SIEMENS

SIMATIC

Industrial PC SIMATIC IPC827C

Operating Instructions

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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 relevant 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, 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.

Proper use of Siemens products

Note the following:

⚠ WARNING

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 complied with. 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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Introduction

1

1.1 Preface

Purpose of this document

These operating instructions contain all the information you need for commissioning and operation of the SIMATIC IPC827C.

It is intended both for programming and testing personnel who commission the device and connect it with other units (automation systems, additional programming devices), as well as for service and maintenance personnel who install expansions 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 of automation control engineering is recommended.

Scope of validity of this document

This documentation is valid for all supplied versions of the SIMATIC IPC827C.

Its place in the information landscape

The documentation for the SIMATIC IPC827C includes the following sections:

- SIMATIC IPC827C, Getting Started
- SIMATIC IPC827C, Operating Instructions

The documentation is supplied in German,English, French, Spanish, Italian, Japanese and Chinese with the device in electronic form as a PDF file on the "Documentation and Drivers" DVD.

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

Conventions

The term "Box PC" or "device" is sometimes used to refer to the SIMATIC IPC827C product in this documentation. The abbreviation "CP" stands for CP 1616 onboard.

History

Currently released versions of these operating instructions:

Edition	Comment
11/2010	First Edition
09/2011	Second edition Windows 7 64-bit, processor specifications, preventive maintenance, setting up the language selection, BIOS setup (video configuration), PCI Express pin assignment, Low Voltage Directive Installation of Windows 7

1.2 Guideline to the operating instructions

Contents format	Contents
Contents	Organization of the documentation, including the index of pages and chapters
Introduction	Purpose, layout and description of the important topics.
Safety instructions	Refers to all the valid safety-technological aspects which are derived from statutory regulations and should be adhered to when installing, commissioning and operating the product/system
Description	Fields of application, the features and the structure of the product/system
Application planning	Issues regarding 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, parameter assignment	Installation of expansion devices (memory, modules, drives)
Service and maintenance	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
Dimensional drawings	Dimensions of the device and of modules
Detailed descriptions	Structure, 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 guidelines	General ESD guidelines.

Safety notes

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 authorized 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. The installation of other expansions can damage the system and violate the radio-interference suppression regulations. 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!

Therefore, do not throw Lithium batteries into an open fire, do not solder or open the cell body, do not short-circuit or reverse polarity, do not heat up above 100° C, dispose of in accordance with regulations and protect against direct exposure to sunlight, moisture and condensation.

ESD guidelines

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 modules which are sensitive to ESD (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 IPC827C is a compact Box PC and is optimized for high-performance PC applications and for direct installation at the machine where space is limited.

- Compact design
- Expandable (5 slots for expansion modules)
- Scalability
- High performance
- High degree of ruggedness



3.2 Areas of application

The SIMATIC IPC provides manufacturers of machines, plants and switch cabinets with a high-performance, expandable PC platform for industrial application on the plant floor:

- Measurement, controlling and regulation of process and machine data, for example, for redundant process control systems and transport systems in production facilities
- Operating and visualization tasks with separate display / monitor solutions, for example, large-scale displays in automotive production
- Data logging and processing, for example, production data logging, distributed process control

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

3.3 Benefits

Reduction in standstill times thanks to high system availability

- Efficient self-diagnostics (SIMATIC PC DiagMonitor ≥ V 4.2, optionally available)
- Solutions for data security (preventative data backups, SIMATIC IPC Image & Partition Creator, optionally available)
- Service-friendly design (modifications, servicing)
- Additional hardware and software options (secondary hard disk or RAID1 configuration)

Cost reductions through high investment security

- High product continuity through long-term secure functionality in hardware and software (support for legacy interfaces)
- Secure replacement availability of the components (5 years)

Reduced costs through high industrial functionality

- High industrial capability through extremely robust design, even against strong vibration and impact loads, and with high ambient temperatures (ventilation design)
- Totally Integrated Automation (TIA) components including integrated PROFIBUS/MPI interface (optional), PROFINET interface (optional) and Ethernet interface, system-tested SIMATIC software package
- Sufficient flexibility and expandability provided by free slots in the smallest possible space
- PEG graphics and onboard graphics can be used at the same time

Cost minimization through time savings

- Configured, turn-key systems
- Preinstalled operating systems for fast commissioning
- Integrated interfaces for communication on the field or process control level

3.4 Function

- Integrated configurable monitoring functions (program execution (watchdog) for internal housing temperature, processor temperatures, disk drive temperatures and RPM of the two fans)
- Enhanced diagnostics / messaging via Ethernet, e-mail, SMS, and for direct input in SIMATIC software applications via OPC (optional via SIMATIC PC DiagMonitor ≥ V 4.3):
  - Operating hours counter
  - Hard disk status
  - Automatic logging of all messages to a log file
  - Options for central monitoring of networked SIMATIC PCs
- RAID1 for automatic data mirroring on two hard disk volumes

3.5 Features

Basic data	
Design	Panel mounting device, box
Processor	• Intel® Celeron™ P4505 mobile processor 1.86 GHz, 2 MB second-level cache, 2 cores, 2 threads, virtualization • Intel® Core™ i3-330E mobile processor 2.13 GHz, 3 MB second-level cache, 2 cores, 4 threads, hyper-threading, virtualization • Intel® Core™ i7-610E mobile processor 2.53 GHz, 4 MB second-level cache, 2 cores, 4 threads, hyper-threading, Turbo Boost and virtualization, AMT
Chipset	• Mobile Intel® QM57 Express Chipset
Main memory	• 1 GB SDRAM (DDR3) • Expandable up to 2 × 4 = 8 GB SDRAM (DDR3) • ECC, optional
Slots for expansions	• 2 X PCI 290 mm long • 1 X PCI 240 mm long • 1 × PCIe × 16, 240 mm long • 1 × PCIe × 4, 185 mm long

Basic data	
Graphics	• Intel® HD graphics controller, 2-D and 3-D engine integrated in chip set, Dynamic Video Memory Technology (uses up to 256 MB RAM) • CRT: Up to 1280 × 1024 at 100 Hz, 32-bit color depth up to 1600 × 1200 at 60 Hz, 32-bit color depth max. resolution: 2038 × 1536 at 75 Hz, 16-bit colors • LCD via DVI-I: 1600x1200 at 60 Hz, 32-bit color depth
Power supply	• 100 to 240 V AC, 190 W; wide range • 24 V DC, 210 W Both with bridging of transient loss of voltage according to NAMUR: max. 20 ms. The 24 V DC power supply is protected against polarity reversal.

Drives and storage media	
Mass storage	• 1 × 3.5" hard disk or • 2 x 2.5" hard disk or RAID1 system Capacity see order forms
DVD drive	DVD burner
Flash memory	• Slot for CompactFlash card • 1 × solid-state drive

Interfaces	
Ethernet	2 × 10/100/1000 Mbps (RJ45)
PROFIBUS/MPI	12 Mbps, isolated potential, compatible with CP-5611, optional
PROFINET	10/100 Mbps (CP 1616 onboard), three RJ45, optional
USB	• External: 4 × USB 2.0 high current (max. 2 can be simultaneously operated as high current) • Internal: 1 × USB 2.0 high current + 1 × USB 2.0 low current on a 10-pin contact strip, 1 × USB 2.0 low current for internal USB stick/dongle • Front interface: :1 × USB 1.1, 1 × USB 2.0, both high current
COM	Serial V.24 port
Monitor	1 × DVI-I (VGA monitors can be connected with a DVI/VGA adapter that is available as an accessory)

Monitoring and safety functions	
Temperature	• When permitted temperature range is exceeded • Warning messages from application program that can be analyzed: local (DiagBase), via LAN (DiagMonitor, optionally available)
Fans	• Failure of device and power supply fans • Warning messages from application program that can be analyzed: local (DiagBase), via LAN (DiagMonitor, optionally available)
Watchdog	• Monitoring function for program execution • Restart can be parameterized in the event of a fault • Warning messages from application program that can be analyzed: local (DiagBase), via LAN (DiagMonitor, optionally available)
LED display	2 LEDs for displaying system status that can be programmed by the user[1]
Transient voltage interruption	Buffer time up to 20 ms at full load
Buffer memory (optional)	2 MB, battery-backed SRAM [1) 2)]

1) The DMAPI programming interface is available to activate the LEDs and the SRAM[2)]. You will find it in the folder "C:\Program Files\Siemens\DiagnosticManagement\DMAPI".
2) Only for devices with PROFIBUS or PROFINET interface.

Optional equipment	
Vertical mounting brackets	For space-saving installation of the Box PC in the control cabinet, ports facing up/down or forward
Graphics adapter	
DVI-I to VGA adapter	Used to connect a monitor with a VGA port to the Box PC
DVI-I to VGA and DVI Y-adapter (dual display)	Used to connect two monitors to the Box PC

Optional expansions	
SIMATIC PC DiagMonitor software ≥ V 4.2	Software tool for monitoring local and remote SIMATIC PCs: • Watchdog • Temperature • Fan speed • Hard disk monitoring (SMART) Communication: • Ethernet interface (SNMP protocol) • OPC for integration in SIMATIC software • Client server architecture • Layout of log files
SIMATIC IPC Image & Partition Creator	Software tool for local data backup and partitioning of hard disks

Software	
Operating systems	• Without • Preinstalled, activated, available on the Restore CD/DVD: – Windows Embedded Standard 2009 English on CompactFlash – Windows XP Professional MUI 1) – Windows 7 Ultimate MUI 1) 32/64-bit

1) MUI: Multilanguage User Interface; 6 languages (English, German, French, Spanish, Italian)

3.6 Windows Embedded Standard 2009

The overview shows the essential device functions in Windows Embedded Standard 2009 if the device ships with this operating system:

Function	CompactFlash card version
Enhanced Write Filter (EWF)	Operation in RAM Reg mode
SIMATIC IPC DiagBase	Available
Pagefile	Deactivated in favor of the EWF
System Restore Core	Available
File based Writefilter (FBWF)	Available
Registryfilter	Available

Function	CompactFlash card version
Device Update Agent (DUA)	Available
HORM	Available
Telnet Server	Available
Windows Backup	Available
User Mode Driver Framework (UMDF)	Available
MUI	GER default language: English
Administrator Account	Available
User Account	Available
Explorer Shell	Available
Internet Explorer (IE)	Available, IE7
Internet Information Server (IIS)	Available V 5.1
Terminal Services	Available
Bluetooth	Available
Wireless Network Support	Available
Windows Firewall	Available
Windows Security Center	Available
MSN Explorer	Not available
Outlook Express	Available
Administrative Tools	Available
SMS Advanced Client	Not available
Remote Desktop	Available V 6.0
Remote Assistance	Available
.NET Framework	Not available
ASP.NET	Not available
Windows .NET Messenger	Available V 4.7
Code pages/User Location/Keyboard	Selection available
Disk Management Services	Available
Windows Installer Service	Available V 3.1
Class Installer	Available
CoDevice Installer	Available
Windows Movie Maker	Not available
Media Player	Available, V11.0
Windows Media Player Tour	Not available
DirectX	V9.0c
Accessories	Available
Help files for all components	Not available
Games	Not available
Fonts	118
Windows XP Tour	Not available
Microsoft Silverlight	Available V 1.0
NetMeeting	Available V 3.1

Note

When "HORM" is activated, the "Hibernate" function can be used for Windows Embedded Standard 2009:

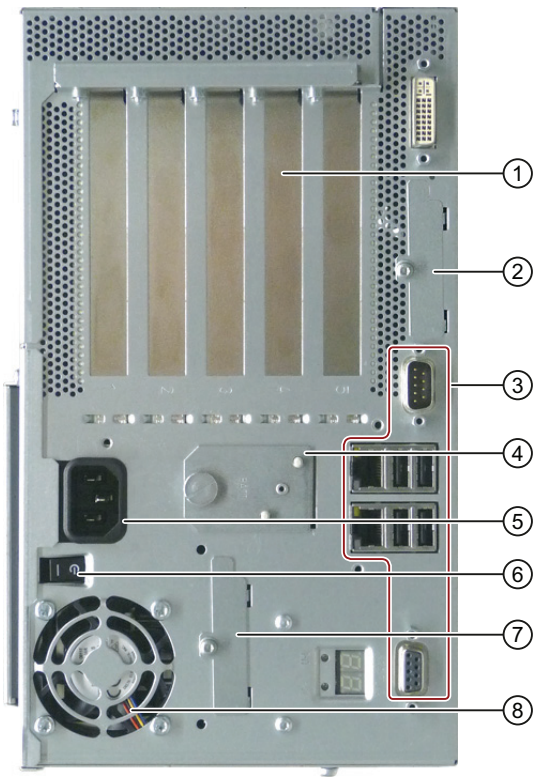
EWFMGR C: /activatehorm

"Hibernate" is activated following a restart. The system then always boots from this file.

3.7 Design

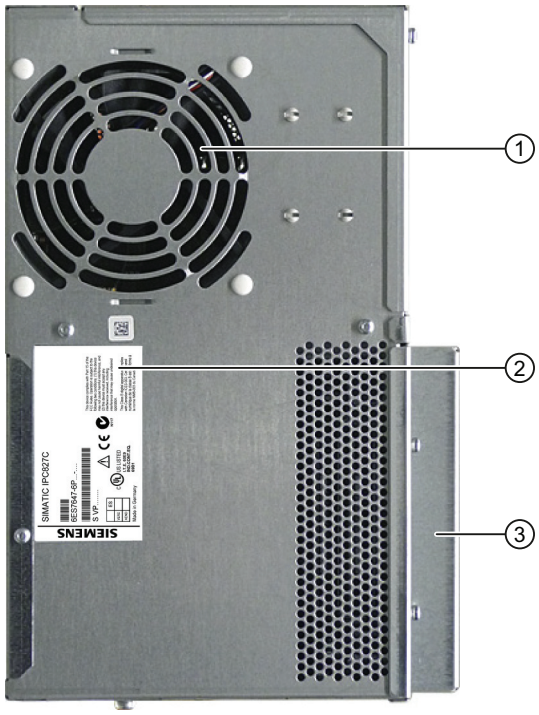
3.7.1 Exterior design

Front view



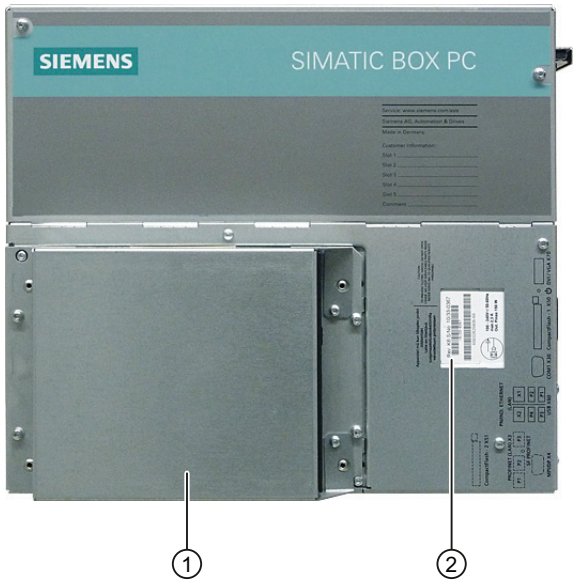
①	Slots for expansion modules
②	Slot for CompactFlash memory card
③	Network connection elements
④	Cover plate for battery
⑤	IEC connector for AC power supply or connection for DC power supply
⑥	On / Off switch
⑦	Cover plate for CompactFlash card slot (optional)
⑧	Power supply fan

Rear view



①	Device fan
②	Rating label with serial number
③	Drive bay module for hard disks and DVD burners

Side view (drive side)

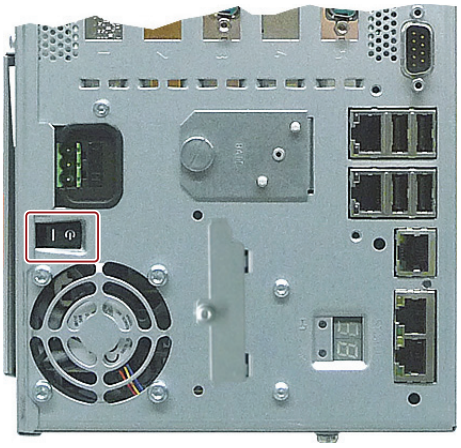


①	Drive bay module for hard disks and DVD burners
②	Input data of the power supply

Bottom view		
		Connection for equipotential bonding 

3.7.2 Operator Controls

On/Off switch

On/Off switch	Description
	Switch the device on using the on/off switch. This requires that the BIOS Setup entry "After Power Failure" is set to "Power On".

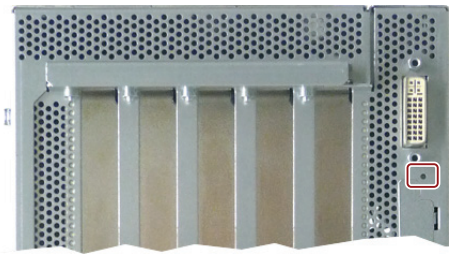
WARNING

The on/off switch does not isolate the device from the mains! When the switch is in 0 position (Off), the device is still supplied with mains voltage in order to generated the internal auxiliary voltage for the power supply.

NOTICE

Terminate the operating system before shutting down the device with the on/off switch, otherwise data may be lost.

On/off button

On/off button	Description
	The on/off button has three functions: • Switch on the PC Press briefly once. • Shut down the operating system and switch off the PC Press briefly once. • Switch off the PC without shutting down the operating system, hardware reset Press for more than 4 seconds.

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

⚠ WARNING
The on/off button does not isolate the device from the mains!

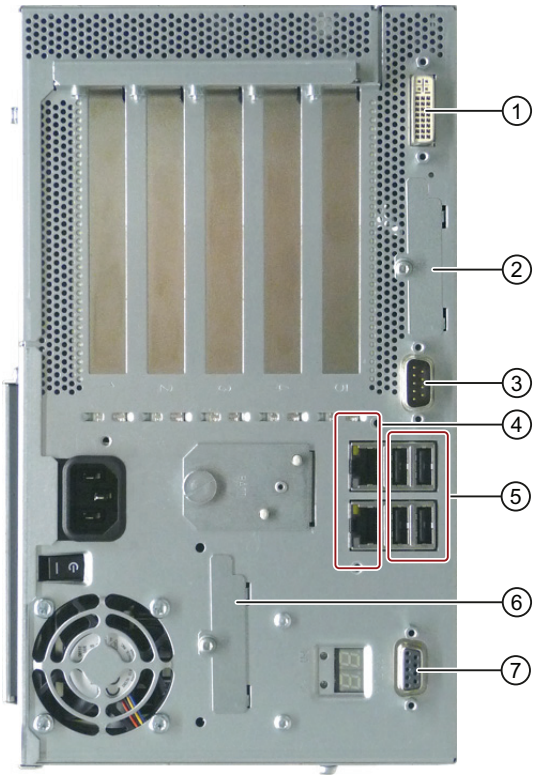
Note

By default, the BIOS Setup entry "After Power Failure" is set to "Power On". This means the device is switched on with the on/off switch and you do not have to operate the on/off button.

3.7.3 Connection elements

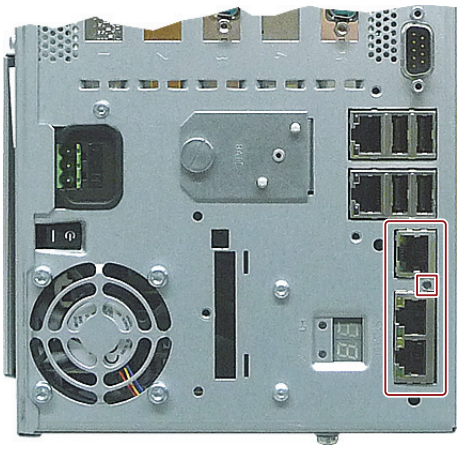
Interfaces

Location of the interfaces



Item	Description	Description
①	DVI/VGA	DVI/VGA connection for CRT or LCD monitor with DVI interface, VGA via DVI/VGA adapter
②	Compact Flash card	Slot for CompactFlash memory card
③	COM	Serial V.24 port
④	ETHERNET	2 x RJ-45 Ethernet connection for 10/100/1000 Mbps
⑤	USB 2.0	4 ports for USB devices (only 2 ports can be simultaneously used as high current)
⑥	Compact Flash card	Slot for CompactFlash memory card
⑦	PROFIBUS/MPI	MPI interface (RS485, electrically isolated), optional 9-pin D-sub socket (optional product model)

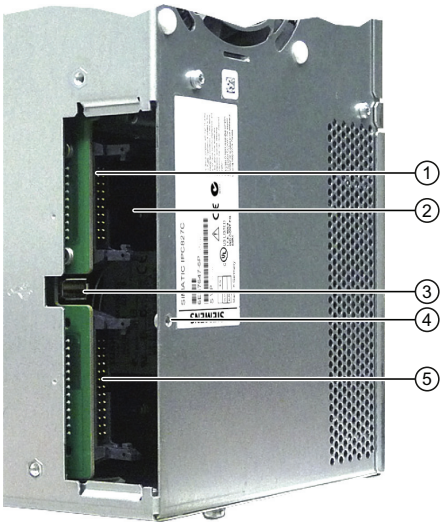
Location of the interfaces



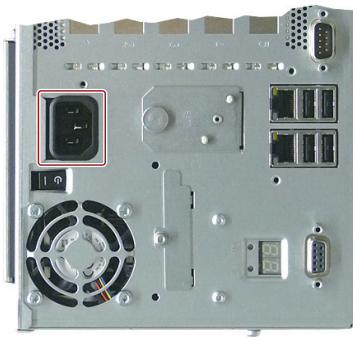
–	PROFINET	CP-1616 onboard interface, three RJ45 sockets (optional product version)

The interfaces available on the device can be uniquely identified based on their numbering. This numbering may deviate, however, from the numbering performed by the operating system.

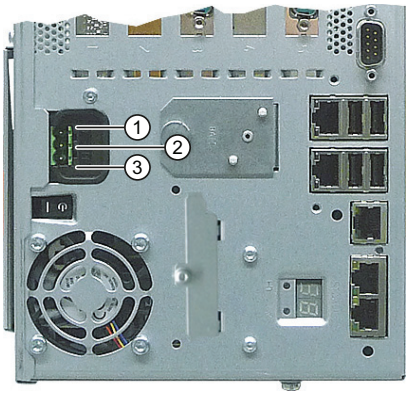
Interfaces for connecting an operation panel or a display

Location of the interfaces		
	①	LVDS display interface for TFT displays up to 1024 x 768 pixels
	②	Access to second LVDS display interface for TFT displays up to 1280 x 1024
	③	USB 2.0 for front
	④	Retaining screw for the steel cover plate that covers the interfaces described below.
	⑤	I/O interface for connecting front panel components

AC power supply

Position of the AC socket	Description
	IEC power connector to AC power supply of the device. The permitted voltage range is 100 V AC to 240 V AC.

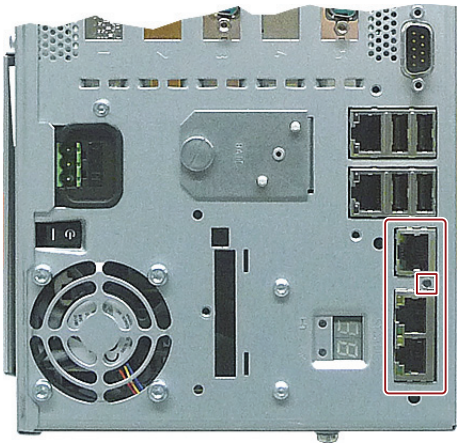
DC power supply

Location of the DC socket	Description	
	Plug connector for DC power supply of the device	
	①	+ (24 V DC)
	②	- (ground)
	③	PE (ground terminal)

3.7.4 Status displays

PROFINET status display

PROFINET status display

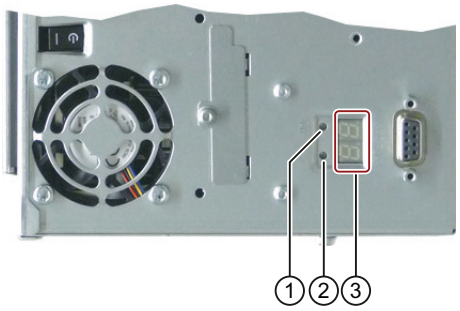


Display	Meaning	LED	Description
SF PROFINET (optional)	Status display for CP 1616 onboard	OFF	• CP not available • CP disabled • No error, communication established • Download in progress
		Slow flashing	• Link status error • IO controller: IO device cannot be addressed • IO controller: Duplicate IP address
		Fast flashing	Exception error: Diagnostics via Web or SNMP no longer possible
		AN	• Diagnostic information available • No communication established.

Virtual status displays			
The two "virtual" CP 1616 LEDs can only be seen in the SIMATIC software and can be scanned via SNMP.			
PROFINET	Virtual LEDs	RUN	CP is active
		STOP	CP is in the stop state
		Flashes	There are no "slow flashing" or "fast flashing" states.

Status display

The status display consists of two 7-segment displays and two three-color LEDs.



①	LED H1 (red, yellow, orange)
②	LED H2 (red, yellow, orange)
③	2 7-segment displays

	7 segment display	LED H1	LED H2
Power On (= status display test)	88h	Orange	Orange
BIOS self-test	xxh (see BIOS post code)	Off	Off
BIOS self-test completed	00h	Off	Off
Operating system running	00h	Off	Off
Controlled by an application	Display is controlled via SIMATIC IPC DiagBase		
Operating system shutting down	Off	Off	Off

Planning the use

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! 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. If condensation has developed on the device wait at least 12 hours before you switch it on.

4.2 Unpacking and checking the delivery unit

Note the following when unpacking the device:

- Check the delivery unit for any 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 damage.
- It is advisable not to dispose of the original packing material. Keep it in case you have to transport the unit.
- Please keep the documentation in a safe place. It is required for initial commissioning and is part of the device.

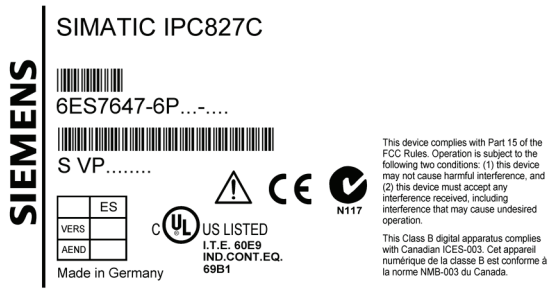
4.3 Device identification data

The device can be clearly identified with the help of this identification data in case of repairs or theft.

Enter the following data in the table below:

- Serial number: The serial number (S VP...) is found on the rating plate.

Rating plate



- Order number of the device
- Ethernet addresses

  The Ethernet addresses of the device are printed on the device and are stored in the BIOS Setup (F2 key) under "Advanced > Peripheral Configuration".
- Microsoft Windows "Product Key" on the "Certificate of Authenticity" (COA).

  The COA label is bonded to the device. The Product Key is always required to reinstall the operating system.

COA label



Enter the system-related numbers in the following table.

Manufacturing number (serial number)	S VP ...
Order number	6ES7647-6P...
Microsoft Windows Product Key	
Ethernet address 1	
Ethernet address 2	
CP 1616 onboard layer 2	

4.4 Ambient and environmental conditions

When you plan your project, take note of the following points:

- Observe the climatic and mechanical environmental conditions specified in the technical specifications of your operating instructions.
- This device was designed for use in a normal industrial environment. Without additional protective measures (such as the provision of clean air), SIMATIC Box PCs may not be operated in harsh environments that are subject to caustic vapors or gases.
- At least 100 mm space should be left free around the ventilation slots, in order that the PC receives sufficient ventilation.
- Do not cover the vent slots of the device.
- The device together with its AC power supply fulfils the requirements for fire protected enclosures according to EN 60950-1. Therefore it can be installed without any additional fire protective covering.
- The device with DC power supply does not fulfill the requirements according to EN 60950-1 in the power supply unit area. The device must therefore be installed in such a ways is part of an operating area with restricted access (e.g. a locked switchgear cabinet, control panel or server room).
- Always observe the mounting positions permitted for this device.
- The connected or built-in peripherals should not introduce negative field voltage in excess of 0.5 V into the device.

⚠ WARNING

Failure to adhere to these conditions when mounting the system voids the approvals based on UL 60950-1, UL 508 and EN 60950-1!

4.5 Permitted mounting positions

PC mounting positions according to UL60950-1/UL508/EN60950-1/CSA22.2 No. 60950-1

An inclination of ± 20° is permitted for all approved mounting positions.

 Position 1, preferred position	 Position 2
 Position 3, desktop	

Additional PC mounting positions according to UL508/CSA 22.2 No. 142

NOTICE
CD/DVD drive The drive drawer opens up or down with the following mounting positions. There can be mechanical damage to the drive drawer mechanism. Do not operate the CD/DVD drive with the following mounting positions.

An inclined mounting position of ±15° is permitted for the following mounting positions.

 Position 4 Interfaces pointing down	 Position 5 Interfaces pointing up

NOTICE

When using the device in the area of Industrial Control Equipment (UL 508), ensure that the it is classified as "Open Type". A mandatory requirement for approval or operation according to UL 508 is therefore installation of the device in an enclosure certified for UL 508.

NOTICE

Mounting positions 4 and 5 are also permitted for the Information Technology Equipment area when the device is mounted in an enclosure that fulfills the requirements stipulated by sections 4.6 and 4.7.3 of IEC/UL/EN/DIN EN 60950-2.

Mounting 5

5.1 Installing the device

The device is particularly suitable for installation in consoles, switch cabinets and switchboards.

⚠ WARNING

Function test while installing the device in machines or execute systems

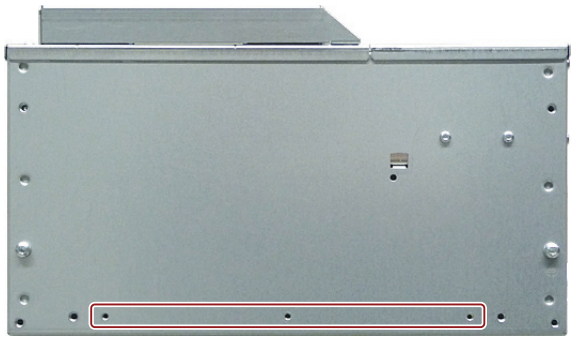
Following the results of a risk analysis, additional protection equipment on the machine or the system is necessary to avoid endangering persons. With this, especially the programming, configuration and wiring of the inserted I/O modules have to be executed, in accordance with the necessary risk analysis identified safety performance (SIL, PL or Cat.). The intended use of the device has to be secured.

The correct use of the device has to be verified with a function test on the system. This test can detect programming, configuration and wiring errors. The test results have to be documented and if necessary inserted into the relevant inputs.

5.2 Installing device with mounting brackets

Screw-mounting the brackets

Two angle brackets are included in the product package. You can fasten the brackets with 6 M3 x 6 mm screws to the PC housing.



Fasten the brackets on the device. Use M3 screws from the scope of supply for this purpose. The maximum screw-in depth is 5 mm.

Instructions for wall mounting

Mounting examples		
Material	**Hole diameter**	**Mounting**
Concrete	8 mm diameter, 60 mm depth	Dowel: 8 mm, 50 mm screws 4 mm, 50 mm
Plasterboard (min. 13 mm thick)	14 mm diameter	Tilting dowel diameter 4 mm min. length 50 mm
Metal (min. 2 mm thick)	5 mm diameter	Metal screws diameter 4 mm min. length 15 mm

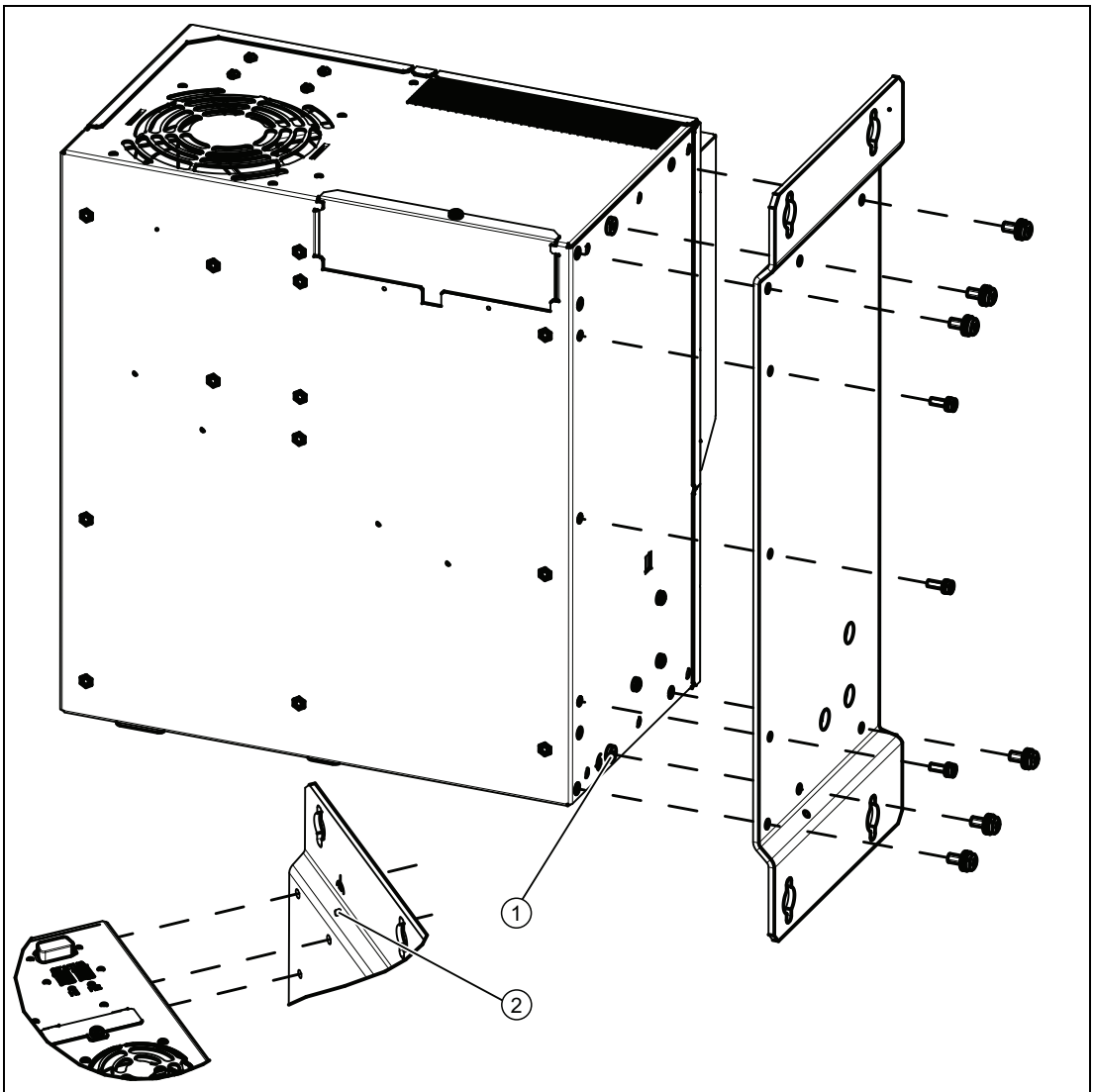
⚠ WARNING

Ensure that the wall is capable of bearing four times the total weight of the device (including the brackets and expansion modules). The total weight is approx. 7 kg.

5.3 Install device with vertical mounting kit

The optional vertical mounting kit allows space-saving installation of the device.

Securing the vertical mounting plate to the device



1.	Remove the equipotential bonding screw (1) from the device and attach it with the vertical mounting plate (2).
2.	Attach the vertical mounting plate to the device with four M4 screws and three M3 screws.

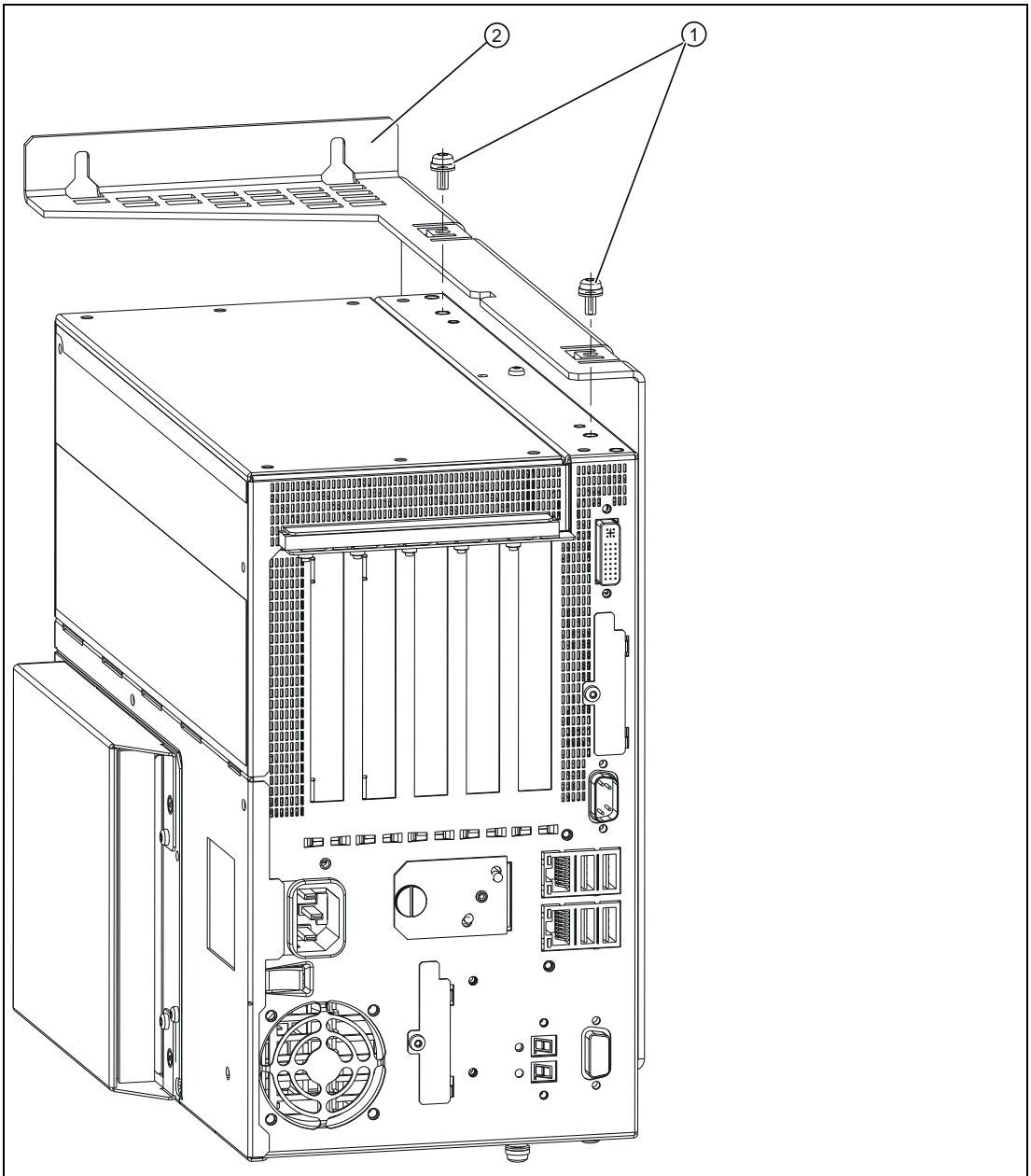
Note

Follow the instructions in the "Permitted mounting positions" section.

5.4 Install device with vertical mounting kit for PC interfaces on front

The optional vertical mounting kit allows space-saving installation of the device.

Securing the vertical mounting plate to the device



1.	Secure the vertical mounting plate (2) on the device using five M4 screws: two screws on top (1) and three (not shown in figure) on the bottom of the device.

Note

Follow the instructions in the "Permitted mounting positions" section.

Connecting

6

6.1 Connecting peripherals

Note before connecting

NOTICE
Connect only peripheral devices approved for industrial applications to EN 61000-6-2:2005.

Note

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

CAUTION
Peripheral devices 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 in the manuals for the peripheral devices.

NOTICE
The connected or built-in peripherals should not introduce a negative field voltage into the device. A negative field voltage greater than 0.5 V to ground on the + 3.3 VDC / + 5 VDC / + 12 VDC power rail due to a connected or integrated component can prevent normal operation or even destroy the computer. When measuring the negative field voltage, remember the following: • The computer must be switched off and the power cable should be plugged in. • During the measurement, all cables from the plant to the computer should be connected. • All other components in the plant must be active.

6.2 Connecting 100/240 V AC power supply

Note before connecting the device

Note

The varying voltage power supply module is designed for operation on 120/230/240 V AC networks. The setting of the voltage range takes place automatically.

⚠ WARNING

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

⚠ WARNING

The device is designed for operation on grounded power supply networks (TN networks 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 an active PFC (Power Factor Correction) circuit to conform to the EMC guidelines.

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

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

Localized information

For countries other than the USA and Canada:

230 V power supply

This device is equipped with a safety-tested power cord which may only be connected to a grounded sealed contact power outlet. If you choose not to use this cable, you must use a flexible cable of the following type: At least 18 AWG (1 mm²) conductor cross-section and 15 A, 250 V sealed contact power outlet. The cable set must be compliant with the safety regulations and stipulated IDs of the country where the system is to be installed.

For the USA and Canada:

For the United States and Canada, a CSA or UL-listed power cord must be used.

The connector must be compliant with NEMA 5-15.

120 V power supply

Use a flexible power cord which is approved to UL and CSA with the following features:

Type SJT with three leads, min. 18 AWG conductor cross-section, max. 4.5 m in length and parallel ground contact connector 15 A, min. 125 V.

