

# SIEMENS

## SIMATIC




### Industrial PC SIMATIC Panel PC 477B

#### Operating Instructions

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## Safety Guidelines

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.

 <b>Danger</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.
 <b>Warning</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.
 <b>Caution</b>
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.
<b>Caution</b>
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.
<b>Notice</b>
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.

## Prescribed Usage

Note the following:

 <b>Warning</b>
This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

## Trademarks

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## Disclaimer of Liability

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

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# Introduction

## 1.1 Preface

### Purpose of the manual

These operating instructions contain all the information you need for commissioning and using the SIMATIC Panel PC 477B.

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

### Scope of this manual

This documentation is valid for all supplied variations of the SIMATIC Panel PC 477B and describes the state of the product package as of May 2007.

### Position in the information landscape

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

### Conventions

The abbreviated forms "Panel PC" and "device" are also used within this manual for the SIMATIC Panel PC 477B product.

### History

Currently released versions of these operating instructions:

Version	Comment
05/2007	First edition


## 1.2 Guideline to the operating instructions

Organization of contents	Contents
Table of contents	Organization of the documentation, including the index of pages and chapters
Introduction	Purpose, layout and description of the important topics.
Safety information	Refers to all the valid technical safety aspects which have to be adhered to while installing, commissioning and operating from the product/system view and with reference to statutory regulations.
Description	Fields of application, the features and the design of the product/system
Application planning	Aspects of storage, transport, environmental and EMC conditions to be considered in the preparatory stage
Installation / panel-mounting	Product installation options and installation instructions
Connecting	Options of connecting the product and connection instructions
Operation	Operator control elements and operation at the product.
Commissioning	Commissioning the product/system.
Integration	Options of integrating the product into existing or planned system environments/networks
Functions	Monitoring and display functions
Expansions and configuration	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
Dimensional drawings	Dimensions of the device and of modules
Detailed descriptions	Design, function and features of the vital components, allocation of system resources and use of the BIOS Setup
Appendix	Guidelines and certifications, service and support, notes on retrofitting.
ESD guidelines	General ESD guidelines.



## Safety Information


### 2.1 General safety instructions

 <b>Caution</b>
Please observe the safety instructions on the back cover 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, and UL. 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.

 <b>Warning</b>
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. If you install other expansion devices, you may damage the system or violate the safety requirements and regulations on RF suppression. Contact your technical support team or where you purchased your PC to find out which system expansion devices may safely be installed.

<b>Caution</b>
If you install or exchange system expansions and damage your device, the warranty becomes void.

## Battery

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

### Caution

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

### Warning

Risk of explosion and release of harmful substances!

Therefore, do not throw Lithium batteries into an open fire, do not solder or open the cell body, do not short-circuit or reverse polarity, do not heat up above 100° C, dispose as regulated and protected against direct exposure to sunlight, humidity and dewing.

## ESD guidelines

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



Strictly follow the guidelines mentioned below when handling electrostatic sensitive devices:

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

## Description

### 3.1 Overview



#### Features

The SIMATIC Panel PC 477B provides high-level industrial performance.

- Compact design
- Maintenance-free operation
- Rugged

#### Device variants

The SIMATIC Panel PC 477B is available in the following variants:

Device with touch screen	Device with key panel
 <p>The image shows the front view of the SIMATIC Panel PC 477B with a touch screen. The screen is black and framed by a light blue border. The word 'TOUCH' is printed vertically on the right side of the device's frame.</p>	 <p>The image shows the front view of the SIMATIC Panel PC 477B with a key panel. It features a black screen on the left and a control panel on the right with numerous buttons, a directional pad, and a numeric keypad.</p>
12" LCD, 15" LCD or 19" LCD	12" LCD or 15" LCD

## **3.2 Applications**

The SIMATIC Panel PC 477B is an industry-standard platform for demanding tasks in the field of automation. The device is conceived for use direct on site at the machine. The SIMATIC Panel PC 477B provides a flexible system 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 (e.g., automated washing systems, robot controls)
- Operator control and monitoring of machines (HMI function)
- Data logging and processing (e.g. system data logging, distributed process control)

### 3.3 Features

<b>Basic data</b>	
Installation / mounting	<ul style="list-style-type: none"> <li>• Switchgear cabinet installation</li> <li>• Rack mounting</li> <li>• Swivel arm mounting</li> </ul>
Processor	<ul style="list-style-type: none"> <li>• Intel Celeron M 1GHz, 400 MHz FSB, SLC 512 KB</li> </ul>
Main memory	<ul style="list-style-type: none"> <li>• 1 GB DDR2 SDRAM SODIMM</li> </ul>
Free slots for expansion	Up to 3x PC/104- <i>Plus</i> modules (PCI bus only); with expansion frame
Display	<ul style="list-style-type: none"> <li>• 12" screen diagonal with background illumination, resolution 800*600 pixels</li> <li>• 15" screen diagonal with background illumination, resolution 1024*768 pixels</li> <li>• 19" screen diagonal with background illumination, resolution 1280*1024 pixels</li> </ul>
Graphic controller	<ul style="list-style-type: none"> <li>• Integrated Intel GMA900 graphics</li> <li>• CRT resolution of 640x480 pixels up to 1600x1200 pixels</li> <li>• DVI resolution of 640x480 pixels up to 1600x1200 pixels</li> <li>• 8-128 MB graphics memory taken from RAM (dynamic UMA)</li> </ul>
DC power supply	<ul style="list-style-type: none"> <li>• 24 V DC (20.4 to 28.8 V)</li> <li>• Bridging of power failures ≤ 15 ms</li> </ul>
Conditions of use	<ul style="list-style-type: none"> <li>• Operation without fan</li> </ul>
<b>Drives and storage media</b>	
Compact Flash card in the internal module receptacle	<ul style="list-style-type: none"> <li>• 512 MB optional or</li> <li>• 1 GB optional or</li> <li>• 2 GB optional or</li> <li>• 4 GB optional</li> </ul>
Compact Flash card in the external module receptacle	<ul style="list-style-type: none"> <li>• 512 MB optional or</li> <li>• 1 GB optional or</li> <li>• 2 GB optional or</li> <li>• 4 GB optional</li> </ul>
Floppy/CDROM drive	Connected via external USB port
USB stick	Connected via external USB port
<b>Ports</b>	
Serial	COM1 (RS232)
Graphic controller	Combined DVI and VGA
USB	5 x USB 2.0 high current
Ethernet	2 x 10/100/1000 Mbps (RJ 45) <sup>1</sup>
PROFIBUS DP	12 Mbps (isolated potential, compatible to CP 5611), optional
PROFINET	3x PROFINET via 100 Mbps Ethernet (optional)
External keyboard, mouse	Connected via external USB port

Monitoring and safety functions	
Temperature	<ul style="list-style-type: none"> <li>When permitted temperature range is exceeded</li> <li>Warnings can be analyzed by application program (local, via LAN)</li> </ul> Functions are optionally available.
Watchdog	<ul style="list-style-type: none"> <li>Monitoring function for program execution</li> <li>Restart can be configured for a fault</li> <li>Warnings can be analyzed by application program (local, via LAN)</li> </ul>
LED display computer unit	4 LEDs for displaying system status, 2 of these can be programmed by the user
Transient voltage interruption	Up to 20 ms
Buffer memory	2 MB battery-buffered SRAM <sup>2</sup>

1	Only 1x 10/100/1000 Mbps (RJ45) is available for devices with PROFINET
2	Supported by PLC software WinAC RTX 2005

Software	
Operating systems	
Available	<ul style="list-style-type: none"> <li>Windows XP Embedded (language: English) pre-installed on Compact Flash card</li> </ul>
SIMATIC Industrial Software	
Control software	WinAC

## 3.4 Accessories

Accessories	Order No.
PCI-104 / PC/104Plus expansion kit	6AG4070 - 0BA00 - 0XA0
512 MB Compact Flash card	6ES7648 - 2BF01 - 0XD0
1 GB Compact Flash card	6ES7648 - 2BF01 - 0XE0
2 GB Compact Flash card	6ES7648 - 2BF01 - 0XF0
SIMATIC USB Flash Drive, USB 2.0, 512 MB	6ES7648-0DC20-0AA0
SIMATIC USB Flash Drive, USB 2.0, 1 GB	6ES7648 - 0DC30 - 0AA0
256 MB DDR2 SODIMM memory module	6ES7648 - 2AG20 - 0GA0
512 MB DDR2 SODIMM memory module	6ES7648 - 2AG30 - 0GA0
1 GB DDR2 SODIMM memory module	6ES7648 - 2AG40 - 0GA0
2 GB DDR2 667, SODIMM memory module	6ES7648 - 2AG50 - 0HA0
Screw mount 19" device	6AV7672 - 8KE00 - 0AA0

## 3.5 Windows XP Embedded


The Windows XP Embedded package contains Service Pack 2 (SP 2) and Feature Pack 2007. The overview shows the most important device functions under Windows XP Embedded:

Function	Compact Flash card version
Enhanced Write Filter (EWF)	In RAM RAM(REG)
Safecard on Motherboard (SOM)	Available V 3.02
Pagefile	Deactivated in favor of the EWF
System Restore Core	Available
MUI	Not available
Administrator Account	Available
User Account	Available
Explorer Shell	Available
Internet Explorer (IE) 6.0	Available IE6.0 (SP 2)
Internet Information Server (IIS)	Available V 5.1
Terminal Services	Available
Bluetooth	Available
Wireless Network Support	Available
Windows Firewall	Available
Windows Security Center	Available
MSN Explorer	Not available
Outlook Express	Available
Administrative Tools	Available
SMS Advanced Client	Not available
Remote Desktop	Available
Remote Assistance	Available
.NET Framework	Not available
ASP.NET	Not available
Windows .NET Messenger	Not available
Code pages/User Location/Keyboard	Selection available
Disk Management Services	Available
Windows Installer Service	Available
Class Installer	Available
CoDevice Installer	Available
Windows Movie Maker	Not available
Media Player	V10.0
Windows Media Player Tour	Not available
DirectX	V9.0c
Accessories	Available
Help files for all components	Not available
Games	Not available
Fonts	116
Windows XP Tour	Not available

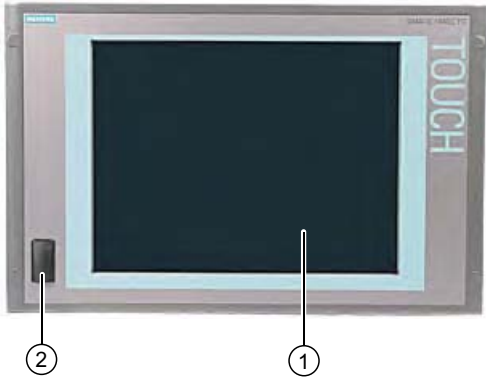
### 3.6 Design

#### 3.6.1 External feature

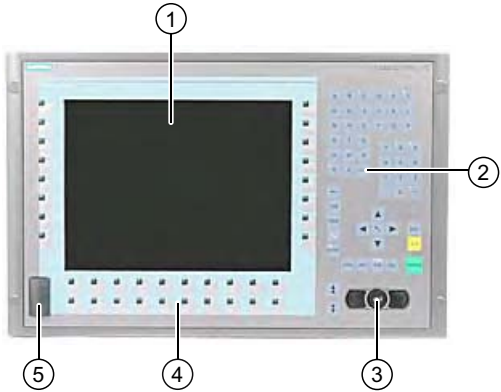
##### Basic elements

Basic elements of all device variants	Pos	Description
	(1)	Computer unit
	(2)	Control unit

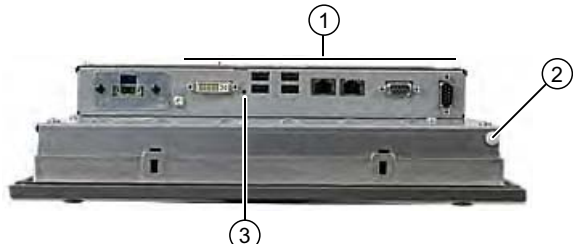
##### Device elements of control unit


Device with touch screen	Item	Description
	(1)	Touch sensor
	(2)	USB port



Device with key panel	Item	Description
	(1)	LCD display
	(2)	Alphanumeric keys, numeric keys, cursor keys and control keys
	(3)	Integrated mouse
	(4)	Function keys, softkeys
	(5)	USB port

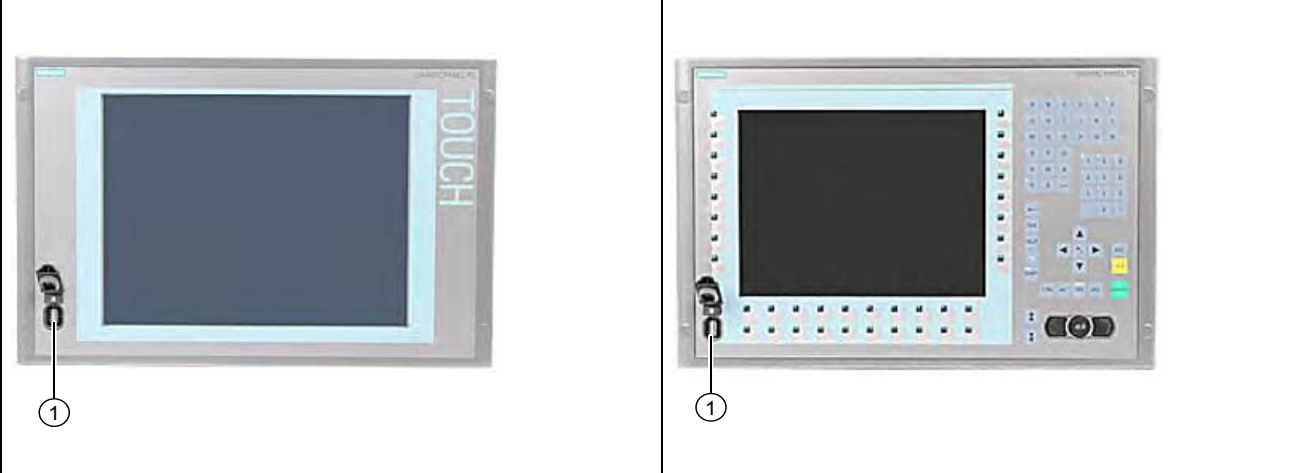
Device elements of computer unit

All device variants / Side view	Item	Description
	(1)	Ports / Connectors
	(2)	Computer / control unit rotating joint
	(3)	Reset button

All device variants / Rear view	Item	Description
	(1)	Cover
	(2)	Cover plate for Compact Flash module
	(3)	Extension cover
	(4)	Status displays

### 3.6.2 Connection components

#### Connectors of control unit

Connector locations		
		
Item	Designation	Description
(1)	USB	1 connection USB 2.0 / 500 mA under sealed cover

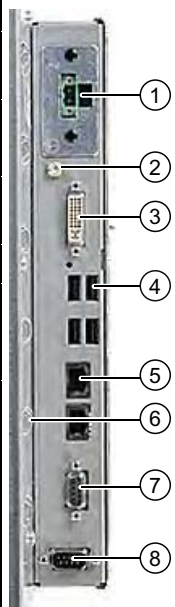
#### Notice

##### Ensuring of protective class

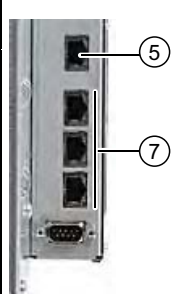
When the sealed cover over the USB port is removed in order to connect a USB component, the degree of protection for the device is no longer guaranteed.

## Connectors of computer unit

Connector locations		
Item	Designation	Description
(1)	24 V DC	Connection for a 24 V DC power supply
(2)	Protective conductor	Connection for low-resistance grounding connection
(3)	DVI	DVI-I socket
(4)	USB	4 USB 2.0 connections / 500 mA
(5)	ETHERNET	2 RJ45 Ethernet connections for 10/100/1000 Mbps
(6)	Metal eyes	Eyes for connection strain relief via cable ties
(7)	PROFIBUS DP/MPI	PROFIBUS-DP/MPI interface (RS 485, electrically isolated), 9-pin Cannon socket
(8)	COM 1	Serial port 1 (RS232) 9-pin Cannon socket

Variants with PROFINET		
Item	Designation	Description
(5)	ETHERNET	1 RJ45 Ethernet connection for 10/100/1000 Mbps
(7)	PROFINET	3 RJ45 Ethernet connections for 100 Mbps

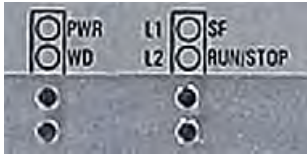


### Note

#### Use of USB devices

- Wait at least 10 seconds between the unplugging and replugging of USB devices. This also applies in particular to touch control in control units with touch screen panels.
- When using standard USB peripherals, bear in mind that their EMC immunity level is frequently designed for office applications only. However, only industry-standard devices are allowed for industrial operation.
- Peripherals are developed and marketed by individual vendors. The respective manufacturers offer support for the peripherals. Moreover, the terms of liability of the individual vendors or suppliers apply here.

### 3.6.3 Status displays

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

<sup>1</sup>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 RMOS under the FAQ at the Customer Support site of the Microbox.

## Application planning and preparation

### 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.

<b>Caution</b>
<b>Risk of damage to the device!</b> If you are transporting the device in extreme weather conditions with large fluctuations in temperature, care must be taken to ensure that no moisture forms on or in the device (condensation). If condensation develops, wait at least 12 hours before switching on the device.

## 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 no.	6AV785 ...
Ethernet address 1	
Ethernet address 2	

You can find the corresponding data here:

- Serial number: You can find the serial number on the rating plate on the back of the device.



- Order number of the device
- Ethernet address: You can find the Ethernet address of the device in your BIOS Setup (F2 function key) under **Hardware Options > ETH 1 Address** or **ETH 2 Address**.

## 4.3 Affixing Labeling Strips for Function Keys and Softkeys

### Note

The following table applies only to devices with a key panel.

The control unit has two horizontal and two vertical keypads for the function keys and the softkeys. Assign user specific functions to the keys as needed. You can mark these keys with labeling strips. A4 films for creating the labeling strips are available as accessories.

Proceed as follows to affix the labeling strips:

### Preparing the labeling strips

1. Label the DIN A4 film with a laser printer, for example using the printing templates provided on the Documentation and Drivers CD.
2. Cut the labeling strips along the pre-printed lines.

### Note

Do not insert handwritten labeling strips until the ink has dried.

### Separating the control unit from the computer unit

#### 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 that can be destroyed by electrostatic charges. You should therefore follow safety precautions when opening the device. Refer to the (ESD) guidelines for handling electrostatic sensitive devices.

Tool required to separate the computer unit from the control unit: Torx T10 screwdriver

1. Disconnect the device from the power supply.

#### Warning

Unauthorized opening of the device may result in substantial damage to equipment or endanger the user. Always disconnect the device from the power supply before opening it.

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

3. Loosen the indicated screws that secure the computer unit to the control unit.

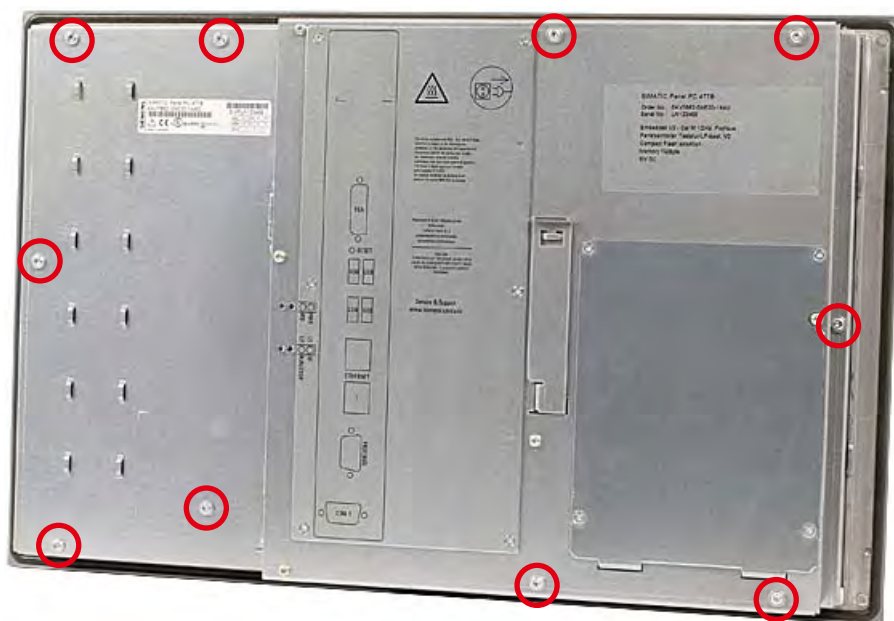


Figure 4-1 Example 12" touch screen device

---

**Note**

**Device variants**

The number of screws to be screwed out varies depending on the device variants.

---



4. Fold out the computer unit along the articulated joint.



Figure 4-2 Example 12" touch screen device: Separating the computer unit from the control unit

### Affixing the labeling strips

**Notice**

**Risk of damage**

Do not under any circumstances touch exposed components of the control unit.

Insert the labeling strips into the slots provided on the rear of the control unit.



Figure 4-3 Device rear with connections and slots for the labeling strips

- 1 Slots for long labeling strips, vertical keypads
- 2 Slots for short labeling strips, horizontal keypads
- 3 Slots for labeling strips, horizontal keypads

### Screwing the computer unit onto the control unit

Mount the computer unit back onto the control unit using the screws that were removed beforehand.

## **4.4 Ambient and Environmental Conditions**

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

- Note the climatic and mechanical environmental conditions specified in the technical data in your operating manual.
- The device is approved for operation in closed rooms only.
- Avoid extreme environmental operating conditions. Protect the device against dust, moisture and heat.
- Do not place the device in direct sunlight.
- Ensure at least 100 mm of space above and below the device and between other components or the sides of cabinets.
- Do not cover the vent slots of the device.
- Always observe the mounting positions permitted for this device.



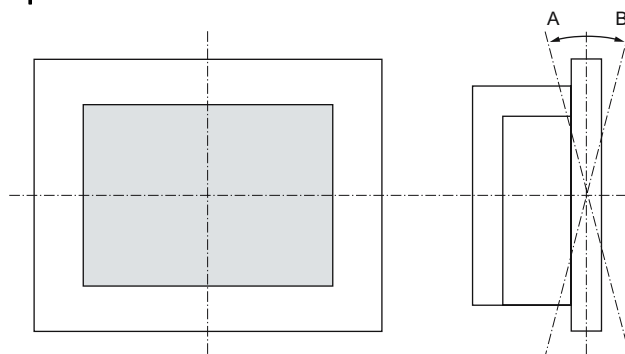
## Installation / panel-mounting

### 5.1 Permitted mounting positions

#### Mounting positions

Only vertical installation with two mounting directions of up to +15° and -15° or up to +30° and -30° are permitted for the device.

#### With installed Compact Flash card



Temperature at the device		Angle A	Angle B
Rear	Front		
5° - 50°C	Max. 40°C	15°	15°
5° - 45°C	5° - 45°C	15°	15°
5° - 40°C	5° - 40°C	30°	30°

#### Mechanical environmental conditions

- Vibration
  - Operation, tested in accordance with DIN IEC 60068-2-6  
10 to 58 Hz: 0.075 mm 58 to 200 Hz: 9.8 m/s<sup>2</sup>
  - Storage/transport, tested according to IEC 60068-2-27, IEC 60068-2-29  
50 m/s<sup>2</sup>, 30 ms,  
250 m/s<sup>2</sup>, 6 ms,

## 5.2 Fastening and installation types

### Mounting methods

You can install the device by three methods:

- In a 19" rack
- On a swivel arm
- In a switchgear cabinet

### Type of fixation

You can fasten the device by two methods:

- With clamps Clamp and grub screws are included in the contents of delivery.
- With screws

---

#### **Note**

You cannot use screws to secure the device variant with the 12" touch screen variant.

---

## 5.3 Mounting information

Before installing the device, read the following general notes relating to installation.

- Ensure that the protective contact socket of the building installation is easily accessible and that there is a mains disconnect switch in switchgear cabinet installations.
- Position the device so that the screen is in an ergonomic position favorable to the user. Choose a suitable installation height.
- Position the device so that the screen is not subject to direct sunlight or other strong sources of light.
- Provide adequate volume in the switchgear cabinet for air circulation and heat transport. Keep at least 10 cm distance between the device and switchgear cabinet.
- Do not allow the maximum air intake temperature to exceed 45° C. Decisive is the temperature measured at a distance of 10 cm from an air intake. The maximum air intake temperature must be accounted for especially when sizing closed switchgear cabinets.
- Position the device so that the air vents of the housing are not covered up following installation.
- Provide enough free space to add on to the device.
- Equip the switchgear cabinet with struts for stabilizing the installation cut-out. Install struts where necessary.
- Avoid extreme environmental operating conditions. Protect your device against dust, moisture and heat.
- Install the device in such a way that it poses no danger, e.g. by falling over.
- During assembly, please comply with the approved installation positions.


<b>Notice</b>
Install the device in such a way that the area behind the front part of an operating area has restricted access (e.g. lockable switchgear cabinet or console).

<b>Notice</b>
The device is classified as "Open Type" according to UL508. A UL508 conform enclosure is therefore a mandatory requirement for approval or operation according to UL508.



<b>Warning</b>
<b>Danger, high voltage</b>
Isolate the power supply to a switchgear cabinet before opening it. Ensure that the power to the switchgear cabinet cannot be turned on accidentally.

<b>Caution</b>
The device is approved for operation in closed rooms only.

 <b>Warning</b>
<p><b>Function test while installing the device in machines or execute systems</b></p> <p>Following the results of a risk analysis, additional protection equipment on the machine or the system is necessary to avoid endangering persons. With this, especially the programming, configuration and wiring of the inserted I/O modules have to be executed, in accordance with the necessary risk analysis identified safety performance (SIL, PL or Cat.). The intended use of the device has to be secured.</p> <p>The proper use of the device has to be verified with a function test on the system. With this programming, configuration and wiring errors can be identified. The test results have to be documented and if necessary inserted into the relevant inputs.</p>

## 5.4 Preparing the mounting cut-out

The following illustration shows the dimensions for the mounting cut-out.

