# SYSTEMBAUGRUPPE D1031
# SYSTEM BOARD D1031

**TECHNISCHES HANDBUCH**
**TECHNICAL MANUAL**

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# Systembaugruppe D1031
# System board D1031

**Technisches Handbuch**
**Technical Manual**

**Ausgabe Januar 2000**
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# Contents

# Introduction

| | |
|---|---|
| **i** | This system board is available in different configuration levels. Depending on the hardware configuration of your device, it may be that you cannot find several options in your version of the system board, even though they are described. |

You may find further information in the description "BIOS Setup".

Further information to drivers is provided in the readme files on hard disk or on the supplied drivers diskettes or on the "Drivers & Utilities" or "ServerStart" CD.

## Notational conventions

The meanings of the symbols and fonts used in this manual are as follows:

| | |
|---|---|
| ⚠ | Pay particular attention to texts marked with this symbol. Failure to observe this warning endangers your life, destroys the system, or may lead to loss of data. |

| | |
|---|---|
| **i** | Supplementary information, remarks and tips follow this symbol. |

► Texts which follow this symbol describe activities that must be performed in the order shown.

␣ This symbol means that you must enter a blank space at this point.

⏎ This symbol means that you must press the Enter key.

`Texts in this typeface` are screen outputs.

**`Texts in this bold typeface`** are the entries you make via the keyboard.

*Texts in italics* indicate commands or menu items.

"Quotation marks" indicate names of chapters and terms that are being emphasized.

## Important notes

Store this manual close to the device. If you pass on the device to third parties, you should also pass on this manual.

| | |
|---|---|
| ⚠ | Be sure to read this page carefully and note the information before you open the device. |

You cannot access the components of the system board without first opening the device. How to dismantle and reassemble the device is described in the Operating Manual accompanying the device.

Please note the information provided in the chapter "Safety" in the Operating Manual of the device.

Incorrect replacement of the lithium battery may lead to a risk of explosion. It is therefore essential to observe the instructions in the chapter „Add-on modules" - „Replacing the lithium battery".

CE

The shipped version of this board complies with the requirements of the EEC directive 89/336/EEC "Electromagnetic compatibility".

Compliance was tested in a typical PC configuration.

When installing the board, refer to the specific installation information in the Operating Manual or Technical Manual of the receiving device.

Connecting cables for peripherals must be adequately insulated to avoid interference.

⚠ Components can become very hot during operation. Make sure you do not touch components when making extensions to the system board. There is a danger of burns!

**i** The warranty is invalidated if the device is damaged during the installation or replacement of system expansions. Information on which system expansions you can use is available from your sales outlet or the customer service center.

# Information on boards

To prevent damage to the system board or the components and conductors on it, please take great care when you insert or remove boards. Take care above all to ensure that extension boards are slotted in straight without damaging components or conductors on the system board, or any other components, for example EMI spring contacts.

Be especially careful with the locking mechanisms (catches, centering pins etc.) when you replace the system board or components on it, for example memory modules or processors.

Never use sharp objects (screwdrivers) for leverage.

Boards with electrostatic sensitive devices (ESD) are identifiable by the label shown.

When you handle boards fitted with ESDs, you must observe the following points under all circumstances:

● You must always discharge yourself (e.g. by touching a grounded object) before working.

● The equipment and tools you use must be free of static charges.

● Pull out the power plug before inserting or pulling out boards containing ESDs.

● Always hold boards with ESDs by their edges.

● Never touch pins or conductors on boards fitted with ESDs.

