

# Modular RAID Controller PRAID CP500i (SAS 3.0)

User Guide

## **Comments... Suggestions... Corrections...**

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## **Documentation creation according to DIN EN ISO 9001:2015**

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 9001:2015.

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## Version history

<b>Issue number</b>	<b>Issue date</b>	<b>Description</b>
V 1.0	10/2020	Initial release
V 2.0	02/2021	Technical and editorial changes



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# 1 Introduction

## 1.1 Modular RAID concept

The PRIMERGY Modular RAID concept is designed to provide a flexible and common RAID solution for the internal disks in all PRIMERGY servers and consists of three different RAID solutions:

- Embedded RAID for SATA disks
- Entry RAID controller for SAS and SATA disks
- Full-featured RAID controller for SAS and SATA disks

## 1.2 Requirements

You will need hardware knowledge in order to install the board. To install the software, you will need to be familiar with the operating system used.

## 1.3 Further information

Information on boards, drives and other devices can be found in the manuals you received with these products. Information on your operating system and the application programs you are using is contained in the associated manuals or help texts. The latest information on our products, tips, updates, etc. can be found on the Internet at: <https://support.ts.fujitsu.com>



For Japan please use the URL: <https://www.fujitsu.com/jp/products/computing/servers/primergy/downloads/>

## 1.4 Notational conventions

The following notational conventions are used in this manual:

## Introduction

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<b>Text in bold</b>	Indicates references to names of interface elements.
Text in monospace	Indicates commands.
"Quotation marks"	Indicate names of chapters and terms that are being emphasized.
▶	Describes activities that must be performed in the order shown.
 <b>CAUTION</b>	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.



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## 2 Important information

### 2.1 Introduction

In this chapter you will find essential information regarding safety when working with the board. Please read the instructions carefully if you want to install/remove a board.



#### **CAUTION**

- ▶ Observe the safety notes in the operating manual of your system unit.

### 2.2 Safety instructions

#### 2.2.1 Basic safety instructions

- ▶ 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 extensions that have been released. If you install other extensions, you may interfere with the requirements and rules governing safety and electromagnetic compatibility of your system. Information on which system extensions are suitable can be obtained from the customer service center or your sales outlet.
- ▶ The warranty becomes invalid if the device is damaged during the installation or replacement of system extensions.

## Important information

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- ▶ Components can become very hot during operation. To avoid burns, make sure you do not touch components when adding or removing system board extensions!
- ▶ Transmission cables to peripheral devices must be adequately shielded.
- ▶ For the LAN wiring, the requirements according to standards EN 50173 and EN 50174-1/2 apply. The minimum requirement is the use of a protected LAN line of category 5 for 10/100 Mbit/s Ethernet, and/or of category 5e for Gigabit Ethernet. The requirements of specification ISO/IEC 11801 must be observed.
- ▶ Never connect or disconnect data cables during a storm (lightning hazard).

### 2.2.2 Batteries

- ▶ Incorrect replacement of the 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.
- ▶ Do not throw batteries into the trash can. They must be disposed of in accordance with local regulations concerning special waste.

### 2.2.3 Notes about boards

- ▶ During installation/uninstallation of a board, observe the specific instructions described in the service manual for the server.
- ▶ To ensure that the system and system board are completely disconnected from the mains voltage, remove the plug from the mains outlet.
- ▶ To prevent damage to boards and the components and conductors on them, please take great care when you insert or remove them. Make sure 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, centering pins etc.) when you replace boards.
- ▶ Never use sharp objects (e.g. screw drivers) for leverage.

## 2.2.4 Modules with Electrostatic-Sensitive Devices (ESD modules)

ESD modules are identified by the following sticker:

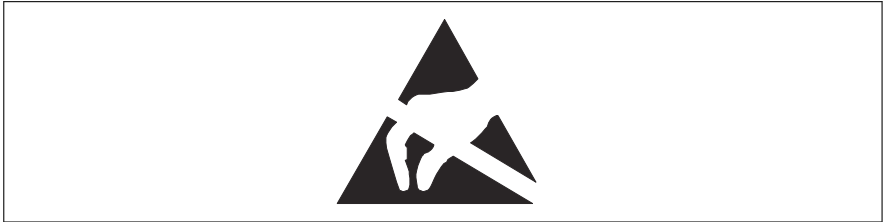


Figure 1: ESD label



The ESD label can be different.

