

FUJITSU Server

PRIMEQUEST 2000 Series

General Description



Preface

This manual describes the functions and features of the PRIMEQUEST 2000 series. The manual is intended for system administrators.

For details on the regulatory compliance statements and safety precautions, see the *PRIMEQUEST 2000 Series Safety and Regulatory Information* (CA92344-0523).

Organization of this manual

This manual is organized as follows.

[CHAPTER 1 Product Overview](#)

Chapter 1 describes the features, specifications, structural concept, system configuration, hardware technologies, and software technologies of the PRIMEQUEST 2000 series.

[CHAPTER 2 Hardware Configuration](#)

Chapter 2 describes the hardware configurations and system specifications of the PRIMEQUEST 2000 series and the specifications of individual hardware components.

[CHAPTER 3 Software Configuration](#)

Chapter 3 describes the supported operating systems, bundled software, firmware, and operations management software for the PRIMEQUEST 2000 series.

[CHAPTER 4 Functions provided by the PRIMEQUEST 2000 series](#)

Chapter 4 describes the functions and architecture of the system provided by the PRIMEQUEST 2000 series.

[CHAPTER 5 Partitioning](#)

Chapter 5 describes the partitioning functions, including PPAR and Flexible I/O, used in the PRIMEQUEST 2000 series.

[CHAPTER 6 Redundancy](#)

Chapter 6 describes the redundancy of components for the PRIMEQUEST 2000 series.

[CHAPTER 7 Applicable Components for Hot Maintenance](#)

Chapter 7 describes the hot maintenance of hardware components for the PRIMEQUEST 2000 series.

[CHAPTER 8 Operations Management Tools](#)

Chapter 8 provides an overview of the operations management tools used in the PRIMEQUEST 2000 series.

[CHAPTER 9 Server Maintenance](#)

Chapter 9 describes the considerations to take into account in system design for server maintenance.

[CHAPTER 10 Hardware Installation and Connection](#)

Chapter 10 provides a link to the *PRIMEQUEST 2000 Series Hardware Installation Manual*.

[Appendix A Component Mounting Locations](#)

Appendix A provides a link to Appendix B Physical Mounting Locations and Port Numbers in the *PRIMEQUEST 2000 Series Administration Manual*.

[Appendix B Mounting Locations, BUS numbers, and Slot numbers](#)

Appendix B provides a link to Appendix D Physical Locations and BUS Numbers of Built-in I/O, and PCI Slot Mounting Locations and Slot Numbers in the *PRIMEQUEST 2000 Series Administration Manual*.

[Appendix C Status checks with LEDs](#)

Appendix C provides a link to Appendix F Status Checks with LEDs in the *PRIMEQUEST 2000 Series Administration Manual*.

[Appendix D Component Mounting Conditions](#)

Appendix D provides a link to Appendix G Component Mounting Conditions in the *PRIMEQUEST 2000 Series Administration Manual*.

[Appendix E Cable Specifications](#)

Appendix E provides a link to Chapter 2 Connection Information in the *PRIMEQUEST 2000 Series Hardware Installation Manual*.

[Appendix F Tree Structure of the MIB provided with the PRIMEQUEST 2000 series](#)

Appendix F provides a link to Appendix H Tree Structure of the MIB Provided with the PRIMEQUEST 2000 Series in the *PRIMEQUEST 2000 Series Administration Manual*.

[Appendix G Linkage functions and Services](#)

Appendix G describes the linkage functions and services provided by the PRIMEQUEST 2000 series.

[Appendix H Right or wrong of combination of each function](#)

Appendix H describes available combinations of functions provided by the PRIMEQUEST 2000 series.

Revision History

Edition	Date	Revised location (type) (*1)	Description
01	2014-08-12	All pages	- The edition is initialized to "01" for changing manual code
02	2014-10-07	All pages	- Added description about Secure Boot - Added description about RHEL7
03	2015-02-03	Chapter 4	- Added description about PSU configuration
04	2015-05-01	All pages	- Added description about PRIMEQUEST 2400E2/2800E2/2800B2 - Added description about Memory Scale-up Board and Extended Socket
05	2015-09-29	All pages	- Added description about LDAP
06	2015-10-30	All page	- modified description about Memory Scale-up Board
07	2016-05-30	All page	- Added description about PRIMEQUEST 2400E3/2800E3/2800B3 - Added description about Address Range Mirror
08	2016-11-28	Chapter 1	- Added warning about sadump
09	2017-01-16	Appendix H	- Modified description about Address Range Mirror in the table.
10	2017-02-08	All page	- Added description about Windows Server 2016
		Chapter 2	- Added support CPU

1: Chapter, section, and item numbers in the "Revised location" column refer to those in the latest edition of the document. However, a number marked with an asterisk () denotes a chapter, section, or item in a previous edition of the document.

Product operating environment

This product is a computer intended for use in a computer room environment. For details on the product operating environment, see the following manual:

PRIMEQUEST 2000 Series Hardware Installation Manual (CA92344-0535)

Safety Precautions

Alert messages

This manual uses the following alert messages to prevent users and bystanders from being injured and to prevent property damage.



This indicates a hazardous (potentially dangerous) situation that is likely to result in death or serious personal injury if the user does not perform the procedure correctly.



This indicates a hazardous situation that could result in minor or moderate personal injury if the user does not perform the procedure correctly. This also indicates that damage to the product or other property may occur if the user does not perform the procedure correctly.

Important

This indicates information that could help the user use the product more efficiently.

Alert messages in the text

An alert statement follows an alert symbol. An alert statement is indented on both ends to distinguish it from regular text. Similarly, one space line is inserted before and after the alert statement.



Only Fujitsu certified service engineers should perform the following tasks on this product and the options provided by Fujitsu. Customers must not perform these tasks under any circumstances. Otherwise, electric shock, injury, or fire may result.

- Newly installing or moving equipment
- Removing the front, rear, and side covers
- Installing and removing built-in options
- Connecting and disconnecting external interface cables
- Maintenance (repair and periodic diagnosis and maintenance)

The List of important alert items table lists important alert items.

List of important alert items

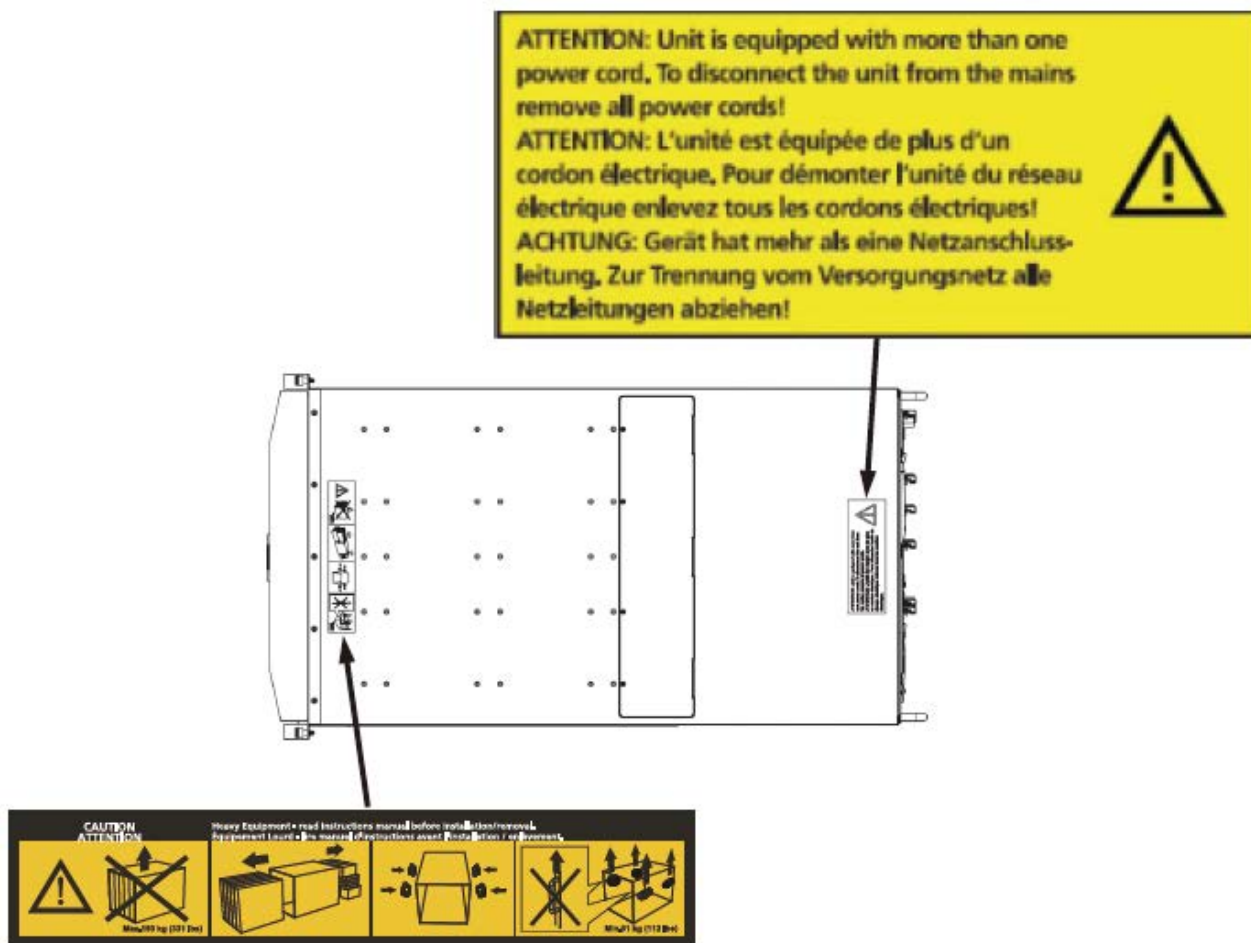
This manual does not contain important alert items.

Warning labels

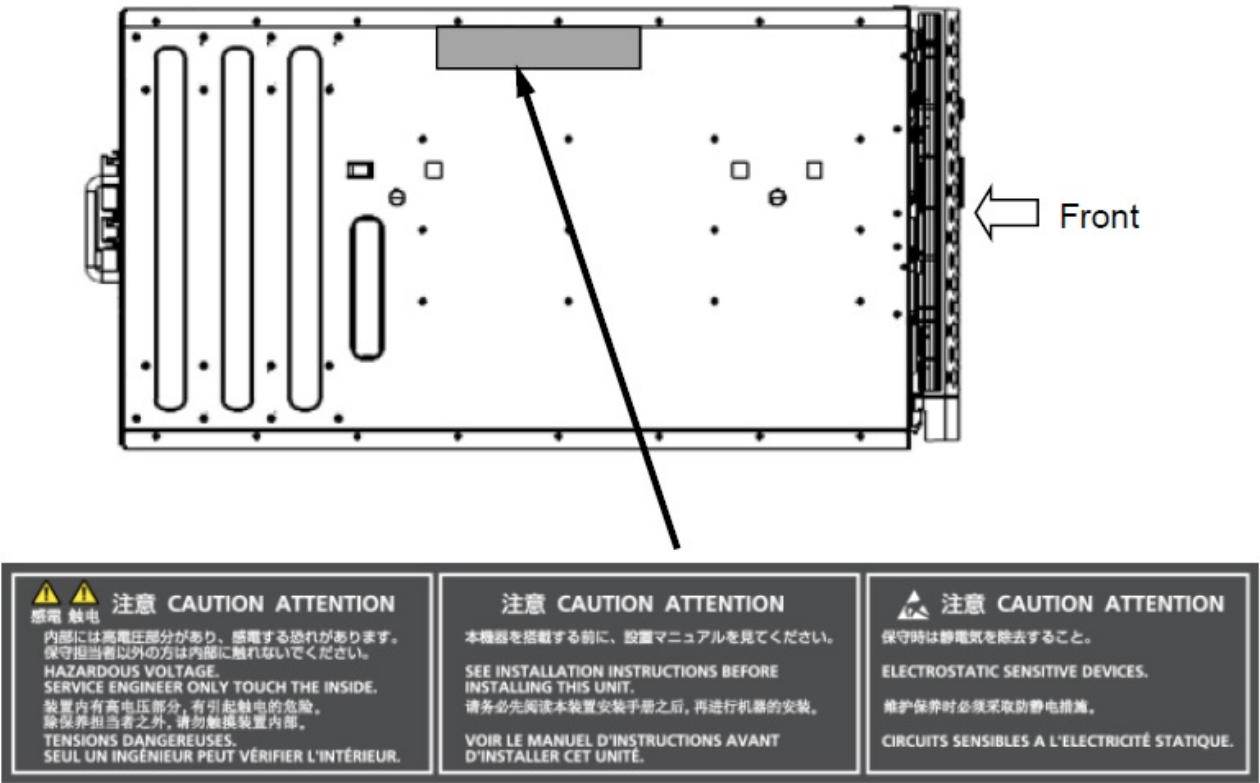


Never remove the warning labels.

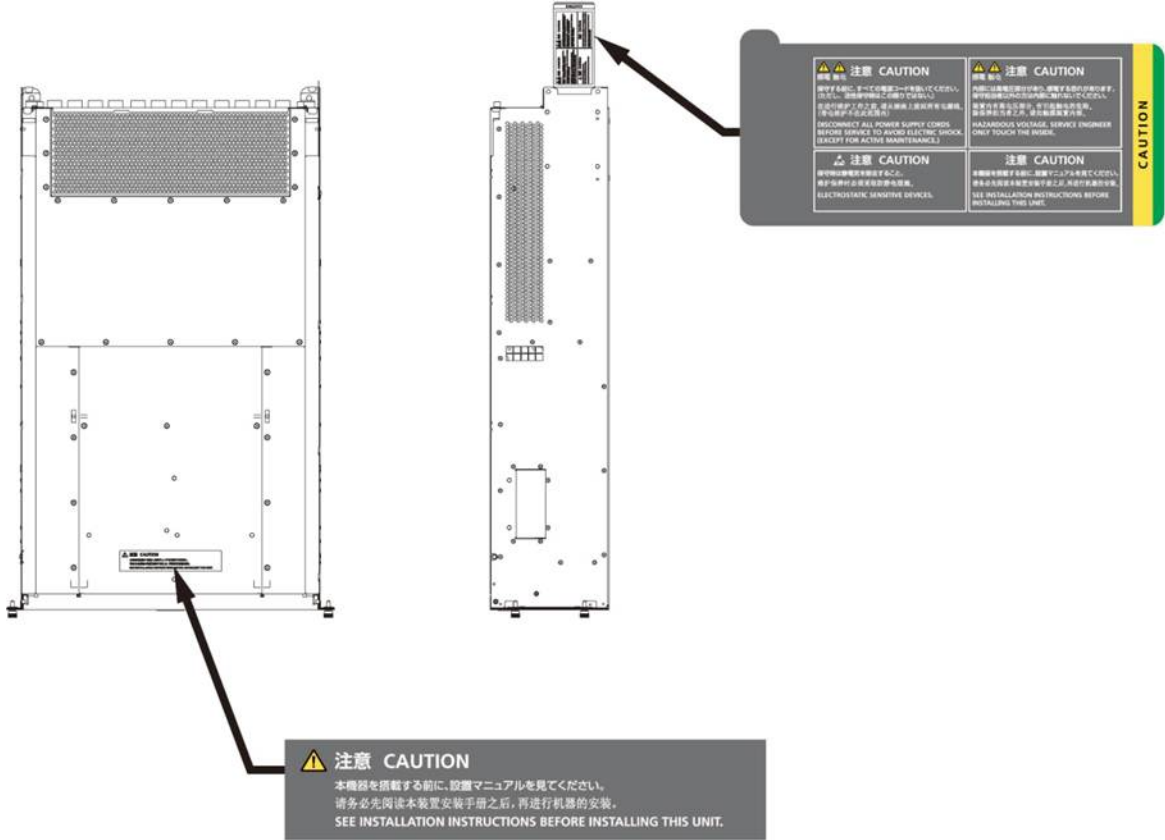
Warning label location (the main cabinet top)



Warning label location (the main cabinet left)



Warning label location (PCI_Box)



Notes on Handling the Product

About this product

This product is designed and manufactured for standard applications. Such applications include, but are not limited to, general office work, personal and home use, and general industrial use. The product is not intended for applications that require extremely high levels of safety to be guaranteed (referred to below as "safety-critical" applications). Use of the product for a safety-critical application may present a significant risk of personal injury and/or death. Such applications include, but are not limited to, nuclear reactor control, aircraft flight control, air traffic control, mass transit control, medical life support, and missile launch control. Customers shall not use the product for a safety-critical application without guaranteeing the required level of safety. Customers who plan to use the product in a safety-critical system are requested to consult the Fujitsu sales representatives in charge.