# Features

- Dual processor system (D1031 dual: second processor optional)
- Pentium II, 350 up to 450 MHz and Pentium III, 500 MHz with 100 MHz bus frequency, with integrated 2x16 Kbyte first-level cache and 512 Kbyte second-level cache
- Upgrade with second Pentium II/ III processor
- Intel 82440GX chipset with ISA bridge
- 72-bit data bus (64-bit data and 8-bit ECC)
- Voltage regulators which sets themselves automatically to the required voltage range (1.5 V to 3.5 V)
- 64 Mbyte to 2 Gbyte main memory for buffered SDRAM DIM modules, ECC protected (max. 4 modules)
- 4 Mbit Flash BIOS
- 6 PCI slots, 1 ISA/PCI slot (shared), all PCI slots have bus master capability
- AGP slot for AGP screen controller
- Screen controller connected to PCI bus, graphics processor Cirrus Logic CL-GD5446, 2 Mbyte DRAM video memory
- Ultra 2-SCSI controller SYM 53C895 with SCSI bus extension SYM 53C141
- IDE hard disk controller connected to PCI bus for two IDE drives
- System boot from SCSI CD-ROM is possible
- Real-time clock/calendar with integrated battery backup
- Floppy disk controller (up to 2.88 Mbytes format)
- Connectors for two fans, temperature sensor, $I^2C$, remote-On/Off, Wake-On-LAN, floppy disk drive, IDE disk drive, control panel and service, SCSI LED
- Loudspeakers
- Security functions in BIOS
- Fujitsu Siemens-ASIC for Server Management
- Server management support
- CAN bus interface for control of external drive cabinets
- USB port (internal and external)
- Connector for soft-off, reset switch, cover monitoring
- Connector for remote-on, programmable
- Connector for chipcard reader
- Monitor port
- Parallel port (ECP- and EPP-compatible)
- Two serial ports (compatible 16550, 16-Byte-FIFO)
- PS/2 mouse port, PS/2 keyboard port

# Interfaces and connectors
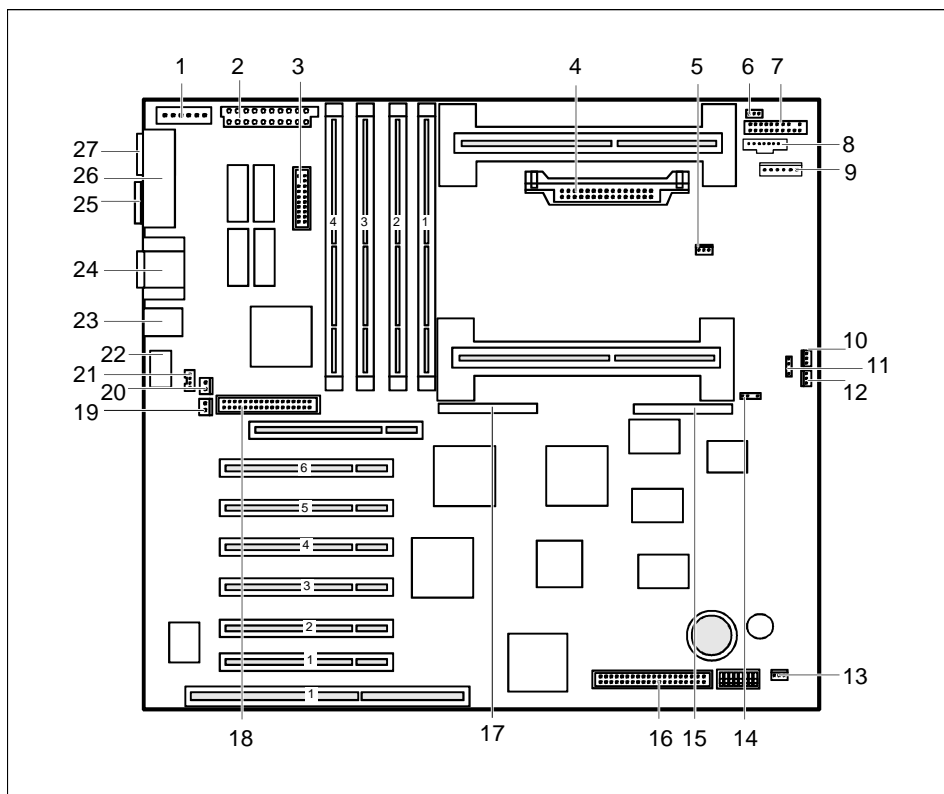


1 = Auxiliary voltage for power supply
2 = Power supply 5V and ±12V
3 = Chipcard reader
4 = Voltage converter for processor 2
5 = Temperature sensor for processor 1
6 = Temperature sensor for processor 2
7 = Control panel
8 = Cover monitoring
9 = Power supply voltage
10 = Fan 1
11 = Loudspeakers
12 = Fan 2
13 = USB port (internal)
14 = SCSI indicator

