

SYSTEMBAUGRUPPE D1159
SYSTEM BOARD D1159

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TECHNICAL MANUAL

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**Systembaugruppe
D1159
System Board D1159**

**Technisches Handbuch
Technical Manual**

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Introduction



These system boards are available in different configuration levels. Depending on the hardware configuration of your device, it may be that you cannot find several options in the system board, even though they are described.

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

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.



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](#)".



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!



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

The components and connectors marked do not have to be present on the system board.

- System board in ATX format
- Dual processor system (D1159 dual: second processor optional)
- 400 or 450 MHz Intel Pentium II with 100 MHz Front Side Bus for slot 1 processor socket
- 450, 500 or 550 MHz Intel Pentium III with 100 MHz Front Side Bus for slot 1 processor socket
- 533 or 600 MHz Intel Pentium III with 133 MHz Front Side Bus for slot 1 processor socket
- Upgrade with second Pentium II or Pentium III processor

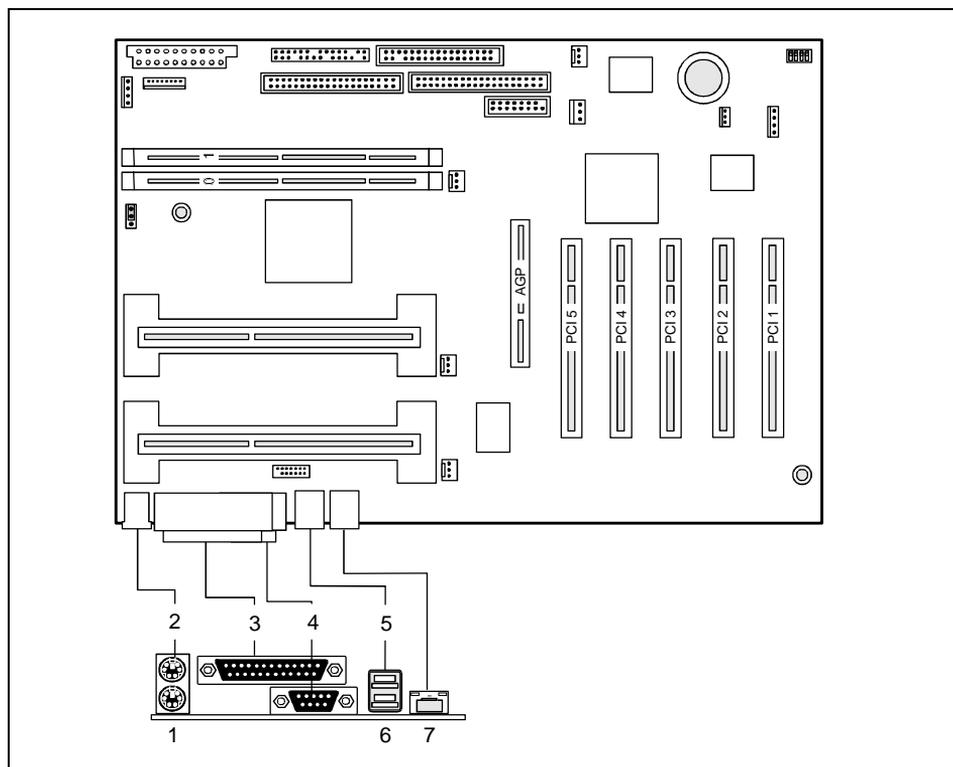
Intel Pentium II and Pentium III processors support MMX technology, Intel Pentium III processors also support Intel Streaming SIMD Extensions. The size of first-level cache and second-level cache is depending on the processor used.

