SIEMENS

SIMATIC

# Industrial PC SIMATIC IPC547C

Operating Instructions


Introduction 1
Safety information 2
Description 3
Application Planning 4
Installing 5
Connecting 6
Commissioning 7
Integration into an Automation System 8
Functions 9
Expansions and parameter assignment 10
Service and maintenance 11
Troubleshooting/FAQs 12
Technical specifications 13
Dimension drawings 14
Detailed descriptions 15
Appendix A
ESD directives B
List of abbreviations C



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## Legal information

### Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

**⚠ DANGER**

indicates that death or severe personal injury **will** result if proper precautions are not taken.

**⚠ WARNING**

indicates that death or severe personal injury **may** result if proper precautions are not taken.

**⚠ CAUTION**

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

**CAUTION**

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

**NOTICE**

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

### Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation for the specific task, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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Note the following:

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Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be adhered to. The information in the relevant documentation must be observed.

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### Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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# Table of contents


**1 Introduction ..... 7**

1.1 Preface ..... 7

1.2 Guideline to the operating instructions ..... 8

**2 Safety information ..... 9**

2.1 General safety instructions ..... 9

**3 Description ..... 11**

3.1 Overview ..... 11

3.2 Applications ..... 11

3.3 Highlights ..... 12

3.4 Function ..... 12

3.5 Features ..... 13

3.6 Structure ..... 16
3.6.1 External structure ..... 16
3.6.2 Operator controls ..... 17
3.6.3 Connection components ..... 18
3.6.4 Status displays ..... 20

**4 Application Planning ..... 21**

4.1 Transport ..... 21

4.2 Unpacking and Checking the Delivery ..... 21

4.3 Ambient and environmental conditions ..... 23

4.4 Access protection ..... 23

**5 Installing ..... 25**

5.1 Mounting the device. ..... 25

**6 Connecting ..... 27**

6.1 Connecting peripherals ..... 27

6.2 Connecting to the power supply ..... 28

6.3 Equipotential bonding ..... 31

**7 Commissioning ..... 33**

7.1 Requirements for commissioning ..... 33

7.2 Initial Commissioning - Initial Startup ..... 33

7.3 Microsoft Windows Security Center ..... 34

7.4 Notes on operation ..... 35
7.4.1 DVD burner (optional) ..... 35
7.4.2 Removable hard disks ..... 35
7.4.3 2HDD system (optional) ..... 37

7.4.4 RAID system ... 37
7.4.4.1 RAID1 system ... 37
7.4.4.2 RAID5 system ... 42
**8 Integration into an Automation System ... 47**
8.1 Integration ... 47
**9 Functions ... 49**
9.1 Introduction ... 49
9.2 Temperature monitoring/display ... 49
9.3 Watchdog (WD) ... 50
9.4 Fan monitoring ... 50
**10 Expansions and parameter assignment ... 51**
10.1 Opening the device ... 51
10.2 Memory expansion ... 53
10.3 Installing expansion cards ... 53
10.3.1 Notes on the modules ... 53
10.3.2 Installation of an expansion module ... 54
10.4 Installing drives ... 54
10.4.1 Installation options for drives ... 54
10.4.2 Installing / removing the drives or removable racks ... 55
10.4.3 Installing / removing a hard disk drive ... 58
**11 Service and maintenance ... 59**
11.1 Removing and installing hardware components ... 59
11.1.1 Repairs ... 59
11.1.2 Preventive maintenance ... 60
11.1.3 Replacing filters ... 60
11.1.4 Removing the device fan ... 60
11.1.5 Replacing the backup battery ... 62
11.1.6 Removing the power supply unit ... 63
11.1.7 Removing the motherboard ... 65
11.1.8 Replacing the processor ... 65
11.2 Reinstalling the software ... 67
11.2.1 General installation procedure ... 67
11.2.2 Restoring the factory state of the software using the Restore DVD ... 67
11.2.3 Installing Windows ... 68
11.2.3.1 Setting up the partitions for Windows operating systems ... 68
11.2.4 Installation of drivers and software ... 72
11.2.5 Installing the RAID controller software ... 73
11.2.6 Installing the burner or DVD software (optional) ... 73
11.2.7 Installing updates ... 73
11.2.7.1 Updating the operating system ... 73
11.2.7.2 Installing or updating application programs and drivers ... 74
11.2.7.3 Performing a BIOS update ... 74
11.2.8 Data backup ... 74
11.2.8.1 Creating an image ... 74
**12 Troubleshooting/FAQs ... 75**
12.1 General problems ... 75

12.2 Problems when using modules of third-party manufacturers ....77
**13 Technical specifications ....79**
13.1 General technical specifications ....79
13.2 Power requirements of the components (maximum values) ....84
13.3 AC voltage supply ....84
13.4 AC power supply, redundant ....85
13.5 Technical specifications of the telescopic rails ....85
**14 Dimension drawings ....87**
14.1 Dimension drawing of the device ....87
14.2 Dimension drawing for the use of telescopic rails ....88
14.3 Dimensional drawings for the installation of expansion modules ....88
**15 Detailed descriptions ....89**
15.1 Motherboard ....89
15.2 System resources ....89
15.3 Interrupt assignment ....90
15.4 BIOS Setup ....92
**A Appendix ....93**
A.1 Guidelines and declarations ....93
A.2 Certificates and approvals ....94
A.3 Service and support ....95
A.4 Retrofitting instructions ....96
**B ESD directives ....97**
B.1 ESD Guidelines ....97
**C List of abbreviations ....99**
C.1 Abbreviations ....99
**Glossary ....105**
**Index ....117**

# Introduction

# 1

## 1.1 Preface

### Purpose of the Operating Instructions

These operating instructions contain all the information you need for commissioning and operation of the SIMATIC IPC547C.

It is intended both for programming and testing personnel who commission the device and connect it with other units (automation systems, programming devices), as well as for service and maintenance personnel who install add-ons or carry out fault/error analyses.

### Basic knowledge required

A solid background in personal computers and Microsoft operating systems is required to understand this manual. General knowledge in the field automation control engineering is recommended.

### Validity of the Operating Instructions

These operating instructions are valid for all supplied variants of the SIMATIC IPC547C and describe the delivery status as of September 2010.

### Position in the information landscape

The documentation for the SIMATIC IPC547C includes the following sections:

- SIMATIC IPC547C, Getting Started
- SIMATIC IPC547C, Operating Instructions

The documentation is on the "Documentation & Drivers" DVD that ships with the product.

For further instructions on how to handle the software, please refer to the corresponding documentation.

### Conventions

The term "PC" or "device" is sometimes used to refer to the SIMATIC IPC547C product in this documentation.

### History

Currently released versions of these operating instructions:

| Version | Comments |
|---|---|
| 06/2009 | First edition |
| 09/2010 | • New operating system: Windows 7 Ultimate<br>• New power supply |

# 1.2 Guideline to the operating instructions

| Organization of contents | Contents |
|---|---|
| Table of contents | Organization of the documentation, including the index of pages and chapters |
| Introduction | Purpose, layout and description of the important topics. |
| Safety information | Covers all general safety-related aspects of statutory regulations in terms of the installation, commissioning and operation of the product/system. |
| Description | Fields of application, the features and the design of the product/system |
| Application planning | Aspects of storage, transport, environmental and EMC conditions to be considered in the preparatory stage |
| Mounting | Product installation options and installation instructions |
| Connecting | Options of connecting the product and connection instructions |
| Commissioning | Commissioning the product/system. |
| Integration | Options of integrating the product into existing or planned system environments/networks |
| Functions | Monitoring and display functions |
| Expansions / programming | Installation of expansion devices (memory, modules, drives) |
| Maintenance and service | Replacement of hardware components, restoring and setup of the operating system, installation of drivers and software |
| Troubleshooting | Problems, cause, remedy |
| Specifications | General specifications in compliance with relevant standards and current/voltage values |
| Dimension drawings | Dimensions of the device and of modules |
| Detailed descriptions | Design, function and features of the vital components, allocation of system resources and use of the BIOS Setup |
| Appendix | Guidelines and certifications, service and support, notes on retrofitting |
| ESD directives | General ESD guidelines. |

# Safety information 2

## 2.1 General safety instructions

| ⚠ CAUTION |
| --- |
| Please observe the safety instructions on the back of the cover sheet of this documentation. You should not expand your device unless you have read the relevant safety instructions. |

This device is compliant with the relevant safety measures to IEC, EN, VDE, UL, and CSA. If you have questions about the validity of the installation in the planned environment, please contact your service representative.

### Repairs

Only qualified personnel are permitted to repair the device.

| ⚠ WARNING |
| --- |
| Unauthorized opening and improper repairs can cause considerable damage to property or danger for the user. |

### System expansions

Only install system expansion devices designed for this device. If you install other expansion devices, you may damage the system or violate the safety requirements and regulations on RF suppression. Contact your technical support team or where you purchased your PC to find out which system expansion devices may safely be installed.

| CAUTION |
| --- |
| If you install or exchange system expansions and damage your device, the warranty becomes void. |

### Battery

This device is equipped with a Lithium battery. Batteries may only be replaced by qualified personnel.

| ⚠ CAUTION |
| --- |
| There is the risk of an explosion if the battery is not replaced as directed. Replace only with the same type or with an equivalent type recommended by the manufacturer. Dispose of used batteries in accordance with local regulations. |

**WARNING**

Risk of explosion and release of harmful substances!

For this reason, do not burn lithium batteries, do not solder on the cell body, do not open, do not short circuit, do not reverse polarity, do not heat above 100°C, dispose of correctly, and protect against direct sunlight, dampness and dew.

## Headphones

**CAUTION**

**Impaired hearing due to excessive sound pressure**

The setting of the volume and the equalizer can increase the sound pressure in the headphones. Other factors not mentioned by the manufacturer can also influence the sound pressure, for example the operating system. equalizer software, firmware and driver.

Excessive sound pressure from headphones can result in impaired hearing or even loss of hearing.

Set the volume control and equalizer to the lowest value, before you put on the headphones. Keep checking the setting of the volume control. Only use headphones approved by the manufacturer.

## ESD directives

Modules containing electrostatic sensitive devices (ESDs) can be identified by the following label:



Strictly follow the guidelines mentioned below when handling modules which are sensitive to ESD:

- Always discharge your body´s static electricity before handling electrostatic sensitive devices (for example, by touching a grounded object).
- All devices and tools must be free of static charge.
- Always pull the mains connector and disconnect the battery before you install or remove modules which are sensitive to ESD.
- Handle modules fitted with ESDs by their edges only.
- Do not touch any wiring posts or conductors on modules containing ESDs.

# Description 3

## 3.1 Overview

The SIMATIC IPC547C is a powerful industrial PC in 19" rack format design (4 HE). It is perfectly suited for high-performance industrial PC applications.

- Maximum performance
- Attractive price




Figure 3-1 SIMATIC IPC547C

## 3.2 Applications

The SIMATIC IPC 547C offers system integrators, cabinet designers, system engineers and machine designers a 19" rack PC platform for high-performance IT applications on the control and cell levels. It can be used for:

- Process and visualization applications
- Industrial image processing
- Quality assurance / surveillance tasks
- Measurement, control and rule-based tasks
- Data acquisition and management

The SIMATIC IPC547C has CE certification for use in the industrial sector as well as in residential and commercial areas, and small businesses. In addition to the industrial applications, it can also be used in building services automation or in facilities open to the public.

## 3.3 Highlights

**Latest PC technology:**

- State-of-the-art Intel technology
- High performance and scalability
- PCI-, PCIe x1-, PCIe x8-, PCIe x16 slots

**Industrial suitability:**

- Dust protection
- Service-friendly
- CE certification for industrial and office use
- Transport safety for expansion cards
- Monitoring functions

**Investment security:**

- Guaranteed spare parts availability for at least 3 years

**High system availability:**

- SIMATIC PC DiagMonitor - PC diagnostics / message software via OPC/SNMP/LAN
- Preventative data backup with the SIMATIC PC/PG Image Creator
- RAID1 – redundant data storage on two hard drives, also "hot swap" in connection with SATA removable racks.
- RAID5 – striping with parity on three hard disks, "hot swap" in connection with SATA removable racks
- Redundant power supply

## 3.4 Function

- Integrated, assigned monitoring functions
  - Fan speed (CPU, power supply and front fan)
  - Temperature (case, mainboard)
  - Program execution (watchdog)
- RAID1 (mirroring) for automatic data mirroring of two serial ATA hard drives
- RAID5 (striping with parity) for increased memory and improved data security on three serial ATA hard disks
- Enhanced diagnostic/messaging by way of Ethernet, E-mail, SMS, and for direct input in SIMATIC software by way of OPC (optional using SIMATIC PC DiagMonitor):
  - Operating hours counter
  - Hard disk status
  - System status (Heart Beat)
  - Automatic logging of all messages to a log file
  - Option of remote monitoring of networked SIMATIC PCs

# 3.5 Features

| General features | |
|---|---|
| Design | • 19" rack, 4 HU<br>• Robust full metal rack design case, lacquered outside and coated inside<br>• Prepared for mounting telescopic rails<br>• Horizontal and vertical mounting position is possible<br>• Tower installation by means of Tower Kit<br>• Lockable front cover as access protection |
| Housing | • Dust protection by means of overpressure ventilation using bearing seated front fan through filter<br>• Card retainer for reliable operation of PC modules under vibration and shock conditions |
| Drive bays | • Front: 3 x 5.25" and 1 x 3.5"<br>• Internal: 2x 3.5" |
| Slots for expansion cards (long) | • 4 x PCI (5 V and 3.3 V32 Bit)<br>• 1 x PCIe x16<br>• 1 x PCIe x1<br>• 1 x PCIe x8 (1 Lane) |
| Graphics | • Intel® GMA4500 on-board graphics controller<br>2-D and 3-D engine integrated in chipset,<br>Dynamic Video Memory Technology<br>(uses up to 256 MB of RAM)<br>Max. 1280x1024 at 100 Hz / 32-bit color depth<br>Max. resolution:<br>2048x1536 at 75 Hz / 16-bit color depth<br>• in PCIe x16 slot (optional)<br>PCIe x16 graphic card (dual head: 2 x VGA or 2 x DVI),<br>256 MB DDR2<br>up to 2048 x 1536 at 75 Hz / 32-bit color depth |
| **Ports** | |
| Ethernet | 2 x 10/100/1000 Mbps (RJ45) |
| USB | 6 x back, 2 x front; 1 x internal (high-current) |
| Serial | COM1 (V.24), COM2 (V.24) optional |
| Parallel | LPT1, optional |
| Graphics | 1 x VGA |
| Keyboard | 1 x PS/2 |
| Mouse | 1 x PS/2 |
| Audio | Mic in, Line in, Line out |
| **Power supply** | |
| Standard | 100 - 240 VAC |
| Redundant | 2 x 100 - 240 VAC |

| **Monitoring functions** | |
|---|---|
| Temperature | • Overshoot/undershoot of permissible operating temperature |
| Fans | • RPM monitoring, wear monitoring |
| Watchdog | • Monitoring of program execution<br>• Monitoring time can be parameterized in software<br>• Restart can be parameterized in the event of a fault |
| Status LEDs (front) | • POWER (internal power supply unit, PC switched On)<br>• HDD (access to hard disk drive)<br>• TEMP (temperature status)<br>• FAN (fan status) |
| Status LEDs (back) | • Redundant power supply |

| **Standard versions** | |
|---|---|
| Processor | Intel® Dual Core E5300<br>(2.6 GHz, 800 MHz FSB, 2 MB L2 Cache, EM64T) |
| RAM expansion | 1 GByte DDR2 SDRAM; Single Channel<br>4 DIMM socket for up to 16 GB |
| **Disk drives** | |
| Floppy disk drive | 1.44 MB |
| 3.5" hard disk (SATA) | 250 GB, built in |
| Operating system | None |

| **Optional accessories** | |
|---|---|
| Processor | • Intel® Core™ 2 Duo E8400<br>(3.0 GHz, 1333 MHz FSB, 6 MB L2 Cache, EM64T, VT)<br>• Intel® Core™ 2 Quad Q9400<br>(2.66 GHz, 1333 MHz FSB, 6 MB L2 cache, EM64T, VT) |
| RAM expansion | Up to 8 GB, dual-channel |
| Interfaces | USB retainer |
| **Disk drives** | |
| DVD-ROM | Read:<br>DVD ROM: Single layer 16x, Dual Layer 8x<br>DVD+R/RW, DVD-R/RW 8x, DVD-RAM 2x<br>CD-ROM, CD-R 32x, CD-RW 20x |
| DVD burner | Read:<br>DVD ROM: Single Layer 16x, Dual Layer 12x<br>DVD-R/+R: Single Layer 16x, Dual Layer 12x<br>DVD-RW/+RW 13x<br>CD-ROM/CD-R 48x, CD-RW 40x<br>Read:<br>DVD RAM: 12 x<br>DVD+R 16x, DVD+RW 8x, DVD-R 16x, DVD-RW 6x, DVD+R9 (DL) 16x, DVD-R DL 12x<br>CD-R 52x, CD-RW 32x |

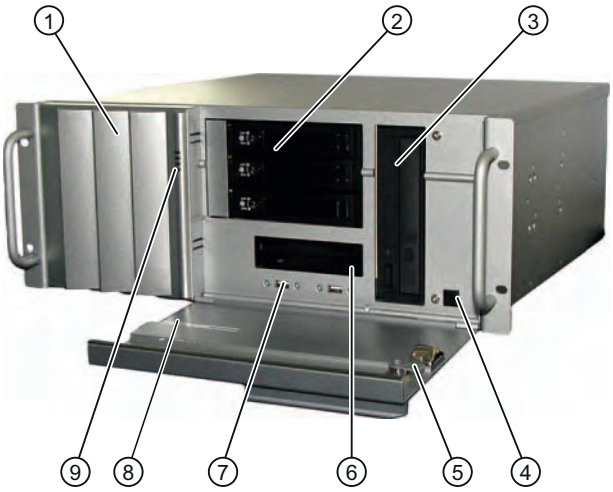
| Optional accessories | |
|---|---|
| Hard disks 3.5" (SATA) | • 500 GB, internal<br>• RAID1 (2x 500 GB); internal<br>• 500 GB in removable HDD frame; front<br>• 2x 500 GB in removable HDD frame; front<br>• RAID1 500 GB (2x500 GB) in removable HDD frame; hot swap; front<br>• RAID5 1 TB (3x 500 GB) in removable HDD frame; hot swap; front |
| Graphics controllers | • Add2 card (1x DVI-D)<br>• PCIe x16 graphics card, dual head (2x VGA or 2x DVI-D) |
| Operating system | Preinstalled / supplied on Restore DVD<br>• Windows XP Professional, MUI*<br>• Windows Vista Ultimate, MUI*<br>• Windows 7 Ultimate MUI*<br>• Windows Server 2003 R2 Standard Edition incl. 5 clients, MUI*<br>• Windows Server 2008 Standard Edition incl. 5 client, MUI *<br>*MUI: **M**ulti language **U**ser **I**nterface; 5 languages (English, German, French, Spanish, Italian) |

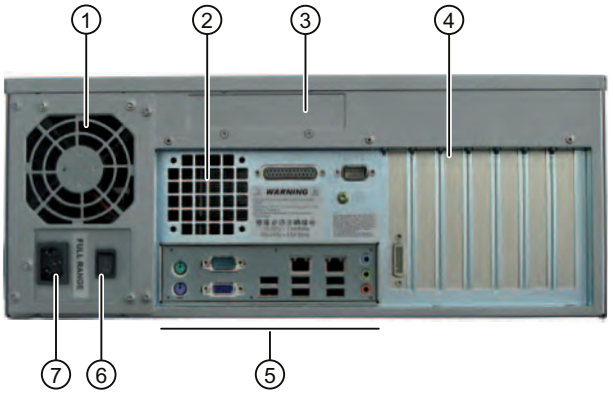
| Languages that can be installed from operating system recovery CD / DVD | | | | | |
|---|---|---|---|---|---|
| **Language** | **Windows XP** | **Windows Server 2003** | **Windows Server 2008** | **Windows Vista** | **Windows 7** |
| German | X | X | X | X | X |
| English | X | X | X | X | X |
| French | X | X | X | X | X |
| Italian | X | X | X | X | X |
| Spanish | X | X | X | X | X |
| Japanese | X | X | X | X | X |
| Chinese Hong Kong | X | X | X | X | X |
| Chinese (simplified) | X | X | X | X | X |
| Chinese Taiwan | | | | X | X |
| Korean | X | X | X | | |
| Russian | X | X | X | X | X |

| Optional expansions | |
|---|---|
| SIMATIC IPC DiagMonitor software | Software tool for monitoring SIMATIC PCs both locally and remote:<br>- Watchdog<br>- Temperature<br>- Fan speed<br>- Hard disk monitoring (SMART, RAID Status)<br>- System/Ethernet monitoring (heartbeat) |
| SIMATIC PC Image & Partition Creator software | Software tool for saving data locally |

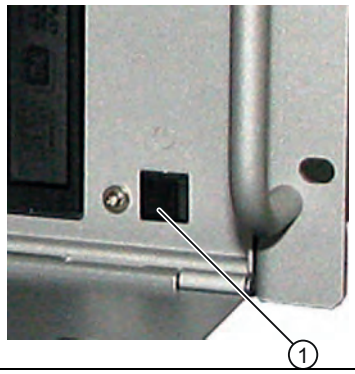
# 3.6 Structure

## 3.6.1 External structure

| Front view of the device | Pos | Description |
|---|---|---|
|  | ① | Front panel with aperture for ventilation of the device (filter mat and fan are located behind this front panel) |
| | ② | Installation options for DVD ROM drives, DVD burners and removable HDD frames |
| | ③ | Installation options for DVD ROM drives, DVD burners |
| | ④ | On/off button |
| | ⑤ | Front door with lock,<br>provides protection against dirt and unauthorized access. Keep the front door closed during normal operation. |
| | ⑥ | Floppy disk drive |
| | ⑦ | USB ports |
| | ⑧ | Type plate |
| | ⑨ | Status displays |

| Rear view of the device | Pos | Description |
|---|---|---|
|  | ① | Power unit fan |
| | ② | Fan aperture<br>Installation option for 60 mm fan |
| | ③ | Blanking panel<br>Option for installing a cover for external ports |
| | ④ | Expansion slots<br>4 x PCI, 1x PCIe x16, 1x PCIe x8 (1 Lane), 1x PCIe x1 |
| | ⑤ | Connection components |
| | ⑥ | On/off switch |
| | ⑦ | Power supply connection |

## 3.6.2 Operator controls

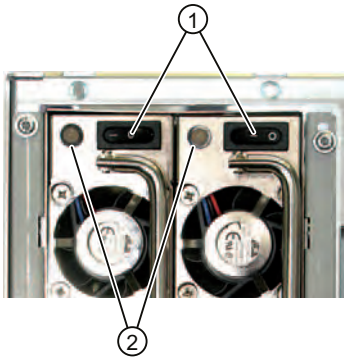
| Operator control on/off button | Pos | Description |
|---|---|---|
|  | ① | The on/off/reset buttons have three functions:<br>- Switch on the PC (press briefly 1x)<br>- Shut down the operating system and PC (press briefly 1x)<br>- Switch off the PC without shutting down the operating system (press and hold more than 4 seconds) = hardware reset.<br>Note: There are one or two power switches on the rear of the device ⑥. These must be switched on otherwise the on/off button has no effect. |

**CAUTION**

Data may be lost when the PC performs a hardware reset.

**⚠ WARNING**

The on/off button and on/off switch(es) do not disconnect the power from the PC!

| Operator controls for the redundant power supply | Pos | Description |
|---|---|---|
|  | ① | On-off switch |
| | ② | Power LED<br>Lit green: Power supply in operation<br>If there is no redundancy, you will be hear an acoustic signal permanently. |

**NOTICE**

**Use of the BIOS setup entry "Power Failure Recovery"**

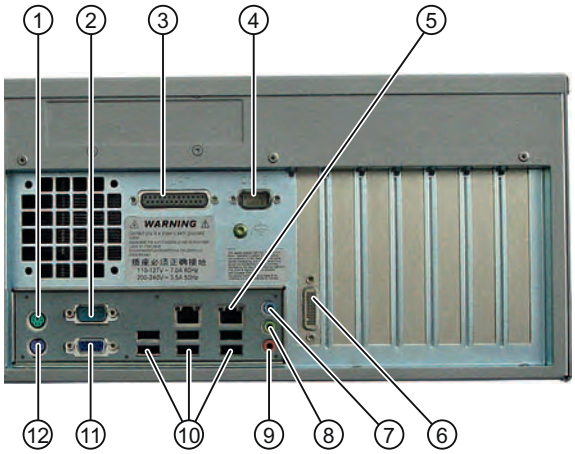
The settings of the BIOS setup entry only take effect if the device was without grid voltage for at least 20 seconds.

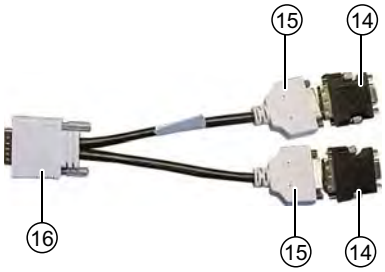
Depending on the BIOS setup entry "Power Failure Recovery" either the PC turns itself on automatically or the On/Off button ① on the front needs to be pressed.

