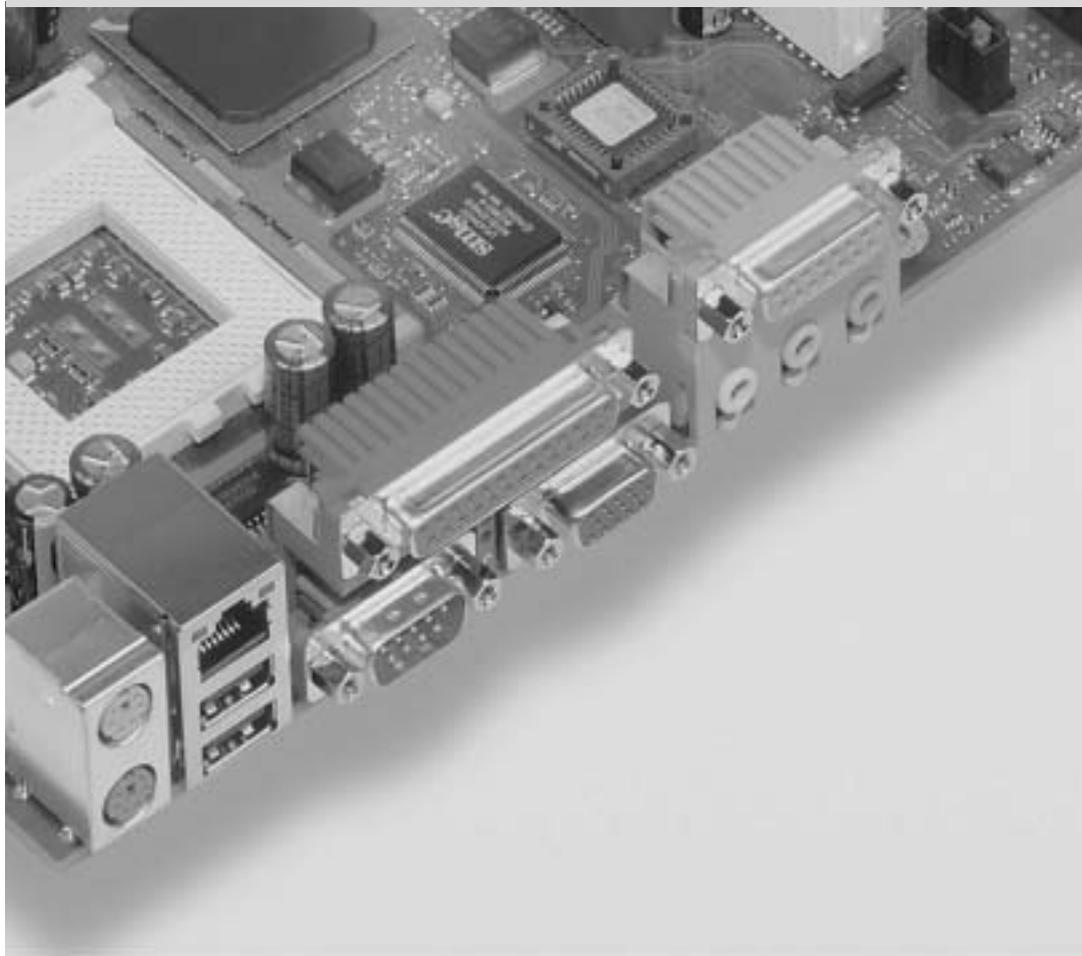


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## Systembaugruppe / System board D1309



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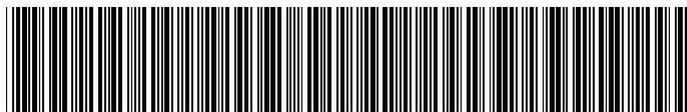


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**Systembaugruppe  
D1309  
System board D1309**

**Technisches Handbuch  
Technical Manual**

**Ausgabe April 2002  
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# Introduction

This Technical Manual describes the system board D1309, which can be equipped with up to two Intel Xeon processors.