240 V power supply

Use a flexible power cord which is approved to UL and CSA with the following features:

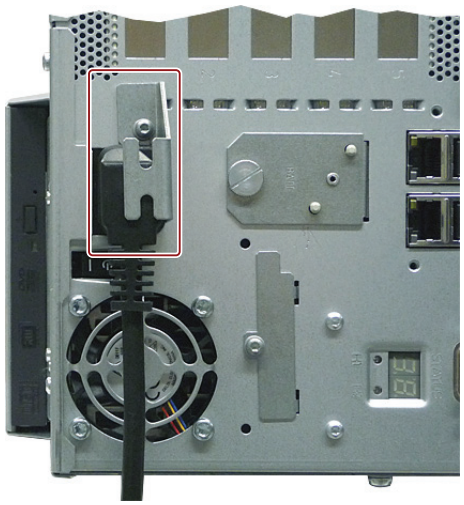
Type SJT with three conductors, min. 18 AWG conductor cross-section, max. length 4.5 m, and tandem grounded connector 15 A, min. 250 V.

Requirement

- Make sure that the ON/OFF switch is in the '0' (OFF) position.

  When you plug in the power cord, the device must not start up unintentionally.

Connecting

Steps		
1	Plug in the IEC plug.	
2	Plug power cable in power outlet.	
3	If necessary, fasten the power cable with the supplied power plug latch as shown.	

6.3 Connecting the 24 V DC power supply

Requirement

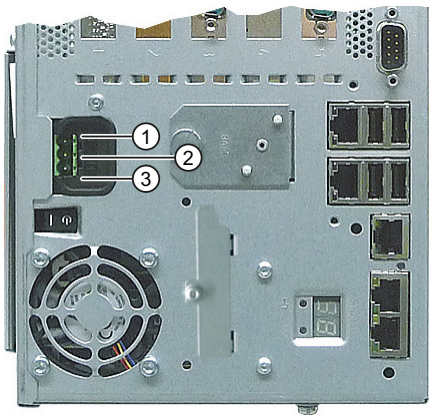
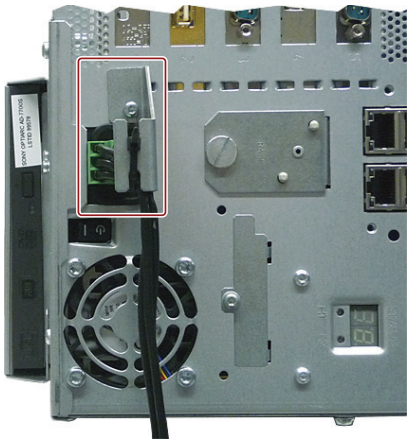
⚠ WARNING

Only connect the device to 24 V DC power supply system which meets the requirements of a safe extra-low voltage (SELV); in addition, a protective conductor must be connected. The cable cross section must withstand the short-circuit current of the 24 V DC power source so that a short-circuit will not damage the cable. Only connect cables with a minimum cross-section of 1.3 mm^2 (AWG16) and a maximum cross-section of 3.3 mm^2 (AWG12).

NOTICE

The 24 V DC power source must be adapted to the input data of the device (see technical specifications).

Connecting

Steps		
1	Ensure that the ON/OFF switch is in the '0' (OFF) position to prevent unintentional startup of the device when connecting it to the 24 V power supply.	
2	Turn off the 24 V DC power supply.	
3	Insert the DC power plug. ① DC 24 V ② ground ③ protective conductor	
4	Fasten the cable with the supplied power plug latch and a cable tie, if necessary.	

Note

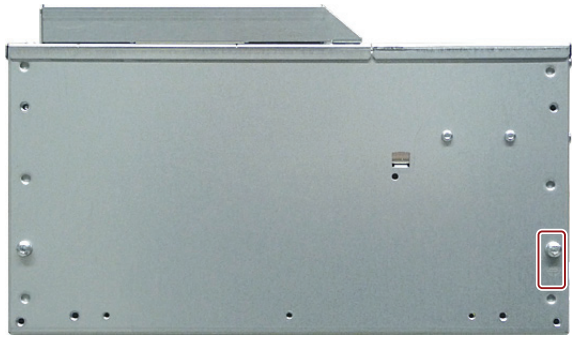
Reverse-polarity protection

The 24 V DC power supply has reverse polarity protection. The device is not damaged when you connect the power supply cores incorrectly, nominal 24 V DC (-15%, +20%) and connected to ground. The device does not switch on. After the power supply has been connected correctly, the device will again be ready to operate.

6.4 Connecting the equipotential bonding circuit

The equipotential bonding terminal (M4 thread) on the device (large surface, large-area contact) must be connected to the PE conductor of the cabinet or system in which the device is to be installed. The minimum cross-section is 5 mm^2.

The equipotential bonding terminal is necessary to protect the device and improves the discharge of interference generated by external power cables, signal cables or cables to the I/O modules.

Steps	
Connect the equipotential bonding terminal on the device (large surface, large-area contact) to the central grounding point of the control cabinet in which the device is installed. The minimum cross-section is 5 mm^2.	

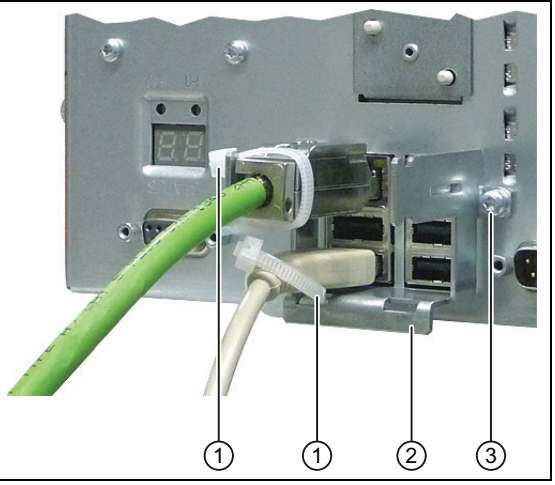
6.5 Connecting Ethernet/USB strain relief

The Ethernet/USB strain relief in the scope of supply is used to prevent accidental loosening of the Ethernet cable and Industrial Ethernet FastConnect connector from the device. You need two cable ties to use the strain relief. In addition to the Ethernet cables, you can also use this strain relief to protect the four USB cables from inadvertent removal.

Requirement

- TORX T10 screwdriver

Procedure

Steps		
1	Secure Ethernet/USB strain relief ② using two M3 screws ③ on the equipment housing.	
2	Connecting the cable	
3	Secure the plug with a cable tie ① to the strain relief.	

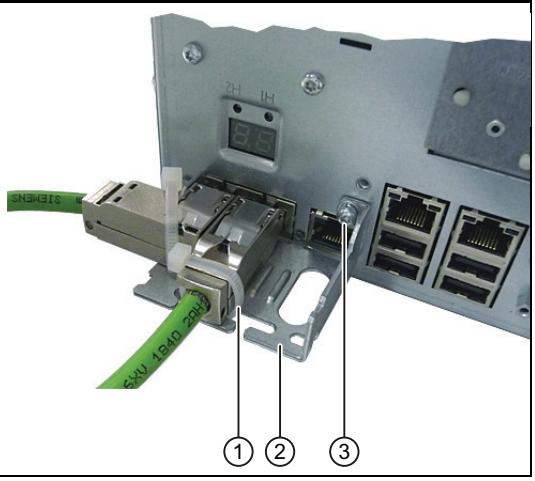
6.6 Connecting the PROFINET strain relief

The PROFINET strain relief supplied in the product package is used to prevent accidental removal of the Ethernet cable and Industrial Ethernet FastConnect connector from the device. You need two cable ties to use the strain relief.

Requirement

- TORX T10 screwdriver

Procedure

Steps		
1	Secure PROFINET strain relief ② using two M3 screws ③ to the equipment housing.	
2	Connecting network cables	
3	Secure the plug with a cable tie ① to the strain relief.	

Commissioning 7

7.1 Requirements for commissioning

CAUTION
Risk of damage to the device! Make sufficient allowances for the device to acquire room temperature before you put it into use. If condensation has developed on the device wait at least 12 hours before you switch it on.

Note

The device features an off/off switch and an on/off button.

By default, the BIOS Setup entry "After Power Failure" is set to "Power On". This means that the device is turned on using the on/off switch.

If the BIOS Setup entry is set to "Stay Off" or "Last state" and the on/off switch is set to "I" (ON), the device can only be turned on by pressing the on/off button.

- Connect the peripherals, such as the keyboard, mouse, monitor and the power supply, before putting the device into operation.
- The operating system you ordered for your device is already installed on the hard disk.

7.2 Basic commissioning - initial startup

The PC operating system is automatically set up the **first** time you switch on the device. Procedure:

1. Set the ON / Off switch to I position (On). The PC performs a POST. During the self-test, this message appears:

   ```
   Press <F2> go to SETUP Utility

   Press <F12> go to Bootmanager
   ```

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 when you run setup. Do **not** change the default BIOS settings, otherwise the operating system setup may become corrupted.

4. Automatic restart

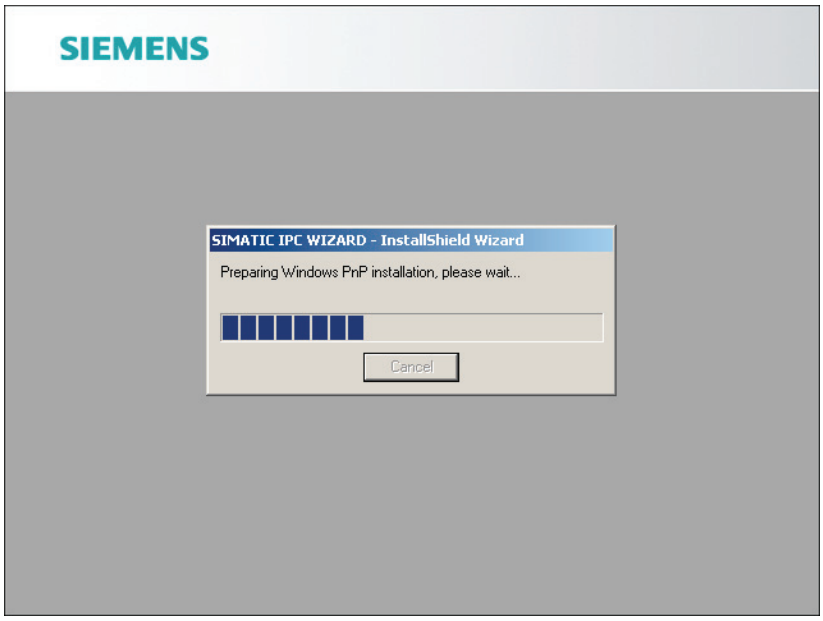
After you have entered all necessary information and after the operating system setup is completed, the PC is automatically restarted and displays the user interface of the relevant operating system.

When you switch on the PC now, the user interface of the operating system or logon dialog of the operating system (with Windows Embedded Standard 2009) is automatically opened when the startup routine is completed.

7.3 Operation with SIMATIC Flat Panel and Windows7/64-bit operating system

SIMATIC IPC wizard

The "SIMATIC IPC Wizard" program is started once during commissioning. The wizard configures the device-specific drivers and applications of the SIMATIC Flat Panel, such as the touch driver, the first time the operating system is started. The hardware is detected automatically.



The device will be rebooted once you complete installation. Additional information on the IPC wizard software can be found in the operating manual "SIMATIC IPC Wizard" on the included "Documentation and Drivers" DVD.

7.4 Windows XP, Windows 7 Security Center

Warning from the Windows Security Center

A warning from the Windows Security Center appears the first time you switch on your device. The Security Center checks the status of the device in regard to 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 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 comprehensive, current antivirus program is installed on the device.

  The factory setting is no antivirus software installed.

- 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.

7.5 Switching off the device

NOTICE
Close down the operating system before turning off the device with the on/off switch, otherwise data may be lost.

Set the ON / Off switch to 0 position (off.) Disconnect the mains connector to isolate the device from mains.

Note

After the operating system is shut down, power continues to be supplied to the device. The fans continue to operate to ensure proper ventilation even when the device is in a powered down state.

7.6 Notes on operation

7.6.1 DVD burner

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

In order to utilize full functionality of the DVD burner under Windows XP, you need to install additional software (burning software). 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 data carriers should be inserted in the drive. This is because data carriers with errors can interrupt the automatic hard drive recognition. This makes it impossible to correctly display the possible burner functions.

Notes on burning optical data carriers

CAUTION
Danger of data errors when burning data carriers! 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. When backing up an image, the data should be restored to the hard disk and the system should be rebooted from the hard disk.

7.6.2 2HDD system (optional)

The two hard disks are configured as follows in the factory state of the device:

Hard disk 0	Hard disk 1
Partition C: System, NTFS, 25 GB	Not configured
Partition D: Data, NTFS, remaining capacity	

The two hard disks are connected to the SATA ports 0 and 2. The hard disk on SATA port 2 is not configured. 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.

Boot from the slave hard disk

The system boots by default from the hard disk on SATA port 0. You can also configure the system to boot from the disk on SATA port 2.

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 > Legacy > Hard Disk Drive > <Hard disk name> e.g. P0- ST3500418AS, 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.

7.6.3 RAID1 system (optional)

This is a RAID1 system configuration (mirroring with two hard disks). This configuration enhances system availability as the system is able to continue operation if a hard drive fails, or if there is a cable problem at a channel.

The two hard disks are configured as follows in the factory state of the device:

RAID1 system
Partition C: System, NTFS, 25 GB
Partition D: Data, NTFS, remaining capacity

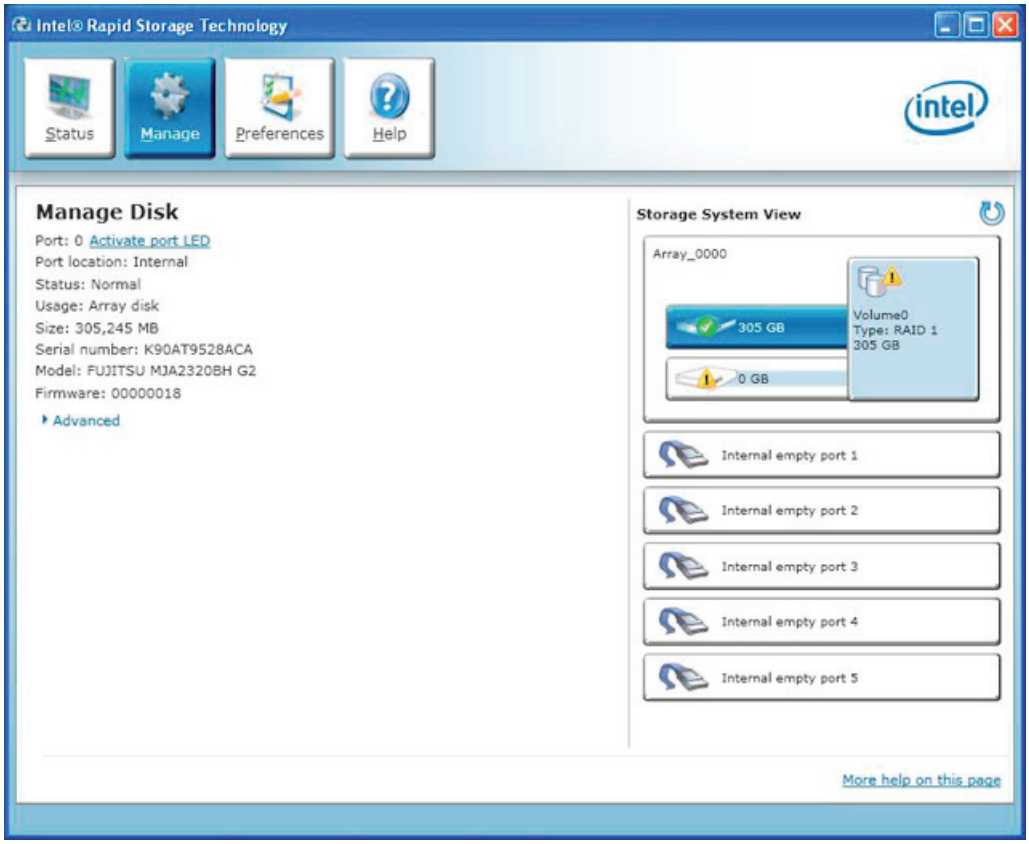
Note

You can find information regarding Intel RAID controllers in the RAID documentation on the included "Documentation and Drivers" CD 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. Start the software by selecting the "Start > Programs > Intel Rapid Storage Technology command.



The "Manage > Advanced" command returns details of the RAID volumes.

The command "Help > System Report > Save" can be used to create a report with details of the RAID volumes.

NOTICE
The RAID status is always indicated in Windows. A hard drive can be synchronized at operating system level if a fault is detected. It may take up to several hours to synchronize a new disk in the background, depending on the size of the hard disk and on the system load. The safe system state RAID 1 is reinstated only after synchronization is completed.

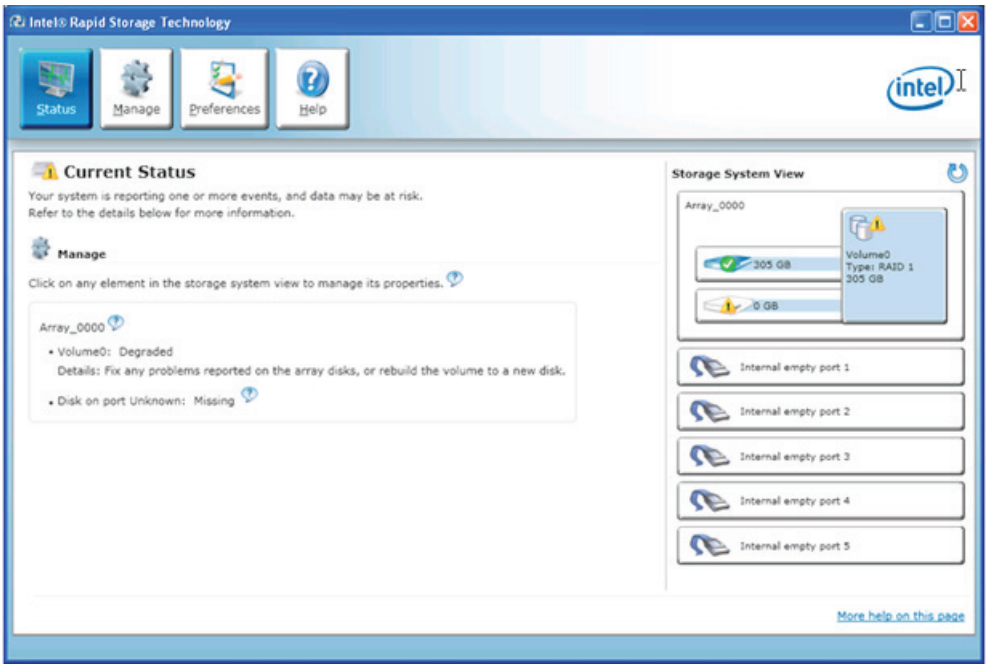
Fault

NOTICE
Input delay System load may briefly increase due to synchronization when a hard disk has failed, depending on processor load and current hard disk activity. In extreme cases, input from the keyboard and touch screen may be delayed for a brief period.

Before you replace the defective hard disk, create a backup copy of the system.

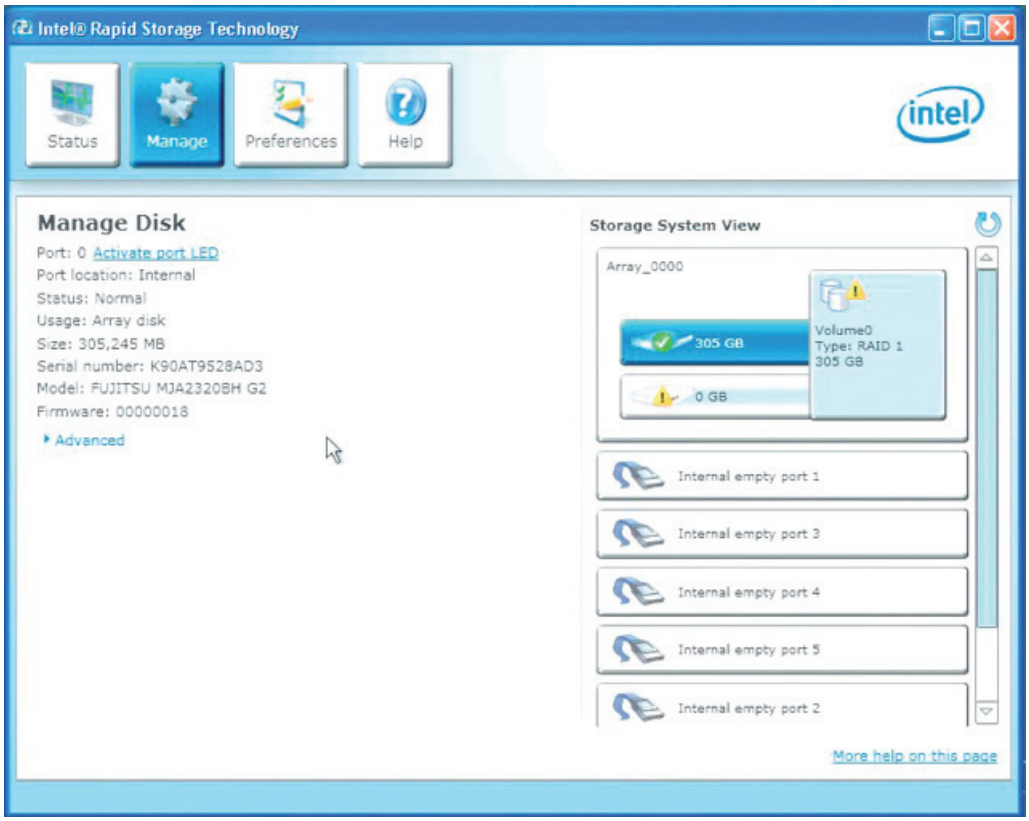
7.6.4 Replacing a defective drive in the RAID system

A missing drive is reported via the RAID software.



Replace defective RAID drives with a new drive in order to recover secure RAID1 state. The RAID software reports the defective 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 port number:



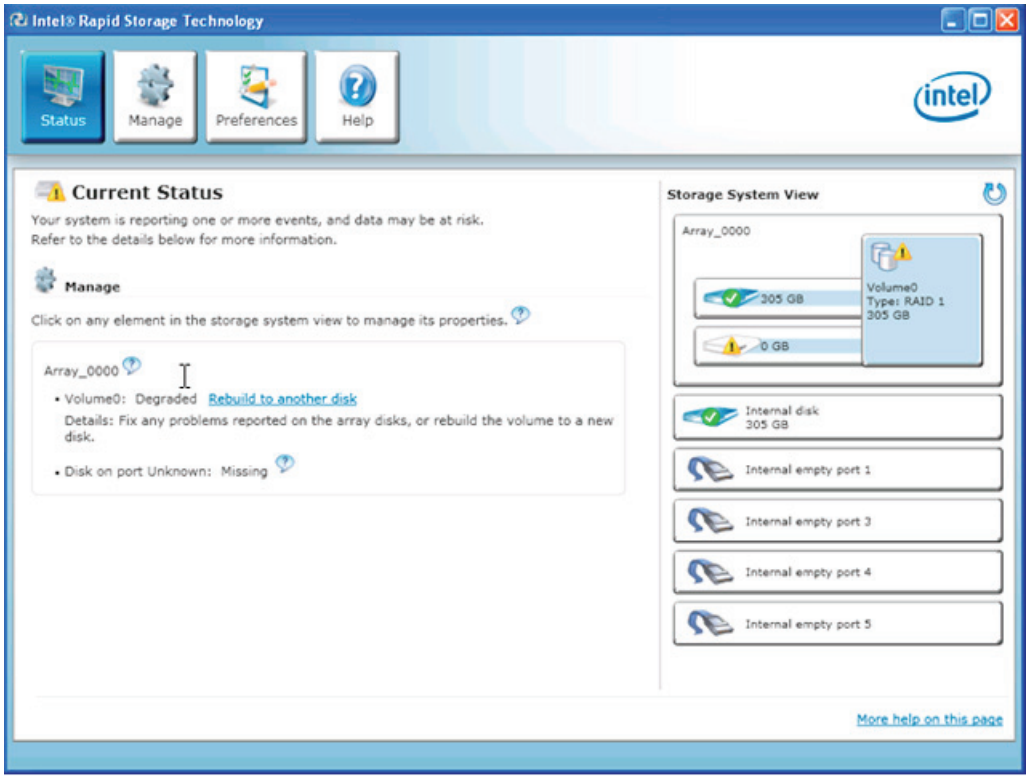
Always replace the defective drive with a new one of the same type and capacity.

To be able to boot from the RAID system, you must place it on top in the list of bootable sources in the "Boot" BIOS 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.

NOTICE
BIOS messages during startup At the first restart / cold start following a hard disk failure or installation of a new hard disk (servicing), the RAID BIOS reports that the RAID functionality is no longer available and offers the appropriate operator options.

NOTICE
The new HDD can be integrated into the RAID system at operating system level by means of the RAID software. Synchronization may take several hours, depending on system load.

The "Rebuild to another disk" command initiates synchronization of the RAID1 system:



NOTICE
The "SIMATIC PC DiagMonitor" diagnostics and alarm software also provides information about the RAID status. This software only needs to be installed once - additional logons are not required. The diagnostics and alarm software "SIMATIC DiagMonitor " is available as an accessory.

7.6.5 Compact Flash card (optional)

NOTICE
We highly recommend that use use approved SIMATIC Compact Flash cards. No liability can be accepted if functions are impaired due to the use of third-party cards.

Design

A Compact Flash card can be used on-board and in an extra mount. This mount replaces the usual hard disk mount.

Characteristics

The Flash drive with Compact Flash card reacts just like any standard IDE hard disk preset as a master. No special driver software is required to operate the Flash drive.

Even though the Flash drive reacts like a hard disk on the outside, there are restrictions due to the limited number of write cycles on Flash memory. The service life of a Compact Flash card depends on the number of write access to the medium - read accesses have no effect.

To maximize the service life of Compact Flash cards, take care that the writing to the cards is kept to a minimum.

For example, you can do this by ensuring that:

- Swap files of the operating system and application are not located on the Compact Flash card.
- Cyclic writing is avoided.

Operating systems such as MS-DOS and Windows XP Embedded allow this, for example. The Enhanced Write Filter (EWF) can be used with Windows XP Embedded, for example. This minimizes the number of write accesses to the Flash drive or avoids it entirely.

Booting from the Flash drive

A operating system must be installed before you can boot from the Flash drive. You will find the procedure for installing an operating system in section "Installing Windows (Page 97)".

7.6.6 SSD drive (optional)

Design

A solid state drive (SSD) flash drive can be used in the device. This drive replaces the usual hard disk drive.

Characteristics

The flash drive reacts just like any standard IDE hard disk preset as a master. No special driver software is required to operate the Flash drive.

Even though the Flash drive reacts like a hard disk on the outside, there are restrictions due to the limited number of write cycles on Flash memory. The service life of an SSD drive depends on the number of instances of write access to the medium - read access has no effect.

To maximize the service life of the SSD drive, ensure that writing is kept to a minimum.

To ensure overall performance, you are advised not to use the complete memory capacity of the SSD drive.

Booting from the Flash drive

A operating system must be installed before you can boot from the Flash drive. You can read about the procedure required for installation of an operating system in the section Installing Windows (Page 97).

Integration

8

8.1 Integration into an automation system

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

Ethernet

The integrated Ethernet port (10/100/1000 Mbps) can also be used for communication and data exchange with programmable controllers such as SIMATIC S7.
This functionality requires the "SOFTNET S7" software package.

PROFIBUS/MPI

The optional electrically isolated PROFIBUS interface (12 Mbps) can be used to interconnect distributed field devices or for coupling to SIMATIC S7.

The "SOFTNET for PROFIBUS" software package is required for coupling to S7 automation systems.

PROFINET

The CP 1616 onboard allows the connection of industrial PCs to Industrial Ethernet. Only one CP 1616 can be installed in a PG/PC. You will find detailed information in sections "PROFINET (Page 58)" and "Communications processor CP 1616 onboard (Page 196)".

Device driver CP 16xx.sys

The device driver allow integration of the Windows network protocol in the optional "CP 1616 onboard" Ethernet PROFINET controller on SIMATIC PCs. The PROFINET interface will act like a regular 100 Mbit Ethernet interface with a MAC address when you use this driver. The three RJ45 sockets are connected with each other via switch.

PROFINET IO application

You can create, operate and configure PROFINET IO applications using the "Development Kit DK-16xx PN IO. It must be installed in addition to the CP 16xx.sys device driver. This kit and the documentation are available free of charge at the following Internet address: DK-16xx PN IO development kit
(http://www.automation.siemens.com/net/html_00/produkte/040_cp_1616_devlopkit.htm)

SIMATIC NET

You can create, operate and configure SIMATIC installations using this software package. You will find information on this on the SIMATIC NET Manual Collection CD. This software package and the documentation are not part of the product package.

Additional information

Additional information is available in the catalog and the online ordering system A&D Mall (http://www.siemens.com/automation/mall).

8.2 PROFINET

CP 1616 onboard

The basic characteristics of the PCS 1616 onboard are:

- Optimized for PROFINET IO
- With Ethernet realtime ASIC ERTEC 400
- Three RJ45 sockets for connecting terminal devices or addition network components
- Integrated 3-port real-time switch
- Automatic hardware detection

CAUTION
A maximum of one CP 1616/1604 module can be installed in one PG/PC. If you want to use an additional CP 1616/1604 module, the CP 1616 onboard option must be disabled via the entry "Onboard Profinet" in the BIOS Setup under Advanced > Peripheral Configuration.

Additional documentation on PROFINET

Get an overview of the information available for PROFINET (http://support.automation.siemens.com/WW/view/en/18880715/133300).

Document name	What is contained in this document?
This documentation is **not** included in the scope of delivery:	
Getting Started PROFINET IO Getting Started: Manual Collection	The documents use concrete examples to provide step-by-step instructions on how to commission a fully functional application.
Manual PROFINET System Description	This gives you the basic knowledge about the PROFINET IO topics: Network components, data exchange and communication, PROFINET IO, component-based automation, application example of PROFINET IO and component-based automation.
Manual From PROFIBUS DP to PROFINET IO	Read this document if you want to convert an installed PROFIBUS system to a PROFINET system.
Readme file for CP 1616/CP 1604 and DK-16xx PN IO	This provides the latest information about the SIMATIC NET products CP 1616/CP 1604, CP 1616 onboard, the developer kit.
Configuration Manual Commissioning PC Stations	This provides you will all the information necessary for commissioning and configuring a PC as a PROFINET IO controller or IO device.
Manual SIMATIC NET Industrial Communication with PG/PC: Volume 1 - Basics SIMATIC NET Industrial Communication with PG/PC: Volume 2 - Interfaces	This manual introduces you to industrial communication and explains the available communication protocols. It also describes the OPC interface as an alternative to the IO-based user programming interface.
S7 CPs for Industrial Ethernet Configuring and Commissioning	This provides the following support: - For commissioning S7 stations - For establishing effective communication
Manual SIMATIC NET - Twisted Pair and Fiber-Optic Networks	Configure and build your Industrial Ethernet networks based on this document.
This documentation is part of the supplied Documentation and Drivers CD:	
Operating instructions CP 1616/CP 1604/CP 1616 onboard	This provides you with all information required for operation.
Installation guide Device Driver CP16xx.sys	Read this guide if you want to install the NDIS device driver, CP16xx.sys.

Further information

You can find the information on specific products in the Internet at the address: Product-related Information SIMATIC NET (http://www.siemens.com/simatic-net)

Functions

9

9.1 Introduction

Functions

The basic version of the device already has the following display, monitoring and control functions:

- Temperature monitoring (over / under temperature)
- Watchdog (hardware or software reset of the computer)
- Monitoring of hard disks, CompactFlash cards and SSD drives with S.M.A.R.T. functionality
- Operating hours meter (information on the cumulative run time)
- Monitoring of the battery level
- AMT (Active Management Technology)

SIMATIC PC DiagBase software

With the SIMATIC PC DiagBase software (included in product package), you can use the display, monitoring and control functions. You use the "DiagBase Management Explorer" application for general monitoring and "DiagBase Alarm Manager" for notification of individual alarms.

the DMAPI programming interface for the DiagBase software is located on the DVCD "Documentation&Drivers" in the folder "\Drivers\DiagBase\program files\Siemens\DiagnosticManagement".

You will find further information on the functions of the SIMATIC PC DiagBase software in the online help.

SIMATIC PC DiagMonitor software

The SIMATIC PC DiagMonitor software can be ordered on CD (does not ship with the product). It contains the networkable monitoring software, the software for the stations to be monitored and a library for creating custom applications.

SIMATIC IPC Image & Partition CreatorSoftware Tool for local data backup and

SIMATIC IPC Image & Partition Creator

To back up data under Windows XP Embedded, Windows XP Professional and Windows 7 Ultimate, we recommend the software tool SIMATIC IPC Image & Partition Creator for the following activities:

- Backup and restoration of CompactFlash cards
- Backup and restoration of hard disks
- Partitioning of hard disks (images)

AMT (Active Management Technology)

AMT is a technology for remote maintenance of computers. You turn an AMT PC on and off remotely and start the BIOS setup remotely. Different operating systems can be booted with ISO files.

9.2 Temperature monitoring

Temperature monitoring

The temperature is monitored at several locations of the device. Amongst others, one thermocouple monitors the processor temperature, another the temperature in the area near the power supply, and a third the air intake temperature next to the DVI port.

The following fault reactions are triggered if one of the temperature values exceeds the set temperature threshold:

Response	Option
Device and CPU fans are set to maximum speed.	None
The DiagBase or DiagMonitor software reports a temperature alarm.	Startup of user-defined programs can be set

Temperature errors do not occur under normal operation. If a temperature does occur, check for the following possible causes:

- Are the fan apertures covered?
- Is the fan functioning correctly?
- Is the ambient temperature within the specified range?
- Is the total output of the power supply within the specified limit?

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

- Acknowledgment of the error message by the monitoring software
- Restart of the device

9.3 Watchdog (WD)

Function

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

The watchdog is idle when the PC is switched on or after a HW-RESET(cold restart), i.e., no reaction of the WD is triggered.

WD reactions

If the watchdog is not triggered again within the set time, the following reactions will be triggered:

Response	Option
The DiagBase or DiagMonitor software is enabled	None
Trigger a PC reset	Selectable
The DiagBase or DiagMonitor software reports a watchdog alarm.	

WD monitoring times (TWD)

The monitoring times can be set in increments of one second within a range from 3 to 255 seconds.

Note

The watchdog is retriggered if the monitoring time is changed at the active watchdog (that is while the watchdog is running)!

9.4 Fan monitoring

The function monitors operation of the enclosure and power supply fans. When a fan fails, the following reactions are triggered:

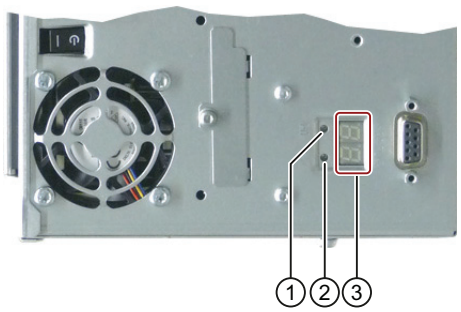
Response	Option
The DiagBase or DiagMonitor software reports a fan alarm.	Startup of user-defined programs can be set

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 monitoring software
- Restart of the device

9.5 Status display

The status display consists of two 7-segment displays and two three-color LEDs.



①	LED H1
②	LED H2
③	2 7-segment displays

Function of the 7-segment displays

The POST codes of the respective test step are displayed during the startup of the BIOS. The POST code of the most recently started test step is displayed should an error occur. Code 00 is displayed when the startup is completed without error.

Application codes can also be displayed if required.

Function of the LED H1, H2

During the BIOS startup, the two LEDs light up in three colors (red, yellow and green) to test their operation. The two LEDs switch off when the startup is completed without errors.

Applications can trigger the two LEDs if required.

Note

You will find the programming interface and sample programs on the DVD "Documentation & Drivers" in the folder "Drivers\DiagBase\program files\Siemens\DiagnosticManagement".

9.6 SRAM buffer memory

In order for applications to store data following a power failure, the motherboard features battery-buffered SRAM. If the supply voltage fails for more than 20 ms for the AC power supply or more than 5 ms for the DC power supply, then you will be informed about this situation by the NAU signal.

At least 10 ms is available to copy the data to the buffered RAM. During this time, 128 Kb can be saved with a full load and even more with a smaller configuration, in other words, a lesser load. A maximum 2 MB memory window is displayed via a PCI address register. The base address is initialized by the BIOS.

A corresponding function is implemented there for using the SRAM under WinAC RTX.

NOTICE
If replacement of the battery takes longer than 30 seconds, the data saved in the CMOS RAM and in the buffered SRAM is lost.

Note

The buffer memory SRAM is available only with devices with PROFIBUS or PROFINET interfaces.

9.7 Battery monitoring

The installed buffer battery has a service life of at least 5 years. The status is checked by a two-stage battery monitoring function and is displayed and evaluated by the DiagBase or DiagMonitor software

When the first warning level is reached, the remaining service life of the battery for buffering CMOS data amounts to at least 1 month.

9.8 AMT (Active Management Technology)

Function

AMT (Active Management Technology) is technology for the remote maintenance of computers (simply called AMT-PC in the remainder of the document) and it includes the following functions:

- Keyboard–Video–Mouse (KVM) redirection: Using KVM that is integrated in the AMT hardware you access the AMT PC remotely. With KVM, you can also control AMT PCs that have no or a defective operating system. A KVM remote session is always possible with the KVM server integrated in the firmware. This means you can restart the PC and change the BIOS setup remotely.
- Remote power management: AMT PCs can be turned on and off and restarted from another PC.
- SOL (Serial over LAN): Redirection of the data of a serial interface to the network. The main use of the function is text-based remote control of an AMT PC using a console.
- IDE redirection: An ISO file on the help desk PC can be mounted on the AMT PC and used as a DVD drive.

  An ISO file contains a memory image of the content of a CD or DVD structured in the ISO 9660 format.
- Remote reboot: An AMT PC can be booted from a bootable ISO file made available by another PC.

Requirement

- A device with a Core i5 or Core i7 processor
- A functioning and configured management engine
- A functioning and configured Ethernet connection
- A help desk PC with a functioning and configured Ethernet connection for the full AMT functionality

Configuration of the AMT PC

You configure AMT using the BIOS setup and the MEBx (Management Engine BIOS Extension). MEBx is a BIOS extension for configuring AMT.

If the BIOS is displayed during start-up, press the shortcut "Ctrl + P". The "MEBx" dialog is displayed.

Expansion and parameter assignment 10

10.1 Opening the Device

CAUTION
Work on the open device may only be carried out by authorized and qualified personnel. Within the warranty time, you are only allowed to install expansions for memory and expansion card modules.

⚠ CAUTION
The device contains electronic components which may be destroyed by electrostatic charge. You therefore need to take precautionary measures before you open the device. Refer to the ESD guidelines on handling electrostatically sensitive components (Page 206).

Tools

You can perform all installation tasks on the device using Torx T6, T10, T15 and T20 screwdrivers as well as a SW 4.5 Allen key.

Requirement

Disconnect the device from the mains.

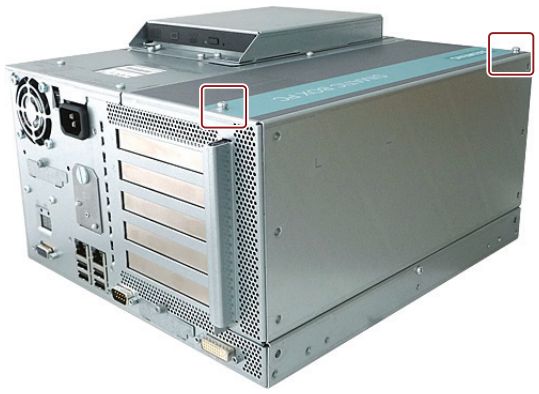
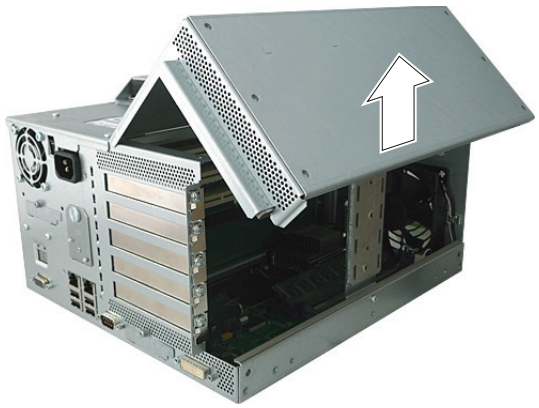
Disclaimer of liability

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

Siemens disclaims any liability 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".

Open the device up

Steps		
1	Remove the highlighted screws.	
2	Swing the cover up and remove it.	

10.2 Increase memory

10.2.1 Removing/Installing Memory Module

Memory expansion options

The motherboard has two slots for memory modules. DIMM DDR3 memory modules, storage frequency 1066 MT/sec, type PC3-8500, unbuffered, with or without ECC can be used. This allows you to expand IPC memory to up to 8 GB, of which you can use approx. 3.2 GB for the operating system and applications with 32-bit operating systems. You can install one or two modules.

Combination	Slot X19 (outside)	Slot X20 (inside)	Maximum expansion
1	1 GB / 2 GB / 4 GB		4 GB
2	1 GB / 2 GB / 4 GB	1 GB / 2 GB / 4 GB	8 GB

Note

Dual-channel operation and available memory

- The modules can be inserted into any slot. Memory is operated in dual-channel mode if two modules are installed.
- If expansion modules with their own memory (for example, graphics cards with 256 MB or more) are used, the memory available for the 32-bit operating system or applications may also be less than 3.2 GB.

  In order to avoid operating faults you may have to remove a module so that the real memory expansion on the motherboard and the reserved memory of the expansion module do not overlap.