## 3.6.3 Connection components

### Interfaces

**Port location at the rear of the device**




| Pos | Description | Description |
|---|---|---|
| ① | MOUSE | Connection for a PS/2 mouse |
| ② | COM 1 | Serial port 1 (V.24), 9-pin D-sub connector |
| ③ | LPT | Parallel port, 25-pin |
| ④ | COM 2 | Serial port 2 (V.24), 9-pin D-sub connector (optional) |
| ⑤ | Ethernet 1, 2 | Two RJ-45 Ethernet connectors for 10/100/1000 Mbps [1] |
| ⑥ | DVI or DMS59 connection | DVI-D connection of ADD2 card for digital monitors (optional) or<br>DMS59 connector of dual-head graphics card (optional). |
| ⑦ | Line in | Connector for analog audio source, 3.5 mm phono jack |
| ⑧ | Line out | Connector for active speakers or headset, 3.5 mm phono jack |
| ⑨ | Micro (input) | Connection for microphone, 3.5 mm phono jack |
| ⑩ | USB | 6 ports for USB devices |
| ⑪ | VGA | Connection for VGA monitor |
| ⑫ | KEYBOARD | Connection for a PS/2 keyboard |
| ⑭ | VGA [2] | VGA connection (adapter plugged in) |
| ⑮ | DVI-I [2] | DVI-I connection |
| ⑯ | Dual-head adapter [2] | DMS59 connector on dual-head graphics card (optional) |

[1] To identify them clearly, the LAN interfaces are numbered on the housing. The numbering by the operating system may deviate from this.

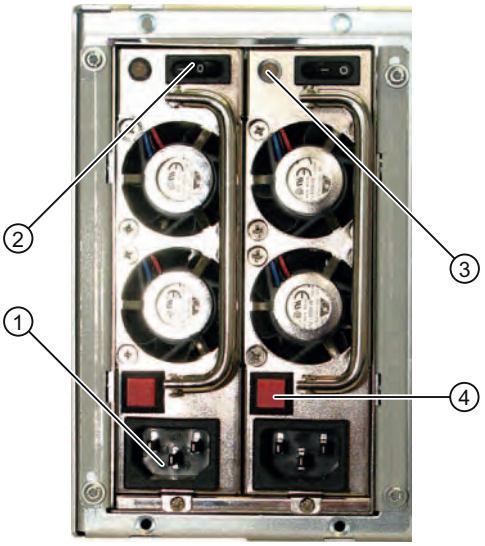
[2] Using the graphic card

## Power supply

| Position of the IEC power connector | Description |
|---|---|
|  | IEC ① connector for the AC power supply to the device. The permitted power range is 100 VAC to 240 VAC.<br>② On/off switch |

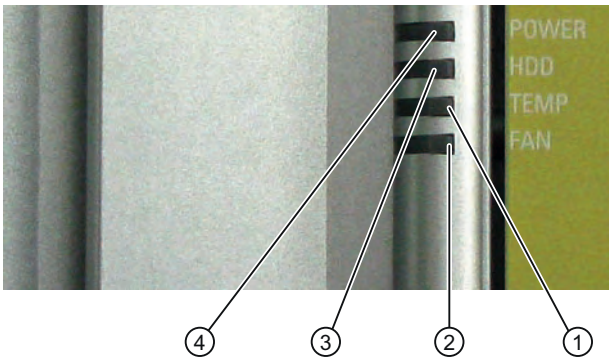
| ⚠ WARNING |
|---|
| The on/off switch does not disconnect the PC from the power supply! |

## Redundant power supply

| Redundant power supply | Pos | Description |
|---|---|---|
|  | ① | IEC connector for the AC power supply to the device. The permitted power range is 100 VAC to 240 VAC. |
| | ② | On/off switch |
| | ③ | LED of power supply |
| | ④ | Alarm reset |
| | | |

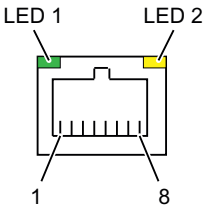
## 3.6.4 Status displays

**Status displays**




| Pos | Display | Meaning | LED | Description |
|---|---|---|---|---|
| ① | TEMP | Temperature status | OFF<br>RED flashing | • No error<br>• Temperature critical (CPU, device temperature). |
| ② | FAN | Fan status | RED flashing | • CPU heat sink fan fault<br>• Housing fan fault<br>• Power supply fan fault |
| ③ | HDD | Display for hard disk access | OFF<br>GREEN | • No access<br>• Access |
| ④ | POWER | PC operating status display | OFF<br>GREEN<br>flashing GREEN | • Hibernate, switched off or unplugged<br>• Windows standby<br>• PC in operation |

**Rear status displays**




| Display | Meaning | LED | Description |
|---|---|---|---|
| Ethernet LAN 1, 2 * | Green LED<br>Link status display | OFF | • No cable connected<br>• Cable disabled<br>• Interface disabled |
| | | GREEN | Active cable connected |
| | Yellow LED<br>Activity status display | OFF | • No cable connected<br>• Cable disabled<br>• Interface disabled<br>• No activity |
| | | YELLOW | Data transfer active |

* To identify them clearly, the LAN interfaces are numbered on the housing. The numbering by the operating system may deviate from this.

# Application Planning 4

## 4.1 Transport

Despite the device's rugged design, its internal components are sensitive to severe vibrations or shock. You must therefore protect the PC from severe mechanical stress when transporting it.

You should always use the **original packaging** for shipping and transporting the device.

| CAUTION |
| --- |
| **Risk of damage to the device!**<br>When transporting the PC in cold weather, it may be submitted to extreme variations in temperature. In this situation, ensure that no moisture (condensation) develops on or inside the device.<br>If condensation develops, wait at least 12 hours before switching on the device. |

## 4.2 Unpacking and Checking the Delivery

### Unpacking the device

Note the following points when you unpack the unit

- It is advisable not to dispose of the original packing material. Keep it in case you have to transport the unit again.
- Please keep the documentation in a safe place. It is required for initial commissioning and is part of the device.
- Check the delivery unit for any signs of visible transport damage.
- Verify that the shipment contains the complete unit and your separately ordered accessories.
- Please inform your local dealer of any disagreements or transport damages.
- Please inform Siemens AG by means of the enclosed SIMATIC IPC/PG quality control report form.

### Noting the device identification data

The device can be identified uniquely with the help of these numbers in case of repairs or theft.

Enter the following data in the table below:

- Serial number: The serial number (S VP) is located on the rating plate inside the front door.

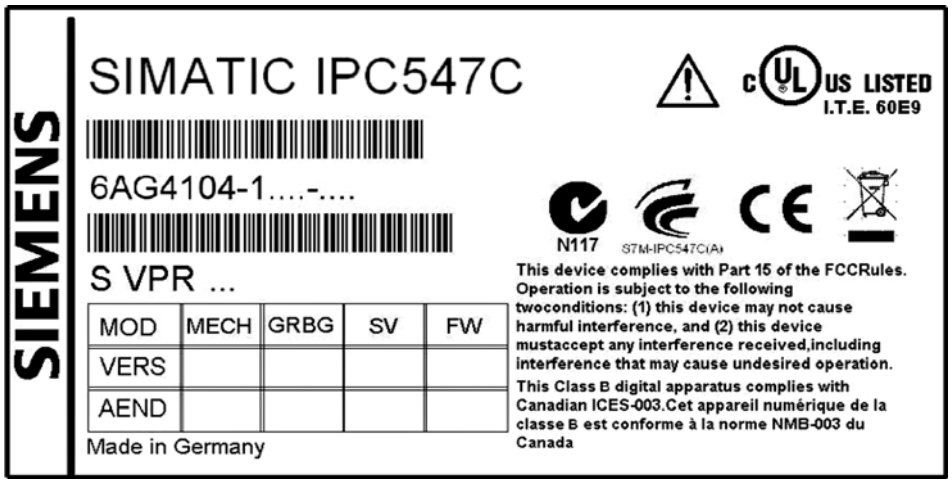



Figure 4-1 Rating plate

- Order number of the device
- Ethernet address: The Ethernet address of the device is available in BIOS Setup **(F2 function key)** , at **Info > (F1 function key) > LAN Address**.
- Microsoft Windows "Product Key" on the "Certificate of Authenticity" (COA). The COA label is attached to the inside of the front door.
  You may need the Product Key in case you reinstall the operating system.




Figure 4-2 COA label

| | |
|---|---|
| Serial number | S VP ... |
| Order no. | 6AG4104-1 ... |
| Microsoft Windows Product Key | |
| Ethernet address 1 | |
| Ethernet address 2 | |

## Device equipment

You will find a list of device equipment on a label behind the front door.

## 4.3 Ambient and environmental conditions

When you plan your project, you should make allowances for:

- The climatic and mechanical environmental conditions specified in the specifications provided by your operating instructions.
- Avoid extreme ambient conditions as far as possible. Protect your PC from dust, moisture, and heat.
- The device has been designed for usage in a normal industrial environment according to IEC 60721-3-3 (pollutant class 3C2 for chemical influence, 3S2 for sand and dust). PC may not be used in severe operating environments, for example locations with acidic vapors or gasses, without additional protective measures (such as the provision of clean air).
- Keep the PC out of direct sunlight.
- Mount the PC as safely as possible to prevent danger (for example, of falling over).
- The device conforms to protection class IP 30 at the front panel.
- The clearance in the area of the ventilation slots must be at least 50 mm, so that the PC is sufficiently ventilated.
- Do not cover the vent slots of the device.
- The device fulfills the requirements for a fire enclosure according to EN 60950-1. It can be installed without additional fire protection.
- The connected or added peripherals must not introduce a counter emf greater than 0.5 V into the device.

**⚠ WARNING**

Failure to comply with these requirements for system installation shall render approvals to UL 60950-1, EN 60950-1 void and leads to the risk of overheating and injury!

## 4.4 Access protection

The access protection of the device exists only when the front panel is closed and no keyboards with an On/Off button (power button) are being used.

**Note**

In Windows, you have the option of setting the function of the On/Off button to meet your requirements. You can make these setting in the "Power Options" menu.

# Installing 5

## 5.1 Mounting the device.

### Optional mounting locations

The device can be mounted in control desks, switching cabinets and 19" rack systems, both horizontally and vertically.

### Optional mounting methods

**⚠ WARNING**

**Dangers relating to unprotected machines or plant**

According to the results of a risk analysis, there is a possibility of danger if the machine is not protected.

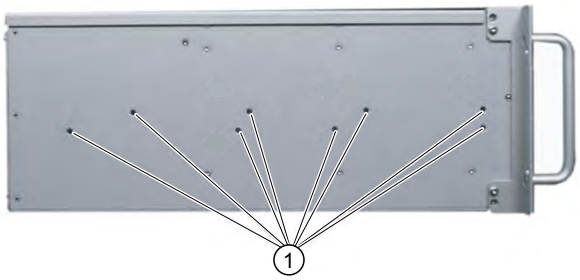
These dangers can lead to personal injury.

According to the risk analysis, you can avoid these potential dangers to persons by taking the following measures:

- Additional protective mechanisms on the machine or system. Here, the programming, configuration and wiring of the I/O used in particular must be performed in accordance with the safety performance (SIL, PL or Cat.) identified by the necessary risk analysis.
- The correct use of the device according to its purpose must be verified by a function test on the system. This test can detect programming, parameter assignment and wiring errors.
- Documentation of the test results that you can enter in the relevant safety verification documents.

The device can be mounted with the following methods

- Mounting with cabinet brackets
- Mounting on device bases
- Tower installation: a separate tower kit can be ordered for tower installation (not available in some countries).
- Mounting on telescopic rails
  These telescopic rails allow you to fully extract the device out of the cabinet or rack.
  Refer to the sections Technical specifications of the telescopic rails (Page 85) and Dimension drawing for the use of telescopic rails (Page 88) for more detailed information.




Position of the mounting holes ① for angle brackets or telescopic rails

| CAUTION |
| --- |
| The mounting screws of the telescopic rails may not protrude more than 5 mm into the device.. |

**Note**

For vertical operation, mount the device on a horizontal metal base and secure it against tipping. The following device bases are available from Rittal for this purpose:
Rittal Type TE 7000.620, Rittal Type VR 3861.580, Rittal Type DK 7063.710.

Please refer to the Cabinet manufacturer's instructions regarding device bases.

| ⚠ CAUTION |
| --- |
| **Risk of injury!**<br>It is not permitted to mount the device only on the 19" brackets of the front panel. |

# Connecting 6

## 6.1 Connecting peripherals

### Note before you connect the device

| NOTICE |
| --- |
| Connect only peripherals approved for industrial applications according to EN / IEC 61000-6-2. |

**Note**

Hot-plug peripherals (USB) may be connected while the PC is in operation.

| CAUTION |
| --- |
| Peripherals that are incapable of hot-plugging may only be connected after the device has been disconnected from the power supply. |

| CAUTION |
| --- |
| Strictly adhere to the specifications for peripheral equipment. |

| NOTICE |
| --- |
| The connected or added peripherals must not introduce any counter emf into the device.<br>A counter e.m.f. greater than 0.5 V to ground on the + 3.3 V DC / + 5 V DC / + 12 V DC voltage due to a connected or integrated component can prevent normal operation or even destroy the computer.<br>When measuring the counter emf, remember the following:<br>• The computer in question must be turned off and the power supply connector should be plugged in.<br>• During the measurement, all cables from the plant to the computer should be connected.<br>• All other components in the plant must be active. |

## 6.2 Connecting to the power supply

### Note before you connect the device

**Note**

The long-range power supply module is designed for operation on 100-240 AC networks. It is not necessary to adjust the voltage range.

**⚠ WARNING**

Do not connect or disconnect power and data cables during thunderstorms.

**⚠ WARNING**

The device may only be operated on grounded power supply networks (TN systems to VDE 0100, part 300, or IEC 60364-3).

Operation on ungrounded or impedance-grounded power networks (IT networks) is prohibited.

**⚠ WARNING**

The permitted nominal voltage of the device must conform with local mains voltage.

**⚠ CAUTION**

The mains connector must be disconnected to fully isolate the device from mains. Ensure easy access to this area.

A master mains disconnect switch must be installed if the device is mounted in a switch cabinet. Always ensure free and easy access to the power inlet on the device or that the safety power outlet of the building installation is freely accessible and located close to the device.

**Note**

The power supply contains a PFC (Power Factor Correction) circuit to conform to the EMC directive.

Uninterruptible AC power systems (UPS) must supply a sinusoidal output voltage in the normal and buffered mode when used with SIMATIC PCs with a PFC.

UPS characteristics are described and classified in the standards EN 50091-3 or IEC 62040-3. Devices with sinusoidal output voltage in the normal and buffered mode are identified with the classification "VFI-SS-...." or "VI-SS-....".

## Regional information

**Outside of the USA and Canada, operation on a 230 V power supply**:

This device is equipped with a safety-tested power cord which may only be connected to a grounded shockproof power outlet. If you choose not to use this cable, you must use a flexible cable of the following type: Min. 18 AWG conductor cross-section and 15-A / 250-V shock-proof connector. The cable set must be compliant with safety regulations and stipulated IDs of the country where the system is to be installed.

**For the USA and Canada**:

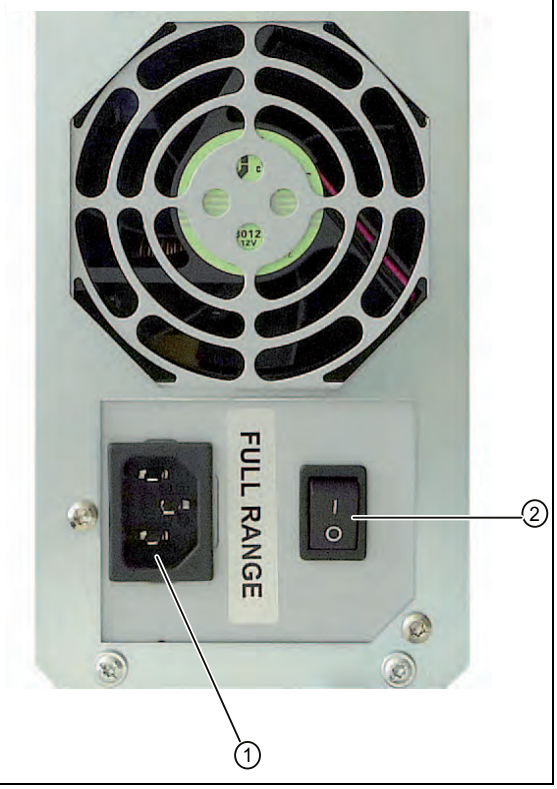
A CSA or UL-listed power cord must be used for the United States and Canada.

The connector must be compliant with NEMA 5-15.

**120 V AC power supply**
A flexible power cord approved to UL and with CSA label should be used. It should have the following features: Type SJT with three leads, min. 18 AWG conductor cross-section, max. length 4.5 m, parallel grounding plug 15 A, min. 125 V.

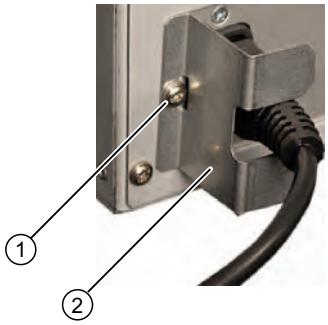
**240 V AC power supply**
A flexible power cord approved to UL and with CSA label should be used. It should have the following features: Type SJT with three conductors, min. 18 AWG conductor cross-section, max. length 4.5 m, and tandem grounded connector 15 A, min. 250 V.

## Connecting

| Steps for connecting the device to the power supply grid | | |
|---|---|---|
| 1 | make sure that the ON/OFF switch ② is in "0" position (Off) when you plug in the power cord to avoid the device starting up unintentionally. |  |
| 2 | Plug in the IEC connector ①. | |
| 3 | Connect the power cord to the outlet socket and turn on the ON/OFF switch ②. | |

## Secure the power plug

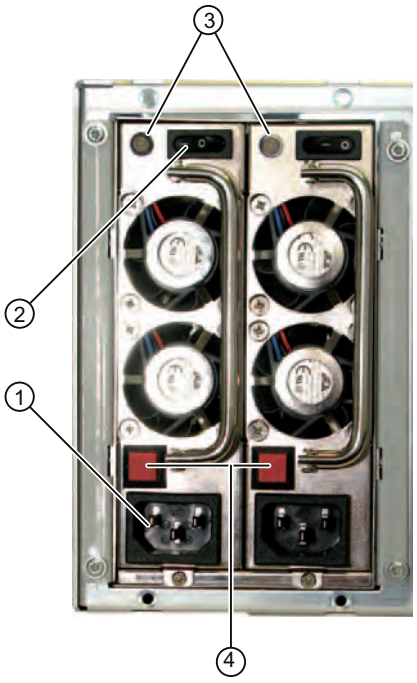
You can secure the power plug in order to avoid unintentional disconnection of the power cord.

| Steps for securing the power plug | | |
|---|---|---|
| 1 | Remove the fastening screw ① on the power supply module. |  |
| 2 | Fasten the power plug interlock ② to the power supply module | |

**WARNING**

If the power plug is secured with a clamp, the power outlet must be freely accessible to allow the device to be easily removed from the mains.

## Connecting to the redundant power supply

| Steps for connecting the device to mains (redundant power supply) | | |
|---|---|---|
| 1 | Connect the connector for cooling devices ①. |  |
| 2 | Plug both power cords into the power outlet at the same time.<br>**Note:**<br>You will hear a warning signal, if the power supply is not established at the same time. You cancel the warning signal by pressing button ④. | |
| 3 | Operate on/off button ② of power supply<br>(The LED on the power supply ③ will be lit green) | |

## 6.3 Equipotential bonding

A low-impedance ground connection improves the discharge of interference generated by external power cables, signal cables or cables for I/O modules to ground.

| **Equipotential bonding terminal** | |
|---|---|
| The equipotential bonding terminal (1) on the device (large surface, large-area contact) must be interconnected with the central grounding busbar of the cabinet or plant in which the PC is to be installed. The minimum conductor cross-section may not be less than 5 $mm^2$. |  |

# Commissioning 7

## 7.1 Requirements for commissioning

- Before you switch on the device, you should verify that all peripheral devices such the keyboard, mouse, monitor and the power supply are connected.
- The operating system of your device is preinstalled on the hard disk.

| CAUTION |
| --- |
| **Risk of damage to the device!**<br>Make sufficient allowances for the device to acquire room temperature before you put it into use. If condensation develops, wait at least 12 hours before switching on the device. |

## 7.2 Initial Commissioning - Initial Startup

The operating system is set up automatically on the device when it is **first** started. Procede as follows:

1. Press the on/off button. The green power LED lights up. The PC performs a POST. During the self-test, this message appears:

   ```
   Press <F2> to enter SETUP
   ```

2. Wait until this message is cleared, then follow the instructions on the screen.
3. Type in the Product Key as required. You find this key on the "Certificate of Authentication" in the "Product Key" line.

| NOTICE |
| --- |
| The PC may not be switched off at any time during the entire installation procedure.<br>**Do not** change the default BIOS settings, otherwise the operating system setup may become corrupted. |

4. Automatic restart

   After you have entered all necessary information and after the operating systemsetup is completed, the PC is automatically restarted and displays the user interface of the relevant operating system.

From now on, after you switch on the PC, the user interface of the operating system is automatically opened when the startup routine is completed.

### Switching off the device

**Note**

The device is equipped with a power supply unit with power switch.

Set the power supply switch to the "0" position. The device then consumes the lowest power from the AC supply grid. It cannot be switched on using the on/off button on the front.

**Note**

When working with Windows, always switch off the PC by clicking **Start > Shut Down**.

Press the on/off button behind the front panel door. The green power LED is switched off. Disconnect the mains connector to isolate the device from mains.

## 7.3 Microsoft Windows Security Center

### Warning from the Windows Security Center

A warning from the Windows Security Center is displayed the first time you switch on your device. The Security Center checks the status of the device in terms of the three important security aspects listed below. If a problem is detected (an outdated antivirus program, for example), the Security Center issues a warning and makes recommendations on how you can better protect the device.

- **Firewall**: The Windows Firewall adds protection to the device by blocking network or Internet access to the device by unauthorized users. Windows checks if the device is protected by a software firewall.
  The firewall is enabled by default in the factory state.
- **Antivirus software**: Antivirus programs add protection to the device by searching for and eliminating viruses and other security threats. Windows checks if a full-range, up-to-date antivirus program is running on the device.
  No antivirus software is installed in the factory state.
- **Automatic updates**: Using the Automatic Update feature allows Windows to regularly search for the latest critical updates for the device and to install them automatically. This feature is disabled in the factory state.
- **Real-time protection** (Windows 7 only): Windows Defender displays warnings if spyware or possibly unwanted software is installed or executed on the computer. You will also receive a warning if programs attempt to modify important Windows settings.

Configure the Security Center according to your requirements.

# 7.4 Notes on operation

## 7.4.1 DVD burner (optional)

The DVD burner drive is an optional feature. Recording methods supported by the disk drive: Disc-at-once, Track-at-once, Session-at-once, Packet writing. You can write to CD-R, CD-RW, DVD+R, DVD-R, DVD-RW, DVD+RW, DVD-RAM and dual-layer media.

### Burner software

Depending on the operating system, you need to install additional software (burner software) to use the full functionality of the DVD burner. This software is included on the CD supplied with the device. Insert the CD in the drive, run setup and follow the instructions on the screen.

| NOTICE |
| --- |
| When first starting the burner software, no disks should be inserted in the drive. This is because disks with errors can interrupt the automatic hard drive recognition. This makes it impossible to correctly display the possible burner functions. |

### Notes on burning optical disks

| CAUTION |
| --- |
| **Danger of data errors when burning disks!**<br>Burning is permissible only in an undisturbed environment, i.e. shock and vibration stress must be avoided. Because of heavy fluctuation in the quality of CD-Rs, data may be corrupted in a burning session, even if no error message is initially displayed. The written data can only be verified by comparing these with the source. To be on the safe side, data should be verified after every burning session. |

## 7.4.2 Removable hard disks

The removable HDD frames support hot plugging in connection with RAID1 or RAID5 during operation. If, however, you have configured a non-RAID system, you will need to turn the device off before exchanging the frame.

### Notes on operation

**Note**

Always replace the faulty drive with a new drive of the same type and capacity.

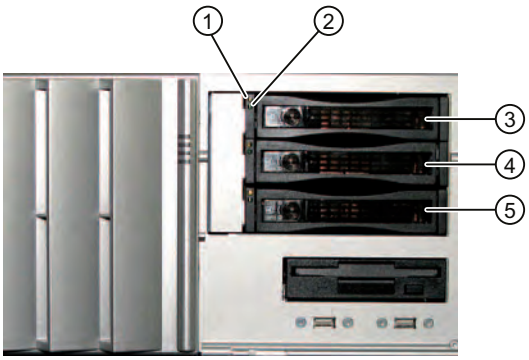
| NOTICE |
| --- |
| Always lock the HDD carrier in the removable HDD frame to ensure reliable operation of the device. |

| CAUTION |
| --- |
| Hard drives may only be replaced in a removable HDD frame if the hard drive is inactive and the HDD activity display of the device is off. Check the ESD Guidelines (Page 97). |

## Identifying a defective hard drive

| NOTICE |
| --- |
| The table and information below apply only to the delivery state of the device and assuming that no changes or expansions have been made. |

Table 7- 1 Location of the removable HDD frames in the device

| | |
| --- | --- |
|  | Power LED ①<br>power applied<br><br>HDD activity display ②<br>Also note the display for hard disk access on the device. |

The table below shows the assignment of the removable HDD frame positions in the device to the RAID system reports:

| RAID BIOS | RAID software | SATA interface | Installation location | Housing labeling [1] |
| --- | --- | --- | --- | --- |
| Port 2 | Device port 2 | SATA2 | Removable HDD frame ③ | 1 |
| Port 3 | Device port 3 | SATA3 | Removable HDD frame ④ | 2 |
| Port 4 | Device port 4 | SATA4 | Removable HDD frame ⑤ | 3 |

[1] A label with the housing details is attached to the front door.

### Procedure

1. Check which hard disk the RAID controller has reported being faulty (see "Identifying a defective hard drive").
2. Remove the drive from the removable HDD frame (see "Expansions and parameter assignment", section "Installing / removing the drives or removable racks (Page 55)").
3. Always replace the defective disk with a new one of the same type and capacity. Take care not to touch the contacts.
4. Install the drive in the removable HDD frame again.

