SIEMENS

SIMATIC

Industrial PC
SIMATIC IPC627D/827D

Operating Instructions

01/2020
A5E32990859-AD

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

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

NOTICE

indicates that property damage can result if proper precautions are not taken.

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.

Trademarks

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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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Preface

Purpose of the Operating Instructions

These operating instructions contain all the information you need to commission and operate the SIMATIC IPC627D and IPC827D.

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

Basic knowledge required

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

Scope of the operating instructions

These operating instructions are valid for all versions of the SIMATIC IPC627D and IPC827D.

Approbations

You will find additional information in "Certificates and approvals (Page 105)".

CE marking

You will find additional information in "Certificates and approvals (Page 105)".

Standards

For more information, refer to chapters "Certificates and approvals (Page 105)" and "Technical specifications (Page 120)".

Position in the information landscape

The IPC documentation comprises:

- SIMATIC IPC627D operating instructions
- SIMATIC IPC827D operating instructions

The documentation is supplied with the IPC in German and English in electronic form as a PDF file on the "Documentation and Drivers" CD/DVD.

Conventions

The terms "PC" and "device" are sometimes used to refer to the SIMATIC IPC627D and SIMATIC IPC827D in this documentation.

The term "Windows Embedded Standard" is used throughout to refer to "Windows Embedded Standard 7 Professional (WES 7/P)". "Windows 7" is used as an abbreviation for "Windows 7 Ultimate".

Note

A note is important information about the product, handling the product or a reference to specific sections of the documentation that require special consideration.

History

The following editions of these operating instructions have already been published:

Edition	Comment
12/2013	First edition
09/2014	Revision: HDD in removable drive bay and RAID
06/2019	Revision: Power supply, Windows 10

Table of contents

Overview

1

1.1 Product description

The SIMATIC IPC627D and IPC827D provide a high degree of industrial functionality.

- Compact design
- Expandability (expansion card slots)
- Scalability
- Level of performance
- High degree of ruggedness

1.1.1 Applications

The device are available for industrial PC systems for high-performance and space-saving applications in particular in the field of machine, plant and control cabinet engineering:

- Measuring and controlling process and machine data, for example, automated washing systems, assembling machines and packaging machines
- Operating and visualization tasks, for example, information terminals and large-scale displays in automobile manufacturing
- Data logging and processing, for example, system data logging and distributed process control

1.1.2 Features

Basic data	
Installation	• Wall mounting • Vertical mounting
Processor	• Intel Xeon E3-1268L v3 2.3 (3.3) GHz, 4 cores, GT2, 8 MB cache, HT, AMT • Intel Core i3-4330TE 2.4 GHz, 2 cores, GT2, 3 MB cache • Intel Celeron G1820TE 2.2 GHz, 2 cores, GT1, 2 MB cache
Main memory	Memory expansion up to 16 GB with the following memory modules: without ECC: • 2 GB DDR3 SDRAM • 4 GB DDR3 SDRAM • 8 GB DDR3 SDRAM with ECC: • 4 GB DDR3 ECC • 8 GB DDR3 ECC
Possible configurations with expansion cards	• IPC627D: – 2 × PCI Rev. 2.2 – 1 × PCI Rev. 2.2, 1 × PCIe x16 Rev. 3.0 – 1 × PCIe x4 Rev. 2.0, 1 × PCIe x16 Rev. 3.0 • IPC827D: – 3 × PCI Rev. 2.2, 1 × PCIe x4 Rev. 2.0, 1 × PCIe x16 Rev. 3.0
Graphics	• Intel® HD Graphics Controller P4600/4700 GT1/GT2 2D and 3D engine integrated in chipset Dynamic Video Memory Technology (occupies up to 512 MB in the main memory) • DisplayPort resolution of up to 3840 x 2160 pixel • DVI/VGA resolution of up to 1920 × 1200 pixel • Graphics memory is claimed in main memory (dynamic UMA) • Triple-head mode
	DisplayPort resolutions depend on the graphics controller in the CPU, which is represented by the processor: • Celeron G1820TE: GT1 (HD Graphics), maximum resolutions up to 2560 × 1600 • Core I3-4330TE: GT2 (HD Graphics 4600), maximum resolutions up to 3840 × 2160 • XEON E3-1268L v3: GT2 (HD Graphics 4600) maximum resolutions up to 3840 × 2160

Basic data	
Power supply	• 120 V / 230 V AC, 190 W; wide range • 24 V DC, 210 W AC and DC power supply with short-term power failure backup in accordance with NAMUR: max. 20 ms at 0.85 rated voltage. The 24 VDC power supply is isolated and protected against reverse polarity connection.
Drives and storage media	
Hard disk	• 1 × 3.5" ≥ 500 GB, SATA • 2 × 2.5" ≥ 320 GB, SATA with RAID1 system for automatic data mirroring on two hard disks • 2 × 2.5" ≥ 320 GB, SATA in removable drive bay with RAID1 system for automatic data mirroring on two hard disks also "Hot Swap" in connection with removable drive bay, hot spare (at least 3 hard disks) is supported.
SSD (Solid State Disk)	2.5" ≥ 240 GB standard
USB stick	Can be connected externally via USB port and internally
DVD drive	DVD burner slimline (optional) • DVD+/-R/RW, CD, CD-RW, DVD-RAM • Double layer functionality
Interfaces	
Ethernet	2 × 10/100/1000 Mbps (two RJ45) Wake on LAN, Remote Boot and teaming are supported
PROFIBUS/MPI	12 Mbps, electrically isolated, compatible with CP 5622 (optional)
PROFINET	3 × RJ45 ports, 10/100 bps, CP 1616 on-board (optional)
USB	• External: 4 × USB 3.0 high current (a maximum of 2 can be operated as high current at the same time) • External: 1 × USB 2.0 high current, 1 × low current (optional) • Internal: 1 × USB 3.0 high current for internal USB stick/dongle
COM	Serial V.24 port
COM2/LPT	optional
Monitor	• 1 x DVI-I (VGA monitors can be operated with a DVI/VGA adapter acquired separately as an accessory) • 1 x DisplayPort

Software	
Operating systems	• Without • Windows 7 Ultimate 32-bit [1, 2] • Windows 7 Ultimate 64-bit [1, 2] • Windows Embedded Standard 7 Professional 32-bit [3] • Windows 10 Enterprise 2015 LTSB, 64-bit [1, 2, 4] • Windows 10 Enterprise 2016 LTSB 64-bit [1, 2, 4]

[1] MUI: Multi-language user interface; English, German, French, Italian, Spanish

[2] Pre-installed or included on USB stick

[3] Pre-installed on SSD ≥240 GB / Restore DVD enclosed

[4] Activation is not absolutely necessary for full functionality of Windows. Activation occurs automatically as soon as the IPC has been connected to the Internet and was able to connect to the Microsoft activation servers.

Optional software	
SIMATIC IPC DiagMonitor V5.0.2 or higher	Software tool for local and remote monitoring of SIMATIC PCs: • Watchdog • Temperature • Fan speed • Hard disk monitoring (SMART) Hard disk access and HDD0 Alarm/HDD1 Alarm (RAID option) in connection with SIMATIC monitoring software Communication: • Ethernet interface (SNMP protocol) • OPC for integrating in SIMATIC software • Configuration of client/server architectures • Structure of log files
SIMATIC IPC Image & Partition Creator V3.5.1 or higher	Software tool for local data backup and partitioning of the hard disks

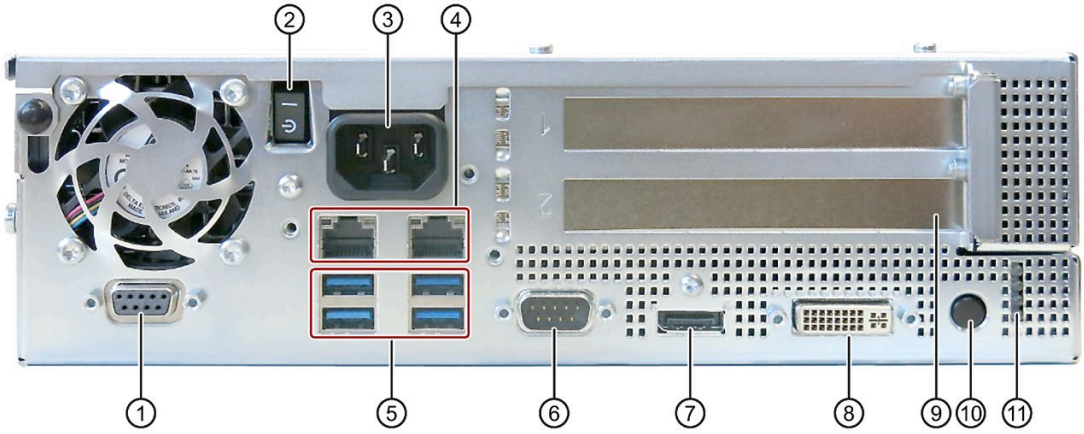
Expansion components

Information on available expansion components is available on the Internet at the following address:
IPC expansion components (http://www.automation.siemens.com/mcms/pc-based-automation/en/industrial-pc/expansion_components_accessories).

1.2 Design of the device

1.2.1 Operator controls and interfaces

Device with PROFIBUS interface

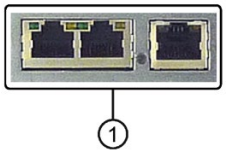


①	PROFIBUS DP/MPI fieldbus	PROFIBUS DP/MPI interface (RS 485, isolated), 9-pin sub D socket
②	On/off switch	You switch on the device with the on/off switch. This requires that the BIOS setup entry "After Power Failure" is set to "Power On". The on/off switch does not isolate the device from the power supply. Position "ON", when the "-)" symbol is pressed inward on the device. Position "OFF" is the factory state.
③	100-240 VAC	Power supply connection
④	2 × Ethernet	• X1P1, left: RJ45 Ethernet port 1 (exclusive PCI interrupt) with 10/100/1000 Mbps, iAMT capable • X2P1, right: RJ45 Ethernet port 2 (shared PCI interrupt) with 10/100/1000 Mbps
⑤	4 × USB	USB 3.0 high current, backward compatible with USB 2.0/1.1
⑥	COM1	Serial interface
⑦	DisplayPort	DisplayPort connection for digital monitor
⑧	DVI-I	DVI connector for CRT or LCD monitor with DVI port
⑨	PCI/PCIe expansion cards, COM2/LPT and USB on expansion card (optional)	behind the cover

⑩	On/off button	The on/off button has three functions: • Switch on the PC: Briefly press once • Shut down operating system and switch off PC: Briefly press once • Switch off PC without shutting down the operating system (hardware reset): Press for more than 4 seconds. Note: The BIOS setup entry "After Power Failure" has been set to "Power On". This means the device is switched on with the on/off switch. You then do not need to press the on/off button.
⑪	4 status LEDs	Status display of the operating state

Device with PROFINET interface

The following PROFINET interface is located at the position of the PROFIBUS interface ① in the figure above:



① CP 1616 onboard interface, three RJ45 sockets for devices with PROFINET, IRT capable

Device with COM2/LPT and USB expansion (optional)

The following expansion cards are located at the position of the cover ⑨ in the figure above:

①	LPT	X32
②	COM	X31
③	USB	X64, X65

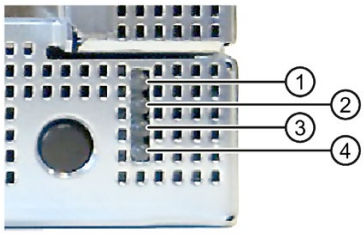
Devices with resistive single-touch screen

Note

If you open the sealed cover for the front USB port, the degree of protection IP65 for the front of the device is no longer guaranteed.

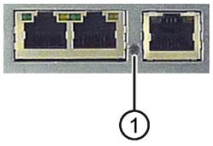
1.2.2 Status displays

The status display consists of four two-colored LEDs.



Position	LED	State	Description
①	PC ON/WD	Off	-
		Green	BIOS ready to boot
		Flashing green/yellow (1 Hz)	BIOS in POST, power switch on
		Yellow	Idle state
		Flashing red (1 Hz)	Watchdog status display: active
②	RUN/STOP / L1	Off	-
		Green	Can be controlled by user program
		Yellow	Can be controlled by controller program (e.g. WinAC)
③	ERROR / L2	Off	-
		Red	-
		Flashing red	Can be controlled by user program or controller program (e.g. WinAC)
④	MAINT / L3	Off	-
		Yellow	-
		Red	Can be controlled by controller program (e.g. WinAC)

For additional information on controlling the LEDs or the SRAM with a Windows operating system, please refer to the chapter "SRAM buffer memory (optional) (Page 63)". Example programs for controlling the LEDs under Windows operating systems is available on the Internet at the following address: Technical support (https://support.industry.siemens.com/cs/ww/en/)

PROFINET status display			
			
Display	**Meaning**	**LED**	**Description**
① 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.

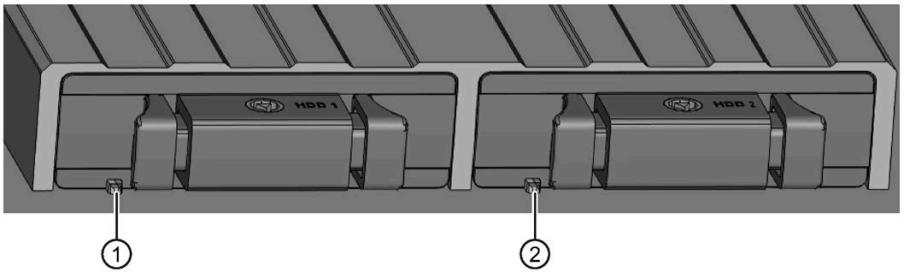
Virtual status displays			
The two "virtual" CP 1616 LEDs can only be seen in the SIMATIC software and can be scanned via SNMP.			
PROFINET	Virtual LEDs	RUN	CP is active
		STOP	CP is in the stop state
		Flashes	There are no "slow flashing" or "fast flashing" states.

See also

Industry Automation and Drive Technologies - Homepage
(http://www.siemens.com/automation/service&support)

1.2.3 Removable drive bay status displays

RAID status display in removable drive bay



Display	Meaning	LED	Description
LED ① "HDD0 ALARM" LED ② "HDD1 ALARM"	HDD alarm in connection with RAID and monitoring software	Both off	RAID is OK
		LED ① lights up red	HDD0 is not OK
		LED ② lights up red	HDD1 is not OK
		Both light up red	RAID is not OK For information on locating the hard disk, see section "Displaying a defective hard disk of a RAID system in the RAID software".
		Both flash	RAID is synchronizing

Safety Instructions 2

2.1 General safety instructions

⚠ WARNING
Life-threatening voltages are present with an open control cabinet
When you install the device in a control cabinet, some areas or components in the open control cabinet may be carrying life-threatening voltages.
If you touch these areas or components, you may be killed by electric shock.
Switch off the power supply to the cabinet before opening it.

System expansions

NOTICE
Damage through system expansions
Device and system expansions may be faulty and can affect the entire machine or plant.
The installation of expansions can damage the device, machine or plant. Device and system expansions may violate safety rules and regulations regarding radio interference suppression. If you install or exchange system expansions and damage your device, the warranty becomes void.

Note the following for system expansions:

- Only install system expansion devices designed for this device. Contact your technical support team or where you purchased your PC to find out which system expansion devices may safely be installed.
- Observe the information on electromagnetic compatibility (Page 107).

NOTICE
"Open Type" UL508
Note that the device is classified as "Open Type" for use in the area of Industrial Control Equipment (UL508). Installation of the device in an enclosure complying with UL508 for specific permitted mounting positions (see corresponding section) is a prerequisite for approval or operation in accordance with UL508.

WARNING

Risk of fire through expansion cards

Expansion cards generate additional heat. The device may overheat and cause a fire.

Please note the following:

- Observe the safety and installation instructions for the expansion cards.
- If in doubt, install the device in an enclosure that is compliant with sections 4.6 and 4.7.3 of the IEC/UL/EN/DIN-EN 60950-1 standard.

Battery and rechargeable battery

WARNING

Risk of explosion and release of harmful substances

Improper handling of lithium batteries can result in an explosion of the batteries.

Explosion of the batteries and the released pollutants can cause severe physical injury. Worn batteries jeopardize the function of the device.

Note the following when handling lithium batteries:

- Replace used batteries in good time; see the section "Replacing the backup battery" in the operating instructions.
- Replace the lithium battery only with an identical battery or types recommended by the manufacturer (order no.: A5E00331143).
- Do not throw lithium batteries into fire, do not solder on the cell body, do not recharge, do not open, do not short-circuit, do not reverse polarity, do not heat above 100°C and protect from direct sunlight, moisture and condensation.

High frequency radiation

NOTICE

Unintentional operating situations

High frequency radiation, e g. from a cellular phone, interferes with device functions and can result in malfunctioning of the device.

Persons are injured and the plant is damaged.

Avoid high-frequency radiation:

- Remove radiation sources from the environment of the device.
- Switch off radiating devices.
- Reduce the radio output of radiating devices.
- Observe the information on electromagnetic compatibility (Page 107).

ESD Guideline

Electrostatic sensitive devices can be labeled with an appropriate symbol.

NOTICE
Electrostatic sensitive devices (ESD) When you touch electrostatic sensitive components, you can destroy them through voltages that are far below the human perception threshold. If you work with components that can be destroyed by electrostatic discharge, observe the ESD Guideline (Page 108).

Industrial Security

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under.

Disclaimer for third-party software updates

This product includes third-party software. Siemens AG only provides a warranty for updates/patches of the third-party software, if these have been distributed as part of a Siemens software update service contract or officially released by Siemens AG. Otherwise, updates/patches are undertaken at your own risk. You can find more information about our Software Update Service offer on the Internet at Software Update Service (http://www.automation.siemens.com/mcms/automation-software/en/software-update-service).

Notes on protecting administrator accounts

A user with administrator privileges has extensive access and manipulation options in the system.

Therefore, ensure there are adequate safeguards for protecting the administrator accounts to prevent unauthorized changes. To do this, use secure passwords and a standard user account for normal operation. Other measures, such as the use of security policies, should be applied as needed.

See also

Industrial security (http://www.siemens.com/industrialsecurity)

Technical support (https://support.industry.siemens.com/cs/ww/en/)

2.2 Notes on use

NOTICE

Possible functional limitations if operation of plant is not validated

The device has been tested and certified based on technical standards. In rare cases, you may encounter functional limitations when operating your plant.

To avoid such functional limitations, you should validate the correct operation of the plant.

NOTICE

Ambient conditions

Ambient conditions for which the device is not suitable can cause faults or damage the device.

Note the following:

- Operate the device only in closed rooms. Failure to comply nullifies the warranty.
- Operate the device only in accordance with the ambient conditions specified in the technical specifications.
- Protect the device against dust, moisture and heat.
- Do not expose the device to direct sunlight or other strong sources of light.
- Without additional measures, such as a supply of clean air, the device may not be used in locations with harsh operating conditions caused by acidic vapors or gases.
- Observe the permitted mounting positions of the device.
- Do not obstruct the venting slots of the device.

Note

Use in an industrial environment without additional protective measures

This device was designed for use in a normal industrial environment according to IEC 60721-3-3.

Installing and connecting the device 3

3.1 Preparing for installation

3.1.1 Checking the delivery package

Procedure

1. When accepting a delivery, please check the packaging for visible transport damage.
2. If any transport damage is present at the time of delivery, lodge a complaint at the shipping company in charge. Have the shipper confirm the transport damage immediately.
3. Unpack the device at its installation location.
4. Keep the original packaging in case you have to transport the unit again.

Note

Damage to the device during transport and storage

If a device is transported or stored without packaging, shocks, vibrations, pressure and moisture may impact the unprotected unit. Damaged packaging indicates that ambient conditions have already had a massive impact on the device and it may be damaged.

This may cause the device, machine or plant to malfunction.

- Keep the original packaging.
- Pack the device in the original packaging for transportation and storage.

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5. Check the contents of the packaging and any accessories you may have ordered for completeness and damage.

6. Please inform the delivery service immediately if the package contents are incomplete or damaged or do not correspond with your order. Fax the enclosed form "SIMATIC IPC/PG Quality Control Report".

⚠ DANGER

Electric shock and fire hazard due to damaged device

A damaged device can be under hazardous voltage and trigger a fire in the machine or plant.

A damaged device has unpredictable properties and states.

Death or serious injury could occur.

- Avoid installing and commissioning a damaged device.
- Label the damaged device and keep it locked away.
- Send off the device for immediate repair.

NOTICE

Damage from condensation

If the device is subjected to low temperatures or extreme fluctuations in temperature during transportation, as is the case in cold weather, for example, moisture can build up on or inside the device (condensation).

Moisture causes a short circuit in electrical circuits and damages the device.

In order to prevent damage to the device, proceed as follows:

- Store the device in a dry place.
- Bring the device to room temperature before starting it up.
- Do not expose the device to direct heat radiation from a heating device.
- If condensation develops, wait approximately 12 hours or until the device is completely dry before switching it on.

7. Please keep the enclosed documentation in a safe place. It belongs to the device. You need the documentation when you commission the device for the first time.
8. Write down the identification data of the device.

3.1.2 Identification data of the device

Unpacking the device

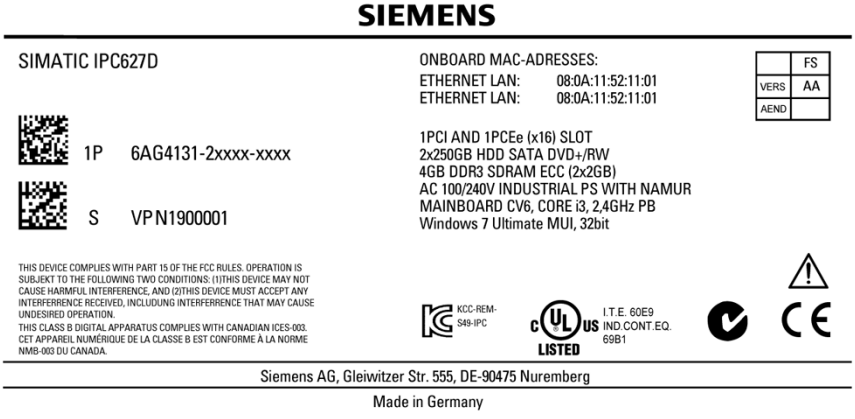
The device can be identified uniquely with the help of these numbers in case of repairs or theft.

Enter the identification data in the table below:

Identification date	Source	Value
Serial number	Nameplate	S VP ...
Order number of the device	Nameplate	6AG4131-2... SIMATIC IPC627D 6AG4132-2... SIMATIC IPC827D
Microsoft Windows Product Key Certificate of Authenticity (COA)	Back of the device	Only devices with preinstalled Windows operating systems have COA labels
Ethernet address 1	BIOS setup, "Main" menu	
Ethernet address 2		
CP 1616 onboard MAC Address Layer 2 (only for PROFINET devices)		
CP 1616 onboard MAC address PROFINET (only for PROFINET devices)		

Nameplate

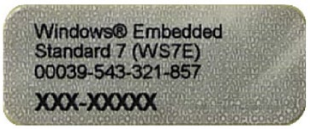
The following image shows the nameplate on the SIMATIC IPC627D as an example.



Example of a COA label

Microsoft Windows "Product Key" on the "Certificate of Authenticity" (COA):
The COA label is only attached to the rear of the device containing a Windows Embedded Standard 7 or Windows 7 operating system.

- COA label of a device with Windows Embedded Standard 7 operating system



- COA label of a device with Windows 7 operating system

3.1.3 Permitted mounting positions

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

CAUTION

Points to note with expansion cards

Expansion cards may impose restrictions on the installation location (fire-proof enclosure) and permitted mounting positions (see Technical specifications). If the device has been fitted with expansion cards, please observe the safety and installation instructions for the expansion cards in the corresponding documentation.

If in doubt, install the device in an enclosure that is compliant with IEC/UL/EN/DIN-EN 60950-1, sections 4.6 and 4.7.3.

NOTICE

Operation only in closed rooms

The device is only approved for operation in closed rooms. Pay attention to the ambient and environmental conditions.

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

Position 1 (preferred) for wall mounting: The interfaces are at the right.

Position 2 for wall mounting: The interfaces are at the left.

Position 3 (desktop)

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

An inclination of ±15° is allowed in this mounting position.

 Position 4 (interfaces facing down) CD/DVD drive may not be operated.	 Position 5 (interfaces facing up) CD/DVD drive may not be operated.

NOTICE

Points to note for position 4 and 5

CD/DVD and floppy drives cannot be operated in this position. The CD drawer opens upward or downward, which can lead to mechanical damage in the drawer mechanism.

Note

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 60950-1.

3.2 Installing the device

3.2.1 Installation guidelines

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

- Take note of the climatic and mechanical ambient conditions (Page 124).
- 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.
- 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 so that it is part of a restricted access location (e.g. a locked switchgear cabinet, control panel or server room).

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

- At least 100 mm space should be left free around the ventilation slots, in order that the PC receives sufficient ventilation.

3.2.2 Mounting instructions

Note the following:

- Always observe the mounting positions permitted for this device.
- The device is only approved for operation in closed rooms.
- For installation in a control cabinet, observe the SIMATIC installation guidelines and applicable DIN/VDE requirements or other applicable country-specific regulations.
- When the device is used in the area of Industrial Control Equipment in accordance with UL508, note that the device is classified as "Open Type". The installation of the device in a housing conforming to UL508 is therefore a mandatory requirement for approval or operation in accordance with UL508.

Securing the device

NOTICE
Insufficient load carrying capacity If the wall it is mounted on does not have a sufficient load-bearing capacity, the device may fall and be damaged. Ensure that the mounting surface on the wall can bear four times the total weight of the device, including fixing elements.

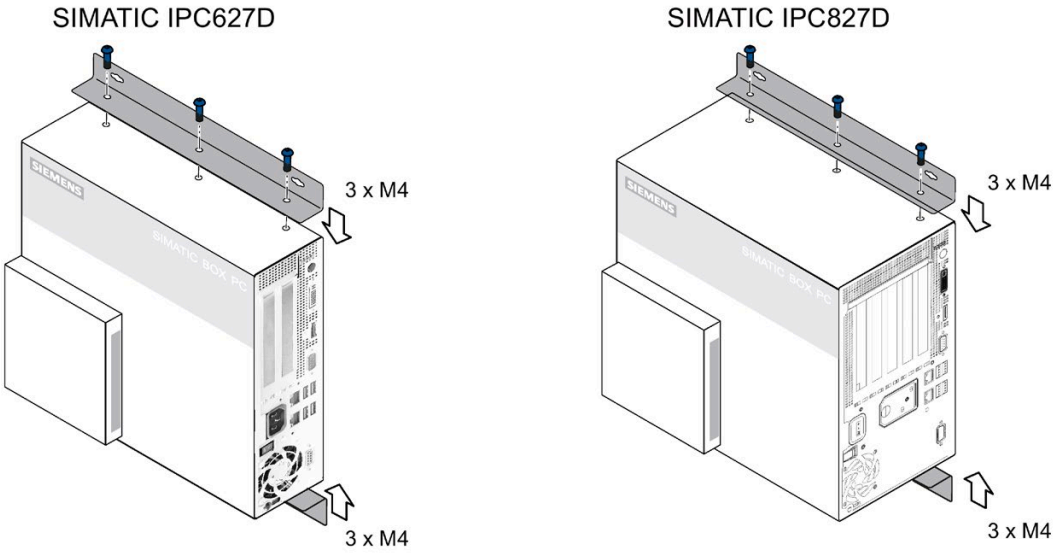
NOTICE
Incorrect fixing elements The device may not be securely fitted if you use anchors and screws other than those specified below for mounting. The device can fall and may be damaged. Use only the anchors and screws specified in the following table.

3.2.3 Installing the device with mounting brackets

Screw-mounting the brackets

Two angle brackets are included in the product package.

Secure the two brackets with six M4x6 screws, maximum penetration depth 5 mm, to the device. Use the marked threaded holes.



Instructions for wall mounting

Mounting examples		
Material	**Hole diameter**	**Mounting**
Concrete	8 mm diameter, 60 mm depth	Dowel: 8 mm diameter, 50 mm length screws 4.5-6 x 50 mm
Plasterboard (at least 13 mm thick)	14 mm diameter	Tilting dowel: 4 mm diameter, at least 50 mm long
Metal (at least 2 mm thick)	5 mm diameter	Metal screws: 4 mm diameter, at least 15 mm long

⚠ WARNING

Personal injuries or material damage in the case of insufficient load-bearing capacity of wall

The device could fall if the wall to which it is mounted has insufficient load-bearing capacity. This can result in personal injuries or material damage.

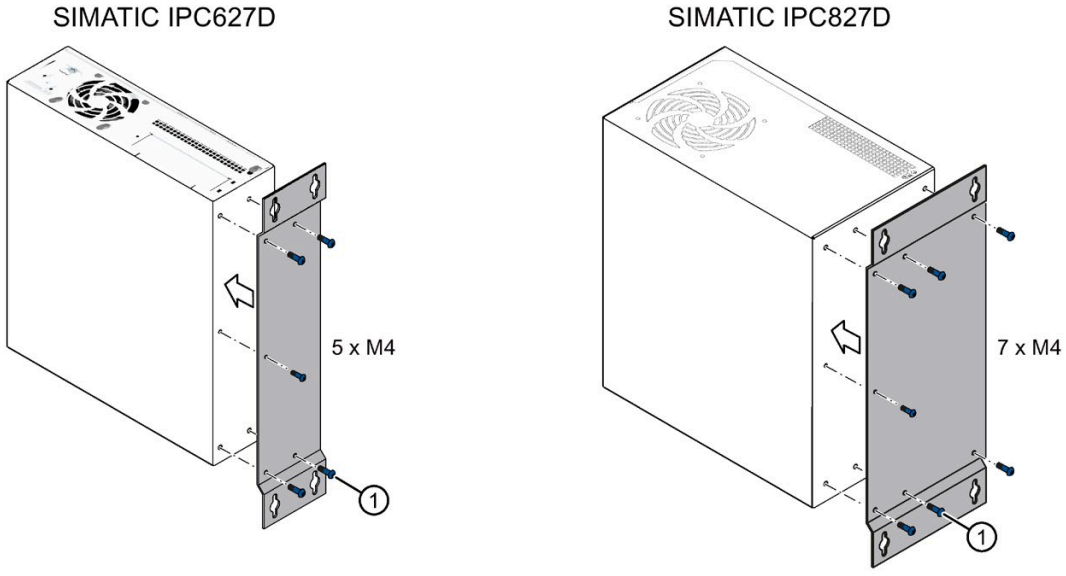
Ensure that the wall is capable of bearing four times the total weight of the device (including the brackets and expansion modules). The total weight of the device is approximately 7 kg.

3.2.4 Installing the device with the 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 to the vertical mounting plate ②.



2. Secure the vertical mounting plate to the device using the following number of screws:
   - SIMATIC IPC627D: 5 x M4 screws
   - SIMATIC IPC827D: 7 x M4 screws

Note

Read the information in section Permitted mounting positions (Page 28).

