

# System board D2020 for Econel 200

Technical manual

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## **Certified documentation according to DIN EN ISO 9001:2000**

To ensure a consistently high quality standard and user-friendliness, this documentation was created to meet the regulations of a quality management system which complies with the requirements of the standard DIN EN ISO 9001:2000.

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# 1 Introduction

This technical manual describes the system board D2020, which can be equipped with one or two Intel® processors.

Further information about drivers is provided in the readme files on the hard disk, on the supplied "ServerSupport" or "ServerStart" CDs.

You will find further information in the BIOS description.

## Notational conventions

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

|                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>italics</i>                                                                                      | indicates commands, menu items, file and path names or software programs                                                                                                                                                                                                                                                                                                                                                               |
| fixed font                                                                                          | indicate system output on the monitor                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>semi-bold fixed font</b>                                                                         | indicates values to be entered through the keyboard                                                                                                                                                                                                                                                                                                                                                                                    |
| <span style="border: 1px solid black; padding: 2px;">Key symbol</span>                              | <p>indicates keys according to their representation on the keyboard</p> <p>If capital letters are to be entered explicitly, then the Shift key is shown, e.g. <span style="border: 1px solid black; padding: 2px;">SHIFT</span> - <span style="border: 1px solid black; padding: 2px;">A</span> for A.</p> <p>If two keys need to be pressed at the same time, then this is shown by placing a hyphen between the two key symbols.</p> |
| "quotation marks"                                                                                   | indicates names and terms that are being emphasized.                                                                                                                                                                                                                                                                                                                                                                                   |
| ►                                                                                                   | indicates an operation that to be performed                                                                                                                                                                                                                                                                                                                                                                                            |
|  <b>CAUTION!</b> | indicates warnings, which, if ignored, will endanger your health, destroy the system or lead to the loss of data.                                                                                                                                                                                                                                                                                                                      |
|                  | indicates additional information, notes and tips                                                                                                                                                                                                                                                                                                                                                                                       |

Table 1: Notational conventions



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## 2 Important notes

In this chapter you will find essential information regarding safety when working with your server.



### **CAUTION!**

With the system board installed you must open the system to access the system board. How to dismantle and reassemble the system is described in the service manual accompanying your system.

When installing the system board, refer to the specific installation information in the operating and/or service manual for the receiving server.

### 2.1 Notes on safety



#### **CAUTION!**

- The actions described in these instructions should only be performed by authorized, qualified personnel. Equipment repairs should only be performed by qualified staff. Any failure to observe the guidelines in this manual, and any unauthorized openings and improper repairs could expose the user to risks (electric shock, fire hazards) and could also damage the equipment. Please note that any unauthorized openings of the device will result in the invalidation of the warranty and exclusion from all liability.
- Transport the device only in the antistatic original packaging or in packaging that protects it from knocks and jolts.
- Only install expansions that are allowed for the system board. If you install other expansions, you may damage the requirements and rules governing safety and electromagnetic compatibility or your system. Information on which system expansions are suitable can be obtained from the customer service centre or your sales outlet.
- The warranty expires if the device is damaged during the installation or replacement of system expansions.



- 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!
- Transmission lines to peripheral devices must be adequately shielded.
- To the LAN wiring the requirements apply in accordance with the standards EN 50173 and EN 50174-1/2. As minimum requirement the use of a protected LAN line of category 5 for 10/100 MBps Ethernet, and/or of category 5e for Gigabit Ethernet is considered. The requirements of the specification ISO/IEC 11801 are to be considered.
- Never connect or disconnect data transmission lines during a storm (lightning hazard).

## Batteries



### CAUTION!

- Incorrect replacement of lithium battery may lead to a risk of explosion. The batteries may only be replaced with identical batteries or with a type recommended by the manufacturer.

It is essential to observe the instructions on page 21.

