Technical Manual - English

FUJITSU

System Board D2863 for PRIMERGY RX100 S6

Technical Manual

Edition February 2011

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 9001:2008

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 9001:2008.

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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.)

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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)
- CSS (Customer Self Service)
- Replacing the lithium battery

Contents

Contents

1 Introduction

This technical manual describes the system board D2863, which can be equipped with one processor.

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 “D2863 BIOS Setup Utility for RX100 S6” manual.

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

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

Notational conventions

The following notational conventions are used in this manual:

Text in italics	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 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 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 storm (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 doesn't 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:

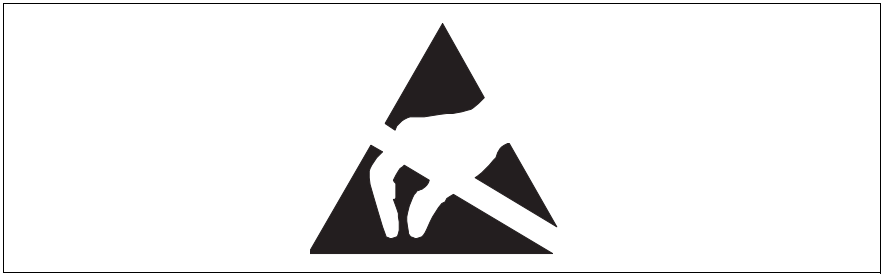

Figure 1: ESD label

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

CE

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 525 1410

Fax +49 5251 525 32 1410

3 Features

3.1 Overview

Processors

– one processor socket LGA1156
– one Intel® Quad-Core processor of the Intel Xeon 3400 series (up to 95 W) or one Intel® Dual-Core processor (Celeron, Pentium or Core-i3)

Main memory

– 4 slots for main memory; CPU supports 2 channels with 2 DIMM slots
– UDIMM (unbuffered DIMM) or RDIMM (registered DIMM) memory modules, RDIMM memory modules are configurable for Xeon CPUs only
– minimum memory configuration: one DIMM in DIMM1A
– maximum memory configuration: UDIMM memory modules 16 GB, RDIMM memory modules 32 GB (technical release pending)
– ECC multiple bit error detection and single bit error correction

Chips on the system board

– Intel® BD3420 PCH chip set
– Gigabit Ethernet controller Intel 82574 (shared LAN)
– Gigabit Ethernet controller Intel 82578 (system LAN)
– 4 MB Flash BIOS
– onboard iRMC S2 Server Management Controller with integrated graphics controller and associated management LAN connector

Internal connectors

– 5x SATA connectors
– 1x I^2C signaling connector for LocalView Service Panel (optional)
– 1x I^2C signaling connector for SATA backplane
– 1x power connector 24 pin (12V)
– 1x backplane power connector 8 pin
– 1x connector for fans and ODD
– 1x front panel connector
– 1x front USB connector (for the two USB connectors on the front side)
– 1x connector for optional Front VGA module

- 1x USB connector for optional USB Flash Module (UFM)
- 1x connector for optional TPM

External connectors

- front side:
  - 1x VGA and 1x USB 2.0 connector (with optional Front VGA module)
  - 2x USB 2.0 connectors
- rear side:
  - 1x serial connector (COM1)
  - 4x USB 2.0 connectors
  - 1x video connector (VGA)
  - 3x RJ45 LAN connectors

PCI slots

- 1 x PCI Express x8 slot for a riser card
- 1 x PCI Express x8 and x4 slot for a riser card

Power management

- ACPI (states S1, S4, S5)
- 3.3 V standby power on the PCI Express slots
- on/off/sleep/wake by power button
- on/off by software
- wake by RTC, external serial connectors, LAN, PCI Express controller and iRMC S2
- power on by power button, external serial connectors, LAN, PCI Express controller and iRMC S2

BIOS features

- Phoenix SecureCore
- SMBIOS 2.5 (DMI)
- Server Hardware Design Guide
- WfM 2.0
- ACPI 2.0 support
- USB keyboard/mouse
- boot possible from:
  - CD-ROM/DVD (SATA)
  - hard disk (SATA, SAS, USB)
  - LAN

– console redirection support
– OEM logo
– CPU, memory disable

Environmental protection

– battery in holder

Form factor

– 260 x 305 mm

CSS (Customer Self Service)

This system board supports the CSS functionality. You will find a description of CSS functionality in the operating manual of your server.