Storage of accessories

Keep the accessories in a safe place because they are required for server operation.

Adding optional products

For stable operation of the PRIMEQUEST 2000 series server, use only a Fujitsu-certified optional product as an added option.

Note that the PRIMEQUEST 2000 series server is not guaranteed to operate with any optional product not certified by Fujitsu.

Exportation/release of this product

Exportation/release of this product may require necessary procedures in accordance with the regulations of the Foreign Exchange and Foreign Trade Control Law of Japan and/or US export control laws.

Maintenance



Only Fujitsu certified service engineers should perform the following tasks on this product and the options provided by Fujitsu. Customers must not perform these tasks under any circumstances. Otherwise, electric shock, injury, or fire may result.

- Newly installing or moving equipment
- Removing the front, rear, and side covers
- Installing and removing built-in options
- Connecting and disconnecting external interface cables
- Maintenance (repair and periodic diagnosis and maintenance)



Only Fujitsu certified service engineers should perform the following tasks on this product and the options provided by Fujitsu. Customers must not perform these tasks under any circumstances. Otherwise, product failure may result. PRIMEQUEST 2000 Series General Description

- Unpacking an optional Fujitsu product, such as an optional adapter, delivered to the customer

Modifying or recycling the product



Modifying this product or recycling a secondhand product by overhauling it without prior approval may result in personal injury to users and/or bystanders or damage to the product and/or other property.

Note on erasing data from hard disks when disposing of the product or transferring it

Disposing of this product or transferring it as is may enable third parties to access the data on the hard disk and use it for unforeseen purposes. To prevent the leakage of confidential information and important data, all of the data on the hard disk must be erased before disposal or transfer of the product.

However, it can be difficult to completely erase all of the data from the hard disk. Simply initializing (reformatting) the hard disk or deleting files on the operating system is insufficient to erase the data, even though the data appears at a glance to have been erased. This type of operation only makes it impossible to access the data from the operating system.

Malicious third parties can restore this data.

If you save your confidential information or other important data on the hard disk, you should completely erase the data, instead of simply carrying out the aforementioned operation, to prevent the data from being restored. To prevent important data on the hard disk from being leaked when the product is disposed of or transferred, you will need to take care to erase all the data recorded on the hard disk on your own responsibility.

Furthermore, if a software license agreement restricts the transfer of the software (operating system and application software) on the hard disk in the server or other product to a third party, transferring the product without deleting the software from the hard disk may violate the agreement. Adequate verification from this point of view is also necessary.

Support and service

Product and service inquiries

For all product use and technical inquiries, contact the distributor where you purchased your product, or a Fujitsu sales representative or systems engineer (SE). If you do not know the appropriate contact address for inquiries about the PRIMEQUEST 2000 series, use the Fujitsu contact line.

Fujitsu contact line

We accept Web inquiries. For details, visit our website:

<https://support.ts.fujitsu.com/IndexContact.asp?lng=COM&ln=true>

Warranty

If a component failure occurs during the warranty period, we will repair it free of charge in accordance with the terms of the warranty agreement. For details, see the warranty.

Before requesting a repair

If a problem occurs with the product, confirm the problem by referring to 12.2 Troubleshooting in the *PRIMEQUEST 2000 Series Administration Manual* (CA92344-0537). If the error recurs, contact your sales representative or a field engineer. Confirm the model name and serial number shown on the label affixed to the right front of the device and report it. Also check any other required items beforehand according to 12.2 Troubleshooting in the *PRIMEQUEST 2000 Series Administration Manual* (CA92344-0537).

The system settings saved by the customer will be used during maintenance.

Manual

How to use this manual

This manual contains important information about the safe use of this product. Read the manual thoroughly to understand the information in it before using this product. Be sure to keep this manual in a safe and convenient location for quick reference.

Fujitsu makes every effort to prevent users and bystanders from being injured and to prevent property damage. Be sure to use the product according to the instructions in this manual.

Exportation/release of this document may require necessary procedures in accordance with the regulations of the Foreign Exchange and Foreign Trade Control Law of Japan and/or US export control laws.

Manuals for the PRIMEQUEST 2000 series

The following manuals have been prepared to provide you with the information necessary to use the PRIMEQUEST 2000 series.

You can access HTML versions of these manuals at the following sites:

Japanese-language site:

<http://www.fujitsu.com/jp/products/computing/servers/primequest/products/2000/catalog/manual/2000/>

Global site: <http://www.fujitsu.com/global/products/computing/servers/mission-critical/primequest/>

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

Title	Description	Manual code
<i>PRIMEQUEST 2000 Series Getting Started Guide</i>	Describes what manuals you should read and how to access important information after unpacking the PRIMEQUEST 2000 series server. (This manual comes with the product.)	CA92344-0522
<i>PRIMEQUEST 2000 Series Safety and Regulatory Information</i>	Contains important information required for using the PRIMEQUEST 2000 series safely.	CA92344-0523
<i>PRIMEQUEST 2000 Series General Description</i>	Describes the functions and features of the PRIMEQUEST 2000 series.	CA92344-0534
<i>SPARC Enterprise/ PRIMEQUEST Common Installation Planning Manual</i>	Provides the necessary information and concepts you should understand for installation and facility planning for SPARC Enterprise and PRIMEQUEST installations.	C120-H007EN
<i>PRIMEQUEST 2000 Series Hardware Installation Manual</i>	Includes the specifications of and the installation location requirements for the PRIMEQUEST 2000 series.	CA92344-0535
<i>PRIMEQUEST 2000 Series Installation Manual</i>	Describes how to set up the PRIMEQUEST 2000 series server, including the steps for installation preparation, initialization, and software installation.	CA92344-0536
<i>PRIMEQUEST 2000 Series User Interface Operating Instructions</i>	Describes how to use the Web-UI and UEFI to assure proper operation of the PRIMEQUEST 2000 series server.	CA92344-0538
<i>PRIMEQUEST 2000 Series Administration Manual</i>	Describes how to use tools and software for system administration and how to maintain the system (component replacement and error notification).	CA92344-0537
<i>PRIMEQUEST 2000 Series Tool Reference</i>	Provides information on operation methods and settings, including details on the MMB and UEFI functions.	CA92344-0539
<i>PRIMEQUEST 2000 Series Message Reference</i>	Lists the messages that may be displayed when a problem occurs during operation and describes how to respond to them.	CA92344-0540
<i>PRIMEQUEST 2000 Series REMCS Installation Manual</i>	Describes REMCS service installation and operation	CA92344-0542
<i>PRIMEQUEST 2000 Series Glossary</i>	Defines the PRIMEQUEST 2000 series related terms and abbreviations.	CA92344-0541

Related manuals

The following manuals relate to the PRIMEQUEST 2000 series.

You can access these manuals at the following site:

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

Contact your sales representative for inquiries about the ServerView manuals.

Title	Description
<i>ServerView Suite ServerView Operations Manager Quick Installation (Windows)</i>	Describes how to install and start ServerView Operations Manager in a Windows environment.
<i>ServerView Suite ServerView Operations Manager Quick Installation (Linux)</i>	Describes how to install and start ServerView Operations Manager in a Linux environment.
<i>ServerView Suite ServerView Installation Manager</i>	Describes the installation procedure using ServerView Installation Manager.
<i>ServerView Suite ServerView Operations Manager Server Management</i>	Provides an overview of server monitoring using ServerView Operations Manager, and describes the user interface of ServerView Operations Manager.
<i>ServerView Suite ServerView RAID Management User Manual</i>	Describes RAID management using ServerView RAID Manager.
<i>ServerView Suite Basic Concepts</i>	Describes basic concepts about ServerView Suite.
<i>ServerView Operations Manager Installation ServerView Agents for Linux</i>	Describes installation and update installation of ServerView Linux Agent.
<i>ServerView Operations Manager Installation ServerView Agents for Windows</i>	Describes installation and update installation of ServerView Windows Agent.
<i>ServerView Mission Critical Option User Manual</i>	Describes the necessary functions unique to PRIMEQUEST (cluster linkage) and ServerView Mission Critical Option (SVmco), which is required for supporting these functions.
<i>ServerView RAID Manager VMware vSphere ESXi 5 Installation Guide</i>	Describes the installation and settings required to use ServerView RAID Manager on the VMware vSphere ESXi 5 server.
<i>Modular RAID Controller LSI MegaRAID SAS 2.0 Software</i>	Provides technical information on using SAS RAID controllers. RAID Ctrl SAS 6Gb 1GB (D3116C)

Title	Description
<i>LSI MegaRAID SAS 2.0 Device Driver Installation</i>	MegaRAID SAS 9286CV-8e Refer to the following URL: The Fujitsu Technology Solutions manuals server http://manuals.ts.fujitsu.com/
<i>Modular RAID Controller</i>	Provides technical information on using SAS RAID controllers. PRAID EP400i / EP420i (D3216) PRAID EP420e
<i>LSI MegaRAID SAS 3.0 Software</i>	
<i>LSI Integrated RAID SAS 3.0 Solution</i>	
	Refer to the following URL: The Fujitsu Technology Solutions manuals server http://manuals.ts.fujitsu.com/

Abbreviations

This manual uses the following product name abbreviations.

Formal product name	Abbreviation
Microsoft (R) Windows Server (R) 2016 Datacenter	Windows, Windows Server 2016
Microsoft (R) Windows Server (R) 2016 Standard	
Microsoft (R) Windows Server (R) 2012 R2 Datacenter	Windows, Windows Server 2012 R2
Microsoft (R) Windows Server (R) 2012 R2 Standard	
Microsoft (R) Windows Server (R) 2012 Datacenter	Windows, Windows Server 2012
Microsoft (R) Windows Server (R) 2012 Standard	
Microsoft (R) Windows Server (R) 2008 R2 Standard	Windows, Windows Server 2008 R2
Microsoft (R) Windows Server (R) 2008 R2 Enterprise	
Microsoft (R) Windows Server (R) 2008 R2 Datacenter	
Red Hat (R) Enterprise Linux (R) 7 (for Intel64)	Linux, RHEL7
Red Hat (R) Enterprise Linux (R) 6 (for Intel64)	Linux, RHEL6
Oracle Linux 6 (x86_64)	Oracle Linux, Oracle Linux 6
VMware vSphere (R) 6	VMware, vSphere 6.x, VMware 6, VMware 6.x
VMware (R) ESXi (TM) 6	ESX, ESX 6, ESX 6.x
VMware vSphere (R) 5	VMware, vSphere 5.x, VMware 5, VMware 5.x
VMware (R) ESXi (TM) 5	ESXi, ESXi 5, ESXi 5.x
SUSE (R) Linux Enterprise Server 12	SLES, SLES 12
SUSE (R) Linux Enterprise Server 11	SLES, SLES 11

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- Xen is a trademark or registered trademark of Citrix Systems, Inc. or its subsidiaries in the United States and other countries.
- Other company names and product names are the trademarks or registered trademarks of their respective owners.
- Trademark indications are omitted for some system and product names in this manual.

Notation

This manual uses the following fonts and symbols to express specific types of information.

Font or symbols	Meaning	Example
<i>italics</i>	Title of a manual that you should refer to	See the <i>PRIMEQUEST 2000 Series Installation Manual</i> (CA92344-0536).
[]	Window names as well as the names of buttons, tabs, and drop-down menus in windows are enclosed in brackets.	Click the [OK] button.

Notation for the CLI (command line interface)

The following notation is used for commands.

Command syntax

Command syntax is represented as follows.

- Variables requiring the entry of a value are enclosed in angle brackets < >.
- Optional elements are enclosed in brackets [].
- Options for optional keywords are grouped in | (stroke) separated lists enclosed in brackets [].
- Options for required keywords are grouped in | (stroke) separated lists enclosed in braces { }.

Command syntax is written in a box.

Remarks

The command output shown in the PDF manuals may include line feeds at places where there is no line feed symbol (\ at the end of the line).

Notes on notations

- If you have a comment or request regarding this manual, or if you find any part of this manual unclear, please take a moment to share it with us by filling in the form at the following webpage, stating your points specifically, and sending the form to us:
<https://support.ts.fujitsu.com/IndexContact.asp?lng=COM&ln=true>
- The contents of this manual may be revised without prior notice.
- In this manual, the Management Board and MMB firmware are abbreviated as "MMB."
- In this manual, IOU_10GbE and IOU_1GbE are collectively referred to as IO Units.
- Screenshots contained in this manual may differ from the actual product screen displays.
- The IP addresses, configuration information, and other such information contained in this manual are display examples and differ from that for actual operation.
- The PDF file of this manual is intended for display using Adobe(R) Reader(R) in single page viewing mode at 100% zoom.

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CHAPTER 1 Product Overview

This chapter describes the features, specifications, structural concept, system configuration, hardware technologies, and software technologies of the PRIMEQUEST 2000 series.

1.1 Introduction of the PRIMEQUEST 2000 series

PRIMEQUEST 2000 series is a server with highest level scalability, availability and operability by considering the newest Intel architecture as its basis. In particular, PRIMEQUEST 2000 incorporates server integration and power-saving technologies, thereby contributing to cost savings and green ICT systems.

1.1.1 PRIMEQUEST 2400E3/2800E3/2800B3 Features

The features of the PRIMEQUEST 2400E3/2800E3/2800B3 are given below.

High reliability and high-performance

- Use of Intel (R) Xeon (R) processor E7 v4 product family
- SMP system with up to eight sockets (PRIMEQUEST 2800E3/2800B3)

High availability

- The following are supported as the memory functions.
 - Bank DDDC
 - Memory Patrol Scrub
 - Full Memory Mirror
 - Partial Memory Mirror
 - Address Range Mirror
 - Memory Sparing
- Support of degradation operation function so that the system can operate by isolating the faulty CPU cores or SBs
- Support of hardware RAID
- Support of software RAID
- Support of Reserved SB functions

Operations support function

- Agentless (ServerView Agentless Service (SVAS)) hardware monitoring function

Maintainability

- Provided with a Fault Location function to identify suspected components when hardware failure occurs
- Support for maintenance operations by MMB Web-UI Maintenance Wizard

Flexibility

	PRIMEQUEST		
	2400E3	2800E3	2800B3
- Support of physical partitioning (See, 5.2 Physical Partitioning (PPAR))	Supported	Supported	Not Supported
- Support of flexible I/O function (See, 5.10 Flexible I/O Mode)	Supported	Supported	Not Supported
- Support of Extended Partitioning (See, 5.3 Extended Partitioning)	Supported	Supported	Not Supported
- Support of Extended Socket (See, 5.4 Extended Socket)	Supported	Supported	Not Supported

	PRIMEQUEST		
	2400E3	2800E3	2800B3
- Support of Dynamic Reconfiguration (See, 5.9 Dynamic Reconfiguration Function)	Supported	Supported	Not Supported
- Memory Scale-up Board (See, 5.5 Memory Scale-up Board)	Supported	Not Supported	Not Supported

Virtualization support

- Support of Intel (R) Virtualization Technology (VT-x, VT-d)
- Support of APIC virtualization (APICv)

Green compliance / Power saving

- Control of power optimization
- Control of the device cooling airflow with flap
- Optimization of cooling by group partition in the cabinet
- Support of power efficiency function (Optimal Power Allocation)
- Use of low consumption devices (LV-DIMM and SSD)
- Use of high efficiency power supply (80plus platinum)
- Precision control of cooling fan rotation speed
- Support of Power Saving function
- Compliance with RoHS regulation (2011/65/EU)

1.1.2 PRIMEQUEST 2400E2/2800E2/2800B2 Features

The features of the PRIMEQUEST 2400E2/2800E2/2800B2 are given below.

