SIEMENS

SIMATIC

Industrial PC
SIMATIC IPC427C

Operating Instructions

Legal information

Warning notice system

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

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

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

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

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

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

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

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

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 adhered to. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of the Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

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

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Introduction 1

1.1 Preface

Objective of this documentation

These operating instructions contain all the information you need for commissioning and operation of the SIMATIC IPC427C.

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 requirements

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 validity of this document

The operating instructions are valid for all supplied variations of the SIMATIC IPC427C and describe the delivery status as of May 2009.

Position in the information landscape

The documentation for the SIMATIC IPC427C includes the following sections:

- SIMATIC IPC427C, Operating Instructions (Compact)
- SIMATIC IPC427C, Operating Instructions

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

Conventions

The term "PC" or "device" is sometimes used to refer to the SIMATIC IPC427C product in this documentation.

History

Currently released versions of this operating manual:

Edition	Comment
04/2009	First edition

1.2   Guideline to the Operating Instructions

Contents format	Table of Contents
Contents	Organization of the documentation, including the index of pages and chapters
Introduction	Purpose, layout and description of the important topics.
Safety instructions	Refers to all the valid technical safety aspects which have to be adhered to while installing, commissioning and operating the product/systemin and in reference to statutory regulations.
Description	Fields of application, the features and the structure of the product/system
Application planning	Aspects of storage, transport, environmental and EMC conditions to be considered in the preparatory stage
Mounting	Product installation options and installation instructions
Connecting	Options of connecting the product and connection instructions
Commissioning	Commissioning the product/system.
Integration	Options of integrating the product into existing or planned system environments/networks
Functions	Monitoring and display functions
Expansions / configurations	Procedure for installing expansion devices (memory, modules).
Maintenance and service	Replacement of hardware components, restoring and setup of the operating system, installation of drivers and software
Alarm, error and system messages	Error messages from booting
Troubleshooting	Problems, cause, remedy
Technical specifications	General specifications in compliance with relevant standards and current/voltage values
Dimension drawings	Dimensions of the device and of modules
Detailed descriptions	Structure, function and features of vital components, distribution of system resources and use of the BIOS Setup routine
Appendix	Guidelines and certifications, service and support, notes on retrofitting.
ESD guidelines	General ESD guidelines.

Safety Instructions

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2.1 General safety instructions

⚠ CAUTION

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

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

Repairs

Only authorized personnel are permitted to repair the device.

⚠ WARNING

Unauthorized opening of and improper repairs to the device may result in substantial damage to equipment or endanger the user.

System expansions

Only install system expansion devices designed for this device. The installation of other expansions can damage the system and violate the radio-interference suppression regulations. Contact your technical support team or where you purchased your PC to find out which system expansion devices may safely be installed.

CAUTION

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

Battery

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

⚠ **CAUTION**

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

⚠ **WARNING**

Risk of explosion and release of harmful substances!

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

ESD directives

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

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

● Always discharge your body´s static electricity before handling modules that are sensitive to ESD (for example, by touching a grounded object).

● All devices and tools must be free of static charge.

● Always pull the mains connector and disconnect the battery before installing or removing modules which are sensitive to ESD.

● Handle modules fitted with ESDs only by their edges.

● Do not touch any connector pins or conductors on modules containing ESDs.

Description

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3.1 Overview

The SIMATIC IPC427C provides high-level industrial performance.

- Compact design
- Maintenance-free operation
- High degree of ruggedness

Figure 3-1   SIMATIC IPC427C

3.2 Applications

The device provides industrial PC systems for high-performance and space-saving applications in particular in the field of machine, systems and switchgear cabinet engineering:

● Measuring and controlling of process and machine data (for example, automated washing systems, assembling machines, packaging machines)

● Operating and visualization tasks with separate display / monitor solutions (information terminals, large-scale displays in automotive production)

● Data logging and processing (for example, system data logging, distributed process control)

3.3 Features

Basic data	
Installation / mounting	• Installation on a DIN rail • Wall mounting • Vertical mountin • Hanging assembly
Processor	• Intel Celeron M 1.2 GHz, 800 MHz FSB, 1 MB SLC or • Intel Pentium Core 2 Solo 1.2 GHz, 800 MHz FSB, 3 MB SLC or • Intel Pentium Core 2 Duo 1.2 GHz, 800 MHz FSB, 3 MB SLC
Main memory	• 512 MB DDR3-SDRAM SODIMM • 1 GB DDR3-SDRAM SODIMM • 2 GB DDR3-SDRAM SODIMM • 4 GB DDR3-SDRAM SODIMM
Free slots for expansion	Up to 3 x PCI/104 modules or 3x PC/104-*Plus* module (PCI bus only); installed with expansion frame
Graphics	• Integrated Intel GMA4500 graphics • CRT resolution of 640x480 pixels up to 1920x1200 pixels • DVI resolution of 640x480 pixels up to 1920x1200 pixels • 8-512 MB graphics memory taken from main memory (dynamic UMA)
Power supply	24 VDC (19.2 – 28.8 V) max. 4 A
Conditions of use	• Operation without fan
Drives and storage media	
Compact Flash card	• 256 MByte optional or • 2 GB optional or • 4 GB optional or • 8 GB optional
Hard disk	≥ 80 GB SATA HD 2.5" optional
SSD (Solid State Disk)	≥ 32 GB optional
Floppy/CDROM drive	Connected via external USB port
USB stick	Connected via external USB port

Basic data	
Ports	
Serial	COM1 (RS232)
	COM2 (RS232); optional
Graphics	DVI-I: combined DVI and VGA
USB	4 x USB 2.0 high current
Ethernet	2 x RJ 45 (10/100/1000 Mbps)
PROFIBUS DP	12 Mbps (isolated potential, compatible to CP 5611), optional
CAN interface	Optional
Keyboard, mouse	Connected via external USB port

Monitoring and safety functions	
Temperature	• When permitted temperature range is exceeded • Warnings can be analyzed by application program (local, via LAN)
Watchdog	• Monitoring function for program execution • Restart can be parameterized in the event of a fault • Warnings can be analyzed by application program (local, via LAN)
LED display	4 LEDs for displaying system status 2 of these can be programmed by the user[1]
Transient voltage interruption	Up to 15 ms buffer time at full load
Buffer memory	2 MB battery-buffered SRAM[1]

Software	
Operating systems	
Available	• Without • Windows Embedded Standard 2009 • Windows XP Professional MUI SP3 preinstalled [2]
Project-specific	• LINUX • QNX • VxWorks • Others on request • RMOS3 V3.40 (ordered separately)

[1]You can find additional information about addressing the LEDs or the SRAM under a Windows operating system in the section "Output register LED L1/L2". You can find example programs for addressing the LEDs under Windows XP and under RMOS3 under the FAQ at the Customer Support site Industry Automation and Drive Technologies - Homepage (http://www.siemens.com/automation/service&support).

[2] MUI: Multi Language User Interface; 5 languages (English, German, French, Spanish, Italian)

3.4 Windows Embedded Standard 2009

The supplied Windows Embedded Standard has the product version 2009. The overview shows the basic device functions under Windows Embedded Standard 2009:

Function	Hard disk / SSD version	Compact Flash card version
Enhanced Write Filter (EWF)	In RAM RAM(REG)	In RAM RAM(REG)
SIMATIC IPC DiagBase	Available V 1.2	Available V 1.2
Pagefile	Deactivated in favor of the EWF	Deactivated in favor of the EWF
System Restore Core	Available	Available
File based Writefilter (FBWF)	Available	Available
Registryfilter	Available	Available
Device Update Agent (DUA)	Available	Available
HORM	Available	Available
Telnet Server	Available	Available
Windows Backup	Available	Available
User Mode Driver Framework (UMDF)	Available	Available
MUI	GER/FRA/ITA/SPA Default language: English	GER default language: English
Administrator Account	Available	Available
User Account	Available	Available
Explorer Shell	Available	Available
Internet Explorer (IE)	Available, IE7	Available, IE7
Internet Information Server (IIS)	Available V 5.1	Available V 5.1
Terminal Services	Available	Available
Bluetooth	Available	Available
Wireless Network Support	Available	Available
Windows Firewall	Available	Available
Windows Security Center	Available	Available
MSN Explorer	Available	Not available
Outlook Express	Available	Available
Administrative Tools	Available	Available
SMS Advanced Client	Available	Not available
Remote Desktop	Available V 6.0	Available V 6.0
Remote Assistance	Available	Available
.NET Framework	Available, V3.5	Not available
ASP.NET	Available, V3.5	Not available
Windows .NET Messenger	Available V 4.7	Available V 4.7
Code pages/User Location/Keyboard	Available	Selection available
Disk Management Services	Available	Available
Windows Installer Service	Available V 3.1	Available V 3.1
Class Installer	Available	Available

Function	Hard disk / SSD version	Compact Flash card version
CoDevice Installer	Available	Available
Windows Movie Maker	Available V 2.1	Not available
Media Player	Available, V11.0	Available, V11.0
Windows Media Player Tour	Available	Not available
DirectX	V9.0c	V9.0c
Accessories	Available	Available
Help files for all components	Available	Not available
Games	Available	Not available
Fonts	316	118
Windows XP Tour	Available	Not available
Microsoft Silverlight	Available V 1.0	Available V 1.0
NetMeeting	Available V 3.1	Available V 3.1

Note

Activation of "HORM" and creation of a "Hiber File"
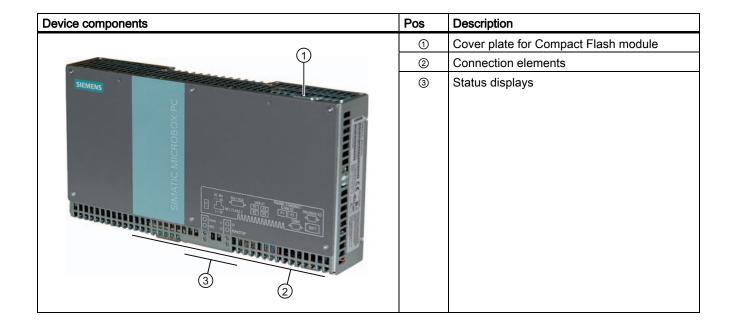
When "HORM" is activated, the "Hibernate" function can be used for Windows Embedded Standard 2009:

- EWFMGR C: /activatehorm

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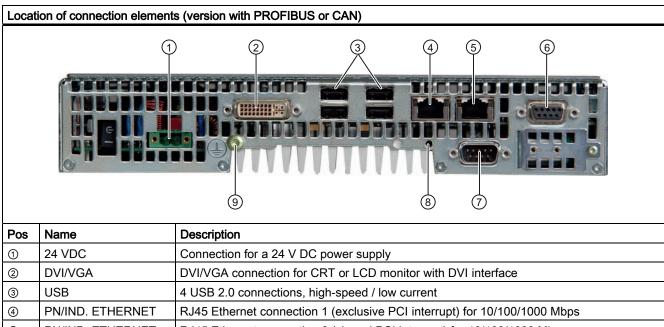
3.5   Design

3.5.1   External Design

Device components	Pos	Description
	①	Cover plate for Compact Flash module
	②	Connection elements
	③	Status displays
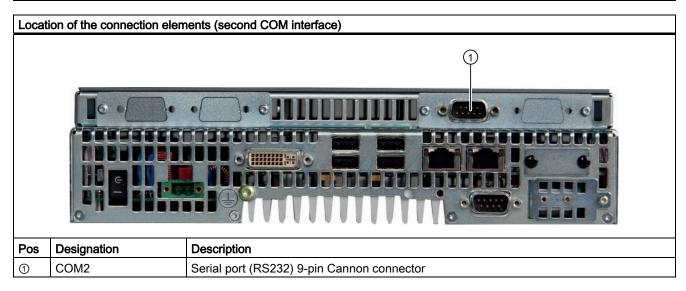
3.5.2 Connection components

Ports and power supply

Location of connection elements (version with PROFIBUS or CAN)

Pos	Name	Description
①	24 VDC	Connection for a 24 V DC power supply
②	DVI/VGA	DVI/VGA connection for CRT or LCD monitor with DVI interface
③	USB	4 USB 2.0 connections, high-speed / low current
④	PN/IND. ETHERNET	RJ45 Ethernet connection 1 (exclusive PCI interrupt) for 10/100/1000 Mbps
⑤	PN/IND. ETHERNET	RJ45 Ethernet connection 2 (shared PCI interrupt) for 10/100/1000 Mbps
⑥	PROFIBUS DP/MPI CAN fieldbus	PROFIBUS DP/MPI interface (RS 485 isolated), 9-pin Cannon socket or CAN fieldbus (on request)
⑦	COM1	Serial port (RS232) 9-pin Cannon connector
⑧	USB strain-relief fastener	The USB strain relief must be fastened to the device enclosure with an oval-head screw (M4 thread). The USB cables can be fastened to the strain-relief assembly with a cable tie.
⑨	PE terminal	The PE terminal (M4 thread) must be connected to the protective ground conductor of the plant, in which the device is to be installed. The minimum conductor cross-section may not be less than 2,5 mm².

Location of the connection elements (second COM interface)

Pos	Designation	Description
①	COM2	Serial port (RS232) 9-pin Cannon connector
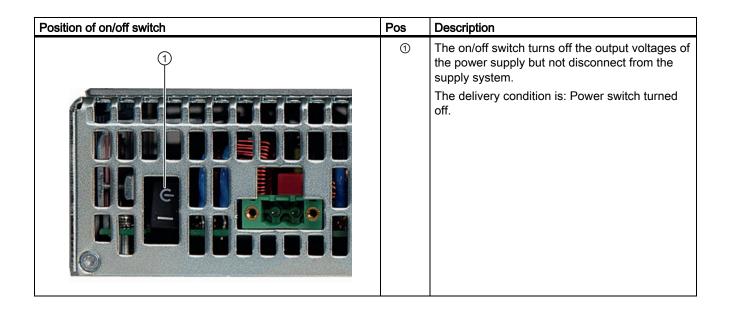
3.5.3 Operator controls

On/Off switch

⚠ CAUTION
The On/Off switch does not disconnect the device from the supply voltage.

Position of on/off switch	Pos	Description
①	①	The on/off switch turns off the output voltages of the power supply but not disconnect from the supply system. The delivery condition is: Power switch turned off.

3.5.4 Status displays

Status displays	LED	Meaning	LED	Description
	PWR	Power supply	OFF GREEN	Standby mode Supply voltage available
	WD	Watchdog status display	OFF GREEN RED	Watchdog disabled Watchdog enabled, monitoring time not expired Watchdog enabled, monitoring time expired
	L1 SF	User LED L1	OFF YELLOW RED	Can be controlled by user programs[1]
		Group errors	RED	Can be controlled by controller program (e.g. WinAC)[1]
	L2 RUN/STOP	User LED L2	OFF YELLOW GREEN	Can be controlled by user programs[1]
		RUN STOP	GREEN YELLOW	Can be controlled by controller program (e.g. WinAC)[1]

[1]You can find additional information about addressing the LEDs or the SRAM under a Windows operating system in the section "Output register LED L1/L2". Example programs for addressing the LEDs under Windows XP and under RMOS are available under the FAQ at the Customer Support site Industry Automation and Drive Technologies - Homepage (http://www.siemens.com/automation/service&support).

Application planning

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4.1 Transport

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

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

CAUTION
Risk of damage to the device!
If you are transporting the device in extreme weather conditions with large fluctuations in temperature, care must be take to ensure that no moisture forms on or in the device (condensation).
If condensation has developed on the device, wait at least 12 hours before you switch it on.

4.2 Unpacking and checking the delivery unit

Unpacking the device

Note the following when unpacking the unit:

- It is advisable not to dispose of the original packing material. Keep it in case you have to transport the unit again.

- Please keep the documentation in a safe place. It is required for initial commissioning and is part of the device.

- Check the delivery unit for any visible transport damage.

- Verify that the shipment contains the complete unit and your separately ordered accessories. Please inform your local dealer of any disagreements or transport damages.