When you handle ESD modules, you must always observe the following points:

- ▶ Switch off the server and remove the power plugs from the power outlets before installing or removing ESD modules.
- ▶ The circuit boards and soldered parts of internal options are exposed and can be damaged by static electricity. To ensure reliable protection, you must wear an earthing band on your wrist when working with ESD modules and connect it to an unpainted, conducting metal part of the server.
- ▶ 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 server.
- ▶ Always hold ESD modules at the edges or at the colored touch points.
- ▶ Do not touch any connectors or conduction paths on an ESD module.
- ▶ Place all the components on a pad which is free of electrostatic charge.



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

## 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. More information can be found at:

[https://ts.fujitsu.com/products/standard\\_servers/index.html](https://ts.fujitsu.com/products/standard_servers/index.html)

For Japan:

<https://jp.fujitsu.com/platform/server/primergy/concept/>

### 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 does not apply in Japan and APAC. Do not throw away the packaging. You may need it later for transporting the server. 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 2012/19/EU 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.

More information can be found at:

<https://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 at:

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



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# 3 PRAID CP500i

## 3.1 Overview



### CAUTION

► Follow the safety instructions in ["Important information" on page 9](#).

The RAID controller PRAID CP500i is the Fujitsu version of the Broadcom MegaRAID®Storage Adapter MegaRAID 9440-8i (model number 50008).

The RAID controller PRAID CP500i is based on the SAS3408 Tri-Mode IOCs (I/O Controllers).

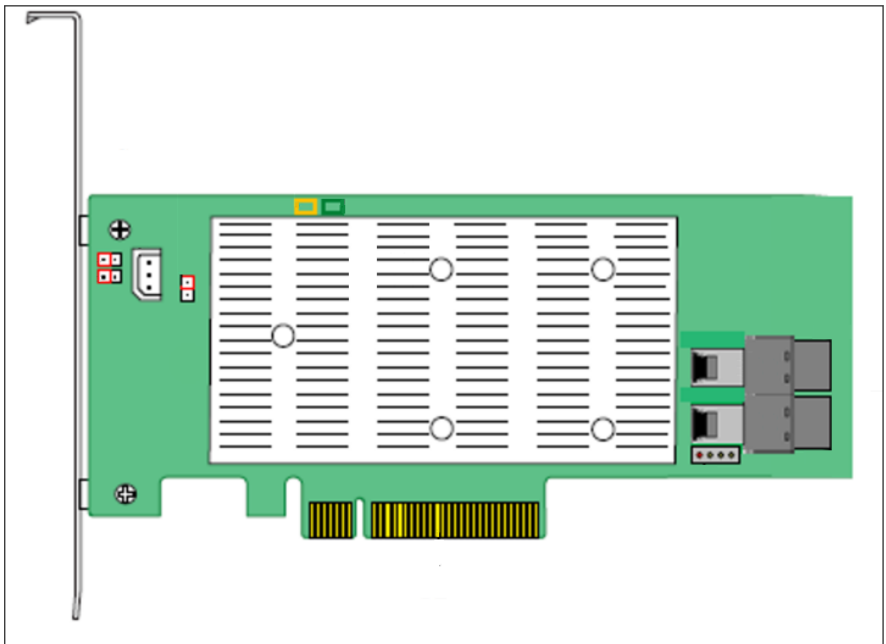


Figure 2: PRAID CP500i



Depending on the target system, the following bracket types are offered:

- Full height perforated
- Low profile perforated

## **3.2 Features**

The RAID controller PRAID CP500i is a high-performance PCIe-to-SATA/SAS/PCIe (Tri-Mode) adapter. The Tri-Mode SerDes Technology enables operation of SAS or SATA storage devices in a single drive bay. A single controller can operate in all three modes concurrently: SAS or SATA