- Do not throw batteries into the trash can. They must be disposed of in accordance with local regulations concerning special waste.
- The battery must be disposed of in accordance with local regulations concerning special waste.
- All batteries containing pollutants are marked with a symbol (a crossed-out garbage can). In addition, the marking is provided with the chemical symbol of the heavy metal decisive for the classification as a pollutant:

Cd Cadmium

Hg Mercury

Pb Lead

### Modules with electrostatic-sensitive components

Systems and components that might be damaged by electrostatic discharge (ESD) are marked with the following label:

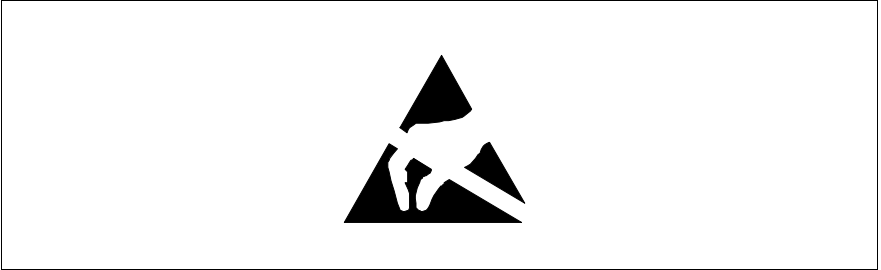


Figure 1: ESD label

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

- You must always discharge yourself of static charges (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 power socket 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.
- Use a grounding cable designed for this purpose to connect yourself to the system unit as you install/deinstall the board.
- Place all components on a static-safe base.



You will find a detailed description for handling ESD components in the relevant European or international standards (EN 61340-5-1, ANSI/ESD S20.20).

### Notes about boards

- During installation/deinstallation of the system board, observe the specific instructions described in the service manual for the server.
- Remove the plug from the mains outlet so that system and system board are totally disconnected from the mains voltage.
- To prevent damage to the system board, 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 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.

## 2.2 CE Certificate



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 PRIMERGY configuration.

## 2.3 Environmental Protection

### Notes on packaging

Please do not throw away the packaging. We recommend that you do not throw away the original packaging in case you need it later for transporting.

### Notes on dealing with consumables

Please dispose batteries in accordance with local government regulations.

Do not throw lithium batteries into the household waste. They must be disposed of in accordance with local regulations concerning special waste.

### Take-back, recycling and disposal

For details on take-back and reuse of devices and consumables within Europe, contact your Fujitsu Siemens Computers branch office/subsidiary or our recycling centre in Paderborn:

Fujitsu Siemens Computers  
Recycling Center  
D-33106 Paderborn  
Germany

Tel. +49 5251 8 18010

Fax +49 5251 8 18015



## 3 Features

### 3.1 Overview

#### Processors

- 2 x Intel® Xeon™ processors
- 2 processor sockets mPGA604 for Intel® Xeon™ Prozessor with 800 MHz front side bus
- Support of SMP, MPS 1.4 compliant
- VRM 10.1 onboard (EVRD)

#### Main Memory

- 4 slot for main memory PC2700 DDRI/333 MHz (registered), SDRAM memory modules with 512 MB and 1Gbyte
- maximum 4 Gbyte of memory
- minimum 512 MB
- ECC multiple bit error detection and single bit error correction
- memory scrubbing function
- Single Device Data Correction (SDDC) function (Chipkill™)

#### Chips on the system board

- Intel® E7320 Chipset
- Intel® 6300ESB PCI-X Hub
- 1 x GBit LAN controller (Broadcom BCM5705E)
- VGA controller (ATI Rage XL) onboard with 8 MB SDRAM memory
- Super I/O controller (Winbond W83627THF-A)
- Flash EPROM for:
  - BIOS
  - LAN
- thermal and system management controller (W83792D)

**internal connectors**

- floppy disk
- 1 IDE primary
- 1 IDE secondary
- main power connector (12V, -12V, 5V, 3.3V and 5V auxiliary)
- 12V (CPU) power connector
- 2 CPU fans
- 1 front fan
- 1 rear fan
- PC98 connector
- IPMB connector (ID Prom)
- SATA-HDD Access (HDLED1)
- front panel
- battery holder
- 2 SATA RAID connectors

**external connectors**

- 1 serial port (COM1)
- 2 PS/2 interfaces for keyboard and mouse
- 2 USB 2.0 ports with 480 Mbits/s (rear)
- 1 VGA port
- 1 RJ45 LAN port

**PCI slots**

Standard:

- 2 x PCI-X (64 Bit / 66 MHz)
- 2 x PCI (32 Bit / 33 MHz)
- 1 x PCI-Express x8 slot