Table 10- 1 Usable memory

Memory configuration	32-bit operating system	64-bit operating system
1 GB	0.9 Gbyte	0.9 Gbyte
2 Gbyte	1.9 Gbyte	1.9 Gbyte
3 Gbyte	2.9 Gbyte	2.9 Gbyte
4 Gbyte	3.0 Gbyte	3.9 Gbyte
8 Gbyte	3.0 Gbyte	7.9 Gbyte

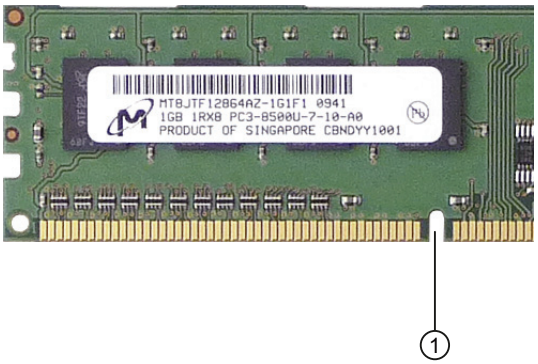
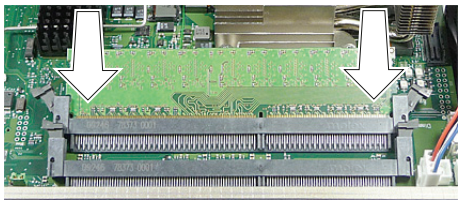
Preparation

Disconnect the device from mains and unplug all cables.

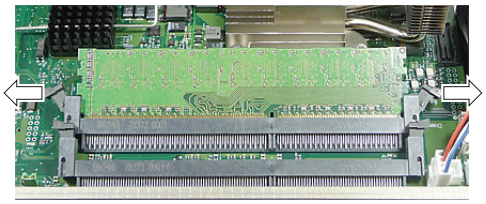
CAUTION
The electronic components on the PCBs are highly sensitive to electrostatic discharge. Always take appropriate precautionary measures when handling these components. Refer to the ESD directives on handling electrostatic sensitive components.

NOTICE
We highly recommend using memory modules approved by Siemens. Siemens disclaims any liability for impairment of functions caused by the use of third-party memory modules.

Installing a memory module

How to install a memory module		
1	Open the device (Page 67).	
2	Note where the (polarized) cutout ① is located on the pin side of the RAM module before inserting it.	
3	Insert the module downwards, applying slight pressure and press it until the locking snaps into place.	
4	Close the device.	

Removing a memory module

How to remove a memory module		
1	Open the device (Page 67).	
2	Release the locking mechanism on the left and right.	
3	Pull the memory module out of the slot.	
4	Close the device.	

Display of the current memory configuration

A new memory module is automatically detected. When switching on the device and starting the BIOS Setup using <F2>, the current memory size is displayed under "Total Memory".

10.3 Installing PCI / PCIe card

10.3.1 Notes on the modules

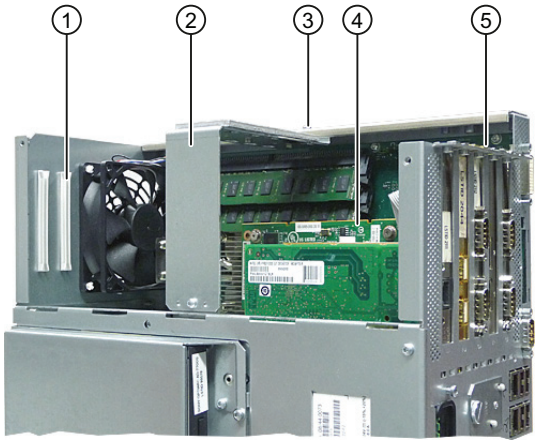
The device is designed for use with modules conforming to PCI specifications V 2.2. 5 V 32-bit PCI modules, universal (5 V & 3.3 V) 32-bit PCI modules and PCI Express x16 modules can be operated. The permitted module dimensions are specified in the section Dimension drawings (Page 131).

10.3.2 Installing / removing expansion modules

Preparation

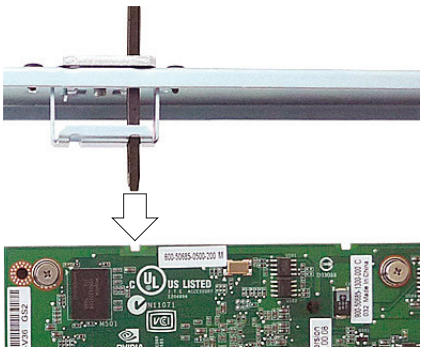
Disconnect the device from the mains.

Installing expansion modules

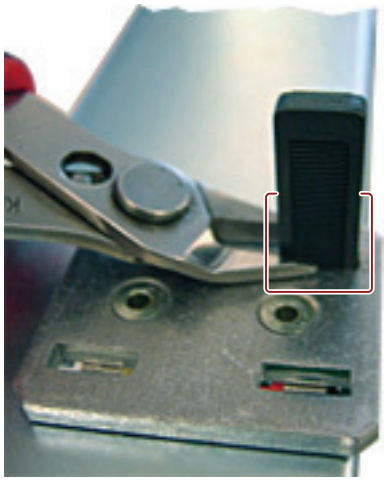
How to install an expansion module (PCI / PCI express card):		
1	Open the device (Page 67).	
2	Remove the fastening screw ③ and remove the module bracket ②.	
3	Remove the slot cover ⑤ from the slot provided.	
4	Insert the expansion module ④ into the slot provided. When using long PCI modules be aware of the guide rail ①.	
5	Install the module bracket.	
6	Screw down the slot cover ⑤ for the expansion module.	
7	Close the device.	

Inserting the slider

Proceed as follows when using the slider:

How to install a slider		
1	Push the slider through the guide slot until it is seated firmly on the module. Insert the module into the slot.	

CAUTION
Do not put pressure on the module. Do not apply excessive force on the slider when you push it onto the module.

2	Cut off the protruding part of the slider element. Use a knife to apply a cut on the slider at the upper edge of the bracket and then break this section off. Cut off the excess length with a diagonal cutter.	

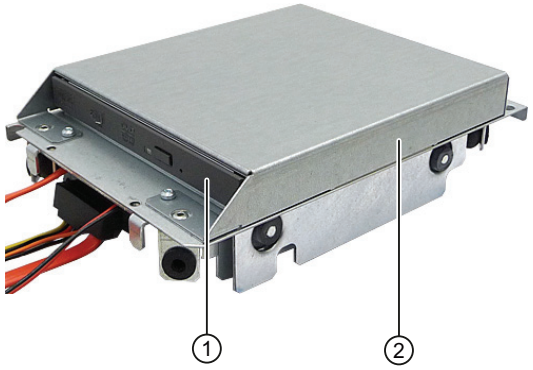
Note

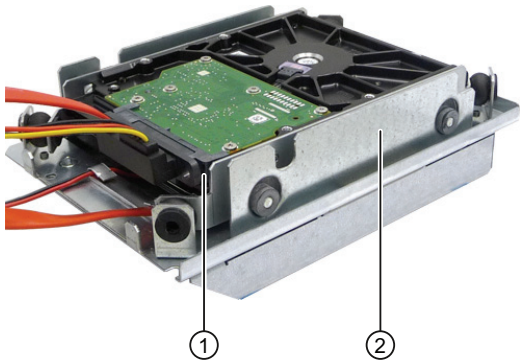
Each PCI card slot has an exclusive interrupt. The assignment of the PCI IRQ line to the PCI slot is explained in the section Bus board (Page 153).

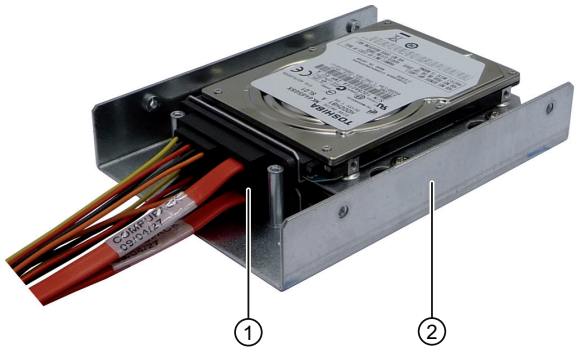
10.4 Installing a drive

10.4.1 Options of installing disk drives

Drive bay module for hard disks and optical drive

DVD burner drive bay mount	Item	Description
	①	Slot for DVD burner drive
	②	DVD burner drive bay mount

A 3.5" hard disk drive	Item	Description
	①	Slot for one 3.5" drive
	②	Hard disk drive bay for one 3.5" drive

Two 2.5" hard disks	Item	Description
	①	Two slots for 2.5" hard disks
	②	Hard disk drive bay for 2.5" hard disks

10.4.2 Installing/removing a drive bay module

Requirement

Isolate the device from mains and disconnect all connection cables.

Removing a drive bay module for hard disks and optical drives

Steps		
1	Remove the highlighted screws.	
2	Lift out the drive bay module for hard disks and the optical drive.	

10.4.3 Removing / installing an optical drive

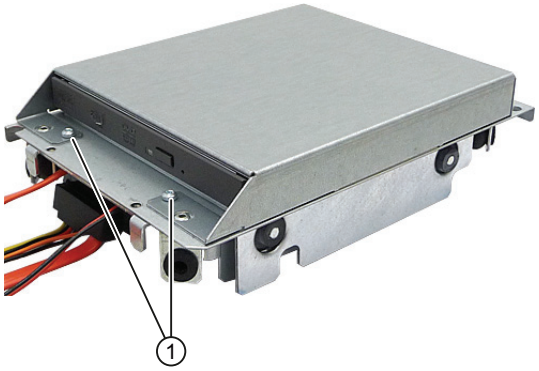
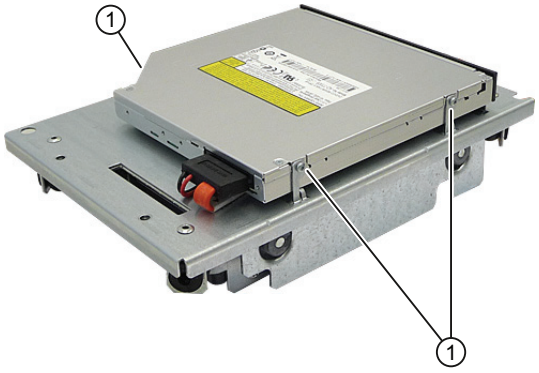
Requirement

Isolate the device from mains and disconnect all connection cables.

You need the following screwdrivers to remove the the DVD burner:

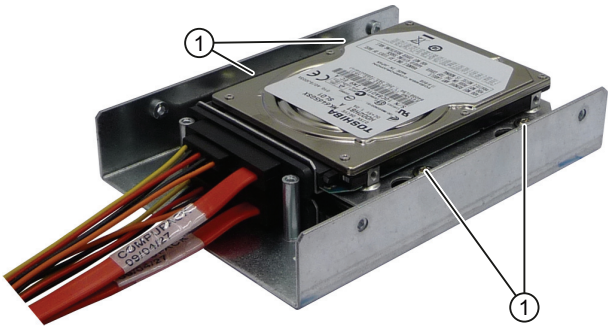
- Torx T10 to mount/remove the drive bay
- Torx T6 to install/remove the drive

Removing the DVD burner drive

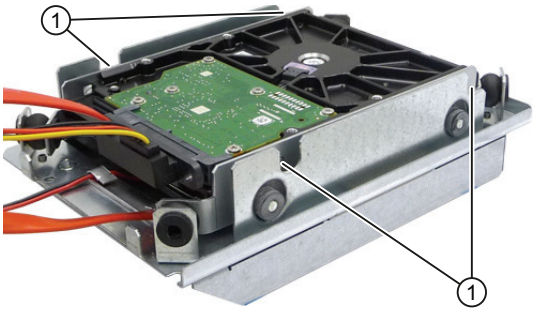
Steps		
1	Remove the drive bay module.	
2	Loosen the screws ① on the DVD burner drive bay.	
3	Remove the retaining screws ① of the drive.	
4	Disconnect the power supply and the data cable from the drive.	
5	Lift the drive out.	

10.4.4 Removing hard disks

Removing 2.5" drives

Steps		
1	Remove the drive bay module.	
2	Unscrew ① the drive.	
3	Remove the hard disk drive and the steel mounting bracket from the bay.	
4	Disconnect the power supply and the data cable from the drive.	

Removing a 3.5" drive

Steps		
1	Remove the drive bay module.	
2	Disconnect the power supply and the data cable from the drive.	
3	Remove the screws ① of the drive.	
4	Remove the hard disk drive from the bay.	

Note

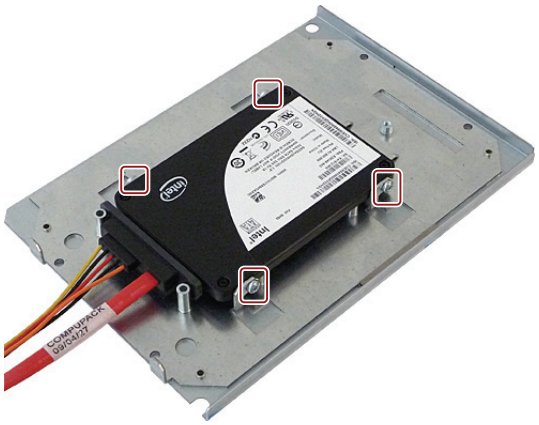
Here you use screws with inch threading, screw designation 6-32x3/16"-St-G3E.

10.4.5 Installing an SSD drive

Requirement

Disconnect the device from the mains.

Installing an SSD drive

Steps		
1	Remove the hard disk cover. Place the hard disk cover on the device.	
2	Connect the power supply cable and the data cable to the SSD drive. Fasten the SSD drive with screws at the points marked.	
3	Install the hard disk cover.	

10.4.6 Installing/removing an on-board Compact Flash card

NOTICE
We highly recommend the use of approved SIMATIC CompactFlash cards. Siemens disclaims any liability for impairment of functions caused by the use of third-party cards.

Memory expansion options

The device features a slot for CompactFlash cards types I / II.

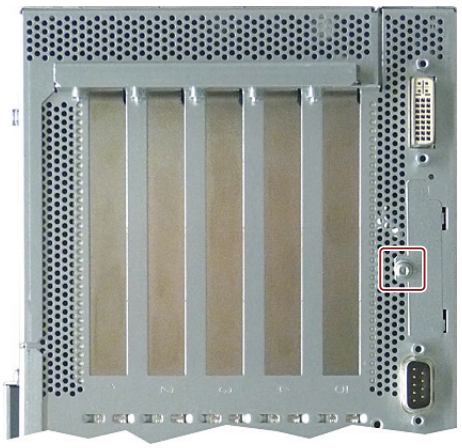
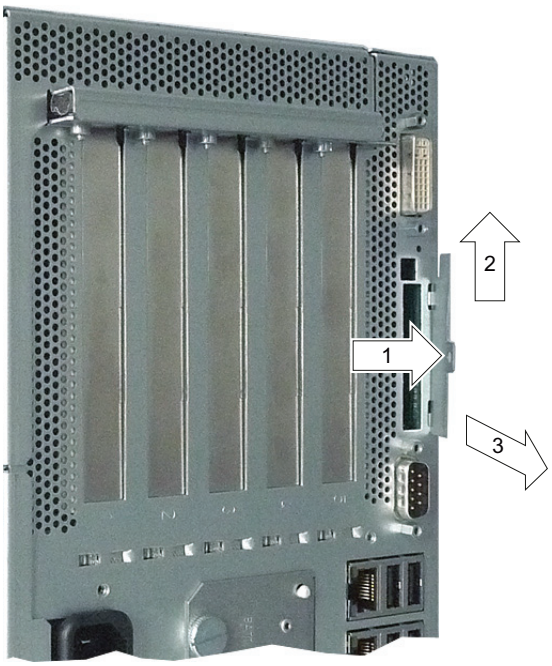
NOTICE
This slot is not hot-plug capable. The CompactFlash card must be installed before the PC is switched on and should only be removed when the device is switched off.

Preparation

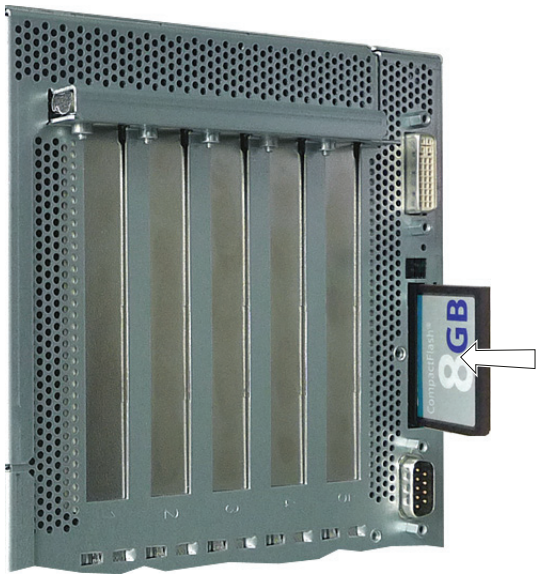
Disconnect the device from the mains.

⚠ CAUTION
The electronic components on the PCBs are highly sensitive to electrostatic discharge. Always take appropriate precautionary measures when handling these components. Refer to the ESD directives on handling electrostatic sensitive components (Page 206).

Opening the module slot

Steps		
1	Remove the screws.	
2	Slide the cover plate of the module slot towards the DVI connection and lift it out.	

Installing the CompactFlash card

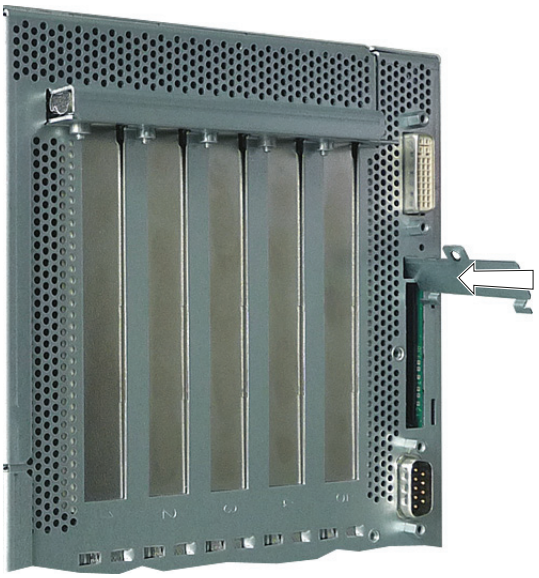
Steps		
1	Open the module slot.	
2	Insert the CompactFlash card in the slot with the connector facing in until it locks into place.	
3	Open the module slot.	

Note

The Compact Flash slot is coded against reversed insertion. Insert the CompactFlash card so that its label side is facing the front panel of the PC.

CAUTION
If the CompactFlash card meets resistance, flip it over. Never insert the CompactFlash card with force.

Removing the CompactFlash card

Steps		
1	Open the module slot.	
2	Press the eject button, for example with the cover of the module slot, and remove the CompactFlash card.	
3	Open the module slot.	

10.4.7 Installing/removing an additional compact flash card

NOTICE
We highly recommend the use of approved SIMATIC CompactFlash cards. Siemens disclaims any liability for impairment of functions caused by the use of third-party cards. In accordance with UL 60950-1, UL 508 and EN 60950-1, only CompactFlash cards with no external interfaces may be used.

Requirement

Disconnect the device from the mains.

Opening the module slot

Steps		
1	Remove the screws.	
2	Slide the cover plate of the module slot towards the battery compartment and lift it.	

Installing the CompactFlash card

Steps	
1	Open the module slot.
2	Insert the CompactFlash card in the slot with the connector facing in until it locks into place.
3	Open the module slot.

Removing the CompactFlash card

Steps	
1	Open the module slot.
2	Press the eject button, for example with the cover of the module slot, and remove the CompactFlash card.
3	Open the module slot.

Service and maintenance

11

11.1 Removing and installing hardware components

11.1.1 Repairs

Make repairs

Only authorized personnel are permitted to repair the device.

⚠ WARNING
Unauthorized opening and improper repairs may lead to material damage and hazards to users.

- Always disconnect the power connector before you open the device.
- Install only system expansions which are designed for this computer. The installation of other expansions can damage the system and violate the radio-interference suppression regulations. 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 guideline (Page 206).

Disclaimer of liability

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

Siemens disclaims any liability for impairment of functions caused by the use of third-party devices or components.

Tools

You can perform all installation tasks on the device using Torx T6, T10, T15 and T20 screwdrivers as well as a SW 4.5 Allen key for hexagon bolts.

11.1.2 Preventive maintenance

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

Component	Replacement interval:
HDD	3 years
Fan	3 years
CMOS backup battery	5 years
CompactFlash drive [1]	Depends on the type of use
SSD drive [1]	Depends on the type of use

[1] The interval for replacement of the flash drives (CompactFlash and SSD) depends greatly on the type of use. A specific interval cannot be given.

All drives are monitored with the software tools DiagBase or DiagMonitor on the basis of their SMART status. As soon the SMART status of the HDD, CF or SSD switches to "Not OK", a message is sent by DiagBase or DiagMonitor, or when you start your PC. You should then back up your data and replace the drive.

11.1.3 Replacing the Backup Battery

Note

Batteries are wearing parts. Replace the battery of the device every 5 years. This ensures proper functioning of the PC.

Dispose of batteries in accordance with local regulations.

To be noted before you replace the battery

CAUTION
Risk of damage
The lithium battery may only be replaced with an identical battery or with a type recommended by the manufacturer (order number: A5E00331143).

⚠ 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.

Requirement

Note

For the BIOS setting "Profile: Standard" the configuration data of the device is deleted when the battery replacement takes more than 30 seconds. For the BIOS setting "Profile: User" the configuration data of the device is retained; only the date and time has to be reconfigured.

The content of the SRAM is lost if the battery replacement takes more than 30 seconds.

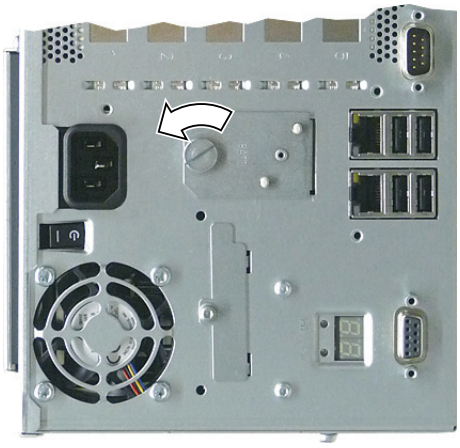
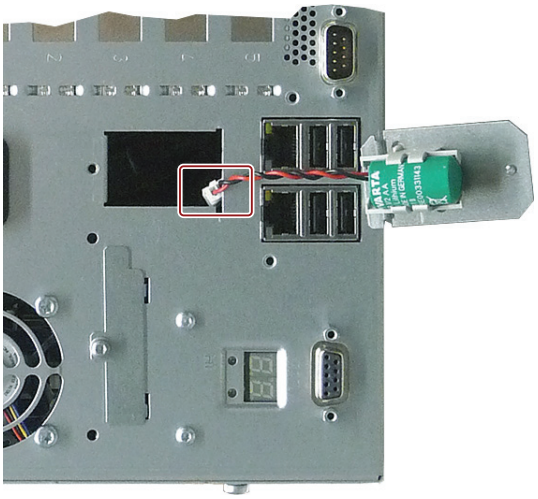
- Current BIOS Setup settings are written down.

  A list in which you can write down this information is available in the BIOS description.
- Disconnect the device from mains.
- All connecting cables on the device have been removed.

  Note

  You may replace the battery while the device is running. Do not reach inside the device. We recommend switching off the device beforehand.

Replacing the battery

Steps		
1	Open the battery compartment.	
2	Remove the battery bracket.	
3	Remove the plug connector.	
4	Remove the old battery.	
5	Attach a new battery.	
6	Install the battery bracket.	
7	Close the battery compartment.	

Reconfiguring the BIOS setup

If the battery replacement took longer than 30 seconds, the CMOS configuration data of the device will have been deleted and you will need to reconfigure this in the BIOS Setup. If you use the BIOS profile "User", you do not need to make any new settings.

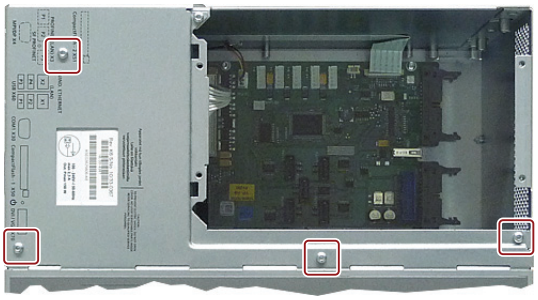
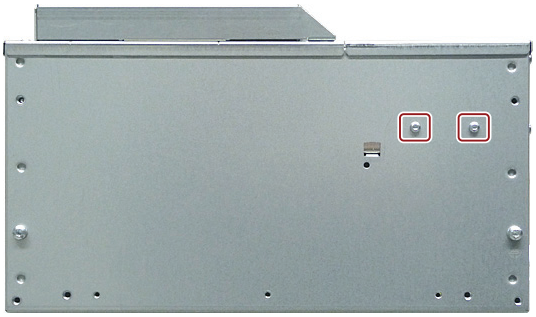
11.1.4 Removing/Installing the Power Supply

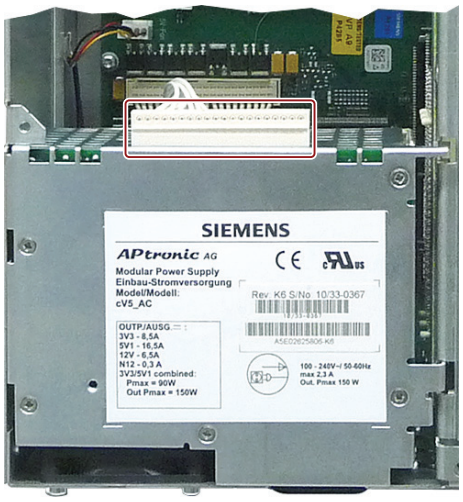
⚠ WARNING
Only authorized trained personnel are allowed to replace the power supply unit.

Requirement

- Disconnect the device from mains.
- All connecting cables on the device have been removed.
- The device is open.
- Torx T10 screwdriver

Removing the power supply unit

Steps		
1	Remove the drive bay module for hard disks and the DVD burner.	
2	Remove the highlighted screws.	
3	Remove the power supply cover.	
4	Remove the highlighted screws.	

Steps		
5	Remove the highlighted connector from the power supply module.	
6	Lift out the power supply module.	

See also

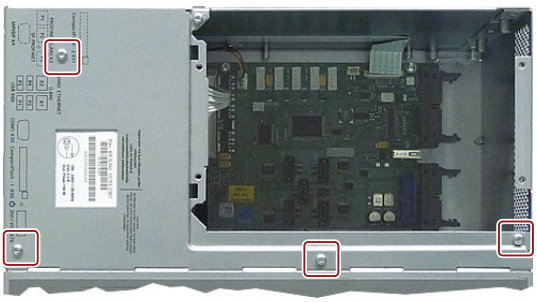
Opening the Device (Page 67)

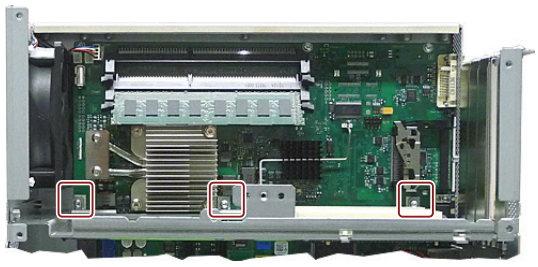
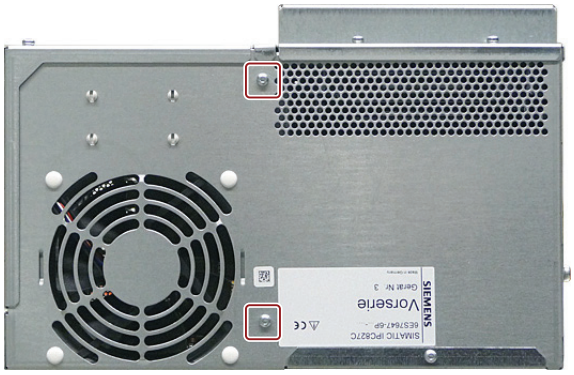
11.1.5 Installing / removing the bus board

Requirement

- Disconnect the device from mains.
- All connecting cables on the device have been removed.
- The device is open.

Removing the bus board

Steps		
1	Remove all modules from the slots.	
2	Lift out the drive bay module for hard disks and the DVD burner.	
3	Remove the highlighted screws and take off the power supply cover.	

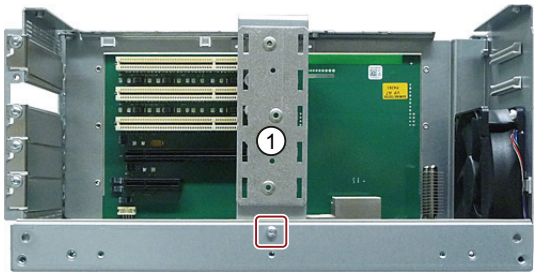
Steps		
4	Remove the power supply.	
5	Remove the highlighted screws on the bus board.	
6	Remove the highlighted screws on the enclosure.	
7	Pull the bus board from the motherboard.	

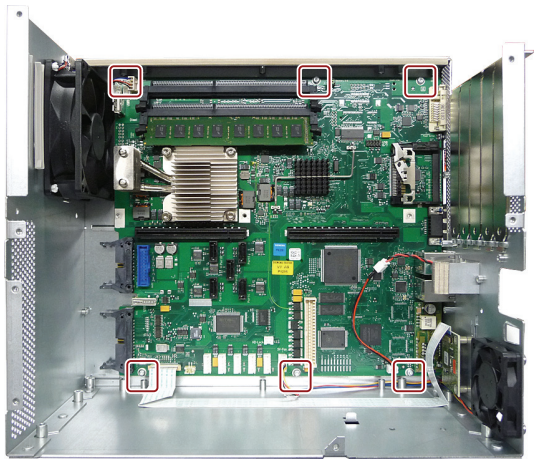
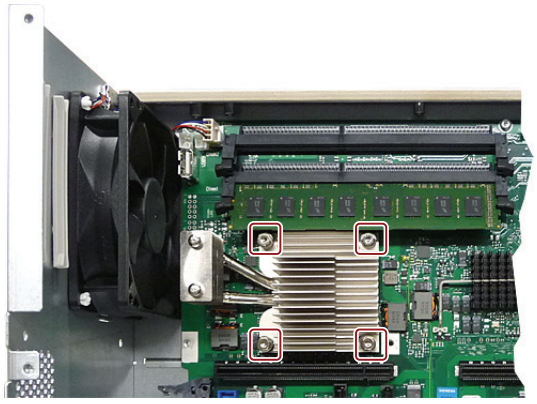
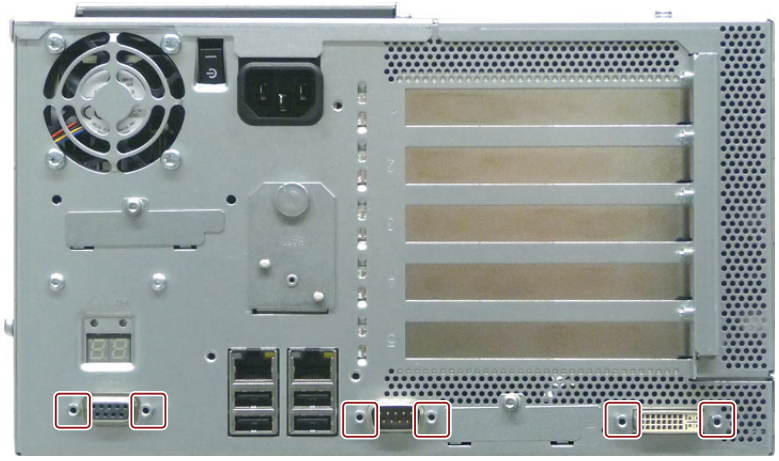
11.1.6 Installing / removing the motherboard

Requirement

- Disconnect the device from mains.
- All connecting cables on the device have been removed.
- The device is open.

Removing the motherboard

Steps		
1	Remove the drive bay module for hard disks and the DVD burner.	
2	Remove the highlighted screw. Remove the module bracket ①.	
3	Remove the power supply cover.	
4	Remove the power supply.	

Steps		
5	Remove the bus board.	
6	Disconnect all cables from the motherboard, noting down their positions while doing so.	
7	Remove the highlighted screws.	
8	Remove the highlighted screws. Remove the processor heat sink.	
9	Remove the highlighted hexagon bolts at the interfaces.	
		
10	Remove the motherboard.	

See also

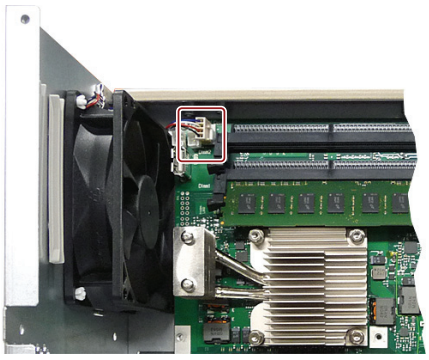
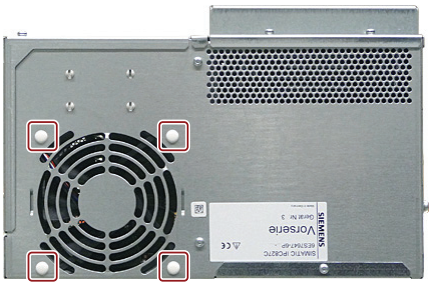
Opening the Device (Page 67)

11.1.7 Installing / removing the equipment fan

Requirement

- Disconnect the device from mains.
- The device is open - see section "Device (Page 67)".

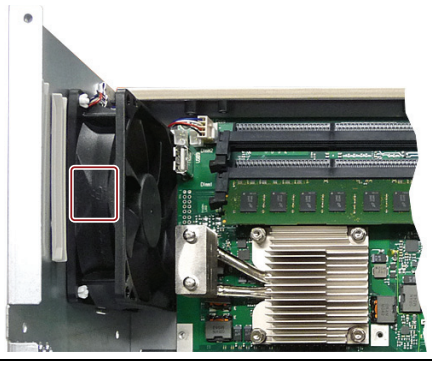
Removing the fan

Steps		
1	Pull the fan plug from the motherboard.	
2	Loosen the highlighted plastic rivets on the enclosure.	
3	Take the fan out of the enclosure.	

Installing the fan

Note

Always install a fan of the same type!

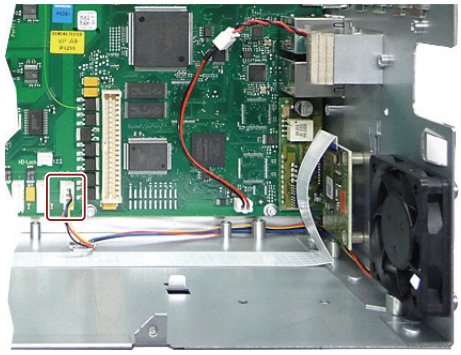
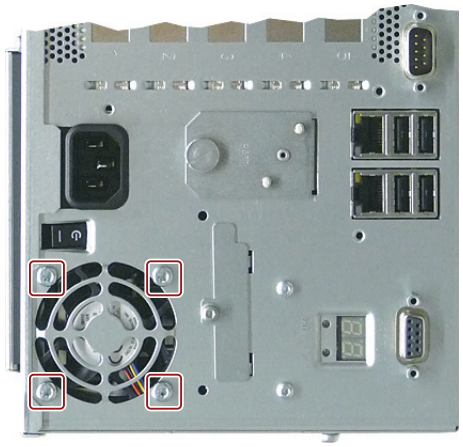
Mounting position	
The figure shows the correct fan mounting position. Pay attention to the direction of the arrow on the fan enclosure!	

11.1.8 Installing / removing the power supply fan

Requirement

- Disconnect the device from mains.
- The device is open - see section "Device (Page 67)".
- The power supply unit is removed.

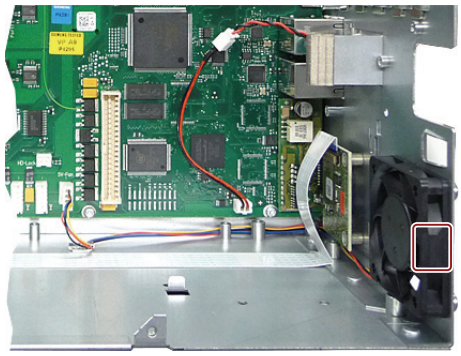
Removing the fan

Steps		
1	Pull out the fan connector.	
2	Loosen the four screws on the enclosure.	
3	Take the fan out of the enclosure.	

Installing the fan

Note

Always install a fan of the same type!

Fan mounting position	
The figure shows the correct fan mounting position. Pay attention to the direction of the arrow on the fan enclosure!	

11.1.9 Processor replacement

Operation of the CPU is not possible.

As the processor is soldered on the motherboard, it has to be completely replaced. Please observe the information in Section Installing / removing the motherboard (Page 91).

11.2 Reinstalling the software

11.2.1 General information on installation

If your software no longer functions correctly you can reinstall it from either the Recovery 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 to be installed is English. If you want to integrate additional languages, you can install them from the Recovery CD 2 or DVD later.

- 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 and monitoring software, such as DiagBase).

11.2.2 Restoring the Factory State of the Software Using the Restore DVD

You can restore the original factory software using the Restore DVD. The DVD contains the necessary images and tools for transferring the factory software to the hard disk of your PC. You can 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.
- If backup is not possible, please contact Customer Support. 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. If "Restore entire hard disk" is set ALL data, user settings, authorizations or license keys will be lost on the hard disk.

Restoring factory state

To restore the delivery state, follow these steps:

- Place the Restore DVD into the drive and restart the device using the on/off switch.
- When BIOS outputs the message

  `Press <F2> to enter Setup or <F12> to show Boot menu` press F12.
  The "Boot Menu" is displayed when initialization is completed.
- Select the optical drive using the cursor keys.
- Follow the on-screen instructions.

CAUTION
All existing **data, programs, user settings** and **authorizations or license keys will be deleted** from the hard disk and are therefore lost.

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

11.2.3 Installing Windows

11.2.3.1 Installing Windows

Use the Recovery DVD to install Windows to suit your particular requirements. You also need the supplied Documentation and Drivers DVD. 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 or the "Load Driver" icon key while booting 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 DVD

1. To boot the Recovery DVD press when BIOS outputs the message

   Press <F2> to enter SETUP or <F12> to display the boot menu.

   press the F12 key. The boot menu displayed after initialization indicates all boot devices.
2. Select the DVD drive.

   Follow the on-screen instructions until the "Siemens SIMATIC Recovery" window opens.

   When using the recovery function of Windows 7, confirm that you want to boot from DVD immediately at startup. Otherwise the system boots from hard disk if you have a bootable hard disk installed.

The following sections describe older Windows operating systems. The Recovery for Windows 7 is described in the section Recovery of Windows 7 (Page 102).

11.2.3.2 Setting up partitions for Windows XP and Server 2008 operating systems

You will need to reinstall the operating system from the Recovery DVD after a new hard disk has been installed, to repair faulty partitions, or to change the partitioning.

CAUTION
All data on the hard disk are lost if you delete / setup partitions or logical DOS volumes. All partitions on the hard disk are deleted.

Microsoft recommends setup of the NTFS file system on hard disk partitions in Windows operating systems. Procedure:

Setting up partitions

When shipped, the partitions are set up as follows:

Partition	Operating system	Name	Size	File system
First	Windows XP	SYSTEM	25 GB	NTFS not compressed
Second	Windows XP	DATA	Remainder	NTFS not compressed

Boot from the Recovery DVD and follow the instructions on the screen.

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 information specifically for administrators involved in installing, managing and integrating Windows in networks or multi-user environments.

Information for systems with RAID or AHCI 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. During the rest of the installation, you will be asked several times for a missing driver of the module. The driver is available on the included "Documentation and Drivers" DVD in the Drivers\RAID-AHCI\Intel directory.
2. Copy the matching driver to the USB disk.
3. After being prompted to press the F6 key, select the driver on the screen in a selection window. To display the proposed list completely, you may need to scroll down with the arrow keys.
   - Selection at AHCI: "Intel(R) 5 Series 6 Port SATA AHCI Controller"
   - Selection with RAID: "Intel(R) ICH8M-E/ICH9M-E/5 Series SATA RAID Controller"

11.2.3.3 Installation of Windows 7

Note

Specific information on the use of the Windows 7 operating system can be found in the following manual (not included in the scope of delivery):

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

Requirement

You need the Windows 7 recovery DVD, which is included in the scope of delivery.

Procedure

1. If necessary, connect a DVD drive to the USB interface.
2. Insert the Recovery DVD into the DVD drive.
3. Reboot the device.
4. Press the <F12> key when the following BIOS message appears.

   ```
   Press F2 to go to Setup Ulility

   Press F12 to go to Boot Manager
   ```

   After initialization, a boot menu is displayed.
5. In the boot menu, select the optical drive using the cursor keys. It is identified by a "P" in front of the SATA port number.

   Example:

   ```
   P3 - OPTIARC DVD-ROM DDU1681S
   ```
6. Confirm the selection by pressing ENTER.
7. **Immediately** press any key when you see the following prompt to install the operating system from the Recovery DVD.

   ```
   Press any key to boot from CD or DVD ..
   ```

   After a few seconds, you will see the "Install Windows" installation program.
8. Now follow the instructions in the installation program. You can find additional information on this in the section: "Install Windows" installation program.

"Install Windows" installation program

The language of the installation program and the operating system you want to install has been preset to English. You can change the language of the operating system after the installation. You can find information on this in section: Setting up the language selection by means of the Multilanguage User Interface (MUI) (Page 100).