15 = Ultra SCSI (SE)
16 = IDE drives
17 = Ultra 2 SCSI (LVD/SE)
18 = Floppy disk drives
19 = Wake On LAN (WOL)
20 = Remote on
21 = CAN bus connection internal
22 = CAN bus connection external
23 = Keyboard and mouse
24 = Serial interface 1 and 2
25 = USB port (external)
26 = Parallel port
27 = Monitor port

# Possible screen resolution

Depending on the operating system used the screen resolutions in the following table refer to the screen controller on the system board for 2 Mbyte video memory.
If you are using an external screen controller, you will find details of supported screen resolutions in the Operating Manual or Technical Manual supplied with the controller.

| Screen resolution | Refresh rate (Hz) | Horizontal-rate (kHz) ** | Max. number of colors |
|---|---|---|---|
| 640x350 | 70 | 31,5 | 16 |
| 640x480 | 60 | 31,5 | 16777216 |
| 640x480 | 75 | 37,5 | 16777216 |
| 640x480 | 85 | 43,4 | 16777216 |
| 640x480 | 100 | 50,6 | 16777216 |
| 720x400 | 70 | 31,5 | 16 |
| 720x400 | 84 | 38 | 16 |
| 800x600 | 60 | 38 | 65536 |
| 800x600 | 72 | 48 | 65536 |
| 800x600 | 75 | 47 | 65536 |
| 800x600 | 85 | 53,7 | 65536 |
| 800x600 | 100 | 63 | 65536 |
| 1024x768 | 60 | 48,4 | 256 |
| 1024x768 | 75 | 60 | 256 |
| 1024x768 | 85 | 68,7 | 256 * |
| 1024x768 | 87 interlaced | 36 | 256 |
| 1024x768 | 100 | 81 | 256 * |
| 1280x1024 | 87 interlaced | 49 | 16 |

\*    no 16 color mode
\*\*   The horizontal rate values may have a tolerance range of ±0.3 kHz.

# Interrupt table

| | assigned IRQ | | assigned IRQ |
|---|---|---|---|
| System clock | IRQ0 | free | IRQ9 |
| Keyboard | IRQ1 | free | IRQ10 |
| not available | IRQ2 | free | IRQ11 |
| Serial port COM2 | IRQ3 | Mouse controller | IRQ12 |
| Serial interface COM1 | IRQ4 | Numeric processor | IRQ13 |
| free | IRQ5 | IDE controller/free | IRQ14 |
| Floppy disk drive controller | IRQ6 | free | IRQ15 |
| Parallel interface LPT1 | IRQ7 | | |
| Real-time clock (RTC) | IRQ8 | | |

"assigned IRQ" = interrupts assigned as shipped

**i**   Note that an interrupt cannot be used by two ISA boards or onboard controllers at the same time.

# SCSI bus termination

SCSI is the abbreviation for **S**mall **C**omputer **S**ystem **I**nterface.

The system board is equipped with an Ultra 2 SCSI controller SYM 53C895 with SCSI bus extension SYM 53C141. There are two SCSI connections for Ultra SCSI (single-ended; max. 40 Mbyte/s) and Ultra 2 SCSI (low voltage differential; max. 80 Mbyte/s) on the system board.

The Ultra 2 SCSI controller is used as an interface between the system interface and devices with an SCSI interface, called SCSI devices in the following.

SCSI devices are interconnected with a cable routed from device to device. This provides all devices with access to a common "SCSI bus".

The operating manual or the technical manual for your SCSI device explains how to install and operate your SCSI device.

**Ultra SCSI connection (single-ended; max. 40 Mbyte/s)**

Here you can connect accessible SCSI drives. The Ultra SCSI connection is always terminated.

Connect the SCSI devices so that the Ultra SCSI connection on the system board is located at one of the two ends of the SCSI bus. Ensure the correct termination of the SCSI device at the other end of the SCSI bus. The termination must be removed or deactivated on all other internal SCSI devices.

The description of your SCSI devices contains instructions on how to remove or deactivate the termination of the SCSI devices.

**Ultra 2 SCSI connection (low voltage differential; max. 80 Mbyte/s)**

Here you can connect SCSI hard disks, e.g. via an SCSI platter in the system unit. The termination of the Ultra 2 SCSI connection can be activated and deactivated via the BIOS setup (menu item *SCSI Termination LVD*). The default setting is *Enabled*. The termination affects the entire bus width (low byte and high byte).

You may find further information in the description "BIOS Setup".