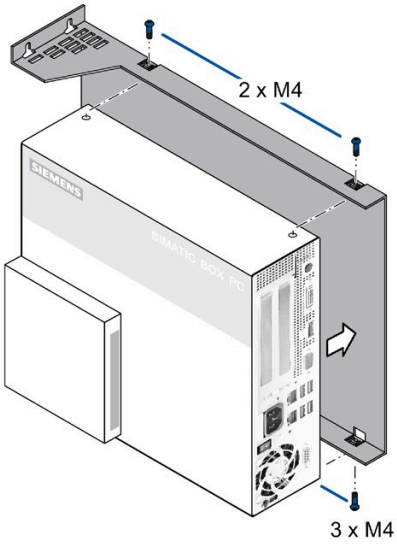
3.2.5 Installing the device with the vertical mounting kit for PC port access from the front

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

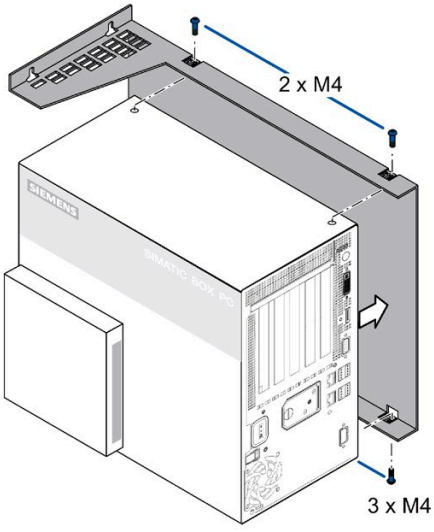
Securing the vertical mounting plate to the device

Secure the vertical mounting plate to the device using five M4 screws. Two screws at the top and three at the bottom of the device.

SIMATIC IPC627D



SIMATIC IPC827D



Note

Read the information in section Permitted mounting positions (Page 28).

3.3 Connecting the device

3.3.1 Wiring information

⚠WARNING

Risk of fire and electric shock

The on/off switch does not isolate the device from the power supply. Risk of electric shock if the device is opened incorrectly or defective. There is also a risk of fire if the device or connecting lines are damaged.

You should therefore protect the device as follows:

- Always pull out the power plug when you are not using the device or if the device is defective. The power plug must be freely accessible.
- Properly connect the device to a protective conductor.
- Use a central isolating switch in the case of cabinet installation.

⚠WARNING

Risk of lightning strikes

A lightning flash may enter the mains cables and data transmission cables and jump to a person.

Death, serious injury and burns can be caused by lightning.

Take the following precautions:

- If there is no additional lightning protection equipment: Disconnect the device from the power supply in good time when a thunderstorm is approaching.
- Do not touch mains cables and data transmission cables during a thunderstorm.
- Keep a sufficient distance from electric cables, distributors, systems, etc.

NOTICE

Fault caused by I/O devices

The connection of I/O devices can cause faults in the device.

The result may be personal injury and damage to the machine or plant.

Note the following when connecting I/O devices:

- Read the documentation of the I/O devices. Follow all instructions in the documentation.
- Only connect I/O devices which are approved for industrial applications in accordance with EN 61000-6-2 and IEC 61000-6-2.
- I/O devices that are not hotplug-capable may only be connected after the device has been disconnected from the power supply.

NOTICE
Damage through regenerative feedback Regenerative feedback of voltage to ground by a connected or installed component can damage the device. Connected or built-in I/Os, for example, a USB drive, are not permitted to supply any voltage to the device. Regenerative feedback is generally not permitted.

3.3.2 Connecting the Equipotential Bonding Circuit

A low-resistance ground connection ensures that interference signals generated by external power supply cables, signal cables or cables to the I/O modules are safely discharged to ground.

The equipotential bonding connection of the device is located on the side of the device and is identified by the following symbol:

Requirement

For the equipotential bonding connection, you need:

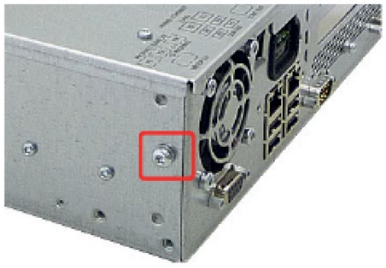
- One TORX T20 screwdriver
- One equipotential bonding cable with minimum cross-section of 2.5 mm^2

Procedure

1. Connect the marked equipotential-bonding connection (thread M4) of the device with the equipotential-bonding cable.

   Ensure that the equipotential-bonding cable has a large-area contact with the housing.
2. Connect the equipotential-bonding cable with the central grounding point of the cabinet.

   Ensure that the equipotential-bonding cable has a large-area contact with the central grounding point.



3.3.3 Connecting 100-240 VAC 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

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

⚠ WARNING

Operation only in TN networks
The device is designed for operation in grounded power supply networks (TN networks according to VDE 0100 Part 100, or IEC 60364-1).
Operation on ungrounded or impedance-grounded power networks (IT networks) is prohibited.

⚠ WARNING

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

NOTICE

Notes on the power supply network
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.
Make sure that the safety power outlet of the building installation is freely accessible and located as close as possible 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 supply voltage
This device is equipped with a safety-tested power supply cord which may only be connected to a grounded safety power outlet. If you choose not to use this cable, you must use a flexible cable of the following type: Cable cross-section at least 0.82 mm^2 and 15 A / 250 V ground contact connector. The cable set must be compliant with the safety regulations of the country where the device is to be installed and carry the identification labels required by law.

For the USA and Canada:

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

The connector must be compliant with NEMA 5-15.

120 V supply voltage
A flexible cable with UL approval and with CSA label which has the following features is to be used: 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 supply voltage
A flexible cable with UL approval and with CSA label which has the following features is to be used: 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.

Procedure

1. Make sure that the ON/OFF switch is in position '-' (Off) to avoid unintentional startup of the device when you plug in the power cord.

2. Connect the appliance connector to the device.
3. Connect the power cable with the safety power outlet.
4. If necessary, install the enclosed cable grip.

3.3.4 Connecting the 24 VDC power supply

Note before connecting the device

WARNING

Safety extra-low voltage (SELV)

The device should only be connected to a 24 V DC power supply which meets the requirements of safe extra low voltage (SELV) according to IEC/EN/DIN EN 60950-1. A protective conductor must also be used. The conductors 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).

Note

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

Procedure

1. Make sure that the ON/OFF switch is in the position "0" (OFF) to prevent unintentional startup of the device when it is connected to the 24 V power supply.
2. Switch off the external 24 V DC power supply.
3. Connect the 24 VDC plug connector to the device.

   Observe the correct polarity of the contacts:

   ① DC 24 V

   ② ground

   ③ protective conductor

4. If necessary, install the enclosed cable grip.
5. Secure the 24 VDC cable to the cable grip using a cable tie.

Note

Reverse-polarity protection

The DC power supply (24V) has a mechanism to protect against reverse polarity. In the event that the 24 VDC lines are reversed (24 VDC nominal (-20% / +20%) and connected to ground, the device will not be damaged. The device will simply fail to turn on. After the power supply has been connected correctly, the device will again be ready to operate.

See also

General technical specifications (Page 120)

3.3.5 Connecting peripheral equipment

Note

Observe suitability for industrial applications

Only connect I/O devices that are suitable for industrial applications in accordance with EN IEC 61000-6-2.

Note

I/O devices capable of hot-plugging (USB)

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

NOTICE

Non-hot-plug I/O devices

I/O devices that do not support hot-plugging may not be connected until the device is powered off. Strictly adhere to the specifications for peripheral equipment.

Note

Wait at least ten seconds before you reinsert USB devices.

Note that the EMC immunity of standard USB devices is designed only for office environments. These USB devices are appropriate for handling commissioning and service tasks. Only industrial grade USB devices are permitted for use in industrial environments. The USB devices are developed and marketed by the respective supplier. The respective product supplier provides support for the USB devices. The manufacturer's terms of liability shall apply.

Note

A monitor should be connected and switched on before device booting to ensure it is correctly detected and run by the BIOS and the operating system. The screen may otherwise remain dark.

Note

The connected or built-in I/Os, such as USB drives, should not introduce a counter EMF into the device.

Reverse voltages exceeding 0.5 V to ground that are generated by connected or installed components may prevent proper operation of the device or lead to its destruction.

3.3.6 Connecting the device to networks

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 automation devices 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

PROFINET can be operated via

- CP1616 IRT (Isochronous Real Time)
- Standard Ethernet interfaces (RT)

CP 1616 on-board allows you to connect IPCs to Industrial Ethernet. Only one CP 1616 can be installed in a PG/PC. You will find detailed information in sections "PROFINET (Page 45)" and "CP 1616 onboard communications processor (Page 156)".

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:
Development Kit DK-16xx PN IO
(http://www.automation.siemens.com/net/html_00/produkte/040_cp_1616_devlopkit.htm)

SIMATIC NET

Use this software package to configure network components and connections. You will find information on this on the SIMATIC NET DVD. 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 Industry Mall (https://mall.industry.siemens.com).

3.3.7 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 connection terminal devices or addition network components
- Integrated 3-port real-time switch
- Automatic hardware detection

NOTICE
A maximum of one CP 1616/1604 is permitted 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 card, the CP 1616 onboard option must be disabled using the "Profinet" entry in the BIOS setup.

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 product package:	
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.

Document name	What is contained in this document?
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)

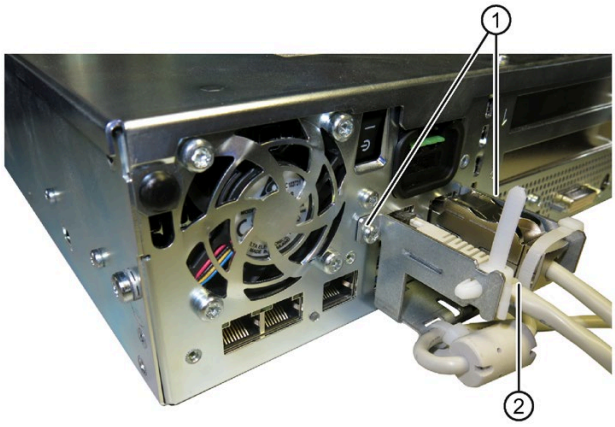
3.3.8 Connecting Ethernet/USB strain relief

The Ethernet/USB 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. In addition to the Ethernet cables, you can also use this strain relief to protect the four USB cables from inadvertent removal.

To secure the Ethernet strain relief, you will need a TORX T10 screwdriver.

Procedure

1. Secure the Ethernet/USB strain relief with two oval-head screws M3 ① to the device housing.
2. Connect the network and USB cables with the device and secure the connectors to the strain relief with cable ties ②.



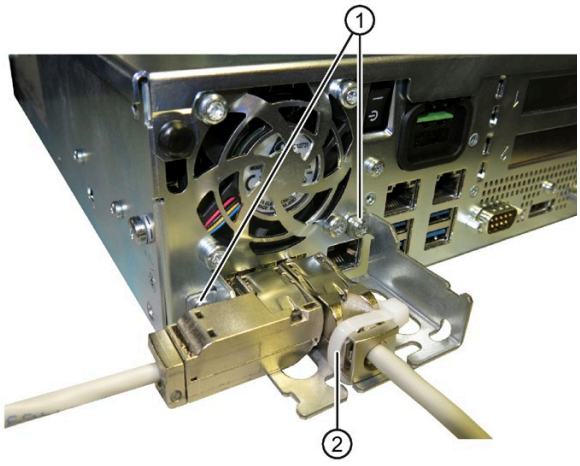
3.3.9 Connecting the PROFINET strain relief

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.

To fix the PROFINET strain relief, you will need a TORX T10 screwdriver.

Procedure

1. Secure the PROFINET strain relief with two oval-head screws M3 ① to the device housing.
2. Connect the PROFINET cables with the device and secure the PROFINET connector with straight cable outlet to the strain relief with cable ties ②.



Commissioning the device

4

4.1 General information on commissioning

Note

Windows Embedded Standard 7

Read the EWF and FBWF information

Two configurable write filters (Enhanced Write Filter and File Based Write Filter) are provided with Windows Embedded Standard. Read the EWF/FBWF information if you activate and use them, otherwise you may experience data loss.

Note

Configuring memory cards in the device

Memory cards used in a device need to be configured on that device. Memory cards configured on other devices will not boot as the drive parameters will be different.

Requirement

- The device is connected to the power supply.
- The protective conductor is connected.
- The connection cables are plugged in correctly.
- The following hardware is available for initial commissioning:
  - One USB keyboard
  - One USB mouse
  - A monitor/display

4.2 Switching on the device

Following the initial startup, the operating system preinstalled on the drive is automatically configured on the device.

NOTICE

Faulty installation

If you change the default values in the BIOS Setup or if you turn off the device during installation, you disrupt the installation and the operating system is not installed correctly. The operating safety of the device and the plant is at risk.

Do not switch off the device during the entire installation process. Do not change the default values in the BIOS Setup.

Note

The power-up time depends on the system-related device configuration and the BIOS settings. Changes of the device configuration and/or the BIOS settings can influence the power-up time.

Procedure

1. Set the On/Off switch to "ON" position.

   The "PC ON/WD" LED lights up. The device carries out a self-test. During the self-test, the following message appears:

   ```
   Press Esc for Boot Options
   ```

2. Wait for the message to disappear.
3. Follow the instructions on the screen.

   The following steps are required only when switching on the device for the first time after delivery:

4. Make the region and language settings.

   If you want your system language to be international, select English. Information about changing the region and language settings is available in the chapter "Servicing and maintaining the device", under "Installing software".

   Note

   Once the operating system has been set up, the device may restart.

5. Type in the product key as required.

   The product key is located below the identification data of the device on the "Certificate of Authentication" COA label, in the "Product Key" line.

6. If the device is connected with a SIMATIC Industrial Flat Panel, the setup of the SIMATIC IPC Wizard is started automatically after operating system installation (see next chapter).

The installation of the operating system is complete.

4.3 Automatic switching on of the device

In the BIOS setup, you can specify the behavior of the device when it is disconnected from the mains voltage. The following property is set as default:

- BIOS setup, "Advanced" menu, "Chipset Configuration" submenu, setup parameter "After G3 On" to "S0".
- After a power loss during operation, the device will automatically restart when the power returns.

The mains voltage must have failed for at least 20 s for the power failure to be detected and for this defined action to be executed.

NOTICE
Unintentional reactions at power loss restart Automatic startup, for example, after a power failure, can result in unintentional reactions of the machine or plant. This endangers the operation. Take the BIOS setup entry "After G3 On" into consideration in the plant planning.

4.4 Windows Action Center

The Action Center checks the status of the device with regard to the important safety aspects listed below. If a problem is found, the Action Center provides recommendations on how you can better protect the device.

Functions

- **Firewall**: The Windows Firewall adds protection to the device by blocking network or Internet access to the device by unauthorized users. The firewall is enabled in the delivery state.
- **Antivirus software**: Antivirus programs add protection to the device by searching for and eliminating viruses and other security threats. No antivirus software is installed in the delivery state.
- **Automatic updates**: Using the Automatic Update feature allows Windows to regularly search for the latest critical updates for the device and to install them automatically.

  This option is disabled in the delivery state for Windows Server 2008 R2 and Windows Server 2012 R2. You can enable or disable this option for Windows 7 and Windows 10 during commissioning of Windows.
- **User Account Control:** User Account Control issues a warning when programs attempt to modify important Windows settings. You can then either acknowledge this warning or prevent the program from changing the Windows settings.

  This option is disabled in the delivery state for Windows Server 2008 R2 and Windows Server 2012 R2. This option is enabled in the delivery state for Windows 7 and Windows 10.

4.5 Notes on different device configurations

4.5.1 Notes on the DVD burner

Notes on the data backup on DVD

To achieve a reliable data backup on the DVD-R media with the burner (HLDS GTC0N, HLDS GUD0N), use the "SIMATIC IPC Image & Partition Creator" software Version V3.5.1 or higher.

Only HLDS drives for the use with DVD-R blanks are affected. There are no restrictions for DVD+R or DVD+RW blanks.

NOTICE
Data errors during burning: • Burner operation is only permitted in an environment free of shock and vibration. • It cannot be ruled out that vibrations in the environment and varying quality of raw discs could result in data errors when burning data media, even when no error message occurs. • Data comparison is the only guarantee that data has been written correctly. Perform data comparison each time you burn a disc.

Requirement

- "SIMATIC IPC Image & Partition Creator" Version V3.5.1 or higher
- DVD+R or DVD+RW blank

Procedure

1. With the "SIMATIC IPC Image & Partition Creator" software create a backup of your data on a DVD.
2. Check your backups for integrity.

You can find information on this in the operating manual: "SIMATIC IPC Image & Partition Creator (https://support.industry.siemens.com/cs/de/en/view/21766418)".

4.5.2 RAID1 system (SW- and HW-RAID)

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

Note

You will find information about the RAID controller in the "Drivers\RAID-AHCI\Intel" or "Drivers\RAID-AHCI\Adaptec" directory on the "Documentation and Drivers" DVD that ships with the product.

Additional information on RAID1 systems can be found in the section "Managing RAID systems (Page 82)".

See also

Replacing a defective hard disk drive in the RAID system (Page 91)

4.5.3 Replacing hard disks

The hard disks in the removable drive bay can be replaced during operation in connection with RAID1.

Requirement

- A hard disk of the same interface type

  Always replace the defective hard disk with a new one of the same interface type and capacity.
- A key for the hard disk lock

Procedure

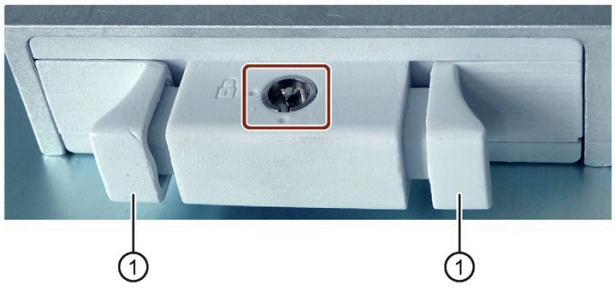
NOTICE

Damage to the hard disk and loss of data

When you remove the hard disk while data is being written to the hard disk, you may damage the hard disk and destroy data.

- Only remove the hard disk tray from the removable drive bay when the hard disk is inactive.
- Observe the EGB guidelines.

1. Identify which hard disk the RAID controller has reported as being faulty.
2. Open the lock identified in the figure with the appropriate key.



3. Push in both sliders ① on the handle and remove the hard disk tray using its handle.
4. Insert the hard disk tray with the replaced hard disk into the removable drive bay and push it all the way in.
5. Lock it with the appropriate key.

Note

Always lock the hard disk tray in the removable drive bay to ensure reliable operation of a device with removable drive bay.

4.6 Switching off the device

Procedure

WARNING

Risk of electric shock

The on/off switch does not isolate the device from the mains. When the on/off switch is in the position 0 "Off", the device is still supplied with line voltage to generate the internal auxiliary voltage.

Always pull out the plug to isolate the device from the mains.

NOTICE

Risk of data loss

Microsoft operating systems and hardware components, such as hard drives, save your data in internal caches. Files may be open or data may be being written when the power supply is interrupted in the following ways:

- When you activate the on/off switch while the device is running (uncontrolled switch off)
- In the case of a hardware reset
- In the case of an unpredictable supply voltage failure

This results in data loss, which damages the device of plant. Follow these steps to prevent data loss:

- Shut down the operating system with "Start > Shut down" before you switch off the device.
- Protect the device and plant with a suitable uninterruptible power supply (UPS).

1. Open the function "Start > Shut down" in the Start menu.

   The green LED "PC ON/WD" changes to yellow.

Extended device functions

5

5.1 Monitoring Functions

5.1.1 Overview of the monitoring functions

The basic version of the device also provides monitoring functions. The following display, monitoring and control functions are available when the appropriate software is used:

- Temperature monitoring (over / under temperature)
- Battery monitoring: The charge level of the battery is monitored.
- Monitoring of hard disks, memory cards and SSD drives with S.M.A.R.T. functionality
- Watchdog (hardware or software reset of the computer)
- Operating hours meter (information on the cumulative run time)
- Hard disk status and status of the RAID system

SIMATIC IPC DiagBase software

Use the functions of the SIMATIC IPC DiagBase software included in the scope of delivery for local monitoring. Use the "DiagBase Management Explorer" application to obtain a clear overview for monitoring purposes. Use the DiagBase Alarm Manager to receive notifications about individual alarms.

Note

For more information on SIMATIC IPC DiagBase software functionality, please refer to the relevant online help.

SIMATIC IPC DiagMonitor software

SIMATIC IPC DiagMonitor is available on CD (not included in the scope of delivery). The CD contains both the monitoring software and the software for the stations to be monitored. The interface specifications and a library for creating your own applications are also provided.

5.1.2 Temperature monitoring/display

Four temperature sensors monitor the temperature of the device at several positions:

- Processor temperature
- Temperature close to the RAM ICs/chips
- Temperature of the basic module below the power supply
- Temperature in proximity of the air inlet

A temperature error is triggered under these circumstances:

- The configured low threshold for the temperature has been violated.
- The configured high threshold for the temperature has been violated.

A temperature error causes the following reaction:

Reaction	Option
The DiagBase or DiagMonitor software alerts the user.	None

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

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

5.1.3 Watchdog (WD)

Configuration

You configure the watchdog with the DiagBase or DiagMonitor software.

Function

The watchdog is able to monitor system runtime and informs the user about the different reactions that are triggered if the system does not respond to the watchdog within the specified monitoring time.

A watchdog alarm is retained after a restart and is reset and logged by the DiagBase or DiagMonitor software. The watchdog configuration is retained in the process.

Watchdog reactions

The following reactions can occur if the watchdog is not addressed within the set time:

Option	Reaction
Reset on	Executes a hardware reset when the watchdog expires
Reset off[1]	Executes no action when the watchdog expires
Restart [1]	Restarts the operating system when the watchdog expires
Shutdown [1]	Shuts down the operating system when the watchdog expires

[1] Option is device-specific.

NOTICE
"Reset on" option The "Reset on" option immediately triggers a hardware reset that may result in loss of data under Windows and damage to the installation.

Watchdog monitoring times

The monitoring time can be configured with the DiagBase or DiagMonitor software.

Note

When you change the monitoring time, the change becomes effective immediately.

5.1.4 Battery monitoring

The installed buffer battery has a service life of at least 5 years. The status can be checked with two-tier battery monitoring. The information can be read from an I/O register and evaluated.

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

5.2 Enhanced Write Filter (EWF)

Purpose and function

The Enhanced Write Filter (EWF) is a function that is only available for Windows Embedded operating systems. EWF is a write filter that can be configured by the user.

You can use the Enhanced Write Filter to boot Windows Embedded Standard from read-only media, for example, memory cards or Solid State Drives (SSD), or provide individual partitions with write protection.

EWF can be used to minimize write access to storage media. This is important because the write cycles are limited due to technical reasons. We therefore recommend using EWF if you work with these storage media.

If you use HORM or compressed NTFS, EWF is indispensable.

CAUTION

Data loss with several write filters

Both EWF and FBWF are preinstalled in the SIMATIC IPC images. If several writer filters are active on one partition at the same time, you may experience data loss. This may damage the machine or plant.

Make sure that you only activate one write filter for each partition.

Note

Windows Embedded Standard

The Enhanced Write Filter is deactivated in the Windows Embedded Standard default state.

- Back up your data after installation of the operating system and programs.
- Activate the EWF.

Setting EWF

The following programs can be used to install, enable or disable the EWF:

- EWFMGR.EXE
- SIMATIC IPC EWF Manager.

The SIMATIC IPC EWF Manager is pre-installed and included on the supplied "Documentation and Drivers" DVD.

Start the SIMATIC IPC EWF Manager as follows:

- "Start > All Programs >Siemens Automation > SIMATIC > EWF Manager > EWF Manager"

Configure the SIMATIC IPC EWF Manager as follows:

- "Start > All Programs > Siemens Automation > SIMATIC > EWF Manager > EWF Settings"

  or

- Click the "SIMATIC IPC EWF Manager" icon in the system tray.

The following functions are available:

Function	Command
Write-protect drive C: Power on	`ewfmgr c: -enable`
Write-protect drive C: disable: the modified data are applied	`ewfmgr c: -commitanddisable`
Modified data on drive C: apply	`ewfmgr c: -commit`
Display information about the EWF drive	`ewfmgr c:`
Display help	`ewfmgr /h`

Note

The EWF commands affecting the write protection do not become active until after the next booting process.

Note

The EWF command `ewfmgr c: -commitanddisable` may not be used with the option `-live`: Not `ewfmgr c: -commitanddisable -live`.

Special notes for use

If EWF is enabled, when the PC shuts down all changes made on drive C: after the boot process are lost.

These changes are only retained on the PC in the following cases:

- EWF is disabled when you make changes.
- EWF is enabled and you save the changes before shutting down the device using the following command on C: drive :

```
ewfmgr c: -commit
```

Note

When the system is set to automatically adjust the clock for daylight saving time adjustment, systems without central time management and with activated EWF set the clock forward or backward by one hour in the daylight saving time or standard time period each time the system boots.

The reason for this behavior is that Windows Embedded Standard 7 makes a registry entry that the changeover to daylight saving time has occurred. Since this file is also protected against modification by the EWF, the marker is lost during the boot sequence and the adjustment is made again.

We therefore recommend that you deactivate the automatic adjustment and change the clock manually.

Follow these steps:

1. Deactivate automatic adjustment in the Control Panel: In the "Time Zone" tab opened with the menu command "Start > Control Panel > Date and Time", remove the check mark from the "Automatically adjust clock for daylight saving changes" check box.
2. Save the change you have made with `ewfmgr c: -commit` and then reboot the system.

5.3 File Based Write Filter (FBWF)

Purpose and function

With the Feature Pack 2007 for Windows XP Embedded and Windows Embedded Standard 7, Microsoft introduced a second write filter, File Based Write Filter (FBWF).

In contrast to EWF, which protects partitions based on sectors, FBWF works on the file level. When FBWF is enabled, all files and folders of a partition are protected unless they are included in an exception list.

FBWF is disabled by factory default in the operating system images for SIMATIC IPC and must be enabled and configured by the user.

When you enable FBWF, the folders C:\FBWF and D:\FBWF are authorized for writing by default.

Comparison between EWF and FBWF

- You should prefer FBWF, because it is more flexible in its configuration and allows immediate writing without rebooting.
- If you use HORM or compressed NTFS, EWF is indispensable.

CAUTION

Data loss with several write filters

Both EWF and FBWF are preinstalled in the SIMATIC IPC images. If several writer filters are active on one partition at the same time, you may experience data loss. This may damage the machine or plant.

Make sure that you only activate one write filter for each partition.

Configuring FBWF

FBWF can be configured in command console using the program FBWFMGR.EXE.

Note

- Observe the following syntax: Enter a **space** after the drive designation colon.
- Changes for direct write access only take effect after rebooting.
- Only existing files and folders can be entered in the exception list.

Function	Command
Display the current FBWF status	`fbwfmgr /displayconfig`
Enable FBWF after the next startup	`fbwfmgr /enable`
Write to protected files	`fbwfmgr /commit c: \Test.txt`
Adding/removing elements in the exception list:	

• Add file	`fbwfmgr /addexclusion C: \Test.txt`
• Add folder	`fbwfmgr /addexclusion C: \Test folder`
• Remove file	`fbwfmgr /removeexclusion C: \Test.txt`
• Remove folder	`fbwfmgr /removeexclusion C: \Test folder`
Call up the help function	`fbwfmgr /?`

Detailed instructions on FBWF are available on the Internet (http://msdn.microsoft.com/en-us/library/aa940926(WinEmbedded.5).aspx).

5.4 SRAM buffer memory (optional)

In order for applications to store data following a power failure, motherboards with fieldbus (PROFIBUS or PROFINET) feature 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.

Note

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.

See also

Status displays (Page 16)

5.5 Operation without monitor and keyboard

The device can be operated without a monitor and keyboard. The device startup is guaranteed without these peripherals. A USB keyboard and mouse and an analog CRT monitor can be later connected for diagnostics.

A digital DVI monitor or DisplayPort monitor cannot be activated retrospectively unless the Windows Embedded Standard or Windows 7 Ultimate operating system has completed booting.

5.6 Active Management Technology (AMT)

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 operating system 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.

SIMATIC IPC Remote Manager

The "SIMATIC IPC Remote Manager" software is available for utilization of the AMT functions with SIMATIC IPCs. The software can be ordered from the Siemens online ordering system. For detailed information about "SIMATIC IPC Remote Manager", refer to the corresponding product documentation: SIMATIC IPC Remote Manager (http://support.automation.siemens.com/WW/view/en/48707158)

Typical areas of application and functions of the SIMATIC IPC Remote Manager:

- Remote maintenance of SIMATIC IPC with AMT, for example for service purposes in the case of a defective operating system or for adapting BIOS settings.
- Diagnostics without on-site use
- Convenient service: Access to AMT clients, such as headless systems, without additional hardware
- Resource management

Requirement

- A device with Xeon 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 by means of the BIOS setup and MEBx (Management Engine BIOS Extension). MEBx is a BIOS extension for configuration of AMT (see BIOS description in chapter "Technical specifications").

5.7 Trusted Platform Modul (TPM)

Depending on the ordered configuration, the motherboard contains a Trusted Platform Module (TPM). A TPM is a chip that adds important security functions to your device, such as enhanced protection of the PC against unauthorized manipulation by third parties. The current operating systems, for example, Windows 7 and Windows 8, support these security functions.

NOTICE
Import restrictions TPM technology is subject to legal restrictions in some regions and may not be used there. You could commit a crime by importing or exporting the device in certain countries. Note the respective import provisions for the TPM module.

Activating the Trusted Platform Module

The TPM can be activated under "Security" in the BIOS setup. Please follow the instructions in the BIOS setup.

Using the Trusted Platform Module

The TPM can be used in Windows 7 with the "BitLocker" drive encrypter. Please follow the instructions for this in the operating system.

Note

Risk of data loss

If you lose the password for the drive encryption, you will not be able to restore the data. You will then lose accesss to the encrypted drive.

The warranty does not cover a reset of the hardware in the event of a loss of a password.

Please store the password carefully and make sure it is protected against unauthorized access.

Expanding and assigning parameters to the device

6

6.1 Opening the Device

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 108).

Requirement

- The device is disconnect from the mains.
- All connecting cables are unplugged
- Screwdriver of type Torx T10

Limitation 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".

Procedure

1. Remove the four screws in the cover.
2. Lift up the cover.

6.2 Memory expansion

Memory expansion options

The motherboard has 2 slots for memory modules. DIMM DDR3 1600 memory modules, type PC3-12800, unbuffered, with or without ECC can be used. This allows you to expand IPC memory capacity to up to 16 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	2 GB/4 GB/8 GB		8 GB
2	2 GB/4 GB/8 GB	2 GB/4 GB/8 GB	16 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.
- Memory modules with ECC and without ECC may not be used in mixed operation.
- 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.

Preparation

Disconnect the device from mains and unplug all cables.

NOTICE

Electrostatic discharge

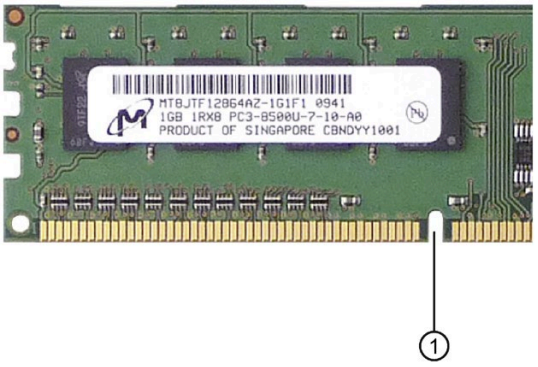
The electronic components on the PCBs are highly sensitive to electrostatic discharge. Always take appropriate precautionary measures when handling these components. Refer to the ESD directives on handling electrostatic sensitive components.