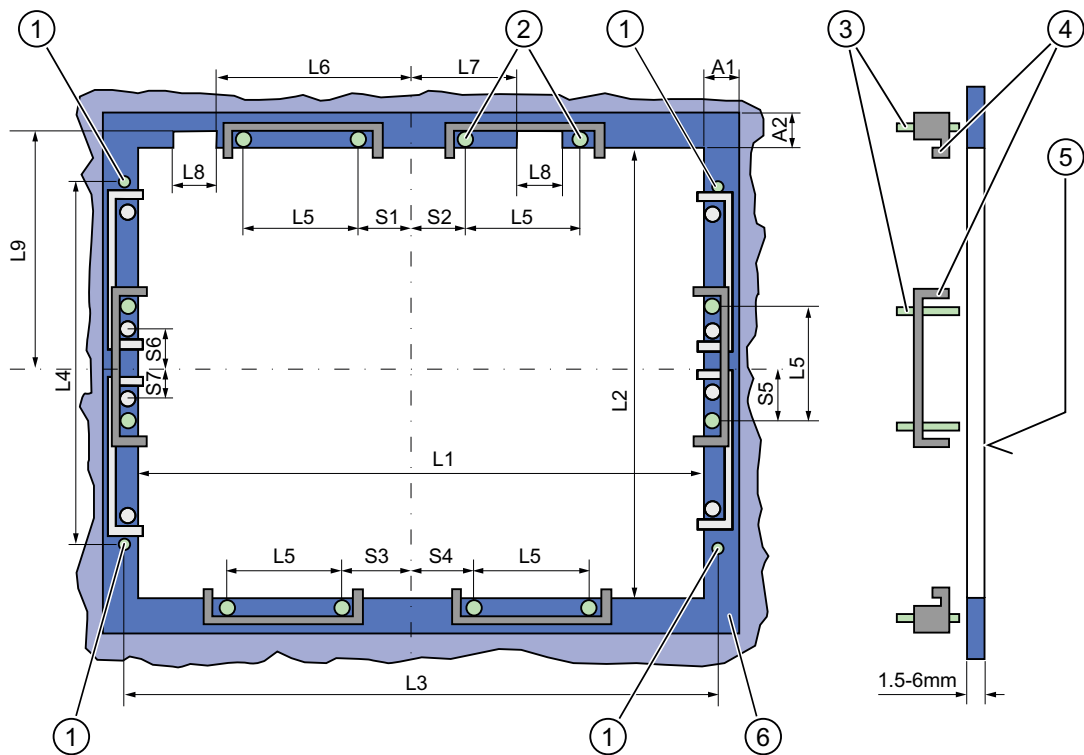


Figure 5-1 Drill holes for the screws and pressure points for the clamp screws

- |                                     |                             |
|-------------------------------------|-----------------------------|
| (1) Drill hole for screw attachment | (4) Clamp                   |
| (2) Pressure points for clamp       | (5) Rz 120 in the seal area |
| (3) Setscrews                       | (6) Seal area               |



**Note**

Mounting dimensions can be read from the dimension overview or they can be transferred to the cabinet from the mounting template supplied.

Table 5-1 Dimensions for the mounting cut-out in mm

Control unit	L1	L2	L3 <sup>1)</sup>	L4 <sup>1)</sup>	L5	L6 <sup>2)</sup>	L7 <sup>2)</sup>	L8 <sup>2)</sup>	L9 <sup>2)</sup>	A1	A2	S1	S2 S3 S4	S5 <sup>3)</sup>	S6 <sup>3)</sup> S7 <sup>3)</sup>
<b>Tolerance</b>	<b>±1</b>	<b>+1</b>	<b>±0,2</b>	<b>±0.2</b>	<b>±0.5</b>	<b>±0.5</b>	<b>±0.5</b>	<b>±0.5</b>	<b>+1</b>	<b>±1</b>	<b>±1</b>	<b>±1</b>	<b>±1</b>	<b>±1</b>	<b>±1</b>
Key panel															
12" TFT	450	290	465	235	112	—	—	—	—	16	10	78	78	56	—
15" TFT	450	321	465	279	112	186	135	25	165	16	17	51	51	56	—
Touch panel															
12" TFT	368	290	—	—	112	—	—	—	—	16	10	19	35	56	—
15" TFT	450	290	465	235	112	—	—	—	—	16	10	81	81	56	—
19" TFT	450	380	465	235	112	—	—	—	—	16	10	46	46	—	33

1) M6 thread or drill holes with a diameter of 7 mm

2) Cut-outs for the shafts of the insert strips are only necessary for 15" key panels.

3) Two clamps necessary for vertically securing clamps only for 19" touch panel fronts.

**Preparing the mounting cut-out**

Steps for preparing the mounting cut-out	
1.	Select a location suitable for mounting, taking into account the mounting position.
2.	On the basis of the dimensions, check whether the required screw and pressure points on the rear and the seal area are easily accessible after the completion of the mounting cut-out. Otherwise the mounting cut-out is useless.
3.	Complete the mounting cut-out in accordance with the dimensions.

## 5.5 Securing the Device with Clamps

You require 6 clamps in order to mount the device. These are supplied with the device.

Required tool for fastening the clamps: Allen wrench 2.5 mm



Figure 5-2 Clamp assembly

### Rack mounting

Steps for fastening the device with clamps	
1.	Follow the installation instructions.
2.	Disconnect the device from the power supply.
3.	Working from the front, insert the device into the 19" rack.
4.	Fasten the control unit in the rack from the rear using the clamps. Tighten the setscrews to a torque of 0.4-0.5 Nm.

### Swivel arm mounting

Steps for fastening the device with clamps	
1.	Follow the installation instructions.
2.	Disconnect the device from the power supply.
3.	Working from the front, place the device onto the swivel arm.
4.	Fasten the control unit on the swivel arm from the rear using the clamps. Tighten the setscrews to a torque of 0.4-0.5 Nm.

### Switchgear cabinet installation

Steps for fastening the device with clamps	
1.	Follow the installation instructions.
2.	Disconnect the device from the power supply.
3.	Working from the front, insert the device into the mounting cut-out.
4.	Secure the control unit in the mounting cut-out from behind with the clamps, as shown in the mounting cut-out in the dimensions. Tighten the setscrews to a torque of 0.4-0.5 Nm.

### IP65 degree of protection

The IP65 degree of protection is only provided for a clamp mounting together with a ring seal.

**Notice**

**Switchgear cabinet installation: Material strength at the mounting cut-out**

Please ensure that the material strength at the mounting cut-out is a maximum of 6 mm. Please follow the specifications for the dimensions in the "Preparing the mounting cut-out" section.

The degree of protection can only be guaranteed when the following requirements are met:

1. The material strength at the mounting cut-out must be at least 2 mm.
2. The deviation from the plane of the mounting cut-out in relation to the external dimensions for an installed HMI device is  $\leq 0.5$  mm.

## 5.6 Securing the Device with Screws

### IP54 degree of protection

This degree of protection is ensured for screw mounting.

<b>Notice</b>
<b>Switchgear cabinet installation: Material strength at the mounting cut-out</b> Please ensure that the material strength at the mounting cut-out is a maximum of 6 mm. Please follow the specifications for the dimensions in the "Preparing the Mounting Cut-out" section.  The degree of protection can only be guaranteed when the following requirements are met: 1. The material strength at the mounting cut-out must be at least 2 mm. 2. The deviation from the plane of the mounting cut-out in relation to the external dimensions for an installed HMI device is $\leq 0.5$ mm.

---

**Note**

Securing with screws is not possible with the 12" touch screen variant.

---

Required tool for fastening with screws: 7 mm drill

<b>Notice</b>
Only use the catalog-listed mounting material (order number 6AV7672-8KE00-0AA0) for 19" devices for screw mounting.

<b>Notice</b>
<b>Risk of damage</b> Ensure that no metal cuttings enter the device when the holes are drilled. Cover the device with film or when drilling, use removal by suction.

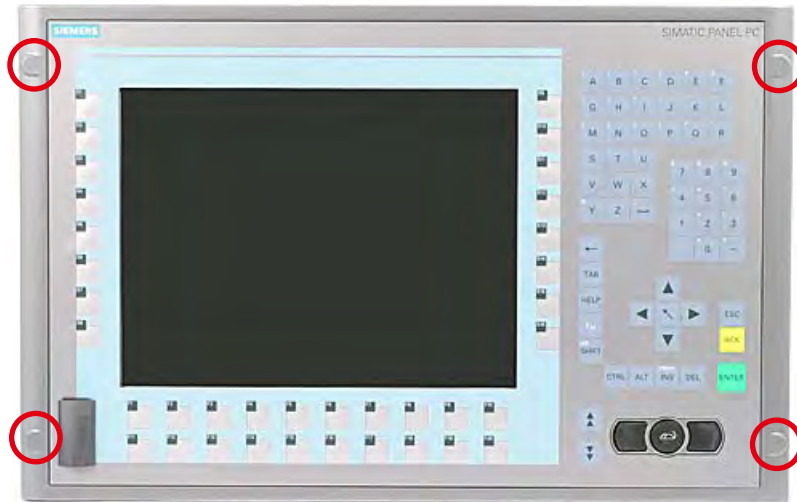


Figure 5-3 Designated location for holes on the control unit

### Rack mounting

<b>Steps for fastening the device with screws</b>	
1.	Follow the installation instructions.
2.	Carefully drill the respective holes in the control unit at the designed location from the rear.
3.	Working from the front, insert the device into the 19" rack.
4.	Secure the control unit by inserting suitable screws through the holes and attaching nuts.

### Swivel arm mounting

<b>Steps for fastening the device with screws</b>	
1.	Follow the installation instructions.
2.	Carefully drill the respective holes in the control unit at the designed location from the rear.
3.	Working from the front, place the device onto the swivel arm.
4.	Secure the control unit by inserting suitable screws through the holes and attaching nuts.

### Switchgear cabinet installation

<b>Steps for fastening the device with screws</b>	
1.	Follow the installation instructions.
2.	Drill suitable holes at the prepared installation cut-out in accordance with the specifications for L4 and L5, as shown at the dimensions in the mounting cut-out
3.	Carefully drill the respective holes in the control unit at the designed location from the rear.
4.	Working from the front, insert the device into the mounting cut-out.
5.	Secure the control unit by inserting suitable screws through the holes and attaching nuts.



## Connecting

### 6.1 Connecting the 24 V DC power supply

#### Note before connecting

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

 <b>Warning</b>
--

The device is only allowed to be connected to a power supply VDC 24 according to NEC class 2 or LPS (Limited Power Source).
---

Use the special plug supplied to connect the supply voltage. The protective conductor on the device needs to be connected to the protective earth conductor which is integrated in the cabinet.
--

<b>Notice</b>
---------------

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

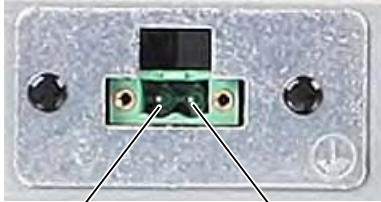
<b>Notice</b>
---------------

The permitted cable cross-section for the 24 V DC connection is 0.75 mm <sup>2</sup> to 2,5 mm <sup>2</sup> .
---

<b>Notice</b>
---------------

If a Compact Flash card is used in the device, be sure that the card is properly installed before you connect it.
---

Connecting 12" and 15" devices

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


Power consumption

The power consumption at 24 V amounts to 70 W.

Implementing the protective conductor

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

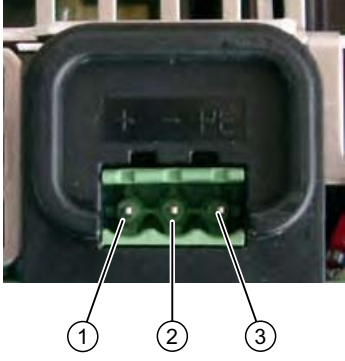
Required tool for protective conductor: TORX T20 screwdriver.

Steps for connecting the PE conductor		
1.	<p>Connect the protective conductor (M4 threads) (1) on the device (large surface, large-area contact) with the protective earth conductor of the cabinet or plant in which the device is to be installed.</p> <p>The minimum conductor cross-section may not amount to less than 5 mm<sup>2</sup>.</p>	



## Connecting 19" devices

Steps for connecting the device to the 24 V DC power supply	
1.	Switch off the 24 V DC power source.
2.	Connect the DC plug (1) DC 24 V (2) ground (3) protective conductor



## Power consumption

The power consumption at 24 V amounts to 90 W.

## 6.2 Connecting equipotential bonding

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

The equipotential bonding terminal of the device is located at the connectors of the computer unit and is identified by the following symbol:



Figure 6-1 Equipotential bonding

### Connecting equipotential bonding

Required tool for equipotential bonding terminal: TORX T20 screwdriver

Steps for connecting the equipotential bonding	
<p>1. Connect the equipotential bonding terminal (M4 thread) on the device (large surface, large-area contact) with the central grounding point of the control cabinet. The minimum conductor cross-section may not amount to less than 5 mm<sup>2</sup>.</p>	

### Avoiding differences in potential

Differences in potential arise between separated system parts, which in some cases leads to high equalization currents. This situation may arise if the cable shielding is terminated at both ends and grounded at different system parts. Potential differences can be caused, for example, by different power inputs.

Reduce the differences in potential by laying the equipotential bonding cables in such a way that the affected electronic components function properly. Observe with the following guidelines when setting up equipotential bonding:

- The lower the impedance of the equipotential bonding cable, the greater the effectiveness of the equipotential bonding.
- When two system parts are connected by means of a shielded signal cable, and their shields are both connected to the ground or protected conductor, the following must be observed: The impedance of the additional equipotential bonding cable amounts to 10% of the shield impedance, at the most.

- Make sure that the equipotential bonding cable cross section is selected to accommodate the maximum equalization current. Equipotential bonding cables with a cross section of 16 mm<sup>2</sup> are field-proven.
- Use equipotential bonding conductors made of copper or galvanized steel. Connect the cables to the ground or protective conductor over a wide area. Protect the ground or protective conductor from corrosion.
- Lay the equipotential bonding cable in such a way that the area between the equipotential bonding cable and signal cables is as small as possible.

## 6.3 Connecting peripheral equipment

<b>Notice</b>
---------------

<b>Ensure suitability for industrial applications</b>
---

Connect only I/O modules approved for industrial applications according to EN 61000-6-2.
--

---

**Note**

**Peripheral devices capable of hot-plugging (USB)**

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

---

<b>Caution</b>
----------------

<b>Peripheral devices incapable of hot-plugging</b>
---

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

<b>Caution</b>
----------------

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

---

**Note**

**Strain relief**

Use the eyes for connection strain relief on the device rear via cable ties.

---

## Operation

### 7.1 Device with key panel

#### 7.1.1 Safety

<b>Notice</b>
<b>Maloperation</b> If you activate several keys simultaneously, a malfunction on the device cannot be excluded. Activate function keys and softkeys only in sequence!
<b>Malfunctions of the user software</b> For security reasons, always use "Security features" of the KeyTools. If you deactivate it nevertheless, serious malfunctions of the user software may occur when the additional function keys and softkeys F13 to S16 are used or if own key code tables are used.
<b>Risk of damage</b> Activating a key using a hard or pointed object, for example a screwdriver, reduces the life of the key or can damage it.

### 7.1.2 Overview

#### Overview

The number of keys, their labeling and function is the same on all key panels. The various panel types differ in the arrangement of the keys and in the size and type of the display.

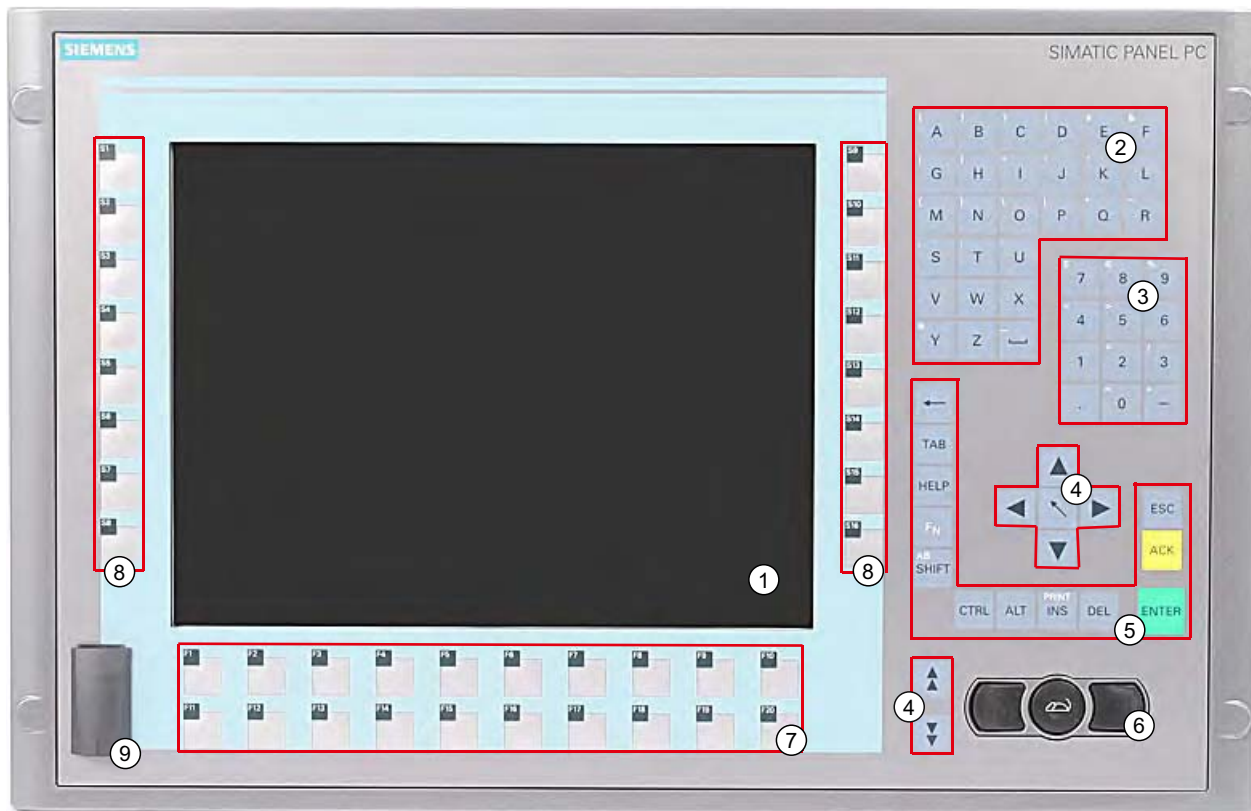


Figure 7-1 Example of a 12" key panel

- (1) Display
- (2) Alphanumeric keys
- (3) Numeric keys
- (4) Control keys
- (5) Cursor keys
- (6) Integrated mouse
- (7) Function keys
- (8) Softkeys
- (9) USB ports (optional)

## 7.1.3 Buttons

### 7.1.3.1 Control keys

#### Control keys

The control keys activate editing functions and control functions in different applications:

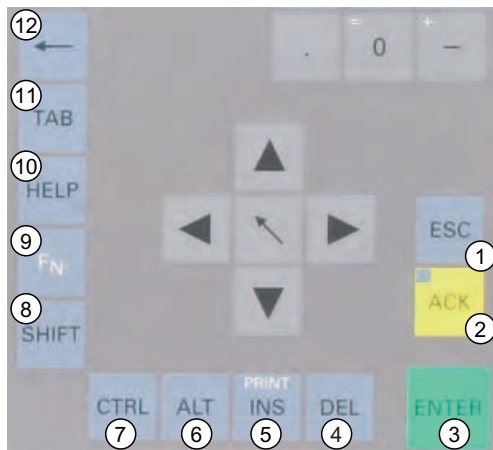


Figure 7-2 Control keys

- (1) Cancel
- (2) Acknowledge
- (3) Enter
- (4) Delete
- (5) Insert/Print screen (in combination with FN)
- (6) Application-specific function key codes (see key code table in appendix)
- (7) Application-specific function key codes (see key code table in appendix)
- (8) Toggling between lower-case letters and upper-case letters
- (9) Function key
- (10) Call Help
- (11) Tabulator
- (12) Backspace

### 7.1.3.2 Alphanumeric and numeric keys

#### Alphanumeric keys

Enter letters, special characters, blank spaces and underline using the alphanumeric keys.

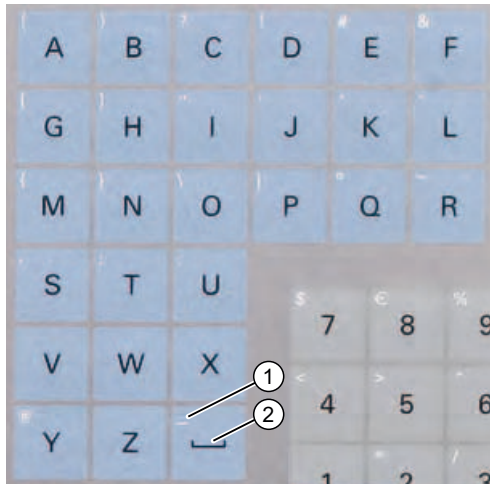


Figure 7-3 Alphanumeric keys 2

- (1) Underline
- (2) Space character

#### toggling between lower-case and upper-case letters

Enter the lower-case letters using the pre-defined assignment of the alphanumeric keys. To enter an upper-case letter, proceed as follows:

1. Hold down the <Shift> key.
2. Activate the desired alphanumeric key at the same time. The displayed upper case letter will be entered.
3. To enter lower case letters, release the <Shift> key.
4. You can, however, also activate the Caps Lock function using the <FN> and <Shift> keys. The LED on the <Shift> key is then also lit.



## Numeric keys

Enter the numerals "0" to "9" and special characters, e.g. the decimal point, using the pre-defined assignment of the numeric keys.

### Enter special characters, arithmetic signs and signs

Special characters, arithmetic signs and signs are also assigned to most of the alphanumeric and numeric keys. These signs are indicated by white symbols on the top left of the keys. To enter such a sign, proceed as follows:

1. Hold down the <F<sub>N</sub>> control key.
2. Activate the desired alphanumeric or numeric key at the same time. The displayed special character, arithmetic sign or signs will be entered.
3. To enter the signs of the pre-defined assignment again, release the <F<sub>N</sub>> key.

### 7.1.3.3 Cursor keys

Navigate, scroll or move the writing mark using the cursor keys. The cursor keys correspond to the usual keys of the PC keyboard.



Figure 7-4 Cursor keys

- (1) <Left> key
- (2) <Up> key
- (3) <Right> key
- (4) <Down> key
- (5) Position 1 key (Home)
- (6) <Page up> key
- (7) <Page down> key

#### **7.1.3.4 External keyboards**

The keyboard layout has been set to "English/USA international." If you use a keyboard with a layout other than the "English/USA international" layout, the key codes of the internal and external keyboards might no longer correspond.

## 7.2 Device with touch screen

The 12" variant and the 15" variant differ in their dimensions and the size of the display. The 12" and 19" variants do not have side drill hole covers.

The following figure is only an example using the front view of the 15" variant.

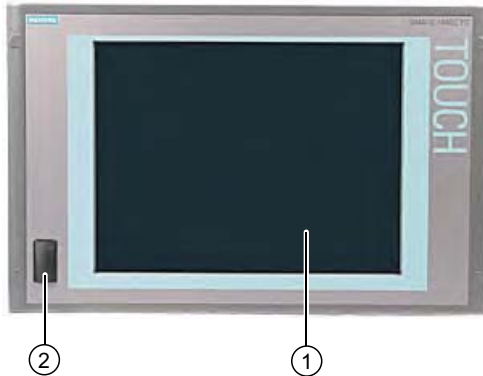


Figure 7-5 Example of a 15" touch screen front

- (1) Display with touch screen
- (2) USB port

### 7.2.1 Using the touch screen

Application-specific user interface elements, for example buttons, are shown on the display. When you tap the button with your finger, the function assigned to the button is activated.

The following types of pressure are permissible:

- Using a plastic pen with a 1 mm radius at the point: 25 g.
- Using a silicone finger with a diameter of 1.6 cm: 50 g.

#### Caution

Only touch one point on the touch screen and not several points at one time. You may otherwise trigger unintended reactions.

Do not touch the screen in the following situations:

- During the booting process
- When plugging or unplugging USB components
- While Scandisk is running



# Commissioning

## 8.1 Activating the Screen Keyboard

You can operate the device by means of a virtual screen keyboard. You can use it to enter the characters directly on the touch screen or with the mouse.

### Starting Touch Input

Start the "Touch Input" application on the desktop. The screen keyboard is displayed.




(1) Button for language selection: German, English, Italian, Spanish, French

## 8.2 Note before commissioning

### Factory state

The Windows XP Embedded operating system is supplied on a Compact Flash card.

### Information about Commissioning

 <b>Caution</b>
<b>Risk of damage to the device</b> If condensation has developed, wait at least 12 hours before commissioning the device.
<b>Notice</b>
<b>Windows XP Embedded: Observe the EWF rules!</b> Under Windows XP Embedded a configurable write filter (Enhanced Write Filter) is always active. Please observe the EWF rules during commissioning, since a data loss may otherwise occur.

## 8.3 Commissioning Windows XP Embedded

### 8.3.1 Basic commissioning - initial startup

#### Setting up the operating system

When the computer starts up for the **first** time, the Windows XP operating system on the Compact Flash card or hard disk is configured automatically. Proceed as follows:

1. Connect the device to the 24 V DC power supply. The PC performs a self-test (POST). During the self-test, this message appears:  
Press <F2> to enter SETUP or <ESC> to display the boot menu
2. Wait until this message is cleared, then follow the instructions on the screen.

<b>Notice</b>
The device may not be switched off at any time during the installation process. <b>Do not</b> 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. Acknowledge this prompt with **Yes**.

---

**Note**

System startup can take longer than usual for the basic commissioning. A blue screen is displayed for several minutes.