Information about the recovery of the RAID system is available in the section RAID system (Page 37).

## 7.4.3 2HDD system (optional)

When the device ships, the second hard disk is connected to SATA port 3. This hard disk drive is not set up. This gives you the option of backing up your data to this hard disk. For information on hard disk capacities, refer to your order documentation.

### Booting from the slave hard disk

In order to allow booting from the second hard disk, you need to configure it as the primary boot device. Make the following settings in your BIOS Setup:

Select Boot > Hard Drive > <Disk name> e.g. STxxxxxxxxx- SATA3, then press the "+" key to move it up in the boot order.

| NOTICE |
| --- |
| The drive letters for the partitions on both drives are assigned by the operating system used. You can change these in the Control Panel as required. |

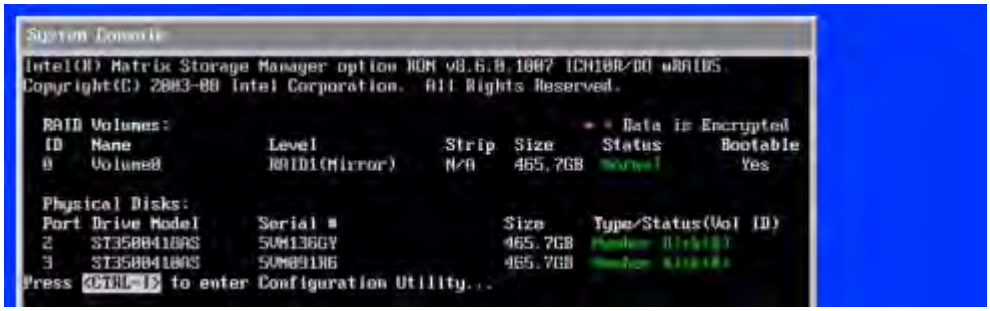
## 7.4.4 RAID system

### 7.4.4.1 RAID1 system

This is a RAID1 system configuration (data mirroring with two hard disks). This means that if there is a defective hard disk or there are cable problems, the system can continue to operate in one channel achieving a high degree of system availability.

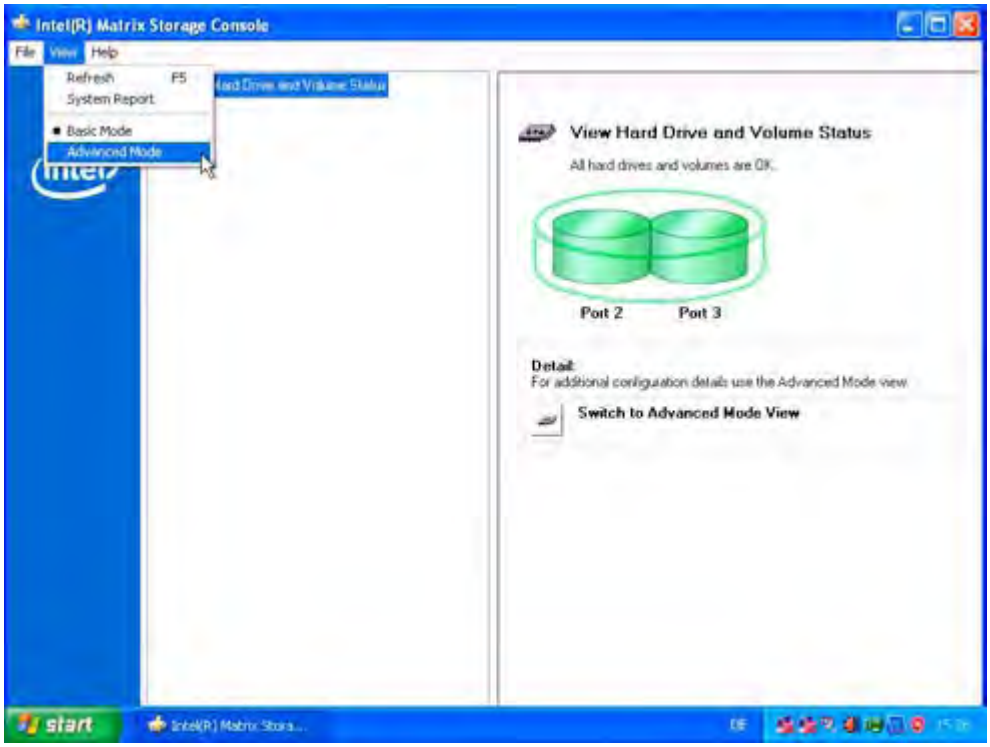
**Note**

You will find information about Intel RAID controllers in the RAID documentation on the "Documentation and Drivers" DVD that ships with the product in the Drivers\RAID\Intel directory.




## RAID system management functions

The pre-installed RAID system software offers enhanced functionality for RAID system operation and management. It is started by selecting the "Start > Programs > Intel Matrix Storage Manager command.




The "View -> Advanced Mode" command returns details of the RAID volumes. The "View -> System Report" command can be used to create a report with details of the RAID volume.

| NOTICE |
| --- |
| The RAID status entries are returned by default in the Windows event viewer and in the log file of the program.<br>If an error occurs, a hard disk drive can be synchronized at the operating system level. It may take up to ten hours to synchronize a new hard disk in the background, depending on its size and on system load.<br>The redundant system state RAID 1 is reached again only after synchronization is completed. |

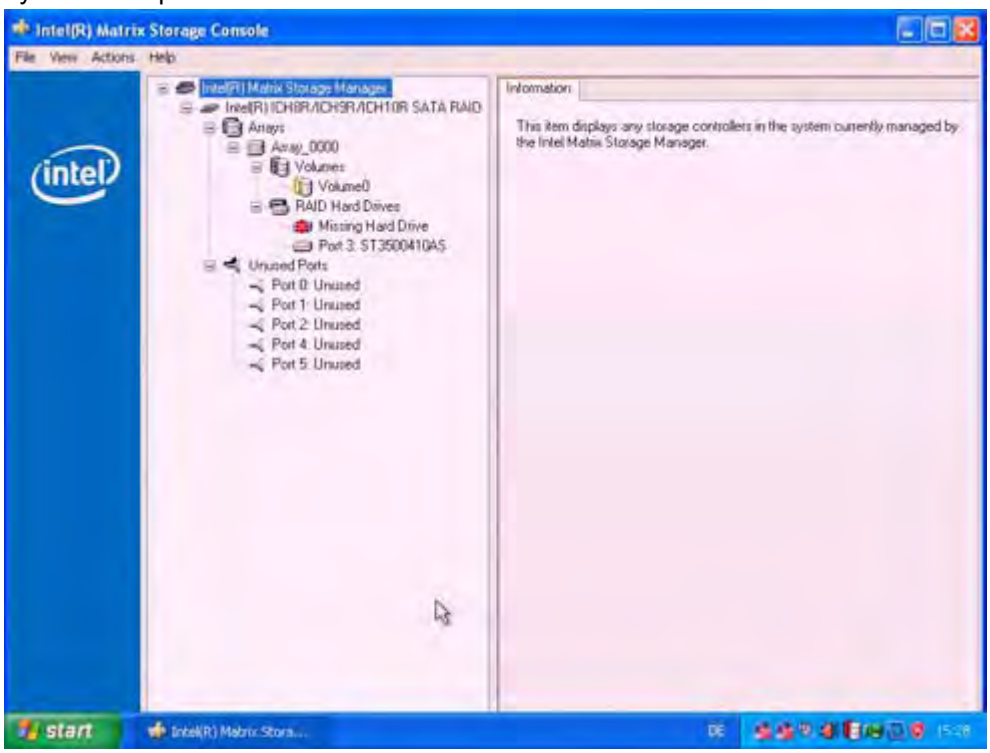
## Comments about faults

| NOTICE |
| --- |
| **Input delay**<br>Depending on the load on the processor and the hard disk activity at the time, the system may become briefly overloaded when a disk fails due to the synchronization process.<br>Execution of keyboard, mouse or touch screen commands may be briefly delayed in extreme situations. |

## Replacing a faulty drive in a RAID array

Replace faulty RAID drives with a new drive in order to recover secure RAID1 state. The RAID software reports the faulty drive and returns details of the operable hard drive.

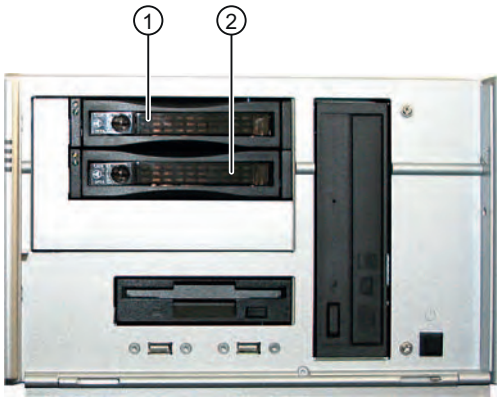
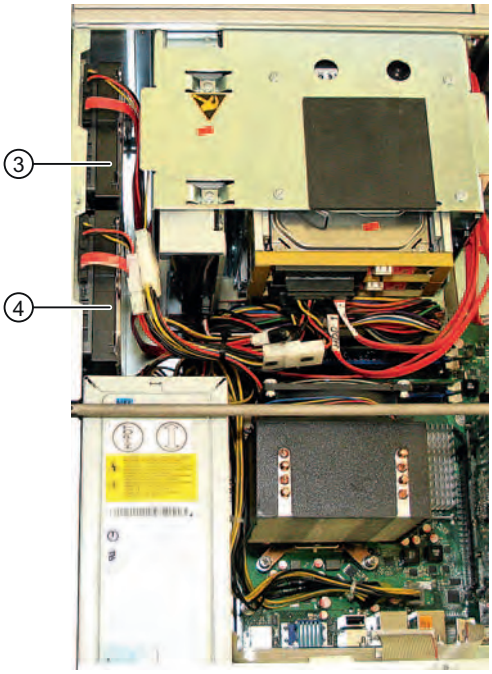
The functioning hard drive is indicated in BIOS by its port number, or by the RAID software by its device port number.




The functioning drive can be localized by means of the following table.

**Note**

The table and information below apply only to the delivery state of the device, that is no changes or expansions were made.

| Mounting locations | | |
|---|---|---|
|  | ①, ② | Removable HDD frame |
|  | ③, ④ | Side wall |

| RAID BIOS | RAID software | SATA connection on the motherboard | Installation location | Labeling on the housing |
|---|---|---|---|---|
| Port 2 | Device port 2 | SATA2 | Removable HDD frame ① | 1 |
| Port 3 | Device port 3 | SATA3 | Removable HDD frame ② | 2 |
| Port 2 | Device port 2 | SATA2 | Side wall ③ | 1 |
| Port 3 | Device port 3 | SATA3 | Side wall ④ | 2 |

Please replace the faulty drive with a new one of the same type and capacity.

| NOTICE |
| --- |
| Drives in removable HDD frames can be hot-swapped without shutting down the device. Devices without a removable HDD frame may only be replaced when they are turned off.<br>The new hard disk can be integrated into the RAID volume at operating system level by the RAID software. Synchronization may take several hours, depending on system load. This is not possible at BIOS level. |

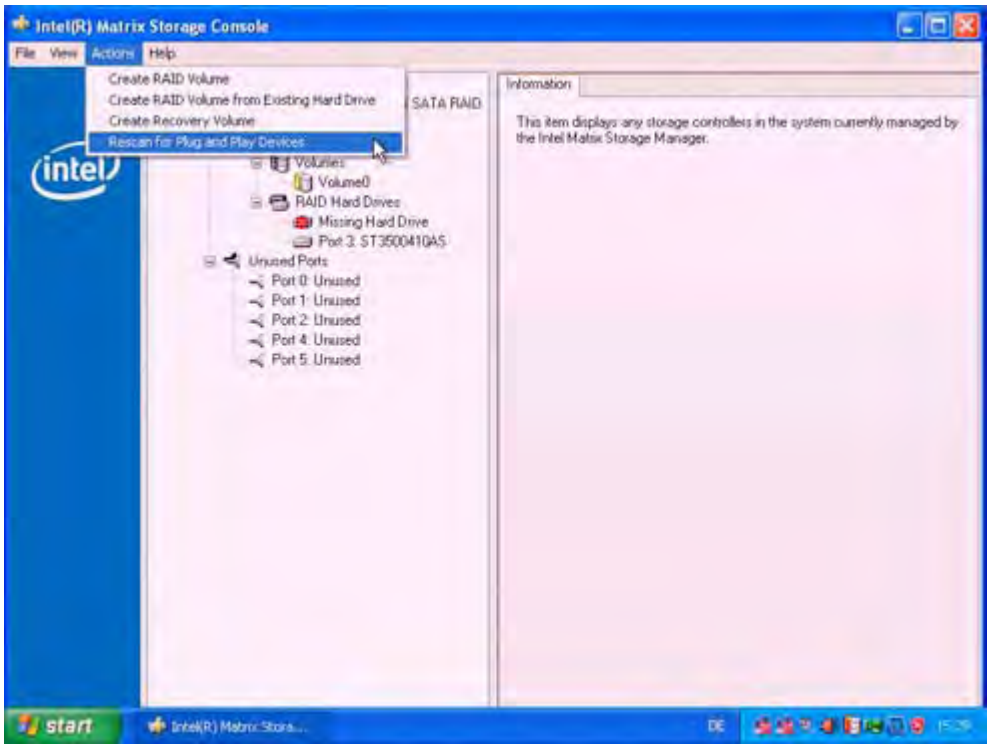
### Points to note if the hard disk is replaced when the computer is turned off

Only a hard disk that was active and functioning correctly when you booted can later be included in the RAID array.

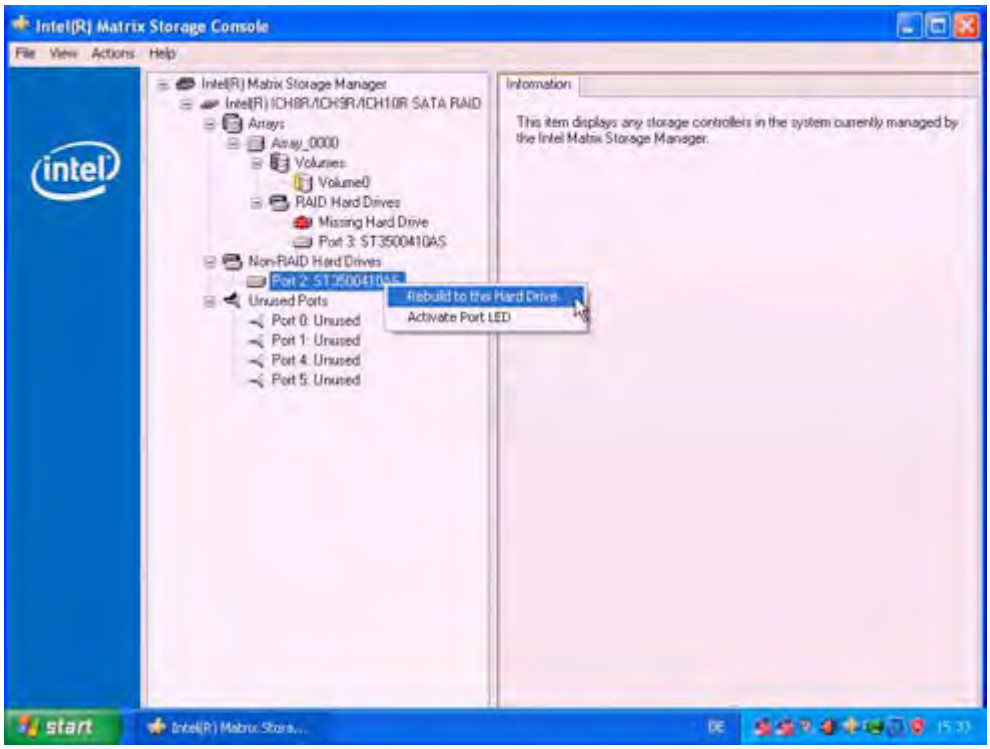
To be able to boot from the RAID system, you must place this first in the list of bootable sources in the BIOS "Boot" setup menu. Otherwise the system will boot from the hard disk you have just installed and the message "Operating system not found" will be displayed.

### Integrating a new hard drive

Select the "Rescan for Plug and Play Devices" command to find and display the new hard disk.




If you have shut down and restarted the system without installing a functioning new hard disk, "unused" will be displayed for the corresponding SATA port. In this case, you will need to shut down the system again and boot with the functioning hard disk. The new hard disk is then assigned to a SATA port and can be included in the RAID array. The "Rebuild to this Hard drive" command initiates synchronization of the RAID1 system.

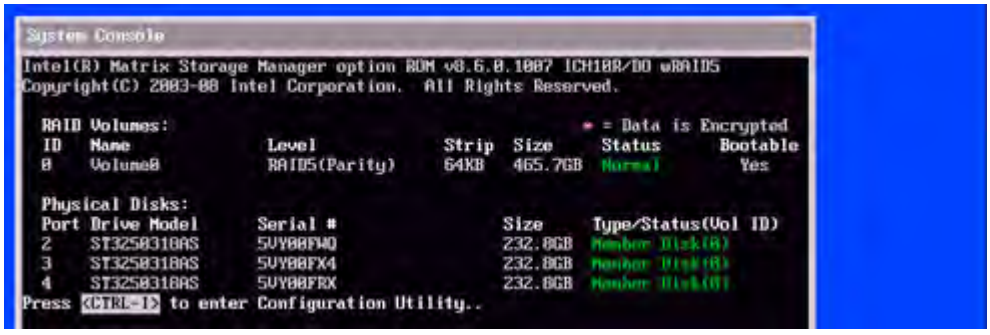



### 7.4.4.2 RAID5 system

This is a RAID5 system configuration (striping with parity). This means that if there is a defective hard disk or there are cable problems, the system can continue to operate in one channel achieving a high degree of system availability.

**Note**

You will find information about Intel RAID controllers in the RAID documentation on the "Documentation and Drivers" DVD that ships with the product in the "Drivers\RAID\Intel" directory.




### RAID system management functions

The pre-installed RAID system software offers enhanced functionality for RAID system operation and management. It is started by selecting the "Start > Programs > Intel Matrix Storage Manager command.




The "View -> Advanced Mode" command returns details of the RAID volumes.

The "View -> System Report" command can be used to create a report with details of the RAID volume.

| NOTICE |
| --- |
| The RAID status entries are returned by default in the Windows event viewer and in the log file of the program.<br>If an error occurs, a hard disk drive can be synchronized at the operating system level. It may take up to 24 hours to synchronize a new hard disk in the background, depending on the its size and on system load.<br>The redundant system state RAID Level 5 is only recovered if synchronization has been successfully completed. |

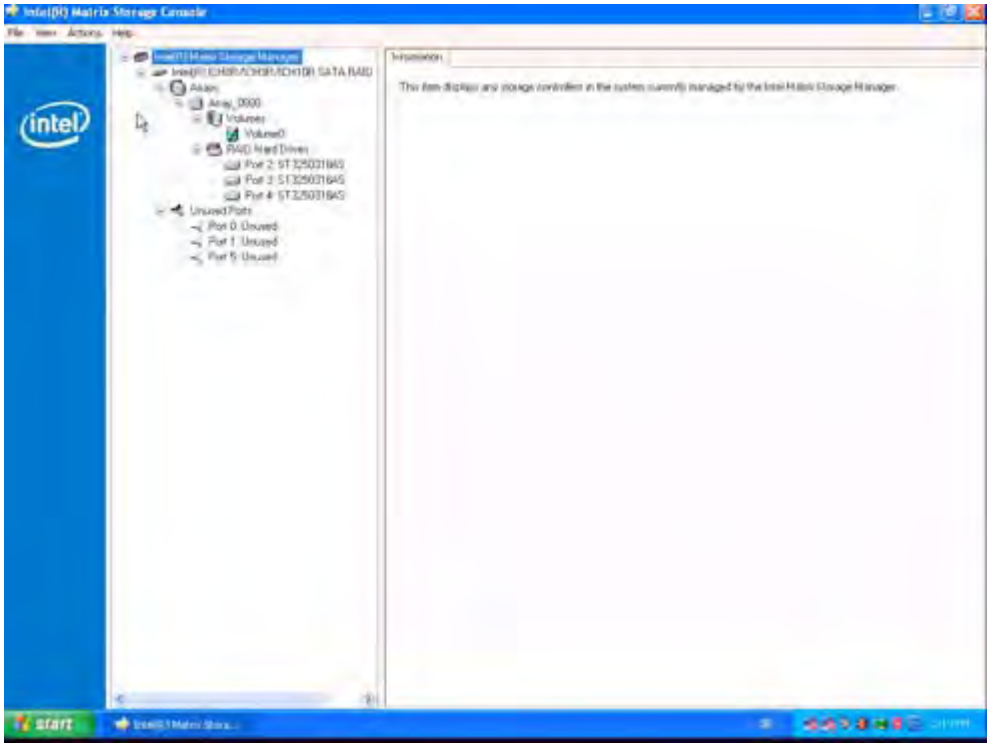
## Comments about faults

| NOTICE |
| --- |
| **Input delay**<br>Depending on the load on the processor and the hard disk activity at the time, the system may become briefly overloaded when a disk fails due to the synchronization process.<br>In extreme cases, input from the keyboard and touch screen may be delayed for a brief period. |

## Replacing a faulty drive in a RAID array

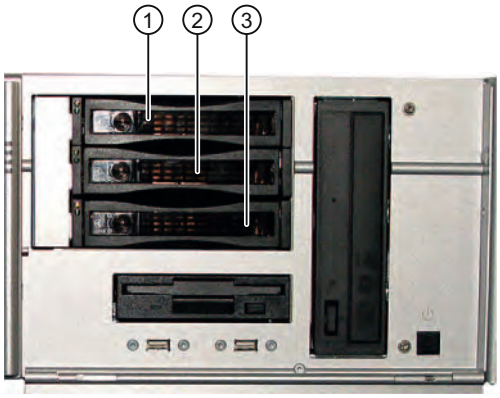
Replace faulty drive with a new drive in order to recover secure RAID5 state. The RAID software reports the faulty drive and returns details of the operable hard drive.

The functioning hard drive is indicated in BIOS by its port number, or by the RAID software by its device port number.



The functioning drive can be localized by means of the following table.

The table and information below apply only to the delivery state of the device, that is no changes or expansions were made.



| RAID BIOS | RAID software | SATA connection on the motherboard | Installation location | Labeling on the housing |
|---|---|---|---|---|
| Port 2 | Device port 2 | SATA2 | Removable HDD frame ① | 1 |
| Port 3 | Device port 3 | SATA3 | Removable HDD frame ② | 2 |
| Port 4 | Device port 4 | SATA4 | Removable HDD frame ③ | 3 |

Please replace the faulty drive with a new one of the same type and capacity.

| NOTICE |
|---|
| Drives in removable HDD frames can be hot-swapped without shutting down the device. Devices without a removable HDD frame may only be replaced when they are turned off.<br>The new hard disk can be integrated into the RAID volume at operating system level by the RAID software. This is not possible at BIOS level. |

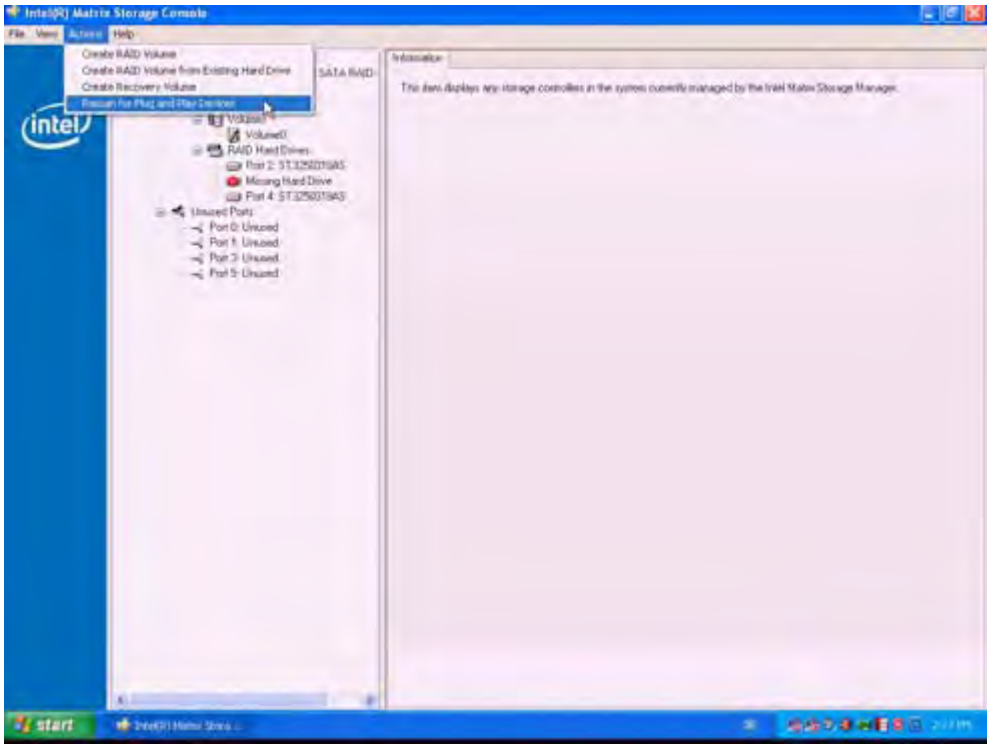
### Points to note if the hard disk is replaced when the computer is turned off

Only a hard disk that was active and functioning correctly when you booted can later be included in the RAID array.