USB Flash Module (option)

The system board can be equipped with an USB Flash Module (UFM) by the manufacturer or by an add-on kit. The module can be used as optional memory for software (e.g. VMware) or as a software dongle.

TPM (option)

The system board can be equipped with a TPM (Trusted Platform Module) 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

You will find the descriptions how to install memory modules in the Options Guide of your server.

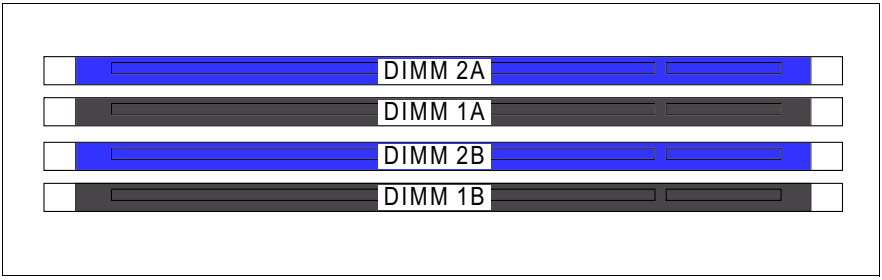

Figure 2: Slots of the main memory

The assignment of the DIMM slots is:
DIMM 1A = channel A DIMM 1, DIMM 1B = channel B DIMM 1,
DIMM 2A = channel A DIMM 0, DIMM 2B = channel B DIMM 0

Module population

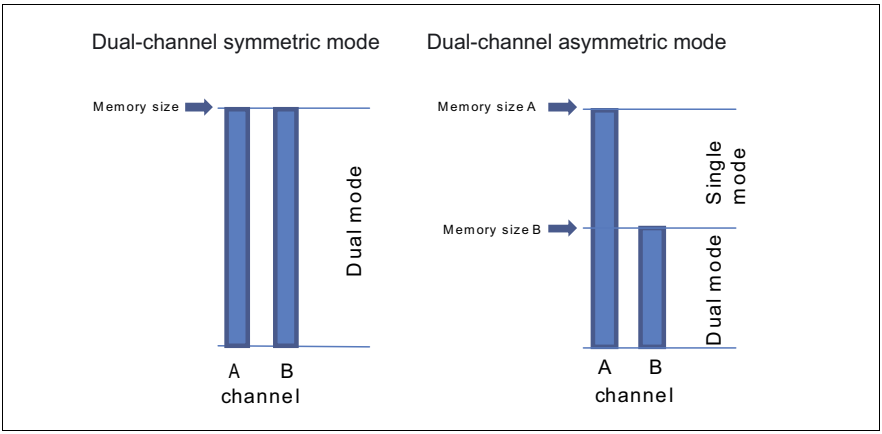

Figure 3: Dual-channel symmetric and asymmetric mode

– 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 (1Gbit / 2Gbit) 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.
– If memory modules with different frequencies are populated, the slowest memory module defines the speed of the whole memory subsystem.
– 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 max. speed of the selected configuration.
– Single-channel mode is used when 1 memory module is populated in DIMM 1A.

Population rules

– Memory slot 1 / channel A (DIMM 1A) needs to be populated first.
– Quad rank (QR) memory modules must be populated first in DIMM 1A, in case of usage memory modules with different ranks (SR/DR + QR).
– Within all channels memory slot 1 must be populated prior to slot 2.
– Install memory modules within a channel in descending order of capacity: higher capacity in slot 1, lower capacity in slot 2.
– Mixing of RDIMM and UDIMM is not allowed.

RDIMM memory modules

Technology: DDR3 800 / 1066 / 1333 buffered single rank (SR), dual rank (DR) or quad rank (QR) RDIMM memory modules with ECC. Support for up to 4 RDIMM memory modules.

RDIMM memory modules are only supported by Intel® Quad-Core processors (Xeon 3400 series).