---

**Note**

Errors and warnings can be displayed in the status bar, with the first and second switch on of the initial commissioning or after a restore procedure. This will have no effect on the device functions.

---

When you switch on the PC now, the user interface of the Windows XP Embedded 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 basic commissioning.

---

### **Switching off the Device**

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

---

#### **Note**

The Enhanced Write Filter should be enabled following the installation of Windows XP Embedded on a Compact Flash card. The device can then be switched off by disconnecting the power supply.

---



## 8.4 Setting the Panel Type

Once the device has rebooted, several dialogs appear on the screen. Drivers and applications can be installed from these dialogs.

### Setting the panel type

1. In the "Panel Wizard" dialog, click the type of panel that corresponds to your device.

#### Note

The devices with touch panel require a USB mouse or USB keyboard for commissioning.



Figure 8-1 Panel Wizard, Welcome dialog

2. In the "Panel Wizard Touch" dialog, click on the screen size that corresponds to your device. The screen resolution is set correspondingly for the device.

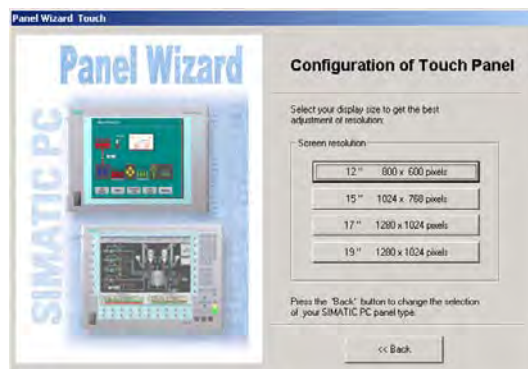


Figure 8-2 Touch panel; selection of the screen size

The next step only applies to control units with touch screen panels.

Once the screen size is selected, the wizard will search for new hardware, the touch controller. The Panel Wizard closes and the Touch Base calibration appears. Carry out the following steps carefully.

### Touch screen calibration

After concluding the "Panel Wizard" dialog, the touch controller is installed.

1. Calibrate the touch screen.

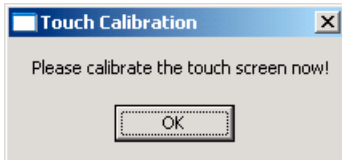


Figure 8-3 Start touch screen calibration

2. Confirm with "OK".

## 8.5 Device with key panel

### 8.5.1 Activating KeyTools

SIMATIC KeyTools is one selection of the applications for SIMATIC Panel PC. These applications allow you to adapt key codes that are sent by the key panel of the control unit. SIMATIC KeyTools consists of the following applications:

- Key code table: Loading and editing of key code tables.
- WinCC hotkey function: WinCC hotkey function activation und deactivation.
- Security features: Lock function that prevents two function keys from being activated simultaneously. This prevents incorrect operations and undefined states of the application program.

---

#### **Note**

For a detailed description of the SIMATIC KeyTools, refer to the help menu and the application description on the Documentation & Drivers DVD.

---

### Opening Keytools

1. Open Keytools with the command **Start > Settings > Control Panel > SIMATIC KeyTools**.
2. Select the desired application and follow the instructions on the screen.

<b>Notice</b>
<b>Malfunctions of the user software</b> For security reasons always use the "Security features". If you deactivate it nevertheless, serious malfunctions of the user software may occur when the additional function keys and softkeys F13 to S16 are used or if own key code tables are used.

## 8.6 Device with touch screen

### 8.6.1 Recalibrating the Touch Screen

If the touch screen does not react as expected when touched, repeat the calibration.

#### Procedure

1. Select "Start > Programs > UPDD > Settings".  
The "UPDD Console" dialog box opens.

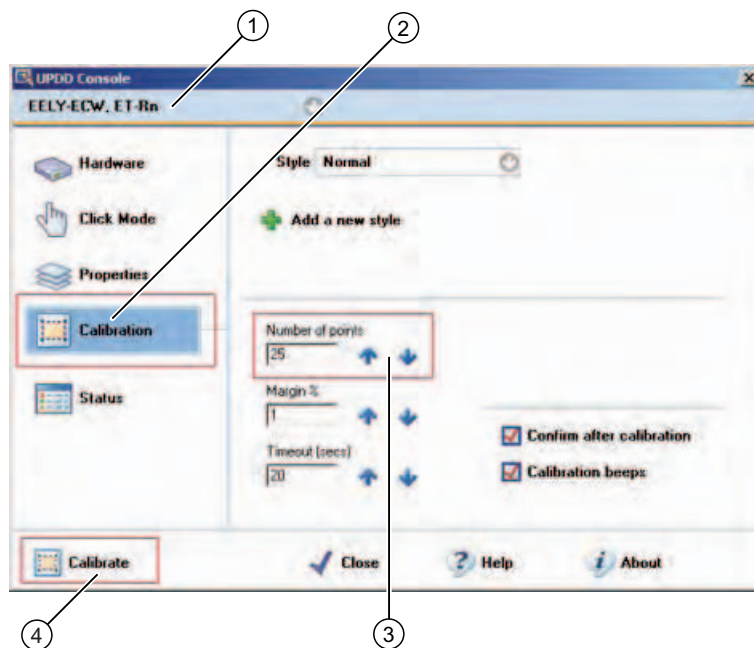


Figure 8-4 Point calibration

2. Select the screen (1) you wish to calibrate.
3. Click on "Calibration" (2).
4. Activate "25-point calibration" (3).
5. Click on "Calibrate" (4).  
The calibration mask is output on the selected display.
6. Touch the blue arrow.  
The input is confirmed by a tick, and the next arrow is displayed.
7. Confirm all input prompts (arrows, or crosses in the center) until the complete screen has been calibrated.

 **Warning**

**Faulty operation**

If you touch the touch screen while configuring it or if the screen saver is active, the SIMATIC process visualization software, e.g. ProTool/Pro, will carry out the functions which happen to be behind it.

**Caution**

Only touch one point on the touch screen and not several points at one time. You may otherwise trigger unintended reactions.

Do not touch the screen in the following situations:

- During the booting process
- When plugging or unplugging USB components
- While Scandisk is running



# Integration

## 9.1 Integration into an Automation System

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

### Ethernet

The integrated Ethernet interface (10/100/1000 Mbps) can, for example, be used for communication with automation devices such as SIMATIC S7.

### PROFIBUS/MPI

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

### PROFINET

The optional PROFINET port can be used to couple to other PROFINET devices such as a CP1616 via Ethernet cable.

### RS232

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

### Additional information

You can find additional information in the catalog and to the online ordering system of Siemens A&D.

<http://mall.ad.siemens.com>





## Functions

### 10.1 Monitoring functions

#### 10.1.1 Overview

The following individual functions are implemented:

- Temperature monitoring
- Watchdog

Messages can be output from the monitoring modules to the applications.

The SOM software (Safecard On Motherboard) and DiagMonitor software on CD (optional) are available for Windows XP Embedded.

The DiagMonitor software contains the monitoring software, the software for the stations to be monitored and a library for creating user-specific applications.

#### 10.1.2 Temperature monitoring/display

##### Temperature monitoring

The temperature is recorded by two temperature sensors. One sensor monitors the processor temperature and the other monitors the temperature near the RAM module.

When the temperature exceeds one of the two defined temperature thresholds, the following error reactions are triggered:

Reaction	Option
The SOM or DiagMonitor software is enabled	None

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

- Acknowledgement of the error message by the SOM program
- Restart of the device

### 10.1.3 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 WD is not triggered again within the set time (by application with the help of the SOM drive), the following reactions are triggered:

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

---

#### Note

If the desired device reset does not occur, set Bit 7 to the value 0 in the General Purpose Ports (GPP) output register (address 404D) .

---

#### WD monitoring times (TWD)

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: 2 s, 4 s, 6 s, 8 s, 16 s, 32 s, 48 s and 64 s.

---

#### Note

##### Default mode

The macro mode is selected as the default during SOM operation.

---

---

#### Note

If the watchdog time is changed after the watchdog was enabled (i.e., while the watchdog is running), the watchdog is retriggered!

---

### 10.1.4 Safecard on Motherboard (SOM)

This application is used to monitor PC hardware (temperature and watchdog) and to display the current measured values. A GUI is used to configure the application and also to activate the temperature monitoring and watchdog function.

Your device is equipped with three temperature sensors which are automatically detected by the application.

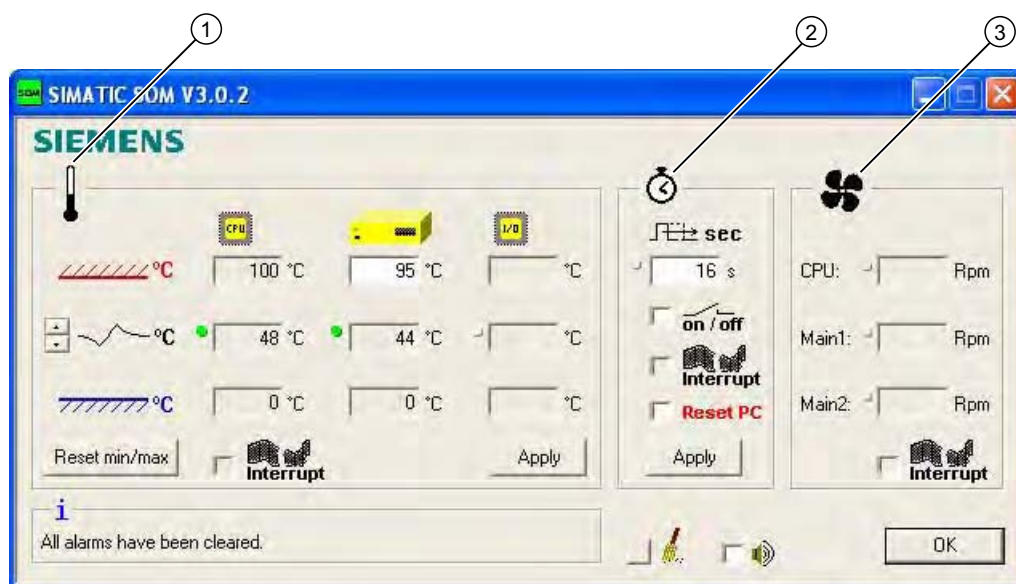


Figure 10-1 Safecard On Motherboard

1	Temperature range:	Here the current temperature and limit values are shown. You can toggle the temperature display mode to indicate either the current temperature, or the min./max. values measured since the start of the application.
2	Watchdog area:	Here, you can configure the watchdog function in your monitoring application. You can specify the watchdog time, activate a PC reset and activate / deactivate the watchdog.
3	Fan area:	This option is not enabled because the device does not have a fan.

### 10.1.5 Enhanced Write Filter (EWF)

#### Purpose and function

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

The Enhanced Write Filter allows you to boot Windows XP Embedded 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, 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.

---

#### Note

The Enhanced Write Filter is disabled by default for Windows XP embedded with SP2. After the operating system has been set up, you should back up your data 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	<code>ewfmgr c: -enable</code>
Write-protect drive C: disable (modified files are accepted)	<code>ewfmgr c: -commitanddisable</code>
Write-protect drive C: disable (modified files are lost)	<code>ewfmgr c: -disable</code>
Modified files on drive C: Accept	<code>ewfmgr c: -commit</code>
Display information about the EWF drive	<code>ewfmgr c:</code>
Display help	<code>ewfmgr c: /h</code>

---

#### 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 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 reaction is that Windows XPe 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.
-



## Expansions and Configurations

### 11.1 Open the device

**Caution**

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

**Warning****Danger to life**

- Separate the device from the mains before opening it.
- Use the supplied screws to close the device before commissioning.

**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 electrostatic sensitive devices.

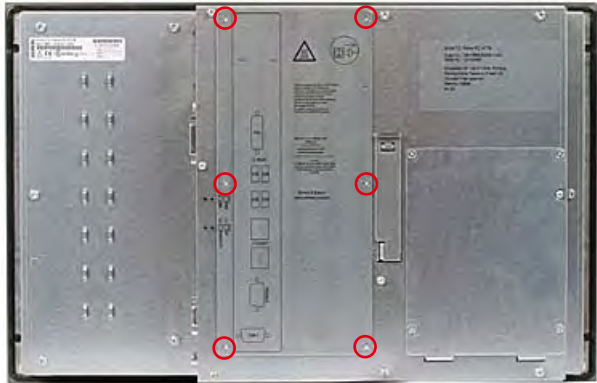
#### Tools

- Expansion cover: Torx T8
- Equipotential bonding terminal: Torx T20
- Spacing bolts PC/104: Hexagon head 5 mm

#### Preparation

Disconnect the device from power supply.

## Removing the Expansion Cover

Steps for removing the expansion cover	
1. Remove the six screws.	
2. Remove the expansion cover.	



## 11.2 Memory Expansion

### 11.2.1 Installing the memory module

#### Memory expansion options

The motherboard is equipped with one slot for a memory module. A DDR2 SDRAM SO-DIMM memory module can be used. This allows you to expand the memory capacity of the SIMATIC Panel PC 477B to a maximum of 2 GB.

#### 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 directives for handling electrostatic sensitive devices.

#### Removing a Memory Module

How to remove a memory module	
1.	Remove the expansion cover.
2.	Press the latch (1) downward. Tilt the memory module forward.
	
3.	Pull the memory module out of the slot.

### Installing the memory module

How to install a memory module	
1.	Place the memory module in the slot at an angle.
	
2.	Lightly press the memory module down until it snaps into the latch.
3.	Mount the expansion cover.

### Display of the current memory configuration

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

## 11.3 Mounting PCI-104 / PC/104 Plus modules

### 11.3.1 Notes on the modules

#### Notes on module specifications

The device is designed to operate with the following modules in conformity to the specifications of the PC/104 consortium.

- PCI-104 modules: PCI compatible (120-pin plug)
- PC/104 *Plus* modules, which only used the 120-pin plug

---

#### Note

The necessary expansion frames for the installation of these modules can be ordered via the A&D online ordering system, as a 6-pack with the order number 6AG4070-0BA00-0XA0.

---

### 11.3.2 Mounting a PC/104 module

#### Tools



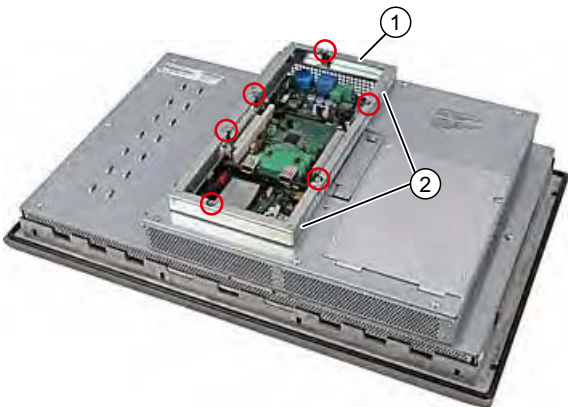
Use hexagon head screws (5 mm) to mount the spacing bolts of the PCI-104 or PC/104-*Plus* module. If this is the only PCI-104 or PC/104-*Plus* module you wish to mount, you can also use screws (M3) instead of the spacing bolts.

#### Preparation

- Disconnect 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. The dimensional drawings provide the required measurements.

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 guidelines on handling electrostatic sensitive devices.

Mounting PCI-104 or PC/104-Plus modules

Steps for mounting an expansion module		
1.	Remove the expansion cover.	
2.	Insert the module in the slot (1).	
3.	Secure the module with four screws or spacing bolts.	
4.	Mount the expansion frame (1) auf and secure it with six spacing bolts. If the connector extrudes, remove the slot plates (2).	
5.	Mount the expansion cover onto the expansion frame.	

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

The device can be equipped with a maximum of 3 PC/104 modules. An additional expansion frame is required for each PC/104 module.

---

#### Note

With a 19" device, the basic design allows you to install an expansion module without an additional expansion frame.

---

Follow the installation procedure described in the section *Mounting a PC/104 or PC/104-Plus module* (steps 2 to 4).

---

#### Note

PC/104-Plus modules must be mounted before PC/104 modules.

---

### Configuring/installing a PC/104 module

You may need to make settings in the BIOS Setup and select an interrupt and address for a PC/104 module. For detailed information about installation, refer to the manufacturer documentation for the respective module.

## 11.4 Installing/Removing Compact Flash Cards

### 11.4.1 Installation options for Compact Flash cards

#### Memory expansion options

The device can be expanded with Compact Flash cards (Types I / II). The following options are available:

- Installing a Compact Flash card in the internal module receptacle
- Installing a Compact Flash card in the external module receptacle

Only use SIMATIC PC Compact Flash cards for industrial application.




Figure 11-1 SIMATIC PC Compact Flash®

<b>Notice</b>
<b>Risk of damage</b>
The Compact Flash slots are not hot-plug capable. The Compact Flash card must be installed before the device is switched on and should only be removed when the device is switched off.
<b>Note</b>
The Compact Flash slots are coded against reversed insertion. Insert the Compact Flash card so that its upper side (label side) is facing right.
 <b>Caution</b>
If the Compact Flash card meets resistance, flip it over. Never insert the Compact Flash card with force.



## 11.4.2 Installing/Removing the Compact Flash Card in the External Module Receptacle

### Preparation

Disconnect the device from the power supply.

 <b>Caution</b>
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 guidelines on handling electrostatic sensitive devices.

### Installing the Compact Flash card in the external module receptacle

How to install a Compact Flash card	
1. Open the cover of the module receptacle at the rear of the device. First push the cover up and then pull it outward.	
2. Insert the Compact Flash card in the module receptacle with the connector facing in until it locks into place.	
3. Close the cover.	

### Removing the Compact Flash card from the external module receptacle

How to remove a Compact Flash card	
1.	Open the cover of the module receptacle.
2.	Press the eject key and remove the Compact Flash card.
3.	Close the cover.







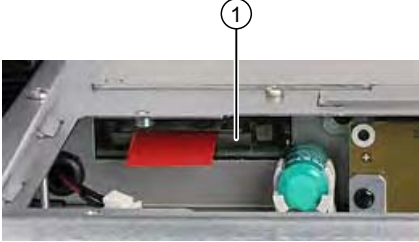
### 11.4.3 Installing/Removing the Compact Flash card in the Internal Module Receptacle

#### Preparation

Disconnect the device from the power supply.

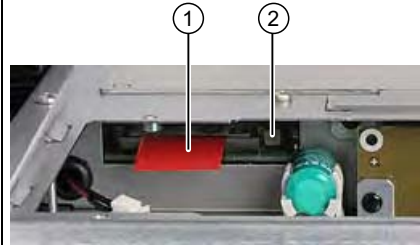
 <b>Caution</b>
The electronic components on the PCBs are highly sensitive to electrostatic discharge. Always take appropriate precautionary measures when handling these components. Refer to the ESD guidelines on handling electrostatic sensitive devices.

#### Installing the Compact Flash card in the internal module receptacle

How to install a Compact Flash card	
1. Remove the cover at the rear of the device. Use a Torx T8 screwdriver.	
2. Insert the Compact Flash card (1) in the slot with the connector facing in until it locks into place.	
3. Fasten the cover.	

### Removing the Compact Flash card from the internal module receptacle

Steps for removing a Compact Flash card	
1.	Remove the cover at the rear of the device.
2.	Press the eject button (2) and pull out the Compact Flash card by the link (1).
3.	Fasten the cover.



## Maintenance and service

### 12.1 Cleaning the Device Front

The device is designed for low-maintenance operation. You should still clean the device front regularly, however.

#### Cleaning Agents

Use dish soap or foaming screen cleaner only as cleaning agents.

<b>Notice</b>
<b>Risk of damage</b> Do not clean the device with aggressive solvents or scrubbing agents or with pressurized air or steam cleaner.

#### Cleaning the Device Front


1. Switch off the device. This prevents the accidental triggering of functions when the screen and/or the membrane keyboard is touched.
2. Dampen the cleaning cloth.
3. Spray the cleaning agent on the cloth and not directly on the device.
4. Clean the device with the cleaning cloth.


## 12.2 Removing and Installing Hardware Components

### 12.2.1 Repairs

#### Carrying out repairs

Only authorized personnel are permitted to repair the device.

 <b>Warning</b>
<b>Danger to life</b> <ul style="list-style-type: none"><li>• Separate the device from the mains before opening it.</li><li>• Use the supplied screws to close the device before commissioning.</li></ul>

 <b>Warning</b>
<b>Unauthorized opening and improper repairs on the device may result in substantial damage to equipment or endanger the user.</b>

- 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.**

<b>Notice</b>
Note the ESB instructions.

#### Disclaimer of liability

All specifications and approvals are only valid when the expansion component feature the CE symbol.

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

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

#### Tools

- Torx T8 (expansion cover and cover for internal memory)
- Torx T20 (equipotential bonding terminal)
- Hexagon head 5mm (spacing bolts PC/104)

## 12.2.2 Replace the backup battery

### Note 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).

 **Warning****Risk of explosion and release of harmful substances**

Therefore, do not throw Lithium batteries into an open fire, do not solder or open the cell body, do not short-circuit or reverse polarity, do not heat up above 100° C, dispose as regulated and protected against direct exposure to sunlight, humidity and dewing.

### 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. Note down the current settings of the BIOS setup.  
A list in which you can note down this information is found in the BIOS description.
2. Isolate the device from mains and disconnect all cables.

## Replacing the Battery

Steps for replacing the battery	
1. Remove the cover.	
2. Pull out the fan connector (1).	
3. Remove the battery from the bay.	
4. Insert the new battery and fasten it.	
5. Close the cover.	

## Reconfiguring the BIOS setup

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

## 12.3 Reinstalling the Windows XP Embedded Operating System

### 12.3.1 General installation procedure

If your software becomes corrupt for any reason, you can reinstall it from the Restore CD. The Restore CD contains an image file with the original software and is included with the product as a software package.

---

**Note**

You require a USB keyboard in order to reinstall the operating system.

---

### 12.3.2 Restoring the software to factory state using the Restore CD

You can reinstall the original factory software using the Restore CD (forms part of the scope of delivery). The CD contains the necessary images and tools for transferring the factory software to the Compact Flash card of your PC.

#### 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 in the drive and reboot the device. When the BIOS message appears, press

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

3. Select the Boot menu and move the entry "CD-ROM Drive" to the first position.
4. End the BIOS setup with the "Exit Saving Changes" entry.
5. Now follow the instructions on the screen.

<b>Caution</b>
All existing <b>data, programs, user settings</b> and <b>authorizations or license keys will be deleted</b> from the hard disk and therefore lost.

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

---

**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.

---

### 12.3.3 Partitioning the Compact Flash Card

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

Partition	Name	Size	File system
1. Partition	system	867 MB	NTFS (compressed)
2. Partition	DATA	Rest *	NTFS (compressed)

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

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..

### 12.3.4 Updating the operating system

An update of the operating systems is only possible with a new version of the Restore CD. Please contact customer support for more information about its availability.

#### Other operating systems

Please contact the corresponding manufacturer.

### 12.3.5 Installing or updating application programs and drivers

A USB drive has to be connected in order to install the software from a CD or floppy disk under Windows XP Embedded.

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

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

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



### 12.3.6 Data Backup

#### Driver installation under Windows XP Embedded

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

The software can be ordered from the Siemens A&D online ordering system. For detailed information about SIMATIC PC/PG Image Creator, please refer to the corresponding product documentation.

### 12.3.7 Installing drivers and software

<b>Notice</b>
---------------

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.

<b>Notice</b>
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For new Windows XP installations, the chipset driver must be installed before you install any other drivers.
--

When drivers are being installed under Windows XP Embedded, you may see a message that the Windows XP Installation CD or SP2 CD is required.

In this case, insert the Restore DVD. The required files are available in the \Drivers\_XPE folder.



## Alarm, Error and System Messages

### 13.1 Boot error messages

During startup (the boot process), the BIOS first performs a **Power On Self Test (POST)** and checks whether certain functional units of the PC are operating error-free. The boot sequence is immediately interrupted if critical errors occur.

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

The following lists the error messages from the system BIOS. For information on error messages output by the operating system or programs, refer to the corresponding manuals.

#### On-screen error messages

On-screen error message	Meaning / suggestions
Address conflict	Plug-and-Play problem. Contact your technical support team.
Combination not supported	Plug-and-Play problem. Contact your technical support team.
IO device IRQ conflict	Plug-and-Play problem. Contact your technical support team.
Invalid system configuration data	Plug-and-Play problem <ul style="list-style-type: none"> <li>Set the RESET CONFIGURATION DATA option in the "Advanced" menu of Setup.</li> <li>Contact your technical support team.</li> </ul>
Allocation Error for ...	Plug-and-Play problem <ul style="list-style-type: none"> <li>Please undo the last hardware change.</li> <li>Contact your technical support team.</li> </ul>
System battery is dead. Replace and run SETUP	The battery on the CPU module is defective or dead. Contact your technical support team.
System CMOS checksum bad Run SETUP	Call up SETUP, adjust settings and save. If this message appears during each startup, contact your technical support team.
Failure Fixed Disk	Error accessing the hard drive. Check the SETUP settings. Contact your technical support team.
System RAM Failed at offset:	Memory error. Contact your technical support team.
Shadow RAM Failed at offset:	Memory error. Contact your technical support team.

13.1 Boot error messages

<b>On-screen error message</b>	<b>Meaning / suggestions</b>
Extended RAM Failed at offset:	Memory error. Contact your technical support team.
Failing Bits:	Memory error. Contact your technical support team.
Operating system not found	Possible causes: <ul style="list-style-type: none"><li>• No operating system present</li><li>• Incorrect active boot partition</li><li>• Wrong boot drive settings in SETUP</li></ul>
Previous boot incomplete Default configuration used	Abort of the previous BOOT procedure, for example, due to a power failure. Adjust the settings in SETUP.
System time-out	Hardware error. Contact your technical support team.
Real-time clock error	Clock chip error. Contact your technical support team.
Keyboard controller error	Controller error. Contact your technical support team.