High reliability and high-performance

- Use of Intel (R) Xeon (R) processor E7 v3 product family
- SMP system with up to eight sockets (PRIMEQUEST 2800E2/2800B2)

High availability

- The following are supported as the memory functions.
 - Bank DDDC
 - Memory Patrol Scrub
 - Memory Mirror
 - Partial Memory Mirror
 - Memory Sparing
- Support of degradation operation function so that the system can operate by isolating the faulty CPU cores or SBs
- Support of hardware RAID
- Support of software RAID
- Support of Reserved SB functions

Operations support function

- Agentless (ServerView Agentless Service (SVAS)) hardware monitoring function

Maintainability

- Provided with a Fault Location function to identify suspected components when hardware failure occurs
- Support for maintenance operations by MMB Web-UI Maintenance Wizard

Flexibility

	PRIMEQUEST		
	2400E2	2800E2	2800B2
- Support of physical partitioning (See, 5.2 Physical Partitioning (PPAR))	Supported	Supported	Not Supported
- Support of flexible I/O function (See, 5.10 Flexible I/O Mode)	Supported	Supported	Not Supported
- Support of Extended Partitioning (See, 5.3 Extended Partitioning)	Supported	Supported	Not Supported
- Support of Extended Socket (See, 5.4 Extended Socket)	Supported	Supported	Not Supported
- Support of Dynamic Reconfiguration (See, 5.9 Dynamic Reconfiguration Function)	Supported	Supported	Not Supported
- Memory Scale-up Board (See, 5.5 Memory Scale-up Board)	Supported	Not Supported	Not Supported

Virtualization support

- Support of Intel (R) Virtualization Technology (VT-x, VT-d)
- Support of APIC virtualization (APICv)

Green compliance / Power saving

- Control of power optimization
- Control of the device cooling airflow with flap
- Optimization of cooling by group partition in the cabinet
- Support of power efficiency function (Optimal Power Allocation)
- Use of low consumption devices (LV-DIMM and SSD)
- Use of high efficiency power supply (80plus platinum)
- Precision control of cooling fan rotation speed
- Support of Power Saving function
- Compliance with RoHS regulation (2011/65/EU)

1.1.3 PRIMEQUEST 2400E/2800E/2800B Features

The features of the PRIMEQUEST 2400E/2800E/2800B are given below.

High reliability and high-performance

- Use of Intel (R) Xeon (R) processor E7 v2 product family
- SMP system with up to eight sockets (PRIMEQUEST 2800E/2800B)

High availability

- The following are supported as the memory functions.
 - DDDC
 - Memory Patrol Scrub

- Memory Mirror
- Partial Memory Mirror
- Memory Sparing
- Support of degradation operation function so that the system can operate by isolating the faulty CPU cores or SBs
- Support of hardware RAID
- Support of software RAID
- Support of Reserved SB functions

Operations support function

- Agentless (ServerView Agentless Service (SVAS)) hardware monitoring function

Maintainability

- Provided with a Fault Location function to identify suspected components when hardware failure occurs
- Support for maintenance operations by MMB Web-UI Maintenance Wizard

Flexibility

	PRIMEQUEST		
	2400E	2800E	2800B
- Support of physical partitioning (See, 5.2 Physical Partitioning (PPAR))	Supported	Supported	Not Supported
- Support of flexible I/O function (See, 5.10 Flexible I/O Mode)	Supported	Supported	Not Supported
- Support of Extended Partitioning (See, 5.3 Extended Partitioning)	Supported	Supported	Not Supported
- Support of Extended Socket (See, 5.4 Extended Socket)	Supported	Supported	Not Supported
- Support of Dynamic Reconfiguration (See, 5.9 Dynamic Reconfiguration Function)	Supported	Supported	Not Supported
- Memory Scale-up Board (See, 5.5 Memory Scale-up Board)	Not Supported	Not Supported	Not Supported

Virtualization support

- Support of Intel (R) Virtualization Technology (VT-x, VT-d)
- Support of APIC virtualization (APICv)

Green compliance / Power saving

- Control of power optimization
- Control of the device cooling airflow with flap
- Optimization of cooling by group partition in the cabinet
- Support of power efficiency function (Optimal Power Allocation)
- Use of low consumption devices (LV-DIMM and SSD)
- Use of high efficiency power supply (80plus platinum)
- Precision control of cooling fan rotation speed
- Support of Power Saving function
- Compliance with RoHS regulation (2011/65/EU)

1.2 Product Lineup

The PRIMEQUEST 2000 series includes the following models.

- PRIMEQUEST 2400E3: 4 sockets, Enterprise model
- PRIMEQUEST 2800E3: 8 sockets, Enterprise model
- PRIMEQUEST 2800B3: 8 sockets, Business model

- PRIMEQUEST 2400E2: 4 sockets, Enterprise model
- PRIMEQUEST 2800E2: 8 sockets, Enterprise model
- PRIMEQUEST 2800B2: 8 sockets, Business model

- PRIMEQUEST 2400E: 4 sockets, Enterprise model
- PRIMEQUEST 2800E: 8 sockets, Enterprise model
- PRIMEQUEST 2800B: 8 sockets, Business model

The external view is shown below.

For details on the conceptual diagram, see '[2.2 Base cabinet](#)'.

FIGURE 1.1 External Overview of 2400E3/2800E3/2400E2/2800E2/2400E/2800E



FIGURE 1.2 External Overview of 2800B3/2800B2



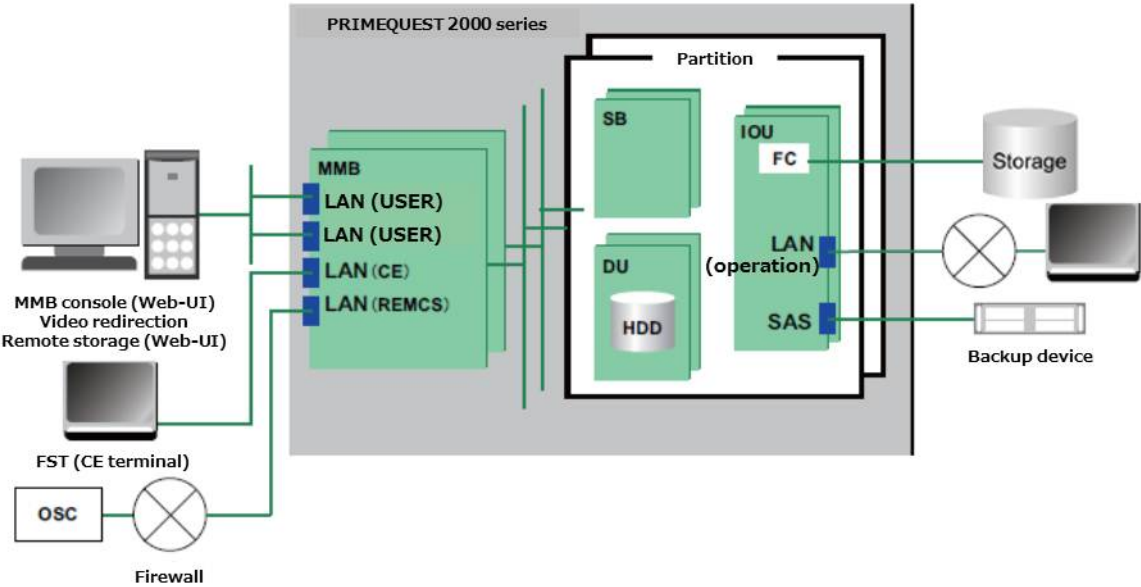
FIGURE 1.3 External Overview of 2800B



1.3 PRIMEQUEST 2000 series configuration

The following figure shows a conceptual diagram of the configuration of the PRIMEQUEST 2000 series.

FIGURE 1.4 Configuration conceptual diagram



1.3.1 Hardware configuration

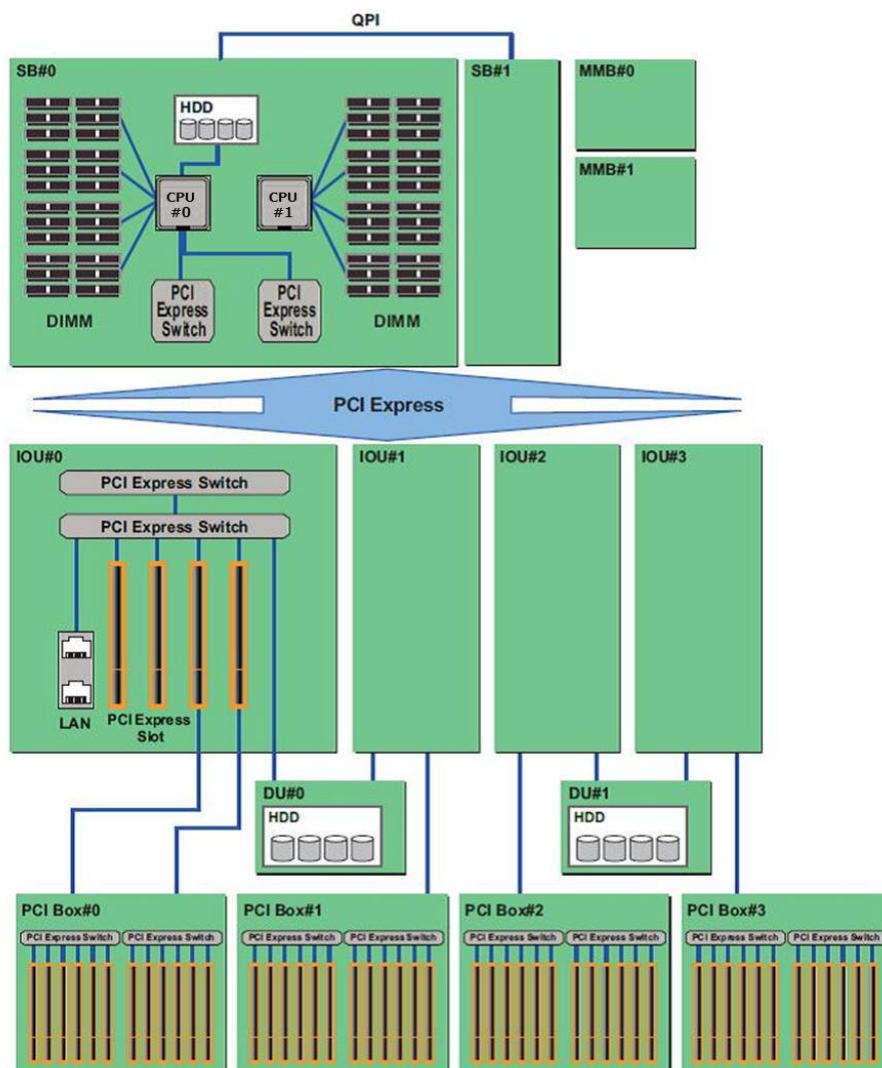
Features of PRIMEQUEST 2400E3/2400E2/2400E

The features of the PRIMEQUEST 2400E3/2400E2/2400E are listed below.

- Up to two CPUs can be mounted to each SB
- Up to two SBs can be mounted
- Up to three Memory Scale-up Boards can be mounted (*1)
- Up to four HDDs can be mounted to each SB
- Up to four sockets SMP
- Up to two physical partitions (PPAR)
- Main hardware configuration
 - Number of connected IOUs: 4
 - Number of connected DUs: 2
 - Number of PCI_Boxes: 4

(*1) Only PRIMEQUEST 2400E3/2400E2 support Memory Scale-up Board.

FIGURE 1.5 Hardware configuration image (PRIMEQUEST 2400E3/2400E2/2400E)

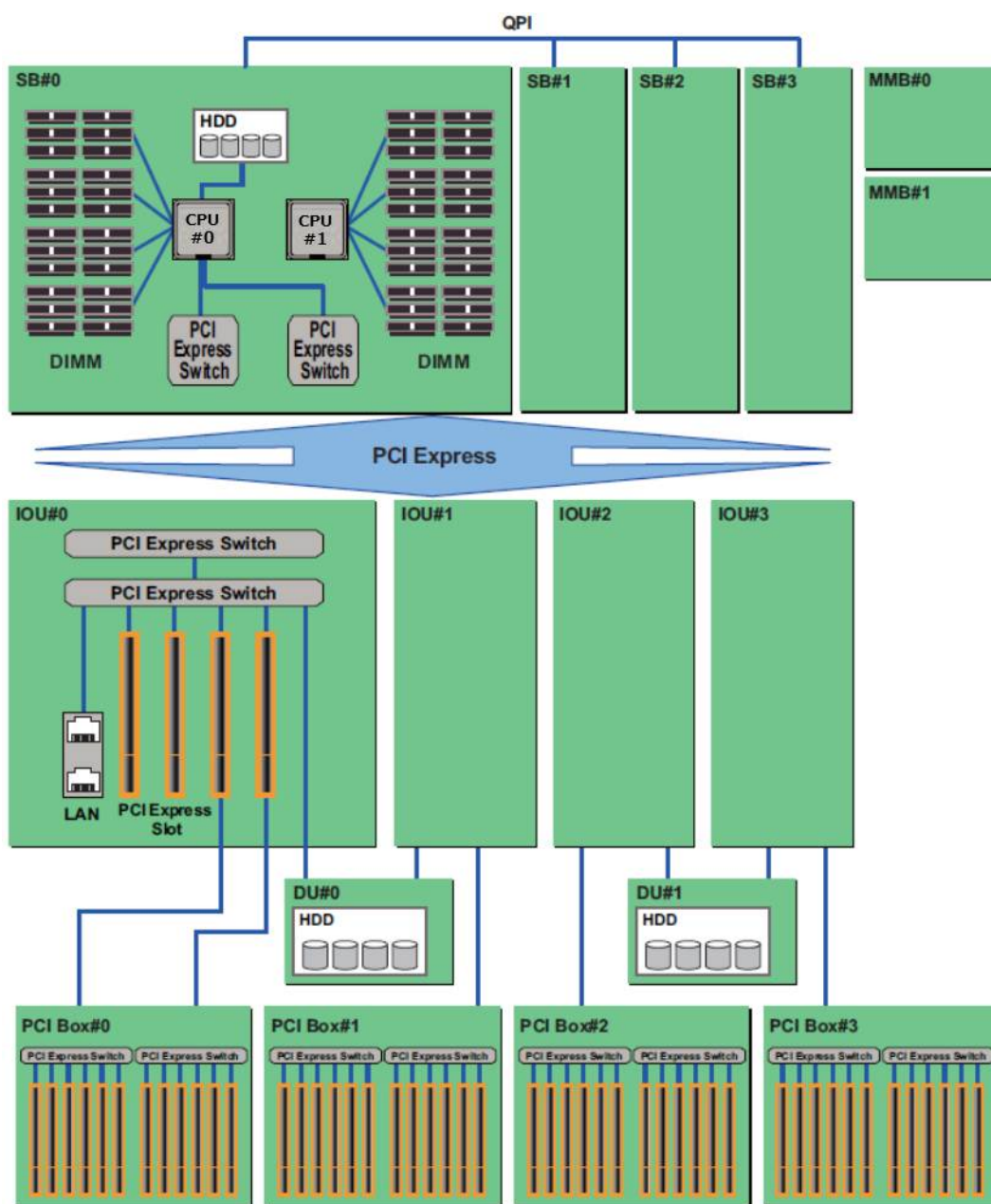


Features of the PRIMEQUEST 2800E3/2800E2/2800E

Features of the PRIMEQUEST 2800E3/2800E2/2800E are as below.