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

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

## Notational conventions

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



Pay particular attention to text marked with this symbol. Failure to observe this warning endangers your life, destroys the device, or may lead to loss of data.



Supplementary information, remarks, and tips follow this symbol.

- ▶ Text which follows this symbol describes activities that must be performed in the order shown.
- ┆ This symbol indicates that you must enter a blank space (press the Space Bar) at this point.
- ⏎ This symbol indicates that you must press the Enter key.

*Text in this typeface* indicates screen outputs.

**Text in this bold typeface** indicates the entries you make via the keyboard.

*Text in italics* indicates commands or menu items.

"Quotation marks" indicate names of chapters or terms.

## Important notes

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



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

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

Please observe the safety information provided in the "Important notes" chapter in the device's operating manual.

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



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 for the receiving device.

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



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



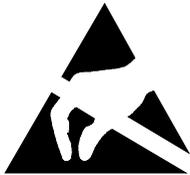
The warranty is invalidated if the device is damaged during the installation or replacement of system expansions. Information on which system expansions you can use is available from your sales outlet or the customer service centre.

## Information about 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 great care 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, centring 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.

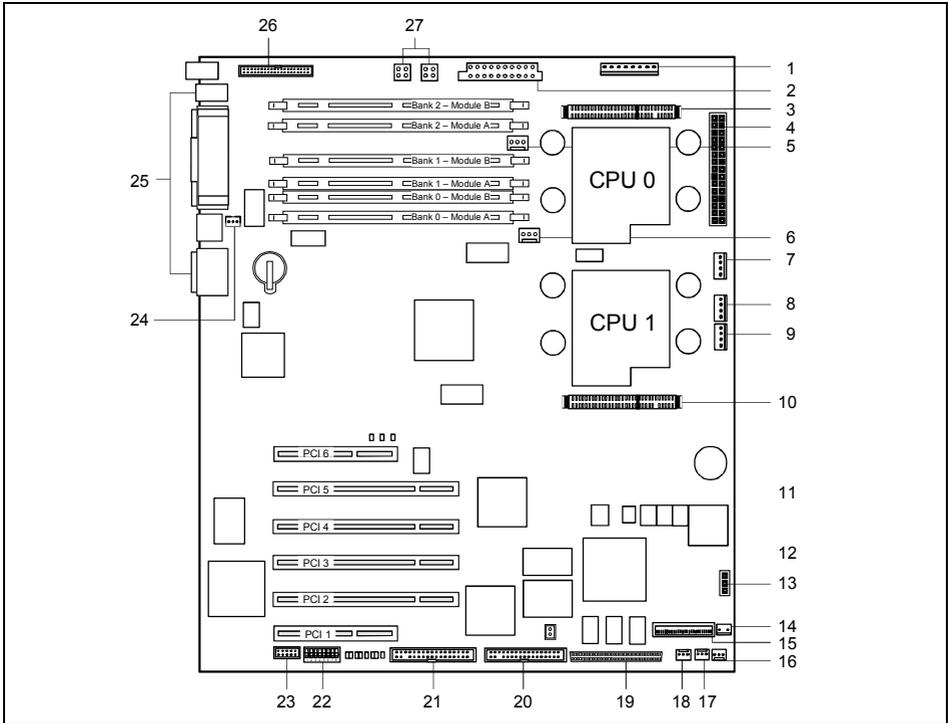
When you handle boards fitted with ESDs, you must, under all circumstances, observe the following points:

- You must always discharge static build up (e.g. by touching a grounded object) before working.
- The equipment and tools you use must be free of static charges.
- Remove the power plug from the mains supply before inserting or removing boards containing ESDs.
- Always hold boards with ESDs by their edges.
- Never touch pins or conductors on boards fitted with ESDs.