## Troubleshooting/FAQs

### 14.1 General problems

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

Problem	Possible cause	Remedy
The device is not operational.	There is no power supply to the device.	Check your computer configuration:
The monitor remains dark.	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 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. 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.		1. Press <F2> within the boot sequence to open the BIOS Setup. 2. Set the time and date in the setup menu.
Although the BIOS setting is OK, the time and data are still wrong.	The backup battery is dead.	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 XP Embedded must be first disabled for this.

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

Problem	Possible cause	To correct or avoid error
The PC crashes during startup.	<ul style="list-style-type: none"> <li>• I/O addresses are assigned twice.</li> <li>• Hardware interrupts and/or DMA channels are assigned twice</li> <li>• Signal frequencies or signal levels are not adhered to</li> <li>• Different connector pin assignments</li> <li>• No "Reset Configuration" in BIOS SETUP.</li> </ul>	<p>Check your computer configuration:</p> <ul style="list-style-type: none"> <li>• If the computer configuration corresponds with factory state, please contact your technical support team.</li> <li>• 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.</li> <li>• Force a "Reset Configuration" using the BIOS setup.</li> </ul> <p>If the PC still crashes, contact your technical support team.</p>

## Technical Specifications

### 15.1 Keyboard table

#### Key codes

The following table applies only to control units with key panels. It contains all characters that can be entered in SIMATIC KeyTools in the "Key code table" area and under "User specific". The character that is triggered by pressing a specific key is listed in the "Display/function" column. You can find additional information in the documentation for SIMATIC KeyTools on the "Documentation and Drivers" CD.

Name	Code (Hex) 0x	Check-box	Display/function
a A	4	—	a
		L Shift/R Shift	A
		R Alt	á
		R Alt+L Shift/R Shift	Á
b B	5	—	b
		L Shift/R Shift	B
c C	6	—	c
		L Shift/R Shift	C
		R Alt	©
		R Alt+L Shift/R Shift	ç
		L Ctrl/R Ctrl	Copy
d D	7	—	d
		L Shift/R Shift	D
		R Alt	ð
		R Alt+L Shift/R Shift	Ð
e E	8	—	e
		L Shift/R Shift	E
		R Alt	é
		L Shift/R Shift	É
		L Gui/R Gui	Start Windows Explorer

15.1 Keyboard table

Name	Code (Hex) 0x	Check-box	Display/function
f F	9	—	f
		L Shift/R Shift	F
		L Gui/R Gui	Find folder and file
g G	0A	—	g
		L Shift/R Shift	G
h H	0B	—	h
		L Shift/R Shift	H
i I	0C	—	i
		L Shift/R Shift	I
		R Alt	í
		R Alt+L Shift/R Shift	Í
j J	0D	—	j
		L Shift/R Shift	J
k K	0E	—	k
		L Shift/R Shift	K
l L	0F	—	l
		L Shift/R Shift	L
		R Alt	ø
		R Alt+L Shift/R Shift	Ø
m M	10	—	m
		L Shift/R Shift	M
		R Alt	μ
		L Gui/R Gui	Minimize all windows
n N	11	—	n
		L Shift/R Shift	N
		R Alt	ñ
		R Alt+L Shift/R Shift	Ñ
o O	12	—	o
		L Shift/R Shift	O
		R Alt	ó
		R Alt+L Shift/R Shift	Ó
		L Ctrl/R Ctrl	Open
p P	13	—	p
		L Shift/R Shift	P
		R Alt	ö
		R Alt+L Shift/R Shift	Ö
		L Ctrl/R Ctrl	Printing



Name	Code (Hex) 0x	Check-box	Display/function
q Q	14	—	q
		L Shift/R Shift	Q
		R Alt	ä
		R Alt+L Shift/R Shift	Ä
r R	15	—	r
		L Shift/R Shift	R
		R Alt	®
		L Gui/R Gui	Display "Run" dialog
s S	16	—	s
		L Shift/R Shift	S
		R Alt	ß
		R Alt+L Shift/R Shift	§
		L Ctrl/R Ctrl	Save
t T	17	—	t
		L Shift/R Shift	T
		R Alt	þ
		R Alt+L Shift/R Shift	Þ
u U	18	—	u
		L Shift/R Shift	U
		R Alt	ú
		R Alt+L Shift/R Shift	Ú
v V	19	—	v
		L Shift/R Shift	V
		L Ctrl/R Ctrl	Paste
w W	1A	—	w
		L Shift/R Shift	W
		R Alt	å
		R Alt+L Shift/R Shift	Å
x X	1B	—	x
		L Shift/R Shift	X
		L Ctrl/R Ctrl	Cut
y Y	1C	—	y
		L Shift/R Shift	Y
		R Alt	ÿ
		R Alt+L Shift/R Shift	Ÿ

15.1 Keyboard table

Name	Code (Hex) 0x	Check-box	Display/function
z Z	1D	—	z
		L Shift/R Shift	Z
		R Alt	æ
		R Alt+L Shift/R Shift	Æ
		L Ctrl/R Ctrl	
1 !	1E	—	1
		L Shift/R Shift	!
		R Alt	i
		R Alt+L Shift/R Shift	¹
2 @	1F	—	2
		L Shift/R Shift	@
		R Alt	²
3 #	20	—	3
		L Shift/R Shift	#
		R Alt	³
4 \$	21	—	4
		L Shift/R Shift	\$
		R Alt	¤
		R Alt+L Shift/R Shift	£
5 %	22	—	5
		L Shift/R Shift	%
		R Alt	€
6 ^	23	—	6
		L Shift/R Shift	^
		R Alt	¼
7 &	24	—	7
		L Shift/R Shift	&
		R Alt	½
8 *	25	—	8
		L Shift/R Shift	*
		R Alt	¾
9 (	26	—	9
		L Shift/R Shift	(
		R Alt	'
0 )	27	—	0
		L Shift/R Shift	)
		R Alt	'
Return	28	—	Return
Escape	29	—	Escape
Backspace	2A	—	Backspace

Name	Code (Hex) 0x	Check-box	Display/function
Tab	2B	—	Tab
Space	2C	—	Space
- _	2D	—	-
		L Shift/R Shift	_
		R Alt	¥
= +	2E	—	=
		L Shift/R Shift	+
		R Alt	×
		R Alt+L Shift/R Shift	÷
[ {	2F	—	[
		L Shift/R Shift	{
		R Alt	«
] }	30	—	]
		L Shift/R Shift	}
		R Alt	»
\	31	—	\
		L Shift/R Shift	
		R Alt	¬
		R Alt+L Shift/R Shift	¡
Europe 1	32	—	Europe 1
; :	33	—	;
		L Shift/R Shift	:
		R Alt	¶
		R Alt+L Shift/R Shift	°
' "	34	—	'
		L Shift/R Shift	"
		R Alt	'
		R Alt+L Shift/R Shift	''
' ~	35	—	'
		L Shift/R Shift	~
, <	36	—	,
		L Shift/R Shift	<
		R Alt	ç
		R Alt+L Shift/R Shift	Ç
. >	37	—	.
		L Shift/R Shift	>

15.1 Keyboard table

Name	Code (Hex) 0x	Check-box	Display/function
/ ?	38	—	/
		L Shift/R Shift	?
		R Alt	¿
Caps Lock	39	—	Caps Lock
F1	3A	—	F1
		L Shift/R Shift	F13
		L Ctrl/R Ctrl	S5
F2	3B	—	F2
		L Shift/R Shift	F14
		L Ctrl/R Ctrl	S6
F3	3C	—	F3
		L Shift/R Shift	F15
		L Ctrl/R Ctrl	S7
F4	3D	—	F4
		L Shift/R Shift	F16
		L Ctrl/R Ctrl	S8
F5	3E	—	F5
		L Shift/R Shift	F17
		L Ctrl/R Ctrl	S9
F6	3F	—	F6
		L Shift/R Shift	F18
		L Ctrl/R Ctrl	S10
F7	40	—	F7
		L Shift/R Shift	F19
		L Ctrl/R Ctrl	S11
F8	41	—	F8
		L Shift/R Shift	F20
		L Ctrl/R Ctrl	S12
F9	42	—	F9
		L Shift/R Shift	S1
		L Ctrl/R Ctrl	S13
F10	43	—	F10
		L Shift/R Shift	S2
		L Ctrl/R Ctrl	S14
F11	44	—	F11
		L Shift/R Shift	S3
		L Ctrl/R Ctrl	S15
F12	45	—	F12
		L Shift/R Shift	S4
		L Ctrl/R Ctrl	S16
Print Screen, FN+INS	46	—	Print Screen, FN+INS
Scroll Lock	47	—	Scroll Lock

Name	Code (Hex) 0x	Check-box	Display/function
Break, Ctrl+Pause	48	—	Break, Ctrl+Pause
Pause	48	—	Pause
Insert	49	—	Insert
Home	4A	—	Home
Page Up	4B	—	Page Up
Delete	4C	—	Delete
End	4D	—	End
Page Down	4E	—	Page Down
Right Arrow	4F	—	Right Arrow
Left Arrow	50	—	Left Arrow
Down Arrow	51	—	Down Arrow
Up Arrow	52	—	Up Arrow
Num Lock	53	—	Num Lock
Keypad /	54	—	Keypad /
Keypad *	55	—	Keypad *
Keypad -	56	—	Keypad -
Keypad +	57	—	Keypad +
Keypad Enter	58	—	Keypad Enter
Keypad 1 End	59	—	Keypad 1 End
Keypad 2 Down	5A	—	Keypad 2 Down
Keypad 3 PageDn	5B	—	Keypad 3 PageDn
Keypad 4 Left	5C	—	Keypad 4 Left
Keypad 5	5D	—	Keypad 5
Keypad 6 Right	5E	—	Keypad 6 Right
Keypad 7 Home	5F	—	Keypad 7 Home
Keypad 8 Up	60	—	Keypad 8 Up
Keypad 9 PageDn	61	—	Keypad 9 PageDn
Keypad 0 Insert	62	—	Keypad 0 Insert
Keypad . Delete	63	—	Keypad . Delete
Europe 2	64	—	Europe 2
App	65	—	App
Keyboard Power	66	—	Keyboard Power
Keypad =	67	—	Keypad =
F13	68	—	F13
F14	69	—	F14
F15	6A	—	F15
F16	6B	—	F16
F17	6C	—	F17
F18	6D	—	F18
F19	6E	—	F19
F20	6F	—	F20
F21	70	—	F21

15.1 Keyboard table

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Name	Code (Hex) 0x	Check-box	Display/function
F22	71	—	F22
F23	72	—	F23
F24	73	—	F24
Left Control	E0	—	Left Control
Left Shift	E1	—	Left Shift
Left Alt	E2	—	Left Alt
Left GUI	E3	—	Left GUI
Right Control	E4	—	Right Control
Right Shift	E5	—	Right Shift
Right Alt	E6	—	Right Alt
Right GUI	E7	—	Right GUI

## 15.2 General Technical Specifications

<b>General specifications</b>	
Order nos.	see the order documents
Dimensions	Device with touch screen, 12" display 400x310x75 (WxHxD in mm) Device with touch screen, 15" display 483x310x75 (WxHxD in mm) Device with touch screen, 19" display: 483x400x98 (WxHxD in mm) Device with key panel, 12" display: 483x310x75 (WxHxD in mm) Device with key panel, 15" display: 483x355x75 (WxHxD in mm)
Weight	Device with touch screen, 12" display 7.3 kg Device with touch screen, 15" display 8,3 kg Device with touch screen, 19" display: 14.30 kg Device with key panel, 12" display: 7.7 kg Device with key panel, 15" display: 8.7 kg
Supply voltage	24 V DC <sup>1</sup> (20.4 to 28.8 V)
Brief power failure according to Namur	min. 15 ms Max. 10 events per hour; min. 1 s recovery time
Maximum power consumption:	
12" and 15" devices	3.5 A continuous current (starting current 6.5 A/ 30 ms)
19" devices	4.5 A (starting current 14.4 A/ 30 ms)
Noise emission	< 30 dB (A) to DIN 45635-1 at operation with Compact Flash card / in no.load mode
Degree of protection	IP 20 to IEC 60529
<b>Safety</b>	
Protection class	Protection class I to IEC 61140
Safety specifications	EN60950-1, UL 508; CSA C22.2 No. 142

<sup>1</sup> The generation of the 24 DC V supply voltage by the line-side power supply 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.

<b>General specifications</b>	
<b>Electromagnetic compatibility (EMC)</b>	
Emitted interference	EN 55022 Class A, FCC Class A
Noise immunity on signal lines	± 1 kV (to IEC 61000-4-4, burst, length < 3 m) ± 2 kV (to IEC 61000-4-4, surge symmetrical, length > 3 m) ± 2 kV (to IEC 61000-4-5, surge symmetrical, length > 30 m)
Immunity to conducted interference on the supply lines	± 2 kV (to IEC 61000-4-4, burst) ± 1 kV (to IEC 61000-4-5, surge symmetrical) ± 2 kV (to IEC 61000-4-5, surge asymmetrical)
Immunity to discharges of static electricity	± 6 kV, contact discharge (to IEC 61000-4-2) ± 8 kV, air discharge (to IEC 61000-4-2)
Immunity to RF interference	10 V/m, 80 - 1000 MHz, 80% AM; (to IEC 61000-4-3) 10 V/m, 1.4 - 2 GHz 1 V/m, 2 - 2.7 GHz 10 V, 9 kHz - 80 MHz; (to IEC 61000-4-6)
Immunity to magnetic fields	100A/m, 50/60 Hz; (to IEC 61000-4-8)
<b>Climatic conditions</b>	
Temperature - vertical mounting position with +/- 15° angle	Tested to IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14  5 - 45° C (in front of and behind the device) with full configuration (max. 3 expansions each with up to 3W) 5 - 50° C (rear), 40° C (front); (max. 3 expansions each with up to 3W)
- vertical mounting position with +/- 30° angle	5 - 40° C (in front of and behind the device); (max. 3 expansions each with up to 3W)
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)
<b>Mech. Ambient conditions</b>	
Vibration	Tested to DIN IEC 60068-2-6
- Operation	10 to 58 Hz: 0.075 mm, 58 to 500 Hz: 9,8 m/s <sup>2</sup>
-Storage/transport	5 to 9 Hz: 3.5 mm, 9 to 500 Hz: 9.8 m/s <sup>2</sup>
Resistance (shock)	tested to IEC 60068-2-27, IEC 60068-2-29
-Operation	50 m/s <sup>2</sup> , 30 ms
-Storage/transport	250 m/s <sup>2</sup> , 6 ms
<b>Special features</b>	
Quality assurance	acc. to ISO 9001
<b>Motherboard</b>	
Processor	Intel Celeron M ULV 373, 1 GHz, 512 KB Second Level Cache
Main memory	SO-DIMM Module; 256/512/1024/2048 MB DDR2-SDRAM
Buffer memory	2 MB SRAM (128 KB of this can be backed up in the buffer time of the power supply)
Free expansion slots	Up to 3 PCI-104 or PC/104- <i>Plus</i> modules can be used (max. permitted power loss: 3 W per module, 9 W total)



<b>General specifications</b>	
<b>Memory media</b>	
Compact Flash card	256/512/1024/2048 MB
<b>Graphic controller</b>	
Display	12" screen diagonal with background illumination, resolution 800x600 pixels 15" screen diagonal with background illumination, resolution 1024x768 pixels 19" screen diagonal with background illumination, resolution 1280x1024 pixels
Touch controller (only touch screen devices)	Resistive Semtech-Controller ELO CTR-2216SU-AT-CHP-00
Graphic connector	DVI connection with external VGA output
Resolutions / controller	From 640x480 to 1600x1200
<b>Ports</b>	
COM1	RS232, max. 115 Kbps., 9-pin Cannon, male
DVI	VGA integrated in the DVI-I
Keyboard	USB support
Mouse	USB support
USB	1x USB 2.0 / 500 mA (device front) 4x USB 2.0 / 500 mA (device rear)
PROFIBUS/MPI-Port electrically isolated - Transmission speed - Operating modes	9-pin Cannon socket, 2-row 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 (only for devices with PROFIBUS feature)
Ethernet	2x Ethernet ports (RJ45) Intel Tekoa 82573L 10/100/1000 Mbps, isolated Teaming-capable
PROFINET	3x PROFINET via 100 Mbps Ethernet (only for devices with PROFINET feature) - Transmission rate 10/100 Mbps - Half/full duplex - Autocrossover, Autonegotiation - Autopolarity for 10 Mbit - LED functions for link and activity

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<b>General specifications</b>		
<b>Status displays Computer unit</b>		
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)	YELLOW	Can be controlled by user programs
SF (Group fault)	RED	Can be controlled by controller program (e.g. WinAC)
L2 (LED 2)	YELLOW	Can be controlled by user programs
RUN	GREEN	Can be controlled by controller program (e.g. WinAC)
STOP	YELLOW	

---

## 15.3 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	--	--	--	6 W (for all USB devices)
	Low current	100 mA	--	--	--	
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	

#### Notice

##### Device can overheat!

For thermal reasons, a 3 watt power loss per PC/104 slot should not be exceeded.

## 15.4 Power Supply for 12" and 15" Devices

### 15.4.1 DC power supply

#### Technical specifications

Input Voltage	24 V DC (20.4 to 28.8 V DC)
Input current	Up to 3,5 A continuous current (up to 6.5 A for 30 ms at startup)
Power consumption (continuous)	70 W
Power failure buffering	Hold-up time > 15 ms (after > 5 ms DC_FAIL is active)
Protection class	VDE 0106

## 15.5 Power Supply for 19" Devices

### 15.5.1 DC power supply

#### Technical specifications

Input Voltage	24 V DC (20.4 to 28.8 V DC)
Input current	Up to 4,5 A continuous current (up to 14,4 A for 30 ms at startup)
Power consumption (continuous)	90 W
Power failure buffering	Hold-up time > 30 ms (DC_FAIL becomes active > 5 ms at the earliest and < 18 ms at the latest)
Protection class	VDE 0106

## Dimensional Drawings

### 16.1 Overview of the dimension drawings

This section contains the following dimensional drawings of the SIMATIC Panel PC 477B:

- Dimension drawing of the touch screen device, 12" display
- Dimension drawing of the touch screen device, 15" display
- Dimension drawing of the touch screen device, 19" display
- Dimension drawing of the key panel device, 12" display
- Dimension drawing of the key panel device, 15" display
- Dimension drawing of the touch screen device, 12" display with expansion frame
- Dimension drawing of the touch screen device, 15" display with expansion frame
- Dimension drawing of the touch screen device, 19" display with expansion frame
- Dimension drawing of the key panel device, 12" display with expansion frame
- Dimension drawing of the key panel device, 15" display with expansion frame

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**Note**

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

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16.2 Dimension drawing of the touch screen device, 12" display