**BIOS features**

- American Megatrend BIOS
- MultiProcessor Specification 1.4
- Server Hardware Design Guide 3.0
- WfM 2.0
- IPMI V1.5
- ACPI 1.0b support
- LSI SATA RAID BIOS
- USB keyboard/mouse
- boot possible from:
  - 120 MB floppy disk drive
  - CD-ROM
  - USB drive
  - LAN
- console redirection support
- OEM logo
- CPU, Memory disable
- memory mirroring support

**Environmental protection**

Battery in holder

**Form factor**

12" x 10.5"

### 3.2 Main memory

The system board supports up to 16 Gbyte main memory. 4 slots (2 banks with 2 modules) are available for the main memory. Each memory bank can be populated with 512 Mbyte or 1 Gbyte registered PC2700 DDR I memory modules.

ECC with memory scrubbing and with the Single Device Data Correction (SDDC) function is supported.

#### Module population

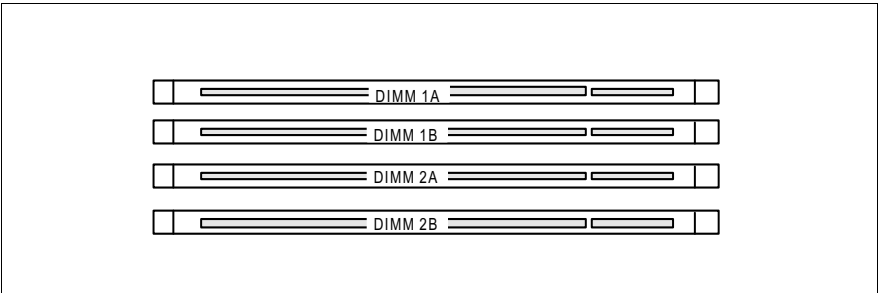


Figure 2: Main memory

- The memory modules have to be based on x4 organized SDRAMs.
- If the memory modules are populated in pairs, each pair must consist of identical memory modules (2-way interleaved mode)
- The module capacity between pairs can differ: pair 2A/2B can be populated with two 512 Mbyte modules and pair 1A/1B with two 1 Gbyte modules.
- Only single rank modules are permitted.

Following table shows the mandatory population order:

|                | DIMM 1A   | DIMM 2A   | DIMM 1B   | DIMM 2B   |
|----------------|-----------|-----------|-----------|-----------|
| single channel | populated | empty     | empty     | empty     |
| dual channel   | populated | empty     | populated | empty     |
|                | populated | populated | populated | populated |

### 3.3 PCI bus

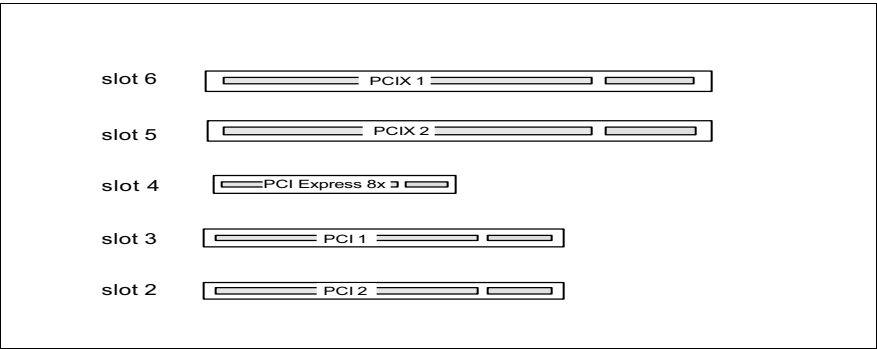


Figure 3: PCI slots

#### PCI slots

The following table shows an overview of the PCI slots:

| PCI slot | 64Bit/<br>32Bit | Frequency<br>in MHz | Description           |
|----------|-----------------|---------------------|-----------------------|
| 2        | 32 Bit          | 33                  | 32 bit PCI bus slot   |
| 3        | 32 Bit          | 33                  | 32bit PCI bus slot    |
| 4        |                 |                     | PCI-Express x8 slot   |
| 5        | 64 Bit          | 66                  | 64 bit PCI-X bus slot |
| 6        | 64 Bit          | 66                  | 64 bit PCI-X bus slot |