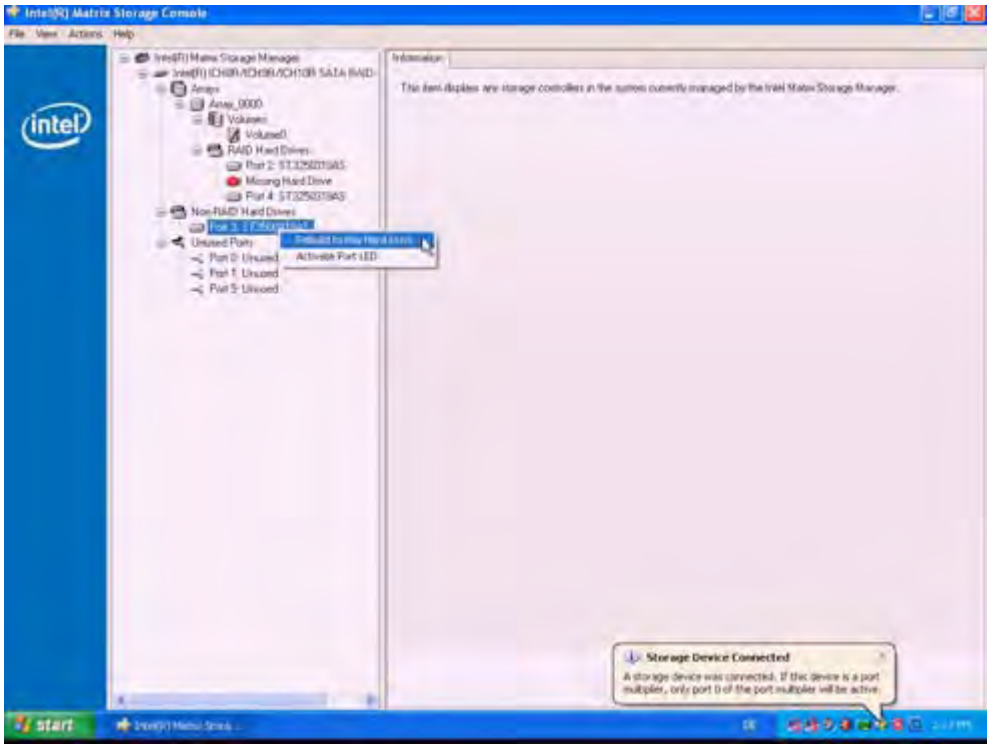
To be able to boot from the RAID system, you must place this first in the list of bootable sources in the BIOS "Boot" setup menu. Otherwise the system will boot from the hard disk you have just installed and the message "Operating system not found" will be displayed.

### Integrating a new hard drive

Select the "Rescan for Plug and Play Devices" command to find and display the new hard disk.




If you have shut down and restarted the system without installing a functioning new hard disk, "unused" will be displayed for the corresponding SATA port. In this case, you will need to shut down the system again and boot with the functioning hard disk. The new hard disk is then assigned to a SATA port and can be included in the RAID array. The "Rebuild to this Hard drive" command initiates synchronization of the RAID1 system.



# Integration into an Automation System 8

## 8.1 Integration

The following options are available for the integration of the device in existing or planned system environments/networks:

### Ethernet

The integrated Ethernet ports (10/100/1000 Mbps) can be used for communication and for data exchange with automation devices such as SIMATIC S7.
For this purpose you require the "SOFTNET S7" software package. Wake on LAN and Remote Boot are supported.

### Additional information

You will find additional information in the catalog and the Siemens online ordering system Industrial Automation and Drive Technologies (http://mall.automation.siemens.com).

# Functions

# 9

## 9.1 Introduction

Even in its basic version, the device comes with optional monitoring functions. When used in combination with the appropriate software, the following functions for displaying, monitoring and controlling are available:

- Temperature monitoring (over-temperature, under-temperature or cable break at a temperature sensor)
- Fan monitoring (fan speed too low, fan failure, or a break in a tachometer line)
- Monitoring of hard disks with S.M.A.R.T functionality even in a RAID system
- Watchdog (hardware or software reset of the computer)
- Operating hours meter (information on the cumulative run time)

### SIMATIC PC DiagBase software

With the SIMATIC PC DiagBase software (included in product package), you can use these functions for local monitoring. You can use the DiagBase Management Explorer application on the "Documentation and Drivers" DVD for general monitoring or DiagBase Alarm Manager for notification of individual alarms.

Additional information on the functions of the SIMATIC PC DiagMonitor software is available in the online help.

### SIMATIC PC DiagMonitor software

SIMATIC PC DiagMonitor software is provided on CD (not included in the scope of delivery). It contains the monitoring software, the software for the stations to be monitored and a library for creating custom applications.

## 9.2 Temperature monitoring/display

### Temperature monitoring

The temperature is recorded using temperature sensors that are installed at critical locations of the device. The processor temperature, the temperature in the area of the memory modules and the temperature below the bus module are monitored.

The flashing Temp LED indicates that the device is being operated at its limits. The following fault reactions are triggered if one of the temperature values exceeds the set temperature threshold:

| Reaction | Option |
|---|---|
| The Temp LED changes to red | None |
| Device cooling fan switches to maximum speed (the power unit controls its own fan) | None |
| SIMATIC monitoring software is activated | None |

The temperature error is retained in memory until temperatures have fallen below the thresholds and are reset by one of the following measures:

- Check whether the ambient temperature limit has been exceeded, or whether the filter is soiled.
- Acknowledgment of the error message by the monitoring software
- Restart of the device

## 9.3 Watchdog (WD)

### Function

The watchdog monitors program execution and reports a program crash to the user by means of various reactions.

The watchdog can only be activated by monitoring software. The watchdog is idle when the PC is switched on or after a hardware reset (cold restart), in other words, no watchdog reaction is triggered. If the watchdog is activated and was not retriggered by the monitoring software within the selected time, the monitoring software is activated.

## 9.4 Fan monitoring

The front fan and processor fan are monitored. The following reactions are triggered when a fan fails:

| Reaction | Option |
|---|---|
| The fan LED switches to red | None |
| SIMATIC monitoring software is activated (if installed) | None |

The fan fault is retained in memory until the cause of the fan failure has been rectified and the error is reset by taking one of the following measures:

- Acknowledgment of the error message by the SIMATIC PC DiagBase program or DiagMonitor software.
- Restart of the device.

# Expansions and parameter assignment 10

## 10.1 Opening the device

| CAUTION |
| --- |
| Only qualified personnel should be permitted to carry out any work on the open device. The device must always be kept closed, otherwise device safety cannot be ensured. |

| ⚠ CAUTION |
| --- |
| **The device contains electronic components which may be destroyed by electrostatic charge.**<br>You therefore need to take precautionary measures before you open the device. Refer to the ESD guidelines on handling electrostatically sensitive components (ESD Guidelines (Page 97)). |

### Tools

All mechanical installation tasks on the device can be carried out with Torx T10 screwdrivers.

### Preparation

Disconnect the device from the mains.

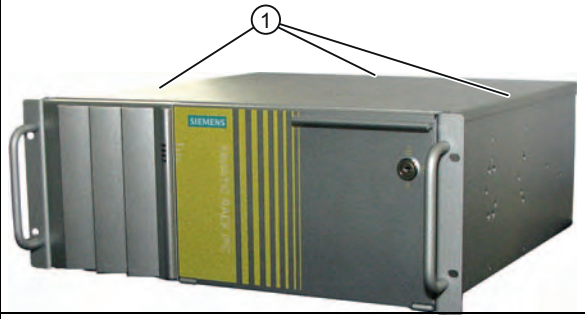
### Liability disclaimer

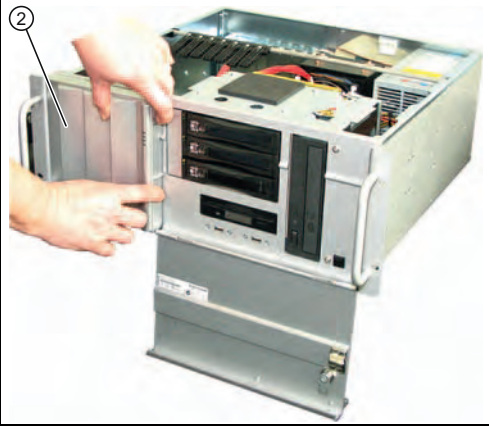
All specifications and approvals apply only to expansion units which are released by SIEMENS.

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

Observe the installation instructions for the components. UL approval of the device only applies when the UL-approved components are used according to their "Conditions of Acceptability".

## Opening the device

| Steps for opening the housing cover | | |
|---|---|---|
| 1 | Remove the mounting screws ①. |  |
| 2 | Lift up the lid from the back and remove it. |  |

| Steps for opening the device front | | |
|---|---|---|
| 1 | Tilt the front door ① downwards. |  |
| 2 | Remove the fan cover ②. |  |

## 10.2 Memory expansion

### Memory expansion options

The motherboard is equipped with four slots for memory modules. This option lets you expand the device memory up to 16 GB, of which you can use ca. 3.2 GB for the operating system and applications.

A detailed description of possible memory expansion options is available in the technical manual of the D2836-S11 motherboard on the "Documentation and Drivers" DVD that ships with the product.

## 10.3 Installing expansion cards

### 10.3.1 Notes on the modules

### Notes on module specifications

The device is designed for use with modules to PCI specification 2.3 PCIe 1.0a (32-bit; 33 MHz, Rev. 2.3). The dimensions of the cards may not exceed the specified dimensions. If the height is exceeded, you may experience contact problems, malfunctions and difficulties with the assembly. The permitted module dimensions are specified in the section Dimensional drawings for the installation of expansion modules (Page 88).

| NOTICE |
| --- |
| The performance is limited for PCI modules with 5V supply voltage. The output of the modules may not exceed 25W in total. |

### Note about long PCI, PCIe modules

Before long modules can be inserted into the guide rails, they must be fitted with an extender (this should form part of the scope of supply of long modules).

### Notes on the allocation of resources

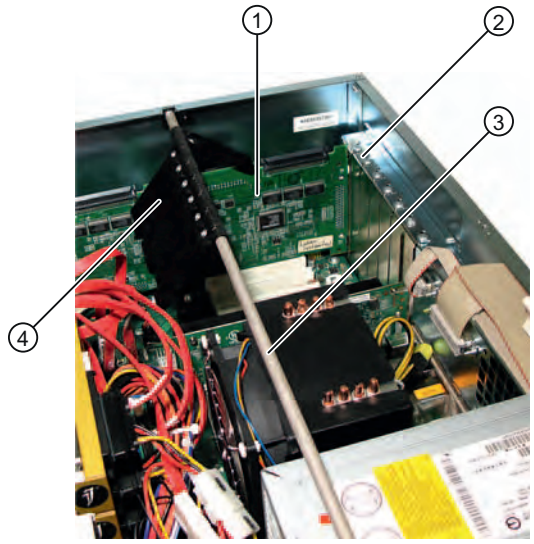
Due to the number of functions on the motherboard, there are no reserved interrupts for PCI modules. If the new expansion module requires exclusive resources, you have to disable the functions on the motherboard. You will find notes on the allocated resources in the technical manual of the D2836-S11 motherboard on the "Documentation and Drivers" DVD shipped with the product and in the section System resources (Page 89).

### 10.3.2 Installation of an expansion module

#### Preparation

Disconnect the device from mains.

#### Installing expansion modules

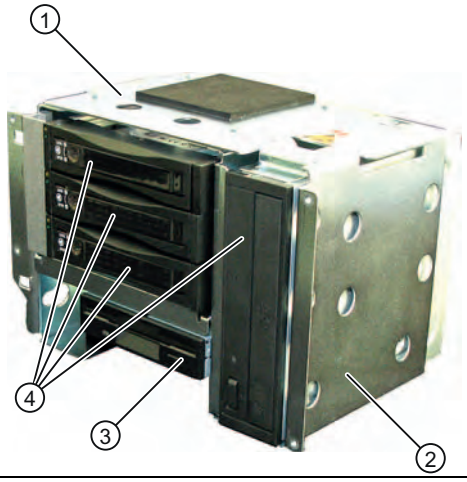
| Steps for installing an expansion module: | | |
|---|---|---|
| 1 | Open the device |  |
| 2 | Hold the posts ③ of the module bracket at both ends and lift it out. | |
| 3 | Remove the relevant steel slot cover ②. | |
| 4 | Insert the expansion module ① into the relevant slot. | |
| 5 | Screw-tighten the steel slot cover ② of the expansion module. | |
| 6 | Insert the module bracket again. | |
| 7 | Release the free module retainer ④, fit it on the expansion module and tighten the screws. With short expansion modules, you can remove the locking screw from the bracket and screw it into the hole on the opposite side. | |
| 8 | Close the device. | |



## 10.4 Installing drives

### 10.4.1 Installation options for drives

The driver bay module consists of a horizontal and vertical driver carrier. A DVD-ROM, DVD burner, floppy drive or removable cartridge can be installed in the drive bay module.

| Drive bay module | Pos | Description |
|---|---|---|
|  | ① | Horizontal drive bay |
| | ② | Vertical drive bay |
| | ③ | 3.5" floppy desk drive (FD) |
| | ④ | 5.25" mounting bays for DVD/CD or hard drives in removable cartridges |

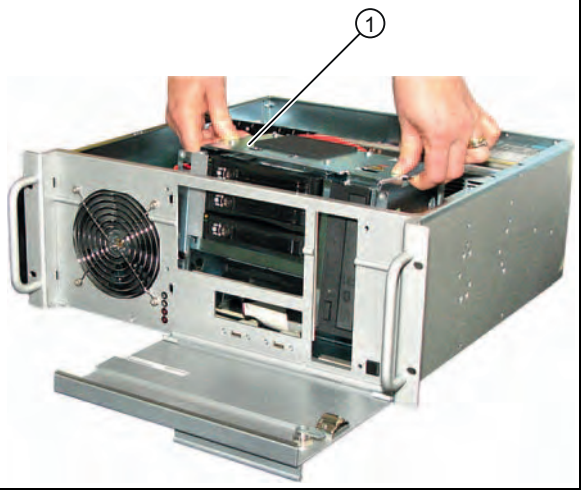
## 10.4.2 Installing / removing the drives or removable racks

### Preparations

1. Unplug the device from mains and disconnect all cables.
2. Open the device.

### Removing the drive bay module

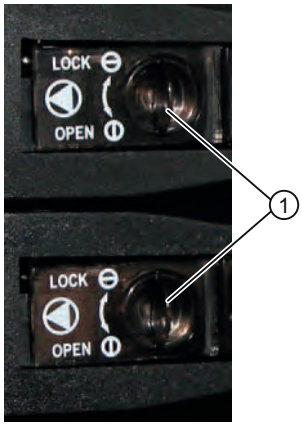
The drive bay module consists of a horizontal and vertical drive bay.

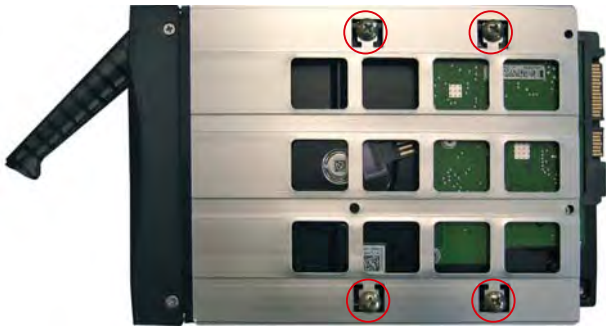
| Steps for removing the drive bay module | | |
|---|---|---|
| 1 | Loosen the mounting screws of the drive bay module. |  |
| 2 | Disconnect the power cable and the data cable from the installed disk drives. | |
| 3 | Lift the drive carrier module ① out of the device until you can access the cables of the floppy disk drive. Disconnect these cables. |  |
| 4 | Remove the drive bay completely from the device. | |

## Installing drives or removable cartridges

| Steps for installing a disk drive in a horizontal drive bay | | |
|---|---|---|
| 1 | Slide the disk drive into the carrier from the front. |  |
| 2 | Remove any vertical drive bay The only way to get at the mounting screws on the right side of the drive is through the openings of the vertical carrier. | |
| 3 | Mount the disk drive into the drive bay using four screws. | |
| 4 | Insert the drive bay module again. | |
| 5 | Connect the power and data cables to the disk drive. | |

## Removing a drive from the removable rack

| How to remove a drive | | |
|---|---|---|
| 1. | Turn the locking switch ① to the "OPEN" position. |  |
| 2. | Press on the marking or press the release in the direction of the arrow so that the lever on the hard disk cartridge comes out. |  |

| How to remove a drive | | |
|---|---|---|
| 3. | Pull on the lever until the hard disk cartridge noticeably disengages and pull it out completely. |  |
| 4. | Loosen the four screws on the bottom of the cartridge. Use a Phillips screwdriver PH No. 1. |  |
| 5. | Pull the disk out of the cartridge. | |

## Installing a drive in the removable rack

| How to install the hard disk | | |
|---|---|---|
| 1. | Carefully slide the drive into the cartridge without touching the contacts. | |
| 2. | Fasten the drive with the four screws on the base of the cartridge. Use the original screws only. | |

| NOTICE |
|---|
| **Damage to the hard disk cartridge**<br>You can damage the hard disk cartridge by closing the lever prematurely.<br>Always slide the hard disk cartridge completely into the removable rack before you close the lever. |

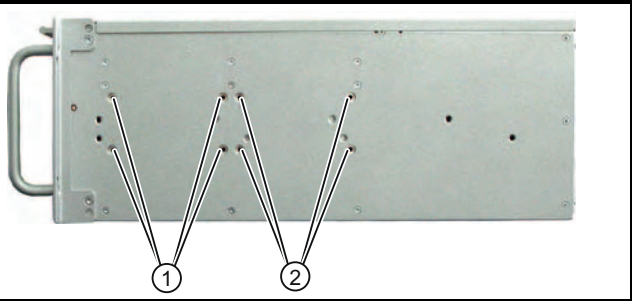
| How to install the hard disk (continued) | | |
|---|---|---|
| 3. | Close the lever on the hard disk cartridge. |  |
| 4. | Turn the locking switch to the "LOCK" position. You can clearly hear when the removable rack locks into position. | |

## 10.4.3 Installing / removing a hard disk drive

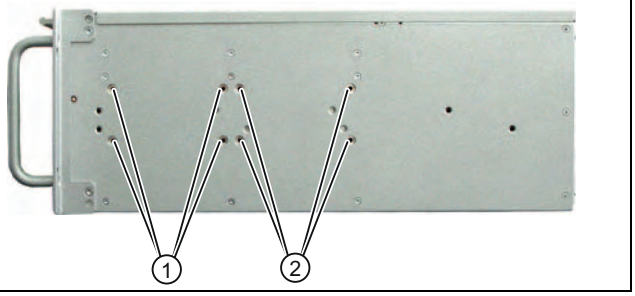
### Preparations

1. Unplug the device from mains and disconnect all cables.
2. Open the device

### Installing a drive

| How to install a drive | | |
|---|---|---|
| 1 | Connect the power and data cables to the disk drive. |  |
| 2 | Place the drive onto the drive bay plate and secure it with 4 screws ① or ②. | |

### Removing drives

| How to remove a drive | | |
|---|---|---|
| 1 | Disconnect the power and data cables from the drive. |  |
| 2 | Loosen the four screws ① or ② and remove the drive from the housing. | |

# Service and maintenance 11

## 11.1 Removing and installing hardware components

### 11.1.1 Repairs

#### Performing repairs

Only qualified personnel are permitted to repair the device.

| ⚠ WARNING |
| --- |
| Unauthorized opening and improper repairs on the device may result in substantial damage to equipment or endanger the user. |

- Always disconnect the power connector before you open the device.
- Install only system expansions which are designed for this computer. If you install other expansion devices, you may damage the system or violate the safety requirements and regulations on RF suppression. Contact Technical Support or your local sales department to find out which system expansions are suitable for installation.

**If you install or exchange system expansions and damage your device, the warranty becomes void.**

| NOTICE |
| --- |
| Check the ESD Guidelines (Page 97). |

#### Liability disclaimer

All specifications and approvals apply only to expansion units which are released by SIEMENS.

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

#### Tools

All mechanical installation tasks on the device can be carried out with Torx T10 and Torx T20 screwdrivers as well as a side-cutter.

## 11.1.2 Preventive maintenance

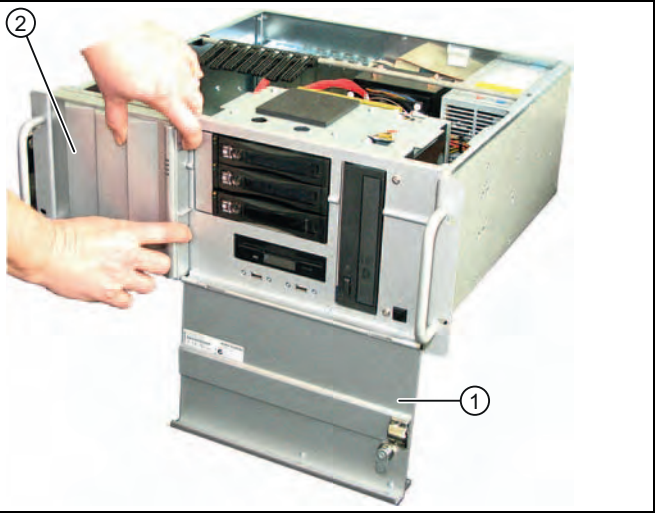
To maintain high system availability, we recommend the preventative exchange of those PC components that are subject to wear. The table below indicates the intervals for this exchange.

| HDD | Fan | CMOS backup battery | Air filter mat |
|---|---|---|---|
| 3 years | 3 years | 5 years | Depending on the degree of soiling |

## 11.1.3 Replacing filters

**Note**

Filter meshes are available under the following order number: A5E02399219.

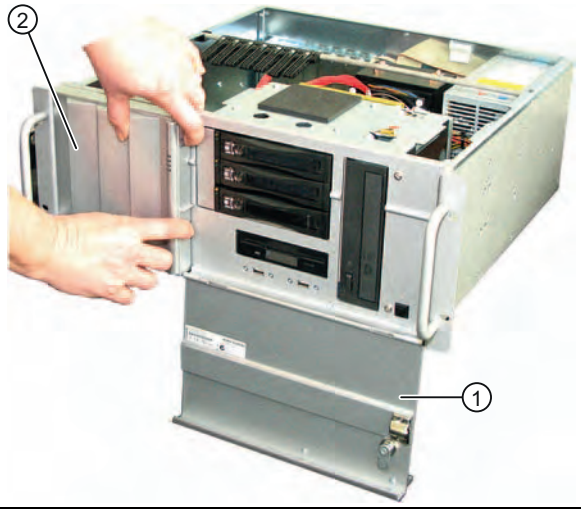
| How to replace the filter | | |
|---|---|---|
| 1. | Tilt the front door ① downwards. |  |
| 2. | Lift off the filter cover ② and remove the filter. | |

## 11.1.4 Removing the device fan

### Preparing for equipment fan exchange

Unplug the device from mains.

## Remove the fan

| Steps | | |
|---|---|---|
| 1. | Tilt the front door ① downwards. |   |
| 2. | Remove the fan cover ②. | |
| 3. | Open the device cover. | |
| 4. | Unplug the fan connector from the motherboard. | |
| 5. | Remove all fan screws. |  |

## Installing the fan

| NOTICE |
|---|
| Always install a fan of the same type! |

| CAUTION |
|---|
| Ensure that the arrow on the fan points away from the fan bracket. |

## 11.1.5 Replacing the backup battery

### Note before you replace the battery

**Note**

Batteries are wearing parts. Backup batteries should be replaced at intervals of 5 years in order to maintain PC functionality.

| CAUTION |
| --- |
| Risk of damage!<br>The lithium battery may only be replaced with an identical battery or with a type recommended by the manufacturer. Information on original spare parts for SIMATIC PCs is available at After-sales information system for SIMATIC PC/PG (http://www.siemens.com/asis). |

### Disposal

| CAUTION |
| --- |
| Depleted batteries must be disposed of in accordance with local regulations. |

### Preparation

**Note**

The configuration data of the device are deleted when the battery is replaced. Note the current BIOS Setup settings. You can conveniently back up the BIOS settings by means of the SIMATIC PC BIOS manager.

### Replacing the battery

The location of the backup battery on the motherboard and the procedure for replacing it is described in technical manual for the D2836-S11 on the "Documentation and Drivers" DVD that ships with the product.

### Reconfiguring the BIOS setup

When a battery is exchanged, the configuration data of the device are lost and must be reentered in the BIOS setup.

