

Technical Manual - English



System Board D2779 for PRIMERGY TX100 S2

Technical Manual

Edition June 2010

Comments... Suggestions... Corrections...

The User Documentation Department would like to know your opinion of this manual. Your feedback helps us optimize our documentation to suit your individual needs.

Feel free to send us your comments by e-mail to email: manuals@ts.fujitsu.com.

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.

cognitas. Gesellschaft für Technik-Dokumentation mbH
www.cognitas.de

Copyright and Trademarks

Copyright © 2010 Fujitsu Technology Solutions GmbH.

All rights reserved.

Delivery subject to availability; right of technical modifications reserved.

All hardware and software names used are trademarks of their respective manufacturers.

- The contents of this manual may be revised without prior notice.
- Fujitsu assumes no liability for damages to third party copyrights or other rights arising from the use of any information in this manual.
- No part of this manual may be reproduced in any form without the prior written permission of Fujitsu.

Microsoft, Windows, Windows Server, and Hyper V are trademarks or registered trademarks of Microsoft Corporation in the USA and other countries.

Intel and Xeon are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the USA and other countries.

Before reading this manual

For your safety

This manual contains important information for safely and correctly using this product.

Carefully read the manual before using this product. Pay particular attention to the accompanying manual "Safety Notes and Regulations" and ensure these safety notes are understood before using the product. Keep this manual and the manual "Safety Notes and Regulations" in a safe place for easy reference while using this product.

Radio interference

This product is a "Class A" ITE (Information Technology Equipment). In a domestic environment this product may cause radio interference, in which case the user may be required to take appropriate measures. VCCI-A

Aluminum electrolytic capacitors

The aluminum electrolytic capacitors used in the product's printed circuit board assemblies and in the mouse and keyboard are limited-life components. Use of these components beyond their operating life may result in electrolyte leakage or depletion, potentially causing emission of foul odor or smoke.

As a guideline, in a normal office environment (25°C) operating life is not expected to be reached within the maintenance support period (5 years). However, operating life may be reached more quickly if, for example, the product is used in a hot environment. The customer shall bear the cost of replacing replaceable components which have exceeded their operating life. Note that these are only guidelines, and do not constitute a guarantee of trouble-free operation during the maintenance support period.

High safety use

This product has been designed and manufactured for general uses such as general office use, personal use, domestic use and normal industrial use. It has not been designed or manufactured for uses which demand an extremely high level of safety and carry a direct and serious risk to life or body if such safety cannot be ensured.

These uses include control of nuclear reactions in nuclear power plants, automatic airplane flight control, air traffic control, traffic control in mass transport systems, medical devices for life support, and missile guidance control in weapons systems (hereafter, "high safety use"). Customers should not use this product for high safety use unless measures are in place for ensuring the level of safety demanded of such use. Please consult the sales staff of Fujitsu if intending to use this product for high safety use.

Measures against momentary voltage drop

This product may be affected by a momentary voltage drop in the power supply caused by lightning. To prevent a momentary voltage drop, use of an AC uninterruptible power supply is recommended.

(This notice follows the guidelines of Voltage Dip Immunity of Personal Computer issued by JEITA, the Japan Electronics and Information Technology Industries Association.)

Technology controlled by the Foreign Exchange and Foreign Trade Control Law of Japan

Documents produced by Fujitsu may contain technology controlled by the Foreign Exchange and Foreign Trade Control Law of Japan. Documents which contain such technology should not be exported from Japan or transferred to non-residents of Japan without first obtaining authorization in accordance with the above law.

Harmonic Current Standards

This product conforms to harmonic current standard JIS C 61000-3-2.

Only for the Japanese market: About SATA hard disk drives

The SATA version of this server supports hard disk drives with SATA / BC-SATA storage interfaces. Please note that the usage and operation conditions differ depending on the type of hard disk drive used.