Examples of partitions in the default factory setting

Table 11- 1 Windows 7 32-bit

Partition	Name	Size	File system
First	SYSTEM	25 GB	NTFS not compressed
Second	DATA	Remainder	NTFS not compressed

Table 11- 2 Windows 7 64-bit

Partition	Name	Size	File system
First	SYSTEM RESERVED	100 MB	Automatically set up by installation program
Second	SYSTEM	40 GB	NTFS not compressed
Third	DATA	Remainder	NTFS not compressed

11.2.4 Setting up the language selection by means of the Multilanguage User Interface (MUI)

You can set the display of menus, dialogs or other information, such as date and time, to a different language. For this purpose, you can either select one of the preinstalled languages or install a new language package.

The following command sequences are described in English. Depending on the default setting, they can be displayed in another language.

Setting up the language selection for Windows XP Professional

Note

Specific information for setting up the language for Windows XP Professional is available in the following manual (not included in the product package):

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

Changing the settings for language, region and formats of a registered user account

1. Choose:

   "Start > Control Panel > Regional and Language"

2. You can make the desired changes in the "Regional Settings", "Languages" and "Advanced" tabs.

Installing new language packages

1. Start the "MUISETUP.EXE" program in the "MUI" folder from the Recovery DVD.

   All languages that can be installed are displayed.

Setting up the language selection in Windows 7

Note

Specific information for setting up the language selection for Windows 7 is available in the following manual (not included in the scope of delivery):

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

Changing the settings for language, region and formats of a registered user account

1. Choose:

   "Start > Control Panel > Clock, Language, and Region > Regional and Language Options"

2. You can make the desired changes in the "Formats" and "Location und Keyboards and Languages" tabs.

Changing the settings for language, region and formats of the system account and the standard user account

You can change the settings for language, region and formats of the system account (for example, the language in the user login dialog) and the settings of the standard user account (standard setting for new users). The settings of the registered user are copied to the system account and the standard user account for this purpose.

1. Choose:

   "Start > Control Panel > Clock, Language, and Region > Regional and Language Options"

2. You can make the required changes in the "Administrative" tab. You copy the settings by clicking the respective button.

Installing new language packages

Some language packages are available on the Recovery DVD in the "Languagepacks" folder.

1. Choose:

   "Start > Control Panel > Clock, Language, and Region > Regional and Language Options"

2. Select the "Keyboards and Languages" tab.
3. Click the "Install/uninstall languages" button and make the required changes.

11.2.5 Recovery of Windows 7

There is a full graphical user interface available for recovery of Windows 7. 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 instructions on the screen. It may take several minutes before the next prompt for the product key is displayed.

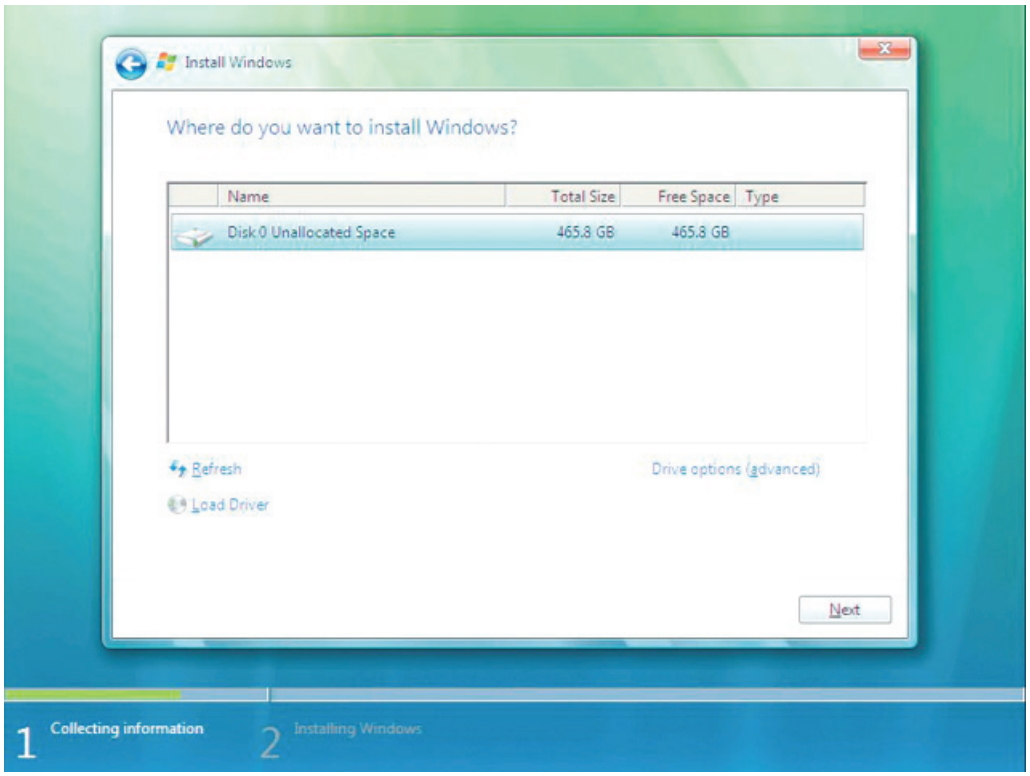
Note

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

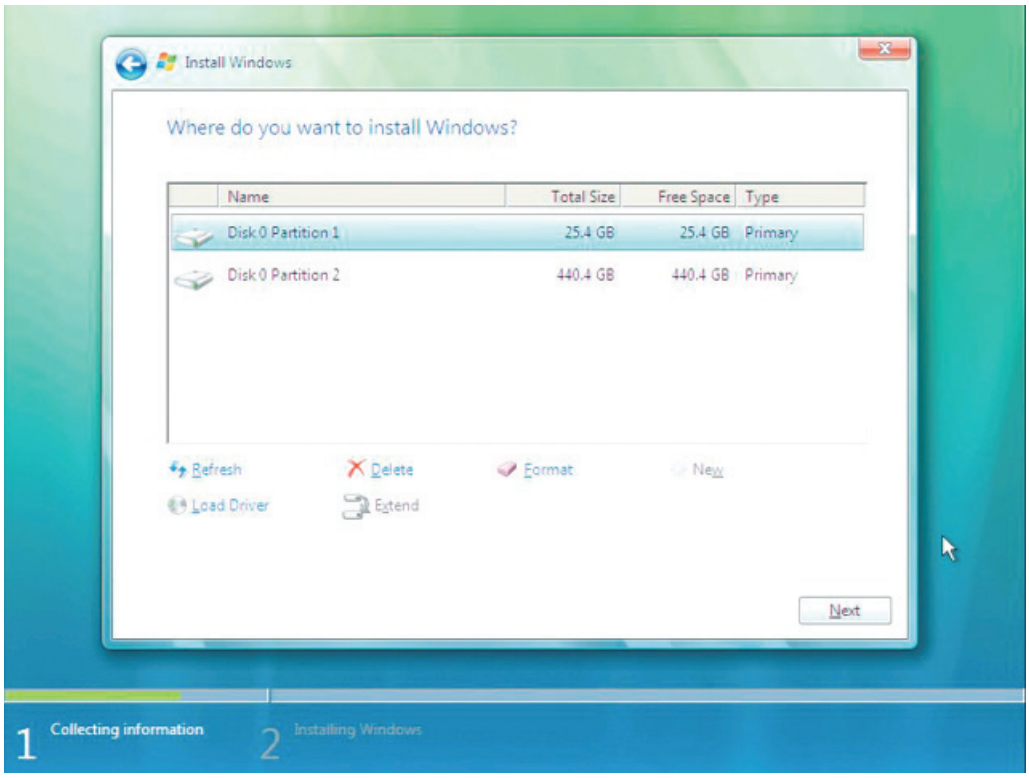
Setting up and formatting partitions

Set up the hard disk partitions after having installed a new hard disk, or to repair faulty partitions, or to change the partitioning.

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.

When shipped, the partitions are set up as follows:

Partition	Operating system	Name	Size	File system
First	Windows 7	SYSTEM	25 GB	NTFS not compressed
Second	Windows 7	DATA	Remainder	NTFS not compressed

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)

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

Setting up language selection in Windows 7

With the Multilanguage User Interface (MUI), you can set up the Windows menus and dialogs for additional languages. When shipped, Windows 7 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.

11.2.6 Installing 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 included "Documentation and Drivers" CD.
Procedure:

1. Place the CD into the drive.
2. Run *START*.
3. Select *Drivers & Updates* from the index.
4. Select the operating system in *Drivers & Updates*.
5. Install the required driver.

NOTICE
If you require the driver for the chipset after reinstalling 7 / XP / Server 2008, this must always be installed first before all other drivers.

11.2.7 Installing the RAID controller software

The procedure for installing the software is described in the user manual on the supplied "Documentation and Drivers" DVD in the directory Drivers\RAID-AHCI\Intel.

Note on Windows XP Professional, Windows Server 2008 and Windows 7

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. During the rest of the installation, you will be asked several times for the missing driver of the module. The driver is available on the included "Documentation and Drivers" DVD in the Drivers\RAID-AHCI\Intel directory.
2. Copy the matching driver to the USB disk.
3. After being prompted to press the F6 key, select the driver on the screen in a selection window. To display the proposed list completely, you may need to scroll down with the arrow keys.
   - Selection at AHCI: "Intel(R) 5 Series 6 Port SATA AHCI Controller"
   - Selection with RAID: "Intel(R) ICH8M-E/ICH9M-E/5 Series SATA RAID Controller"

11.2.8 Installing the optional burner or DVD software

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

11.2.9 Update installation

11.2.9.1 Updating the operating system

Windows

The latest updates for the Windows operating system are available in the Internet at Microsoft (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.

11.2.9.2 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.

11.2.10 Data backup and partition change

11.2.10.1 Hardware supported

Note

SIMATIC IPC Image & Partition Creator supports the hardware of your device only as of Version 3.1.

11.2.10.2 Creating an image

To back up data under Windows XP Embedded, Windows XP Professional and Windows 7 Ultimate, we recommend the software tool "SIMATIC IPC Image & Partition Creator". This tool provides comfortable and efficient functions for backup and restoring the full content of CompactFlash cards, HDDs and individual partitions (images.)

The "SIMATIC IPC Image & Partition Creator" only supports burning to DVD media.

The software can be ordered from the Siemens online ordering system. For detailed information about "SIMATIC IPC Image & Partition Creator", please refer to the corresponding product documentation.

11.2.10.3 Modifying the partitions

In order to modify partitions, we recommend using the software tool "SIMATIC IPC Image & Partition Creator".

Detailed information about using this tool is available in the manufacturer documentation of the "SIMATIC IPC Image & Partition Creator".

11.2.11 CP 1616 onboard

NDIS device driver

Read the information in description provided by Device_Driver_CP16xx.pdf on the supplied "Documentation and Drivers" CD.

PROFINET IO

Read the information regarding the SIMATIC devices and SIMATIC NET documentation listed in the "Integration" section.

11.3 Installing RAID controller software

You find the procedure for installing the RAID controller software in the RAID user manual on the supplied "Documentation and Drivers" CD.

Note

Select the type "Intel BD82QM57 Controller" from the suggested list for new installation of Windows XP Professional.

11.4 BIOS update

Writing down the BIOS Setup settings

Before you update your BIOS Setup settings, you should write down the values so that you can restore them after the BIOS update, if necessary.

Updating the BIOS default values

It is imperative that you update the BIOS default values after a BIOS update:

1. Keep the F2 key pressed during the device start until the setup menu is displayed on the screen.
2. Load the defaults using F9.
3. Adapt the BIOS Setup settings again, if necessary.

NOTICE
Reboots Several reboots can be carried out after a BIOS update. These reboots are initiated by the Management Engine (ME). The reboots are required by the ME to adapt itself to the changes in the BIOS update.

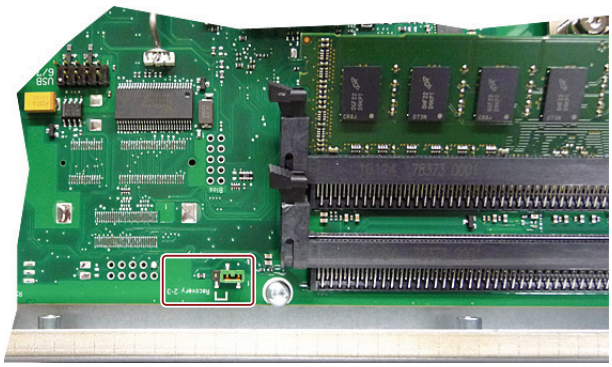
11.5 BIOS Recovery

The "BIOS-Recovery" function is used to reinstall the device when a BIOS is unusable.

The recovery resets all the BIOS setup settings to the default values. After successful recovery, you will need to make these settings again if you require any customer-specific values.

Procedure

1. Switch off the device.
2. Remove the device cover.
3. Insert jumper on "Recovery".



4. Close the device cover.
5. Place the Siemens BIOS Update USB stick into an USB slot of the device front.
6. Connect the power supply and switch on the device.

   Recovery is executed automatically and cannot be interrupted or operated. The recovery progress will be displayed on the screen.
7. Complete the recovery:
   - Switch off the device.
   - Remove the device cover, plug the jumper on "Park position" and close the device cover.
   - Remove the USB stick.
   - Switch on the device.
   - Call up the BIOS Setup by pressing the F2 key. If necessary, reset the Setup values.

Alarm, error, and system messages

12

12.1 Boot error messages

BIOS first performs a **P**ower **O**n **S**elf **T**est (POST) within the boot routine to verify proper operation of certain functional units of the PC. The boot sequence is interrupted immediately if fatal errors occur.

If the POST does not return an error, the BIOS initializes and tests further functional units. In this startup phase, the graphics controller is initialized and any error messages are output to the screen.

The error messages output by the system BIOS are listed below. For information on error messages output by the operating system or programs, refer to the corresponding manuals.

On-screen error messages

On-screen error message	Meaning / suggestions
Error - CMOS battery failed	The battery on the CPU module is defective or dead. Contact your technical support team.
Error - SMART failure detected on HDD	Hard disk error: An error bound suggested by the manufacturer has been exceeded. The operation of the hard disk is not secure. The hard disk must be replaced. Contact your technical support.
Error - Keyboard error	Check whether the keyboard is properly connected. Keyboard faults Contact your technical support.
No bootable device -- Please restart system	Possible causes: • No operating system present • Wrong drive addressed (disk in drive A/B) • Incorrect active boot partition • Wrong drive settings in SETUP • Hard disk is not connected / defective
Error - Realtime clock has lost power	Clock chip error. Contact your technical support team.

12.2 BIOS beep codes

The following section lists the POST codes relevant to users in the sequence in which they occur: Contact Customer Support (http://www.siemens.com/automation/service&support) for information on all other POST codes.

Display (hex)	Meaning	Description		Remedy
4DH	DXE_MTC_INIT	MTC Initial	MonoTonicCounter initialization	Service case
4EH	DXE_CPU_INIT	CPU Middle Initial	CPU initialization	Replace basic module
4FH	DXE_MP_CPU_INIT	Multi-processor Middle Initial	Multiprocessor initialization	Replace basic module
50H	DXE_SMBUS_INIT	SMBUS Driver Initial	SMBUS driver initialization	Service case
51H	DXE_SMART_TIMER_INIT	8259 Initial	SMART Timer initialization	Service case
52H	DXE_PCRTC_INIT	RTC Initial	RTC initialization	Service case
53H	DXE_SATA_INIT	SATA Controller early initial	Advance initialization of the SATA Controller	Service case
54H	DXE_SMM_CONTROLER_INIT	Setup SMM Control service, DXE_SMMContr oler_INIT	SSM Control service	Service case
55H	DXE_LEGACY_INTERRUPT	Setup Legacy Interrupt service, DXE_LegacyInte rrupt	Setup Legacy Interrupt service	Service case
01H	SEC_SYSTEM_POWER_ON	CPU power on and switch to Protected mode	Switch to Protected Mode	Service case
02H	SEC_BEFORE_MICROCODE_PATCH	Patching CPU microcode	Load CPU Microcode	Service case
03H	SEC_AFTER_MICROCODE_PATCH	Setup Cache as RAM	Set up cache as RAM	Service case
04H	SEC_ACCESS_CSR	PCIE MMIO Base Address initial	Initialize PCIE	Service case
05H	SEC_GENERIC_MSRINIT	CPU Generic MSR initial	Initialize CPU MS (Machine Status) Register	Service case
06H	SEC_CPU_SPEEDCFG	Setup CPU speed	Specify CPU speed	Service case
07H	SEC_SETUP_CAR_OK	Cache as RAM test	Carry out RAM Test on cache	Replace basic module

Display (hex)	Meaning	Description		Remedy
08H	SEC_FORCE_MAX_RATIO	Tune CPU frequency ratio to maximum level	Setting CPU frequency	Service case
09H	SEC_GO_TO_SECSTARTUP	Setup BIOS ROM cache	Set up BIOS ROM cache	Service case
0AH	SEC_GO_TO_PEICORE	Enter Boot Firmware Volume	Calling up the boot firmware memory area	Service case
70H	PEI_SIO_INIT	Super I/O initial	Initialization of the Super I/O	Service case
71H	PEI_CPU_REG_INIT	CPU Early Initial	Initialize CPU Register	Service case
72H	PEI_CPU_AP_INIT	Multi-processor Early initial	Multi processor initialization	Service case
73H	PEI_CPU_HT_RESET	HyperTransport initial	Initialize Hyper Transport functionality	Service case
74H	PEI_PCIE_MMIO_INIT	PCIE MMIO BAR Initial	Initialize PCIE Register	Service case
75H	PEI_NB_REG_INIT	North Bridge Early Initial	Initialization of the North bridge	Service case
76H	PEI_SB_REG_INIT	South Bridge Early Initial	Initialization of the South bridge	Service case
77H	PEI_PCIE_TRAINING	PCIE Training	Training phase of the PCIE device	Service case
79H	PEI_SMBUS_INIT	SMBUS Early Initial	Initialization of the SM Bus	Service case
41H	DXE_SB_SPI_INIT	South bridge SPI initial	Initialization of the Serial Peripheral Interface in the South Bridge	Service case
42H	DXE_CF9_RESET	Setup Reset service, DXE_CF9Reset	Setup Reset service	Service case
43H	DXE_SB_SERIAL_GPIO_INIT	South bridge Serial GPIO initial, DXE_SB_Serial GPIO_INIT	Initializations of the serial GPIO	Service case
44H	DXE_SMMACCESS	Setup SMM ACCESS service	Setup SMM access service	Service case
45H	DXE_NB_INIT	North bridge Middle initial	Initialization of the North Bridge	Service case
46H	DXE_SIO_INIT	Super I/O DXE initial	Initialization of the Super IO	Service case

Display (hex)	Meaning	Description		Remedy
47H	DXE_LEGACY_REGION	Setup Legacy Region service, DXE_LegacyRegion	Setup service Legacy region	Service case
48H	DXE_SB_INIT	South Bridge Middle Initial	Initialization of the South Bridge	Service case
49H	DXE_IDENTIFY_FLASH_DEVICE	Identify Flash device	Identify FLASH type	Service case
4AH	DXE_FTW_INIT	Fault Tolerant Write verification	Checking of the write fault tolerance	Service case
4BH	DXE_VARIABLE_INIT	Variable Service Initial	Initialization of the variable service	Service case
4CH	DXE_VARIABLE_INIT_FAIL	Fail to initial Variable Service	Failure to initialize the variable service	Service case
26H	BDS_CONNECT_LEGACY_ROM	Dispatch option ROMs	Callup of the Legacy Option ROMs	Service case
27H	BDS_ENUMERATE_ALL_BOOT_OPTION	Get boot device information	Determine the Boot Device information	Service case
28H	BDS_END_OF_BOOT_SELECTION	End of boot selection	Boot selection terminated	Service case
29H	BDS_ENTER_SETUP	Enter Setup Menu	Callup into SETUP	Service case
2AH	BDS_ENTER_BOOT_MANAGER	Enter Boot manager	Callup Boot Manager	Service case
2BH	BDS_BOOT_DEVICE_SELECT	Try to boot system to OS	Booting of the OS	Service case
2CH	BDS_EFI64_SHADOW_ALL_LEGACY_ROM	Shadow Misc Option ROM	Copying the Legacy Option ROMs into RAM	Service case
2DH	BDS_ACPI_S3SAVE	Save S3 resume required data in RAM	Make available for operating state S3 RAM	Service case
2EH	BDS_READY_TO_BOOT_EVENT	Last Chipset initial before boot to OS	Initialization of the last chipset before the OS Boot	Service case
2FH	BDS_GO_LEGACY_BOOT	Start to boot Legacy OS	Boot Legacy OS	Service case
30H	BDS_GO_UEFI_BOOT	Start to boot UEFI OS	Boot UEFI OS	Service case
31H	BDS_LEGACY16_PREPARE_TO_BOOT	Prepare to Boot to Legacy OS	Preparation for booting of Legacy OS	Service case
32H	BDS_EXIT_BOOT_SERVICES	Send END of POST Message to ME via HECI	Terminate Boot Service	Service case
33H	BDS_LEGACY_BOOT_EVENT	Last Chipset initial before boot to Legacy OS.	Initialization of the last chipset before the Legacy OS Boot	Service case

Display (hex)	Meaning	Description		Remedy
34H	BDS_ENTER_LEGACY_16_BOOT	Ready to Boot Legacy OS.	Callup to boot the Legacy OS	Service case
35H	BDS_RECOVERY_START_FLASH	Fast recovery start flash	Start the BIOS Recovery function	Service case
F9H	POST_BDS_NO_BOOT_DEVICE	No Boot Device, PostBDS_NO_BOOT_DEVICE	No BOOT device found	Service case
FBH	POST_BDS_START_IMAGE	UEFI Boot Start Image, PostBDS_START_IMAGE	Booting of an UEFI image	Service case
FDH	POST_BDS_ENTER_INT19	Legacy 16 boot entry	Start Legacy 16 boot	Service case
FEH	P0ST_BDS_JUMP_BOOT_SECTOR	Try to Boot with INT 19	Boot with INT 19	Service case
E5H	ASL_WAKEUP_S5	System wakeup from S5	Reboot from operating state S5	Service case
10H	BDS_ENTER_BDS	Enter BDS entry	Phase Boot Device Selection	Service case
11H	BDS_INSTALL_HOTKEY	Install Hotkey service	Installation of the Hotkey service	Service case
12H	BDS_ASF_INIT	ASF Initial	Initialize Alert Standard Format	Service case
13H	BDS_PCI_ENUMERATION_START	PCI enumeration	Enumerate PCI bus	Service case
14H	BDS_BEFORE_PCIIO_INSTALL	PCI resource assign complete	Assign PCI resources	Run a test by disabling the hardware components in SETUP, or by removing the expansion modules installed on the bus module
15H	BDS_PCI_ENUMERATION_END	PCI enumeration complete	PCI enumeration completed	Service case
16H	BDS_CONNECT_CONSOLE_IN	Keyboard Controller, Keyboard and Mouse initial	Initialization of keyboard and mouse	Run a test by replacing the keyboard/mouse
17H	BDS_CONNECT_CONSOLE_OUT	Video device initial	Initialize graphic connection	Service case
18H	BDS_CONNECT_STD_ERR	Error report device initial	Initialize default error output	Service case
19H	BDS_CONNECT_USB_HC	USB host controller initial	Initialize USB host controller	Service case
1AH	BDS_CONNECT_USB_BUS	USB BUS driver initial	Initialize USB bus driver	Service case

Display (hex)	Meaning	Description		Remedy
1BH	BDS_CONNECT_USB_DEVICE	USB device driver initial	Initialize USB device driver	Service case
1CH	BDS_NO_CONSOLE_ACTION	Console device initial fail	Initialization of the console faulty	Service case
1DH	BDS_DISPLAY_LOGO_SYSTEM_INFO	Display logo or system information	Display logo or system information	Service case
1EH	BDS_START_IDE_CONTROLLER	IDE controller initial	Initialization of the IDE controller	Service case
1FH	BDS_START_SATA_CONTROLLER	SATA controller initial	Initialization of the SATA controller	Service case
20H	BDS_START_ISA_ACPI_CONTROLLER	SIO controller initial	Initialization of the Super IO	Service case
21H	BDS_START_ISA_BUS	ISA BUS driver initial	Initialization of the ISA bus driver	Service case
22H	BDS_START_ISA_FDD	Floppy device initial	Initialization of the floppy connection	Service case
23H	BDS_START_ISA_SERIAL	Serial device initial	Initialization of the serial connection	Service case
24H	BDS_START_IDE_BUS	IDE device initial	Initialization of the IDE connection	Service case
25H	BDS_START_AHCI_BUS	AHCI device initial	Initialization of the AHCI connection	Service case
56H	DXE_RELOCATE_SMBASE	Relocate SMM BASE	Reassign SMM base	Service case
57H	DXE_FIRST_SMI	SMI test	SMI test	Service case
58H	DXE_VTD_INIT	VTD Initial	Initialize I/O virtualization (VTD)	Service case
59H	DXE_BEFORE_CSM16_INIT	Legacy BIOS initial	Legacy BIOS initialization	Service case
5AH	DXE_AFTER_CSM16_INIT	Legacy interrupt function initial	Legacy interrupts initialization	Service case
5BH	DXE_LOAD_ACPI_TABLE	ACPI Table Initial	ACPI table initialization	Service case
5CH	DXE_SB_DISPATCH	Setup SB SMM Dispatcher service, DXE_SB_Dispatch	SMM dispatcher service	Service case
5DH	DXE_SB_IOTRAP_INIT	Setup SB IOTRAP Service	SouthBridge IOTRAP service	Service case
5EH	DXE_SUBCLASS_DRIVER	Build AMT Table	Initialization of the AMT (Active Management Technology) table	Service case
5FH	DXE_PPM_INIT	PPM Initial	Initialization of the Processor Power Management	Service case

Display (hex)	Meaning	Description		Remedy
60H	DXE_HECIDRV_INIT	HECIDRV Initial	Initialization of the Host Embedded Controller Interface	Service case
61H	DXE_VARIABLE_RECLAIM	Variable store garbage collection and reclaim operation	Loading of the variable memory	Service case
7AH	PEI_PROGRAM_CLOCK_GEN	Clock Generator Initial	Initializations of the clock generator	Service case
7BH	PEI_IGD_EARLY_INITIAL	Internal Graphic device early initial, PEI_IGDOpRegion	First initialization of the graphic connection	Service case
7CH	PEI_HECI_INIT	HECI Initial	Initialization of the Host Embedded Controller Interface	Service case
7DH	PEI_WATCHDOG_INIT	Watchdog timer initial	Initialization of the watchdog timer	Service case
7EH	PEI_MEMORY_INIT	Memory Initial for Normal boot	Memory initialization during the PEI phase	Replace the memory modules
7FH	PEI_MEMORY_INIT_FOR_CRISIS	Memory Initial for Crisis Recovery	Memory initialization for BIOS recovery	Replace the memory modules
80H	PEI_MEMORY_INSTALL	Simple Memory test	Memory test	Replace the memory modules
81H	PEI_TXTPEI	TXT function early initial	Initialization of the Trusted Execution Technology	Service case
82H	PEI_SWITCH_STACK	Start to use Memory	Start the memory use	Service case
83H	PEI_MEMORY_CALLBACK	Set cache for physical memory	Use cache as a physical memory	Service case
84H	PEI_ENTER_RECOVERY_MODE	Recovery device initial	Initialize the device for BIOS recovery	Service case
85H	PEI_RECOVERY_MEDIA_FOUND	Found Recovery image	BIOS Recovery image found	Service case
86H	PEI_RECOVERY_MEDIA_NOT_FOUND	Recovery image not found	BIOS Recovery image not found	Check whether the BIOS Recovery image exists on the recovery medium (e.g. USB stick).
87H	PEI_RECOVERY_LOAD_FILE_DONE	Load Recovery Image complete	Loading of BIOS Recovery image completed	Service case

Display (hex)	Meaning	Description		Remedy
88H	PEI_RECOVERY_START_FLASH	Start Flash BIOS with Recovery image	Starting of flashing of BIOS Recovery image	Service case
89H	PEI_ENTER_DXEIPL	Loading BIOS image to RAM	Copy BIOS image to the RAM	Service case
8AH	PEI_FINDING_DXE_CORE	Loading DXE core	Loading DXE (Driver Execution Environment) program	Service case
8BH	PEI_GO_TO_DXE_CORE	Enter DXE core	Start DXE program	Service case

Special codes

The BIOS does not generate any beep codes.

Troubleshooting/FAQs

13

13.1 General problems

This chapter provides you with tips on how to localize and troubleshoot frequently occurring problems.

Problem	Possible causes	Remedy
The device is not operational	There is no power supply to the device.	• Check the power supply, the network cable and the power plug. • Check if the On/Off switch is in the correct position.
	Device is being operated outside the specified ambient. conditions	• Check the ambient conditions. • After transport in cold weather, wait approximately 12 hours before switching on the device.
Windows no longer boots	Settings in the BIOS Setup are incorrect	• Check the settings in the BIOS Setup "SATA Configuration" submenu • Check the setting in the BIOS Setup Boot menu
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 the screen brightness. 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. • 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 if the mouse driver is correctly installed.
	The mouse is not connected.	Check whether the mouse lead is connected to the system unit. If you are using an adapter or extension for the mouse lead, check the connectors. Should the mouse cursor still not be visible on-screen after completing these checks and measures, contact technical support.

Problem	Possible causes	Remedy
Wrong time and/or date on the PC.	–	1. Press <F2> during the boot sequence to open BIOS Setup. 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.	Replace the backup battery.
USB device not responding.	The USB ports are disabled in your BIOS.	Use a different USB port or enable the port.
	Operating system does not support the USB port.	Enable USB Legacy Support for the mouse and keyboard. For other devices you need the USB drivers for the respective operating system.
DVD: 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: 1. Switch off the device 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. 3. Pull the loader further out.
The RAID software reports the following errors: • The RAID plug-in failed to load, because the drive is not installed. • The Serial ATA plug-in failed to load, because the driver is not installed correctly. • The Intel® Matrix Storage Console was unable to load a page for the following reason: – A plug-in did not provide a page for the selected device – A plug-in failed to load	RAID is not activated RAID is activated	In this case, the messages have no negative influence on the device function and can be ignored. Acknowledge the messages. Re-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

Problem	Possible causes	Remedy
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 excluded as a 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
The screen flickers when the mouse moves or when programs are called	DDC information is not available. Possible causes: • Monitor does not supply DDC information • KVM switch does not pass through DDC information. • Y cable adapter with DVI-I for DVI-D/VGA connector is being used	• Use a monitor that supports DDC • Use a KVM switch that passes through DDC information • Use a basic cable adapter with DVI-I to VGA connector.

13.2 Problems when Using Modules of Third-party Manufacturers

Problem	Possible cause	Remedy
The PC crashes during startup	• Double allocation of I/O addresses • Double allocation of hardware interrupts and/or DMA channels • Signal frequencies or signal levels are incorrect. • Different connector pin assignments	Check your computer configuration: • If the computer configuration corresponds with factory state, please contact your technical support team. • 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.
		Contact Technical Support if the PC still crashes.
	• If the performance of the external 24 V power supply is insufficient	• use a larger power supply.

13.3 Display a temperature error by means of the DiagBase application

Cause

Temperature errors do not occur during the normal approved use of the device. If the monitoring software (DiagBase or DiagMonitor) indicates a temperature error and the symbol in the status display changes from green to red, check the following:

- Are the fan apertures covered?
- Has the fan has failed (check speed display in the monitoring software)?
- Is the ambient temperature higher than the allowed value (see technical data)?
- Is the total output of the power supply within the specified limit?
- Are the heatsinks inside the PC covered with dust?

Remedy

The temperature fault is stored until the temperature drops back below the temperature threshold and you acknowledge the error message in the monitoring software.

- Click on the button with the "small broom" icon.
  When the error message has been acknowledged, the "TEMP" LED goes out, the title bar changes in the monitoring software and the symbol in the status bar changes from red to green.
- Restart the PC if you have not installed the monitoring software.

Technical data

14

14.1 General Specifications

General specifications	
Order numbers	6ES7647-6P ...
Dimensions	Without DVD burner: 297 x 267 x 153 (B x H x D in mm) With DVD burner: 297 x 267 x 172
Weight	approx. 10 kg
Supply voltage (AC)	Nominal 100 - 240 V AC (-15% / +10%) (autorange)
Supply voltage (DC)	Nominal 24 V DC (-20% / + 20%), SELV
Input current AC	Continuous current up to 2.3 A (on start-up, up to 50A for 1 ms)
Input current DC	Continuous current to 8 A (to 14 A for 30 ms at startup)
Line voltage frequency	50 - 60 Hz (47 to 63 Hz)
Transient current interruption according to Namur	max. 20 ms
max. power consumption AC / DC	Effective power 190 W / 210 W Apparent power 250 VA / -
Maximum power loss and heat dissipation	AC: 190 W = 190 J/s = 0.18 BTU/s DC: 210 W = 210 J/s = 0.2 BTU/s Efficiency > 80%
max. current output	+5 V / 16.5 A * (18.5 W peak) +3.3 V / 8.5 A * * total of 90 W permitted +12 V / 6.5 A (8 A peak) -12 V / 0.3 A The total sum of all voltages is max. 150 W.
Noise emission	< 55 dB(A) according to EN ISO 7779
Degree of protection	IP 20
Safety	
Protection class	Protection class I to IEC 61140
Safety regulations	AC: EN 60950-1; UL60950-1; CAN/CSA C22.2 No 60950-1-03 DC: EN 61131-2; UL508; CSA C22.2 No 142
Electromagnetic compatibility (EMC)	
Emitted interference	EN 61000-6-3, EN 61000-3-2 class D EN 61000-3-3; FCC class A
Noise immunity: Mains borne disturbance variables on supply lines	± 2 kV, (according to IEC 61000-4-4; Burst) ± 1 kV; (according to IEC 61000-4-5; Surge symm) ± 2 kV; (according to IEC 61000-4-5; Surge asymm)

General specifications	
Noise immunity on signal lines	± 1 kV;(according to IEC 61000-4-4; Burst; Length < 30 m) ± 2 kV; (according to IEC 61000-4-4; Burst; Length > 30 m) ± 2 kV; (according to IEC 61000-4-5; Surge; Length > 30 m)
Immunity to discharges of static electricity	± 6 kV contact discharge (according to IEC 61000-4-2) ± 8 kV air discharge (according to IEC 61000-4-2)
Immunity to RF interference	10 V/m 80 to 1000 MHz and 1.4 to 2 GHz, 80% AM (according to IEC 61000-4-3) 1 V/m 2 - 2.7 GHz, 80% AM (according to IEC 61000-4-3) 10 V 10 KHz to 80 MHz; (according to IEC 61000-4-6)
Magnetic field	100 A/m, 50 Hz (to IEC 61000-4-6)
Climatic conditions	
Temperature - Operation *1 - Storage/transport - Gradient	Tested according to IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14 + 5 °C to + 45 °C + 5 °C to + 50 °C (with a total of max. 50 W for the slots) + 5 °C to + 55 °C (with a total of max. 10 W for the slots) – 20° C to +60° C max. 10° C/h in operation, 20° C/h storage, no condensation
Relative humidity -Operation - Storage/transport	tested to IEC 60068-2-78, IEC 60068-2-30 5% to 80% at 25° C (no condensation) 5% to 95 % at 25° C (no condensation)
Atmospheric pressure -Operation - Storage/transport	 1080 to 795 hPa (corresponds to an altitude of -1000 to 2000 m) 1080 to 660 hPa (corresponds to an altitude of -1000 to 3500 m)
Mech. ambient conditions	
Vibration - in operation *2, *3 - Storage/transport	tested to DIN IEC 60068-2-6 10 to 58 Hz: 0.075 mm, 58 to 500 Hz: 9.8 m/s² 5 to 9 Hz: 3.5 mm, 9 to 500 Hz: 9.8 m/s²
Shock resistance - in operation *3 - Storage / transport	Tested to IEC 60068-2-27, IEC 60068-2-29 50 m/s², 30 ms, 250 m/s², 6 ms
Special features	
Quality assurance	to ISO 9001
Motherboard	
Chipset	Mobile Intel® QM57 Express Chipset
Processor	Intel® Celeron™ P4505 mobile processor 1.86 GHz, 2 MB second-level cache, 2 cores / 2 threads, virtualization Intel® Core™ i3-330E mobile processor 2.13 GHz, 3 MB second-level cache, 2 cores /4 threads, hyperthreading, virtualization Intel® Core™ i7-610E mobile processor 2.53 GHz, 4 MB second-level cache, 2 cores / 4 threads, hyper-threading, turbo boost, virtualization, AMT

General specifications	
Main memory	2 sockets with a maximum of 8 GB SDRAM DDR3 1066 each See order documentation for memory expansion
Backup memory	2 MB SRAM, 128 KB can be backed up in the buffer time
Free expansion slots	• 2x PCI, 290 mm long • 1x PCI 240 mm long, • 1x PCIe x16 240 mm long • 1x PCIe x4 185 mm long
Max. permissible power consumption per PCI/PCIexpress slot	5 V / 2 A or 3.3 V / 3 A, 12 V / 1 A, -12 V / 0.05 A The accumulated power consumption (all slots) may not exceed 50 W
Disk drives	
Hard disk drive	3.5" / 2.5" serial ATA, see ordering documentation for the hard disk capacity - 3 Gbps data transmission rate - supports NCQ (Native Command Queuing; SATA II property)
Flash memory	CompactFlash card 1 x solid-state drive
DVD burner *2	Serial ATA, See order documentation for features
Graphics	
Graphic controller	Intel® HD Graphics Controller, 2-D and 3-D engine integrated in chipset
Graphics memory	Dynamic Video Memory Technology (uses up to 256 MB of RAM)
Resolutions/frequencies/colors	CRT: Max. 1280x1024 at 100 Hz / 32-bit color depth Max. 1600x1200 at 60 Hz / 32-bit color depth Maximum resolution: 2038x1536 at 75 Hz / 16-bit color depth LCD via DVI-I: 1600x1200 at 60 Hz / 32-bit color depth
Interfaces	
DVI-I	Port for external CRT / LCD monitor
USB	External: 4 x USB 2.0 on the port side (max. 2 can be simultaneously operated as high current) There are 3 USBs available internally: 1 x USB 2.0 high current + 1x USB 2.0 low current on a 10-pin male connector, 1 x USB 2.0 low current for internal USB stick/dongle Internal front interface (X44): 1 x USB 2.0 high current 1 x USB 1.1 high current

General specifications	
PROFIBUS / MPI interface *4 - Transmission speed - Operating mode - Physical interface - Memory address space - Interrupts	9-pin Cannon socket 9.6 Kbps to 12 Mbps, software-selectable potential isolation: - Data lines A, B - Control lines RTS AS, RTS_PG - 5 V supply voltage (max. 90 mA) ground connection: - DP12 connector cable shield RS485, isolated *5 automatically configured
PROFINET *6	3 x RJ-45 connection, CP 1616 compatible onboard interface based on ERTEC 400, 10/100 Mbps isolated *5
Ethernet *5 *6	Wake on LAN and Remote Boot are supported Ethernet 1: Intel 82577 LM, capable of teaming capable of AMT, supports jumbo frames up to 4088 bytes Ethernet 2: Intel 82574 L, capable of teaming supports jumbo frames up to 9014 bytes
COM1	Serial port 1 9-pin Cannon socket
Compact Flash	Slot for Compact Flash Card
Status displays on the device	
	DVD/CD access (to CD drive if installed) 2x 7-segment display (for BIOS post codes) 2x three-color alarm LEDs 1x LED for Profinet (optional)

*1 Restrictions for DVD burner: Burner is only permitted with ambient temperatures of +5°C to +40°C

*2 Limitation with DVD burner drives:
10 to 58 Hz: 0.019 mm / 58 to 500 Hz: 2.5 m/s²
Burner can only be operated in an interference-free environment

*3 Restriction for installation with vertical mounting kit
Vibration: 10-58 Hz: 0.0375 mm / 58-500 Hz: 4.9 m/s²
Shock resistance: 25 m/s², 30 ms

*4 Optional product variant

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

*6 For unique labeling, the LAN interfaces are numbered on the housing. The numbering by the operating system can differ.

14.2 Current/power requirements of the device

Maximum current values

Component	Voltage			
	+5 V	**+3.3 V**	**+12 V**	**-12 V**
Base device [1) 2)]	8.5 A	2.3 A	0.7 A	0 A
Hard disk drive 1 x 3.5" [2)]	0.6 A		0.5 A	
Hard disk drives 2 x 2.5" [2)]	1.2 A			
DVD burner drive [2)]	0.8 A			
USB ports [3)]	1.2 A			
PCI/PCIexpress slots [3)]	4 A	6 A	2 A	0.1 A
Individual currents (max. permissible) [4)]	**16.5 A**	**8.5 A**	**6.5 A**	**0.3 A**

1) Basis device contains motherboard, processor, memory, both fans, CF
2) Depends on the selected device configuration
3) The maximum permitted accumulated power for the PCI and USB extensions is max. 30 W.
4) The max. permitted accumulated power of the + 5 V and + 3.3 V voltages is 90 W.

Typical power values

Component	Current consumption (AC-SV, U=230V)	Current consumption (DC-SV, U=24V)	Power consumption
Base device	0.2 A	1.9 A	45 W
Hard disk drive 1 x 3.5"	0.04 A	0.38 A	9 W
Hard disk drives 2 x 2.5"	0.03 A	0.25 A	6 W
DVD burner drive	0.02 A	0.17 A	4 W
USB expansion	0.03 A max.	0.29 A	Max. 7 W
PCI-/PCIexpress expansion	0.16 A max.	1.54 A max.	Max. 37 W

14.3 AC voltage supply

Technical data

Degree of protection	IP20 (in installed state)
Protection class	VDE 0106

Note

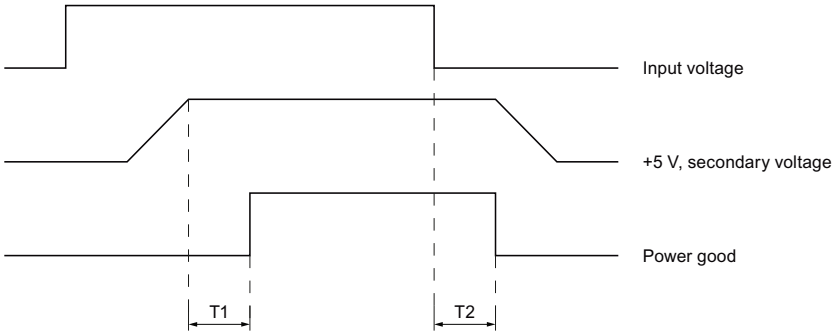
The power supply contains an active PFC (Power Factor Correction) circuit to conform to the EMC guidelines.