- Up to two CPUs can be mounted to each SB
- Up to four SBs can be mounted
- Up to four HDDs can be mounted to each SB
- Up to eight sockets SMPs
- Up to four physical partitions (PPAR)
- Main hardware configuration
 - Number of connected IOUs: 4
 - Number of connected DUs: 2
 - Number of PCI_Boxes: 4

FIGURE 1.6 Hardware configuration image (PRIMEQUEST 2800E3/2800E2/2800E)

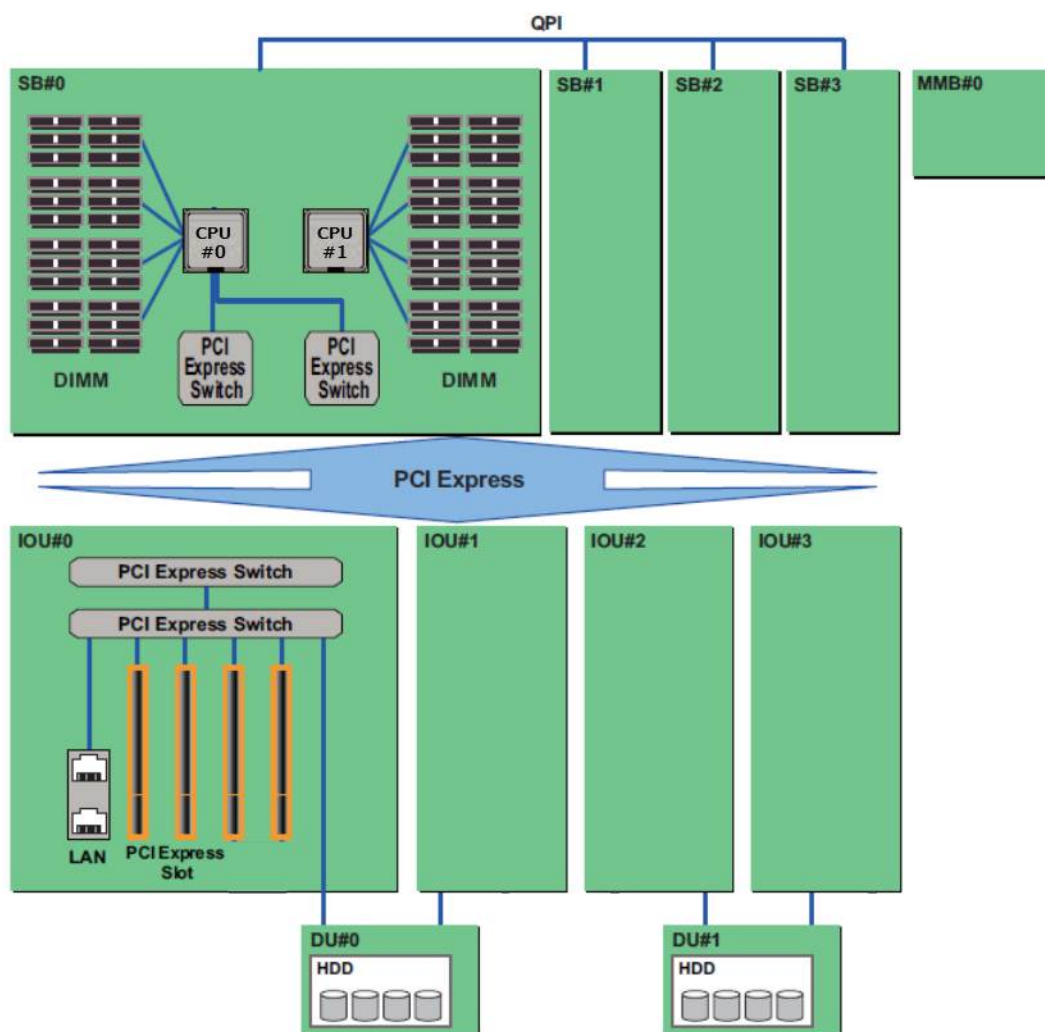


Features of the PRIMEQUEST 2800B3/2800B2/2800B

Features of the PRIMEQUEST 2800B3/2800B2/2800B are as below.

- Up to two CPUs can be mounted to each SB
- Up to four SBs can be mounted
- Up to eight sockets SMPs
- Main hardware configuration
 - Number of connected IOUs: 4
 - Number of connected DUs: 2

FIGURE 1.7 Hardware configuration image (PRIMEQUEST 2800B3/2800B2/2800B)



1.3.2 Hardware specifications

The hardware specifications of the PRIMEQUEST 2000 series are listed in the table below.

TABLE 1.1 Hardware specifications (PRIMEQUEST 2400E3/2800E3/2800B3)

		PRIMEQUEST		
		2400E3	2800E3	2800B3
Number of mounted SBs		2	4	4
Number of mounted Memory Scale-up Boards		3 (*1)	0	0
Number of mounted IOUs		4	4	4
Number of mounted DUs		2	2	2
Number of mounted PCI_Boxes		4	4	-
CPU	Number of sockets	Up to 4	Up to 8	Up to 8
	Maximum SMP	4	8	8
	Socket Type	Socket R1 (LGA 2011)		
	Supported CPU	Intel(R) Xeon(R) processor E7 v4 product family (*2)		
	Core / Socket	Up to 24 (*3)		
	CPU clock	Up to 3.20 GHz (*3)		
	QPI rate	Up to 9.6 GT/s (*3)		
	L1 cache	Instruction: 32 KB/core, Data: 32 KB/core		
	L2 cache	256 KB/core		
	L3 cache	Up to 60 MB/socket (*3)		
	Virtual assist	Intel VT, Intel VT-d		
Memory	Supported DIMM	DDR4-RDIMM, DDR4-LRDIMM, 8GB /16GB/ 32GB/ 64GB/128GB		
	Maximum capacity	12 TB (@128 GB) / 24 TB (@128 GB) (*4)	24 TB (@128 GB)	
	Speed	1333 MT/s, 1600 MT/s, 1866 MT/s		
	Memory protection function	ECC, SDDC, Bank DDDC		
	Memory mirror	Partial mirror / Full mirror / Address range mirror		
	Memory spare	1, 2, 3 rank spare supported		
	Maximum number of partitions (PPAR)	2	4	1
Dynamic Reconfiguration (DR)		Supported		-
Flexible I/O		Supported		-
Reserved SB		Supported		-
Internal disk	Number of SB built-in slots	8	16	-
	Number of DU built-in slots	8		
	Maximum capacity	19.2 TB	28.8 TB	9.6TB
PCI Express slot	Built-in (PCI Express Gen3)	Up to 16 (4x IOU_1GbE)		
	Max. (PCI Express Gen3) (*5)	Up to 56 (4x IOU_1GbE + 4x PCI_Box)	Up to 16 (4x IOU_1GbE)	
Onboard device		Dual GbE (on IOU_1GbE) / Dual 10GbE (on IOU_10GbE)		
KVM interface (*6)	External USB	USB2.0 4 port (/SB)		
	VGA	25 pin analog -VGA 1 port (/SB)		
Video redirection function		Supported		
Virtual media function		Supported		
Redundancy supported hardware		PSU, fan, HDD, PCI Express card, CLK, MMB (*7), power input system		
Hot replacement supported components		PSU, fan, HDD, PCI Express card, MMB (when duplication)		PSU, fan, HDD, PCI Express card

		PRIMEQUEST		
		2400E3	2800E3	2800B3
Number of installed MMBs		1 (Duplication is an option)		1 (Duplication not supported)
Input voltage		AC100-120 V/ 200-240 V	AC200-240 V	
Number of installed PSUs (maximum)		6 (200 V), 4 (100 V)	6	
Power redundancy support		N+1, N+N (Dual power feed)		
External dimensions [mm (in.)]	Width	445 (17.52)		
	Depth	782 (30.79)		
	Height	438 (17.25)		
Number of occupied units		10U		
Weight [kg(lb)]		124 (273)	150 (331)	143 (315)

*1: Total number of SB and Memory Scale-up Board is up to four boards.

*2: Since supported CPU differs depending on PRIMEQUEST model, see '2.3.1 Support CPU list'.

*3: Since these values differ depending on CPU model, see '2.3.1 Support CPU list'.

*4: The case where Memory Scale-up Board is used in PRIMEQUEST 2400E3.

*5: When the maximum number of PCI_Boxes are connected.

*6: The KVM interface is provided for each SB (should not be always-on connection).

*7: Redundancy of MMB is supported in PRIMEQUEST 2400E3 and 2800E3. PRIMEQUEST 2800B3 does not support MMB redundancy.

For details on the device specifications, environment conditions and power conditions of the PRIMEQUEST 2000 series, see *PRIMEQUEST 2000 series hardware installation manual* (CA92344-0535).

TABLE 1.2 Hardware specifications (PRIMEQUEST 2400E2/2800E2/2800B2)

		PRIMEQUEST		
		2400E2	2800E2	2800B2
Number of mounted SBs		2	4	4
Number of mounted Memory Scale-up Boards		3 (*1)	0	0
Number of mounted IOUs		4	4	4
Number of mounted DUs		2	2	2
Number of mounted PCI_Boxes		4	4	-
CPU	Number of sockets	Up to 4	Up to 8	Up to 8
	Maximum SMP	4	8	8
	Socket Type	Socket R1 (LGA 2011)		
	Supported CPU	Intel(R) Xeon(R) processor E7 v3 product family (*2)		
	Core / Socket	Up to 18 (*3)		
	CPU clock	Up to 3.20 GHz (*3)		
	QPI rate	Up to 9.6 GT/s (*3)		
	L1 cache	Instruction : 32 KB/core, Data : 32 KB/core		
	L2 cache	256 KB/core		
	L3 cache	Up to 45 MB/socket (*3)		
	Virtual assist	Intel VT, Intel VT-d		
Memory	Supported DIMM	DDR4-RDIMM, DDR4-LRDIMM, 8GB /16GB/ 32GB/ 64GB		
	Maximum capacity	6 TB (@64 GB) /12 TB (@64 GB) (*4)	12 TB (@64 GB)	
	Speed	1333 MT/s, 1600 MT/s, 1866 MT/s		
	Memory protection function	ECC, SDDC, Bank DDDC		
	Memory mirror	Partial mirror / Full mirror		
	Memory spare	1, 2, 3 rank spare supported		
	Maximum number of partitions (PPAR)	2	4	1
Dynamic Reconfiguration (DR)		Supported		-
Flexible I/O		Supported		-

		PRIMEQUEST		
		2400E2	2800E2	2800B2
Reserved SB		Supported		-
Internal disk	Number of SB built-in slots	8	16	-
	Number of DU built-in slots	8		
	Maximum capacity	19.2 TB	28.8 TB	9.6TB
PCI Express slot	Built-in (PCI Express Gen3)	Up to 16 (4x IOU_1GbE)		
	Max. (PCI Express Gen3) (*5)	Up to 56 (4x IOU_1GbE + 4x PCI_Box)		Up to 16 (4x IOU_1GbE)
Onboard device		Dual GbE (on IOU_1GbE) / Dual 10GbE (on IOU_10GbE)		
KVM interface (*6)	External USB	USB2.0 4 port (/SB)		
	VGA	25 pin analog -VGA 1 port (/SB)		
Video redirection function		Supported		
Virtual media function		Supported		
Redundancy supported hardware		PSU, fan, HDD, PCI Express card, CLK, MMB (*7), power input system		
Hot replacement supported components		PSU, fan, HDD, PCI Express card, MMB (when duplication)		PSU, fan, HDD, PCI Express card
Number of installed MMBs		1 (Duplication is an option)		1 (Duplication not supported)
Input voltage		AC100-120 V/ 200-240 V	AC200-240 V	
Number of installed PSUs (maximum)		6 (200 V), 4 (100 V)	6	
Power redundancy support		N+1, N+N (Dual power feed)		
External dimensions [mm (in.)]	Width	445 (17.52)		
	Depth	782 (30.79)		
	Height	438 (17.25)		
Number of occupied units		10U		
Weight [kg(lb)]		124 (273)	150 (331)	143 (315)

*1: Total number of SB and Memory Scale-up Board is up to four boards.

*2: Since supported CPU differs depending on PRIMEQUEST model, see '2.3.1 Support CPU list'.

*3: Since these values differ depending on CPU model, see '2.3.1 Support CPU list'.

*4: The case where Memory Scale-up Board is used in PRIMEQUEST 2400E2.

*5: When the maximum number of PCI_Boxes are connected.

*6: The KVM interface is provided for each SB (should not be always-on connection).

*7: Redundancy of MMB is supported in PRIMEQUEST 2400E2 and 2800E2. PRIMEQUEST 2800B2 does not support MMB redundancy.

For details on the device specifications, environment conditions and power conditions of the PRIMEQUEST 2000 series, see *PRIMEQUEST 2000 series hardware installation manual* (CA92344-0535).

TABLE 1.3 Hardware specifications (PRIMEQUEST 2400E/2800E/2800B)

		PRIMEQUEST		
		2400E	2800E	2800B
Number of mounted SBs		2	4	4
Number of mounted IOUs		4	4	4
Number of mounted DUs		2	2	2
Number of mounted PCI_Boxes		4	4	-
CPU	Number of sockets	Up to 4	Up to 8	Up to 8
	Maximum SMP	4	8	8
	Socket Type	Socket R1 (LGA 2011)		

		PRIMEQUEST		
		2400E	2800E	2800B
	Supported CPU	Intel(R) Xeon(R) processor E7 v2 product family (*1)		
	Core / Socket	Up to 15 (*2)		
	CPU clock	Up to 3.40 GHz (*2)		
	QPI rate	Up to 8.0 GT/s (*2)		
	L1 cache	Instruction : 32 KB/core, Data : 32 KB/core		
	L2 cache	256 KB/core		
	L3 cache	Up to 37.5 MB/socket (*2)		
	Virtual assist	Intel VT, Intel VT-d2		
Memory	Supported DIMM	DDR3-RDIMM, DDR3-LRDIMM, 8GB /16GB/ 32GB/ 64GB		
	Maximum capacity	6 TB (@64 GB)	12 TB (@64 GB)	
	Speed	1066 MT/s, 1333 MT/s, 1600 MT/s		
	Memory protection function	ECC, SDDC, DDDC		
	Memory mirror	Partial mirror / Full mirror		
	Memory spare	Supported		
Maximum number of partitions (PPAR)		2	4	1
Dynamic Reconfiguration (DR)		Supported		-
Flexible I/O		Supported		-
Reserved SB		Supported		-
Internal disk	Number of SB built-in slots	8	16	-
	Number of DU built-in slots	8		
	Maximum capacity	19.2 TB	28.8 TB	9.6TB
PCI Express slot	Built-in (PCI Express Gen3)	Up to 16 (4x IOU_1GbE)		
	Max. (PCI Express Gen3) (*3)	Up to 56 (4x IOU_1GbE + 4x PCI_Box)		Up to 16 (4x IOU_1GbE)
Onboard device		Dual GbE (on IOU_1GbE) / Dual 10GbE (on IOU_10GbE)		
KVM interface (*4)	External USB	USB2.0 4 port (/SB)		
	VGA	25 pin analog -VGA 1 port (/SB)		
Video redirection function		Supported		
Virtual media function		Supported		
Redundancy supported hardware		PSU, fan, HDD, PCI Express card, CLK, MMB (*5), power input system		
Hot replacement supported components		PSU, fan, HDD, PCI Express card, MMB (when duplication)		PSU, fan, HDD, PCI Express card
Number of installed MMBs		1 (Duplication is an option)		1 (Duplication not supported)
Input voltage		AC100-120 V/ 200-240 V	AC200-240 V	
Number of installed PSUs (maximum)		4 (200 V), 4 (100 V)	6	
Power redundancy support		N+1, N+N (Dual power feed)		
External dimensions [mm (in.)]	Width	445 (17.52)		
	Depth	782 (30.79)		
	Height	438 (17.25)		
Number of occupied units		10U		
Weight [kg(lb)]		124 (273)	150 (331)	143 (315)

*1: Since supported CPU differs depending on PRIMEQUEST model, see '2.3.1 Support CPU list'.