Please refer to the following internet address for further information on the usage and operation conditions of each available type of hard disk drive:

<http://primeserver.fujitsu.com/primergy/harddisk/>

Only for the Japanese market:



Although described in this manual, some sections do not apply to the Japanese market. These options and routines include:

- USB Flash Module (UFM)
- Replacing the lithium battery



Contents

| | | |
|------------|--|-----------|
| 1 | Introduction | 9 |
| 1.1 | Notational conventions | 9 |
| 2 | Important information | 11 |
| 2.1 | Notes on safety | 11 |
| 2.2 | CE certificate of conformity | 14 |
| 2.3 | Environmental protection | 15 |
| 3 | Features | 17 |
| 3.1 | Overview | 17 |
| 3.2 | Main memory | 20 |
| 3.2.1 | Fitting rules | 21 |
| 3.3 | PCI / PCIe slots | 23 |
| 3.4 | Screen resolutions | 24 |
| 3.5 | Temperature and system monitoring | 24 |
| 3.6 | Connectors and jumpers | 26 |
| 3.6.1 | Onboard connectors | 26 |
| 3.6.2 | Onboard jumpers | 28 |
| 3.6.3 | External connectors | 30 |
| 4 | Replacing the lithium battery | 31 |

Contents

1 Introduction

This technical manual describes the D2779 system board, which can be equipped with up to four Intel processors.

For additional driver information (if available), refer to the Readme files located on the server hard disk and on the supplied DVDs (see Installation DVD of ServerView Suite - ServerView Software Products).

You will find further information about the BIOS setup in the "D2779 BIOS Setup Utility for TX100 S2" manual.



PRIMERGY manuals are available in PDF format on the ServerView Suite DVD 2. The ServerView Suite DVD 2 is part of the ServerView Suite supplied with every server.

PRIMERGY Abbreviations and Glossary can also be found on the ServerView Suite DVD 2.

1.1 Notational conventions

The following notational conventions are used in this manual:

| | |
|---|--|
| <i>Text in italics</i> | indicates commands or menu items. |
| "Quotation marks" | indicate names of chapters and terms that are being emphasized. |
| ▶ | describes activities that must be performed in the order shown. |
|  CAUTION! | pay particular attention to texts marked with this symbol. Failure to observe this warning may endanger your life, destroy the system or lead to the loss of data. |
|  | indicates additional information, notes and tips. |

2 Important information

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 access the system board of your system is described in the appropriate service supplement (except for the Japanese market).

When handling the system board, refer to the specific notes on safety in the operating manual and/or service supplement for the respective 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 packagings 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 approved for installation can be obtained from our customer service center or your sales outlet.
- The warranty expires if the device is damaged during the installation or replacement of system expansions.

**CAUTION!**

- 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.
- Ethernet cabling has to comply with EN 50173 and EN 50174-1/2 standards or ISO/IEC 11801 standard respectively. The minimum requirement is a Category 5 shielded cable for 10/100 Ethernet, or Category 5e for Gigabit Ethernet.
- Never connect or disconnect data transmission lines during a thunderstorm (risk of lightning hazard).

Batteries**CAUTION!**

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

This information does not apply to the Japanese market.

It is essential to observe the instructions in the [chapter "Replacing the lithium battery"](#).

Modules with Electrostatic-Sensitive Devices

Modules with electrostatic-sensitive devices are identified by the following sticker:



Figure 1: ESD label

When you handle components fitted with ESDs, you must always observe the following points:

- Switch off the system and remove the power plugs from the power outlets before installing or removing components with ESDs.
- You must always discharge static build-up (e.g. by touching a grounded object) before working with such components.
- Any devices or tools that are used must be free of electrostatic charge.
- Wear a suitable grounding cable that connects you to the external chassis of the system unit.
- Always hold components with ESDs at the edges or at the points marked green (touch points).
- Do not touch any connectors or conduction paths on an ESD.
- Place all the components on a pad which is free of electrostatic charge.



For a detailed description of how to handle ESD components, see the relevant European or international standards (EN 61340-5-1, ANSI/ESD S20.20).

Notes about boards

- During installation/deinstallation of the board, observe the specific instructions described in the service supplement for the respective server.
- Shut down the server and disconnect the power plug, before you make modifications on an installed board.
- To prevent damage to the 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 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 (screw drivers) for leverage.
- Do not damage or modify internal cables or devices. Doing so may cause a device failure, fire, or electric shock.
- Do not touch the circuitry on boards or soldered parts. Hold the metallic areas or the edges of the circuit boards.

2.2 CE certificate of conformity



The board complies with the requirements of the EC directives 2004/108/EC regarding “Electromagnetic Compatibility” and 2006/95/EC “Low Voltage Directive”. This is indicated by the CE marking (CE = Communauté Européenne).