The Tri-Mode adapter provides the following storage interface data transfer rates:

- SAS data transfer rates of 12, 6, and 3 Gb/s per lane
- SATA transfer rates at 6 and 3 Gb/s data transfer rates per lane

### **Summary of key features**

Ports	8-internal
I/O processor / SAS controller	SAS3408
Form factor	LP-MD2
Storage interface connectors	2x SFF-8634 x2
Host interface	x8 PCIe 3.1
Storage interface	SAS, SATA
Cache memory	None
Cache protection	None
Super capacitor	Not supported

RAID features:

- RAID levels 0, 1, and 5
- RAID spans 10 and 50



- Online Capacity Expansion (OCE) and Online RAID Level Migration (RLM)
- Auto resume after loss of system power during array rebuild or reconstruction (RLM)
- Load balancing
- Configurable stripe size up to 1 MB
- Fast initialization for quick array setup
- Check Consistency for background data integrity
- SSD Support with SSD Guard™ technology
- Patrol read for media scanning and repairing
- 64 logical drive support
- DDF compliant Configuration on Disk (COD)
- S.M.A.R.T. support
- Global and dedicated Hot Spare with Revertible Hot Spare support
- Automatic rebuild
- Enclosure affinity
- Enclosure management
- SES (inband)
- SGPIO (sideband)
- Shield state drive diagnostic technology

### 3.3 Controller versions

Name	Chip	PCIe	Cache	No. of SAS channels	Bracket type
PRAID CP 500i	Broadcom SAS3408	PCIe 3.1	none	8	low profile full height

### 3.4 Connectors

The following figure shows the location of the connectors on the RAID controller.

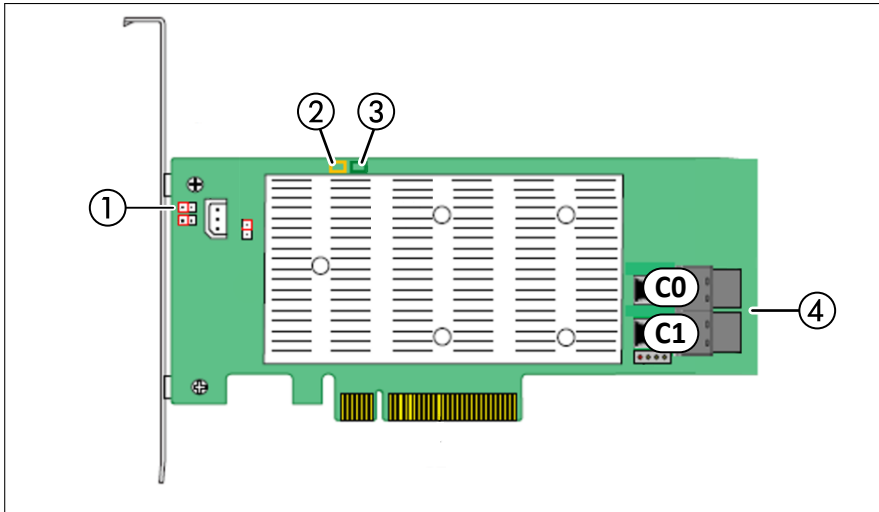


Figure 3: PRAID CP500i board layout

- |   |  |   |                                     |
|---|--|---|-------------------------------------|
| 1 | Connector for Global Drive Activity LED cable        | 3 | LED for status "normally operating" |
| 2 | LED for temperature sensor on the SAS3408 controller | 4 | 2x SFF-8643 mini-SAS-HD connectors  |

The LED (2) lights up yellow to indicate that the temperature sensor on the SAS3408 controller exceeds the temperature threshold. If the device is in an appropriate thermal range, this LED turns off.

The LED (3) flashes green to indicate that the SAS3408 controller that is mounted to the card operating normally.

The connectors (4) connect the SAS RAID controller card with a cable to the backplane of the server device.