*2: Since these values differ depending on CPU model, see '2.3.1 Support CPU list'.

*3: When the maximum number of PCI_Boxes are connected.

*4: The KVM interface is provided for each SB (should not be always-on connection).

*5: Redundancy of MMB is supported in PRIMEQUEST 2400E and 2800E. PRIMEQUEST 2800B does not support MMB redundancy.

For details on the device specifications, environment conditions and power conditions of the PRIMEQUEST 2000 series, see *PRIMEQUEST 2000 series hardware installation manual* (CA92344-0535).

1.3.3 Partition management

Partition is a divided unit of the hardware which is provided with the functions of processing device, having at least one SB and IOU. Since partitions are independent hardware units, each partition can be considered as an independent server. Multiple production systems can be operated on a PRIMEQUEST 2000 by installing different OS and applications in each partition.

The configuration of a partition of the PRIMEQUEST 2000 series can be changed by static configuration control function (*1), and by dynamic configuration control function (*2).

*1: Function that turns on or turns off power in a partition unit, or changes its configuration triggered by rebooting.

*2: Dynamic Reconfiguration (DR). Function which changes the partition resource configuration without rebooting the partition which is the target for changing configuration.

For details on the partition functions, see '[4.2.6 Partition settings and configuration display](#)'.

1.3.4 Hardware management

The Management Board (MMB) is provided as a mechanism for managing the hardware of the entire PRIMEQUEST 2000 series.

The MMB console (*1), the Field Support Tool (FST (*2)), and an external network can be connected through a LAN connection from the MMB.

*1: Console for setting up and displaying each hardware resource

*2: Console for maintaining the hardware of the PRIMEQUEST 2000 series. Used by the field engineers.

The MMB has dedicated CPU which is independent of the CPU on the SB, and is mounted on the rear of the cabinet.

The MMB controls and processes the following.

- Partition configuration control in cabinet
- Power control
- Mirror mode settings
- Reset process
- Sensor monitoring
- Log management
- Schedule operations

Connecting the MMB to REMCS (remote client support system) by any of the following methods enables to remotely monitor the status of the device.

- Via the Web-UI from management network (usual)
- Via the CLI where the management terminal is connected to the MMB serial port

1.4 Hardware technologies

PRIMEQUEST 2400E3/2800E3/2800B3 Hardware technologies

This section describes the main functions provided in the PRIMEQUEST 2000 series.

Technology that attains high efficiency, high scalability (expandability)

- Intel (R) Xeon (R) processor E7 v4 product family
- QuickPath Interconnect (QPI)
- Hyper threading-technology function

Technologies providing high-reliability and high-availability

- Bank DDDC
- Memory Patrol Scrub
- Full Memory Mirror
- Partial Memory Mirror
- Address Range Mirror
- Memory Sparing function
- Reserved SB
- Hardware RAID
- PCI hot plug for PCI_Box
- Security / Encryption function
- TPM/BitLocker
- Secure Boot

Technologies providing flexible operability

- Physical partitioning (PPAR)
- Extended Partitioning
- Extended Socket
- Dynamic Reconfiguration (DR)
- Flexible I/O
- Memory Scale-up Board
- Virtualization support function (Virtualization Technology)
- Enhanced Speed Step/Turbo Boost function
- Management Board (MMB)
- Network (LAN)
- Preboot eXecution Environment (PXE)
- iSCSI boot and iSCSI connection
- FcoE boot and FCoE connection
- Wake on LAN (WOL)

Technologies that facilitate administration

- Centralized management of hardware with MMB
- Agentless (ServerView Agentless Service (SVAS)) hardware monitoring
- LDAP function (Lightweight Directory Access Protocol)

Remarks

SVAS should be installed to monitor for any error in the PCI Express card (*1).

*1: Since firmware monitor SAS RAID controller cards, monitoring SAS RAID controller cards and HDD or SSD can be done without installing SVAS.

PRIMEQUEST 2400E2/2800E2/2800B2 Hardware technologies

This section describes the main functions provided in the PRIMEQUEST 2000 series.

Technology that attains high efficiency, high scalability (expandability)

- Intel (R) Xeon (R) processor E7 v3 product family
- QuickPath Interconnect (QPI)
- Hyper threading-technology function

Technologies providing high-reliability and high-availability

- Bank DDDC
- Memory Patrol Scrub
- Memory Mirror function
- Memory Sparing function
- Reserved SB
- Hardware RAID
- PCI hot plug for PCI_Box
- Security / Encryption function
- TPM/BitLocker
- Secure Boot

Technologies providing flexible operability

- Physical partitioning (PPAR)
- Extended Partitioning
- Extended Socket
- Dynamic Reconfiguration (DR)
- Flexible I/O
- Memory Scale-up Board
- Virtualization support function (Virtualization Technology)
- Enhanced Speed Step/Turbo Boost function
- Management Board (MMB)
- Network (LAN)
- Preboot eXecution Environment (PXE)
- iSCSI boot and iSCSI connection
- FcoE boot and FCoE connection
- Wake on LAN (WOL)

Technologies that facilitate administration

- Centralized management of hardware with MMB
- Agentless (ServerView Agentless Service (SVAS)) hardware monitoring
- LDAP function (Lightweight Directory Access Protocol)

Remarks

SVAS should be installed to monitor for any error in the PCI Express card (*1).

*1: Since firmware monitor SAS RAID controller cards, monitoring SAS RAID controller cards and HDD or SSD can be done without installing SVAS.

PRIMEQUEST 2400E/2800E/2800B Hardware technologies

This section describes the main functions provided in the PRIMEQUEST 2000 series.

Technology that attains high efficiency, high scalability (expandability)

- Intel (R) Xeon (R) processor E7 v2 product family
- QuickPath Interconnect (QPI)
- Hyper threading-technology function

Technologies providing high-reliability and high-availability

- DDDC

- Memory Patrol Scrub
- Memory Mirror function
- Memory Sparing function
- Reserved SB
- Hardware RAID
- PCI hot plug for PCI_Box
- Security / Encryption function
- TPM/BitLocker
- Secure Boot

Technologies providing flexible operability

- Physical partitioning (PPAR)
- Extended Partitioning
- Extended Socket
- Dynamic Reconfiguration (DR)
- Flexible I/O
- Virtualization support function (Virtualization Technology)
- Enhanced Speed Step/Turbo Boost function
- Management Board (MMB)
- Network (LAN)
- Preboot eXecution Environment (PXE)
- iSCSI boot and iSCSI connection
- FcoE boot and FCoE connection
- Wake on LAN (WOL)

Technologies that facilitate administration

- Centralized management of hardware with MMB
- Agentless (ServerView Agentless Service (SVAS)) hardware monitoring
- LDAP function (Lightweight Directory Access Protocol)

Remarks

SVAS should be installed to monitor for any error in the PCI Express card (*1).

*1: Since firmware monitor SAS RAID controller cards, monitoring SAS RAID controller cards and HDD or SSD can be done without installing SVAS.

1.4.1 CPU

In PRIMEQUEST 2400E3/2800E3/2800B3, the Intel (R) Xeon (R) processor E7 v4 product family is mounted.

In PRIMEQUEST 2400E2/2800E2/2800B2, the Intel (R) Xeon (R) processor E7 v3 product family is mounted. In PRIMEQUEST 2400E/2800E/2800B, the Intel (R) Xeon (R) processor E7 v2 product family is mounted.

In all models, a mix installation of CPU having different number of cores is supported in a cabinet, as long as those CPUs are restricted to the product number supported by the respective model.

For details on the conditions of mix installation of CPUs in the cabinet, see 'G.1 CPU' of "*PRIMEQUEST 2000 Series Administration Manual*" (CA92344-0537).

Hyper Threading Technology Function

The PRIMEQUEST 2000 series supports the Hyper Threading Technology function.

For details on the Hyper Threading Technologies functions, see '[1.4.3 Hyper Threading Technology Function](#)'.

Intelligent Power Technologies

The PRIMEQUEST 2000 series supports the following Intelligent Power Technologies.

- Enhanced Halt State

This function reduces the CPU power consumption by lowering the core/ clock frequency ratio and core voltage of the CPU in the idle mode, according to the instructions of the OS.

- Demand Based Switching

This function changes the combination of operating voltage and the clock of the CPU, called the P-State to reduce the power consumption.

- Turbo Boost Technology

When more than one CPU core is idle, this function increases the frequency of the running CPU core to a higher than specified frequency, within the Thermal Design Power (TDP) range.

Enhanced Speed Step

Enhanced Speed Step is a function that changes the operating frequency according to the load of each core in the CPU. The default value is “enabled”.

In PRIMEQUEST 2400E3/2800E3/2800B3/2400E2/2800E2/2800B2, Enhanced Speed Step has following features:

- Each core in the socket can have different frequency each other.
- Threads in the core can have only same frequency.

In PRIMEQUEST 2400E/2800E/2800B, Enhanced Speed Step has following features:

- Each socket in the partition can have different frequency each other.
- Cores in the Socket can have only same frequency.

1.4.2 QuickPath Interconnect (QPI)

The PRIMEQUEST 2000 series uses a high-speed system bus called Intel (R) Quick Path Interconnect (QPI) to communication between CPUs in a partition.

The resource can be increased by connecting peer CPUs by the QPI.

1.4.3 Hyper Threading Technology Function

PRIMEQUEST 2000 series supports the function of hyper-threading technology. In hyper threading technology function, a single processor core does the work of multiple processor cores when viewed from the OS, thereby improving CPU performance.

- In PRIMEQUEST 2400E3/2800E3/2800B3, this function supports up to two threads per core and up to 48 threads for each CPU (24 cores).
- In PRIMEQUEST 2400E2/2800E2/2800B2, this function supports up to two threads per core and up to 36 threads for each CPU (18 cores).
- In PRIMEQUEST 2400E/2800E/2800B, this function supports up to two threads per core and up to 30 threads for each CPU (15 cores).

Enabled/disabled of the [Hyper-Threading] is set from the [CPU configuration] menu of the UEFI.

- Enabled (Default value)
- Disabled

For details on the hyper threading technology function settings, see '3.4.4 [CPU Configuration] menu' in the “PRIMEQUEST 2000 Series Tool Reference” (CA92344-0539).

1.4.4 Memory Mirror Functions

The memory is duplicated and the data is written to both of duplicated memories. Even if an uncorrectable error occurs in one memory, the data in the other memory can be used. This prevents the data errors which cannot be corrected by Error Checking Correction (ECC), such as multi-bit error, which attains a continuous and stable system operation.

In the PRIMEQUEST 2000 series, the Memory Mirror function is selected from the following Memory Mirror Mode.

- Full Mirror: All memory in all SB and Memory Scale-up Board of specific partition is mirrored.
- Partial Memory Mirror: The memory included in only the Home SB of the partition is duplicated.
- Address Range Mirror: All memory in all SB and Memory Scale-up Board of specific partition is mirrored, and duplicated rate can be configured arbitrarily.

Available Memory Mirror Mode in each model is shown below.

Table 1.4 Available Memory Mirror Mode

Memory Operation Mode	PRIMEQUEST	PRIMEQUEST	PRIMEQUEST
	2400E3/2800E3/2800B3	2400E2/2800E2/2800B2	2400E/2800E/2800B
Full Mirror	Supported	Supported	Supported
Partial Memory Mirror	Supported	Supported	Supported
Address Range Mirror	Supported	Not supported	Not Supported

Using the Memory Mirror, the partition can keep operating even if duplicated memory fails. The failed memory will be removed from the partition (memory degradation) at next reboot. In full mirror mode and partial mirror mode, the operation when there is memory degradation due to a memory fault can be selected from the following.

- Mirror Keep Mode: The memory duplication is maintained even after memory degradation.
- Capacity Keep Mode: The memory capacity is maintained by cancelling the memory duplication either partially or in full.

For the details on the Memory Mirror function, see '3.2.5 Memory Mirror' in "PRIMEQUEST 2000 Series Administration Manual" (CA92344-0537).

1.4.5 Memory Sparing Function

The PRIMEQUEST 2000 series is provided with a Memory Sparing function.

The Memory Sparing function prepares spare rank (a rank means unit of the block of memory module.) to endure rank errors. If predictive failure of a rank is detected, copying the data of the rank into the spare rank not to use failed rank will be able to keep the partition operating.

The Memory Spare function is enabled by the MMB Web-UI.

- In PRIMEQUEST 2400E3/2800E3/2800B3/2400E2/2800E2/2800B2, up to half number of total ranks on a DDR channel per DDR channel can be spared.
- In PRIMEQUEST 2400E/2800E/2800B, one rank on a DDR channel per DDR channel can be spared.

Note

The PRIMEQUEST2000 series does not support Memory Sparing between CPU sockets and between DDR Channels. When using Memory Sparing, it is necessary to mount the DIMM in such a way so as to have multiple Ranks in a DDR Channel. If Memory Spare Mode is selected at the order placement, corresponding PRIMEQUEST systems are shipped in such a way so as to fulfil this condition.

1.4.6 Reserved SB Function

PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E models support Reserved SB function.

The Reserved SB function is the function where a faulty SB is automatically removed from the partition, and the Reserved SB which is previously configured is added to a partition when the partition is powered on.

SB reserved for switching at the time of failure, is called Reserved SB. Since the partition is automatically reconfigured / restarted, there is improved operation continuity.

For details on the Reserved SB function, see '3.2.3 Reserved SB' in "*PRIMEQUEST 2000 Series Administration Manual*" (CA92344-0537).

1.4.7 Hardware RAID

The PRIMEQUEST 2000 series supports hardware RAID. The hardware RAID has a dedicated RAID controller chip and firmware. It can independently control an array by disconnecting the hard disk where error had occurred, and connecting a spare disk or new normal hard disk.

The RAID levels supported by the hardware RAID are RAID 0, RAID 1, RAID 5, RAID 6, RAID 1E, RAID 10, RAID 50, and RAID 60.

In SAS RAID controller card, a dedicated super-capacitor can be connected. The Write performance of RAID 5 and RAID 6 can be improved by enabling the Write Back Cache.

The SAS RAID controller card necessary for the hardware RAID should be mounted in the SB and DU.

Below table shows the number of HDD/SSD that is connected to a SAS RAID controller card in the DU and shows

The number of HDD / SSD that can be mounted for each SAS RAID controller card in the DU is listed in the table below.

TABLE 1.5 Hardware RAID Level

Component	Installation RAID card	Number of connected HDDs/SSDs	Hardware RAID level
SB/DU	SAS RAID controller card	1	RAID 0
		2	RAID 0, RAID 1
		3	RAID 0, RAID 1, RAID 5, RAID 6
		4	RAID 0, RAID 5, RAID 6, RAID 1E, RAID 10

When two SAS RAID controller cards are installed in a DU, there would be up to two HDDs connected to a SAS RAID controller card.

Activation of HDD/SSD can be increased even when using a hardware RAID.

For details, see '*Modular RAID Controller/ Modular SAS HBA*', '*MegaRAID SAS Software*' and '*MegaRAID SAS Device Driver Installation*'.

1.4.8 PCI Hot Plug Function

All PCI Express slots in the PCI_Box of the PRIMEQUEST 2000 series support the PCI hot plug function.

This function is a technology that enables extraction or insertion of a PCI card during system operation.