- Intel chipset 820 AGP consisting of MCH 82820DP, ICH 82801 and FWH 82802 supports PC600, PC700 and PC800 RDRAM memory modules with and without ECC
- Intel 82559 LAN controller (10/100 Mbit/s) with RJ45 interface; WOL with Magic Packet™ is supported, as is booting from LAN with Bootix LAN BootP or Intel PXE.
- Alert On LAN
- Fujitsu Siemens system monitoring and temperature management
- 2 RIMM slots for 64 to 1 Gbyte main memory (RIMM memory modules)
- or
- 1 additional board for SDRAM for 64 Mbyte to 512 Mbyte main memory (SDRAM memory modules of the DIMM format)
- Flash BIOS
- Energy saving functions
 - ACPI S3 / Save-to-RAM (requires an operating system that supports ACPI). ACPI S3 is not supported by SDRAM memory modules of the DIMM format.
 - ACPI S4 / Save-to-Disk (requires an operating system that supports ACPI).
- Security functions:
 - Chipcard reader interface
 - Cover monitoring: The cover monitoring reports when the cover has been opened without authorization.
 - Simple error detection and correction in the main memory with an ECC (only for memory modules with ECC)
 - System, Setup and Keyboard password
 - parallel and serial ports can be deactivated
 - Write protection for floppy disk drive
 - Virus warning function for the boot hard disk
 - Virus protection function for the flash BIOS and the EEPROMs on the memory modules

Features

- 1 AGP slot, 5 PCI slots
AGP and PCI slots support 3.3 V main and auxiliary voltages.
- AC'97 for audio devices
- IDE hard disk controller connected to PCI bus for up to four IDE drives (e.g. IDE hard disk drives, ATAPI CD-ROM drives)
The IDE hard disk controllers are designed for the extended busmaster ultra DMA33 mode and ultra ATA/66, and support the PIO modes 0 to 4.
- external temperature sensor
- I²C connector
- Floppy disk drive controller (possible formats: 720 Kbyte, 1.44 Mbyte)
- The system board supports booting from a 120 Mbyte IDE floppy disk drive.
- 1 external parallel interface (ECP- and EPP-compatible)
- 1 external serial port (16C550 compatible with FIFO)
- 1 internal chipcard reader interface As an alternative this interface can also be used as a second serial port (16C550 compatible with FIFO).
- 1 internal WOL interface
- 2 external PS/2 interfaces for keyboard and mouse
- 1 external USB port
- 1 internal/external USB interface
- Real-time clock/calendar with integrated battery backup

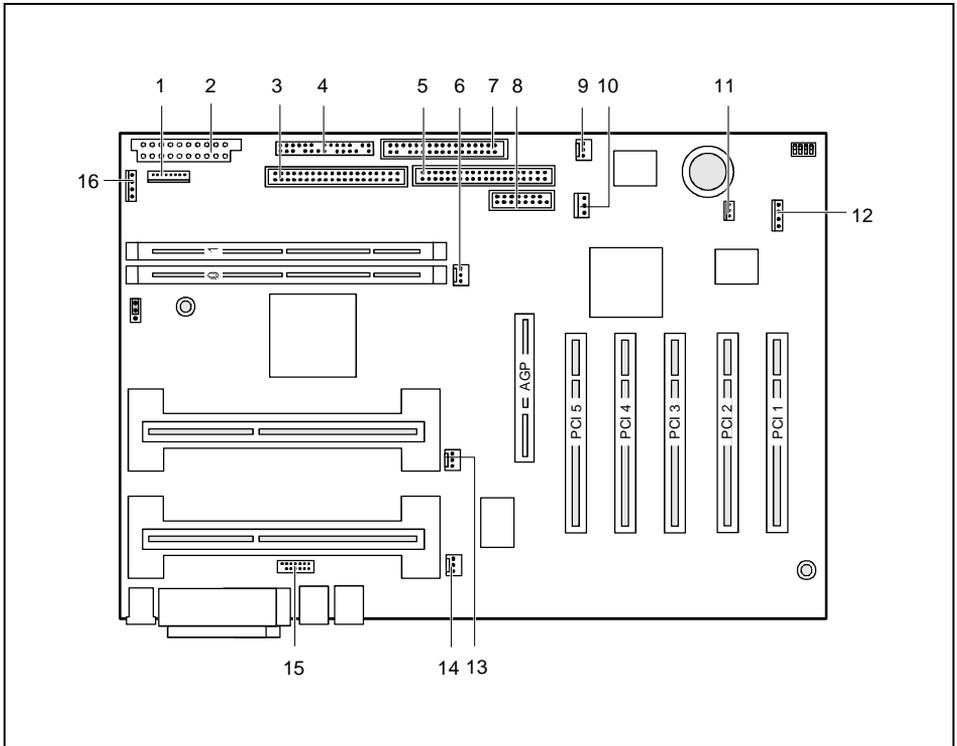
Interfaces and connectors



- 1 = PS/2 keyboard port
- 2 = PS/2 mouse port
- 3 = Parallel port
- 4 = Serial port 1

- 5 = USB port 2
- 6 = USB port 1
- 7 = LAN port

The components and connectors marked do not have to be present on the system board.