Total memory size: up to 32 GB

Configuration per channel	Max. speed	DIMM-2	DIMM-1
1	DDR3-1333	empty	SR/DR
2	DDR3-1066	empty	QR
3	DDR3-1333	SR/DR	SR/DR
4	DDR3-800	QR	QR

UDIMM memory modules

Technology: DDR3 1066 / 1333 unbuffered single rank (SR) or dual rank (DR) UDIMM memory modules with ECC. Support for up to 4 UDIMM memory modules.

UDIMM memory modules are supported by Intel® Dual-Core processors (e.g. Core i3-540, Pentium G6950, Celeron G1101) and by Intel® Quad-Core processors (Xeon 3400 series).

Under Pentium G6950 and Celeron G1101, the clock rate will be limited to 1066 MHz.

Total memory size: up to 16 GB

Configuration per channel	Max. speed	DIMM-2	DIMM-1
1	DDR3-1333	empty	SR/DR
2	DDR3-1333	SR/DR	SR/DR

3.3 PCI slots

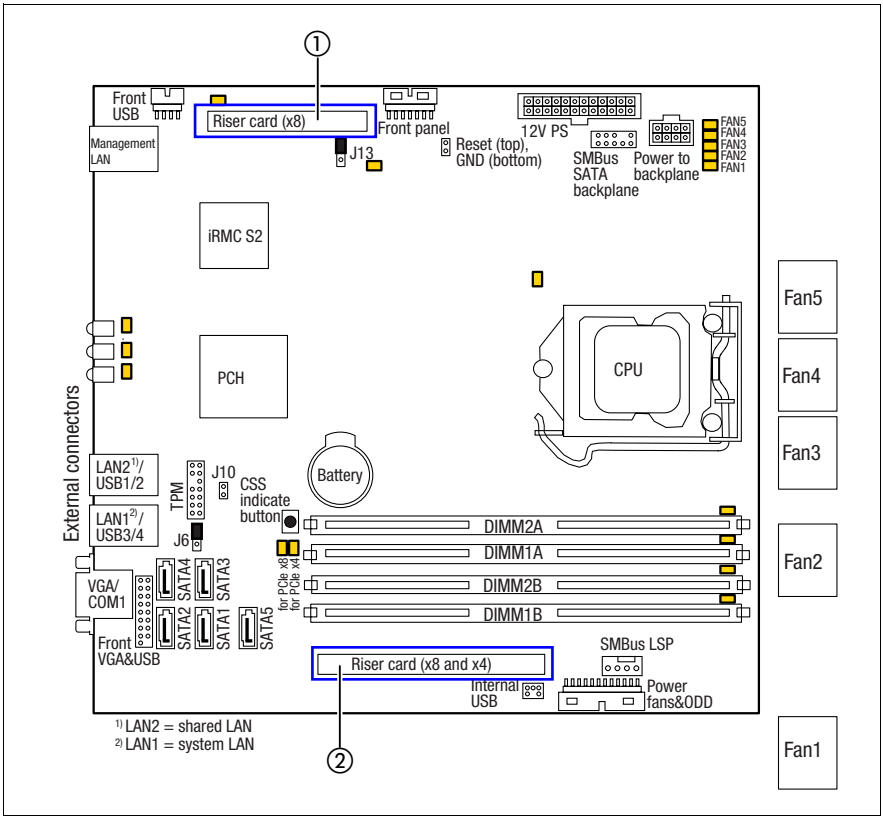

Figure 4: PCI slots for riser cards

No.	Type	Function	Slot no.	
1	PCI Express x8	Slot for riser card riser card offers one slot	1	standard or low-profile PCIe x8 slot, maximum length 175 mm
2	PCI Express x8 and x4	Slot for riser card riser card offers two slots	2	low-profile PCIe x8 slot, maximum length 170 mm
			3	PCIe x4 slot (mech. x8), only for modular RAID

PCI Express interrupts

Each device connected to a PCI Express can use up to four interrupt signals depending on the functionality.

PCI Express devices send their interrupts through messages. The interrupts are defined by the system design.