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

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

Power supply characteristics	**AC power supply**
Input data	
Voltage	Nominal 100 - 240V AC (-20% / +10%), wide range
Continuous current	Max. 2.3 A
Starting current (load-independent)	to 50 A for 1 ms
Active power	190 W
Apparent power	250 VA
Output data	
Voltages	+5 V / 16.5 A * (18.5 A peak) +3.3 V / 8.5 A * * total of 90 W permitted +12 V / 6.5 A (8 A peak) -12 V / 0.3 A
Secondary power output	Max. 150 W

Power Good signal of the AC power supply



T1: preset time 50 ... 500 ms
T2: hold-up time 20 ms minimum

14.4 DC power supply

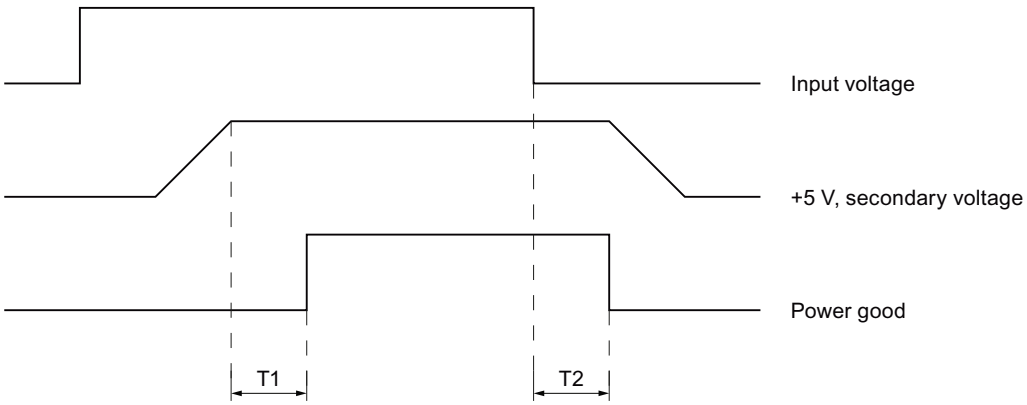
Specifications

Degree of protection	IP20 (in installed state)
Protection class	VDE 0106

1) 15 W per PCI slot included

Power supply characteristics	**DC power supply**
Input data	
Voltage	Nominal 24 V DC (-15% / +20%), SELV
Continuous current	Max. 8 A
Starting current (load-independent)	to 14 A for 30 ms
Active power	190 W
Output data	
Voltages	+5 V / 16.5 A * (18.5 A peak) +3.3 V / 8.5 A * * total of 90 W permitted +12 V / 6.5 A (8 A peak) -12 V / 0.3 A
Secondary power output	Max. 150 W

Power Good signal of the DC power supply



T1: preset time 50 ... 500 ms
T2: hold-up time 20 ms minimum

Dimension drawings

15

15.1 Overview of the dimensional drawings

This section contains the following dimension drawings:

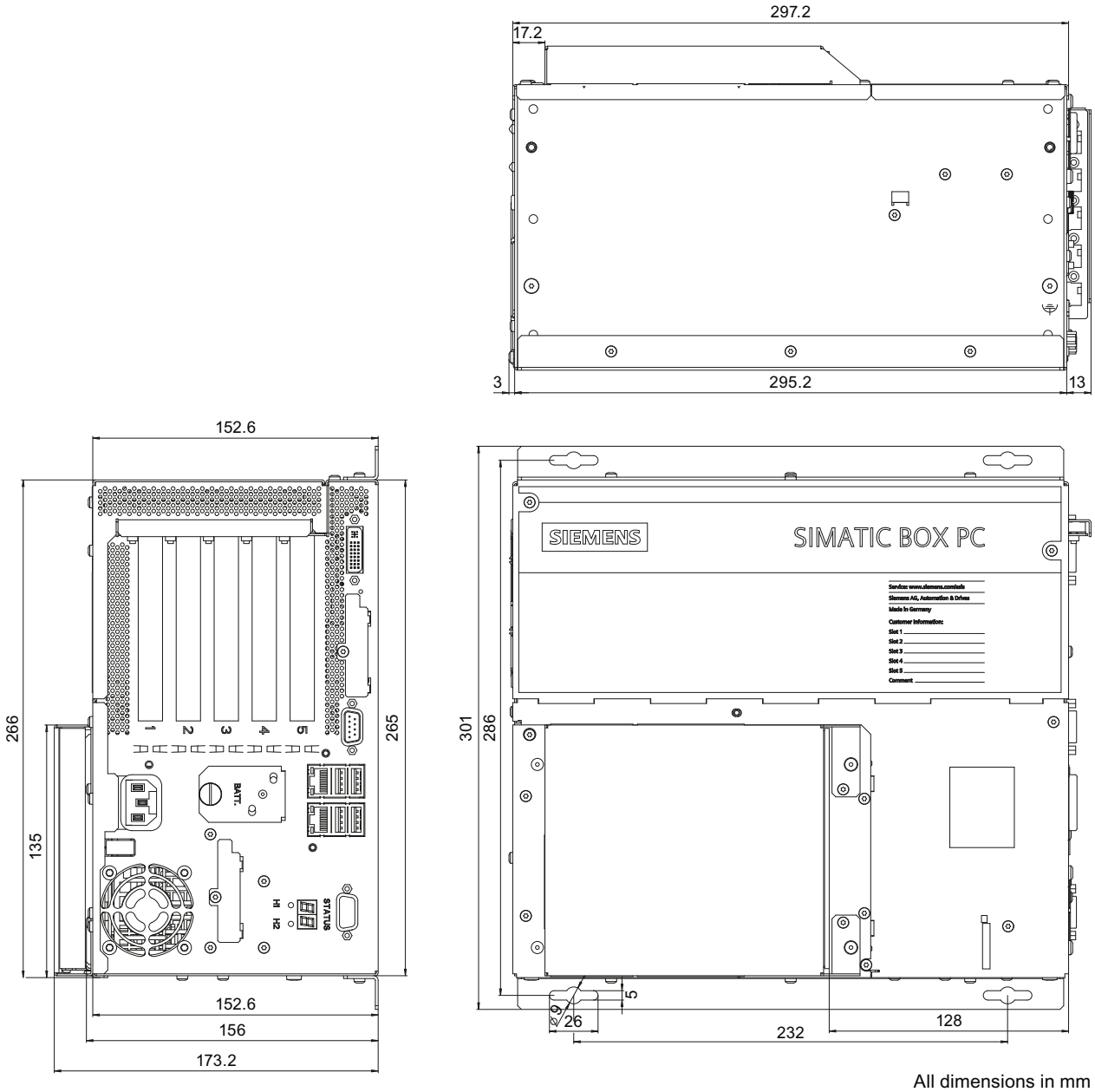
- Dimensional drawing of device for mounting with angle bracket (Page 132)
- Dimensional drawing of device for mounting without angle bracket (Page 132)
- Dimensional drawing of device for mounting with the vertical mounting kit (Page 132)
- Dimensional drawing of device for installation with the vertical mounting kit for PC port access from the front (Page 132)
- Dimensional drawings for the installation of expansion modules (Page 136)

Note

The dimensions are always given in in mm and inch (above: Millimeter, below: Inch).

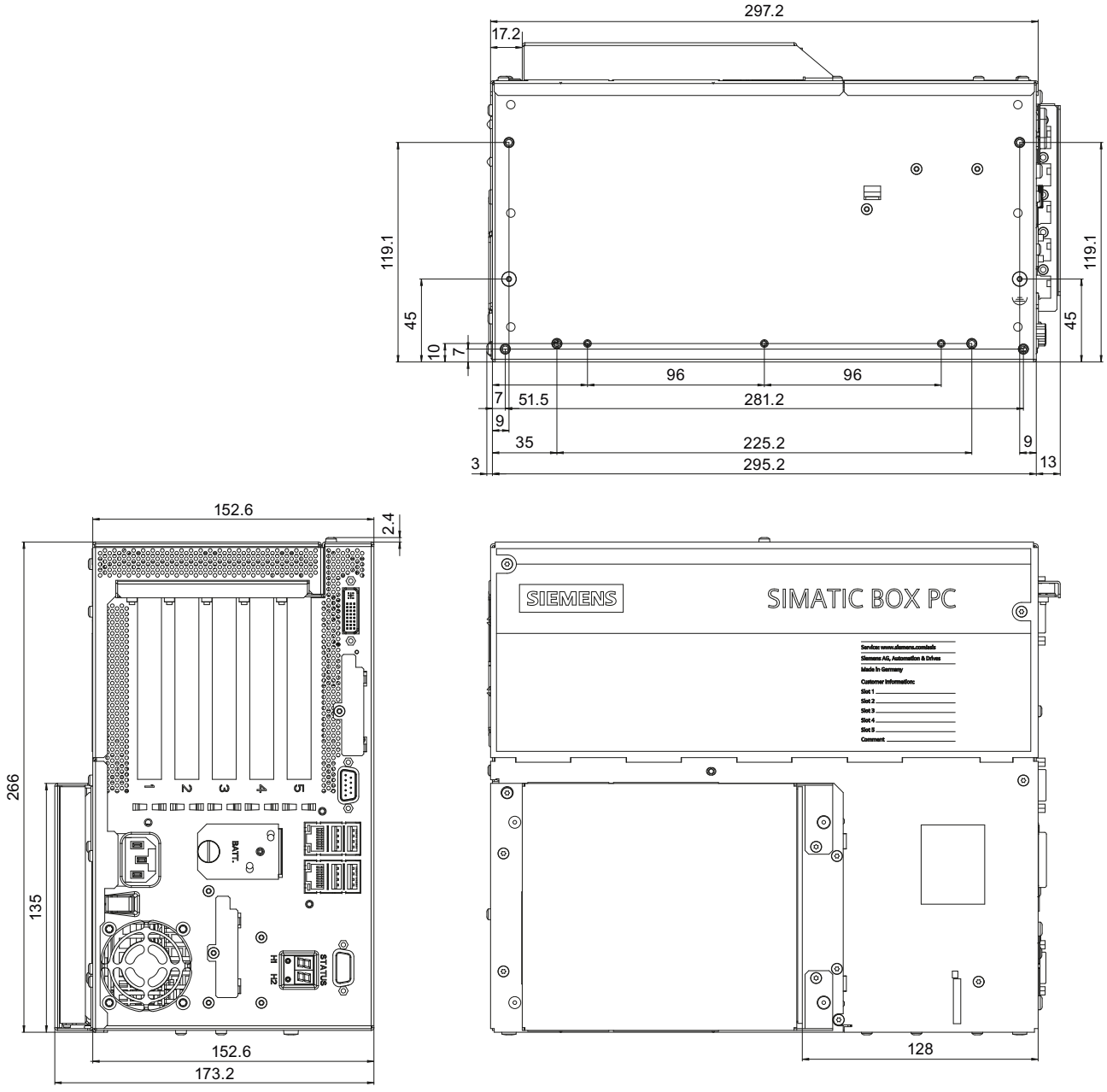
15.2 Dimensional drawings of the device

Dimensional drawing for mounting with angle bracket



All dimensions in mm

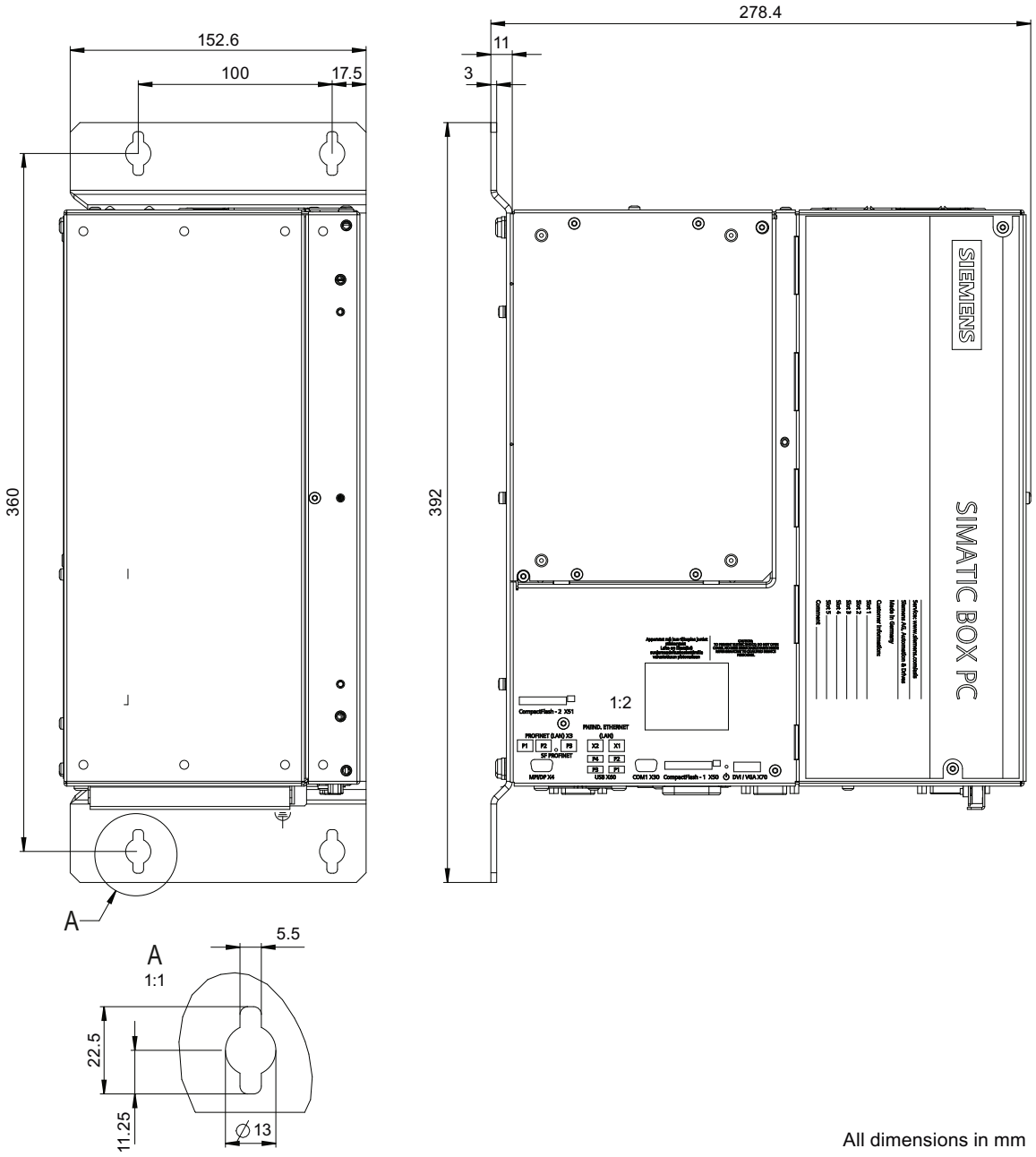
Dimensional drawing for mounting without angle bracket



All dimensions in mm

NOTICE
When mounting devices with optical drives the installation depth changes.

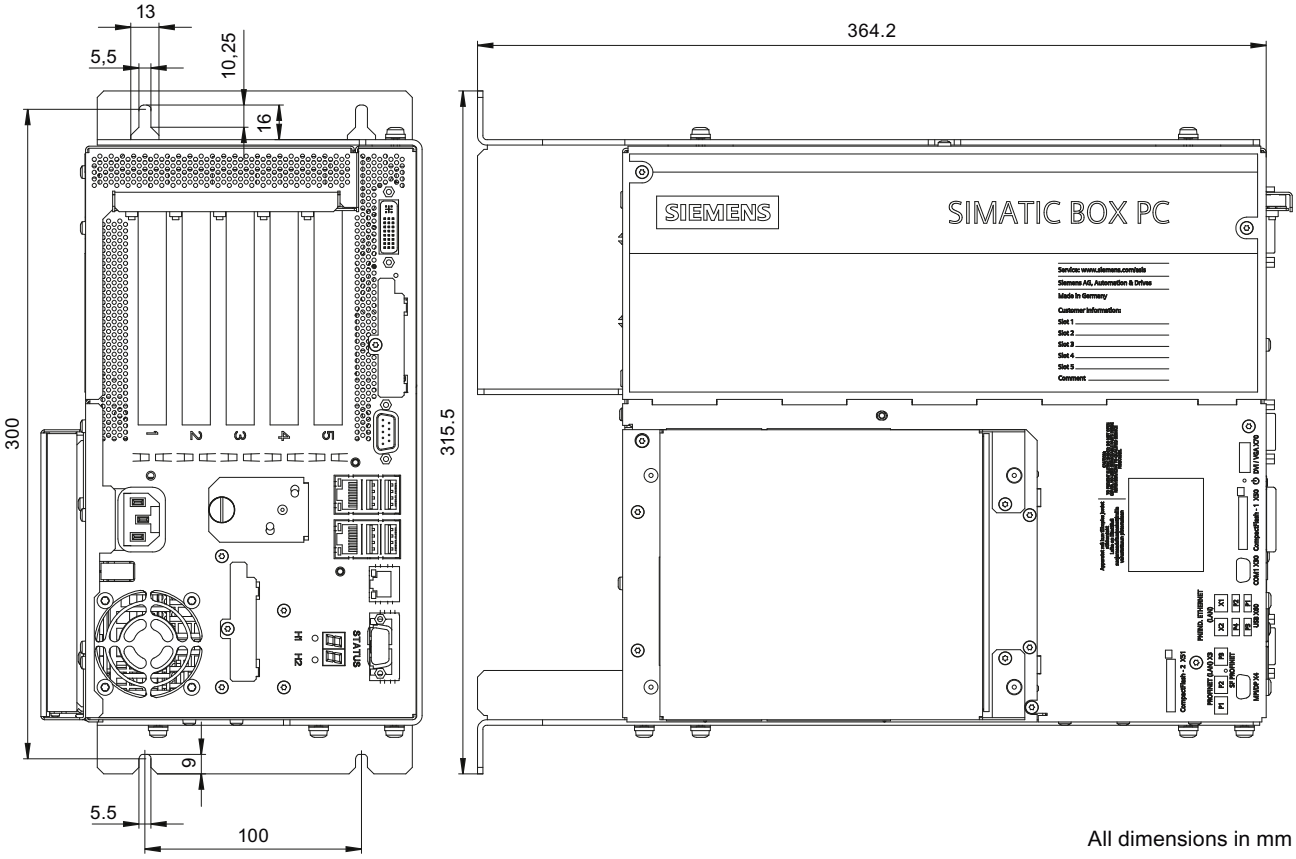
Dimensional drawing for installation with the vertical mounting kit (model without DVD burner)



All dimensions in mm

NOTICE
When mounting devices with optical drives the installation depth changes.

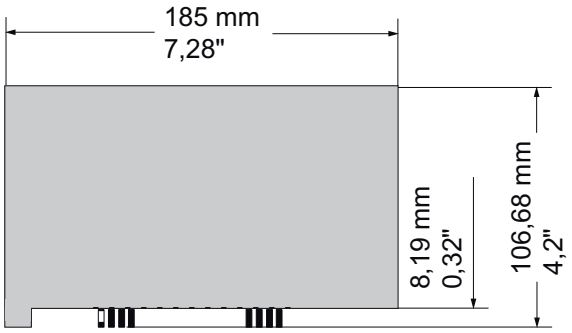
Dimensional drawing for installation with the vertical mounting kit for PC port access from the front



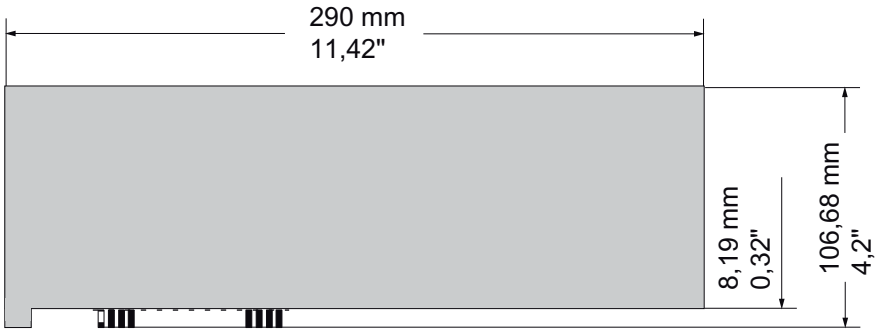
All dimensions in mm

15.3 Dimensional drawings for the installation of expansion modules

Dimension drawing for short PCI or PCI Express module



Dimension drawing for the largest installable PCI module



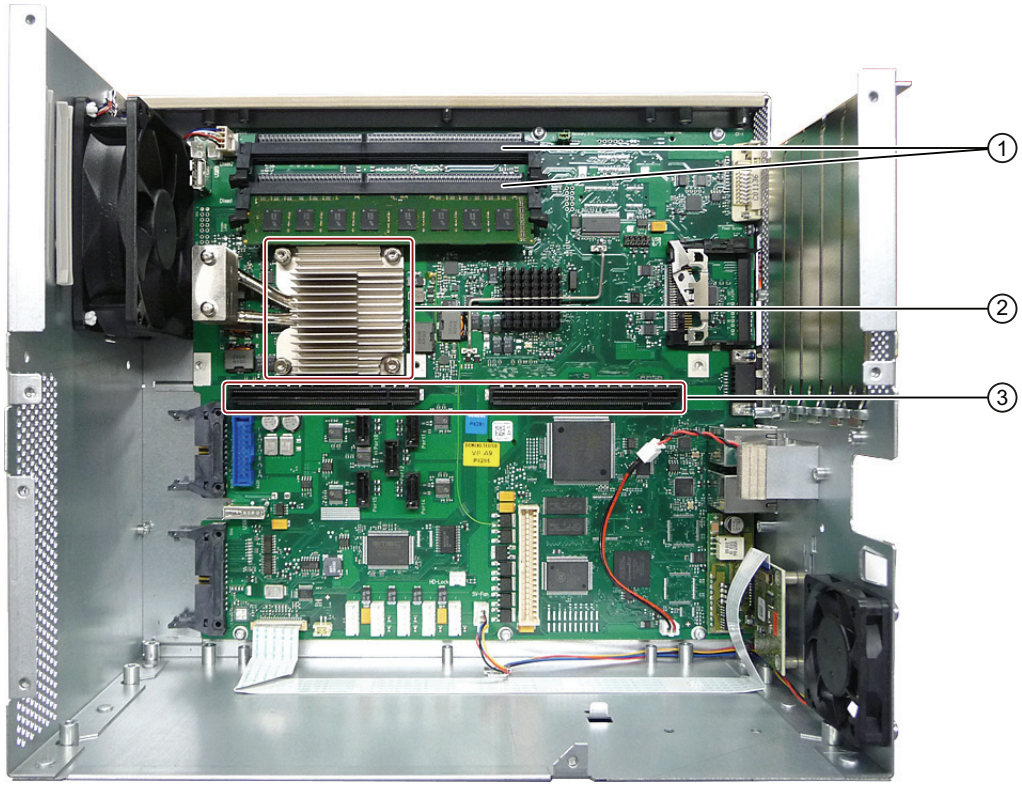
Detailed descriptions

16

16.1 Motherboard

16.1.1 Structure and functions of the motherboard

The essential components of the motherboard are the processor and the chip set, two slots for memory modules, internal and external interfaces and the Flash BIOS.



①	Slots for memory modules
②	Processor heat sink
③	Slot for the bus board

16.1.2 Technical features of the motherboard

Table 16- 1

Component / interface	Description	Characteristics
Chip set	Single chip set	• Mobile Intel® QM57 Express Chipset
BIOS	Update by means of software	• InsideH20 Setup Utility Rev. 3.x
CPU	• Intel® Celeron P4505 1.86 GHz • Intel® Core i3-330E 2.13 GHz • Intel® Core i7-610E 2.53 GHz	• 2 MB second-level cache, 2 cores / 2 threads, virtualization • 3 MByte second level cache, 2 cores /4 threads, hyperthreading, virtualization • 4 MB second-level cache, 2 cores / 4 threads, hyper-threading, turbo boost, virtualization, AMT
Memory	2 sockets maximum 4 GB SDRAM DDR3	• 64-bit/72-bit data bus width (without ECC / with ECC) • 3.3 V • SDRAM DDR3 in accordance with PC3-8500 specifications
Graphics	integrated in chip set	• Onboard Intel® Graphics Media Accelerator HD Graphics Controller 2-D and 3-D engine integrated in chipset • Dynamic Video Memory Technology (uses up to 256 MB of RAM) • CRT: Max. 1280x1024 at 100 Hz / 32-bit color depth Max. 1600x1200 at 60 Hz / 32-bit color depth Maximum resolution: 2038x1536 at 75 Hz / 16-bit color depth • LCD via DVI-I: 1600x1200 at 60 Hz / 32-bit color depth
Hard disk	2 channels, Serial ATA	3.5" / 2.5" serial ATA, see ordering documentation for the hard disk capacity • - 3 Gbps data transmission rate - supports NCQ (Native Command Queuing; SATA II property)
Flash memory	CompactFlash card	
	Solid-state drive	

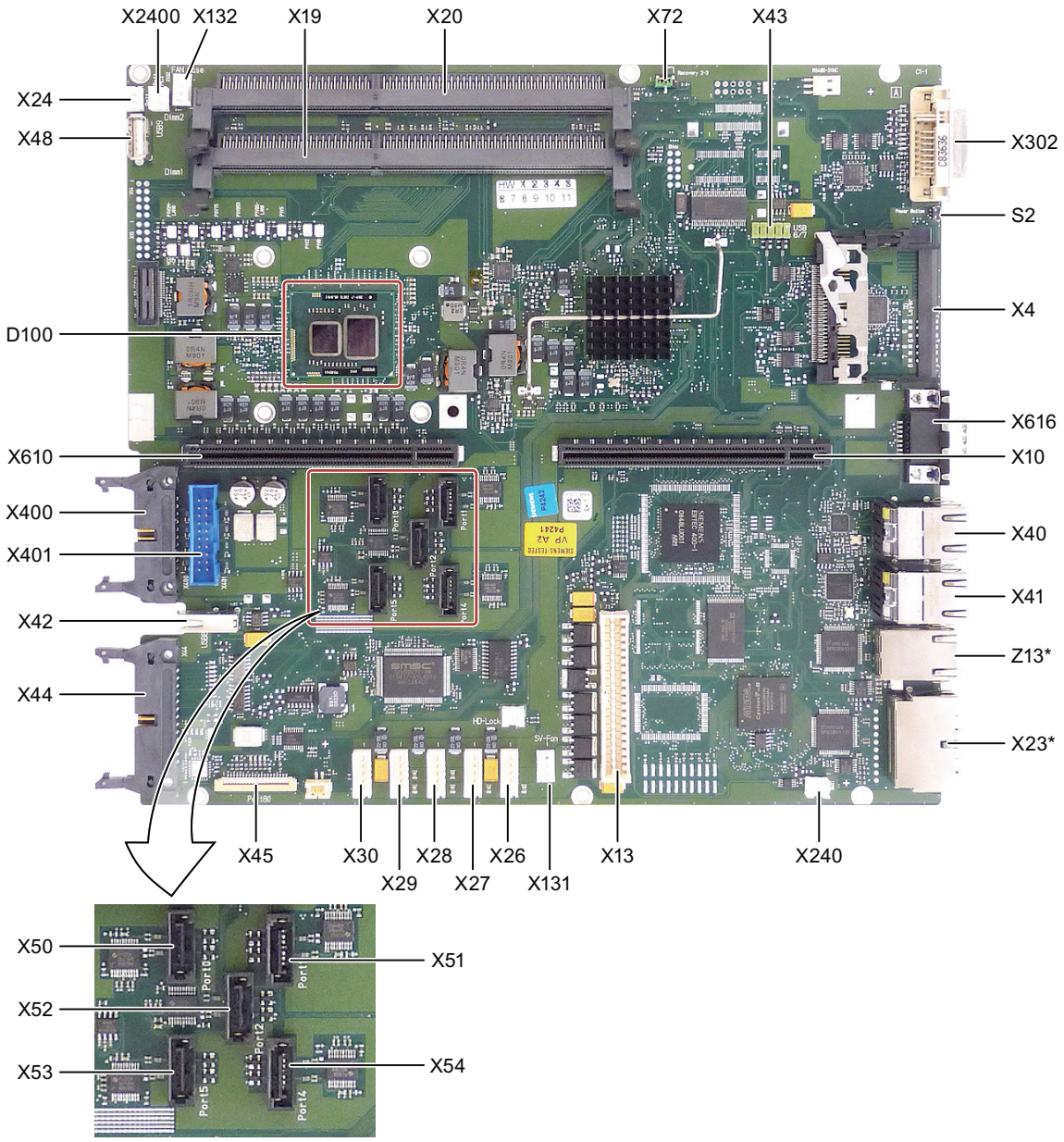
Component / interface	Description	Characteristics
RAID	Onboard Serial ATA	• Intel BD82QM57 RAID 0, 1, 0+1
DVD Burner [3]	connection, Serial ATA	• UDMA-capable, ATA33
PROFIBUS/MPI [2]	Communication port SIMATIC S7	• Potential isolated [1] CP 5611 compatible • 12 Mbps
PROFINET [2]	Communication interface for PROFINET IO applications and SIMATIC installations	• 10/100 Mbps, electrically isolated [1] • CP 1616 compatible 3 port interface
USB	Universal Serial Bus	• External: 4 x USB 2.0 on the port side (max. 2 can be simultaneously operated as high current) • There are 3 USBs available internally: 2x for connecting a cover with USB interfaces as an extension - 1x for UFDs • Internal front interface (X44): 1 x USB 2.0 high current, 1x USB 1.1 high current
Ethernet	2x 10BaseT/100Base-TX	• 10/100/1000 Mbps, electrically isolated[1] • Ethernet 1: Intel 82577 LM, capable of AMT, supports jumbo frames up to 4088 bytes • Ethernet 2: Intel 82574 L, supports jumbo frames up to 9014 bytes

1 Electrical isolation within the safety extra-low voltage circuit (SELV)
2 Optional product variant
3 Depends on the selected device configuration

16.1.3 Position of the interfaces on the motherboard

The motherboard of the device features the following interfaces:

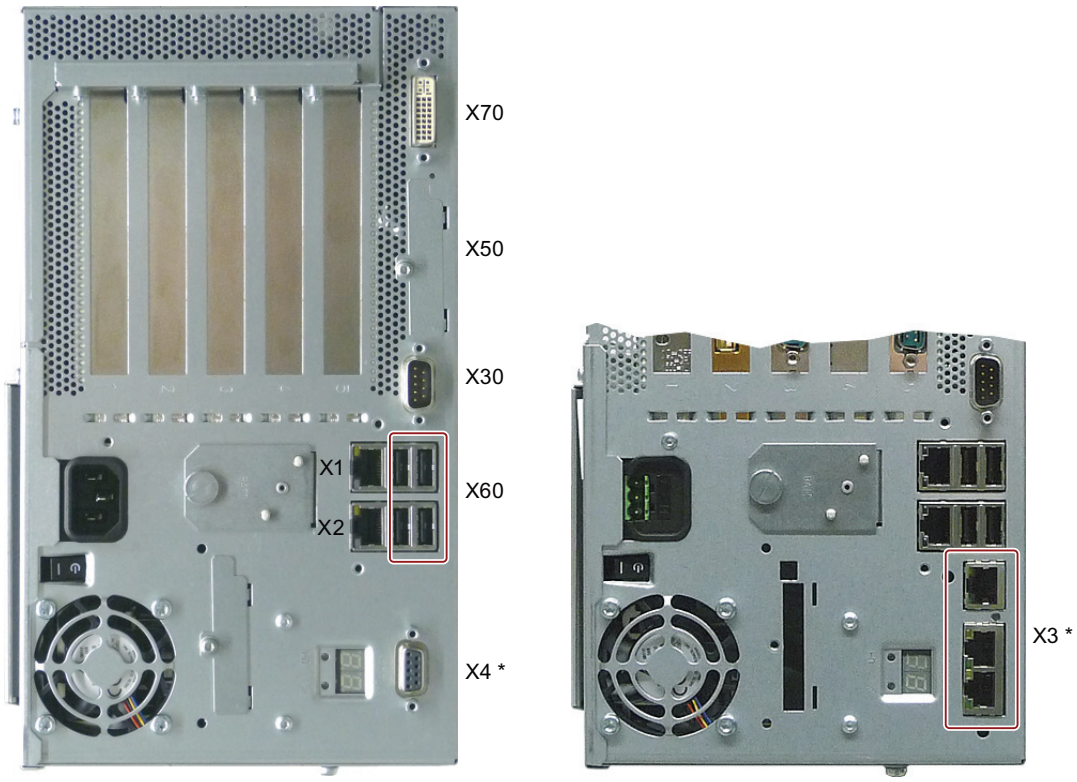
- Interfaces for the connection of external devices
- Interfaces for internal components (drives, bus boards etc.)



* Optional product variant

16.1.4 External ports

Pin assignment



* Optional product variant

Interface	Position	Connector	Description
USB 2.0	external	X60	Lower USB channel 0, upper USB channel 1 Lower USB channel 2, upper USB channel 3
PROFIBUS/MPI	external	X4	9-pin, standard socket, electrically isolated interface
PROFINET	external	X3	Three RJ45 ports
Ethernet	external	X1 X2	First RJ45 port Second RJ45 port
DVI-I	external	X70	26-pin socket
Compact Flash	external	X50	50-pin CF socket, types I / II
COM1	external	X30	Serial port

USB ports, X60

The Universal Serial Bus interfaces have the following pinout:

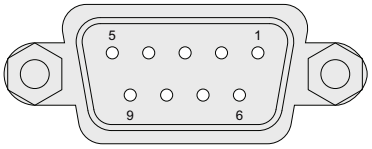
USB interface			
			
Pin no.	**Short description**	**Meaning**	**Input / Output**
1	VCC	+ 5 V (fused)	Output
2	– Data	Data channel	Input / Output
3	+ Data	Data channel	Input / Output
4	GND	Ground	–

The connectors are of type A.

All ports are designed as high current USB (500 mA), you can only use a maximum of 2 simultaneously as high current, however.

CAUTION
No USB devices can be connected which feed back voltage to the Box PC.

PROFIBUS/MPI interface X4

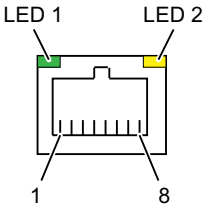
PROFIBUS/MPI interface [1]			
			
Pin no.	**Short description**	**Meaning**	**Input / Output**
1	–	Unassigned	–
2	–	Unassigned	–
3	LTG_B	Signal line B of MPI module	Input/output
4	RTS_AS	RTSAS, control signal for received data stream. The signal is "1" when the directly connected AS is sending.	Input
5	M5EXT	M5EXT return line (GND) of 5 V supply. The current load of an external consumer connected between P5EXT and M5EXT may not exceed the 90 mA.	Output
6	P5 EXT	P5EXT power supply (+5 V) of the 5 V power supply. The current load of an external consumer connected between P5EXT and M5EXT may not exceed the 90 mA.	Output

PROFIBUS/MPI interface [1]			
7	–	Unassigned	–
8	LTG_A	Signal line A of the MPI module	Input/output
9	RTS_PG	RTS output signal of the MPI module. The control signal is "1" when the programming device is sending.	Output
Shield		on connector casing	

[1] Optional product variant

PROFINET LAN X3 Port P1, P2, P3

PROFINET interface [1]

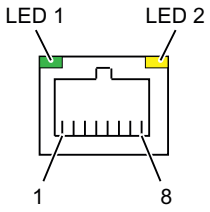


Pin no.	Short description	Meaning	Input / Output
1	RD+	Receive data *	Input
2	RD-	Receive data *	Input
3	TD+	Transmit data *	Output
4, 5 [1)]	SYMR	Internal with 75 Ohm terminating resistor	_
6	TD-	Receive data *	Output
7, 8 [1)]	SYMT-	Internal with 75 Ohm terminating resistor	_
S		Shield	
	LED 1	Lit green: link	
	LED 2	Lights up yellow: activity	
* Auto negotiation and auto crossover supported			

[1] Optional product variant

Ethernet RJ45 connection, X1, X2

Ethernet RJ45 connection



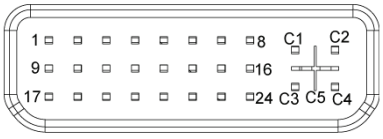
Pin no.	Short description	Meaning	Input / Output
1	BI_DA+	Bi-directional data A+	Input / Output
2	BI_DA-	Bi-directional data A-	Input / Output
3	BI_DB+	Bi-directional data B+	Input / Output
4	BI_DC+	Bi-directional data C+	Input / Output
5	BI_DC-	Bi-directional data C-	Input / Output
6	BI_DB-	Bi-directional data B-	Input / Output
7	BI_DD+	Bi-directional data D+	Input / Output
8	BI_DD-	Bi-directional data D-	Input / Output
S		Shield	–
	LED 1	Off: 10 Mbps Lit in green color: 100 Mbps Lit in orange color: 1000 Mbps	–
	LED 2	Lit: Active connection (to a hub, for example) Flashing: Activity	–

Note

The interfaces available on the device have been numbered so they can be clearly distinguished. This numbering may deviate from the numbering provided by the respective operating system.

DVI-I port, X70

DVI-I port



Pin no.	Short description	Meaning	Input / Output
S	GND	Ground	–
S1	GND	Ground	–

DVI-I port			
C1	R	Red	Output
C2	G	Green	Output
C3	B	Blue	Output
C4	HSYNC	Horizontal synchronizing pulse	Output
C5	GND	Ground	–
CSA	GND	Ground	–
1	TX2N	TDMS data 2-	Output
2	TX2P	TDMS data 2+	Output
3	GND	Ground	–
4	NC	Unassigned	–
5	NC	Unassigned	–
6	DDC CLK	DDC clock	Input / Output
7	DDC CLK	DDC data	Input / Output
8	VSYNC	Vertical synchronizing pulse	Output
9	TX1N	TDMS data 1-	Output
10	TX1P	TDMS data 1+	Output
11	GND	Ground	–
12	NC	Unassigned	–
13	NC	Unassigned	–
14	+5 V	+5 V	Output
15	GND	Ground	–
16	MONDET	Hotplug detect	Input
17	TX0N	TDMS data 0-	Output
18	TX0P	TDMS data 0+	Output
19	GND	Ground	–
20	NC	Unassigned	–
21	NC	Unassigned	–
22	GND	Ground	–
23	TXCP	TDMS clock +	Output
24	TXCN	TDMS clock -	Output

CompactFlash card, X50

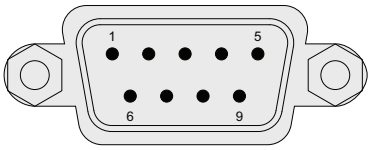
CompactFlash card port		
Pin no.	**Short description**	**Meaning**
41	RESET#	Reset (output)
7	CS0#	Chip select 0(output)
32	CS1#	Chip select 1(output)
34	IORD#	I/O read (output)
35	IOWR#	I/O write (output)
20, 19, 18,	A0-A2	Address bit 0-2 (output)

CompactFlash card port		
17, 16, 15, 14, 12, 11, 10, 8	A3-A10	Address bit 3-10 (output) to ground
21, 22, 23, 2, 3, 4, 5, 6, 47, 48, 49, 27, 28, 29, 30, 31	D0-D15	Data bits 0-15 (in/out)
37	INTRQ	Interrupt request (input)
9	OE# /ATA SEL#	Enables True IDE mode
24	IOCS16#	I/O-chip select 16 (input)
39	CSEL#	Cable select (output)
42	IORDY	I/O ready (input)
46	PDIAG#	Passed diagnostic
45	DASP#	Drive active/slave present (not connected)
26, 25	CD1#, CD2#	Card detect (not connected)
33, 40	VS1#, VS2#	Voltage sense (not connected)
43	DMARQ	DMA request (input)
44	DMACK#	DMA acknowledge (output)
36	WE#	Write enable
1, 50	GND	Ground
13, 38	VCC	+ 3.3V power

Serial interface COM 1, X30

The COM1 serial port has the following pin assignment:

Serial interface COM1



Pin no.	Short description	Meaning	Input / Output
1	DCD (M5)	Receive signal (carrier)	Input
2	RxD (D2)	Receive data	Input
3	TxD (D1)	Transmit data	Output
4	DTR (S1)	Data terminal ready	Output
5	GND (E2)	Functional ground (reference potential)	–
6	DSR (M1)	Ready for operation	Input
7	RTS (S2)	Request to send	Output
8	CTS (M2)	Clear to send	Input
9	RI (M3)	Incoming call	Input

16.1.5 Internal interfaces

Pin assignment of the internal ports

Interface	Position	Connector	Description
Memory	Internal	X19, X20	2 DIMM sockets, 64-bit
Bus expansion	Internal	X10, X610	Socket for bus expansion, assigned PCI bus signals
Power supply	Internal	X13	20-pin connector plug for power supply
BIOS Recovery	Internal	X72	
Serial ATA	Internal	X50, X51, X52, X53, X54	Serial ATA, max. 3 drives operable
Connection for PS serial ATA	Internal	X26, X27, X28, X29, X30	Voltage supply for serial ATA
Connection for PS fan	Internal	X131	Voltage supply for CPU fan, 4-pin male connector
Connection for equipment fan	Internal	X132	Voltage supply for equipment fan, 4-pin male connector
Backup battery	Internal	X24, X240	Voltage supply for backup battery, 2-pin male connector
Tap for backup battery	Internal	X2400	Voltage tap (= 3V) of the backup battery, 2-pin, male connector
USB interface	Internal	X43	USB channel 6 and 7, 10-pole male connector
USB interface	Internal	X48	USB channel 9, upright USB socket

Pin assignment of the equipment fan, X132

Pin no.	Short description	Meaning	Input / Output
1	GND	Ground	-
2	+12 V	Switched voltage supply	Output
3	CPU FAN_CLK	Clock signal	Input

Pin assignment of the supply for the power supply fan, X131

Pin no.	Short description	Meaning	Input / Output
1	GND	Ground	-
2	+12 V	Switched voltage supply	Output
3	PG1 FAN_CLK	Clock signal	Input

Connection for backup battery, X24, X240 (BATT)

A battery for buffering the CMOS RAM is connected to this connector. This is a 3 V Lithium battery with a capacity of 750 mAh.

