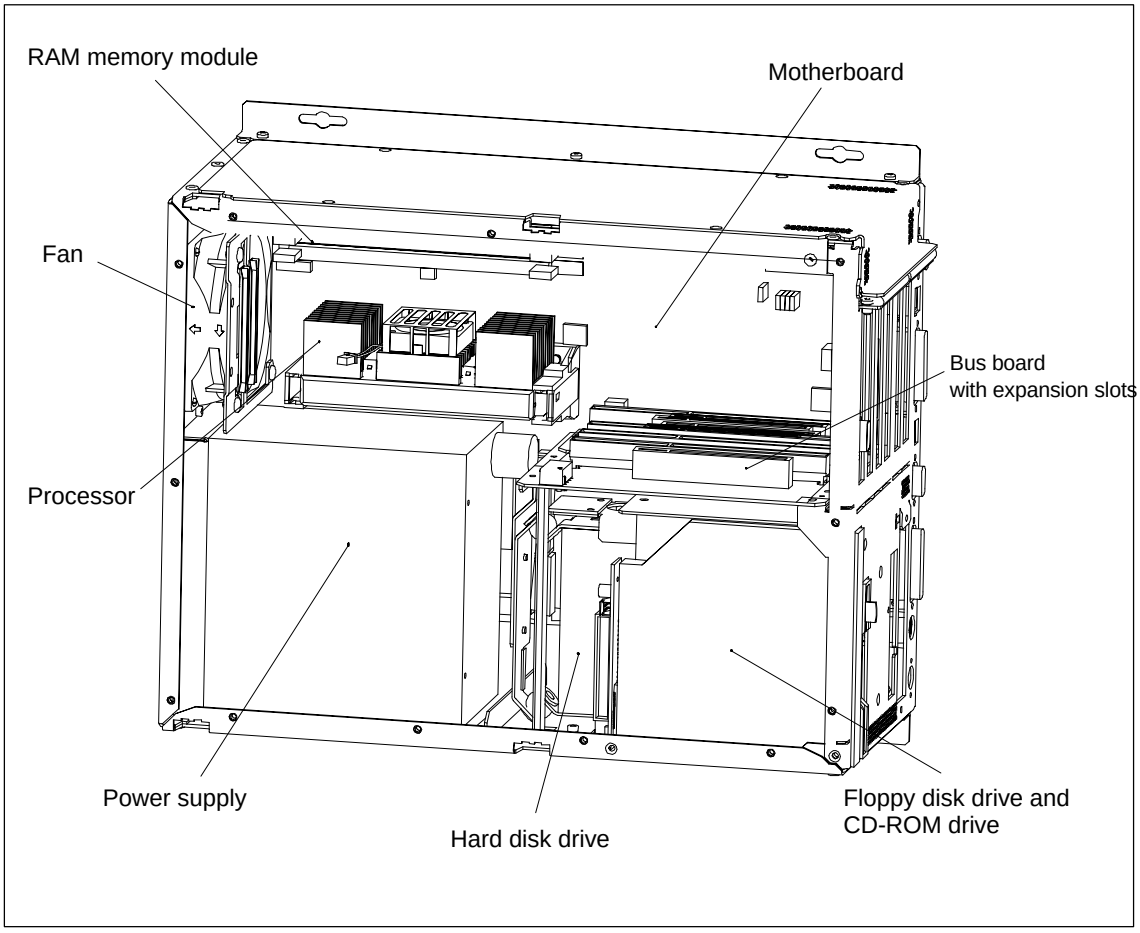


Figure 1-7 Function Units when the Box PC 820 is Opened

1.3.2 Lowering the PC FI45 V2 Housing Away from the Front Panel

- Close the application you are using.
- Remove the diskette or CD-ROM from the drive.
- Pull out the power supply connector.
- Remove the six screws used to fasten the cover to the front of the housing.

Warning

When removing the last screw, hold the housing with one hand.

- Tilt the housing about 5° towards you and then pull it away from the front panel until it reaches the latched position of the hinge.
- Now lower the housing down completely. A wire holds the housing in place at a 90° angle.

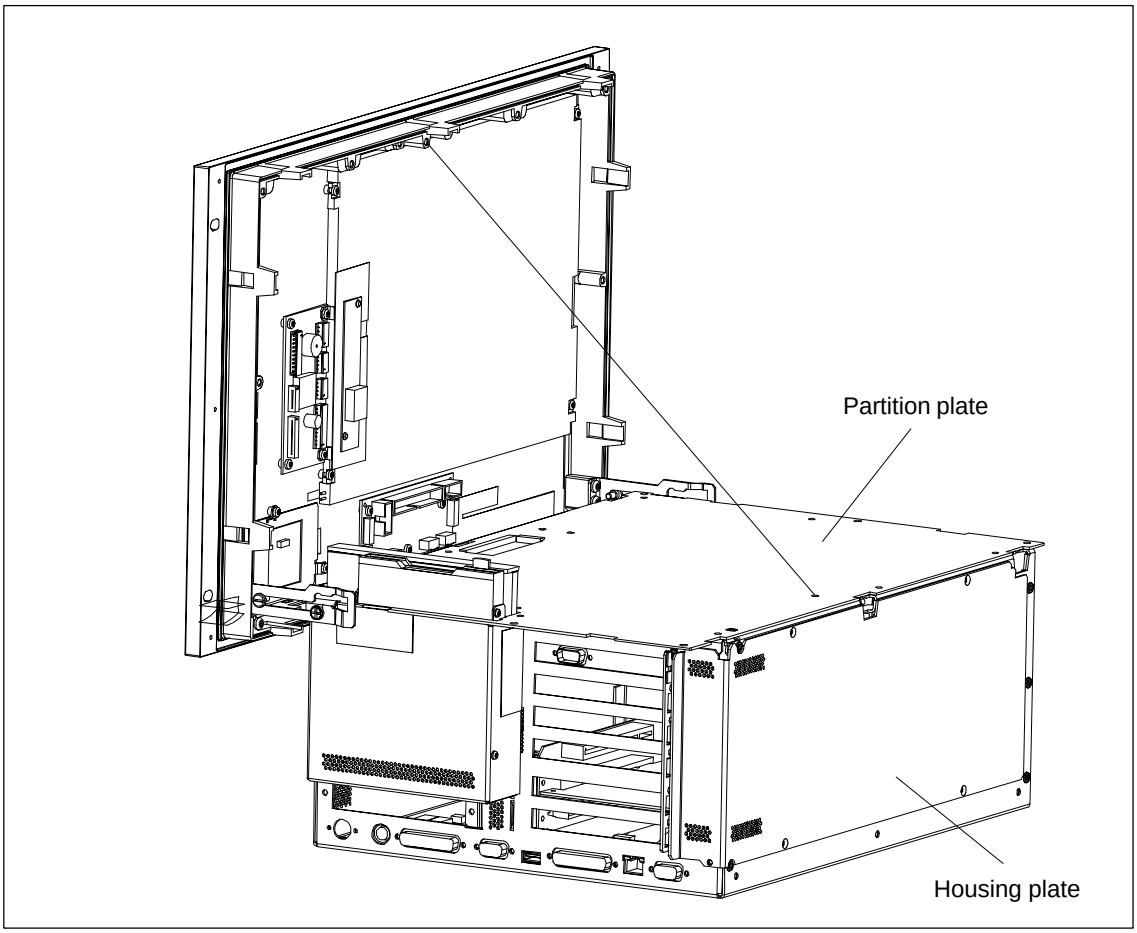


Figure 1-8 Lowering the Housing of the PC FI45 V2

When the housing has been lowered, you will see the following components/function units in the front panel:

- LC display
- Inverter module
- Keyboard controller
- Front adapter module
- Touch pad controller module

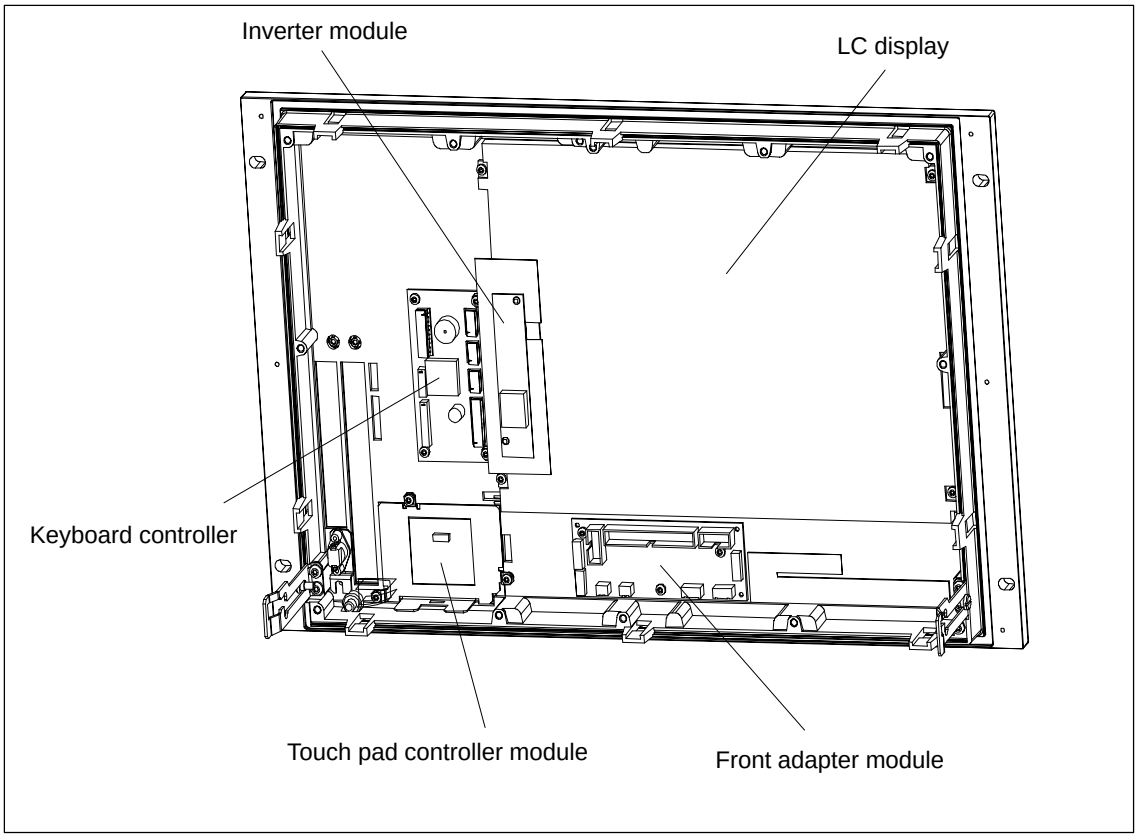


Figure 1-9 Function Units in the Front Panel of the PC FI45 V2

1.3.3 Removing the Housing of the PC FI45 V2 from the Front Panel

- Lower the housing of the PC FI45 V2 away from the front panel as described in Section 1.3.2.
- Disconnect the mains supply (1) to the LC display by pulling the connector carefully towards the front frame.
- Disconnect the LCD cable guide (2).
- Disconnect the ribbon cable (3) from the front adapter module.
- Unhook the safety wire (4) from the housing.
- Lift the housing (5) upwards and out so that the hinge is released from its attached position; then pull the system unit further away from the front.
- The housing is now isolated from the front unit.

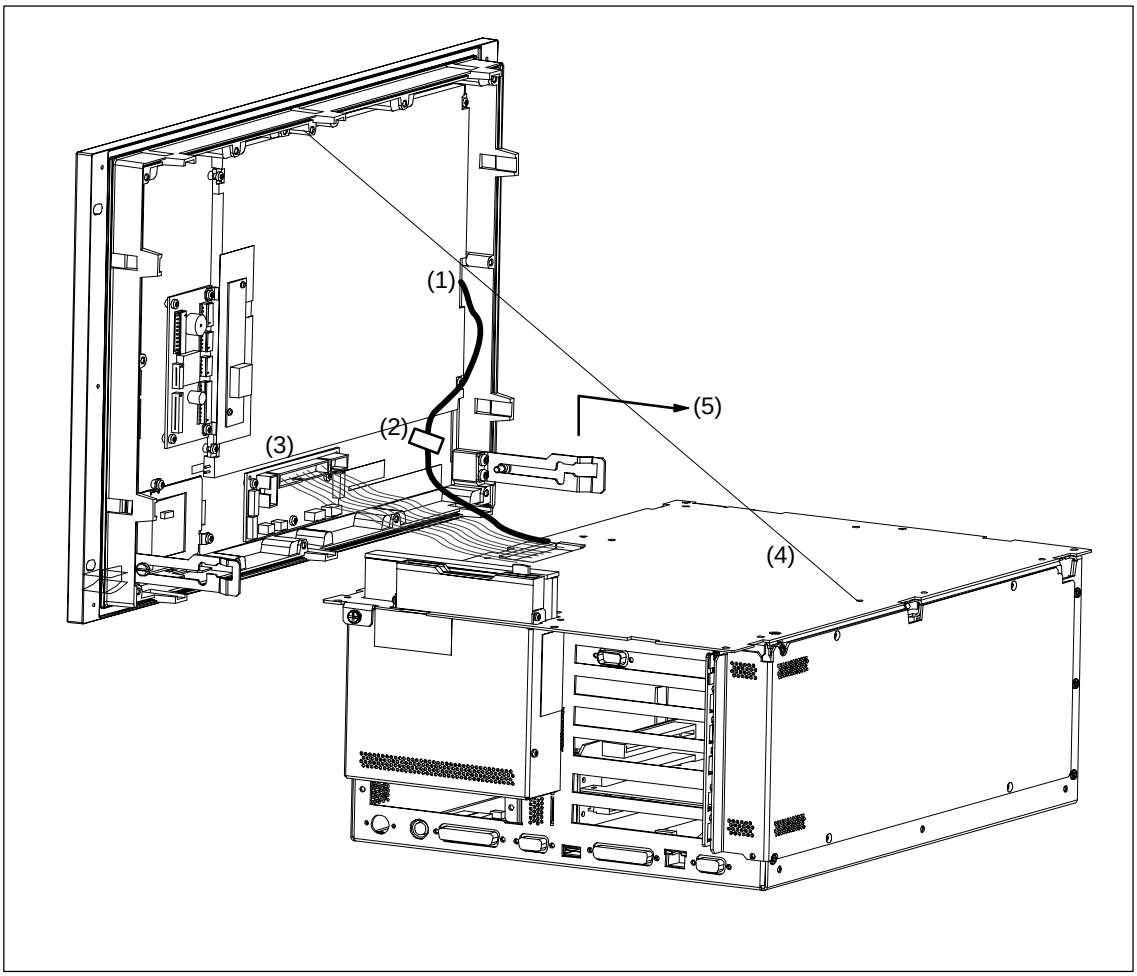


Figure 1-10 Removing the Housing of the PC FI45 V2

1.3.4 Opening and Closing the Housing of the PC FI45 V2

- Remove the housing from the front panel as described in Section 1.3.3.
- Remove the seven screws on the unit partition plate.

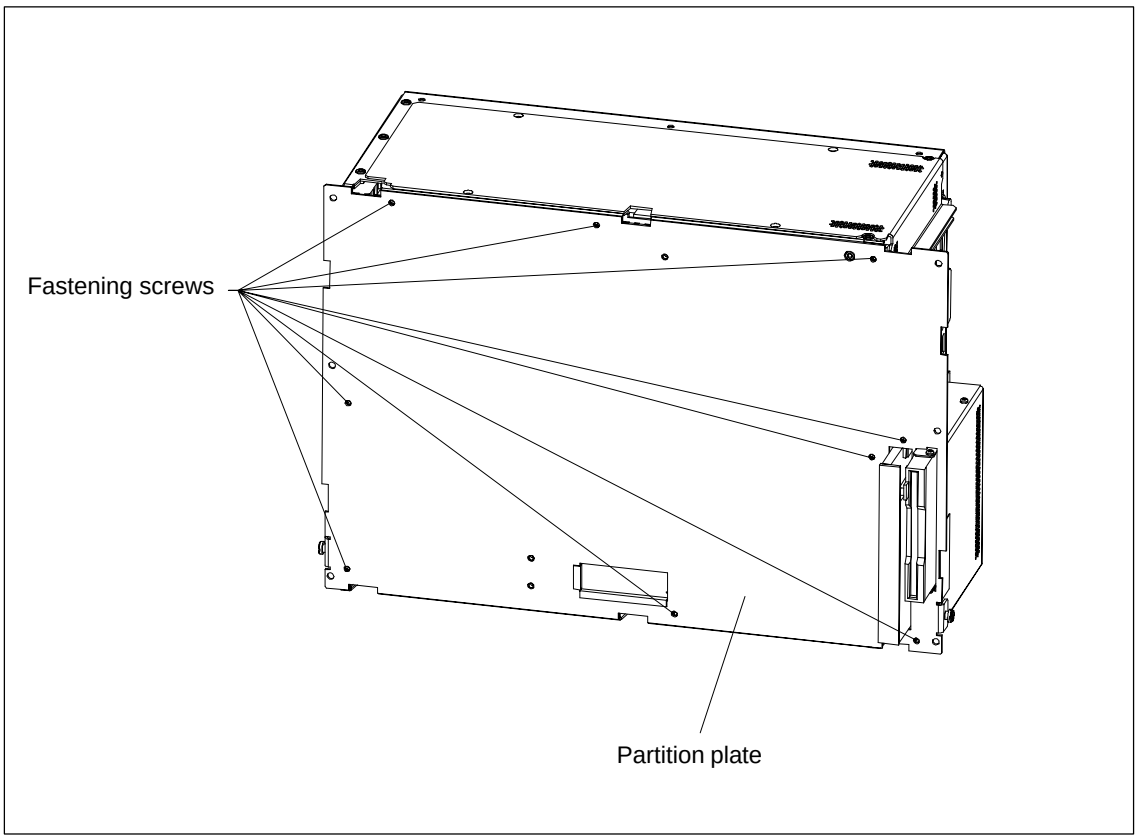


Figure 1-11 Opening the System Unit of the PC FI45 V2

When the partition plate is removed, you see the following components/function units:

– Power supply
– Floppy disk drive and CD-ROM drive
– Motherboard
– Bus board
– Fan
– Processor
– RAM memory module(s)

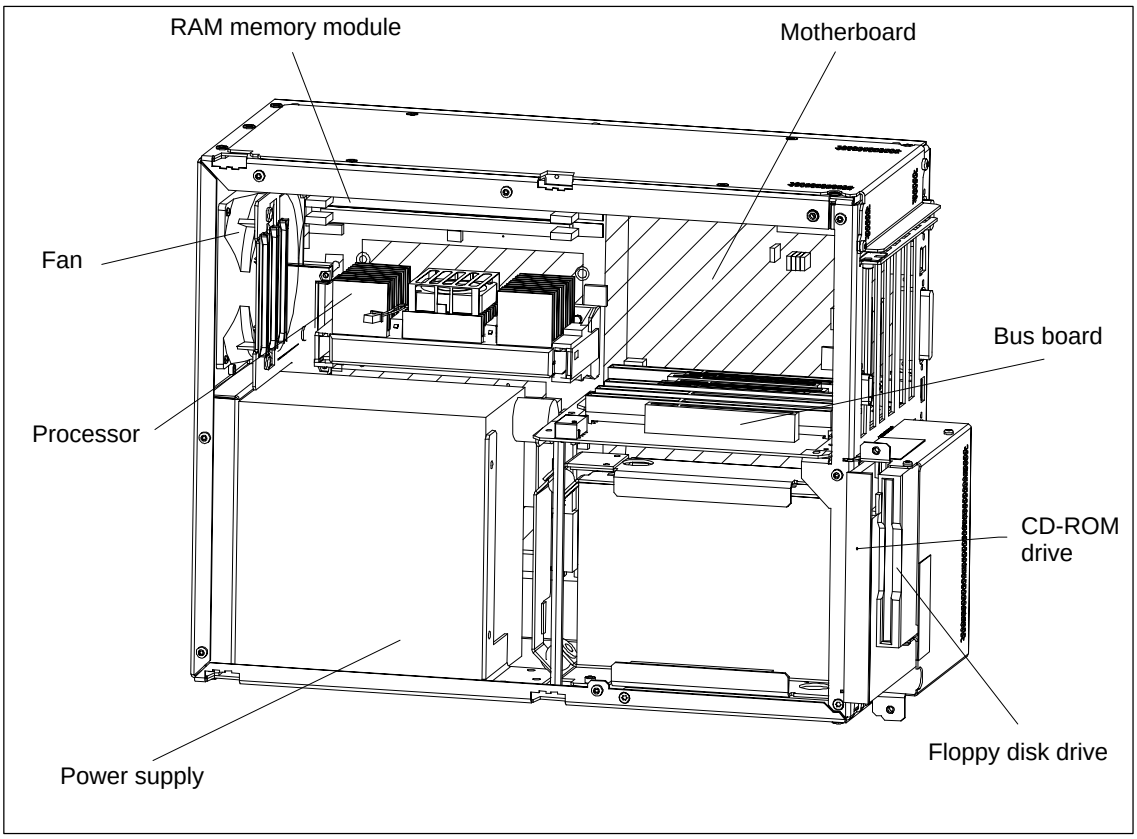


Figure 1-12 Function Units when the PC FI45 V2 is Opened

1.3.5 Removing and Installing Expansion Modules

- Close the application you are using.
- Remove the diskette or CD-ROM from the drive.
- Pull out the power supply connector.
- Release the 6 screws on the cover of the unit. (If necessary, remove the Box PC 820 from its support or lower the PC FI 45 housing away from the front panel as described in Section 1.3.2).

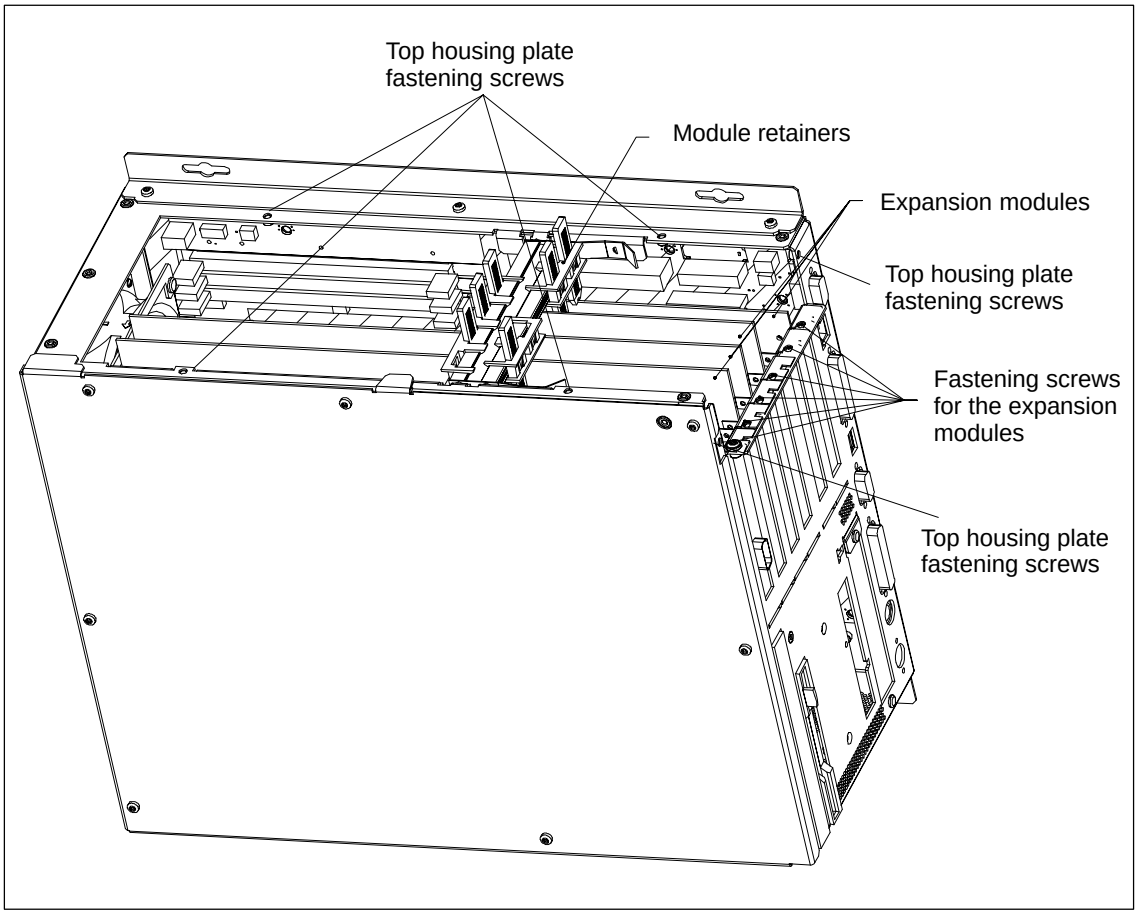


Figure 1-13 Opening the Cover of the Housing

Installing and Removing the Module Retainer

First you must remove the crossbeam on which the modules are mounted.

- When you bend the notched spring clips inwards a little, the snap-in lockings can be released.
- Grip the crossbeam, push it approximately 1cm to the left, and then lift it out with the the module retainers.

To install the retainers, proceed in reverse order.

Installing and Removing Expansion Modules

- Disconnect all mains connections to the module to be removed.
- Undo the screw which fastens the expansion module to the side of the system box.
- Pull the module carefully out of the slot – without tilting it.
- Set the DIP switches and jumpers of the new module according to the appropriate module documentation.

To install the new module, proceed in reverse order. After installing/exchanging an expansion module, the retainers may need to be readjusted. To do this, proceed as follows:

Adjusting the Retainer

- 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.

- Detach the part of the sliding element which juts out by scratching a notch in the top of the sliding element with a knife and then bending it over to break it off.

1.3.6 Removing and Installing the Power Supply Unit

- Open the housing as described in Section 1.3.1 (Box PC 820) or Section 1.3.4 (PC FI45 V2).
- Release the three screws with which the bent clips of the power supply support are fastened to the housing.
- Pull the power supply unit and its support right out of the housing.
- Disconnect the cables from the motherboard, the hard disk, and the bus expansion unit, and write down their previous connections.
- Release the four screws with which the power supply support is attached to the power supply unit.

To install the power supply unit, proceed in reverse order.

Changing the Supply Voltage

The standard power supply is for 115/230V networks. The voltage selection switch is located at the side of the housing below the ventilation slots.

You must ensure that the supply voltage set at the voltage selection switch corresponds to the local supply voltage.

The voltage selection ist made automatically in wide range power supply units.

Selecting the Supply Voltage [1)]

If the voltage specified at the selection switch does not match the local supply voltage, you must change the voltage selection switch so that you can read the required voltage value set below the green triangle on the right. Use a small, flat screwdriver to lever out the part with the voltage values and reinsert it in the appropriate position.

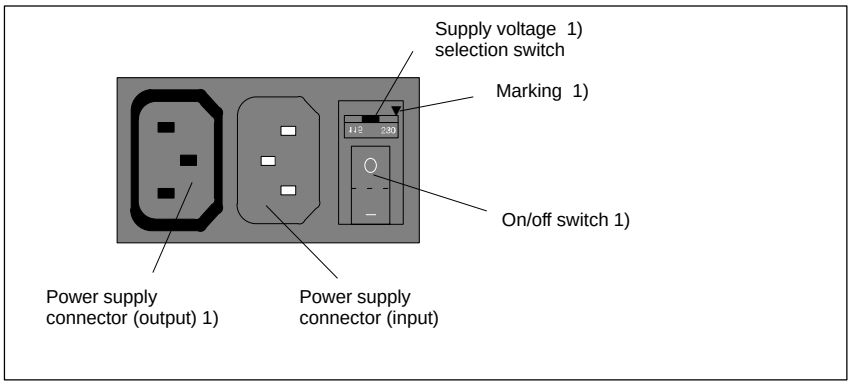


Figure 1-14 Connecting the Supply Voltage

[1)] Not applicable for devices with wide range power supply unit

Caution

Damage may be caused to the device!

Operating the PC with the wrong supply voltage setting may damage the device. The same voltage is applied to the supply voltage output as to the supply voltage input.

Please observe the specifications made by the monitor manufacturer when operating the monitor.

The following table lists the permissible input currents for the monitor:

Input voltage	120 V / 240 V ± 10%
Input current	8A / 4A
Output voltage	Equal to input voltage
Max. output current	3A / 1.5A

Caution

You must remove the power supply connector before changing the supply voltage.

Operating a power supply unit set to 115V in conjunction with a 230V network may cause serious damage to the PC.

1.3.7 Removing and Installing the Bus Board

- First remove all expansion modules as described in Section 1.3.5.
- Open the housing as described in Section 1.3.1 (Box PC 820) or Section 1.3.4 (PC FI45 V2).
- Remove the power supply connection from the bus board.
- Release the two screws on the bus board.
- Lift the bus board out of the connector to the motherboard.

To install the bus board, proceed in reverse order.

1.3.8 Removing and Installing the Fan

- First remove all expansion modules as described in Section 1.3.5.
- Remove the power supply connection for the fan from the motherboard.
- The fan is fastened to the system unit with four plastic rivets. Remove the plastic rivets by pressing the pin out from behind.
- Take out the fan and the metal plate to which the guide rails are attached.
- Detach the plate with the guide rails by releasing the four plastic rivets.

To install the fan, proceed in reverse order.

1.3.9 Removing and Installing a Floppy Disk Drive or CD-ROM Drive for the Box PC 820

The floppy disk drive and the CD-ROM drive are fitted in a single support in the housing.

- Open the housing as described in Section 1.3.1.
- Lay the housing face up on a flat surface.
- Remove the three screws with which the support is fastened to the housing.
- Disconnect the disk drive connection cables and lift the support carefully out of the housing.

Caution

Before you remove the flexible cable from the floppy disk drive, you must first release the interlock on the port.

- The floppy disk drive is fastened to the support with three screws. Remove these screws and pull the drive out of the support.
- The CD-ROM drive is fastened to the support with three screws. Remove the screws and pull the drive out of the support.

To install the drives, proceed in reverse order.