Compliance was tested in a typical PRIMERGY configuration.

2.3 Environmental protection

Environmentally-friendly product design and development

This product has been designed in accordance with the Fujitsu standard for "environmentally friendly product design and development". This means that key factors such as durability, selection and labeling of materials, emissions, packaging, ease of dismantling and recycling have been taken into account.

This saves resources and thus reduces the harm done to the environment.

Further information can be found at:

- http://ts.fujitsu.com/products/standard_servers/index.html (for the EMEA market)
- <http://primeserver.fujitsu.com/primergy/concept/> (for the Japanese market)

Energy-saving information

Devices that do not need to be constantly switched on should be switched off until they are needed as well as during long breaks and after completion of work.

Packaging information

This packaging information doesn't apply to the Japanese market.

Do not throw away the packaging. You may need it later for transporting the system. If possible, the equipment should only be transported in its original packaging.

Information on handling consumables

Please dispose of printer consumables and batteries in accordance with the applicable national regulations.

In accordance with EU directives, batteries must not be disposed of with unsorted domestic waste. They can be returned free of charge to the manufacturer, dealer or an authorized agent for recycling or disposal.

All batteries containing pollutants are marked with a symbol (a crossed-out garbage can). They are also marked with the chemical symbol for the heavy metal that causes them to be categorized as containing pollutants:

Cd Cadmium

Hg Mercury

Pb Lead

Labels on plastic casing parts

Please avoid sticking your own labels on plastic parts wherever possible, since this makes it difficult to recycle them.

Returns, recycling and disposal

Please handle returns, recycling and disposal in accordance with local regulations.



The device must not be disposed of with domestic waste. This device is labeled in compliance with European directive 2002/96/EC on waste electrical and electronic equipment (WEEE).

This directive sets the framework for returning and recycling used equipment and is valid across the EU. When returning your used device, please use the return and collection systems available to you. Further information can be found at

<http://ts.fujitsu.com/recycling>.

Details regarding the return and recycling of devices and consumables within Europe can also be found in the "Returning used devices" manual, via your local Fujitsu branch or from our recycling center in Paderborn:

Fujitsu Technology Solutions
Recycling Center
D-33106 Paderborn

Tel. +49 5251 8 18010

Fax +49 5251 8 333 18010

3 Features

3.1 Overview

Processors

- Intel Xeon 3400 series (Lynnfield and Clarkdale) processor (up to 4 cores) in the LGA1156 package
- CPUs with up to 95 W TDP (FMB 2009B) are supported

Main memory

- Up to four DDR3 UDIMMs (1066/1333) with 1, GB, 2 GB and 4 GB capacity.
- Up to 16 GB memory (with 4 GB DRAM Technology)
- Minimum 1 GB (1 memory module)
- Maximum 21 Gbit/s band width in dual channel mode and 10.67 Gbit/s in single channel mode
- ECC support

Chipset devices on the system board

- Intel® 3420 Ibex Peak PCH Platform Controller Hub
- Intel® 82578DM Gigabit Ethernet
- ATI ES1000 graphic controller
- SMC SCH5627 Super I/O processor
- 4 Mbyte SPI-Flash (BIOS / Baseboard Management Controller-Firmware)

Internal connectors

- 2x USB 2.0 connector
- 6x SATA connector
- Trusted Platform Module (TPM) (Option)
- 1x USB Flash Module (UFM) (Option)

External connectors

- 8x USB 2.0 connector (2 front, 6 rear)
- 1x serial (COM1) port
- 1x VGA
- 1x RJ45 LAN connector

PCI / PCIe Slots

- 1x PCI 3.0 (32 bit / 33 MHz), support of 3.3 V and 3.3 V/5 V cards; no support of 5 V cards
- 2x PCI Express 2.0 slots (x8)
- 1x PCI Express 2.0 slot (x4)

LAN Gigabit Ethernet Controller

- GbE Ethernet PHY Intel[®] 82578DM
- 10/100/1000 Base-T IEEE 802.3 MAC
- 4 KB Jumbo Frames
- WOL by Magic-Packet[™], link status change and interesting packet
- PXE 2.0, iSCSI Boot remote boot support
- IPV6 Header Offloading
- Receive Side Scaling
- Interface: PCI-Express x1 based