- | | |
|---|---|
| 1 = Power supply monitoring | 9 = Fan (e. g. for the optional fan (AUX)) |
| 2 = Power supply | 10 = Wake On LAN |
| 3 = IDE drives 3 and 4 (secondary) | 11 = Cover monitoring |
| 4 = Connector for front panel | 12 = I ² C connector (primary SMBus) |
| 5 = IDE drives 1 and 2 (primary) | 13 = Fan for CPU 0 (processor 0) |
| 6 = Fan for CPU 1 (processor 1) | 14 = Fan (e. g. for the optional fan (system)) |
| 7 = Floppy disk drive | 15 = USB chipcard reader |
| 8 = Serial chipcard reader interface or serial port 2 | 16 = Temperature sensor (AUX) |

The components and connectors marked do not have to be present on the system board.

Temperature monitoring / system monitoring

One goal of temperature and system monitoring is to reliably protect the computer hardware against damage caused by overheating. In addition, any unnecessary noise is also to be prevented with a reduced fan speed, and information is to be provided on the system state. The cover monitoring protects the system from unauthorized 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 device temperature with an optional temperature sensor (AUX).

Temperature control:

The temperature is controlled with the fan speed and/or by reducing the clock frequency of the processor. The clock frequency of the processor is dependent on the setting in the *BIOS setup*. Temperature-dependent processor speed control enables a reduced fan speed, decreasing noise.

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 (exception: auxiliary fan (AUX)).

Sensor monitoring:

A fault or removal of a temperature sensor is detected. In this case all fans affected 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:

Unauthorized opening of the cover is detected, even when the system is switched off. However, this will not be indicated until the system is operating again.

Voltage monitoring:

The voltages 12 V, 5 V and the CMOS battery are monitored.

With hardware monitoring - regardless of the operating system and processor - the advantages compared to conventional software monitoring are clear:

- suitable for all operating systems and processor types
- no additional load on processor (performance)
- optimum reliability, even if process faults or faults are present in the operating system
- optimum noise reduction

Three different operating modes are available and can be configured in *BIOS Setup - System Management*.

Hard disk connection

An ultra ATA/66 hard disk must be connected with a cable especially designed for the ATA/66 mode.

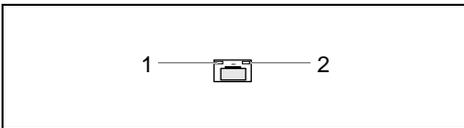
- ▶ Connect the blue marked end of the cable to the system board.

LAN port

This system board is equipped with the Intel 82559 LAN controller as an option. This LAN controller supports the transfer speeds 10 Mbit/s and 100 Mbit/s. The LAN controller is equipped with a 3 Kbyte transmission and receiving buffer (FIFO) and supports the 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).

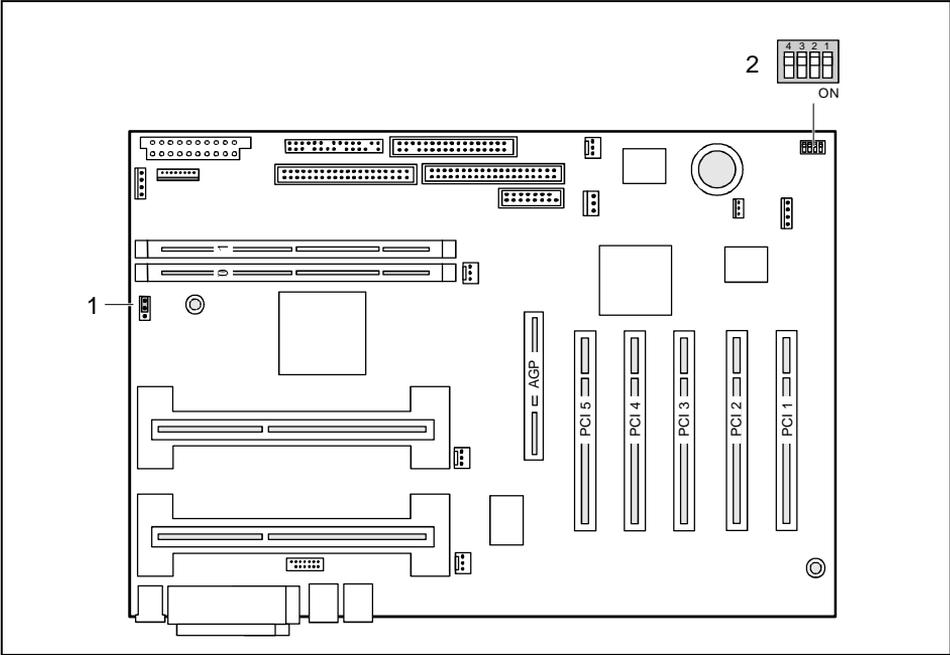
Yellow Link Mode: the LAN connection is active.
WOL mode: a Magic Packet™ is being received.