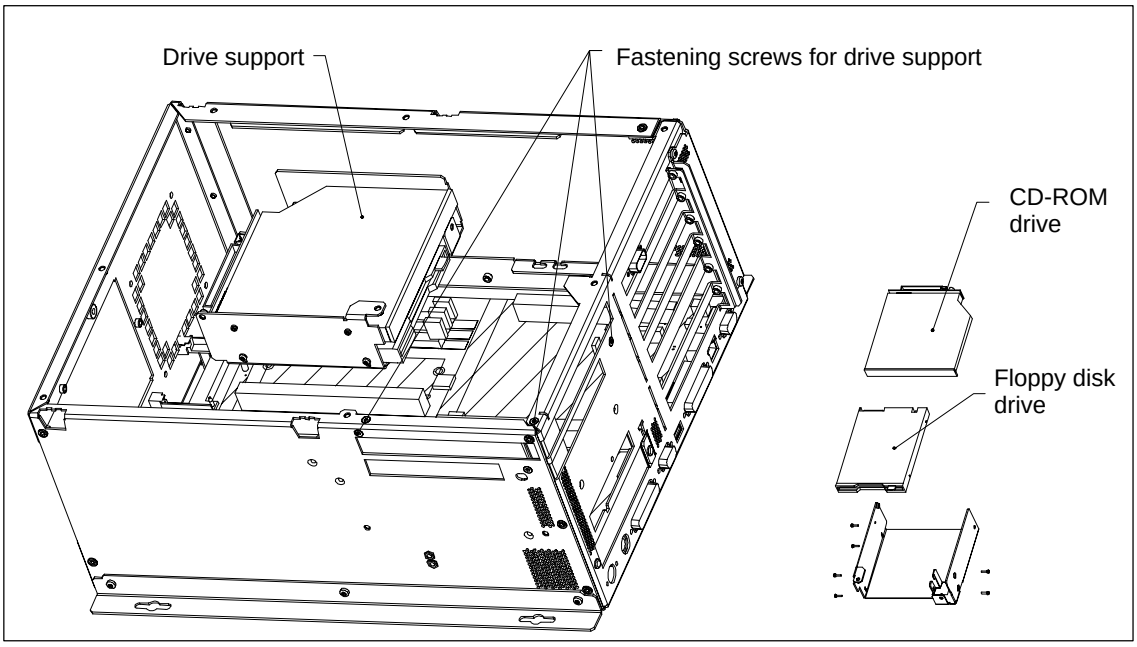


Figure 1-15 Floppy Disk/CD-ROM Drive Support on the Box PC 820

Note

The floppy disk/CD support can also be installed in the housing at a 90° angle. This is necessary if the unit is installed with the network connection at the top. The floppy disk drive may not be operated with the opening for the diskettes face up or face down.

1.3.10 Removing and Installing a Floppy Disk Drive or CD-ROM Drive for the PC FI45 V2

The floppy disk drive and the CD-ROM drive are fitted in a single support in the system housing.

- Open the housing as described in Section 1.3.4.
- Lay the housing on a flat surface with the opening face up.
- Raise the support approximately 1cm and lower it to one side of the housing.
- Remove the connecting cables.

Caution

Before you remove the flexible cable from the floppy disk drive, you must first release the interlock on the port.

- The floppy disk drive is fastened to the support with three screws. Remove the screws and pull the drive out of the support.
- The CD-ROM drive is fastened to the support with two screws. Remove the screws and pull the drive out of the support.

To install the drives, proceed in reverse order.

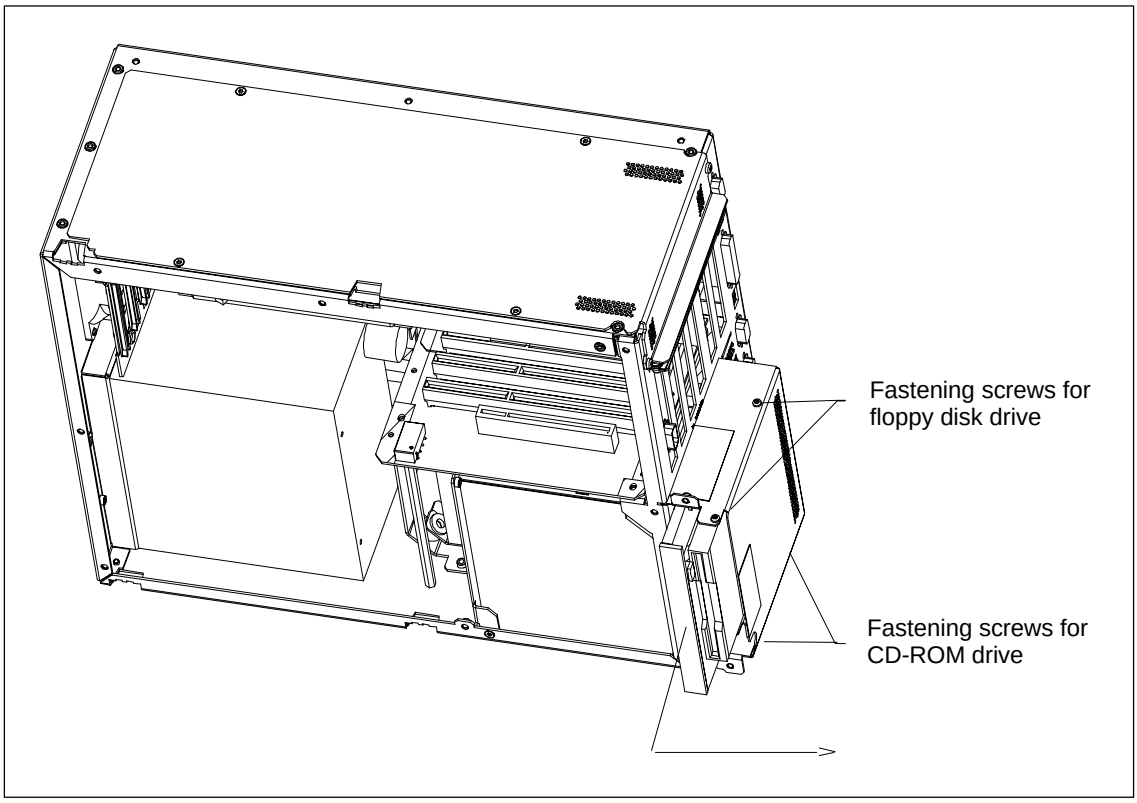


Figure 1-16 Floppy Disk/CD-ROM Drive Support for the PC FI45 V2

1.3.11 Removing and Installing the Hard Disk

- If you are using the Box PC 820, remove the floppy disk/CD-ROM drive support as described in Section 1.3.9.
- If you are using the PC FI45 V2, lower the floppy disk/CD-ROM drive support to one side of the housing as described in Section 1.3.10.
- Remove the four screws with which the hard disk support is fastened to the housing.
- Remove the disk drive connecting cables and lift the support carefully out of the housing.
- Remove the four screws with which the hard disk is fastened to the vibration-damped part of the support.
- Take the hard disk out out of the support.

To install the drive, proceed in reverse order.

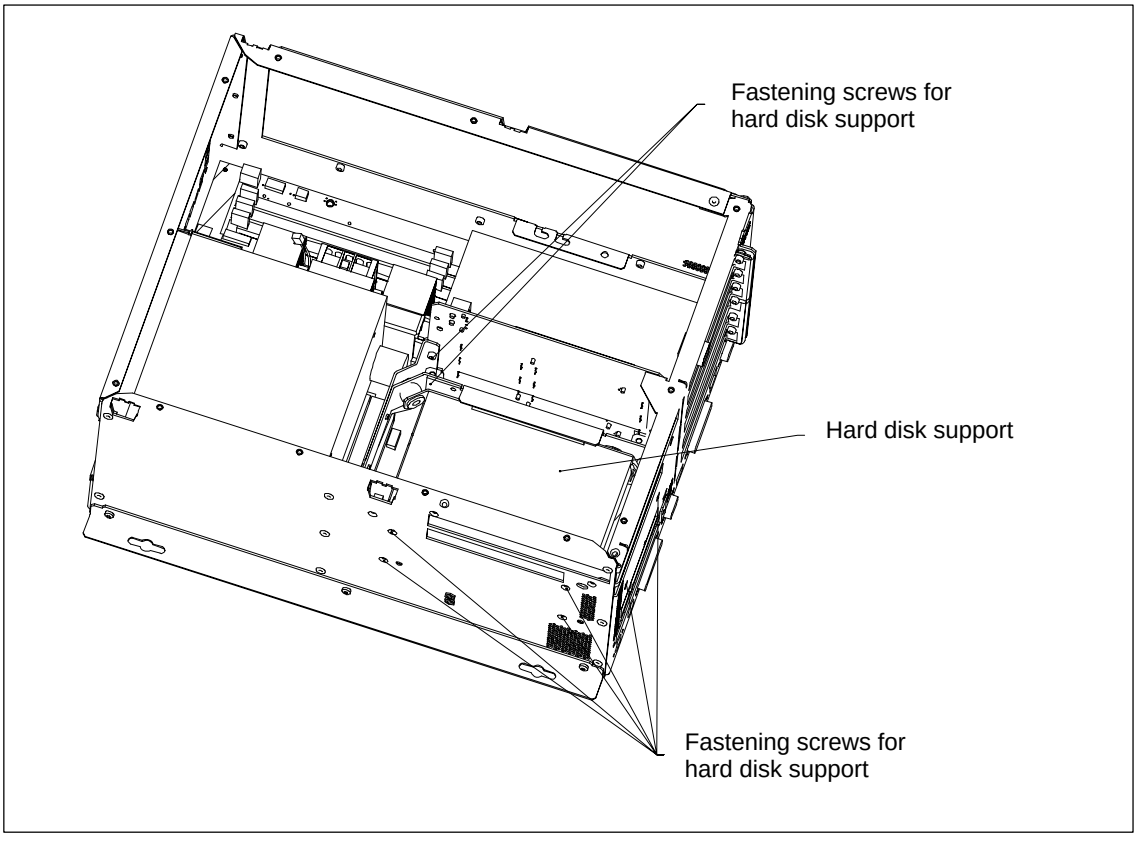


Figure 1-17 Removing the Hard Disk Support

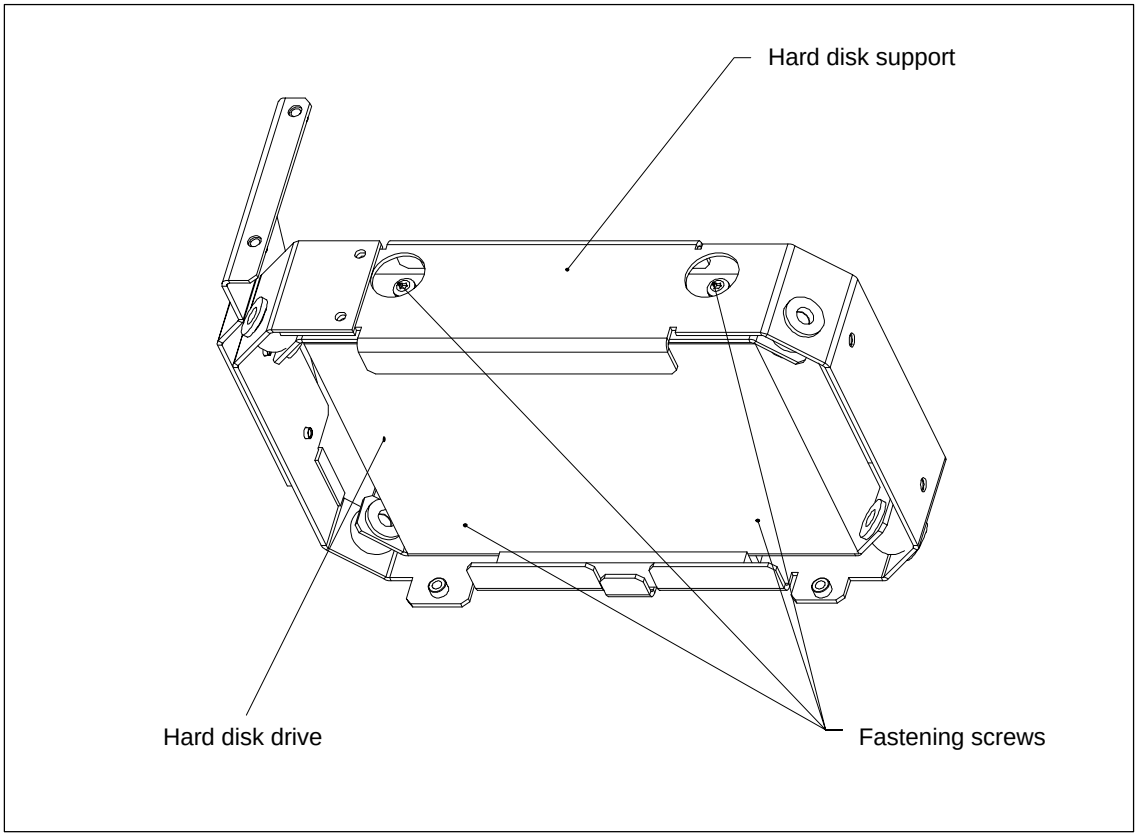


Figure 1-18 Removing the Hard Disk Drive from the Support

1.3.12 Removing and Installing the Motherboard

- Open the housing as described in Section 1.3.1 (Box PC 820) or Section 1.3.4 (PC FI45 V2).
- Remove the power supply as described in Section 1.3.6.
- Remove the bus board as described in Section 1.3.7.
- Remove the fan as described in Section 1.3.8.
- Remove the support for the floppy disk drive and the CD-ROM drive as described in Section 1.3.9 (Box PC 820) or Section 1.3.10 (PC FI45 V2).
- Remove the hard disk support as described in Section 1.3.11.
- The motherboard is fastened to the housing with seven screws and to the side of the system unit with 10 hexagonal socket screws.
- Undo these socket screws and remove the motherboard.

To install the motherboard, proceed in reverse order. Tighten the 10 hexagonal socket screws first.

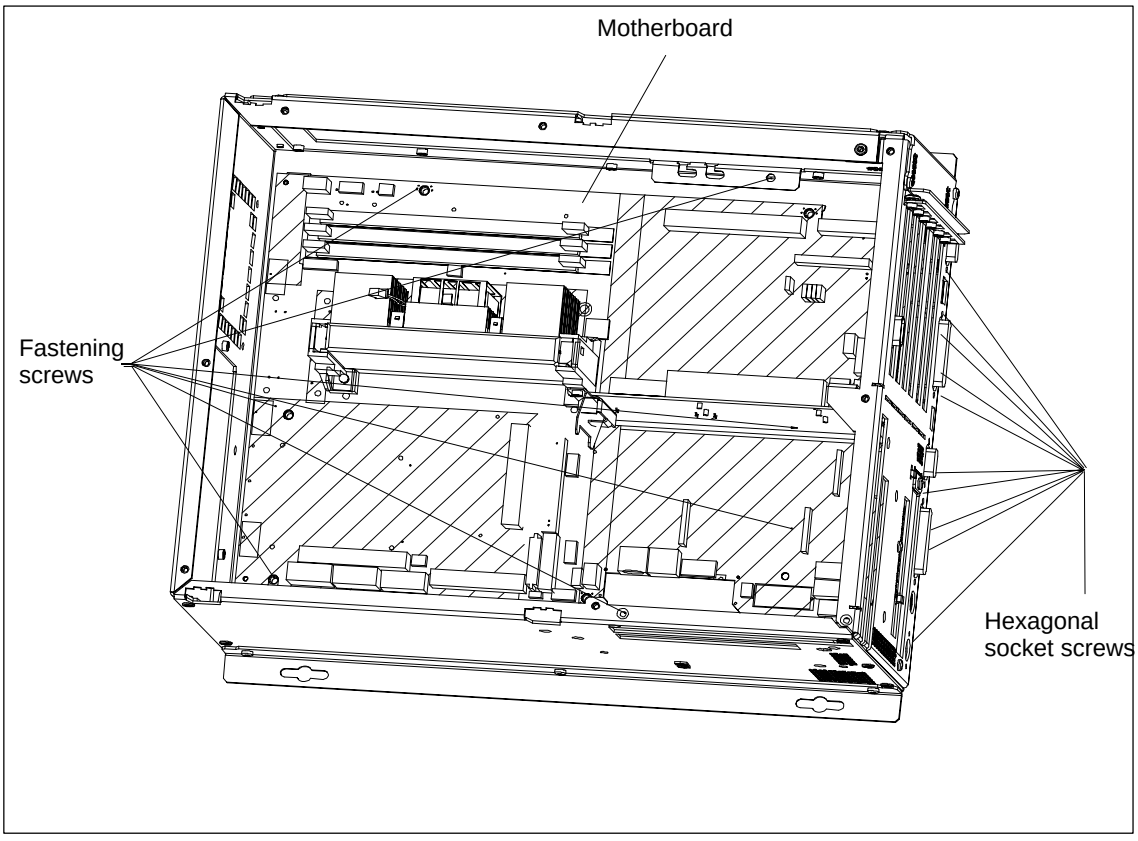


Figure 1-19 Removing the Motherboard

1.3.13 Removing and Installing the Membrane Keyboard or Front Components of the PC FI45 V2

After the device has been installed, the membrane keyboard or front components can be exchanged from the front. Proceed as follows:

- Close the application you are using.
- Open the cover of the disk drive and remove the diskette or CD-ROM.
- Pull out the mains connector.
- Remove the 10 screws with which the membrane keyboard is fastened to the front frame.
- Grip the cover of the disk drive carefully and pull the membrane keyboard forwards and off.

Caution

There is nothing to prevent the keyboard from falling.

- Unplug the 40-pin connector from the front adapter module and disconnect the interface cable carefully from the display.
- Remove the membrane keyboard and the front components mounted on it.

To install the membrane keyboard, proceed in reverse order.

1.3.14 Removing and Installing the Keyboard Controller for the PC FI45 V2

- Lower the housing of the PC FI45 V2 away from the front as described in Section 1.3.2 or remove the membrane keyboard as described in Section 1.3.13.
- Remove the two screws and then remove the support with the inverter module.
- Remove the two connection cables for the membrane keyboard.

Caution

Before you remove the membrane keyboard connecting cables, release the interlocks on the ports so that the contacts of the connecting cables are not damaged.

- Before you unplug all the other connectors to the keyboard controller, write down their arrangement.
- Remove the two remaining support screws; you can then lift out the keyboard controller board.

To install the keyboard controller, proceed in reverse order.

1.3.15 Removing and Installing the Inverter Module for the PC FI45 V2

- Lower the housing of the PC FI45 V2 away from the front panel as described in Section 1.3.2 or remove the membrane keyboard as described in Section 1.3.13.
- Before you unplug all the inverter module connectors, write down their arrangement.
- Remove the two inverter support screws and remove the support.
- The inverter module is fastened to the support with two plastic rivets. Remove the rivets, by pressing the pin out from behind.

To install the inverter module, proceed in reverse order.

Caution

When installing the module, do not forget to place the insulating foil between the inverter module and the metal plate.

1.3.16 Removing and Installing the Display for the PC FI45 V2

- Lower the system box of the PC FI45 V2 away from the front panel as described in Section 1.3.2 or remove the membrane keyboard as described in Section 1.3.13.
- Remove the two screws with which the support for the inverter module is mounted.
- Before you unplug all the connectors, write down their arrangement.
- Remove the display connector.
- Remove the four screws with which the display is secured and then remove the display.

To install the display, proceed in reverse order.

1.3.17 Removing and Installing the Touch Pad for the PC FI45 V2

- Remove the membrane keyboard as described in Section 1.3.13.
- Remove the three touch pad module screws on the installation plate.
- Remove the installation plate and the copper-colored sheet-metal spring underneath.
- Take out the touch pad module and detach the flexible cord (contact side faces module).

To install the touch pad, proceed in reverse order.

1.3.18 Removing and Installing the Front Adapter Module for the PC FI45 V2

- Lower the housing of the PC FI45 V2 away from the front panel as described in Section 1.3.2, or remove the membrane keyboard as described in Section 1.3.13.
- Before you unplug all the other connectors, write down their arrangement.

Caution

Before you remove the membrane connecting cables, release the interlocks on the ports so that the contacts of the connecting cables are not damaged.

- After removing the three screws; then you can remove the front adapter module.

To install the front adapter module, proceed in reverse order.

1.4 Connecting the MPI/DP Interface

Connecting a PROFIBUS-DP Network via MPI/DP Interface

You can connect your IPC to PROFIBUS-DP networks via the optically isolated *) MPI/DP interface. The connection is established via SINEC L2 components for stationary links or via an MPI connecting cable with a length of 5 meters for non-stationary links (order no.: 6ES7001-0BF00-0AA0). SINEC L2 components and MPI connecting cables are not included with the IPC and have to be ordered separately. The MPI connecting cable (5m) can only be employed for data transfer rates up to 187.5 Kbps.

To connect your IPC to a PROFIBUS-DP network, proceed as follows:

1. Switch off your IPC.
2. Plug the connecting cable (of the SINEC L2 components or the MPI connecting cable) into the MPI/DP socket connector 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 guideline).

PROFIBUS-DP Network

You can network up to 32 devices (PC, PG, PLC 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.

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 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 Hardware Manual.

*) Optically isolated within SELV circuit

1.5 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 SIMATIC PC 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 SIMATIC PC to S5 Programmable Controllers

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

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

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

Caution

Risk of damage to the device!

The interface port may be damaged if you confuse the connections or use the wrong connecting cables. Make sure the TTY cable of the PC 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 PC and the programmable controller must be operated at the same protective ground potential.

Connecting the SIMATIC PC via an Adapter

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

Interface	Link	Connecting Cable	Adapter
TTY interface (COM1)	PC 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).

1.6 Error Diagnostics

Error	Cause	Remedy
Power-ON LED does not light up	• PC is switched off • Power supply is not properly connected	• Check power supply connections, power cable and power plug
The "Invalid configuration information... Press the F1 key for continue, F2 to run Setup utility" appears on the screen	• Incorrect configuration data • Buffer battery is low or damaged	• Press "F2" key, check the configuration data in SETUP, enter any default values, and check error messages in the first SETUP menu
The "No boot device available" appears on the screen	• There is no boot diskette in the drive • Wrong hard disk drive set in SETUP	• Use the "Fixed disk function" in SETUP
"Keyboard stuck key failure" message appears	• A key has become blocked during the system keyboard selftest	• 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 • Write-protect hole open on 3.5" diskette	• Cancel write protection
"EPROM TSR Interface disabled, check Power Management" message	• "Programming Interface" has been disabled in SETUP	• Enable "Programming Interface" in SETUP under submenu "FI Hardware options"
COM1,COM2, LPT1 or MPI/DP do not respond	• Ports have been disabled in SETUP	• Enable COM1,COM2, LPT1 or MPI/DP in SETUP under submenu "FI 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>
PS/2 port keyboard trackball does not function (FI45 V2)	• FI45 V2 PS/2 port does not support trackballs.	

Motherboard

2

Chapter Overview

2.1 Components and Interfaces

Component/ Interface	Description	Parameters
CPU - base	Slot 1 for micro processor card, up to 500 MHz	• Can be upgraded via SLOT 1 • Multimedia support • ECC
Memory	DIMM module up to max. 256 Mbyte/DIMM	• Data width 64 Bit + ECC • Module with ECC possible • 3.3 V • SDRAM according to PC100 specifications • up to 128 Mbit chip size on the module • 100 MHz bus clock • 3 DIMMs can be inserted • easy to replace • variable from 64-256 Mbyte/DIMM
Chipset	Single chip set 440LX	• SDRAM • ECC support
Hard Disk	ATA-33 mode	• Ultra DMA capable
DP12	Communication port SIMATIC S7	• optically isolated DP12 * (CP 5611 compatible) • 12Mbps
TTY	Communication with SIMATIC S5-CPUs	• Range up to 1000 m
USB	Universal Serial Bus	• high current (500mA)-USB-Port
Ethernet	10BaseT(100Base-TX	• 10/100 Mbps, Galvanic isolation *)
Floppy	Standard port for 34-pin ribbon cable	• 1.44 Mbyte
Keyboard	Port for PS2 keyboard	• Standard • Trackball supported (on PS/2 jack on side housing)
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
CD-ROM		• 24 times speed

* Galvanic isolation within the safety extra-low voltage circuit (SELV)

2.2 Processor

Which Processor Type can be Used?

Pentium III 450/500/550 MHz in slot 1
Celeron 400, 433 im Slot 1

Clock Setting S2

S2(4)	ISA Bus Frequency	PCI Bus Frequency	CPU Bus Frequency
on	8.25MHz	33MHz	66MHz
off	**8.25MHz**	**33MHz**	**100MHz** [1)]

1) Frequency is dependent on the processor and is set automatically e.g. 100 MHz for Pentium III.

Warning

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

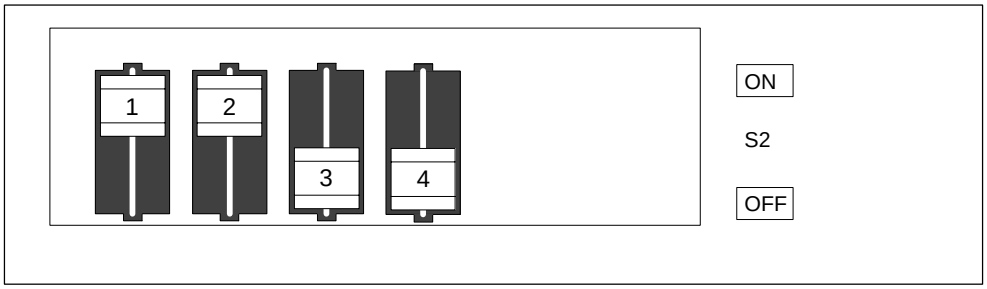


Figure 2-1 Standard Setting of the Switches S2

2.3 Memory

If ECC submodules are not mixed up with ECC submodules, the memory will work without ECC fuse or correction.

Organization	Size in MByte	Type	Access-Time/ Frequency
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 128 Mbit 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 mains.
2. Unscrew the housing and remove the cover (see Chapter 1.3.5).
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 VGA Onboard

Brief Description

The graphics interface module of the motherboard is a AGP implementation; that is, the SVGA-LCD controller Chips and TE69000 is located on the board and connected to the AGP bus. Its refresh memory has a backup capacity of 2 MB which cannot be upgraded.

Supported Resolutions

Two mode types are supported:

- standard modes and
- extended modes

Note

Some monitors do not support all modes. Your monitor automatically uses the highest vertical scan frequency.