Noting the device identification data

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

Enter the data in the following table:

Serial number	S VP ...
Order number of the device	6ES 7647-7B ...
Microsoft Windows Product Key	
Ethernet address 1	
Ethernet address 2	

You can find the corresponding data here:

- Serial number: The serial number is available on the rating plate on the right side of the device.

- Order number of the device: The order number is located on the rating plate.

● Ethernet address: The Ethernet address of the device is available in your BIOS Setup
(F2 function key) under **Main > Hardware Options > Ethernet 1 Address** or
Ethernet 2 Address.

● Microsoft Windows "Product Key" from the "Certificate of Authenticity" (COA): The COA
label is only present in pre-installed Windows Embedded Standard 2009 or
XP Professional and is affixed to the back of the device.

Figure 4-1   COA Label Windows Embedded Standard 2009

Figure 4-2   COA Label Windows XP Pro for Embedded Systems

4.3 Ambient and Environmental Conditions

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

- The climatic and mechanical environmental conditions specified in the specifications given in your operating instructions.

- The device is approved for operation in closed rooms only.

- Avoid extreme ambient conditions. Protect the device against dust, moisture and heat.

- Do not place the device in direct sunlight.

- Ensure that the distance to other components or the sides of cabinets is at least 50 mm above and 100 mm below the device.

- Do not cover the ventilation slots of the device.

- Always observe the mounting positions permitted for this device.

- The connected or built-in peripherals should not introduce a counter emf in excess of 0.5 V into the device.

Installing/mounting

<div style="text-align: right">

5

</div>

5.1   Permitted mounting positions

NOTICE
The device is approved for operation in closed rooms only.
Ensure that there is a minimum clearance to the other components or the walls of a housing:
• Below at least 100 mm
• Above at least 50 mm

Horizontal (preferred position)	Permitted temperatures
	Operation with hard disk: • with up to 3 expansion modules (max. load 9 W): +5 to +40°C Operation with CompactFlash card and/or SSD drive: • with up to 3 expansion modules (max. load 9 W): 0 to +45°C • with up to 3 expansion modules (max. load 9 W) in RAL: 0 to +50°C Operation with Compact Flash cards: • without expansion modules in RAL: 0 to +55°C
Vertical (power supply at the top)	
	Operation with hard disk: • with up to 3 expansion modules (max. load 9 W): +5 to +40°C With installed Compact Flash card: • without expansion modules: 0 to +45°C Operation with CompactFlash card and/or SSD drive: • with up to 3 expansion modules (max. load 9 W) in RAL: 0 to +45°C Operation with Compact Flash cards: • with up to 3 expansion modules (max. load 9 W) in RAL: 0 to +50°C **Notes**: When mounted on a DIN rail, the device should be secured to prevent shifting (e.g. with a DIN rail ground terminal).

Suspended	
	Operation with CompactFlash card and/or SSD drive and without expansion modules: 0 to +40°C **Note**: Mounting brackets are required if the device is suspended.
Upright mounting	**Permitted temperatures**
	Operation with hard disk: • with up to 3 expansion modules (max. load 9 W): +5 to +40°C With installed Compact Flash card: • without expansion modules: 0 to +45°C Operation with CompactFlash card and/or SSD drive: • with up to 3 expansion modules (max. load 9 W) in RAL: 0 to +45°C Operation with Compact Flash cards: • with up to 3 expansion modules (max. load 9 W) in RAL: 0 to +50°C

RAL = Restricted Access Location
(e.g. installation of the unit in a lockable cabinet)

NOTICE
The safety and installation instructions for the expansion modules should be followed if the device is expanded with PCI-104 / PC/104-plus modules.
If necessary, the device should be installed in an enclosure that meets the requirements of paragraphs 4.6 and 4.7.3 of IEC/UL/EN/DINEN60950-1.

5.2 Mounting information

Before you install the device, read the following mounting instructions.

NOTICE
Adhere to the SIMATIC assembly guidelines and the relevant DIN/VDE requirements or the country-specific regulations when mounting in switching cabinets.

NOTICE
Ensure that the device is classified as "Open Type" when using the device in the area of Industrial Control Equipment (UL508). A UL508 conform enclosure is therefore a mandatory requirement for approval or operation according to UL508.

5.3 Mounting the device

Mounting methods

SIMATIC IPC427C can be mounted on DIN rails, with mounting brackets and in an upright position.

5.4 Mounting on DIN rails
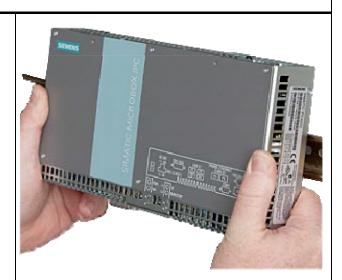
Mounting the device on DIN rails

Note

Use of Siemens 35 mm standard mounting rail is recommended.

Steps for mounting on DIN rails		
1.	Set the device inclined on the upper DIN rail.	
2.	Swing the device fully onto the rails until both clamps completely latch.	

Note

To ensure secure mounting on vertical mounting rails, a DIN rail ground terminal should be mounted beneath the device.

NOTICE
The rails are secured to a wall or cabinet similar to mounting with mounting brackets. Ensure that the wall or ceiling can hold four times the total weight of the device (including the rails and additional expansion modules). Also see section Mounting with mounting brackets (Page 30).
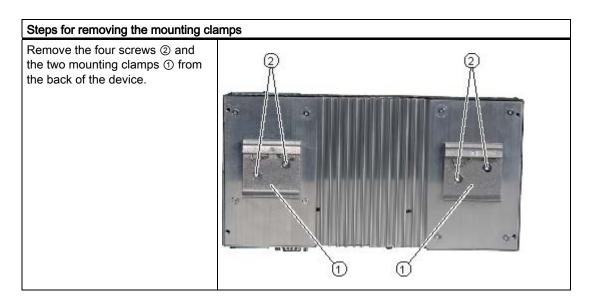
Removing the device from the DIN rail

- Push down the device until the clamps release it.
- Swing the device out of the rails.

5.5 Mounting with mounting brackets
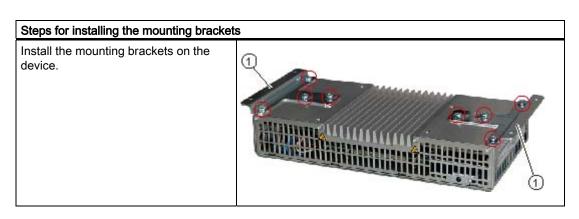
Removing mounting clamps from the device

Two mounting clamps are factory installed on the device for DIN rail mounting. These need to be removed before mounting the mounting brackets.

Steps for removing the mounting clamps
Remove the four screws ② and the two mounting clamps ① from the back of the device.

Installing brackets on the device

Two mounting brackets are included in the device package. They can be installed on the device with four screws supplied.

Steps for installing the mounting brackets
Install the mounting brackets on the device.

Note

Required tools

You need a TORX T20 screwdriver to remove the mounting clamps and mount the mounting brackets.

Mounting/demounting the device

The dimensions of the device with mounting brackets are listed under Dimension drawings of the device with mounting brackets (Page 99).

Mounting examples		
Material	Bore diameter	Mounting
Concrete	8 mm diameter 60 mm depth	Dowel: 8 mm diameter 50 mm length Screws: 4 mm diameter 50 mm length
Plasterboard (min. 13 mm thick)	14 mm diameter	Gravity toggle: 4 mm diameter 50 mm length
Metal (min. 2 mm thick)	5 mm diameter	Metal screws M 4: 4 mm diameter 15 mm length
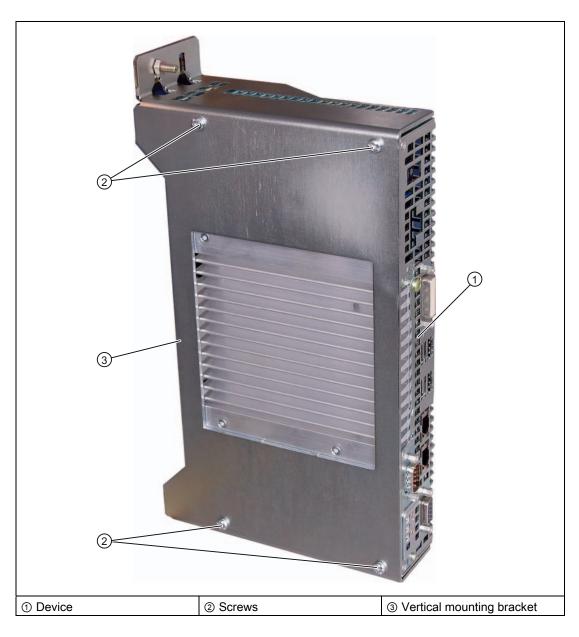
⚠ WARNING
Ensure that the wall or ceiling can hold four times the total weight of the device (including the cabinet brackets and additional expansion modules).

5.6 Upright mounting

With the available optional vertical mounting kit you have the possibility to implement a place saving installation.

Mounting the vertical mounting bracket onto the device

| ① Device | ② Screws | ③ Vertical mounting bracket |

Note

- Information on installation and operation is available in the supplement of the accessories.

Connecting 6

6.1 Connecting peripheral equipment

NOTICE
Connect only peripheral devices approved for industrial applications conforming to EN 61000-6-2 / IEC 61000-6-2.

Note

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

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

CAUTION
Strictly adhere to the specifications for peripheral equipment.

Note

A DVI or CRT monitor should be connected and switched on when the device boots in order for it to be correctly detected by the BIOS and the operating system. The screen may otherwise remain dark.

NOTICE
The connected or built-in peripherals, such as USB drives, should not introduce a counter emf into the device. A counter emf greater than 0.5 V to ground on the + 3.3 VDC / + 5 VDC / + 12 VDC power rail due to a connected or integrated component can prevent normal operation or even destroy components of the device.

6.2 Connecting the 24 V DC power supply

To be noted before you connect the device

Note the following in order to operate the device safely and according to regulation:

⚠ WARNING
The device should only be connected to a 24V DC power supply which satisfies the requirements of safe extra low voltage (SELV).
If the device is used on a wall, in an open rack or other similar locations, an NEC Class 2 current source is required in order to meet the UL requirements (UL 60950-1). In all other cases (IEC / EN / DIN EN 609501) either a current source of limited output (LPS = Low Power Source), or a line-side fuse or a line-side circuit breaker is necessary. The power needs to be limited to a value below 4.16 A. The fuse value required: Max. 4 A.
Use the special plug supplied to connect the supply voltage. Connect the PE conductors as described in the next section.

NOTICE
The permitted cable cross-section for the 24 VDC connection is 0.75 mm^2 to 2.5 mm^2.

NOTICE
If a CompactFlash card is used in the device, make sure that the card is seated correctly before you connect it.

Connecting

Steps for connecting the device to the 24 V DC power supply	
1. Switch off the 24 V DC power source.	
2. Connect the power supply using the plug (included in the package).	
3. Connect the PE conductor.	(P24 in) (M in)

6.3   Protective ground connection
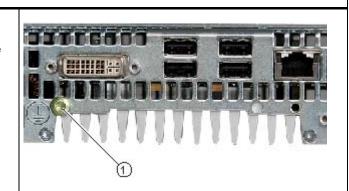
The PE terminal (M4 thread) on the device (large surface, large-area contact) must be connected to the PE conductor on the cabinet or system in which the PC is to be installed. The conductor cross-section must not be less than 2.5 mm^2.

The PE terminal is needed to protect the device and ensures that interference signals generated by external power cables, signal cables or cables to the I/O modules are safely discharged to earth.

Required tool for protective earth terminal: TORX T20 screwdriver

Protective earth terminal	
Connect the PE terminal (M4 thread) ① on the device to the PE conductor on the cabinet or system in which the PC will be installed. The minimum conductor cross-section may not be less than 2,5 mm^2.	
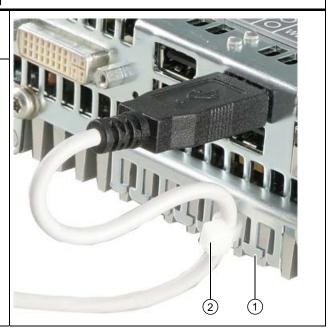
6.4 USB strain-relief

The USB strain-relief provided as an accessory is used to prevent accidental loosening of the USB cable from the device. A cable binder (not included in the package) is needed to use this accessory.

To fix the USB strain relief, you will need a TORX T20 screwdriver.

Steps for connecting the USB strain-relief	
1. Fasten the USB strain-relief ① to the device housing with an oval-head screw (M4 thread).	
2. Thread the cable tie ② through the comb of the USB strain-relief to clamp the USB cable.	

Commissioning 7

7.1 Note before commissioning

Factory state

The SIMATIC IPC427C is available in the following versions:

- With the Windows Embedded Standard 2009 operating system (pre-installed on CompactFlash card, SSD drive or the hard disk)
- With the Windows XP Professional operating system (pre-installed on SSD drive or the hard disk)
- Without operating system

Connections before commissioning

Before connecting the device to the power supply, a DVI or CRT monitor should be connected in order for it to be correctly detected by the BIOS and the operating system during startup.

⚠️ CAUTION
Risk of damage to the device
If condensation has developed, wait at least 12 hours before commissioning the device.

NOTICE
Windows Embedded Standard 2009: Read the EWF and FBWF information
Two configurable write filters (Enhanced Write Filter and File Based Write Filter) are provided with Windows Embedded Standard 2009. Please be aware of this when activating and using the EWF/FBWF information, otherwise you may experience data loss.

Note

Setting up CompactFlash cards on the employed device

If you want to use CompactFlash cards with the device, they need to be set up on the device. CompactFlash cards set up on other devices will not boot due to the differing drive parameters.

7.2 Commissioning - Windows Embedded Standard 2009

7.2.1 Basic commissioning - initial startup

Requirements

- The device is connected to the 24 VDC power supply.
- Equipotential bonding is connected.
- The cables are correctly plugged in.

Configuring the operating system

When the computer is started with the power switch for the **first** time, the
Windows Embedded Standard 2009 operating system on the Compact Flash card or hard
disk is configured automatically.

Proceed as follows:

1. Switch the device on using the On/Off switch. The PC performs a self-test (POST).
   During the self-test, this message appears:
   ```
   Press F2 go to Setup Utility or
   Press ESC go to Boot Manager
   ```

2. Wait until this message is cleared, then follow the instructions on the screen.

NOTICE
The device may not be switched off at any time during the installation process.
Do not change the default BIOS settings, otherwise the operating system setup may become corrupted.

3. Restart
   After you have entered all the necessary information and the operating system is
   configured, you are prompted to restart the system. Respond to this prompt with **Yes**.

   Note

   System startup can take considerably longer than usual for the initial commissioning.
   Only a blue or black screen is displayed for several minutes.

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

Note

To prevent data loss, it is advisable to create an image of your system partition after initial
commissioning.

Switch off the device

When you work with Windows Embedded Standard , always shut down the PC with the command **Start > Shut Down**.

Note

The Enhanced Write Filter should be enabled following the installation of Windows Embedded Standard on a CompactFlash card or SSD drive. When this is enabled, the device can be switched off with the power switch by disconnecting the power supply.

7.3 Commissioning - Windows XP Professional

7.3.1 Basic commissioning - initial startup

Requirements

- The device is connected to the 24 VDC power supply.
- Equipotential bonding is connected.
- The cables are correctly plugged in.

Configuring the operating system

When the computer is started with the power switch for the **first** time, the Windows XP Professional operating system on the hard disk or SSD drive is configured automatically.

Proceed as follows:

1. Switch the device on using the On/Off switch. The PC performs a self-test (POST). During the self-test, this message appears:
   ```
   Press F2 go to Setup Utility or
   Press ESC go to Boot Manager
   ```

2. Wait until this message is cleared, then follow the instructions on the screen.

NOTICE
The device may not be switched off at any time during the installation process.
Do **not** change the default BIOS settings, otherwise the operating system setup may become corrupted.

3. Automatic restart
   After you have entered all necessary information and the operating system is configured, the PC is automatically restarted and displays the user interface of the operating system.

   Note

   System startup can take considerably longer than usual for the initial commissioning.