PCI bus interrupts

The following table shows which PCI bus interrupts on the system board are assigned.

PCI bus interrupt	Component on system board:	PCI bus interrupt	Component on system board:
A	PCI bus slot 5	B	AC'97 Audio
A	PCI bus slot 1	C	PCI bus slot 3
A	AGP slot	D	PCI bus slot 4
B	PCI bus slot 2	D	USB controller
B	SMBus	D	LAN controller

Settings



1 = Jumper

2 = Switch block

Switch block

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

Switch 3 = Write-protection for floppy disk
Switch 4 = Clear CMOS (must be set to *off* during operation)

Processor's clock speed

The clock frequency of the processor is set automatically. It cannot be changed manually.

Setting USB power jumper

The power supply of the USB port is set with the jumper.

Position 1 - 2 The USB port is only supplied with power when switched on.

Position 2 -3 The USB port is always supplied with power (default setting).

Recovering System BIOS - switch 2

Switch 2 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 center).

On The System BIOS executes from standard floppy drive A: and the inserted "Flash-BIOS-Diskette" restores the System BIOS on the system board.

Off Normal operation (default setting).

Write protection for floppy disks - switch 3

Switch 3 is used to define whether floppy disks can be written or deleted in the standard 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*).

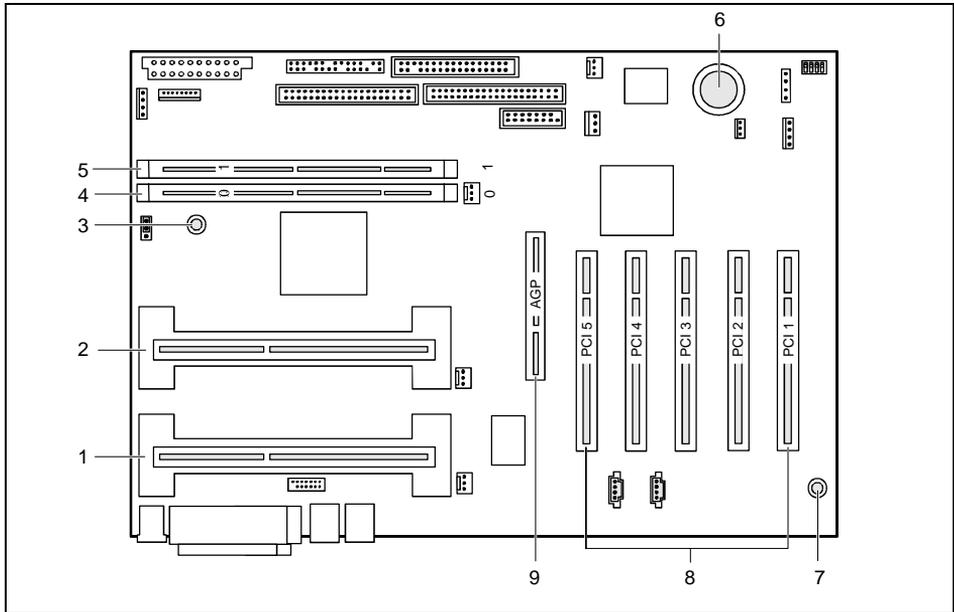
On The standard floppy disk drive is write-protected.