BIOS features

- System and BIOS password
- Harddisk password
- Recovery BIOS support
- Boot sequential control for IDE drives
- Serial access protection
- Boot sector virus warning
- SPD EEPROM write protection against virus
- Wake on LAN
- USB voltage short detection
- Advanced fan control

Environmental protection

- Battery on socket for recycling
- RoHS compliant (1.1.2006)

Power management

- ACPI (states S0, S4, S5)
- ACPI 2.0
- 3.3 V auxiliary power on the PCI/PCIe bus slots
- On/Off/Sleep/Wake by power button
- On/Off software

- Wake on by: RTC, external serial ports, LAN, PCI and PCI Express Cards
- Power on by: Power button, external serial ports, LAN, PCI and PCI Express cards
- 0-Watt standby

Form factor

µBTX: 26.4 cm x 26.7 cm

USB Flash Module (option)



This feature is not available for the Japanese market.

The system board can be equipped with one USB Flash Module (UFM). The module can be used as optional memory for software (e.g. VMware).

Trusted Platform Module (option)

The system board can be equipped with a Trusted Platform Module (TPM) by the manufacturer or by an add-on kit. This module enables programs from third party manufacturers to store key information (e.g. drive encryption using Windows Bitlocker Drive Encryption).

The TPM is activated via the BIOS system (for more information, refer to the BIOS manual).



CAUTION!

- When using the TPM, note the program descriptions provided by the third party manufacturers.
- You must also create a backup of the TPM content. To do this, follow the third party manufacturer's instructions. Without this backup, if the TPM or the system board is faulty you will not be able to access your data.
- If a failure occurs, please inform your service about the TPM activation before it takes any action, and be prepared to provide them with your backup copies of the TPM content.

3.2 Main memory

The system board supports up to 16 GB of main memory. 4 slots (2 memory banks with 2 slots each) are provided for the main memory. Every slot can be fitted with DDR3 UDIMMs with ECC with 1 GB, 2 GB or 4 GB.

The system board supports x72 ECC DDR3 UDIMMs with 1 Gbit and 2 Gbit. RDIMMS are not supported.

ECC with memory scrubbing is supported. There is no support for non-ECC-DIMMs.

 Installing and removing memory boards and DIMMs is described in the Options Guide.

The system board has four slots for memory modules. For dual-channel operation the memory modules must be equipped in pairs and color coded, starting from the bottom to the top.

Black slots: DIMM 1A (1) and DIMM 1B (2)

Blue slots: DIMM 2A (3) and DIMM 2B (4)

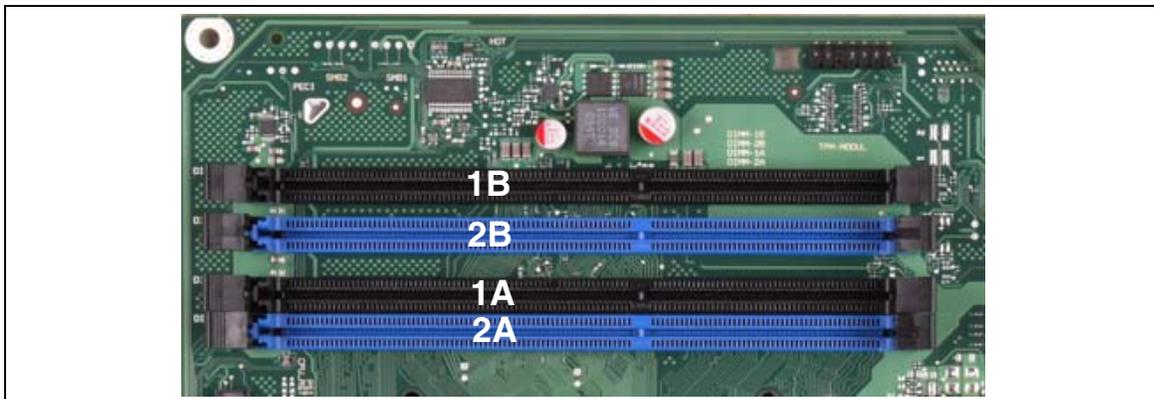


Figure 2: DIMM slot assignment

- Each memory bank is equipped with two memory modules with the same capacity.
- The module capacity between pairs can differ: pair 1A/1B can be populated with two 1 GB modules and pair 2A/2B with two 2 GB modules.