Note

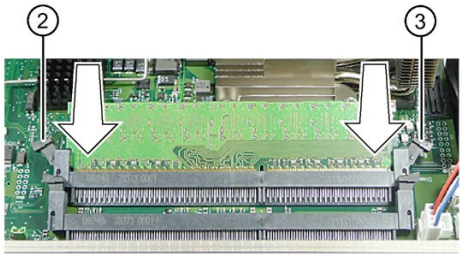
We strongly recommend using only memory modules approved by Siemens. Siemens disclaims any liability for impairment of functions caused by the use of third-party memory modules.

Installing a memory module

1. Open the device (Page 66).
2. Note where the (polarized) cutout ① is located on the pin side of the RAM module before inserting it.



3. Open the two locking mechanisms on the left ② and right ③ of the slot.
4. Insert the module downwards, applying slight pressure and press it until the locking snaps into place.

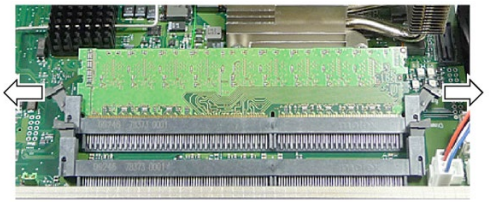


5. Close the device.

Removing a memory module

1 Open the device (Page 66).

2 Release the locking mechanisms on the left and right of the slot.



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".

6.3 Expansion cards

6.3.1 Notes on the expansion cards

The device is designed for the following types of expansion cards:

- PCI specification 2.3
- x4: PCIe Gen 2, expansion cards of the PCIe type Gen 1 and Gen 2 are supported.
- x16: PCIe Gen 3, expansion cards of the PCIe type Gen 1, Gen 2, Gen 3 and PEG are supported.

PCI expansion cards with 5 V and 3.3 V supply voltage can be operated.

Possible configurations for IPC627D:

- 2 × PCI
- 1 × PCI, 1 × PCIe x16
- 1 × PCIe x4 Slot 1, 1 × PCIe x16 Slot 2

Possible configurations for IPC827D:

- 3 × PCI, 1 × PCIe x4 slot 4, 1 × PCIe x16 slot 5

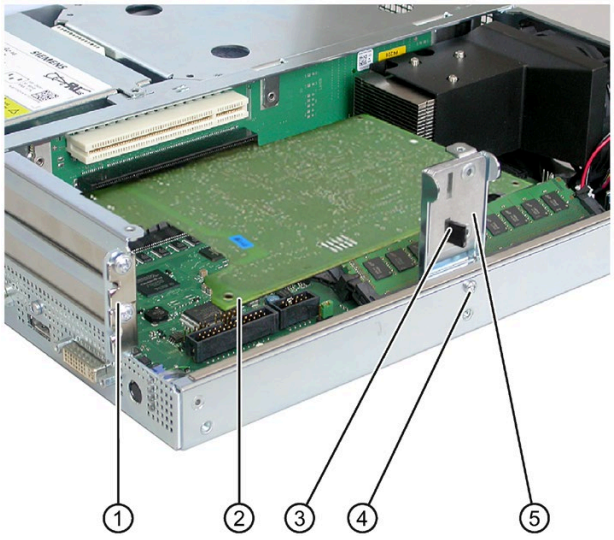
6.3.2 Removing and installing expansion cards with 627D

Requirement

- The device is opened.

Procedure

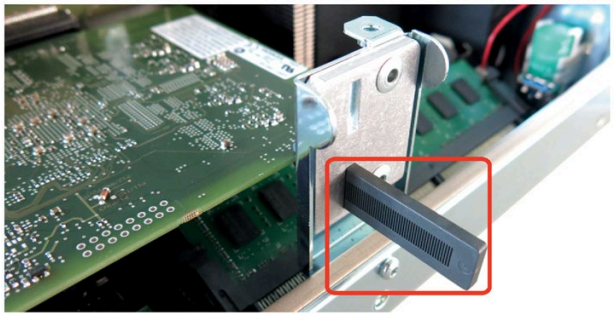
1. Loosen the fastening screw ④ and remove the card retainer ⑤.
2. Remove the slot cover ① from the intended slot.
3. Insert the expansion card ② into the intended slot.
4. Mount the card bracket and insert the slider ③.
5. Screw in the slot cover ① of the expansion card.



6. Insert the slider.

Inserting the slider

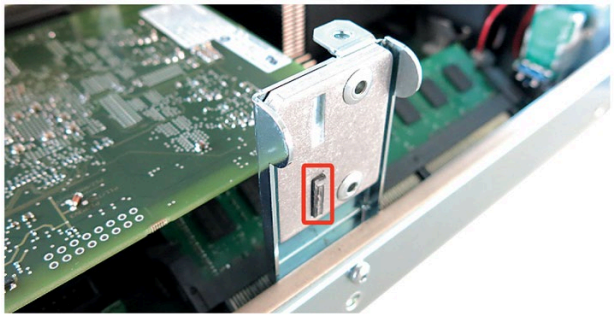
1. Push the slider through the guide slot until it is firmly seated on the expansion card. The expansion card must now be inserted into the slot.



NOTICE
Damage to the expansion card. The expansion card can break if excessive force is used. • Do not apply any pressure. • Do not apply excessive force on the slider when you push it onto the expansion card.

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.



Notes on the allocation of resources

The slots for the expansion cards come with exclusive interrupts. The assignment of the PCI IRQ line to the PCI slot is explained in the chapter "Bus board (Page 135)".

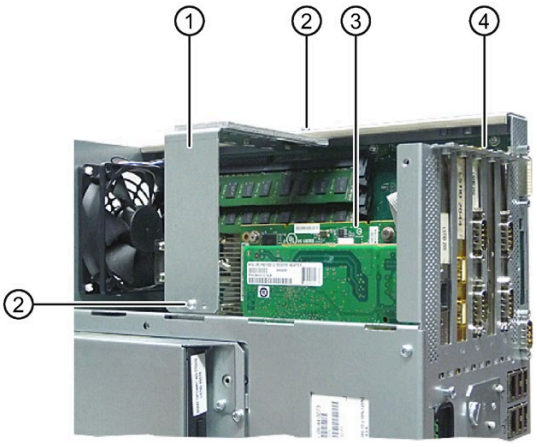
6.3.3 Removing and installing expansion cards with 827D

Requirement

- The device is opened.

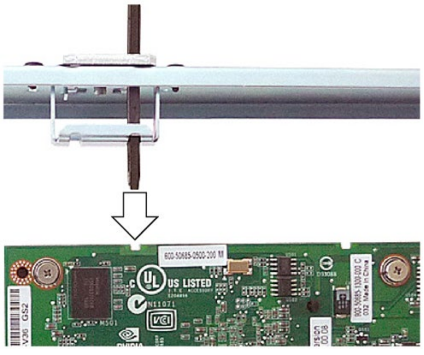
Procedure

1. Remove the two fastening screws ② and remove the module bracket ①.
2. Remove the slot cover ④ from the intended slot.
3. Insert the expansion card ③ into the intended slot.
4. Install the module bracket.
5. Fasten the slot cover ④ of the expansion card.
6. Insert the slider.



Inserting the slider

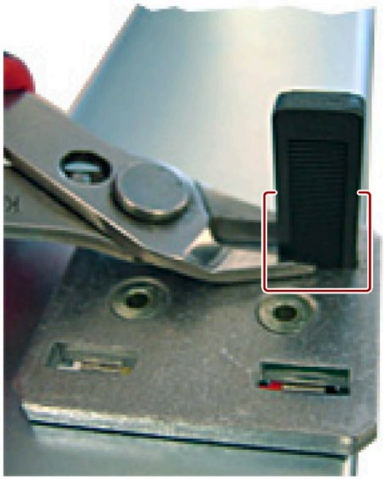
1. Push the slider through the guide slot until it is firmly seated on the card. The card must now be inserted into the slot.



NOTICE
Damage to the expansion card. The expansion card can break if excessive force is used. • Do not apply any pressure. • Do not apply excessive force on the slider when you push it onto the expansion card.

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.



Notes on the allocation of resources

The slots for the expansion cards come with exclusive interrupts. The assignment of the PCI IRQ line to the PCI slot is explained in the section "System resources (Page 148)".

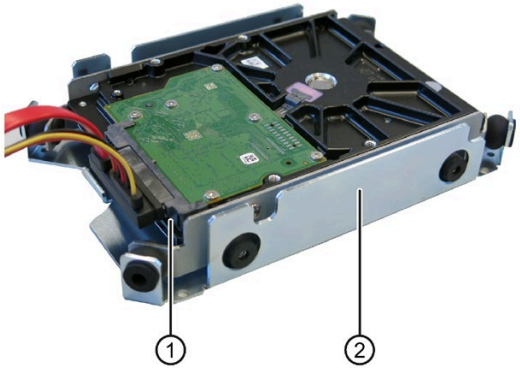
Note on PROFINET expansion cards

For devices with CP 1616 on-board: Before you install a PROFINET expansion card, for example CP 1616, deactivate the "Onboard PROFINET" parameter in the BIOS setup "Advanced" menu, submenu "Peripheral Configuration".

6.4 Drives

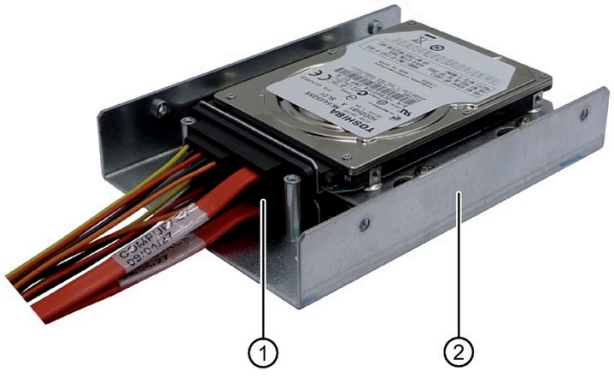
6.4.1 Installation options for internal drives

One 3.5" hard disk



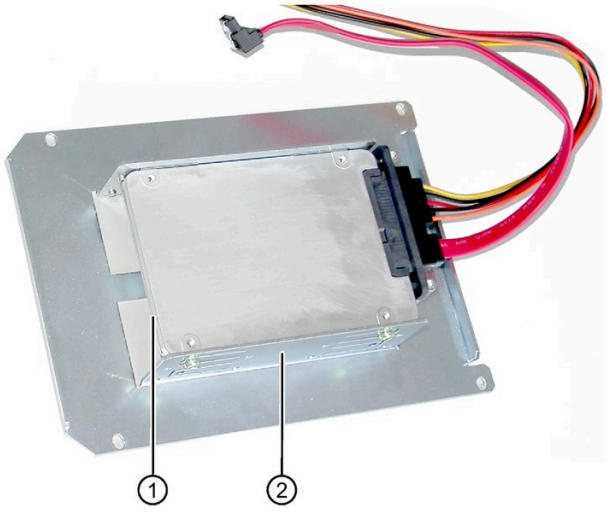
Item	Description
①	Slot for one 3.5" drive
②	Drive bay for one 3.5" drive

Two 2.5" hard disks



Item	Description
①	2.5" hard disk: Two slots for 2.5" hard disks
②	Drive bay for 2.5" hard disks

One SSD drive



Item	Description
①	SSD drive: Two slots for SSD drives
②	Drive bay for SSD drive

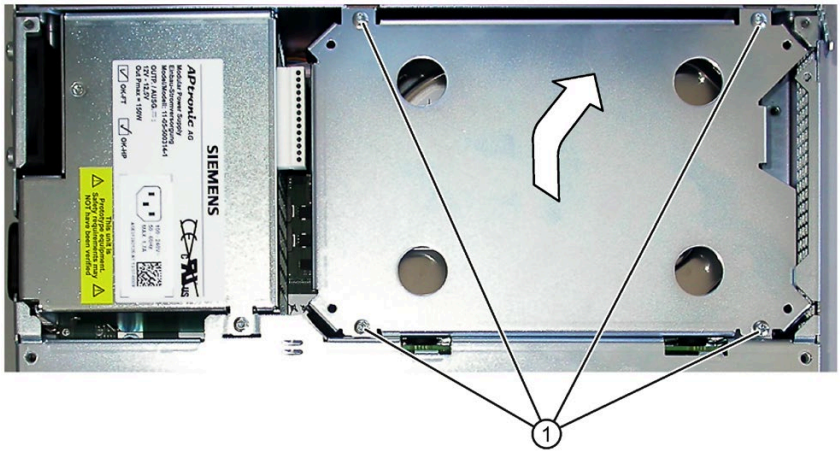
6.4.2 Removing and installing the drive bay module

Requirement

- The device is opened.

Procedure

1. Remove the four screws ①.



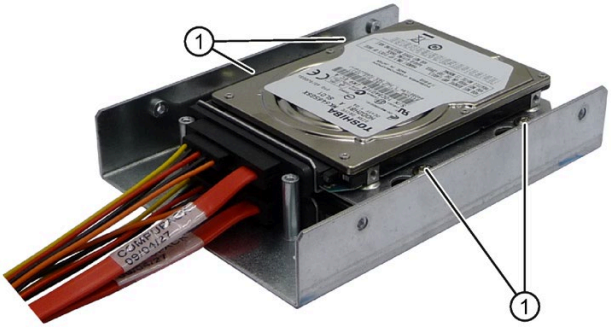
2. Lift out the drive bay module for hard disks and set it down carefully with the base facing downwards.

6.4.3 Removing and installing hard disks

Procedure

Removing 2.5" drive

1. Remove the drive bay module.
2. Loosen the 4 screws ① on the holding plates.
   Do not remove the screws.



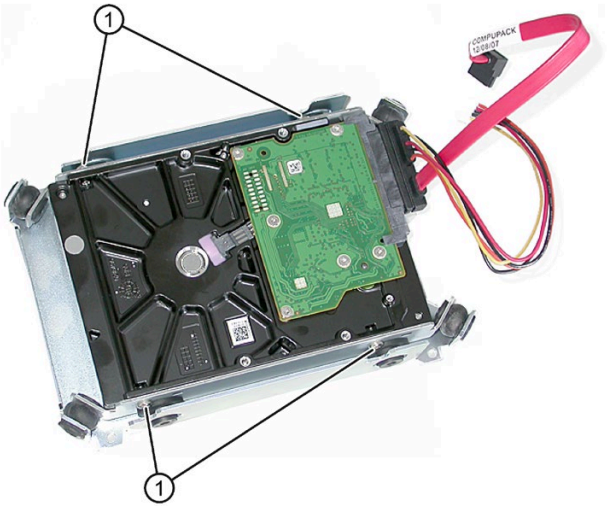
3. Remove the hard disk drive including the mounting plate from the bay.
4. Disconnect the power supply and the data cable from the drive.

Removing 3.5" drive

Note

Special screws with inch threads (screw designation 6-32x3/16"-St-G3E) are used with this drive.

1. Remove the drive bay module.
2. Disconnect the power supply and the data cable from the drive.
3. Remove the screws ① (Torx T15) of the drive.



4. Remove the hard disk drive from the bay.

Removing hard disk in removable drive bay

See chapter "Maintaining and repairing the device", "Removing and installing hardware", section "Removing and installing the hard disk in the removable drive bay (Page 92)".

Installation

Proceed in reverse order in each case.

6.4.4 Removing and installing an SSD drive

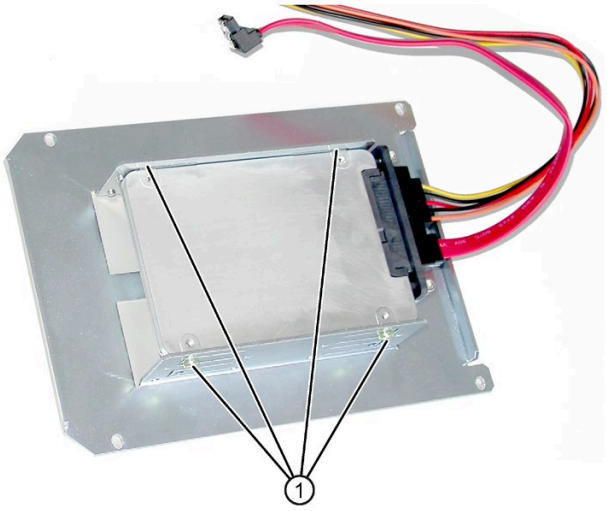
Requirement

- The device is opened.

Procedure

Removal

1. Remove the drive bay module.
2. Disconnect the power supply and the data cable from the drive.
3. Loosen the screws ① of the drive.



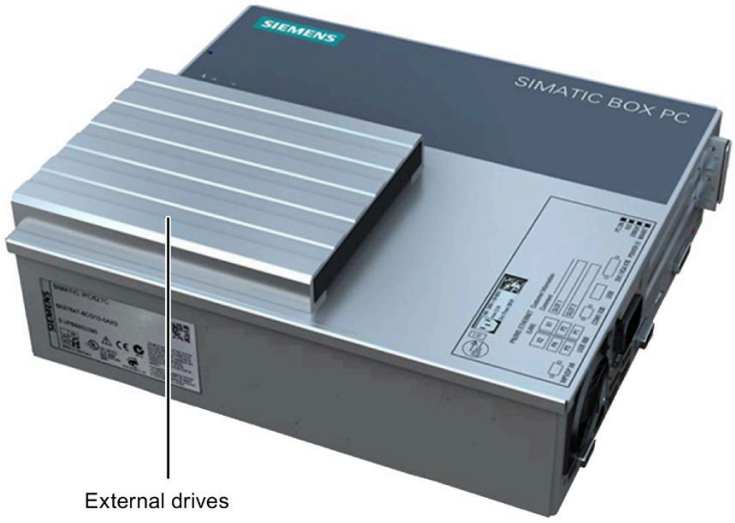
4. Remove the drive from the bay.

Installation

Proceed in reverse order.

6.4.5 Installation options for external drives

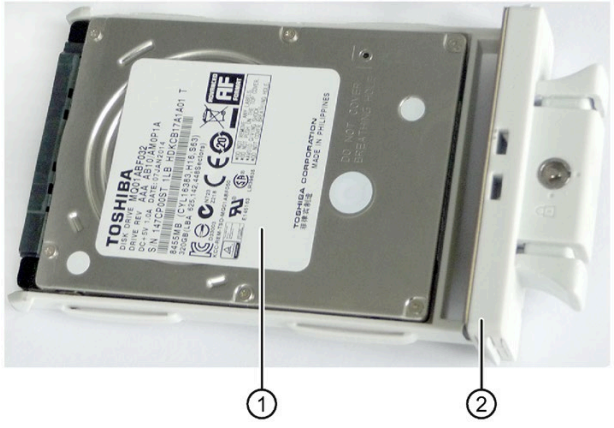
Some devices are equipped with external drives according to their configuration; these are mounted on the outside of the device, for example, a DVD drive.



A DVD drive

The figure shows a mounted DVD drive.

Two 2.5" hard disks in removable drive bay



Item	Description
①	2.5" hard disk
②	Tray for one 2.5" hard disk

6.4.6 Removing and installing a DVD drive

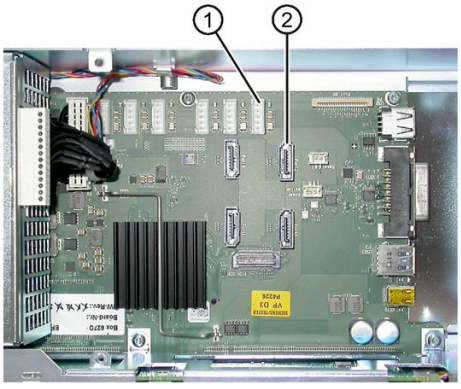
Requirement

- The device is opened.

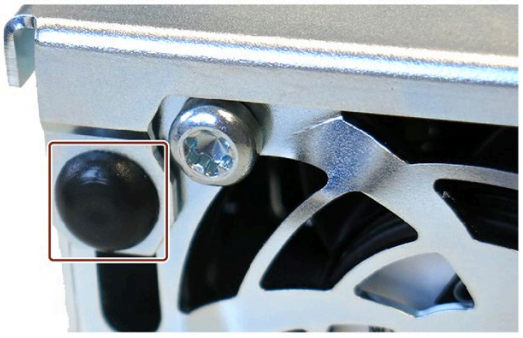
Procedure

Removing external drive

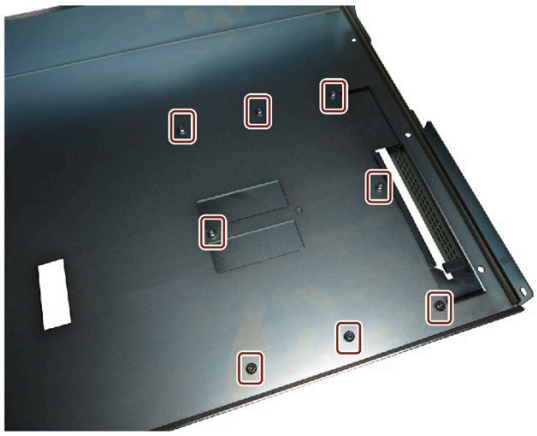
1. Remove the internal HDD/SSD drive bay module.
2. Loosen the following connectors of the optical drive from the mother-board:
   - Power supply connector ①.
   - SATA connector ②



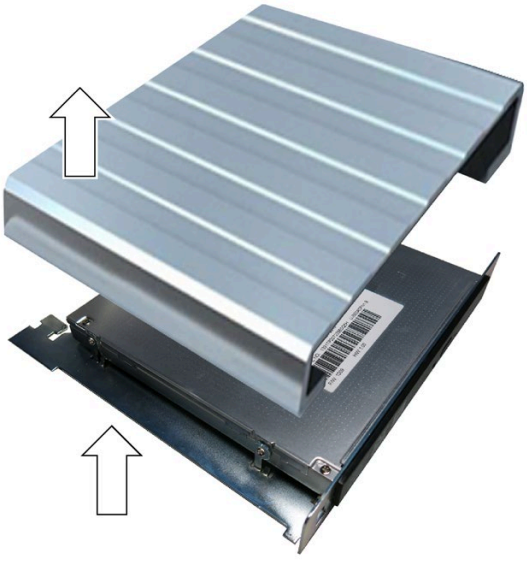
3. Loosen the designated rivets on the left and right on the cover with a screwdriver and put the cover down with the optical drive facing down-wards.



4. Loosen the designated screws on the inside of the cover.



5. Remove the cover of the external drive and the drive bay from the device.
6. Pull the connector of the SATA cable from the drive.



7. Loosen the four screws that connect the optical drive with the drive bay and pull out the optical drive to the front from the drive bay.

Installing external drive

Proceed in reverse order.

Device maintenance and repair

7

7.1 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:
Hard disk drive	3 years
Fan	3 years
CMOS backup battery	5 years
SSD	Depends on the type of use [1]

[1] The interval for replacement of the flash drives (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 or SSD switches to "Not OK", a message is sent in DiagBase or DiagMonitor, or when you start up the PC. You should then back up your data and replace the drive.

7.2 Managing RAID systems

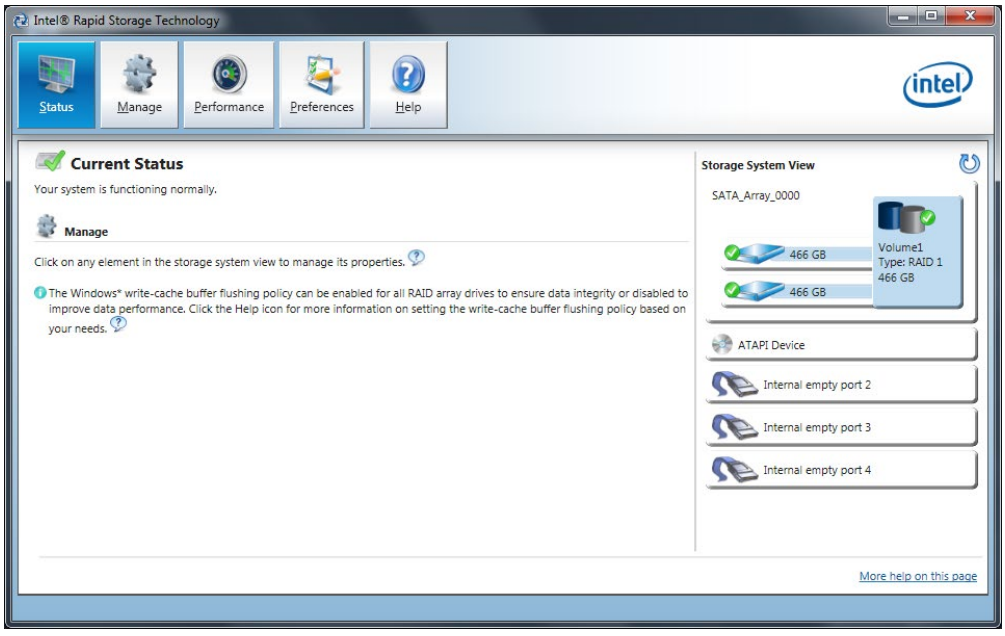
7.2.1 Example for a RAID1 system during the boot phase of the system

You can configure RAID hardware with <CTRL-I> in the boot phase. The associated description is available on the "Documentation and Drivers" DVD.

7.2.2 RAID software

The RAID software "Intel Rapid Storage Technology" offers advanced functions to use and manage the RAID system.

1. Select the RAID software via "Start > Programs > Intel Rapid Storage Technology".



2. Select "Manage" > "Advanced" to display details of the RAID system.
3. Select "Help" > "System Report" > "Save" to create a report with the details of the RAID system.

7.2.3 Checking the status of the RAID system

By default, the status of the RAID system is displayed in the Windows Event Viewer and in a log file of the program. If an error occurs, a hard disk can be synchronized at the operating system level.

Note

It may take a very long time (hours or even days in the case of a high drive load) to synchronize a new hard disk in the background, depending on its size and on the system load.

The redundant system state is reached again only after synchronization is completed.

NOTICE
Operator errors on the machine or plant
Data is synchronized if a hard disk fails. Depending on the work load of the processor and hard disks, the system may react with some delay. Execution of keyboard, mouse or touch screen commands may be briefly delayed in extreme situations. This could result in operator errors on the machine or plant.
Do not operate safety-critical functions when a hard disk has failed.

7.2.4 Displaying a defective hard disk of a RAID system in the RAID software

Note

Always replace the defective hard disk with a new hard disk of the same type and capacity.

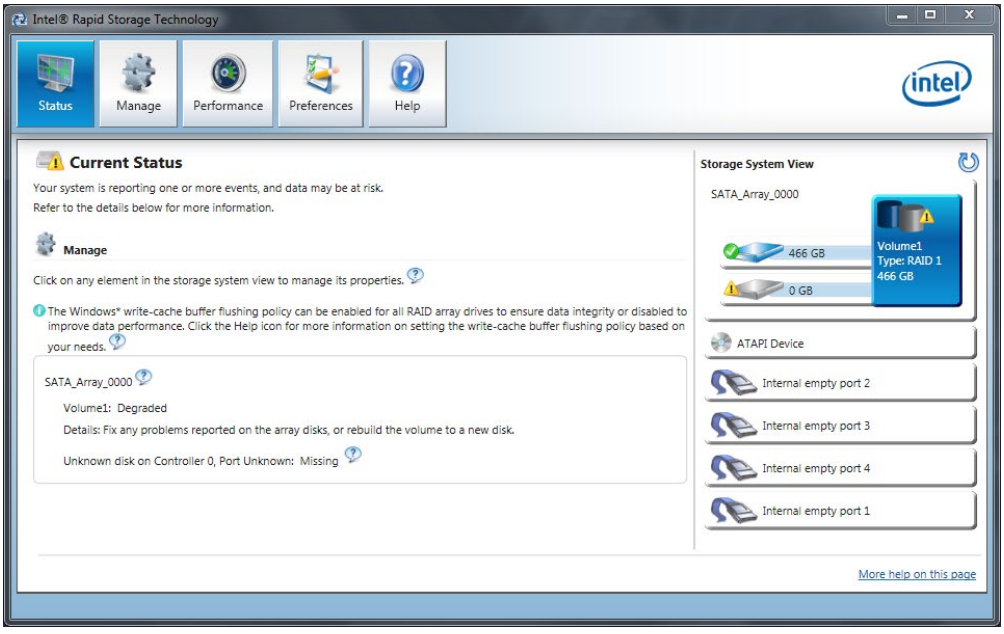
If an error is detected the defective hard disk must be replaced with a new hard disk to return to a secure RAID status after an error.

The RAID software indicates the following:

- A defective hard disk
- Details of the functioning hard disk:

  The functioning hard disk is indicated by BIOS with its port number or by the RAID software with its device port number.

  The following figure shows the corresponding window in the RAID software with a RAID1 system.



You can find information on how to detect and replace a defective hard disk in the RAID system in the section "Removing and installing hardware (Page 91)".

See also

Removable drive bay status displays (Page 18)

7.2.5 Special feature: Replacing hard disk in the RAID system when switched off

The RAID system does not automatically boot up when restarted if a defective hard disk was replaced while the RAID system is switched off. Therefore, place the RAID system in the first place of the bootable sources in the BIOS setup menu "Boot". Otherwise, the system will boot from the hard disk you have just installed and the message "Operating system not found" will be displayed.

7.2.6 Integrating a new hard disk drive in the RAID system

The RAID system is configured in the delivery state so that a new hard disk must be integrated manually in case of an error. To integrate the hard disk automatically, activate "Automatic rebuild" in the "Preferences" menu of the RAID software.

Automatic integration of a hard disk

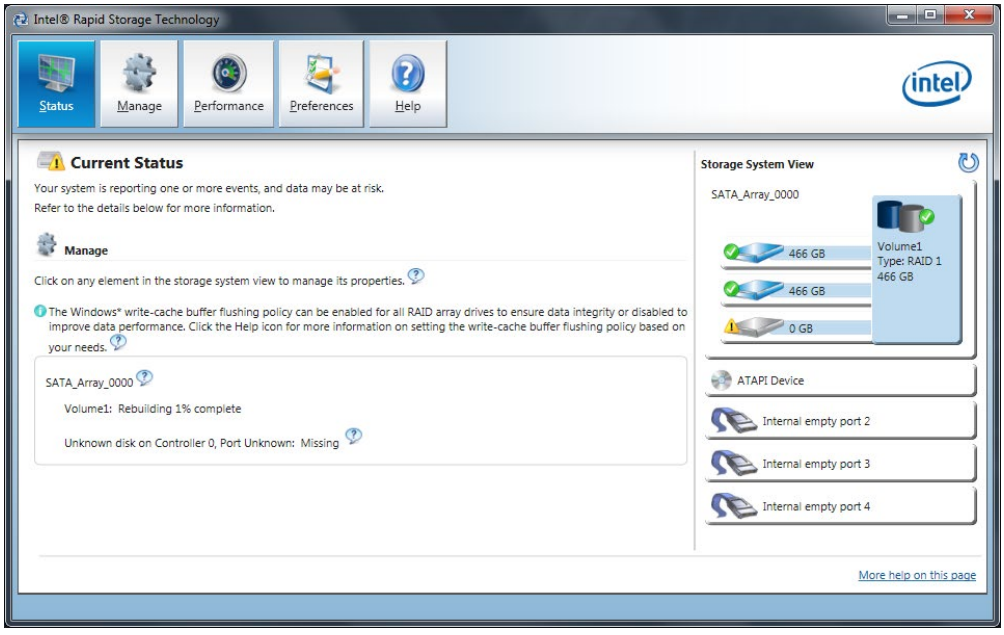
NOTICE
Data loss The hard disk to be integrated is not checked for partition information or existing data during automatic integration. All partitions and data on the hard disk are deleted without warning. Insert only a brand-new hard disk.