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

Add-on modules



For all steps described in this chapter exit the suspend mode before switching off the device and then pull the power plug out of the power outlet!
 Even when you have run down the device, parts of the device (e. g. memory modules, AGP and PCI extension boards) are still energized.
 The voltage indicator LED shows whether the main-memory slots are energized.



- | | |
|---|-------------------------------------|
| 1 = Location 1 for processor 0 / CPU 0 with heat sink | 5 = Location bank 1 for main memory |
| 2 = Location 2 for processor 1 / CPU 1 with heat sink | 6 = Lithium battery |
| 3 = Voltage indicator LED | 7 = Front Side Bus - Mismatch LED |
| 4 = Location bank 0 for main memory | 8 = PCI slots 1, 2, 3, 4, 5 |
| | 9 = AGP slot |



AGP slots in the 1x and 2x mode and PCI slots support 3.3 V main and auxiliary voltage. With AGP in the 4x mode, the system board automatically switches over to 1.5 V.

Installing / removing processor

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 (CPU 0)), 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 (working and FSB clock frequency) as the first.

If processors with different FSB clock frequencies are used, the board is held in reset and the FSB mismatch LED lights up.

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

Installing the processor

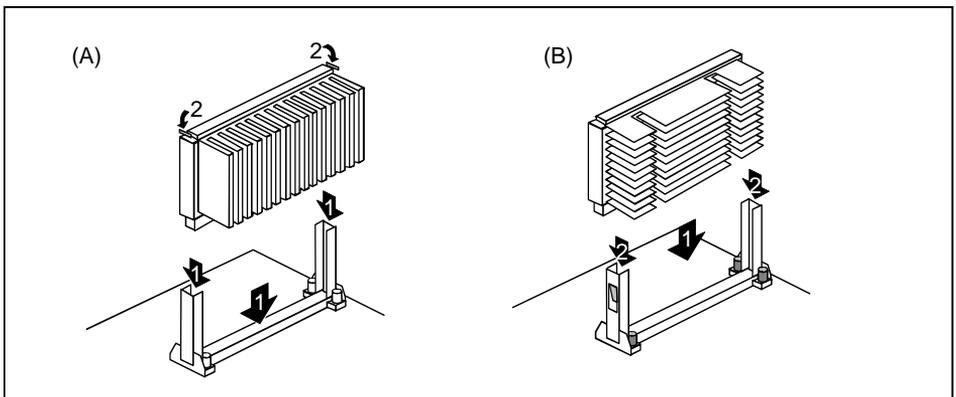


If you wish to upgrade the system with a new processor, the processor bracket on the system board may need to be replaced beforehand. Should it be necessary to replace the bracket, please contact our customer service center.

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 old processor 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.
- ▶ 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 the system board.

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 slightly outwards (B) and pull the processor up and out. Use a screwdriver if necessary.

Upgrading main memory

These slots are suitable for 64 to 512 Mbyte RDRAM memory modules of the RIMM format. The permissible total size of the main memory is 1 Gbyte.

Memory modules with different memory capacities can be combined.



All locations must always be occupied. Missing memory modules must be replaced with a C-RIMM module. This C-RIMM module must then be installed in the order of the locations **behind** the RIMM memory module:

Location bank 0 = RIMM memory module

Location bank 1 = C-RIMM memory module

The system board supports a maximum of 32 RDRAM modules at all locations for the main memory combined:

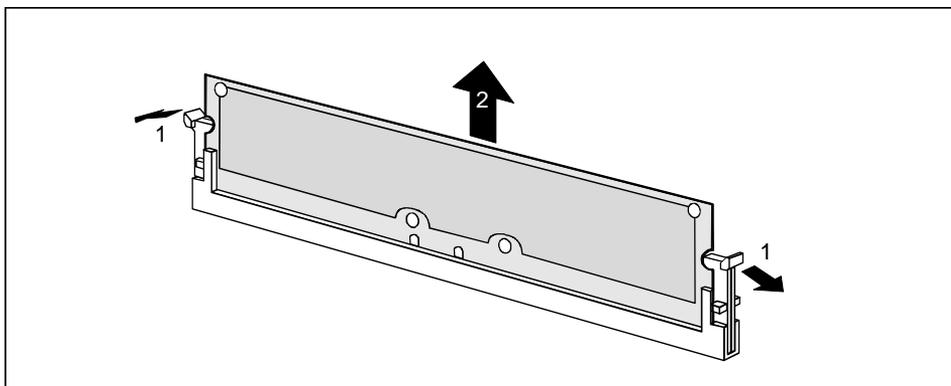
	Total size of RIMM module	Number of chips
64Mbit technology	64 Mbyte	8
	96 Mbyte	12
	128 Mbyte	16
128Mbit technology	64 Mbyte	4
	128 Mbyte	8
	192 Mbyte	12
	256 Mbyte	16
256Mbit technology	128 Mbyte	4
	256 Mbyte	8
	384 Mbyte	12
	512 Mbyte	16