When you switch on the PC now, the user interface of the Windows XP Professional operating system is automatically opened when the startup routine is completed.

Note

To prevent data loss, it is advisable to create an image of your system partition after initial commissioning.

Switch off the device

When you work with Windows XP Professional, always shut down the PC with the command **Start > Shut Down**. You can then switch off the device with the power switch or by disconnecting the power supply.

7.3.2 Setting up the language selection for Windows XP Professional / Embedded Standard

The **M**ultilanguage **U**ser **I**nterface (MUI) allows you to set up the Windows XP Professional / Embedded Standard menus and dialogs for additional languages.

Default language of your Windows XP MUI installation is English and a US keyboard layout. You can change the language in the Control Panel. Select:

Start > Control Panel > Regional and Language Options
  Languages, tab **Language used in menus and dialogs**
 field.
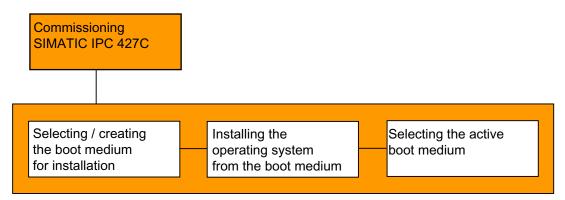
For the **Regional and Language Options** set the default as **non-Unicode programs** under **Advanced** in addition to the language for menus and dialogs.

7.4 Commissioning - other operating systems

7.4.1 Commissioning - guide

The desired operating system can be installed on the hard disk, CompactFlash card or SSD drive. A variety of USB devices (hard disk, external floppy or CD-ROM drive, USB stick) or Compact Flash cards can be used as boot media.

```
┌─────────────────────┐
│ Commissioning       │
│ SIMATIC IPC 427C    │
└─────────────────────┘
          │
┌─────────────────────────────────────────────────────────────────────┐
│  ┌──────────────────┐  ┌──────────────────┐  ┌──────────────────┐    │
│  │ Selecting /      │  │ Installing the   │  │ Selecting the    │    │
│  │ creating         │  │ operating system │  │ active           │    │
│  │ the boot medium  │  │ from the boot    │  │ boot medium      │    │
│  │ for installation │  │ medium           │  │                  │    │
│  └──────────────────┘  └──────────────────┘  └──────────────────┘    │
└─────────────────────────────────────────────────────────────────────┘
```

The following provides an overview of the steps involved in commissioning:

Steps		Description
1	Select and create a boot medium for installation.	Select a suitable boot medium for the operating system to be used in the BIOS Setup (CD-ROM drive, Compact Flash card, hard disk or USB device). See Boot menu (Page 126).
		If no boot medium is available, one must be created based on the instructions provided by the respective operating system documentation.
		For example, you can use the SIMATIC PC/PG Image Creator tool to make a USB stick a bootable medium.
2	Install the operating system on the boot medium.	Install the operating system based on the instructions provided by the respective documentation.
3	Select final boot medium	In the BIOS Setup, select the medium on which the operating system has been installed.

Additional information

Further information about installation and commissioning is available in the documentation of the respective operating system.

Integration into an Automation System

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8
</div>

8.1 Overview

Options of integration in existing or planned system environments/networks:

Ethernet

The integrated Ethernet port (10/100/1000 Mbps) can also be used for communication and for data exchange with automation devices such as SIMATIC S7.
For this purpose you require the "SIMATIC NET" 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.

CAN

CAN interface for connection to CAN field systems (on request).

RS232

The serial port can be used for data communication (via terminal applications, for example).

Additional information

Additional information is available in the catalog and the online ordering system Industrial Automation and Drive Technologies (http://mall.automation.siemens.com).

Functions 9

9.1 Monitoring Functions

9.1.1 Introduction

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

● Temperature monitoring (over / under temperature)

● Monitoring of the battery level

● Monitoring of hard disks, CompactFlash 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)

SIMATIC PC DiagBase software

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

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

SIMATIC PC DiagMonitor software

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

9.1.2 Temperature monitoring/display

Temperature monitoring

The temperature is recorded by means of three thermocouples. The sensors monitor the processor temperature, the temperature near the RAM module and the motherboard around the DVI/VGA socket.

If one of the three configured temperature values is exceeded (CPU: 100°C, RAM: 95°C, motherboard: 95°C), the following fault reaction is triggered:

Reaction	Option
The DiagBase or DiagMonitor software is enabled	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

9.1.3   Watchdog (WD)

Function

If the user program does not respond to the watchdog within the predetermined monitoring time, the watchdog monitors the program process and informs the user about various reactions.

After POWER ON of the device or after a HW RESET (cold restart), the watchdog is in idle state, i.e. a reaction of the WD will not be triggered and the Watchdog LED is switched off.

Watchdog reactions

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

Reaction	Option
Switch watchdog LED to red	None
Trigger a PC reset	Configurable
Enabling the DiagBase or DiagMonitor software	None

Note

If the desired device reset is not performed, go the Advanced menu of the BIOS Setup and set the SafeCard functions to Enabled. Contact Customer Support for a detailed description of the Watchdog functions.

WD monitoring times

The monitoring times are defined as follows:

Normal mode: 94 ms, 210 ms, 340 ms, 460 ms, 590 ms, 710 ms, 840 ms and 960 ms.
Macro mode: 2s, 4s, 6s, 8s, 16s, 32s, 48s and 64s.

Note

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

9.2 Enhanced Write Filter (EWF)

Purpose and function

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

The Enhanced Write Filter allows you to boot Windows Embedded Standard 2009 from write-protected media (such as CD-ROM), to write protect individual partitions and adapt the performance of the file system to your needs (when using CompactFlash cards, for example).

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

CAUTION

Activate only one write filter per partition - otherwise you may incur data loss.

Both EWF and FBWF are preinstalled in the SIMATIC IPC images.

Ensure that only one write filter is enabled on a partition, otherwise you may incur data loss.

Note

The Enhanced Write Filter is disabled by default for Windows Embedded Standard 2009. After the operating system has been set up, you should back up your date and then enable the EWF.

Set EWF

The EWFMGR.EXE program can be used to install, enable or disable the EWF. Use the command prompt to call up the program. The following functions are available:

Function	Command
Write-protect drive C: Switching on	`ewfmgr c: -enable`
Write-protect drive C: disable (modified files are accepted)	`ewfmgr c: -commitanddisable`
Modified files on drive C: Accept	`ewfmgr c: -commit`
Display information about the EWF drive	`ewfmgr c:`
Display help	`ewfmgr c: /h`

Note

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

Special features for the use of Enhanced Write Filters (EWF)

- In the event of a power failure, if the EWF is enabled changes made after the boot sequence on drive C: are lost.
  To prevent data loss in the event of a power failure, the use of a USV is recommended.

- You can save the files in the EWF RAM overlay to the Compact Flash card or the hard disk before you shut down the device. To do so, enter the following command in the command prompt:

```
ewfmgr c: -commitanddisable
```

Then restart the system.

```
ewfmgr c: -enable
```

Then restart the system.

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 2009 has a registry entry that detects if the clock has been adjusted for daylight saving time. 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.

Procedure:

1. Switch off the EWF filter (ewfmgr c: -commitanddisable) and reboot the system.
2. 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.
3. Enable EWF again (ewfmgr c: -enable) and reboot the system.

9.3   File Based Write Filter (FBWF)

Purpose and function

With the Feature Pack 2007 for Windows XP Embedded, 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
Activate only one write filter per partition - otherwise you may incur data loss.
Both EWF and FBWF are preinstalled in the SIMATIC IPC images.
Ensure that only one write filter is enabled on a partition, otherwise you may incur data loss.

Configuring FBWF

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

NOTICE
• 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 /?`

For detailed instructions on FBWF go to (http://msdn.microsoft.com/en-us/library/aa940926(WinEmbedded.5).aspx)

9.4 SRAM buffer memory

For applications to be able to store data following a power failure, the motherboard features a battery-buffered CMOS-RAM. If the supply voltage fails longer than 5 ms, this is indicated by the DC FAIL signal.

Enough time is provided for copying data to the buffered RAM that 256 KB can be saved with a full configuration.

A maximum 2048 Kb 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 CMOS-RAM under WinAC RTX.

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

9.5   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 buffered SRAM is at least 1 month.

9.6 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 can only be subsequently activated when the Windows Embedded Standard 2009 or Windows XP Professional operating system has fully booted.

Expansions and Configurations 10

10.1 Open the device (front panel)

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

⚠ CAUTION
The device contains electronic components which may be destroyed by electrostatic charge. You therefore need to take precautionary measures before you open the device. Refer to the ESD guidelines on handling electrostatically sensitive components under ESD Guidelines (Page 147).

Tools

- Cover and top cover plate: Torx T8
- Hard disk mounting: Torx T10
- Protective earth terminal: Torx T20
- Spacing bolts PC/104: Hexagon head 5mm
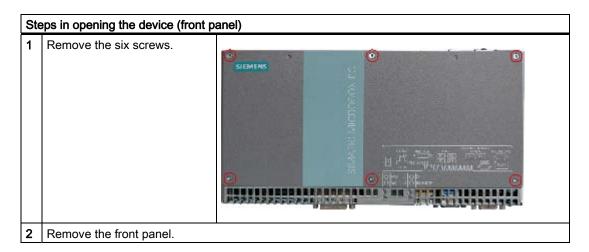
Preparation

Isolate the device from power supply.

Open the device

Steps in opening the device (front panel)	
1	Remove the six screws.
2	Remove the front panel.

10.2 Memory expansion

10.2.1 Installing the memory module

Memory expansion options

The motherboard is equipped with one slot for an SO-DIMM DDR3 memory module. This lets you expand the memory capacity of your device to a maximum of 4 GB. 3 GB of this memory is available for the operating system and applications.

Note

We recommend using the original spare parts for memory configuration.

Preparation

Disconnect the device from the power supply.

CAUTION
The electronic components on the PCBs are highly sensitive to electrostatic discharge. Always take appropriate precautionary measures when handling these components. Refer to the ESD directives on handling electrostatically sensitive components ESD Guidelines (Page 147).

Removing a memory module

How to remove a memory module	
1	Open the device.
2	Open the retention clamps ①. Tilt the memory module forward.
3	Carefully remove the memory module.

Installing a memory module

How to install a memory module	
1	Set the memory module in the mount tilting forward.
2	Carefully push the memory module back into the heat sink until it fully engages.
3	Close the device.

Display of the current memory configuration

The new memory configuration is detected automatically. System RAM, Extended RAM and Cache SRAM are displayed during device startup.

10.3 Installing PCI-104 / PC/104 Plus modules

10.3.1 Notes on the modules

Notes on module specifications

The device is designed for use with modules conforming to specifications of the PC/104 Consortium.

- PCI-104 modules: PCI compatible (120-pin plug)
- PC/104 *Plus* modules that use only the 120-pin plug (PCI bus)

Note

The necessary expansion frames for mounting these modules can be ordered as a six-pack with order number 6AG4070-0BA00-0XA0 via the A&D online ordering system (http://www.siemens.com/automation/mall).

NOTICE
When expanding the device with PCI-104 / PC/104 Plus modules, adhere to the safety and mounting regulations for the expansion modules.
The device may be mounted in an enclosure that meets the requirements of Sections 4.6 and 4.7.3 of IEC/UL/EN/DINEN60950-1.

10.3.2 Mounting PCI-104 or PC/104 Plus modules

Tools

Use hexagon head screws (5 mm) to mount the spacing bolts of the PCI-104- or PC/104-*Plus* module. If this is the only PCI-104 or PC/104-*Plus* module you wish to mount, you can also use screws (M3) instead of the spacing bolts.

Preparation
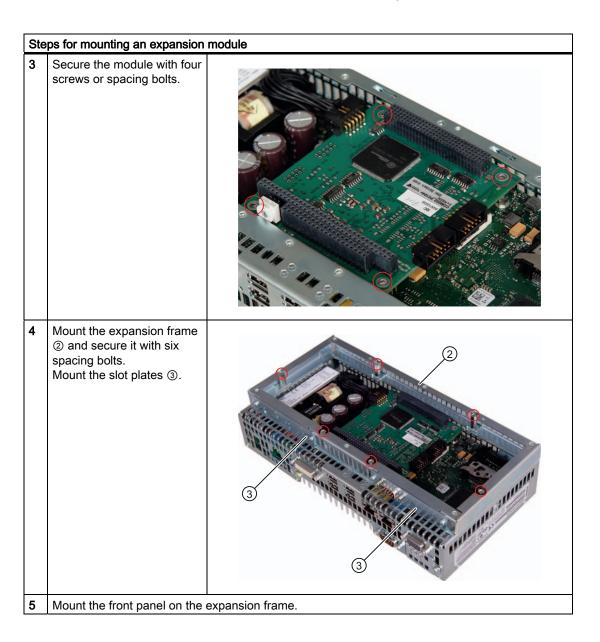
● Isolate the device from power supply.

● Two blanking plates are mounted on the expansion frame. If the PCI-104 or PC/104-*Plus* module features external ports, you can use these blinding plates to mount the connectors. You can also use a slot plate with existing connector perforations. You can find required dimensions in the section Dimension drawing of the blanking plate (Page 103).

CAUTION
The electronic components on the PCBs are highly sensitive to electrostatic discharge. Always take appropriate precautionary measures when handling these components. Refer to the ESD directives on handling electrostatically sensitive components ESD Guidelines (Page 147).

Mounting PCI-104 or PC/104-*Plus* modules

Steps for mounting an expansion module	
1	Open the device (remove front panel).
2	Insert module in slot ①.

Steps for mounting an expansion module		
3	Secure the module with four screws or spacing bolts.	
4	Mount the expansion frame ② and secure it with six spacing bolts. Mount the slot plates ③.	
5	Mount the front panel on the expansion frame.	

Mounting additional PCI-104 or PC/104-*Plus* modules

The device can be equipped with a maximum of PCI-104 or PC/104-*Plus* modules. An additional expansion frame is required for each module.

Follow the mounting procedure described in the previous section (steps 2 to 4).

Configuring/installing a PCI-104 or PC/104-*Plus* module

You may need to make settings in the BIOS Setup. For detailed information about installation, refer to the manufacturer documentation for the respective module.

10.4 Installing/Removing Compact Flash Cards

10.4.1 Installation options for Compact Flash cards

Memory expansion options

The device features an accessible slot for Compact Flash cards (types I / II). As an alternative to a hard disk, you can optionally order a fixed-mounted, inaccessible Compact Flash card drive.

Only use SIMATIC PC Compact Flash cards for industrial application.

Note

Only SIMATIC PC CompactFlash cards with product version number 02 (ES 02) can be used for this device.

Figure 10-1   SIMATIC IPC CompactFlash®

10.4.2   Installing/removing an accessible Compact Flash card

Preparation

Disconnect the device from the power supply.
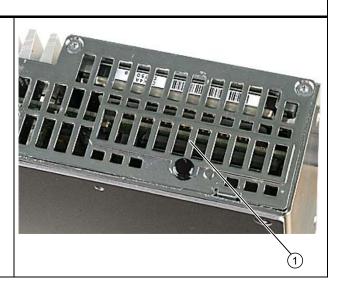
⚠ CAUTION
The electronic components on the PCBs are highly sensitive to electrostatic discharge. Always take appropriate precautionary measures when handling these components. Refer to the ESD directives on handling electrostatically sensitive components ESD Guidelines (Page 147).

Opening the module receptacle

Steps for opening the module receptacle	
Turn the cover plate ① of the module receptacle 180 degrees counter-clockwise.	
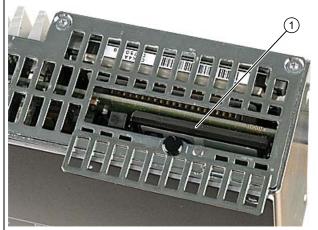
Installing the Compact Flash card

Steps for installing a Compact Flash card		
1	Open the module receptacle.	
2	Insert the CompactFlash card with the connector facing in until it locks into place ①.	
3	Close the module receptacle again.	