## Features

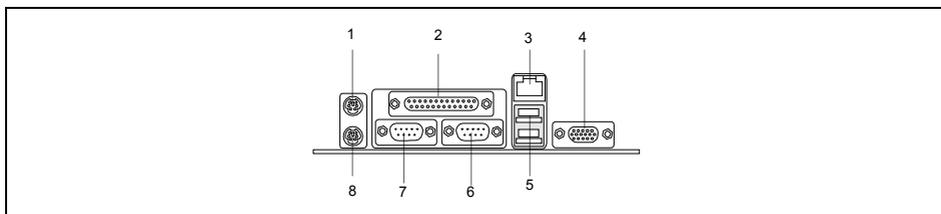
- ServerWorks GC LE chipset
- two processor slots for Xeon (Prestonia) processors with 2.2 GHz and higher, socket 603, with 100 MHz Front Side Bus
- 512 Kbyte second level cache
- 6 memory slots for PC1600 modules (registered DDR SDRAM memory modules) for 256 Mbyte to 12 Gbyte main memory
- two 64 bit PCI-X slots with 100 MHz
- two 64 bit PCI slots with 66 MHz
- one 32 bit PCI slot with 33 MHz
- one 32 bit PCI slot with 33 MHz (short design)
- SCSI controller LSI 53C1000R onboard with Ultra160 SCSI interface and 64 bit/66 MHz PCI interface
- Screen controller ATI Rage XL VGA onboard with 230 MHz RAMDAC and 8 Mbyte SDRAM memory
- Intel 82559PM LAN controller
- Server Management with Scylla (SM ASIC) onboard
- IDE controller ATA100 capable, supports PIO mode 0-4
- one external parallel interface (ECP- and EPP-compatible)
- two external serial ports (COM1 and COM2)
- two external and one internal USB1.1 port
- one external RJ45 LAN port
- two external PS/2 interfaces for keyboard and mouse
- system monitoring

## Interfaces and connectors



- |   |   |
|---|---|
| 1 = PC98                                  | 15 = Connector RSB signals                  |
| 2 = Power supply                          | 16 = Monitoring of the position of the door |
| 3 = Voltage regulator module (VRM) CPU 0  | 17 = System fan 2                           |
| 4 = Connector for front panel             | 18 = System fan 1                           |
| 5 = Fan connector for CPU 0               | 19 = SCSI connection                        |
| 6 = Fan connector for CPU 1               | 20 = IDE drives (primary)                   |
| 7 = Connector LCD display                 | 21 = IDE drives (secondary)                 |
| 8 = Connector for casing ID EEPROM        | 22 = Switch block                           |
| 9 = Connector PS backplane                | 23 = Internal USB port for chipcard reader  |
| 10 = Voltage regulator module (VRM) CPU 1 | 24 = Wake On LAN                            |
| 11 = Power monitoring                     | 25 = External ports                         |
| 12 = Connector bus multiplexer            | 26 = Floppy Disk Drive                      |
| 13 = Connector NMI key                    | 27 = Power supply 12 V                      |
| 14 = Connector RSB power                  |   |

## External ports



1 = PS/2 mouse port

2 = Parallel port LPT

3 = LAN connector

4 = VGA port

5 = USB ports

6 = Serial port COM2

7 = Serial port COM1

8 = PS/2 keyboard port

## Temperature / System monitoring

Temperature and system monitoring aim to reliably protect the computer hardware against damage caused by overheating. In addition, any unnecessary noise is also prevented by reducing the fan speed, and information is provided about the system status. Cover monitoring protects the system from unauthorised opening.

The temperature and system monitoring are controlled by an onboard controller developed by Fujitsu Siemens.

The following functions are supported:

### Temperature monitoring:

Measurement of the processor temperature, measurement of the system temperature with an onboard temperature sensor, measurement of the ambient temperature with an temperature sensor.

### Fan monitoring:

Fans that are no longer available, blocked or sticky fans are detected. Blocked or sticky fans are operated with 12 V pulse voltage. Fans removed while the system is switched off are signaled by the *Display news* LED when the system is switched on again and processed by the BIOS or the application.