Connect the SCSI devices so that the Ultra 2 SCSI connection on the system board is located at one of the two ends of the SCSI bus. Ensure the correct termination of the SCSI device at the other end of the SCSI bus.

If you connect SCSI devices to both ends of the Ultra 2 SCSI connection and the SCSI controller is then not located at the end of the SCSI bus, deactivate the termination of the Ultra 2 SCSI connection via the BIOS setup. In this case ensure the correct termination of the two SCSI devices at the ends of the SCSI bus.

The description of your SCSI devices contains instructions on how to remove or deactivate the termination of the SCSI devices.

Then the Ultra 2 SCSI connection only operates in the Ultra 2 mode (LVD) when all connected SCSI devices support Ultra 2. If even one device is connected which only supports the Ultra SCSI mode, all connected devices will automatically be switched into the Ultra SCSI mode (SE).

The SCSI BIOS and the drivers for the SCSI controller are described in the manual "PCI SCSI Device Management System SMDS 4.0".

# Settings on the system board
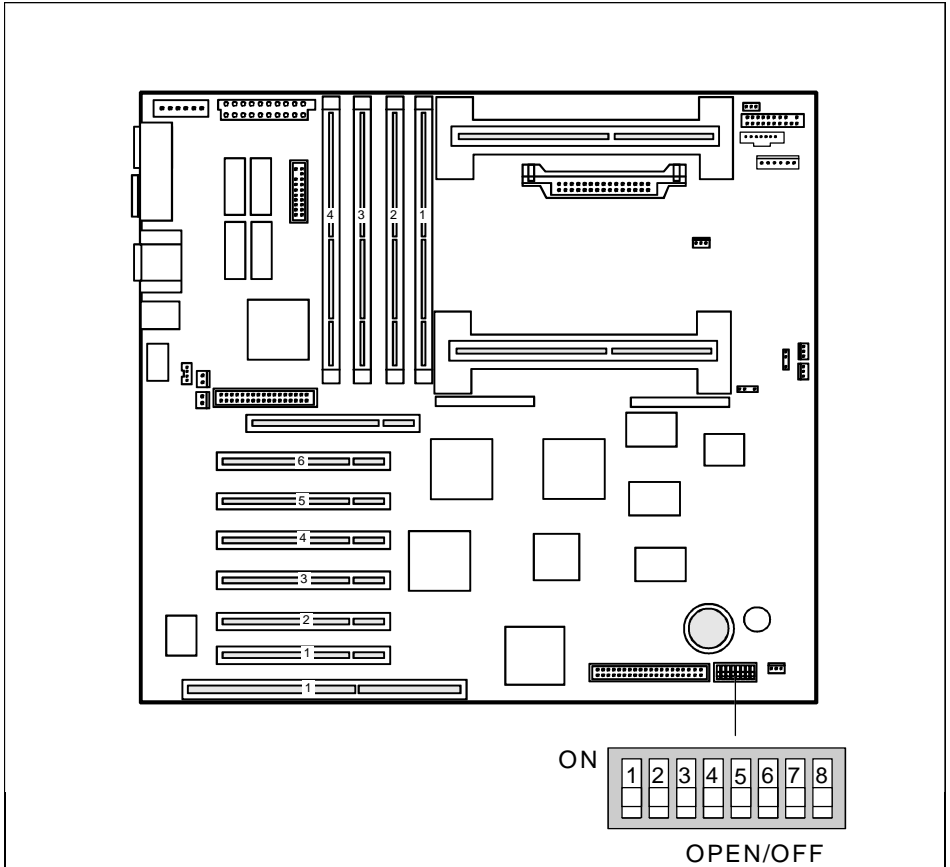


Switch 1 = System BIOS recovery
Switch 2 = must be set to *off*

Switch 3 = write protection for system BIOS
Switch 4 = write protection for floppy disk drive
Switch 5, 6, 7, 8 = clock frequency

**i** The switch settings apply both to the dual-processor system and to the monoprocessor system.

# Recovering System BIOS - switch 1

Switch 1 enables recovery of the old system BIOS after an attempt to update has failed. To restore the old BIOS you need a Flash BIOS Diskette (call customer service center). The existing BIOS settings are meaningless for restoring the system BIOS (e.g. the *Security* menu in the *Flash Write* field).

*OFF*  The System BIOS is started with the system BIOS from the system board (default setting).