Pin no.	Short description	Meaning	Input / Output
1	+	Plus pole	Input
2	-	Minus pole	-

Tap of the backup battery, X2400 (OUT)

This connection is intended for expansion modules with on-board CMOS-RAM. The voltage of the backup battery can be tapped here to backup the CMOS RAM data of the expansion module.

Pin no.	Short description	Meaning	Input / Output
1	+	Plus pole	Output
2	-	Minus pole	-

NOTICE
No battery should be connected to this connection.

Pin assignment of the supply for the serial ATA drives X26, X27, X28, X29, X30

Pin no.	Short description	Meaning	Input / Output
1	+12 V	Voltage supply	Output
2	GND	Ground	–
3	GND	Ground	–
4	+5 V	Voltage supply	Output
5	+3.3 V	Voltage supply	Output

Pin assignment of the internal USB interface connector, X43

Pin no.	Short description	Meaning	Input / Output
1	VCC 5V	+ 5 V, fused	Output
2	VCC 5V	+ 5 V, fused	Output
3	USB3	USB3_M	Input / Output
4	USB5	USB5_M	Input / Output
5	USB3	USB3_P	Input / Output
6	USB5	USB5_P	Input / Output

Pin no.	Short description	Meaning	Input / Output
7	GND	Ground	–
8	GND	Ground	–
9	GND	Ground	–
10	GND	Ground	–

16.1.6 Front ports

Overview

Interface	Position	Connector	Description
Display (LVDS)	Internal	X400	Connection of LCD displays with LVDS interface (channel 1)
Display (LVDS)	Internal	X401	Connection of LCD displays with LVDS interface (channel 2)
I/O front	Internal	X44	Ports for front I/O, including USB channel 10
USB	Internal	X42	Internal USB 2.0 interface (USB channel 8)

Display interfaces

TFT displays with an LVDS interface can be connected to this interface. You can connect 18-bit displays with a resolution up to 1024 x 768 pixels on X400 only (single-channel LVDS), and of 1280 x 1024 pixels on X400 and X401 (dual-channel LVDS). On the X401, there is also +12 V as supply voltage for the backlight inverter (max. 4.2 A) for 19" / Dual Channel LVDS displays. The permitted display clock rate is 20 MHz to 66 MHz. The display is selected automatically based on the code of the display select inputs.

The display power supply voltages 3.3 V and 5 V are switched via the graphic controller depending on the requirements of the connected display units. The maximum cable length is 50 cm at a transmission rate of 455 MHz. Special cable properties are required for the differential cable pairs specified by the LVDS specification.

Display interface (1st LVDS channel), X400

Pin no.	Short description	Meaning	Input / Output
1	P5V_D_fused	+5V (fused) display VCC	Output
2	P5V_D_fused	+5V (fused) display VCC	Output
3	RXIN0-	LVDS output signal bit 0 (-)	Output
4	RXIN0+	LVDS output signal bit 0 (+)	Output
5	P3V3_D_fused	+3.3V (fused) display VCC	Output

Pin no.	Short description	Meaning	Input / Output
6	P3V3_D_fused	+3.3V (fused) display VCC	Output
7	RXIN1-	LVDS output signal bit 1 (-)	Output
8	RXIN1+	LVDS output signal bit 1 (+)	Output
9	GND	Ground	-
10	GND	Ground	-
11	RXIN2-	LVDS output signal bit 2 (-)	Output
12	RXIN2+	LVDS output signal bit 2 (+)	Output
13	GND	Ground	-
14	GND	Ground	-
15	RXCLKIN-	LVDS clock signal (-)	Output
16	RXCLKIN+	LVDS clock signal (+)	Output
17	GND	Ground	-
18	GND	Ground	-
19	NC	Unassigned	-
20	NC	Unassigned	-

Display interface (2nd LVDS channel), X401

Pin no.	Short description	Meaning	Input / Output
1	GND	Ground	-
2	GND	Ground	-
3	RXIN10-	LVDS input signal bit 0 (-)	Output
4	RXIN10+	LVDS input signal bit 0 (+)	Output
5	GND	Ground	Output
6	GND	Ground	Output
7	RXIN11-	LVDS input signal bit 1 (-)	Output
8	RXIN11+	LVDS input signal bit 1 (+)	Output
9	GND	Ground	-
10	GND	Ground	-
11	RXIN12-	LVDS input signal bit 2 (-)	Output
12	RXIN12+	LVDS input signal bit 2 (+)	Output
13	GND	Ground	-
14	GND	Ground	-
15	RXCLKIN1-	LVDS clock signal (-)	Output
16	RXCLKIN1+	LVDS clock signal (+)	Output
17	GND	Ground	-
18	P12VF	+12 V fused	Output
19	P12VF	+12 V fused	Output
20	P12VF	+12 V fused	Output

Assignment of the display to the display select pins

One of the 15 available displays is configured automatically via the display select inputs. The display select inputs are connected to pull–up resistors, i.e. if these inputs are not interconnected, they are high level. The input must be connected to ground to generate a low level.

Pin no.	LCD_SEL3	LCD_SEL2	LCD_SEL1	LCD_SEL0	Display type
0	low	low	low	low	reserved
1	low	low	low	high	1280 x 1024 (SXGA), TFT, 2 x 18-bit, LVDS channel 1 and 2
2	low	low	high	low	DVI LCD 640 x 480
3	low	low	high	high	DVI LCD 800 x 600
4	low	high	low	low	640 x 480 (VGA), TFT, 18 bits, LVDS channel 1
5	low	high	low	high	reserved
6	low	high	high	low	1024 x 768 (XGA), TFT, 18 bits, LVDS channel 1
7	low	high	high	high	800 x 600 (SVGA), TFT, 18 bits, LVDS channel 1
8	high	low	low	low	reserved
9	high	low	low	high	reserved
10	high	low	high	low	reserved
11	high	low	high	high	reserved
12	high	high	low	low	1024 x 768 (XGA), TFT, 2 x 18-bit, LVDS channel 1 and 2
13	high	high	low	high	DVI LCD 1024 x 768
14	high	high	high	low	DVI LCD 1280 x 1024
15	high	high	high	high	No LVDS display or DVI LCD with automatic DDC ID

I/O front port for operator panels, X44

This port carries all signals required for connecting operator panels in addition to the display interface. The maximum cable length is 50 cm at a USB data rate of 12 Mbps.

Pin no.	Short description	Meaning	Input / Output
1	GND	Ground	-
2	P12V	Inverter voltage supply	Output
3	BL_ON	Backlight on (5 V = On)	Output
4	P5V_fused	+5 V (fused)	Output
5	GND	Ground	-
6	P3V3_fused	+3.3 V VCC (fused)	Output
7	Reserved	Reserved	-
8	Reserved	Reserved	-
9	Reserved	Reserved	-

Pin no.	Short description	Meaning	Input / Output
10	Reserved	Reserved	-
11	P5V_fused	+5 V (fused)	Output
12	USB_D1M	USB data channel 10	Input / Output
13	USB_D1P	USB data+, channel 10	Input / Output
14	GND	Ground	-
15	LCD_SEL0	Display Type-Select Signal 0	Input
16	LCD_SEL1	Display Type-Select Signal 1	Input
17	LCD_SEL2	Display Type-Select Signal 2	Input
18	LCD_SEL3	Display Type-Select Signal 3	Input
19	RESET_N	Reset signal (active low)	Input
20	reserved	Reserved	-
21	HD_LED	HD LED, anode with 1 kOhm in series on the motherboard	Output
22	DP_LED	MPI/DP LED, anode via 1 kOhm in series on the motherboard	Output
23	Ethernet_LED	Ethernet LED, anode with 1 kOhm in series on the motherboard	Output
24	TEMP_ERR	Temperature error LED, anode with 1 kOhm in series on the motherboard	Output
25	RUN_R	Watchdog error LED, anode with 1 kOhm in series on the motherboard	Output
26	RUN_G	Watchdog OK LED, anode with 1 kOhm in series on the motherboard	Output

Pin Assignment of the USB 2.0 interface, X42

Pin no.	Short description	Meaning	Input / Output
1	VCC	+ 5 V, fused	Output
2	USB5	USB5_M	Input / Output
3	USB5	USB5_P	Input / Output
4	GND	Ground	-
S1	S	Shield	-
S2	S1	Shield	-

Note

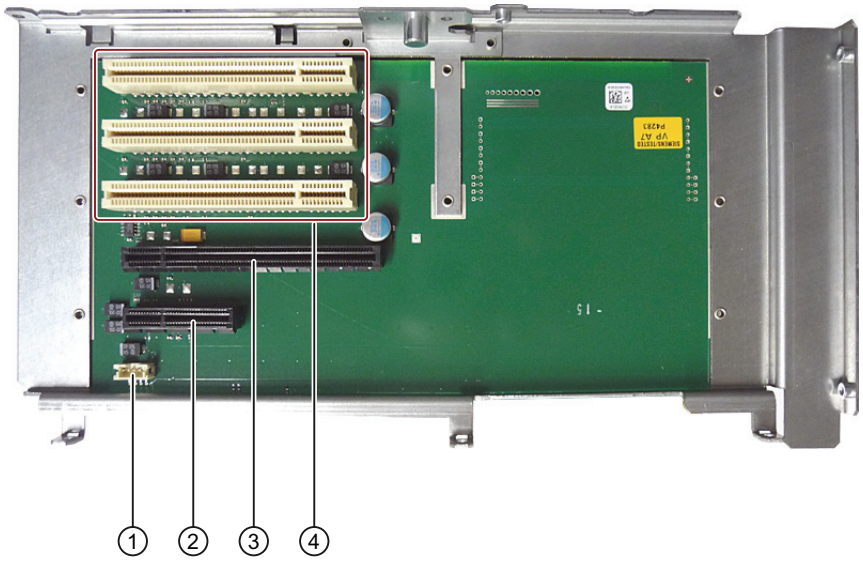
For detailed information on the pin assignments of the interfaces, please contact Customer Support (http://www.siemens.com/automation/service&support) or the Repair Center.

16.2 Bus board

16.2.1 Layout and principle of operation

The bus board is designed as a link between the motherboard and the expansion modules. It is fastened with five screws.

The bus board has three PCI and two PCI Express slots.



①	12 V power supply connector
②	Slot 1 PCI Express x4
③	Slot 2 PCI Express x16
④	3x PCI

16.2.2 PCI slot pin assignment

	5 V system environment	
	Side B	Side A
1	-12V	TRST#
2	TCK	+12V
3	Ground	TMS
4	TDO	TDI
5	+5V	+5V
6	+5V	INTA#
7	INTB#	INTC#

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

	5 V system environment	
	Side B	**Side A**
49	Ground	AD[09]
50	CONNECTOR KEY	
51	CONNECTOR KEY	
52	AD[08]	C/BE[0]#
53	AD[07]	+3.3V
54	+3.3V	AD[06]
55	AD[05]	AD[04]
56	AD[03]	Ground
57	Ground	AD[02]
58	AD[01]	AD[00]
59	+5 V (I/O)	+5 V (I/O)
60	ACK64#	REQ64#
61	+5V	+5V
62	+5V	+5V

16.2.3 Pin assignment 12 V/5 V power supply

Pin	Short description	Meaning	Input /Output
1	+12 V [1]	12 V voltage	Output
2	GND	Ground	-
3	GND	Ground	-
4	+5 V [1]	5 V voltage	Output

1) max. permissible current: 1 A; with this power demand the total power demand for the PCI slots are not allowed to be exceeded.

16.2.4 PCI Express slot x4 pin assignment

	5 V system environment	
	Side B	**Side A**
1	P12V	PRSNT1_N
2	P12V	GND
3	P12V	P12V
4	GND	GND
5	SMBCLK	PTCK
6	SMBDAT	PTDI
7	GND	PTDO
8	P3V3	PTMS

	5 V system environment	
	Side B	Side A
9	PTRST_N	P3V3
10	Aux_3V3	P3V3
11	PCIE_Wake_N	PCI RST_N
12	Reserved	GND
13	GND	GND
14	PCIE_TX_P(1)	GND
15	PCIE_TX_N(1)	GND
16	M	PCIE_RX_P(1)
17	PRSNT2_N	PCIE_RX_N(1)
18	GND	GND
19	PCIE_TX_P(2)	Reserved
20	PCIE_TX_N(2)	GND
21	GND	PCIE_RXP(2)
22	GND	PCIE_RX_N(2)
23	PCIE_TX_P(3)	GND
24	PCIE_TX_N(3)	GND
25	GND	PCIE_RX_P(3)
26	GND	PCIE_RX_N(3)
27	PCIE_TX_P(4)	GND
28	PCIE_TX_N(4)	GND
29	GND	PCIE_RX_P(4)
30	GND	PCIE_RX_N(4)
31	PRSNT2_N	GND
32	GND	Reserved

16.2.5 PCI Express slot x16 pin assignment

Signal	Pin no.	Pin no.	Signal
P12V	B1	A1	P12V
P12V	B2	A2	P12V
P12V	B3	A3	P12V
GND	B4	A4	GND
SMB_CLK2	B5	A5	n.c.
SMB_DATA2	B6	A6	n.c.
GND	B7	A7	n.c.
P3V3	B8	A8	n.c.
n.c.	B9	A9	P3V3
AUX_3V	B10	A10	P3V3
WAKE2	B11	A11	PCIE_RESET_L

Signal	Pin no.	Pin no.	Signal
n.c.	B12	A12	GND
GND	B13	A13	PCIE0_ECLK
PCIEX16_TX_P(15)	B14	A14	PCIE0_ECLK_N
PCIEX16_TX_N(15)	B15	A15	GND
GND	B16	A16	PCIEX16_RX_P(15)
SDVO_CTRLCLK	B17	A17	PCIEX16_RX_N(15)
GND	B18	A18	GND
PCIEX16_TX_P(14)	B19	A19	n.c.
PCIEX16_TX_N(14)	B20	A20	GND
GND	B21	O21	PCIEX16_RX_P(14)
GND	B22	A22	PCIEX16_RX_N(14)
PCIEX16_TX_P(13)	B23	A23	GND
PCIEX16_TX_N(13)	B24	A24	GND
GND	B25	A25	PCIEX16_RX_P(13)
GND	B26	A26	PCIEX16_RX_N(13)
PCIEX16_TX_P(12)	B27	A27	GND
PCIEX16_TX_N(12)	B28	A28	GND
GND	B29	A29	PCIEX16_RX_P(12)
n.c.	B30	A30	PCIEX16_RX_N(12)
SDVO_CTRLDATA	B31	A31	GND
GND	B32	A32	n.c.
PCIEX16_TX_P(11)	B33	A33	n.c.
PCIEX16_TX_N(11)	B34	A34	GND
GND	B35	A35	PCIEX16_RX_P(11)
GND	B36	A36	PCIEX16_RX_N(11)
PCIEX16_TX_P(10)	B37	A37	GND
PCIEX16_TX_N(10)	B38	A38	GND
GND	B39	A39	PCIEX16_RX_P(10)
GND	B40	A40	PCIEX16_RX_N(10)
PCIEX16_TX_P(9)	B41	A41	GND
PCIEX16_TX_N(9)	B42	A42	GND
GND	B43	A43	PCIEX16_RX_P(9)
GND	B44	A44	PCIEX16_RX_N(9)
PCIEX16_TX_P(8)	B45	A45	GND
PCIEX16_TX_N(8)	B46	A46	GND
GND	B47	A47	PCIEX16_RX_P(8)
MCH_CFG_20	B48	A48	PCIEX16_RX_N(8)
GND	B49	A49	GND
PCIEX16_TX_P(7)	B50	A50	n.c.
PCIEX16_TX_N(7)	B51	A51	GND
GND	B52	A52	PCIEX16_RX_P(7)
GND	B53	A53	PCIEX16_RX_N(7)

Signal	Pin no.	Pin no.	Signal
PCIEX16_TX_P(6)	B54	A54	GND
PCIEX16_TX_N(6)	B55	A55	GND
GND	B56	A56	PCIEX16_RX_P(6)
GND	B57	A57	PCIEX16_RX_N(6)
PCIEX16_TX_P(5)	B58	A58	GND
PCIEX16_TX_N(5)	B59	A59	GND
GND	B60	A60	PCIEX16_RX_P(5)
GND	B61	A61	PCIEX16_RX_N(5)
PCIEX16_TX_P(4)	B62	A62	GND
PCIEX16_TX_N(4)	B63	A63	GND
GND	B64	A64	PCIEX16_RX_P(4)
GND	B65	A65	PCIEX16_RX_N(4)
PCIEX16_TX_P(3)	B66	A66	GND
PCIEX16_TX_N(3)	B67	A67	GND
GND	B68	A68	PCIEX16_RX_P(3)
GND	B69	A69	PCIEX16_RX_N(3)
PCIEX16_TX_P(2)	B70	A70	GND
PCIEX16_TX_N(2)	B71	A71	GND
GND	B72	A72	PCIEX16_RX_P(2)
GND	B73	A73	PCIEX16_RX_N(2)
PCIEX16_TX_P(1)	B74	A74	GND
PCIEX16_TX_N(1)	B75	A75	GND
GND	B76	A76	PCIEX16_RX_P(1)
GND	B77	A77	PCIEX16_RX_N(1)
PCIEX16_TX_P(0)	B78	A78	GND
PCIEX16_TX_N(0)	B79	A79	GND
GND	B80	A80	PCIEX16_RX_P(0)
n.c.	B81	A81	PCIEX16_RX_N(0)
n.c.	B82	A82	GND

Note

This slot can also be used for PCIe x6, x4 and x1 modules.

16.3 System resources

16.3.1 Currently allocated 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	**Start > Run :** In the **Open** dialog, enter *msinfo32*and confirm with **OK**
Windows 7 Ultimate	**Start >** Enter "cmd" in the search function, then enter "msinfo32" in the input box

16.3.2 System resources used by the BIOS/DOS

The following table describes the system resources for the factory state of the device.

16.3.2.1 I/O address allocation

I/O address (hex)		Size (bytes)	Description of the basic function	Possible alternative function
from	to			
0000	000F	16	DMA controller	
0010	001F	16	Motherboard resources	
0020	0021	2	Programmable interrupt controller	
0022	003F	30	Motherboard resources	
0040	0043	4	System timer	
0044	005F	28	Motherboard resources	
0060	0060	1	Keyboard controller	
0061	0061	1	System loudspeaker	
0062	0063	2	Motherboard resources	
0064	0064	1	Keyboard controller	
0067	006F	9	Motherboard resources	
0070	0075	6	System CMOS/real-time clock	
0076	0080	11	Motherboard resources	
0081	008F	15	DMA controller	
0090	009F	16	Motherboard resources	
00A0	00A1	2	Programmable interrupt controller	
00A2	00BF	30	Motherboard resources	
00C0	00DF	32	DMA controller	
00E0	00EF	16	Motherboard resources	
00F0	00FE	15	Numeric data processor	

I/O address (hex)				
0110	016F	96	Not used	
0170	0177	8	Secondary EIDE channel	
0178	01EF	120	Not used	
01F0	01F7	8	Primary EIDE channel	Switchable in Setup, then free
01F8	01FF	8	Not used	
0200	0207	8	Reserved for game port	
0208	02E7	224	Not used	
02E8	02EF	8	Reserved	
02F8	02FF	8	COM2	Switchable in Setup, then free
0300	031F	32	Not used	
0320	032F	16	Not used	
0330	033F	16	Not used	
0340	035F	32	Not used	
0360	0367	8	Not used	
0370	0371	2	SOM	
0372	0375	4	Not used	
0376	0376	1	Secondary EIDE channel	
0378	037F	8	LPT 1	Switchable in Setup, then free
0380	03AF	48	Not used	
03B0	03BB	12	Graphics	
03BC	03BF	4	Reserved	
03C0	03DF	16	Graphics	
03E0	03E7	8	Not used	
03E8	03EF	6	Reserved	
03F0	03F5	6	Standard floppy disk controller	
03F6	03F6	1	Primary EIDE channel	
03F7	03F7	1	Standard floppy disk controller	
03F8	03FF	8	COM1	Switchable in Setup, then free

Dynamic range; resources are managed by means of Plug and Play functionality				
0400	0777	888	Not used	
0778	077F	8	ECP LPT 1	
0780	07FF	128	Not used	
0800	080F	16	ACPI communications range	Fixed
0810	0CFB	1260	PCI configuration index	Fixed
0CFC	0CFF	4	PCI configuration data	Fixed
0D00	0EFF	512	Not used	
0F00	0F4F	80	Super IO	

Dynamic range; resources are managed by means of Plug and Play functionality				
0F50	0FFF	176	Not used	
1000	10FF	256	Used internally	
1180	11FF	128	Used internally	
1800	187F	128	Used internally	
8800	8BFF	1023	SATA RAID Controller	
8C00	FEFF	29288	Not used for SATA RAID	
8870	8897	39	PATA RAID Controller	
8898	FEFF	30311	Not used for PATA RAID	
1880	886F	28655	Not used	
FF00	FF0F	16	EIDE bus master register	

16.3.2.2 Interrupt Assignments

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

Interrupt assignment in PIC mode:

	IRQ Number																							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 Line / Function																	A (1)	B (2)	C (3)	D (4)	E (5)	F (6)	G (7)	H (8)	1)
System Timer / HPET	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ISA exclusive
PS/2-Keyboard-Controller-Emulation	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ISA exclusive
Cascaded Interrupt-Controller 2	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ISA exclusive
Com Port 2 (COM2)	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	can also be used for COM 1
Com Port 1 (COM1)	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	can also be used for COM 2
FD-Controller	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	only free in ACPI-PIC mode
Parallel port 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Free
Real time clock (RTC)	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Fixed
PS/2-Maus-Controller-Emulation	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	ISA exclusive
Numeric processor	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	Fixed
HD-Controller 1 (primary)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	can be switched off, fixed in Enhanced Mode
HD-Controller 2 (secondary)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	can be switched off, fixed in Enhanced Mode
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SATA	-	-	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	Can be switched off
USB port 0/1	-	-	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	Cannot be disabled
USB port 2/3	-	-	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	Cannot be disabled
USB port 4/5	-	-	-	-	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	Y	-	Cannot be disabled
USB 2.0 Controller	-	-	-	-	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	Y	-	Cannot be disabled
Ethernet 1	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	Can be switched off
Ethernet 2	-	-	-	-	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	Y	-	-	-	-	-	Can be switched off
VGA	-	-	-	-	-	-	-	-	-	-	Z	-	-	-	-	-	-	Y	-	-	-	-	-	-	Can be switched off
PROFIBUS oder PROFINET	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	Can be switched off, exclusive

1) Host PCI-IRQ A to H will be assigned IRQ 16 to 23 permanently in ACPI mode. Host PCI-IRQ A to H will be automatically assigned IRQ 0 to 15 in PIC mode. A specific assignment can not be enforced.

X Interrupt in PIC and APIC mode

Y Interrupt in APIC mode

Z BIOS Default Interrupt in PIC mode (e.g. DOS)

Interrupt assignment of the slot connectors on the bus board:

			IRQ																							
		IRQ (APIC)	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	◄							►	
	Slot	**Host IRQ-Line**																	A	B	C	D	E	F	G	H	1)
①	**PCI-Slot**																										
		PCI IRQ Line A																					Y				
		PCI IRQ Line B																						Y			
		PCI IRQ Line C																							Y		
		PCI IRQ Line D																								Y	
②	**PCI-Slot 2**																										
		PCI IRQ Line A																						Y			
		PCI IRQ Line B																							Y		
		PCI IRQ Line C																								Y	
		PCI IRQ Line D																					Y				
③	**PCI-Slot 3**																										
		PCI IRQ Line A																							Y		
		PCI IRQ Line B																								Y	
		PCI IRQ Line C																					Y				
		PCI IRQ Line D																						Y			
④	**PCIe-Slot x16**	IRQ																	Y								
⑤	**PCIe-Slot x4**																										
		PCI IRQ Line A																	Y								
		PCI IRQ Line B																		Y							
		PCI IRQ Line C																			Y						
		PCI IRQ Line D																				Y					

①-⑤ Marking on the housing

1) Host PCI-IRQ A to H will be assigned IRQ 16 to 23 permanently in ACPI mode. Host PCI-IRQ A to H will be automatically assigned IRQ 0 to 15 in PIC mode. A specific assignment can not be enforced.

Y Interrupt in APIC mode

16.3.2.3 Exclusive PCI hardware interrupt

Applications demanding a high-performance interrupt require a 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.

Exclusive interrupt in APIC mode

	IRQ assignments for Windows systems, (APIC mode)
Ethernet 1	16 1) 2)
Ethernet 2	17 1)
Profibus/MPI	19 1)
PCI slot 1	20 1)
PCI slot 2	21 1)
PCI Express slot	16 1) 3)

1) Requirement: The modules in the PCI slots each require only one interrupt

2) Requirement: VGA and PCI Express do not require an interrupt

3) Requirement: VGA does not require an interrupt and Ethernet1 is disabled

Exclusive interrupt in PIC mode

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.

16.3.2.4 Memory address assignments

PCI VGA modules can be operated with expansion ROM up to 48K.

Address		Size	Description of the basic function	Possible alternative function
from	to			
0000 0000	0007 FFFF	512K	Conventional system memory	
0008 0000	0009 F7FF	127K	Conventional system memory extended	
0009 F800	0009 FFFF	2K	XBDA, extended Bios Data Area	
000A 0000	000A FFFF	64K	VGA graphics refresh memory	Shared SMM for power management
000B 0000	000B 7FFF	32K	Software graphics / text refresh memory	Not used
000B 8000	000B FFFF	32K	VGA graphics/text refresh memory	
000C 0000	000C BFFF	48K	VGA BIOS expansion	
000C 0000	000C FFFF	64K	VGA BIOS	Always occupied or reserved
000E 0000	000FFFF	2 x 64K	DMI data, System BIOS, Options ROMs: PXE, RAID	
0010 0000	CFFF FFFF	3.2GB	System memory 4 GB memory configuration	Depends on memory configuration
D460 0000	D460 0FFF	4K	Motherboard resources	
F000 0000	F3FF FFFF	64M	Motherboard resources	
FED0 0000	FED0 03FF	1K	High Precision Event Timer	
FED1 0000	FED1 3FFF	16K	Motherboard resources	
FED1 8000	FED1 8FFF	4K	Motherboard resources	
FED1 9000	FED1 9FFF	4K	Motherboard resources	
FED1 C000	FED1 FFFF	16K	Motherboard resources	
FED2 0000	FED3 FFFF	128K	Motherboard resources	
FED9 0000	FED9 3FFF	16K	Motherboard resources	
FEE0 0000	FEEF FFFF	1M	Motherboard resources	
FF00 0000	FFFF FFFF	16M	Motherboard resources	

16.3.2.5 Addresses used by SRAM

The battery-buffered SRAM uses a 2 MB memory address area that can be read via the PCI register.

The address area is dynamic and is set by the BIOS during the enumeration. The base address of the SRAM can obtained either using the resource information of the Device Manager (device name: Standard RAM Controller) or in the PCI configuration address area from the device with device ID "110Ah, VendorID 4040h" and Offset "10h"

16.3.2.6 Accessing addresses of LEDs, watchdog and battery status

These addresses cannot be accessed directly.

SIMATIC PC DiagBase software provides the DMAPI programming interface for this purpose. It can be found:

- On the "Documentation & Drivers" DVD in the folder "Drivers\DiagBase\program files\Siemens\DiagnosticManagement"
- In the installation directory under "%ProgramFiles%\Siemens\DiagnosticManagement\DMAPI"

16.4 BIOS-Setup

16.4.1 Overview

BIOS Setup program

BIOS SETUP allows you to set the hardware configuration, and system properties. SETUP is also used to set the time and date of the realtime clock.

Changing the device configuration

Your device configuration is preset for operating with the included software. You should only change the default values if you have modified the technical configuration your device, or if a fault occurs when the unit is powered up.

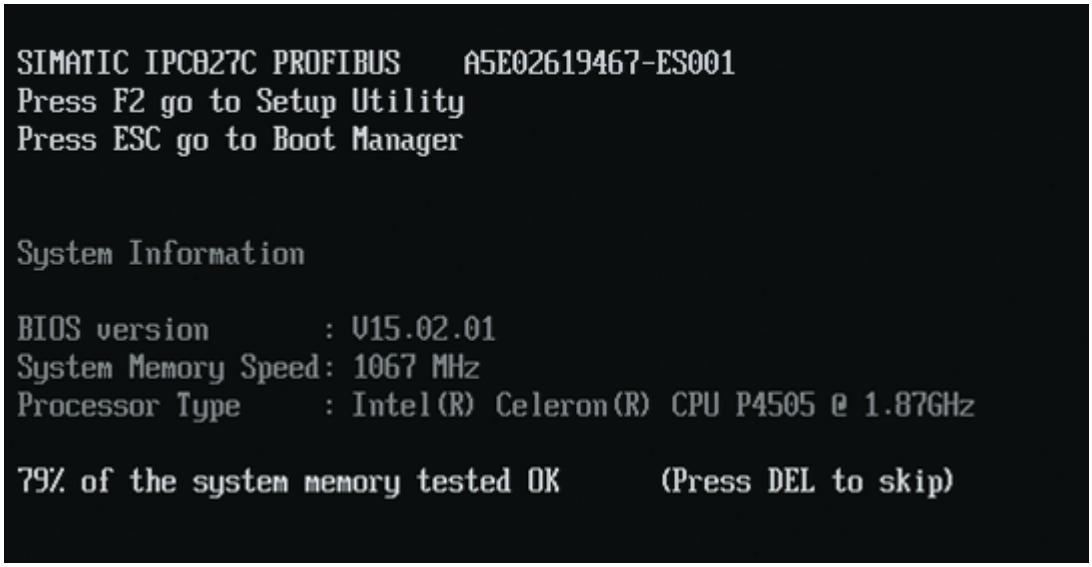
16.4.2 Starting BIOS Setup

Starting BIOS Setup

Start the setup program as follows:

1. Reset the device (warm or cold restart).

   In the figures shown, the default settings differ based on the device versions. With the default setting of the Box PC, the display shown below appears following power-on, for example:



   On completion of the POST, the BIOS gives you the opportunity of starting the SETUP program. The following message appears on the screen:

   - `Press F2 go to Setup Utility`
   - `Press F12 go to Boot Manager`

2. Press the F2 key while the BIOS prompt appears on the screen.

16.4.3 BIOS Setup menus

The various menus and submenus are listed on the next pages. You can obtain information on the selected SETUP item from the "item-specific help" part of the respective menu.

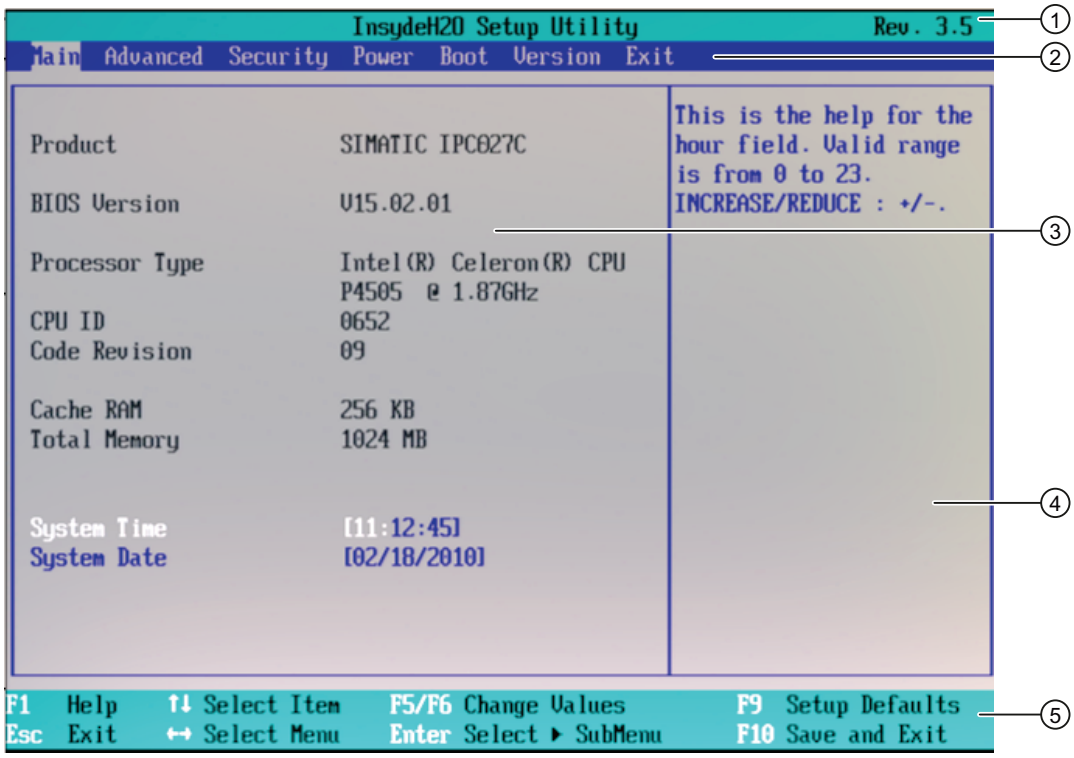


Figure 16-1 SETUP Main menu (example)

① Header	④ Help window
② Menu bar	⑤ Command line
③ System information	

Menu layout

The screen is divided into four sections. In the top section ②, you can select the submenus [Main], [Advanced], [Security], [Power], [Boot], [Version], [Exit]. You can select various settings or submenus in the left middle section ③. Short help texts are displayed on the right ④ for currently selected menu entries; the bottom section contains information for operator input.

The following figures represent examples of specific device configurations. The screen content may deviate slightly depending on the equipment actually supplied.

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

Menu	Meaning
Main	System functions are set here
Advanced	An extended system configuration can be set here
Security	This is where setting security functions such as the password are set.
Power	The behavior of the device after a power failure and after wake events is specified here.
Boot	This is where the boot priority is specified.
Version	This shows device-specific information (such as the release version).
Exit	Used for terminating and saving.

16.4.4 Main menu

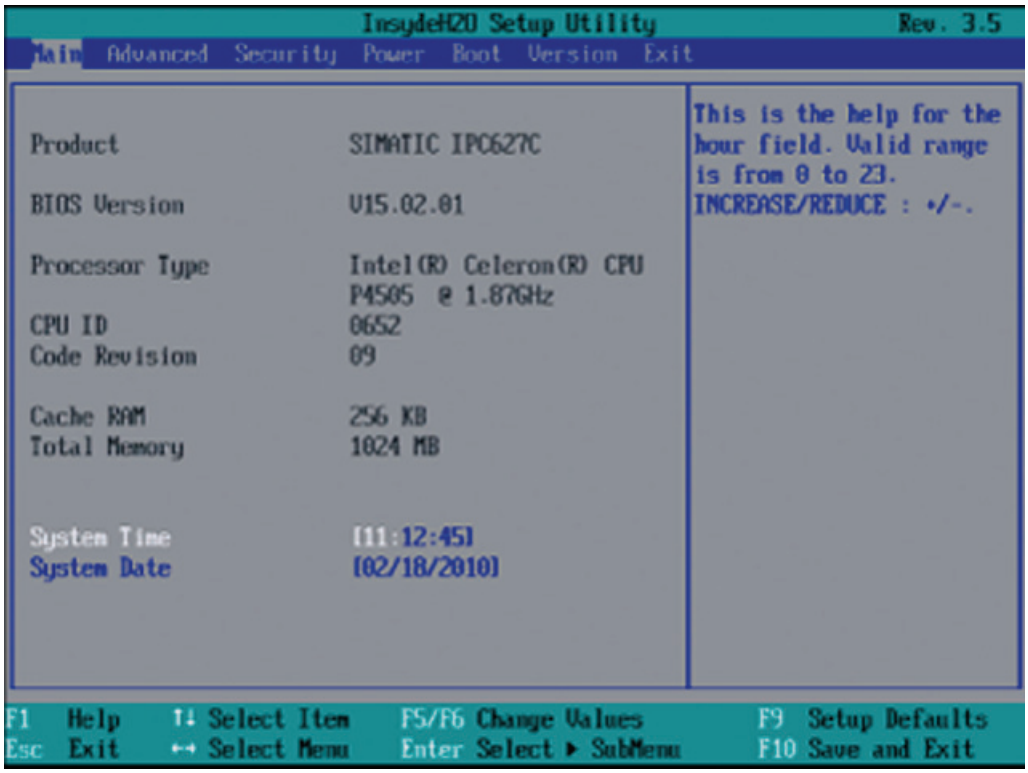


Figure 16-2 Main menu (example)

Settings in the main menu

In the main menu, you can move up and down to select the following system configuration boxes by means of the [↑] up and [↓] down cursor keys:

Field	Meaning
System Time	For viewing and setting the current time
System Date	For viewing and setting the current date

System time and date

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

Hour: Minute: Second

and for the date

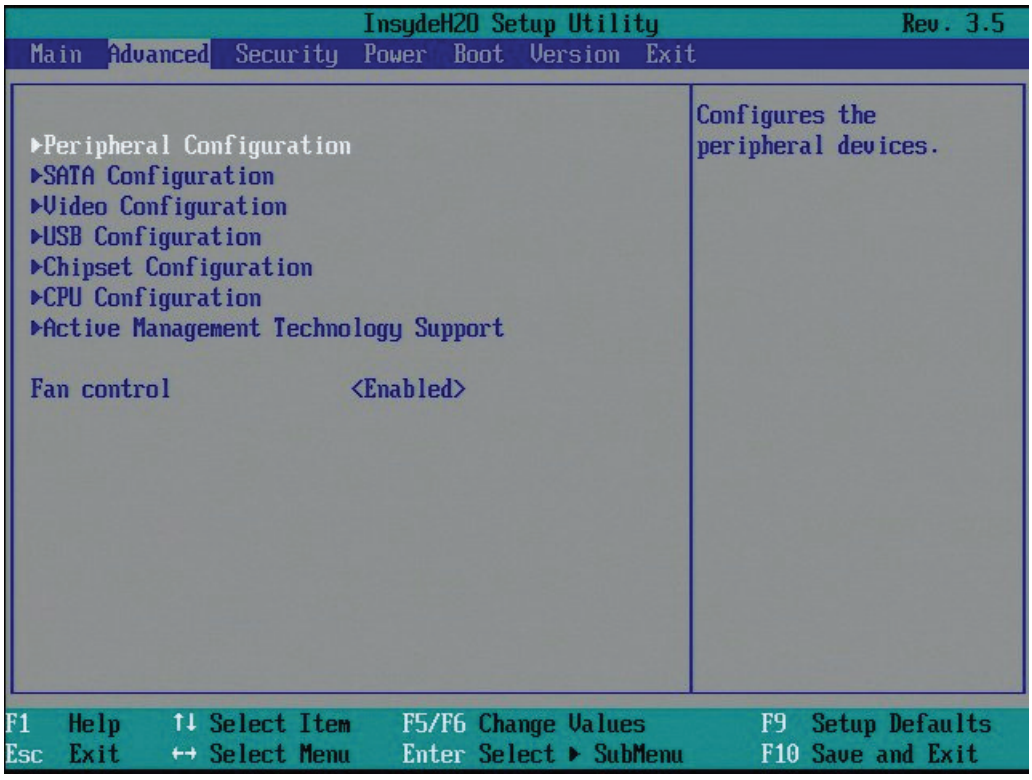
Month/Day/Year

.

You can navigate between the entries in the date and time fields (for example, from hour to minute) using the ENTER key.

16.4.5 Advanced menu

Menu layout



Settings in the Advanced Menu

Entry	Meaning
Peripheral Configuration	Configuration of components on the motherboard.
SATA Configuration	Configuration of the SATA interface.
Video Configuration	Configuration of the graphics interface
USB Configuration	Configuration of the USB ports
Chipset Configuration	Extended chipset configuration.
CPU Configuration	Configuration of CPU parameters
Active Management Technology Support	Configuration of the AMT functionality
Fan control	Activate/deactivate fan control. If deactivated, the fans always run at full speed.