3.2.1 Fitting rules

- Minimum required for booting the system is one UDIMM (socket DIMM 1A).
- Therefore, memory boards must be fitted with UDIMMs as follows.

The maximum performance can be achieved in a symmetric dual-channel configuration. Therefore, both channels have to be populated with the same amount of memory. The DRAM device technology may vary from one channel to the other.

If the amount of memory differs between the two channels, the system board will run in dual-channel asymmetric mode.

Regardless of the mode, all DIMMs will run at the highest common frequency that is allowed by the SPD data of the DIMMs and the maximum speed of the selected configuration.

| Mode | Configuration | DIMM 1A black | DIMM 2A blue | DIMM 1B black | DIMM 2B blue |
|----------------------|---------------|------------------|-----------------|------------------|-----------------|
| Single-channel | 1 | populated | -- | -- | -- |
| Single-/dual-channel | 2 | populated | populated | populated | -- |
| Dual-channel | 3 | populated | -- | populated | -- |
| Dual-channel | 4 | populated | populated | populated | populated |

Table 1: Configuration of the main memory

Configuration 1: single-channel configuration

Configuration 2:

The dual-channel mode is only activated, if the size of the used memory module in socket DIMM 1B is equal to the summary of the memory modules in the sockets DIMM 1A and DIMM 2A (e.g. DIMM 1A = 1GB, DIMM 2A = 1GB, DIMM 1B = 2GB).

Configuration 3 and 4:

For dual-channel configuration arrange identical memory modules in pairs of the sockets.

Install identical memory modules in sockets DIMM 1A and DIMM 1B and identical memory modules in sockets DIMM 2A and DIMM 2B.

3.3 PCI / PCIe slots

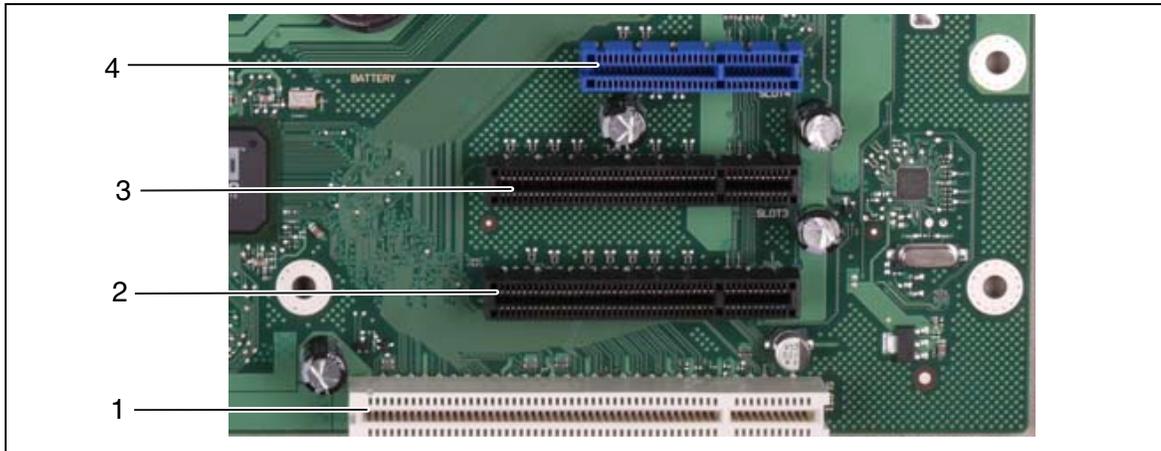


Figure 3: PCIe slots on system board D2779

| Pos. | PCIe slot | Description | Hot-plug |
|------|-----------|---|----------|
| 1 | Slot 1 | PCI 3.0 slot (32 Bit / 33MHz) (support for 3.3V and 3.3V/5V cards) | no |
| 2 | Slot 2 | PCI Express slot (Gen 2), x8 connector | no |
| 3 | Slot 3 | PCI Express slot (Gen 2), x8 connector | no |
| 4 | Slot 4 | PCI Express slot notched (Gen 2; running at 2.5GT/s), x4 connector | no |

PCI interrupt assignment

The BIOS assigns the PCI interrupts automatically. Further settings are not necessary.