The following interrupt signals are used in the system:

Slot/device	Property	Interrupt signal
VGA	iRMC S2 graphic	PCI-INTA
LAN	Intel 82574	PCI-INTA
LAN	Intel 82578	PCI-INTA
Slot 3	PCIe x4	PCI_INTA, PCI_INTB, PCI_INTC, PCI_INTD
Slot 2	PCIe x8	PCI_INTA, PCI_INTB, PCI_INTC, PCI_INTD
Slot 1	PCIe x8	PCI_INTA, PCI_INTB, PCI_INTC, PCI_INTD

3.4 Screen resolution

Depending on the operating system used the screen resolutions in the following table refer to the graphic controller on the system board. The graphic controller is integrated in the iRMC S2 (integrated Remote Management Controller).

Screen resolution (pixel)	Maximum refresh rate (Hz)	Max. number of colours
640x480	85	32 bit
800x600	85	32 bit
1024x768	75	32 bit
1152x864	60	16 bit
1280x1024	60	24 bit
1600x1200	60	16 bit

If you are using an external graphic controller, you will find details of supported screen resolutions in the operating manual or technical manual supplied with the graphic controller.

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 following functions are supported:

Temperature monitoring

Measurement of the processor and the system internal temperature by an onboard temperature sensor, measurement of the ambient temperature by a I^2C temperature sensor.

Fan monitoring

The power supply unit and system fans are monitored. Fans that are no longer available, blocked or stuck 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.

System Event Log (SEL)

All monitored events of the system board are signalized via the Global Error LED or CSS LED and recorded in the System Event Log. They could be retrieved in the BIOS Setup, iRMC S2's Web interface or via the ServerView Operations Manager.

PRIMERGY Local Diagnostic LEDs

Optical signaling through the LEDs on the system board identifies defective modules and components (CSS functionality) as well as gaining information on the PDA (Prefailure Detection and Analysis).