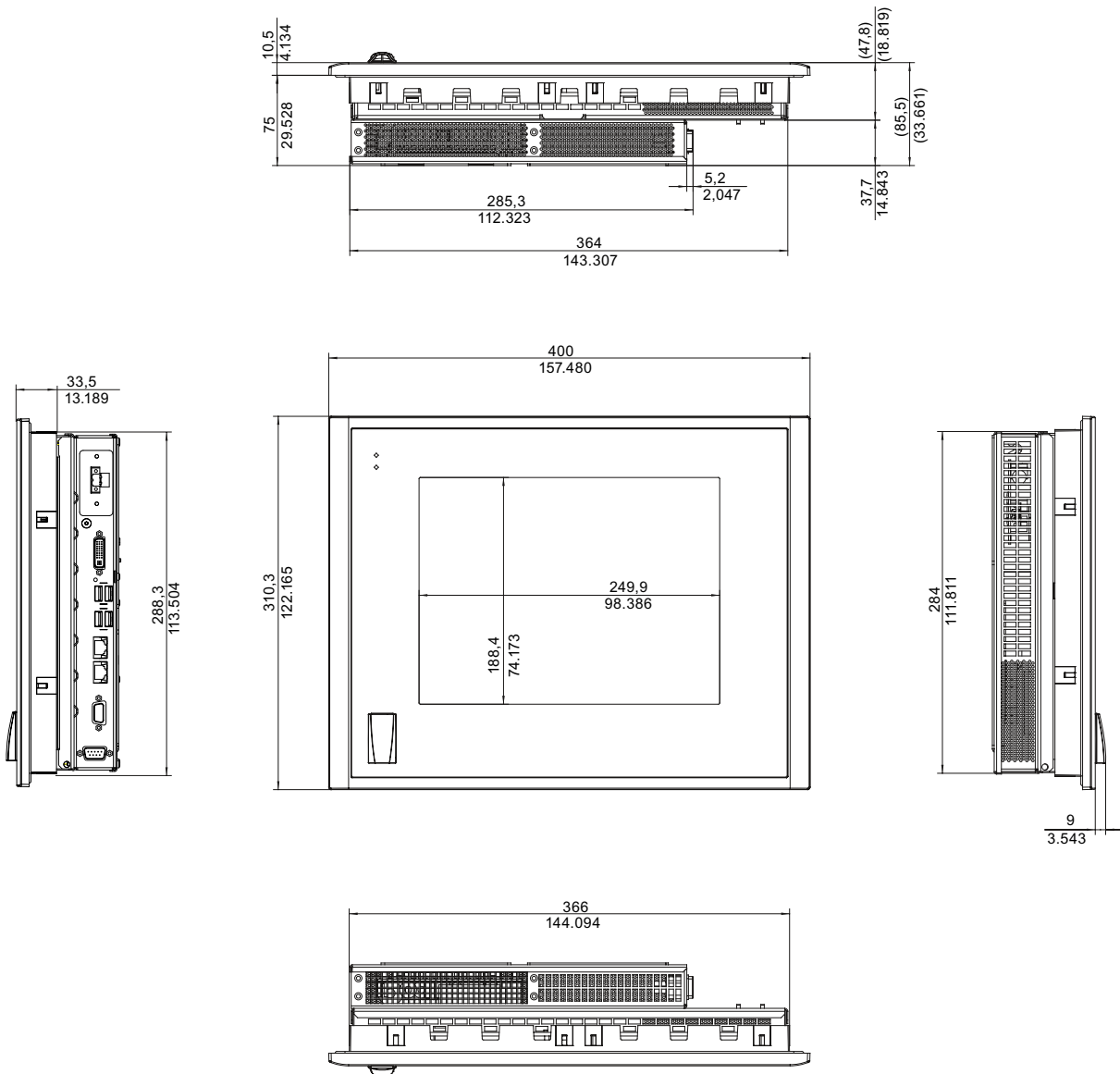


Figure 16-1 Dimension drawing of the touch screen device with 12" display

### 16.3 Dimension drawing of the touch screen device, 15" display

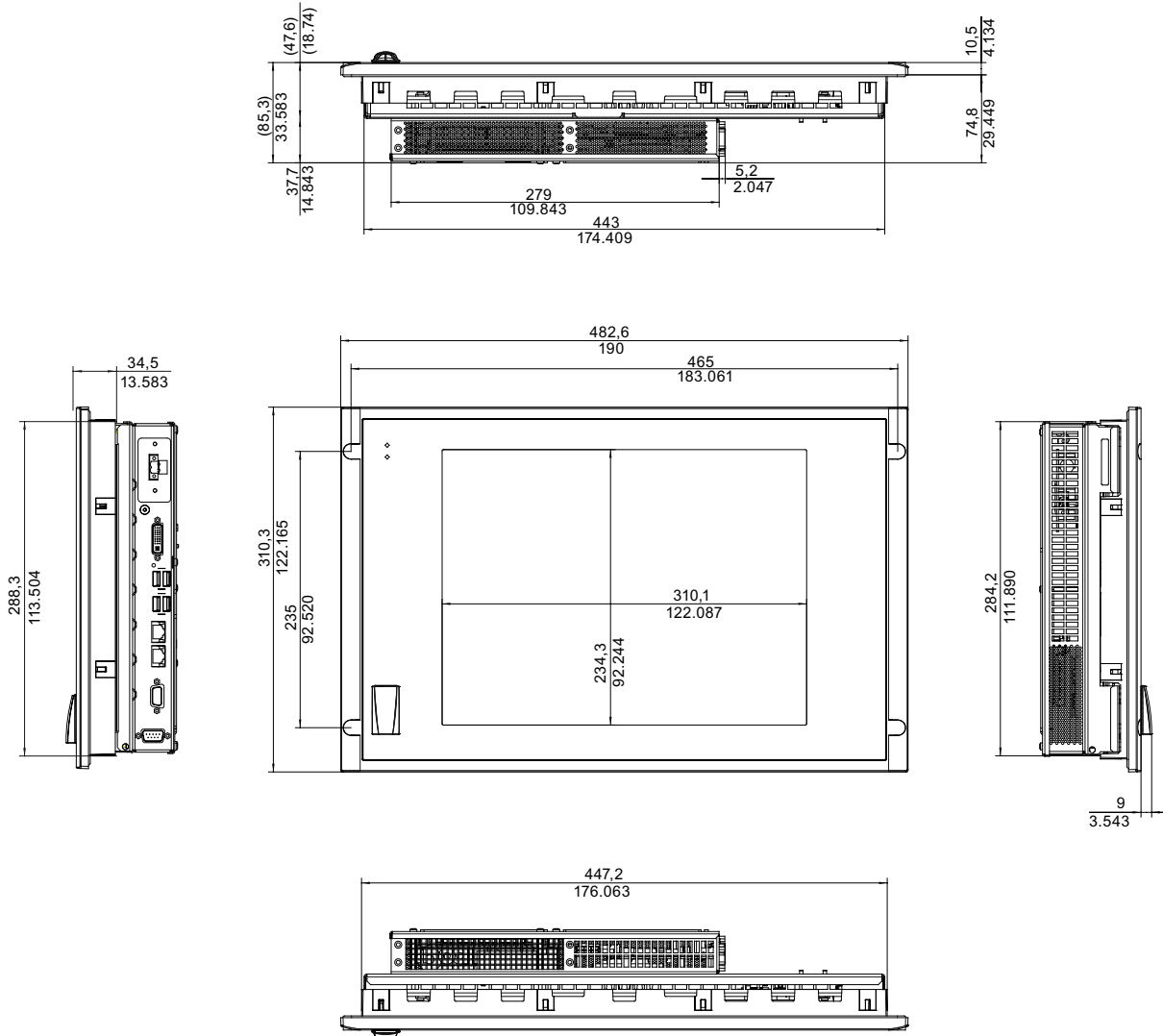


Figure 16-2 Dimension drawing of the touch screen device with 15" display

16.4 Dimension drawing of the touch screen device, 19" display

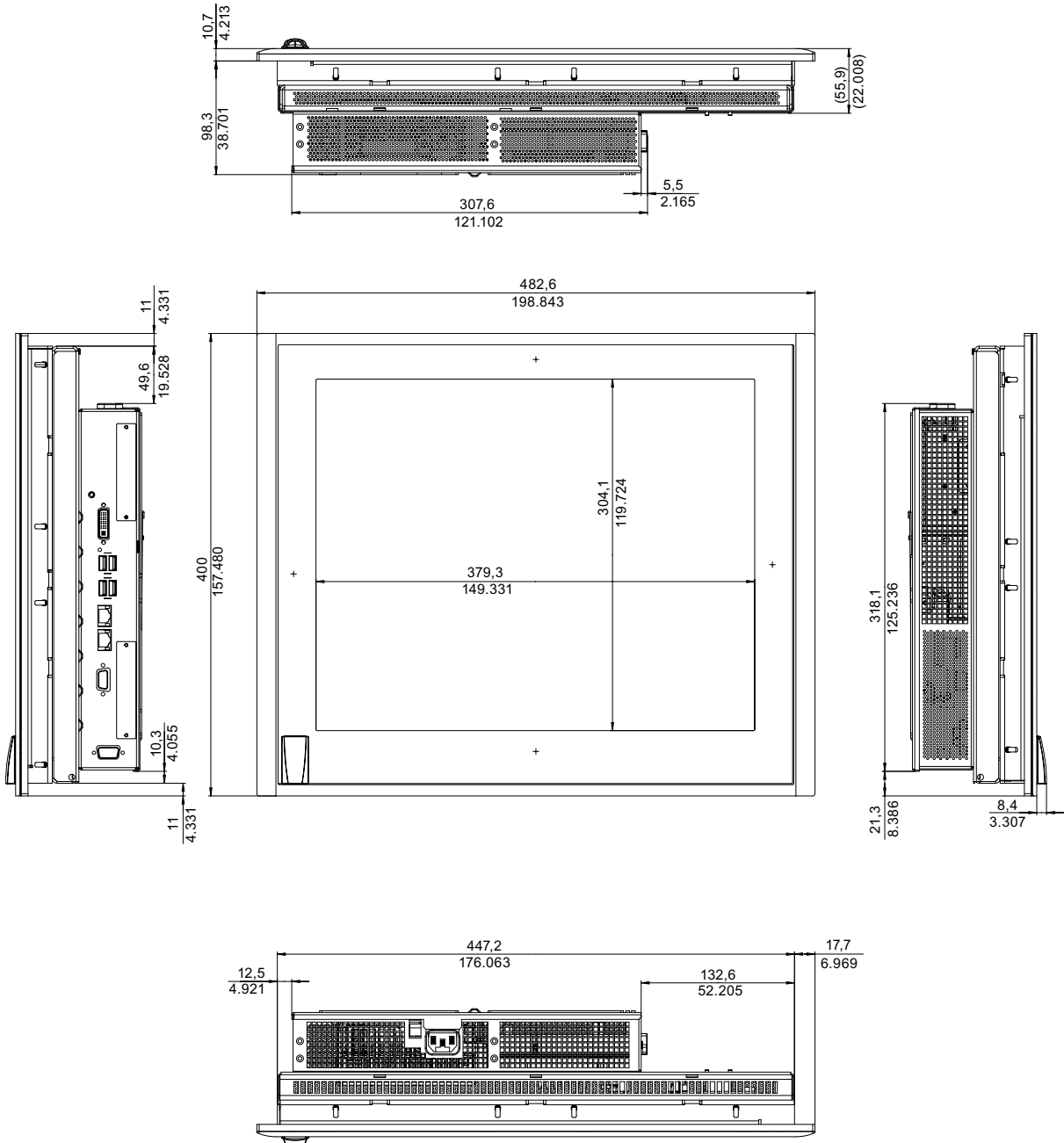


Figure 16-3 Dimension drawing of the touch screen device with 19" display



### 16.5 Dimension drawing of the key panel device, 12" display

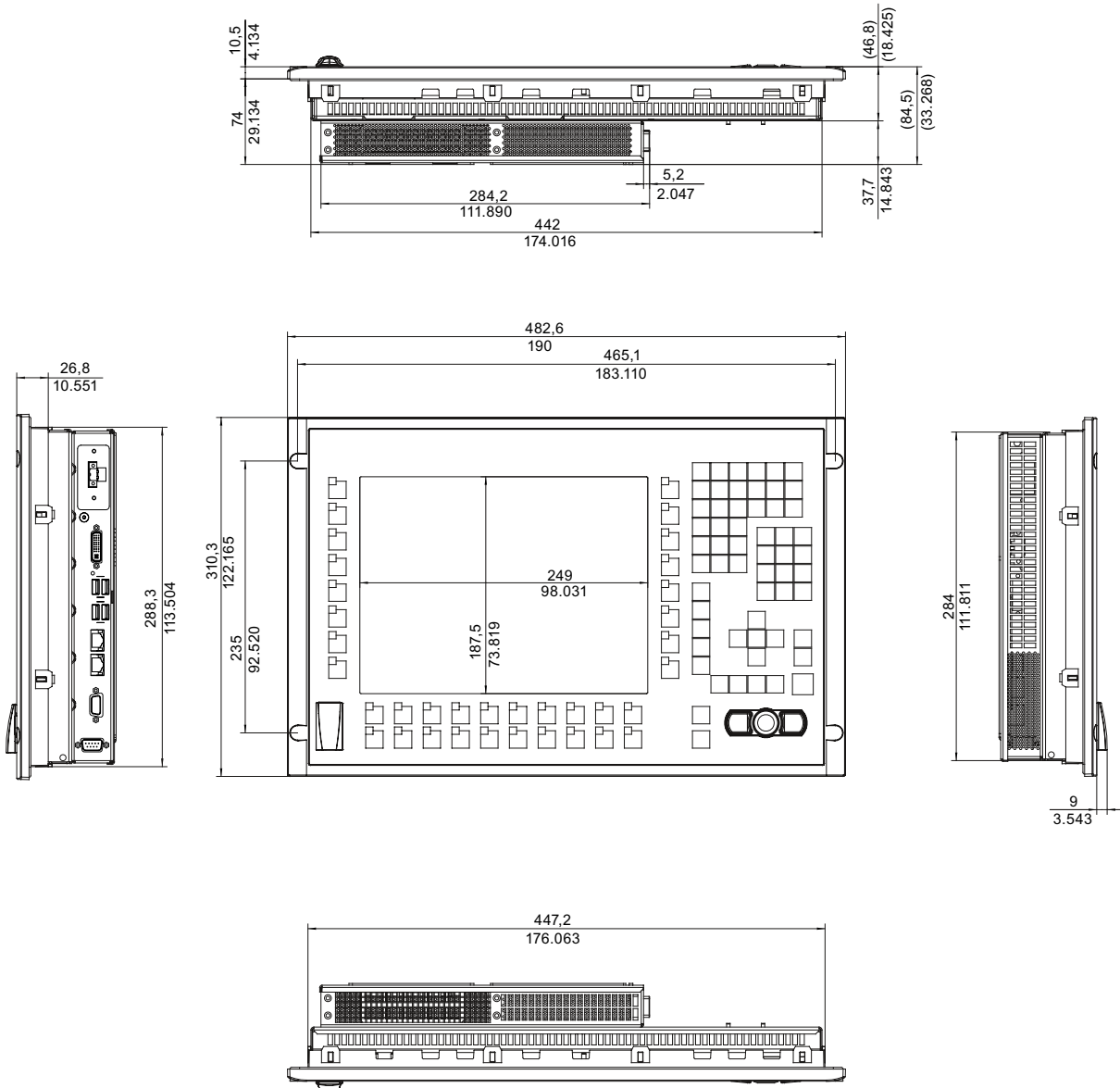


Figure 16-4 Dimension drawing of the key panel device with 12" display

16.6 Dimension drawing of the key panel device, 15" display

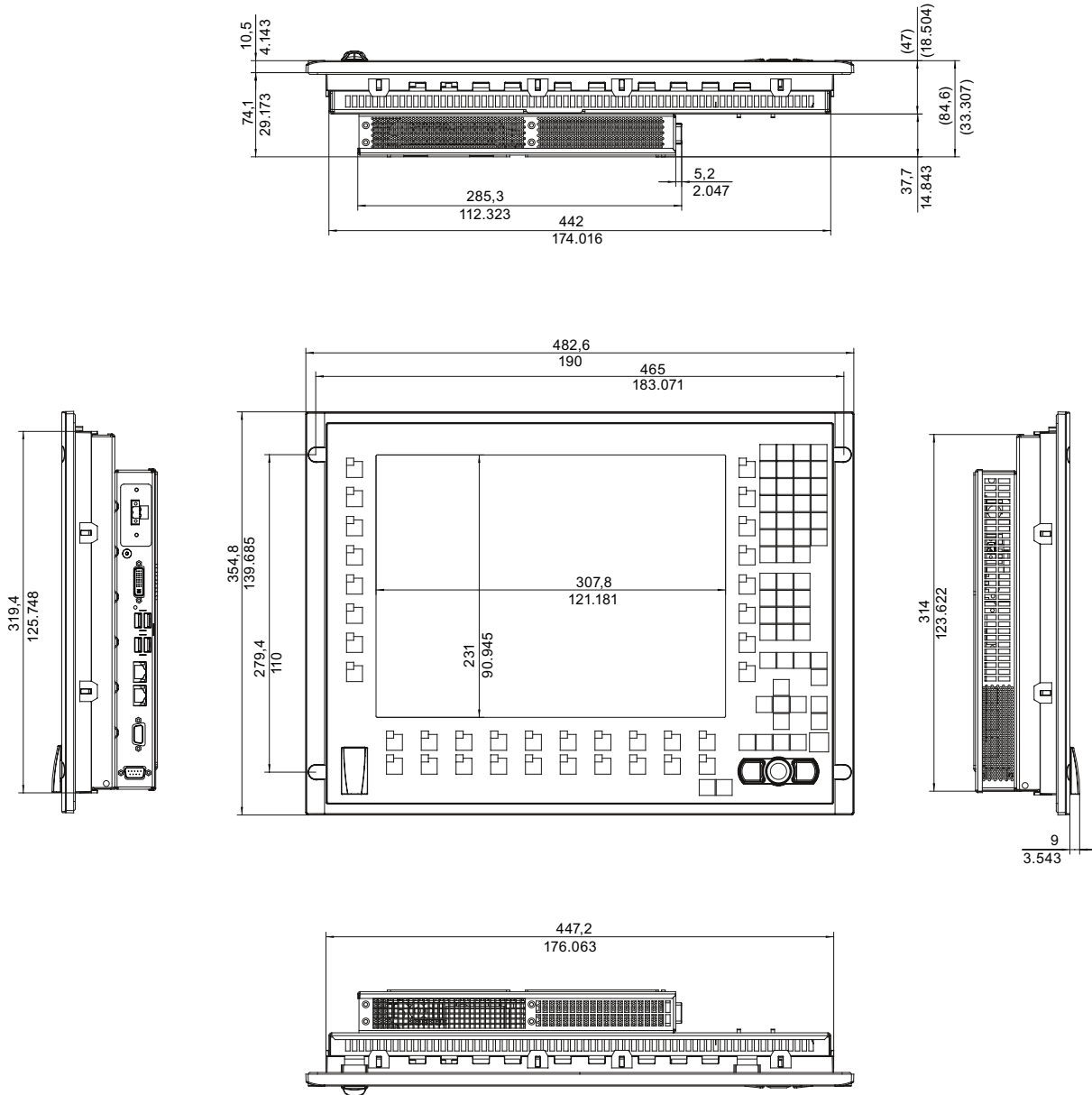


Figure 16-5 Dimension drawing of the key panel device with 15" display

### 16.7 Dimension drawing of the touch screen device, 12" display with expansion frame

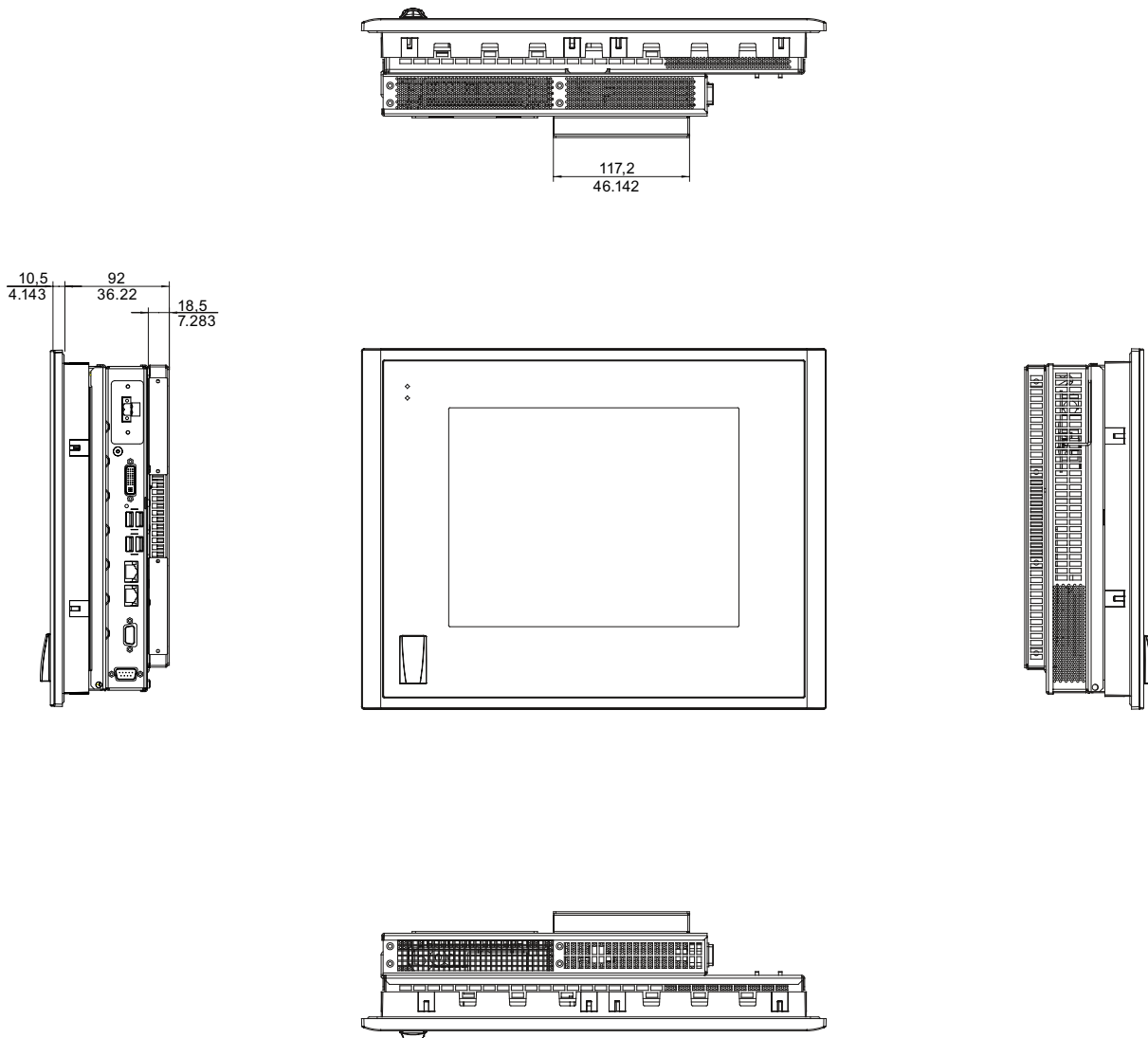


Figure 16-6 Dimension drawing of the touch screen device with 12" display and expansion frame

### 16.8 Dimension drawing of the touch screen device, 15" display with expansion frame

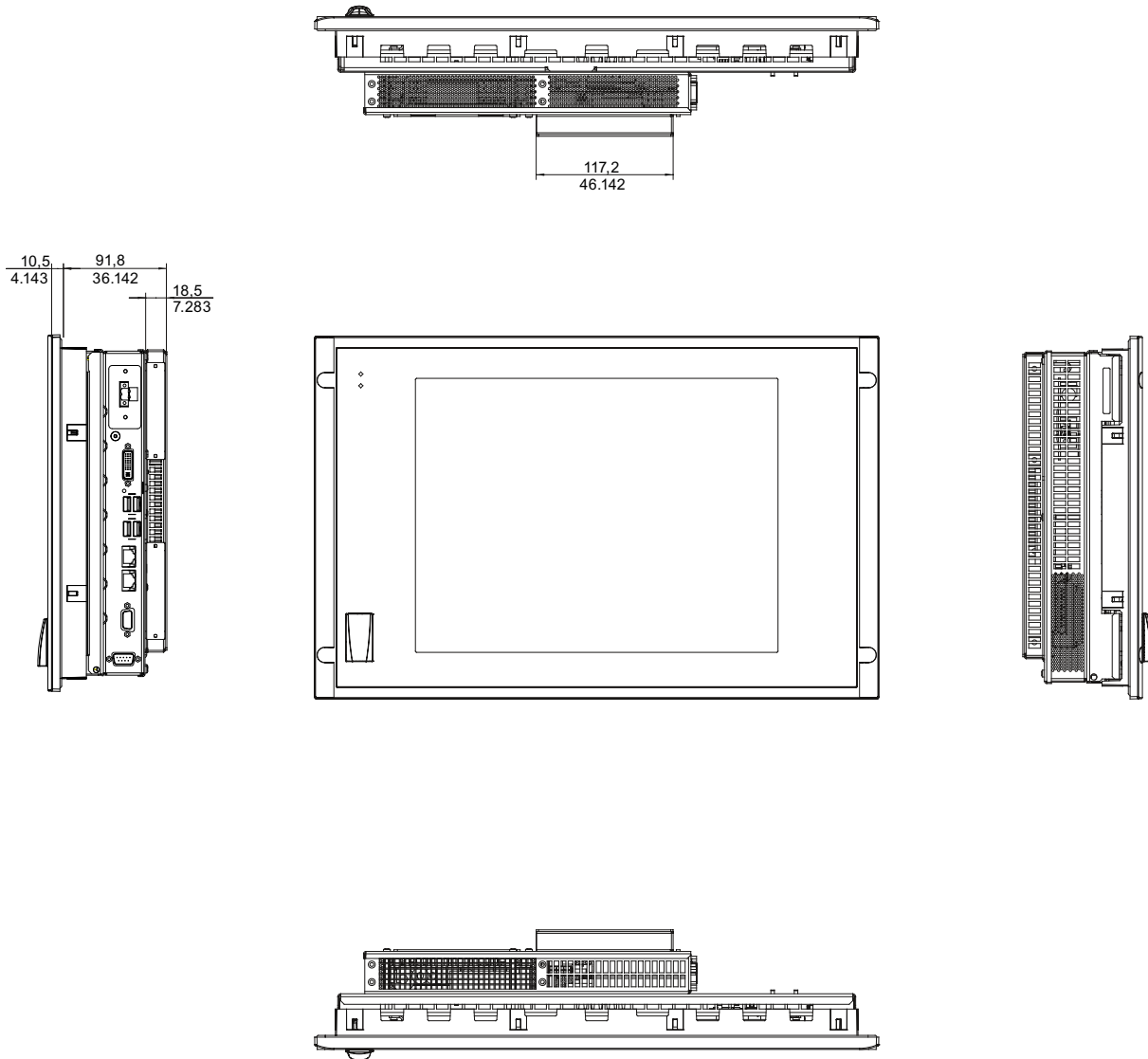


Figure 16-7 Dimension drawing of the touch screen device with 15" display and expansion frame

## 16.9 Dimension drawing of the key panel device, 12" display with expansion frame

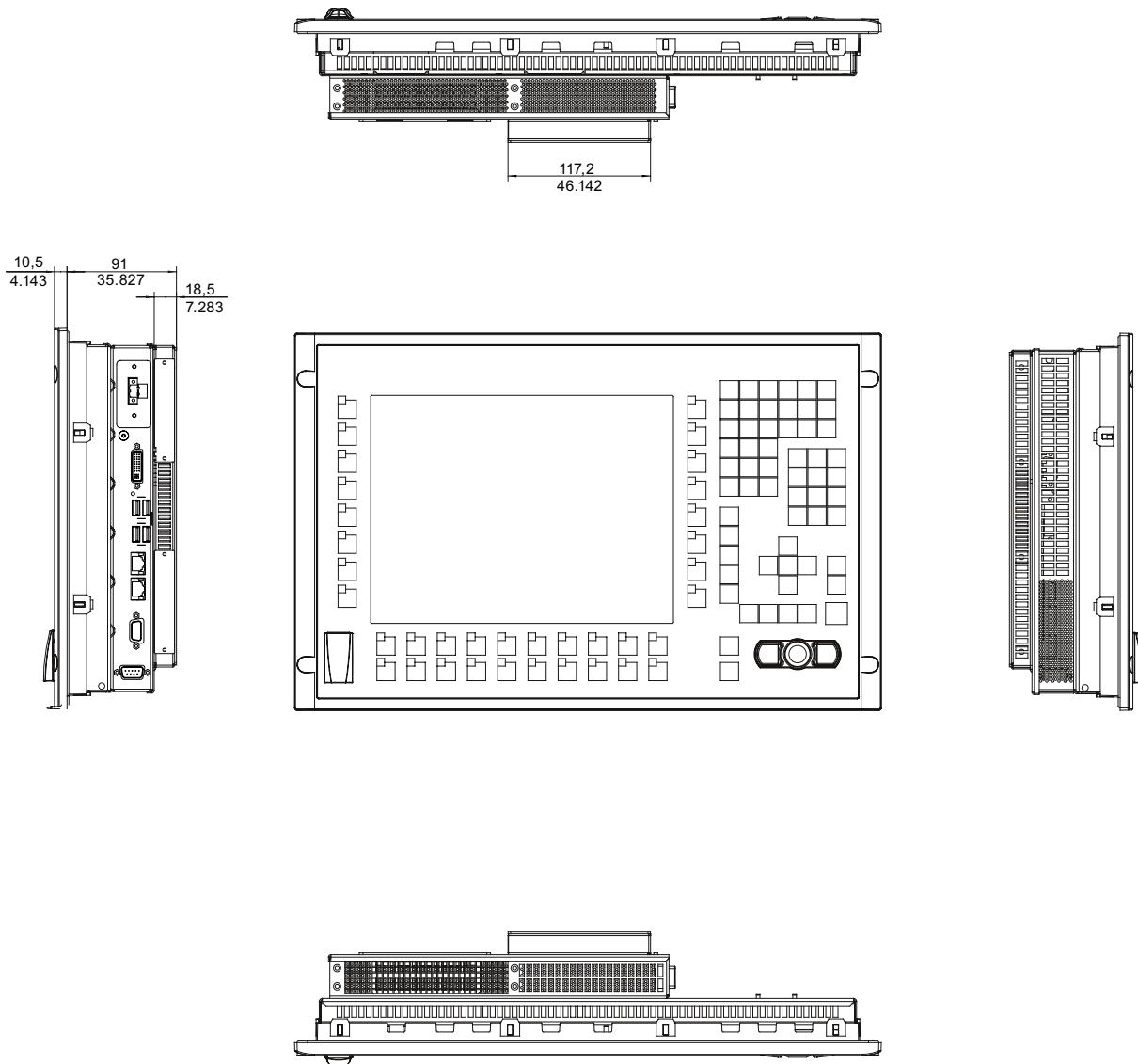


Figure 16-8 Dimension drawing of the key panel device with 12" display and expansion frame

### 16.10 Dimension drawing of the key panel device, 15" display with expansion frame

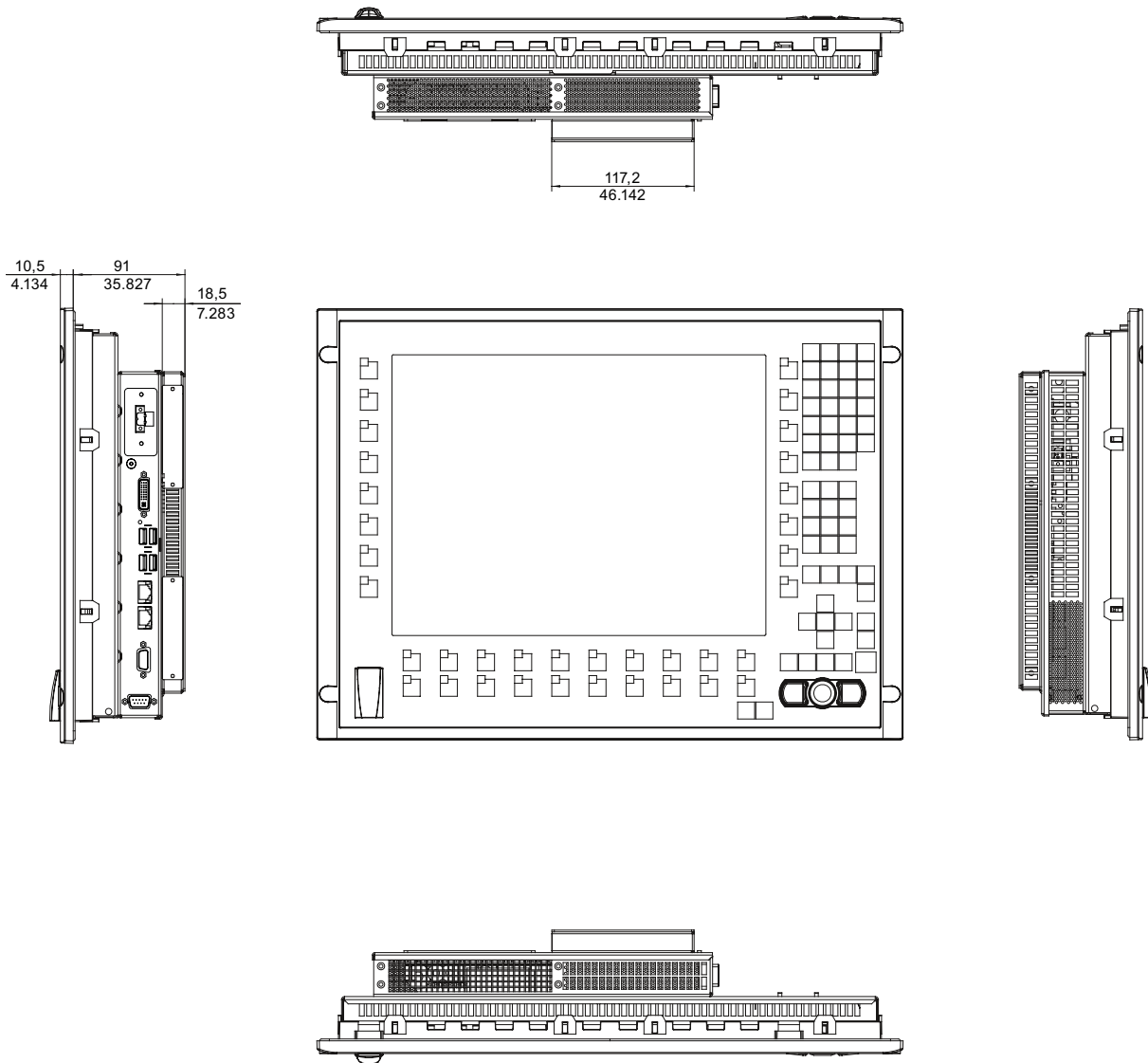


Figure 16-9 Dimension drawing of the key panel device with 15" display and expansion frame