### Fan control:

The fans are regulated according to temperature.

### Sensor monitoring:

The removal of, or a fault in, a temperature sensor is detected. Should this happen all fans monitored by this sensor run at maximum speed, to achieve the greatest possible protection of the hardware. Temperature sensors removed while the system is switched off are signaled by the *Display news* LED and processed by the BIOS or the application.

### Cover monitoring:

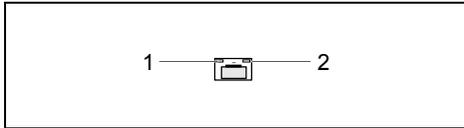
Unauthorised opening of the cover is detected, even when the system is switched off. However, this will only be indicated when the system is switched on again.

## LAN connector

This system board has an Intel 82559 LAN controller. The LAN controller is equipped with a 3 KB transmission and receiving buffer (FIFO) and supports WOL function through Magic Packet™.

It is also possible to boot a device without its own boot hard disk via LAN. Here Bootix LAN BootP and Intel PXE are supported.

The LAN RJ45 connector is equipped with a yellow and a green LED (light emitting diode).



- 1 = Yellow indicator
- 2 = Green indicator

Green a connection exists (e.g. to a hub).

Yellow Link Mode: the LAN connection is active.  
 WOL mode: a Magic Packet™ is being received.

## ISA bus resources

Device	IRQ	Address	DMA
Keyboard	1		
Serial port COM2	3	03F8, <b>02F8</b> , 03E8, 02E8	
Serial port COM1	4	<b>03F8</b> , 02F8, 03E8, 02E8	
	5		
Floppy disk drive controller	6		2
Parallel interface LPT1	7	0278, 0378, 03BC	0, 1, 3
Real-time clock (RTC)	8		
free	9, 10, 11		
Mouse controller	12		
Numeric processor	13		
IDE controller	14	1F0-1F7	
free	15		

"IRQ" = interrupt assigned as shipped

"Address" = this address can be used for your particular device

"Address" = this DMA can be used for your particular device

Default settings are shown in bold print.

## PCI bus resources

### PCI slots

The following table shows an overview of the PCI slots:

PCI slot	64bit/32bit	Frequency in MHz	Hot plug	PCI-X	Description
1	32 bit	33	no	no	32 bit PCI bus slot
2	64 bit	66	no	no	64 bit PCI bus slot
3	64 bit	66	no	no	64 bit PCI bus slot
4	64 bit	100	no	yes	64 bit PCI bus slot
5	64 bit	100	no	yes	64 bit PCI bus slot
6	32 bit	33	no	no	32 bit PCI bus slot (short)

### PCI IRQ line x - Assignment of the PCI interrupts

*PCI IRQ Line x* defines which ISA interrupts are used for the separate PCI slots.

If you select *Auto* in the BIOS setup, the interrupts are assigned automatically and no further settings are required.

Multifunctional PCI boards or boards with an integrated PCI-to-PCI bridge can use several PCI interrupts (INTA#, INTB#, INTC#, INTD#). Monofunctional PCI boards (default) only use one PCI interrupt (INTA#) per PCI slot.

The PCI interrupts INTA#, INTB#, INTC# and INTD# are available for every PCI slot.

The same interrupt can be assigned simultaneously to several PCI boards. You should avoid this condition due to reduced performance.

If you use a setting other than *Auto*, the Plug&Play functionality of the system BIOS for the corresponding PCI boards is deactivated.

*Auto*                    The PCI interrupts are assigned automatically in accordance with the Plug&Play guidelines.

*Disabled*            No ISA interrupt is assigned to the PCI interrupt.

*3, 4, 5, 7, 10, 11, 12, 14, 15*

The selected ISA interrupt is assigned to the PCI interrupt. You may not select an ISA interrupt that is used by a component on the system board (e.g. controller) or an ISA board.