3.6 Connectors and indicators

3.6.1 System board

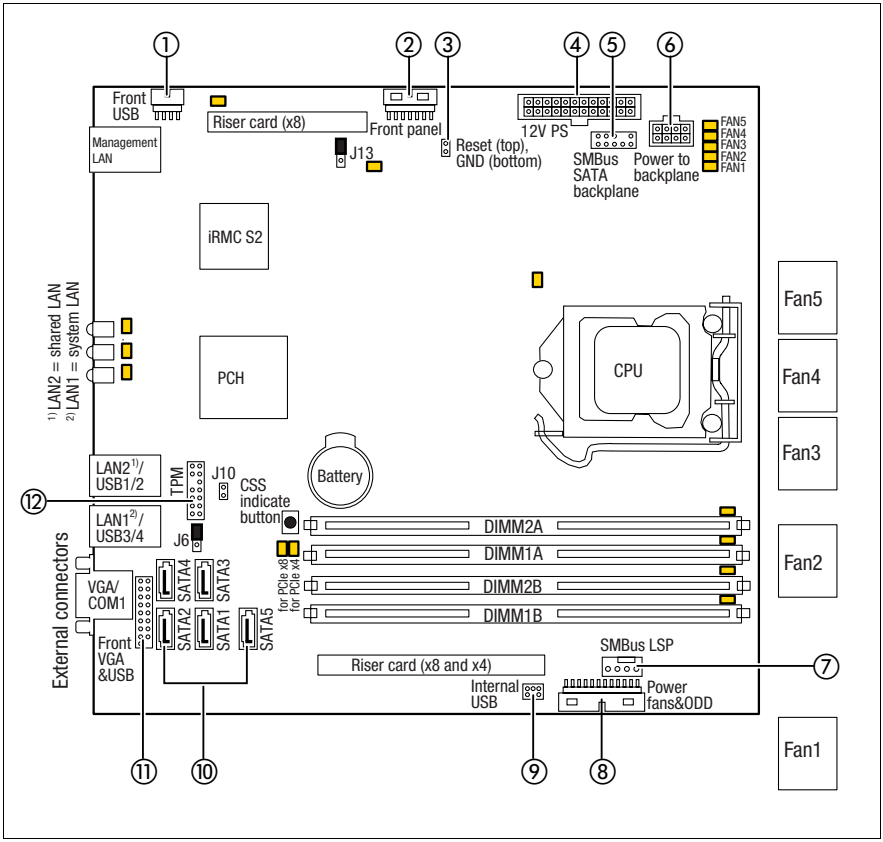

Figure 5: Internal connectors of the system board D2863

No.	Description
1	Front USB connector
2	Front panel connector
3	Reset connector (optional)
4	Power supply connector 12V
5	I^2C signaling connector for SATA backplane
6	Power supply connector for HDD backplane
7	I^2C signaling connector for LocalView Service Panel
8	Power supply connector for system fans and ODD
9	Connector for USB Flash Module (UFM)[1]
10	5x SATA connector
11	Connector for optional Front VGA module
12	Connector for TPM

[1] needs optional cable

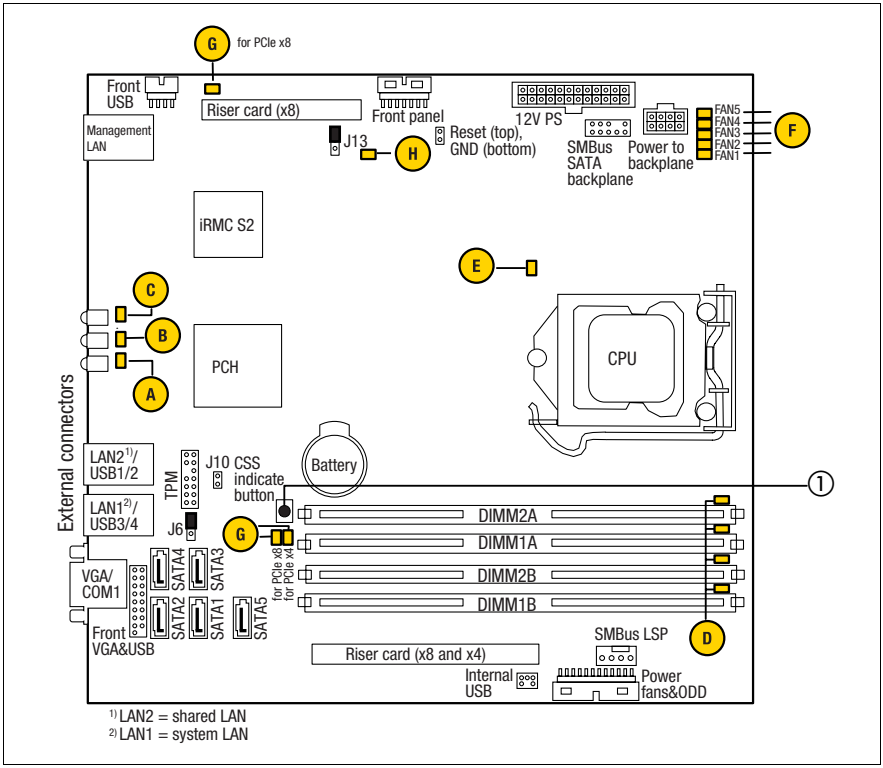

Figure 6: Indicators on the system board and CSS indicate button

No.	Description
1	CSS indicate button

LEDs A, B and C are visible from outside on the rear of the server. All the other LEDs are only visible, if the cover of the server has been opened.

If the server has been powered off (power-plugs must be disconnected) it is possible to indicate the faulty component by pressing the CSS indicate button.

The LEDs have the following meaning:

LED	Indicator	Meaning
A - CSS (Customer Self Service)	off	no error (CSS component)
	yellow on	indicates a prefailure (CSS component)
	yellow flashing	indicates a failure (CSS component)
B - GEL (Global Error LED)	off	no error (non CSS component)
	orange on	indicates a prefailure (non CSS component)
	orange flashing	indicates a failure of a non CSS component. Reasons for a failure may be: - over temperature measured by one of the sensors - sensor is defective - CPU error - software detected an error
C - Identification	blue on	server is identified via the ServerView Operations Manager
	blue flashing	local monitor off
D - Memory	off	no failure
	orange on	memory module failure
E - CPU	off	no failure
	orange on	CPU failure
F - System fan	off	no failure
	orange on	system fan failure
G - PCI card	off	no failure
	orange on	PCI card failure (PCI card installed on riser card)
H - iRMC	off	iRMC S2 inactive
	green flashing	iRMC S2 okay