Any PCI Express Slots in the IOU_1GbE and the IOU_10GbE do not support the PCI hot plug function.

1.4.9 Security and Encryption Function

The following security/ encryption function s are supported in the PRIMEQUEST 2000 series.

- Advanced Encryption Standard New Instructions (AES-NI)
- Digital Random Number Generator (DRNG)
- Supervisor Mode Execution Protection (SMEP)

For details on the security functions related to TPM related security, see '[1.4.10 Trusted Platform Module \(TPM\)](#)'

1.4.10 Trusted Platform Module (TPM)

Trusted Platform Module (TPM) is supported in the PRIMEQUEST 2000 series. PRIMEQUEST 2400E3/2800E3/2800B3 supports TPM1.2 and TPM2.0. PRIMEQUEST 2400E2/2800E2/2800B2/2400E/2800E/2800B supports TPM1.2.

Remarks

To use TPM, System Boards with TPM is required to be purchased.

Reserved SB function cannot be used if TPM function is enabled. The TPM is a security chip with the following functions.

- Data (storage) encryption processing function

- Secret key storage function
- Platform certification

The TPM is enabled by UEFI to enable its function.

The BitLocker can be used by enabling the TPM.

For details, see '3.4.12 [Security Configuration] menu' in "*PRIMEQUEST 2000 Series Tool Reference*".

1.4.11 Secure Boot

Secure Boot is the function that UEFI firmware checks whether an operating system to be boot and IO cards is not tampered and boots the operating system only if they are not tampered before OS booting.

If you enable Secure Boot, enable Secure Boot by UEFI.

For details, see '3.4.9 [Secure Boot Configuration] menu' in "*PRIMEQUEST 2000 Series Tool Reference*".

1.4.12 Physical Partitioning (PPAR)

The Physical partitioning divides the hardware resource into multiple systems within the cabinet and operates independent systems (OS) as divided units.

The PRIMEQUEST 2000 series supports physical partitioning except for PRIMEQUEST 2800B3/2800B2/2800B.

The physical partition with any number of resources can be configured by using the flexible I/O mode (*1) in all models.

*1: For details on the flexible I/O mode, see '[5.10 Flexible I/O Mode](#)'.

The following are the features of the partitioning function.

- Multiple operations can be configured in the same cabinet, thus enabling a flexible system operation.
- Hardware protection to prevent faults in the arbitrary partitions from affecting the other partitions.

For details, see '[5.2 Physical Partitioning \(PPAR\)](#)'.

1.4.13 Extended Partitioning

The PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E supports the Extended Partitioning function.

The Extended Partitioning function is the function which divides the physical partition in units of CPU core.

Low cost, high reliability and secure procedures are provided.

The features of this function are listed below.

- The granularity of the resource allocation to the partition is fine, thereby enabling effective usage of the server resources.
 - The CPU can be allocated in units of core.
 - The memory can be allocated by one GB.
- Easier to set up than virtualization OS
- A device in the partition can be directly accessed from the CPU, without using a virtual device

The hardware resource allocation by using Extended Partitioning can be set in the MMB Web-UI.

For details, see '[5.3 Extended Partitioning](#)'.

1.4.14 Extended Socket

PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E supports Extended Socket function.

Extended Socket is the function which enables up to 40 Gbps high-speed communication among Extended Partitions on the same physical Partition. Enable/Disable of Extended Socket to each EP can be set by MMB Web-UI.

1.4.15 Dynamic Reconfiguration (DR) function

The DR function changes the resource configuration of a partition without rebooting the partition.

The PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E supports the dynamic reconfiguration function.

Remarks

The DR function operates only for the physical partition.

For detail on the target of the DR function and OS supporting DR, see "Table 3.12 DR Supported list" in 3.2.3 Dynamic Reconfiguration (DR) in *PRIMEQUEST 2000 Series Administration Manual* (CA92344-0537)

1.4.16 Flexible I/O

The Flexible I/O can configure a physical partition by combining any SB and IOU irrespective of the mounting location.

The PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E supports Flexible I/O.

For details, see '[5.10 Flexible I/O Mode](#)'.

1.4.17 Memory Scale-up Board

Memory Scale-up Board is the board for expanding memory in PRIMEQUEST 2400E3/2400E2. Up to three Memory Scale-up Boards can be installed. Using Memory Scale-up Board can expand memory up to 24TB without increasing CPU.

For details, see '[5.5 Memory Scale-up Board](#)'.

1.4.18 Virtual Support Virtualization Technology (VT) Function

PRIMEQUEST 2000 series supports the Virtualization Technology (VT) listed in the table below.

TABLE 1.6 VT

VM Support	Components		Remarks
VT-x	CPU		Intel (R) CPU Virtualization technology 'VMX root mode and VMX non-root mode' are added in the existing processor mode (rings from 0 to 3) The merit of VT-x is low overheads of issue of privilege command by Guest OS.
VT-c			Intel (R) Virtualization technology VT-c is the general term for the virtualization support functions (VM Assist) listed below.
	IO-AT	CPU On board LAN controller	I/O Acceleration Technology (IO-AT) IO-AT indicates high speed I/O technology, which increases the speed and efficiency of processing data and interruption. - Intel (R) QuickData Technology - Direct Cache Access (DCA) - Extended Message Signaled Interrupts (MSI-X) - Receive Side Coalescing (RSC) - Low Latency Interrupts
	VMDq	On board LAN controller	Virtual Machine Device Queues (VMDq) VMDq is a virtualization support mechanism provided in the Intel LAN card. The hardware with VMDq contains a function that creates the LAN-SW on the VMM when the NIC is shared by multiple VMs.
	SR-IOV	On board LAN controller	Single Root- IO Virtualization The SR-IOV is a PCI Express standard, having multiple functions in the card, which directly accesses the respective functions from the VM.

1.4.19 Management Board (MMB)

Management Board functions: Monitoring the hardware status, displaying configuration / error information, partition management, network environment management and power control.

At least one MMB is required for operating the system in the PRIMEQUEST 2000 series. One more MMB can duplicate the MMB in PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E; even if one of the MMBs fail, the process can be continued with the other MMB.

Active maintenance can be carried out in an operation with duplicate MMBs.

For details on the MMB, see '[2.7 MMB \(Management Board\)](#)'.

1.4.20 Network (LAN)

The PRIMEQUEST 2000 series has the following network (LAN) functions.

- LAN port (IOU_1GbE)
The GbE interface of the GbE controller that is mounted on the IOU_1GbE, externally outputs the data with a RJ-45 connector. It is supported in 1000BASE-T.
- LAN port (IOU_10GbE)
The 10GbE interface of the 10GbE controller that is mounted on the IOU_10GbE, externally outputs the data with a RJ-45 connector. It is supported in 10G BASE-T.
- USER port (MMB #0 and #1 port)
Port for connecting to an external terminal for operating and monitoring various MMB functions via the LAN. It is supported in 1000BASE-T.
- REMCS port ([REMOTE] port on MMB)
This is a LAN port for REMCS. The port supports 100BASE-TX.
- CE port (MMB [LOCAL] port)
This port is dedicated to connecting maintenance terminal used by field engineers. It is supported in 100BASE-TX.

1.4.21 Preboot eXecution Environment (PXE)

The PRIMEQUEST 2000 series supports the PXE boot through LAN port on the IOU and PCI Express card. The PXE enables remote management operations, such as system startup and installation and updating of the operating system. The following table shows whether the PXE boot is supported or not in each port.

TABLE 1.7 PXE boot support

Component	Port		PXE Support			
			Legacy		EFI	
			IPv4	IPv6	IPv4	IPv6
MMB	User port (Management LAN)	1000Base-T	-	-	-	-
	REMCS port	100Base-TX	-	-	-	-
	CE port	100Base-TX	-	-	-	-
IOU_1GbE/ IOU_10GbE	LAN port (IOU_1GbE)	1000Base-T	Supported	-	Supported	Supported
	LAN port (IOU_10GbE)	10GBase-T	Supported	-	Supported	Supported
	PCI Express slot		Supported	-	Supported	Supported
PCI_Box	PCI Express slot		Supported	-	Supported	Supported

Remarks

Internal ports are not supported.

1.4.22 iSCSI boot and iSCSI connection

The PRIMEQUEST 2000 series supports iSCSI boot and iSCSI connections.

TABLE 1.8 iSCSI boot

Component	Port		iSCSI boot			
			Legacy		EFI	
			IPv4	IPv6	IPv4	IPv6
MMB	User port (Management LAN)	1000Base-T	-	-	-	-
	REMCS port	100Base-TX	-	-	-	-
	CE port	100Base-TX	-	-	-	-
IOU_1GbE/ IOU_10GbE	Operation port (LAN port) (IOU_1GbE)	1000Base-T	Supported	-	Supported	Supported
	Operation port (LAN port) (IOU_10GbE)	10G Base-T	Supported	-	Supported	Supported
	PCI Express slot	CNA	Supported	-	Supported	Supported
		Except for CNA	-	-	-	-
PCI_Box	PCI Express slot	CNA	Supported	-	Supported	Supported
		Except for CNA	-	-	-	-

TABLE 1.9 iSCSI connections

Component	Port		iSCSI connection			
			Legacy		EFI	
			IPv4	IPv6	IPv4	IPv6
MMB	User port (Management LAN)	1000Base-T	-	-	-	-
	REMCS port	100Base-TX	-	-	-	-
	CE port	100Base-TX	-	-	-	-
IOU_1GbE/ IOU_10GbE	Operation port (LAN port) (IOU_1GbE)	1000Base-T	Supported	Supported	Supported	Supported
	Operation port (LAN port) (IOU_10GbE)	10G Base-T	Supported	Supported	Supported	Supported
	PCI Express slot	CNA	Supported	Supported	Supported	Supported
		Except for CNA	Supported	Supported	Supported	Supported
PCI_Box	PCI Express slot	CNA	Supported	Supported	Supported	Supported
		Except for CNA	Supported	Supported	Supported	Supported

1.4.23 FCoE boot and FCoE connection

PRIMEQUEST 2000 series supports FCoE boot and FCoE connections.

TABLE 1.10 FCoE boot

Component	Port		FCoE boot	
			Legacy	EFI
			IPv4/IPv6	IPv4/IPv6
MMB	User port (Management LAN)	1000Base-T	-	-
	REMCS port	100Base-TX	-	-
	CE port	100Base-TX	-	-
IOU_1GbE/ IOU_10GbE	Operation port (LAN port) (IOU_1GbE)	1000Base-T	-	-
	Operation port (LAN port) (IOU_10GbE)	10G Base-T	-	-
	PCI Express slot	CNA	Supported	-
		Except for CNA	-	-
PCI_Box	PCI Express slot	CNA	Supported	-
		Except for CNA	-	-

TABLE 1.11 FCoE connections

Component	Port		FCoE connection	
			Legacy	EFI
			IPv4/IPv6	IPv4/IPv6
MMB	User port (Management LAN)	1000Base-T	-	-
	REMCS port	100Base-TX	-	-
	CE port	100Base-TX	-	-
IOU_1GbE/ IOU_10GbE	Operation port (LAN port) (IOU_1GbE)	1000Base-T	-	-
	Operation port (LAN port) (IOU_10GbE)	10G Base-T	-	-
	PCI Express slot	CNA	Supported	Supported
		Except for CNA	-	-
PCI_Box	PCI Express slot	CNA	Supported	Supported
		Except for CNA	-	-

1.4.24 Virtualization function of FC card

PRIMEQUEST 2000 series supports VFC (Virtual Fiber Channel) and NPIV (N_Port ID Virtualization) which are virtualization function of FC card.

1.4.25 Wake on LAN (WOL)

WOL is a function that turns on the power from remote control.

The PRIMEQUEST 2000 series supports WOL in all the LAN ports on the IOU.

WOL is enabled in any LAN card that is mounted in the Onboard LAN port and the PCI Express slot.

However, enabling WOL from an Onboard LAN port of the IOU requires setup by MMB Web-UI.

For details, see '1.3.9 [Partition #x] menu' in "*PRIMEQUEST 2000 Series Tool Reference*" (CA92344-0539).

TABLE 1.12 WOL Support

Component	Port		WOL	
			Legacy	EFI
			IPv4/IPv6	IPv4/IPv6
MMB	User port (Management LAN)	1000Base-T	-	-
	REMCS port	100Base-TX	-	-
	CE port	100Base-TX	-	-
IOU_1GbE	Operation port (LAN Port)	1000Base-T	Supported	Supported
	PCI Express slot Low Profile		Supported	Supported
IOU_10GbE	Operation port (LAN Port)	10G Base-T	Supported	Supported
	PCI Express slot		Supported	Supported
PCI_Box	PCI Express slot		-	-

1.4.26 sadump

sadump is provided in the PRIMEQUEST 2000 series (except for PRIMEQUEST 2800B3/2800B2/2800B) to improve quality of PRIMEQUEST systems using Red Hat Enterprise Linux. (*1) sadump supports only UEFI OS.

The memory dump can be acquired by executing sadump when error occurs irrespective of the status of the RHEL that is operating in the PRIMEQUEST 2000 series. Then, investigation of the cause of error and support becomes possible thereby receiving a high degree of support.

(*1) sadump is not supported on SUSE Linux Enterprise Server.

1.4.27 Green Support and Power Saving Technology

The PRIMEQUEST 2000 series provides power saving functions which help reduce power consumption for relevant configuration with technology that is supported in the customer's operating environment, such as workload integration and business schedule, integration.

- Optimization of cooling by group partition in the cabinet
Achieving optimization by carefully controlling the fan rotational speed for each cooling group
- Reduction of power consumption
Using low power consumption devices (LV-DIMM, SSD), and high efficiency power (80 PLUS PLATINUM).
With Power Saving functions, performance tuning takes place automatically when the power consumption approaches the maximum preset value.
- Control of the device cooling airflow with flap
The flap in the cabinet is opened and closed by inserting and removing SB, Memory Scale-up Board, DU, IOU, PSU or FANU, which can efficiently control cooling airflow.
- Based on RoHS Regulations (2011/65/EU)

1.4.28 Active Processor Cores Function

The PRIMEQUEST 2000 series supports Active Processor Cores
Active Processor Cores limits the number of cores for specific physical partition.
Active Processor Cores is also called as Core Disabling or Logical Processor Disable.
Active Processor Cores is configured by the UEFI.
The default value is 'All Cores Enabled'.

TABLE 1.13 Active Processor Cores specifications

Item	Specifications
Default value	All cores are enabled.
Minimum number of enabled cores	One core for each socket is enables.
Specifying enabled cores	The number of enabled cores is specified.
Hyper Thread setting	Setting Enable/Disable of Hyper thread function.

Note

The setting that Hyper Thread is made enabled or disabled is applied to all active cores of all CPU in the partition.
For details, see '3.4.4 [CPU Configuration] Menu' in "*PRIMEQUEST 2000 Series Tool Reference*" (CA92344-0539).

1.4.29 Optimal Fan Control Cooling (Optimization of rotation per minute of fans)

The PRIMEQUEST 2000 series supports Optimal Fan Control Cooling function.
This function optimizes fan rotational speed so that system is cooled efficiently while reducing power consumption.

Optimal Fan Control Cooling function below:

- Determines the rpm of the fan, considering both the Ambient and the Component temperature of the place where the system is set and configuration pattern of the system.
- There is the concept of cooling group in a cabinet, which controls fan rotational speed for each group.

For details on cooling, see '[2.16 Fan \(Cooling mechanism\)](#)'.

1.4.30 Air Flow Monitoring

The PRIMEQUEST 2000 series supports the Air Flow Monitoring function.
The Air Flow Monitoring provides the following functions.

- The exhaust volume is displayed in the MMB Web-UI
- The exhaust volume is notified to the higher level software through the SNMP.

1.4.31 Optimal Power Allocation (Optimization of the number of operation power sources)

The PRIMEQUEST 2000 series supports Optimal Power Allocation as one of the energy saving functions.
The following operations are performed in Optimal Power Allocation.