	A	B	C	D
Slot 1	PCI IRQ line 0	PCI IRQ line 1	PCI IRQ line 2	PCI IRQ line 3
Slot 2	PCI IRQ line 4	PCI IRQ line 5	PCI IRQ line 6	PCI IRQ line 7
Slot 3	PCI IRQ line 6	PCI IRQ line 7	PCI IRQ line 4	PCI IRQ line 5
Slot 4	PCI IRQ line 8	PCI IRQ line 9	PCI IRQ line 10	PCI IRQ line 11
Slot 5	PCI IRQ line 10	PCI IRQ line 11	PCI IRQ line 8	PCI IRQ line 9
Slot 6	PCI IRQ line 2	PCI IRQ line 3	PCI IRQ line 0	PCI IRQ line 1
Slot 7	PCI IRQ line 11	PCI IRQ line 8	PCI IRQ line 9	PCI IRQ line 10
Slot 8	PCI IRQ line 8	PCI IRQ line 9	PCI IRQ line 10	PCI IRQ line 11
Slot 9	PCI IRQ line 9	PCI IRQ line 10	PCI IRQ line 11	PCI IRQ line 8
VGA	-	-	-	-
SCSI	PCI IRQ line 13	-	-	-
LAN	PCI IRQ line 14	-	-	-
USB	-	-	-	-

A..D = Interrupt output of the PCI controller

Slots 7 ... 9 are only available if a PCI expansion board is installed in slot 5.

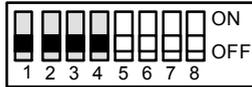
## Screen resolution

Depending on the operating system used the screen resolutions in the following table refer to the screen controller on the system board. 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)	Max. number of colours
640x480	200	16.7 mio.
800x600	200	16.7 mio.
1024x768	150	16.7 mio.
1052x864	120	16.7 mio.
1280x1024	100	16.7 mio.
1600x1200	76	16.7 mio.

Shaded screen resolutions are not supported by LCD monitors (TFT).

## Settings with switches



Preset for switches 1 to 4 = *Off*.

The switches 5 to 8 don't have any function for the processor. The clock frequency of the processor is set automatically. It cannot be changed manually.

### 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 system BIOS you need a Flash BIOS Diskette (please call our customer service centre).

- on* The system boots from the "Flash BIOS floppy disk" from Drive A and reprograms the system BIOS on the board.
- off* The System BIOS is started with the system BIOS from the system board (default setting).

### Skipping the password query - switch 2

Switch 2 is used to define whether the password is queried at system startup, if the password protection is enabled in *BIOS Setup* (in *Security* menu, the *Password* field must be set to *Enabled*).

- on* The password query is effective.
- off* The password query is skipped (default setting).

### Write protection for Flash BIOS - switch 3

Switch 3 is used to define whether the System BIOS is write protected or not.

- on* The System BIOS can neither be written to nor deleted. Flash-BIOS update from floppy disk is not possible.
- off* The System BIOS can be written or deleted. Flash-BIOS update from floppy disk is possible (default setting).