2.5 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, proceed as follows:

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

2.6 Block Diagram of the Motherboard

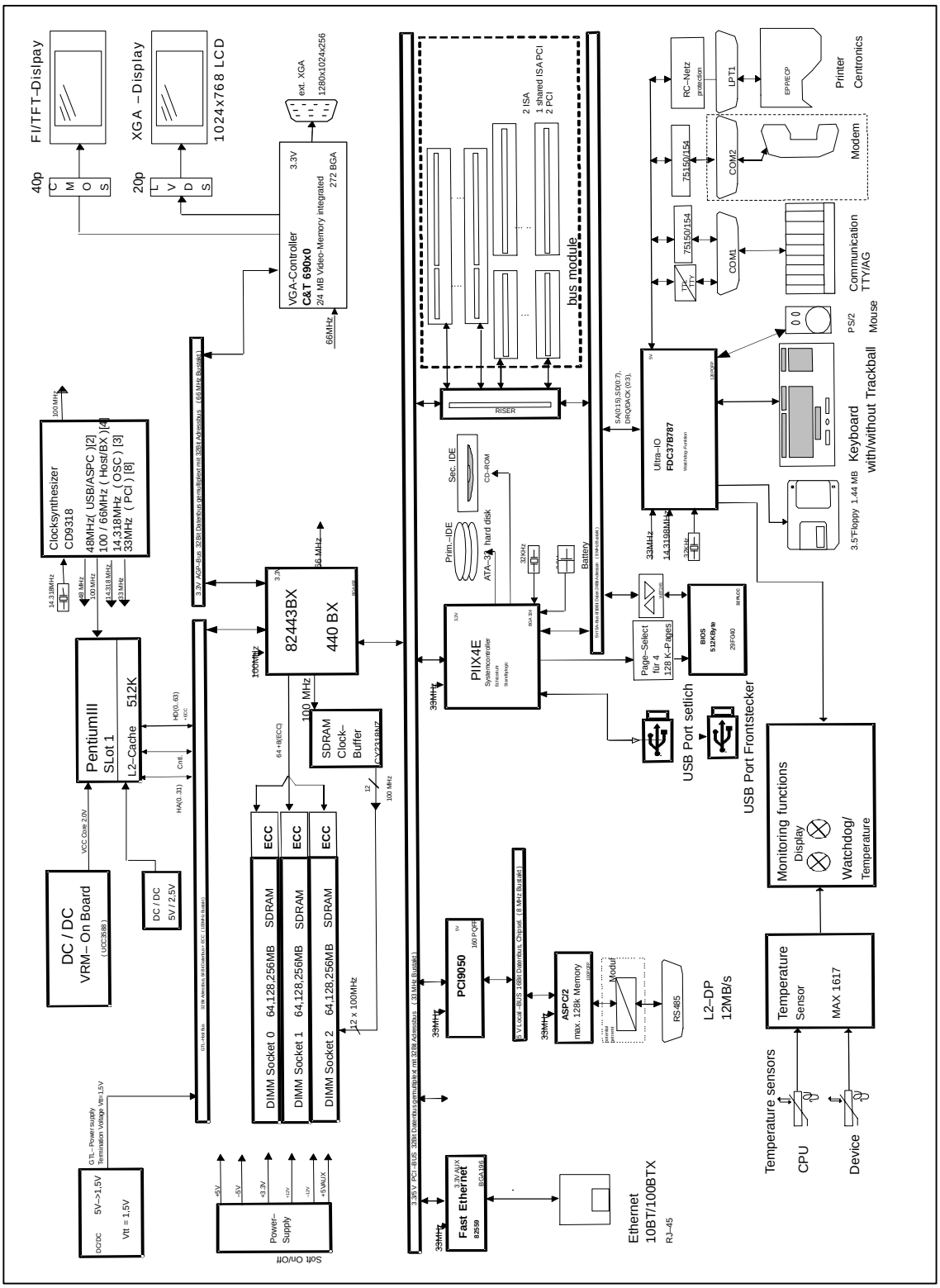


Figure 2-2 Motherboard

2.7 Hardware Ports

Position of Connectors and Switches

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

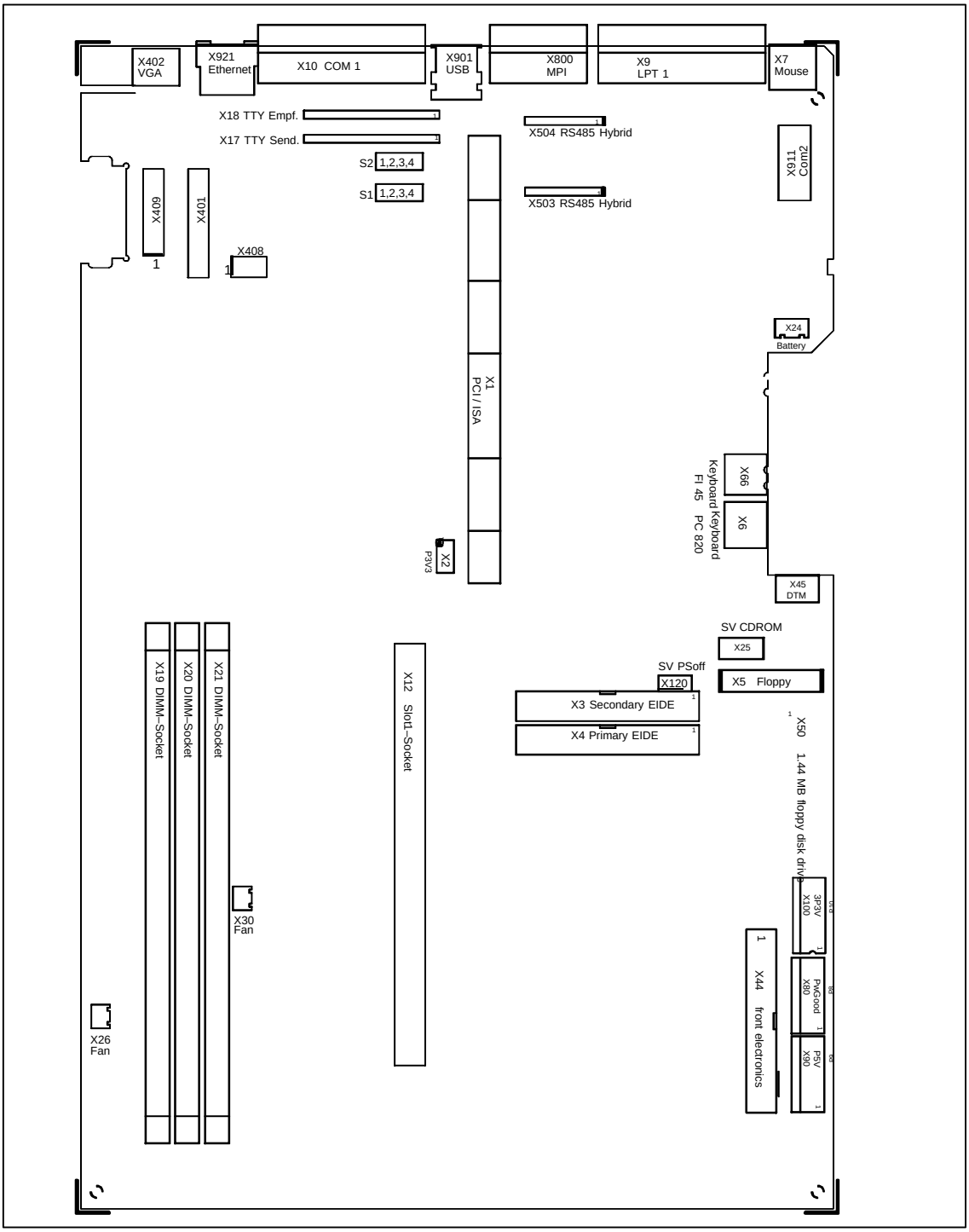


Figure 2-3 Motherboard: Position of Connectors and Switches

Ports		
Floppy X5	internal	360 Kbyte, 720 Kbyte, 1.2 Mbyte, 1.44 Mbyte 3F0h-3F7h, 370h-377h, disconnectable IRQ 6, edge triggered 26-pin, membrane cable plug
Hard disks X4 CD-ROM X3	internal	170h-177h, 1F0h-1F7h, disconnectable IRQ14, IRQ15, edge triggered 2*39-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 X11 X911	at rear internal	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 connected via ribbon cable with x911
MPI/DP X800	at rear	disconnectable PCI PNP supported 9-pin, standard socket connector (CP 5611 compatible)
Keyboard, trackball integrated X6	internal	060h-064h IRQ1, edge triggered 6-pin, mini Din socket Trackball connection integrated (Box PC 820)
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
Display X401	internal	CMOS display interface, 40-pin, plug connector
Display X409	internal	LVDS display interface, 20-pin, plug connector
VGA X402	at rear	Standard VGS (15 pin)
USB X901	at rear	Highcurrent, PCI PNP is supported 4 Pin USB-interfaces
Ethernet X921	at rear	PCI PNP is supported RJ45-socket with twoLEDs (active, Token)

Special Connector, Switch		
X1	internal	EISA socket connector for direct connector (ISA; PCI signals)
X12	internal	Slot 1 for Pentium III
X17	internal	Socket for TTY send submodule
X18	internal	Socket for TTY receive submodule
X19, X20, X21	internal	3 DIMM sockets, 64bit + 8 bit ECC
X2	internal	3,3 V for PCI-Bus
X24	internal	Connector for lithium battery
X25	internal	Power supply for CD-ROM drive
X26, X30	internal	Fan supply, 2 connectors (2-pin)
X44	internal	Combination plug for front electronics 40 pin, pin for 2.54 mm ribbon cable connection
X45	internal	Direct key module
X408	internal	Display voltage
X503	internal	MPI submodule 10-pin socket
X504	internal	MPI submodule 10-pin plug connector
X66	internal	060h-064h edge triggered 6 pin mini D-jacks FI45 keyboard connector on housing (no trackball support)
S2	Switch 2	CPU-Tact, Flash EPROM, TTY interface
S1	Switch 2	Display type, backlight

2.8 Assignment of Connectors and Ports

2.8.1 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

2.8.2 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	ma-ster#	17	eth_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 when jumper X2 pins 1, 3, 5, 7 are connected with pins 2, 4, 6, 8.

2.8.3 Battery Connection, X24

Pin No.	Description
1	+
2	–

2.8.4 Internal Keyboard / Mouse / Inverter Connection for FI45, X44

Pin No.	Signal	Description
1	VCC	+5V (with multifuse)
2	GND	Ground
3	KBD_CLK	Keyboard clock line (front connection)
4	GND	Ground
5	KBD_DATA	Keyboard data line (front connection)
6	GND	Ground
7	VCC	+5V (with multifuse)
8	n.c.	Coding
9	MAUS_DATA	PS/2 mouse data line (front)
10	MAUS_CLK	PS/2 mouse clock line (front)
11	V_{in}	12V power supply for inverter (with multifuse)
12	ON/OFF	On/Off signal (TTL), ‘1’ = ON, ‘0’ = OFF
13	BL_CTRL1	Backlight brightness 1
14	BL_CTRL2	Backlight brightness 2
15	BL_CTRL3	Backlight brightness 3
16	GND	Ground
17	EXTRES_N	External Reset
18	MPI	MPI/DP Operation indicator
19	ETH_LED	Ethernet operation indicator
20	TEMP_R	Temperature monitoring LED red
21	TEMP_G	Temperature monitoring LED green
22	WDT_RED	Watchdog LED red
23	WDT_GRN	Watchdog LED green
24	DTAST_DAT	Data signal for direct key module
25	DTAST_LATCH	Latch signal for direct key module
26	DTAST_CLCK	Clock signal for direct key module
27	KCLK_EXT	Keyboard clock line (Box connection)

Pin No.	Signal	Description
28	VCC	+5V (with multifuse)
29	GND	Ground
30	KDAT_EXT	Keyboard data line (box connection)
31	EXTRES_N	External reset
32	3,3 V	+3.3 V (with multifuse)
33	3,3 V	+3.3 V (with multifuse)
34	VCC	+5V (with multifuse)
35	GND	Ground
36	MPI	MPI/DP Operation indicator
37	USB_1M	–Data (USB-interface on the front)
38	USB_1P	+Data (USB-interface on the front)
39	PWR_LED	Power LED on the front
40	HD CD_LED	Hard disk drive, active CDROM (Display LED on the front)

2.8.5 Direct Key Module (Internal Box) FI45, X45

Pin-Nr.	Signal	Bedeutung
1	GND	Ground
2	DTAST_CLCK	Clock signal for direct key module
3	GND	Ground
4	DTAST_LATCH	Latch signal for direct key module
5	GND	Ground
6	DTAST_DAT	Data signal for direct key module

2.8.6 Internal Keyboard Connection for Box PC 820, X6

Pin no.	Signal	Description
1	KBD_DATA	Keyboard data line
2	MOUSE_DATA	PS/2 mouse data line
3	GND	Ground
4	VCC	+5V (with multifuse)
5	KBD_CLK	Keyboard clock line
6	MOUSE_CLK	PS/2 mouse clock line

2.8.7 Internal COM2 Interface, X911

Pin no.	Signal	Description
1	DCD	data carrier detect
2	DSR	data set ready
3	RxD	receive data
4	RTS	request zo send
5	TxD	transmit data
6	CTS	
7	DTR	data terminal ready
8	RI	ring indicator
9	GND	GND
10	+5V	+5V supply voltage

2.8.8 Voltage Supply for CD-ROM Drive, X25

Pin no.	Description
1	+12V
2	GND
3	GND
4	+5V

2.8.9 Setting the Power Supply for the Display, X408

Plug-in Jumper	Description
1–2	5V voltage supply
2–3	3.3V voltage supply

2.8.10 CMOS (Universal) Interface for TFT Displays, X401

Pin no.	Signal	Description	Pin no.	Signal	Description
1	GND		2	CK	Clock signal for scanning the data signals
3	GND		4	GND	
5	Hsync	Horizontal synchronous pulse	6	Vsync	Vertical synchronous pulse
7	GND		8	R0	Data signal for RED (LSB)
9	R1	Data signal for RED)	10	R2	Data signal for RED)
11	R3	Data signal for RED)	12	R4	Data signal for RED)
13	R5	Data signal for RED) (MSB)	14	GND	
15	GND		16	GND	
17	G0	Data signal for GREEN)	18	G1	Data signal for GREEN
19	G2	Data signal for GREEN	20	G3	Data signal for GREEN
21	G4	Data signal for GREEN	22	G5	Data signal for GREEN (MSB)
23	GND		24	GND	
25	GND		26	B0	Data signal for BLUE (LSB)
27	B1	Data signal for BLUE	28	B2	Data signal for BLUE
29	B3	Data signal for BLUE	30	B4	Data signal for BLUE
31	B5	Data signal for BLUE (MSB)	32	GND	
33	GND		34	GND	
35	ENAB	Enable data signal	36	VCC	Voltage supply (3.3V / 5V)
37	VCC	Voltage supply (3.3V / 5V)	38	n.c.	
39	DISPON	Display On	40	reserved	Standard: n.c.)*

)* When fitted with R458, there is a +5V power supply at pin 40.

2.8.11 LVDS Interface (Single Chip LVDS), X409

Pin no.	Signal	Description
1	VCC	3.3V / 5V voltage supply
2	VCC	3.3V / 5V voltage supply
3	GND	GND
4	GND	GND
5	RXIN0–	LVDS input signal bit 0 (–)
6	RXIN0+	LVDS input signal bit 0 (+)
7	GND	GND
8	RXIN1–	LVDS input signal bit 1 (–)
9	RXIN1+	LVDS input signal bit 1 (+)
10	GND	GND
11	RXIN2–	LVDS input signal bit 2 (–)
12	RXIN2+	LVDS input signal bit 2 (+)
13	GND	GND
14	RXCLKIN–	LVDS clock signal (–)
15	RXCLKIN+	LVDS clock signal (+)
16	GND	GND
17	Res.	Not connected (reserved)
18	Res.	Not connected (reserved)
19	GND	GND
20	GND	GND

2.8.12 Selection of Display Type / Polarity of Backlight-On Signal (Switch S1)

S1-4	S1-3	S1-2	S1-1	Display type
	on	on	on	reserved
	on	on	off	1280 x 1024, TFT
	on	off	on	reserved
	on	off	off	reserved
	off	on	on	640 x 480, TFT (Sharp)
	off	on	off	640 x 480, TFT (non Sharp)
	off	off	on	1024 x 768, TFT (standard setting)
	off	off	off	800 x 600, TFT

2.8.13 VGA

The VGA socket connector has the following pinout:

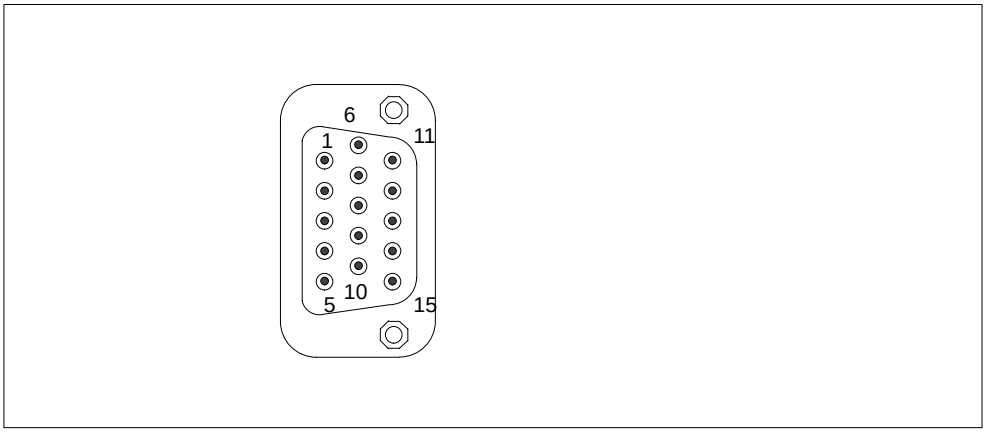
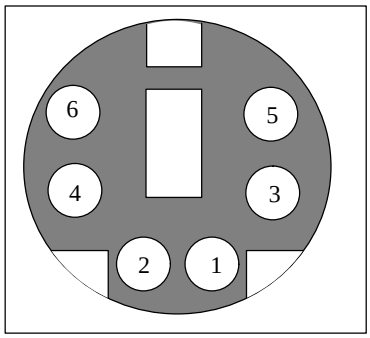


Figure 2-4 VGA Socket Connector

Pin	Description	Pin	Description
1	Video signal red	9	Code (no pin)
2	Video signal green	10	Ground synchronisation
3	Video signal blue	11	Display ID Bit 0
4	Display ID Bit 2	12	Display ID Bit 1
5	Ground	13	Horizontal synchronisation
6	Ground red	14	Vertical synchronisation
7	Ground green	15	Display ID Bit 3
8	Ground blue		

2.8.14 PS/2 Mouse Connection, X7

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



View of socket connector

Figure 2-5 Connecting Cable for the Mouse

2.8.15 Keyboard-Mouse Connection, X6

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

2.8.16 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)	Output
10	-TTY Receive data (RxD)	Input	23	unassigned	
11	unassigned		24	unassigned	
12	unassigned		25	unassigned	
13	unassigned		Housing	Ground	

2.8.17 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

2.8.18 Assignment for the Floppy, X50

Pin No.	Description	Pin No.	Description
1	P5V	2	Index
3	P5V	4	DS_N0
5	P5V	6	DCHG_N
7	NC	8	NC
9	HDOUT	10	MOT_N0
11	HDIN	12	DIR_SL_N
13	NC	14	STEP_N
15	Ground	16	WR_DAT_N
17	Ground	18	WR_GAT_N
19	EDOUT	20	TRACK_N0
21	EDIN	22	WR_PRT_N
23	Ground	24	RD_DAT_N
25	Ground	26	SIDE_1_N

2.8.19 Assignment of the COM 2 Port, X11

The interface is connected from the basic module (X911) to the black plane by a ribbon cable.

Pin No.	Description	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	+5V

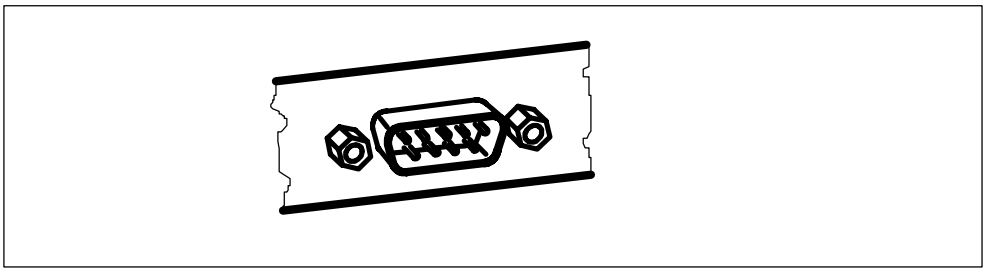


Figure 2-6 Serial COM 2 Port

2.8.20 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

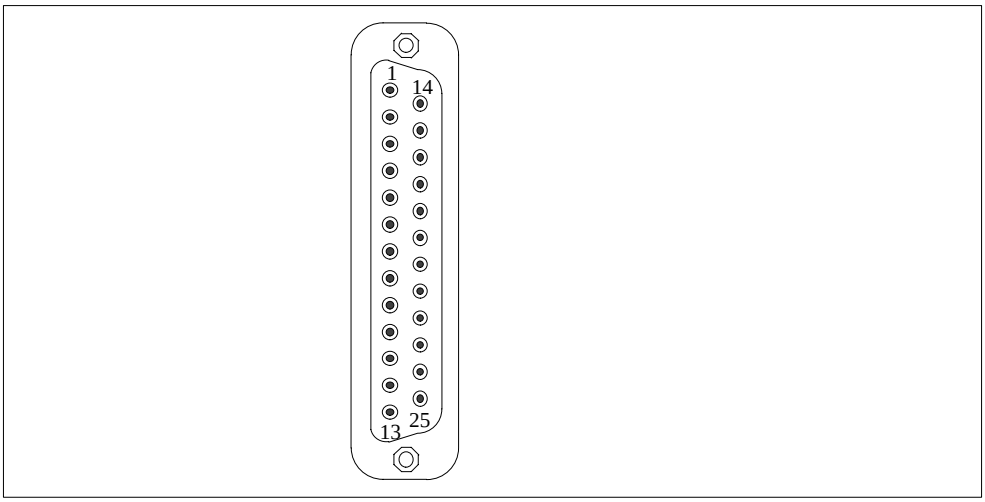


Figure 2-7 LPT 1 Parallel Port

2.8.21 Assignment of the PS/2 Power Connector, X80

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

2.8.22 Assignment of the PS/2 Power Connector, X90

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

2.8.23 Assignment of the PS/2 Power Connector, X100

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

2.8.24 Assignment of the PS/2 Power Connector, X120

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

2.8.25 Assignment of the Fan Supply, X26, X30

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

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

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

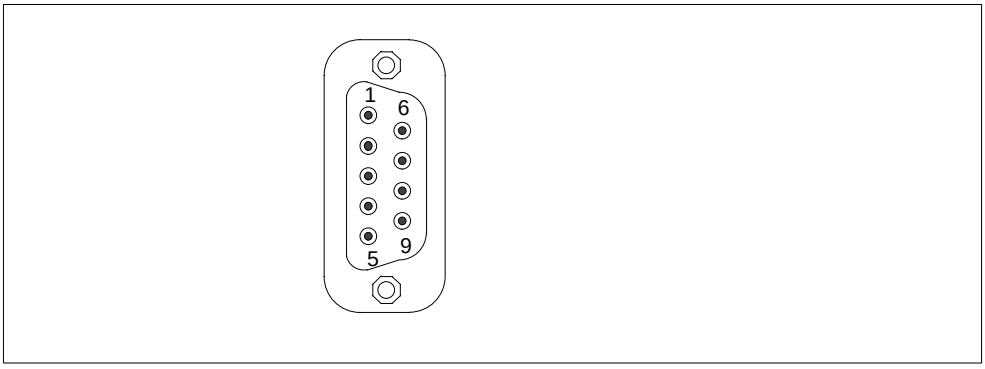


Figure 2-8 MPI/DP Socket Connector

2.8.27 Ethernet RJ45 Connection, X921

Pin No	Meaning
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

2.8.28 USB (two high current USB Interfaces Type A), X901

Pin No.	Meaning
1	VCC (500 mA max. current)
2	- Data
3	+ Data
4	Ground

2.8.29 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 funtion described.

BIOS Source File

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 Front Side Bus Frequency S2

S2(4)	ISA Bus Frequency	PCI Bus Frequency	CPU Bus Frequency
on	8.25MHz	33MHz	66MHz
off	**8.25MHz**	**33MHz**	**100MHz** [1)]

1) Frequency is dependent on the processor and is set automatically e.g. 100 MHz for Pentium III.

2.9 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	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	Vacant	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	MPI/DP	P&P **)	INT72H
IRQ 11	Reserved for SafeCard on motherboard	Reserved	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 Onboard MPI/DP interface is Plug&Play capable, the occupied resources are managed by the BIOS.

2.10 Hardware Addresses

2.10.1 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	Reserved (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	Reserved (Sound)	Vacant
0340	035F	Reserved for HIGRAPH Host interface, otherwise vacant	Reserved / vacant
0360	036F	Generally not used	Vacant

Address From	To	Assignment	Remark
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		
10C0	10EF		

2.10.2 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.

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	000D FFFF	148k	VGA BIOS expansion and system resources. The available area above 000C 7FFF depends on the system equipment.	VGA
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)	

2.11 Monitoring Functions

2.11.1 Overview

The following individual functions are available:

- Temperature monitoring and over/under temperature display
- Watchdog

Monitoring module messages can be forwarded to an application.

SOM 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 SOM programs on this CD *Documentation and Drivers*.

2.11.2 Status displays

LED Indicators

The LEDs have the following significations:

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 /Temperature Display and Fan Control

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 separately (via driver or program SOM).

An error causes one of the following reactions:

Reaction	Option
TempLED from GREEN to RED	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 (via driver or SOM program).

Watchdog Reactions

If the watchdog is not triggered within a preset time interval (by driver or SOM program), the following reactions occur:

Reaction	Option
RUN LED changes from GREEN to RED	always
Canceling WD	always
Initiating of PC reset	can be set
Transmitting IRQ to PC	can be set

Reactions can be configured with the driver or SOM program.

Watchdog Monitoring Times TWD

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

Note

If you modify the WD time after the Watchdog has been activated (that is, during Watchdog execution), the Watchdog is retriggered!

2.11.5 SW Interfaces

Overview

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

2.12 Interrupt Assignment (Hardware)

Interrupt	Description
NMI	Expansion slots signal I/O channel
IRQ 0	Internal timer (system clock)
IRQ 1	Keyboard buffer full
IRQ 2	Cascading of interrupt controller 2
IRQ 3	Serial port 2 (COM2) can be enabled via Setup
IRQ 4	Serial port 1 (COM1/TTY) can be enabled via Setup
IRQ 5	
IRQ 6	Floppy
IRQ 7	Parallel port 1 /printer port LPT1/EPP/ECP) can be enabled via Setup
IRQ 8	Battery-backed real-time clock
IRQ 9	VGA controller usually unassigned
IRQ 10	MPI (recommended for Plug & Play), can be enabled via Setup
IRQ 11	Reserved for SafeCard on motherboard (SOM)
IRQ 12	S/2 Mouse/keyboard trackball can be enabled via Setup if no need for mouse or trackball function.
IRQ 13	Arithmet. coprocessor error
IRQ 14	Primary IDE interface
IRQ 15	Secondary IDE interface

2.13 DMA Channels

DMA Channel	Data Transfer	Description
0	8/16 bit	
1	8/16 bit	
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

2.14 Changing the System Configuration with BIOS SETUP

Changing the Configuration

The 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 PC 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.

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 (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 Box PC 820 / PC FI45   V08.01.02

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: [Fujitsau MPD3043AT-DM]
ATAPI CD-ROM: [Toshiba CD-ROM VM 1902B]

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.

Je nach Geräteausstattung können die Voreinstellungen von den vorliegenden Bildern abweichen. The following screen form appears when you start the BIOS setup:

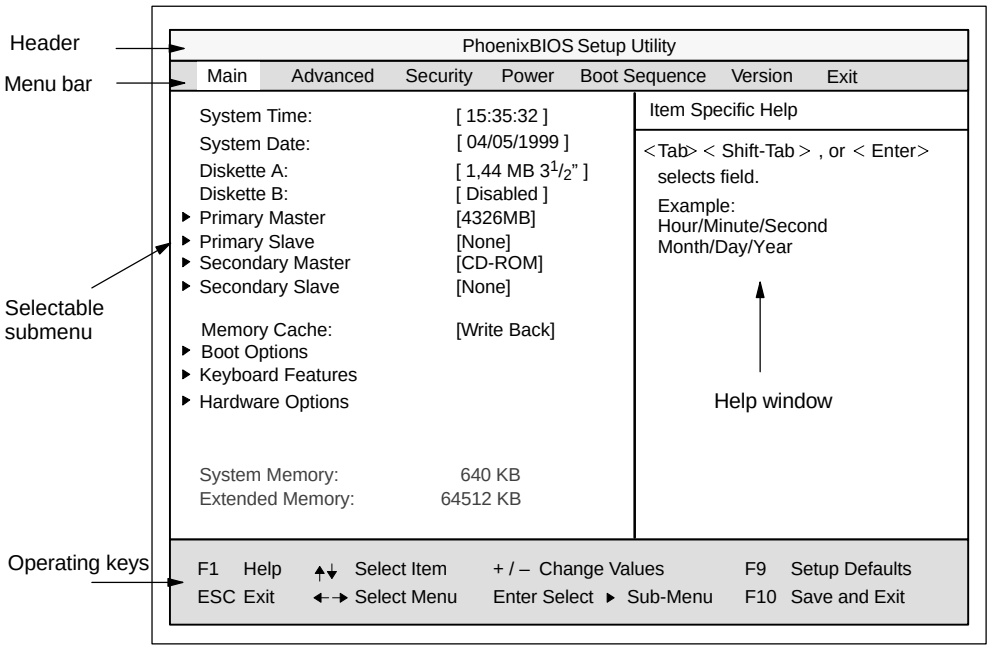


Figure 2-9 Main SETUP Menu

Menu Structure

The screen is divided into four parts. In the top part, you can select the menu forms [Main], [Advanced], [Security], [Power], [Boot Sequence], [Version], [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
Boot Sequence	The order of possible bootable devices is determined here.
Version	Device-specific information is displayed 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.

2.14.1 The Main Menu

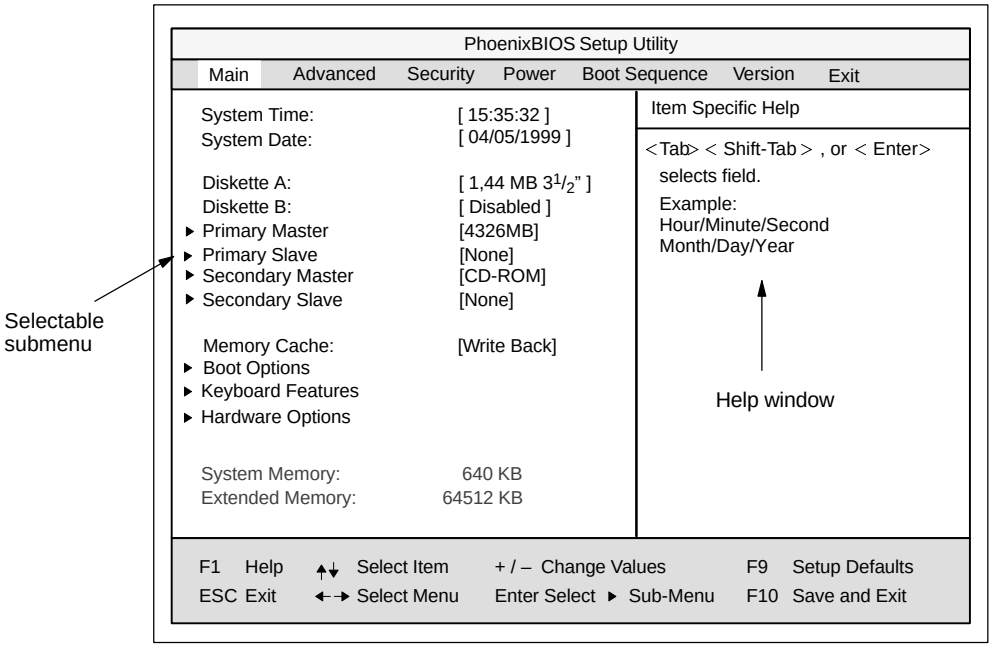


Figure 2-10 Main SETUP Menu

Settings in the Main Menu

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

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

System Time and System Date *(Time and Date)*

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

`Hour:Minute:Second` and the date

`Month/Day/Year`.