- Optimization of the number of operating PSUs
Changing the number of operating PSUs based on the configuration of the device.
- Optimization of the number of operating DDCs
Changing the number of operating DDCs based on the number of CPUs mounted in the SB.

Optimal Power Allocation operates automatically according to the configuration of the device. There is no screen for setting.

Remarks

If redundantly configured PSU turns non-redundant due to PSU failure, Optimal Power Allocation does not operate.

1.4.32 Power Consumption Monitoring

The PRIMEQUEST 2000 series supports Power Consumption Monitoring.

Power Consumption Monitoring is a function that displays the power consumption of the main unit and the PCI_Box of the PRIMEQUEST 2000 series.

Power consumption updated periodically is displayed in the MMB Web-UI. It is linked with the Systemwalker Centric Manager, which is operation management software, and the power consumption is displayed as a graph. Therefore, it is to effectively control power consumption of data center.

TABLE 1.14 Power Consumption Monitoring Support

Target	MMB Web-UI	SNMP (MIB)
Main unit	Supported	Supported
PCI_Box	Supported	Supported

1.4.33 Power Saving

Power Saving is a function that automatically adjusts the system operation when its power consumption closes to pre-determined upper limit such that power consumption of the system does not exceed the maximum value that has been set.

All models of PRIMEQUEST 2000 series supports the Power Saving function.

1.4.34 Agentless Monitoring

Agentless monitoring is supported in the PRIMEQUEST 2000 series.

Agentless monitoring is a function that reduces the use of agent software on OS and monitors the server by the hardware.

It is necessary to install the SVAS if PCI Express card should be monitored (*1).

*1: SVAS does not monitor SAS RAID controller card. Since BMC firmware and MMB firmware monitor SAS RAID controller cards, monitoring SAS RAID controller cards can be done without installing SVAS.

1.4.35 LDAP function (Lightweight Directory Access Protocol)

LDAP is a function that you can login MMB by using user accounts which are managed in the directory service of external LDAP server.

LDAP function (Active Directory) can be available in BA15082, BB15082 or later version of firmware.

LDAP (Novell eDirectory/OpenLDAP/OpenDS/OpenDJ) function can be available in BA15104, BB15104 or later version of firmware.

1.5 Software technologies

The PRIMEQUEST 2000 series uses the following types of software to increase reliability, availability, and operability.

- Firmware
- Operating system and virtualization software
- Server management software
- Fujitsu middleware products
- Clustering

1.5.1 Firmware

The PRIMEQUEST 2000 series has the following firmware embedded for hardware management and operation.

- UEFI (BIOS) firmware
The PRIMEQUEST 2000 series uses UEFI (United Extensible Firmware Interface) firmware, which is becoming an industry standard. The UEFI firmware has the BIOS setup menu that enables various types

of settings.

The UEFI has a variety of functions. They include functions for loading various UEFI drivers, diagnosing and initializing memory areas for the operating system, performing write/read diagnosis of various I/O registers, selecting a boot device, and setting the boot device order. Moreover, the Extended Partitioning function is installed in the UEFI firmware (*1). For the details, see '[5.3 Extended Partitioning](#)'.

*1: Extended Partitioning is a function which runs on firmware, similar to the partition function (PPAR) running on hardware. Different from the VMware, device virtualization is not carried out. OS handles hardware resources divided by firmware as a hardware device within the partition. The granularity of the partition consists of physically segmented hardware units (CPU core, DIMM Module, and I/O Device).

- BMC firmware
BMC firmware is provided with the functions for communicating with firmware, OS, and the MMB firmware to realize physical partition and Extended Partitioning.
Included functions are:
 - Console redirection
 - Video direction function
 - Virtual media function
Function corresponding to the remote storage function before the PRIMEQUEST 2000 series.
 - Interface between the software in the higher level layers
- MMB firmware
MMB firmware manages entirely all models of PRIMEQUEST
- 2000 series.
Included functions are:
 - System management function
 - Hardware monitoring
 - Power control, system initialization
 - Mirror mode setup and partition configuration control
 - Web-UI function for system management
 - User authority management
 - Time synchronization
 - Scheduled power on and off operation
 - Maintenance/ update function of each firmware
 - Save/restore of the setup information
 - Reserved SB function setup
 - Firmware update while the partition is operating. (*1)

(*1) It is the time when the partition is turned off that updated firmware is applied.

1.5.2 Operating system and virtualization software

- Windows
PRIMEQUEST 2000 series supports Windows Operating systems such as Windows Server 2016. Hyper-V is available with all of Windows OS supported by PRIMEQUEST 2000 series.
- Linux
PRIMEQUEST 2000 series supports Linux operating systems such as Red Hat Enterprise Linux and SUSE Linux Enterprise Server.
PRIMEQUEST 2000 series also supports KVM adopted in Red Hat Enterprise Linux and SUSE Linux Enterprise Server.
- VMware
PRIMEQUEST 2000 series supports VMware vSphere 5 as a virtualization platform.
To consolidate mission critical applications using VMware, PRIMEQUEST 2000 series with its high reliability is the best matched platform.

For details on operating systems supported by PRIMEQUEST 2000 series, see [3.2 OS](#).

1.5.3 Server management software

The following server management software is a standard bundle in the PRIMEQUEST 2000 series.

- ServerView Agentless Service (SVAS)
- ServerView Suite (SVS)
- Operations management software

ServerView Agentless Service (SVAS)

The SVAS is a software component installed in the OS. It monitors the PCI Express card (*1). When an error is detected, it is reported through MMB.

*1: Since firmware monitor SAS RAID controller cards, monitoring SAS RAID controller cards can be done without installing SVAS.

Note

If SV Agent is installed, it is not possible to install SVAS.

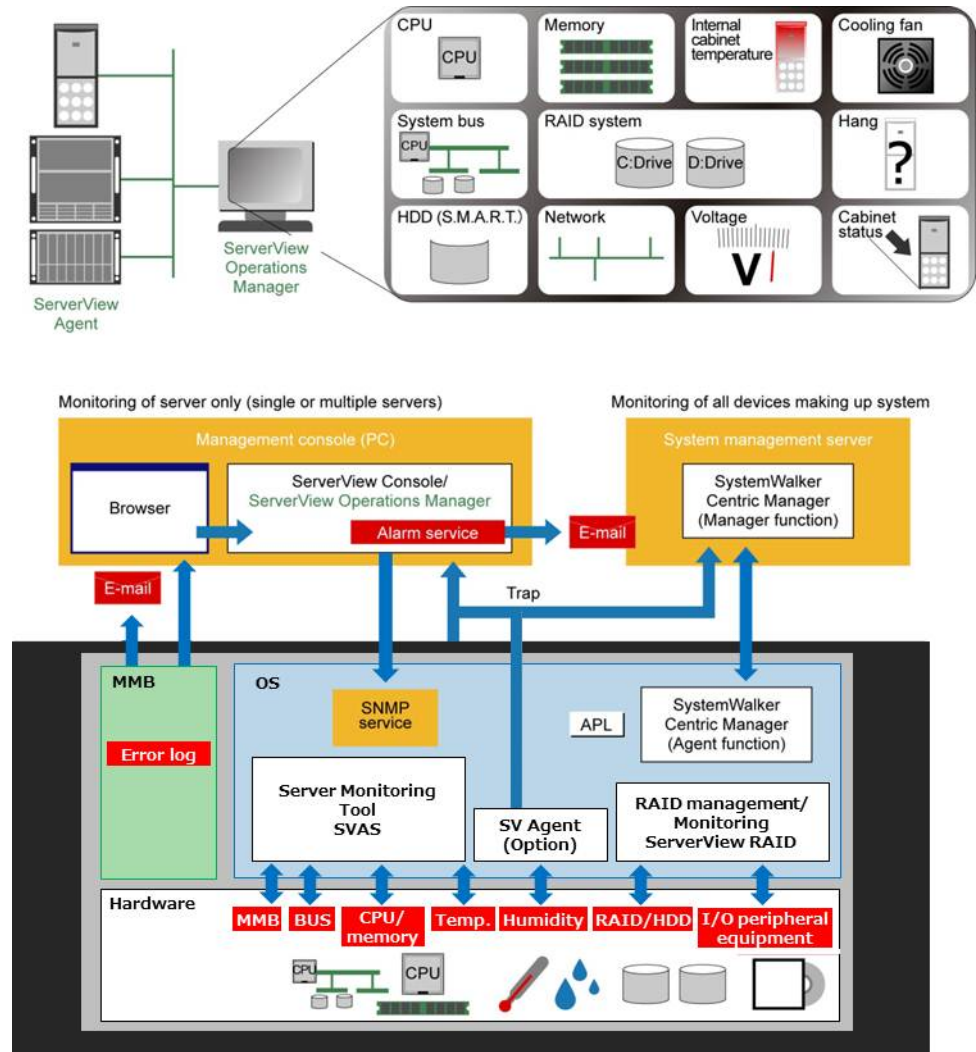
ServerView Suite (SVS)

The SVS provides following functions, all of them are bundled as standard products:

- ServerView Installation Manager (SVIM)
- ServerView Operations Manager (SVOM)
- ServerView Agent (SV Agent)
- ServerView RAID Manager (SV RAID)
- ServerView Mission Critical Option (SVmco)

The SVS manages the PRIMEQUEST 2000 series in the following configuration.

FIGURE 1.8 Configuration diagram of the PRIMEQUEST 2000 series operation management

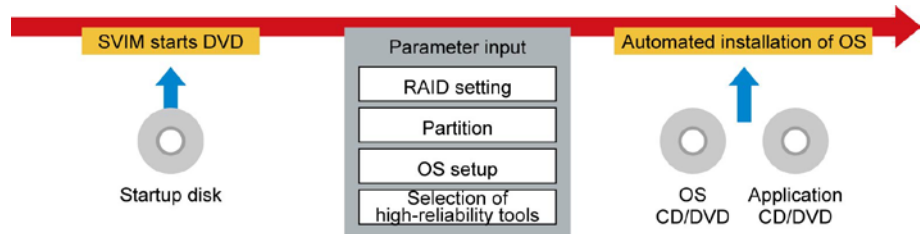


ServerView Installation Manager (SVIM)

SVIM allows the user to easily perform the setup operations, including the OS installation during the initial installation or reconfiguration of a server.

SVIM much simplifies steps for hard disk RAID configuration and driver selection to the extent that even users without expertise can implement a setup easily and securely in a short time. Setting up using the SVIM results in a stable operation early, at the beginning of an operation.

FIGURE 1.9 SVIM setup flow



Item	Description
Automatic HDD RAID configuration	You can configure RAID using configuration tool called WebBIOS. This tool is started after power-on and start of OS. SVIM can simplify setup for a RAID. You only need to enter information such as the RAID type, combination of HDDs, and spares, even if without having the knowledge on how to operate the RAID configuration tool.

	The capacity of each compartment/partition can also be set.
Optimal driver installation	General-purpose drivers and model-specific drivers exist even for the same hardware. SVMIM selects and installs the best-fit driver for each model, so that the drivers do not cause any problems after operation begins.
Guidance on bundled software	SVMIM supports installation of the high-reliability tools, including the hardware monitoring tool (ServerView) and RAID management/monitoring tool (SV RAID) that must be installed. Once a selection is made from the group of software products, SVMIM automatically installs the selected tool from the CD/DVD.
Hot fix application	SVMIM applies an 'emergency' level hot fix for the operating system. This prevents the occurrence of known faults and promotes stable operation.

ServerView Operations Manager (SVOM)

SVOM identifies hardware faulty parts, displays diagnosis on the console, and sends e-mail to the administrator to support early recovery and stable operation.

ServerView Agent (SV Agent)

SV Agent monitors the status of the hardware and the operating system, and instructs operation from the SVOM.

ServerView RAID Manager (SV RAID)

SV RAID is the management tool that monitors, manages, maintains, and configures the array controller and the hard disks and logical drives connected to the RAID controllers.

ServerView Mission Critical Option (SVMco)

SVMco cooperates with PRIMECLUSTER or Primesoft Server to acquire the status of each partition and stop the partition forcibly. SVMco is needed if you use PRIMECLUSTER or Primesoft Server.

1.5.4 Fujitsu middleware products

A high-reliability and high-availability system can be constructed by combination of PRIMQUEST and Fujitsu middleware products below.

- Interstage
Application server, Web service, report, Java development environment, business intelligence
- Systemwalker
Business service management, operation service management, life cycle management, security management, resource management, job management, resource control, network management.
Systemwalker displays graph for the power consumption of entire server and PCI_Box by Power Consumption Monitoring function.

As long as virtualization software environment provides the function that is compatible with the physical hardware environment, Fujitsu middleware can operate on a guest OS. Operation on virtual software might not be assured depending on the middleware or operation pattern.

1.5.5 Clustering

Red Hat Enterprise Linux (RHEL) supports clustering with PRIMECLUSTER (Fujitsu middleware).

Windows Server 2016, 2012 R2, Windows Server 2012 and Windows Server 2008 R2 support the clustering with Failover Cluster (OS standard function).

Using clustering can improve the availability of the entire system.

Clustering produces high availability in such a way that even if a fault occurs in the active partition or cabinet, a standby partition or cabinet can take over job operations.

Through automatic detection of faults in important system resources ranging from hardware and middleware to applications and autonomous control, such as failover, clustering enables the system to continue secure operations. Clustering also enables autonomous control such as failover.

The service uptime is greatly improved because periodic maintenance or system reconfiguration (during a scheduled downtime) can be performed without affecting the resources in use.

CHAPTER 2 Hardware Configuration

This section describes the PRIMEQUEST 2000 series hardware configuration, system specification and each component specification.

2.1 Components

The table below lists the hardware components.

Remarks

The hierarchy in the component column represents an inclusive relationship.

TABLE 2.1 Maximum installation number of components

Component	Granularity	Maximum number mounted				Display format	Redundancy configuration
		PRIMEQUEST					
		2400E3/ 2400E2	2400E	2800E3/ 2800E2/ 2800E	2800B3/ 2800B2/ 2800B		
PSU	Per system	6	4	6	6	PSU#0, PSU#5, etc.	Possible by option
PSU_P/PSU_S							
FANM	Per PSU	2	3	2	2	FANM#0, FANM#1	Possible as standard
FANU	Per system	3	4	3	3	FANU#0, FANU#5, etc.	Possible by option
FANM	Per FANU	2	2	2	2	FANM#0, FANM#1	Possible as standard
SB	Per system	2	2	4	4	SB#0, SB#3, etc.	Possible by option
CPU	Per SB	2	2	2	2	CPU#0, CPU#1	No
DIMM	Per SB (Except Mezzanine)	24	24	24	24	DIMM#0A0, DIMM#1B5, etc.	Possible by option
Mezzanine	Per SB	2	2	2	2	Mezz#0, Mezz#1	No
DIMM	Per Mezzanine	12	12	12	12	DIMM#0C0, DIMM#1D5, etc.	Possible by option
SAS RAID controller card	Per SB	1	1	1	-	PCI Slot	Possible by software RAID
FBU	Per SB	1	1	1	-	FBU	No
HDD/ SSD		4	4	4	-	HDD#0, HDD#3, etc.	Possible by option
TPM		1	1	1	1	TPM	No
BATTERY		1	1	1	1	Battery	No
Memory Scale-up Board		3	0	0	0	SB#0, SB#3, etc.	No
DIMM	Per Memory Scale-up Board (Except Mezzanine)	24	0	0	0	DIMM#0A0, DIMM#1B5, etc.	Possible by option
Mezzanine	Per Memory Scale-up Board	2	0	0	0	Mezz#0, Mezz#1	No
DIMM	Per Mezzanine	12	0	0	0	DIMM#0C0, DIMM#1D5, etc.	Possible by option
BATTERY	Per Memory Scale-up	1	0	0	0	Battery	No

Component			Granularity	Maximum number mounted				Display format	Redundancy configuration
				PRIMEQUEST					
				2400E3/ 2400E2	2400E	2800E3/ 2800E2/ 2800E	2800B3/ 2800B2/ 2800B		
		Board							
IOU_1GbE (*1)		Per system	4	4	4	4	IOU#0,I OU#3, etc.	Possible by option (*3)	
PCI Express slot (*2)	LP	Per IOU_1GbE	4	4	4	4	PCIC#0, PCIC#3, etc.	Possible by option (*3)	
	FH		0	0	0	0			
IOU_10GbE (*1)		Per system	4	4	4	4	IOU#0, IOU#3, etc.	Possible by option (*3)	
PCI Express slot (*2)	LP	Per IOU_10GbE	1	1	1	1	PCIC#0, PCIC#2, etc.	Possible by option (*3)	
	FH		2	2	2	2			
DU		Per system	2	2	2	2	DU#0,DU#1	Possible by software RAID	
SAS RAID controller card			2	2	2	2	PCI Slot	Possible by software RAID	
			2	2	2	2	FBU		
			4	4	4	4	HDD#0, HDD#3, etc.	Possible by option	
MMB		Per system	2	2	2	1	MMB#0, MMB#1	Possible by option	
OPL		Per system	1	1	1	1	OPL	No	
MP		Per system	1	1	1	1	MP	No	

*1: In the PRIMEQUEST 2400E3/2800E3/2800B3/2400E2/2800E2/2800B2/2400E/2800E/2800B, one to four units per system can be mounted.