3.4 Screen resolutions

Depending on the operating system in use, the screen resolutions specified below apply to the internal graphics controller.

| Screen resolution | Refresh rate (Hz) | No. of bits per pixel |
|-------------------|-------------------|-----------------------|
| 1600 x 1200 | 75 | 16 bpp |
| 1280 x 1024 | 120/75 | 16 bpp/32 bpp |
| 1152 x 864 | 160/100 | 16 bpp/32 bpp |
| 1024 x 768 | 200/120 | 16 bpp/32 bpp |
| 800 x 600 | 200 | 32 bpp |
| 640 x 480 | 200 | 32 bpp |

3.5 Temperature and system monitoring

Temperature and system monitoring aims to reliably protect the hardware from overheating and to provide information on the system state. It also prevents unnecessary noise by reducing the fan speed.

Temperature and system monitoring is controlled by an onboard Base Management Controller (BMC) that supports the following functions:

Temperature monitoring

Measuring the processor temperature by way of a temperature sensor.

Measuring the ambient temperature with an onboard temperature sensor.

Measuring the temperature with the Super I/O chip.

Fan monitoring

The fans are monitored. Fans that are blocked, sluggish or no longer available are detected. The BMC supports two fan interfaces.

Fan control

The fans are controlled according to temperature. Maximum speed will only be achieved when switching on the server and in case of a fan test.

Sensor monitoring

Any fault in a temperature sensor is detected. Should this happen, all fans run at maximum speed to ensure the highest possible cooling of the hardware.

Voltage control

All important voltages provided from the PSU are controlled.

Also voltage of the Lithium battery is supervised. If one voltage exceeds or falls below its upper/lower threshold value, an alert is generated and stored in the System Event Log (SEL).

System Event Log (SEL)

System events only will be logged during OS runtime. All monitored events of the system board are signaled and recorded in the System Event Log. They could be retrieved in the BIOS Setup or via the ServerView Operations Manager.