#### 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 each 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, 6, 7, 9, 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.

|        | <b>IDsel</b> | <b>INTA</b> | <b>INTB</b> | <b>INTC</b> | <b>INTD</b> |
|--------|--------------|-------------|-------------|-------------|-------------|
| slot 2 | 17           | PIRQE#      | PIRQF#      | PIRQG#      | PIRQH#      |
| slot 3 | 18           | PIRQG#      | PIRQH#      | PIRQE#      | PIRQF#      |
| slot 4 |              |             |             |             |             |
| slot 5 | 18           | PXIRQ3      | PXIRQ1      | PXIRQ0      | PXIRQ2      |
| slot 6 | 17           | PXIRQ0      | PXIRQ1      | PXIRQ2      | PXIRQ3      |
| VGA    | 19           | PIRQB#      |             |             |             |
| LAN    | 20           | PIRQF#      |             |             |             |
| USB    |              | PIRQH#      |             |             |             |

### 3.4      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.              |
| 1152x864          | 120               | 16,7 Mio.              |
| 1280x1024         | 100               | 16,7 Mio.              |

### 3.5      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.

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

The following functions are supported:

#### Temperature monitoring

Measurement of the processor temperature, measurement of the ambient temperature by a temperature sensor on the LED board.

#### Fan monitoring

Fans that are no longer available, blocked or sticky fans are detected.

#### 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.

**Voltage monitoring**

When voltage exceeds warning level high or falls below warning level low an alert will be generated.

**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

**System Event Log (SEL)**

All monitored events of the system board are recorded in the System Event Log. They could be retrieved after a system reboot via ServerView.

### 3.6 Connectors and Jumpers

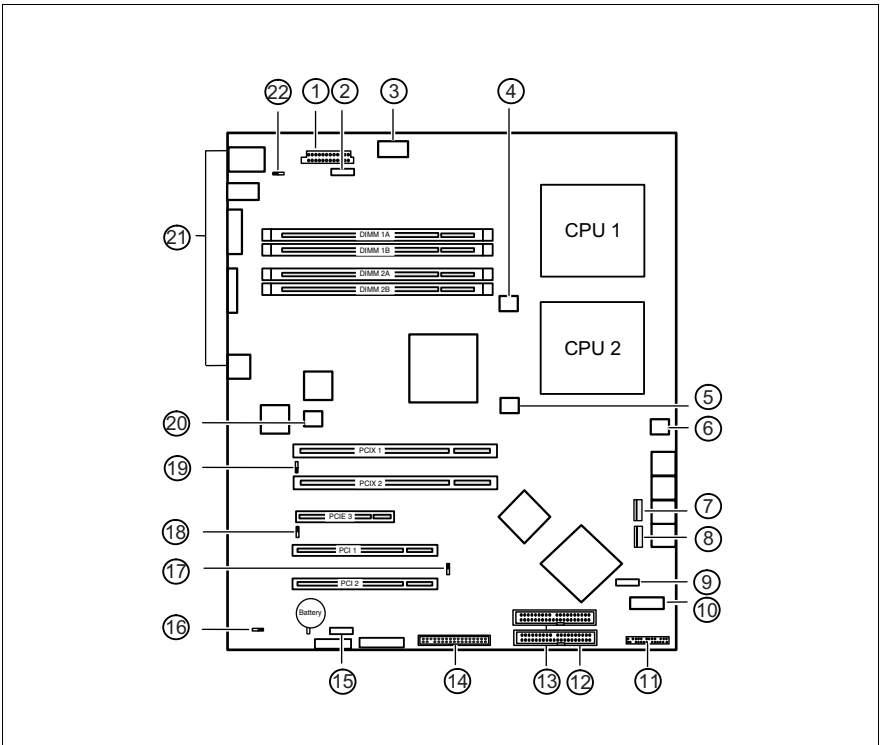


Figure 4: Schematic overview of the system board D2020

- |                             |                         |
|-----------------------------|-------------------------|
| 1 = PSU ATX connector       | 12 = IDE primary        |
| 2 = PC98                    | 13 = IDE secondary      |
| 3 = PSU 12V connector (CPU) | 14 = floppy disk drive  |
| 4 = CPU1 fan                | 15 = IPMB               |
| 5 = CPU2 fan                | 16 = CLRTC (jumper)     |
| 6 = front fan               | 17 = BIOSREC (jumper)   |
| 7 = SATA 2                  | 18 = VGA EN1 (jumper)   |
| 8 = SATA 1                  | 19 = LAN EN2 (jumper)   |
| 9 = HDLED1                  | 20 = rear fan           |
| 10 = Intrusion              | 21 = external connector |
| 11 = front panel            | 22 = KBPWR1 (jumper)    |