3.6.2 Connector panel

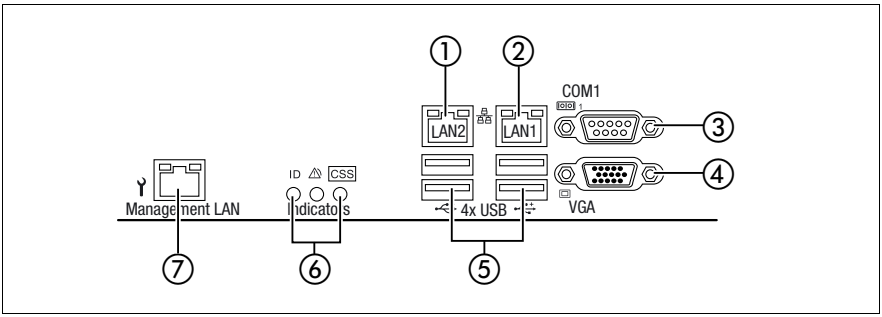

Figure 7: Connector panel

No.	Description
1	LAN 2 connector (shared LAN)
2	LAN 1 connector (system LAN)
3	Serial connector COM1
4	Video connector (VGA)
5	4x USB connectors
6	Global error indicator (orange), CSS indicator (yellow), ID indicator (blue); (description see preceding section)
7	Management LAN connector (for iRMC S2 server management function)

The serial connector COM1 can be used as default interface or to communicate with the iRMC S2.

LAN connectors

The system board is equipped with a Gigabit Ethernet Controller type Intel 82574 (shared LAN) and a Gigabit Ethernet Controller type 82578 (system LAN). The LAN controllers support transmission rates of 10 Mbit/s, 100 Mbit/s and 1 Gbit/s.

The LAN controllers also support WOL functionality by means of Magic Packet™. It is also possible to start a system via a LAN without a separate boot hard disk drive. PXE is supported here.

The separate management LAN connector is used as a management interface (iRMC S2) and is prepared for operation with the Remote Management. Optionally LAN connector 1 can also be used for iRMC S2 server management.

Each LAN connector has two LEDs which display the speed of the connection and its status:

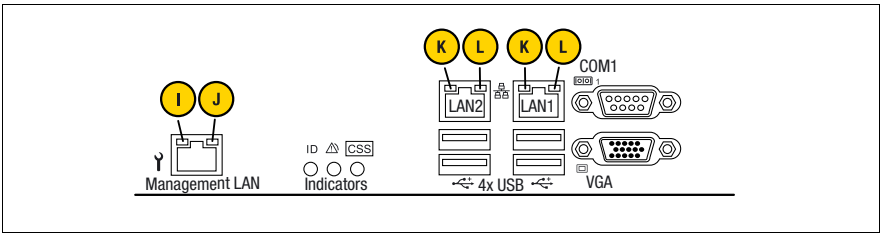

Figure 8: LAN LEDs

LED	Indicator	Description
I	LAN speed (management LAN)	**Steady orange signal** in the event of a LAN transfer rate of 100 Mbit/s. **Remains dark** in the event of a LAN transfer rate of 10 Mbit/s.
J	LAN link/transfer (management LAN)	**Steady green signal** when a LAN connection exists. **Remains dark** when no LAN connection exists. **Flashes green** when LAN transfer takes place.
K	LAN speed (system LAN/ shared LAN)	**Steady orange signal** in the event of a LAN transfer rate of 1 Gbit/s **Steady green signal** in the event of a LAN transfer rate of 100 Mbit/s. **Remains dark** in the event of a LAN transfer rate of 10 Mbit/s.
L	LAN link/transfer (system LAN/ shared LAN)	**Steady green signal** when a LAN connection exists. **Remains dark** when no LAN connection exists. **Flashes green** when LAN transfer takes place.