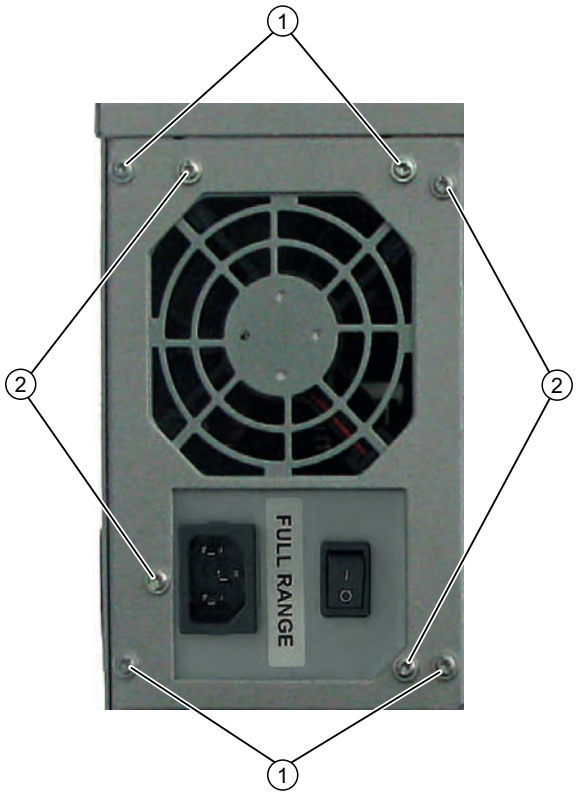
## 11.1.6 Removing the power supply unit

| ⚠ WARNING |
|---|
| The power supply or power supply modules may only be replaces by qualified personnel. Disconnect the computer from the power supply.<br>Pull the power plug(s) before you start replacing the power supply / power supply module. |

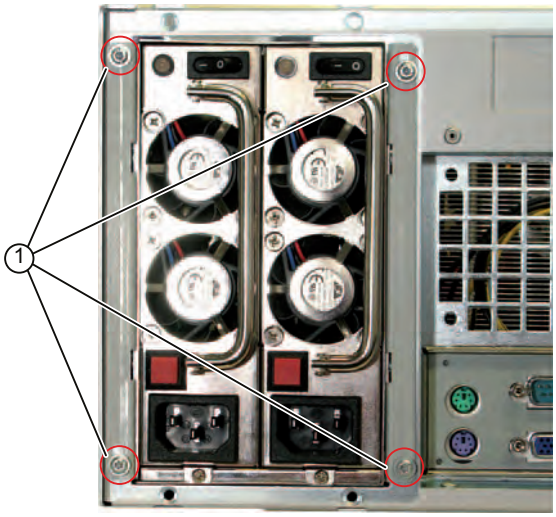
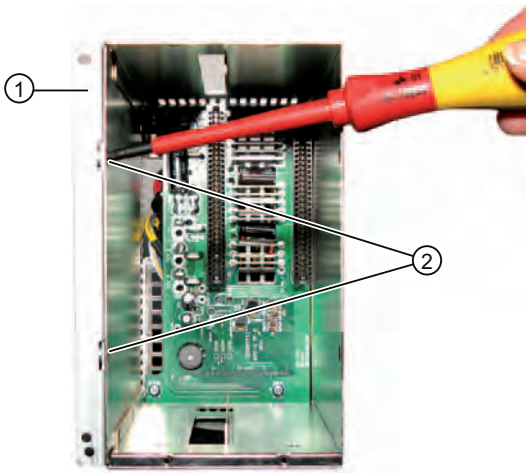
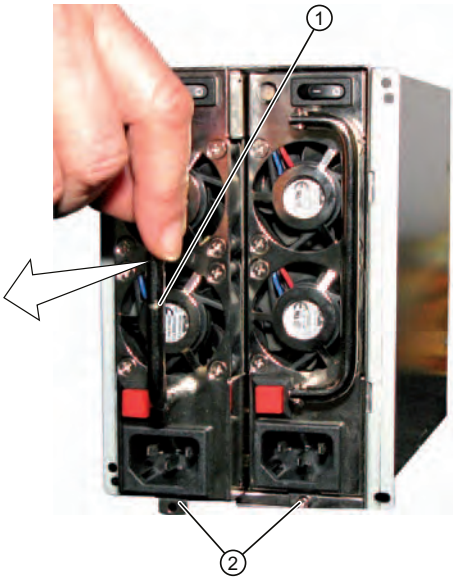
### Preparations

1. Unplug the device from mains and disconnect all cables.
2. Open the device.

### Removing the power supply unit

| How to remove the power supply module | | |
|---|---|---|
| 1. | Disconnect the power cables from the disk drives and motherboard. |  |
| 2. | Remove the tie-wraps holding the power cables in the housing. | |
| 3. | Remove the securing screws (TORX T10) ①. | |
| 4. | Lift the power supply module out of the housing until you can access the power cable of the floppy disk drive. | |
| 5. | Disconnect this power cable from the floppy disk drive. | |
| 6. | Remove the screws ② on the steel bracket. | |

## Removing redundant power supply modules

| How to remove the power supply modules | | |
|---|---|---|
| 1. | Disconnect the power cables from the disk drives and motherboard. |  |
| 2. | Remove the tie-wraps holding the power cables in the housing. | |
| 3. | Remove the securing screws (TORX T10) ①. | |
| 4. | Lift the power supply module out of the housing until you can access the power cable of the floppy disk drive. | |
| 5. | Disconnect this power cable from the floppy disk drive. | |
| 6. | Remove the screws ② on the steel bracket ①. |  |
| 7. | Remove the power supply module.<br>Remove the slotted fastening screw ②.<br>Pull out the module using the handle ①. |  |

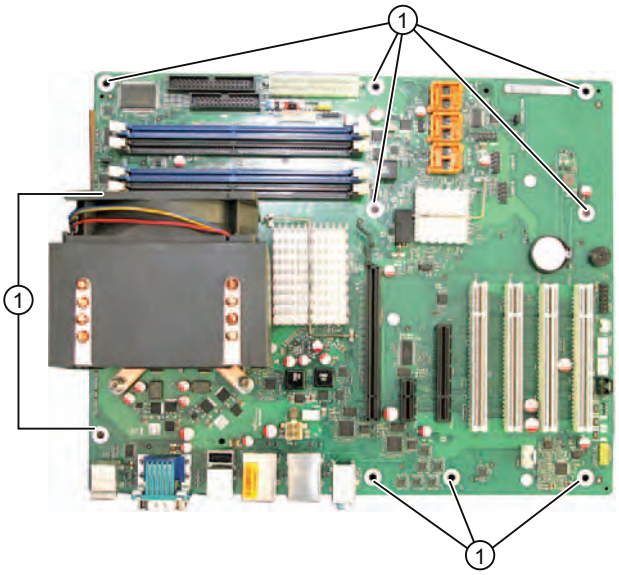
## 11.1.7 Removing the motherboard

### Preparation

1. Unplug the device from mains and disconnect all cables.
2. Open the device.

### Removing the motherboard

| How to remove the motherboard | |
|---|---|
| 1. | Remove all modules from their slots. |
| 2. | Disconnect all cables from the motherboard, noting down their positions while doing so. |
| 3. | Remove ten screws from the motherboard. |




A replacement motherboard is supplied without processor and memory modules.

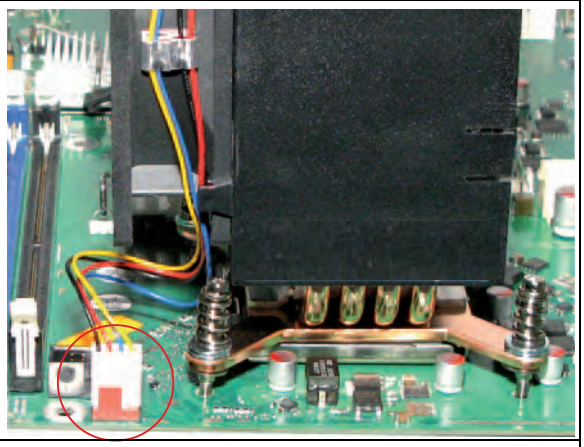
## 11.1.8 Replacing the processor

| CAUTION |
|---|
| Only qualified personnel are permitted to replace a processor. If the processor type is changed, the BIOS must be updated so that the suitable microcode is loaded. Information on original spare parts for SIMATIC PCs is available in the Internet at After-sales information system for SIMATIC PC/PG (http://www.siemens.com/asis) . |

### Preparation

1. Unplug the device from mains.
2. Open the device.

## Removing the processor

| How to remove the processor | | |
|---|---|---|
| 1. | Unhook the fan holder on the heat sink and pull off towards the front. | |
| 2. | Disconnect the processor fan connector. |  |
| 3. | Loosen the four screws and remove the heat sink. | |
| 4. | Unlock the CPU socket and lift off socket cover. |  |
| 5. | Remove processor. | |

Additional instructions are available in the D2836-S11 manual on the "Documentation & Drivers" DVD.

**CAUTION**

Operating a processor at a frequency higher than it specified speed can result in damage to the device and the loss of data.

Only certified and approved processors can be used with the supplied motherboard. Please contact your Siemens representative at the local office under Contacts (http://www.siemens.com/automation/partner).

# 11.2 Reinstalling the software

## 11.2.1 General installation procedure

If your software becomes corrupted, you can reinstall it either from the Recovery CD/DVD, the "Documentation and Drivers" DVD or the Restore DVD.

### Recovery CD/DVD:

The recovery CD/DVD contains the Windows user interface with tools for configuring the hard drives, and for installation of the operating system and the languages supported by the operating system (MUI).

The basic language of the operating system that is installed is English. If you want to integrate additional languages, you will need to retro-install them from the Recovery CD/DVD.

### "Documentation and Drivers" DVD:

Contains the documentation and the hardware drivers.

### Restore DVD:

Contains a hard disk image file with the original factory software (operating system with installed hardware drivers).

## 11.2.2 Restoring the factory state of the software using the Restore DVD

You can restore the software to the original factory state using the Restore CD (not included in all package variants). The DVD contains the necessary images and tools for transferring the factory software to the hard disk of your PC. You can only restore the entire hard disk with drive C: (system) and drive D: or only drive C: . This allows you to retain any user data on drive D:.

### Retrieving authorizations or license keys from the hard disk

- Check whether you can retrieve your authorization or license key from the hard disk and perform this procedure as described below if possible.
- Contact Customer Support if you are unable generate a backup copy. There you can obtain information necessary for software authorization.

| CAUTION |
| --- |
| If "Restore system partition only" is set all data on drive C: (system partition) will be deleted. All data, user settings and all authorizations or license keys on drive C: are lost! All data on drive C: of the hard disk will be deleted. Setup formats the hard disk and installs the original factory software.<br>If "Restore entire hard disk" is set ALL data, user settings, authorizations or license keys will be lost on the hard disk. |

### Restoring the factory state

To restore the delivery state:

- Place the Restore DVD into the drive and restart the device using the on/off switch.
- During the self-test phase, press the F12 key. The "Boot Menu" is displayed when initialization is completed.
- Select the optical drive using the cursor keys.
- Now follow the instructions on the screen.

| CAUTION |
| --- |
| All existing **data, programs, user settings** and **authorizations or license keyswill be deleted** from the hard disk and therefore lost. |

For information on the functions, refer to the README.TXT file on the Restore DVD.

## 11.2.3 Installing Windows

### Introduction

Use the Recovery CD/DVD to install Windows to suit your particular requirements. You also need the "Documentation and Drivers" DVD that ships with the product. Additional controllers unknown to the operating system must be made known to the recovery system and to the Windows operating system.

1. Press the F6 key while booting or the "Load Driver" icon and follow the on-screen instructions. During the rest of the installation, you will be asked several times for the missing driver of the controller.

### Booting with the Recovery CD/DVD

1. To boot from the recovery CD/DVD, press the <F12> key during the self-test phase. The boot menu displayed after initialization indicates all boot devices.
2. Select "CD/DVD drive".
   Follow the instructions on the screen until the "Siemens SIMATIC Recovery" window is displayed.

   When using the recovery function with Windows Vista, Windows 7 and Windows Server 2008, confirm that you want to boot from CD/DVD as soon as you restart. Otherwise the system boots from hard disk if you have a bootable hard disk installed.

### 11.2.3.1 Setting up the partitions for Windows operating systems

After you have installed a new hard disk, or if partitions are faulty, or when you wish to change the partitioning on your hard disk, you need to create or reconfigure partitions on the hard disk

| CAUTION |
| --- |
| When you delete or create partitions or logical DOS partitions, you lose all data on the hard disk. All drives on the hard disk will be deleted. |

Microsoft recommends setup of the NTFS file system on hard disk partitions in Windows operating systems. To do this, follow these steps:

## Setting up partitions

When shipped, the partitions are set up as follows:

| Partition | Operating system | Name | Size | File system |
|---|---|---|---|---|
| First | All | PROG | 25 GB | NTFS not compressed |
| Second | All | DATA | Remainder | NTFS not compressed |

To restore the original partition to its factory state, we recommend the software tool SIMATIC PC/PG Image Creator. Additional information is available in the software documentation.

**Note**

If you want to use Microsoft Windows as a professional user, you will need the following manual (not supplied):

- Microsoft Windows XP Professional, Technical Reference (MSPress No 934)

This manual contains specialized information for administrators involved in installing, managing and integrating Windows in networks or multi-user environments.

## Setting up the language selection for Windows XP Professional

The **M**ultilanguage **U**ser **I**nterface (MUI) allows you to change the Windows menu and dialog language.

The default language setting of your Windows installation is English with US keyboard layout. You can change the language in the Control Panel by selecting

**Start > Control Panel > Regional and Language, Languages** tab **Language used in menus and dialogs** field.

For the **Date**, **Time**, **Language**, and **Regional Options**, set the default as **non-Unicode programs** under **Advanced** in addition to the language for menus and dialogs.

## Information for systems with RAID controllers (optional)

Unknown additional controllers must be made known to the Windows operating system.

1. Press F6 key within the startup sequence and follow the on-screen instructions. In the next installation phases you are prompted several times to insert a floppy disk containing the missing RAID driver. You will find this in the "Drivers\RAID\Intel" directory on the "Documentation and Drivers" DVD that ships with the product.
2. Copy the driver to an empty floppy disk.
3. After the message "Press F6", select the driver "Intel(R) ICH8R/ICH9R/ICH10R/DO SATA RAID" on the screen in a selection window. To display the proposed list completely, you may need to scroll down with the arrow keys.

## Recovery of Windows Vista, Windows 7 and Windows Server 2008

To recover Windows Vista, Windows 7 and Windows Server 2008, there is a full graphic user interface available. It may take several minutes before the first input window appears. In this window, you can set the time and currency formats and select the keyboard language.

English is the basic language and other languages can be installed later with the MUI. The MUI is on the recovery DVD.
Now follow the on-screen instructions. It may take several minutes before the next prompt for the product key is displayed.

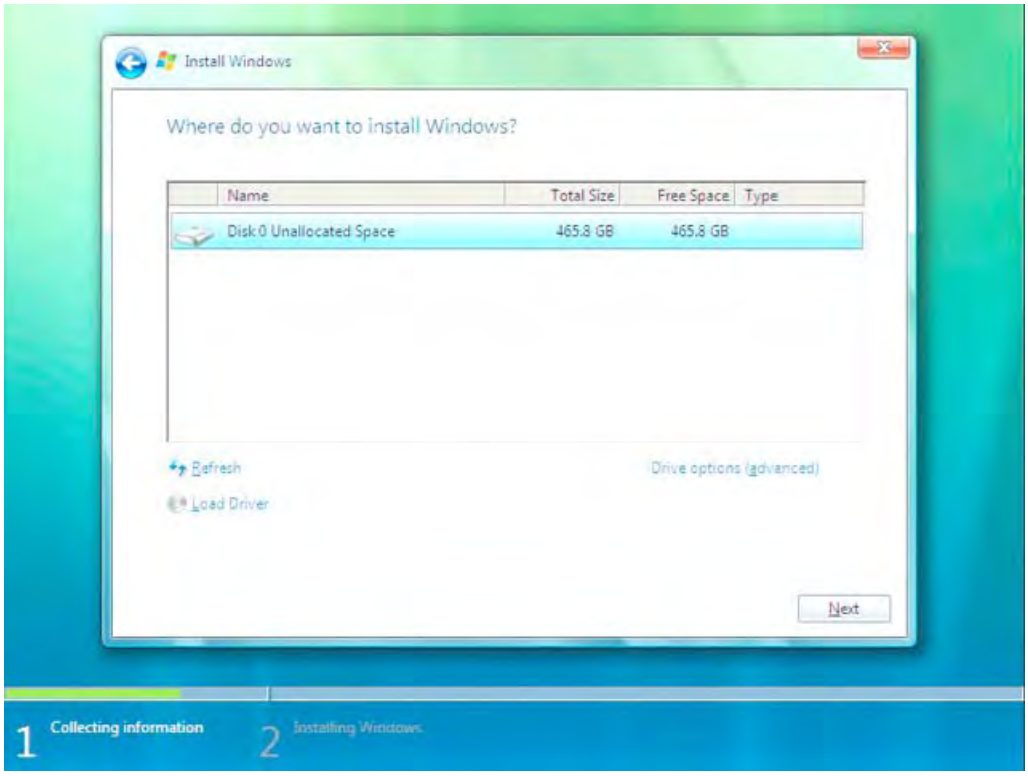
**Note**

Due to the previous activation, you do not need to enter the product key (COA number). This is entered automatically during the installation.

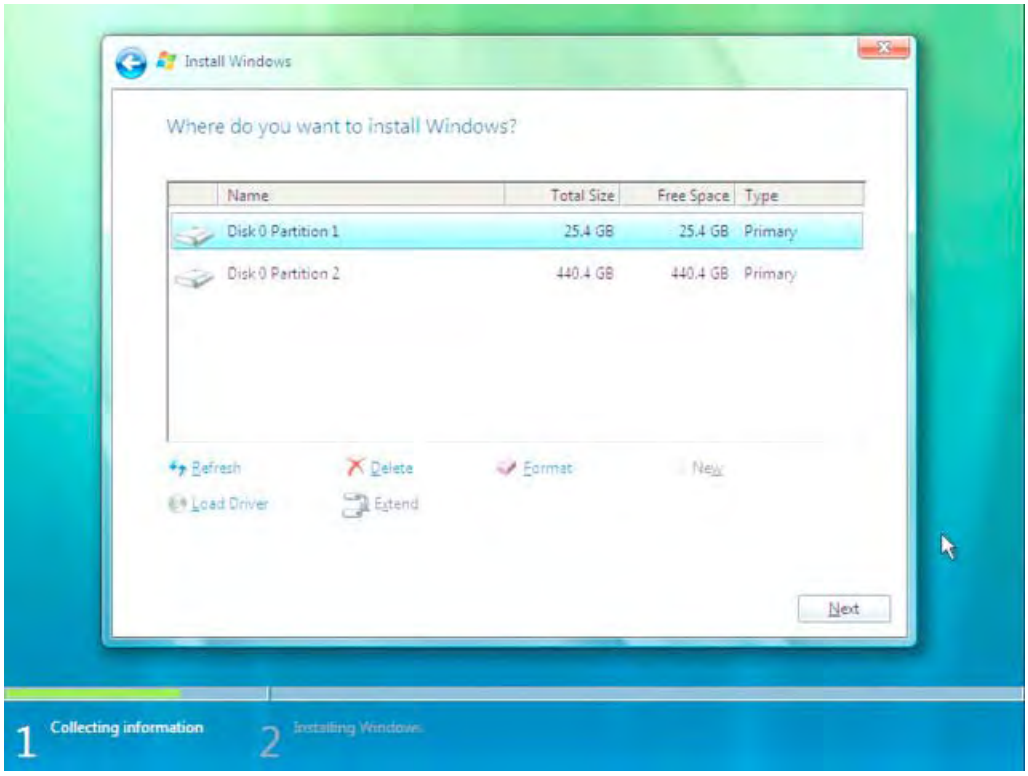
## Setting up and formatting partitions

After you have installed a new hard disk, or if partitions are faulty, or when you wish to change the partitioning on your hard disk, you need to create or reconfigure partitions on the hard disk

In the next dialog box, you can set up the hard disk according to your requirements and add controllers that are not yet known to the system.




| Options | Meaning |
|---|---|
| Drive options (advanced) | Further functions are displayed with which you can set up the hard disk. |
| Load Driver | To add new drivers, for example the driver for RAID. |




| Options | Meaning |
|---|---|
| Refresh | Updating |
| Delete | Deleting a partition |
| Format | Formatting a partition |
| New | Creating new partitions |
| Load Driver | To add new drivers, for example the driver for RAID |
| Extend | Changing the partition size |
| ⚠ | Any error messages that occur are displayed behind this icon, for example if the hard disk was not formatted in the required "NTFS" format. |

The first partition should be at least 25 GB. The operating system must be installed on this partition. You can use the rest of the hard disk as a data partition. Both partitions must be installed as the NTFS file system.

Following a required reboot, Windows will be installed on the hard disk. This process takes at least 20 minutes.

Now follow the instructions on the screen.

**Note**

If you want to reinstall drivers from a USB floppy disk drive, select Floppy Drive (A:) .

**Note**

If you want to use Microsoft Windows as a professional user, you should have the following manuals available (not included in the scope of delivery):

- Windows 7 Technical Reference (MS Press No. 5913)
- Windows Server 2008 Technical Reference (MS Press No. 5919)

These manuals contain specific information for administrators who install, manage and integrate Windows in networks or multi-user environments.

### Language selection in Windows Vista, Windows 7 or Windows Server 2008

With the Multilanguage User Interface (MUI), you can set up the Windows menus and dialogs for additional languages. When shipped, Windows Vista, Windows 7 or Windows Server 2008 is installed with English menus and dialogs. You can change this in the Control Panel with the "Regional and Language options" or "Time and Date" dialogs.

Here, you can change all system formats:
Start > Control Panel > Clock, Language, and Region > Change display language > Regional and Language options

Here, you can only change the date and time formats:
Start > Control Panel > Clock, Language, and Region > Change display language > Time and Date

If you want to install additional languages, you can install these later in the Control Panel, as follows. You will find the necessary files on the recovery DVD in the "Languagepacks" folder.

Start > Control Panel > Clock, Language, and Region > Change display language > Regional and Language options > Keyboards and Languages

Additional languages can be integrated through Windows Update.

## 11.2.4 Installation of drivers and software

| NOTICE |
| --- |
| Before you install new drivers or updates for multilingual operating systems, (MUI versions), reset the regional settings for menus and dialogs and the default language to US English. |

Install the drivers and software from the "Documentation and Drivers" DVD that ships with the product. Procedure:

1. Insert the DVD.
2. Start the "START" program.
3. Select "Drivers & Updates" from the index.
4. Select the operating system in "Drivers & Updates".
5. Install the required driver.

| NOTICE |
| --- |
| When reinstalling Windows XP, Server 2008, Vista, the driver for the chipset must always be installed first before all other drivers. |

### 11.2.5 Installing the RAID controller software

You will find the procedure for installing the software in the directory "Drivers\RAID\Intel" on the "Documentation and Drivers" DVD that ships with the product.

#### Notes on Windows operating systems

Select the type "Intel(R) ICH8R/ICH9R/ICH10R/DO SATA RAID" controller from the proposed list when you install a new Windows operating system. To display the list completely, you may need to scroll down with the arrow keys.

### 11.2.6 Installing the burner or DVD software (optional)

**Note**

**Installation**

Information about installation of the burner / DVD software is available on the supplied CD.

### 11.2.7 Installing updates

#### 11.2.7.1 Updating the operating system

#### Windows

The latest updates for the Windows operating system are available in the Internet at Microsoft Side Guide (http://www.microsoft.com).

| NOTICE |
| --- |
| Before you install new drivers or operating system updates for Windows MUI versions, set the default language to US English in the regional settings for menus and dialogs. |

#### Other operating systems

Contact the corresponding manufacturer.

#### 11.2.7.2 Installing or updating application programs and drivers

Install and connect an appropriate drive in order to install software from a CD and / or floppy disk in Windows.

The USB floppy disk and CD-ROM drivers are included in Windows and do not have to be installed from other sources.

For information about installation of SIMATIC software packages, refer to the corresponding manufacturer documentation.

Contact the manufacturer to obtain updates of drivers and application programs you purchased from third-party vendors.

| NOTICE |
| --- |
| Before you install new drivers or operating system updates for Windows versions, set the default language to US English in the regional settings for menus and dialogs. |

#### 11.2.7.3 Performing a BIOS update

**Download from BIOS update**

Check regularly if updates are available for download to your device.

You can find the downloads in the Internet (http://www.siemens.com/asis) in the "Support" tab under "Tools & Downloads"´. Using the global search function, you can then also search for any downloads you require.

### 11.2.8 Data backup

#### 11.2.8.1 Creating an image

**Data backup in Windows**

Siemens recommends using **SIMATIC PC Image Creator** to generate backup copies of your data. This tool provides comfortable and efficient functions for backup and restoring the full content of Compact Flash cards, of HDDs and of individual partitions (images.)

**Note**

**Hardware support**

Older versions of the SIMATIC PC Image Creator do not support the hardware of the SIMATIC IPC547C. Support is available as of SIMATIC PC Image Creator version 3.x.

The software is available at the Siemens A&D online ordering system Industrial Automation and Drive Technologies (http://mall.automation.siemens.com). For detailed information about SIMATIC PC Image Creator, please refer to the corresponding product documentation.