## Detailed Descriptions

### 17.1 Internal Components

#### 17.1.1 Overview of internal components

The basic components of the device are

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

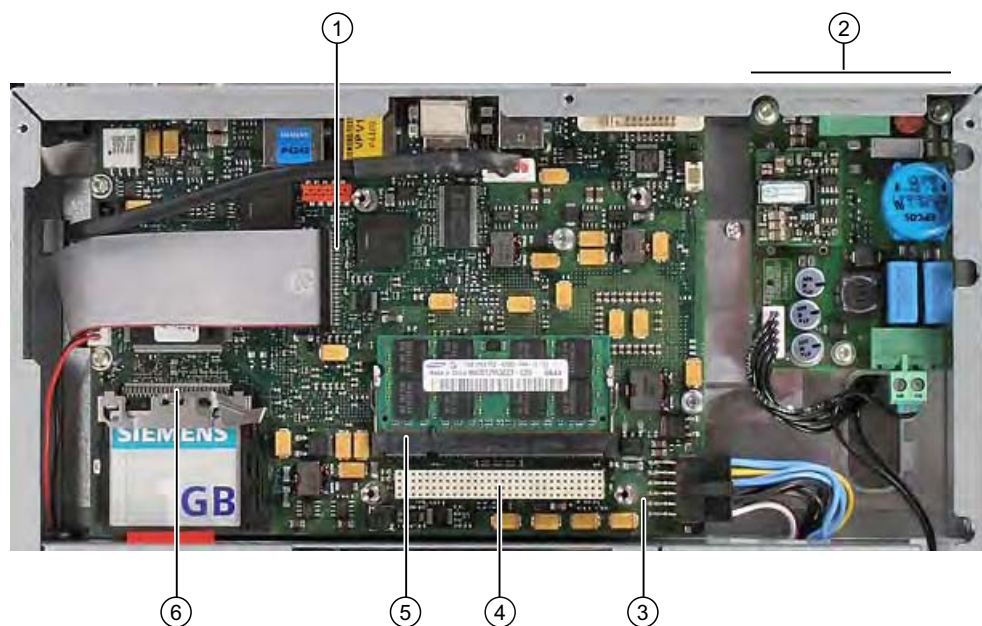


Figure 17-1 Internal design of the device

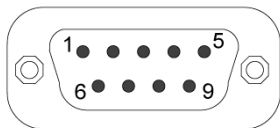
Internal Design of the SIMATIC Panel PC 477B	
(1)	Panel controller connecting cable
(2)	DC converter panel
(3)	Motherboard
(4)	Slot for max. 3 PC/104 modules
(5)	Slot for a memory module
(6)	Slot for Compact Flash card

17.1.2 Technical features of the motherboard

Component / port	Description	Parameters
Chipset	Intel 910GML + Intel ICH6 m	
BIOS	Phoenix BIOS 4.0 Release 6.0	
CPU	Intel Celeron M	1 GHz
Memory	SO-DIMM module	256 MB to 2 GB DDR2-SDRAM
Graphic controller	Intel GMA900	8 - 128 MB graphics memory taken dynamic from RAM

17.1.3 External Ports

17.1.3.1 COM

Serial port COM1, 9-pin (plug)		
		
Pin no.	Short designation	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	
6	DSR	Data set ready (I)
7	RTS	Request to send (O)
8	CTS	Clear to send (I)
9	RI	Incoming call (I)



### 17.1.3.2 DVI-I

DV-I interface, standard socket		
Pin no.	Short designation	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

17.1.3.3 Ethernet

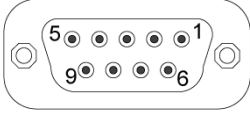
Pin assignment of port with 1 Gbps operating mode

Ethernet RJ45 connection			
Pinno.	Short designation	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	–

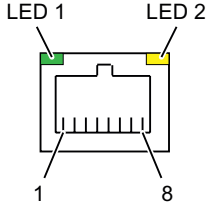
Pin assignment of port with 100 Mbps operating mode

Ethernet RJ45 connection			
Pinno.	Short designation	Description	Input / output
1	Rx+	Receive +	Input
2	RX-	Receive -	Input
3	TX+	Transmit +	Output
4			-
5			-
6	TX-	Transmit -	Output
7			-
8			-
c		Shield	-
	LED 1	Off: 10 Mbps Lit in green color: 100 Mbps	-
	LED 2	Lit: Active connection (to a hub, for example) Flashing: Activity	-

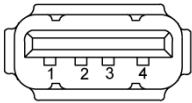
### 17.1.3.4 PROFIBUS

PROFIBUS interface, 9-pin (socket)		
		
Pin no.	Short designation	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)

### 17.1.3.5 PROFINET

Ethernet RJ45 connection			
			
Pinno.	Short designation	Description	Input / output
1	Rx+	Receive +	Input
2	RX-	Receive -	Input
3	TX+	Transmit +	Output
4			-
5			-
6	TX-	Transmit -	Output
7			-
8			-
c		Shield	-
	LED 1	Off: 10 Mbps Lit in green color: 100 Mbps	-
	LED 2	Lit: Active connection (to a hub, for example) Flashing: Activity	-

### 17.1.3.6 USB

USB interface, 4 channels (2* low current, 2* high current)		
		
Pin no.	Short designation	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

17.1.4 Internal Ports

17.1.4.1 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

### 17.1.4.2 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

## 17.2 BIOS Setup

### 17.2.1 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.

### 17.2.2 Starting BIOS Setup

#### Starting BIOS Setup

1. Start the setup program as follows:
2. 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**:

```
Phoenix BIOS 4.0 Release 6.0 cME FirstBIOS Desktop Pro A5E000xxxxx-ES0xx
Copyright 1985–2003 Phoenix Technologies Ltd.
All Rights Reserved.
```

```
SIMATIC Panel PC 477B Version V07.01.01
CPU = Intel® Celeron® M processor 1.00GHz
512M System RAM Passed
System BIOS shadowed
Video BIOS shadowed
Fixed Disk 0: SIMATIC PC Compact Flash 1 GB
USB 2.0: SIEMENS
Mouse initialized
```

```
Press <F2> to enter SETUP or <ESC> to display the boot menu
```