### Write protection for floppy disks - switch 4

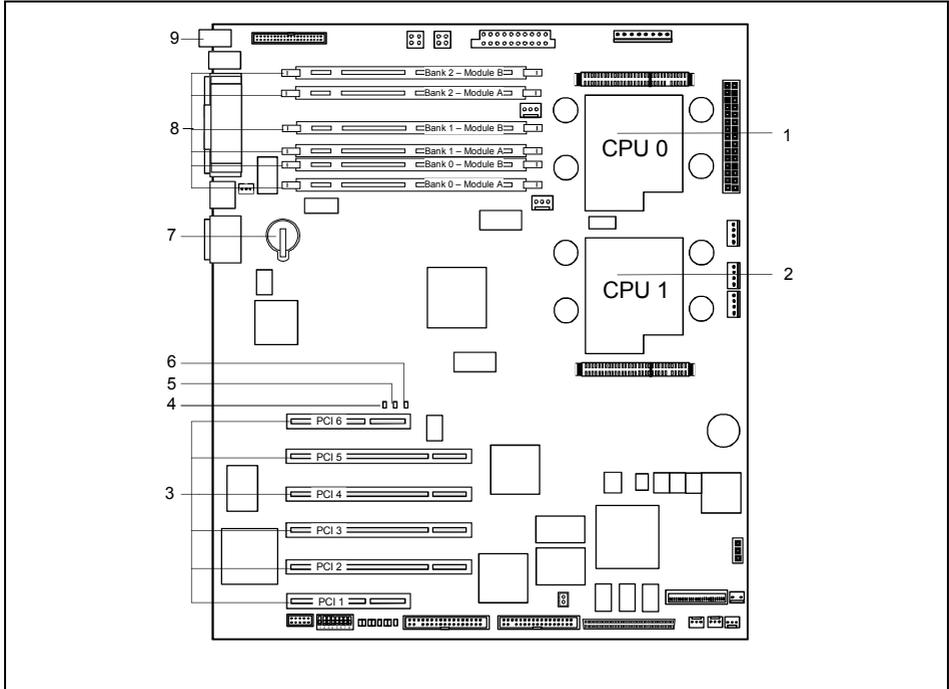
Switch 4 is used to define whether floppy disks can be written or deleted in the floppy disk drive. To write and delete floppy disks, the write-protection in *BIOS Setup* must be disabled (in menu *Security*, the field *Diskette Write* must be set to *Enabled*).

- on* The floppy disk drive is write-protected.
- off* Floppy disks can be read, written and deleted (default setting).

# Add-on modules



For all steps described in this chapter pull the power plug out of the mains outlet!



1 = Socket for processor 1 (CPU 0)

2 = Socket for processor 2 (CPU 1)

3 = PCI slots 1 to 6

4 = LED L1 (yellow): "System off"

5 = LED L2 (green): "System run"

6 = LED L3 (red): "Configuration error"

7 = Lithium battery

8 = Locations for main memory (memory bank 0-2)

9 = LED L4 (amber): "Message"



PCI slots support 3.3 V main and auxiliary voltages.

## Slot sequence

- An additional screen controller must always be inserted into PCI slot 1 or 6.
- Insert 32 bit / 33 MHz adapter first into PCI slots 1, 6 and then into PCI slots 2, 3.
- Insert 64 bit / 33 MHz adapter first into PCI slots 2, 3 and then into PCI slots 4, 5.
- Insert 64 bit / 66 MHz adapter first into PCI slots 2, 3 and then into PCI slots 4, 5.

## Upgrading main memory

These slots are suitable for DIMM format 512, 128, 256, 2048 and 1024 MB DDR SDRAM memory modules. The organisation in three memory banks 0 to 2 enables fast memory access with two-fold interleave. The board supports a maximum of 12 Gbytes.

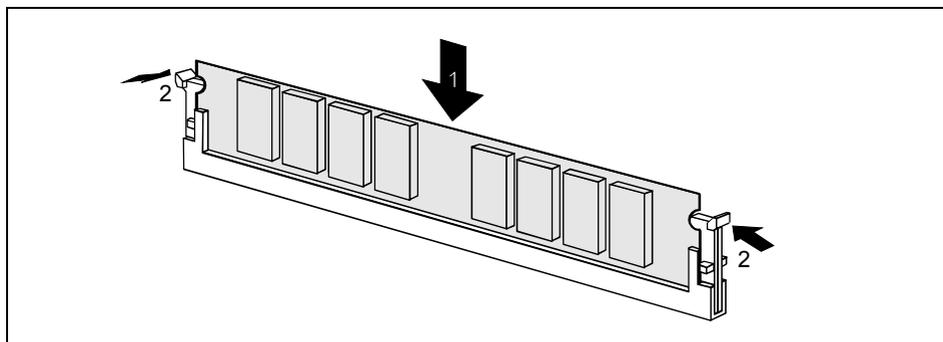
Two identical memory modules must be installed per memory bank. Partial equipping of a memory bank is not possible. The equipping sequence of the memory banks is arbitrary.