**Settings with jumpers**

The system board is supplied with all jumpers set on default position (pin 1-2).

**CLRTC (16)**

- 1-2 CMOS/RTC settings are not cleared (default)
- 2-3 clear CMOS/RTC settings

**BIOSREC (17)**

- 1-2 system BIOS (default)
- 2-3 recover system BIOS

**VGA EN1 (18)**

- 1-2 onboard VGA enabled (default)
- 2-3 onboard VGA disabled (PCI VGA graphics controller)

**LAN EN2 (19)**

- 1-2 onboard LAN enabled (default)
- 2-3 onboard LAN disabled (PCI LAN controller)

**KBPWR1 (22)**

- 1-2 wake from standby via keyboard disabled (default)
- 2-3 wake from standby via keyboard enabled

### 3.6.1 External connectors

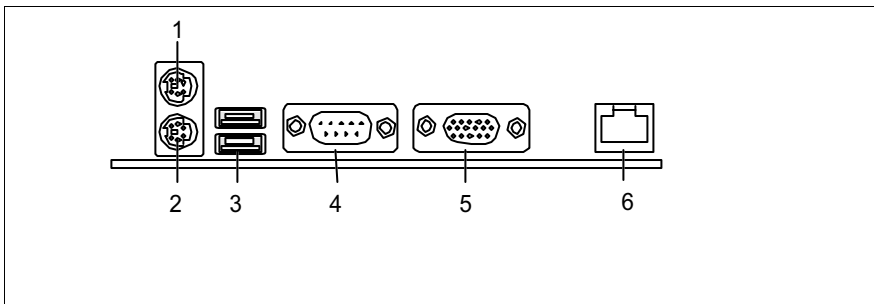


Figure 5: External connectors of the system board D2020

1 = PS/2 mouse port

4 = Serial port COM1

2 = PS/2 keyboard port

5 = VGA port

3 = USB port 1/2

6 = LAN port1

#### LAN connectors

On this system board you will find one GbE Broadcom LAN controller BCM5705E. This LAN controller supports the transfer rates of 10 Mbit/s, 100 Mbit/s and 1 Gbit/s. The LAN controller supports WOL function through Magic Packet™.

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

The LAN port serves as management interface and is prepared for Remote-View.

The LAN controller connectors are equipped with two LEDs (light emitting diode) indicating the transfer rate and the activity.

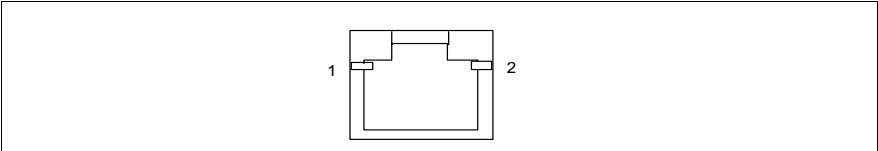


Figure 6: LAN connectors

|   |                    |                |          |                                            |
|---|--------------------|----------------|----------|--------------------------------------------|
| 1 | LAN link/aktivit y | green          | on       | LAN connection                             |
|   |                    |                | off      | no LAN connection                          |
|   |                    |                | flashing | LAN transfer                               |
| 2 | LAN transfer rate  | green + orange | off      | transfer rate 10 Mbit/s (or no connection) |
|   |                    | green          | on       | transfer rate 100 Mbit/s                   |
|   |                    | orange         | on       | transfer rate 1000 Mbit/s                  |

---

## 4 Replacing the lithium battery

In order to save the system information permanently, a lithium battery is installed to provide the CMOS-memory with a current. When the charge is too low or the battery is empty, a corresponding error message is provided. The lithium battery must then be replaced.