Note

The Compact Flash slot is coded against reversed insertion. Insert it so that its upper side (label side) is facing the front panel of the device.
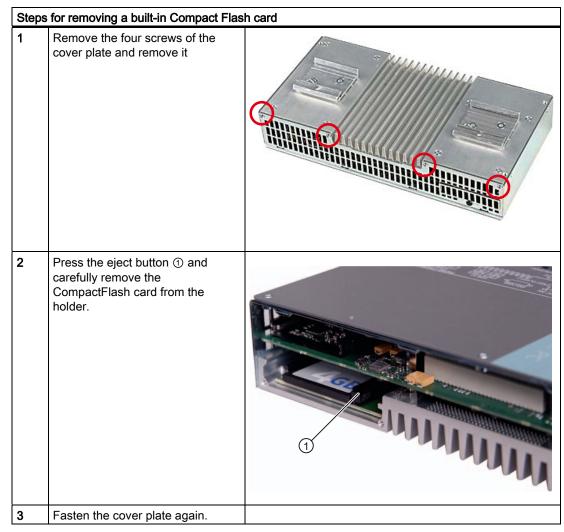
⚠ CAUTION
If the Compact Flash card meets resistance, flip it over. Never insert the CompactFlash card with force.

Removing the Compact Flash card

Steps for removing a Compact Flash card	
1	Open the module receptacle.
2	Press the eject button ① and remove the CompactFlash card.
3	Close the module receptacle again.

10.4.3 Installing/removing a built-in Compact Flash card

Steps for removing a built-in Compact Flash card		
1	Remove the four screws of the cover plate and remove it	
2	Press the eject button ① and carefully remove the CompactFlash card from the holder.	
3	Fasten the cover plate again.	

To install, carry out the above steps in reverse order.

Maintenance and Service

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11

</div>

11.1 Removing and Installing Hardware Components

11.1.1 Repairs

Carrying out repairs

Only authorized personnel are permitted to repair the device.

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

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

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

> **NOTICE**
>
> Check the ESD Guidelines (Page 147).

Limitation of Liability

All specifications and approvals are only valid when the expansion component feature the CE symbol. Observe the installation instructions for the expansion components.

UL approval of the device only applies when the UL-approved components are operated taking the "Conditions of Acceptability" into consideration.

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

Tools

- Torx T8 (cover and upper sheet metal cover)
- Torx T10 (hard disk mounting)
- Torx T20 (Protective earth terminal)
- Hexagon head 5mm (spacing bolts PC/104)

11.1.2   Preventive maintenance

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

Component	Exchange interval:
Hard disk	3 years
CMOS backup battery	5 years

11.1.3   Replacing hard disk or SSD drive

⚠ CAUTION
Drives may only be replaced by authorized qualified personnel.

Tools

You will need size TORX T8 and T10 screwdrivers to mount the hard disk and a 5mm Allen wrench for installing/removing PC/104 modules.

You will need a TORX T20 screwdriver to loosen the protective earth terminal.

Preparation

1. Disconnect the device from the power supply.

2. Unplug all peripherals (mouse, keyboard, monitor, for example) from the device.

Removing drives

NOTICE
Check the ESD Guidelines (Page 147).

How to remove a drive		
1	Remove the four screws of the cover plate and remove it	

How to remove a drive		
2	Remove the four screws holding the drive to the back of the enclosure.	
3	Carefully remove the drive from the enclosure.	
4	Take the drive out of the holder.	

Installing a drive

Carry out the described tasks in the reverse order.

11.1.4   Replace the backup battery

To be noted before you replace the battery

Note

The service life of a backup battery is approximately 5 - 8 years, depending on the operating conditions.

CAUTION
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

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

Preparation

Note

The configuration data and contents of the SRAM in the device are buffered for at least 30 seconds.

---

1. Write down the current settings of the BIOS setup or save the settings as a user profile in the Exit menu (Page 131) of the BIOS setup.
   A list in which you can note this information is available in the BIOS description.

2. Disconnect the device from the power supply.

Tool

You will need a TORX T8 screwdriver to open the battery compartment.

Replacing the battery

Proceed as follows:

Steps for replacing the battery		
1	Open the battery compartment.	
2	Remove the battery holder.	
3	Pull out the battery plug ①.	
4	Take the old battery out of the holder.	
5	Place a new battery in the holder and reconnect the battery plug.	
6	Close the battery compartment.	

Reconfiguring the BIOS Setup

If the battery replacement takes longer than 30 seconds, the configuration data of the device will be lost. You will have to reconfigure the BIOS setup in this case.

11.2   Reinstalling the operating system

11.2.1   Windows Embedded Standard 2009

11.2.1.1   General installation procedure

If your software becomes corrupt for any reason, you can reinstall it from the Restore CD/DVD. The Restore CD/DVD contains an image file for the hard disk or CF card with the original software (operating system with installed hardware drivers).

Note

You require a USB keyboard and a USB CD-ROM drive to reinstall the operating system. Before performing the new installation, you should check the date and time set in the BIOS Setup (Page 117) and correct it if necessary.

11.2.1.2   Restoring the software to factory state using the Restore DVD

You can restore the original factory software using the Restore CD/DVD. The CD/DVD contains the necessary images and tools for transferring the factory software to the hard disk / SSD or CF card of your PC. The following options are available for restoring software:

● Restore the entire hard disk / SSD with drive C: (system) and drive D:

● Restore drive C: only. This allows you to retain any user data on drive D.

● Restore the entire CF card

● Restore the system partition of the CF card only.

CAUTION
If "Restore system partition only" is set all data on drive C: (system) will be deleted. All data, user settings and all authorizations or license keys on drive C: will be lost in the process! All data on drive C: of your hard disk drive will be deleted. Setup formats the hard disk partition and reinstalls the original factory software. When you select the "Restore entire hard disk" option, ALL the data, user settings and authorizations or license keys will be lost on the hard disk.

NOTICE
When using device models with two CompactFlash cards, the data is transferred to the accessible CF card. If you want to transfer the software to the built-in CF card, you need to remove the removable CF card before performing the restore.

Restoring the factory state

To restore the factory state, proceed as follows:

1. Connect a USB CD-ROM drive to the device.

2. Insert the Restore CD/DVD in the drive and reboot the device. When the BIOS message appears, press

   ```
   Press <F2> to enter Setup or <ESC> to show the Boot menu
   ```

   the F2 key.

3. Select the Boot menu and move the entry "CD-ROM Drive" to the first position.

4. Close the BIOS setup with the "Exit Saving Changes" entry.

5. Follow the on-screen instructions.

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

Note

The "Legacy USB Support" option has to be set to "Enabled" in the Advanced menu of the BIOS so that the device can address a USB CD-ROM drive.

11.2.2 Windows XP Professional

11.2.2.1 General installation procedure

If your software becomes corrupt for any reason, you have two possibilities:

- **Restoring the factory state of the software by means of the Restore DVD**
  The Restore DVD contains an image of the original supplied software (operating system with installed drivers) and is included in the Windows XP Professional variant.

- **Setting up the operating system with the Recovery CD**
  The recovery CD contains the tools required to set up the hard drive / SSD as well as the Windows XP Professional operating system. After the required data have been copied to the hard disk / SSD, you can run Windows XP Professional Setup to install the operating system.
  The Recovery CD is included in the scope of delivery for Windows XP Professional.

  Note

  You will need a USB keyboard in order to reinstall the operating system. Before performing the new installation, you should reset the date and time set in the BIOS Setup (Page 117).

11.2.2.2 Restoring the Software to Factory State Using the Restore DVD

You can reinstall the original factory software (included in the Windows XP Professional product package) using the Restore DVD. The DVD contains the necessary images and tools for transferring the factory software to the hard disk or SSD of your PC. The following options are available for restoring software:

● Restore the entire hard disk or SSD with the system drive with all partitions and drive D:.

● Restore the system partition only. This allows you to retain any user data on drive D.

CAUTION
If "Restore system partition" option is set, all data on your system partition will be deleted. All data, user settings and all authorizations or license keys on the system drive will be lost in this case. The system drive on the hard disk will be completely deleted and reformatted, and the original factory software will be copied to it.
When you select the "Restore entire system drive" option, ALL data, user settings and authorizations or license keys on the system drive will be lost together with all partitions.

Restoring the factory state

To restore the factory state, proceed as follows:

1. Connect a USB DVD-ROM drive to the device.

2. Insert the Restore DVD in the drive and reboot the device. When the BIOS message
   ```
   Press <F2> to enter Setup or <ESC> to show the Boot menu
   ```
   appears, press the F2 key.

3. Select the Boot menu and move the entry "CD-ROM Drive" to the first position.

4. Close the BIOS setup with the "Exit Saving Changes" entry.

5. Follow the on-screen instructions.

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

Note

The "Legacy USB Support" option has to be set to "Enabled" in the Advanced menu of the BIOS so that the device can address a USB DVD-ROM drive.

Setting up the language selection for Windows XP Professional / Embedded Standard

The **M**ultilanguage **U**ser **I**nterface (MUI) allows you to set up the Windows XP Professional / Embedded Standard menus and dialogs for additional languages.

Default language of your Windows XP Professional / Embedded Standard MUI installation is English and a US keyboard layout. You can change the language in the Control Panel. Select:

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

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

11.2.2.3 Setting up the operating system via the Recovery CD/DVD

Use the supplied Recovery CD/DVD to install Windows to suit your particular requirements. You also need the included Documentation and Drivers CD.

Note

Prerequisite is that you connect a USB CD-ROM drive to the device and have set the "Legacy USB Support" option to "Enabled" in the BIOS setup.

Booting with the Recovery CD/DVD

1. Insert the Restore CD/DVD in your drive and reboot the device. When the BIOS message
   ```
   Press <F2> to enter Setup or <ESC> to show Bootmenu
   ```
   appears, press the ESC key. The "Boot Menu" is displayed when initialization is completed.

2. Follow the on-screen instructions until the "Windows XP Professional Setup" window opens.

Partition setup

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

CAUTION

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

With Windows XP operating systems, the factory state features two partitions with an NTFS file system on the hard disk. To restore the partitions to factory state, follow the on-screen instructions:

● To install the selected partition, select "ENTER"

● To create a new partition in an unpartitioned area, press C.

● To delete the selected partition, press D.

Note

The on-screen instructions are in English.

Installation of the operating system

Follow the on-screen instructions when the "Windows XP Professional Setup" window appears.

Note

Note that there must still be free space on the drive after the selected recovery data has been transferred:
1500 MB for Windows XP

Note

If you want to use Windows XP as a professional you should have the following manual (not included in the product package) available:
Microsoft Windows XP Professional, the technical reference" (MSPress Nr 934).

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

Setting up the language selection for Windows XP Professional

The **M**ultilanguage **U**ser **I**nterface (MUI) allows you to set up the Windows XP Professional menus and dialogs for additional languages.

To install the MUI, start the program MUISETUP.EXE in the folder

CD_DRIVE:\MUI

of the "MUI-english" Recovery CD/DVD or in root folder of the "MUI Windows XP" Recovery CD/DVD. Follow the instructions on the screen to install the required languages.

Default language of your Windows XP MUI installation is English and a US keyboard layout. You can change the language in the Control Panel. Select:

Start > Control Panel > Regional and Language Options **Languages,** tab **Language used in menus and dialogs** field. For the **Regional and Language Options** set the default as **non-Unicode programs** under **Advanced** in addition to the language for menus and dialogs.

11.3 Partitioning data media

11.3.1 Setting up the partitions under Windows Embedded Standard 2009

You need to set up the partitions on the CompactFlash card after installing a new drive, to repair corrupt partitions or to change the partitioning.

Partitioning the Compact Flash card

The factory state of the Compact Flash card includes the following partitions:

Partition	Name	Size of the card			File system
		2 GB	4 GB	8 GB	
1. Partition	SYSTEM	1536 MB	2560 MB	5120 MB	NTFS (compressed)
2. Partition	DATA	Remainder *	Remainder *	Remainder *	NTFS (compressed)

* Due to partitioning/formatting, the actual Compact Flash capacity does not correspond to the memory size specified on the Compact Flash.

Partitioning the hard disk

The following partitions are configured in the factory state of the hard disk with Windows Embedded Standard 2009:

Partition	Name	Size	File system
1. Partition	SYSTEM	25 GB	NTFS (not compressed)
2. Partition	DATA	Remainder	NTFS (not compressed)

Partitioning the SSD drive

The following partitions are configured in the factory state of the SSD drive with Windows Embedded Standard 2009:

Partition	Name	Size	File system
1. Partition	SYSTEM	15 GB	NTFS (not compressed)
2. Partition	DATA	Remainder	NTFS (not compressed)

To restore the original partition to its factory state, we recommend the software tool **SIMATIC PC/PG Image Creator.** Detailed information about using this tool is available in the manufacturer documentation.

11.3.2 Setting up the partitions under Windows XP Professional

You need to set up the partitions on the CompactFlash card after installing a new drive, to repair corrupt partitions or to change the partitioning.

Partitioning the hard disk

The factory state of the hard disk with Windows XP Professional includes the following partitions:

Partition	Name	Size	File system
1. Partition	SYSTEM	25 GB	NTFS (not compressed)
2. Partition	DATA	Remainder	NTFS (not compressed)

Partitioning the SSD drive

The following partitions are configured in the factory state of the SSD drive with Windows XP Professional:

Partition	Name	Size	File system
1. Partition	SYSTEM	15 GB	NTFS (not compressed)
2. Partition	DATA	Remainder	NTFS (not compressed)

To restore the original partition to its factory state, we recommend the software tool **SIMATIC PC/PG Image Creator.** Detailed information about using this tool is available in the manufacturer documentation.

11.4 Installing drivers and software

11.4.1 Driver installation under Windows Embedded Standard 2009

The driver installation under Windows Embedded Standard 2009 is conducted in the same way as under Windows XP Professional. Pay attention to the installation instructions of the driver manufacturer.

When installing drivers under Windows Embedded Standard 2009, you may see a prompt for the "Windows XP Installation CD".

● In this case, insert the Restore DVD.

The required files are in the folder \Drivers_WES.

● Disable the Enhanced Write Filter before installing drivers and enable it again when you are finished.

11.4.2 Installing drivers and software

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

Install the drivers and software from the included "Documentation and Drivers" CD.
Procedure:

1. Place the CD into the drive.

2. Start the program with "START".

3. Select "Drivers & Updates" from the index.

4. Select the operating system in "Drivers & Updates".

5. Install the required driver.

NOTICE
For new Windows XP Professional installations, the chipset driver must be installed before you install any other drivers.

11.5 Installing updates

11.5.1 Updating the operating system

Windows

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

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

Other operating systems

Please contact the corresponding manufacturer.

11.5.2 Installing or updating application programs and drivers

A USB drive has to be connected to install the software from a CD and/or floppy disk under Windows Embedded Standard 2009 / Windows XP Professional.

Drivers for USB floppy disk and CD-ROM drives are included in Windows Embedded Standard 2009 / Windows XP Professional and do not have to be installed from other sources.

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

For updates of drivers and application programs from third-party manufacturers, contact the respective manufacturer.

NOTICE
Before you install new drivers or operating system updates at Windows XP Professional MUI versions, the regional settings for menus and dialogs and the default language have to be reset to US English.

11.5.3   Performing a BIOS update

Download from BIOS update

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

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

11.6 Data backup

11.6.1 Creating an image

Data backup under Windows Embedded Standard 2009 / Windows XP Professional

To back up data under Windows Embedded Standard 2009 / Windows XP Professional, we recommend the software tool **SIMATIC PC/PG Image Creator** (as of V3.0). This tool provides comfortable and efficient functions for backup and restoring the full content of Compact Flash cards, of HDDs and of individual partitions (images.)

The Image Creator only supports the burning of DVD media.

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

Alarm, error and system messages

<div style="text-align: right; font-size: 3em;">12</div>

12.1 Boot error 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 error	Hard disk reports pending failure through S.M.A.R.T.