- C0: SAS connector 0 (SAS ports 0-3)
- C1: SAS connector 0 (SAS ports 4-7)

### 3.4.1 Connecting the Global Drive Activity LED cable

To activate the HDD activity indicator at the front of the system a cable must be connected to the Global Drive Activity LED connector of the RAID controller PRAID CP500i.

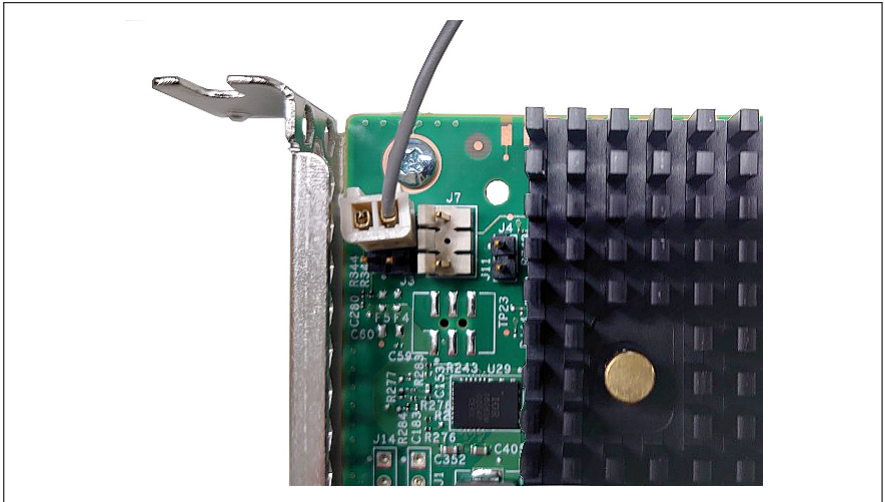


Figure 4: Connecting the Global Drive Activity LED cable

- ▶ Connect the 2-pin connector of the Global Drive Activity LED cable to the RAID controller.
- ▶ Connect the 4-pin connector of the Global Drive Activity LED cable to the system board. Please refer to the system specific manual to locate the connector on the system board.

**i** For installation the RAID controller in a server, see "[Installing the RAID controller](#)" on page 19.

## 3.5 Installing the RAID controller

**i** To safeguard against data loss, remember to back up your data before you change your system configuration

To install the RAID controller in a server, proceed as follows:

### **Step 1: Unpack the controller**

- ▶ Unpack the new controller in a static-free environment.
- ▶ Remove it from the anti-static bag and inspect it for damage.
- ▶ Contact the Fujitsu support service if the controller appears to be damaged.

### **Step 2: Prepare the server**

- ▶ Shut down and power off the server.
- ▶ Remove the cover from the chassis.

### **Step 3: Install the new RAID controller**

- ▶ Insert the controller in a suitable PCIe slot on the system board.
- ▶ Press down gently but firmly to ensure the controller is properly seated in the slot.
- ▶ Secure the controller to the server chassis with the PCI card hold down latches.
- ▶ Connect the SAS and/or SATA HDDs located in the system to the SAS cable connector(s) on the controller.

Refer to your server specific Upgrade and Maintenance Manual for information on the PCIe slot and installing the controller.

### **Step 4: Power-up the server**

- ▶ Replace the server cover and reconnect the power cable(s).
- ▶ Start up the server.

### **Step 5: Run the Configuration Utility**

A WebBIOS or Ctrl-R Configuration Utility is not available on the Tri-Mode adapters.

- ▶ Use the UEFI HII Configuration Utility at your system to configure the drive groups and the virtual drives.

**Step 6: Install the operating system driver**

The controller can operate under various operating systems.

- ▶ Install software drivers to use these operating systems.

The ServerView Suite DVD 1 includes drivers for the supported operating systems, along with documentation. You can view the supported operating systems and download the latest drivers for RAID adapters on the website at: <http://ts.fujitsu.com/support/>

For Japan please use the URL: <http://www.fujitsu.com/jp/products/computing/servers/primergy/downloads/>