Requirement:

- "Automatic rebuild" is selected in the "Preferences" menu of the RAID software.
- The hard disk must be completely new or set up as spare drive for this purpose. Notes on creating spare drives are available in the controller documentation.

Sequence

The following figure is an example for the automatic rebuilding process.



A defective hard disk is still displayed during the rebuilding process. This display disappears when the rebuilding process is completed.

Procedure - integrating hard disk manually

When the "Automatic rebuild" option is deselected in the "Preferences" menu of the RAID software (default setting), you must integrate the hard disk manually:

1. Select "Start" > "Programs" > "Intel Rapid Storage Technology".
2. Click "Run Hardware Scan now".

   The new hard disk is found and displayed.

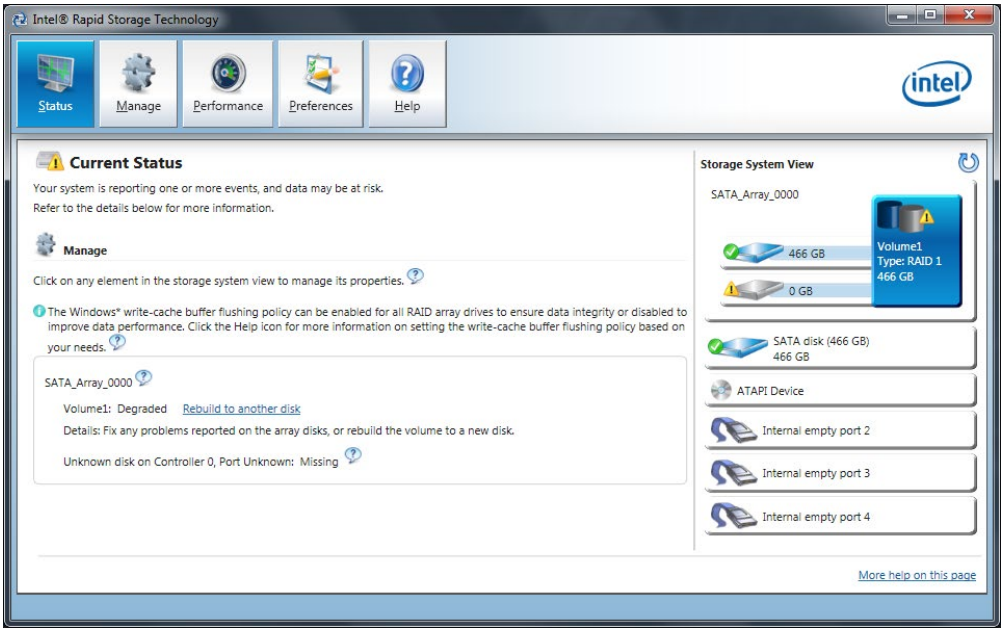
Or:

1. Reboot the device.

   The RAID software automatically integrates the hard disk.
2. Click the "Rebuild to another Disk" link.

   The RAID system is synchronized.

The following figure shows the window when integrating a hard disk in a RAID1 system.



If you shut down and restart the system without installing a functioning new hard disk, "unused" is displayed for the corresponding SATA port. You can install the functioning hard disk while the system is running. The new hard disk is then assigned to a SATA port and is integrated into the RAID system.

A defective hard disk is still displayed during the rebuilding process. This display disappears when the rebuilding process is completed.

7.3 Service and spare parts

Making repairs

WARNING

Opening the device

Unauthorized opening and improper repairs on the device may result in substantial damage to equipment or endanger the user. If you install or replace a system expansion and damage your device, the warranty will become void.

The device may only be repaired by qualified personnel.

Safety when working in and on electrical systems

Work in or on electrical systems may only be carried out by authorized persons. The following safety regulations apply in Germany for the prevention of electric shock and electrocution:

1. Switch off the system
2. Secure the system to prevent it switching back on
3. Check the system to ensure it is de-energized
4. Ground and short the system
5. Cover or shield adjacent live parts

These safety rules are based on the DIN VDE 0105 standard.

Note

These safety steps must always be taken in the above order before any work on electrical systems. Once work on an electrical system is finished, cancel the safety steps starting with the last and finishing with the first.

In accordance with the applicable safety regulations, clearly indicate on an electrical system that work on it is underway.
Observe the safety regulations applicable in the country of operation.

⚠ CAUTION

Electrostatic-sensitive components

The device contains electronic components which are destroyed by electrostatic charges. This can result in malfunctions and damage to the machine or plant.

Make sure you take precautionary measures even when you open the device, for example, when opening device doors, device covers or the housing cover. For more information, refer to the chapter "ESD Guideline (Page 108)"

⚠ WARNING

Risk of explosion and release of harmful substances

Improper handling of lithium batteries can result in an explosion of the batteries. Explosion of the batteries and the released pollutants can cause severe physical injury.

Observe all safety and handling instructions for lithium batteries. Do not expose lithium batteries to flames and do not solder the battery cell. Do not recharge, open, or short lithium batteries. Do not reverse lithium battery polarity or heat the batteries to over 100°C. Keep lithium batteries out of direct sunlight and protect them from moisture and condensation.

Note the following when handling lithium batteries:

- An empty battery jeopardizes the function of the device. Charge the battery in good time.
- Replace lithium batteries only with batteries of the same type or a type recommended by the manufacturer.

  The order number for the lithium battery is A5E00331143.

NOTICE

Batteries and rechargeables pollute the environment

Do not dispose of used batteries or rechargeables in household waste. Users are obliged by law to return used batteries and rechargeable batteries. You as the user are legally responsible disposing used batteries or rechargeables in a correct manner.

Observe the following rules for the disposal of batteries and rechargeables:

- Dispose of used batteries and rechargeable batteries separately as hazardous waste in accordance with local regulations.
- You can take used batteries and rechargeable batteries to public collection points and wherever batteries and rechargeable batteries of the type in question are sold.
- Mark used battery containers as "Used batteries".

Limitation of liability

All technical specifications and approvals for the device apply only if you use expansion components that have a valid CE approval (CE marking). The installation instructions for expansion components in the associated documentation must be observed.

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

We are not liable for functional limitations caused by the use of third-party devices or components.

See also

Spare parts and repairs (http://support.automation.siemens.com/WW/view/en/16611927)

7.4 Removing and installing hardware

7.4.1 Replacing a defective hard disk drive in the RAID system

A hard disk can only be replaced during operation in the removable drive bay in connection with a configured RAID1 system. This functionality is referred to as "Hot Swap".

Note

If you have configured a non-RAID system with several hard disks, or in the case of an internally installed hard disk, you need to turn off the device before you replace a hard disk.

Observe the EGB guidelines. Always replace the drive with a new drive of the same type and capacity.

Mounting locations for hard disks in the RAID1 system

Hard disks for a RAID1 system can be installed permanently in the device or in a removable drive bay.

Note

The replacement of a RAID hard disk with removable drive bay can be performed without shutting down the device. An internal hard disk may only be replaced when the device is switched off.

The new hard disk can be integrated into the RAID system at operating system level with the RAID software. Synchronization may take several hours, depending on system load.

Status displays of the hard disks in a RAID1 system

The following table includes information on the alarms of the status displays. If the hard disk is defective and the SIMATIC DiagBase monitoring software is installed, the LEDs of the status display light up individually or simultaneously.

Internal hard disk or hard disk in removable drive bay

Status display	RAID BIOS	RAID software	SATA connection of the motherboard	Drive
HDD0 alarm	Port 0	Device port 0	SATA 0	0
HDD1 alarm	Port 1	Device port 1	SATA 1	1

Replacing a defective hard disk in the RAID system

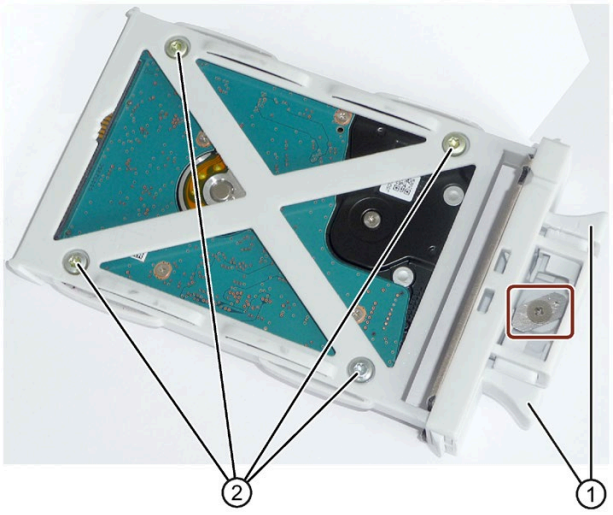
1. Determine which hard disk was reported by the RAID software as defective.
2. Remove the defective hard disk or replace the hard disk in the removable drive bay.
3. Replace the defective hard disk with a hard disk of the same type and capacity.
4. Integrate a new hard disk drive into the RAID system (Page 85).

7.4.2 Removing and installing the hard disk in the removable drive bay

Procedure

Removal

1. Open the lock identified in the figure with the appropriate key from the top.
2. Push in both sliders ① on the handle and remove the hard disk tray using its handle.
3. Place the hard disk bay top down on a soft surface.
4. Loosen the screws ② of the drive.



5. Remove the drive from the removable drive bay.

Installation

Proceed in reverse order.

7.4.3 Replacing the Backup Battery

Note

Batteries are wearing parts and should be replaced every 5 years to ensure proper functioning of the PC.

To be noted before you replace the battery

⚠ 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.

NOTICE

Risk of damage!

The lithium battery may only be replaced with an identical battery or with a type recommended by the manufacturer (Order No.: A5E00331143).

Disposal

Batteries must be disposed of in accordance with local regulations.

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. You need to enter the configuration data again in the BIOS setup.

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.

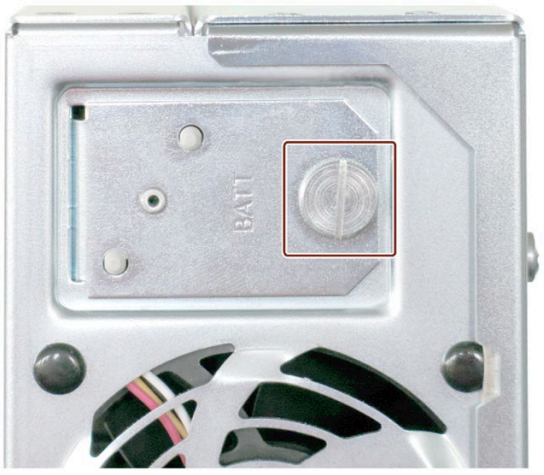
- You have written down the current settings of the BIOS setup.
  A list in which you can note down this information is found in the BIOS description.
- The device is disconnected from the mains and all connecting cables have been removed.

Note

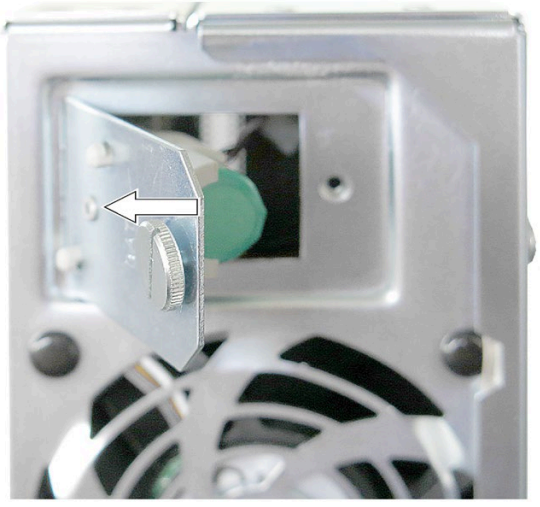
You can also replace the battery while the device is running; do not touch anything with the device in this case. We recommend switching off the device beforehand.

Procedure

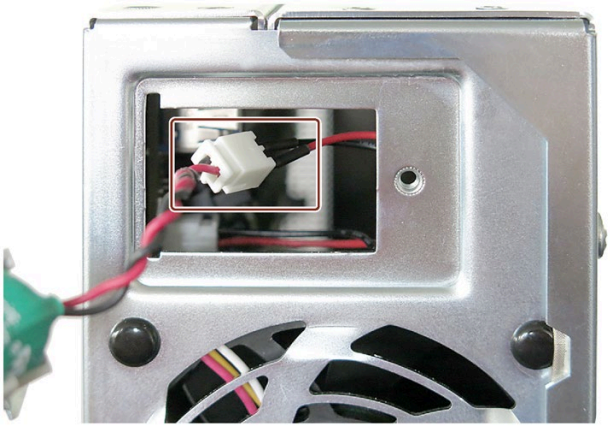
1. Open the battery compartment with a screwdriver at the indicated location.



2. Remove the battery holder.



3. Detach the cable.



4. Remove the old battery.
5. Fasten the new battery and reinsert the battery holder.
6. Close the battery compartment.

7.4.4 Removing and installing the power supply

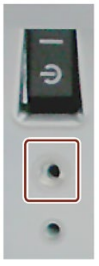
Requirement

- The device is opened.

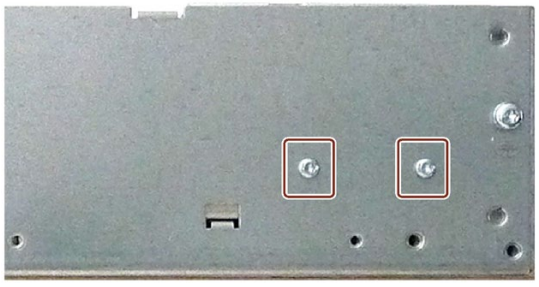
Procedure

Removal

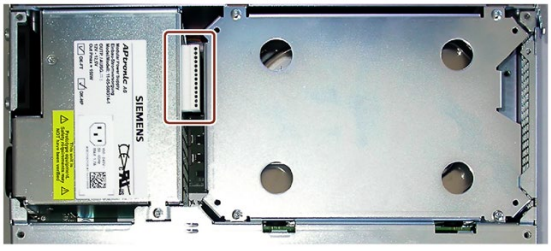
1. Remove the screw at the indicated location below the on/off switch on the back of the device.



2. Remove the identified screws (Torx T10) on the side.



3. Remove the drive bay module. (Page 76)
4. Remove the labeled power supply connector of the power supply.
5. Lift up the power supply unit slightly and remove it to the rear top



Installation

Proceed in reverse order.

7.4.5 Removing and installing the bus board

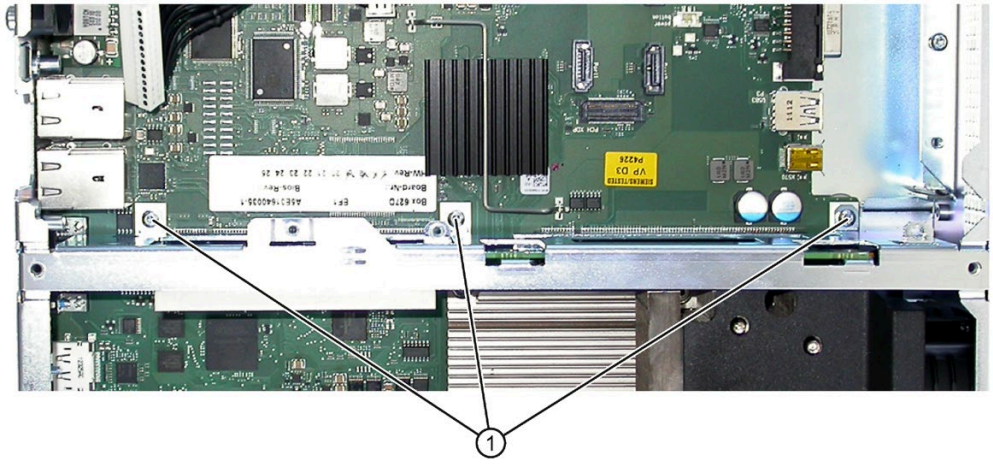
Requirement

- The device is opened.

Procedure

Removal

1. Remove all modules from the slots.
2. Remove the drive bay module for hard disks.
3. Remove the power supply.
4. Remove the screws ① on the bus board.



5. Pull the bus board from the motherboard.

Installation

Proceed in reverse order.

7.4.6 Removing and installing the power supply fan

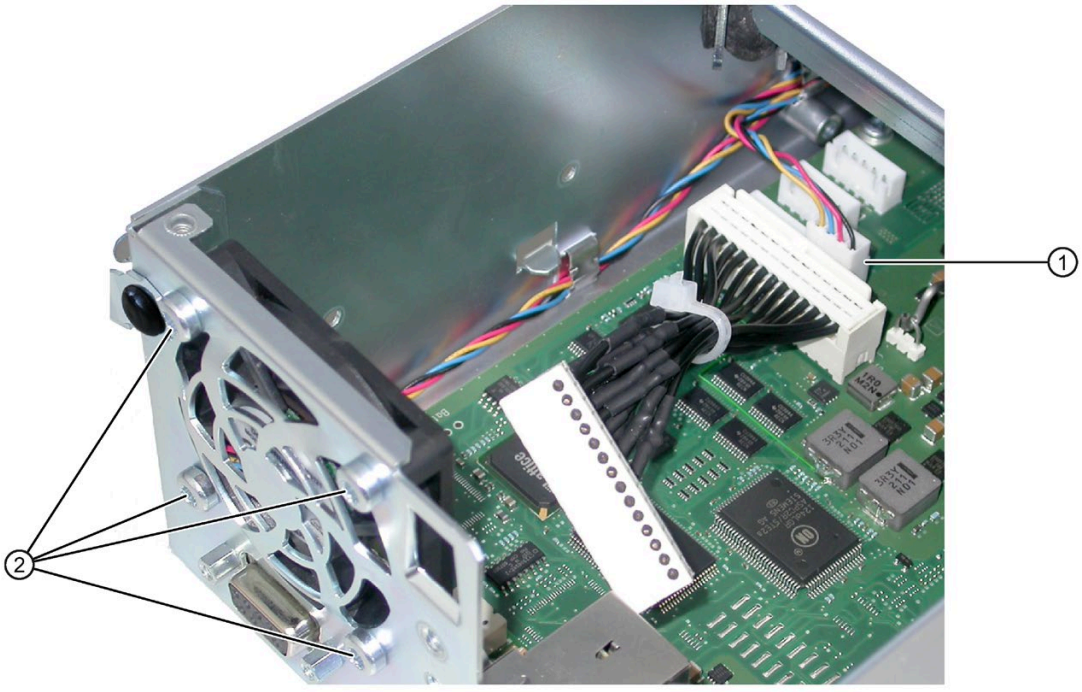
Requirement

- The device is opened.
- The power supply has been removed.

Procedure

Removal

1. Pull out the plug of the power supply fan ①.



2. Loosen the four screws ② on the enclosure.
3. Take the power supply fan out of the enclosure.

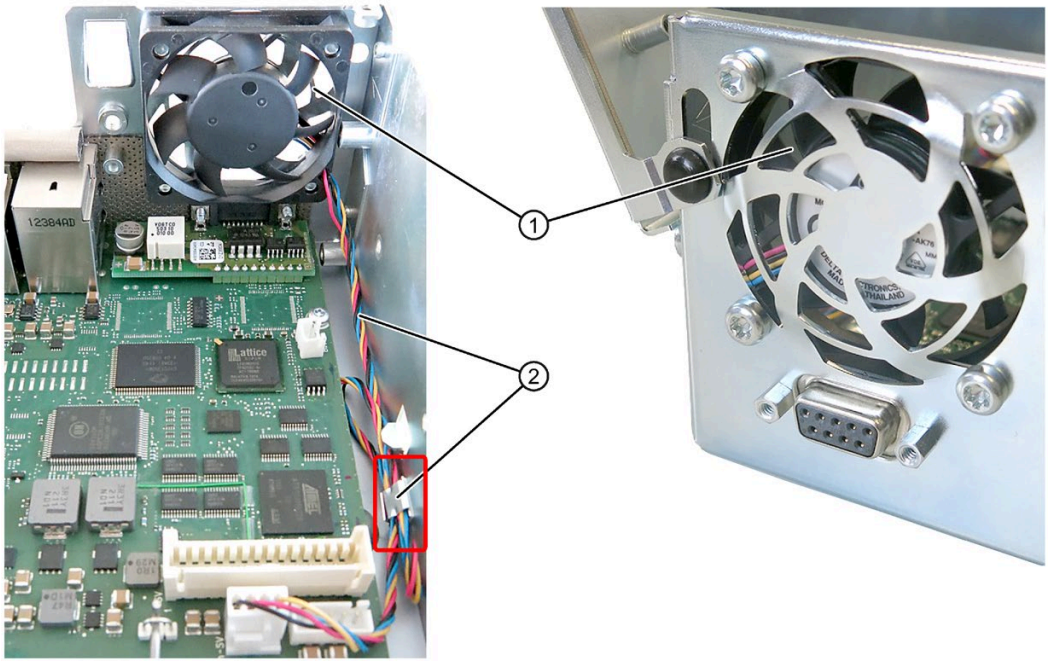
Installation

Note

Install only a fan of the same type. Note the correct mounting position of the fan.

The figure shows the correct mounting position.

- Direction of flow: Make sure that the blades ① of the power supply fan are on the outside of the housing.
- Run the power supply cable ② along the housing edge and fasten any excess cable as loop as shown in the illustration.



7.4.7 Removing and installing the device fan

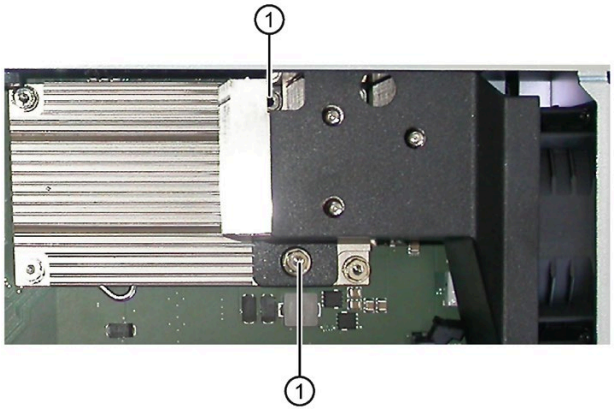
Requirement

- The device is opened.

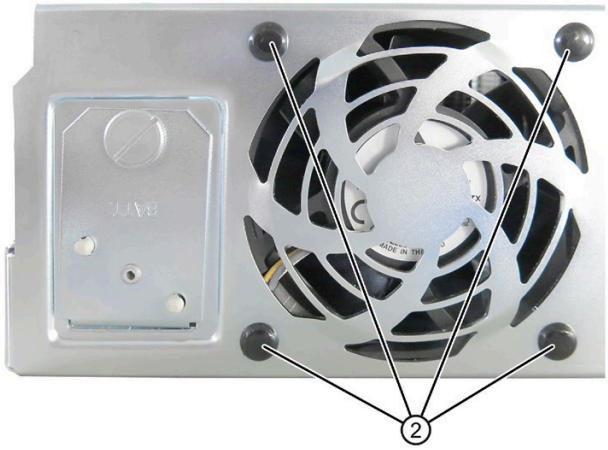
Procedure

Removal

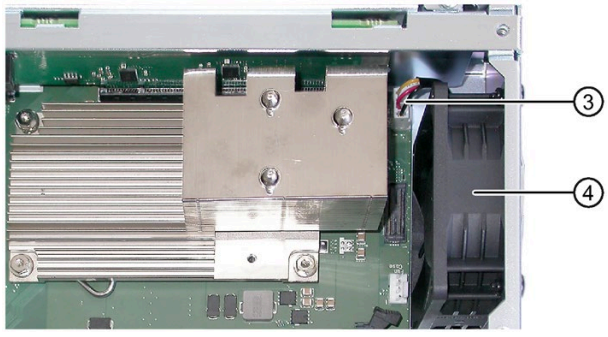
1. Remove the two screws ① and remove the air guide pulling it up vertically.



2. Loosen the four plastic rivets ② on the enclosure.



3. Pull out the fan plug ③.
4. Take the fan ④ out of the enclosure.



Installation

Note

Install only a fan of the same type. Note the correct fan mounting position: Make sure that the blades of the fan are on the outside of the housing.

Proceed in reverse order.

7.4.8 Replacing the processor

Requirement

- The device is opened.
- The memory modules have been removed.
- The air guide has been removed (see chapter "Removing and installing the device fan (Page 99)")
- A suitable processor

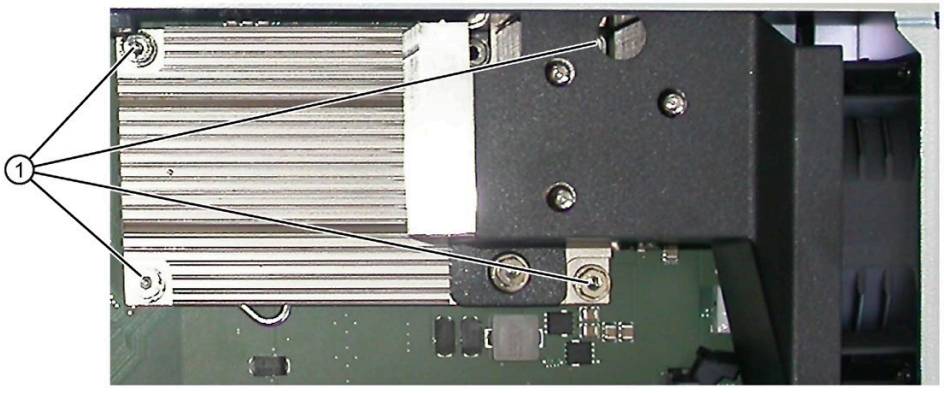
  Only an approved processor is permitted to be installed on the motherboard of the device. If the processor type is changed, the BIOS must be updated so that the suitable microcode is loaded. Information about original spare parts for SIMATIC IPCs is available on the Internet at:

  – Contacts (http://www.siemens.com/automation/partner)

  – SIMATIC IPC after-sales information system (http://www.siemens.com/asis)

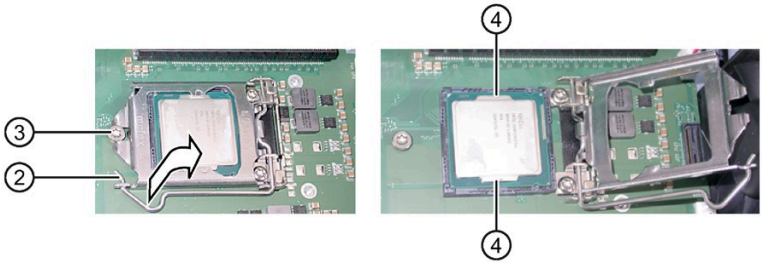
Procedure

1. Loosen the screws ①.



   The fourth screw is hidden by the air guide in the figure.

2. Remove the heat sink.
3. Release the lever ② of the processor bay and tilt it all the way back. The bay releases the processor.



4. Remove the processor by grabbing the rails on the side ④. Do not touch the processor and its connections in the process (see Technical Specifications, chapter "ESD guidelines").
5. Install the new processor on the socket, as shown in the figure.

   During positioning, make sure to take the highlighted arrow on the processor into consideration.
6. Tilt the lever to the front again. Make sure that the bay covers the screw ③.
7. Press the lever all the way down and lock it again.

NOTICE
Damage to the processor The locking mechanism may be stuck. The locking mechanism is damaged while being pressed down. The processor is not correctly locked in place by the bay. The result may be malfunctions. • Do not use excessive force. • Tilt the lever back again and try again.

The next steps are available in the "Technical manual of the motherboard" on the "Documentation and Drivers" DVD shipped with the product.

Processor type and clock frequency

When a processor is replaced, perform a BIOS update. The microcode matching the processor is loaded in the process.

Note

Damage to the processor due to high clock frequency

If the installed processor is operated with a higher clock frequency than permitted, it can be destroyed or cause loss of data.

Operate the processor only at a clock frequency that is equal to or less than the permitted clock frequency.

7.5 Installing operating system, software and drivers

7.5.1 Installing the operating system

Information on commissioning, restoring or reinstalling the operating system you ordered with the device can be found in the detailed operating system description on the delivered data carrier or online under:

- Microsoft® Windows® 7 (https://support.industry.siemens.com/cs/ww/en/view/109749497)
- Microsoft® Windows® 10 (https://support.industry.siemens.com/cs/ww/en/view/109749498)
- Microsoft® Windows Embedded Standard® 7 (https://support.industry.siemens.com/cs/ww/en/view/109749499)

7.5.2 Installing software and drivers

The supplied USB stick (read only), contains the "Documentation and Drivers" suite, which you use to install all supplied software and drivers.

Procedure

1. Insert the provided USB stick into the device.
2. Start the "Documentation and Drivers" suite from the USB flash drive by executing the "START_DocuAndDrivers.CMD" file.
3. Install the desired software and drivers.

7.6 Backing up data and restoring image

Data backup with Windows Embedded Standard 7 and Windows 7

We recommend that you use the **SIMATIC IPC Image & Partition Creator** software tool for data backups in Windows Embedded Standard 7 and Windows 7. This tool provides convenient and efficient functions for backing up and restoring the full content of memory cards, hard disks and individual partitions (images).

SIMATIC IPC Image & Partition Creator supports the burning of DVD media only. You can order the tool using the Siemens online ordering system (http://www.siemens.com/automation/mall). For more information about SIMATIC IPC Image & Partition Creator, refer to its product documentation.

7.7 Recycling and disposal

Due to the low levels of pollutants in the HMI devices described in these operating instructions, they can be recycled.

Contact a certified disposal service company for electronic scrap for environmentally sound recycling and disposal of your old devices, and dispose of the device according to the relevant regulations in your country.

Technical specifications

8

8.1 Certificates and approvals

8.1.1 DIN ISO 9001 certificate and software license agreements

ISO 9001 certificate

The Siemens quality management system for our entire product creation process (development, production and sales) meets the requirements of ISO 9001:2008.

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

Certificate no.: 001323 QM08

Software license agreements

If the device is supplied with preinstalled software, you must observe the corresponding license agreements.

8.1.2 UL standard and Canadian National Standard

UL approval

The following approvals are available for the device:

Underwriters Laboratories (UL) according to standard UL 60950-1 and Canadian National Standard CAN/CSA-C22.2 No. 60950-1 (I.T.E) or UL508 and to Canadian National Standard CAN/CSA-C22.2 No. 142 (IND.CONT.EQ)

8.1.3 FCC Rules (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.

8.1.4 ICES compliance (Canada)

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

8.1.5 RCM (Australia / New Zealand)

This product meets the requirements of EN 61000-6-3 Generic standards - Emission standard for residential, commercial and light-industrial environments.

This product meets the requirements of the standard EN 61000-6-3 Generic standards - Emission standard for residential, commercial and light-industrial environments.

8.1.6 KC Mark (Korea)

This product meets the requirements of Korean certification.

This product satisfies the requirement of the Korean Certification (KC Mark).

이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

8.2 Directives and declarations

8.2.1 CE marking

The device meets the guidelines listed in the following sections.

EU Declaration of Conformity

The associated declaration of conformity is available on the Internet at the following address: Certificate Box PC (http://support.automation.siemens.com/WW/view/en/10805671/134200).

Electromagnetic compatibility

This product meets the requirements of EU Directive 2014/30/EU "Electromagnetic Compatibility".

The device is designed for the following areas of application corresponding to the CE marking:

Scope of application	Requirements for	
	Interference emission	Immunity to interference
Industrial area	EN 61000-6-4 +A1	EN 61000-6-2
Residential and commercial areas and small businesses	EN 61000-6-3 +A1	EN 61000-6-1

The devices are compliant with EN 61000-3-2 (harmonic currents) and EN 61000-3-3 (voltage fluctuations and flicker).