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!

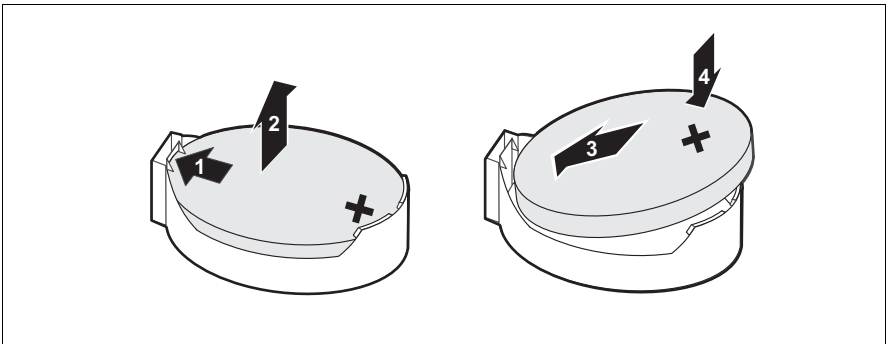


Figure 7: Replacing the lithium battery

- ▶ Press the locking spring into direction of of the arrow (1), so that the lithium-battery jumps out of its socket.
- ▶ Remove the battery (2).
- ▶ Insert a new lithium battery of the same type into the socket (3) and (4).



---

# Abbreviations

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 management Interface

## **ASSR**

Automatic Server Recovery and Restart

## **ATA**

Advanced Technology Attachment

## **BBU**

Battery Backup Unit

## **BIOS**

Basic Input Output System

## **BMC**

Baseboard Management Controller

## **CMOS**

Complementary Metal Oxide Semiconductor

## **COM**

COMmunication port

## **CPU**

Central Processing Unit

## **DDR**

Double Data Rate

## **DIMM**

Dual In-line Memory Module

## Abbreviations

---

**DIP**

Dual In-line Package

**DMI**

Desktop Management Interface

**DRAM**

Dynamic Random Access Memory

**ECC**

Error Correction Code

**EEPROM**

Electrical Erasable Programmable Read Only Memory

**EPROM**

Erasable Programmable Read Only Memory

**EMRL**

Embedded RAID Logic

**EVRD**

Enterprise VRD

**HPC**

Hotplug Controller

**ICE**

In Circuit Emulation

**IDE**

Integrated (intelligent) Drive Electronics

**IME**

Integrated Mirror Enhanced

**IOOP**

Intelligent Organisation Of PCI

**IPMB**

Intelligent Platform Management Bus

**IPMI**  
Intelligent Platform Management Interface

**LAN**  
Local Area Network

**LED**  
Light Emitting Diode

**MPS**  
Multi Processor Specification

**NMI**  
Non Maskable Interrupt

**OEM**  
Original Equipment Manufacturer

**OHCI**  
Open Host Controller Interface

**OS**  
Operating System

**PCI**  
Peripheral Components Interconnect

**PDA**  
Prefailure Detection and Analyzing

**PIO**  
Programmed Input Output

**PLD**  
Programmable Logic Device

**PS(U)**  
Power Supply (Unit)

**PWM**  
Puls Wide Modulation

## Abbreviations

---

**PXE**

Preboot eXecution Environment

**RAID**

Redundant Array if Inexpensive Disks

**RSB**

Remote Service Board

**RST**

ReSeT

**RTC**

Real Time Clock

**SCSI**

Small Computer Systems Interfache

**SDDC**

Single Device Data Correction

**SDRAM**

Synchronous Dynamic Random Access Memory

**SHDG**

Server Hardware Design Guide

**SMB**

System Management Bus

**SMM**

Server Management Mode

**SMP**

Symmetrically Multi Processing

**UHCI**

Unified Host Controller Interface

**USB**

Universal Serial Bus

|            |                          |
|------------|--------------------------|
| <b>VGA</b> | Video Graphics Adapter   |
| <b>VRD</b> | Voltage Regulator Down   |
| <b>VRM</b> | Voltage Regulator Module |
| <b>WfM</b> | Wired for Management     |
| <b>WOL</b> | Wake up On LAN           |



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Comments  
Suggestions  
Corrections

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Comments on System board D2020 for Econel 200  
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