# Troubleshooting/FAQs

# 12

## 12.1 General problems

This chapter provides you with tips on how to locate and troubleshoot common problems.

| Problem | Possible cause | Remedy |
|---|---|---|
| The device is not operational | No power supply | Check the power supply, and the power cord / connector |
| | Device is being operated outside the specified ambient. conditions | • Check the ambient conditions.<br>• After transport in cold weather, wait approximately 12 hours before switching on the device. |
| The external monitor remains dark. | The monitor is switched off. | Switch on the monitor. |
| | The monitor is in "power save" mode. | Press any key on the keyboard. |
| | The brightness button has been set to dark. | Increase brightness by means of luminance control. For detailed information, refer to the monitor operating instructions. |
| | The power cord or the monitor cable is not connected. | • Check whether the power cord has been properly connected to the monitor and to the system unit or to the grounded shockproof outlet.<br>• Check whether the monitor cable has been properly connected to the system unit and to the monitor. |
| | | If the monitor screen still remains dark after you have performed these checks, please contact your technical support team. |
| The mouse pointer does not appear on the screen. | The mouse driver is not loaded. | Check whether the mouse driver is properly installed and present when you start the application program. For more detailed information, refer to the manuals for the mouse or application programs. |
| | Mouse not connected. | Check whether the mouse cord is properly connected to the system unit. If you use an adapter or extension on the mouse cable, also check the connectors. |
| | | If the mouse pointer still does not appear on the screen after you have performed these checks and measures, please contact your technical support team. |
| Wrong time and/or date on the PC. | | 1. Press <F2> within the boot sequence to open the BIOS Setup.<br>2. Set the time and date in the setup menu. |
| Although the BIOS setting is OK, the time and data are still wrong. | The backup battery is dead. | In this case, please contact your technical support team. |
| USB device not responding. | The USB ports are disabled in your BIOS. | Use a different USB port or enable the port. |
| | USB 2.0 device connected but USB 2.0 is disabled. | Enable USB 2.0. |

| Problem | Possible cause | Remedy |
|---|---|---|
| | Operating system does not support the USB interfaces. | Enable USB Legacy Support for the mouse and keyboard. For other devices you need the USB drivers for your operating system. |
| DVD/CD: The front loader does not open. | The device is switched off or the open/close button is disabled by a software application. | Emergency removal of the data medium:<br>1. Switching off the device<br>2. Insert a pointed object, a pin for example, or an opened paper clip into the emergency extraction opening of the drive. Apply slight pressure to the contact until the front loader opens.<br>3. Pull the loader further out. |
| The RAID software reports the following errors:<br>• The RAID plug-in failed to load, because the drive is not installed.<br>• The Serial ATA plug-in failed to load, because the driver is not installed correctly.<br>• The Intel® Matrix Storage Console was unable to load a page for the following reason:<br>– A plug-in did not provide a page for the selected device<br>– A plug-in failed to load | RAID is not activated<br><br>RAID is activated | The messages have no negative effect on the operation of the device and can be ignored. Acknowledge the messages.<br>Install the software from the supplied "Documentation and Drivers" DVD |
| After changing the hard disk, the system does not boot from the RAID array | RAID array does not have highest boot priority | Set the RAID array to be first in the boot order |
| After changing the hard disk, "unused" is indicated for the relevant SATA port | The system was booted without a functioning hard disk (the removable cartridge was possibly not turned on) | Reboot the system with a functioning hard disk |
| Computer does not boot or "Boot device not found" is displayed | The boot device is not first in the boot priority in the BIOS setup or is not permitted as boot device | Change the boot priority of the boot device in the Boot menu of the BIOS setup or permit boot device in the boot priority |

## Error displays on the front panel

| Front LED | Possible cause | Details about the error display |
|---|---|---|
| Red TEMP LED is lit | Excess temperature in the device | See section Temperature monitoring/display (Page 49) |
| Red FAN LED is lit | Fan failure | See section Fan monitoring (Page 50) |

## 12.2 Problems when using modules of third-party manufacturers

| Problem | Possible cause | Remedy |
|---|---|---|
| The PC crashes during startup | • Double allocation of I/O addresses<br>• Double allocation of hardware interrupts and/or DMA channels<br>• Signal frequencies or signal levels are incorrect,<br>• Connector assignments deviate,<br>• No "Reset Configuration" executed in BIOS SETUP. | Check your computer configuration:<br>• If the computer configuration corresponds with factory state, please contact your technical support team.<br>• If the computer configuration has changed, restore the original factory settings. Remove all third-party modules, then restart the PC. If the error no longer occurs, the third-party module was the cause of the fault. Replace this module with a Siemens module or contact the module supplier.<br>• Force a "Reset Configuration" using the BIOS Setup. |
| | | Contact Technical Support if the PC still crashes. |
| PC does not restart or turns off immediately | A voltage > 0.5 V is fed into the PC due to connected or installed third-party components | Check with the supplier of the component<br>• whether this can be operated without an external power supply,<br>• Whether the settings for the component can be changed so that only the PC power supply is used or only the external power supply. |

# Technical specifications

# 13

## 13.1 General technical specifications

| NOTICE |
|---|
| **Applicability of technical specifications**<br>The following technical specifications only apply,<br>• if the device is in correct working order.<br>• The fan cover and filter mat are installed.<br>• The front door is closed. |

| General specifications | |
|---|---|
| Order numbers | 6AG4104-1...(for details, refer to the ordering documentation) |
| Dimensions | 433.5 x 176.5 x 445.5 (WxHxD in mm) Detailed dimensional specifications can be found in the Dimension drawing of the device (Page 87) section. |
| Weight | Min. 16 kg, max. 23 kg |
| Supply voltage ($V_N$) | • 100 to 240 VAC (-15%, +10%)<br>• 2 x 100 to 240 VAC (-15%, +10%); redundant power supply unit |
| Input current AC | Continuous current up to 6 A (at 100 V) 3 A (at 240 V)<br>during startup up to 30 A for 5 ms |
| Frequency | 50 – 60 Hz (min. 47 Hz to max. 63 Hz, sinusoidal) |
| Transient voltage interruption | 20 ms at 93 V<br>(max. 10 events per hour; recovery time of at least 1 s) |
| Power consumption (with 210 W secondary)<br>obtained from the maximum configuration and the maximum permitted power loss of the slots of 80 W | 310 W (80% efficiency with AC power supply and 70% efficiency with redundant AC power supply)<br>corresponds to the maximum power loss; corresponds to 1156 kJ/h or 1058 BTU/h |
| Max. current output (DC) | +5 V / 26 A<br>+3.3 V / 24 A<br>in total 190 W with AC power supply and 100 W with redundant AC power supply are permitted.<br>+12 V / 15 A<br>+12 V / 15 A<br>-12 V / 0.2 A<br>+5 Vaux/2 A |
| Noise emission | < 45 dB (A) to DIN 45635<br>(40 dB(A) at 20°C / Windows idle mode) |

| **General specifications** | |
|---|---|
| Degree of protection | IP 30 with closed front door, IP 20 at the back in conformity to EN 60529 |
| Dust protection | With the front panel closed according to IEC 60529<br>Filter class G2 EN 779, 99 % of particles > 0.5 mm are filtered |
| **Security** | |
| Protection class | Protection class I compliant with IEC 61140 |
| Safety regulations | IEC60950-1, EN60950-1, UL60950-1, CSA C22.2 No 60950-1-07 |
| **Electromagnetic compatibility (EMC)** | |
| Emitted interference (AC) | EN 61000-6-3; EN 61000-6-4;<br>CISPR22:2004 class B; FCC class A;<br>EN 61000-3-2 class D, EN 61000-3-3 |
| Noise immunity:<br>Mains borne disturbance variables on supply lines | ± 2 kV; (conforms to IEC 61000-4-4; Burst)<br>± 1 kV; (conforms to IEC 61000-4-5; Surge sym)<br>± 2 kV; (conforms to IEC 61000-4-5; Surge asym) |
| Noise immunity on signal lines | ± 2 kV (to IEC 61000-4-4; burst; length > 30 m)<br>± 1 kV (to IEC 61000-4-4; burst; length < 30 m)<br>± 2 kV (to IEC 61000-4-5; sym. surge, length > 30 m) |
| Immunity to discharges of static electricity | ± 4 kV, contact discharge (to IEC 61000-4-2)<br>± 8 kV, atmospheric discharge (to IEC 61000-4-2) |
| Immunity to RF interference | 1 V/m, 2-2.7 GHz, 80% AM (to IEC 61000-4-3)<br>10 V/m, 80-1000 MHz und 1.4 - 2 GHz, 80% AM; (conforms to IEC 61000-4-3)<br>10 V, 10 kHz-80 MHz; (conforms to IEC 61000-4-6) |
| Magnetic field | 100 A/m, 50 Hz / 60 Hz; (to IEC 61000-4-8) |
| **Climatic conditions** | |
| Temperature | Tested to IEC 60068-2-2, IEC 60068-2-1, IEC 60068-2-14, |
| - In operation<br><br><br><br>- Gradient<br>- Storage/transport<br>- Gradient | + 5 °C to + 40 °C without burner operation,<br>+ 5°C to + 35°C with restriction<br>CPU up to 95W power dissipation<br>See "Retrofitting instructions"<br>max. 10°C/h no condensation<br>– 20°C to +60°C<br>max. 20°C/h no condensation |
| Relative humidity | Tested to IEC 60068-2-78, IEC 60068-2-30 |
| - In operation<br>- Gradient<br>- Storage/transport<br>- Gradient | 5% to 80% at 25 °C (no condensation)<br>max. 10°C/h no condensation<br>5% to 95% at 25 °C (no condensation)<br>max. 20°C/h no condensation |
| Atmospheric pressure | |
| - in operation<br>- Storage/transport | 1080 to 795 hPa<br>(corresponds to an altitude of -1000 to 2000 m)<br>1080 to 660 hPa<br>(corresponds to an altitude of -1000 to 3500 m) |

| **General specifications** | |
|---|---|
| **Mech. Ambient conditions** | |
| Vibration<br>- Operation [1)]<br>- Storage/transportation | Tested to IEC 60068-2-6, 10 cycles<br>20 - 58 Hz, Amplitude 0.015mm; 58 to 200 Hz: 2m/s²<br>5 - 8.51 Hz, Amplitude 3.5 mm; 8.51 to 500 Hz: 9.8 m/s² |
| Shock resistance<br>- Operation [1]<br>- Storage/transport | tested to DIN IEC 60068-2-27<br>half sine: 9.8 m/s², 20 ms, 100 shocks per axis<br>half-sine: 250 m/s², 6 ms, 1000 shocks per axis |
| **Special features** | |
| Quality assurance | to ISO 9001 |
| **Motherboard** | |
| Processor | • Intel® Dual Core E5300 (2.6 GHz, 800 MHz FSB, 2 MB L2 Cache, EM64T)<br>• Intel® Core™ 2 Duo E8400 (3.0 GHz, 1333 MHz FSB, 6 MB L2 Cache, EM64T, VT-X)<br>• Intel® Core™ 2 Quad Q9400 (2.66 GHz, 1333 MHz FSB, 6 MB L2 Cache, EM64T, VT-X) |
| Chipset | Intel Q45 |
| RAID (on-board) | Intel ICH10DO with Intel storage manager software |
| Main memory (available ex works) | • 1 GB DDR2 SDRAM (1x 1.0 GB); Single Channel<br>• 2 GB DDR2 SDRAM (2x 1.0 GB); Dual Channel<br>• 4 GB DDR2 SDRAM (2x 2.0 GB); Dual Channel<br>• 8 GB DDR2 SDRAM (4x 2.0 GB); Dual Channel |
| Memory configuration | 4 DIMM socket for up to 16 GB ; max. 3.2 GB for operating system and applications with 32 bit operating systems. |
| Expansion slots | 4 x PCI<br>1 x PCIe x1<br>1x PCIe x8 (1 Lane)<br>1 x PCIe x16 (Generation 2.0)<br>All modules up to 312 mm in length are supported |
| max. permitted power consumption PCIe x1/x8 (1 Lane) slot<br>max. permissible power consumption PCIe x16 slot<br>Max. permitted power consumption per PCI slot (5 V/32 bit)<br>Max. accumulated power loss per PCI slot<br>PCI modules with exclusively 5V supply<br>Max. permissible power loss at all slots | PCIe x1 modules: 3.3V 3A; 12V 2.1A; 3.3Vaux 0.4A<br>PCIe x16 module: 3.3V 3A; 12V 2.1A; 3.3Vaux 0.4A<br>5V 5A or 3.3V 7A, 12V 0.5 A, -12V 0.05 A; 3.3 Vaux 0.4A<br>Accumulated power loss (all voltages) may not exceed 25 W.<br>The total consumption of all modules may not exceed 25W<br>Total power consumption of 80 W must not be exceeded In total, the 3.3 Vaux current of 1.2 A must not be exceeded |

| **General specifications** | |
|---|---|
| **Drives (for configuration details, refer to the order documentation)** | |
| Floppy disk drive | 3.5" (1.44 MB) |
| 3.5" hard disk (SATA) | • 250 or 500 GB, internal<br>• RAID1 500 GB (2x 500 GB); internal<br>• 500 GB in removable HDD frame; front<br>• 2x 500 GB in HDD frame; front<br>• RAID1 500 GB (2x500 GB) in HDD frame; hot swap; front<br>• RAID5 1 GB (3x 500 GB) in HDD frame; hot swap; front |
| DVD-ROM | 5.25" SATA<br>Read:<br>DVD ROM: Single Layer 16x, Dual Layer 12x<br>DVD+R/RW, DVD-R/RW 8x, DVD-RAM 2x<br>CD-ROM, CD-R 32x, CD-RW 20x |
| DVD burner | 5.25" SATA<br>Read:<br>DVD-ROM: Single Layer 16x, Dual Layer 12x<br>DVD-R/+R: Single Layer 16x, Dual Layer 12x<br>DVD-RW/+RW 13x<br>CD-ROM/CD-R 48x, CD-RW 40x<br>Write:<br>DVD-RAM 12x<br>DVD+R 16x, DVD+RW 8x, DVD-R 16x, DVD-RW 6x,<br>DVD+R9 (DL) 16x, DVD-R DL 12x<br>CD-R 52x, CD-RW 32x |
| **Graphics** | |
| Graphics controller | Intel® GMA4500 graphics controller,<br>chipset integrated 2-D and 3-D engine,<br>up to 2048 x 1536 at 75 Hz |
| Graphics memory | Dynamic Video Memory Technology<br>(uses up to 256 MB of RAM) |
| Resolutions/frequencies/colors | • CRT:<br>Up to 1280x1024 at 100 Hz / 32 bit colors<br>Up to 1600x1200 at 100 Hz / 32 bit colors<br>Maximum resolution: 2048x1536 at 75 Hz<br>• LCD via DVI:<br>Expansion module (Add2 card) in PCIe x16 slot (optional)<br>Up to 1600x1200 at 60 Hz / 32 bit colors |
| Graphics module (optional) [2)] | PCIe x16 graphics card, dual head (2x VGA or 2x DVI)<br>type: PNY NVS 290 (256 MB graphics memory)<br>Up to 2048x1536 at 75 Hz, 32 bit colors |
| **Ports** | |
| COM1 | Serial interface 1 (V.24), 9-pin D-sub connector |
| COM2 (optional) [4)] | Serial interface 2 (V.24), 9-pin D-sub connector |

| General specifications | |
|---|---|
| LPT1 (optional) 2) | Parallel interface (Standard, EPP and ECP mode)<br>Connection for parallel port printer |
| VGA | Connection for analog monitor, 15-pin D-sub socket |
| DVI-D with ADD card (optional) | For connecting a digital monitor |
| 2x DVI-D/VGA with Dual-Head graphics controller (optional) | For connecting two digital or analog monitors |
| Keyboard | PS/2 keyboard connection |
| Mouse | PS/2 mouse connection |
| USB | 9 channels (6 at back, 2 in front, 1 internal)<br>high current, high speed USB 2.0<br>• USB (on rear panel):<br>6x USB 2.0 (500 mA high current)<br>• USB (on front panel):<br>2x USB 2.0 (500 mA high current)<br>• USB (internal): 1x USB2.0 |
| Ethernet | 2x Realtek RTL8111CP Ethernet Controller with 10/100/1000 Mbit/s |
| Audio<br>- Mic in<br>- Line in<br>- Line out | Realtek ALC663 Audio Codec<br><br><br>2x 0.5W / 8 Ohm |
| **Approvals** | |
| CE residential area (emission)<br>CE industrial area (immunity)<br>cUlus | EN61000-6-3:2007<br>EN61000-6-2:2005<br>60950-1 |
| **Status displays (LEDs)** | |
| | POWER<br>HDD<br>TEMP<br>FAN |

1) When using a hard disk in a HDD frame, the device should generally be free of mechanical disturbances.
When using a DVD burner, the device should generally be free of mechanical disturbances during burning.

2) Interfaces supplied as optional.

## 13.2 Power requirements of the components (maximum values)

### Base system

| Components | Voltage | | | | |
|---|---|---|---|---|---|
| | **+5 V** | **+3.3 V** | **+12 V** | **-12 V** | **5 Vaux** |
| FSC D2836-S11 motherboard with processor and heat sink | 5 A | 0.5 A | 12 A | 0.05 A | 0.3 A |
| Front fan | | | 0.5 A | | |
| Disk drive | 0.25 A | | | | |
| **Base system** | **5.25 A** | **0.8 A** | **12.5 A** | **0.01 A** | **0.5 A** |
| **Expansions** | | | | | |
| Hard disk drive SATA 1) | 0.5 A | | 0.7 A | | |
| DVD ROM 1) | 0.9 A | | 0.8 A | | |
| DVD Burner 1 | 1.1 A | | 1.4 A | | |
| Single lines of current (max. permissible) 2 | 30 A | 28 A | 30 A | 0.5 A | 2 A |
| Total power consumption, permissible | 210 W | | | | |
| Efficiency of the power supply 1 | • Redundant AC power supply: approx. 70% (230 VAC) / approx. 65% (120 VAC)<br>• AC power supply: approx. 80% (230 VAC) / approx. 75% (120 VAC) | | | | |

1) Depends on the selected device configuration

2) The max. permitted accumulated power of the +5 V and + 3.3 V is 190 W.

The accumulated power of the +5 V and + 3.3 V voltages must not exceed 100 W with redundant AC power supplies.

## 13.3 AC voltage supply

### Output voltage

| Voltage | Max. current | Voltage stability |
|---|---|---|
| + 12 V | 10 A | +/- 5 % |
| + 12 V | 13 A | +/- 5 % |
| - 12 V | 0.3 A | +/- 10 % |
| + 5 V | 25 A 1) | + 5 % / - 4 % |
| + 3.3 V | 20 A 1) | + 5 % / - 4 % |
| + 5 Vaux | 2.5 A | + 5 % / - 3 % |

1) The max. permitted accumulated power of the +5 V and + 3.3 V voltages is 190 W.

The maximum inrush current is as follows for:
110 VAC: 25 A, 5 ms
240 VAC: 30 A, 5 ms

## 13.4 AC power supply, redundant

### Output voltage

| Voltage | Max. current | Voltage stability |
|---|---|---|
| + 12 V | 18 A [2)] | +/- 5 % |
| + 12 V | 18 A [2)] | +/- 5 % |
| + 12 V | 14 A [2)] | +/- 5 % |
| - 12 V | 0.8 A | +/- 10 % |
| + 5 V | 20 A [1)] | + 5 % / - 4 % |
| + 3.3 V | 20 A [1)] | + 5 % / - 4 % |
| + 5 Vaux | 2.0 A | + 5 % / - 3 % |

1) The max. permitted accumulated power of the +5 V and + 3.3 V voltages is 100 W.

2) the maximum accumulated current of the +12 V voltage must not exceed 24 A.

The maximum inrush current is as follows for:
110 VAC: 25 A, 5 ms
230 VAC: 30 A, 5 ms

## 13.5 Technical specifications of the telescopic rails

| | |
|---|---|
| Ultimate load per pair | At least 30 kg |
| Full extraction length | At least 470 mm |
| Rail thickness | Maximum 9.7 mm |
| Mounting screws | M5 x 6 mm |

The mounting screws of the telescopic rails may not protrude by more than 5 mm into the enclosure.

# Dimension drawings

# 14

## 14.1 Dimension drawing of the device

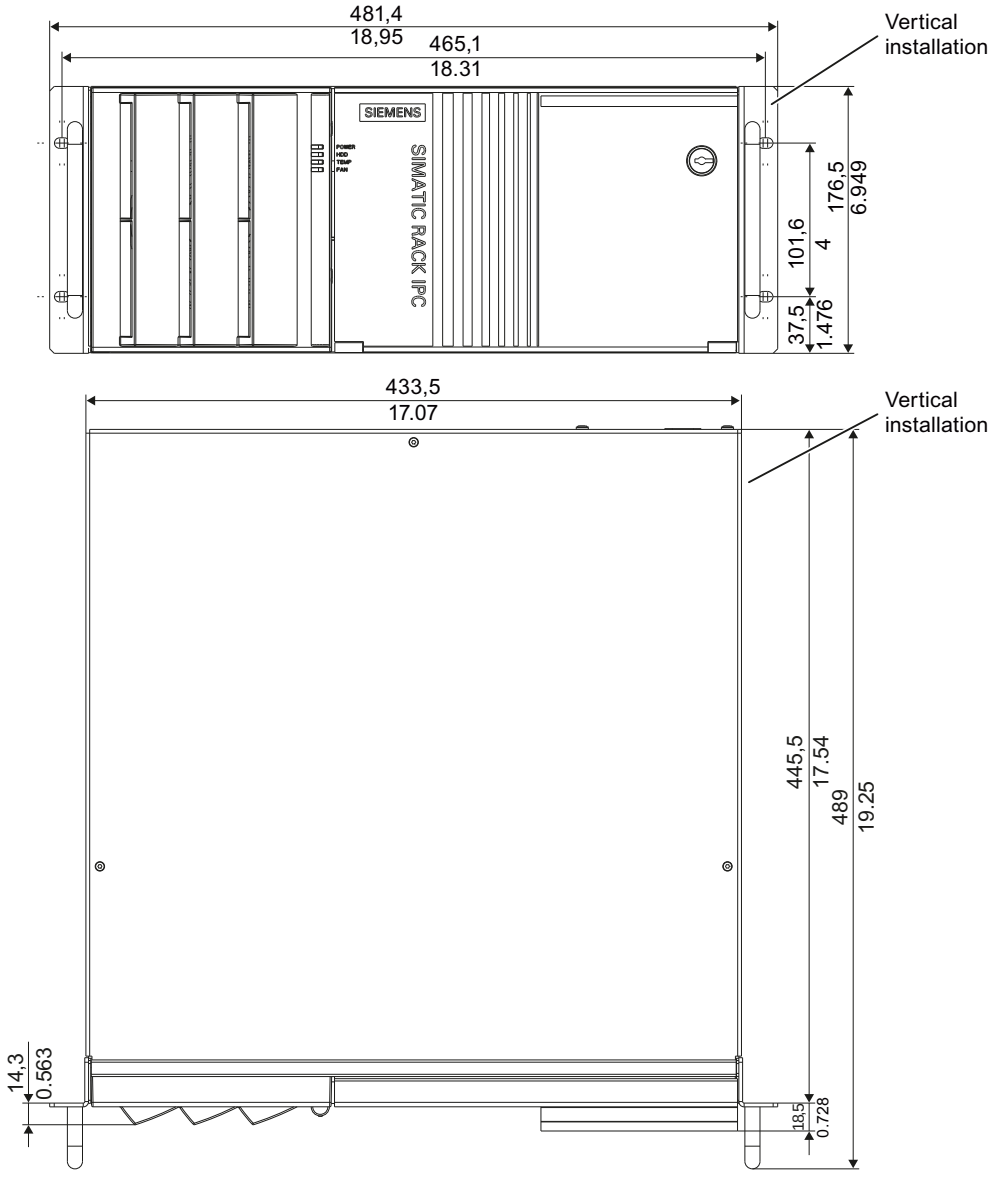



Figure 14-1 Dimensional drawing of the device

## 14.2 Dimension drawing for the use of telescopic rails

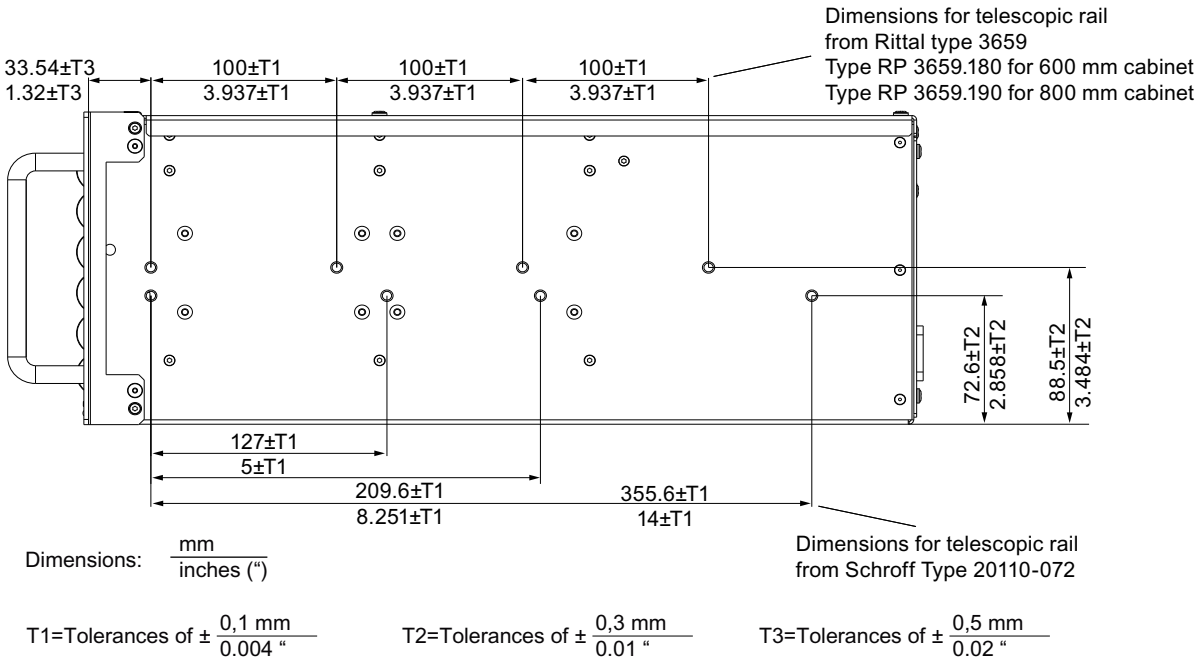



Figure 14-2 Dimensional drawing for the use of telescopic rails

## 14.3 Dimensional drawings for the installation of expansion modules

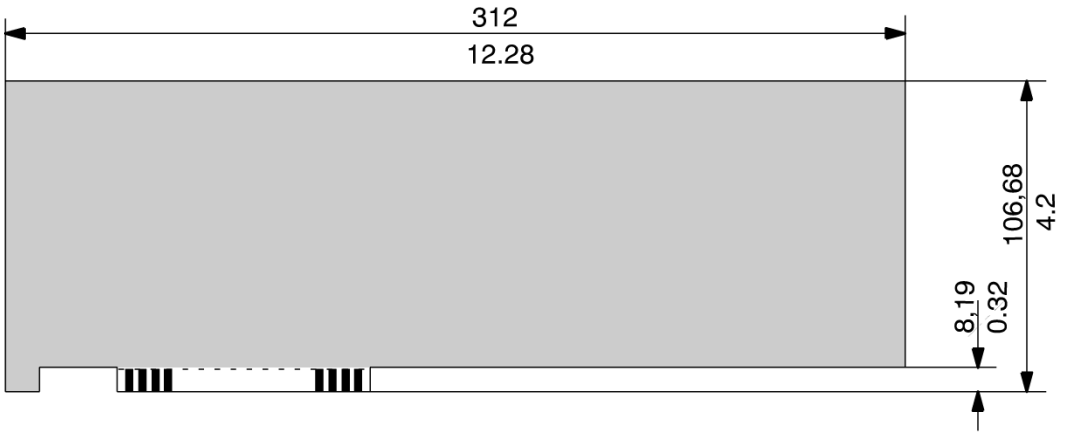



Figure 14-3 Long PCI module, PCIe module

# Detailed descriptions 15

## 15.1 Motherboard

The motherboard consists of the processor and the chipset, four slots for memory modules, internal and external ports, the Flash BIOS and the backup battery.