You may only use 2.5V RIMM memory modules.

The system board supports memory modules of the speed classes PC600, PC700 and PC800. Always use memory modules of the same speed class. Otherwise the memory speed is limited to the slowest speed class. Optimal system speed is achieved when you use PC800 RDRAM memory modules.

Removing C-RIMM or memory module

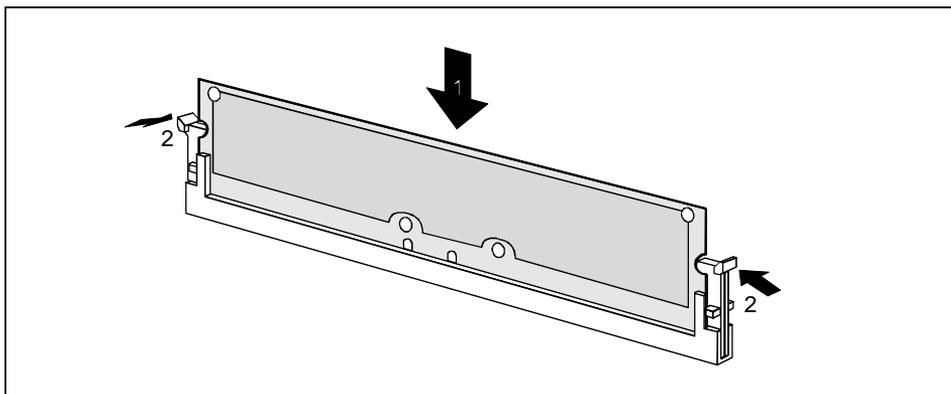


- ▶ Flip the holders to the right and left of the location outwards (1).
- ▶ Slide the module out of its slot (2).

Installing C-RIMM module or memory module



Note the coding of the module!



- ▶ Flip the holders on each side of the relevant location outwards.
- ▶ Insert the module in the slot (1) while folding the side holders up until the module engages (2).

Installing network board with WOL

- ▶ Install the network board as described in the operating manual for your unit.
- ▶ Push the WOL cable onto the WOL plug connector of the system board.



To use the WOL functionality of a network board the power supply must provide a 5 V auxiliary voltage of at least 1 A. If the system board was not already incorporated in a device when you bought it you must check whether your power supply can provide the auxiliary voltage.

You may find further information in the supplied description of the network board.

Replacing the lithium battery

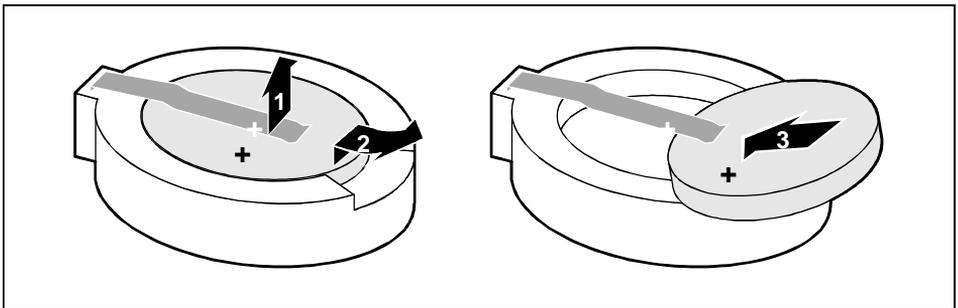


Incorrect replacement of the lithium battery may lead to a risk of explosion.

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!



- ▶ 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.

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
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



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