Advanced menu > "Peripheral Configuration"

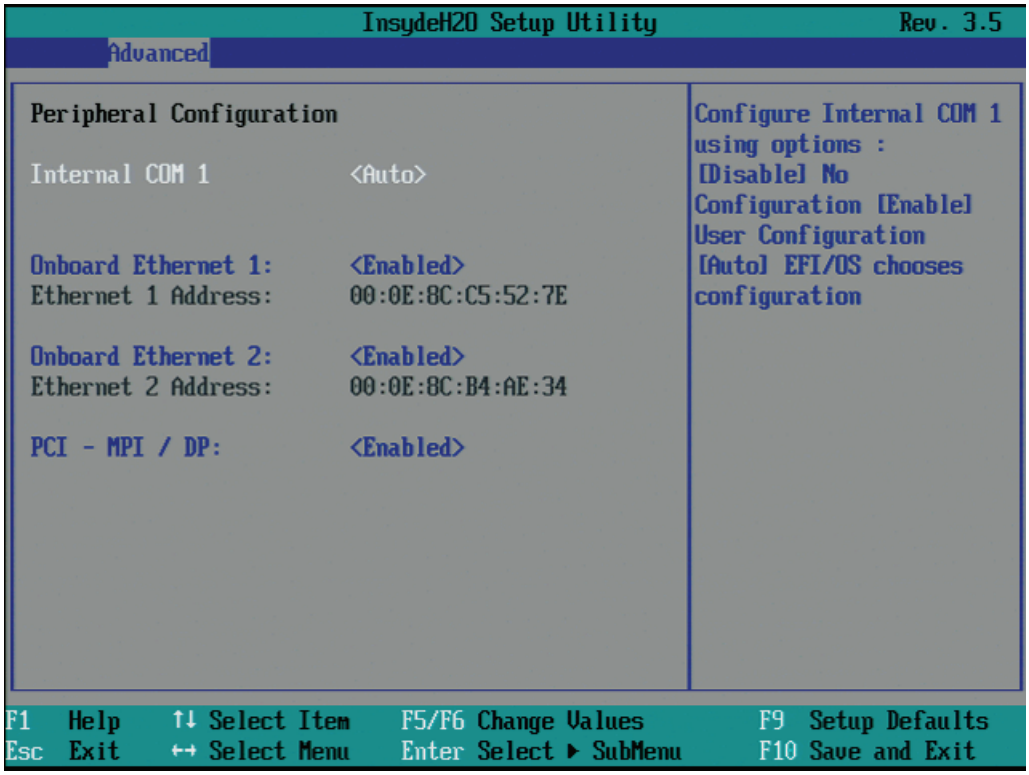


Figure 16-3 "Peripheral Configuration" submenu

Entry	Meaning
Internal COM 1	Enable (Enabled) or disable (Disabled) the serial port or configure it automatically (Auto) With Enabled, it is possible to specify the I/O base address and the interrupt. AUTO: BIOS switches on the COM. Resources are assigned in the OS per reconfiguration.
Onboard Ethernet 1:	Enable or disable the onboard Ethernet 1 interface.
Ethernet 1 Address:	Display the MAC address of Ethernet 1
Onboard Ethernet 1:	Enable or disable the onboard Ethernet 2 interface.
Ethernet 1 Address:	Display the MAC address of Ethernet 2
PCI – MPI / DP / PROFINET:	Enable or disable the onboard MPI/DP or PROFINET interface.

Advanced menu > SATA/PATA Configuration

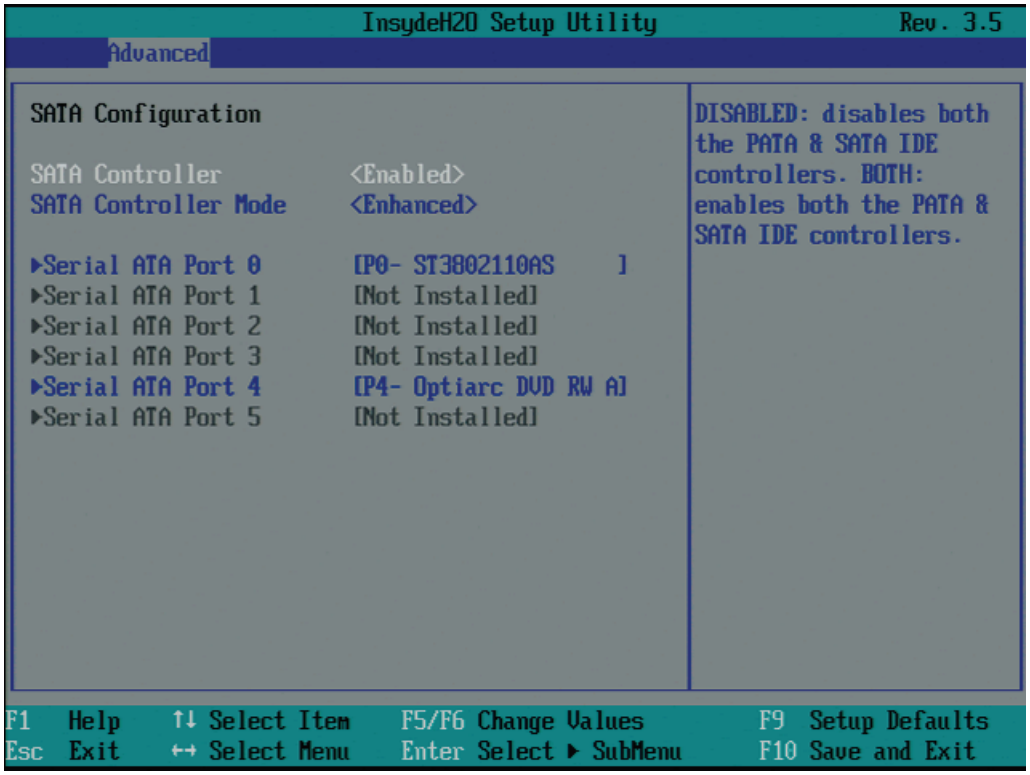


Figure 16-4 "SATA/PATA Configuration" submenu

Entry	Meaning
SATA Controller	Enable or disable the SATA and PATA controllers.
SATA Controller mode	Set operating mode of the SATA controller: • Enhanced: SATA Ports 0-3 operate in Legacy mode, SATA Ports 4-5 in native IDE mode • AHCI : Disable or enable the AHCI support • RAID: Disables or enables RAID support
Serial ATA Port 0	Submenu for SATA Port 0 configuration
Serial ATA Port 1	Submenu for SATA Port 1 configuration
Serial ATA Port 2	Submenu for SATA Port 2 configuration
Serial ATA Port 3	Submenu for SATA Port 3 configuration
Serial ATA Port 4	Submenu for SATA Port 4 configuration
Serial ATA Port 5	Submenu for SATA Port 5 configuration

Advanced menu > Video Configuration

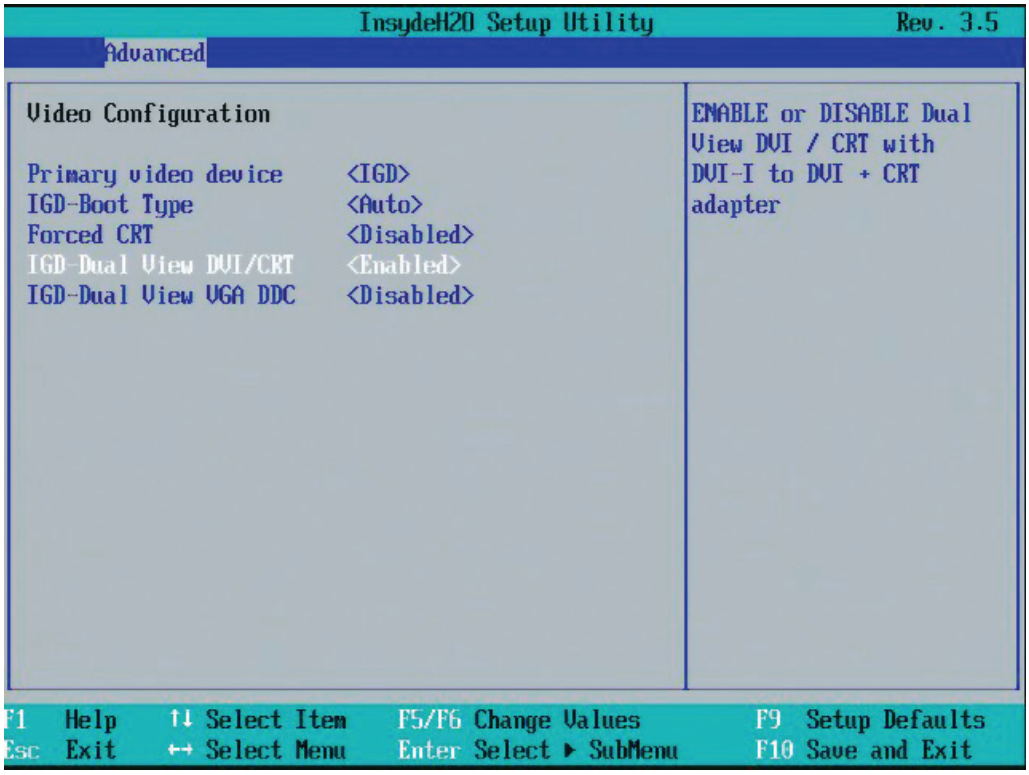


Figure 16-5 Submenu Advanced menu > Video Configuration

Entry	Meaning
Primary video device	Selection of the primary video interface to which the boot messages are to be output: • IGD: Internal onboard graphics • PEG: PCIExpress graphics (internal graphics is deactivated) • PCI: PCI graphics (internal graphics is deactivated)
IGD boot type	Selection of the video device that is used during booting. • Auto: The graphics specified by the VIDEO BIOS is used. • CRT: VGA screen • LFP: Local Flat Panel • CRT+LFP: VGA screen and local display
Forced CRT	Enabled: The CRT/VGA interface is active even when no monitor is connected, e.g. for AMT headless mode. Disabled: The CRT/VGA interface is only active when a monitor is connected.

Entry	Meaning
IGD Dual View DVI/CRT	Activate/deactivate the dual view mode: Simultaneous operation of 2 monitors (CRT and DVI) by means of adapter (splitter) at the DVI output of the device.
IGD Dual View VGA DDC	Enabled: When a DVI monitor and a CRT monitor are operated via a Y cable, the DDC signal of the DVI monitor is also used for the CRT monitor. This prevents the CRT monitor screen briefly going black when you right-click. The CRT monitor resolution should be the same or higher than that of the DVI monitor.

Advanced menu > USB Configuration

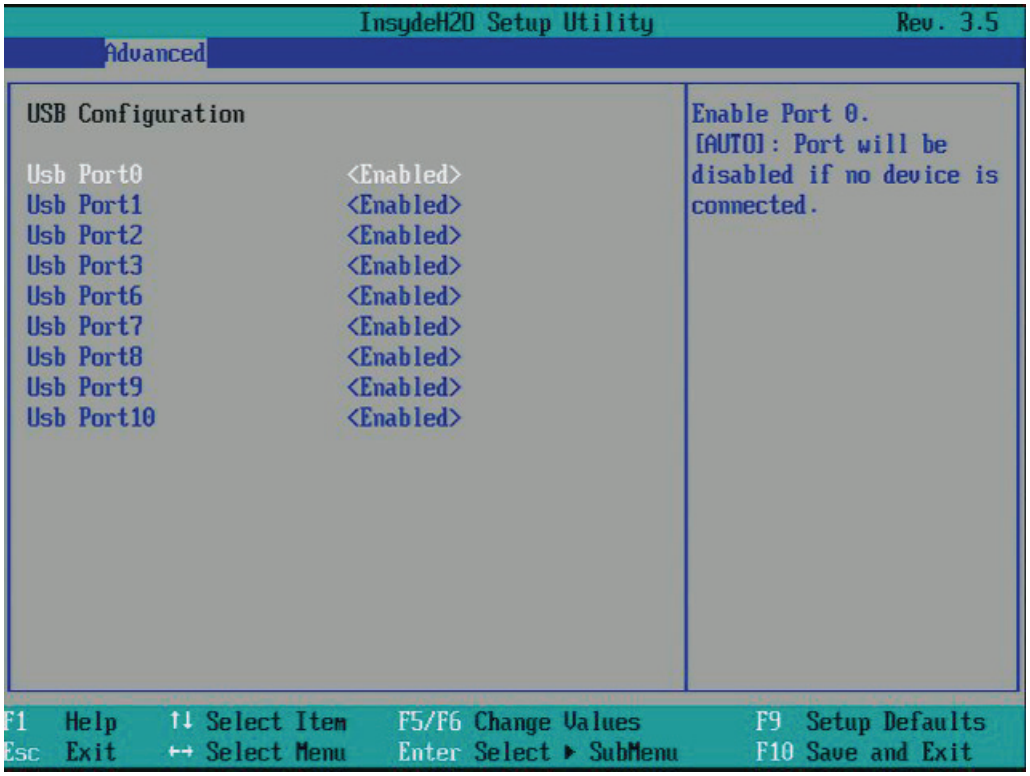


Figure 16-6 Submenu Advanced menu > USB Configuration

Entry	Meaning
USB Port0 -10	• Enable: USB port is activated. • Auto: USB port is deactivated when no device is plugged. • Disable: USB port is deactivated.

The following table lists the assignment of the USB ports to the USB interfaces:

USB port	USB interface
0	Ext. interface X60 P1
1	Ext. interface X60 P2
2	Ext. interface X60 P3
3	Ext. interface X60 P4
6	Int. interface X43 Pin 1 - 5
7	Int. interface X43 Pin 6 - 10
8	Front-end interface of the panel fronts X42
9	Int. interface X48
10	Keyboard / Touch controller interface of the panel fronts X44

Advanced menu > Chipset Configuration

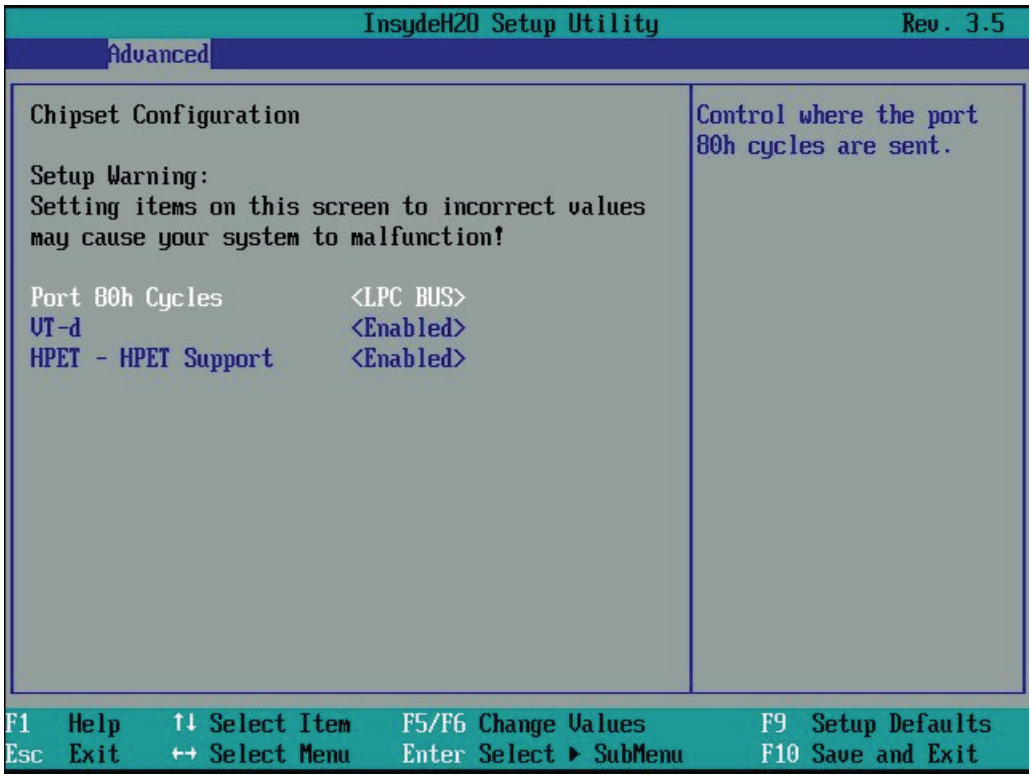


Figure 16-7 Submenu Advanced menu > Chipset Configuration

Entry	Meaning
Port 80h Cycles	Output Port 80 status display to PCI bus or LPC BUS (status display at the device).
VT-d	Enable or disable advanced support for virtualization technology "DIRECT I/O"
HPET	Enable High Precision Event Timer

Advanced menu > CPU Configuration

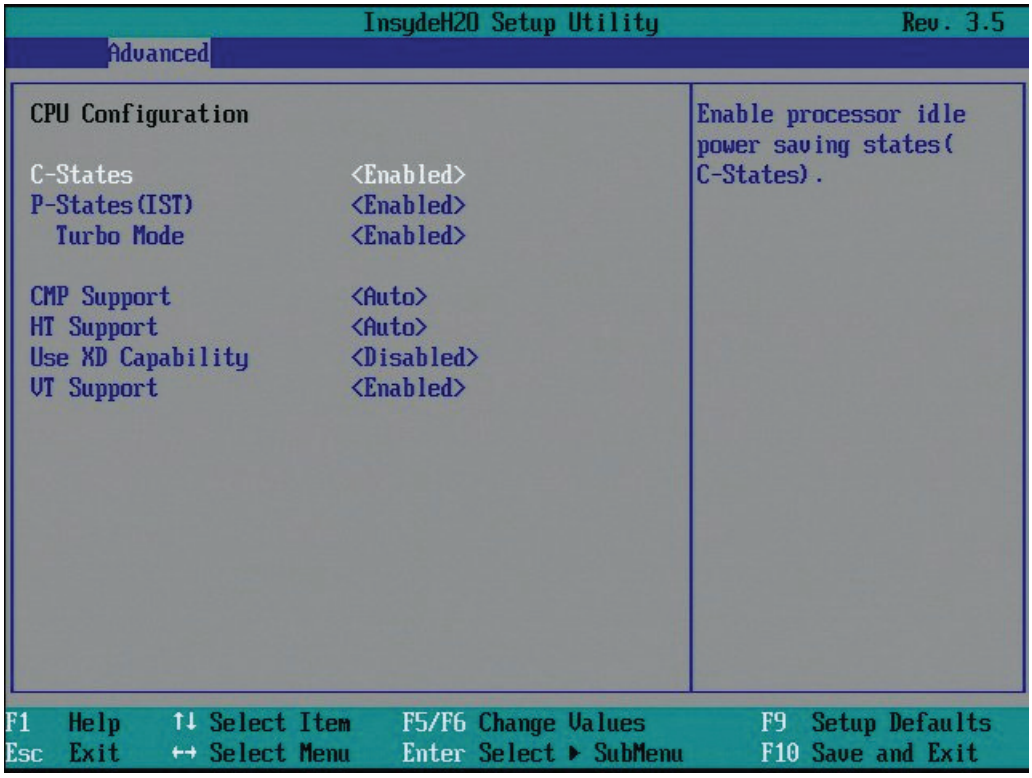


Figure 16-8 Submenu Advanced menu > CPU Configuration

Entry	Meaning
C-States	Enable the power saving modes of the processor.
P-States (IST)	Enable the performance modes of the processor.
Turbo Mode	Enable or disable Turbo Modes.
CMP support	• Auto: Multi Core operation, if available • Disabled: Single Core operation
HT Support	• Auto: Use hyperthreading, if available. • Disabled: Hyperthreading disabled.
Use XD Capability	Enable or disable XD (Execute Disable) Capability.
VT Support	Enable or disable virtualization functionality "Vanderpool Technology".

16.4.6 Advanced menu: Active Management Technology Support

Settings in the BIOS

The following figure shows the BIOS submenu "Advanced Menu > Active Management Technology Support", in which you configure part of AMT in the BIOS. You will find further configuration options for AMT in the MEBx (see "Settings in the MEBx").

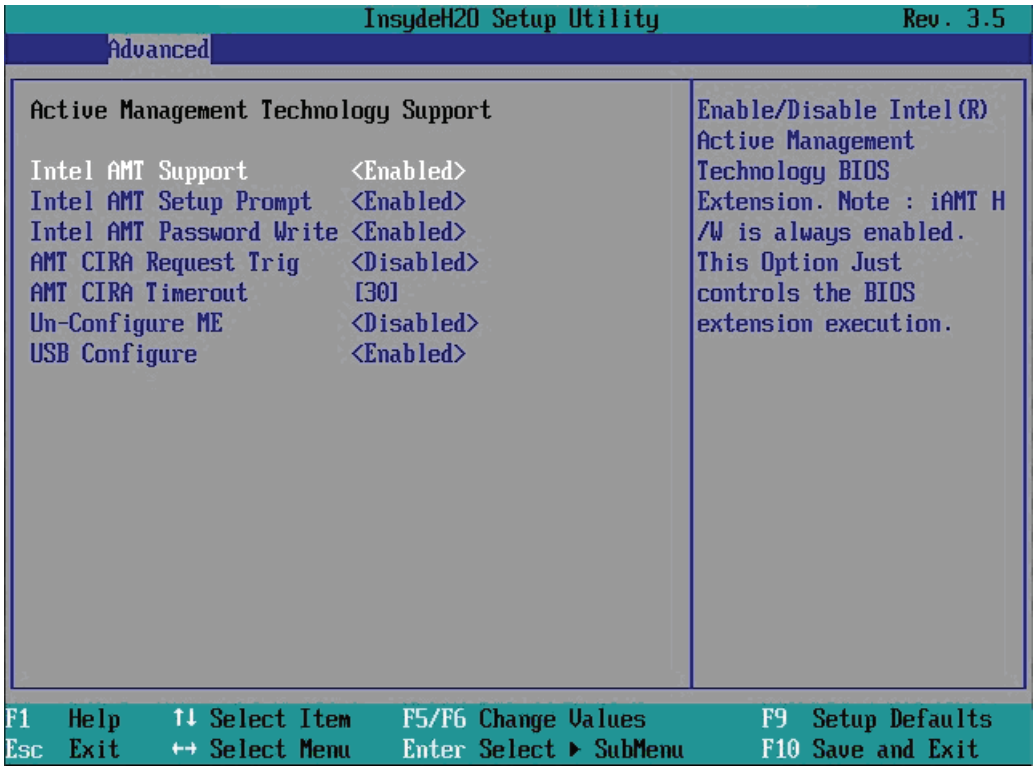


Figure 16-9 Submenu "Advanced menu > Active Management Technology Support"

Entry	Meaning
Intel AMT Support	Enable and disable BIOS support for Intel Active Management Technology (AMT)
Intel AMT Setup Prompt	Enable and disable the boot interruption <Ctrl+P> to call up the MEBx configuration page.
Intel AMT Password Write	Enable and disable the AMT password write protection.
AMT CIRA Request Trig	Enable CIRA (Client Initiated Remote Access, "Fast Call For Help"). CIRA allows AMT maintenance event if the AMT PC is not in the Intranet.
AMT CIRA Timeout	CIRA timeout for connection establishment with MPS (Manageability Presence Server / "vPro Enabled Gateway").

Entry	Meaning
Unconfigure ME	Resets all the values of the MEBx to their defaults (see section "Resetting with Unconfigure (Page 195)").
USB Configure	Enable and disable the USB configuration (provisioning).

Settings in the MEBx

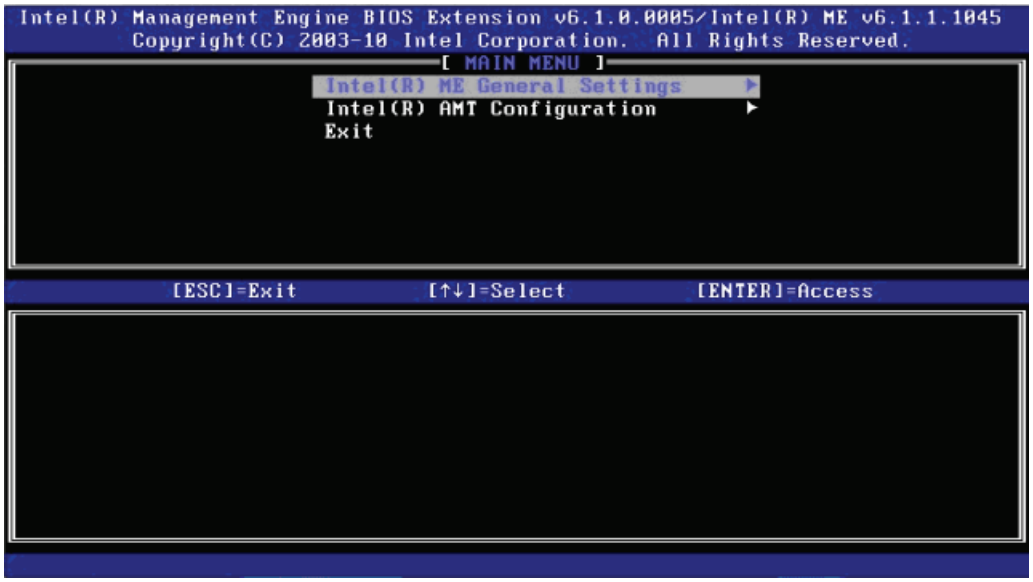


Figure 16-10 MEBx main menu

Entry	Meaning
Intel(R) ME General Settings	Opens the submenu with the general ME settings (see "ME General Settings").
Intel(R) AMT Configuration	Opens the submenu for the AMT settings (see "ME General Settings").
Exit	Exits the MEBx.

ME general settings

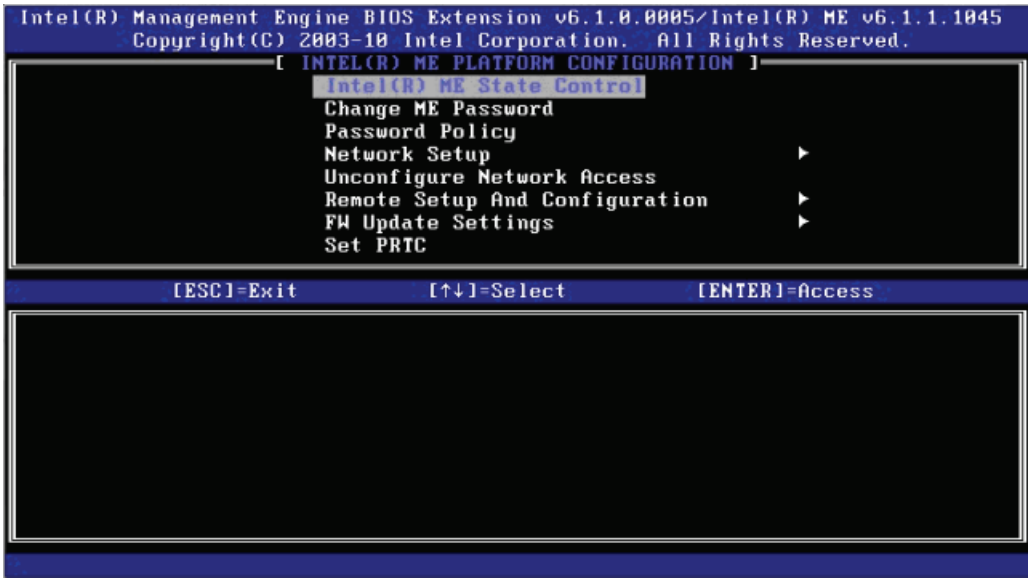


Figure 16-11 MEBx Intel(R) ME platform configuration

You cannot see all the switches in the menu at the same time. Use the arrow buttons to display the hidden switches.

Entry	Meaning
Intel(R) ME State Control	Enable ME: Normal operation Disable ME: Stops ME at a very early boot stage to search for errors. • When searching for errors, ME can then be excluded as a possible source of error. • No ME activities on a BUS.
Change ME Password	Used to change the password
Password Policy	Password policy that specifies the conditions under which the password can be modified remotely.
Network Setup	Network settings, for example DHCP, IP address, host name, domain name.
Activate Network Access	Activates the network interface. This menu entry only exists if the network is not activated.
Unconfigure Network Access	Deactivates the network interface and resets the network settings to their default values.
Remote Setup And Configuration	Displays the current provisioning settings.
FW Update Settings	Sets the user rights and the conditions under which ME firmware updates can be transferred.

Entry	Meaning
Set PRTC	PRTC (protected real time clock) is an internal ME clock, that is required in the ME, for example for comparing times with TLS & Kerberos, time stamps of events. Period of validity: 1.1.2004 – 4.1.2021.
Power Control	Specifies the power states S0, S3, S4 of the computer in which the ME is activated.
Previous Menu	Return to the main menu.

AMT configuration

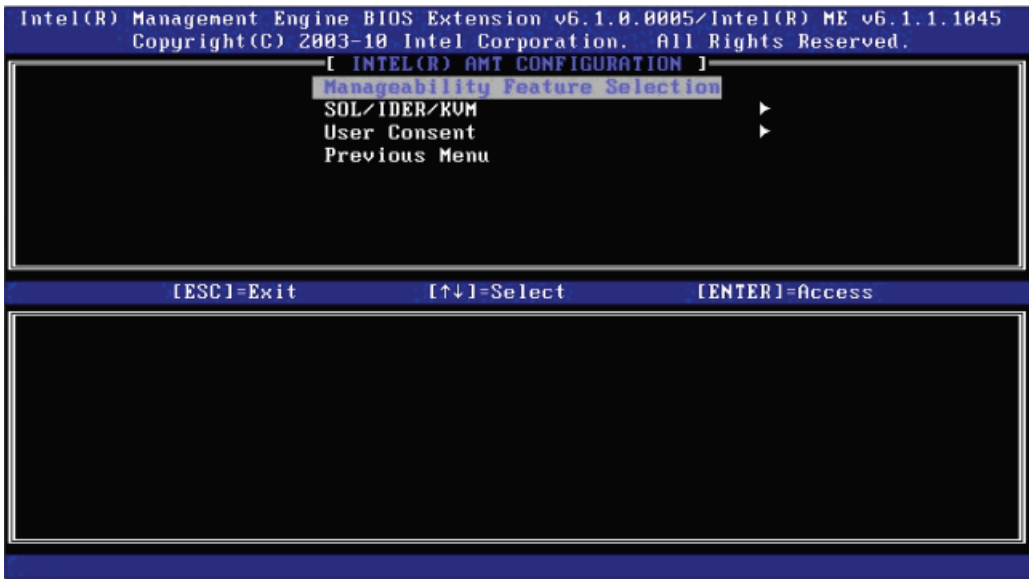


Figure 16-12 Intel(R) AMT Configuration

Entry	Meaning
Manageability Feature Selection	Enable and disable all AMT features.
SOL/IDER/KVM	Enable and disable the features SOL, IDE redirection, KVM.
User Consent	User consent settings. Forces the following additional security behavior: When a user attempts to establish a KVM connection remotely, a six-figure number is displayed on the AMT PC. The remote user must enter this number on the help desk PC before the KVM connection can be opened.
Previous Menu	Return to the main menu.

16.4.7 Security menu

In this menu access to the IPC can be limited or prevented by assigning passwords (Supervisor / User password).

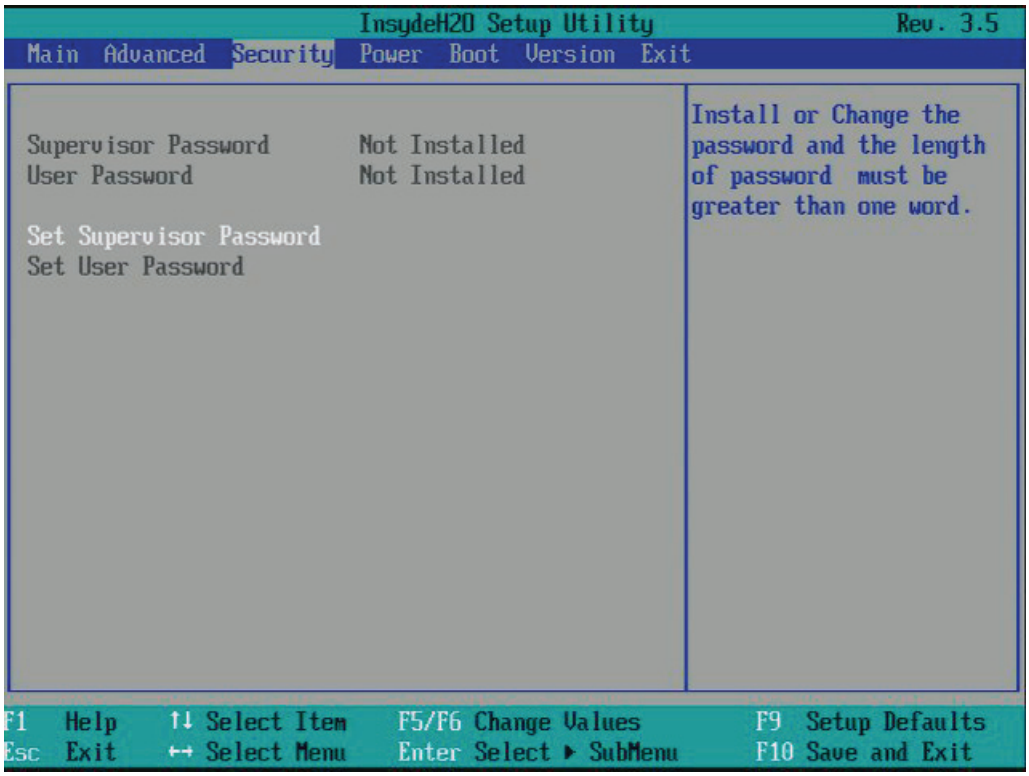


Figure 16-13 Security menu

Entry	Meaning
Supervisor Password	• Installed: A Supervisor password is set up • Not installed: No Supervisor password is set up
User password	• Installed: A User password is set up • Not installed: No User password is set up
Set Supervisor Password	Set a Supervisor password for full access to the SETUP. This field opens the password input dialog. After entering the Supervisor password correctly, the user can change the password, or clear and thus deactivate it by pressing "ENTER".
Set User Password	Set a User password for limited access to the SETUP. This field opens the password input dialog. Logged on users can change the password, or clear and thus deactivate it by pressing "RETURN".

16.4.8 Power menu

The behavior of the device after a power failure and after wake events is specified in this menu.

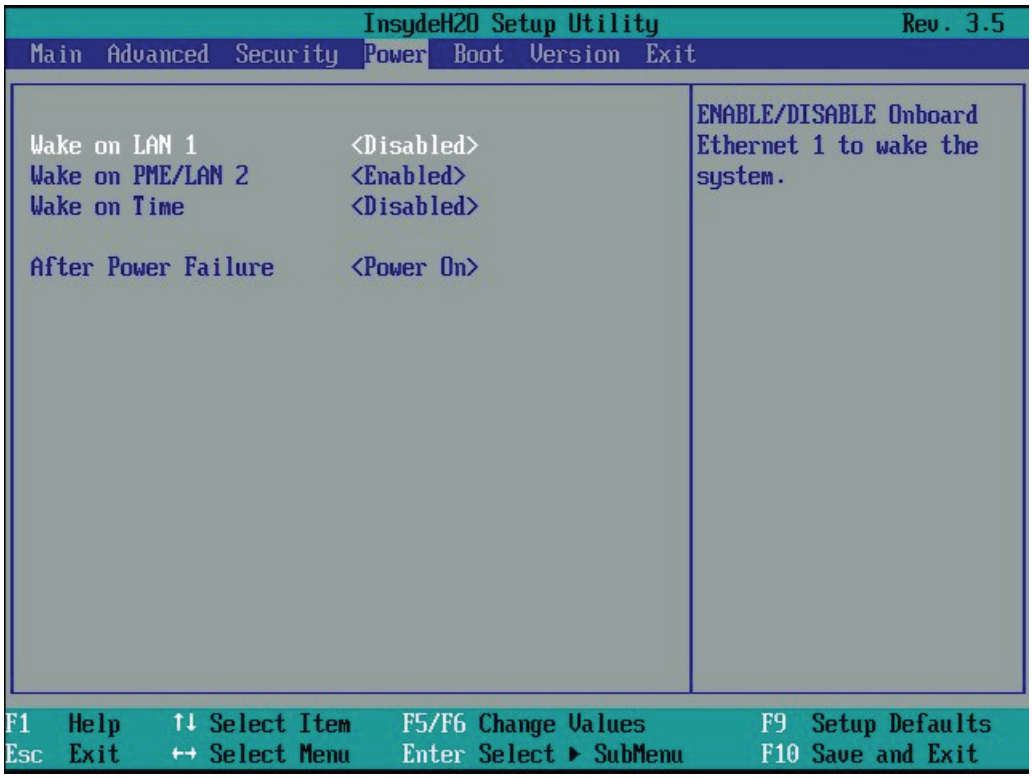


Figure 16-14 Power menu

Entry	Meaning
Wake on LAN 1	Device can be activated by an event via LAN.
Wake on PME/LAN 2	The device switches on when a Power Management Event occurs.
Wake on Time	The device switches on at a moment to be specified when it is in the operating state S5.
After Power Failure	Specification of the device behavior after a voltage failure and voltage recovery. • [Power On]: After voltage failure and subsequent voltage restoration, the device switches on automatically. • [Stay Off]: After voltage failure and subsequent voltage restoration, the device remains switched off. • [Last State]: If the device was switched on when the power failure occurred, the device switches on when the voltage is restored. Otherwise, the device remains switched off when the voltage is restored.

16.4.9 Boot Menu

In this menu this booting behavior of the device is specified and the boot medium or sequence of the boot media is determined.

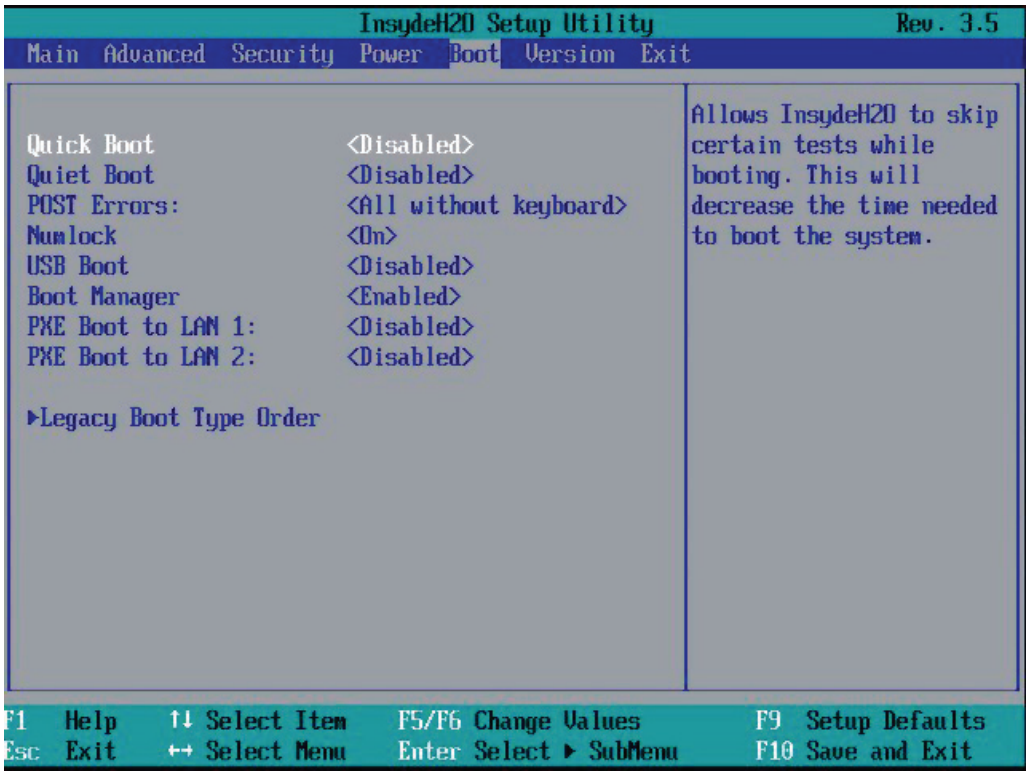


Figure 16-15 Boot Menu

Entry	Meaning
Quick Boot	Enable or disable If enabled, the programming device starts faster because various hardware function tests are skipped.
Quiet Boot	Booting is carried out in text mode.
POST errors	Specification of the booting behavior if errors are recognized. • Never halt on errors: Continue the booting process when errors occur. • Halt on all errors: Interrupt the booting process when errors occur. • All without keyboard: Interrupt the booting process when errors occur, except for keyboard errors. • All without kb/smart: Interrupt the booting process when errors occur, except for keyboard and S.M.A.R.T errors. (SMART: Self-Monitoring, Analysis and Reporting Technology)
NumLOCK	On = Enable numeric keypad on right Off = Disable numeric keypad on right (= navigation)
USB Boot	Allow/Do not allow booting of inserted USB devices.
PXE Boot to LAN 1	Enable or disable booting of the LAN1.

Entry	Meaning
PXE Boot to LAN 2	Enable or disable booting of the LAN2.
EFI>	Set order of the EFI boot media
Legacy>	Set traditional boot order (Normal, Advanced, Advanced Placeholder).

Boot menu > Legacy: Standard

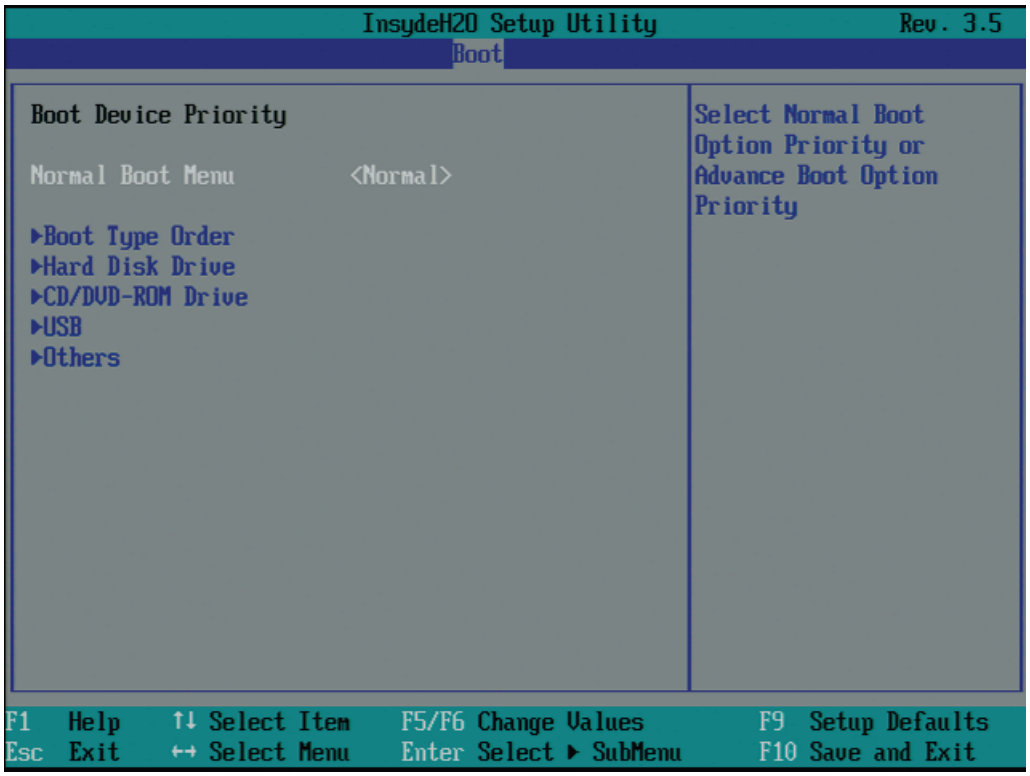


Figure 16-16 Submenu "Boot / Legacy / Normal Boot Menu <Normal>"

Entry	Meaning
Entry	Meaning
Normal Boot Menu	• Normal = Boot order based on component type • Advanced = Customized boot order of all components • Advanced Placeholder = Individual, fixed booting sequence that is not changed automatically
Boot Type Order	Submenu for setting the boot order of component groups relative to one another
Hard Disk Drive	Submenu for setting the boot order within the hard disk group
CD/DVD ROM Drive	Submenu for setting the boot order within the group of optical drives.
USB	Submenu for setting the boot order within the group of USB drives.
Others	Submenu for setting the boot order within the others group (for example Remote Boot Device)

Boot menu / Legacy / Normal Boot Menu (Advanced)

In this menu all the connected bootable components and their booting position are displayed. The booting position of the component can be moved freely.