Troubleshooting/FAQs

13

13.1 General problems

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

Problem	Possible cause	To correct or avoid error
The device is not operational.	There is no power supply to the device.	Check if the power switch is set to ON.
The monitor remains dark.	The monitor is switched off.	Switch on the monitor.
	The monitor is in "powersave" mode.	Press any key on the keyboard.
	The brightness button has been set to dark.	Set the monitor brightness button to obtain more light. For detailed information, refer to the monitor operating instructions.
	The power cord or the monitor cable is not connected.	• Check whether the power cord has been properly connected to the monitor and to the system unit or to the grounded shockproof outlet. • Check whether the monitor cable has been properly connected to the system unit and to the monitor.
		If the monitor screen still remains dark after you have performed these checks, please contact your technical support team.
The mouse pointer does not appear on the screen.	The mouse driver is not loaded.	Check whether the mouse driver is properly installed and present when you start the application program. For more detailed information, refer to the manuals for the mouse or application programs.
	The mouse is not connected.	Check whether the mouse cord is properly connected to the system unit. If you use an adapter or extension on the mouse cable, also check the connectors.
		If the mouse pointer still does not appear on the screen after you have performed these checks and measures, please contact your technical support team.
Wrong time and/or date on the PC.		• Press <F2> within the boot sequence to open BIOS Setup. • Set the time and date in the setup menu.
Although the BIOS setting is OK, the time and data are still wrong.	The backup battery is dead.	In this case, please contact your technical support team.
USB device not responding	Operating system does not support the USB port.	No remedy.
	The operating system does not have a suitable driver for the USB device.	Install a suitable driver; the correct driver can often be downloaded from the homepage of the device's manufacturer. The EWF for Windows Embedded Standard 2009 must first be disabled for this purpose.

13.2 Problems when using modules of third-party manufacturers

Problem	Possible cause	To correct or avoid error
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 factory state, please contact your technical support team. • If the computer configuration has changed, restore the original factory settings. Remove all third-party modules, then restart the PC. If the error no longer occurs, the third-party module was the cause of the fault. Replace this module with a Siemens module or contact the module supplier.
		If the PC still crashes, contact your technical support team.

Technical specifications

<div style="text-align: right; font-size: 3em;">14</div>

14.1   General specifications

General specifications	
Order numbers	see the order documents
Dimensions	262x142x47 (WxHxD in mm)
Weight	Approximately 2 kg
Supply voltage (DC)	24 VDC [1] (19.2 to 28.8 V)
Brief power failure according to Namur	min. 15 ms (at 20.4 V) Max. 10 events per hour; min. 1 s recovery time
Maximum power consumption	4 A (at 24 V)
Noise emission	<40dB (A) to DIN 45635-1
Degree of protection	IP 20 to IEC 60529
Safety	
Protection class	Protection class I to IEC 61140
Safety specifications	EN 60950-1; UL 60950; CAN/CSA-C22.2 No. 60950-1; UL 508; CAN/CSA-C22.2 No. 142 or CAN/CSA-C22.2 No.14-05
Electromagnetic compatibility (EMC)	
Emitted interference	EN 61000-6-3 , EN 61000-6-4 , CISPR22:2004 Class B; FCC Class A
Noise immunity: Mains borne disturbance variables on supply lines	+/- 2 kV to IEC 61000-4-4; Burst +/-1 kV to IEC 61000-4-5; surge symmetric +/- 2 kV to IEC 61000-4-5; Surge asymmetric
Noise immunity on signal lines	± -1 kV to IEC 61000-4-4; Burst; Length < 3 m ± -2 kV to IEC 61000-4-4; Burst; length > 3 m ± -2 kV to IEC 61000-4-5; Surge; length > 30 m
Immunity to discharges of static electricity	+/-6 kV contact discharge according to IEC 61000-4-2 -8 kV air discharge according to IEC 61000-4-2
Immunity to RF interference	10 V/m 80 – 1000 MHz and 1.4 - 2 GHz, 80% AM to IEC 61000-4-3 1 V/m 2 - 2.7 GHz, 80% AM to IEC 61000-4-3 10 V 10 KHz – 80 MHz, 80% AM to IEC 61000-4-6
Magnetic field	100 A/m 50/60 Hz according to IEC 61000-4-8

[1]   The generation of the 24 DC V supply voltage by the line-side SV must be made as functional extra-low voltage with safe electrical isolation according to
IEC 60364-4-41 or as SELV in conformity to IEC/UL/EN/DIN-EN 60950-1 and LPS / NEC Class 2.

General specifications	
Climatic Conditions	
Temperature	Tested according to IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14
- Operation	**Horizontal mounting position:**
	Operation with hard disk:
	• with up to 3 expansion modules (max. load 9 W): +5 to +40° C
	Operation with CompactFlash card and/or SSD drive:
	• with up to 3 expansion modules (max. load 9 W): 0 to +45°C
	• with up to 3 expansion modules (max. load 9 W) in RAL: 0 to +50°C
	Operation with CompactFlash card:
	• Without expansion modules in RAL: 0 to +55°C
	Vertical / portrait mounting position:
	Operation with hard disk:
	• with up to 3 expansion modules (max. load 9 W): +5 to +40° C
	Operation with CompactFlash card:
	• Without expansion modules: 0 to +45° C
	Operation with CompactFlash card and/or SSD drive:
	• with up to 3 expansion modules (max. load 9 W) in RAL: 0 to +45° C
	Operation with CompactFlash card:
	• with up to 3 expansion modules (max. load 9 W) in RAL: 0 to +50° C
	Horizontal mounting position:
	Operation with CompactFlash card and/or SSD drive and without expansion modules: 0 to +40° C
	RAL = Restricted Access Location (installation of device in operating facilities with restricted access - for example, a locked control cabinet)
- Storage/transport	–20° to +60°C
- Gradient	Operating mode: Max. 10°C/h; Storage: 20°C/h; no condensation
Relative humidity	tested to IEC 60068-2-78, IEC 60068-2-30
- Operation	5% to 80% at 25° C (no condensation)
-Storage/transport	5% to 95% at 25° C (no condensation)

General specifications	
Mech. Ambient conditions	
Vibration	Tested to DIN IEC 60068-2-6
- Operation	with CompactFlash card 5 to 9 Hz: 3.5 mm, 9 to 500 Hz: 9.8 m/s2
	with hard disk and wall installation: 10 to 58 Hz: 0.0375 mm; 58 to 200 Hz: 4.9 m/s2
	with hard disk and DIN rail mounting or vertical installation: Starting prohibited
- Storage/transport	5 to 9 Hz: 3.5 mm, 9 to 500 Hz: 9.8 m/s2
Resistance to shock	Tested to DIN IEC 60068-2-27
- Operation	without hard disk drive: 150 m/s^2, 11 ms; with hard disk drive: 50 m/s^2, 30 ms
- Storage/transport	250 m/s^2, 6 ms
Special Features	
Quality assurance	acc. to ISO 9001
Motherboard	
Processor	Intel Celeron M 1.2 GHz, 1 MB SLC or
	Intel Pentium Core 2 Solo 1.2 GHz, 3 MB SLC or
	Intel Pentium Core 2 Duo 1.2 GHz, 3 MB SLC
Front Side Bus	800 MHz
Main memory	SO-DIMM modules; 512/1024/2048/4096 MB DDR3-SDRAM
Buffer memory	2 MB SRAM (256 KB of this can be backed up in the buffer time of the power supply under full load)
Free expansion slots	Up to 3 PCI-104 or PC/104-*Plus* modules can be used (max. permitted power loss: 3 W per module, 9 W total)
Drives / storage media	
Hard disk	1x 2.5" SATA-HD optional
Solid State Disk	1x 2.5" SATA-SSD optional
Compact Flash card	256/2048/4096/8192 MB
Graphics	
Graphics controller	Intel GMA4500
Graphics memory	8 - 512 MB Shared Memory
Resolutions/frequencies/color depth	CRT: 640 x 480 to 1920 x 1200 / 60 - 120Hz DVI-LCD: 640 x 480 to 1920 x 1200 / 60Hz

General specifications		
Ports		
COM1; COM2 (optional)		RS232, max. 115 Kbps., 9-pin Cannon, male
VGA/DVI		VGA integrated in the DVI-I
Keyboard		USB support
Mouse		USB support
USB		4x USB 2.0 high-speed / high current
PROFIBUS / MPI interface, isolated		9-pin Cannon socket, 2-row
- Transmission speed - Operating modes		9.6 Kbps to 12 Mbps DP master: DP-V0, DP-V1 with SOFTNET-DP DP slave: DP-V0, DP-V1 with SOFTNET DP slave
Ethernet		2x Ethernet ports (RJ45) Intel 82574L 10/100/1000 Mbps, isolated Teaming-capable
CAN (on request)		Philips SJA1000
Status displays on the device		
PWR	GREEN	Indicates correct supply voltage of 3.3 V, 5 V and 12 V from the integrated power unit
WD	OFF	Watchdog disabled
	GREEN	Watchdog enabled, monitoring time not expire
	RED	Watchdog enabled, monitoring time expired
L1 (LED 1) SF (Group fault)	OFF YELLOW RED	Can be controlled by user programs
	RED	Can be controlled by controller program (e.g. WinAC)
L2 (LED 2) RUN STOP	OFF YELLOW GREEN	Can be controlled by user programs
	GREEN YELLOW	Can be controlled by controller program (e.g. WinAC)

14.2   Power requirements of the components

Maximum power consumption of the auxiliary components

Auxiliary components		Maximum permitted power consumption				Max. total power
		+5 V	**+3.3 V**	**+12 V**	**-12 V**	
USB device	High current	500 mA	--	--	--	10 W (for all USB devices)
PC/104 modules	Per slot	1.5 A	1.5 A	0.3 A	0.2 A	9 W (for the whole device)
	Total	2 A	2 A	0.5 A	0.5 A	

1) The total load for PCI-104 and USB expansion is max. 15W.

NOTICE
Device can overheat!
For thermal reasons, a 3 watt power loss per PCI/104 slot should not be exceeded.

14.3   Integrated DC power supply

Technical specifications

Input voltage	24 VDC (19.2 to 28.8 VDC)
Power consumption 1)	max. 72 W
Power failure buffering	Hold-up time > 15 ms (after > 5 ms DC_FAIL becomes active)
Maximum continuous output power 1)	60 W
Degree of protection	IP 20
Protection class	Safety class I (A protective conductor must be connected to the device)

1) The performance specifications apply to the power supply components and the IPC427C device.

Note

Inrush current

A minimum of 4.5 A inrush current for 15 ms is required for starting the IPC427C.

The peak value of the startup current depends on the input voltage and the impedance of the 24V source: Peak values of more than 4.5 A are possible. This will not inhibit the operation of the IPC427C.

Typical power consumption

	Current consumption	Power consumption (at 24 V rated voltage)
Base device with Celeron or Core 2 Solo processor	550 mA	13 W
Base device with Core 2 Duo processor	750 mA	18 W
Fieldbus (Profibus or Profinet)	120 mA	3 W
2.5" hard disk	100 mA	2 W
Expansion USB 1)	max. 500 mA	max. 12 W
Expansion PCI-104 1)	max. 460 mA	max. 11 W

1) The total load for PCI-104 and USB expansion is max. 15W.

Dimension drawings

<div style="text-align: right; font-size: 3em;">15</div>

15.1 Overview of the dimensional drawings

This section contains the following dimension drawings:

- Dimension drawings of the device (Page 98)
- Dimension drawings of the device with mounting brackets (Page 99)
- Dimensional drawings of the device with vertical mounting angles (Page 101)
- Dimensional drawings of the device with expansion frames (Page 102)
- Dimension drawing of the blanking plate (Page 103)

Note

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

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15.2 Dimension drawings of the device
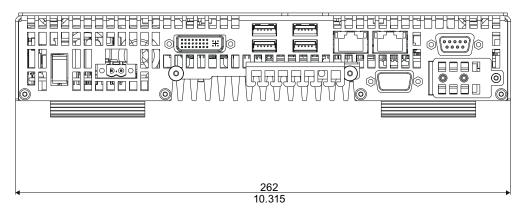
Figure 15-1   Dimensional drawing of the device: Front view
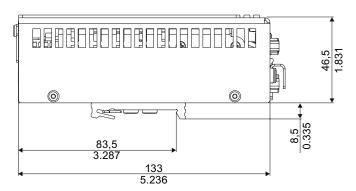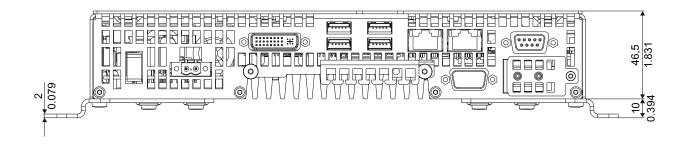

Figure 15-2   Dimensional drawing of the device: Side view

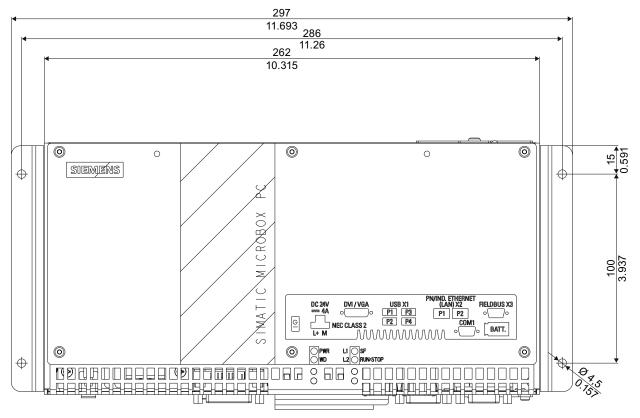## 15.3 Dimension drawings of the device with mounting brackets

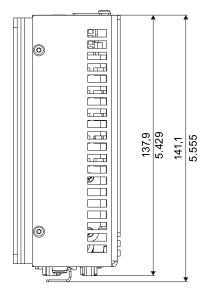Figure 15-3   Dimensional drawing of the device with mounting brackets Front view and top view

Figure 15-4   Dimensional drawing of the device with mounting brackets Side view

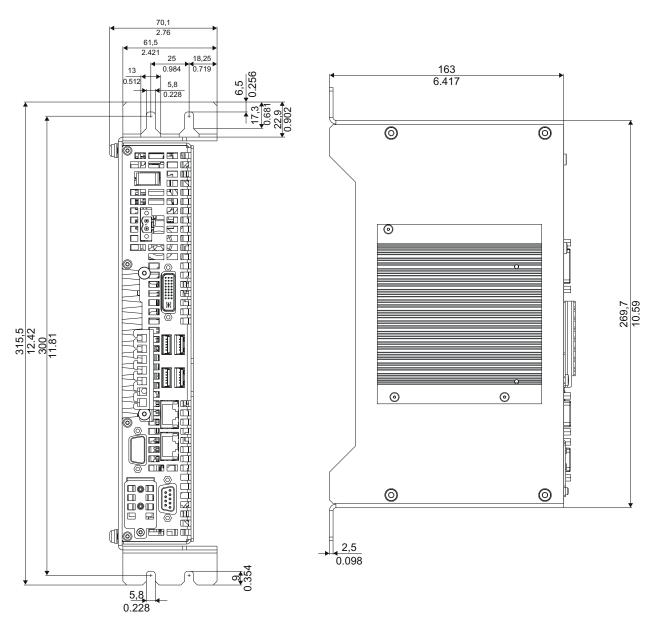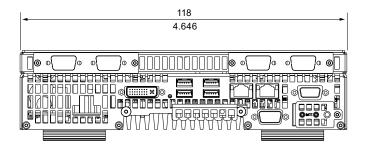## 15.4 Dimensional drawings of the device with vertical mounting angles
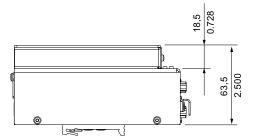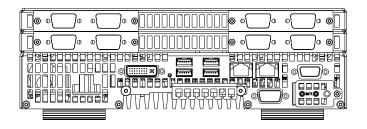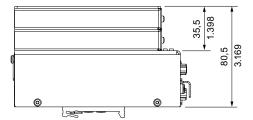