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

Diskette A/ Diskette B *(Floppy Disk Drive)*

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

[Disabled]	If a diskette drive is not fitted (standard setting for diskette drive B)
[360 Kbyte,5 1/4”]	
[1.2 Mbyte,5 1/4”]	
[720 Kbyte,3 1/2”]	
[1.44 Mbyte, 3 1/2”]	Standard setting for installed diskette drive A
[2.88 Mbyte, 3 1/2”]	

Option “Primary / Secondary”

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

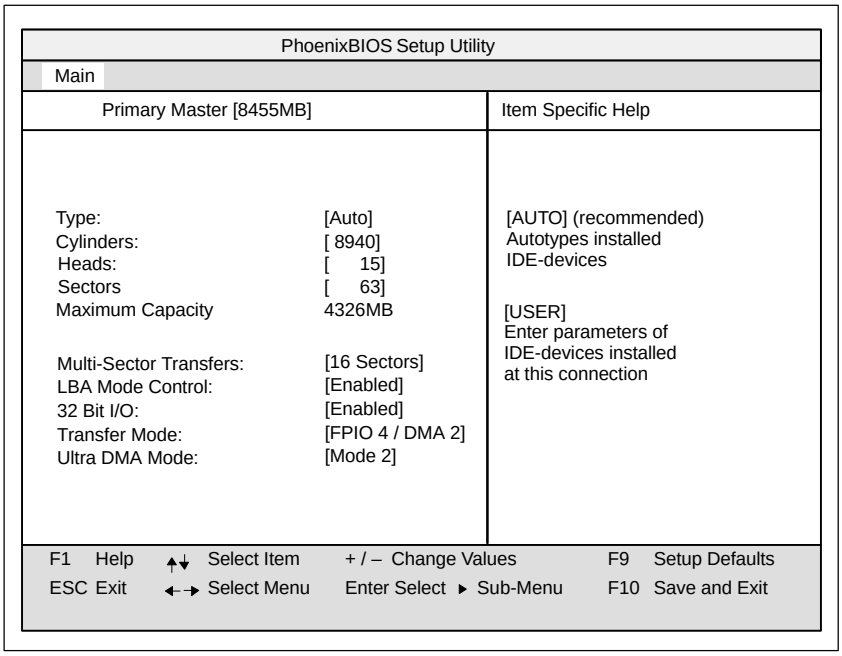


Figure 2-11 Example: “Primary Master”

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

2,4,6,8,16  sectors
```

Option "LBA Mode Control"

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

Option "32 Bit I/O"

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