During booting the component at the first position (highest booting priority) is used. If the component is not available, booting is carried out from the next component in the list.

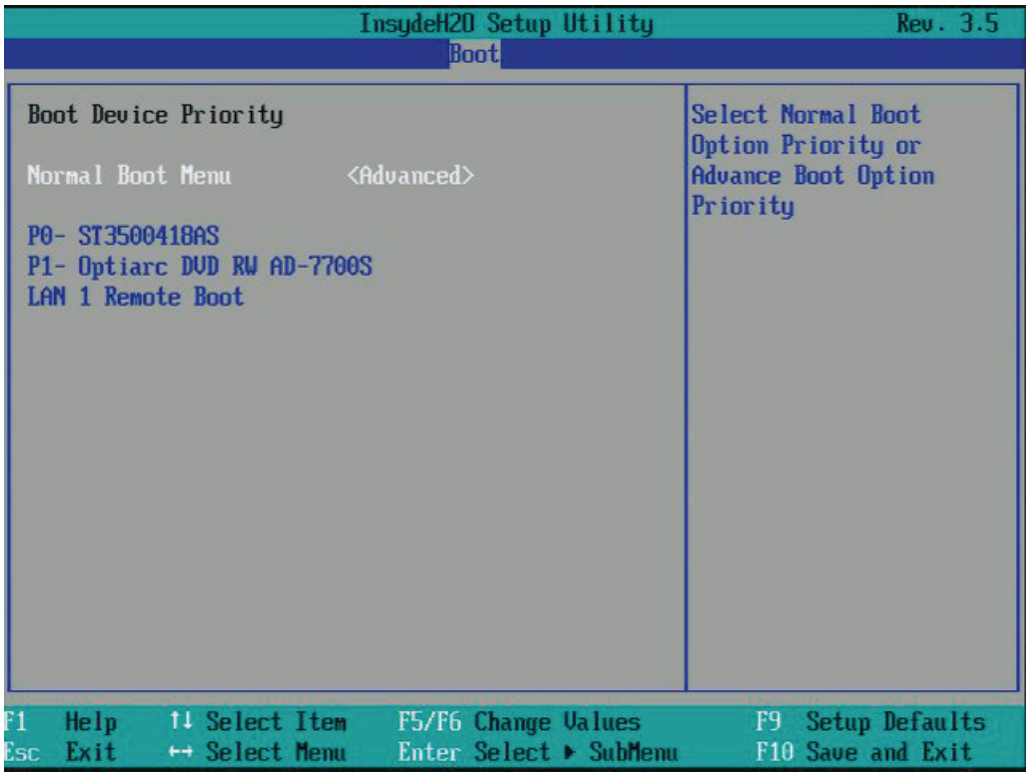


Figure 16-17 Submenu "Boot / Legacy / Normal Boot Menu <Advanced>"

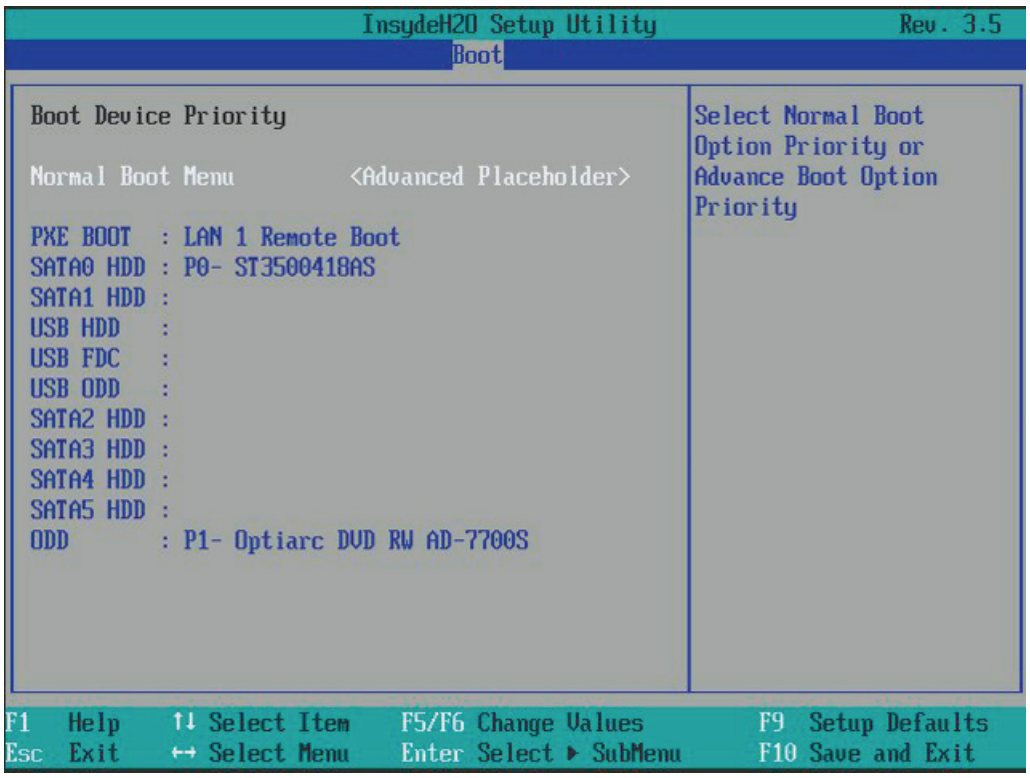


Figure 16-18 Advanced Placeholder

Bootable components that are disconnected from and then reconnected to the PC between booting processes are set by the BIOS to the first position in the case of the "Advanced" setting, and relocated back to their original booting position (Advanced Placeholder Boot) in the case of the "Advanced Placeholder" setting.

The boot sequence is changed as follows:

Select the boot component with the ↑ ↓ keys, move to the desired position with + or -.

Note

During the booting process the boot manager can be started by using the F12 key. The boot manager displays all the available boot components and boots the device selected by the user.

16.4.10 Version Menu

This menu contains system information which should be made available to Technical Support.

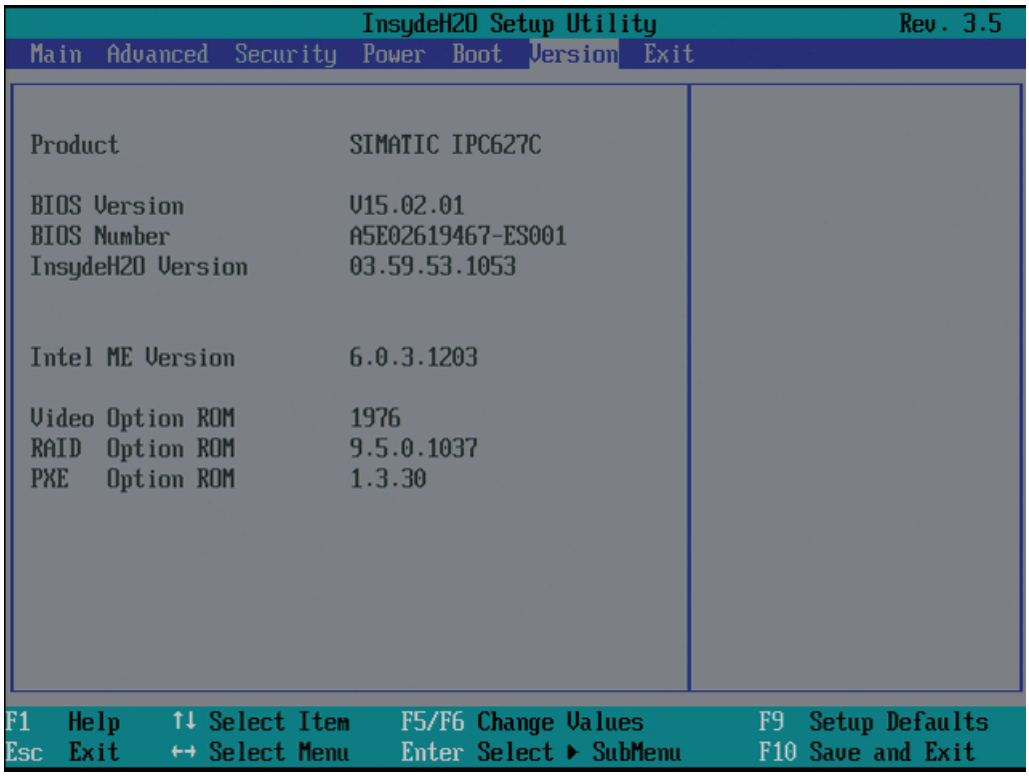


Figure 16-19 Version menu

16.4.11 Exit menu

You always exit BIOS Setup in this menu.

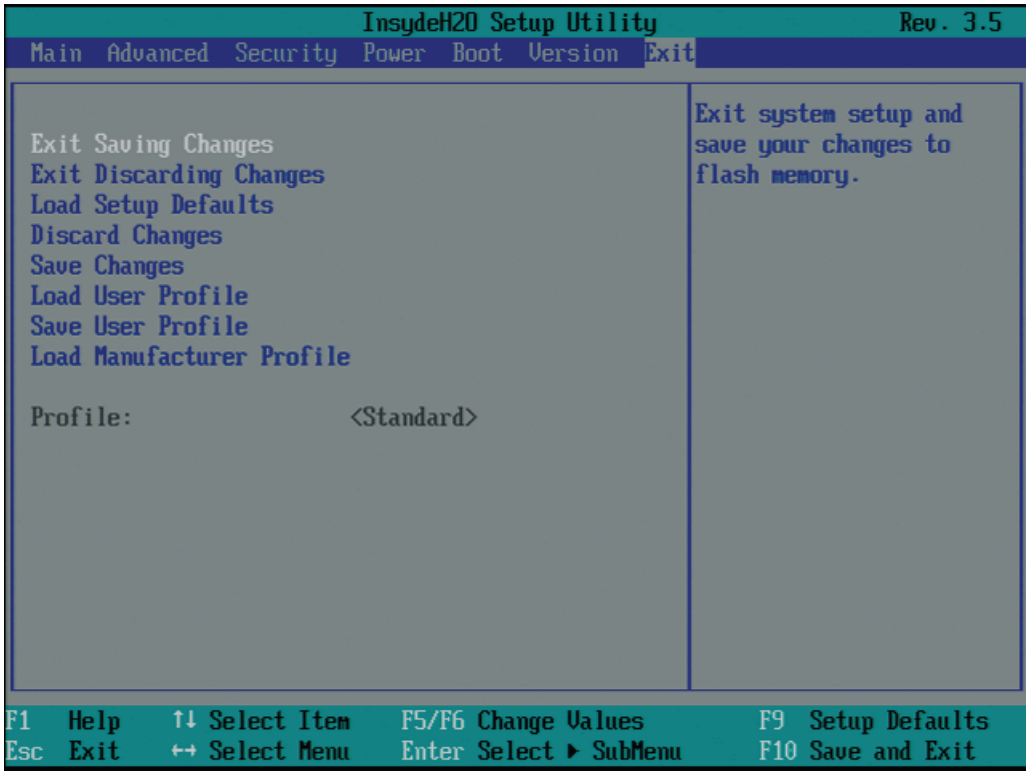


Figure 16-20 The "Exit" menu (example)

Entry	Meaning
Exit Saving Changes	All the parameter changes are saved. Afterwards a system restart is carried out with the new parameters.
Exit Discarding Changes	All the parameter changes are discarded and the system is restarted with the old parameters.
Load Setup Defaults	All parameters are set to safe values.
Discard Changes	All the parameter changes are rejected.
Save Changes	All the parameter changes are saved.
Load User Profile	All the user-defined settings are loaded. (The user settings must have been saved beforehand with the Save User Profile function.)
Save User Profile	The set parameters are saved as a USER profile.
Load Manufacturer Profile	The manufacturer parameters are downloaded to the SETUP device.
Profiles	Display field: Displays the active profile (Standard, User, Manufacturer) with which the device is currently operating ...

16.4.12 BIOS Setup default settings

Documenting your device configuration

If you have changed any default settings in Setup, you can enter them in the following table. You can then refer to these entries for any future hardware modifications.

Note

Print out the table below and keep the pages in a safe place once you made your entries.

Note

The default setup settings vary depending on the ordered device configuration.

If you have changed any default settings in Setup, you can enter them in the following table. You can then refer to these entries for any future hardware modifications.

BIOS Setup default settings

System parameters	Default settings	Local settings
Main		
System Time	hh:mm:ss	
System Date	MM/DD/YYYY	

System parameters	Default settings	Local settings
Advanced>Peripheral Configuration		
Internal COM 1	Auto	
Onboard Ethernet 1	Enabled	
Onboard Ethernet 2	Enabled	
PCI – MPI / DP	Enabled	

System parameters	Default settings	Local settings
Advanced>SATA Configuration		
SATA Controller	Enabled	
SATA Controller mode	AHCI	

System parameters	Default settings	Local settings
Advanced>SATA Configuration		

System parameters	Default settings	Local settings
Advanced>Video Configuration		
Primary video device	PEG	
IGD boot type	VBIOS default	
Forced VGA	Disabled	
IGD Dual View DVI/CRT	Disabled	
IGD Dual View VGA DDC	Disabled	

System parameters	Default settings	Local settings
Advanced > USB Configuration		
USB Port0	Enabled	
USB Port1	Enabled	
USB Port2	Enabled	
USB Port3	Enabled	
USB Port6	Enabled	
USB Port7	Enabled	
USB Port8	Enabled	
USB Port9	Enabled	
USB Port10	Enabled	

System parameters	Default settings	Local settings
Advanced>Chipset Configuration		
Port 80h Cycles	LPC Bus	
VT-d	Enabled	
HPET	Enabled	

System parameters	Default settings	Local settings
Advanced>CPU Configuration		
P-States (IST)	Enabled	
Turbo Mode	Enabled	
CMP support	Auto	
HT Support	Auto	
Use XD Capability	Disabled	
VT Support	Enabled	
Turbo Mode	Enabled	
C-States	Enabled	

System parameters	Default settings	Local settings
Advanced>Active Management Technology Support		
Intel AMT Support	Disabled	
Intel AMT Setup Prompt	Disabled	
AMT CIRA Request Trig	Disabled	
AMT CIRA Timerout	30	
Un-Configure ME	Disabled	
USB Configure	Disabled	

System parameters	Default settings	Local settings
Advanced		
Fan control	Enabled	

System parameters	Default settings	Local settings
Security		
Supervisor Password	Not installed	
User password	Not installed	
Set Supervisor Password	Inactive (no password assigned)	
Set User Password	Inactive (no password assigned)	

System parameters	Default settings	Local settings
Power		
Wake on LAN 1	Disabled	
Wake on PME/LAN 2	Enabled	
Wake on Time	Disabled	
After Power Failure	Power On	

System parameters	Default settings	Local settings
Boot		
Quick Boot	Disabled	
Quiet Boot	Disabled	
POST errors	All without keyboard	
NumLOCK	On	
USB Boot	Disabled	
PXE Boot to LAN 1	Disabled	
PXE Boot to LAN 2	Disabled	

System parameters	Default settings	Local settings
Boot > EFI		

System parameters	Default settings	Local settings
Boot > Legacy		
Normal Boot Menu	Standard	

System parameters	Default settings	Local settings
Exit		
Profile:	Standard	

16.5 AMT (Active Management Technology)

16.5.1 Overview of AMT

This section describes the required measures and settings on the local IPC so that the IPC can be controlled and maintained remotely from a management station known below as the help desk PC.

The local IPC is known below as the "AMT PC".

The sections contain the following information:

- AMT settings in the MEBx and in the BIOS setup
- Basic configuration of AMT
- Further useful notes

16.5.2 Enabling AMT, basic configuration

Procedure

For security reasons, AMT is not enabled on new devices.

To enable AMT, follow these steps:

1. Connect the AMT PC with the LAN.
2. If necessary, first reset AMT to the default status (see section "Unconfigure").
3. To access the BIOS, press the <F2> key while the device is booting.
4. In the Advanced menu, enable "Intel AMT Support", "Intel AMT Setup Prompt" and "Intel AMT Password Write".
5. Exit the BIOS with the <F10> key "Save and Exit". The AMT PC restarts.
6. To access the MEBx, press the <Ctrl+P> keyboard shortcut
7. In the login dialog, enter the standard password "admin".

8. Change the default password. The new password must include the following characters:
   - In total at least eight characters
   - One upper case letter
   - One lower case letter
   - One number
   - One of the special characters ! @ # $ % ^ & * @ # $ % ^ & *

   Note

   The underscore _ and the space characters are valid password characters, however they do not increase password complexity.

9. Enable "Intel (R) AMT Configuration > Manageability Feature Selection".
10. Enable "Intel (R) ME General Settings > Activate Network Access".

16.5.3 Advanced settings

The BIOS and the MEBx contain the most important basic settings for AMT. Additional tools are necessary if you want to make more advanced settings. If required, these must be downloaded from the relevant manufacturer's site. For information on the options and use of these tools, refer to the relevant documentation of the manufacturer.

- Manageability Commander and other tools of the Intel DTK (Manageability Developer Tool Kit): Programs from the Intel DTK that you can download from the Internet at "http://software.intel.com/en-us/manageability".
- AMT Web interface: For encrypted connections, the URL of the Web interface is "https://<Fully qualified domain name>:16993" and for unencrypted connections "http://<IP address>:16992".
- WinRM: A command line program that is part of Windows as of Windows Vista. This tool can be downloaded for older Windows versions.

16.5.4 Resetting with Unconfigure

Note

If the AMT PC still has its factory settings, for example has just been purchased, you can skip this section.

If you have already configured AMT previously, it is best to discard all the previous AMT settings made in the MEBx.

NOTICE
All previous settings in the management engine are deleted. Correct operation in the plant may be at risk. Note down all the settings in the MEBx. Make the settings again as necessary following Unconfigure.

To reset the AMT settings, follow these steps:

1. Enable the "Unconfigure ME" entry in "Advanced > Active Management Technology Support" in the BIOS.
2. Exit the BIOS with the <F10> key "Save and Exit". The AMT PC restarts.
3. After the restart, a user prompt appears asking whether you really want to discard all the settings in the management engine:



4. Confirm with "Y". On a German keyboard, this means pressing the <Z> key.

The device continues to boot with the factory settings of the management engine.

16.5.5 Obtaining the network address

Introduction

To connect the AMT PC with the AMT server, the network address that uniquely localizes the AMT server on the AMT PC must be entered.

If DHCP is set for the automatic assignment of the network address in "Network Setup" in the MEBx of the AMT PC, the network address is not fixed.

Procedure

To check the network address, follow these steps:

1. If the AMT server uses the same network address as the operating system of the AMT PC (most common situation): You can obtain the address of the AMT server in the command line in Windows using "ipconfig" and in UNIX using "ifconfig".
2. If the AMT server and operating system do not use the same network address, ask your network administrator for the address you have been assigned.

16.5.6 Forcing user consent

Introduction

When establishing a connection to the AMT PC, the KVM viewer may prompt the user to enter a six-figure code. This code is displayed on the screen of the AMT PC. The user of the AMT PC must inform the user of the KVM viewer of this code.

Procedure

To set up this code query on the KVM viewer, follow these steps:

1. Select "Intel(R) AMT Configuration > User Consent" in the MEBx.
2. Select the value "KVM" for "User Consent".

To allow a user with administrator privileges to avoid this code query, follow these steps:

1. Select "Intel(R) AMT Configuration > User Consent" in the MEBx.
2. Enable "Opt-in configurable from remote IT".

16.6 Communications processor CP 1616 onboard

16.6.1 Introduction

16.6.1.1 Properties

The CP 1616 onboard allows the connection of industrial PCs to Industrial Ethernet.

The basic characteristics of the PCS 1616 onboard are:

- Optimized for PROFINET IO
- Enhanced Real Time Ethernet Controller 400 = ERTEC 400
- Three RJ45 sockets for connecting terminal devices or addition network components
- Integrated 3-port real-time switch
- Automatic hardware detection

16.6.1.2 Network connections

Ethernet

The CP 1616 is designed for operation in Ethernet networks. Additional features are:

- The connectors are designed for 10BaseT and 100BaseTX.
- Data transfer rates of 10 and 100 Mbps in full/half duplex mode are supported.
- The handshake is performed automatically (auto negotiation).
- A 3-port realtime switch is located in the module.
- Autocrossing

Three RJ45 connectors

The CP 1616 is connected to the LAN (Local Area Network) via one of the three RJ45 sockets of the PC.

These three sockets lead to the integrated realtime switch.

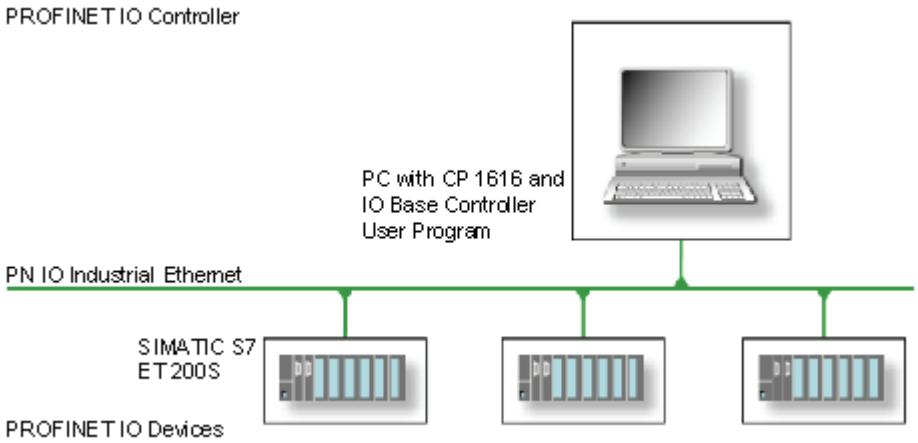
16.6.1.3 Typical Communication Partners

CP 1616 onboard as an IO controller

The following diagram shows a typical application: CP 1616 onboard as PROFINET IO controller on the IO controller layer.

The IO base controller user program runs on the PC. This program accesses the functions of the IO base user program interface.

Data traffic is routed via the communication processor to several SIMATIC S7 PROFINET IO devices, ET 200S over Industrial Ethernet.

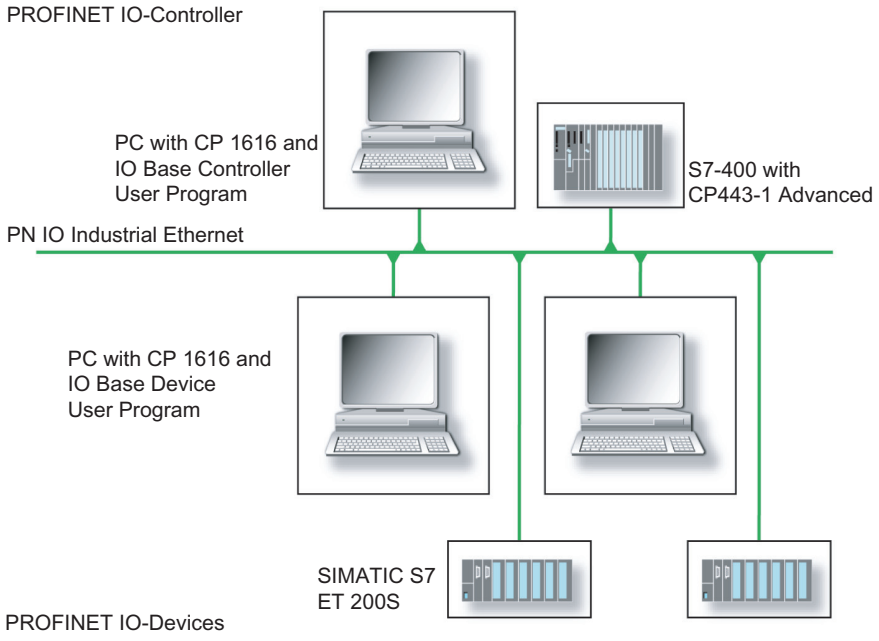


CP 1616 onboard as IO device

The following diagram shows a typical application: Two PCs each with a CP as a PROFINET IO device on the IO device layer.

A PC with a CP as PROFINET IO controller, a SIMATIC S7-400 with a CP 443-1 as PROFINET IO controller and two SIMATIC S7 ET 200S PROFINET IO devices are also connected in the network.

The IO base device user program runs on the IO device PC. This program accesses the functions of the IO base user program interface. Data traffic is routed via the CP 1616 onboard communication processor to a PC as PROFINET IO controller, or to an S7-400 automation system with CP 443-1 over Industrial Ethernet.



16.6.2 Firmware loader

Scenario for using the firmware loader

The CP 1616 onboard is supplied with the latest version of the firmware. If new functions become available due to product development, you can make them available by performing a firmware download.

Description

This section will familiarize you with the application area and use of the firmware loader. You can find additional, detailed information about the individual loader variants in the integrated help of the program.

Firmware

This refers to the system program in the SIMATIC NET modules.

Application area for the firmware loader

The firmware loader enables you to reload new firmware releases to SIMATIC NET modules. It is used for:

- PROFIBUS modules
- Industrial Ethernet modules
- Modules for gateways, for example IE/PB link

Installation

The firmware loader is available on your PG/PC under Windows following the installation of STEP 7/NCM PC.

Loader files

The firmware loader supports the following file types:

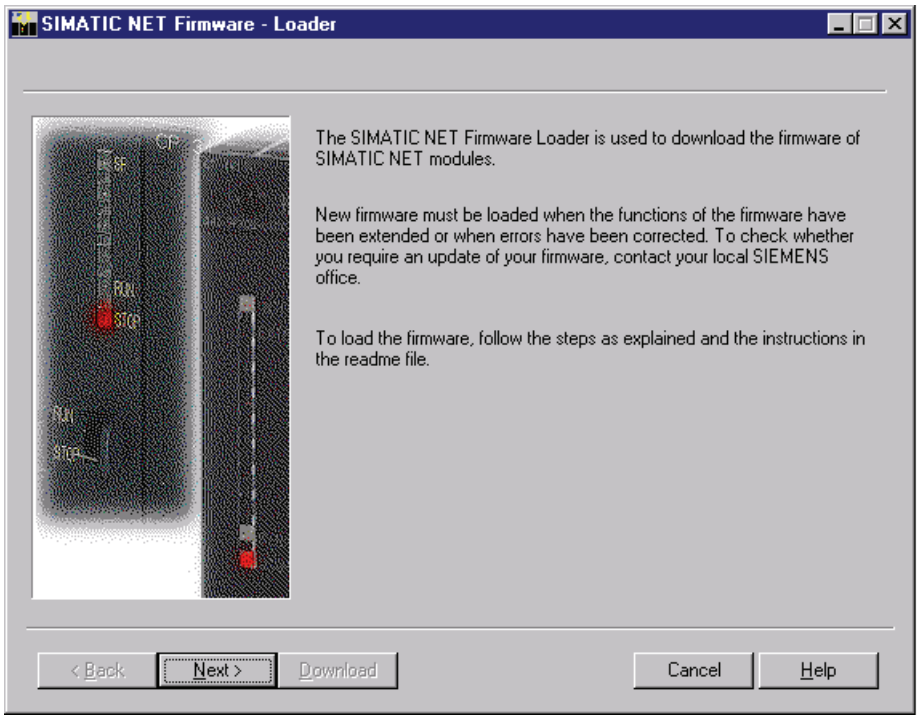
- <file>.FWL
  A file form that contains further information, which is displayed by the firmware loader. The firmware loader can use this information to check if the firmware is compatible to the device.

Read the information provided along with the loader file, for example, in the readme file. This information is also displayed in the firmware loader when the FWL file is loaded.

16.6.2.1 Loading firmware

Start downloading procedure

1. In the Windows Start menu, select the menu command SIMATIC > STEP 7 > NCM S7 > Firmware Loader.



2. Click "Next" and follow the instructions in the dialog fields that follow. A help function is integrated in the software as support.

CAUTION
Ensure that the loader file you are using for the update is suitable for the version of firmware on your module. If you have any doubts, contact your local Siemens consultant.

CAUTION
Be aware that aborting the loading process may result in an inconsistent state in your module.

You can find additional, detailed information about the individual loader variants in the integrated help.

NOTICE
When loading the firmware or commissioning the module, be aware that the CP 1616 onboard takes five MAC addresses (always in direct sequence). The first two are shown in the BIOS.

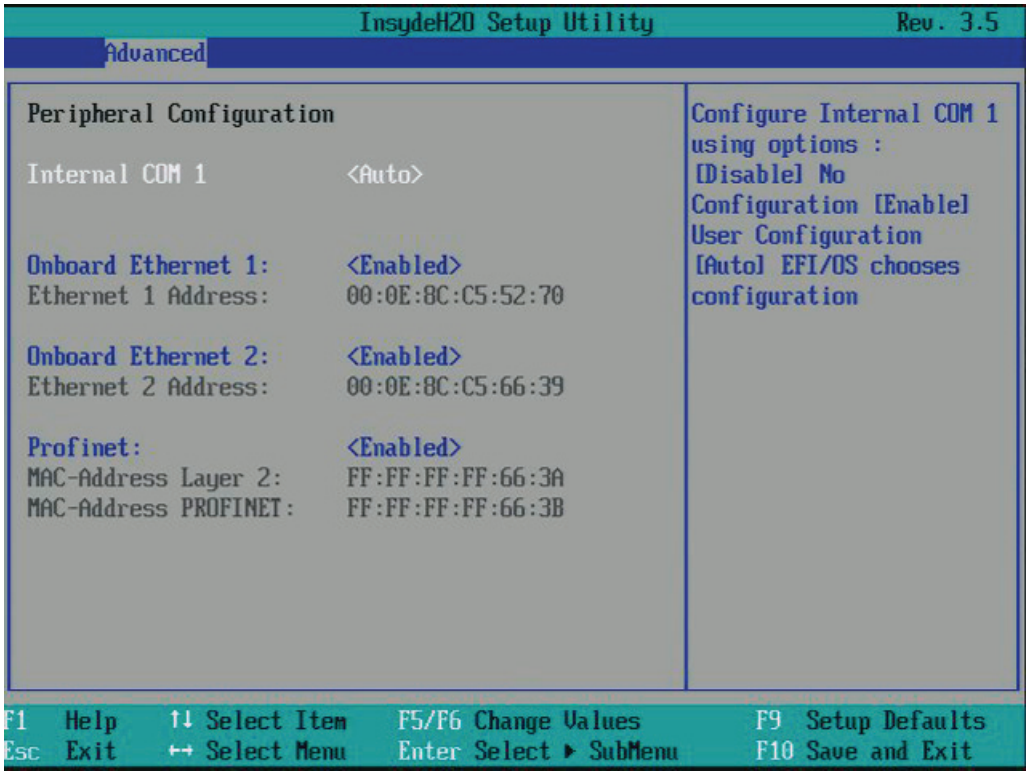


Figure 16-21 Advanced menu Peripheral Configuration

Example

The lower MAC address at "Profinet" is provided for Layer 2 communication, while the second one is used for Ethernet/PROFINET communication.

16.6.3 Further actions in STEP 7/NCM PC

Configuring

Your PC is now ready, although you still have to configure the SIMATIC NET communication software. The rest of the procedure is described in the "Commissioning PC Stations" manual (on the Windows PC that also contains STEP 7/NCM PC: Start > Simatic > Documentation > English > Commissioning PC Stations).

Appendix A

A.1 Guidelines and declarations

Notes on CE marking

CE

The following guidelines apply to the SIMATIC product described in this documentation:

- EMC directive

  The devices fulfill the requirements for the EC directive "2004/108/EEC Electromagnetic Compatibility" and are designed for the following applications as per the CE marking:

Fields of application	Requirement for	
–	Emitted interference	Immunity to interferences
Residential, business and trade areas and small businesses.	EN 61000-6-3:2007	EN 61000-6-1:2007
Industry	EN 61000-6-4:2007	EN 61000-6-2:2005

The device is also compliant with standards EN 61000-3-2:2006 (harmonic currents) and EN 61000-3-3:1995 +A1:2001 +A2:2005 (voltage fluctuation and flicker).

- Low-voltage directive

  Devices with an AC power supply meet the requirements of EC Directive 2006/95/EC "Low Voltage Directive". Conformance with this directive has been verified according to EN 60950-1: 2006 +A11:2009.

- Declaration of conformity

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

- Note the installation guidelines

  The installation guidelines and safety instructions given in this documentation have to be noted during 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 are only be connected via shielded cables.

A.2 Certificates and approvals

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).

Q-Net certificate no.: DE-001108 QM

Software License Agreement

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

Production safety / approvals for the USA, Canada and Australia

The following approval is available for the device:	
	Underwriters Laboratories (UL) to Standard UL 60950-1, Report E11 5352 and Canadian Standard C22.2 no. 60950-1 (I.T.E), or to UL508 and C22.2 no. 142 (IND.CONT.EQ)

EMC

USA	
Federal Communications Commission 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 the requirements of the standard EN 61000-6-3:2007 Generic standards - Emission standard for residential, commercial and light-industrial environments.

A.3 Service and support

You can find additional information and support for the products described on the Internet at the following addresses:

- Technical support (http://www.siemens.com/automation/service&support)
- Support request form (http://www.siemens.com/automation/support-request)
- After-sales information system for SIMATIC PC / PG (http://www.siemens.com/asis)
- SIMATIC Documentation Collection (http://www.siemens.com/simatic-tech-doku-portal)
- Your local representative (http://www.siemens.com/automation/partner)
- Training center (http://www.sitrain.com)
- Industry Mall (http://mall.automation.siemens.com)

When contacting your local representative or Technical Support, please have the following information at hand:

- Order number of the device (MLFB)
- BIOS version (industry PC) or image version (HMI device)
- Installed additional hardware
- Installed additional software

Tools & downloads

Please check regularly if updates and hotfixes are available for download to your device. The downloads are available on the Internet under "After Sales Information System SIMATIC PC/PG" (see above).

A.4 ESD guideline

Meaning



An electronic module is equipped with highly integrated electronic components. Due to their design, electronic components are highly sensitive to overvoltage and thus to the discharge of static electricity. Such electronic components are labeled as electrostatic sensitive devices (ESD).

The following abbreviations are commonly used for electrostatic sensitive devices:

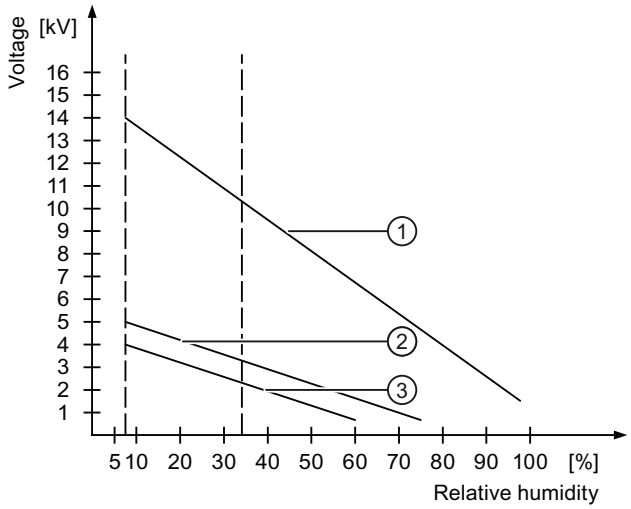
- ESD – Electrostatic Sensitive Device
- ESD – Electrostatic Sensitive Device (internationally recognized term)

Electrostatic charge

CAUTION
Electrostatic charge ESDs may be destroyed by voltages far below the level perceived by human beings. If you are not discharged electrostatically, the voltage that you transfer when touching a component or the contact points of a module can already cause damage. The damage to an ESD caused by overvoltage is usually not recognized immediately. The damage only becomes apparent after a long period of operation. Discharge any electrostatic charge of your body before you touch the ESD.

Anyone who is not connected conductively to their surroundings is subject to electrostatic charge.

The following diagram shows the maximum voltage values to which a person can be charged electrostatically. The values depend on the material and humidity. The shown values are in conformity with the specifications of EN 61000-4-2.



① Synthetic materials
② Wool
③ Antistatic materials such as wood or concrete

Protective measures against discharge of static electricity

CAUTION
Grounding measures There is no equipotential bonding without grounding. An electrostatic charge is not discharged and may damage the ESD. When working with electrostatic sensitive devices, make sure that the person and the workplace are properly grounded.

Note the following:

- Only touch the ESD if it is absolutely necessary.
- When you touch ESD modules, avoid touching the pins or the PCB tracks.

  This precaution reduces the risk of damaging an ESD.
- Discharge electrostatic electricity from your body if you are performing measurements on an ESD.

  To do so, touch a grounded metal object before you carry out the measurement.
- Always use grounded measuring instruments.

Abbreviations

B

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.
AMT	Active Management Technology	Remote maintenance technology from Intel
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
CIRA	Client Initiated Remote Access	Administration of AMT PCs not in the intranet
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
DDRAM	Double Data Random Access Memory	Memory chip with high-speed interface
DHCP	Dynamic Host Configuration Protocol	Protocol for configuring IP networks
DMA	Direct Memory Access	Direct memory access
DOS	Disk Operating System	Operating system without GUI
DP	Display Port	New powerful digital monitor port
DQS	Deutsche Gesellschaft zur Zertifizierung von Qualitätsmanagement mBH	
DSR	Data Set Ready	Ready for operation
DTK	Developer Tool Kit	Tools for software development, testing, configuration etc.
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 checking and correction	Error correction code
ECP	Extended capability port	Extended parallel port
EFI	Extensible Firmware Interface	
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"

Abbreviation	Term	Meaning
FQDN	Fully qualified domain name	Full name of a domain
FSB	Front Side Bus	
GND	Ground	Chassis ground
HD	Hard disk	Hard disk
HDA	High Definition Audio	
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	
IAMT	Intel Active Management Technology	Diagnostics, management and remote control of PCs
IDE	Integrated Device Electronics	
IDER	IDE Redirection	Remotely mounting an ISO file as a drive
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	
KVM	Keyboard, Video, Mouse	
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
ME	Management engine	Unit implemented by AMT
MEBx	Management Engine BIOS Extension	User interface for basic configuration of AMT
MLFB	Machine-readable product designation	
MMC	Micro Memory Card	Memory card of the format 32 mm x 24.5 mm

Abbreviation	Term	Meaning
MPI	Multipoint-capable interface for programming devices	
MPS	Manageability Presence Server	Proxy for AMT
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
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, 7)
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	
PRTC	Protected Real Time Clock	Clock in the management engine MEBx
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	

Abbreviation	Term	Meaning
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	
SOL	Serial over LAN	Text-based remote control
SOM	SafeCard on Motherboard (SOM)	
SPP	Standard Parallel Port	Synonym for parallel port
SRAM	Static Random Access Memory	Static RAM
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
TXT	Trusted Execution Technology	Hardware implementation
TWD	Watchdog Time	Watchdog monitoring time
UEFI	Unified Extensible Firmware Interface	Specification that defines an interface between operating systems and platform firmware. UEFI was developed to replace the conventional BIOS firmware.
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.

Abbreviation	Term	Meaning
VCC		Positive supply voltage of integrated circuits
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.
VT-D	Virtualization Technology for Directed I/O	Enables the direct assignment of a device (e.g. network adapter) to a virtual device.
W2k	Windows 2000	
WAN	Wide Area Network	
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	
XD	Execute Disable Capability	Hardware implementation
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.

AMT

AMT (Active Management Technology) is a technology for remote maintenance of computers. You turn an AMT PC on and off remotely and start the BIOS setup remotely. Different operating systems can be booted with ISO files.

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.

Boot disk

A boot disk is a disk with a "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

Communauté **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.

CompactFlash 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.

DP

Display **P**ort: New digital monitor interface.

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.

ECC

Error checking and correction is a method for detecting and correcting errors when saving and transferring data, frequently used in conjunction with RAM modules with and without ECC.

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 CompactFlash 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.

Execute Disable Capability

Hardware implementation that prevents mutual memory accesses by programs and applications. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

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 (FBWF)

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 Active Management Technology

This technology permits the diagnostics, management and remote control of PCs. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

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).

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.

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

PixElement (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

Process **F**ield **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

Redundant **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.

RAL

Restricted **A**ccess **L**ocation: Installation of the device in a production facility with restricted access, for example, a locked control cabinet.

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, low energy consumption and rapid data transfer.

STEP 7

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

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

Trusted Execution Technology

Hardware implementation that allows secured execution of programs and applications. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

Turbo Mode

In this mode individual processor cores can be clocked higher in accordance with the load from the user programs and as required. It is only supported by Core i5 and Core i7 processors.

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

Wireless **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.

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