Figure 15-5   Dimensional drawings of the device with vertical mounting brackets
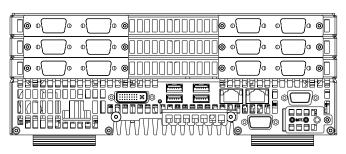
15.5   Dimensional drawings of the device with expansion frames
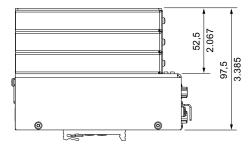
Figure 15-6   Dimensional drawings of the device with expansion frames

15.6 Dimension drawing of the blanking plate
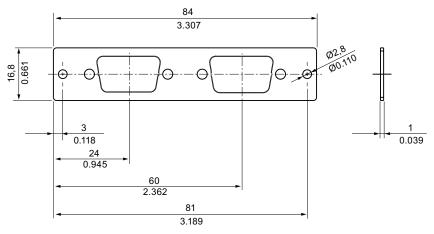
Figure 15-7   Dimensional drawing of the blinding plate

Detailed descriptions

16

16.1   Internal components

16.1.1   Overview of internal components

The basic components of the device are

- the motherboard with processor, chipset, one slot for a RAM module, internal and external ports,
- a DC/DC converter for the power supply of the device

Figure 16-1   Internal layout of the device

①	Slot for a memory module	④	Motherboard
②	Slot for up to three PCI-104 or PC/104-*Plus* modules	⑤	DC/DC converter
③	Slot for Compact Flash card		

16.1.2   Technical features of the motherboard
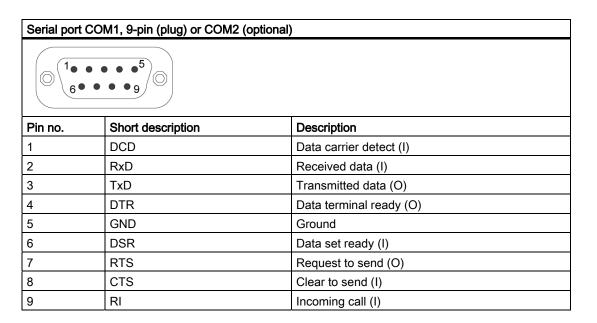
Component / port	Description	Parameters
Chipset	Intel GM45+ICH-9m	
BIOS	Insyde H20...	
CPU	Intel Celeron M Inter Pentium Core 2 Solo Intel Pentium Core 2 Duo	1.2 GHz, 1 MB SLC 1.2 GHz, 3 MB SLC 1.2 GHz, 3 MB SLC
Memory	DDR 3 SO-DIMM module	512 MB / 1024 MB / 2048 MB / 4096 MB
Graphics	Intel GMA4500	8 - 512 MB graphics memory taken dynamic from RAM

16.1.3 External ports

16.1.3.1 Overview

Port	Position	Description	
COM1; COM2 (optional)	external	9-pin male	V24
USB	external	Four USB channels	USB 1.1
		4 x high current	USB 2.0
PROFIBUS /MPI /DP12(optional)	external	9-pin female	
CAN (optional)	external	9-pin female	CAN
Ethernet	external	2 x RJ45	10/100/1000 Mbps
DVI-I	external	DVI-I standard socket	

16.1.3.2 COM1/2

Serial port COM1, 9-pin (plug) or COM2 (optional)		
Pin no.	**Short description**	**Description**
1	DCD	Data carrier detect (I)
2	RxD	Received data (I)
3	TxD	Transmitted data (O)
4	DTR	Data terminal ready (O)
5	GND	Ground
6	DSR	Data set ready (I)
7	RTS	Request to send (O)
8	CTS	Clear to send (I)
9	RI	Incoming call (I)

16.1.3.3   DVI-I

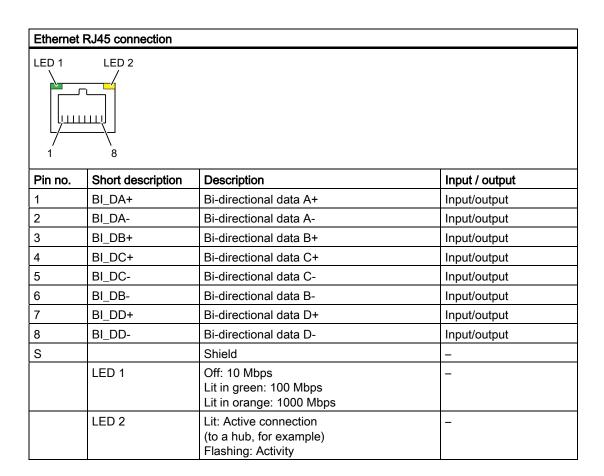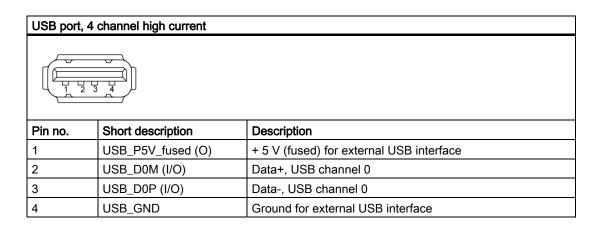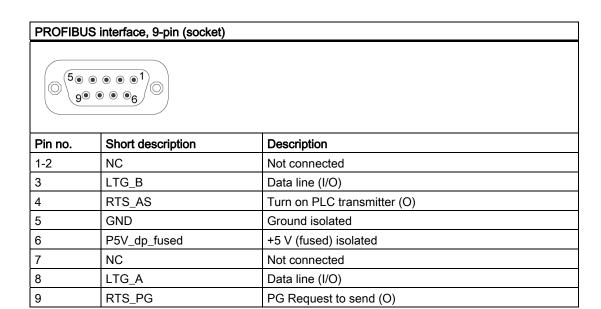| DV-I port, standard socket		
Pin no.	Short description	Description
1	TMDS Data2-	DVI data channel (O)
2	TMDS Data2+	DVI data channel (O)
3	TMDS Data2/4 shield	Cable shield
4	NC*	
5	NC	
6	DDC clock (SCL)	Display data channel – clock (I/O)
7	DDC data (SDA)	Display data channel – data (I/O)
8	Analog vertical sync (VSYNC)	Analog vertical sync signal (O)
9	TMDS Data1-	DVI data channel (O)
10	TMDS Data1+	DVI data channel (O)
11	TMDS Data1/3 shield	Cable shield
12	NC	
13	NC	
14	+5V power (VCC)	+5V power for DCC (O)
15	Ground (return for +5V, Hsync and Vsync) (GND)	Analog ground
16	Hot Plug Detect	
17	TMDS data 0-	DVI data channel (O)
18	TMDS data 0+	DVI data channel (O)
19	TMDS Data0/5 shield	Cable shield
20	NC	
21	NC	
22	TMDS clock shield	Cable shield
23	TMDS clock+	DVI clock channel (O)
24	TMDS clock-	DVI clock channel (O)
C1	Analog red (R)	Analog red signal (O)
C2	Analog green (G)	Analog green signal (O)
C3	Analog blue (B)	Analog blue signal (O)
C4	Analog horizontal sync (HSYNC)	Analog horizontal sync signal (O)
C5	Analog ground (analog R, G, & return) (GND)	Analog ground

16.1.3.4   Ethernet

Ethernet RJ45 connection			
LED 1 LED 2 1 8			
Pin no.	**Short description**	**Description**	**Input / output**
1	BI_DA+	Bi-directional data A+	Input/output
2	BI_DA-	Bi-directional data A-	Input/output
3	BI_DB+	Bi-directional data B+	Input/output
4	BI_DC+	Bi-directional data C+	Input/output
5	BI_DC-	Bi-directional data C-	Input/output
6	BI_DB-	Bi-directional data B-	Input/output
7	BI_DD+	Bi-directional data D+	Input/output
8	BI_DD-	Bi-directional data D-	Input/output
S		Shield	–
	LED 1	Off: 10 Mbps Lit in green: 100 Mbps Lit in orange: 1000 Mbps	–
	LED 2	Lit: Active connection (to a hub, for example) Flashing: Activity	–

16.1.3.5   USB

USB port, 4 channel high current		
Pin no.	**Short description**	**Description**
1	USB_P5V_fused (O)	+ 5 V (fused) for external USB interface
2	USB_D0M (I/O)	Data+, USB channel 0
3	USB_D0P (I/O)	Data-, USB channel 0
4	USB_GND	Ground for external USB interface

16.1.3.6   PROFIBUS

PROFIBUS interface, 9-pin (socket)		
Pin no.	**Short description**	**Description**
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 (fused) isolated
7	NC	Not connected
8	LTG_A	Data line (I/O)
9	RTS_PG	PG Request to send (O)

16.1.3.7   CAN bus

CAN bus port, 9-pin (socket)		
Pin no.	**Short description**	**Description**
1	-	Reserved
2	CAN_L	CAN bus signal (L active)
3	CAN_GND	CAN station ground
4	-	Reserved
5	-	Reserved
6	-	Reserved
7	CAN H	CAN bus signal (H active)
8	-	Reserved
9	-	Reserved

NOTICE
The permitted maximum length of the CAN bus cable is 30 meters.

16.1.4   Internal ports

16.1.4.1   Overview

Port	Position	Connector	Description
Compact Flash card (True IDE mode)	Internal	X3	50-pin CF socket, types I / II
PCI -104	Internal		PCI interface

16.1.4.2   Compact Flash card interface

Compact Flash card interface, X3		
Pin no.	Short description	Description
41	RESET#	Reset (output)
7	CS0#	Chip select 0(output)
32	CS1#	Chip select 1(output)
34	IORD#	I/O read (output)
35	IOWR#	I/O write (output)
20, 19, 18,	A0-A2	Address bit 0-2 (output)
17, 16, 15, 14, 12, 11, 10, 8	A3-A10	Address bit 3-10 (output) to ground
21, 22, 23, 2, 3, 4, 5, 6, 47, 48, 49, 27, 28, 29, 30, 31	D0-D15	Data bits 0-15 (in/out)
37	INTRQ	Interrupt request (input)
9	OE# /ATA SEL#	Enables True IDE mode
24	IOCS16#	I/O-chip select 16 (input)
39	CSEL#	Cable select (output)
42	IORDY	I/O ready (input)
46	PDIAG#	Passed diagnostic
45	DASP#	Drive active/slave present (not connected)
26, 25	CD1#, CD2#	Card detect (not connected)
33, 40	VS1#, VS2#	Voltage sense (not connected)
43	DMARQ	DMA request (input)
44	DMACK#	DMA acknowledge (output)
36	WE#	Write enable
1, 50	GND	Ground
13, 38	VCC	+ 5V power

16.1.4.3   PCI-104 or PC/104-Plus interface (PCI part)

PCI-104 or PCI part of the PC/104-Plus interface, X7			
Pin no.	O	B	C	D
1	GND	Reserved	+5	AD00
2	VI/O 5V	AD02	AD01	+5V
3	AD05	GND	AD04	AD03
4	C/BE0#	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O	AD10	M66EN
7	AD14	AD13	GND	AD12
8	+3.3V	C/BE1#	AD15	+3.3V
9	SERR#	GND	--	PAR
10	GND	PERR#	+3.3V	--
11	STOP#	+3.3V	LOCK#	GND
12	+3.3V	TRDY#	GND	DEVSEL#
13	FRAME#	GND	IRDY#	+3.3V
14	GND	AD16	+3.3V	C/BE2#
15	AD18	+3.3V	AD17	GND
16	AD21	AD20	GND	AD19
17	+3.3V	AD23	AD22	+3.3V
18	IDSEL0 = AD28	GND	IDSEL1= AD29	IDSEL2 = AD30
19	AD24	C/BE3#	VI/O	IDSEL3 = AD31
20	GND	AD26	AD25	GND
21	AD29	+5V	AD28	AD27
22	+5V	AD30	GND	AD31
23	REQ0#	GND	REQ1#	VI/O
24	GND	REQ2#	+5V	GNT0#
25	GNT1#	VI/O	GNT2#	GND
26	+5V	CLK0	GND	CLK1
27	CLK2	+5V	CLK3	GND
28	GND	INTD#	+5V	RST#
29	+12V	INTA#	INTB#	INTC#
30	-12V	Reserved	Reserved	GND

16.2 BIOS Setup

16.2.1 Overview

BIOS Setup program

BIOS Setup program is stored in ROM BIOS. System configuration data are stored in battery-backed RAM of the device.

SETUP can be used to define the hardware configuration (for example, the hard disk type) and system properties. SETUP is also used to set the time and date of the realtime clock.

Changing the device configuration

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

16.2.2 Starting BIOS Setup

Starting BIOS Setup

Start the setup program as follows:

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

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


   ```
   BIOS Version      : V12.01.01
   BIOS Build Date   : 03/30/2009

   Processor Type    : Intel(R) Core(TM)2 Duo CPU    U9300 @ 1.20GHz

   System Memory Speed :  800 MHz




















   SIMATIC IPC427C  PROFIBUS    A5E82038587-ES000
   Press F2 go to Setup Utility
   Press ESC go to Boot Manager
   ```

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

   ```
   PRESS F2 go to Setup Utility or
   Press ESC go to Boot Manager
   ```

2. Press F2 key as long as BIOS prompt appears on screen.

16.2.3   BIOS Setup menus

The various menus and submenus are listed on the next pages. You can obtain information on the selected SETUP item from the "Item-specific help" part of the respective menu.
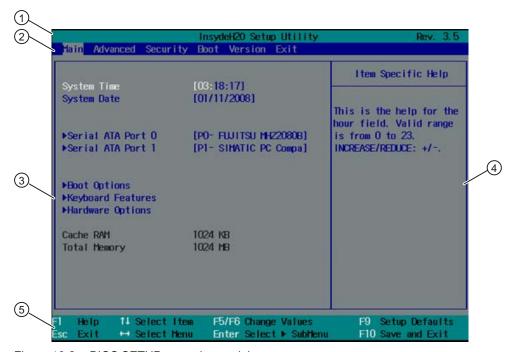
Figure 16-2   BIOS SETUP menu (example)

① Header	④ Help window
② Menu bar	⑤ Command line
③ Selectable submenu	

Menu layout

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

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

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

Menu	Description
Main	System functions are set here
Advanced	An extended system configuration can be set here
Security	Security functions are set here, for example, a password.
Boot	This is where the boot priority is specified.
Version	Information about the programming device (for example, release status) can be found here.
Exit	Used for terminating and saving.

16.2.4   Main menu
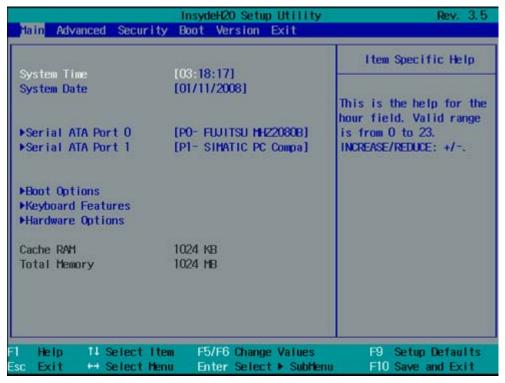
Figure 16-3   Main menu

Settings in the main menu

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

Field	Meaning
System Time	For viewing and setting the current time
System Date	For viewing and setting the current date
by submenus	
Serial ATA Port 0	Type of installed drives
Serial ATA Port 1	Type of installed drives
Boot options	Used for setting the boot options
Keyboard Features	Used for setting the keyboard interface (Numlock)
Hardware Options	Used for setting the hardware options

System time and date

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

Hour: Minute: Second

and for the date

Month/Day/Year

.

You can navigate through the entries within the date and time fields (for example, from hour to minute) using the Enter key.

Serial ATA Port 0, Serial ATA Port 1
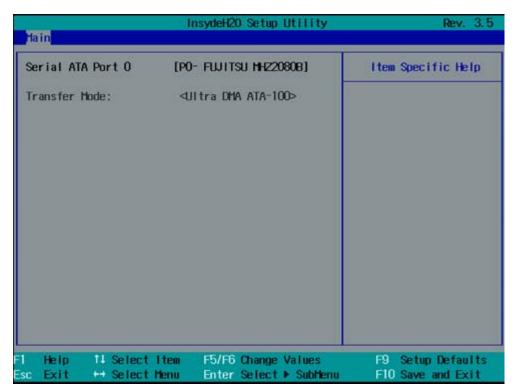
Figure 16-4   "Serial ATA Port 0" submenu (example)

Transfer Mode	Fast PIO	This field shows the transmission speed
	Ultra DMA ATA-33	of the interface. The displayed value depends on the
	Ultra DMA ATA-66	type of drive connected.
	Ultra DMA ATA-100	Exit the submenu by pressing ESC.