*ON*  The system is started from the Flash BIOS Diskette in drive A. A recovery of the system BIOS is executed.

| **i** | If switch 1 is set to *ON*, switch 3 must be set to *OFF (OPEN)*. |
|---|---|

# Write protection for System BIOS - switch 3

Switch 3 enables and disables system Flash BIOS updating. Before an update of the system BIOS can be carried out, switch 1 must be set to *OFF* and write protection for the system BIOS must also be disabled in the *BIOS Setup* (in the *Security* menu: the *Flash Write* field must be set to *Enabled*). If you wish to update your system BIOS, please consult our customer service center.

*OFF*  System BIOS can be overwritten (default setting).

*ON*  System BIOS is write protected.

# Write protection for floppy disk drive - switch 4

Switch 4 is used to define whether floppy disks can be written or deleted in the floppy disk drive. To write and delete floppy disks, the write protection in *BIOS setup* must be disabled (in menu *Security*, the field *Diskette Write* must be set to *Enabled*).

*OFF*  Read, write and delete floppy disks is possible (default setting).

*ON*  The floppy disk drive is write-protected.

# Clock speed - switch 5, 6, 7 and 8

⚠ The switch may only be set as specified in the table below for the particular
processors used.

**Processor with 100 MHz system bus clock frequency**

| processor | switch 5 | switch 6 | switch 7 | switch 8 |
|-----------|----------|----------|----------|----------|
| 350 MHz | on | off | off | on |
| 400 MHz | on | on | on | off |
| 450 MHz | on | off | on | off |
| 500 MHz | on | on | off | off |
| 550 MHz | on | off | off | off |
| 600 MHz | off | on | on | on |
| 650 MHz | off | off | on | on |
| 700 MHz | off | on | off | on |
| 750 MHz | off | off | off | on |
| 800 MHz | off | on | on | off |

# Add-on modules
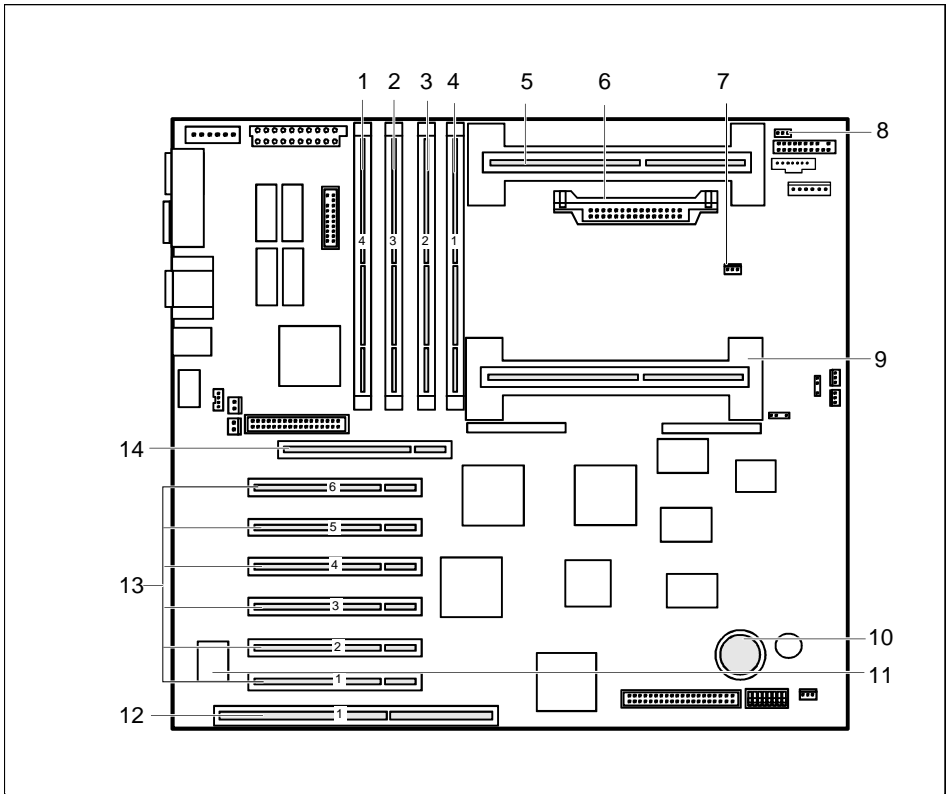


1 = Main memory slot 4 (DIMM3)
2 = Main memory slot 3 (DIMM2)
3 = Main memory slot 2 (DIMM1)
4 = Main memory slot 1 (DIMM0)
5 = Second processor (optional)
6 = Voltage converter for processor 2
7 = Temperature sensor for processor 1