3.6.3 Jumper

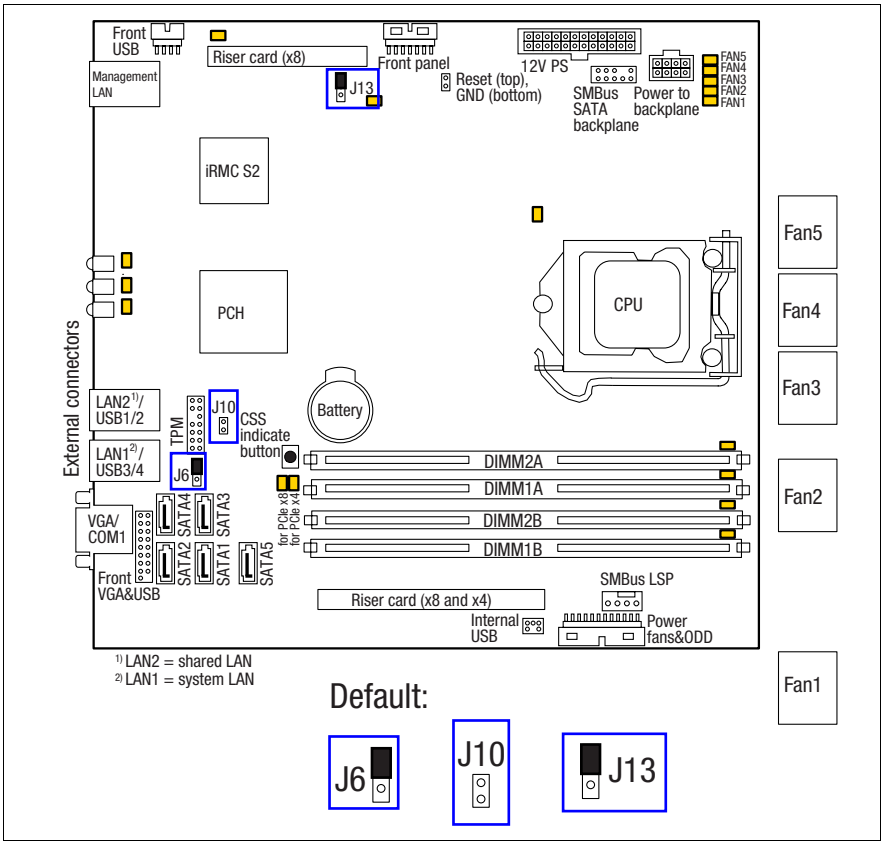

Figure 9: Jumper

Jumper	Description	Setting
J6	Clear RTC	1-2 normal operation (default) 2-3 clear RTC_RST register
J10	Password SKIP	open: normal operation (default) short: skip password
J13	BIOS recovery	1-2 normal operation (default) 2-3 recovery mode

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 (CR2450). This information doesn't apply to the Japanese market.

Do not throw lithium batteries into the trash can. 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!

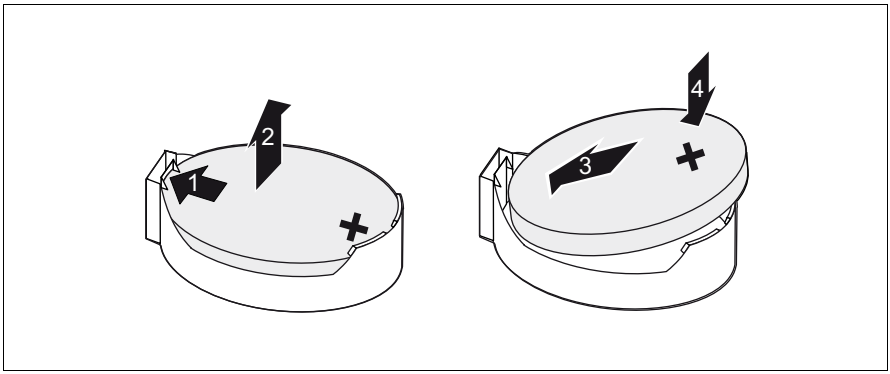

Figure 10: Replacing the lithium battery

- 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).