```
Disabled    16-bit access

Enabled     32-bit access
```

Option "Transfer Mode" 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.

Option “Memory Cache”

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

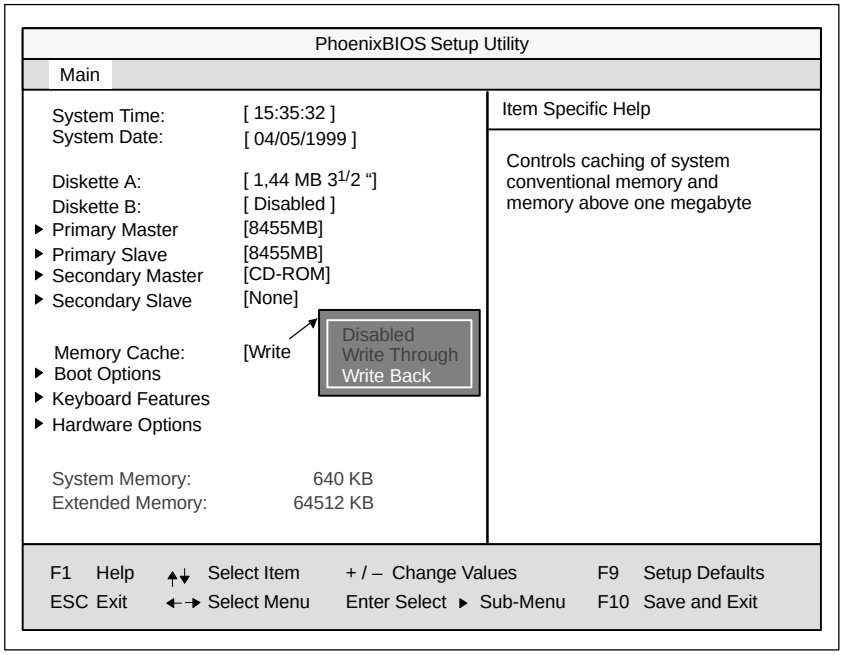


Figure 2-12 Example: “Memory Cache” Submenu

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:

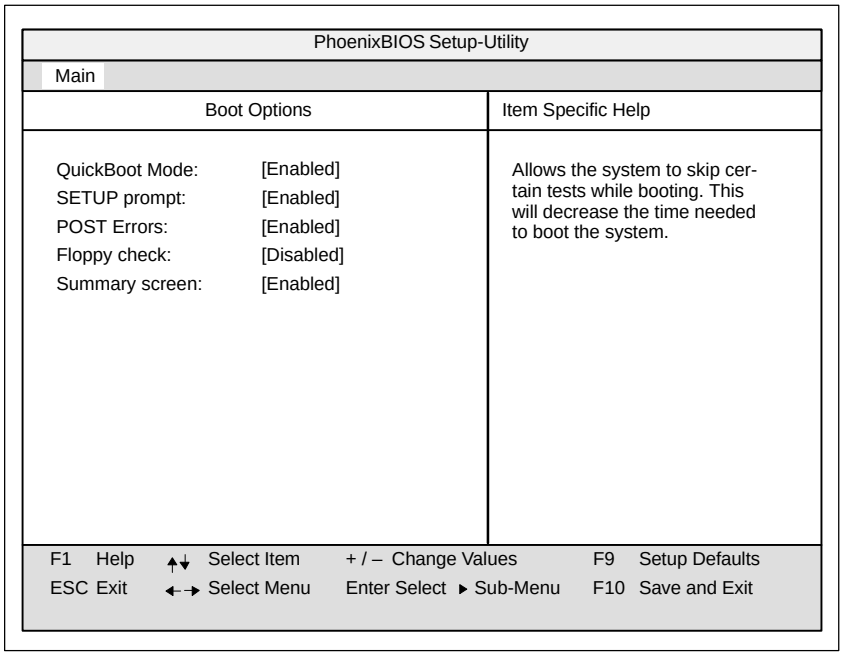


Figure 2-13 ”Boot Options” Submenu

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.

Option “Keyboard Features”

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

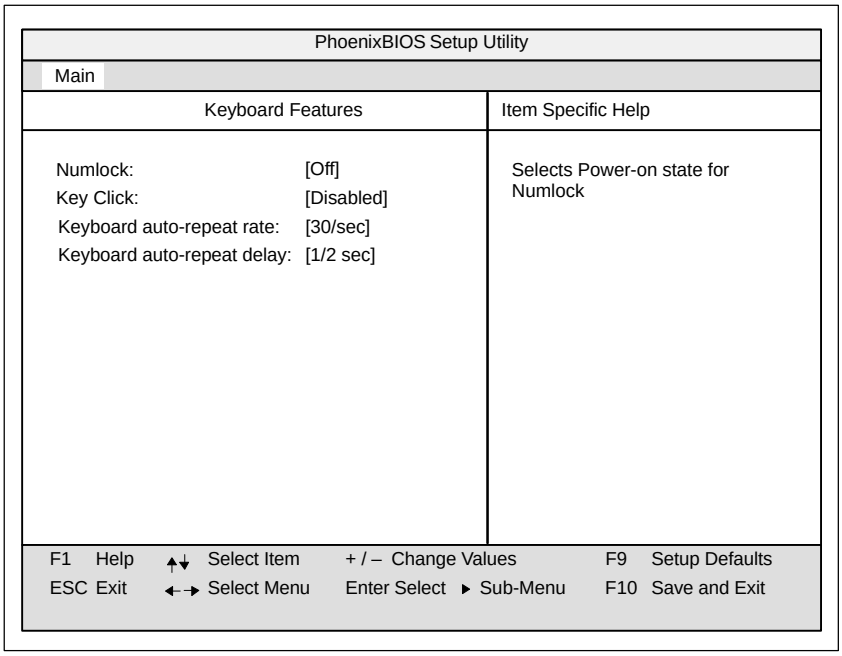


Figure 2-14 “Keyboard Features” Submenu

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:

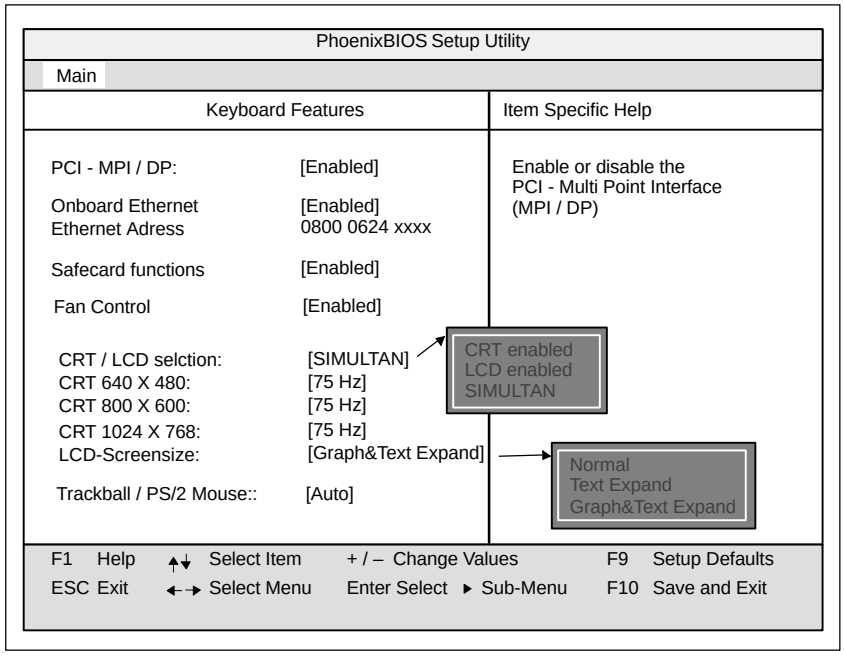


Figure 2-15 “Hardware Options” Submenu

The parameters of the interfaces present on the motherboard 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 [Disabled] Ethernet deactivated. The Ethernet interface hardware is turned off. It is not possible to operate the interface within the operating system. [Enabled] Ethernet activated. It is possible to plug in and operate the network cable at any time later during operation (hot plug). If no cable is plugged in when the system starts up, the device checks whether or not an Ethernet cable is inserted for about 30 seconds when it first boots and for about 40 seconds after returning from the suspend mode. If there is an active network connection, there are no noticeable delays. [Auto] When you boot, the system checks whether or not a network is attached. If a network is found, the Ethernet interface remains activated. If no network is found, the Ethernet interface is deactivated. When you boot, the status of the Ethernet hardware is displayed in the Summary Screen. If you plug in the cable later during operation, you must first reboot the system before you can use the network. A hot plug is not possible with this setting.
Ethernet Adress *)	The individual, specific Ethernet 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
Fan control	[Disabled] Fan rotates at full speed [Enabled] Fan is temperature controlled
CRT / LCD selection	LCD [Enabled] All data are only output on the internal LCD, the 15-way VGA interface is disabled. CRT [Enabled] For the highest resolution the display signals are only output to the 15-way VGA interface, the LCD interface of the VGA controller is disabled. [SIMULTAN] Both display interfaces are run simultaneously. Not all resolutions are then possible on the LCD.
CRT 640 x 480	Picture refresh rate with a resolution of 640 x 480 pixels
CRT 800 x 600	Picture refresh rate with a resolution of 800 x 600 pixels
CRT 1024 x 768	Picture refresh rate with a resolution of 1024 x 768 pixels

Entry	Function	
LCD Screensize	[Normal]	The representation in Text and Graphic modes is not expanded to the full screen size.
	[Text expand]	Only the Text modes are expanded to the full screen size.
	[Graph&Text expand]	The Graphic+Text modes are expanded to full screen size.
Trackball / PS/2 mouse	Internal	The PS/2 interface is active. The IRQ 12 is occupied.
	External	The PS/2 interface is active. The IRQ 12 is occupied. The keyboard trackball is disabled.
	Disabled	The PS/2 interface is inactive, IRQ12 is available.

2.14.2 The Advanced Menu

Menu Structure

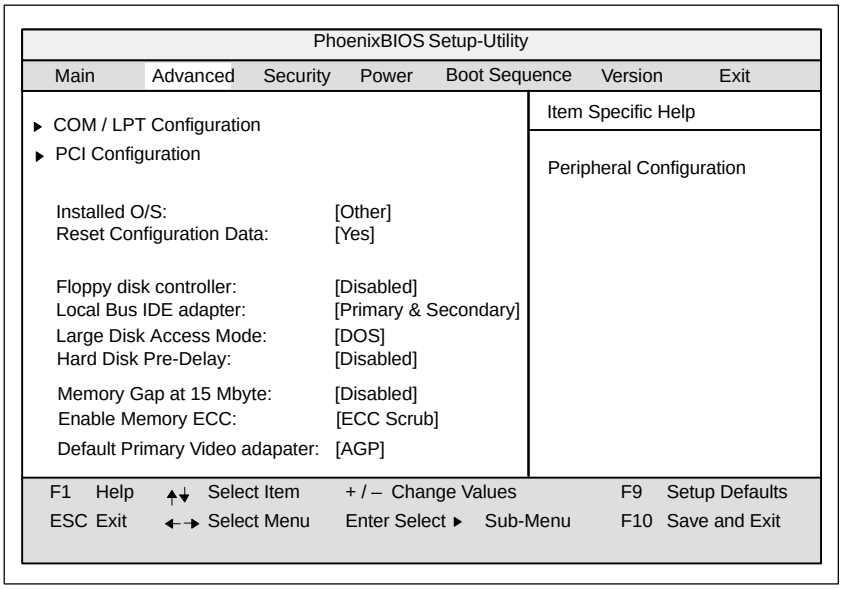


Figure 2-16 “Advanced” Menu

Settings in the Advanced Menu

Installed O/S	means that fitted modules are automatically recognized and installed provided they support plug & play functions.	
	[Other]	The BIOS handles the complete plug & play facilities
	[Win98]	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	Enable or disable the floppy controller of the basic module.	
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 Pre Delay	[Disabled] 3 to 30	No additional startup time for hard disk Additional startup time for the hard disk can be selected
Memory Gap at 15 MByte	[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	[Disable] [ECC Scrub]	No “Error checking and correction” “Error checking and correction” are active Only meaningful in connection with DIMM cards with ECC
Default Primary Video Adapter	[AGP] [PCI]	AGP-Slot on the motherboard is the main VGA output interface Module in PCI-Slot is VGA output interface

Submenu COM/LPT Configuration

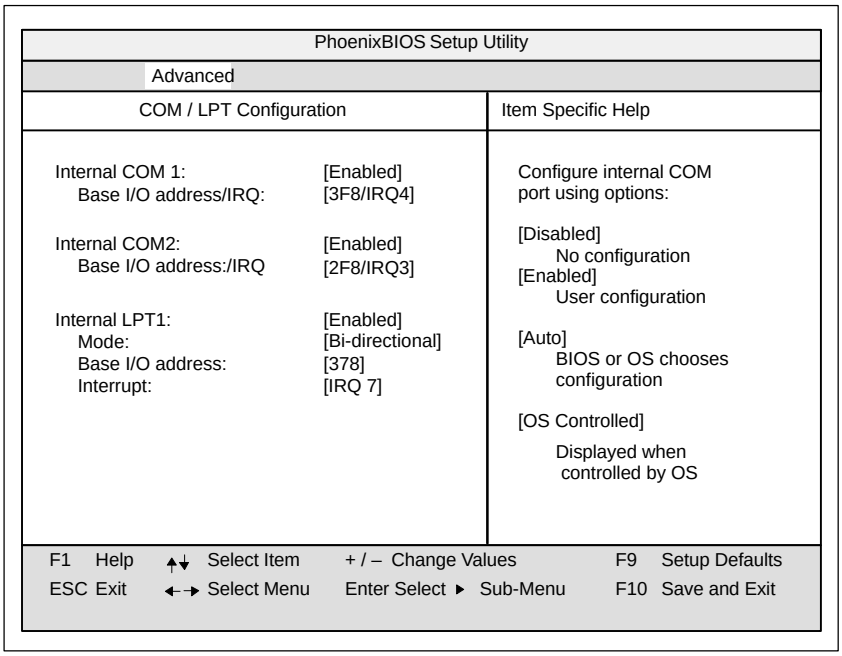


Figure 2-17 “COM / LPT Configuration” Submenu

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

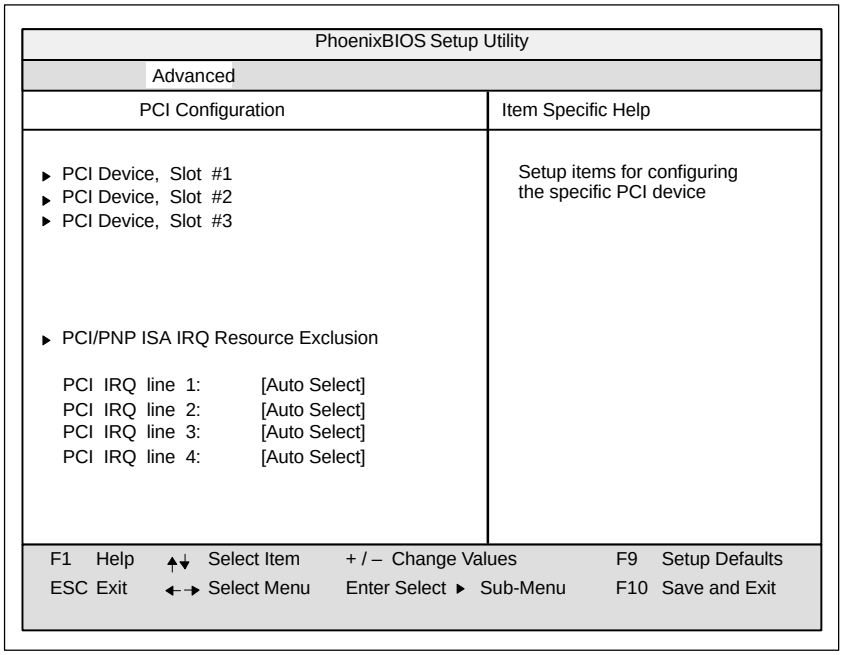


Figure 2-18 “PCI Configuration” Submenu

Option “PCI Devices”

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

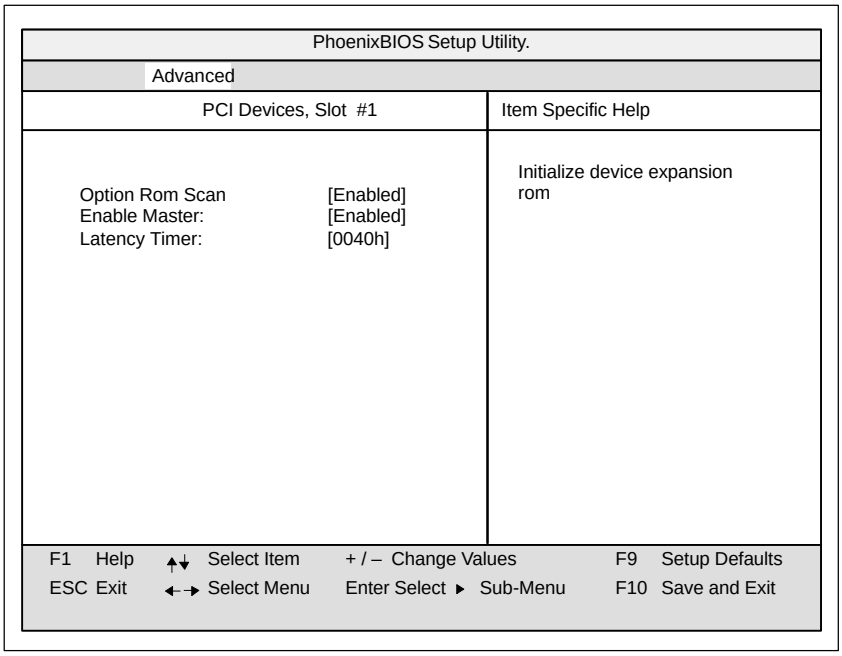


Figure 2-19 ”PCI Devices, Slot #1” Submenu

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.

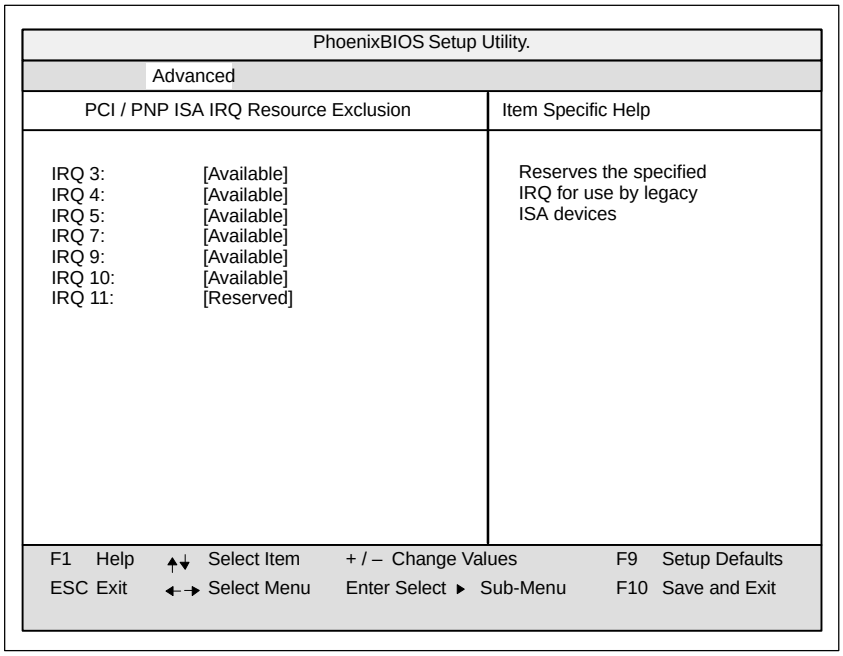


Figure 2-20 “PCI / PNP ISA IRQ Resource Exclusion” Submenu

IRQ11 is reserved for SafeCard functions.

Option “PCI IRQ Line”

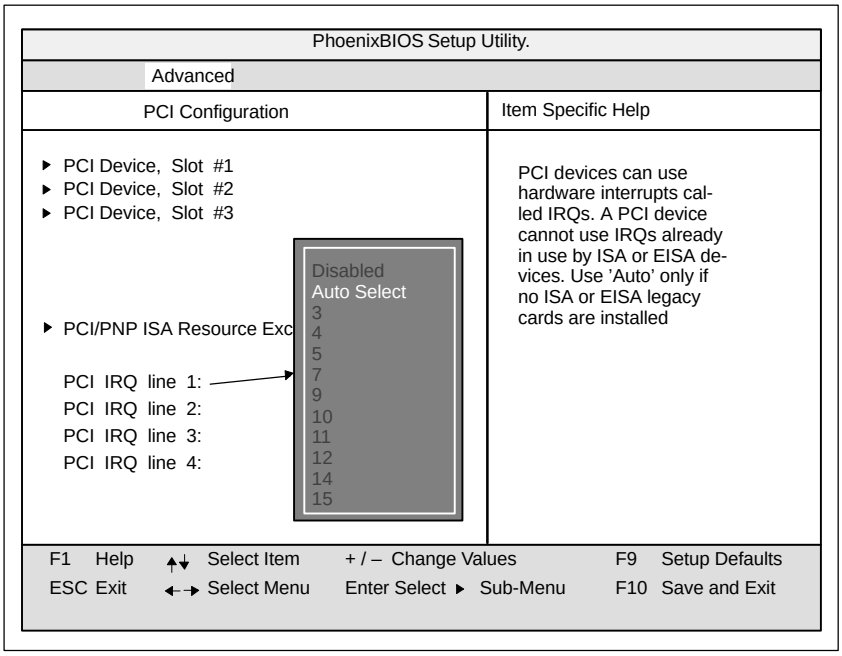


Figure 2-21 “PCI Configuration” Submenu

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 Line to the PCI Slots.

Slot 1	PCI module interrupt
PCI IRQ Line 1	INT - A
PCI-IRQ Line 2	INT - B
PCI IRQ Line 3	INT - C
PCI IRQ Line 4	INT - D
Slot 2	PCI module interrupt
PCI IRQ Line 1	INT - B
PCI-IRQ Line 2	INT - C
PCI IRQ Line 3	INT - D
PCI IRQ Line 4	INT - A
Slot 3	PCI module interrupt
PCI IRQ Line 1	INT - C
PCI-IRQ Line 2	INT - D
PCI IRQ Line 3	INT - A
PCI IRQ Line 4	INT - B

2.14.3 The Security Menu

Summary

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

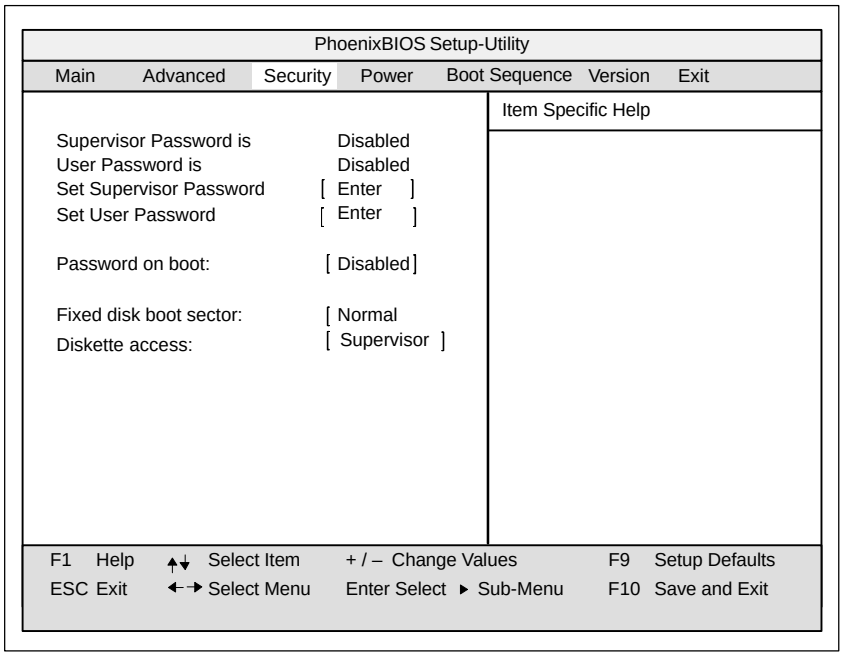


Figure 2-22 “Security” Submenu

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 only valid for LS 120 drives	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.

2.14.4 The Power Menu

Summary

This menu has the following structure:

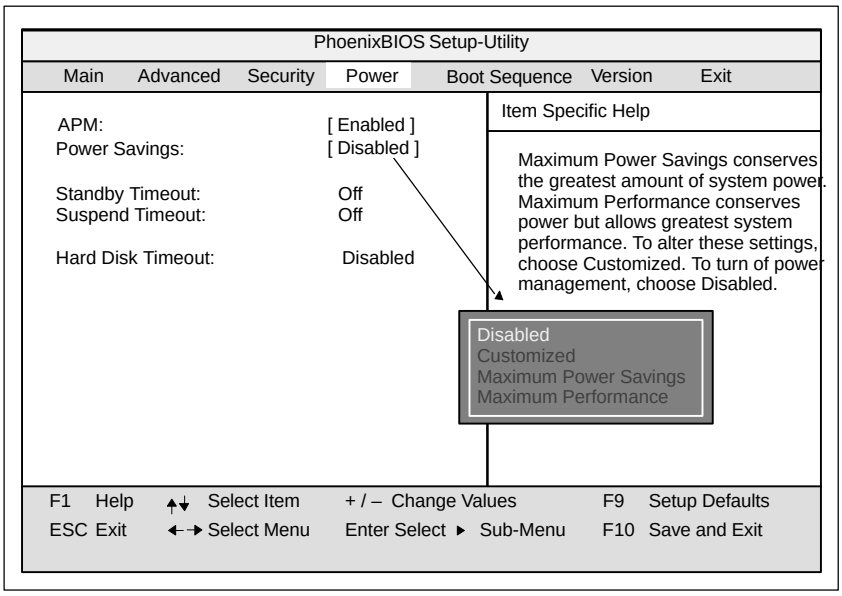


Figure 2-23 ”Power” Menu

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

APM	[Enabled]	Permits the switching off of system resources not required by the operating system.
	[Disabled]	APM (advanced power management) access not permissible for operating system.
Power Savings	[Disabled]	No power saving functions
	[Customize, Maximum Power Savings, Maximum Performance]	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]	No standby mode
	[5, 10, 15, 20, 30, 40, 60]	...minutes after your PC goes to standby mode
Suspend Timeout	[Off]	No suspend mode
	[5, 10, 15, 20, 30, 40, 60]	...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, COM 1/2, 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.

2.14.5 The Boot Sequence Menu

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

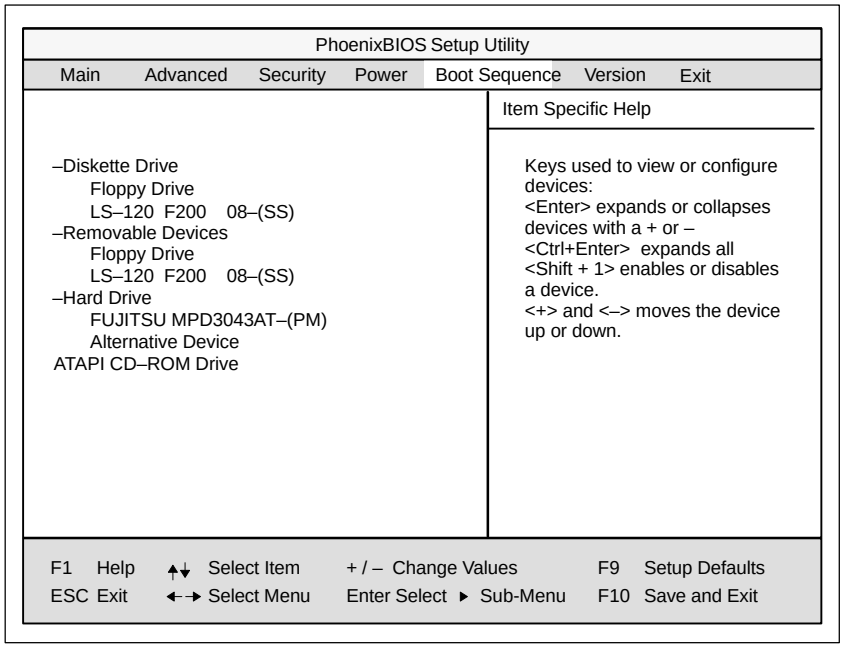


Figure 2-24 Example: “Boot Sequence” Menu

Removable Devices	Describes ATAPI drives such as the LS120.

2.14.6 The System Version Menu

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

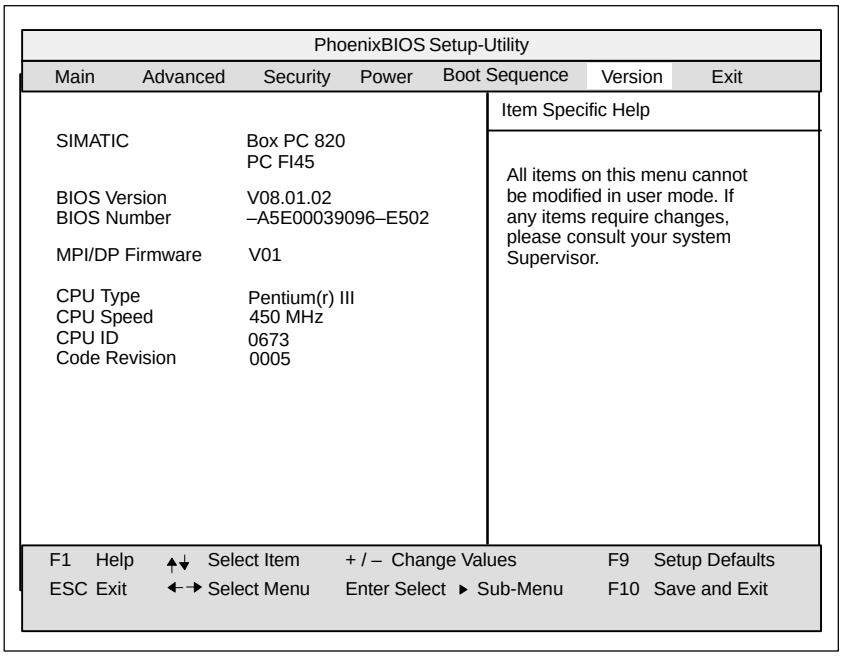


Figure 2-25 Example: “Version” Menu

2.14.7 The Exit Menu

Summary

The setup program is always terminated using this menu.

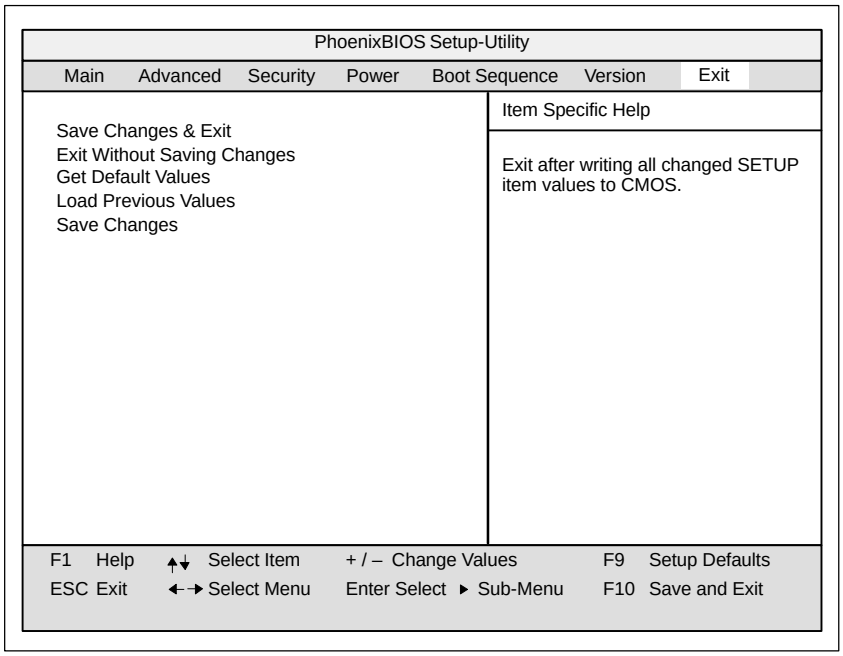


Figure 2-26 ”Exit” Menu

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	Saving of all setup entries.

Documenting your System Configuration

If you have made any modifications to your standard SETUP settings, you can enter them in the following table. You 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	3.5 in., 1.44 Mbyte	
Diskette B	Not installed	
Hard Disk 1	Submenu: Autotype Fixed Disk user xxx Mbyte	
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	
FI 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 Internal	

2.15 Diagnostic Messages (Port 80)

When the SIMATIC PC 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 hex 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	BBB	BBB	Beeps
3		6		Hex 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	Area 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 nondisposable 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	Reenable 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

Keyboard Controller (PC FI45 V2) 3

Chapter Overview

3.1 Overview

The keyboard controller checks the 10 x 8 keyboard matrix of the SIMATIC PC. In this matrix the functions of a standard AT keyboard can be assigned to any key. An additional standard AT-MF II keyboard can be connected (to the front or back of the unit).

The key assignment, which is exclusively determined by software, can be modified at any time without requiring any further technical means. Programming the is executed via the keyboard interface between PC and keyboard controller. All settings are saved in the controller integrated EEPROM. The controller is backed up by a hardware watchdog circuit.

The key assignment can be re-defined with the programming software (which is included with the PC).

The programming software is independent on the operating system. To carry out the programming, you must first create a boot diskette. To do this, follow the instructions in the CD *Documentation and Drivers.*

3.2 Syntax and Structure of the Configuration File

In order to assign parameters to the keyboard controller, you must first create a configuration file (text file). ****.key*** must be selected as the file type. The easiest method is to copy and then adapt the configuration file for standard parameter assignment. A printout of this file can be found in Section 3.5.

The configuration file consists of lines of text. In order to set a particular function, you must enter a keyword followed by other parameters. The keyword must always be located at the beginning of a line. Any number of blanks can be entered between the keyword and the parameters. It is also possible to enter space lines to make the text easier to read. A comment is introduced by a ‘;’ and can begin at any position in the line.

3.2.1 Description of the Keywords

The following nomenclature applies to the description of the keywords and their syntax below:

KEY	**Keyword is printed in bold**
param[n]	Parameter, a hexadecimal number from 00 to FF
TEXT	Any sequence of characters (e.g. comment)
<	Introductory character for direct key parameter
>	End character for direct key parameter
[ ]	Optional entry

SYSTEM FLAG param [; TEXT]

Global settings. This enables you, for example, to lock the auto-repeat function. The following functions can be set via param:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Internal, must be 0	1: only one key must be pressed at the same time	Internal, must be 0	1: ESC after RESET	Internal, must be 0	0: Auto-repeat locked	1: LED outputs for control purposes	Internal, must be 0
	0: N-Key Rollover		0: no ESC after RESET		1: Auto-repeat possible	0: LED for CPS, NUM, SCROLL	

BEEPLEN param [; TEXT]

Duration of beep sound in 1/60 of a second. Value range from param: 00 to 3F hex. param=00: no beep sound

ENTPRELL param [; TEXT]

Duration of debounce time in 1/60 of a second. Value range from param: 00 to 3F hex.

EXTENDPRELL param [; TEXT]

Duration of additional debounce time in 1/60 of a second. Value range from param: 00 to 3F hex. Active, when the IO-Attribute in the keyword KEY is iBit 7=0.

SPEZBREAK param [; TEXT]

Special break code. Value range from param: 00 to 7F hex. If bit 6 is in attribute 1 or attribute 2 =0 (when KEY is the keyword), the special break code is sent instead of the normal break code.

KEY	param1 Matrix no.	param2 AT code1	param3 Attribute1	param4 IO attribute	[param5 param6] [AT code2 attribute 2]	[<param7>] [<DK code>]	[; TEXT]

param1 (Matrix no.) specifies the position in the key matrix or the number of the input switch. The input switches are not wired and cannot therefore be used by the user. The first param1 digit is the X matrix node of the key, the second param1 digit is the Y matrix node of the key (see Figure 3.3).

param2/5 (AT code1 / AT code2) specifies the running number of the key (see Figure 3.2). For normal keys, the value range is from param2/5: 00 to 7F hex. If no key code is to be sent, for example if the key is to be assigned parameters as a shift key or a direct key, param2/5 is set to FF hex.

param3/6 (Attribute1 / Attribute2) controls the key function individually. This means that you can, for example, specify whether the auto-repeat key is to be executed. For individual functions, see the following table:

The function is active when the corresponding bit is set.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Key with auto-repeat	Special break code	Send no break code	Send ESC before key code	Send AltGr before key code	Send Alt before key code	Send Strg before key code	Send Shift before key code

param4 (IO Attribute) controls the key function individually. This means that you can, for example, specify whether the key switches to the second level (param4=7F hex). Port functions cannot be used by the user; this means that Bit 0 to Bit 5 must always be =1. For individual functions, see the following table:

The function is active when the corresponding bit is set.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Key uses internal debounce time	Key switches to second level	1	1	1	1	1	1

param7 (DK code) With SIMATIC PCs a maximum of 32 keys on the membrane keyboard can be configured as direct keys. Up to 2 direct keys can be operated simultaneously.

In principle, every key on the membrane keyboard of the SIMATIC PC can be programmed as a direct key. The special keys (S1 to S16, to the left and right of the screen) and/or the function keys (F1 to F20, at the bottom of the screen) are used as direct keys. A direct key can also be configured as a PC key.

The function (properties) and the key (direct key number) to which the direct key function is assigned, are represented in a byte (**DK code**) (within <.....>.

The DK code:

DK-code (in hex) = function code + number of direct key –1 or for the special function.

DK-code (in hex) = special function code

In the case of special functions, no direct key number must be added to the special function, as with special functions all the direct keys are always addressed at the same time.

Function	Function code	Description
On	40 hex	Pressing a key sets digital input, state remains when key is released
Off	00 hex	Pressing a key resets digital input, state remains when key is released
Touch	C0 hex	Pressing a key sets digital input, releasing the key resets digital input
Toggle	80 hex	Every time a key is pressed and then released, the state of the digital input is inverted.

The following special functions can be configured:

Function	Special Function Code	Description
All on	20 hex	Pressing a key sets **all** digital inputs, state remains when key is released
All off	60 hex	Pressing a key resets **all** digital inputs, state remains when key is released
All touch	E0 hex	Pressing a key sets **all** digital inputs, releasing the key resets **all** digital inputs
All toggle	A0 hex	Every time a key is pressed and then released, the state of **all** digital inputs is inverted.

The special keys and function keys of the SIMATIC PC have the following default assignments:

Membrane key	Direct key no.	Digital I/O (byte bit)	PC AT key	Remarks
F1 to F8	1 to 8	DI 0.0 to DI 0.7	F1 to F8	PC key without-repeat
F9 to F12	9 to 12	DI 1.0 to DI 1.3	F9 to F12	PC key without auto-repeat
F13 to F16	13 to 16	DI 1.4 to DI 1.7	–	–
S1 to S8	17 to 24	DI 4.0 to DI 4.7	–	–
S9 to S16	25 to 32	DI 5.0 to DI 5.7	–	–
F17–F20	–	–	–	–

Note

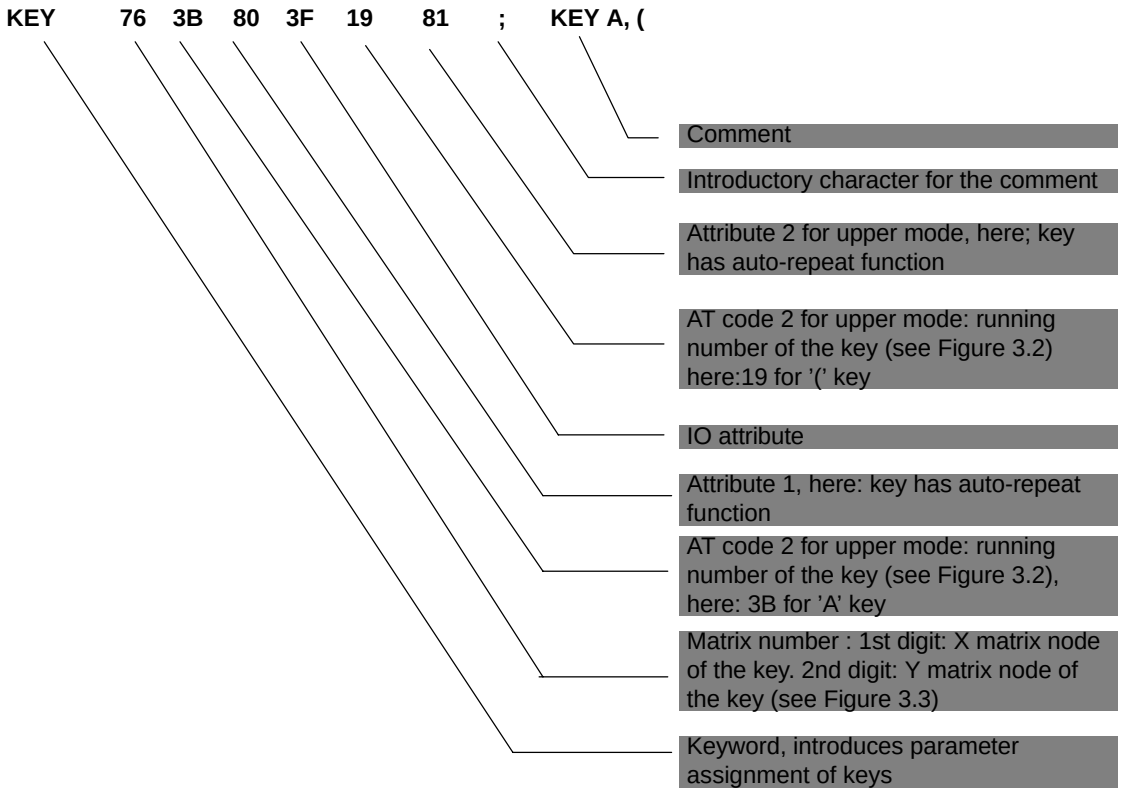
The direct keys can only be used in conjunction with the direct key module (optional).

Examples for Configuring a Key

Example 1 (PC FI45 V2, Upper mode):

Function: Key is to send the character code for the character ‘A’ and, when used in combination with the shift key, the character code for the character ‘(’.

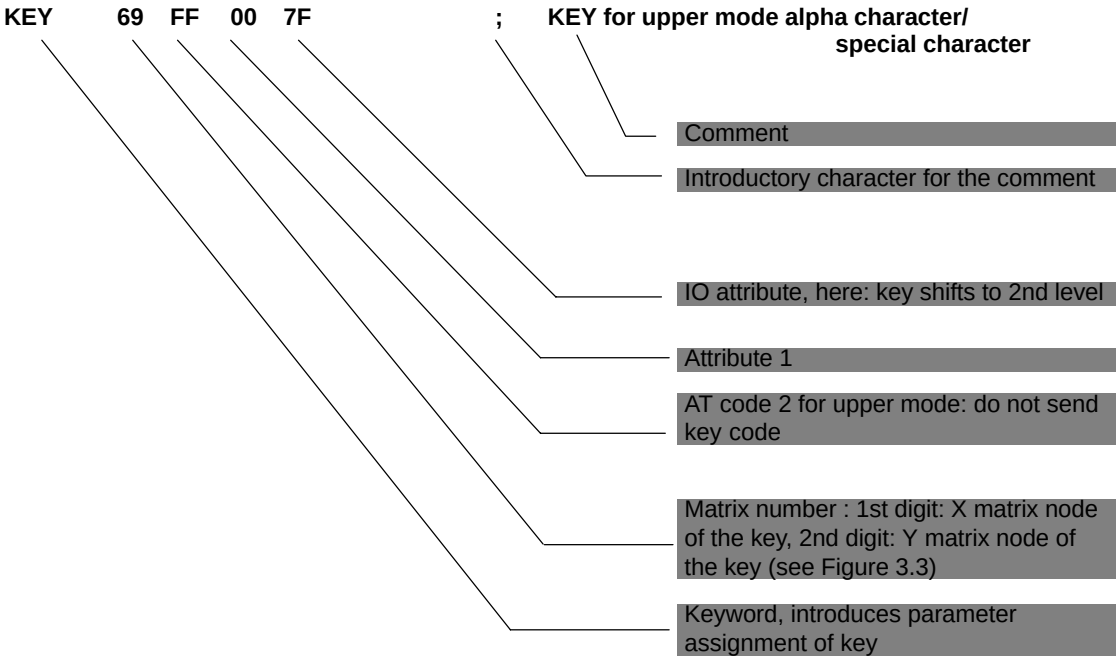
Parameter Assignment



Example 2: (PC FI45 V2, Shift key):

Function: Key is to be configured as a shift key.

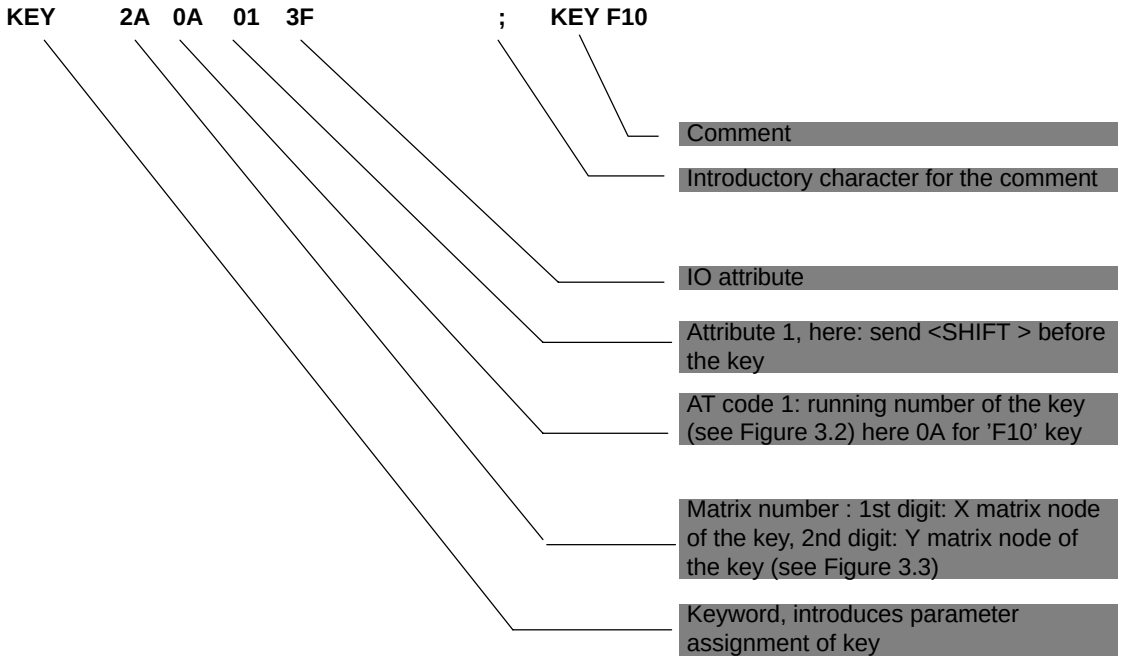
Parameter Assignment



Example 3 (Hotkey function, e.g. for SIMATIC WinCC)

Function: Function key F10 is to send the character codes for <SHIFT F1>.

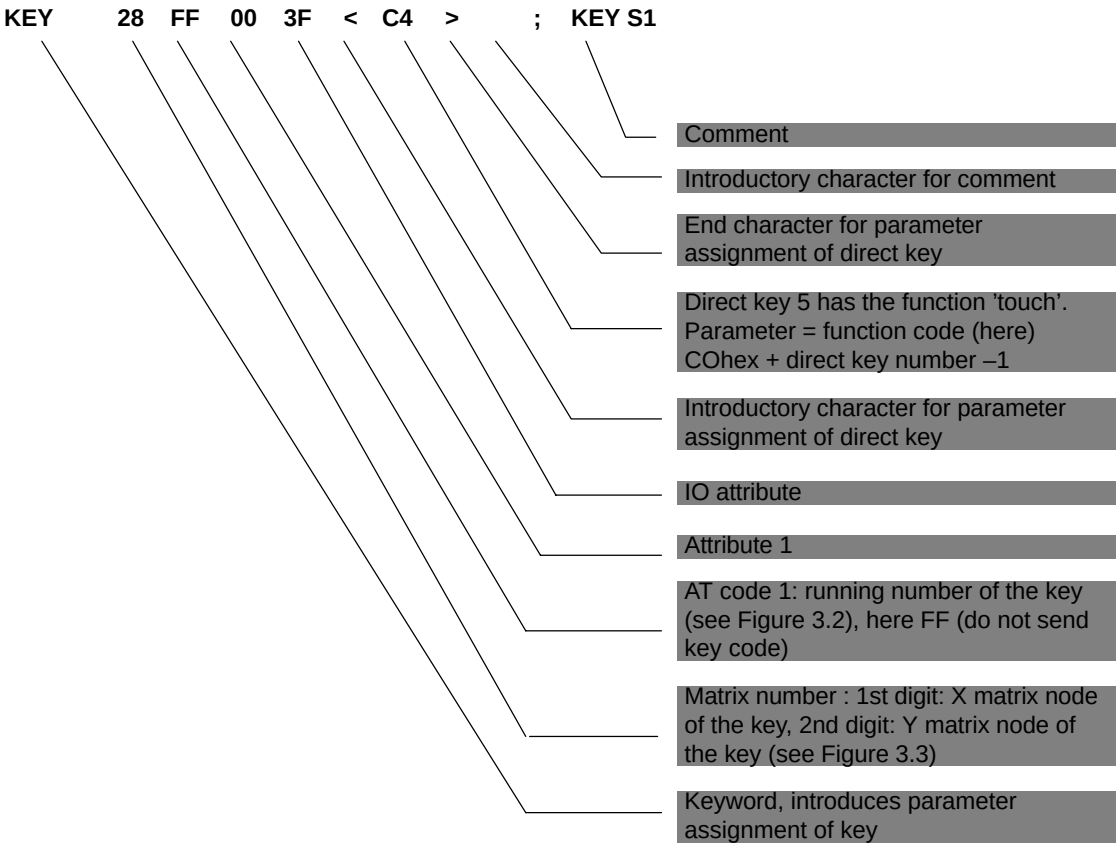
Parameter Assignment



Example 4 (Direct keys in connection with the direct key module)

Function: Special key S1 is not to send any key code, but instead serve as a direct key with the number 5 and the function ‘touch.’

Parameter Assignment



3.3 Connector Assignment of Keyboard Controller

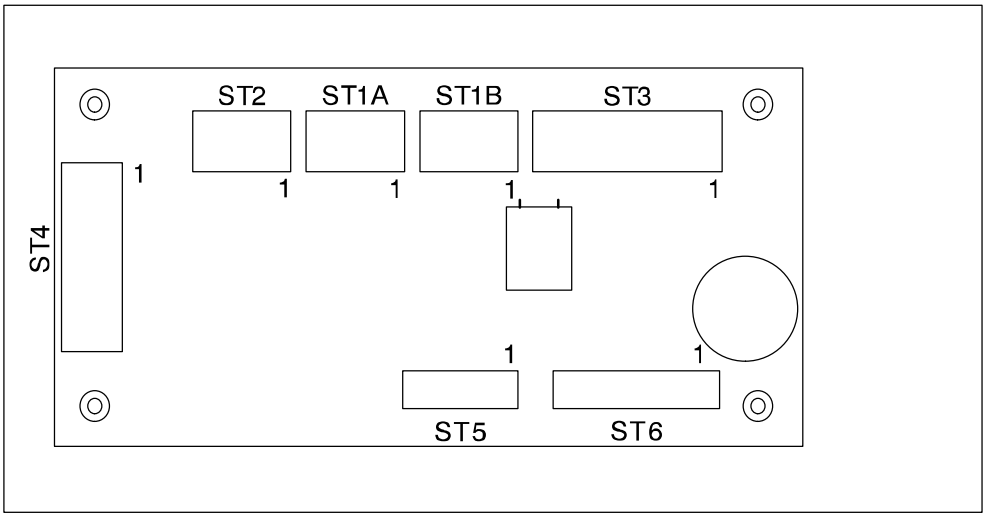
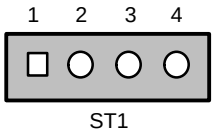


Figure 3-1 Location of the Plug Connectors on the Controller Board

Connector for External Keyboard

Pin	Description
1	CLOCK
2	+5 V
3	GND
4	DATA

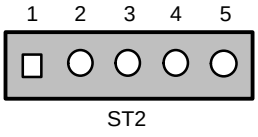
4-pin plug connector: ST1A/ST1B



Connector for Keyboard Port on CPU

Pin	Description
1	GND
2	+5 V
3	CLOCK
4	DATA
5	unassigned

5-pin plug connector: ST2



Connector for LED (not Assigned) Plug Connector ST3

Pin	Description
1	LED Power (anode)
2	V_{CC}
3	GND
4	Beeper
5	LED3 (direct, o.k.)
6	LED3 cathode
7	LED2 (direct, o.k.)
8	LED2 cathode
9	LED1 (direct, o.k.)
10	LED1 cathode

Connector for Input Switches and Direct Key Outputs (Standard Setting: Unassigned) Plug Connector ST4

Pin	Description
1	Switch1
2	Switch2
3	Switch3
4	Switch4
5	GND
6	D-Dat
7	D-Latch
8	D–CLK
9	GND
10	GND

Output Keyboard Matrix XSocket Connector ST5

Pin	Description
1	X0
2	X1
3	X2
4	X3
5	X4
6	X5
7	X6
8	X7

Input Keyboard Matrix Y Socket Connector ST6

Pin	Description
1	Y0
2	Y1
3	Y2
4	Y3
5	Y4
6	Y5
7	Y6
8	Y7
9	Y8
10	Y9
11	Y10
12	Y11
13 to 16	unassigned

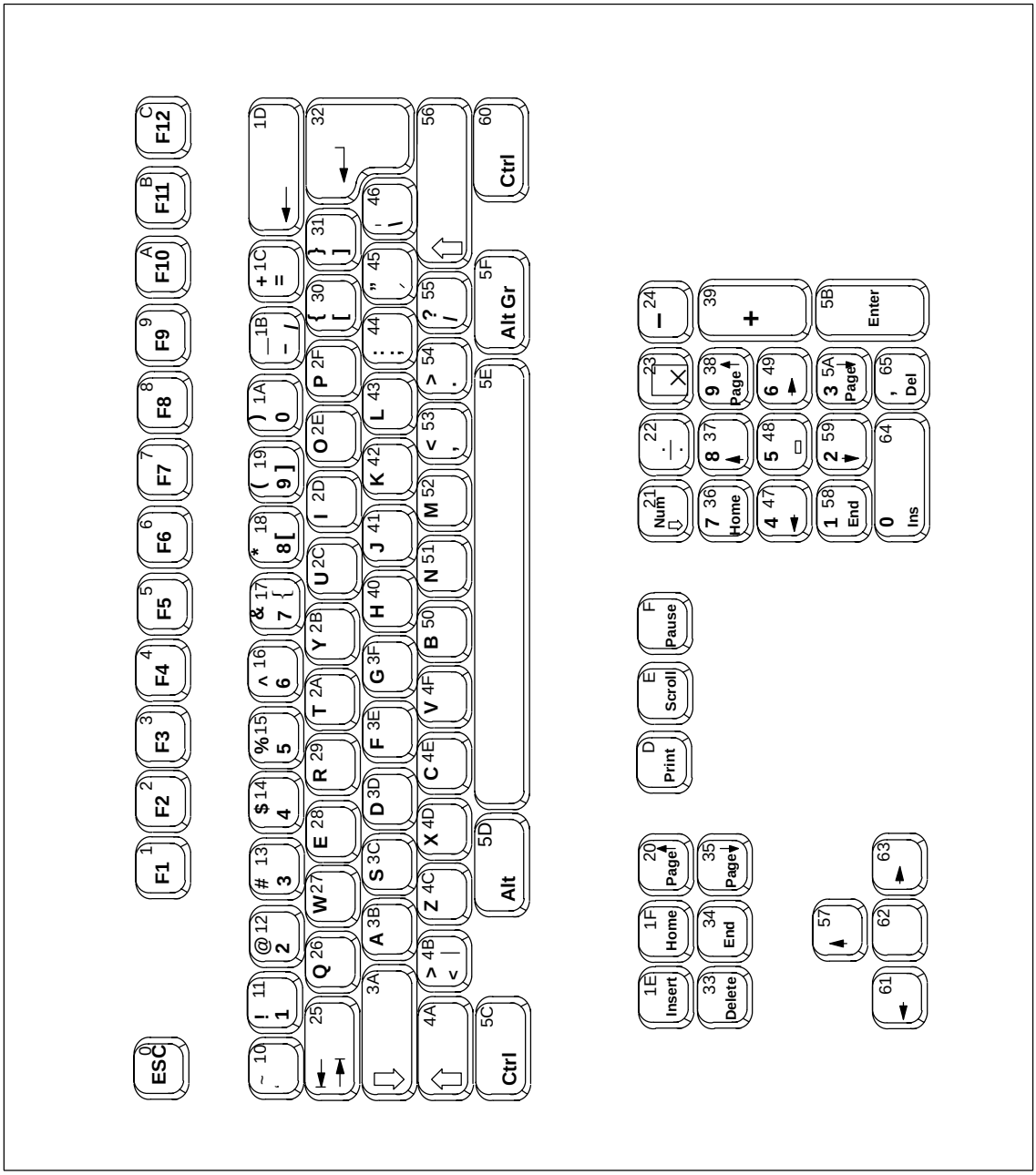


Figure 3-2 Serial Numbers of Keys

3.4 Matrix Configuration PC FI45

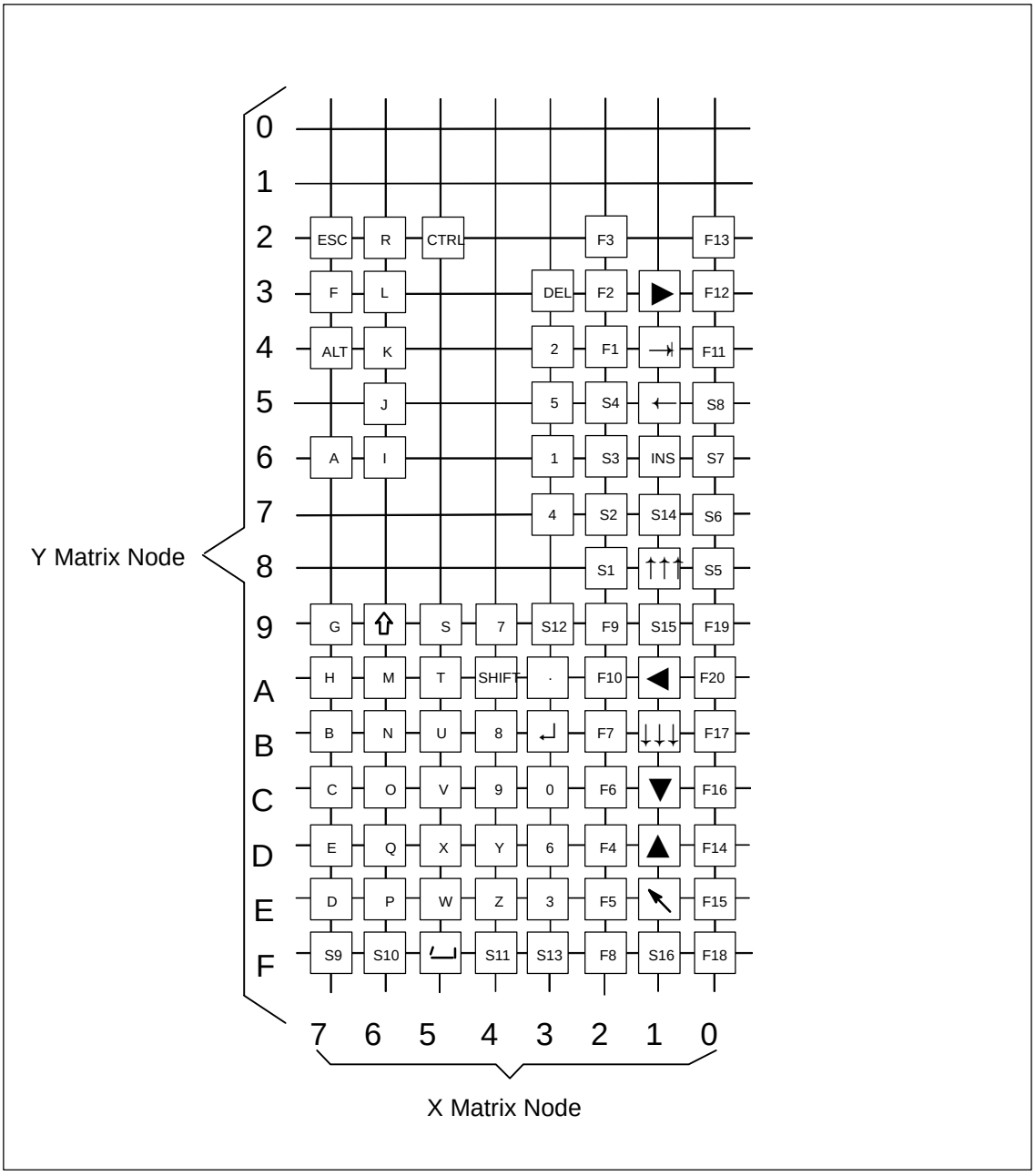


Figure 3-3 Matrix Configuration of the Membrane Keyboard

3.5 Configuration File for Keyboard Controller

```
Configuration file for keyboard controller SIMATIC PC FI45 with direct key fea-
ture

Function keys F1 to F12 are PC keys as well (no auto-repeat)
Direct keys 1 to 16 : as F1 to F16
Direct keys 17 to 32 : as S1 to S16



;======================== Configuration ========================

System Flag  04                 ; Send no ESC after RESET
Beep Len     02                 ; Beep length
Entprell     00                 ; Normal debounce time
Extend Prell 00                 ; Extended debounce time
Spez Break   AA                 ; Special break code $AA


KEY4A FF 00 7F              ; Alpha/special characters
KEY69 4A 00 3F              ; Capital letters/small letters

KEY76 3B 80 3F 19 81      ; a/A, (
KEY7B 50 80 3F lA 81      ; b/B, )
KEY7C 4E 80 3F 17 81      ; c/C, &
KEY7E 3D 80 3F 14 81      ; d/D, $
KEY7D 28 80 3F 55 81      ; e/E, ?