Low-voltage directive

The device with AC power supply complies with the requirements of the EU Directive 2014/35/EU "Low Voltage Directive". Compliance with this standard has been verified according to EN 60950-1 +A11 +A1 +A12 +A2.

8.2.2 ESD guideline

What does ESD mean?

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

The following abbreviations are commonly used for electrostatic sensitive devices:

- ESD – Electrostatic sensitive device
- ESD – Electrostatic Sensitive Device as a common international designation

Electrostatic sensitive devices can be labeled with an appropriate symbol.

NOTICE

Damage to ESD from touch

Electrostatic sensitive devices, ESD, can be destroyed by voltages which are far below the human perception limit. If you touch a component or electrical connections of a module without discharging any electrostatic energy, these voltages may arise.

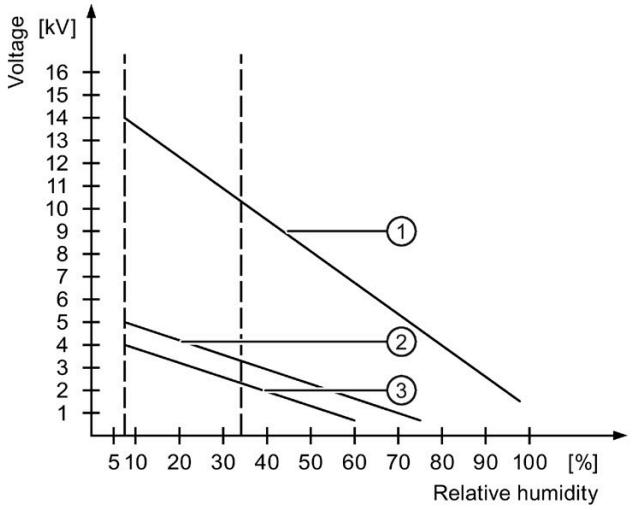
The damage to a module by an overvoltage can often not be immediately detected and only becomes evident after an extended period of operation. The consequences are incalculable and range from unforeseeable malfunctions to a total failure of the machine or system.

Avoid touching components directly. Make sure that persons, the workstation and the packaging are properly grounded.

Charge

Every person without a conductive connection to the electrical potential of his/her surroundings can be electrostatically charged.

The material with which this person comes into contact is of particular significance. The figure shows the maximum electrostatic voltages with which a person is charged, depending on humidity and material. These values conform to the specifications of IEC 61000-4-2.



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

NOTICE
Grounding measures There is no equipotential bonding without grounding. An electrostatic charge is not discharged and may damage the ESD. Protect yourself against discharge of static electricity. When working with electrostatic sensitive devices, make sure that the person and the workplace are properly grounded.

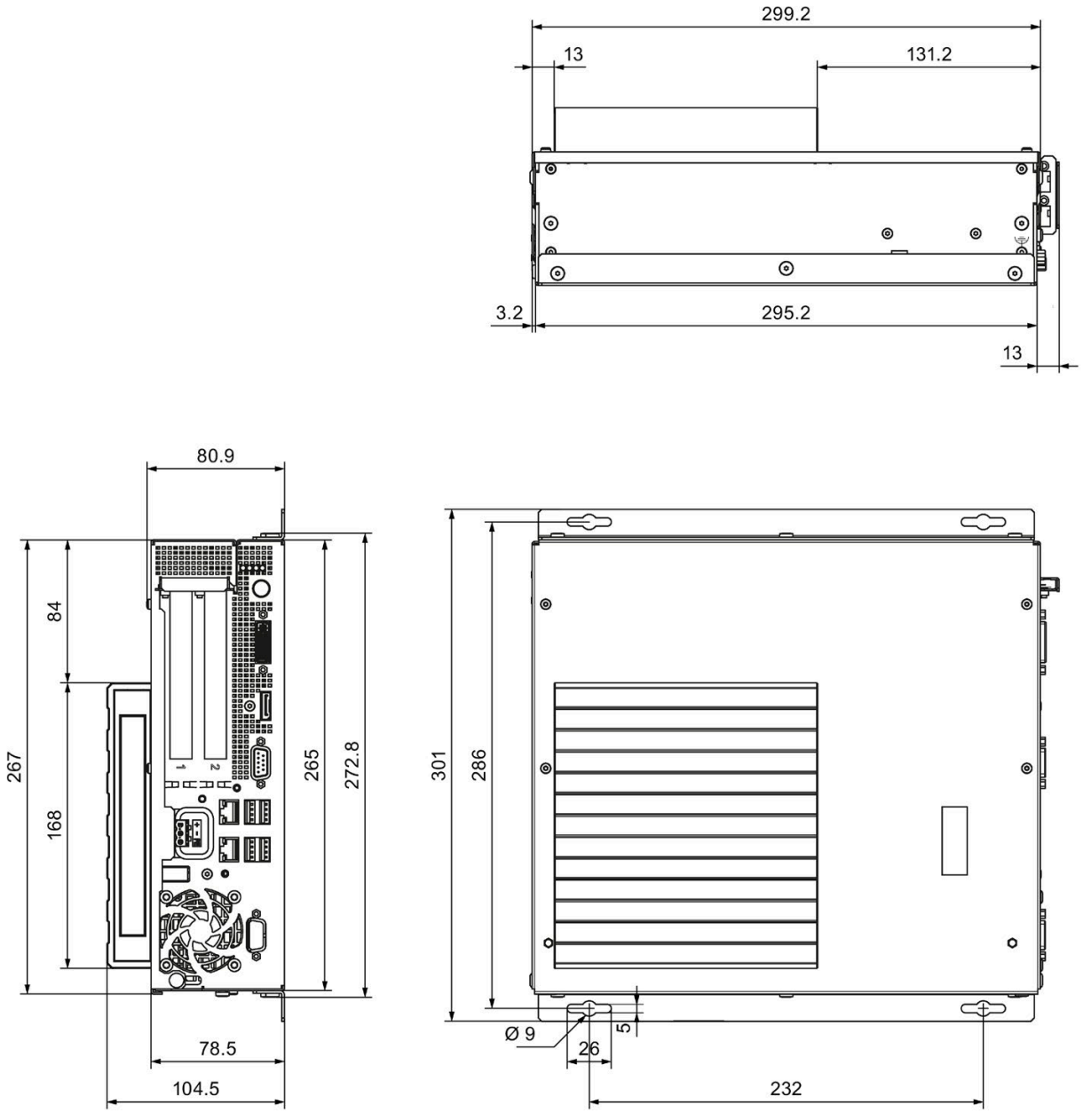
Protective measures against discharge of static electricity

- Disconnect the power supply before you install or remove modules which are sensitive to ESD.
- Pay attention to good grounding:
  - When handling electrostatical sensitive devices, make sure that persons, the workstation and devices, tools and packaging used are properly grounded. This way you avoid static discharge.
- Avoid direct contact:
  - As a general rule, do not touch electrostatic sensitive devices, except in the case of unavoidable maintenance work.
  - Hold the modules at their edge so that you do not touch the connector pins or conductor paths. This way, the discharge energy does not reach and damage the sensitive components.
  - Discharge your body electrostatically before you take a measurement at a module. Do so by touching grounded metallic parts. Always use grounded measuring instruments.

8.3 Dimension drawings

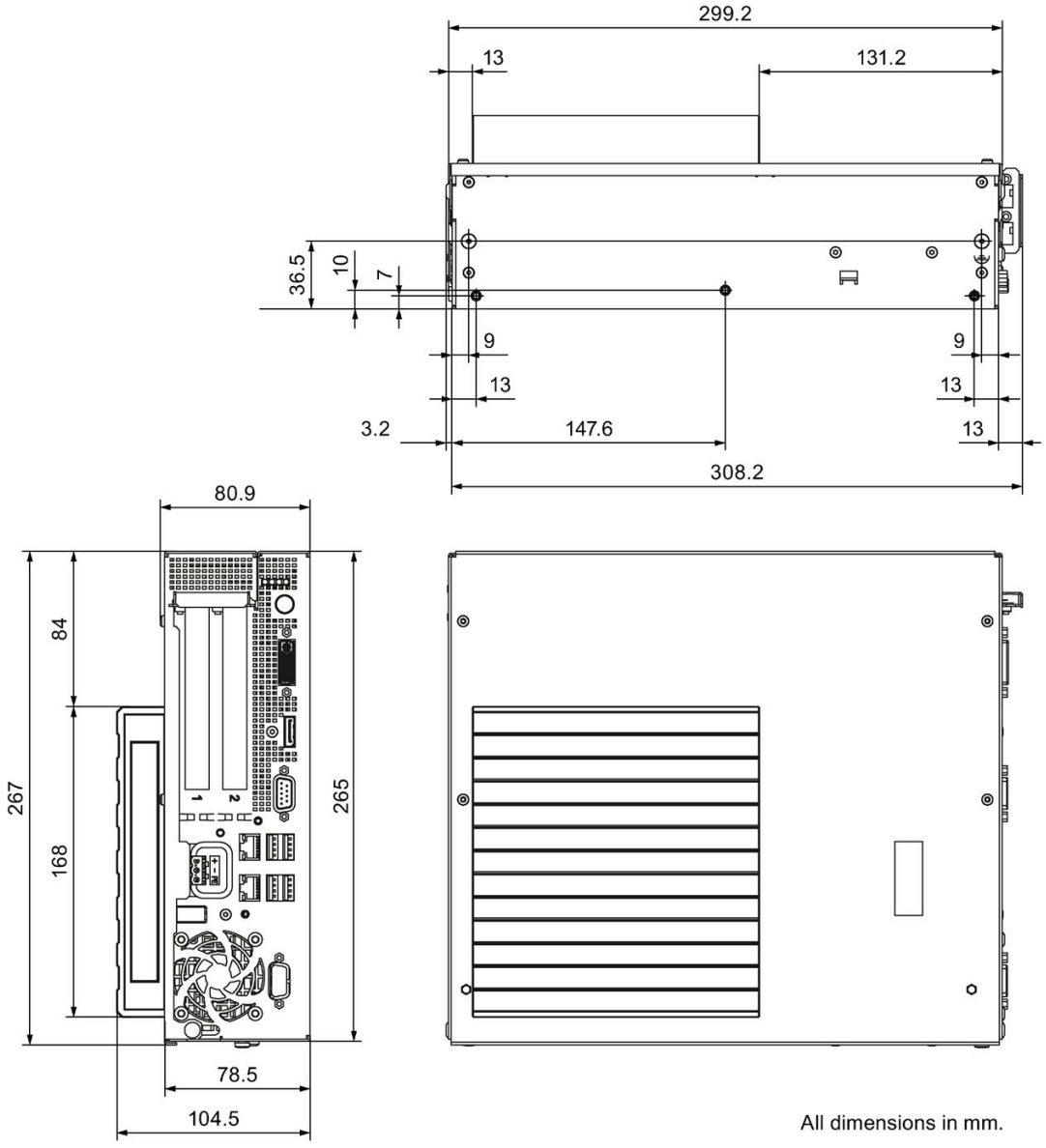
8.3.1 Dimension drawings of SIMATIC IPC627D

Dimension drawing for mounting with angle brackets



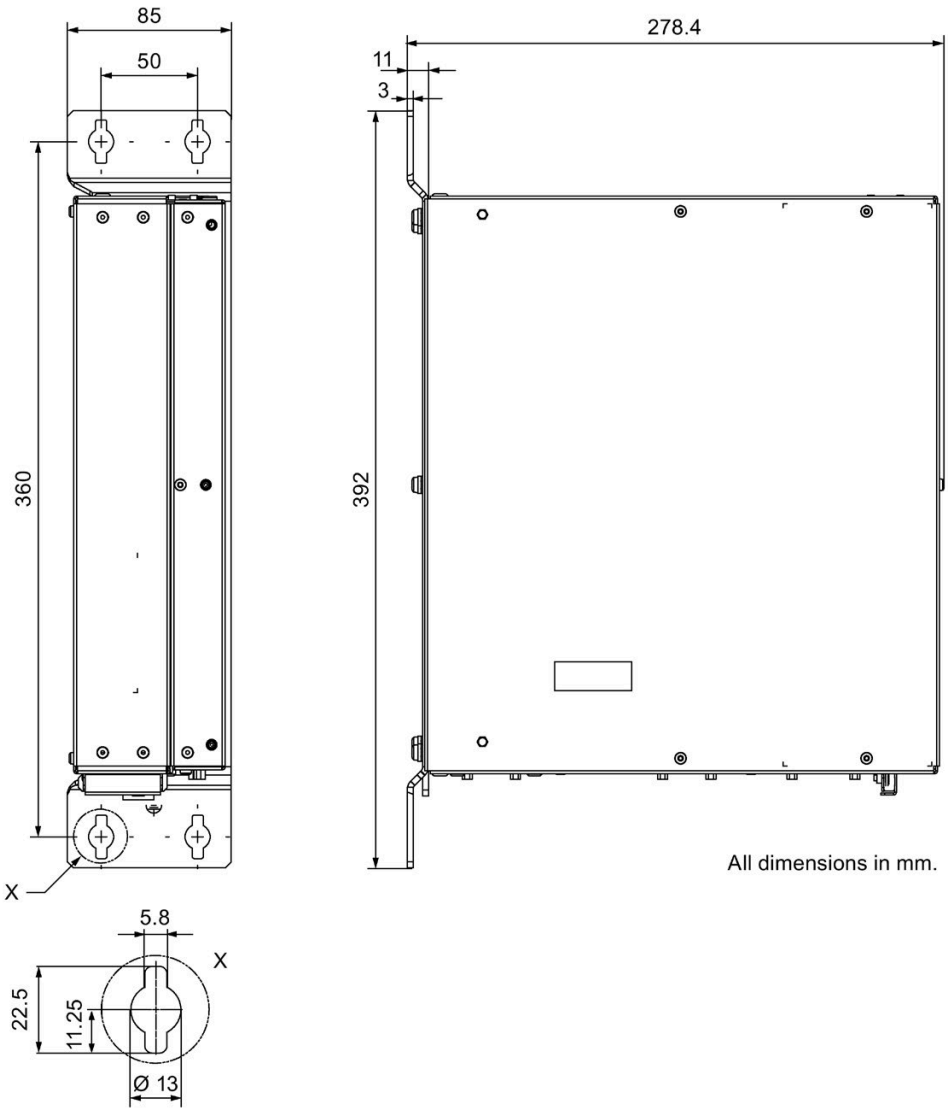
All dimensions in mm.

Dimension drawing for mounting without angle bracket



All dimensions in mm.

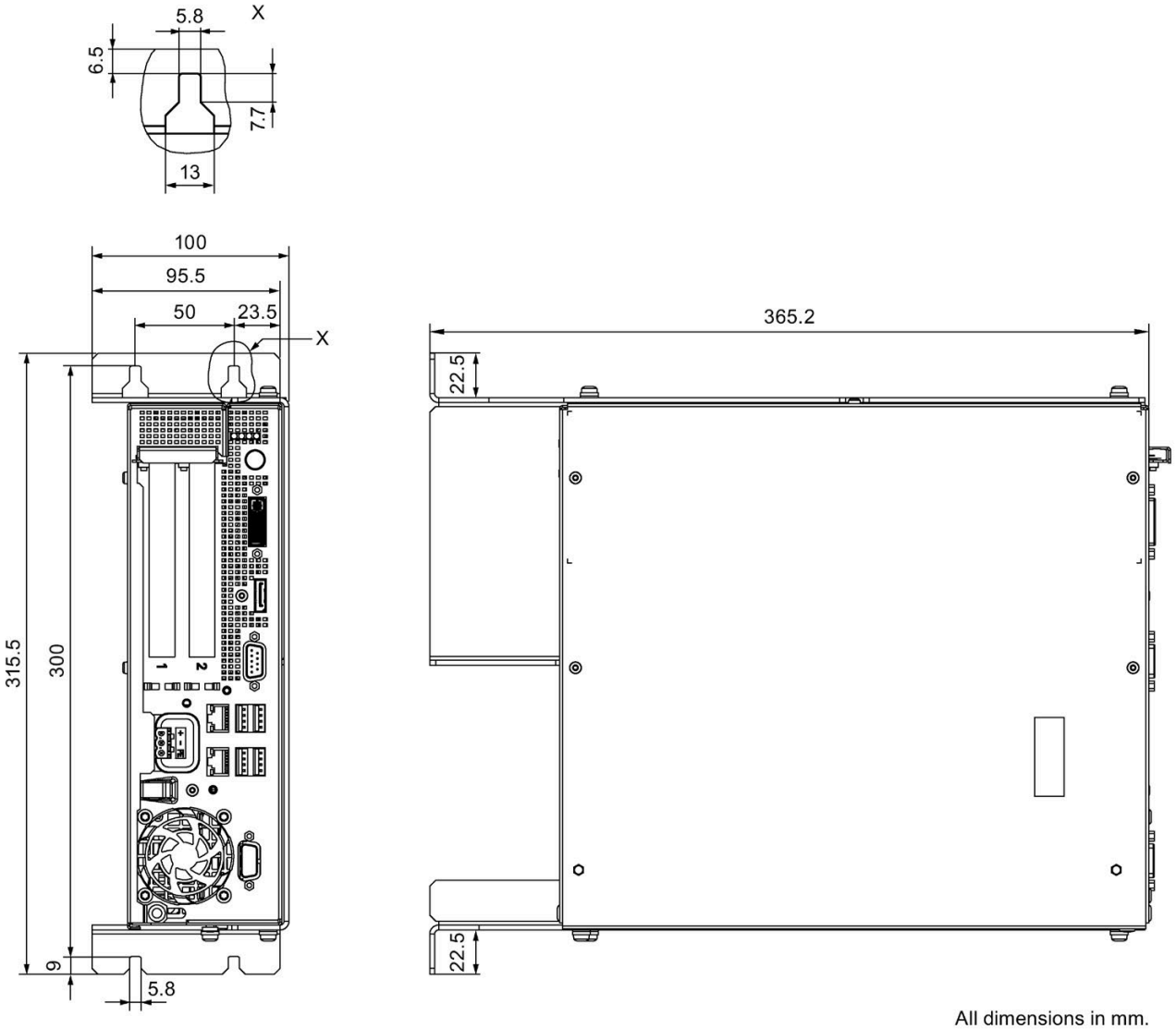
Dimension drawing for mounting with vertical mounting kit



Note

When mounting devices with optical drives, the mounting depth changes.

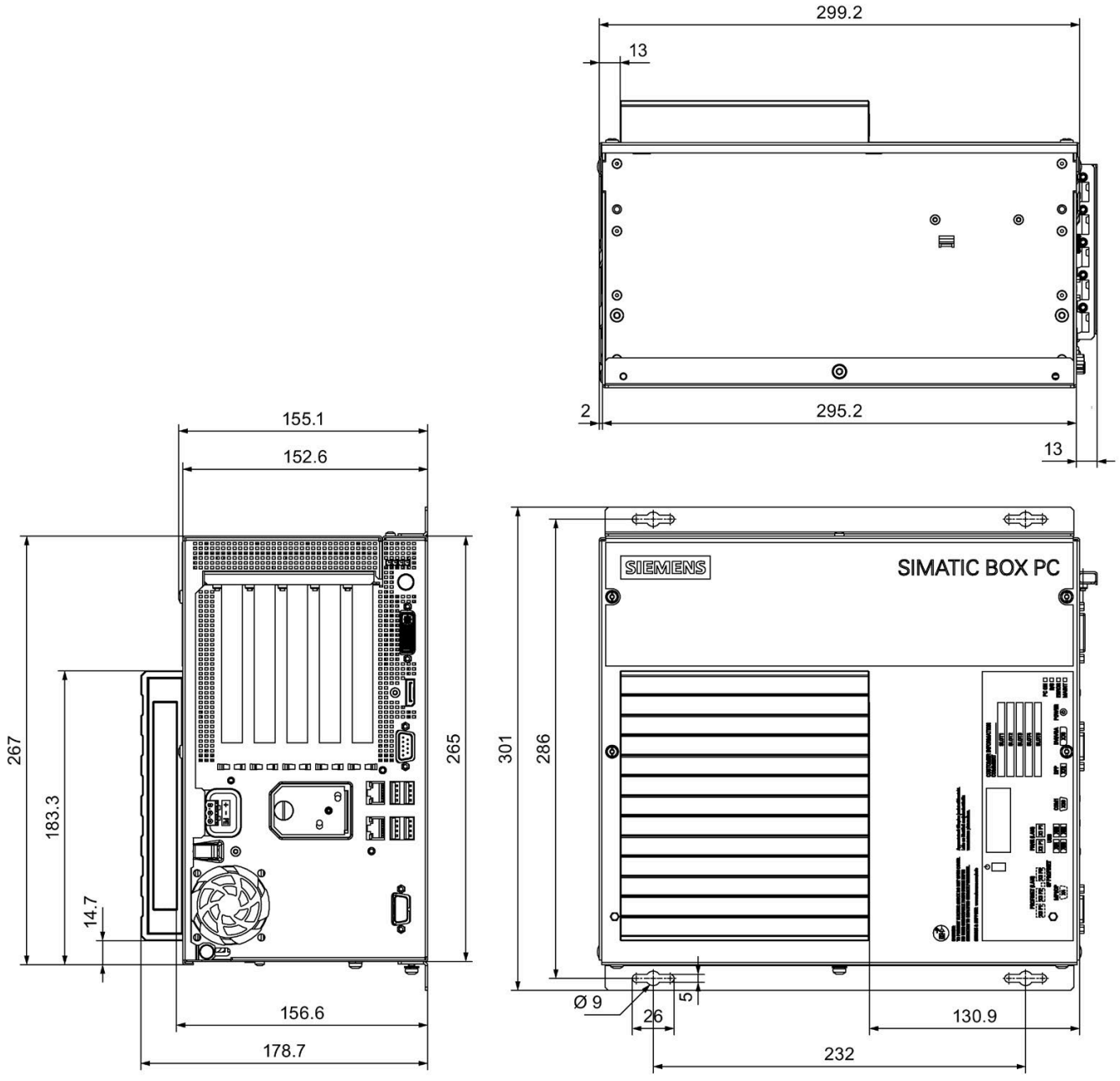
Dimension drawing for installation with the vertical mounting kit for PC port access from the front



All dimensions in mm.

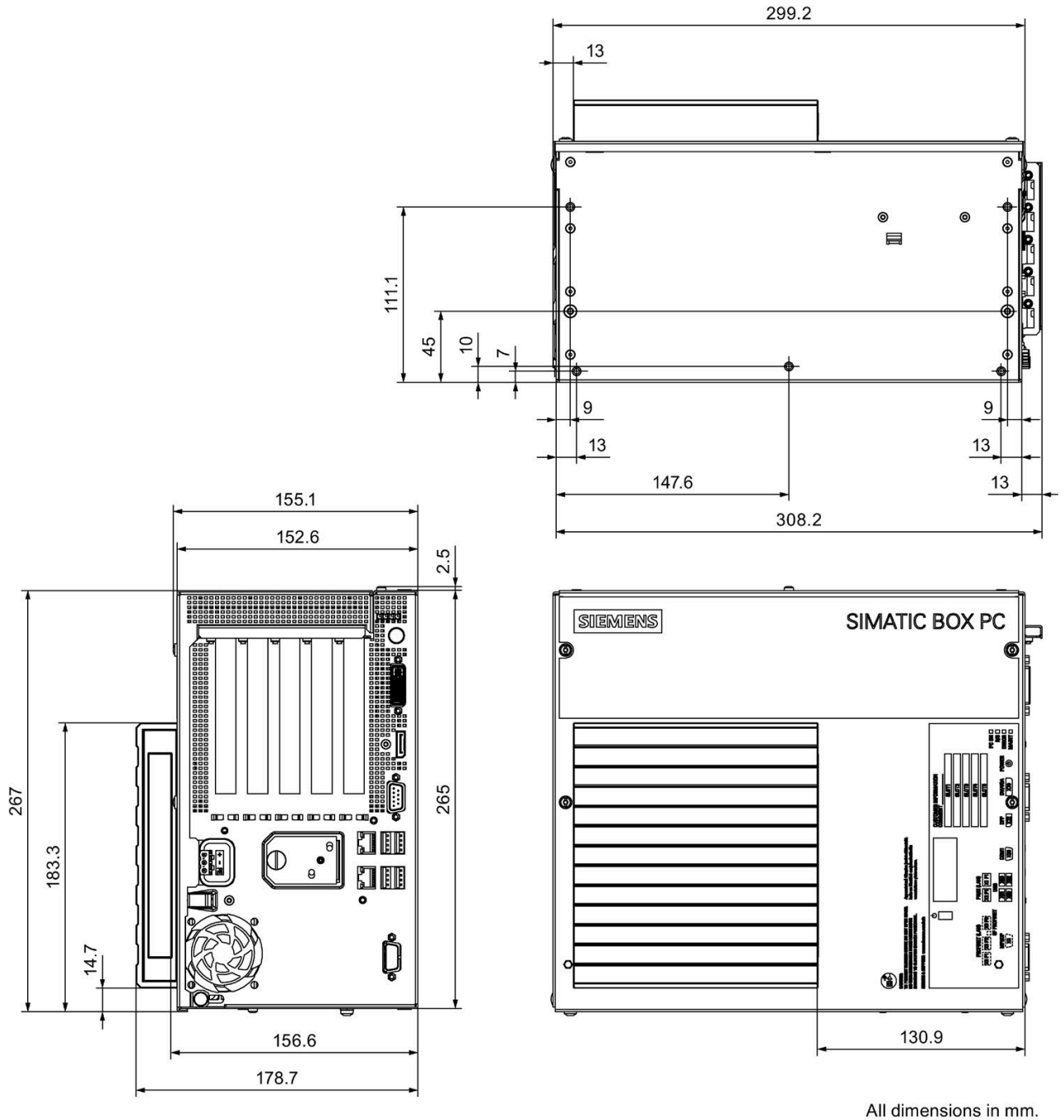
8.3.2 Dimension drawings of SIMATIC IPC827D

Dimension drawing for mounting with angle brackets



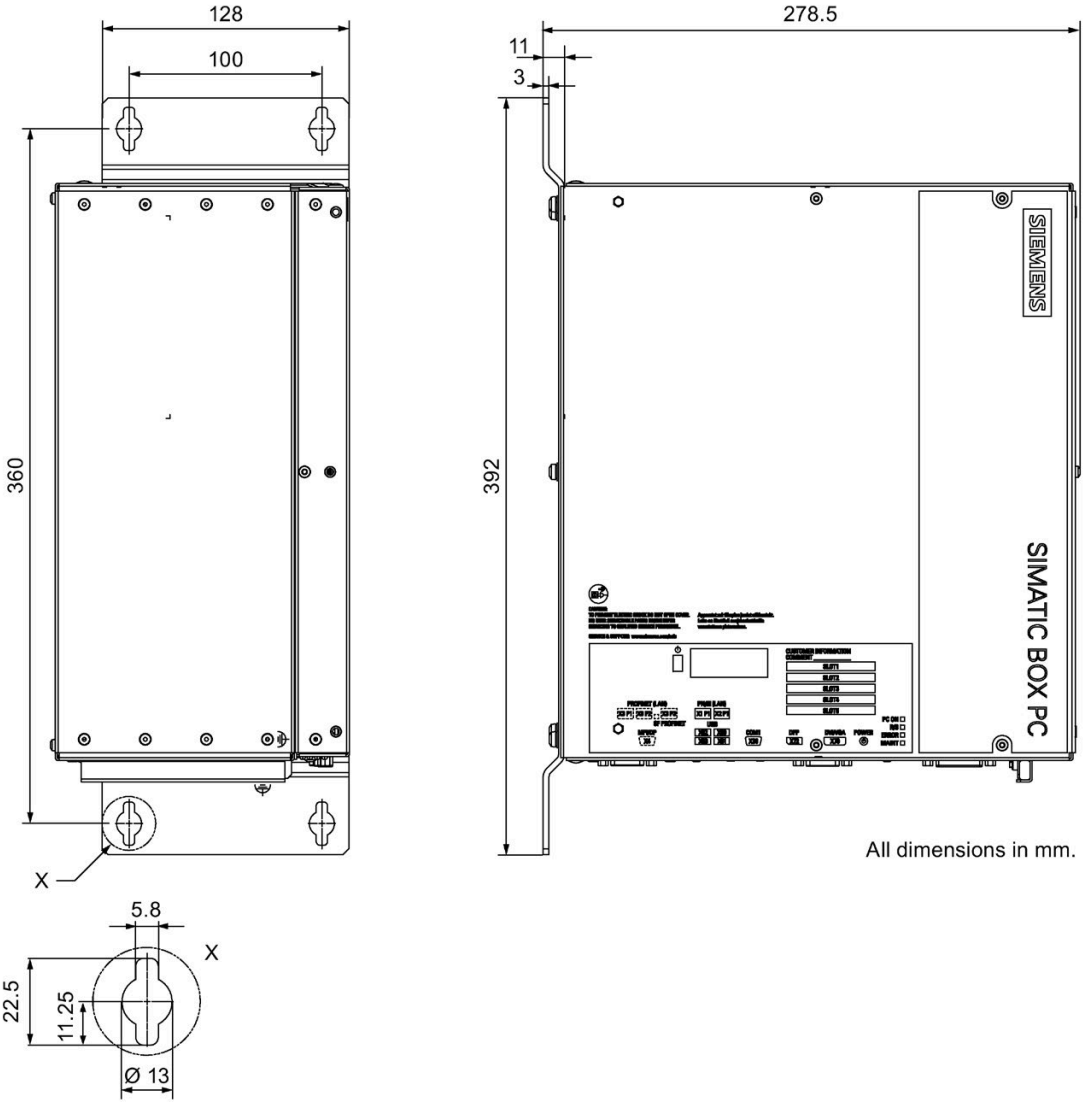
All dimensions in mm.

Dimension drawing for mounting without angle bracket



All dimensions in mm.