"Boot Options" submenu
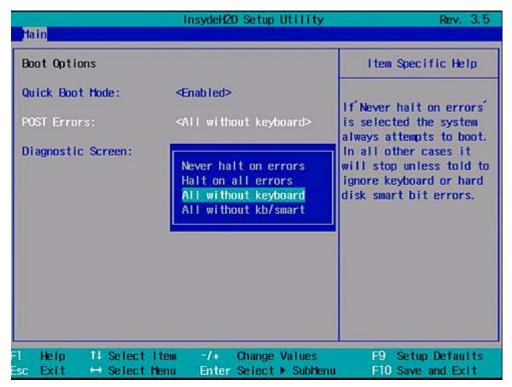
Figure 16-5   "Boot Options" submenu

Quick Boot Mode	Some hardware tests are skipped to speed up the boot sequence.	
POST errors	The boot sequence is stopped if an error is detected during booting; you must press F1 to acknowledge.	
	Never halt on errors	Booting continues if errors occur
	Halt on all errors	Booting is stopped if an error is detected
	All without keyboard	Booting is stopped if any error except a keyboard error occurs
	All without kb/smart	Stop at any error, but not with a keyboard or S.M.A.R.T storage media error.
Diagnostic screen	Shows the diagnostics messages on the monitor during booting.	

"Keyboard Features" submenu
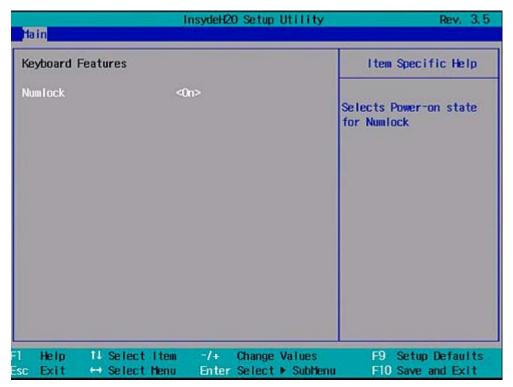
Figure 16-6   "Keyboard Features" submenu

Numlock	On	Switches Numlock on or off following power on.
	Off	

"Hardware Options" submenu
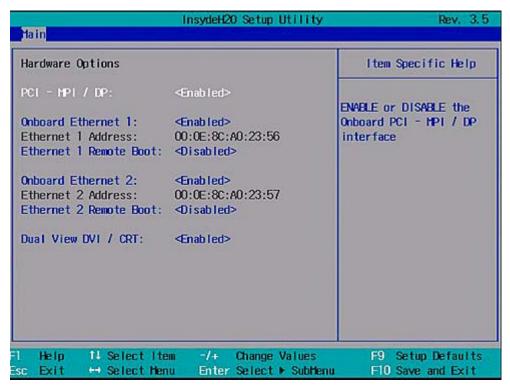
Figure 16-7   "Hardware Options" field

The parameters of the interfaces present on the motherboard are set here.

Entry	Meaning	
PCI - MPI / DP	Enabled	Sharing the MPI/DP interface. The resources are managed by the BIOS PCI Plug and Play mechanism.
	Disabled	The MPI/DP interface is disabled.
Onboard Ethernet 1/2	Enabled	The Ethernet port on the motherboard is enabled.
	Disabled	The Ethernet port on the motherboard is disabled.
Ethernet 1/2 Address	Shows the individual Ethernet address.	
Ethernet 1/2 Remote Boot	Enabled	Booting via a connected LAN is possible.
	Disabled	Booting via LAN is not possible.
Dual view DVI/CRT	Enabled	Dual view DVI/CRT is available via the DVI-I socket.
	Disabled	Only one monitor can be enabled via the DVI/VGA socket.

Note

The second Ethernet interface support is OS dependent. For DOS based applications (e.g. Image Creator), use the first Ethernet interface and disable the second Ethernet interface in BIOS Setup. This is practical because some programs use the second Ethernet interface because it is the first one found on the PCI bus.
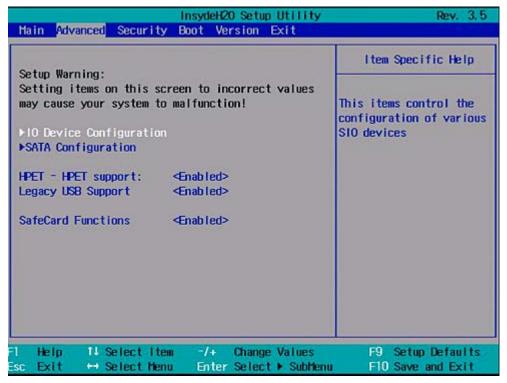
16.2.5 Advanced Menu

Menu layout

Figure 16-8 Advanced Menu

Settings in the Advanced Menu

HPET - HPET support	Disabled	High Precision Event Timer is disabled
	Enabled	High Precision Event Timer is enabled
Legacy USB support	Disabled	Disables Legacy Universal Serial Bus support Booting via USB media is not possible: but USB keyboard and USB mouse work.
	Enabled	Enables Legacy Universal Serial Bus support Booting via USB media is possible and the USB keyboard and USB mouse work. The USB Boot function must be enabled to allow booting from a USB device, or if the system is to be operated without USB support with a USB keyboard or mouse.
SafeCard functions	Enabled	Watchdog reset is enabled.
	Disabled	Watchdog reset is disabled.
		The relevant driver and the application must be started for operation of the monitoring functions.

"IO Device Configuration" submenu

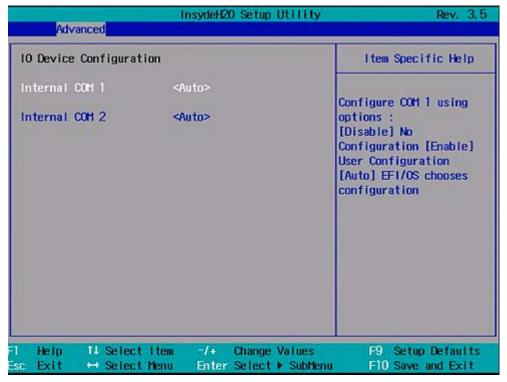Figure 16-9   "IO Device Configuration" submenu

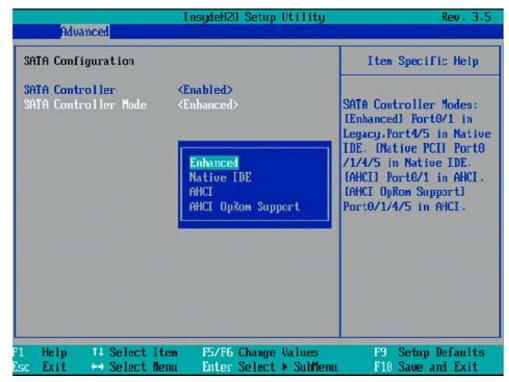| Internal COM 1 / COM 2	Disabled	COM 1 or COM 2 is always disabled.
	Auto	BIOS switches on the COM. Resources are assigned in the OS per reconfiguration.
	Enabled	COM 1 or COM 2 is always enabled. BIOS assigns resources to COM.

"SATA Configuration" submenu

Figure 16-10 "SATA Configuration" submenu

SATA Controller	[Enabled] [Disabled]	Disables or enables the SATA controller
SATA Controller mode	[Enhanced]	Serial ATA Ports 0/1 work in Legacy Mode. Serial ATA Ports 4/5 work in Native IDE Mode.
	Native PCI	Serial ATA Ports 0/1/4/5 work in Native IDE Mode.
	AHCI	Serial ATA Ports 0/1 work in AHCI Mode (only relevant for IPC427C).
	AHCI OpRom Support	Serial ATA Ports 0/1/4/5 work in AHCI Mode with the ROM support option (setting for Panel PC; not relevant for IPC427C).

16.2.6   Security menu

You can only edit the fields enclosed in square brackets. Two passwords can be assigned to protect your PC from unauthorized use. The Supervisor password can be used to restrict access to the hard disks.
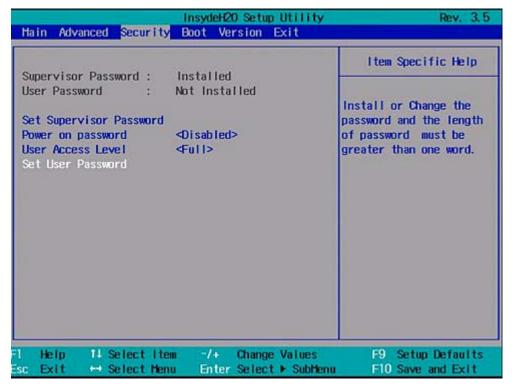
```
                       InsydeH20 Setup Utility            Rev. 3.5
   Main  Advanced  Security  Boot  Version  Exit

                                              Item Specific Help
   Supervisor Password :    Installed
   User Password       :    Not Installed
                                            Install or Change the
   Set Supervisor Password                  password and the length
   Power on password      <Disabled>        of password  must be
   User Access Level      <Full>            greater than one word.
   Set User Password




   F1   Help     ↑↓ Select Item   -/+  Change Values     F9  Setup Defaults
   Esc  Exit     ↔  Select Menu   Enter Select ▶ SubMenu  F10 Save and Exit
```

Figure 16-11 "Security" menu (example)

Supervisor Password	Installed	Certain Setup fields are configurable by the user, including the user password.
	Not installed	The password is disabled.
User password	Installed	Certain setup fields can be changed by the user, including the user password.
	Not installed	The password is disabled.
Set Supervisor Password	This field opens the password input dialog. Authorized logged on users can change the supervisor password, or delete and deactivate it by pressing "Return."	
Power on password	Enabled	Password must be entered to boot.
	Disabled	Password must be entered to access BIOS Setup.
User Access Level	View only	Setup is accessible, but fields cannot be changed.
	Limited	Some setup entries can be changed.
	Full	All setup entries can be changed, except for the supervisor password.
Set User Password	This field opens the password input dialog. Logged on users can change the password, or clear and deactivate it by pressing "Return."	

16.2.7 Boot menu

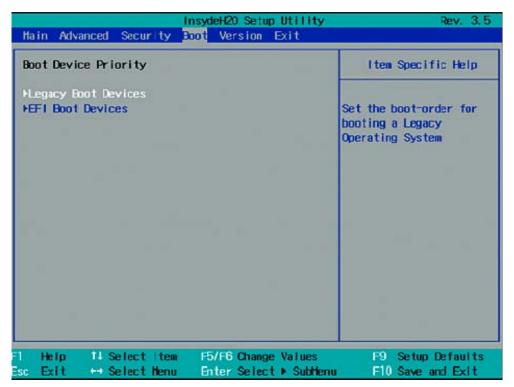This menu allows you to assign a priority for the boot devices.

Figure 16-12 "Boot" menu

Legacy

Specifies the boot sequence for boot devices with Legacy operating systems.
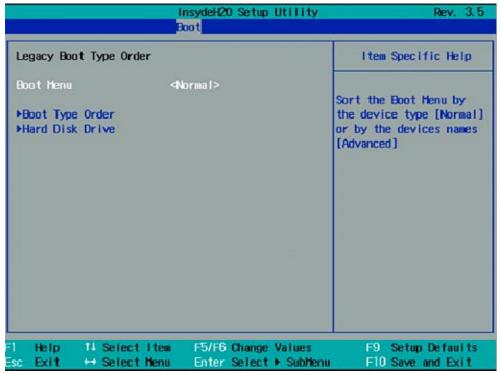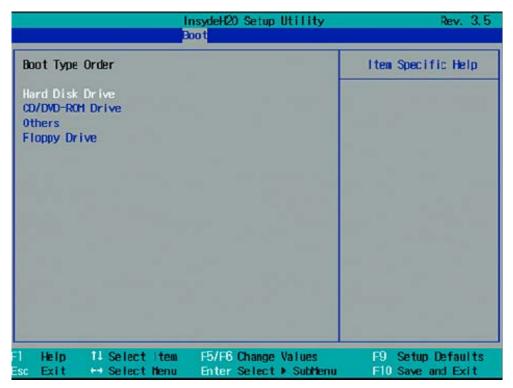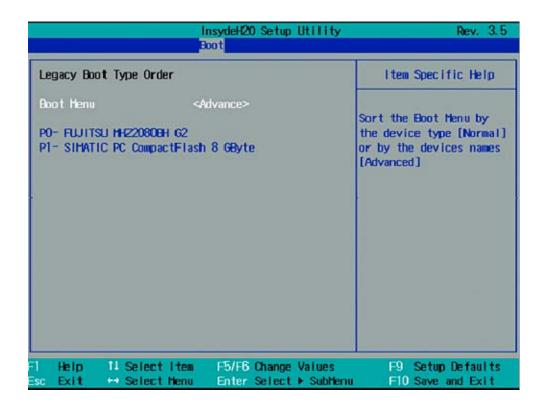

Figure 16-13   "Legacy" submenu

Figure 16-14 "Boot Type Order" field

This screen shows all possible legacy boot types. The boot type with highest boot priority is shown at the top. To change the sequence:

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

Note

You can open the Boot menu and select the boot volume by pressing the ESC key during system startup.

16.2.8 Version menu

Keep this information at hand if customer support has technical questions about your system.
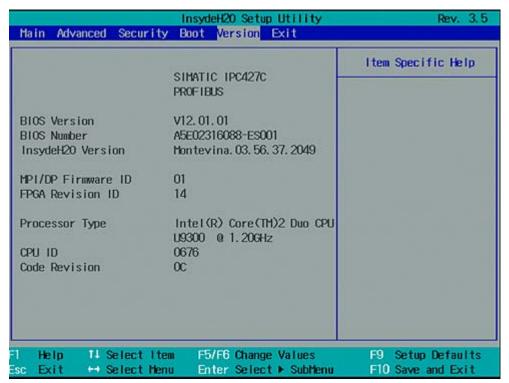
Figure 16-15   Version menu (example)

16.2.9   Exit Menu

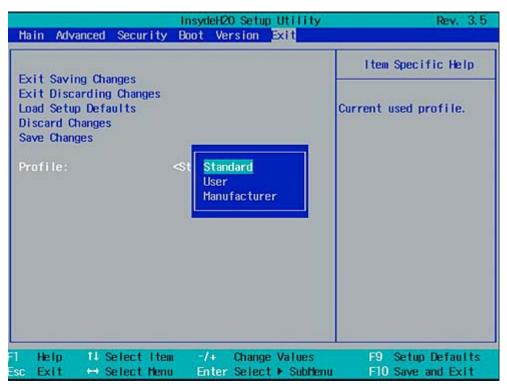You always exit BIOS Setup in this menu.

Figure 16-16   Exit menu

Exit Saving Changes	All changes are saved and the system is restarted with the new parameters.	
Exit Discarding Changes	All changes are discarded and the system is restarted with the old parameters.	
Load Setup Defaults	The default values are loaded.	
Discard Changes	All changes are discarded.	
Save Changes	All changes are saved	
Profiles	Standard	The BIOS settings are backed up to buffered CMOS
	User	The BIOS settings are saved in the non-volatile FLASH memory.
	Manufacturer	This setting is only used for production purposes. Do not use.