KEY73 3E 80 3F 30 80      ; f/F, [
KEY79 3F 80 3F 31 80      ; g/G, ]
KEY7A 40 80 3F 12 81      ; h/H, @
KEY66 2D 80 3F 15 81      ; i/I, %
KEY65 41 80 3F 11 81      ; j/J, !

KEY64 42 80 3F 30 81      ; k/K, {
KEY63 43 80 3F 31 81      ; l/L, }
KEY6A 52 80 3F 13 81      ; m/M, #
KEY6B 51 80 3F 45 81      ; n/N, ”
KEY6C 2E 80 3F 45 80      ; o/O, ’

KEY6E 2F 80 3F 53 81      ; p/P, C
KEY6D 26 80 3F 54 81      ; q/Q, “
KEY62 29 80 3F 10 81      ; z/R, “
KEY59 3C 80 3F 1B 81      ; s/S,
KEY5A 2A 80 3F 53 80      ; t/T, ,


KEY5B 2C 80 3F 16 81      ; u/U, “
KEY5C 4F 80 3F 55 80      ; v/V, /
KEY5E 27 80 3F 46 80      ; w/W, \
KEY5D 4D 80 3F 46 81      ; x/X, “
KEY4D 2B 80 3F 44 81      ; y/Y, .
KEY4E 4C 80 3F 44 80      ; z/Z, ;
```

```
KEY3C 1A 80 3F            ; 0
KEY36 11 80 3F            ; 1
KEY34 12 80 3F            ; 2
KEY3E 13 80 3F            ; 3
KEY37 14 80 3F 23 80      ; 4, *
KEY35 15 80 3F            ; 5
KEY3D 16 80 3F 22 80      ; 6, /
KEY49 17 80 3F 39 80      ; 7, +
KEY4B 18 80 3F 1C 80      ; 8, =
KEY4C 19 80 3F 24 80      ; 9, –

KEY24 01 00 3F <C0>    ; Function key F1 = Direct key 00hex
KEY23 02 00 3F <C1>    ; Function key F2 = Direct key 01hex
KEY22 03 00 3F <C2>    ; Function key F3 = Direct key 02hex
KEY2D 04 00 3F <C3>    ; Function key F4 = Direct key 03hex
KEY2E 05 00 3F <C4>    ; Function key F5 = Direct key 04hex
KEY2C 06 00 3F <C5>    ; Function key F6 = Direct key 05hex
KEY2B 07 00 3F <C6>    ; Function key F7 = Direct key 06hex
KEY2F 08 00 3F <C7>    ; Function key F8 = Direct key 07hex
KEY29 09 00 3F <C8>    ; Function key F9 = Direct key 08hex
KEY2A 0A 00 3F <C9>    ; Function key F10 = Direct key 09hex
KEY04 0B 00 3F <CA>    ; Function key F11 = Direct key 0Ahex
KEY03 0C 00 3F <CB>    ; Function key F12 = Direct key 0Bhex
KEY02 FF 00 3F <CC>    ; Function key F13 = Direct key 0Chex
KEY0D FF 00 3F <CD>    ; Function key F14 = Direct key 0Dhex
KEY0E FF 00 3F <CE>    ; Function key F15 = Direct key 0Ehex
KEY0C FF 00 3F <CF>    ; Function key F16 = Direct key 0Fhex
KEY0B FF 00 3F         ; Function key F17
KEY0F FF 00 3F         ; Function key F18
KEY09 FF 00 3F         ; Function key F19
KEY0A FF 00 3F         ; Function key F20
KEY28 FF 00 3F <D0>    ; Softkey S1 = Direct key 10hex
KEY27 FF 00 3F <D1>    ; Softkey S2 = Direct key 11hex
KEY26 FF 00 3F <D2>    ; Softkey S3 = Direct key 12hex
KEY25 FF 00 3F <D3>    ; Softkey S4 = Direct key 13hex
KEY08 FF 00 3F <D4>    ; Softkey S5 = Direct key 14hex
KEY07 FF 00 3F <D5>    ; Softkey S6 = Direct key 15hex
KEY06 FF 00 3F <D6>    ; Softkey S7 = Direct key 16hex
KEY05 FF 00 3F <D7>    ; Softkey S8 = Direct key 17hex
KEY7F FF 00 3F <D8>    ; Softkey S9 = Direct key 18hex
KEY6F FF 00 3F <D9>    ; Softkey S10 = Direct key 19hex
KEY4F FF 00 3F <DA>    ; Softkey S11 = Direct key 1Ahex
KEY39 FF 00 3F <DB>    ; Softkey S12 = Direct key 1Bhex
KEY3F FF 00 3F <DC>    ; Softkey S13 = Direct key 1Chex
KEY17 FF 00 3F <DD>    ; Softkey S14 = Direct key 1Dhex
KEY19 FF 00 3F <DE>    ; Softkey S15 = Direct key 1Ehex
KEY1F FF 00 3F <DF>    ; Softkey S16 = Direct key 1Fhex
```

```
KEY1D 57 80 3F           ; 'up'
KEY1A 61 80 3F           ; 'left'
KEY1E 1F 80 3F 34 80     ; 'Home / End'
KEY13 63 80 3F           ; 'right'
KEY1C 62 80 3F           ; 'down'
KEY18 20 80 3F           ; 'Page up'
KEY1B 35 80 3F           ; 'Page down'

KEY5F 5E 80 3F           ; 'Space'
KEY3A 54 80 3F           ;  .

KEY52 5C 80 3F           ; <CTRL>
KEY16 1E 80 3F           ; <INS>
KEY74 5D 80 3F           ; <ALT>
KEY33 33 80 3F           ; <DEL>
KEY15 1D 80 3F           ; 'Backspace'
KEY72 00 80 3F           ; <ESC>
KEY14 25 80 3F           ; 'Tab right'
                           'Tab left'
KEY3B 32 80 3F           ; <CR>