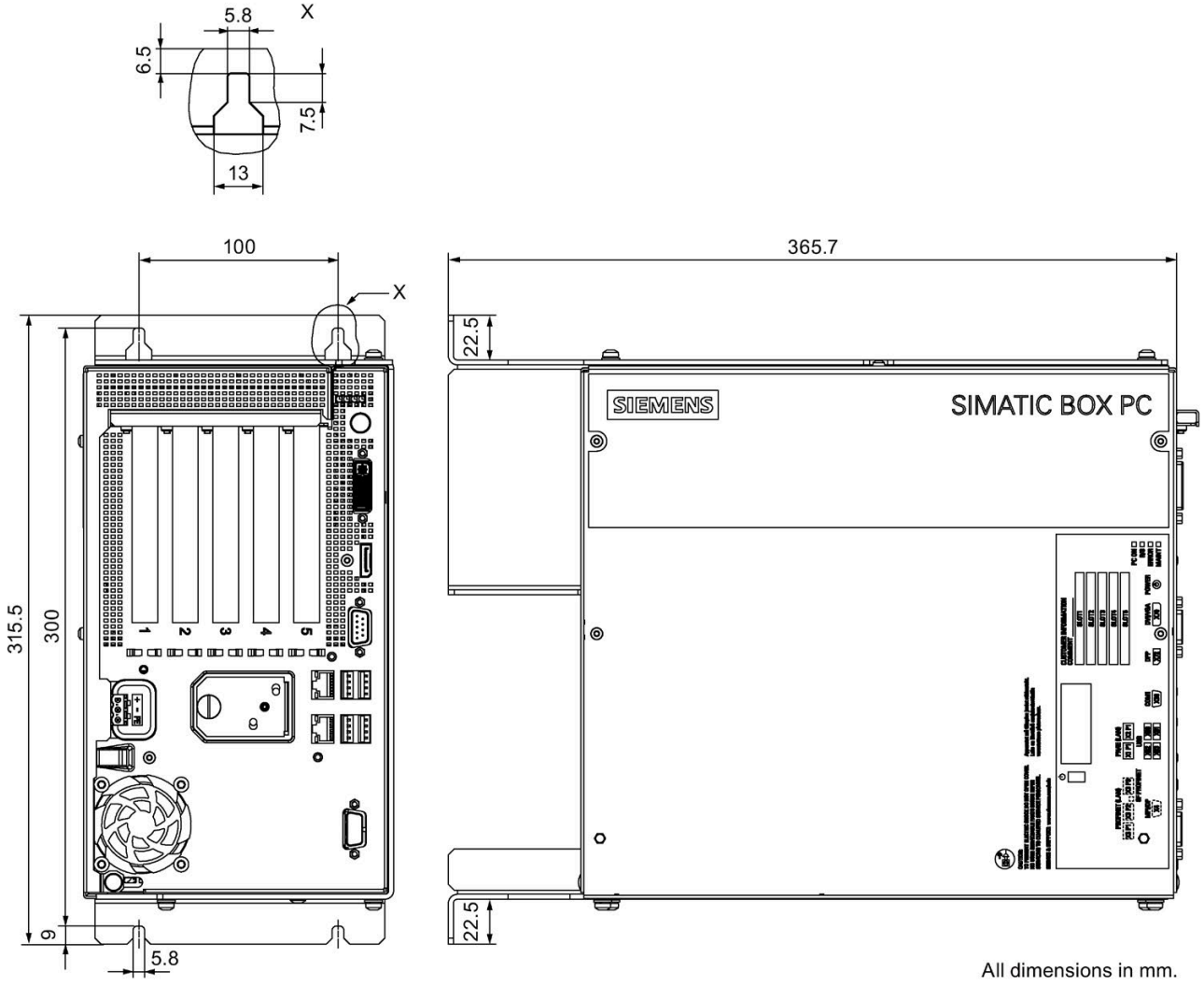
Dimension drawing for mounting with vertical mounting kit



Note

When mounting devices with optical drives, the mounting depth changes.

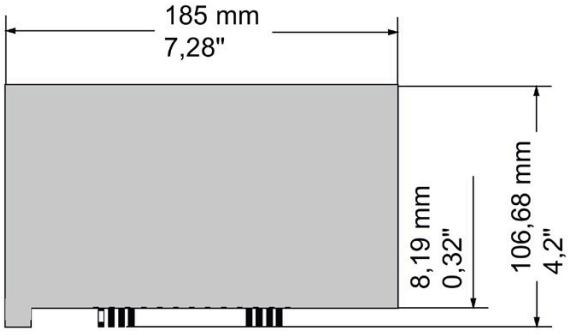
Dimension drawing for installation with the vertical mounting kit for PC port access from the front



All dimensions in mm.

8.3.3 Dimensional drawing for the installation of expansion cards

Short PCI or PCIe expansion card



8.4 Technical specifications

8.4.1 General technical specifications

General technical specifications

Order numbers	See order documents
Dimensions IPC627D	Without DVD burner/HDD in removable drive bay: 297 × 267 × 80 (B × H × T in mm) With DVD burner/HDD in removable drive bay: 297 × 267 × 105
Dimensions IPC827D	Without DVD burner/HDD in removable drive bay: 297 × 267 × 155 (B × H × T in mm) With DVD burner/HDD in removable drive bay: 297 × 267 × 197
Weight IPC627D	approx. 5 kg
Weight IPC827D	approx. 7 kg
Supply voltage AC	Nominal 100-240 V AC (-15% / +10%) (wide range)
Supply voltage DC [1]	Nominal 24 V DC (-20% / + 20%), SELV [1]
Input current AC	Continuous current up to 2.5 A (max. 132 A for a half-value time of 0.8 ms)
Input current DC	Continuous current up to 8 A (max. 13 A for a period of 50 ms)
Line voltage frequency	50-60 Hz (47 to 63 Hz)
Short-term voltage interruption in accordance with Namur	Max. 20 ms (at 93 to 264 V) (max. 10 events/h; recovery time min. 1 s)
Max. power consumption AC and DC	Active power 176 W
Degree of protection	IP 20 to IEC 60529
Protection class	Protection class I to IEC 61140
Safety specifications	EN 60950-1; UL60950-1; CAN/CSA C22.2 No 60950-1-07; UL508; CSA C22.2 No 142
Noise emission	< 55 dB(A) according to EN ISO 7779
Quality assurance	In accordance with ISO 9001

[1] The device should only be connected to a 24 V DC power supply which meets the requirements of safe extra low voltage (SELV) according to IEC/EN/DIN EN 60950-1. A protective conductor must also be used (see section "Connecting the 24 VDC power supply (Page 41)").

Electromagnetic compatibility

Interference emission	EN 61000-6-3, EN 61000-6-4, CISPR32 class B; FCC class A
Immunity with regard to conducted interference on the supply lines	± 2 kV according to IEC 61000-4-4; burst ± 1 kV according to IEC 61000-4-5; symmetrical surge ± 2 kV according to IEC 61000-4-5; asymmetrical surge
Noise immunity on signal lines	± 1 kV to IEC 61000-4-4; Burst; Length < 3 m ± 2 kV in accordance with IEC 61000-4-4; Burst; length > 3 m ± 2 kV in accordance with IEC 61000-4-5; Surge; length > 30 m
Immunity to electrostatic discharge	± 6 kV contact discharge in accordance with IEC 61000-4-2 ± 8 kV air discharge in accordance with IEC 61000-4-2
Immunity to RF interference	10 V/m 80 MHz–2.7 GHz, 80 % AM according to IEC 61000-4-3 3 V/m 2.7–6 GHz, 80 % AM according to IEC 61000-4-3 10 V 10 KHz–80 MHz, 80 % AM according to IEC 61000-4-6
Immunity to magnetic fields	100 A/m, 50/60 Hz according to IEC 61000-4-8

Motherboard

Chipset	Intel DH82C226 PCH
Processor	• Intel Xeon E3-1268L v3 2.3 (3.3) GHz, 4 cores, 8 threads, GT2, 8 MB second level cache, HT, AMT • Intel Core i3-4330TE 2.4 GHz, 2 cores, 4 threads, GT2, 3 MB second level cache • Intel Celeron G1820TE 2.2 GHz, 2 cores, 2 threads, GT1, 2 MB second-level cache
Main memory	Expansion options: • 2048/4096/8192/16384 MB without ECC • 4096/8192/16384 MB with ECC
Buffer memory	2 MB SRAM
Expansion slots IPC627D	Maximum 2 expansion slots
Expansion slots IPC827D	Maximum 5 expansion slots
Maximum bandwidth of PCI slots	Rev. 2.2: 133 Mbps
Maximum bandwidth of PCI slots	Rev. 2.0: 5 GT/s (500 Mbps) bandwidth per lane Rev. 3.0: 8 GT/s (985 Mbps) bandwidth per lane
Max. accumulated power loss per slot	Total power consumption (all voltages) may not exceed 25 W.

Overview of slots and their specification

Slots for expansion cards IPC627D (bus module 2 x PCI)	
Slot 1	PCI: Specification Rev. 2.2, length: Max. 185 mm
Slot 2	PCI: Specification Rev. 2.2, length: Max. 185 mm
Slots for expansion cards IPC627D (bus module 1 x PCI and 1 x PCIexpress)	
Slot 1	PCI: Specification Rev. 2.2, length: Max. 185 mm
Slot 2	PCIexpress x16: Specification Rev. 3.0, length: Max. 185 mm
Slots for expansion cards IPC627D (bus module 2 x PCIexpress)	
Slot 1	PCIexpress x4 (mech: x16): Specification Rev. 2.0, length: Max. 185 mm
Slot 2	PCIexpress x16: Specification Rev. 3.0, length: Max. 185 mm
Slots for expansion cards IPC827D	
Slot 1	PCI: Specification Rev. 2.2, length: Max. 240 mm
Slot 2	PCI: Specification Rev. 2.2, length: Max. 240 mm
Slot 3	PCI: Specification Rev. 2.2, length: Max. 185 mm
Slot 4	PCIexpress x4 (mech: x16): Specification Rev. 2.0, length: Max. 185 mm
Slot 5	PCIexpress x16: Specification Rev. 3.0, length: Max. 185 mm

Drive and memory media

Hard disk drive	1 × 3.5" SATA-HD 2 × 2.5" SATA HD
Solid State Disk	1 × 2.5" SATA SSD, ≥ 240 GB Standard
DVD burner	Serial ATA, See order documentation for features

Graphics

Graphics controller	• Xeon: Intel® HD Graphics Controller P4600 GT2 • Core i3: Intel® HD Graphics Controller P4600 GT2 • Celeron: Intel® HD Graphics Controller (GT1)
Graphics memory	32 - 512 MB Shared Memory
Resolution / frequency / color depth	• Display Port (Spec. V1.2): Max. 3840 x 2160 / 60 Hz / 32-bit • DVI-D: Max. 1920 x 1200 / 60 Hz / 32-bit • VGA: Max. 1920 x 1200 / 60 Hz / 32-bit

Interfaces

DVI-I	Connection of DVI monitor, with adapter also VGA monitor
DisplayPort	Connection of DisplayPort monitor
Keyboard	USB support
Mouse	USB support
USB	4 × USB 3.0, a maximum of 2 can be operated in high-current mode at the same time
PROFIBUS / MPI interface, isolated	9-pin Cannon socket, 2-row • Transmission rate: 9.6 kbps to 12 Mbps • Modes: DP master: DP-V0, DP-V1 with SOFTNET DP DP slave: DP-V0, DP-V1 with SOFTNET-DP slave
PROFINET [3]	RJ45 connection, CP1616 compatible, on-board interface on ERTEC 400 basis, 10/100 Mbps, electrically isolated
Ethernet [3]	2 × Gigabit Ethernet interface (two RJ45s) electrically isolated, Wake on LAN, Remote Boot and teaming are supported [4] [5]: • X1P1: Intel WGI217LM (AMT interface), supports jumbo frames up to 9014 bytes • X2P1: Intel WGI210IT, supports jumbo frames up to 9014 bytes
COM1	RS232, 115 kbps max., 9-pin SUB-D, male
Free slots for expansion cards (see section "Motherboard")	• IPC627D: 2 PCI/PCIe cards • IPC827D: 5 PCI/PCIe cards

[3] For unique labeling, the Ethernet interfaces are numbered on the enclosure. The numbering by the operating system can differ.

[4] No teaming with AMT.

[5] When using AMT, the interface X1P1 must be used for connection to remote maintenance.

8.4.2 Ambient conditions

Climatic conditions

Temperature tested according to IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14	
In operation *1, *5	+ 5 °C to + 45 °C + 5 °C to + 50 °C with a total power of max. 20 W for the USB and PCI/PCIe expansions + 5 °C to + 55 °C with a total power of max. 10 W for the USB and PCI/PCIe expansions
Storage /transportation	– 20° C to +60° C
Gradient	max. 10° C/h in operation, 20° C/h storage, no condensation

Barometric pressure	
During operation	1080 to 700 hPa (corresponds to an altitude of -1000 to 3000 m)
Storage /transportation	1080 to 660 hPa (corresponds to an altitude of -1000 to 3500 m)

Relative humidity, tested in accordance with IEC 60068-2-78, IEC 60068-2-30	
During operation	5 to 31 °C: 5 % to 80 %, decreasing linearly up to 5 % to 25 % to 55 °C (no condensation)
Storage /transportation	At 25 °C: 5 % to 95 % (no condensation)

Mechanical ambient conditions

Vibration, tested according to DIN IEC 60068-2-6	
In operation *2, *3, *4	10 to 58 Hz: 0.075 mm, 58 to 500 Hz: 9.8 m/s2
Storage /transportation	5 to 9 Hz: 3.5 mm, 9 to 500 Hz: 9.8 m/s2

Shock resistance, tested in accordance with IEC 60068-2-27, IEC 60068-2-29	
In operation *3	50 m/s2, 30 ms
Storage /transportation	250 m/s2, 6 ms

*1 Restrictions for DVD burner drives:

Burning is only permitted with ambient temperatures of +5°C to +40°C. Reading is only permitted with ambient temperatures up to a maximum of +50°C.

*2 Limitation with DVD burner drives:
10 to 58 Hz: 0.019 mm / 58 to 500 Hz: 2.5 m/s^2
Burning is only permitted 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/s^2
Shock resistance: 25 m/s^2, 30 ms

*4 Restriction for hard disk drives in removable drive bay:
No mechanical loads may occur at the device.

*5 If operated at higher altitudes, the reduced cooling effect due to the lower barometric pressure must be considered; the maximum permissible ambient temperature is reduced.
Derating factor up to 2000 m: 1.0
Derating factor at 3000 m: 0.9
Linear interpolation is permissible.

8.4.3 Power and energy requirements

Maximum current values

IPC627D

Component	Voltage							
	+5 V		+3.3 V		+12 V		-12 V	
Base device [1, 2]					7.5 A			
Hard disk drive 1 × 3.5" [2]	0.6 A				0.5 A			
Hard disk drives 2 × 2.5" [2]	1.2 A							
SSD drive (SATA) 1 x 2.5" [2]	0.8 A							
DVD burner drive [2]	0.8 A							
USB ports [3 4]	2 A							
PCI/PCIe slots [4] in total Maximum per PCI slot Maximum per PCIe slot	4 A	4 A -	6 A	6 A 3 A	2 A	0.5 A 2 A	0.1 A	0.1 A -
Internal front interfaces for panel PC					2.41 A			
Individual currents (max. permitted) [5]	**14 A**		**14 A**		**12.5 A**		**0.3 A**	

1 Basic device includes motherboard, processor, memory, both fans, CF

2 Depends on the selected device configuration

3 2 × USB3.0 high current and 2 × USB2.0 low current.

4 The total power for individual PCI/PCIe slots may not exceed 25 W.
The total power for USB and PCI/PCIe slots may not exceed 30 W.

IPC827D

Component	Voltage							
	+5 V		+3.3 V		+12 V		-12 V	
Base device [1, 2]					7.5 A			
Hard disk drive 1 × 3.5" [2]	0.6 A				0.5 A			
Hard disk drives 2 × 2.5" [2]	1.2 A							
SSD drive (SATA) 1 x 2.5" [2]	0.8 A							
DVD burner drive [2]	0.8 A							
USB ports [3 4]	2 A							
PCI/PCIe slots [4] in total Maximum per PCI slot Maximum per PCIe slot	6 A	4 A -	10 A	6 A 3 A	2 A	0.5 A 2 A	0.1 A	0.1 A -
Internal front interfaces for panel PC	No front permitted!							
Individual currents (max. permitted) [5]	**14 A**		**14 A**		**12.5 A**		**0.3 A**	

1 Basic device includes motherboard, processor, memory, both fans, CF

2 Depends on the selected device configuration

3 2 × USB3.0 high current and 2 × USB2.0 low current.

4 The total power for individual PCI/PCIe slots may not exceed 25 W.
The total power for USB and PCI/PCIe slots may not exceed 50 W.

Typical power values

IPC627D

Component	Current consumption 230 V AC	Current consumption 24V DC	Power consumption efficiency 0.85
Base device	0.3 A	3.0 A	70 W
Hard disk drive 1 × 3.5"	0.04 A	0.38 A	9 W
Hard disk drives 2 × 2.5"	0.03 A	0.25 A	6 W
SSD drive (SATA) 1 x 2.5"	0.02 A	0.17 A	7 W
DVD burner drive	0.02 A	0.17 A	4 W
USB ports	Max. 0.06 A	Max. 0.54 A	Max. 13 W
PCI/PCIe slots	0.16 A max.	1.54 A max.	Max. 37 W

IPC827D

Component	Current consumption 230 V AC	Current consumption 24V DC	Power consumption efficiency 0.85
Base device	0.3 A	3.0 A	70 W
Hard disk drive 1 × 3.5"	0.04 A	0.38 A	9 W
Hard disk drives 2 × 2.5"	0.03 A	0.25 A	6 W
SSD drive (SATA) 1 x 2.5"	0.02 A	0.17 A	7 W
DVD burner drive	0.02 A	0.17 A	4 W
USB ports	Max. 0.06 A	Max. 0.54 A	Max. 13 W
PCI/PCIe slots	Max. 0.26 A	Max. 2.54 A	Max. 59 W

8.4.4 AC voltage supply

Technical data

Note

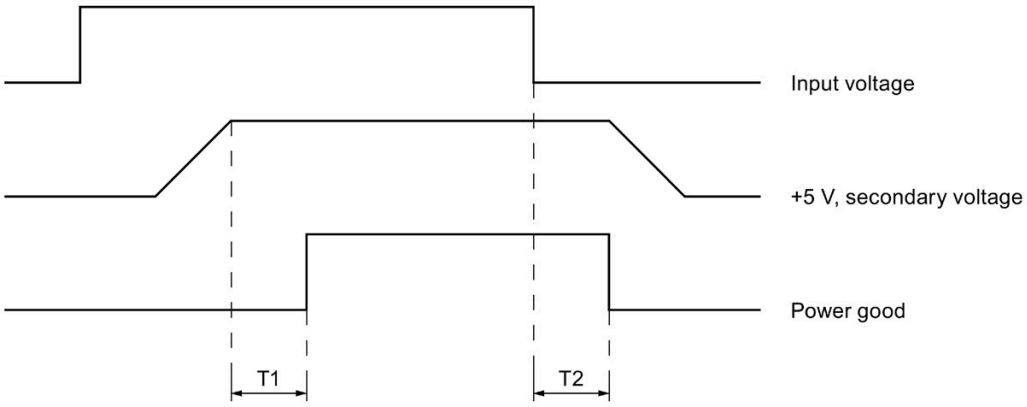
The power supply contains an active PFC (Power Factor Correction) circuit to conform to the EMC guidelines.

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 - 240 V AC (-15% / +10%), wide range
Continuous current	Max. 1.7 A for 20 ms
Starting current (load-independent)	Max. 132 A for a half-value time of 0.8 ms
I^2t	Max. 9.5 A^2s
Active power	176 W
Apparent power	190 VA
Output data	
Voltages	+12 V / 12.5 A
Secondary power output	Max. 150 W

Power Good signal of the AC power supply



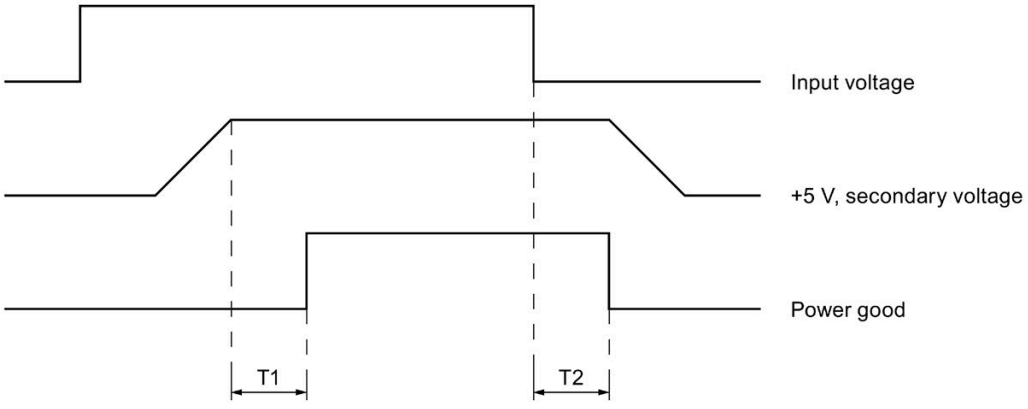
T1: preset time 50 ... 500 ms
T2: hold-up time 20 ms minimum

8.4.5 DC power supply

Technical data

Power supply characteristics	DC power supply
Input data	
Voltage	Nominal 24 V DC (-20% / +20%), SELV, isolated
Continuous current	Max. 8 A
Starting current (load-independent)	Max. 13 A for a period of 50 ms
I^2t	Max. 3.5 A^2s
Active power	176 W
Output data	
Voltages	+12 V / 12.5 A
Secondary power output	Max. 150 W

Power Good signal of the DC power supply



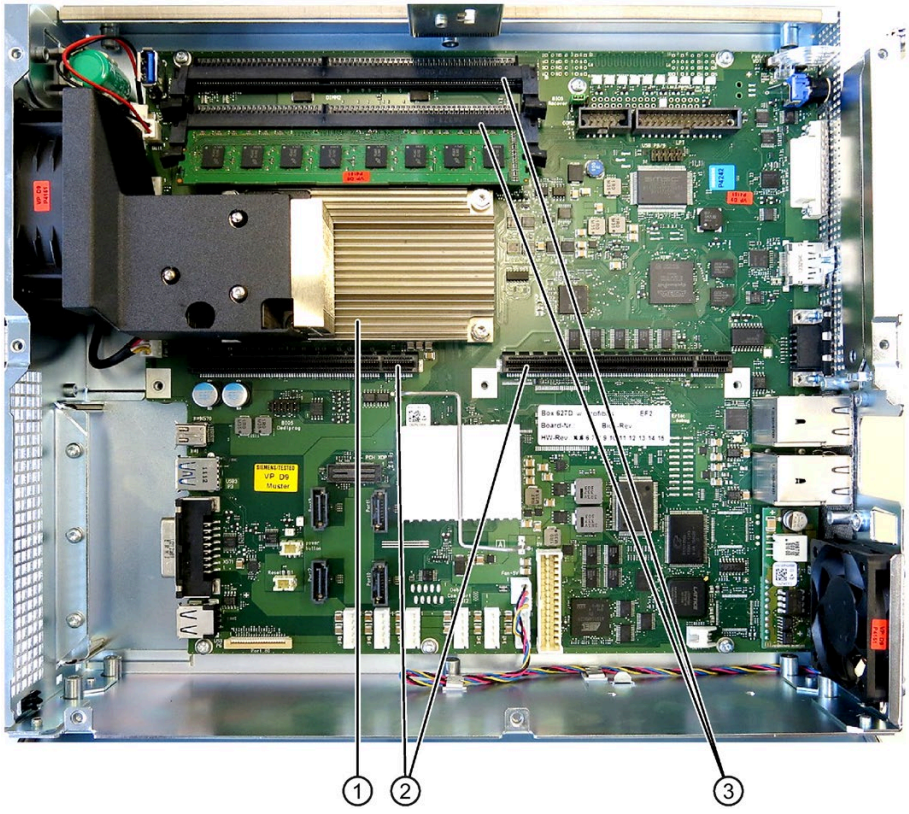
T1: preset time 50 ... 500 ms
T2: hold-up time 20 ms minimum

8.5 Hardware descriptions

8.5.1 Motherboard

8.5.1.1 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.



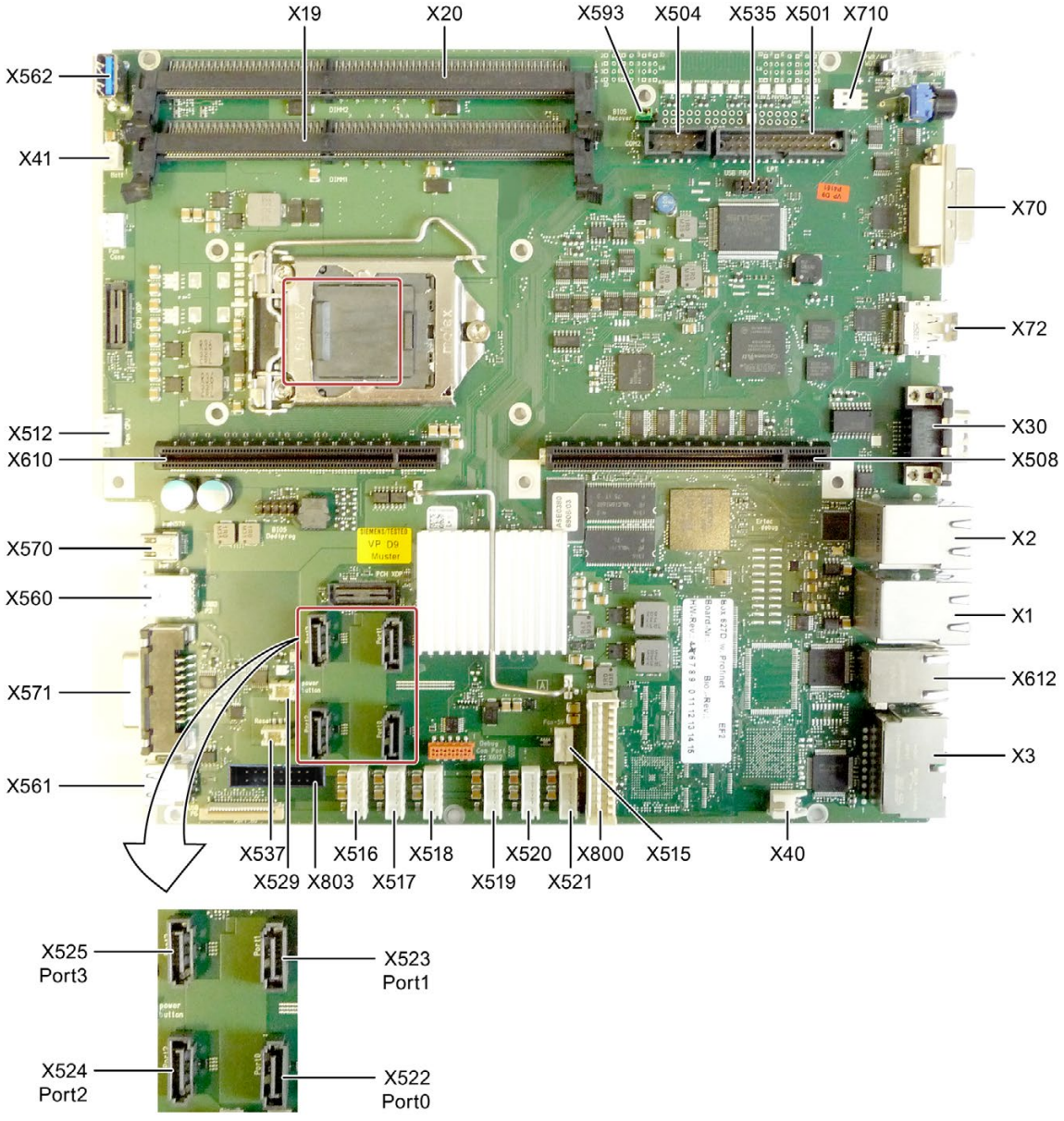
①	Processor heat sink
②	Slot for the bus board
③	Two memory module slots

8.5.1.2 Position of the interfaces on the motherboard

Interfaces

The motherboard of the device features the following interfaces:

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



8.5.1.3 Internal interfaces

Pin assignment of the internal interfaces

Interface	Position	Connector	Description
Memory	Internal	X19, X20	2 DIMM sockets, 64-bit
Bus expansion	Internal	X508, X610	Socket for bus expansion, assigned PCI bus signals
Power supply	Internal	X800	20-pin connector plug for power supply
BIOS Recovery	Internal	X593	Jumper: • Jumper on pins 2-3: default • Replug to pins 3-4 for BIOS Recovery * • Replug to pins 1-2 for ME Update * * USB memory stick required
Serial ATA	Internal	X522, X523, X524, X525	Serial ATA, max. 3 drives operable
Connection for PS serial ATA	Internal	X516, X517, X518, X519, X520, X521	Voltage supply for serial ATA
Connection for PS fan	Internal	X515	Voltage supply for CPU fan, 4-pin male connector
Connection for equipment fan	Internal	X512	Voltage supply for equipment fan, 4-pin male connector
Backup battery	Internal	X40, X41	Voltage supply for backup battery, 2-pin male connector
USB port	Internal	X535	USB channel 6 and 7, 10-pole male connector On expansion card (optional) guided (see section "Operator controls and interfaces")
USB port	Internal	X562	USB channel 9, upright USB socket
Spare HDD	Internal	X803	LED display

Pin assignment of the device fan supply, X512

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

Pin assignment of the supply for the power supply fan, X515

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

Pin assignment of serial ATA voltage supply, X516 - X521

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

Connector for backup battery, X40, X41

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	-

8.5.1.4 Front interfaces (only in combination with IPC677D)

Overview

Interface	Position	Connect-or	Description
Display	Internal	X570	Connection of LC displays
I/O front	Internal	X571	Interface for I/O front
USB 2.0	Internal	X561	Internal USB 2.0 interface (USB channel 6)
USB 3.0	Internal	X560	Internal USB 3.0 interface (USB channel 3)

See also

Industry Automation and Drive Technologies - Homepage
(http://www.siemens.com/automation/service&support)

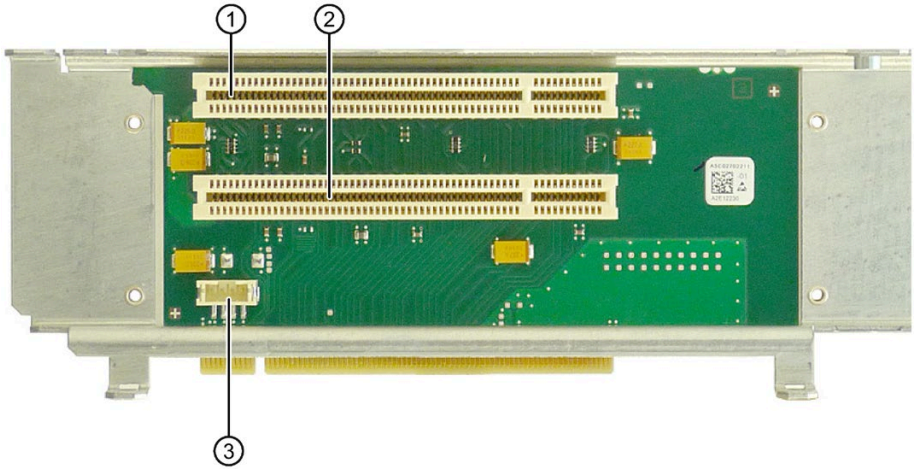
8.5.2 Bus board

8.5.2.1 Layout and principle of operation

The bus board is designed as a link between the motherboard and the expansion cards. It is secured with five screws.
The bus board is available in the following designs:

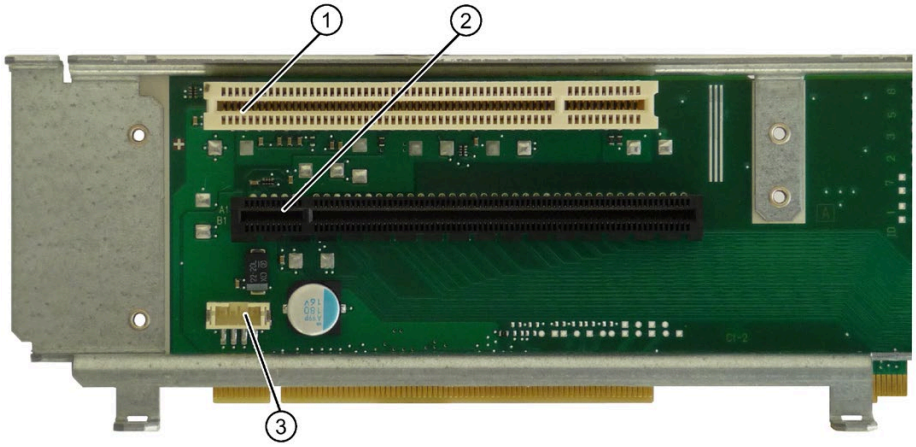
You connect the 12 V power supply connection for expansion cards with a 4-wire cable. Information on pin assignment is available in the sections below.