3.6 Connectors and jumpers

3.6.1 Onboard connectors

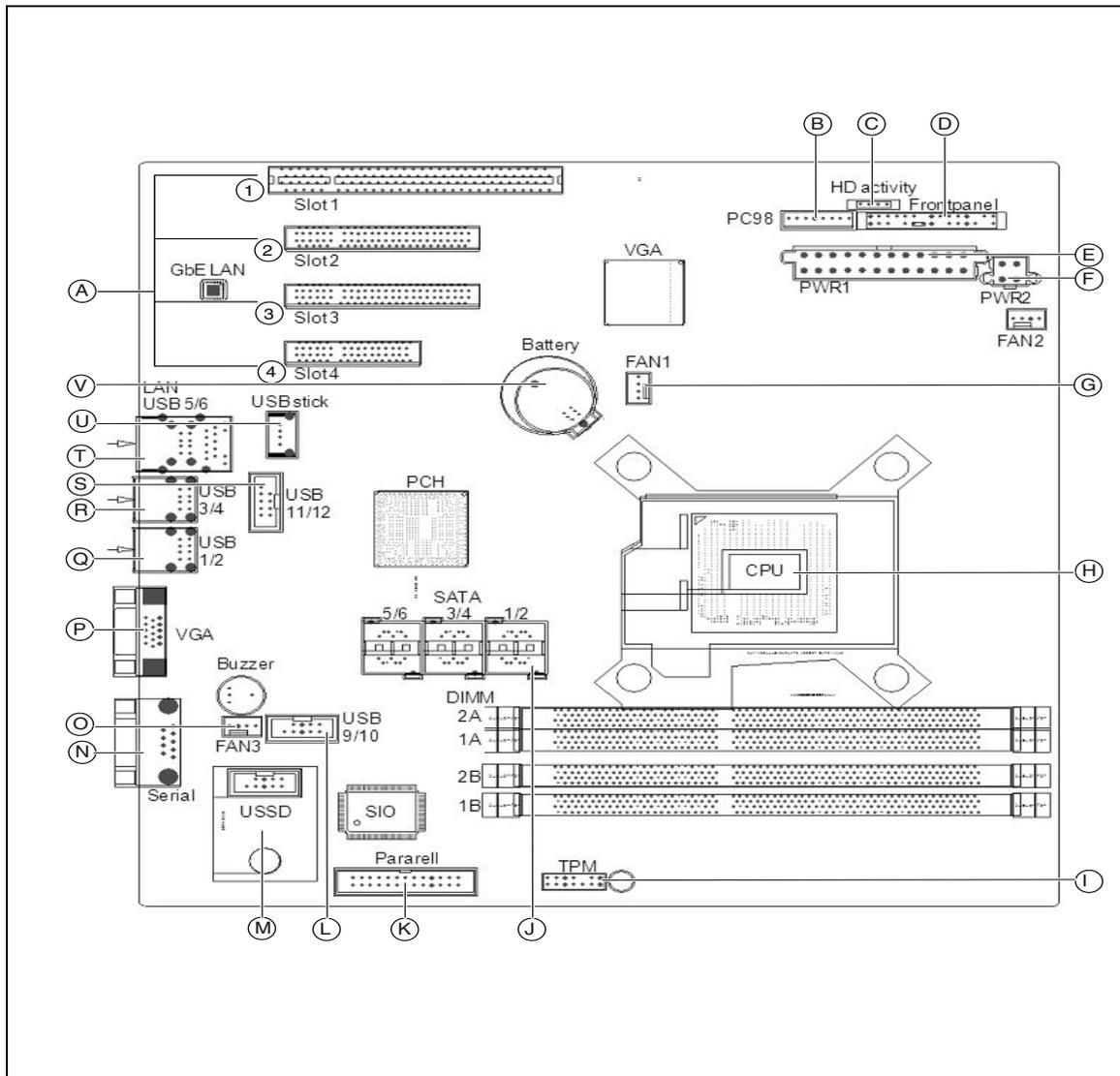


Figure 4: Connectors on system board D2779

| Pos. | Connector | Pos. | Connector |
|------|---------------------------|------|-------------------|
| A | PCI / PCIe slots | B | PC2009 |
| C | HDD activity (SCSI / SAS) | D | Front panel |
| E | Power connector 1 | F | Power connector 2 |
| G | Fan 1 | H | CPU |

| Pos. | Connector | Pos. | Connector |
|-------------|-------------------------------|-------------|-----------------------|
| I | TPM (Trusted Platform Module) | J | SATA connectors |
| K | Parallel port | L | USB connectors 9 - 10 |
| M | UFM connector | N | Serial port |
| O | Fan 3 | P | VGA |
| Q | USB 1 - 2 | R | USB 3 - 4 |
| S | USB 11 - 12 | T | LAN / USB 5 - 6 |
| U | USB stick | V | Lithium battery |

3.6.2 Onboard jumpers

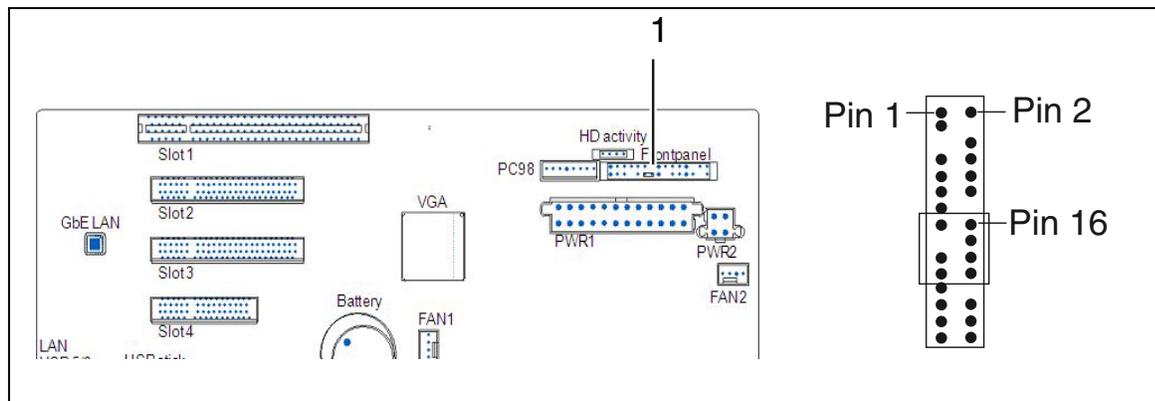


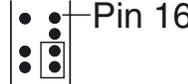
Figure 5: Position of the frontpanel connector on system board D2779

| Pos. | Description |
|------|-----------------------|
| 1 | Front panel connector |

Settings of Jumper "Password Disable/Clear" (J5C3)

| | |
|--|----------------------------------|
| | Password Skip disabled (Default) |
| | Password Skip enabled |