; End of key file
```

Direct Key Module (Optional with PC FI45 V2)

4

Chapter Overview

4.1 General Information

As a plug-in board, the direct key module is designed to be implemented in the SIMATIC industrial PCs.

The module allows you to assign digital events to individual keys on the membrane keyboard. Thus the direct control of a PLC's digital input becomes possible by pressing a key. As the module is configured as slave on the PROFIBUS, data can be transferred via a standard field bus.

The direct key module enriches the SIMATIC Industrial PCs with the following functions:

- The PROFIBUS scans up to 32 keys on the SIMATIC PC's membrane keyboard as direct keys.
- An external panel with up to 16 additional keys can be connected, if necessary.
- 16 digital outputs to trigger check-back indicators of connected panels (PLC via PROFIBUS DP) are provided.
- The PLC scans all direct keys via the PROFIBUS DP.
- The PROFIBUS DP port has been developed for transmission rates of 9.6 Kbps – 12 Mbps.

4.2 Functional Description

The direct key module is employed to scan keys via the PROFIBUS DP within a defined time-slot pattern. The module as such is configured as a PROFIBUS norm slave on PROFIBUS DP. PROFIBUS reaction time guarantees a scanning of the keyboard within the time limit defined for PROFIBUS.

The direct key module always serves as a slave on the PROFIBUS DP. Triggering or scanning the direct key module is always executed by a DP master, which operates the direct key modules via layer two of the seven-layer module. After having received a trouble-free PROFIBUS message, the direct key module independently generates the requested response messages (acc. to DIN standard E19245 T3). Default setting of the slave provides the structuring of the digital inputs and outputs as well as the data transfer modes. Data transfer to and from the direct key module is always consistent and determined by a default setting.

With this module it is possible to scan for 32 direct keys (assigned to the digital inputs DI 0.0-0.7, DI 1.0-1.7, DI 4.0-4.7 and DI 5.0-5.7) as well as to scan for or control 16 digital outputs (DO 0.0-0.7 and DO 1.0-1.7) with 24V/100mA and 16 digital inputs (DI 2.0-2.7 and DI 3.0-3.7) with 24V levels via PROFIBUS DP.

The direct key module supports transmission rates of 9.6 Kbps to 12 Mbps.

To set the PROFIBUS address (node address) of the direct module via PROFIBUS use either the ET200 hand held device or a programming device/PC (with an MPI-/DP port) with STEP 7 software installed (see Hardware Config) or COMPROFIBUS software.

Once the PROFIBUS address (node address) is set, it is stored in the direct key module. Even after disconnecting your Industrial PC from the power supply, the settings remain saved.

Note

On delivery, the PROFIBUS address (node address) is set to 126. A direct key module supplied with the default address 126 in accordance with DP regulations, can be assigned a different address by the user after installation. It is essential that this address setting is carried out because otherwise no data can be exchanged with the direct key module (DP nodes with the address 126 do not by definition participate in data exchange).

You do not need to open the device in order to set the address. The address of the direct key module is set by the PROFIBUS. One of the following devices with DP access software must, however, be available:

- ET200 hand-held device,
- Programming device/PC with MPI-/DP port, or
- the SIMATIC PC, in which the direct key module but no SlotPLC is installed.

Either

- the STEP 7 software (Hardware Config.), or
- the COMPROFIBUS software

must be installed on the device.

To ensure that the address is set successfully, a point-to-point connection must be created between the direct key module and the device being used. Some devices are supplied with a suitable connection cable in the consignment.

PC with integrated SlotPLC (WinAC FI Station Pro):

The DP connection of the direct key module is linked to the SlotPLC inside the device. Before you can carry out the address setting, the SlotPLC must be cleared and reset. This isolates the SlotPLC from the DP bus. Connect the DP connection (9-pin D-sub socket) of the SlotPLC to the DP port of the device on which the access software is installed.

PC without integrated SlotPLC:

Connect the DP connection (9-pin D-sub socket) of the direct key module to the MPI-/DP port of the device on which the DP access software is installed. To do this, you may have to remove the covering on the DP connection of the direct key module.

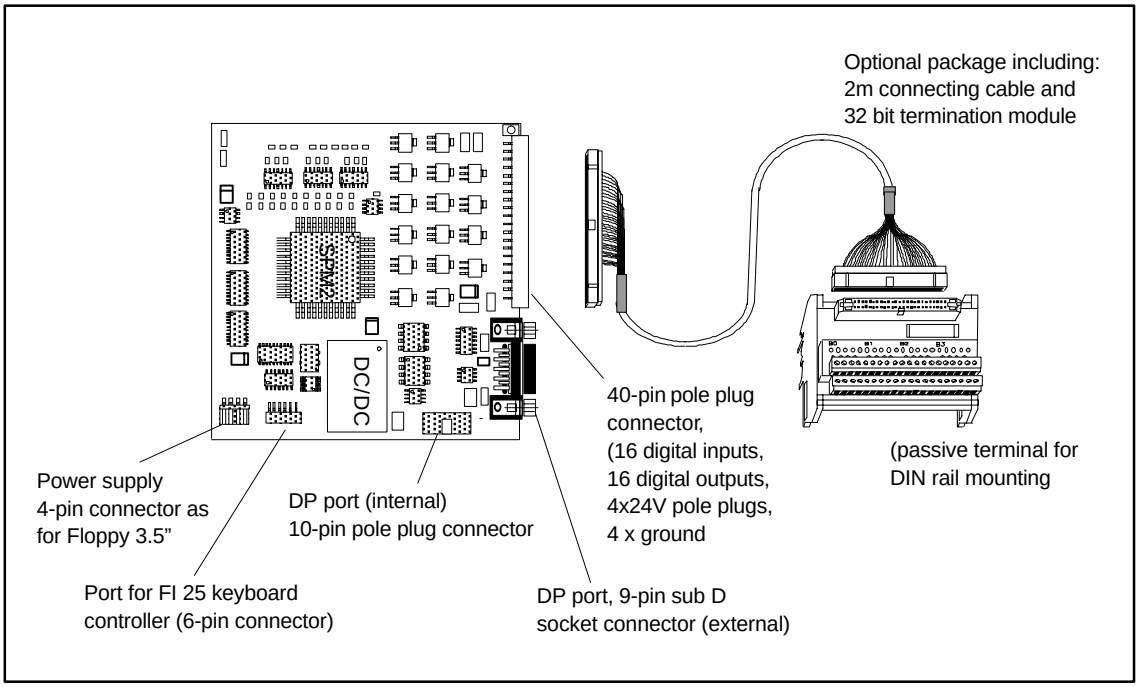
Use the STEP 7 software and proceed as follows:

- Start the SIMATIC Manager
- Select the function **“Assign PROFIBUS Address”** in the **PLC** menu of the SIMATIC Manager. The SIMATIC Manager then contacts the direct key module. A dialog box appears. This dialog box both displays the currently set address of the direct key module and allows you to enter a new address (1, 3 to 125).
- Set the required address. Once the new address has been set, it is stored in the direct key module and is retained even after the power supply has been switched off.
- Close the SIMATIC Manager.

If you are using other PROFIBUS tools, you require the device database file (DDB file). You can find this file on the CD *Documentation and Drivers*.

4.3 Direct Key Module Ports

- 16 digital inputs (DI) non-isolated with a 24V level (external port) to connect drive controllers (external port)
- 16 digital outputs (DO) with non-isolated 24V DC/100mA and protected against short circuit (external port) to connect indicator lamps (external port)
- Optically isolated DP port based on RS485 (external port)
- Non-isolated DP port based on TTL (internal port)
- Keyboard port (serial) for 32 direct keys (internal port)
- Power supply connection (internal port)



4.4 Logical Organisation of Digital Inputs and Outputs

Due to the slave controller block used, the digital inputs DI 0.0 - 5.7 are defined as a block (permanently preset as slave). This block consists of 32 direct keys (DI 0.0–0.7, DI 1.0–1.7, DI 4.0–4.7 and DI 5.0–5.7) of the SIMATIC PC membrane keyboard and 16 digital inputs of the external connector (40-pin plug connector) at the rear sheet metal terminal of the direct key module (DI 2.0–2.7 and DI 3.0–3.7)

The digital outputs (DO 0.0 –0.7 and DO 1.0–1.7) are also defined as a block and can be connected to the external connector (40-pin plug connector).

4.5 Assignment of Direct Keys to Digital Inputs

Direct key no.	Digital input (DI)	SIMATIC PC)* function keys	Direct key no.	Digital input (DI)	SIMATIC PC)* function keys
Direct key 1	DI 0.0	F1	Direct key 17	DI 4.0	S1
Direct key 2	DI 0.1	F2	Direct key 18	DI 4.1	S2
Direct key 3	DI 0.2	F3	Direct key 19	DI 4.2	S3
Direct key 4	DI 0.3	F4	Direct key 20	DI 4.3	S4
Direct key 5	DI 0.4	F5	Direct key 21	DI 4.4	S5
Direct key 6	DI 0.5	F6	Direct key 22	DI 4.5	S6
Direct key 7	DI 0.6	F7	Direct key 23	DI 4.6	S7
Direct key 8	DI 0.7	F8	Direct key 24	DI 4.7	S8
Direct key 9	DI 1.0	F9	Direct key 25	DI 5.0	S9
Direct key 10	DI 1.1	F10	Direct key 26	DI 5.1	S10
Direct key 11	DI 1.2	F11	Direct key 27	DI 5.2	S11
Direct key 12	DI 1.3	F12	Direct key 28	DI 5.3	S12
Direct key 13	DI 1.4	F13	Direct key 29	DI 5.4	S13
Direct key 14	DI 1.5	F14	Direct key 30	DI 5.5	S14
Direct key 15	DI 1.6	F15	Direct key 31	DI 5.6	S15
Direct key 16	DI 1.7	F16	Direct key 32	DI 5.7	S16

)* factory presetting

The direct key number is determined by the parameter assignment of the keyboard controller (see chapter ‘Keyboard Controller’) and can be modified at any time. All settings are stored in the keyboard controller and are saved even after disconnecting your PC from the power supply.

4.6 Description of Ports

4.6.1 Ports

I/O Port

40-pin pole plug connector for 16 digital inputs (DI) with a 24V level, 16 digital outputs (DO) with a driver performance of 24V/100mA and an external 24V power feed-in. The outputs are protected against short-circuit.

Pinout

Pin no.	Signal	Description	Pin no.	Signal	Description
Pin 1	DI 2.0	Input byte 2, bit 0	Pin 2	DI 2.1	Input byte 2, bit 1
Pin 3	DI 2.2	Input byte 2, bit 2	Pin 4	DI 2.3	Input byte 2, bit 3
Pin 5	DI 2.4	Input byte 2, bit 4	Pin 6	DI 2.5	Input byte 2, bit 5
Pin 7	DI 2.6	Input byte 2, bit 6	Pin 8	DI 2.7	Input byte 2, bit 7
Pin 9	DI 3.0	Input byte 3, bit 0	Pin 10	DI 3.1	Input byte 3, bit 1
Pin 11	DI 3.2	Input byte 3, bit 2	Pin 12	DI 3.3	Input byte 3, bit 3
Pin 13	DI 3.4	Input byte 3, bit 4	Pin 14	DI 3.5	Input byte 3, bit 5
Pin 15	DI 3.6	Input byte 3, bit 6	Pin 16	DI 3.7	Input byte 3, bit 7
Pin 17	Ground	Ground	Pin 18	Ground	Ground
Pin 19	+24V	External 24V power feed-in	Pin 20	+24V	External 24V power feed-in
Pin 21	DO 0.0	Output byte 0, bit 0	Pin 22	DO 0.1	Output byte 0, bit 1
Pin 23	DO 0.2	Output byte 0, bit 2	Pin 24	DO 0.3	Output byte 0, bit 3
Pin 25	DO 0.4	Output byte 0, bit 4	Pin 26	DO 0.5	Output byte 0, bit 5
Pin 27	DO 0.6	Output byte 0, bit 6	Pin 28	DO 0.7	Output byte 0, bit 7
Pin 29	Ground	Ground	Pin 30	Ground	Ground
Pin 31	+24V	External 24V power feed-in	Pin 32	+24V	External 24V power feed-in
Pin 33	DO 1.0	Output byte 1, bit 0	Pin 34	DO 1.1	Output byte 1, bit 1
Pin 35	DO 1.2	Output byte 1, bit 2	Pin 36	DO 1.3	Output byte 1, bit 3
Pin 37	DO 1.4	Output byte 1, bit 4	Pin 38	DO 1.5	Output byte 1, bit 5
Pin 39	DO 1.6	Output byte 1, bit 6	Pin 40	DO 1.7	Output byte 1, bit 7

DP Port (9 -Pin Sub D Socket Connector)

The port pinout conforms to PROFIBUS requirements

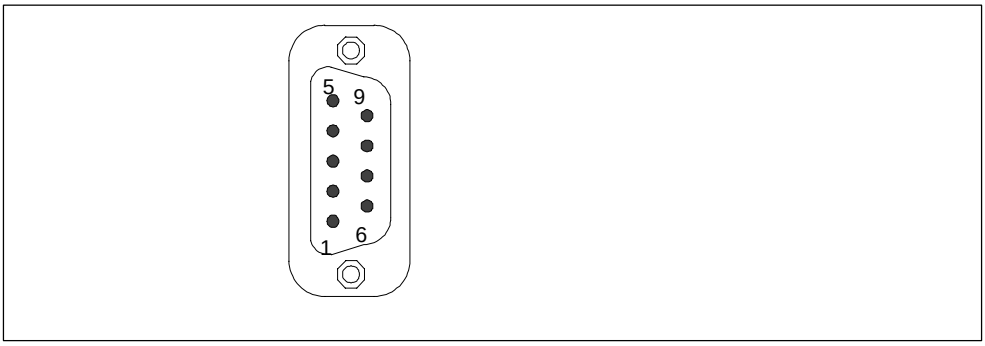


Figure 4-1 DP Port

Pin no.	Signal designation	Description	Input/ Output
Pin 1	n.c.	not assigned	–
Pin 2	n.c.	not assigned	–
Pin 3	LTG_B	Signal line B of direct key module	Input/output
Pin 4	RTS	TTL output signal of direct key module. Signal '1' is active when direct access key module transfers data.	Output
Pin 5	M5EXT	M5EXT ground of 5V isolated power supply The current load of an external consumer connected between P5EXT and M5EXT must not exceed a max. of 90mA.	Output
Pin 6	P5EXT	P5EXT supply (+5V) of isolated 5V power supply. The current load of an external consumer connected between P5EXT and M5EXT must not exceed a max. of 90mA.	Output
Pin 7	n.c.	not assigned	–
Pin 8	LTG_A	Signal line A of direct module	Input/output
Pin 9	n.c.	not assigned	

4.6.2 Internal Ports

4-Pin Power Supply Connector

4-pin male connector

Pin no.	Signal designation
1	+5V
2	Ground
3	Ground
4	not assigned

DP Port

10-pin pole plug

Pin no.	Signal designation	Pin no.	Signal designation
1	not assigned	2	Disable power (control signal)
3	Disable (control signal)	4	not assigned
5	Ground	6	TTL_RXD (TTL level)
7	Ground	8	TTL_TXD (TTL level)
9	Ground	10	TTL_RTS (TTL level)

Keyboard Port

6-pin pole plug connector

Pin no.	Signal designation	Description
Pin 1	Ground	Ground
Pin 2	SLK	Clock signal for transmission of serial data from the keyboard controller
Pin 3	Ground	Ground
Pin 4	LATCH	Memory signal for data package from keyboard controller
Pin 5	Ground	Ground
Pin 6	DATA	Serial data from keyboard controller

4.7 Technical Specifications of Direct Key Modules

Order number	C79458-L7000-B418
Dimensions	(B x H x T in mm) 110 x 110 x 20
Electrical parameters	
Line voltage	5V DC
Current consumption to 5V	approx. 400 mA
Power output at 9-pin sub D socket connector (5V isolated)	max. 90 mA
Module connector (external)	
DP port	9-pin sub D socket connector
I/O port (16xDO 24V/100mA, 16xDI 24V)	40-pin tangent-bend male connector
Module connector (internal)	
Keyboard port	6-pin tangent-bend male connector
DP port	10-pin tangent-bend male connector
Power supply connector	4-pin male connector (pins as for Floppy 3.5”)
DP port (external)	
Controller block	Siemens slave-PROFIBUS controller SPM2
Transmission rate	9.6 Kbps – 12 Mbps
Transmission mode	RS485 optically isolated *
Input for 24V power supply	
Requirements of external power supply	24V / 1,6A permanent current, 4A max. transient, SELV
Keyboard port (internal)	
Signal level	CMOS
Key code transmission	serial
Ambient conditions	
Temperature – operation – storage/transport – gradient	**Tested to DIN EN 60068–2–2:1994,DIN IEC 68–2–1** DIN IEC 68–2–14, + 0°C to +55°C – 20°C to +60°C max. speed of temperature speed 10°C/h, no condensation
Relative humidity – operation – storage/transport	**Tested to DIN IEC 68–2–3, DIN IEC 68–2–30,DIN IEC 68–2–56** 5% to 85% at 25°C (no condensation) 5% to 95% at 25°C (no condensation)
Mechanical specifications	
Vibration – operation – transport	**Tested to DIN IEC 68–2–6** 10 to 58 Hz: 0.075 mm, 58 to 500 Hz: 10 m/s^2 5 to 9 Hz: 3.5 mm, 9 to 500 Hz: 10 m/s^2
Shock – operation – storage	**Tested to DIN IEC 68–2–29** 50 m/s2, 30 ms, 100 shocks 250 m/s2, 6 ms, 1000 shocks

*) Isolation within the low voltage safety circuit (SELV).

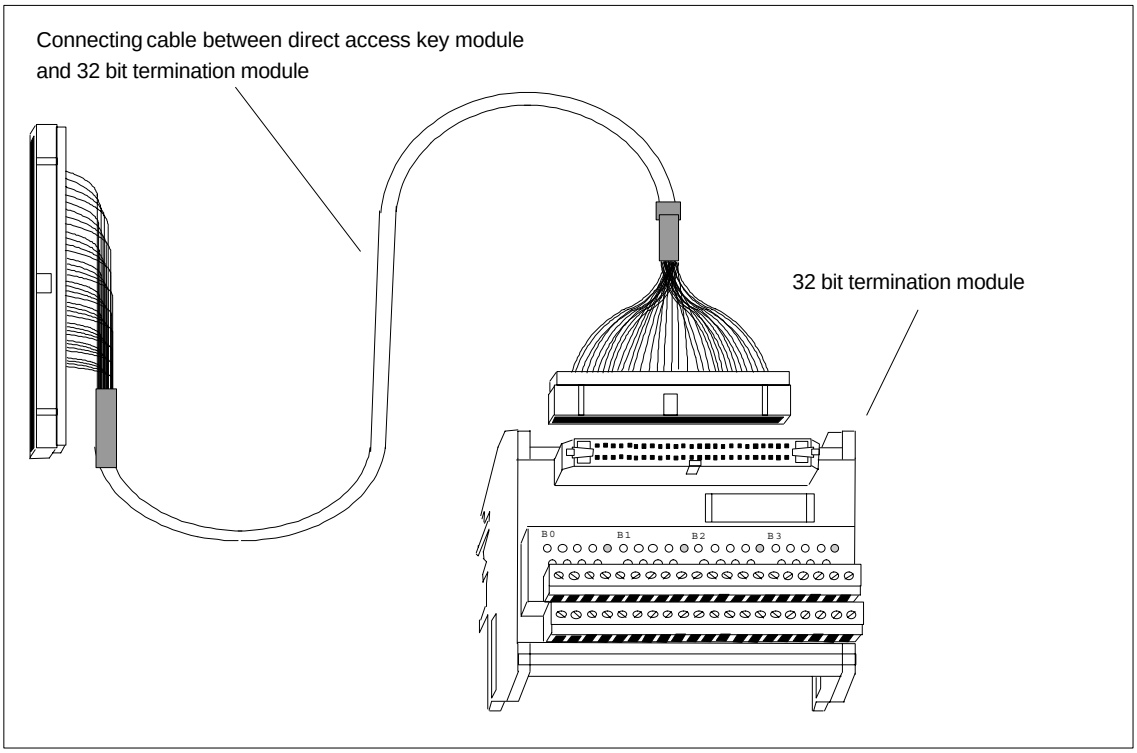
4.8 Optional Package for Direct Key Modules

Order Number

6ES7 648-0AA00-0XA0

Delivery Contents

Connecting cable (2m long) 32 bit termination module for DIN rail mounting



4.9 Assignment of Termination Module Terminals

The termination module bears the labels B0(0..7), + , –, B1 (0..7), + , – , B2 (0..7), +, –, B3 (0..7), +, –. The 24V digital inputs/outputs of the direct key module are assigned to the termination module as follows:

Direct key module40-pin connectors	Designation inputs/outputs	Termination modules 32 bit terminal
Digital inputs		
Pin 1	DI 2.0	B0 (0)
Pin 2	DI 2.1	B0 (1)
Pin 3	DI 2.2	B0 (2)
Pin 4	DI 2.3	B0 (3)
Pin 5	DI 2.4	B0 (4)
Pin 6	DI 2.5	B0 (5)
Pin 7	DI 2.6	B0 (6)
Pin 8	DI 2.7	B0 (7)
Pin 9	DI 3.0	B1 (0)
Pin 10	DI 3.1	B1 (1)
Pin 11	DI 3.2	B1 (2)
Pin 12	DI 3.3	B1 (3)
Pin 13	DI 3.4	B1 (4)
Pin 14	DI 3.5	B1 (5)
Pin 15	DI 3.6	B1 (6)
Pin 16	DI 3.7	B1 (7)
Digital outputs		
Pin 21	DO 0.0	B2 (0)
Pin 22	DO 0.1	B2 (1)
Pin 23	DO 0.2	B2 (2)
Pin 24	DO 0.3	B2 (3)
Pin 25	DO 0.4	B2 (4)
Pin 26	DO 0.5	B2 (5)
Pin 27	DO 0.6	B2 (6)
Pin 28	DO 0.7	B2 (7)
Pin 33	DO 1.0	B3 (0)
Pin 34	DO 1.1	B3 (1)
Pin 35	DO 1.2	B3 (2)
Pin 36	DO 1.3	B3 (3)
Pin 37	DO 1.4	B3 (4)
Pin 38	DO 1.5	B3 (5)
Pin 39	DO 1.6	B3 (6)
Pin 40	DO 1.7	B3 (7)
40-pin plug connector	24V power supply	Terminal
Pin 17,18,29,30	GND	- at terminal module
Pin 19,20,31,32	+24V	+ at terminal module

The termination modules power supply has to be connected to all terminals labeled + or -. Terminals labeled + are connected to the +21V supply whereas terminals labeled with - are connected to ground.

Note

The optional package contains a shielded connecting cable. The shield has to be connected to the SIMATIC PC and grounded at the terminal block.

Bus Board

5

Chapter Overview

5.1 Technical Specifications

Slots	2 x PCI short (max. 175 mm) 1x ISA short (max. 175 mm) 1x ISA long 1x shared ISA/PCI long
Ambient temperature during operation	max. 60 °C
Dimensions	L x W 150 x 160 mm Mounting holes 3.2 mm

5.2 Design and Mode of Operation

The bus board is designed as a passive link between the motherboard and the expansion modules. It is mounted by means of two screws.

The bus board has two ISA slots and two PCI slots, as well as a shared ISA/PCI slot. The expansion modules are powered via the link between the bus board and the motherboard. An external power supply (+5V and +12V) is provided.

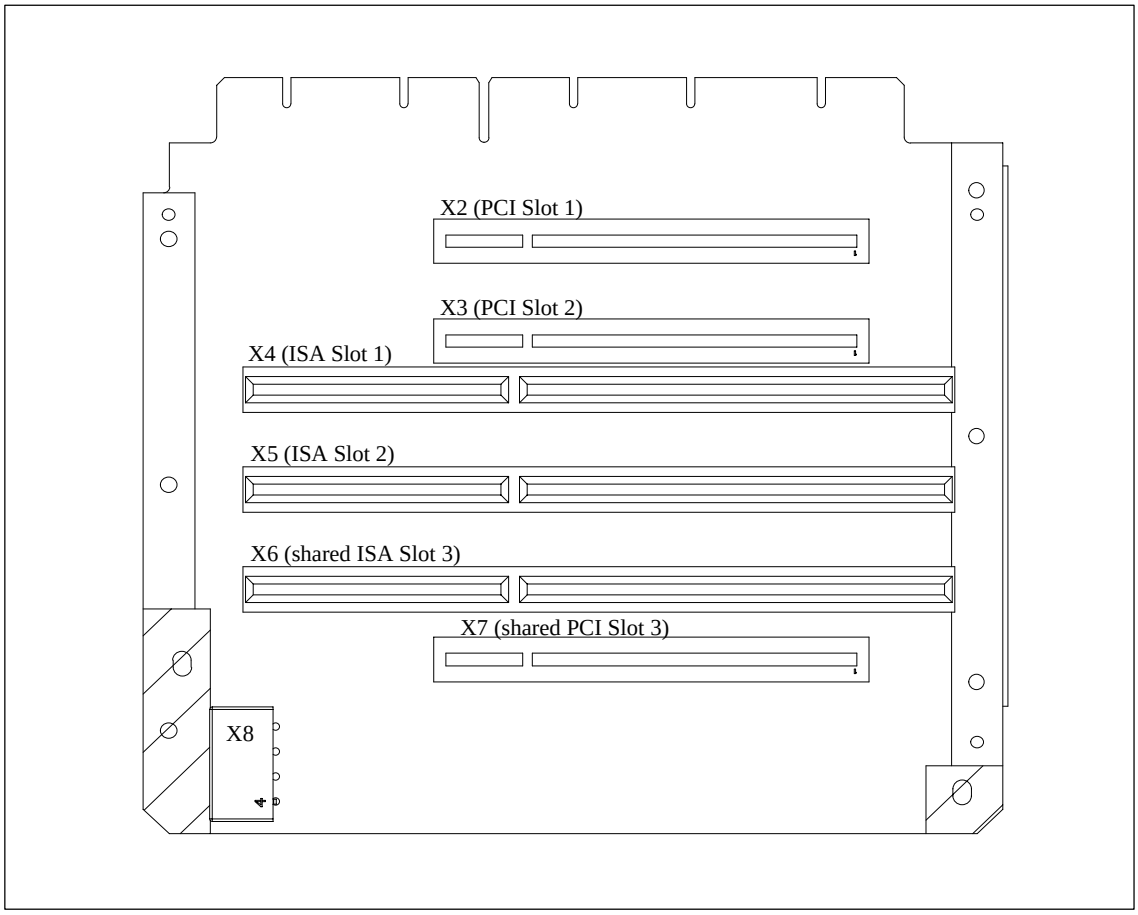


Figure 5-1 Bus Board

5.3 Pin Assignments

5.3.1 Interface to the Motherboard

The connection to the motherboard is established by a gold-plated connector. All the required bus signals (ISA and PCI) are present on this connector. The following table shows the pin assignments.

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	NC	17	NC	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	NC	24	NC				
25	sa6	25	irq3												
26	sa5	26	dack2#					26	NC	26	NC				
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	dev-sel#				
30	sa1	30	osc					30	trdy#	30	plock#				
31	sa0	31	gnd					31	stop#	31	perr#				

5.3.2 ISA Slot Pin Assignment

Pin	Signal name	Type*	Pin	Signal name	Type
A1	–IOCHCK	I	B1	0 V	GND
A2	SD 07	I/O	B2	RESET DRV	O
A3	SD 06	I/O	B3	+ 5V	V_{CC}
A4	SD 05	I/O	B4	IRQ 9	I
A5	SD 04	I/O	B5	– 5V	V_{CC}
A6	SD 03	I/O	B6	DRQ 2	I
A7	SD 02	I/O	B7	– 12V	V_{CC}
A8	SD 01	I/O	B8	–OWA	I
A9	SD 00	I/O	B9	+ 12V	V_{CC}
A10	–IOCHRDY	I	B10	0 V	GND
A11	AEN	O	B11	–SMEMW	O
A12	SA 19	I/O	B12	–SMEMR	O
A13	SA 18	I/O	B13	–IOW	I/O
A14	SA 17	I/O	B14	–IOR	I/O
A15	SA 16	I/O	B15	–DACK3	O
A16	SA 15	I/O	B16	DRQ 3	I
A17	SA 14	I/O	B17	–DACK1	O
A18	SA 13	I/O	B18	DRQ 1	I
A19	SA 12	I/O	B19	–REFRESH	I/O
A20	SA 11	I/O	B20	CLK	O
A21	SA 10	I/O	B21	IRQ 7	O
A22	SA 09	I/O	B22	IRQ 6	O
A23	SA 08	I/O	B23	IRQ 5	O
A24	SA 07	I/O	B24	IRQ 4	O
A25	SA 06	I/O	B25	IRQ 3	O
A26	SA 05	I/O	B26	–DACK2	O
A27	SA 04	I/O	B27	TC	O
A28	SA 03	I/O	B28	BALE	O
A29	SA 02	I/O	B29	+ 5V	V_{CC}
A30	SA 01	I/O	B30	OSC	O
A31	SA 00	I/O	B31	0 V	GND

*) I/O determines the direction of the signals for the CPU board.

Pin	Signal name	Type *	Pin	Signal name	Type
C1	–SBHE	O	D1	–MEMCS16	I
C2	LA 23	I/O	D2	–IOCS16	I
C3	LA 22	I/O	D3	IRQ 10	I
C4	LA 21	I/O	D4	IRQ 11	I
C5	LA 20	I/O	D5	IRQ 12	I
C6	LA 19	I/O	D6	IRQ 13	I
C7	LA 18	I/O	D7	IRQ 14	I
C8	LA 17	I/O	D8	–DACK0	O

Pin	Signal name	Type *	Pin	Signal name	Type
C9	–MEMR	I/O	D9	DRQ 0	I
C10	–MEMW	I/O	D10	–DACK5	O
C11	SD 08	I/O	D11	DRQ 5	I
C12	SD 09	I/O	D12	–DACK6	O
C13	SD 10	I/O	D13	DRQ 6	I
C14	SD 11	I/O	D14	–DACK7	O
C15	SD 12	I/O	D15	DRQ 7	I
C16	SD 13	I/O	D16	+ 5V	V_{CC}
C17	SD 14	I/O	D17	–MASTER	I
C18	SD 15	I/O	D18	0 V	GND

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

5.3.3 PCI Slot Pin Assignment

	5V System Environment	
	Side B	**Side A**
1	-12V	TRST#
2	TCK	+12V
3	Ground	TMS
4	TDO	TDI
5	+5V	+5V
6	+5V	INTA#
7	INTB#	INTC#
8	INTD#	+5V
9	PRSNT1#	Reserved
10	Reserved	+5V (I/O)
11	PRSNT2#	Reserved
12	Ground	Ground
13	Ground	Ground
14	Reserved	Reserved
15	Ground	RST#
16	CLK	+5V (I/O)
17	Ground	GNT#
18	REQ#	Ground
19	+5V (I/O)	Reserved
20	AD[31]	AD[30]
21	AD[29]	+3.3V
22	Ground	AD[28]
23	AD[27]	AD[26]
24	AD[25]	Ground
25	+3.3V	AD[24]
26	C/BE[3]#	IDSEL
27	AD[23]	+3.3V
28	Ground	AD[22]
29	AD[21]	AD[20]
30	AD[19]	Ground
31	+3.3V	AD[18]
32	AD[17]	AD[16]
33	C/BE[2]#	+3.3V
34	Ground	FRAME#
35	IRDY#	Ground
36	+3.3V	TRDY#
37	DEVSEL#	Ground
38	Ground	STOP#
39	LOCK#	+3.3V
40	PERR#	SDONE
41	+3.3V	SBO#
42	SERR#	Ground
43	+3.3V	PAR
44	C/BE[1]#	AD[15]
45	AD[14]	+3.3V
46	Ground	AD[13]
47	AD[12]	AD[11]
48	AD[10]	Ground

	5V System Environment	
	Side B	**Side A**
49	Ground	AD[09]
50	CONNECTOR KEY	
51	CONNECTOR KEY	
52	AD[08]	C/BE[0]#
53	AD[07]	+3.3V
54	+3.3V	AD[06]
55	AD[05]	AD[04]
56	AD[03]	Ground
57	Ground	AD[02]
58	AD[01]	AD[00]
59	+5V (I/O)	+5V (I/O)
60	ACK64#	REQ64#
61	+5V	+5V
62	+5V	+5V
	CONNECTOR KEY	
	CONNECTOR KEY	
63	Reserved	Ground
64	Ground	C/BE[7]#
65	C/BE[6]#	C/BE[5]#
66	C/BE[4]#	+5V (I/O)
67	Ground	PAR64
68	AD[63]	AD[62]
69	AD[61]	Ground
70	+5V (I/O)	AD[60]
71	AD[59]	AD[58]
72	AD[57]	Ground
73	Ground	AD[56]
74	AD[55]	AD[54]
75	AD[53]	+5V (I/O)
76	Ground	AD[52]
77	AD[51]	AD[50]
78	AD[49]	Ground
79	+5V (I/O)	AD[48]
80	AD[47]	AD[46]
81	AD[45]	Ground
82	Ground	AD[44]
83	AD[43]	AD[42]
84	AD[41]	+5V (I/O)
85	Ground	AD[40]
86	AD[39]	AD[38]
87	AD[37]	Ground
88	+5V (I/O)	AD[36]
89	AD[35]	AD[34]
90	AD[33]	Ground
91	Ground	AD[32]
92	Reserved	Reserved
93	Reserved	Ground
94	Ground	Reserved

The following table shows the assignment of the slot-specific PCI bus signals.

PCI Socket Pin No.	FI45 PCI Slot 1 (X2)	FI45 PCI Slot 1 (X2)	FI45 shared ISA PCI Slot (X6/X7)
B16	PCLKG	PCLKE	PCLKF
A6	INTA	INTB	INTC
A7	INTC	INTD	INTB
B7	INTB	INTC	INTD
B8	INTD	INTA	INTB
B18	REQ0	REQ1	REQ3
A17	GNT0	GNT1	GNT3
A26	AD29	AD30	AD31

5.3.4 External Voltage Supply

Pin	Description
1	+ 12V
2	GND
3	GND
4	+ 5V

Front Adapter Module (PC FI45 V2)

6

Chapter Overview

6.1 Overview

Function

The front adapter module makes the central interface available to the system and distributes the specific interface signals for the front panel components of the PC FI45 V2.

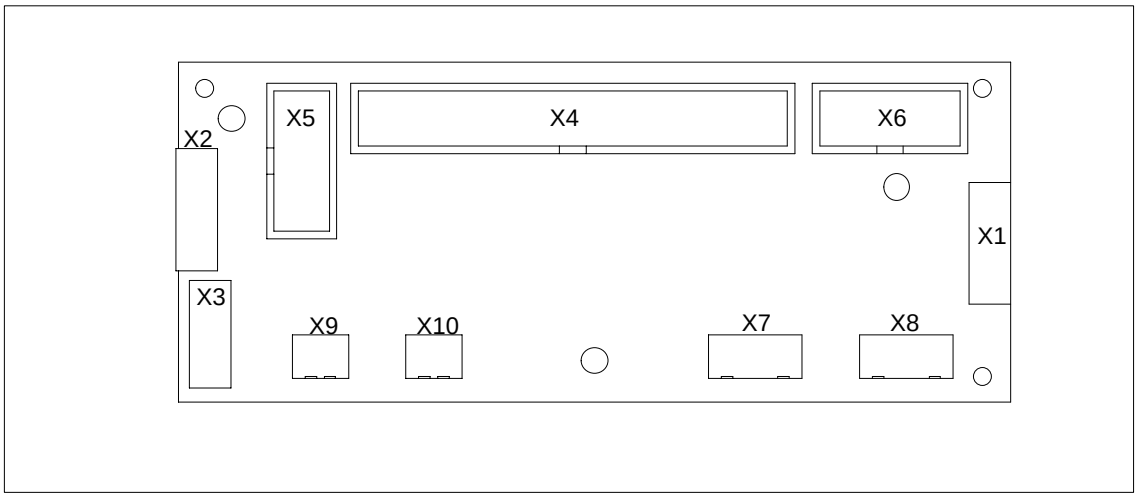


Figure 6-1 Front Adapter Module (PC FI45 V2)

6.2 Pin Assignment

Socket Connector X1

Connection to the LEDs of the membrane keyboard.

Pin No.	Connection to	Signal Name	Remarks
1	GND	GND	
2	X4-20	TEMP_R	Red temperature LED
3	X4-21	TEMP_G	Green temperature LED
4	X4-22	RUN_R	Red RUN LED
5	X4-23	RUN_G	Green RUN LED
6	X4-18, X4-36	DP_LED	DP LED
7	X4-40	HD_LED	HD LED
8	X4-23	RUN_G	POWER LED

Socket Connector X2

Connection to the mouse buttons of the membrane keyboard.

Pin No.	Connection to	Signal Name	Remarks
1	GND	GND	
2	X3-4	MOUSE_L	Left mouse button
3	GND	GND	
4	GND	GND	
5	X3-5	MOUSE_R	Right mouse button
6	GND	GND	
7	–	–	Not connected
8	–	–	Not connected

Socket Connector X3

Connection to the touch pad, inverse counting due to ribbon cable.

Pin No.	Connection to	Signal Name	Remarks
1	–	–	Not connected
2	–	–	Not connected
3	GND	GND	
4	X2-2	MOUSE_L	Left mouse button
5	X2-5	MOUSE_R	Right mouse button
6	X4-10	MOUSE_CLK	Touch pad mouse clock
7	X4-9	MOUSE_DAT	Touch pad mouse data
8	P5V	P5V	

Socket Connector X3

Connection to the Pentium III motherboard.

Pin No.	Connection to	Signal Name	Remarks
1	1P5V	1P5V	+5V via multifuse to motherboard
2	GND	GND	
3	X5-6	KBD_CLK_I	Keyboard clock, connection to motherboard
4	GND	GND	
5	X5-7	KBD_DAT_I	Keyboard data, connection to motherboard
6	GND	GND	
7	1P5V	1P5V	+5V via multifuse to motherboard
8	–	–	Coding
9	X3-7	MOUSE_DAT	Touch pad mouse data
10	X3-6	MOUSE_CLK	Touch pad mouse clock
11	P12V	P12V	Power supply for inverter
12	X6-2	BL_ON	Switch on signal for back light
13	X6-3	BL_CTRL_1	Brightness adjustment
14	X6-4	BL_CTRL_2	Brightness adjustment
15	X6-5	BL_CTRL_3	Brightness adjustment
16	GND	GND	
17	X9-1, X10-1, X4-31	RESET_N	Reset signal (low active)
18	X1-6, X4-36	DP_LED	
19	–	–	Not connected
20	X1-2	TEMP_R	
21	X1-3	TEMP_G	
22	X1-4	RUN_R	
23	X1-5	RUN_G	
24	X5-8	DTAST_DAT	Direct keys data signal
25	X5-9	DTAST_LATCH	Direct keys latch signal
26	X5-10	DTAST_CLK	Direct keys clock signal
27	X5-1	KBD_CLK_E	Keyboard clock, external keyboard
28	1P5V	1P5V	+5V via multifuse to motherboard
29	GND	GND	
30	X5-4	KBD_DAT_E	Keyboard data, external keyboard
31	X9-1, X10-1, X4-17	RESET_N	Reset signal (low active)
32	–	–	Not connected

Pin No.	Connection to	Signal Name	Remarks
33	–	–	Not connected
34	P5V	P5V	
35	GND	GND	
36	X1-6, X4-18	DP_LED	
37	–	–	Not connected
38	–	–	Not connected
39	X1-8	POWER_LED	
40	X1-7	HD_LED	

Socket Connector X5

Connection to the keyboard controller.

Pin No.	Connection to	Signal Name	Remarks
1	X4-27	KBD_CLK_E	Keyboard clock, external keyboard
2	1P5V	1P5V	+5V via multifuse to motherboard
3	GND	GND	
4	X4-30	KBD_DAT_E	Keyboard data, external keyboard
5	GND	GND	
6	X4-3	KBD_CLK_I	Keyboard clock, connection to motherboard
7	X4-5	KBD_DAT_I	Keyboard data, connection to motherboard
8	X4-24	DTAST_DAT	Direct keys data signal
9	X4-25	DTAST_LATCH	Direct keys latch signal
10	X4-26	DTAST_CLK	Direct keys clock signal

Socket Connector X6

Connection to the inverter module.

Pin No.	Connection to	Signal Name	Remarks
1	P12V	P12V	Power supply for inverter
2	X6-2	BL_ON	Switch on signal for back light
3	X6-3	BL_CTRL_1	Brightness adjustment
4	X6-4	BL_CTRL_2	Brightness adjustment
5	X6-5	BL_CTRL_3	Brightness adjustment
6	GND	GND	
7	GND	GND	
8	P5V	P5V	
9	P5V	P5V	
10	P12V	P12V	

Socket Connector X7, X8

Voltage supply 5V/12V, not fitted.

Pin No.	Connection to	Signal Name	Remarks
1	P12V	P12V	Derived from power supply to inverter
2	GND	GND	
3	GND	GND	
4	P5V	P5V	

Socket Connector X9

Connection for reset key.

Pin No.	Connection to	Signal Name	Remarks
1	X10-1, X4-17, X4-31	RESET-	Reset signal (low active)
2	GND	GND	

Socket Connector X10

Connection for reset, not fitted.

Pin No.	Connection to	Signal Name	Remarks
1	X9-1, X4-17, X4-31	RESET-	Reset signal (low active)
2	GND	GND	

Touch Screen (Optional with PC FI45 V2) 7

Chapter Overview

7.1 General Information

The touch screen consists of a pressure-sensitive resistance array that is continuously monitored by a controller. When the screen is touched, the coordinates of the position affected are computed based on the screen resolution used and forwarded to the controller. Since the touch screen function is based on resistance, users can operate it using an appropriate object such as the blunt end of a pen or pencil or when wearing gloves.

Note

Do not use pointed objects to operate the screen, since these can damage the polyester membrane surface.

This screen surface is waterproof and can be cleaned with a mild, non-abrasive cleaner.

The touch screen system consists of the touch screen sensor and the touch screen controller. The FI45 uses the built-in touch controller E271-2210 which is connected to the RS232 interface of the basic module. The external cable (already plugged in) connects the touch controller to the external COM2 port.

The plug-in jumpers on the mini circuit board of the touch controller are preset by the manufacturer; these connections must not be changed.

There is no touch pad available for these devices. The necessary software for operating the touch screeen is pre-installed.

The following section applies only to the first installation of your device.