8 = Temperature sensor for processor 2
9 = First processor
10 = Lithium battery
11 = Flash BIOS
12 = ISA slot
13 = PCI slots - from below: 1, 2, 3, 4, 5, 6
14 = AGP slot

**i** PCI slots 1, 2 and 3 are connected to the PCI bus 0. PCI slots 4, 5 and 6 are connected to the PCI bus 2. The AGP slot is connected to PCI bus 1.

The PCI slot 1 and the ISA slot are shared.

# Upgrading main memory

Four locations (DIMM0 to DIMM3) are available on the system board for main memory. These slots are suitable for 64, 128, 256 and 512 Mbyte SDRAM memory modules of the DIMM format.

The maximum memory configuration is 2 Gbyte, whereby memory modules with different memory capacities can be combined.

Equipping must be performed starting with slot 1 (DIMM0) in sequence.

⚠ You may only use buffered 3.3V memory modules. Unbuffered memory modules are not permitted.

The SDRAM memory board must be compatible with PC100.

**Installing memory modules**

► Flip the holders on each side of the relevant location outwards.

► Insert the memory module into the location.

► At the same time flip the lateral holders upwards until the memory module snaps in place.

**Removing a memory module**

► Flip the holders to the right and left of the location outwards.

► Pull the memory module out of its location.

# Replacing the processor

You can replace the processor in the slot of the first processor. The system board can be upgraded by a second processor if it is inserted into the slot for the second processor.

If the system board only has one processor (inserted into the slot for the first processor ), a terminating board is installed in the slot for the second processor.

⚠ You may only use processors of the same type on the system board (e.g. only Pentium II or only Pentium III). The second processor must have the same clock rate as the first.

A suitable multiprocessor operating system must be used if dual operation is required.

**Installing the processor**

| i | If you wish to upgrade your system with a new processor, the processor bracket on the system board may need to be replaced beforehand. Should it be necessary to replace the bracket, please contact our customer service center. |

Depending on the design of the processor housing, the heat sink can be moved on the processor and the processor in the bracket. This floating suspension in the installed state ensures reliable contact between the processor and the heat sink. Detents in the bracket prevent the processor from slipping out.
If the heat sink on the processor can be moved, then it must also be possible to move the mounted processor in the bracket. This ensures optimum cooling.

If you replace the processor, grasp the processor housing by the processor and the heat sink.
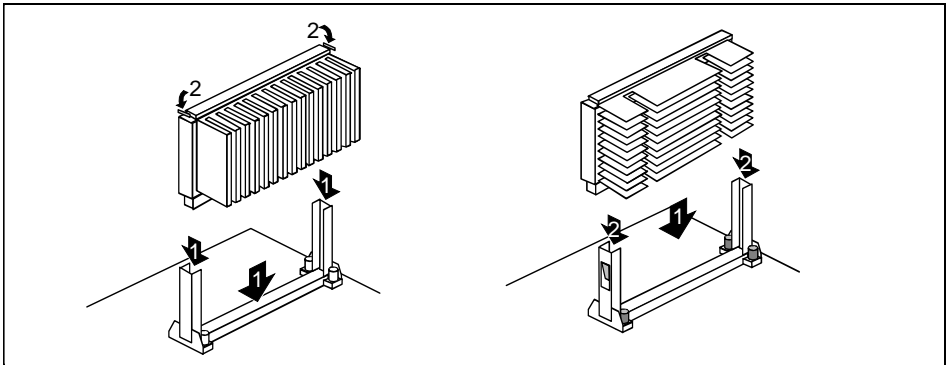


The illustration shows two bracket and processor models.

► Remove the terminating board if necessary.

► Slide the processor into the bracket (1).

► Push the processor down in the bracket and press it into the slot until the clamps (2) to the left and right snap into place.

► Set the clock frequency of the new processor using switches 5 to 8 of the switch block.

► If the processor has a temperature sensor or a fan, attach the associated cable to the connector for the temperature sensor or the fan on system board.