You will find a detailed description of the motherboard as well as the interfaces in the technical manual of the D2836-S11 motherboard on the "Documentation and Drivers" DVD that ships with the product.

## 15.2 System resources

All system resources (hardware addresses, memory configuration, allocation of interrupts, DMA channels) are assigned dynamically by the Windows OS, depending on the hardware configuration, drivers and connected external devices. You can view the current configuration of system resources or possible conflicts with the following operating systems:

| | |
|---|---|
| Windows XP/Server 2008 | **Start > Run :** In the **Open** box, enter "msinfo32" and confirm with **OK** |
| Vista | Start > Enter "cmd" in the search function , then enter "msinfo32" in the input box |

# 15.3 Interrupt assignment

## Interrupt assignment depending on operating system

The functions are assigned different interrupts (IRQ), depending on the operating system. A distinction is made between the PIC and APIC modes.

| | IRQ Nummer | | | | | | | | | | | | | | | | | | | | | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IRQ (APIC-Mode) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| IRQ (PIC-Mode) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | ◄ | | | | | | | | |
| Host PCI IRQ Lin / Funktion | | | | | | | | | | | | | | | | | A1 | B2 | C3 | D4 | E5 | F6 | G7 | H8 | 1) |
| Timer 0 | X | | | | | | | | | | | | | | | | | | | | | | | | Fixed |
| PS/2Keyboard | | X | | | | | | | | | | | | | | | | | | | | | | | Fixed |
| Cascaded (IRQ9) | | | X | | | | | | | | | | | | | | | | | | | | | | Fixed |
| Serial port 2 | | | | X | | | | | | | | | | | | | | | | | | | | | Can be disabled |
| Serial port 1 | | | | | X | | | | | | | | | | | | | | | | | | | | Can be disabled |
| FD-Controller | | | | | | X | | | | | | | | | | | | | | | | | | | Can be disabled |
| Parallel port 1 | | | | | | | X | | | | | | | | | | | | | | | | | | Can be disabled |
| Real time clock (RTC) | | | | | | | | X | | | | | | | | | | | | | | | | | Can be disabled |
| PS/2 mouse | | | | | | | | | | | | | X | | | | | | | | | | | | Fixed, Cannot be disabled |
| Numerik-Prozessor | | | | | | | | | | | | | | X | | | | | | | | | | | Fixed |
| HD-Controller 1(Primary) | | | | | | | | | | | | | | | X | | | | | | | | | | Fixed |
| HD-Controller 2(Secondary) | | | | | | | | | | | | | | | | X | | | | | | | | | Fixed |
| SATA #1 | | | | | | | | | | | | Z | | | | | | | | Y | | | | | Fixed |
| SATA #2 | | | | | | Z | | | | | | | | | | | | | | | | | Y | | Fixed |
| SMBus | | | | | | | | | | | | Z | | | | | | | | Y | | | | | Fixed |
| USB Port 0/1 | | | | | | | | | | | Z | | | | | | | | | | Y | | | | Can be disabled |
| USB Port 2/3 | | | | | | Z | | | | | | | | | | | | | | | | | Y | | Can be disabled |
| USB Port 4/5 | | | | | | | | | | | | Z | | | | | | | | | | Y | | | Can be disabled |
| USB Port 6/7 | | | | | | | | | | | Z | | | | | | | | | | | Y | | | Can be disabled |
| USB Port 8/9 | | | | | | | | | | Z | | | | | | | | | Y | | | | | | Can be disabled |
| USB Port 10/11 | | | | | | | | | | | | Z | | | | | | | | Y | | | | | Can be disabled |
| USB 2.0 Controller 1 | | | | | | | | | | Z | | | | | | | | | Y | | | | | | Can be disabled |
| USB 2.0 Controller 2 | | | | | | | | | | | Z | | | | | | | | | | Y | | | | Can be disabled |
| Ethernet 1 (LAN) | | | | | | | | | | | | Z | | | | | Y | | | | | | | | Can be disabled |
| Ethernet 2 (LAN) | | | | | | | | | | | | Z | | | | | | Y | | | | | | | Can be disabled |
| HD Audio | | | | | | | | | | | Z | | | | | | | | | | Y | | | | Can be disabled |
| Onboard Graphic | | | | | | | | | | | | Z | | | | | Y | | | | | | | | Can be disabled |
| Thermal Subsystem | | | | | | | | | | Z | | | | | | | | | Y | | | | | | Fixed |

1) 1) Host PCI-IRQ A to H is permanently assigned to IRQ 16 to 23 in APIC mode. Host PCI-IRQ A to H is automatically assigned to IRQ 0 to 15 in PIC mode by the BIOS. A specific assignment cannot be forced.

X Interrupt PIC and APIC mode Y Interrupt APIC mode

Z BIOS Default Interrupt PIC mode, e.g. DOS

## Slot-specific interrupt assignment

Interrupt routing of the slot connectors on the motherboard.

| | IRQ Nummer | | | | | | | | | | | | | | | | | | | | | | Bem. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACPI IRQ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |
| IRQ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | ◄ | | | | | | | | |
| Host PCI IRQ Lin / Funktion | | | | | | | | | | | | | | | | | A 1 | B2 | C3 | D4 | E5 | F6 | G7 | H8 | 1) |
| Slot 1 (PEG) | | | | | | | | | | | | | | | | | | | | | | | | | |
| PCI IRQ A | | | | | | | | | | | | Y | | | | | Y | | | | | | | | |
| PCI IRQ B | | | | | | | | | | | | Y | | | | | | Y | | | | | | | |
| PCI IRQ C | | | | | | | | | | Y | | | | | | | | | Y | | | | | | |
| PCI IRQ D | | | | | | | | | | | | Y | | | | | | | | Y | | | | | |
| Slot 2 (PCIe-X1) | | | | | | | | | | | | | | | | | | | | | | | | | |
| PCI IRQ A | | | | | | | | | | | | Y | | | | | | Y | | | | | | | |
| PCI IRQ B | | | | | | | | | | Y | | | | | | | | | Y | | | | | | |
| PCI IRQ C | | | | | | | | | | | | Y | | | | | | | | Y | | | | | |
| PCI IRQ D | | | | | | | | | | | | Y | | | | | Y | | | | | | | | |
| Slot 3 (PCIe-X1 Slot x8) | | | | | | | | | | | | | | | | | | | | | | | | | |
| PCI IRQ A | | | | | | | | | | | | Y | | | | | Y | | | | | | | | |
| PCI IRQ B | | | | | | | | | | | | Y | | | | | | Y | | | | | | | |
| PCI IRQ C | | | | | | | | | | Y | | | | | | | | | Y | | | | | | |
| PCI IRQ D | | | | | | | | | | | | Y | | | | | | | | Y | | | | | |
| Slot 4 (PCI) | | | | | | | | | | | | | | | | | | | | | | | | | |
| PCI IRQ A | | | | | | Y | | | | | | | | | | | | | | | | | Y | | |
| PCI IRQ B | | | | | | | | | | | | Y | | | | | | | | | | Y | | | |
| PCI IRQ C | | | | | | | | | | | | Y | | | | | | | | Y | | | | | |
| PCI IRQ D | | | | | | | | | | Y | | | | | | | | | Y | | | | | | |
| Slot 5 (PCI) | | | | | | | | | | | | | | | | | | | | | | | | | |
| PCI IRQ A | | | | | | | | | | | | Y | | | | | | | | | | Y | | | |
| PCI IRQ B | | | | | | Y | | | | | | | | | | | | | | | | | Y | | |
| PCI IRQ C | | | | | | | | | | Y | | | | | | | | | Y | | | | | | |
| PCI IRQ D | | | | | | | | | | | | Y | | | | | | | | Y | | | | | |
| Slot 6 (PCI) | | | | | | | | | | | | | | | | | | | | | | | | | |
| PCI IRQ A | | | | | | | | | | Y | | | | | | | | | Y | | | | | | |
| PCI IRQ B | | | | | | | | | | | | Y | | | | | | | | Y | | | | | |
| PCI IRQ C | | | | | | | | | | | | Y | | | | | | | | | | Y | | | |
| PCI IRQ D | | | | | | Y | | | | | | | | | | | | | | | | | Y | | |
| Slot 7 (PCI) | | | | | | | | | | | | | | | | | | | | | | | | | |
| PCI IRQ A | | | | | | | | | | | | Y | | | | | | | | Y | | | | | |
| PCI IRQ B | | | | | | | | | | | | Y | | | | | | | | | | Y | | | |
| PCI IRQ C | | | | | | Y | | | | | | | | | | | | | | | | | Y | | |
| PCI IRQ D | | | | | | | | | | Y | | | | | | | | | Y | | | | | | |

1) 1) Host PCI-IRQ A to H is permanently assigned to IRQ 16 to 23 in APIC mode. Host PCI-IRQ A to H is automatically assigned to IRQ 0 to 15 in PIC mode by the BIOS. A specific assignment cannot be forced.

Y Interrupt APIC mode

Z BIOS Default Interrupt PIC mode, e.g. DOS

### Exclusive PCI hardware interrupt

Applications demanding high-performance interrupt handling require high-speed hardware interrupt reaction. The PCI hardware interrupt should be used only by one resource in order to ensure high-speed reaction of the hardware.

### Setting up an exclusive interrupt on the device (APIC mode only)

An exclusive interrupt can only be used and set up for PCI slot 3. Further exclusive interrupts for use at the slots are not available.

### Assigning exclusive interrupts in BIOS Setup (PIC mode only)

The interrupts are automatically assigned to the slots at system startup due to the default settings in system BIOS. Several slots may share the same interrupt, depending on the system configuration. This functionality is known as interrupt sharing.

Exclusive interrupts are not available in PIC mode. Disable specific system resources in order to obtain exclusive interrupts. BIOS assigns the PIC interrupts at random during restart of the system.

## 15.4 BIOS Setup

You can configure the system functions and hardware configuration in the BIOS.

The BIOS is set to a default state suitable to the respective device configuration prior to delivery. The most important settings are shown in the table below.

| Tab | Option | Setting |
|---|---|---|
| Main | Boot Features -> Post Errors | No Halt On All Errors |
| | Boot Features -> POST Diagnostic Screen | Enabled |
| Advanced | Peripheral Configuration ->Parallel Port | Auto |
| | Peripheral Configuration -> LAN 1 Remote Boot | Disabled |
| | Advanced System Configuration -> SATA Raid Enable | Enabled<br>(optional for systems with RAID) |
| | Advanced Processor Options -> Enhanced SpeedStep | Disabled |
| | System Management -> SM Fan Control | Enhanced cooling |
| Security | TPM (Security Chip) Setting -> Security Chip | Disabled |

For a detailed description of how to call up and operate the BIOS setup and which menus and setting options are available, refer to the BIOS reference manual on the "Documentation and Drivers" DVD that ships with the manual.

**NOTICE**

Updating the BIOS or calling the "Default settings" function changes the BIOS settings.

All menu items are set to "Disabled" by default.

The operating system functions "Save to RAM" (standby) and "Save to Disk" (hibernate) are not approved for this device.

# Appendix A

## A.1 Guidelines and declarations

### Notes on the CE Label

The following applies to the SIMATIC product described in this documentation:

### EMC guideline

This product meets requirements of EC directive ™2004/108/EEC Electromagnetic Compatibility", and is designed for operation in the following fields of application in according with this CE marking:

| Scope of application | Requirements for | |
|---|---|---|
| | Interference emission | Immunity to interference |
| Industrial area | EN 61000-6-4 : 2007 | EN 61000-6-2 : 2005 |
| Residential and commercial areas and small businesses | EN 61000-6-3 : 2007 | EN 61000-6-1 : 2007 |

The devices comply with EN 61000-3-2:2006 (harmonic currents) and EN 61000-3-3:2008 (voltage fluctuations and flicker).

### Low-voltage guideline

The devices complies with the requirements of the EC Directive 2006/95/EC "Low Voltage Directive". Conformance with this standard has been verified according to EN 60950-1.

### Conformity certificates

The EC declaration of conformity and the corresponding documentation are made available to authorities in accordance with the EC directives stated above. Your local sales representative can provide these on request.

### Observing the installation guidelines

The installation guidelines and safety instructions specified in this documentation must be observed for commissioning and operation.

### Connecting peripherals

Noise immunity requirements to EN 61000-6-2 are met if connected peripherals are suitable for industrial applications. Peripheral devices may only be connected via shielded cables.

# A.2 Certificates and approvals

## DIN ISO 9001 certificate

The Siemens quality management system for all production processes (development, production and sales) meets DIN ISO 9001:2000 requirements.

This has been certified by DQS (the German society for the certification of quality management systems).

EQ-Net certificate no.: DE-001108 QM

## Software License Agreement

The device is shipped with preinstalled software. Please observe the respective license agreements.

## Certification for the USA, Canada and Australia

### Security

| The following approval is available for the device: | |
|---|---|
|  | Underwriters Laboratories (UL) to standard UL 60950-1, File no. E11 5352 and Canadian National Standard CAN/CSA-C22.2 No. 60950-1-07 (I.T.E). |

### EMC

| USA | |
|---|---|
| Federal Communications Commission<br>Radio Frequency Interference Statement | This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. |
| Shielded cables | Shielded cables must be used with this equipment to maintain compliance with FCC regulations. |
| Modifications | Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment. |
| Conditions of operations | This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. |

| CANADA | |
|---|---|
| Canadian notice | This Class A digital apparatus complies with Canadian ICES-003. |
| Avis Canadian | Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada. |

| AUSTRALIA | |
|---|---|
|  | This product meets requirements of EN 61000--6--3:2007 Generic standards - Emission standard for residential areas, business and commercial operations, and small businesses. |

### Recycling

All the packing materials can be fully recycled.

## A.3 Service and support

### Local information

Contain your Siemens representative (http://www.siemens.com/automation/partner) if you have questions about the products described here.

### Technical documentation for SIMATIC products

You can find additional documentation for SIMATIC products and systems in the Internet: SIMATIC Guide manuals (http://www.siemens.com/simatic-tech-doku-portal)

### Easy shopping at the mall

You can find the online catalog and order system under:
Industrial Automation and Drive Technologies (http://mall.automation.siemens.com)

### Training center

All the training options are listed at:
SITRAIN homepage (http://www.sitrain.com)

### Technical support

You can contact technical support for all Industry Automation and Drive Technologies products by:

- E-mail: support.automation@siemens.com
- Internet: Online support request form: (http://www.siemens.com/automation/support-request)

When you contact the customer support, please have the following information for the technician on hand:

- BIOS version
- Order No. (MLFB) of the device
- Installed additional software
- Installed additional hardware

### Online Service & Support

Information about the product, Support and Service, right through to the Technical Forum, can be found at: Industry Automation and Drive Technologies - Homepage (http://www.siemens.com/automation/service&support)

### After-sales information system for SIMATIC PC / PG

Information about contacts, drivers, and BIOS updates, FAQs and Customer Support can be found at: After-sales information system for SIMATIC PC/PG (http://www.siemens.com/asis)

# A.4 Retrofitting instructions

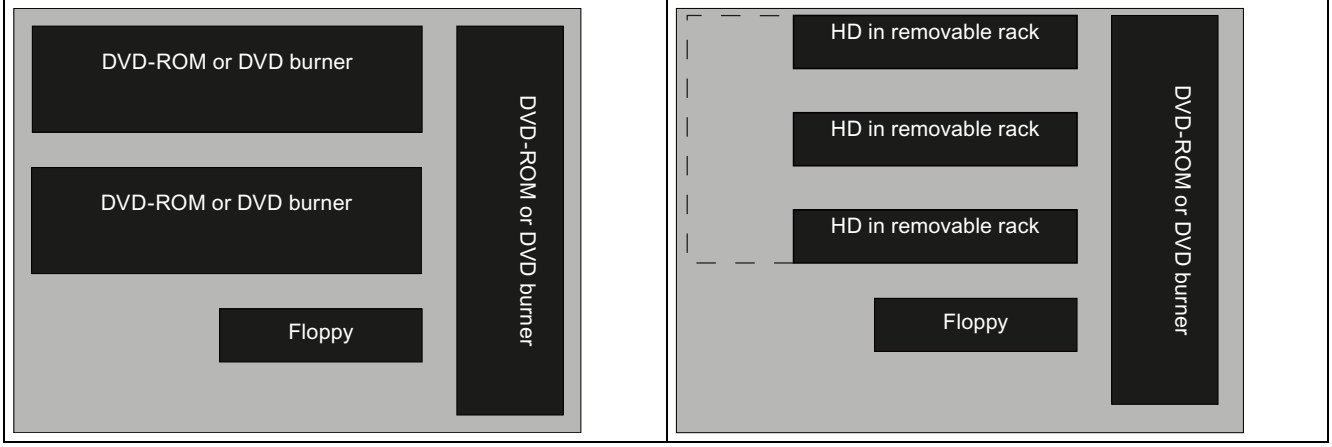
## Approved configuration versions

The section below describes the approved variants of the drive configuration for SIMATIC IPC547C and the resultant operating conditions.

A removable cartridge with hard disk can be installed instead of DVD drive(s). Devices equipped with removable cartridges may not to be exposed to shock during operation as described by DIN IEC 600682.

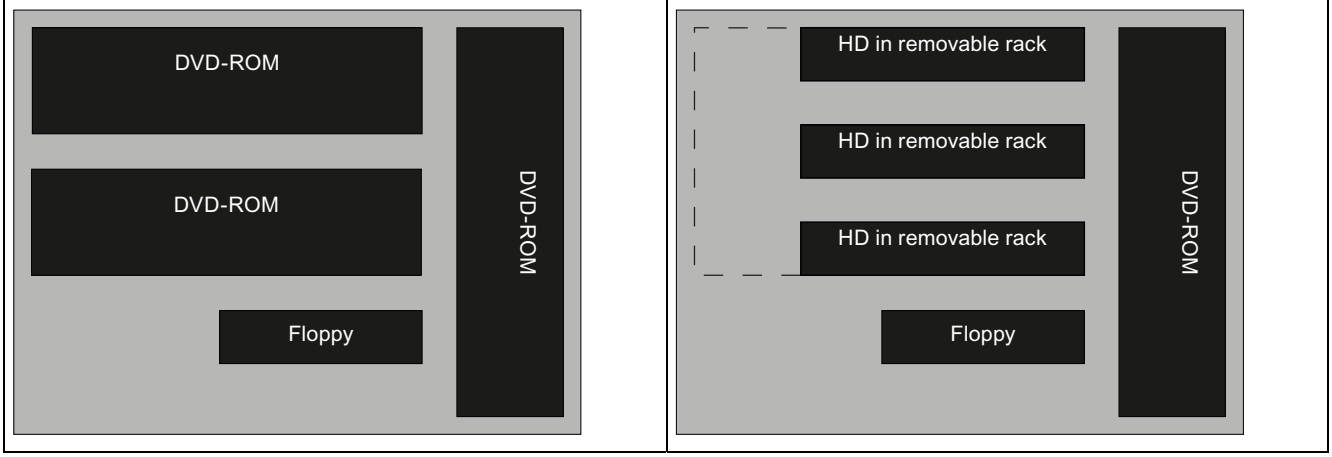
### Temperature range 5 to 35 °C

**Approved configuration versions for the temperature range 5 to 35° C**




### Temperature range 5 to 40 °C

**Approved configuration versions for the temperature range 5 to 40° C**



# ESD directives

# B

## B.1 ESD Guidelines

### Definition of ESD

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

The electrostatic sensitive components/modules are commonly referred to as ESD devices. This is also the international abbreviation for such devices.

ESD modules are identified by the following symbol:



| CAUTION |
| --- |
| ESD devices can be destroyed by voltages well below the threshold of human perception. These static voltages develop when you touch a component or electrical connection of a device without having drained the static charges present on your body. The electrostatic discharge current may lead to latent failure of a module, that is, this damage may not be significant immediately, but in operation may cause malfunction. |

### Electrostatic charging

Anyone who is not connected to the electrical potential of their surroundings can be electrostatically charged.

The figure below shows the maximum electrostatic voltage which may build up on a person coming into contact with the materials indicated. These values correspond to IEC 801-2 specifications.

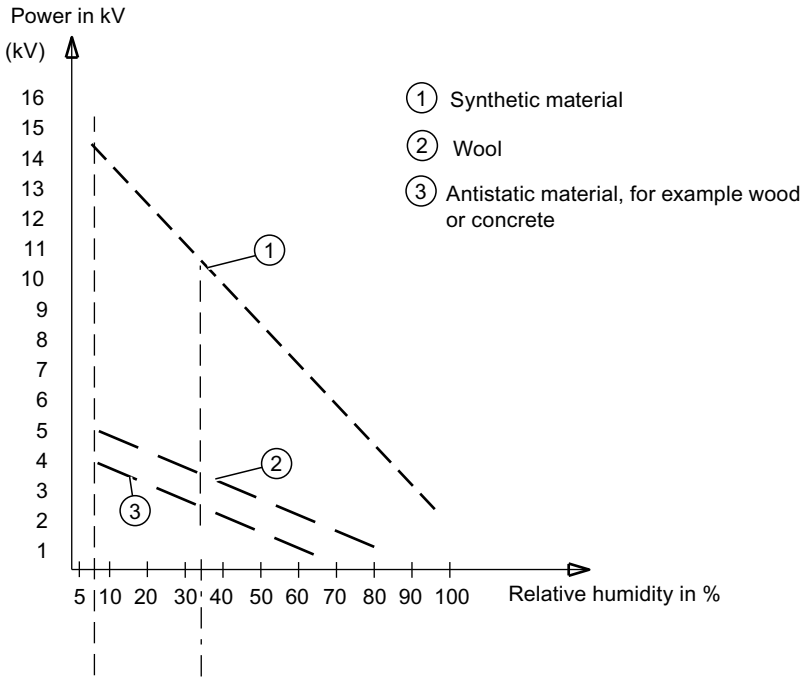



Figure B-1 Electrostatic voltages on an operator

## Basic protective measures against electrostatic discharge

- Ensure good equipotential bonding:
  When handling electrostatic sensitive devices, ensure that your body, the workplace and packaging are grounded. This prevents electrostatic charge.
- Avoid direct contact:
  As a general rule, only touch electrostatic sensitive devices when this is unavoidable (e.g. during maintenance work). Handle the modules without touching any chip pins or PCB traces. In this way, the discharged energy can not affect the sensitive devices.

  Discharge your body before you start taking any measurements on a module. Do so by touching grounded metallic parts. Always use grounded measuring instruments.