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 > to enter SETUP or <ESC> to show boot menu
```

3. Press the F2 key as long as the BIOS prompt appears on the screen.



### 17.2.3 Main menu

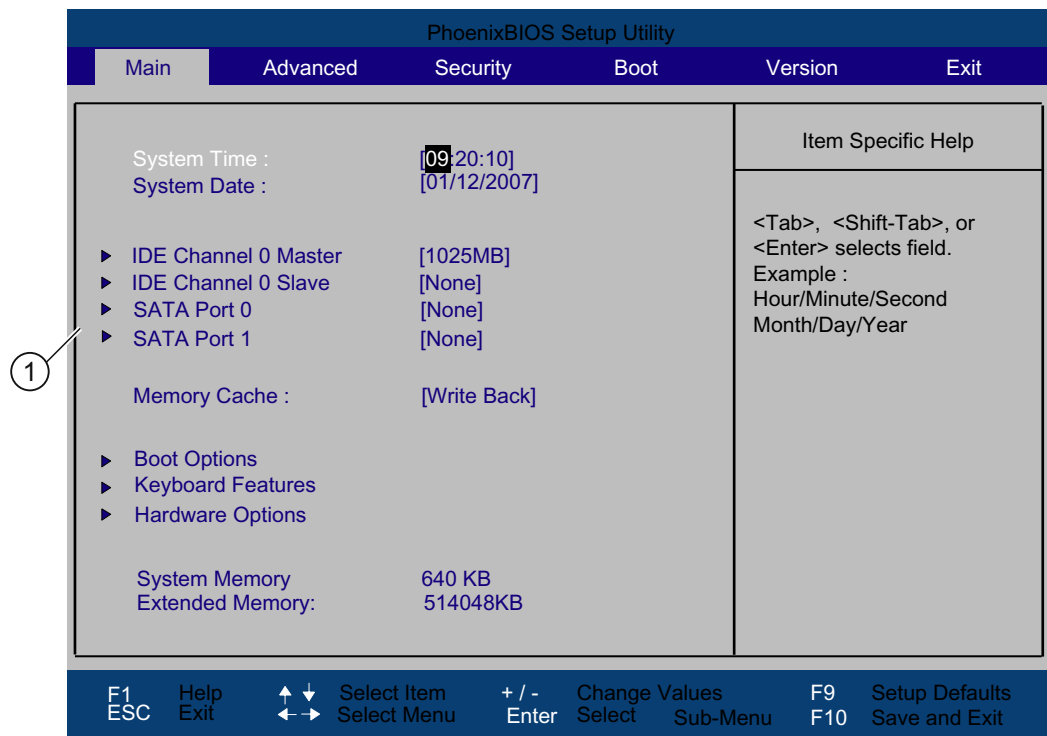


Figure 17-2 Main menu (example)

(1) Selectable submenu

### 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	Description
System Time	For viewing and setting the current time
System Date	For viewing and setting the current date
Memory Cache	Used for setting the cache options
Via submenus	
IDE Channel 0 Master	Type of installed disk drives
IDE Channel 0 Slave	Type of installed disk drives
SATA Port 0	Type of installed disk drives
SATA Port 1	Type of installed disk drives
Boot options	Used for setting the boot options
Keyboard Features	Used for setting of keyboard interface (for instance, NUM-LOCK, typematic rate)
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 move between the entries in the date and time fields (for example, from hour to minute) using the tab key.

**IDE Channel 0 Master, IDE Channel 0 Slave**

The system jumps to the following submenu when you select this type of menu field:

PhoenixBIOS Setup Utility	
Main	
IDE Channel 0 Master [257MB]	Item Specific Help
Type: [User]	User = you enter parameters of hard-disk drive installed at this connection.
CHS Format	Auto = autotypes hard-disk drive installed here.
Cylinders: [ 980]	CD/DVD-ROM = CD/DVD-ROM drive is installed here.
Heads: [ 16]	ATAPI Removable = removable disk drive is installed here.
Sectors: [32]	[Disabled]
Maximum Capacity: 257MB	IDE Removable = removable media installed here
LBA Format	
Total Sectors: 501760	
Maximum Capacity: 257MB	
Multi-Sector-Transfers:	
LBA Mode Control: [Enabled]	
Transfer Mode: [FPIO 4 / DMA 2]	
Ultra DMA Mode: [Disabled]	

F1 Help	↑ ↓ Select Item	+ / - Change Values	F9 Setup Defaults
ESC Exit	← → Select Menu	Enter Select ▶ Sub-Menu	F10 Save and Exit

Figure 17-3 IDE Channel 0 Master (example)

Type	[User]	Select "User" to enter a user-specific definition of the hard disk type. Configure all the other options, for example, Cylinder, Heads, Sectors/Track, or other properties of the hard disk drive.
	[Auto]	The parameters which you can select in this dialog are usually saved to the respective IDE drive. The "Auto" setting in the "Type" field means that these values are automatically read from the drive and written to memory.
	[CD/DVD-ROM]	CD/DVD-ROM is connected.
	[ATAPI Removable]	A removable data volume is connected.
	[IDE Removable]	A removable data volume is connected.
	[Other ATAPI]	Another removable data volume is connected.
	[None]	Select "None" if you have not connected a disk drive. This setting reduces the system waiting time.
Multi-Sector Transfer	The number of blocks (sectors) transferred per interrupt are defined at the "Multi-Sector Transfer" option. The value depends on the drive and should only be set by way of "Auto" setting at the "Type" field.	
	[Disabled]	2, 4, 8, 16 sectors
LBA Mode Control	The "Enabled" setting at the "LBA Mode Control" (enabled, disabled) option means that hard disk capacities greater than 528 MB are supported. The value depends on the drive and should only be set by way of "Auto" setting at the "Type" field.	
Transfer Mode or Ultra DMA Mode	Define the data transmission rate of the interface in these fields. The value depends on the drive and should only be set by way of "Auto" setting at the "Type" field. Exit the submenu by pressing ESC.	

### SATA Port 0, SATA Port 1

The system jumps to the following submenu when you select this type of menu field:

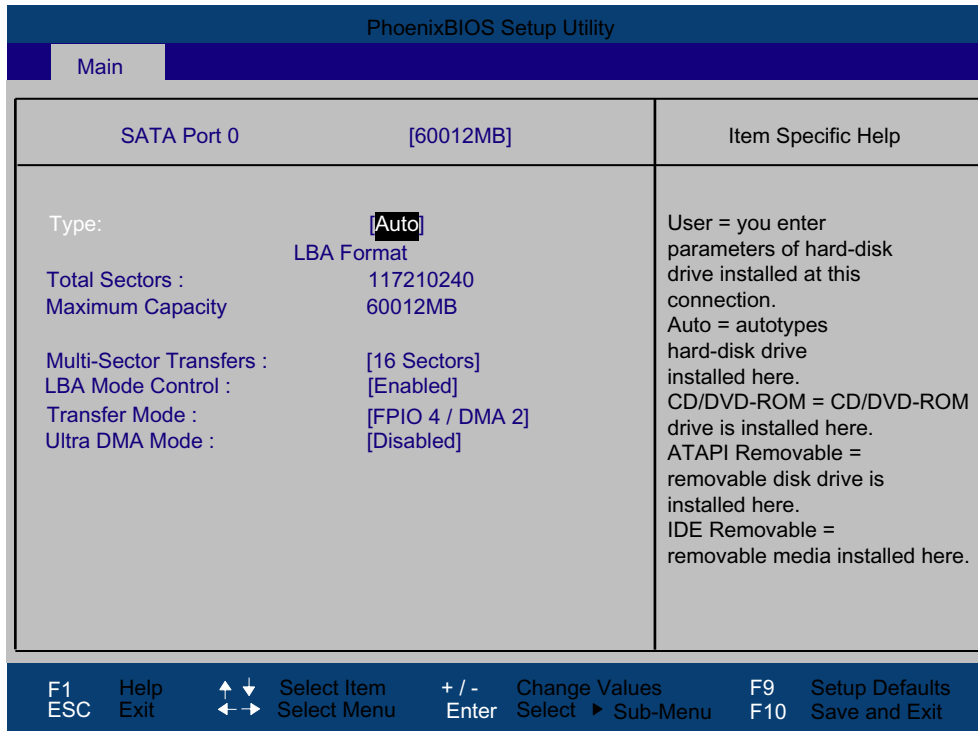


Figure 17-4 SATA Port 0 (example)

Type	[User]	Select "User" to enter a user-specific definition of the hard disk type. Configure all the other options, for example, Cylinder, Heads, Sectors/Track, or other properties of the hard disk drive.
	[Auto]	The parameters which you can select in this dialog are usually saved to the respective IDE drive. The "Auto" setting in the "Type" field means that these values are automatically read from the drive and written to memory.
	[CD/DVD-ROM]	CD/DVD-ROM is connected.
	[ATAPI Removable]	A removable data volume is connected.
	[IDE Removable]	A removable data volume is connected.
	[Other ATAPI]	Another removable data volume is connected.
	[None]	Select "None" if you have not connected a disk drive. This setting reduces the system waiting time.
Multi-Sector Transfer		The number of blocks (sectors) transferred per interrupt are defined at the "Multi-Sector Transfer" option. The value depends on the drive and should only be set by way of "Auto" setting at the "Type" field.
	[Disabled]	2, 4, 8, 16 sectors

LBA Mode Control	The "Enabled" setting at the "LBA Mode Control" (enabled, disabled) option means that hard disk capacities greater than 528 MB are supported. The value depends on the drive and should only be set by way of "Auto" setting at the "Type" field.
Transfer Mode or Ultra DMA Mode	Define the data transmission rate of the interface in these fields. The value depends on the drive and should only be set by way of "Auto" setting at the "Type" field. Exit the submenu by pressing ESC.

### "Memory Cache" field

The following shortcut menu appears when you select the option "Memory cache" in the main menu:

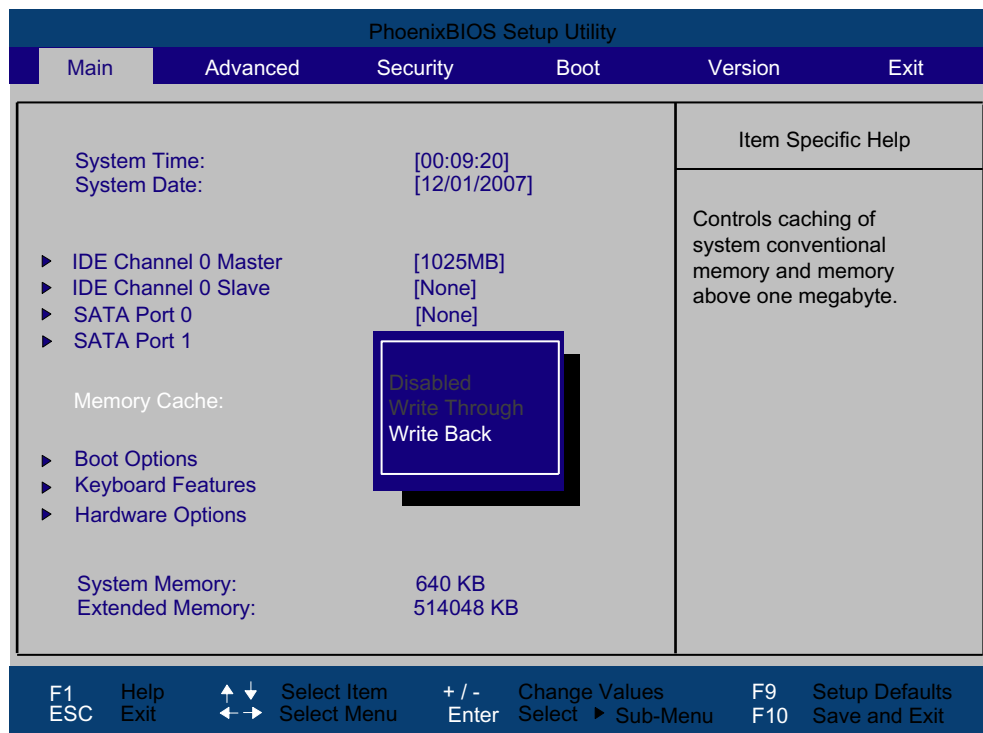


Figure 17-5 "Memory Cache" field

The cache is a high-speed memory buffer between the CPU and memory (DRAM). Repeated memory access operations are executed in the faster cache, and not in the main memory, provided the feature is enabled. In some cases it may be necessary to disable the cache for certain types of hardware and software because intentional program runtimes or delay times may be prevented by the fast cache.

[Disabled]	Cache is disabled
[Write Through]	Write access is not concluded until the entry has been made in main memory
[Write Back]	Write access is concluded immediately, the entry in main memory takes place in the background (default)

**"Boot Options" field**

The following shortcut menu appears when you select the option "Boot Options" in the main menu:

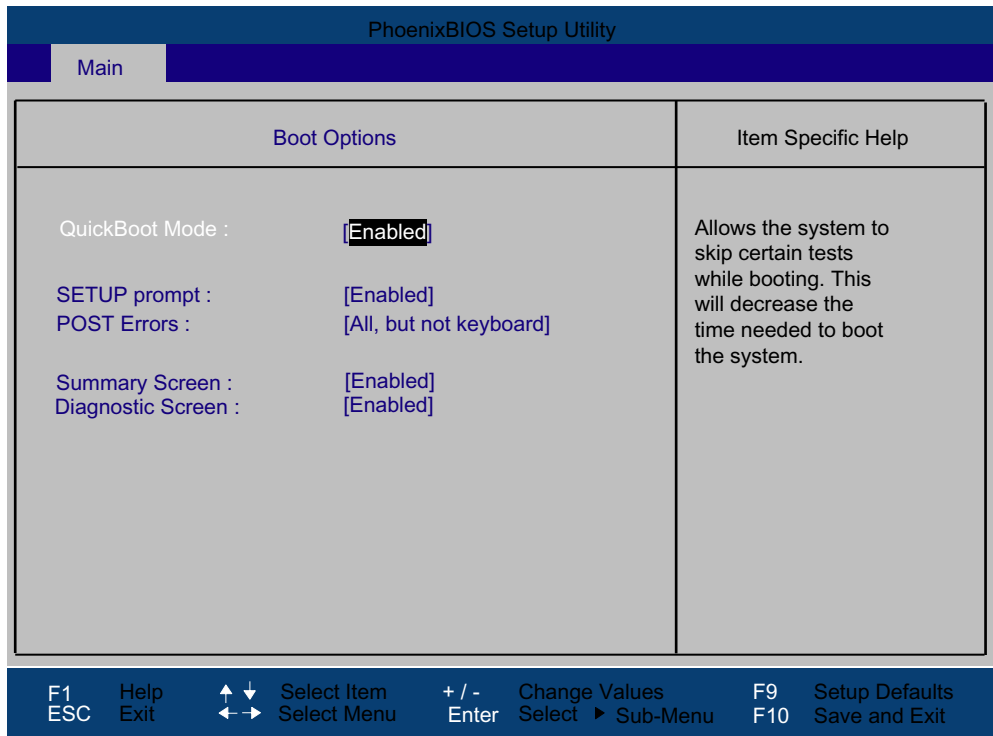


Figure 17-6 "Boot Options" field

Quick Boot Mode	Some hardware tests are skipped to speed up the boot sequence.
SETUP prompt	During the system load phase, the message "Press <F2> to enter Setup or <Esc> to show boot menu" is output on the bottom of the screen.
POST errors	The boot sequence is stopped if an error is detected; you must press F1 to acknowledge.
	[Disabled]    No error confirmation is required, for example, when no keyboard is connected.
	[All, but not keyboard]    Show all errors except for keyboard errors.
Summary screen	The most important system parameters are displayed when the system run-up phase completes. "Enabled" means that the feature is active. "Disabled" means that the feature is inactive.
Diagnostic screen	Shows the diagnostics messages on the monitor during booting.

Example of a summary screen:

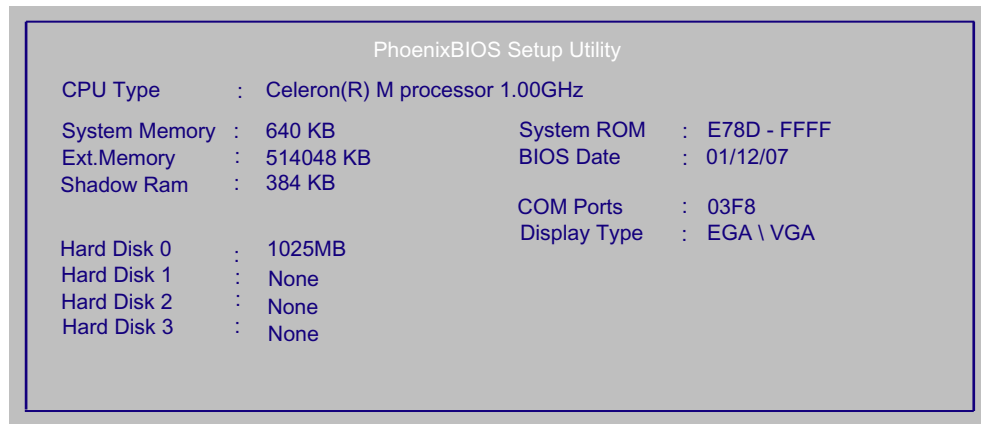


Figure 17-7 Summary screen (example)

The Summary screen appears when the system run-up phase completes.

### "Keyboard Features" field

The following shortcut menu appears when you select the option "Keyboard Features" in the main menu:

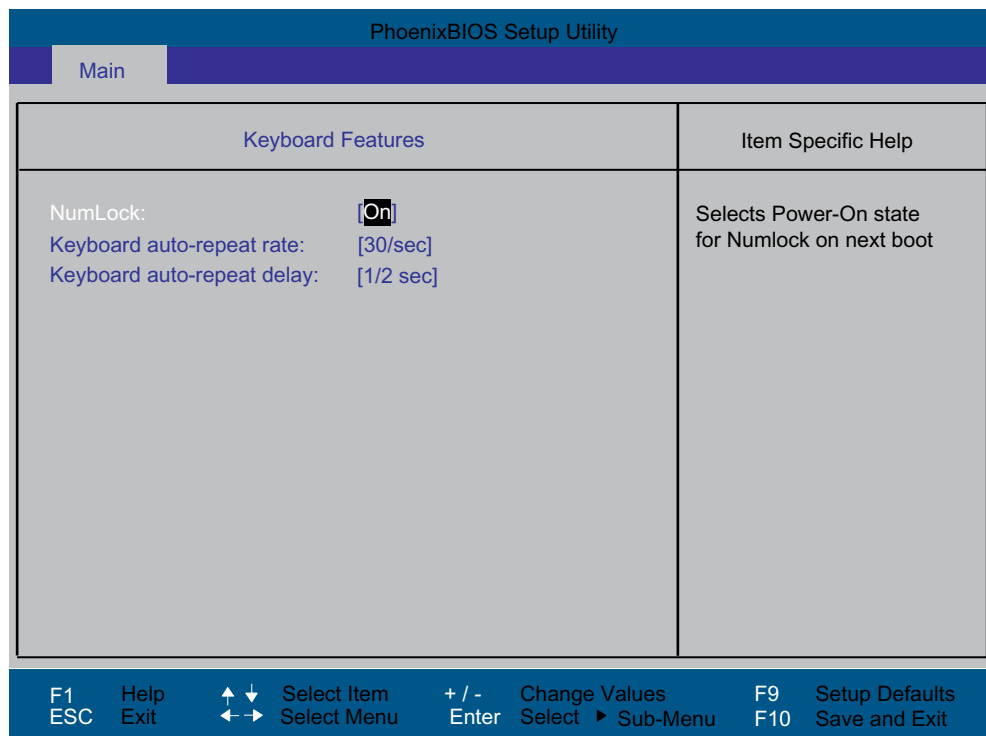


Figure 17-8 "Keyboard Features" field

Numlock	Switches Numlock on or off following power on.
Keyboard auto-repeat rate	Increase in automatic key repeat rate
Keyboard auto-repeat delay	On-delay of automatic keyboard repeat

**"Hardware Options" field**

The following shortcut menu appears when you select the option "Hardware Options" in the main menu:

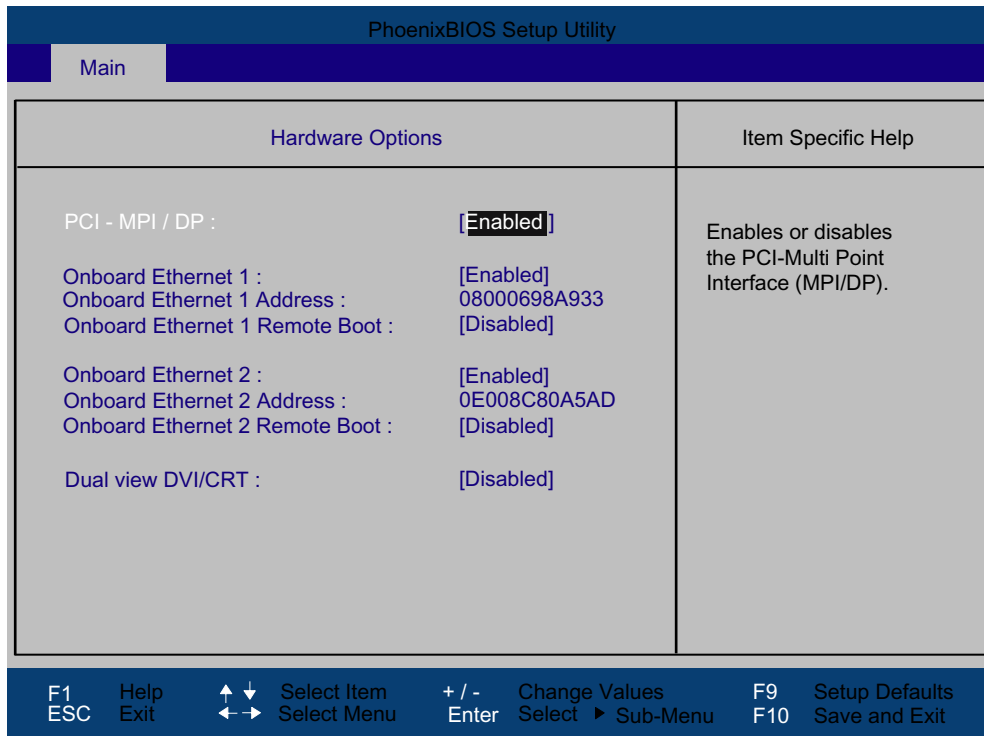


Figure 17-9 "Hardware Options" field

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

Entry	Description	
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.
On-board Ethernet	[Enabled]	The Ethernet port on the motherboard is enabled.
	[Disabled]	The Ethernet port on the motherboard is disabled.
On-board Ethernet Address	Shows the individual Ethernet address.	
On-board Ethernet Remote Boot	[Enabled]	Booting via a connected LAN is possible. The respective boot source is displayed as PXE LAN Remote Boot in the Boot menu.
	[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) please use the first Ethernet interface.



## 17.2.4 Advanced Menu

### Menu layout

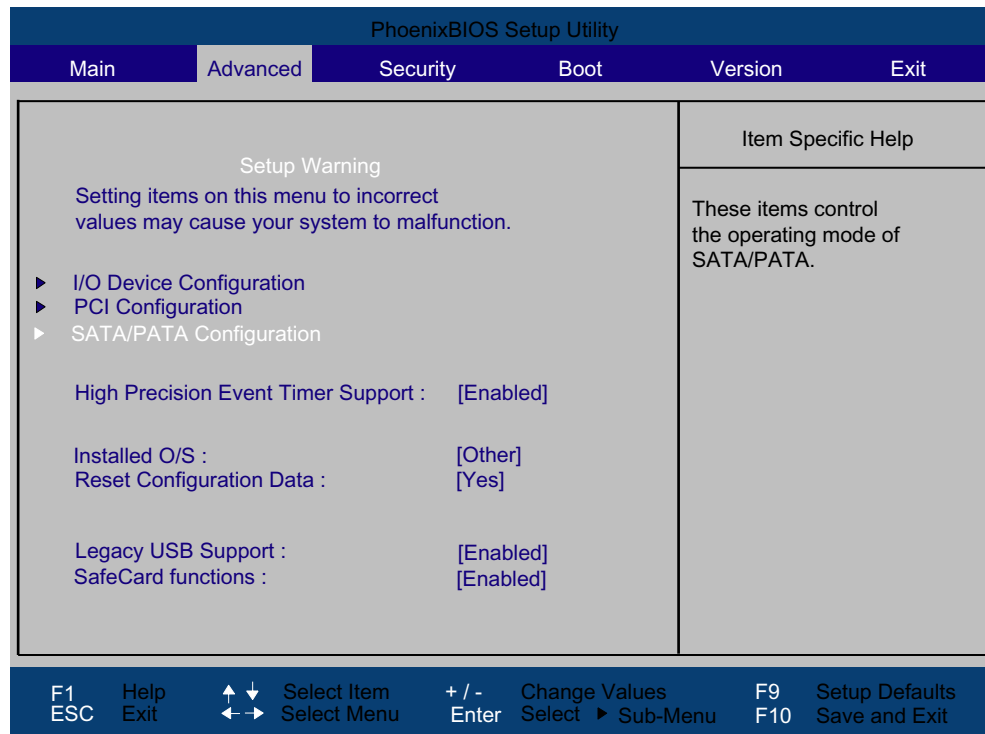


Figure 17-10 "Advanced" menu (example)

### Settings in the Advanced menu

High Precision Event Timer Support	[Enabled]	High-resolution timer for multimedia enabled.
	[Disabled]	High-resolution timer for multimedia disabled.
Installed O/S	Plug-and-Play means that all modules are automatically detected and installed, providing they support the Plug-and-Play functionality.	
	[Other]	BIOS handles the entire Plug-and-Play capability, default setting.
	[WinXP/2000]	The operating system handles the Plug-and-Play functions.
Reset Configuration Data	[Yes]	All installations under Plug-and-Play are deleted and the configuration is retrigged the next time the system boots. The entry is then reset to [No]. System components that do not support Plug-and-Play have to be entered manually.
	[No]	The Plug-and-Play system components are initialized after the next system start.

Legacy USB support	[Disabled]	Disables Legacy Universal Serial Bus support
	[Enabled]	Enables Legacy Universal Serial Bus support The USB Boot function must be enabled if the operating system is to be operated without USB support with a USB keyboard or mouse.
SafeCard functions	[Enabled]	On-board monitoring functions are enabled.
	[Disabled]	No monitoring functions.
		The relevant driver and the application must be started for operation of the monitoring functions.

"I/O Device Configuration" submenu

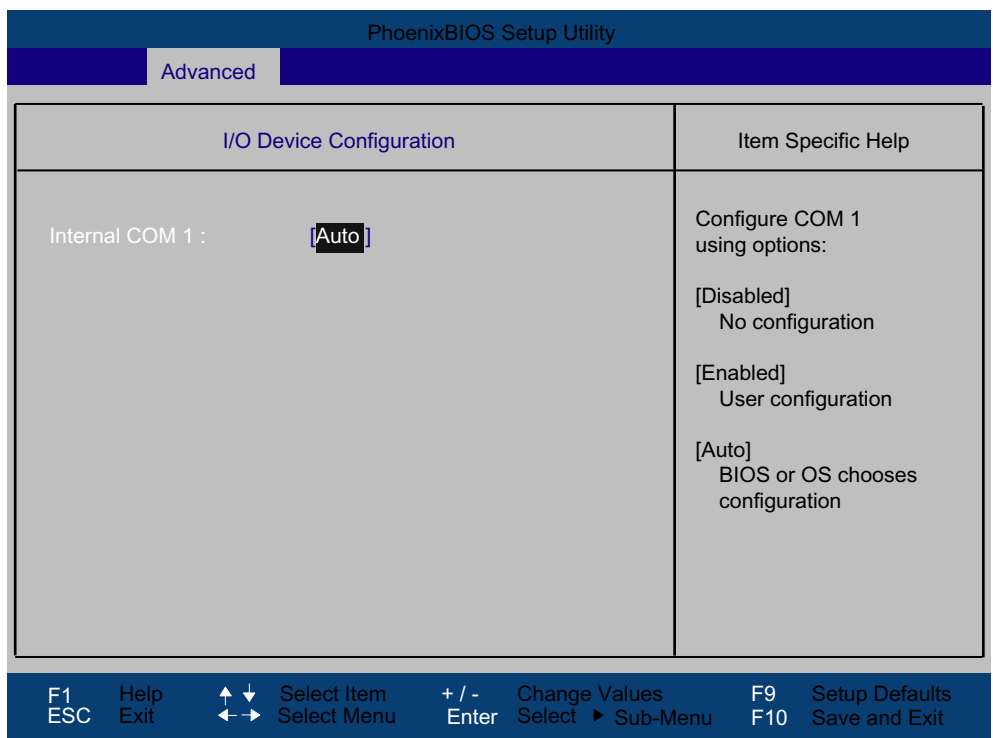


Figure 17-11 "I/O device configuration" submenu

The resources used by an interface are released when you disable the interface in question. The I/O addresses and interrupts are pre-assigned; it is advisable not to change these default assignments.

**Note**

Yellow stars to the left of the interface name indicate resource conflicts at interfaces managed in BIOS. In this case you should select the default settings (F9) or eliminate the conflict.

"PCI Configuration" submenu

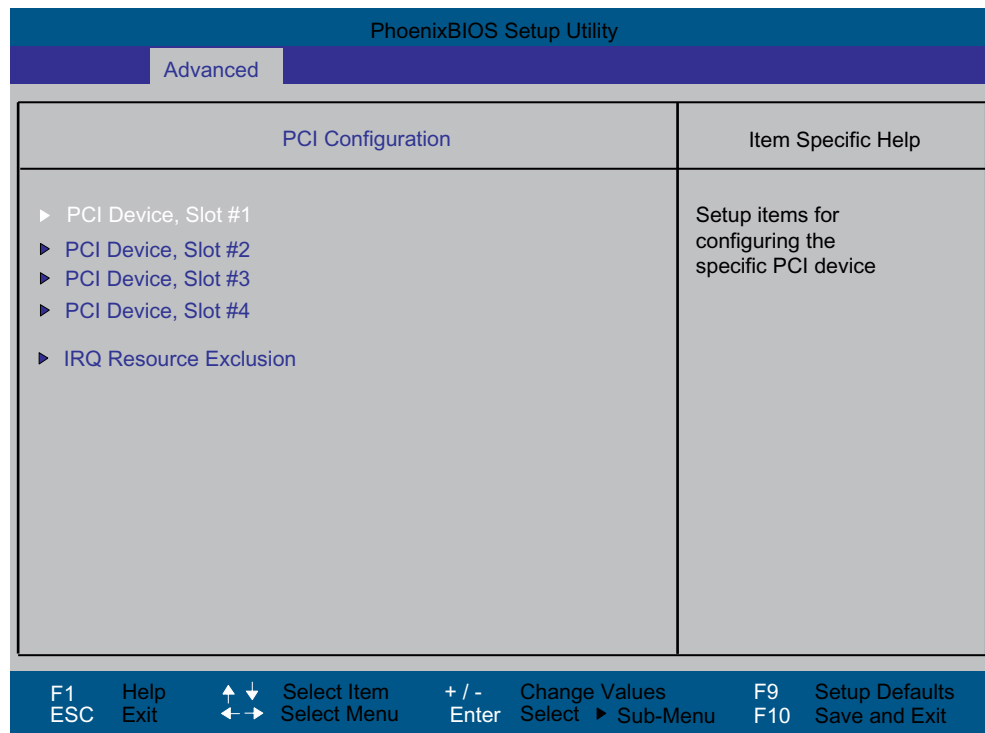


Figure 17-12 PCI Configuration submenu (example)

"PCI Devices" field

If the PCI devices field is selected, the following submenu appears:

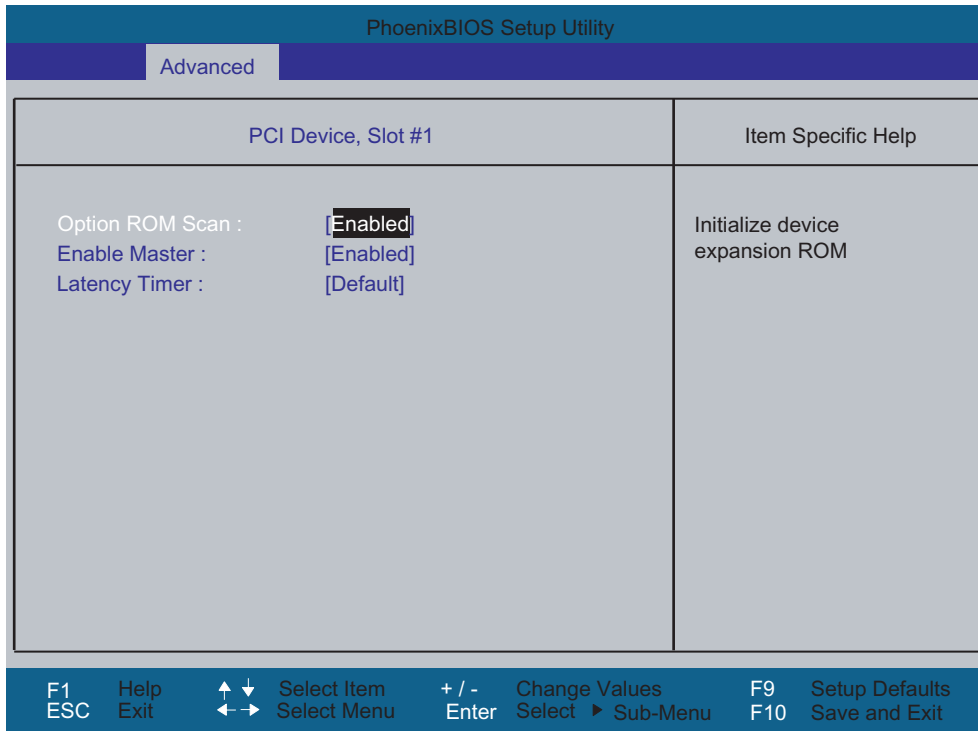


Figure 17-13 Field PCI Devices, Slot #1

ROM scan option:	[Enabled]	The ROM option of the PCI module (if available) is enabled
	[Disabled]	The ROM option of a PCI module is disabled.
Enable Master	[Enabled]	This slot can be assigned master functions
	[Disabled]	This slot can only operate as PCI slave.
Latency Timer	[Default]	The number of active PCI clock cycles of the master modules is determined by this module-
	[0020H to 00E0H]	These settings are used to set the maximum number of active PCI clock cycles to the selected value.
	<b>You should only use a value different from the default if the module or its application requires it.</b>	

"IRQ Resource Exclusion" submenu

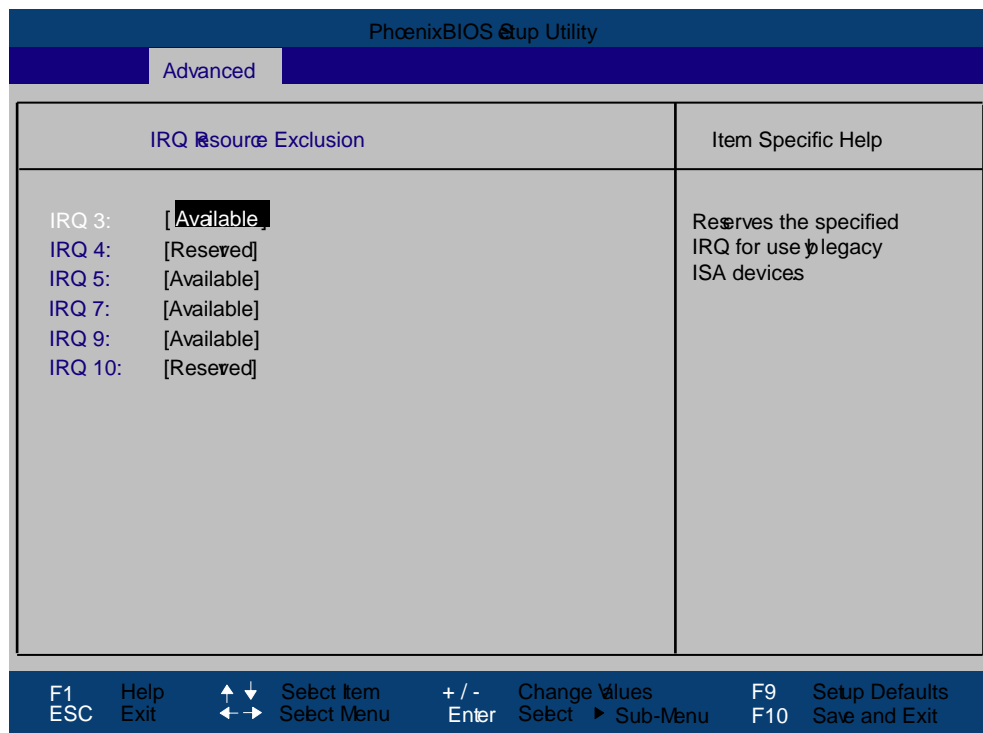


Figure 17-14 IRQ Resource Exclusion submenu

Available means that the Plug and Play mechanism in BIOS can allocate the IRQ to Plug and Play submodules or motherboard functions.

**Note**

Use the 'Reserved' setting only if the interrupt has to be assigned specifically to submodules with no Plug and Play capability.

"SATA/PATA Configuration" submenu

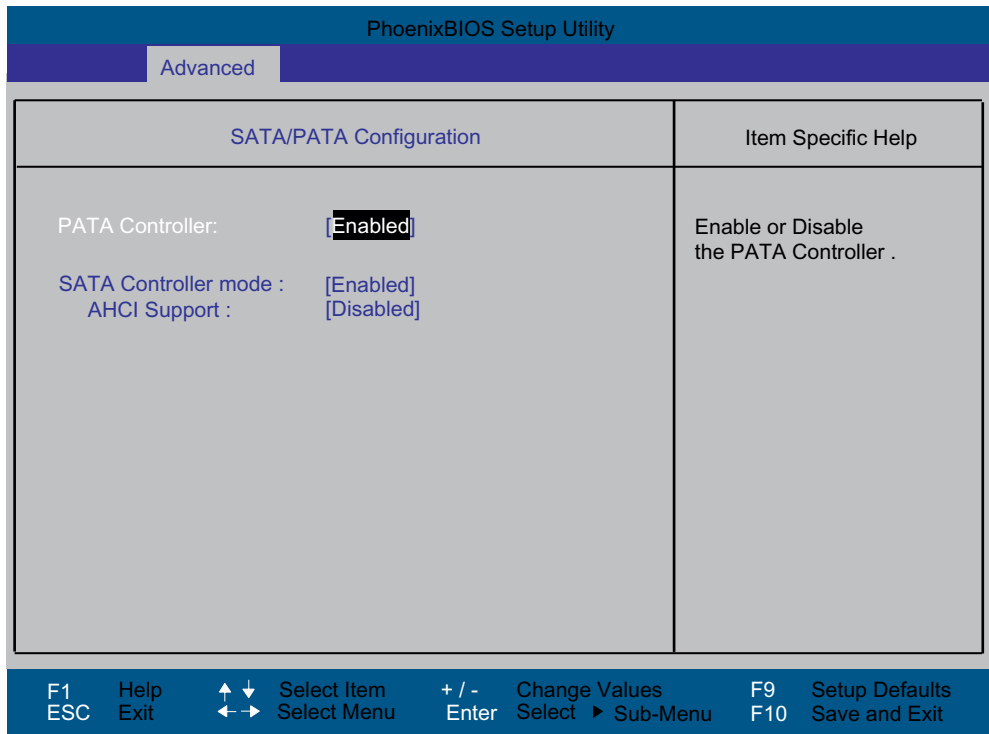


Figure 17-15 SATA/PATA Configuration

PATA Controller:	[Enabled] [Disabled]	Disables or enables the PATA controller
SATA Controller mode	[Enhanced]	Extended operating mode of the IDE controller for Windows or newer operating systems (default setting)
	[Compatible]	Compatible operating mode of the IDE controllers for older operating systems
AHCI Support	[Disabled] [Enabled]	Another operating mode of the IDE controller <b>Important:</b> Do not change this setting after installing the operating system.

## 17.2.5 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.

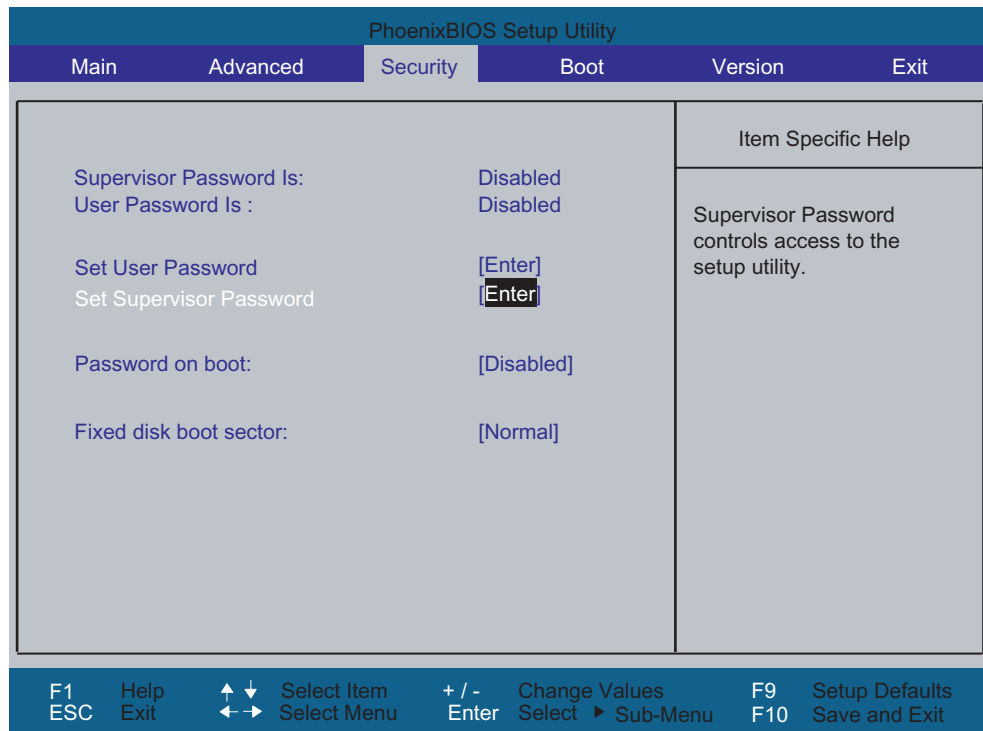


Figure 17-16 Security menu (example)

User password is	Disabled	The password is disabled.
	Enabled	Certain Setup fields are configurable by the user, including the user password.
	The field resets automatically from [Disabled] to [Enabled] when the password is entered.	
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."	
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."	
Password on boot	[Disabled]	No password prompt for booting.
	[Enabled]	Supervisor or user password must be entered for system boot.
Fixed disk boot sector	[Normal]	All types of hard-disk access are permitted.
	[Write protect]	the user cannot install an operating system. This is a way of protecting against boot viruses.

### 17.2.6 Boot menu

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

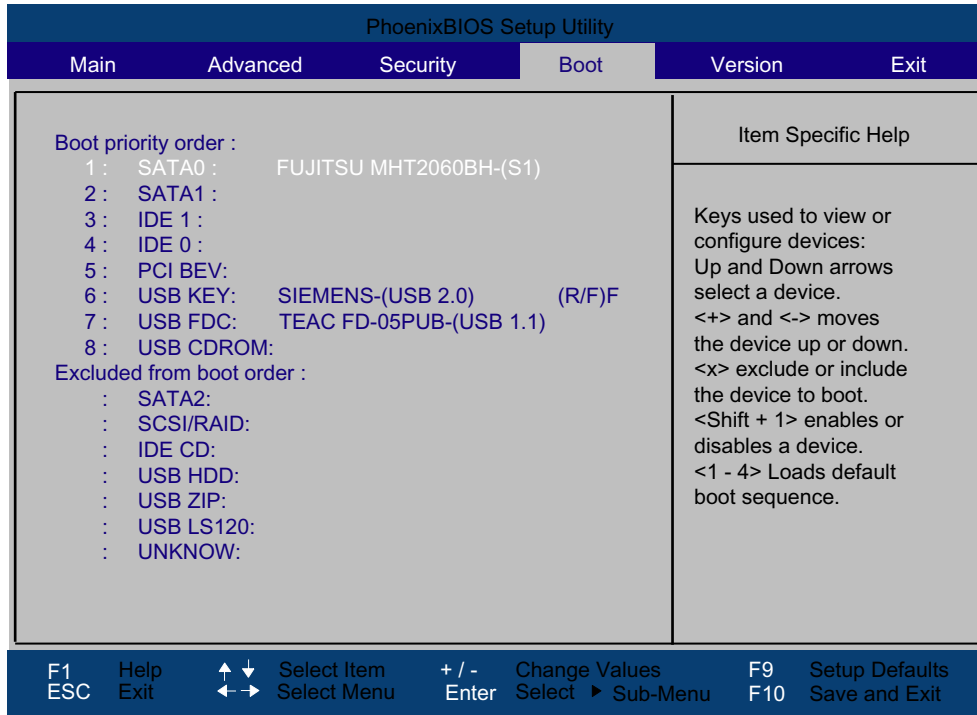


Figure 17-17 Boot menu (example)

This screen shows all possible boot devices. The boot source with the highest boot priority is at the top. To change the sequence:

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

With the x, a selected boot source is moved in the "Boot priority order" or "Excluded from boot order" list.

**Note**

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

If a boot device is not available, the next device in the sequence is automatically checked to ascertain whether or not it is bootable.

Using the 1, 2, 3, 4 keys, you can select from 4 pre-defined boot sequences.



## 17.2.7 Version menu

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

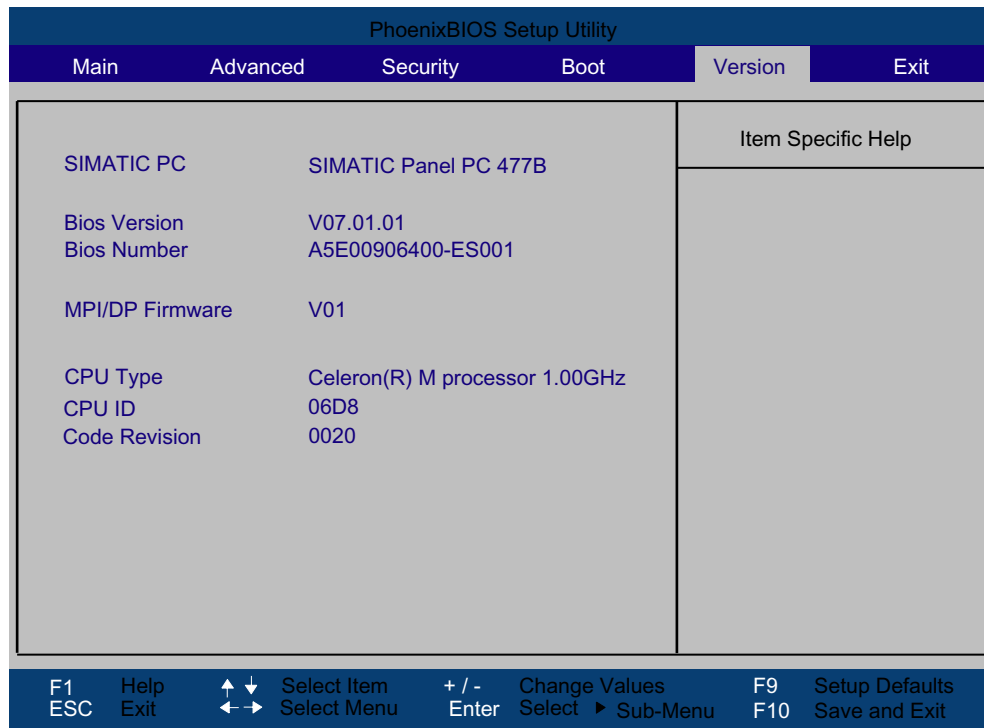


Figure 17-18 Version menu (example)

### 17.2.8 Exit Menu

You always exit BIOS Setup in this menu.

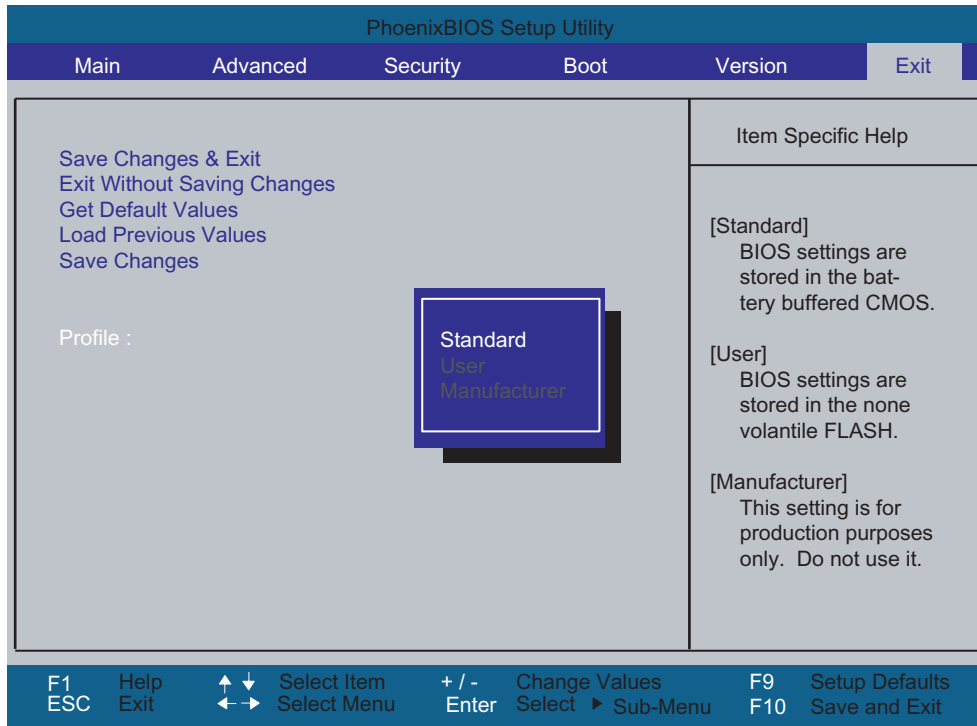


Figure 17-19 Exit menu (example)

Save Changes & Exit	All changes are saved and the system is restarted with the new parameters.	
Exit Without Saving Changes	All changes are discarded and the system is restarted with the old parameters.	
Get Default Values	All parameters are set to safe values.	
Load Previous Values	The last saved values are reloaded.	
Save Changes	Save all Setup settings.	
Profiles	Standard	The BIOS settings are backed up to buffered CMOS.
	User	The BIOS settings are backed up to buffered CMOS.
	Manufacturer	This setting is only used for production purposes. Do not use.

## 17.2.9 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	
IDE Channel 0 Master	None	
IDE Channel 0 Slave	None	
SATA Port 0	60012MB	
SATA Port 1	None	
Memory Cache	Write Back	

Boot Options		
Quick Boot Mode	Enabled	
SETUP prompt	Enabled	
POST errors	All, but not keyboard	
Summary screen	Enabled	
Diagnostic screen	Enabled	

Keyboard Features		
Numlock	On	
Keyboard auto-repeat rate	30/sec	
Keyboard auto-repeat delay	½ sec	

Hardware Options		
PCI-MPI/DP	Enabled	
On-board Ethernet 1	Enabled	
Onboard Ethernet 1 Address	08000698A933	
On-board Ethernet 1 Remote Boot	Disabled	