16.2.10   Default BIOS Setup entries

Documenting your device configuration

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

Note

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

BIOS Setup default settings

System parameters	Defaults	Custom entries
Main		
System Time	hh:mm:ss	
System Date	MM/DD/YYYY	

Serial ATA Port 0, Serial ATA Port 1		
Type		
32-bit I/O		
Block Mode		
Transfer Mode		
Security Mode		

Boot options		
Quick Boot Mode	Enabled	
POST errors	All without keyboard	
Diagnostic screen	Enabled	

Keyboard Features		
Numlock	On	

Hardware Options		
PCI - MPI/DP [1]	Enabled	
Internal CAN [2]	Enabled	
CAN bus I/O address [2]	5400	
On-board Ethernet 1	Enabled	
Ethernet 1 Address	00.0E.8C.xxxxxx	
Ethernet 1 Remote Boot	Disabled	

Hardware Options		
On-board Ethernet 2	Enabled	
Ethernet 2 Address	00.0E.8C.xxxxxx	
Ethernet 2 Remote Boot	Disabled	
Dual view DVI/CRT	Disabled	

[1] Only for models with PROFIBUS
[2] Only with models with CAN bus

Advanced		
HPET - HPET support	Enabled	
Legacy USB support	Enabled	
SafeCard functions	Enabled	

IO device configuration		
Internal COM 1	Auto	
Internal COM 2	Auto	

SATA Configuration		
SATA Controller	Enabled	
SATA Controller mode	Enhanced	

Security		
Supervisor Password	Not installed	
User password	Not installed	
Set Supervisor Password		
Power on password		
User Access Level		
Set User Password		

Boot		
Legacy Boot Devices		
EFI Boot Devices		

Legacy Boot Type Order		
Boot menu	Standard	

Version		
SIMATIC PC	IPC427C PROFIBUS	
BIOS Version	V12.01.xx	
BIOS Number	A5E02316088-ES0xx	
InsideH20 Version	Montevina.03.56.37.20xx	
MPI / DP Firmware ID	xx	
FPGA Revision ID	xx	
Processor Type	Intel® Core™2 Duo CPU U9300 @ 1.20GHz	
CPU ID	00676	
Code Revision	0C	

16.3 System resources

16.3.1 Currently allocated system resources

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

Windows Embedded Standard 2009	**Start > Run :** In the **Open** dialog, enter *msinfo32*and confirm with **OK**

16.3.2 System resources used by the BIOS/DOS

The following tables and pictures describe the system resources for the factory state of the device.

16.3.2.1 PCI Interrupt Lines

The interrupts are assigned to devices by BIOS. Exclusive non-shared interrupts are available for the first two PCI-104 or PC/104-*Plus* slots as well as for DP12 and the first Ethernet interface.

This means that applications or realtime operating system extensions can operate these devices exclusively and with high-performance without having to share the interrupt with other devices.

Table 16- 1   Interrupt sharing in APIC mode

Interrupt		Interrupt type
IRQ0	System Timer / HPET	ISA exclusive
IRQ1	PS/2 keyboard controller emulation	ISA exclusive
IRQ2	Interrupt controller 2	ISA exclusive
IRQ3	Reserved for Com Port 2 (COM2)	ISA exclusive (COM2)
IRQ4	Com Port 1 (COM1)	ISA exclusive
IRQ5	Free	
IRQ6	Reserved	
IRQ7	Free	
IRQ8	Realtime clock / HPET	ISA exclusive
IRQ9	ACPI-SCI (system control interrupt)	
IRQ10	CAN (optional) or free	ISA exclusive (CAN)
IRQ11	Free	
IRQ12	PS/2 mouse controller emulation	ISA exclusive
IRQ13	Coprocessor	ISA exclusive
IRQ14	Primary IDE Channel (enhanced mode)	ISA exclusive
IRQ15	Secondary IDE Channel (enhanced mode)	ISA exclusive
IRQ16	Graphics, PCI-Express Bridge, LAN2, SATA Controller 2 (enhanced / native IDE mode)	PCI shared
IRQ17	LAN1 exclusive	PCI exclusive
IRQ18	SATA-AHCI Controller (AHCI mode), SATA Controller 1 (native IDE mode)	PCI shared
IRQ19	DP12/MPI or PROFINET (optional)	PCI exclusive
IRQ20	PCI104 Slot 1	PCI exclusive
IRQ21	PCI104 Slot 2	PCI exclusive
IRQ22	PCI104 Slot 3, USB-UHCI Controller 1-3 (USB1.1), USB-EHCI Controller 1 (USB2.0)	PCI shared
IRQ23	PCI104 Slot 3, USB-UHCI Controller 4-6 (USB1.1), USB-EHCI Controller 2 (USB2.0)	PCI shared

16.4   I/O Address Areas

16.4.1   Overview of the internal module registers

Overview of the internal module registers

The following addresses are used for the internal registers:

Addresses	Input/output unit
I/O 062h	Watchdog enable register / 066h select register (Page 138)
I/O 066h	Watchdog trigger register (Watchdog enable register bit 2=0) (Page 138)
	CAN base address register (Watchdog enable register bit 2=1) (Page 139)
I/O 404Eh - 404Fh	Output register LED 1/2 and SF LED / RUN/STOP LED (Page 140)
I/O 50Fh	Battery status register (read-only) (Page 140)

16.4.2 Watchdog enable register / 066h select register (read/write, address 062h)

Meaning of the bits

Watchdog enable register / 066h select register (r/w address 062h)								
Bit								Meaning of the bits
7	6	5	4	3	2	1	0	
								Watchdog enable bit (WDE)
							0	Watchdog circuit disabled
							1	Watchdog circuit enabled
								Watchdog Mode
						0		Standard
						1		Macro
								066h select register selection
					0			066h is Watchdog trigger register
					1			066h is CAN base address register
								Scaler watchdog time (Normal/Macro)
		0	0	0				94 ms / 2 s (default)
		0	0	1				210 ms / 4 s
		0	1	0				340 ms / 6 s
		0	1	1				460 ms / 8 s
		1	0	0				590 ms / 16 s
		1	0	1				710 ms / 32 s
		1	1	0				840 ms / 48 s
		1	1	1				960 ms / 64 s
								Trigger red Watchdog LED
	0							Red LED (WD) off
	1							Red LED (WD) on
								Watchdog error / Display and reset
0								WD inactive
1								WD triggered Reset LED after watchdog alarm (Bit 7 = write 1)

16.4.3 Watchdog trigger register (read only, address 066h)

Watchdog trigger register

The watchdog is triggered by a read action (address 066h) by this register. The result of the read access can be disregarded (i.e., dummy read).

16.4.4   CAN base address register (write only, address 066h)

A 512 byte window is created in the I/O area for the CAN controller (Philips SJA1000). The block itself only needs 32 or 128 bytes of this depending on the operating mode. The address window can be selected in 1024 byte steps between 4000h and 7C00h through the CAN base address register (write only, address 066h).

A limited selection can be preset in the BIOS Setup.

Note

The CAN base address register shares its I/O address with other registers. The watchdog enable register / 066h select register therefore must be selected before access.

Meaning of the bits

CAN base address register (write only, address 066h, Address register selection 1)									
Bit								Description	
7	6	5	4	3	2	1	0		
						0	0	Reserved (Write: 00)	
0	1							Reserved (Write:01)	
		0	0	0	0			40h	Sets the high byte of the CAN base address 01nnnn00
		.	.	.	.			.	
		.	.	.	.			.	
		1	1	1	1			7Ch	

16.4.5   Output register LED 1 / 2 (read/write, address 404Eh)

Meaning of the bits

Output register LED 1 / 2 (read/write address 404Eh)						
Bits						
15	14	13 - 8	7	6	5 - 0	
	1			1		LED L1 / SF dark (default)
	1			0		LED L1 / SF lights yellow
	0			1		LED L1 / SF lights red (= group fault)
1			1			LED L2 / R/S dark (default)
1			0			LED L2 / R/S lights yellow (= STOP)
0			1			LED L2 / R/S lights green (= RUN)
		xxxxxx			xxxxxx	Reserved (read/write)

Note

The L1 and L2 LEDs indicate by flashing alternatively yellow the progress of the BIOS self-test during the device startup. When the BIOS self-test is completed, the L1 and L2 LEDs go dark.

16.4.6   Battery status tab (read-only, address 50Fh)

The status of the CMOS battery is monitored; the status (two-tier) can be read from the battery status register.

Meaning of the bits

Battery status register (read-only, address 50Fh)								
Bit								Description
7	6	5	4	3	2	1	0	
0	0							CMOS battery capacity is still sufficient.
1	0							CMOS battery capacity is exhausted (remaining capacity is sufficient for approx. one month)
1	1							CMOS battery is empty

16.4.7 SRAM address register

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

Meaning of the bits

SRAM address register		
PCI register address: SRAM base address register	PCI register content: SRAM memory address (default)	Length of the memory area
8010 2010h	9040 0000h Address is assigned dynamically (depending on device)	20 0000h

Appendix A

A.1 Guidelines and declarations

Notes on the CE Label

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

EMC directive

The devices meet the requirements for the EC directive "2004/108/EEC Electromagnetic Compatibility," and the following fields of application applies according to this CE label:

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

Declaration of conformity

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

Note the installation guidelines

The installation guidelines and safety instructions given in this documentation have to be noted during commissioning and operation.

Connecting peripherals

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

A.2 Certificates and approvals

DIN ISO 9001 certificate

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

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

Q-Net certificate no.: DE-001108 QM

Software License Agreement

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

Approvals for the USA, Canada and Australia

Product safety

The following approvals are available for the device:	
UL	Underwriters Laboratories (UL) according to Standard UL 60950-1, File E115352 and Canadian National Standard CAN/CSA-C22.2 No. 60950-1 (I.T.E) or according to UL508, File E85972 and Canadian National Standard CAN/CSA-C22.2 No. 142 (IND.CONT.EQ) or according to Canadian National Standard CAN/CSA-C22.2 No. 14-05

EMC

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

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

AUSTRALIA	
	This product meets the requirements of the AS/NZS CISPR 22.

A.3 Service and support

Local information

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

Technical documentation for SIMATIC products

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

Easy shopping at the mall

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

Training center

All the training options are listed at:
SITRAIN homepage (http://www.sitrain.com)
Find a contact at: Tel. + 49 911 895 3200

Technical support

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

- Phone: +49 180 5050 222

- Fax: +49 180 5050 223

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

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

- BIOS version

- Order No. (MLFB) of the device

- Installed additional software

- Installed additional hardware

Online Service & Support

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

After-sales information system for SIMATIC PC / PG

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

ESD guidelines

<div style="text-align: right; font-size: 3em;">B</div>

B.1 ESD Guidelines

Definition of ESD

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

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

ESD modules are identified by the following symbol:

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

Electrostatic charging

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

The figure below shows the maximum electrostatic voltage which may build up on a person coming into contact with the materials indicated. These values correspond to IEC 801-2 specifications.
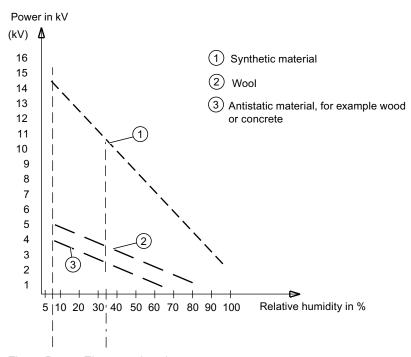
Figure B-1   Electrostatic voltages on an operator

Basic protective measures against electrostatic discharge

- Ensure good equipotential bonding:
  When handling electrostatic sensitive devices, ensure that your body, the workplace and packaging are grounded. This prevents electrostatic charge.

- Avoid direct contact:
  As a general rule, only touch electrostatic sensitive devices when this is unavoidable (e.g. during maintenance work). Handle the modules without touching any chip pins or PCB traces. In this way, the discharged energy can not affect the sensitive devices.

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

List of abbreviations

<div style="text-align: right; font-size: 2em;">C</div>

C.1 Abbreviations

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

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

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

Abbreviation	Term	Meaning
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, Vista)
ODD	Optical Disk Drive	
OPC	OLE for Process Control	Standardized interface for industrial processes
PATA	Parallel ATA	
PC	Personal computer	
PCI	Peripheral Component Interconnect	High-speed expansion bus
PCIe	Peripheral Component Interconnect express	High-speed serial, differential full-duplex PtP interface with high data rate.
PCMCIA	Personal Computer Memory Card International Association	
PI	Protective Earth	Protective conductor
PEG	PCI Express Graphics	
PG	Programming device	
PIC	Programmable Interrupt Controller	Programmable interrupt controller
POST	Power On Self Test	
PXE	Preboot Execution Environment	Software for running new PCs without hard disk data via the network
RAID	Redundant Array of Independent Disks	Redundant hard disk array
RAL	Restricted Access Location	Installation of device in operating facilities with restricted access - for example, a locked switchgear cabinet
RAM	Random Access Memory	
RI	Ring Input	Incoming call
ROM	Read-Only Memory	
RS 485	Reconciliation Sublayer 485	Bi-directional bus system designed for up to 32 nodes
RTC	Real Time Clock	Real-time clock
RTS	Reliable Transfer Service	Request to send
RxD	Receive Data	Data transfer signal
SATA	Serial Advanced Technology Attachment	
SCSI	Small Computer System Interface	
SDRAM	Synchronous DRAM	
SELV	Safety Extra Low Voltage	Safety extra low voltage
SLC	Second Level Cache	
SMART	Self Monitoring Analysis and Reporting Technology	Hard disk error diagnostics program
SMS	Short Message Service	Short message via telecommunication network
SNMP	Simple Network Management Protocol	Network protocol

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

Glossary

AHCI mode

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

APIC mode

Advanced peripheral interrupt controller. 24 interrupt lines are available.

ATAPI CD-ROM Drive

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

Automation system (AS)

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

Backup

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

Baud

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

BEEP code

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

Boot disk

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

Cache

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

CE marking

Communauté Européene The CE mark confirms compliance of the product with corresponding EC Directives, for example, with the EMC Directive.

Chipset

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

Cold restart

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

COM interface

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

Compact Flash cards (CF)

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

Configuration files

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

Configuration software

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

Controller

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

Device configuration

The configuration of a PC or programming device contains information on hardware and device options, such as memory configuration, drive types, monitor, network address, etc. The data are stored in a configuration file and enable the operating system to load the correct device drivers and configure the correct device parameters. . If changes are made to the hardware configuration, the user can change entries in the configuration file using the SETUP program. .

Disc-at-once

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

Drivers

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

Dual Core CPU

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

EMC directive

Directive concerning Electromagnetic Compatibility. Compliance is confirmed by the CE symbol and the EC certificate of conformity.

Energy management

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

Energy options

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

Enhanced Write Filter (EWF)

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

ESD directive

Directive for using electrostatic sensitive components.

Ethernet

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

File Based Write Filter (EWF)

Configurable write filter to protect individual files from write access.

Formatting

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

Gender changer

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

HORM

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

Hot plug

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

Hub

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

Hyper Threading

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

IGD

Integrated Graphics Device. Graphics interface integrated in the chipset.

Image

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

Intel VT

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

InterfaceInterface

See Interface

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

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Interface, multi-point

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

LAN

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

Legacy USB support

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

License key

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

License key disk

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

Low-voltage directive

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

LPT interface

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

Memory card

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

Module

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

Module retainer

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

Motherboard

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

NEC Class 2

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

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

Operating system

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

Packet writing

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

PATA

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

PC card

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

PC/104 / PC/104-Plus

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

PCMCIA

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

PEG interface

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

PIC mode

Peripheral interrupt controller. 15 interrupt lines are available.

Pixel

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

Plug&Play

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

POST

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

PROFIBUS/MPI

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

PROFINET

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

Programmable controller (PLC)

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

PXE server

A Preboot Execution Environment server is part of a network environment and can provide software to connected computers even before they boot. This can involve operating system installations or servicing tools, for example.

RAID

Redundant Array of Independent Disks: Data storage system which is used to save data and the corresponding error correction codes (parity bits, for example) to at least two hard disk volumes in order to enhance reliability and performance. The hard disk array is controlled by management programs and a hard disk controller for error correction. The RAID system is usually implemented in network servers.

Recovery CD

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

Reset

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

Restart

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

Restore DVD

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

ROM

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

S.M.A.R.T

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

SATA

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

SCSI interface

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

Session at once

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

SETUP (BIOS Setup)

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

SSD (Solid State Drive)

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

STEP 7

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

Track-at-once

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

Troubleshooting

Error cause, cause analysis, remedy

V.24 interface

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

Wake on LAN (WoL)

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

Warm restart

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

WLAN

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

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