You may only use registered DDR SDRAM memory modules. Unbuffered memory modules are not permitted.

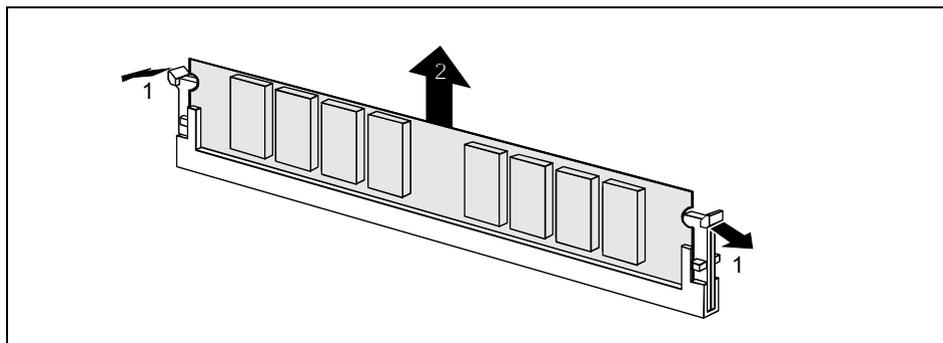
DDR SDRAM memory modules must be designed for a clock frequency of 100 MHz (meets PC1600 specification).

### Installing a memory module



- ▶ Push the holders on each side of the memory compartment outwards.
- ▶ Insert the memory module in the slot while folding the side holders up until the memory module engages (2).

### Removing a memory module



- ▶ Push the clips on the right and left of the compartment outward (1).
- ▶ Carefully remove the memory module from the compartment (2).

## Replacing the lithium battery

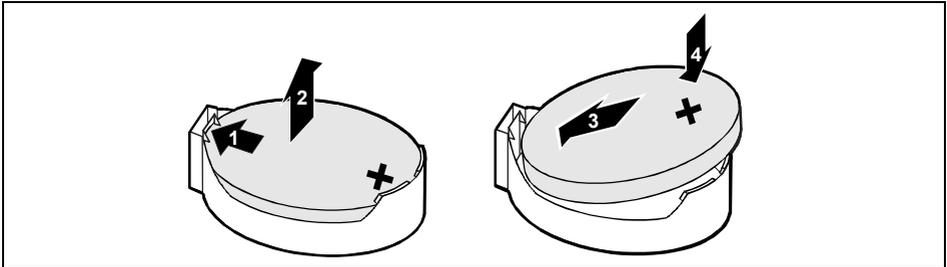


Incorrect replacement of the lithium battery may lead to a risk of explosion.

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 household waste. They must be disposed of in accordance with local regulations concerning special waste.

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



- ▶ Lift the contact (1) a few millimetres and remove the lithium battery from its socket (2).
- ▶ Insert a new lithium battery of the same type into 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
AIMM	AGP Inline Memory Module
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
CNR	Communication Network Riser
C-RIMM	Continuity Rambus Inline Memory Module
DIMM	Dual Inline Memory Module
DDR	Double Data Rate
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 <sup>2</sup> 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
P64H	PCI64 Hub
PCI	Peripheral Component Interconnect
PXE	Preboot eXecution Environment
RAM	Random Access Memory
RAMDAC	Random Access Memory Digital Analogue Converter
RDRAM	Rambus Dynamic Random Access Memory
RIMM	Rambus Inline Memory Module
RSB	Remote Service Board
RTC	Real Time Clock
SB	Soundblaster
SDRAM	Synchronous Dynamic Random Access Memory
SGRAM	Synchronous Graphic Random Access Memory
SIMD	Streaming Mode Instruction (Single Instruction Multiple Data)
SMBus	System Management Bus
SVGA	Super Video Graphic Adapter
USB	Universal Serial Bus
VGA	Video Graphic Adapter
WOL	Wake On LAN