On-board Ethernet 2	Enabled	
Onboard Ethernet 2 Address	0E008C80A5AD	
On-board Ethernet 2 Remote Boot	Disabled	
Dual view DVI/CRT	Disabled	

Advanced		
High Precision Event Timer Support	Enabled	
Installed O/S	Other	
Reset Configuration Data	No	
Legacy USB support	Enabled	
SafeCard functions	Enabled	

I/O Device Configuration		
Internal COM 1	Auto	

PCI Configuration		
<b>PCI Device Slot 1</b>		
ROM scan option:	Enabled	
Enable Master	Enabled	
Latency timer	Default	
<b>PCI Device Slot 2</b>		
ROM scan option:	Enabled	
Enable Master	Enabled	
Latency timer	Default	
<b>PCI Device Slot 3</b>		
ROM scan option:	Enabled	
Enable Master	Enabled	
Latency timer	Default	
<b>PCI Device Slot 4</b>		
ROM scan option:	Enabled	
Enable Master	Enabled	
Latency timer	Default	

IRQ Resource Exclusion		
IRQ 3	Available	
IRQ 4	Available	
IRQ 5	Available	
IRQ 7	Available	
IRQ 9	Available	
IRQ 10	Available	

SATA/PATA Configuration		
PATA Controller:	Enabled	
SATA Controller mode	Enhanced	
AHCI Support	Disabled	

Security		
Supervisor Password Is	Disabled	
User password is	Disabled	
Set User Password	Enter	
Set Supervisor Password	Enter	
Password on boot	Disabled	
Fixed disk boot sector	Standard	

Boot		
Boot priority order:		
Excluded from boot order:		

Version		
SIMATIC PC	Panel PC 477B	
BIOS Version	V07.01.01	
BIOS Number	A5E00906400-ES001	
CPU Type	Celeron® M processor 1GHz	
CPU ID	06D8	
Code Revision	0020	

## 17.3 System Resources

### 17.3.1 Currently allocated system resources

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

Windows XP Embedded	<b>Start &gt; Run</b> : in the <b>Run</b> dialog, enter <i>msinfo32</i> and confirm with <b>OK</b> .
---------------------	--

### 17.3.2 System Resources Used by the BIOS/DOS

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

### 17.3.2.1 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.

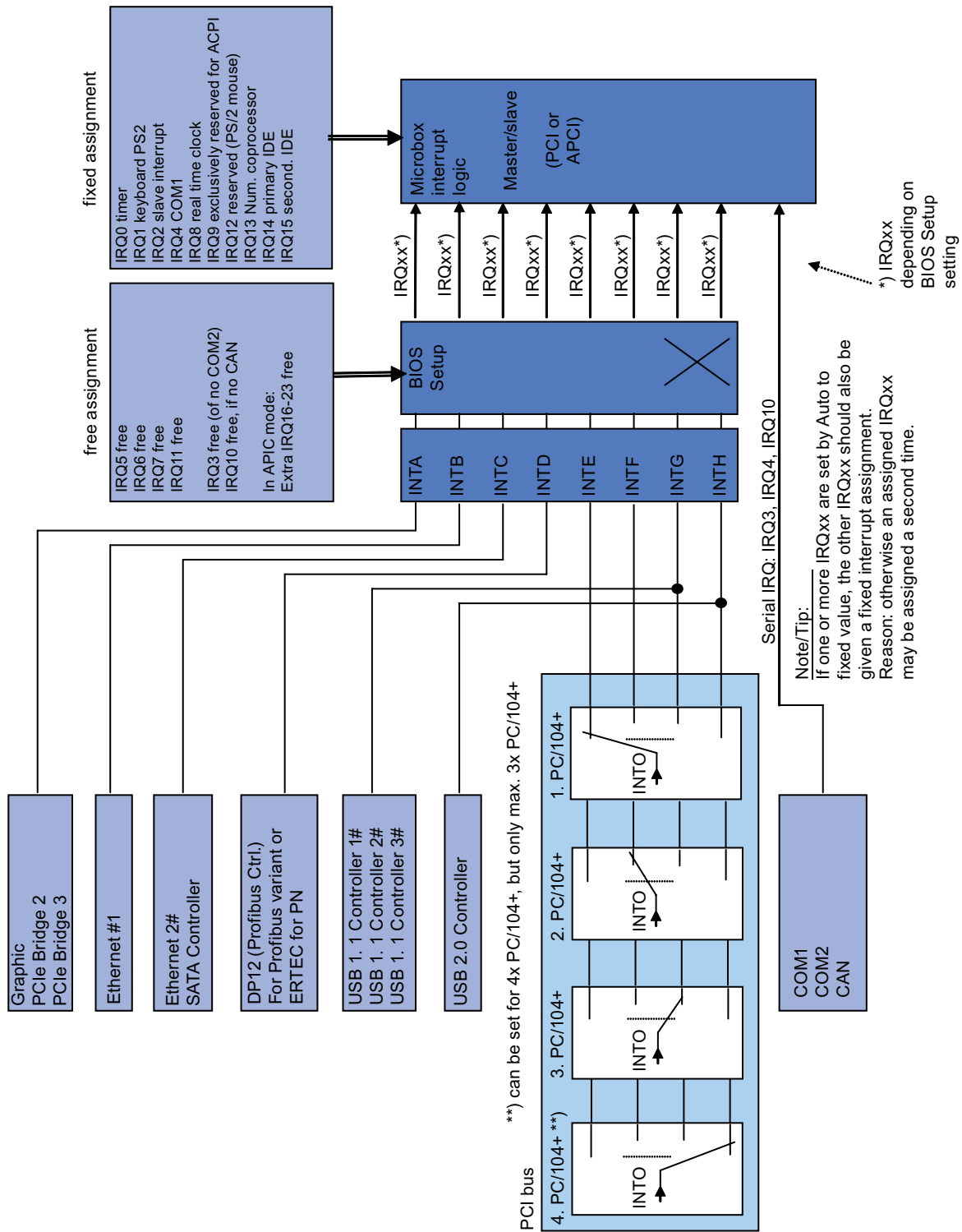
Table 17-1 Interrupt sharing in APIC mode

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

Table 17-2 Interrupt sharing in PIC mode

Interrupt		Interrupt type
IRQ0	System timer	ISA-exclusive
IRQ1	PS/2 keyboard controller emulation	ISA-exclusive
IRQ2	Interrupt controller 2 (cascade)	ISA-exclusive
IRQ3	Reserved for Com Port 2 (COM2)	Free or ISA exclusive (COM2)
IRQ4	Com Port 1 (COM1)	ISA-exclusive
IRQ5	LAN1-exclusive	PCI-exclusive
IRQ6	Reserved	Reserved
IRQ7	PCI104 slot 1/2	PCI / PCI-exclusive
IRQ8	Realtime clock	ISA-exclusive
IRQ9	ACPI-SCI (system control interrupt) or free (no ACPI Besy)	ISA/PCI-shareable or free
IRQ10	CAN (optional) or DP12/MPI (optional) or free	ISA-exclusive (CAN) / PCI-exclusive (DP12) or free
IRQ11	Graphics, PCI-Express Bridge, LAN2, IDE controller 1, USB-UHCI controller (USB1.1), USB-EHCI controller (USB2.0), PCI104 slot 3/4	PCI-shared
IRQ12	PS/2 mouse controller emulation	ISA-exclusive
IRQ13	Coprocessor	ISA-exclusive
IRQ14	IDE controller 2 (enhanced mode) or IDE controller 1 (compatible mode)	ISA-exclusive (compatible mode)
IRQ15	IDE controller 1 (compatible mode) or free (enhanced mode)	ISA-exclusive (compatible mode or PCI (enhanced mode)





## 17.4 I/O Address Areas

### 17.4.1 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
I/O 066h	Watchdog trigger register (Watchdog enable register bit 2=0)
I/O 404Eh - 404Fh	Output register LED 1/2 and SF LED / RUN/STOP LED
I/O 118Fh	Battery status register (read-only)

## 17.4.2 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	
								<b>Watchdog enable bit (WDE)</b>
							0	Watchdog circuit disabled
							1	Watchdog circuit enabled
								<b>Watchdog Mode</b>
							0	Standard
							1	Macro
								<b>066h select register selection</b>
							0	066h is Watchdog trigger register
							1	066h is CAN base address register
								<b>Scaler watchdog time (Normal/Macro)</b>
		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
								<b>Trigger red Watchdog LED</b>
	0							Red LED (WD) off
	1							Red LED (WD) on
								<b>Watchdog error / Display and reset</b>
0								WD inactive
1								WD triggered Reset LED after watchdog alarm (Bit 7 = write 1)

## 17.4.3 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).

### 17.4.4 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.

### 17.4.5 Battery status register (read-only, address 118Fh)

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 118Fh)								
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

### 17.4.6 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
8006 2010h	DC20 0000h	20 0000h



## Appendix

### A.1 Guidelines and Declarations

#### Notes on the CE Label

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

#### EMC guideline

The devices fulfill the requirements for the EC directive "89/336/EEC Electromagnetic Compatibility", and the following fields of application applies according to this CE label:

Area of application	Requirements	
	Emitted interference	Interference immunity
Industry	EN 61000-6-4: 2001	EN 61000-6-2: 2005

The device is also compliant with EN 61000-3-2:2000 (harmonic currents) and EN 61000-3-3:1995 +A1:2001 (voltage fluctuation and flicker.)

#### Low-voltage directive

The devices complies with the requirements of the EC Directive 2006/95/EC "Low Voltage Directive." Conformance with this directive has been verified according to EN60950-1:2001 +A11:2004.

#### Declaration of conformity

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

#### Note the installation guidelines

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

#### Connecting peripherals

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

## A.2 Certificates and Approvals

### DIN ISO 9001 certificate

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

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

EQ Net Certificate No.: DE-001108 QM

### Software license agreement

The device can be supplied with or without preinstalled software. For devices with preinstalled software, please note the relevant license agreements.

### Approvals for USA and Canada

#### Product safety

<b>The following approval is available for the device:</b>	
	Underwriters Laboratories (UL) according to standard UL508 and C22.2 No. 142 or C 22.2 No. 14-05 (IND.CONT.EQ)

#### EMC

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



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

## A.3 Service and support

### Local information

If you have questions about the products described in this document, you can find help at:  
<http://www.siemens.com/automation/partner>

### Technical documentation for SIMATIC products

Further documentation for SIMATIC products and systems can be found at:  
<http://www.siemens.de/simatic-tech-doku-portal>

### Easy shopping with the A&D Mall

Catalog & online ordering system <http://www.siemens.com/automation/mall>

### Training

All the training options are listed at: <http://www.siemens.com/sitrain>  
Find a contact at: Phone: +49(911) 895-3200

### Technical support

Tel +49 180 5050 222  
Fax +49 180 5050 223  
<http://www.siemens.com/automation/service>

You will find support request web form at:  
<http://www.siemens.de/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 support

Information about the product, Support and Service, right through to the Technical Forum, can be found at: <http://www.siemens.com/automation/service&partner>

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

Information about contacts, drivers, and BIOS updates, FAQs and Customer Support can be found at: <http://www.siemens.com/asis>

## A.4 Catalog and A&D online ordering system (mall)

In our continually updated online catalog, you can find detailed information about products, systems and solution in the field of Automation and Drives and – using a personal password – place orders.

**Address:** <http://mall.automation.siemens.com>



## ESD guidelines

### B.1 ESD directives

#### 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:



<b>Caution</b>
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.

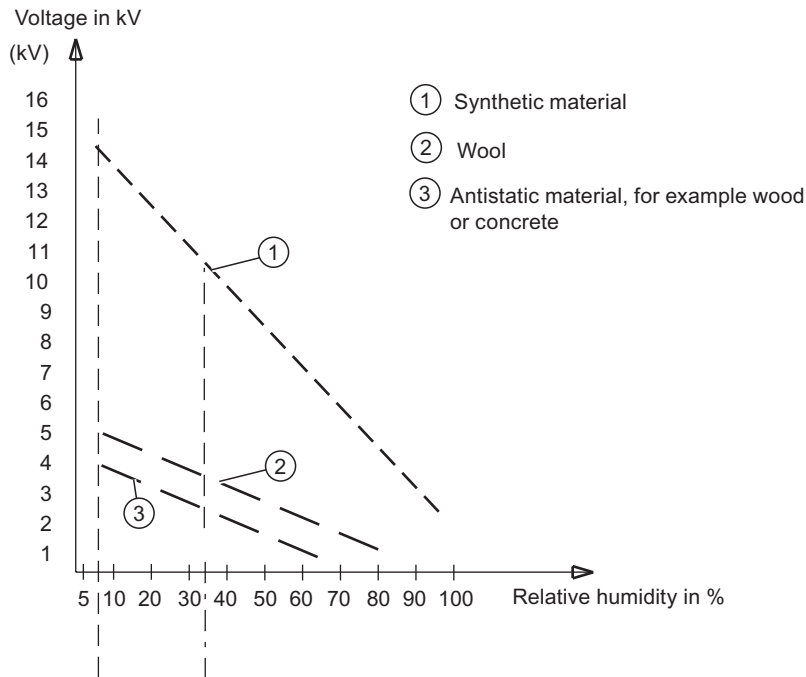


Figure B-1 Electrostatic voltages on an operator

### 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.
- 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/Acronyms

### C.1 Abbreviations

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

List of Abbreviations/Acronyms

C.1 Abbreviations

Abbreviation	Term	Meaning
CSA	Canadian Standards Association	Canadian organisation for tests and certifications according to own or bi-national 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	Disc Operating System	Operating system without GUI
DP	Decentralized peripherals	
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 Disc	Digital versatile disk
DVI	Digital Visual Interface	Digital display interface
ECC	Error Correction Code	Error correction code
ECP	Extended capability port	Extended parallel port
EGA	Enhanced Graphics Adapter	PC to monitor interface
ESD	Electrostatic sensitive devices	
EM	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
FD	Floppy disk	Disk drive, 3.5"
FSB	Front Side Bus	
GND	Ground	Chassis ground
HD	Hard disk	Hard disk
HDA	High Definition Audio	
HU	Height unit	
HMI	Human Machine Interface	User interface
HT	Hyper-Threading	



Abbreviation	Term	Meaning
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
IDE	Integrated Device Electronics	
IEC	International Electronics Commission	
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
IT	Information Technology	Information technology
LAN	Local Area Network	Computer network that is limited to a local area.
LCD	Liquid Crystal Display	Liquid crystal display
LED	Light Emitting Diode	Light emitting diode
LPT	Line Printer	Printer port
LVDS	Low Voltage Differential Signaling	
LW	Disk 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 with the format 32 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)	
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 certain versions of Windows (NT, 2000, XP)
OPC	OLE for Process Control	Standardized interface for industrial processes
PATA	Parallel ATA	
PC	Personal computer	

List of Abbreviations/Acronyms

C.1 Abbreviations

Abbreviation	Term	Meaning
PCI	Peripheral Component Interconnect	High-speed expansion bus
PCMCIA	Personal Computer Memory Card International Association	
PE	Protective Earth	Protective conductor
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
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 ATA	
SCSI	Small Computer System Interface	
SDRAM	Synchronous DRAM	
SELV	Safety Extra Low Voltage	Safety extra low voltage
SMART	Self Monitoring Analysis and Reporting Technology	Hard disk error diagnostics program
SLC	Second Level Cache	
SMS	Short Message Service	Short message via telecommunication network
SNMP	Simple Network Management Protocol	Network protocol
SO-DIMM	Small Outline Dual Inline Memory Module	
SOM	SafeCard on Motherboard (SOM)	
SPP	Standard Parallel Port	Synonym for parallel port
SVGA	Super Video Graphics Array	Enhanced VGA standard with at least 256 colors
SVP	Serial number of the device	
SW	Software	
TCO	<b>Total Cost of Ownership</b>	
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 bi-national standards (with CSA / Canada) standards
UMA	Unified Memory Architecture	
URL	Uniform Resource Locator	Designation of the full address of an Internet page

Abbreviation	Term	Meaning
USB	Universal Serial Bus	
UXGA	Ultra Extended Graphics Array	Graphic standard, maximum resolution 1.600 x 1.200 pixels
V.24		ITU-T standardized recommendation for data transfer via serial ports
VDE	Verein deutscher Elektrotechniker (Union of German Electrical Engineers)	
VGA	Video Graphics Array	Video adapter which meets industrial standard
VRM	Voltage Regulator Module	
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	Wireless local area network
WWW	World Wide Web	
XGA	Extended Graphics Array	Graphic standard, maximum resolution 1.024 x 768 pixels



# Glossary

## **ATAPI CD-ROM Drive**

AT Bus Attachment Packet Interface (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 carrier 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.

## **Booting**

Start or restart of the computer. During booting the operating system is transferred from the system data carrier to the work memory.

## **Cache**

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

### **CE label**

**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 **E**lectromagnetic **C**ompatib**i**lity. 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 XP Embedded 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 Mbps.

### **Formatting**

Basic partitioning of memory space on a magnetic data carrier into tracks and segments. Formatting deletes all data on a data carrier. All data carriers 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.

### **Hard disk drives**

Hard disks represent a form of magnetic disk storage medium (Winchester drives, hard disks) with integrated magnetic disks.

### **Hot swapping**

The SATA interface gives the device's hard drive system hot-swap capability. Prerequisite for this configuration is a RAID1 system with SATA RAID controller (on-board, or slot module), and at least two SATA exchangeable racks. The advantage of hot swapping 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.

### **Image**

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



### Intel chip set 910GML / 915GM

The chip set organizes the data traffic between the main processor, working memory, cache, slots and other interfaces.

Features of the 910GML / 915GM: 400/533 MHz front-side bus, Intel® graphical media accelerator 900, support for up to 2 GB dual-channel DDR2 RAM, Intel® High Definition Audio, Intel® Display Power-Saving Technology 2 (Intel® DPST 2)

### Interface

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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- Physical interconnection (cable) of hardware elements such as PLCs, PCs, programming devices, printers or monitors.
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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 communication 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.

**Pentium M**

Intel processor type: The architecture of the processor is designed for mobile computing; the processor features superior performance characteristics for computer applications and enhanced power-saving functions

**Pixel**

**PixE**lement (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 Field Bus** (standard bus system for process applications)

## 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 setting up the 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.

### **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.

### **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.

### **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.

### **Windows**

Microsoft Windows is a multitasking graphical user interface. Windows provides a standard graphical interface based on drop-down menus, windowed regions on the screen, and allows operation with a pointer device such as a mouse.

### **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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