Version 1 (IPC627D) has two PCI slots. It can host expansion cards conforming to PCI specification (Rev. 2.2) for 5 V and 3.3 V modules. All PCI slots are master compatible. The expansion cards are supplied with power via the bus board to motherboard connection.



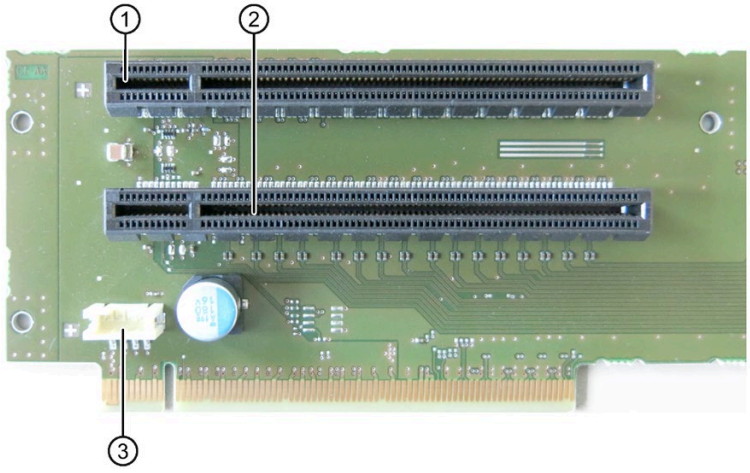
①	Slot 1 PCI (TIA Portal: X100)
②	Slot 2 PCI (TIA Portal: X101)
③	Connection 12 V power supply

Version 2 (IPC627D) has one PCI and one PCIe slot.



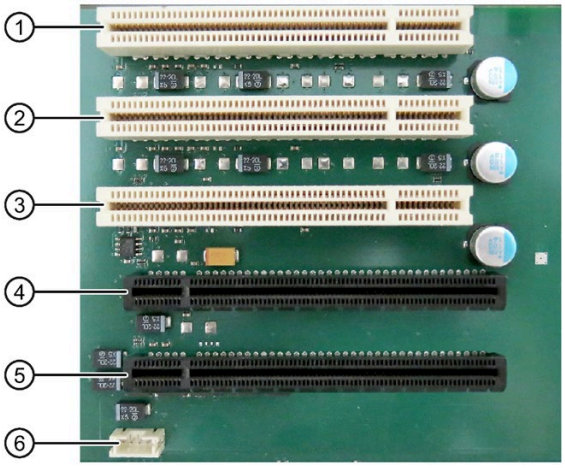
①	Slot 1 PCI (TIA Portal: X100)
②	Slot 2 PCI Express x16 (TIA Portal: X101)
③	12V power supply connection

Version 3 (IPC627D) has two PCIe slots.



①	Slot 1 PCI Express x4, mechanical x16 (TIA Portal: X100)
②	Slot 2 PCI Express x16 (TIA Portal: X101)
③	12V power supply connection

Version 4 (IPC827D) has three PCI and two PCIe slots.



①	Slot 1 PCI (TIA Portal: X100)
②	Slot 2 PCI (TIA Portal: X101)
③	Slot 3 PCI (TIA Portal: X102)
④	Slot 4 PCI Express x4, mechanical x16 (TIA Portal: X103)
⑤	Slot 5 PCI Express x16 (TIA Portal: X104)
⑥	12V power supply connection

8.5.2.2 PCI slot pin assignment

	5V System Environment	
	Side B	**Side A**
1	-12V	TRST#
2	TCK	+12V
3	Ground	TMS
4	TDO	TDI
5	+5V	+5V
6	+5V	INTA#
7	INTB#	INTC#
8	INTD#	+5V
9	PRSNT1#	Reserved
10	Reserved	+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

	5V System Environment	
	Side B	**Side A**
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
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

8.5.2.3 Pin assignment 12 V power supply connection for expansion cards

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

8.5.2.4 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
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)

Signal	Pin no.	Pin no.	Signal
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)
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

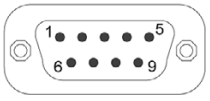
Signal	Pin no.	Pin no.	Signal
GND	B72	A72	PCIEX16_RX_P(2)
GND	B73	A73	PCIEX16_RX_N(2)
PCIEX16_TX_P(1)	B74	A74	GND
PCIEX16_TX_N(1)	B75	A75	GND
GND	B76	A76	PCIEX16_RX_P(1)
GND	B77	A77	PCIEX16_RX_N(1)
PCIEX16_TX_P(0)	B78	A78	GND
PCIEX16_TX_N(0)	B79	A79	GND
GND	B80	A80	PCIEX16_RX_P(0)
n.c.	B81	A81	PCIEX16_RX_N(0)
n.c.	B82	A82	GND

Note

This slot can also be used for PCIe x8, x4 and x1 modules.

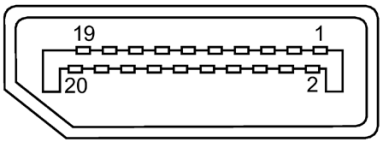
8.5.3 External ports

8.5.3.1 COM1/COM2

Serial port COM1, 9-pin (plug) or COM2			
			
Pin no.	**Short description**	**Meaning**	**Input / output**
1	DCD	Data carrier detect	Input
2	RxD	Received data	Input
3	TxD	Transmit data	Output
4	DTR	Data terminal ready	Output
5	GND	Ground	-
6	DSR	Ready for operation	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9	RI	Incoming call	Input

8.5.3.2 DisplayPort

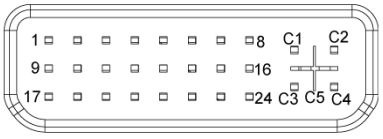
DisplayPort port



Pin no.	Short description	Meaning	Input / output
1	ML_Lane0+	DP data 0+	Output
2	GND	Ground	-
3	ML_Lane0-	DP data 0-	Output
4	ML_Lane1+	DP data 1+	Output
5	GND	Ground	-
6	ML_Lane1-	DP data 1-	Output
7	ML_Lane2+	DP data 2+	Output
8	GND	Ground	-
9	ML_Lane2-	DP data 2-	Output
10	ML_Lane3+	DP data 3+	Output
11	GND	Ground	-
12	ML_Lane3-	DP data 3-	Output
13	CONFIG1 CAD	Cable Adapter Detect	Input
14	CONFIG2	Ground (PullDown)	-
15	AUX_CH+	Auxiliary channel+	Bidirectional
16	GND	Ground	-
17	AUX_CH-	Auxiliary channel-	Bidirectional
18	HPD	Hot Plug Detect	Input
19	GND	Ground	-
20	DP_PWR	+3.3V (fused)	Output

8.5.3.3 DVI-I

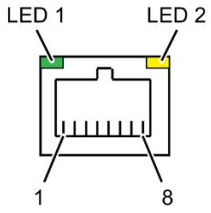
DVI-I port (standard socket)



Pin no.	Short description	Meaning	Input / output
1	TMDS Data2-	DVI data channel	Output
2	TMDS Data2+	DVI data channel	Output
3	TMDS Data2/4 shield	Cable shield	
4	NC		
5	NC		
6	DDC clock (SCL)	Display Data Channel – Clock	Input / output
7	DDC data (SDA)	Display Data Channel – Data	Input / output
8	Analog vertical sync (VSYNC)	Analog Vertical Sync Signal	Output
9	TMDS Data1-	DVI data channel	Output
10	TMDS Data1+	DVI data channel	Output
11	TMDS Data1/3 shield	Cable shield	
12	NC		
13	NC		
14	+5V power (VCC)	+5V power for DCC	Output
15	Ground (return for +5V, Hsync and Vsync) (GND)	Analog ground	
16	Hot Plug Detect		
17	TMDS data 0-	DVI data channel	Output
18	TMDS data 0+	DVI data channel	Output
19	TMDS Data0/5 shield	Cable shield	
20	NC		
21	NC		
22	TMDS clock shield	Cable shield	
23	TMDS clock+	DVI clock channel	Output
24	TMDS clock-	DVI clock channel	Output
C1	Analog red (R)	Analog Red Signal	Output
C2	Analog green (G)	Analog Green Signal	Output
C3	Analog blue (B)	Analog Blue Signal	Output
C4	Analog horizontal sync (HSYNC)	Analog Horizontal Sync Signal	Output
C5	Analog ground (analog R, G, & return) (GND)	Analog ground	

8.5.3.4 Ethernet

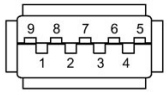
Ethernet RJ45 interface



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 Green light: 100 Mbps Orange light: 1000 Mbps	–
	LED 2	Lit: Active connection, e.g., to a hub Flashing: Activity	–

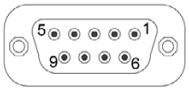
8.5.3.5 USB 3.0

USB 3.0 port



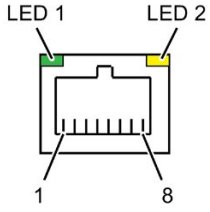
Pin no.	Short description	Meaning	Input / output
1	VBUS	+ 5 V (fused)	Output
2	D-	Data line	Input / output
3	D+	Data line	Input / output
4	GND	Ground	–
5	RX-	Data line	Input
6	RX+	Data line	Input
7	GND	Ground	–
8	TX-	Data line	Output
9	TX+	Data line	Output

8.5.3.6 PROFIBUS

PROFIBUS interface, 9-pin (socket)		
		
Pin no.	**Short description**	**Meaning**
1-2	NC	Not connected
3	LTG_B	Data line (I/O)
4	RTS_AS	Turn on PLC transmitter (O)
5	GND	Ground isolated
6	P5V_dp_fused	+5 V / max. 90 mA (fused) electrically isolated
7	NC	Not connected
8	LTG_A	Data line (I/O)
9	RTS_PG	PG Request to send (O)

8.5.3.7 PROFINET

PROFINET LAN X3 Port P1, P2, P3

PROFINET interface			
			
Pin no.	**Short description**	**Meaning**	**Input / output**
1	RD+	Receive data [2]	Input
2	RD-	Receive data [2]	Input
3	TD+	Send data [2]	Output
4, 5 [1]	SYMR	Internal 75 Ohm terminating resistor	_
6	TD-	Receive data [2]	Output
7, 8 [1]	SYMT-	Internal 75 Ohm terminating resistor	_
S		Shield	
	LED 1	Lights up green: link	
	LED 2	Lights up yellow: Activity	

[1] Optional product variant

[2] Auto Negotiation and auto crossover are supported

8.5.4 System resources

8.5.4.1 Currently allocated system resources

All system resources (hardware addresses, memory allocation, interrupt assignment, DMA channels) are assigned dynamically by the BIOS or the Windows operating system, depending on the hardware equipment, drivers, installed expansion cards and connected external devices. Assignment is automatic and depends on the demanded resources of the connected devices and the inserted modules. Due to this configuration dependency, clear statements can only be made by determining them in relation to the system in the final configuration.

Procedure

Resources may be viewed as follows under Windows:

1. Press the "Windows key" and "R" simultaneously.

   The "Run" dialog box opens.
2. Enter "msinfo32" in the "Open" field.
3. Click "OK" to confirm.

8.5.4.2 System resources used by the BIOS/DOS

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

I/O address allocation

The following tables describe the system resources in the factory state of the device.

Static area

I/O address (hex)		Size [byte]	Description of the basic function	Alternative function
From	To			
0000	001F	32	DMA controller	
0020	0021	2	Programmable interrupt controller	
0022	0023	2	<Not used>	
0024	0025	2	Programmable interrupt controller	
0026	0027	2	<Not used>	
0028	0029	2	Programmable interrupt controller	
002A	002B	2	<Not used>	
002C	002D	2	Programmable interrupt controller	
002E	002F	2	Motherboard resources	
0030	0031	2	Programmable interrupt controller	
0032	0033	2	<Not used>	

I/O address (hex)		Size [byte]	Description of the basic function	Alternative function
From	To			
0034	0035	2	Programmable interrupt controller	
0036	0037	2	<Not used>	
0038	0039	2	Programmable interrupt controller	
003A	003B	2	<Not used>	
003C	003D	2	Programmable interrupt controller	
003E	003F	2	<Not used>	
0040	0043	4	System timer	
0044	004D	10	<Not used>	
004E	004F	2	Motherboard resources	
0050	0053	4	System timer	
0054	005F	12	<Not used>	
0060	0060	1	Keyboard controller	
0061	0061	1	Motherboard resources	
0062	0062	1	<Not used>	
0063	0063	1	Motherboard resources	
0064	0064	1	Keyboard controller	
0065	0065	1	Motherboard resources	
0066	0066	1	<Not used>	
0067	0067	1	Motherboard resources	
0068	006F	8	<Not used>	
0070	0070	1	Motherboard resources	Cascaded
0070	0077	8	System CMOS/real-time clock	
0078	007F	8	<Not used>	
0080	0080	1	Motherboard resources	
0081	0091	17	DMA controller	
0092	0092	1	Motherboard resources	
0093	009F	13	DMA controller	
00A0	00A1	2	Programmable interrupt controller	
00A2	00A3	2	<Not used>	
00A4	00A5	2	Programmable interrupt controller	
00A6	00A7	2	<Not used>	
00A8	00A9	2	Programmable interrupt controller	
00AA	00AB	2	<Not used>	
00AC	00AD	2	Programmable interrupt controller	
00AE	00AF	2	<Not used>	
00B0	00B1	2	Programmable interrupt controller	
00B2	00B3	2	Motherboard resources	
00B4	00B5	2	Programmable interrupt controller	
00B6	00B7	2	<Not used>	
00B8	00B9	2	Programmable interrupt controller	

I/O address (hex)		Size [byte]	Description of the basic function	Alternative function
From	To			
00BA	00BB	2	<Not used>	
00BC	00BD	2	Programmable interrupt controller	
00BE	00BF	2	<Not used>	
00C0	00DF	32	DMA controller	
00E0	00EF	16	<Not used>	
00F0	00F0	1	Numeric data processor	
00F1	0277	391	<Not used>	
0278	027F	8	<Reserved>	Reserved for LPT1
0280	02E7	104	<Not used>	
02E8	02EF	8	<Reserved>	Reserved for COM1 or COM2
02F0	02F7	8	<Not used>	
02F8	02FF	8	COM2	Can be deactivated in setup, then free Reserved for COM1 or COM2
0300	0377	120	<Not used>	
0378	037F	8	LPT1	Can be deactivated in setup, then free Reserved for LPT1
0380	03AF	48	<Not used>	
03B0	03BB	12	Graphics	
03BC	03BF	4	<Reserved>	
03C0	03DF	32	Graphics	
03E0	03E7	8	<Not used>	
03E8	03EF	8	<Reserved>	Reserved for COM1 or COM2
03F0	03F7	8	<Not used>	
03F8	03FF	8	COM1	Can be deactivated in setup, then free Reserved for COM1 or COM2

Dynamic range – resources are managed by means of Plug and Play functionality

I/O address (hex)		Size [byte]	Description of the basic function	Alternative function
From	To			
0400	0453	84	Motherboard resources	
04D0	04D1	2	Programmable interrupt controller	
0680	069F	32	Motherboard resources	
0800	087F	128	Motherboard resources	
164E	164F	2	Motherboard resources	
1800	18FE	255	Motherboard resources	
1854	1857	4	Motherboard resources	Cascaded
2004	2007	4	Motherboard resources	
FFFF	FFFF	1	Motherboard resources	

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 (ACPI 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	A	B	C	D	E	F	G	H	
Host PCI IRQ Line																									[1]
Function																									
Timer output 0	X																								Fixed
Keyboard		X																							Fixed
Cascaded (IRQ9)			X																						Fixed
Serial interface 2				X																					Can be disabled
Serial interface 1					X																				Can be disabled
FD controller							X																		Can be disabled
Parallel interface 1								X																	Can be disabled
Real-time clock (RTC)									X																
PS/2 mouse													X												Fixed, can be disabled
Numeric processor														X											Fixed
SATA												Z												Y	Can be disabled
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		Can be disabled
Ethernet 1											Z						Y								Can be disabled
Ethernet 2											Z							Y							Can be disabled
VGA											Z						Y								Can be disabled
Profibus or Profinet						Z														Y					Option, can be disabled

[Y] Interrupt in APIC mode

[Z] BIOS Default Interrupt in PIC mode, e.g., DOS

[1] Host PCI-IRQ A to H is assigned to IRQ 16 to 23 permanently in APIC mode. Host PCI-IRQ A to H will be automatically assigned IRQ 0 to 15 by BIOS in PIC mode. A specific assignment can not be enforced.

Interrupt assignment of the slot connectors on the bus board

	IRQ Number																							Comments
ACPI IRQ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
IRQ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	◄								
Host PCI IRQ Line / Function																	A (1)	B (2)	C (3)	D (4)	E (5)	F (6)	G (7)	H (8)	[1]
Slot 1 (PCI)																									
PCI INT Pin A	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	
PCI INT Pin B	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	
PCI INT Pin C	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	
PCI INT Pin D	-	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	
Slot 2 (PCI)																									
PCI INT Pin A	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	
PCI INT Pin B	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	
PCI INT Pin C	-	-	-	-	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	
PCI INT Pin D	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	
Slot 2 (PCIexpress)																									
PCI INT Pin A	-	-	-	Z	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	-	
PCI INT Pin B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	-	-	
PCI INT Pin C	-	-	-	-	-	-	-	-	-	-	-	Z	-	-	-	-	-	-	Y	-	-	-	-	-	
PCI INT Pin D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	-	-	-	

[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

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

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 PCIexpress 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.

Memory address assignments

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

Address		Size	Description of the basic function	Alternative function
From	To			
0000 0000	0007 FFFF	512 K	Conventional system memory	
0008 0000	0009 F7FF	126 K	Conventional system memory extended	
0009 F800	0009 FFFF	2 K	XBDA, extended Bios Data Area	
000A 0000	000A FFFF	64 K	VGA graphics refresh memory	Shared SMM for power management
000B 0000	000B 7FFF	32 K	Software graphics / text refresh memory	Not used
000B 8000	000B FFFF	32 K	VGA graphics/text refresh memory	
000C 0000	000C BFFF	48 K	VGA BIOS expansion	
000C 0000	000C FFFF	64 K	VGA BIOS	Always allocated or reserved
000E 0000	000F FFFF	2 × 64K	DMI data, System BIOS, Options ROMs: PXE, RAID	
0010 0000	CFFF FFFF	3.2 GB	System memory 4 GB memory configuration	Depends on memory configuration
EFFF F000	EFFF FFFF	4 K	Motherboard resources	
F000 0000	F3FF FFFF	64 M	Motherboard resources	
FED0 0000	FED0 03FF	1 K	High Precision Event Timer	
FED1 0000	FED1 7FFF	32 K	Motherboard resources	
FED1 8000	FED1 8FFF	4 K	Motherboard resources	
FED1 9000	FED1 9FFF	4 K	Motherboard resources	
FED1 C000	FED1 FFFF	16 K	Motherboard resources	
FED2 0000	FED3 FFFF	128 K	Motherboard resources	
FED4 0000	FED4 4FFF	20 K	Trusted Platform Module 1.2	
FED9 0000	FED9 3FFF	16 K	Motherboard resources	
FEE0 0000	FEEF FFFF	1 M	Motherboard resources	
FF00 0000	FFFF FFFF	16 M	Motherboard resources	Intel® 82802 firmware hub

8.5.5 Assignment of expansion interfaces to the software in the TIA Portal (CP assignment)

The table below shows the correlation between enclosure labeling of the IPC expansion slots and the labeling that is used during assignment of interfaces to the software in the TIA Portal.

Enclosure labeling IPC627D	TIA Portal
1	X100
2	X101

Enclosure labeling IPC827D	TIA Portal
1	X100
2	X101
3	X102
4	X103
5	X104

8.5.6 CP 1616 onboard communications processor

8.5.6.1 Properties

CP 1616 on-board allows you to connect IPCs to Industrial Ethernet.

The basic characteristics of the PCS 1616 onboard are:

- Optimized for PROFINET IO
- Enhanced Real Time Ethernet Controller 400 = ERTEC 400
- 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).
- Autocrossing
- Automatic hardware detection
- Integrated 3-port real-time switch

3-port real-time switch

The switch function of the 3-port real-time switch is maintained in the following cases:

- Restart (Windows Restart)
- Reset (using the shortcut <Ctrl-Alt-Del)

The switch function can be activated permanently in the BIOS setup, "Power" menu with the "PROFINET always On" parameter. When switched off (Disabled), the switch function is interrupted in the following cases:

- Shutting down with Windows command
- Activating the on/off switch
- Shutting down with power switch (on/off switch).

Three RJ45 connectors

Terminal devices or other network components can be connected to the three RJ45 sockets that lead to the integrated real-time switch. The CP 1616 is connected to the LAN (Local Area Network) via one of the three RJ45 sockets of the device.

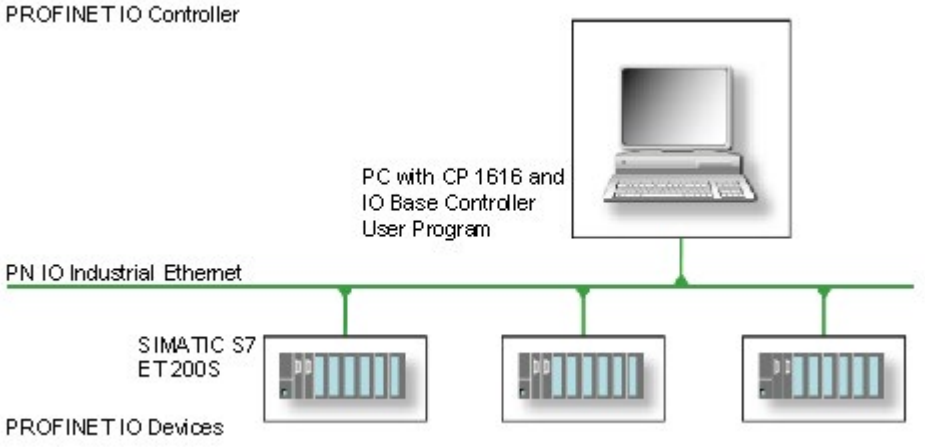
8.5.6.2 Typical Communication Partners

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.

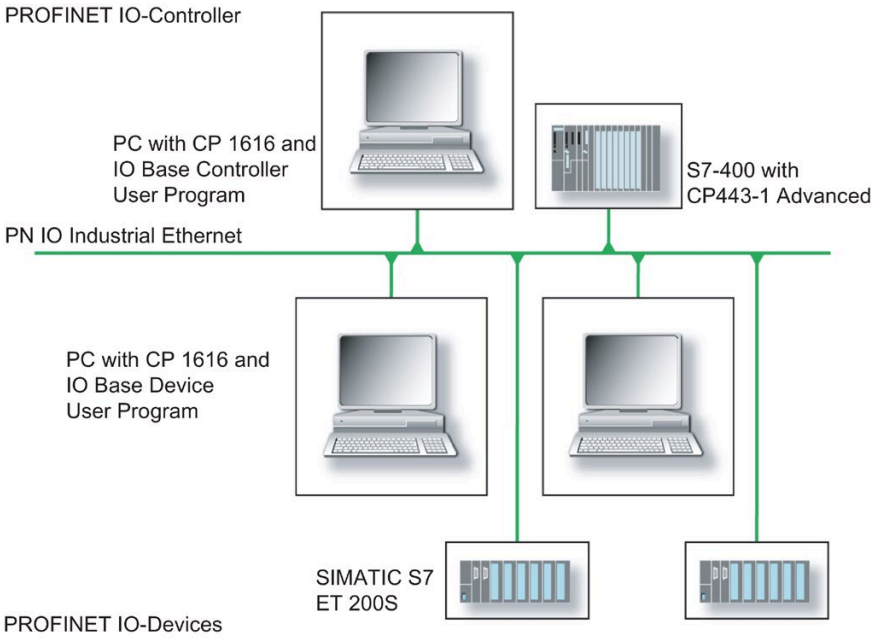


CP 1616 onboard as IO device

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.



8.5.6.3 Firmware

Firmware loader

When to load firmware

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:

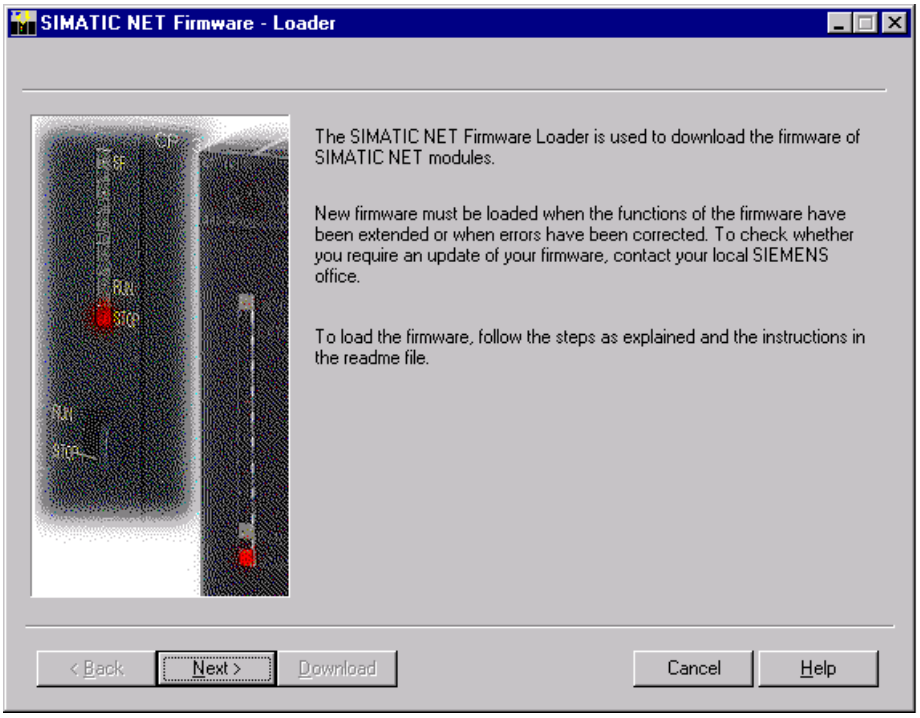
- <file>.FWL
  A file form that contains further information, which is displayed by the firmware loader. The firmware loader can use this information to check if the firmware is compatible to the device.

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.

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.

Note

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.

Note

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.

Note

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 addresses are displayed in the BIOS, in the "Peripheral Configuration" submenu of the "Advanced" menu.

Example

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

8.5.6.4 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).

8.6 BIOS description

8.6.1 Overview

Parameterize your device in the BIOS Setup.

BIOS Setup program

The BIOS Setup program, or BIOS Setup for short, is located, together with the setup parameters, in a FLASH block on the motherboard.

Change the setup parameters of the device in the BIOS Setup, e.g. system time or boot sequence.

Changing the device configuration

Your device configuration is preset for operating with the included software. You should only change the default setup parameters if technical modifications to your device require different parameters.

NOTICE
Malfunctions can occur with running software CPU If a BIOS update of the PC is performed while SIMATIC software controller, a SIMATIC WinAC for example, is running, the software CPU can malfunction, resulting in communication interruptions or failures, for example. Other actions that put a heavy load on the PC hardware, for example, running hardware tests such as benchmarks, can result in malfunctions of the software CPU. Do not run a BIOS update or other actions that would put a heavy load on the hardware during operation of a software CPU. Switch the software CPU to "STOP" before you run a BIOS update or perform other critical actions.

Note

Documentation

BIOS Setup is described for all devices and device configurations. Some BIOS submenus or Setup parameters may not be included, depending on your order. The interface of your BIOS Setup can deviate from the figures in this document.

You can find a detailed description of the BIOS on the Support website under Entry ID 92189178 (http://support.automation.siemens.com/WW/view/en/92189178).

8.6.2 Opening the BIOS selection menu

Procedure

1. Switch on the device or restart the device.
2. Immediately after switching on the device, press the "Esc" button and keep it pressed.

Note

The following message appears briefly after the device is switched on:

```
Press ESC for boot options
```

The BIOS selection setup appears:

The number of buttons in the BIOS selection setup depends on your device version.

The following buttons are available:

Buttons	Function
Continue	Exit selection menu, continue start sequence
Boot Manager	Specify the boot media from which to start, for example: • Hard disk drive • CD-ROM drive • USB device
Device Management	Start device manager for UEFI boot media

Buttons	Function
Boot From File	Boot Maintenance Manager: • Boot Options: Set boot order • Driver Options: Configure drivers • Console Options: Configure connected input device • Boot from File: Start from an ".EFI" file • Reset System: Restoring factory settings
Secure Boot Option [1]	Configuration settings to start the device in Secure Boot mode. The only software modules loaded are those that are known to be safe for the BIOS or the operating system.
SCU	Setup Configuration Utility: The BIOS Setup
BIOS Update	Update BIOS from USB memory stick
MEBx [2]	Intel Management Engine BIOS Extension from Active Management Technology Support (AMT)

[1] Available as of Windows 8, if supported by device

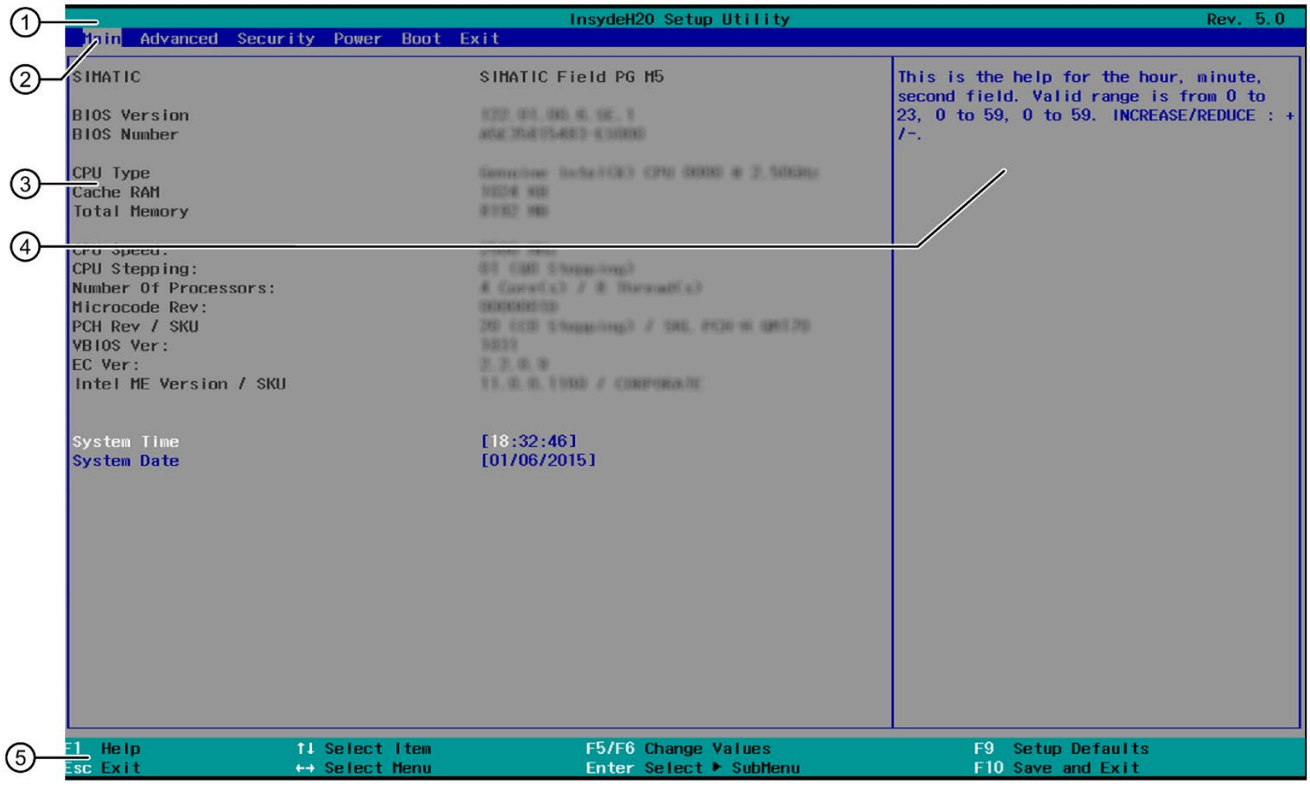
[2] Only if the hardware supports AMT

8.6.3 Structure of the BIOS Setup menu

The individual setup parameters are distributed between different menus and submenus. Not all menus are included in each supplied device configuration. The following table shows the menus.