► Plug in the voltage converter for the second processor.

**Removing the processor**

► If the processor has a temperature sensor or a fan, pull out the associated cable.

► Press the clamps (2) on either side of the processor outwards and pull the processor up and out. Use a screwdriver if necessary.

► Insert the terminating board into the slot if necessary.

► » Pull the voltage converter for the second processor.

# Replacing the lithium battery

⚠️ Incorrect replacement of the lithium battery may lead to a risk of explosion.
The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer (CR2032).
Do not throw lithium batteries into the trashcan. It must be disposed of in accordance with local regulations concerning special waste.

Make sure that you insert the battery the right way round. The plus pole must be on the top!

- **VAROITUS**
  Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

- **VARNING**
  Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

- **ADVARSEL**
  Lithiumbatteri - Explosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Lever det brugte batteri tilbage til leverandøren.

- **ADVARSEL**
  Explosionsfare ved feilaktig skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres i henhold til fabrikantens instruksjoner.
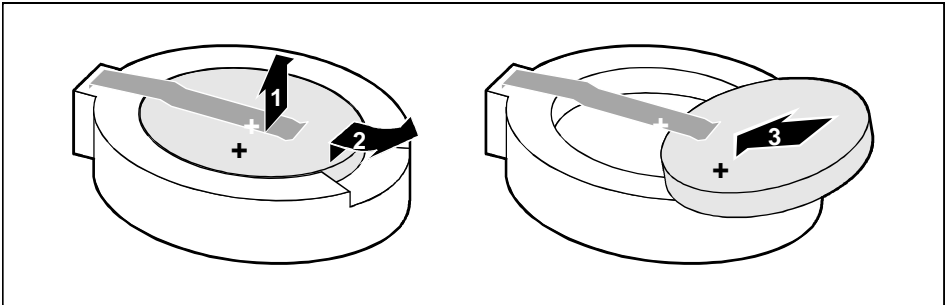


► Lift the contact (1) a few millimeters and remove the battery from its socket (2).

► Insert a new lithium battery of the same type in the socket (3).

# Glossary

The technical terms and abbreviations given below represent only a selection of the full list of common technical terms and abbreviations.

Not all technical terms and abbreviations listed here are valid for the described system board.

ACPI ........................... Advanced Configuration and Power Interface
AC'97 .......................... Audio Codec '97
AGP ............................. Accelerated Graphics Port
AMR ............................ Audio Modem Riser
AOL ............................. Alert On LAN
APM ............................ Advanced Power Management
ATA ............................. Advanced Technology Attachment
BIOS ........................... Basic Input Output System
CAN Controller Area Network

CPU ............................. Central Processing Unit
C-RIMM ....................... Continuity Rambus Inline Memory Module
DIMM ........................... Dual Inline Memory Module
ECC ............................. Error Correcting Code
EEPROM ..................... Electrical Erasable Programmable Read Only Memory
FDC ............................. Floppy Disk Controller
FIFO ............................ First-In First-Out
FSB .............................. Front Side Bus
FWH ............................ Firmware Hub
GMCH .......................... Graphics and Memory Controller Hub
I$^2$C ................................ Inter Integrated Circuit
IAPC ............................ Instantly Available Power Managed Desktop PC Design
ICH .............................. I/O Controller Hub
IDE ............................... Intelligent Drive Electronics
IPSEC .......................... Internet Protocol Security
ISA ............................... Industrial Standard Architecture
LAN .............................. Local Area Network
LSA .............................. LAN Desk Service Agent
MCH ............................ Memory Controller Hub
MMX ............................ MultiMedia eXtension
PCI ............................... Peripheral Component Interconnect
PXE ............................. Preboot eXecution Environment
RAM ............................. Random Access Memory
RAMDAC ..................... Random Access Memory Digital Analog Converter
RDRAM ........................ Rambus Dynamic Random Access Memory
RIMM ........................... Rambus Inline Memory Module
RTC ............................. Real Time Clock
SB ................................ Soundblaster
SDRAM ........................ Synchronous Dynamic Random Access Memory
SGRAM ....................... Synchronous Graphic Random Access Memory
SMBus ......................... System Management Bus
SVGA ........................... Super Video Graphic Adapter
USB ............................. Universal Serial Bus
VGA ............................. Video Graphic Adapter
WOL ............................ Wake On LAN