Settings of Jumper "BIOS Recovery" (J6D1)

| | |
|--|----------------------------------|
|  Pin 16 | BIOS Recovery disabled (Default) |
|  Pin 16 | BIOS Recovery enabled |

3.6.3 External connectors

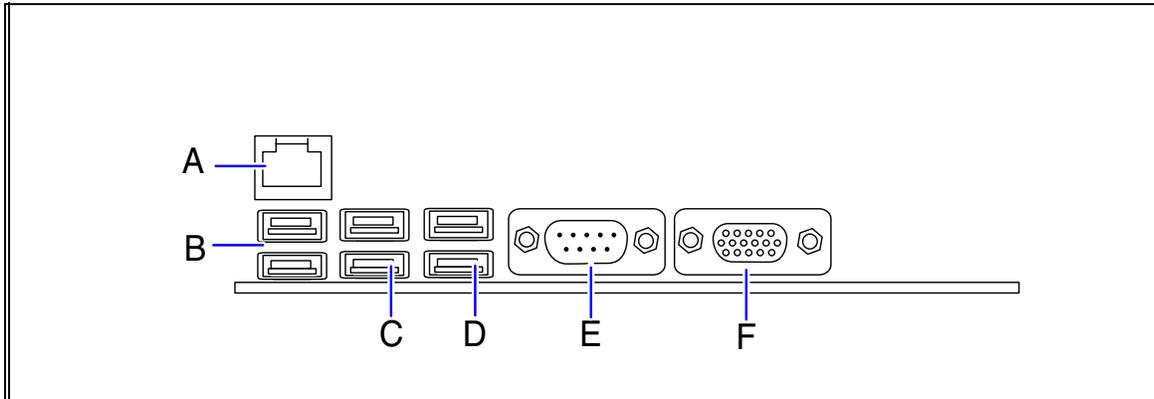


Figure 6: External connectors on system board D2779

| Pos. | Indicator |
|------|-------------|
| A | Gigabit LAN |
| B | USB 5 - 6 |
| C | USB 3 - 4 |
| D | USB 1 - 2 |
| E | VGA port |
| F | Serial port |

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.



CAUTION!

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer (CR2032).

This information does not apply to the Japanese market.

Do not throw lithium batteries into the trash can. They 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!

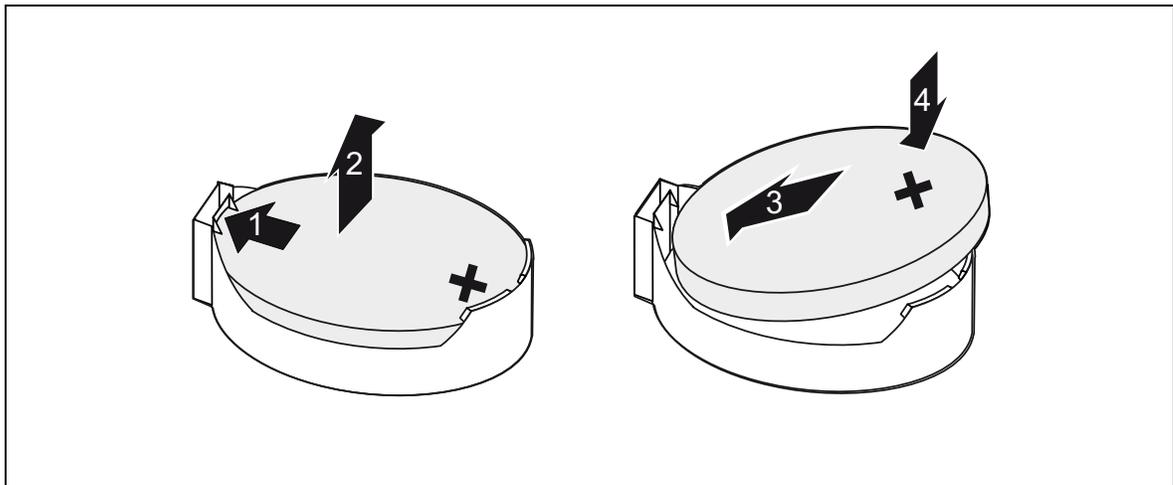


Figure 7: Replacing the lithium battery

- ▶ Press the locking spring into direction of 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).



After replacing the battery date and time have to be set again.

BIOS settings are set to default values.