Menu	Meaning
Main	Display system information, for example, BIOS version, processor and memory
Advanced	Configure hardware using different submenus
Security	Security functions, e.g., setting a password
Power	Specify power management of CPU and the device
Boot	Determine boot options, e.g., boot order
Exit	Save and exit (see Exit menu)

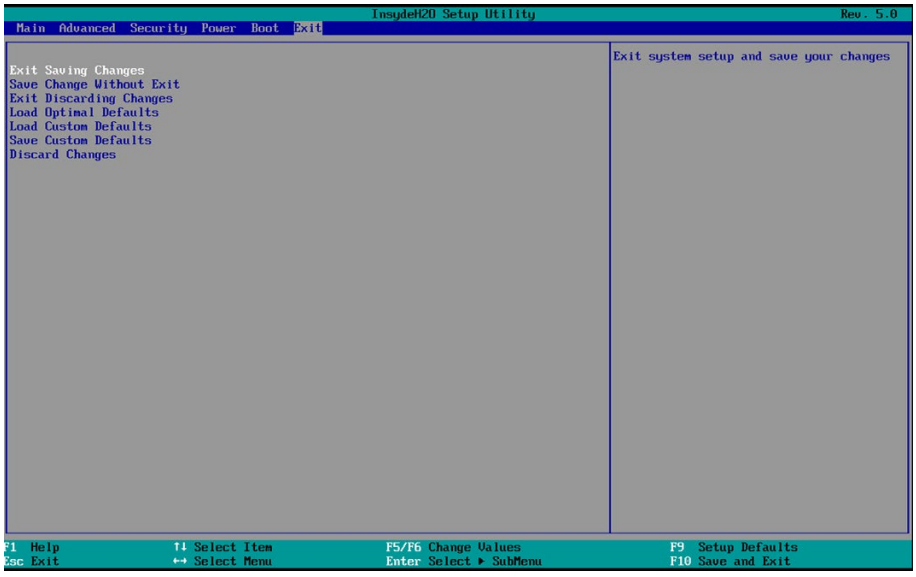
The menus always have the same structure. The figure below shows an example for the "Main" menu. Device-specific information is shown blurred.



①	Header	The current version of the selected BIOS Setup is displayed in the header.
②	Menu bar	Switch between the various menus "Main", "Advanced", etc. in the menu bar at the top.
③	Settings, submenus and device-specific information	Information about your device is displayed in the center left-hand area; here you can edit settings which are partly in submenus.
④	Help area	Short help texts on the currently selected setup parameters are displayed in the center right-hand area.
⑤	Key assignment	The key assignment for navigation in the BIOS Setup is found in the footer.

8.6.4 Exit menu

You always exit BIOS Setup in this menu.



Exit Saving Changes	All changes are saved and the system is restarted with the new Setup parameters.
Save Change Without Exit	All changes are saved
Exit Discarding Changes	All changes are discarded and the system is restarted with the old Setup parameters.
Load Optimal Defaults	All setup parameters are reset to the safe default values. **Notice**: The existing Setup parameters are overwritten by this.
Load Custom Defaults	The profile must be loaded with the custom Setup parameters. Requirement: The parameters are saved prior to this with "Save Custom Defaults". **Notice**: All existing Setup parameters are overwritten during loading. • Write down the BIOS Setup settings beforehand • Save the BIOS Setup settings as user-specific profile.
Save Custom Defaults	The currently configured Setup parameters are saved as a custom profile (see also "Load Custom Defaults").
Discard Changes	All changes are discarded.

8.6.5 BIOS Setup settings

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.

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

BIOS Setup settings

Main

System parameters	Default settings	Local settings
System Time	00:00:00	
System Date	MM/DD/YYYY	

Advanced > Boot Configuration

System parameters	Default settings	Local settings
Numlock	On	
POST errors	All without keyboard	

Advanced > Peripheral Configuration

System parameters	Default settings	Local settings
Internal COM 1 [1]	Auto	
Base I/O address [1 2]	3F8	
Interrupt [1 2]	IRQ4	
Internal COM 2 [1]	Auto	
Base I/O address [1 2]	2F8	
Interrupt [1 2]	IRQ3	
Internal LPT [1]	Auto	
Base I/O address [1 3]	378	
Interrupt [1 3]	IRQ7	
Mode [1 3]	Bi-directional	
DMA Channel [1 3]	DMA 1	
Onboard PROFINET [1]	Enabled	
PCI – MPI / DP [1]	Enabled	
Audio [4]	Auto	
Onboard Ethernet 1 (LAN 1, X1 P1)	Enabled	
Onboard Ethernet 2 (LAN 2, X2 P1)	Enabled	

1 Visible depending on the ordered device configuration

2 Only visible if the corresponding parameter "Internal COM #" is enabled.

3 Only visible if "Internal LPT" is enabled.

4 Only available if an Azalia HD audio controller is installed.

Advanced > SATA Configuration

System parameters	Default settings	Local settings
SATA Controller	Enabled	
HDC Configure As	AHCI / RAID [1]	

[1] Depending on the ordered device configuration

Advanced > Fan Control Configuration

System parameters	Default settings	Local settings
Fan Control Mode	Standard	

Advanced > Video Configuration

System parameters	Default settings	Local settings
Primary Display	Auto	
IGD - Aperture Size	128 MB	
IGD - DVMT Size	MAX	
IGD boot type	VBIOS default	
IGD boot type 2	Disabled	
DPP [1]	Disabled	
PEG0 - Gen X	Auto	
PEG1 - Gen X	Auto	
PEG2 - Gen X	Auto	

[1] As of BIOS V19.02.06, the default settings of the DisplayPort audio device have been changed from "Enabled" to "Disabled". You have to change this setting to "Enabled", if you want to use the audio function of a DisplayPort monitor.

Advanced > USB Configuration

System parameters	Default settings	Local settings
USB Precondition	Enabled	
XHCI	Auto	
Per-Port Control	Disabled	
The following parameters are only visible if "Per-Port Control" is enabled (Enabled).		
USB Port 0 (X61)	Enabled	
USB Port 1 (X60)	Enabled	
USB Port 2 (USB3 P2, internal)	Enabled	
USB Port 3 (USB3 P3, front)	Enabled	
USB Port 4 (X63)	Enabled	
USB Port 5 (X62)	Enabled	
USB Port 6 (USB2 P6, front) [1]	Enabled	
USB Port 6 (USB2 P6, touch) [2]	Enabled	
USB Port 8 (USB2 P8, internal)	Enabled	
USB Port 9 (USB2 P9, internal)	Enabled	
USB Port 10 (USB2 P10, internal) [1]	Enabled	
USB Port 11 (USB2 P11, internal) [1]	Enabled	

[1] Only with rack devices

[2] Only with box devices

Advanced > Chipset Configuration

System parameters	Default settings	Local settings
VT-d	Auto	
After G3 On	S0	
DeepSx Power Policies [1]	Disabled	
Max TOLUD	Dynamic	
HPET Support	Enabled	

[1] Only with rack devices

Advanced > Active Management Technology Support

System parameters	Default settings	Local settings
Intel AMT Support [1]	Disabled	
Hide Un-Configure ME Confirmation	Disabled	
Un-Configure ME	Disabled	
Intel AMT Password Write	Enabled	
AMT CIRA Request Trig	Disabled	
USB Configure [1]	Disabled	
AMT CIRA Timeout	0	

[1] As of BIOS version V19.02.05 default setting: Disabled

Advanced > PCI Express Configuration

System parameters	Default settings	Local settings
PCI Express Root Port 5	Enabled	
PCIe Speed [2]	Auto	
PCI Express Root Port 6 [1]	Enabled	
PCIe Speed [1 2]	Auto	
PCI Express Root Port 7 [1]	Enabled	
PCIe Speed [1 2]	Auto	
PCI Express Root Port 8 [1]	Enabled	
PCIe Speed [1 2]	Auto	

[1] Visible depending on the ordered device configuration

[2] Only visible if the associated parameter "PCI Express Root Port #" is enabled.

Security

System parameters	Default settings	Local settings
TPM Status [1]	Depending on configuration	
TPM Operation [1]	No Operation	
TPM Force Clear [1]	Disabled	
Set Supervisor Password		
Set User Password		
Power-on Password	Disabled	
User Access Level	Full	

[1] Visible depending on the ordered device configuration

Power

System parameters	Default settings	Local settings
Wake on PME or LAN 2 (X2 P1)	Disabled	
Auto Wake on S5	Disabled	
Wake on S5 Time [1]	00:00:00	
Day of Month [1]	1	
Wake on LAN 1 (X1 P1)	Enabled	
PROFINET always On [2]	Disabled	
PROFINET Wake Capability [2 3]	Disabled	
USB Ports 0/1 (X61/X60) powered	Enabled	
USB Ports 0/1 (X61/X60) Wake Capability [4]	Disabled	
USB Ports 4/5 (X63/X62) powered	Enabled	
USB Ports 4/5 (X63/X62) Wake Capability [4]	Disabled	
USB Ports 3/6/8/9 powered	Enabled	
USB Port 3/6/8/9 Wake Capability [4]	Disabled	

1 Only visible if the "Auto Wake on S5" is set accordingly.

2 Visible depending on the ordered device configuration

3 Only visible if the parameter "PROFINET always On" is enabled.

4 Only visible if the associated parameter "USB Ports # powered" is enabled.

Power > Advanced CPU Control

System parameters	Default settings	Local settings
P-States (ACTUAL)	Enabled	
Active Processor Cores	All Cores	
HT Support	Auto	
Execute Disable Bit	Enabled	
Intel (VMX) Virtualization Technology	Enabled	
C-States	Enabled	
Turbo Mode	Enabled	

Boot

System parameters	Default settings	Local settings
Boot Type	Dual Boot Type	
Quick Boot	Enabled	
Quiet Boot	Enabled	
Network Stack	Disabled	
PXE Boot capability	Disabled	
Add Boot Options	Auto	
USB Boot [1]	Disabled	
EFI Device First	Enabled	
Boot Delay Time	3	

1 As of BIOS version V19.02.05 default setting: Disabled

Boot > Legacy

System parameters	Default settings	Local settings
Normal Boot menu	Standard	
Boot Type Order	In the order of the following boot media:	
Floppy drive	Depending on configuration	
Hard Disk Drive	Depending on configuration	
CD/DVD ROM Drive	Depending on configuration	
USB	Depending on configuration	
Others	Depending on configuration	

Exit

System parameters	Default settings	Local settings
Profile:		

8.6.6 BIOS update

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

You can find additional information on the Internet at the following address:After Sales Information system (http://www.siemens.com/asis).

Noting down and restoring BIOS Setup settings

NOTICE
Irretrievable loss of data All BIOS Setup settings are deleted after the BIOS update. This can put the system in an undefined state. This may damage the device and the plant. 1. Print out the table in the next section "General BIOS Setup settings". 2. Enter your specific BIOS Setup setting in this table before you run a BIOS update. 3. Start BIOS Setup after the BIOS update. 4. Load the BIOS Setup default settings with <F9> "Setup Defaults". Or use the BIOS Setup command "Load Optimal Defaults" in the "Exit" menu. 5. Make your own Setup settings based on the table you have printed out. 6. Save the BIOS Setup settings with <F10> "Save and Exit".

Performing a BIOS update

NOTICE
Damage to the device If you switch off the device during the update, the BIOS will be incomplete and corrupt. This may result in malfunctions. Leave the device switched on during the update.

If you have purchased a new BIOS update for your device, follow these steps to install the update:

1. Connect the device to the power supply.
2. Copy the update to a USB memory stick.
3. Reset the device (warm or cold restart).

   The following message appears briefly on the display at the end of the self-test:

   ```
   Press ESC for boot options
   ```
4. Press <ESC> to open the BIOS selection menu.
5. Click the "BIOS Update" button.
6. Follow the instructions on the screen.

Reboots

There may be several reboots 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 of the BIOS update.

8.6.7 Alarm, error and system messages

During startup (the boot process), the BIOS first performs a **P**ower **O**n **S**elf **T**est (POST) and checks whether certain functional units of the PC are operating error-free. The boot sequence is immediately interrupted if critical errors occur.

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

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

On-screen error messages

On-screen error message	Meaning / tip
Operating system not found	Possible causes: • No operating system installed • Incorrect active boot partition • Wrong boot drive settings in SETUP
Keyboard controller error	Controller error. Contact your technical support team.
SMART failure detected on HDD	Hard disk reports pending failure through S.M.A.R.T.
CMOS battery failed	CMOS battery is not connected.
CMOS battery weak	CMOS battery is weak
Real-time clock has lost power	The CMOS clock was operated without battery or with a battery that was too weak, during battery change, for example. Check the CMOS clock.
Keyboard error	• Field PG: Internal keyboard defective and no external keyboard connected • Other devices: Keyboard defective or not connected
PLD configuration failed	Programming of the PLC on the motherboard has failed.

8.7 Active Management Technology (AMT)

8.7.1 Introduction

Intel® Active Management Technology (Intel® AMT) is an Intel technology for the remote maintenance of SIMATIC Industrial PCs (IPCs) with AMT technology using a management PC. It is not necessary to install an operating system on the SIMATIC IPC with Intel® AM. Intel® AMT provides numerous functions, e.g.:

- **Keyboard Video Mouse (KVM) Redirection**

  KVM connections are always possible using the KVM server that is integrated in the firmware. KVM enables access to IPCs with a corrupted or no operating system as the KVM server is integrated in the AMT hardware. KVM enables you to reboot a remote computer and make changes to its BIOS settings.

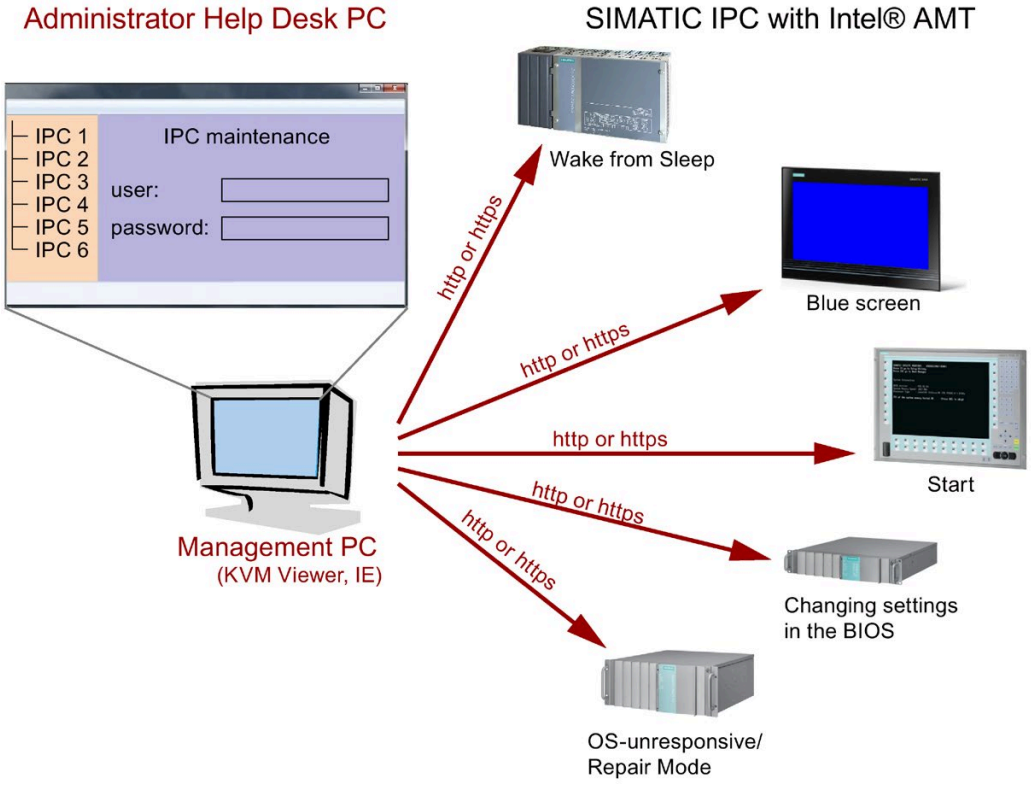
- **Remote power management**

  SIMATIC IPC with Intel ® AMT can be switched on and off or restarted using another PC.

- **IDE redirection**

  An image on the management PC can be integrated and used on the SIMATIC IPC with Intel® AMT both as a CD/DVD drive and as a floppy drive. If the image is bootable, you can also boot the SIMATIC IPC with Intel® AMT from it.

  The following figure shows remote maintenance of SIMATIC IPCs with Intel® AMT, e.g. for troubleshooting a corrupt operating system or incorrect BIOS settings:



8.7.2 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

8.7.3 Enabling Intel® AMT / basic configuration

For security reasons, Intel® AMT is not enabled on new devices. The Management Engine (ME) is always active.

Procedure

For devices IPCxxxD, IPCxxxG, IPCxxxE, Field PG M4, Field PG M5, ITP:

1. If necessary, first reset Intel® AMT to the default status.
2. To open the BIOS selection menu, press the <ESC> key while the device is booting.
3. Open the BIOS Setup using the "Setup Configuration Utility (SCU)".
4. Select the "Active Management Technology Support" command in the Advanced menu.

   Only for the devices IPC547D, IPC547E and IPC547G: Select "AMT Configuration".
5. Activate the option "Intel AMT Support".
6. Only for the devices IPC547D, IPC547E and IPC547G: Select the "Normal" setting for "MEBx Mode".
7. Exit the BIOS Setup with <F10> key (Save and Exit).

   Only for the devices IPC547D, IPC547E and IPC547G: Exit the BIOS Setup with <F4> key.

Settings in the MEBx

1. To open the BIOS selection menu, press the <ESC> key while the device is booting.
2. Use the arrow keys to select "MEBx" and confirm with the <Enter> key.
3. Select "MEBx Login".
4. Enter the default password "admin".

   Change the password. The new password must comprise:

   – At least eight characters
   – An upper case letter
   – A lower case letter
   – A number
   – A special character (! @ # $ % ^ & *)
   – The underscore "_" and space characters are valid in the string but do not increase the complexity of the password.

   Note

   If the password is no longer available, you must reset the Intel® AMT to the default settings.

   Backup the password to protect it against loss.

5. Switch to the "Intel (R) AMT Configuration" submenu and enable "Manageability Feature Selection".
6. Switch to the "Intel(R) ME General Settings" submenu and enable access via the network with "Activate Network Access".
7. Confirm the dialogs that appear with "Y".

Drivers are automatically installed once with the Windows system start in the subsequent restart.

See also

Resetting the Intel® AMT to the default settings and disabling AMT (Page 177)

8.7.4 Resetting the Intel® AMT to the default settings and disabling AMT

If Intel® AMT has already been configured, it is advisable to reset Intel® AMT to the default settings. One effect of resetting to the default settings is that Intel® AMT is disabled.

You can skip this point if you have a new IPC in the factory state.

Procedure

Proceed as follows to reset the Intel® AMT to the default values:

1. Press "F2" in the boot sequence to open the BIOS.
2. Select the "Active Management Technology Support" command in the Advanced menu; for an IPC547D/IPC547E/IPC547G select "AMT Configuration".
3. Set "Un-Configure ME" or "Un-Configure AMT/ME" to Enabled.
4. Exit the BIOS with "F10" (Save and Exit).
   You can exit the IPC547D/547E/IPC547G with "F4".

   The following prompt will appear after an automatic restart:

   ```
   Found unconfigure of Intel(R) ME
   Continue with unconfiguration (Y/N)
   ```

5. Confirm this prompt with "Y" to discard all settings in the Management Engine (ME).
6. For IPC427E/IPC477E/Field PG M4/Field PG M5, you now need to set the "Un-Configure ME" menu command in the BIOS back to Disabled.

8.7.5 Determining the network address

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

If the AMT server uses the same network address as the operating system of the AMT PC (most common situation):

1. You can obtain the address of the AMT server in the command line in Windows using "ipconfig" and in UNIX using "ifconfig".

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.

8.7.6 Forcing user consent

When a connection to the AMT PC is established, 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.

This code query needs to be set up on the KVM viewer.

Procedure

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. Select "Opt-in Configurable from Remote IT".

8.8 Functional scope in Windows

8.8.1 Windows Embedded Standard 7 Professional

The overview shows the most important device functions under Windows Embedded Standard 7:

Function	Availability
.Net Framework	Available, V3.5
Accessories	Available
Aero background	Available
Backup and Restore	Available
Bluetooth	Available
Dialog box filter	Available
DirectX and Windows Device Experience	Available, V11
Domain services	Available
Driver database	Not available
Driver frameworks	Available
Encrypted File System (EFS)	Available
Enhanced Write Filter	Available
Fax and Scan	Available
File Based Write Filter (FBWF)	Available
Fonts	48
Help and Support Engine	Available
Hibernate Once Resume Many (HORM-EEF)	Available
Image Mastering API V2	Available
IME Base Components	Available
Internet Explorer	Available, IE 8
Internet Information Server (IIS)	Available, V7.0
Language (Standard)	English [1]
Mobility Center	Available
Network and Sharing Center	Available
Network Diagnostics	Available
Pagefile	Available
Printing Utilities and Management	Available
Registry Filter	Available
Remote Assistance	Available
Remote Client	Available
Remote Desktop	Available
SIMATIC IPC DiagBase	Available, V1.4
Speech	Not available
System Management Administrative Tools	Available

Function	Availability
Telnet Server	Available
User Account Control	Available
Windows Explorer Shell	Available
Windows Firewall	Available
Windows Installer	Available
Windows Media Player	Available, V12
Windows PowerShell 2.0	Available
Windows Search and Natural Language 6	Available
Windows Security Center	Available
Windows Update	Available
Wireless Networking	Available

[1] Note the licensing agreements for Windows Embedded Standard 7 Professional.

Additional information on language selection is available in section "Setting up the language selection by means of the Multilanguage User Interface (MUI)".

Technical support

A

A.1 Service and support

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

- Technical support (https://support.industry.siemens.com/cs/ww/en/)
- 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.automation.siemens.com/mcms/aspa-db/en/Pages/default.aspx)
- Training center (http://sitrain.automation.siemens.com/sitrainworld/?AppLang=en)
- Industry Mall (https://mall.industry.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.2 Troubleshooting

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

Problem	Possible cause	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.
The PC crashes during startup	• I/O addresses are assigned twice. • Hardware interrupts and/or DMA channels are assigned twice • Signal frequencies or signal levels are not adhered to • Different connector pin assignments	Check your computer configuration: • If the computer configuration corresponds with the factory state, please contact your technical support team. • If the computer configuration has been changed, restore the original factory settings. Remove all third-party expansion cards, then restart the PC. If the error no longer occurs, the third-party expansion card was the cause of the fault. Replace this expansion card with a Siemens card or contact the card supplier.
		If the PC still crashes, contact your technical support team.
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	The mouse driver is not loaded.	Check if the mouse driver is correctly installed.

Problem	Possible cause	Remedy
appear on the screen.	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.
Wrong time and/or date on the PC.		1. Open the BIOS selection menu (see Technical specifications, section "BIOS description"). 2. Select BIOS setup, "Main" menu. 3. Set the time and date.
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

Problem	Possible cause	Remedy
After changing the hard disk, "unused" is indicated for the relevant SATA port	The system was booted without a functioning hard disk (the removable cartridge was possibly not turned on)	Reboot the system with a functioning hard disk
Computer does not boot or "Boot device not found" is displayed	The boot device is not first in the boot priority in the BIOS setup or is 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

Meaning of the symbols on your device

B

B.1 Meaning of the symbols on your device

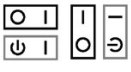
The following tables show all the symbols which may be found on your SIMATIC industrial PC, SIMATIC industrial monitor or SIMATIC Field PG in addition to the symbols which are explained in the operating instructions.

The symbols on your device may vary in some details from the symbols shown in the following tables.

B.2 Safety

Symbol	Meaning		Symbol	Meaning
	Warning, observe the supplied documentation.			Lock is closed
	Attention, radio equipment			Lock is open
	Disconnect the power plug before opening			Opening for Kensington lock
	Attention ESD (Electrostatic sensitive device)			Warning of hot surface

B.3 Operator controls

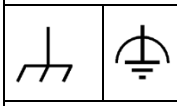
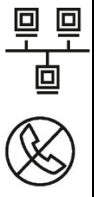
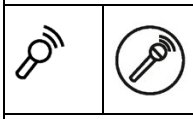
Symbol	Meaning		Symbol	Meaning
	On/off switch, without electrical isolation			Eject CD/DVD
	On/off switch, without electrical isolation			

B.4 Certificates, approvals and markings

The following table shows symbols relating to certificates, approvals and markings which may be on the device. You can find more information in the operating instructions for your device:

Symbol	Meaning		Symbol	Meaning
	Approved for Australia and New Zealand			Marking for the Eurasian Customs Union
	Approved for China			Test mark of Factory Mutual Research
	CE markings for European countries			Marking of Federal Communications Commission for the USA
	EFUP (Environment Friendly Use Period) marking for China			Approved for Korea
	Test mark of the Underwriters Laboratories			Disposal information, observe the local regulations.

B.5 Interfaces

Symbol	Meaning		Symbol	Meaning
⎓	Connection to the power supply			PS/2 mouse interface
	Protective conductor terminal			PS/2 keyboard-interface
	Connection for functional earthing (equipotential bonding line)			Multimedia Card Reader
DPP	DisplayPort interface			Smart Card Reader
	DVI-D interface			Line In
LAN 	LAN interface, not approved for connecting WAN or telephone			Line Out
	Serial interface			Microphone input
	USB port			Universal Audio Jack
	USB 2.0 HiSpeed interface			Headphone output
	USB 3.0 super-speed port			
	USB 3.1 SuperSpeedPlus interface			

B.6 Directives and declarations

Supplement to the chapter of the operating instructions.

Electromagnetic compatibility

This product meets the requirements of EU Directive 2014/30/EU "Electromagnetic Compatibility".

Low-voltage directive

The device with AC power supply complies with the requirements of the EU Directive 2014/35/EU "Low Voltage Directive".

Compliance with this standard has been verified according to EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013.

Abbreviations

C

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

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

Abbreviation	Term	Meaning
HDA	High Definition Audio	
HDD	Hard Disk Drive	Hard disk drive
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	
IAMT	Intel Active Management Technology	Technology that permits the diagnostics, management and remote control of PCs
I/O	Input/Output	Data input/output on computers
IAA	Intel Application Accelerator	
IDE	Integrated Device Electronics	
IEC	International Electronical Commission	
IGD	Integrated Graphics Device	
IP	Ingress Protection	Degree of protection
IR	Infrared	Infrared
IRDA	Infrared Data Association	Standard for data transfer via IR module
IRQ	Interrupt Request	Interrupt request
ISA	Industry Standard Architecture	Bus for expansion modules
ITE	Information Technology Equipment	
L2C	Level 2 cache	
LAN	Local Area Network	Computer network that is limited to a local area.
LCD	Liquid Crystal Display	Liquid crystal display
LED	Light Emitting Diode	Light emitting diode
LPT	Line Printer	Printer port
LVDS	Low Voltage Differential Signaling	
LW	Drive	
MAC	Media access control	Media access control
MC	Memory Card	Memory card in credit card format
MLFB	Machine-readable product designation	
MMC	Micro Memory Card	Memory card of the format 32 mm x 24.5 mm
MPI	Multipoint-capable interface for programming devices	
MRAM	Magnetoresistive Random Access Memory	Non-volatile data memory. Data memory is retained without external power supply.
MS-DOS	Microsoft Disc Operating System	
MTBF	Mean Time Between Failures	
MUI	Multilanguage User Interface	Multilanguage operating system with Windows with language toggling; 5 languages: German, English, French, Spanish and Italian
NA	Not Applicable	

Abbreviation	Term	Meaning
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
OSK	On Screen Keyboard	Screen keyboard emulated by operating system
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
PIC-E	Peripheral Component Interconnect Express	
POST	Power On Self Test	
PXE	Preboot Execution Environment	Software for running new PCs without hard disk data via the network
RAID	Redundant Array of Independent Disks	Redundant hard disk array
RAL	Restricted Access Location	Installation of device in operating facilities with restricted access - for example, a locked switchgear cabinet
RAM	Random Access Memory	
RI	Ring Input	Incoming call
ROM	Read-Only Memory	
RS 485	Reconciliation Sublayer 485	Bi-directional bus system designed for up to 32 nodes
RTC	Real Time Clock	Real-time clock
RTS	Reliable Transfer Service	Request to send
RxD	Receive Data	Data transfer signal
SATA	Serial Advanced Technology Attachment	
SCSI	Small Computer System Interface	
SDRAM	Synchronous DRAM	

Abbreviation	Term	Meaning
SELV	Safety Extra Low Voltage	Safety extra low voltage
SLC	Second Level Cache	
SMART	Self Monitoring Analysis and Reporting Technology	Hard disk error diagnostics program
SMS	Short Message Service	Short message via telecommunication network
SNMP	Simple Network Management Protocol	Network protocol
SO-DIMM	Small Outline Dual Inline Memory Module	
SOM	SafeCard on Motherboard (SOM)	
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
TPM	Trusted Platform Module	Chip with security functions
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	
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 1.600 x 1.200 pixels.
V.24		ITU-T standardized recommendation for data transfer via serial ports
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	

Abbreviation	Term	Meaning
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 1.024 x 768 pixels.

Glossary

AHCI mode

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

APIC mode

Advanced peripheral interrupt controller. 24 interrupt lines are available.

Automation system

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 PCI or PCIe 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 card

CompactFlash 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. .

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.

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

Configurable write filter that allows you to, for example, boot Windows Embedded Standard from write-protected media (e.g., CD-ROM), set write protection for individual partitions, and adapt the file system performance to user requirements (when using memory cards, for example).

ESD Guideline

Guideline 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

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

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.

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 minimizes write access, for example to a CompactFlash medium, when you start up and shut down Windows Embedded Standard 7.

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

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

LAN

Local **A**rea **N**etwork: 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.

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 V AC to 1000 V AC, 70 V DC to 1500 V DC) and not specified in other directives. Compliance is confirmed by the CE symbol and the EC certificate of conformity.

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 7 Ultimate).

Pixel

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.

Programmable controller

The programmable controllers of the SIMATIC S5 system consist of a central controller, one or several CPUs and various other modules (for example, 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.

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.

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.

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.

Wake on LAN

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.

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