7.2 Installing the Drivers and Software

Install the driver from the CD *Documentation and Drivers* supplied. Proceed as follows:

1. Insert the CD.
2. Run *start.exe*
   Acrobat Reader is installed if necessary.
3. Navigate to the driver list (depending from language, operating system and device).
4. Install the desired driver in accordance with the entries in the driver list.

7.3 Operation under MS-DOS

If you have already installed a DOS mouse driver (MOUSE.COM) for your mouse, you can continue to use it with the touch screen under DOS.

To install the software under MS-DOS, proceed as follows:

- Follow the user prompts and instructions that appear on the screen. You will be asked to choose between DOS Express, Windows Express or Selective. Select DOS Express.
- You will then be asked to indicate what types of hardware are present. Select the serial port and then the COM2 port.
- The installation is complete when you are informed that *Autoexec.bat* has been changed and the previous batch file has been renamed to *Autoexec.old*.

Calibrating the Touch Screen

The touch screen must be calibrated after installation. To calibrate the screen, proceed as follows:

- Enter the command **Go** as soon as the installation is complete; then enter the command **Elocalib.exe** in the installation directory.
- Follow the instructions displayed on the screen and touch the appropriate locations on the screen with a with a suitable object made of wood or plastic, such as the blunt end of a pen or pencil.
- Enter the command **Elocalib –h** to determine the additional parameters that can be used as options for the calibration.
- Restart the computer so that the calibration with take effect. If an installation diskette is still in the drive, remove it first.

Demonstration Program for DOS

The demonstration program contains self-explanatory tasks and games that can be completed or played by touching the screen. To use this program, proceed as follows:

- Enter the command **Elodemo.exe** in the installation directory.
- Enter the command **Elodemo –h** to specify additional parameters for this demonstration program.

7.4 Installation under Windows 3.x

To install the software under Windows 3.x, proceed as follows:

- Enter the command **Install** in the directory **C:\Touch\Win311**.
- The directory C:\Touch will be suggested as the location for the installation of the touch driver. If you accept this suggestion but have already installed the touch driver under MS-DOS, a message will be displayed saying that this directory already exists; nevertheless, continue by installing the driver in the suggested directory.
- Follow the user prompts and instructions that appear on the screen. You will be asked to choose between DOS Express, Windows Express or Selective. Select Windows Express.

If you have already installed the touch driver under MS-DOS, you will be informed that entries for the touch screen are already present in *Autoexec.bat*.

- You will asked if you want to keep the current setting or change it; select **Change**.
- You will then be asked to indicate what types of hardware are present. Select the serial port and then the COM2 port.
- The installation is complete when you are informed that *Autoexec.bat* has been changed and the previous batch file has been renamed to *Autoexcec.old*.

Calibrating the Touch Screen

The screen is calibrated using the procedure already described in Section 7.3.

Simultaneous Operation of Touch Screen and Mouse

If you have not previously loaded a mouse driver under MS-DOS, your mouse will no longer function after installing the touch screen under Windows 3.x. To restore the mouse function, you must install a DOS mouse driver such as MOUSE.COM and enter it in *Autoexec.bat* along with its access path.

7.5 Installation under Windows 95 / Windows 98

To install the software under Windows 95 / Windows 98, proceed as follows:

- Install according to the instructions in chapter 7.2.
- Accept the license conditions.
- Select either the **Elo 2310, 2210 or 2300 Smartset Serial Controller on Com2**.
- Restart the computer so that the changes will take effect.

Calibrating the Touch Screen

After restart, follow the instruction on the screen in order to calibrate the Touch Screen.

Double Touch (Similar to a Mouse Click)

Although the double-click speed of the mouse can be set using the sequence Start/ Settings/Control Panel/Mouse, it is also necessary to define the size of the double touch field for the touch screen. This is necessary, because the second touch made in a double touch sequence will not occur in exactly the same location as the first one.

To set a field size of 25 x 25, proceed as follows:

- Go to the Control Panel via **Start > Settings**
- Double-click the **Elo Touchscreen** button to activate the touch screen control window.
- Select the tab **Buttons**
- Enter the field size next to the **Double-click area (10-100 pixel):**
- Confirm with “OK.”

To set a field size other than 25 x 25, proceed as follows:

- Select the tab **Buttons** in Touchscreen control window
- Enter the desired field size next to the **Double-click area (10-100 pixel):**
- Confirm with “OK.”

The full-screen mode is not supported; however, the Windowed DOS mode is supported fully. If you turn on the full-screen mode via the touch screen, the system will immediately return to the Windows desktop. However, you can operate programs with the mouse in full-screen mode.

Note

The touch screen will not function if it is touched while Windows 95 is starting up.

Removing the Mouse Pointer

If you want to remove the mouse pointer, proceed as follows:

- Select the tab **Buttons** in Touchscreen control window (see Double-Touch)
- Activate the **Hide arrow mouse pointer** control window
- Confirm with “OK.”

After this, the normal mouse pointer no longer appears, but all other pointers continue to function as before.

Tips for Touch Screen Applications

To facilitate windows operation with the touch screen, it is a good idea to increase the **window frame width** in order to make changing the window size easier. You can use the menu command **Display > Size** in the Control Panel to change the width of the window frame.

The **scroll bar** can be operated as usual. You can scroll through some data fields by simply touching the screen within the field and then maintaining contact with it while dragging until you are outside the data field.

Touch the window maximizing button or double-click the window title bar to **maximize the window size**. Similarly, you can double-touch the window title bar to restore the window to its previous size.

Recalibrating the Touch Screen

- Go to the Control Panel via **Start > Settings**
- Double-click the **Elo Touchscreen** button to activate the touch screen control window.
- Click the **Calibrate** button. Then touch each of the three targets that appear on the screen as precisely as possible with an a suitable object made of wood or plastic, such as the blunt end of a pen or pencil.
- Confirm with “Yes” and “OK” to conclude the calibration procedure.

7.6 Installation under Windows NT

Install the driver from the CD *Documentation and Drivers* supplied. Proceed as described in Chapter 7.2.

Enter the installation path in the setup program and select **Typical**. In the Touchscreen setup-dialog window, select Serial, SmartSet 2xx0, Com2, English.

Calibrating the Touch Screen

The touch screen must be calibrated after installation. To calibrate the screen, proceed as follows:

- Go to the Control Panel via **Start > Settings**
- Double-click the **Elo Touchscreen** button to activate the touch screen control window.
- Click the **Calibrate** button. Then touch each of the three targets that appear on the screen as precisely as possible with a suitable object made of wood or plastic, such as the blunt end of a pen or pencil.
- Confirm with “Yes” and “OK” to conclude the calibration procedure.

Removing the Mouse Pointer

In order to remove the mouse pointer, you have to replace it with the Null-Cursor-File **Null.cur**, which is included in the EloTouch package. Install the Null-Cursor-File as follows:

- Go to the Control Panel via **Start > Settings**
- Double-click on **Mouse**
- Select the tab **Pointer**
- Select the line **Normal Selection**
- Click on **Browse...**
- `Enter C:\WinNT\Cursors\` in the **File name** box
- Select the file **Null.cur**
- Confirm with OK
- Close the property sheet **Mouse Properities** with OK.

After doing this, the normal mouse pointer will no longer appear, although all other pointers will function as before.

Tips for Touch Screen Applications

The same conditions described for Windows 95 also apply here (see Section 7.5).

7.7 Installation under Windows 2000

Make sure that you select Com2 during installation, otherwise install in accordance with the information in chapter 7.2.

Calibrating the Touch Screen

After restart, follow the instructions on the screen in order to calibrate Touch Screen.

Recalibrating the Touch Screen

- Go to the Control Panel via **Start > Settings**
- Double-click on the button **Elo Touchscreen**
- Click on **Align** in the tab **General**
- Close the **Elo Touchscreen Properties** Dialog box

Double Touch (Similar to a Mouse Click)

See Chapter 7.5.

Removing the Mouse Pointer

See Chapter 7.5.

Tips for Touch Screen Applications

See Chapter 7.5.

Display

8

Chapter Overview

8.1 TFT Display (XGA)

Note

The backlight tube of the TFT display is subjected to wear and hence a guarantee against a defective tube cannot be granted. Depending on its operating temperature, the tube's half-life period is typically 15000 operating hours, i.e. your display has then dimmed to 50% of its original brightness. Under unfavorable operating conditions, we recommend you replace the tube after the half-life period has elapsed. The backlight tube is available as a spare part.

Technical specifications

Screen (visible effective surface)	Diagonal: 13.3 inches Width: 270.3 mm Heigth: 202.8 mm
Resolution	1024 x (RGB) x 768 pixels
Interface	1 chip LVDS
Size of pixels	0.264 mm vertical 0.264 mm horizontal
Faulty spots permitted	High-Level < 12 spots Low-Level < 25 spots Green-High-Level< 5 spots
Order of pixels	RGB vertical strips
Display mode	white characters on black background
Dimensions	Width: 296.5 mm Height: 214.0 mm Depth: 7.8 mm
Weight	approx. 595 g

CD-ROM Drive

9

Chapter Overview

9.1 Functionality

The CD-ROM drive enables you to update your STEP 5, STEP 7 and Windows 95 and Windows 98 software easily. The drive is operated via the secondary IDE interface.

Opening the Drawer

By briefly pressing the eject button, the drawer springs out slightly. Now pull the drawer out until it clicks into position.

Inserting / Removing CDs

Now insert the CD in the drawer with the label face up (Box PC 820) or to the left (PC FI45 V2), and press it firmly down into the center of the turntable. To remove the CD, hold it by the edges and pull upwards.

Caution

To avoid too much pressure on the open drawer, **always** hold the drawer at the front with one hand when inserting or removing a CD.

Closing the Drawer

Push in the drawer until it closes completely. Do **not** press the eject button.

Note

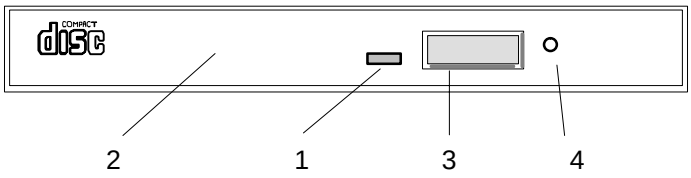
The EJECT function offered by various applications for opening the CD-ROM drawer does not work with this drive.

After the drawer has been closed, the CD is tested and the access display light on the drive starts to flash:

– If the display flashes continually, the CD is faulty but can still be read.

– If the display flashes several times and then remains lit, the CD you have inserted is defective and cannot be read.

CD-ROM Front



1 Access display
2 Drawer
3 Eject button
4 Emergency eject

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.

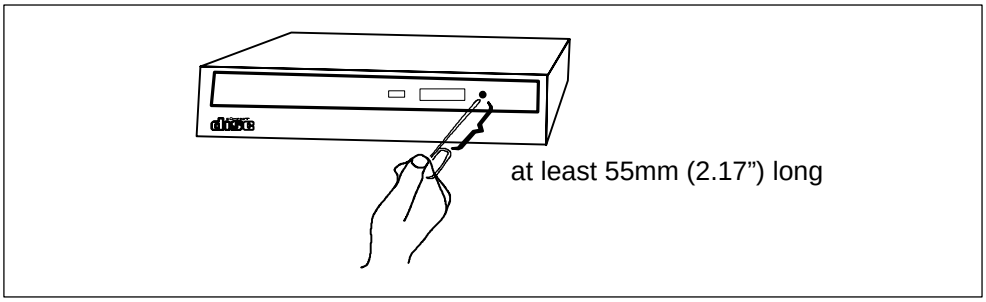


Figure 9-1 Emergency removal

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.

Power Supply

10

Chapter Overview

10.1 Technical Specifications

Voltage

Voltage	Max. Current	Voltage Stability
+ 12 V	8.5 A	± 4 %
– 12 V	0.5 A	± 6 %
+ 5 V	22 A	± 3 %
– 5 V	0.5 A	± 5 %
+ 3.3 V	10.0 A	± 5 %

Voltage

Input voltage	115/230 VAC, ± 10 %
Line voltage frequency	47 – 63 Hz
Power consumption	≤ 320 Watt
Jumpering on power failure	20 ms at 175 W
Output power	220 W DC to T_U = 32°C / 180 W DC to T_U = 45°C
Degree of protection	IP20
Protection class	VDE 0106
Certification	EN 60950/IEC 950, UL

Power-Good Signal

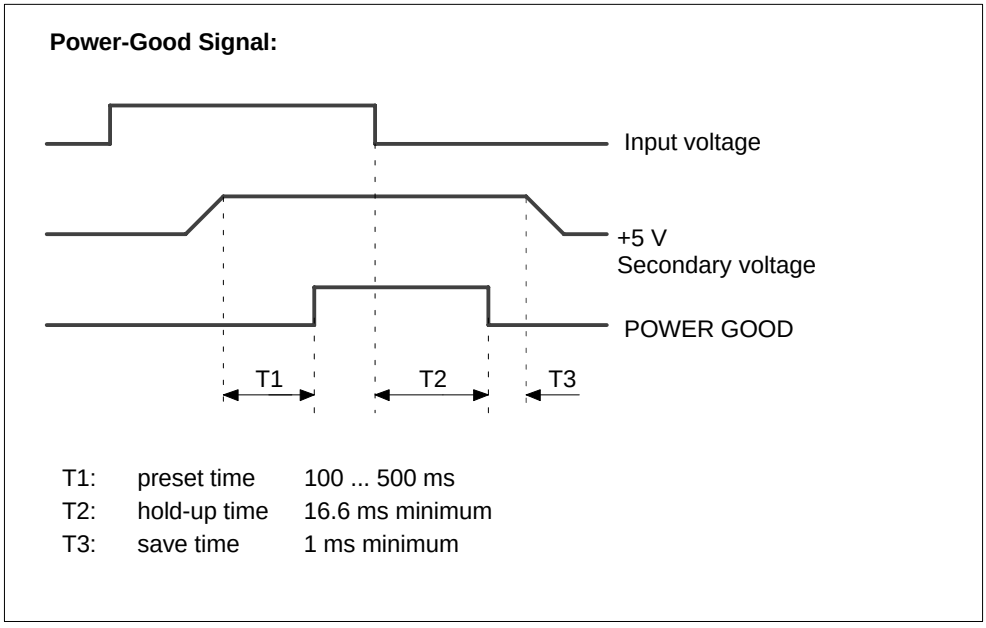


Figure 10-1 Time Characteristics of the Power-Good Signal

Connecting Cables

11

Chapter Overview

11.1 Connecting Cables

Overview

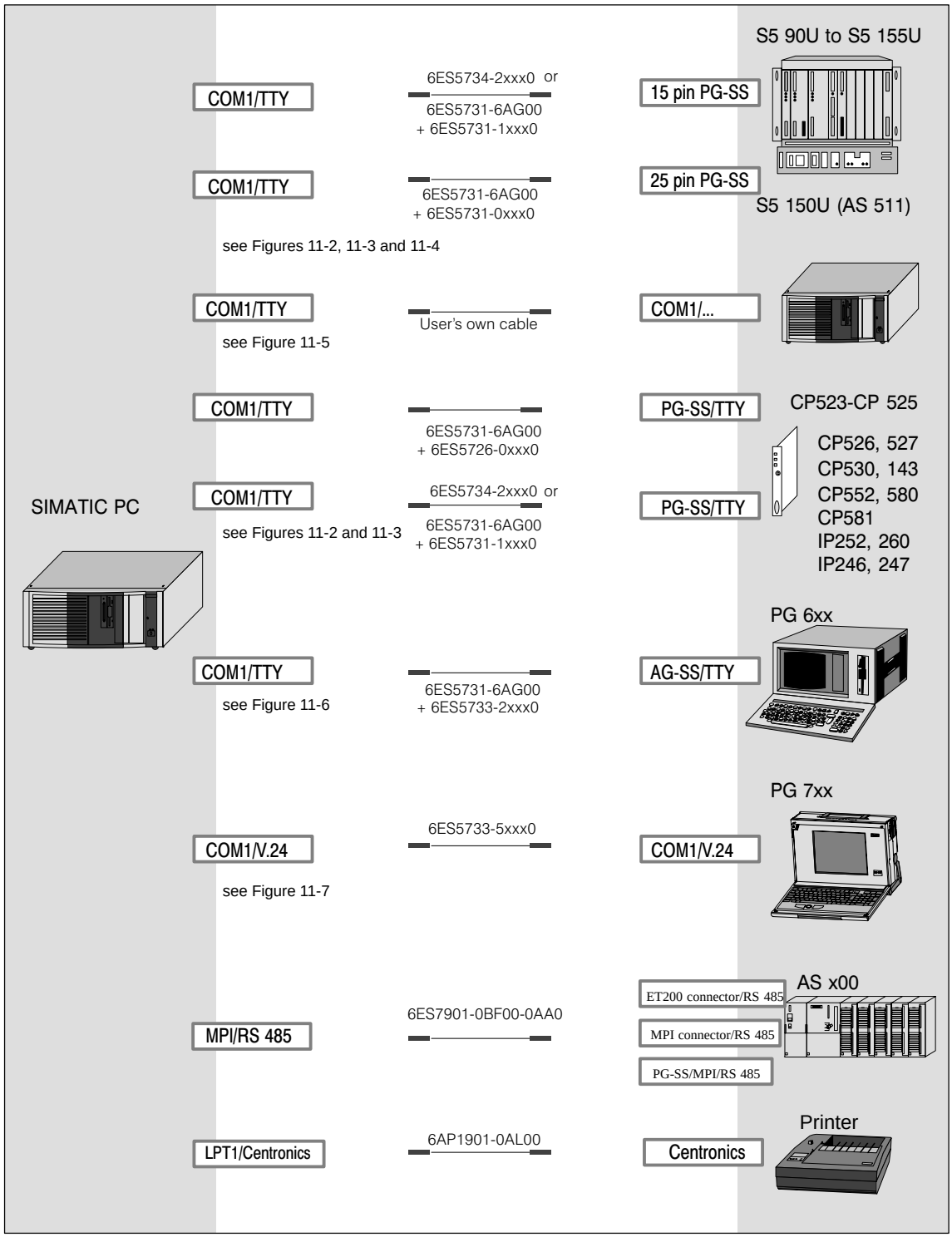


Figure 11-1 Connecting Cables

SIMATIC PC - PLC Standard Connection

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

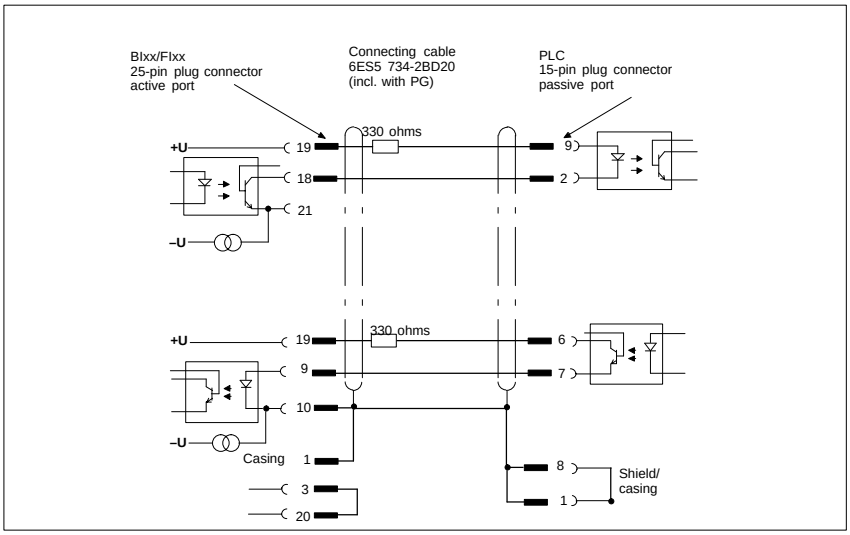


Figure 11-2 SIMATIC PC - PLC Standard Connection

SIMATIC - 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.

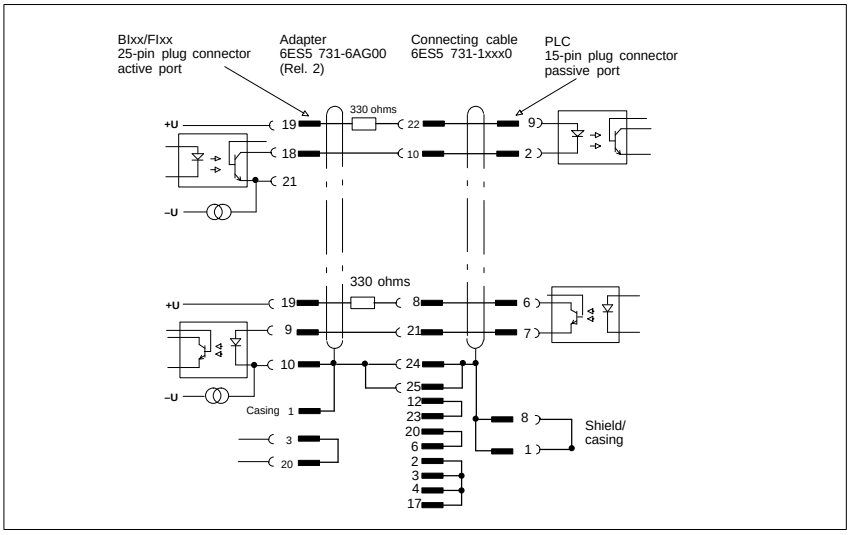


Figure 11-3 SIMATIC - PLC Connection to PG 6xx 15-pin Connecting Cable

SIMATIC PC - 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 PLC 150U (AS 511).

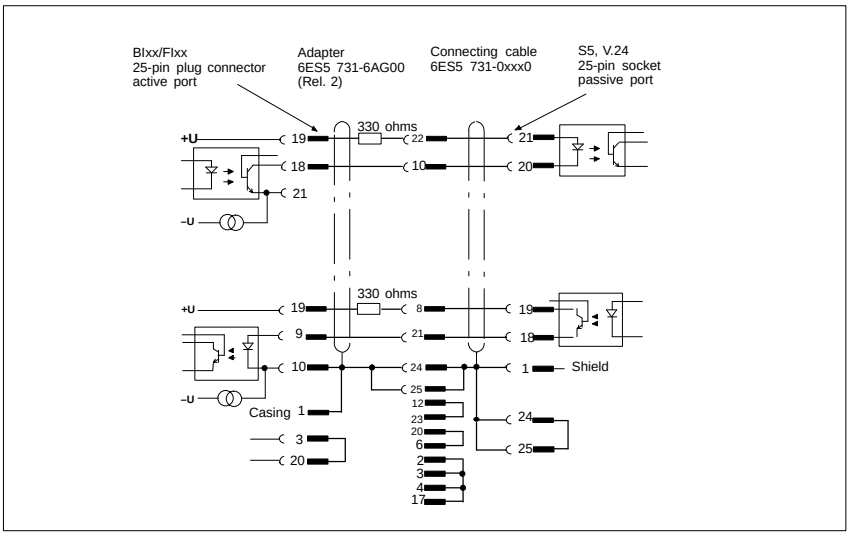


Figure 11-4 SIMATIC PC - PLC Connection via PG 6xx Connecting Cable with 25-pin Socket Connector

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 Chapter 1.3.11.

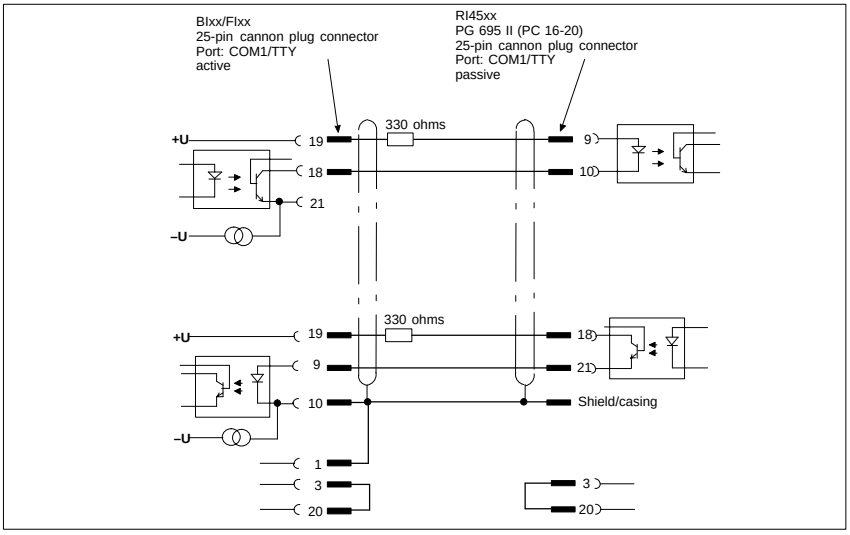


Figure 11-5 Cable for Interconnecting Programming Devices

SIMATIC PC - 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 PC must be switched to active. Please read the notes on changing over the TTY/COM 1 port to active in Chapter 1.3.

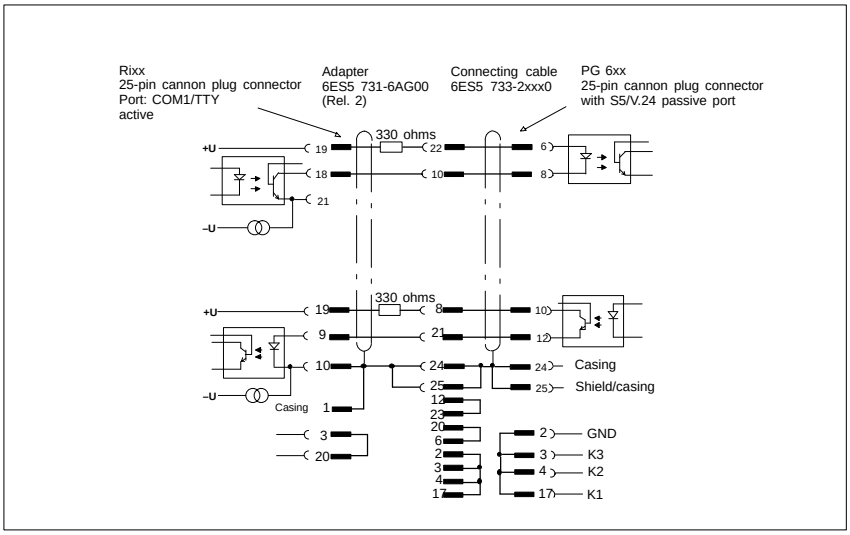


Figure 11-6 SIMATIC PC - PG 6xx Connection to PLC-S5 Port

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

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

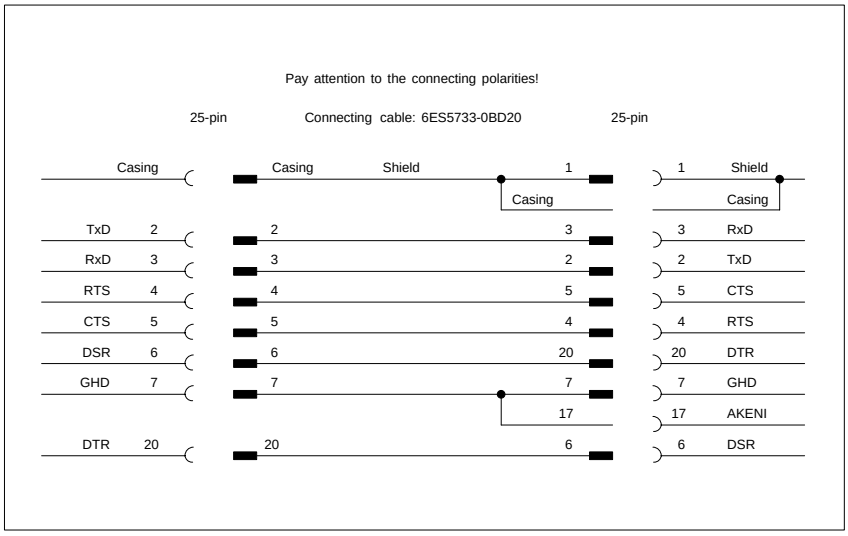


Figure 11-7 SIMATIC PC - PG 7xx Connection in V.24 Operation

Guidelines for Handling Electrostatically-Sensitive Devices (ESD)

A

Chapter Overview

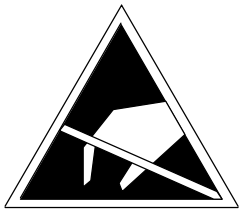
A.1 What is ESD?

Definition

All electronic modules are equipped with large-scale integrated ICs or components. Due to their design, these electronic elements are very sensitive to overvoltages and thus to any electrostatic discharge.

These **E**lectrostatically-**S**ensitive **D**evices are commonly referred to by the abbreviation **ESD**.

Electrostatically-sensitive devices are labeled with the following symbol:



Caution

Electrostatically-sensitive devices are subject to voltages that are far below the voltage values that can still be perceived by human beings. These voltages are present if you touch a component or the electrical connections of a module without previously being electrostatically discharged. In most cases, the damage caused by an overvoltage is not immediately noticeable and results in total damage only after a prolonged period of operation.

A.2 Electrostatic Charging of Persons

Charging

Every person with a non-conductive connection to the electrical potential of its surroundings can be charged electrostatically.

Figure A-1 shows you the maximum values for electrostatic voltages which can build up on a person coming into contact with the materials indicated in the figure. These values are in conformity with the specifications of IEC 801-2.

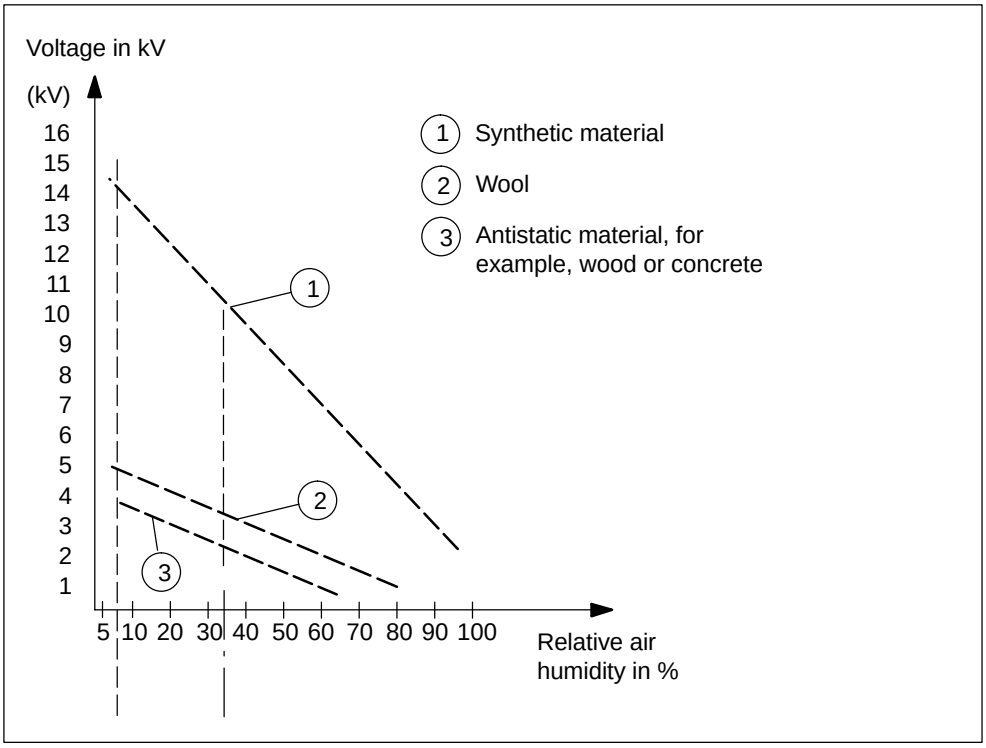


Figure A-1 Electrostatic Voltages which can Build up on a Person

A.3 General Protective Measures Against Electrostatic Discharge Damage

Ensure Sufficient Grounding

Make sure that the personnel, working surfaces, and packaging are sufficiently grounded when handling electrostatically-sensitive devices. You thus avoid electrostatic charging.

Avoid Direct Contact

You should touch electrostatically-sensitive devices only if it is unavoidable (for example, during maintenance work). Hold modules without touching the pins of components or printed conductors. In this way, the discharged energy cannot affect the sensitive devices.

If you have to carry out measurements on a module, you must discharge your body before you start the measurement by touching grounded metallic parts. Use grounded measuring devices only.

Glossary

What does this Chapter Contain?

This chapter contains a glossary in which you will find a list of the terminology used in conjunction with the Siemens range of PCs and programming devices and a brief explanation of each of the terms.

A

Access Protection

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

Application

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

ASCII Editor

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

B

Base Memory

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

Bps

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

BIOS

BASIC Input Output System

Boot Diskette

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

Booting

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

C

Cache

Fast intermediate memory between the work memory and the CPU.

CD ROM

(Compact Disc – Read Only Memory) Removable memory for large amounts of data.

Click

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

COM1 Port

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

COM2 Port

The COM2 port is a serial V.24 interface which can be used to connect a mouse or other external devices (for example, printers).

Configuration Files

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

Configuration Software

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

Cursor

Pointer that shows the position on the screen at which the next entry will appear.

Cursor Control

Keypad on the keyboard for controlling the cursor.

D

Device Configuration

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

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

Diskette

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

Disk Drive

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

Display

The monitor of the PG 740 PII.

Double-Click

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

Drives

Drives are used to hold rotating storage media (diskettes, hard disk, CDs).

Drivers

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

Drop-Down Menu

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

E

EPROM/EEPROM Submodules

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

Extended Memory

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

Ethernet

Local network (bus structure) for text and data communication with a data transmission rate of 10 Mbps.

F

File

A file is a collection of data under one name.

Formatting

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

Function Keys

Function keys can be divided into two different types; the normal function keys which are assigned a particular function of the computer (for example, delete key), and programmable function keys (softkeys).

H

Hard Copy

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

Hard Disk Drive

Hard disk drives (Winchester drives) are a form of magnetic disk memory where the magnetic disks are permanently built into the drive.

I

Interface

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

Interface Module

Module used to connect the hardware I/O.

Interrupt

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

IRQ

Interrupt Request

ISA

Industrial Standard Architecture (bus for expansion module)

J

JEIDA

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

K

Keyboard

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

I

LED

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

LPT1 Port

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

LS 120 drive

The LS 120 drive is compatible with previous 3.5”-disk drives. With the LS 120 drive, normal floppy disks (1.44Mbyte) as well as Superdisks with up to 120 Mbyte capacity can be used.

M

Main Memory

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

Memory Card

Memory cards are memory for user programs and parameters in credit-card format, for example, for programmable modules and CPs.

Modem

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

Module

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

Monitor

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

Mother Board

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

Mouse

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

Mouse Pointer

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

MPI/DP

The multipoint interface (MPI) is the programming device interface of SIMATIC S7. It enables access to programmable modules, text displays, and operator panels from a central point. The stations on the MPI can communicate with each other.

MS-DOS

(Microsoft Disk Operating System) is one of the standard operating systems for personal computers. It is a single-user system.

Multipoint Interface

The multipoint interface (MPI) is the programming device interface of SIMATIC S7/M7. It enables access to programmable modules, text displays, and operator panels from a central point. The stations on the MPI can communicate with each other.

N

Network

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

O

Operating System

Collective term for all programs which, in conjunction with the hardware, control and monitor execution of the user programs, the distribution of resources among the individual user programs, and the maintenance of the operating mode (for example, Windows 98).

P

Parallel Interface

Information is transmitted a byte at a time via a parallel interface (port). This means that the transmission rate is very fast. The programming devices have a parallel interface (LPT) to connect a printer.

Password

See Access Protection

PC

Personal computer

PCI

Peripheral Component Interconnect (fast expansion bus).

PCMCIA

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

PG

Programming device

PG Interface

The PG (programming device) interface is a serial port; it is located on a CPU, a CP/IP, or a coordinator module (PG-MUX) and is used to connect a programming device. Some CPUs may have two PG interfaces as an option.

PIC

SIMATIC programmable controller

Programmable Controller

The programmable logical controllers (PLC) of the SIMATIC systems (S5 or S7) consist of a central controller, one or more CPUs, and various I/O modules.

Pull-Down Menu

See Drop-Down Menu

R

RAM

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

ROM

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

RTC

Real-time clock

S

SCSI Interface

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

Serial Interface

Data are transmitted one bit at a time via a serial interface (port); they are used where large distances have to be covered using the minimum amount of cabling.

SETUP (BIOS Setup)

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

SIMATIC S5 Memory Submodule

Memory submodules for SIMATIC S5 that can be written with the programmer and inserted in an S5 programmable controller.

SIMATIC Memory Cards

Memory submodules in credit-card format for SIMATIC S5 and SIMATIC S7 which are programmed with the PG 740 PII and can be plugged in an S5 or S7 programmable controller.

SINEC L2 (PROFIBUS)

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

SINEC H1(ETHERNET)

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

Software

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

STEP 5 Basic Package

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

STEP 7

Programming software for the creation of user programs for SIMATIC S7 control.

T

Text Cursor

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

TFT Display

Thin-film-transistor color display

Trackball

The trackball is used as an input device for programs serviced by a mouse. On the PG 740 PIII, the trackball is integrated in the keyboard.

U

USB

Universal Serial Bus. Devices with USB interfaces can be connected to the USB interface.

User Interface

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

User Program

A collection of all the instructions, declarations, and data for signal processing, by which a system (or process) is controlled or influenced. It is linked to a programmable module (for example, CPU, FM) and can be structured in smaller units (blocks).

V

V.24 Interface

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

VGA

(Video Graphics Array)
Color graphics control mode

W

Warm Restart

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

Work Memory

The work memory is a RAM memory in the CPU which the processor accesses during user program processing.

Write Protection

Write protection for files or diskettes

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

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