# List of abbreviations

C

## C.1 Abbreviations

| Abbreviation | Term | Meaning |
|---|---|---|
| AC | Alternating current | Alternating current |
| ACPI | Advanced Configuration and Power Interface | |
| PLC | Programmable controller | |
| AGP | Accelerated Graphics Port | High speed bus system |
| AHCI | Advanced Host Controller Interface | Standardized controller interface for SATA devices. This is supported in Microsoft Windows XP as of SP1 and IAA driver. |
| APIC | Advanced Programmable Interrupt Controller | Extended programmable interrupt controller |
| APM | Advanced Power Management | Tool for monitoring and reducing power consumption of the PC |
| AS | Automation system | |
| ASIS | After Sales Information System | |
| AT | Advanced Technology | |
| ATA | Advanced Technology Attachment | |
| ATX | AT-Bus-Extended | |
| AWG | American Wire Gauge | US standard for the cable diameter |
| BIOS | Basic Input Output System | Basic Input Output System |
| CAN | Controller Area Network | |
| CD-ROM | Compact Disc – Read Only Memory | Removable storage medium for large data volumes |
| CD-RW | Compact Disc – Rewritable | Rewritable CD |
| CE | Communauté Européenne (CE symbol) | The product is in conformance with all applicable EC directives |
| CF | Compact Flash | |
| CGA | Color Graphics Adapter | Standard monitor interface |
| CLK | Clock pulse | Clock signal for controllers |
| CMOS | Complementary Metal Oxide Semiconductors | Complementary metal oxide semiconductors |
| COA | Certificate of authentication | Microsoft Windows Product Key |
| CoL | Certificate of License | License authorization |
| COM | Communications Port | Term for the serial interface |
| CP | Communication Processor | Communication computer |
| CPU | Central Processing Unit | CPU |
| CRT | Cathode Ray Tube | |

| Abbreviation | Term | Meaning |
|---|---|---|
| CSA | Canadian Standards Association | Canadian organization for tests and certifications according to own or binational standards (with UL / USA) standards |
| CTS | Clear To Send | Clear to send |
| DRAM | Dynamic Random Access Memory | |
| DC | Direct Current | DC current |
| DCD | Data Carrier Detect | Data carrier signal detection |
| DMA | Direct Memory Access | Direct memory access |
| DOS | Disk Operating System | Operating system without GUI |
| DP | Distributed I/Os | |
| DQS | Deutsche Gesellschaft zur Zertifizierung von Qualitätsmanagement mBH | |
| DDRAM | Double Data Random Access Memory | Memory chip with high-speed interface |
| DSR | Data Set Ready | Ready for operation |
| DTR | Data Terminal Ready | Data terminal is ready |
| DVD | Digital Versatile Disk | Digital versatile disk |
| DVI | Digital Visual Interface | Digital display interface |
| DVI-I | Digital Visual Interface | Digital display interface with digital and VGA signals |
| ECC | Error Correction Code | Error correction code |
| ECP | Extended capability port | Extended parallel port |
| EGA | Enhanced Graphics Adapter | PC to monitor interface |
| ESD | Components sensitive to electrostatic charge | |
| DM | Electronic Manual | |
| EIDE | Enhanced Integrated Drive Electronics | An enhancement of the IDE standard |
| EISA | Extended Industry Standard Architecture | Extended ISA standard |
| EMM | Expanded Memory Manager | Manages memory expansions |
| EM64T | Extended Memory 64 technology | |
| EN | European standard | |
| EPROM / EEPROM | Erasable Programmable Read-Only Memory / Electrically Erasable Programmable Read-Only Memory | Plug-in submodules with EPROM/EEPROM chips |
| EPP | Enhanced Parallel Port | Bi-directional Centronics interface |
| ESC | Escape character | Control character |
| EWF | Enhanced Write Filter | |
| FAQ | Frequently Asked Questions | FAQs |
| FAT 32 | File Allocation Table 32-bit | 32-bit file allocation table |
| FBWF | File-Based Write Filter | |
| FD | Floppy disk | Disk drive, 3.5" |
| FSB | Front Side Bus | |
| GND | Ground | Chassis ground |
| HD | Hard disk | Hard disk |
| HDA | High Definition Audio | |

| Abbreviation | Term | Meaning |
|---|---|---|
| HDD | Hard Disk Drive | HDD |
| HU | Height unit | |
| HMI | Human Machine Interface | User interface |
| HORM | Hibernate Once - Resume Many | |
| HT | Hyper-Threading | |
| HTML | Hyper Text Markup Language | Script language for creating Internet pages. |
| HTTP | Hypertext Transfer Protocol | Protocol for data transfer on the Internet |
| Hardware | Hardware | |
| I/O | Input/Output | Data input/output on computers |
| IAA | Intel Application Accelerator | |
| IDE | Integrated Device Electronics | |
| IEC | International Electronical Commission | |
| IGD | Integrated Graphics Device | |
| IP | Ingress Protection | Degree of protection |
| IR | Infrared | Infrared |
| IRDA | Infrared Data Association | Standard for data transfer via IR module |
| IRQ | Interrupt Request | Interrupt request |
| ISA | Industry Standard Architecture | Bus for expansion modules |
| ITE | Information Technology Equipment | |
| L2C | Level 2 cache | |
| LAN | Local Area Network | Computer network that is limited to a local area. |
| LCD | Liquid Crystal Display | Liquid crystal display |
| LEDs | Light Emitting Diode | Light emitting diode |
| LPT | Line Printer | Printer port |
| LVDS | Low Voltage Differential Signaling | |
| LW | Drive | |
| MAC | Media access control | Media access control |
| MC | Memory Card | Memory card in credit card format |
| MLFB | Machine-readable product designation | |
| MMC | Micro Memory Card | Memory card of the format 32 mm x 24.5 mm |
| MPI | Multipoint-capable interface for programming devices | |
| MS-DOS | Microsoft Disc Operating System | |
| MTBF | Mean Time Between Failures | |
| MUI | Multilanguage User Interface | Language localization in Windows |
| NA | Not Applicable | |
| NAMUR | Normenarbeitsgemeinschaft for Mess- und Regelungstechnik in der chemischen Industrie (standardization body for instrumentation and control technology in the chemicals industry) | |
| NC | Not Connected | Not connected |
| NCQ | Native Command Queuing | Automatic re-sorting of the file and disk access, for increased performance |

| Abbreviation | Term | Meaning |
|---|---|---|
| NEMA | National Electrical Manufacturers Association | Syndicate of manufacturers of electrical components in the USA |
| NMI | Non Maskable Interrupt | Interrupt the processor can not reject |
| NTFS | New Techniques File System | Secure file system for Windows versions (2000, XP, Vista) |
| ODD | Optical Disk Drive | |
| OPC | OLE for Process Control | Standardized interface for industrial processes |
| PATA | Parallel ATA | |
| PC | Personal computer | |
| PCI | Peripheral Component Interconnect | High-speed expansion bus |
| PCIe | Peripheral Component Interconnect express | High-speed serial, differential full-duplex PtP interface with high data rate. |
| PCMCIA | Personal Computer Memory Card International Association | |
| PI | Protective Earth | Protective conductor |
| PEG | PCI Express Graphics | |
| PG | Programming device | |
| PIC | Programmable Interrupt Controller | Programmable interrupt controller |
| POST | Power On Self Test | |
| PXE | Preboot Execution Environment | Software for running new PCs without hard disk data via the network |
| RAID | Redundant Array of Independent Disks | Redundant hard disk array |
| RAL | Restricted Access Location | Installation of device in operating facilities with restricted access - for example, a locked switchgear cabinet |
| RAM | Random Access Memory | |
| RI | Ring Input | Incoming call |
| ROM | Read-Only Memory | |
| RS 485 | Reconciliation Sublayer 485 | Bi-directional bus system designed for up to 32 nodes |
| RTC | Real Time Clock | Real-time clock |
| RTS | Reliable Transfer Service | Request to send |
| RxD | Receive Data | Data transfer signal |
| SATA | Serial Advanced Technology Attachment | |
| SCSI | Small Computer System Interface | |
| SDRAM | Synchronous DRAM | |
| SELV | Safety Extra Low Voltage | Safety extra low voltage |
| SLC | Second Level Cache | |
| SMART | Self Monitoring Analysis and Reporting Technology | Hard disk error diagnostics program |
| SMS | Short Message Service | Short message via telecommunication network |
| SNMP | Simple Network Management Protocol | Network protocol |
| SO-DIMM | Small Outline Dual Inline Memory Module | |
| SOM | SafeCard on Motherboard (SOM) | |

| Abbreviation | Term | Meaning |
|---|---|---|
| SPP | Standard Parallel Port | Synonym for parallel port |
| SSD | Solid State Drive | |
| SVGA | Super Video Graphics Array | Enhanced VGA standard with at least 256 colors |
| SVP | Serial number of the device | |
| SW | Software | |
| TCO | **T**otal **C**ost of **O**wnership | |
| TFT | Thin-Film-Transistor | Type of LCD flat-screen |
| TTY | Tele Type | Asynchronous data transfer |
| TxD | Transmit Data | Data transfer signal |
| TWD | Watchdog Time | Watchdog monitoring time |
| UL | Underwriters Laboratories Inc. | US organization for tests and certifications according to own or binational standards (with CSA / Canada) standards |
| UMA | Unified Memory Architecture | Video memory |
| URL | Uniform Resource Locator | Designation of the full address of an Internet page |
| USB | Universal Serial Bus | |
| UXGA | Ultra Extended Graphics Array | Graphic standard, maximum resolution 1600x1200 pixels. |
| V.24 | | ITU-T standardized recommendation for data transfer via serial ports |
| VDE | Verein deutscher Elektrotechniker (Union of German Electrical Engineers) | |
| VGA | Video Graphics Array | Video adapter which meets industrial standard |
| VRM | Voltage Regulator Module | |
| VT | Virtualization Technology | Intel technology with which a virtually closed environment can be made available. |
| W2k | Windows 2000 | |
| WAV | Wave Length Encoding | Loss-free file format for audio data |
| WD | Watchdog | Program monitoring with error detection and alarming. |
| WLAN | Wireless LAN | LWireless local area network |
| WoL | Wake on Local Area Network | |
| WWW | World Wide Web | |
| XGA | Extended Graphics Array | Graphic standard, maximum resolution 1024x768 pixels. |

# Glossary

### AHCI mode

AHCI is a standardized method to address the SATA controller. AHCI describes a structure in the RAM, which contains a general area for control and status, as well as a command list.

### APIC mode

Advanced peripheral interrupt controller. 24 interrupt lines are available.

### ATAPI CD-ROM Drive

**AT** Bus **A**ttachment **P**acket **I**nterface (connected to AT bus) CD-ROM drive

### Automation system (AS)

A programmable controller (PLC) of the SIMATIC S7 system consist of a central controller, one or several CPUs, and various I/O modules.

### Backup

Duplicate of a program, data medium or database, used either for archiving purposes or for the protection of vital and non-replaceable data against loss when the working copy is corrupted. Certain applications automatically generate backup copies of data files, and manage both the current and the previous versions on the hard disk.

### Baud

Physical unit for the step speed in signal transmission. Defines the number of transferred signal states per second. With only two states, one baud is equivalent to a transmission rate of 1 bps.

### BEEP code

If the BIOS detects a boot error, it outputs an audible warning based on the current test result.

### Boot disk

A boot disk is a bootstrap disk with "Boot" sector. This can be used to load the operating system from the disk.

### Cache

High-speed access buffer for interim storage (buffering) of requested data.

### CE marking

**C**ommunauté **E**uropéene The CE mark confirms compliance of the product with corresponding EC Directives, for example, with the EMC Directive.

### Chipset

Located on the motherboard, connects the processor with the RAM, the graphics controller, the PCI bus, and the external interfaces.

### Cold restart

A start sequence, starting when the computer is switched on. The system usually performs some basic hardware checks within the cold start sequence, and then loads the operating system from the hard disk to work memory -> boot

### COM interface

The COM interface is a serial V.24 interface. The interface is suitable for asynchronous data transfer.

### Compact Flash cards (CF)

Compact Flash is a digital storage medium in card format and without moving parts. The CF card contains the non-volatile memory and the controller. The interface of the CF card corresponds with the IDE interface. CF cards can be operated without additional electronics on PCMCIA or IDE hard disk controllers using a plug and socket adapter. There are two design forms: CF-I (42.6 x 36.4 x 3.3 mm) and CF-II (42.8 x 36.4 x 5 mm).

### Configuration files

These are files containing data which define the configuration after restart. Examples of such files are CONFIG.SYS, AUTOEXEC.BAT and the registry files .

### Configuration software

The configuration software updates the device configuration when new modules are installed . This is done either by copying the configuration files supplied with the module or by manual configuration using the configuration utility.

### Controller

Integrated hardware and software controllers that control the functions of certain internal or peripheral devices (for example, the keyboard controller).

### Device configuration

The configuration of a PC or programming device contains information on hardware and device options, 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 configure 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. .

### Disc-at-once

With this burning technique, data are written to a CD in a single session, and the CD is then closed. Further write access is then no longer possible.

### Drivers

Program parts of the operating system. They adapt user program data to the specific formats required by I/O devices such as hard disk, printers, and monitors.

### Dual Core CPU

Dual-core processors significantly increase the speed of computing and program execution compared to the previous generation of single-core processors with hyperthreading technology.

### EMC directive

Directive concerning **E**lectro**m**agnetic **C**ompatibility. Compliance is confirmed by the CE symbol and the EC certificate of conformity.

### Energy management

The energy management functions of a modern PC allow individual control over the current consumption of vital computer components (e.g. of the monitor, hard disk and CPU), by restricting their activity based on the current system or component load. Energy management is of particular importance for mobile PCs.

### Energy options

The energy options can be used to reduce energy consumption of the computer, while keeping it ready for immediate use. This can be configured in Windows by selecting Settings > Control Panel > Energy options.

### Enhanced Write Filter (EWF)

Configurable write filter that allows you, for example, to boot Windows Embedded Standard from write-protected media (such as CD-ROM), to write protect individual partitions and adapt the performance of the file system to your needs (when using Compact Flash cards).

### ESD directive

Directive for using electrostatic sensitive components.

### Ethernet

Local network (bus structure) for text and data communication with a transfer rate of 10/100/1000 Mbps.

### Extensible Firmware Interface (EFI)

Refers to the central interface between the firmware, the individual components of a computer and the operating system. EFI is located logically beneath the operating system and represents the successor to PC BIOS, focusing on 64-bit systems.

### File Based Write Filter (EWF)

Configurable write filter to protect individual files from write access.

### Formatting

Basic partitioning of memory space on a magnetic data medium into tracks and segments. Formatting deletes all data on a data medium. All data media must be formatted prior to their first use.

### Gender changer

Using the gender changer (25-pin / 25-pin), the COM1/V24/AG interface of the SIMATIC PC family can be converted to the usual 25-pin male connector.

### HORM

Hibernate once, resume many is a method for fast booting from a single Hibernate file that only needs to be created once. HORM ensures restoration of a uniform, saved system state when booting. This reduces the writing to a CompactFlash medium to a minimum, for example, when starting up and shutting down Windows Embedded Standard 2009.

### Hot plug

The SATA interface gives the device's hard drive system hot plugging capability. Prerequisite for this configuration is a RAID1 system with SATA RAID controller (onboard, or slot module), and at least two SATA removable cartridges. The advantage of hot plugging is that defective hard disks can be replaced without having to reboot the computer.

### Hub

A term in network technology. In a network, a device joining communication lines at a central location, providing a common connection to all devices on the network.

### Hyper Threading

HT technology (multi-threading) enables the parallel computing of processes. HT is only effective when all relevant system components, such as processors, operating systems and applications are supported.

### IGD

Integrated Graphics Device. Graphics interface integrated in the chipset.

### Image

This refers to the image, for example, of hard disk partitions saved to a file in order to restore them when necessary.

### Intel VT

The Intel Virtualization Technology (IVT) is the implementation of a secure closed environment for applications. Special (visualization) software an a VT-capable processor is required for its use.

### Interface

See Interface

- Physical interconnection (cable) of hardware elements such as PLCs, PCs, programming devices, printers or monitors.
- Interface for interactive software applications.

### Interface

See Interface

- Physical interconnection (cable) of hardware elements such as PLCs, PCs, programming devices, printers or monitors.
- Interface for interactive software applications.

### Interface, multi-point

MPI is the programming interface of SIMATIC S7/M7. Allows remote access to programmable modules, text-based displays and OPs from central locations. The MPI nodes can intercommunicate.

### LAN

Local Area Network: LAN is a local network that consists of a group of computers and other devices that are distributed across a relatively restricted range and are linked with communication cables. The devices connected to a LAN are called nodes. The purpose of networks is the mutual use of files, printers or other resources.

### Legacy Boot Device

Conventional drives can be used as USB devices.

### Legacy USB support

Support of USB devices (e.g. mouse, keyboard) on the USB ports without driver.

### License key

The license key represents the electronic license stamp of a license. Siemens provides the license keys for protected software.

### License key disk

The license key disk contains the authorizations or license keys required to enable protected SIMATIC software.

### Low-voltage directive

EC Product Safety Directive relating to the safety of products which are operated on low voltage (50 VAC to 1000 VAC, 70 VDC to 1500 VDC) and not specified in other directives. Compliance is confirmed by the CE symbol and the EC certificate of conformity.

### LPT interface

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

### Memory card

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

### Module

Modules are plug-in units for PLCs, programming devices or PCs. They are available as local modules, expansion modules, interfaces or mass storage (Mass storage module).

### Module retainer

The module retainer is used to fasten modules and ensure safe contact and transport. Shocks and vibrations especially affect large, heavy modules. It is therefore recommended to use the module retainer for this type of module. There are also short, compact and light modules on the market. The module retainer was not designed for these modules because the standard fastening is sufficient for them.

### Motherboard

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

### NEC Class 2

The "NEC", National Electrical Code, is the USA collection of regulations that generally correspond to German VDE 0100 standards. All USA standards governing the safety of electrical equipment and corresponding "deviations" in IEC standards are based on NEC in terms of their country-specific requirements.

NEC Class 2 specifies higher safety requirements for protection against electric shock and National Fire Protection Association (NFPA) requirements for fire protection. Power supplies operating within the range from 20 VDC to 30 VDC must be equipped with an internal current limiting circuit which safely prevents output power higher than 100 VA.

### Operating system

Generic term which describes all functions for controlling and monitoring user program execution, distribution of system resources to the user programs and the operating mode in cooperation with the hardware (for example Windows XP Professional).

### Packet writing

The CD-RW is used as a disk medium. The CD can then be read only by packet–writing compatible software or has to be finalized. Finalization of a CD closes the CD within an ISO9660 shell. You can still write to the CD-RW several times in spite of finalization. Not all CD drives can read packet-written CDs . There are restrictions to using this method in general data transfer.

### PATA

Interface for hard disk drives and optical drives, with parallel data transmission rate up to 100 Mbps.

### PC card

Trademark of the Personal Computer Memory Card International Association (PCMCIA). Designation for auxiliary cards that conform with PCMCIA specifications. A PC card that has roughly the size of a credit card can be plugged into a PCMCIA slot. Version 1 specifies cards of Type I with a thickness of 3.3 millimeters, which are designed mainly for use as external memory. Version 2 of the PCMCIA specification also defines cards of Type II with a thickness of 5 mm and cards of Type III with a thickness of 10.5 mm. Type II cards can realize devices such as modems, fax cards and network interface cards. Type III cards are equipped with devices that require more space, for example wireless communications modules, or rotary storage media such as hard disk drives, for example.

### PC/104 / PC/104-Plus

Two bus architectures are especially fashionable today in the industrial world. PC/104 and PC/104-*Plus*. Both are standard in single-board computers of the PC class. The electrical and logical layout of the two bus systems is identical with ISA (PC/104) and PCI (PC/104-*Plus*). Software cannot usually detect a difference between them and normal desktop bus systems. Their advantage is the compact design and the resulting space they save.

### PCMCIA

Association consisting of approx. 450 member companies of the computer industry whose focus is set on providing worldwide standards for miniaturization and flexible use of PC expansion cards in order to provide basic technologies to the market.

### PEG interface

PCI Express for Graphics. Graphics interface with 16 PCIe lanes for expansions with graphics modules.

### PIC mode

Peripheral interrupt controller. 15 interrupt lines are available.

### Pixel

**PixEl**ement (picture point). The pixel represents the smallest element that can be reproduced on-screen or on a printer.

### Plug&Play

Generally, a reference to the ability of a computer to automatically configure the system for communication with peripheral devices (for example monitors, modems or printers). The user can plug in a peripheral and "play" it at once without manually configuring the system. A Plug&Play PC requires both a BIOS that supports Plug&Play and a Plug&Play expansion card.

### POST

Self-test performed by the BIOS after the computer is switched on. Performs a RAM test and a graphics controller test, for example. The system outputs audible signals (beep codes) if the BIOS detects any errors; the relevant message indicating cause of error is output on the screen.

### PROFIBUS/MPI

**Pro**cess **Fi**eld **Bus** (standard bus system for process applications)

### PROFINET

PROFINET is the name of the standard for Industrial Ethernet developed and maintained by the PROFIBUS user organization. PROFINET unites protocols and specifications with which Industrial Ethernet meets the requirements of industrial automation technology.

### Programmable controller (PLC)

The programmable controllers (PLC) of the SIMATIC S5 system consist of a central controller, one or more CPUs, and various other modules (e.g. I/O modules).

### PXE server

A **P**reboot E**x**ecution **E**nvironment server is part of a network environment and can provide software to connected computers even before they boot. This can involve operating system installations or servicing tools, for example.

### RAID

**R**edundant **A**rray of **I**ndependent **D**isks: Data storage system which is used to save data and the corresponding error correction codes (parity bits, for example) to at least two hard disk volumes in order to enhance reliability and performance. The hard disk array is controlled by management programs and a hard disk controller for error correction. The RAID system is usually implemented in network servers.

### Recovery CD

Contains the tools for configuring hard disks and the Windows operating system.

### Reset

Hardware reset: Reset/restart of the PC using a button/switch.

### Restart

Warm restart of a computer without switching the power off (Ctrl + Alt + Del)

### Restore DVD

The Restore DVD is used to restore the system partition or the entire hard disk to factory state if the system has crashed. The bootable DVD contains all the necessary image files. You can also create a boot disk allowing restoration via the network.

### ROM

Read-Only Memory ROM is a read-only memory in which every memory location can be addressed individually. The programs or data are permanently stored and are not lost in the event of a power failure.

### S.M.A.R.T

The Self-Monitoring, Analysis and Reporting Technology (SMART or S.M.A.R.T.) is an industry standard integrated in storage media. It makes for permanent monitoring of important parameters and early detection of imminent problems.

### SATA

Serial ATA Interface for hard disk drives and optical drives with serial data transmission rates of up to 300 Mbps.

### SCSI interface

Small Computer System Interface Interface for connecting SCSI devices such as hard disk drives or optical drives.

### Session at once

In session at once, the CD can be written to both with an audio session and a data session. The two sessions are written to at once (as in disc at once).

### SETUP (BIOS Setup)

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

### SSD (Solid State Drive)

A Solid State Drive is a drive that can be installed like any other drive; it does not contain a rotating disk or other moving parts because only semiconductor memory chips of similar capacity will be used. This design makes SSDs more rugged, provides shorter access times and low energy consumption.

### STEP 7

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

### Track-at-once

In track-at-once recording, a CD can be written to in bits in several sessions if the CD was not closed.

### Troubleshooting

Error cause, cause analysis, remedy

### V.24 interface

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

### Wake on LAN (WoL)

Wake on Local area network. This function allows the PC to be started via the LAN interface.

### Warm restart

The restart of a computer after a program was aborted. The operating system is loaded and restarted again. The CTRL+ ALT+ DEL hotkey can be used to initiate a warm restart.

### WLAN

**W**ireless **LAN** is a local network that transmits data via radio waves, infrared light or another wireless technology. Wireless LAN is mainly used for mobile computer applications in office or factory environments.

# Index


## A

Abbreviations, 99, 103
Access protection, 23
Angle brackets
  Mounting methods, 26
Antivirus software, 34
Approvals, 94
Assignment
  Resources, 53
Authorization, 67

## B

Backup battery
  Configuration, 62
Battery, 9
Battery replacement, 62
Burner software, 35

## C

Cabinet manufacturer, 26
Certificates, 94
Clamp for mains connector, 30
COM, 82
Configuration versions, 96
Connecting
  Peripherals, 27
Connection components, 18

## D

Data backup, 74
Degree of protection, 80
Device configuration, 92
Device fan, 60
DiagBase software, 49
DiagMonitor
  Fan monitoring, 50
  Temperature monitoring, 49
DiagMonitor software, 49
Diagnostics
  DiagBase software, 49
  DiagMonitor software, 49
Disk drives, 14
Drive bay plate, 58
Dust protection, 80
DVD burner, 14, 35
DVD player, 35
DVD-ROM
  Operating notes, 35

## E

Electrostatic sensitive devices, 10
EMC, 94
Equipotential bonding, 31
Error messages, 75
ESD directives, 10
ESD guidelines, 97
Ethernet, 13, 18, 47
Ethernet address, 22
Expansion
  Disk drives, 54
  Memory, 14
  Slots, 13
Expansion module, 54
Expansion slots, 81

## F

Fan monitoring, 50
Fan screws, 61
Firewall, 34
Front cover, 60
Front view, 16

## G

Graphics, 82
Guidelines
  ESD guidelines, 97

## H

HDD, 82
Hexagonal bolts, 65

## I

Identification data, 21
Image
  Creating, 74
Initial commissioning, 33
Installing Windows, 68
Interfaces
  Ethernet, 18
  Parallel, 13
  PROFIBUS, 18

## K

Keyboard, 13, 18

## L

Language selection
  Windows 7, 72
Liability disclaimer, 59
License Key, 67
Lithium battery, 62
LPT1, 83

## M

Memory configuration, 81
Microsoft Windows Product Key, 21
Module bracket, 54
Modules, 53
Monitoring
  Fan, 50
  Overview of functions, 14
  Status displays, 20
  Temperature, 49
  Watchdog, 14, 50
Monitoring functions, 14
Monitoring software, 50
Motherboard, 89
Motherboard
  Configuration, 6565
Mounting
  Modules, 54
  Mounting locations, 25
  Mounting methods, 25
Mounting holes, 26

## O

Online ordering system, 47
Open
  device, 52
Open the front door, 52
Opening the device, 52
Operating system, 13, 33
  Initial commissioning, 33
  Updates, 73
  Windows 7, 70
Operator controls, 17
Order no., 21
Output voltage, 84, 85

## P

Partitioning, 68
  Hard disks, 37
Partitioning the hard disk, 37, 68
PCI cards, 53
Peripherals, 27
Pollutant class, 23
Ports
  Ethernet, 13
  Keyboard, 13
  Mouse, 13
  Parallel, 83
  Serial, 13
  USB, 13, 83
  VGA, 13
Power consumption, 79
Power requirements, 84
Power supply, 13, 19
  AC supply voltage, 84, 85
  Connecting, 28
  Removing the power supply unit, 63
Power supply unit
  Configuration, 6363
Processor, 14, 81
Protection class, 23, 80
PS/2 port, 13

## R

RAID system
  Management functions, 38, 42
RAM expansion, 14, 81
Real-time protection, 34
Rear view, 16
Recovery
  Windows 7, 70
Regional information, 29
Removable cartridges, 56

Removal
Backup battery, 62
Motherboard, 65
Power supply unit, 63
Removing the drive bay module, 55
Repairs, 9, 59
Restart, 33
Restore DVD, 67
Retrofitting instructions, 96

## S

Safety instructions, 9
Serial number, 22
Shipping, 21
Simatic S7, 47
Slot cover, 54
Slots, 13
SOFTNET S7, 47
Status displays, 20
Supply voltage, 29, 79
System resources, 89

## T

Technical specifications, 79
Telescopic rails, 85
Temperature monitoring, 49
Temperature ranges
Approved configuration versions, 96
Third-party modules, 77
Troubleshooting/FAQs, 75

## U

Updates
Operating system, 73
User programs and drives, 74
USB, 13, 83

## V

VGA, 13

## W

Warranty, 9
Watchdog
Monitoring function, 14, 50
Windows 7
Recovery, 70
Windows Security Center, 34