*2: LP is the abbreviation of Low Profile and FH is the abbreviation is Full Height.

*3: PCI Express card can be made redundant by using standard function of the operating system, software for redundancy, software RAID and so on,

Remarks

IOU_10GbE and IOU_1GbE are collectively referred as IO units (IOU)

2.2 Base cabinet

An overview of the PRIMEQUEST 2000 series device is shown below.

FIGURE 2.1 PRIMEQUEST 2400E3/2800E3/2400E2/2800E2 front view

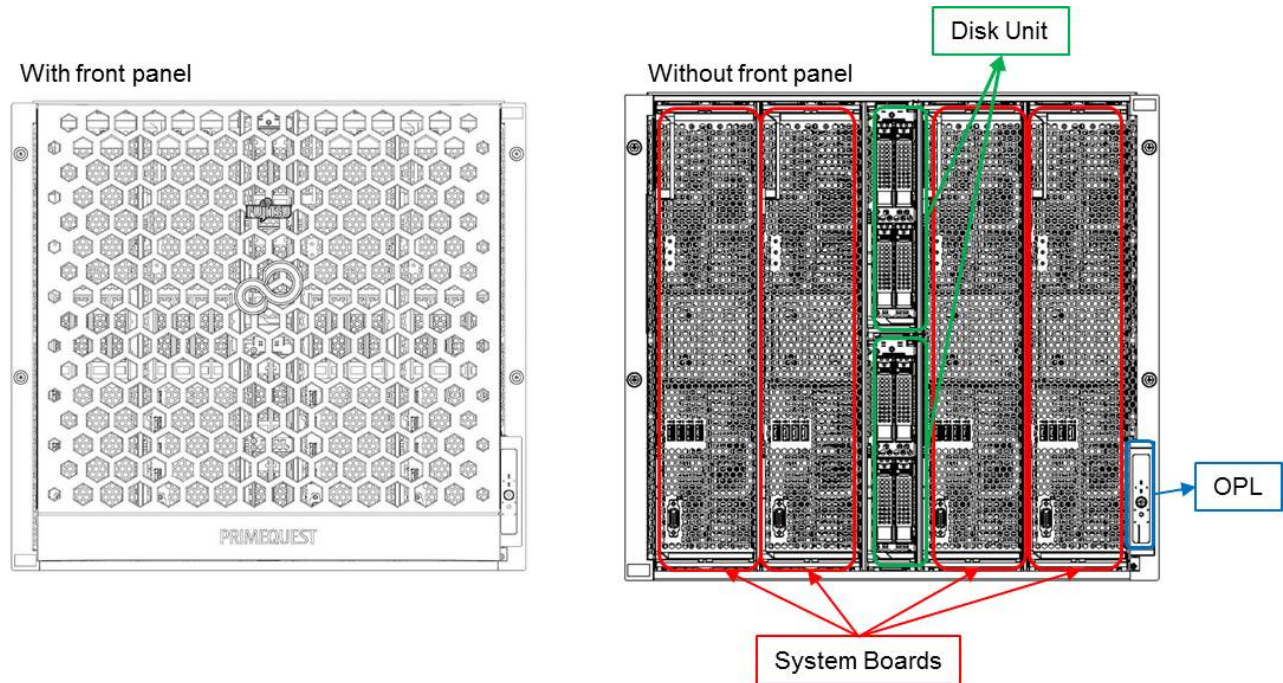


FIGURE 2.2 PRIMEQUEST 2400E/2800E front view

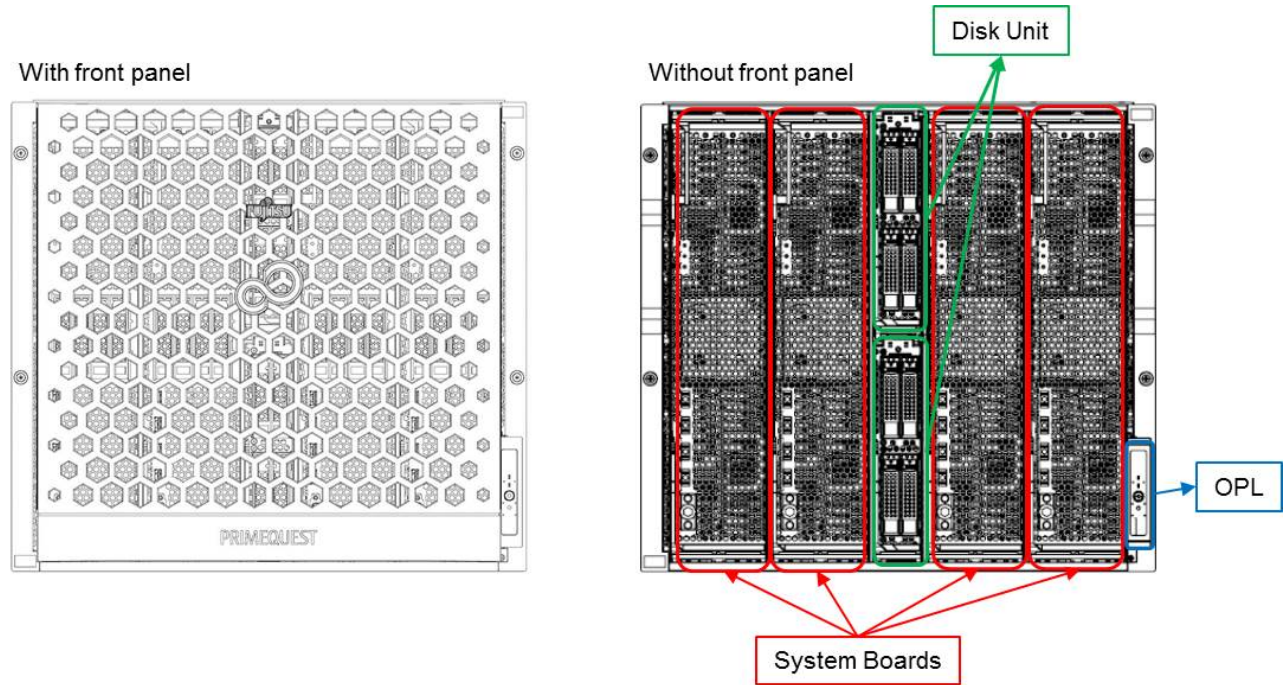


FIGURE 2.3 PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E rear view

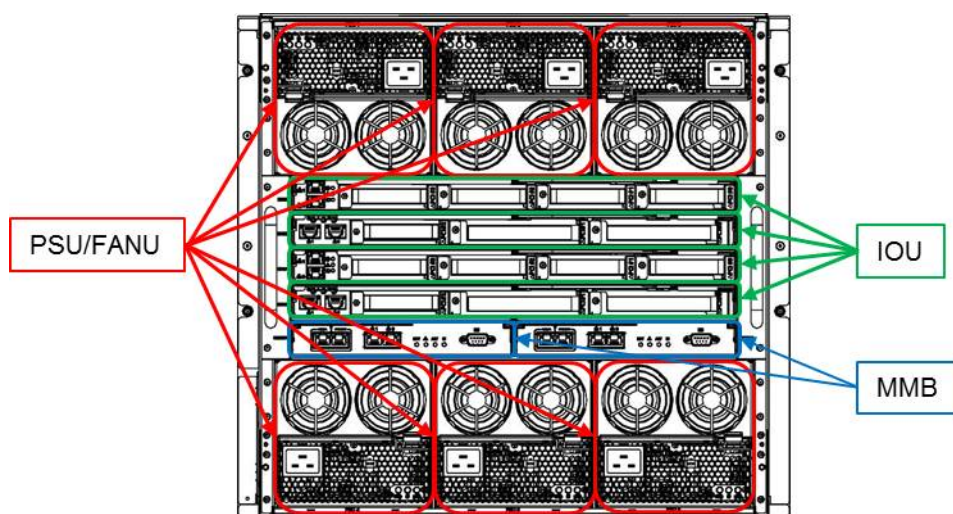


FIGURE 2.4 PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E top view

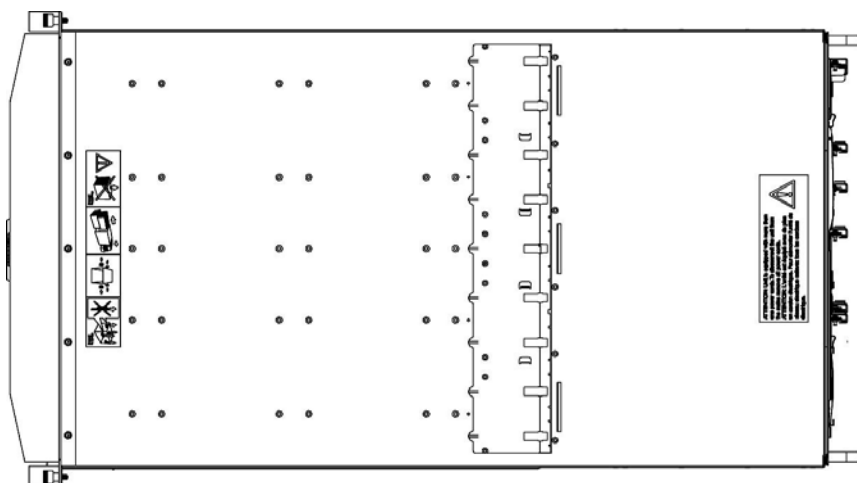


FIGURE 2.5 PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E right view

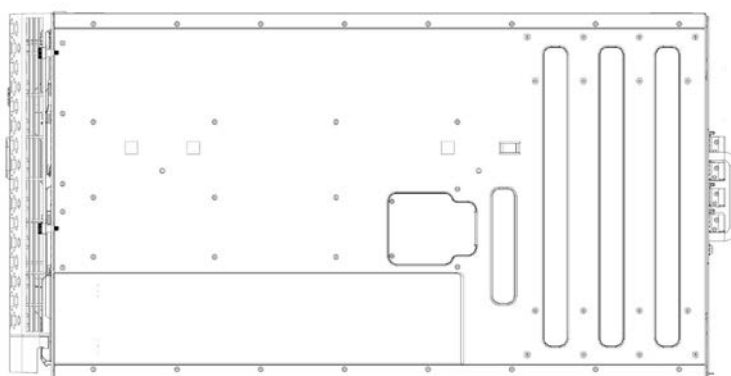


FIGURE 2.6 PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E perspective view

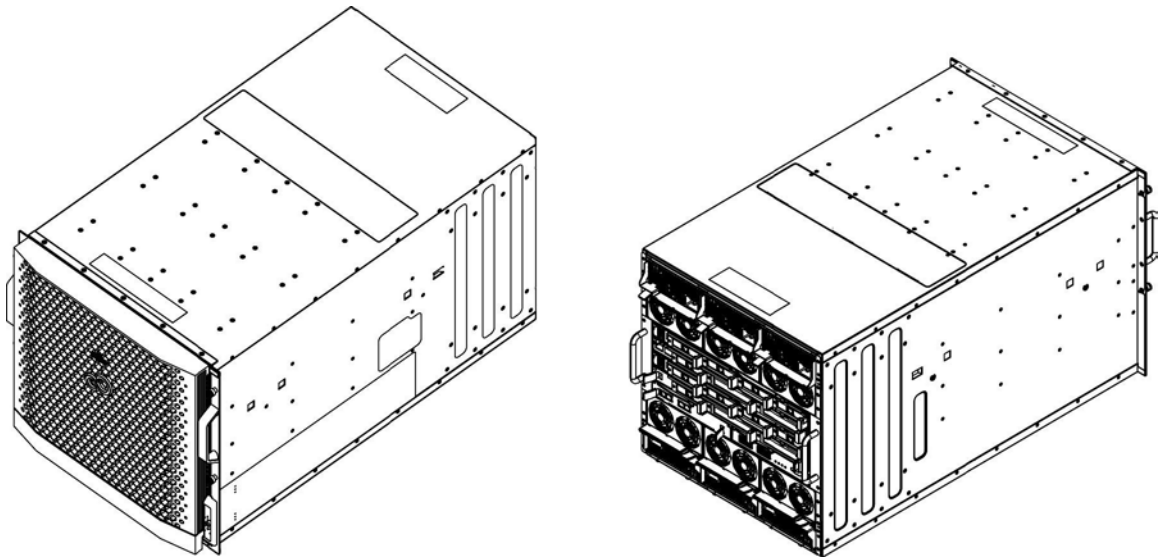


FIGURE 2.7 PRIMEQUEST 2800B3/2800B2 front view

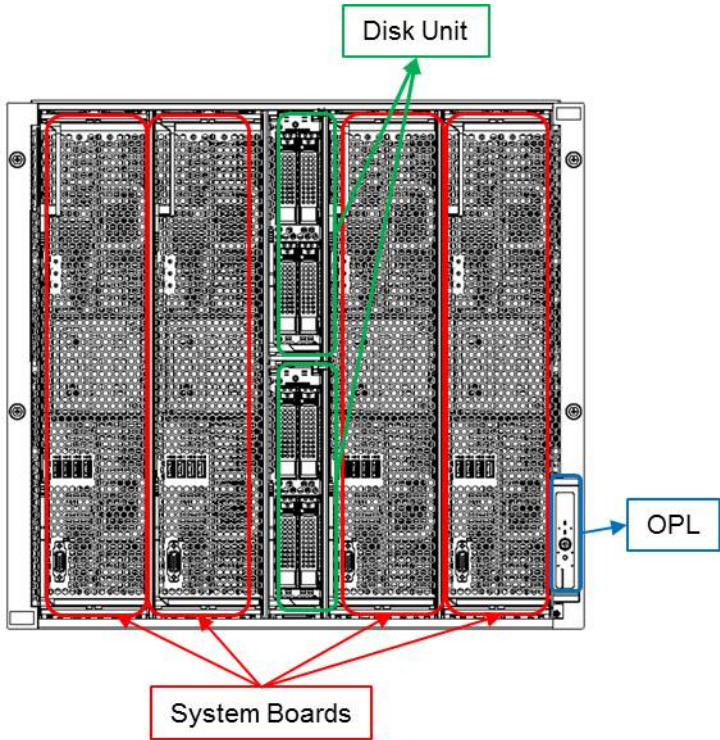


FIGURE 2.8 PRIMEQUEST 2800B front view

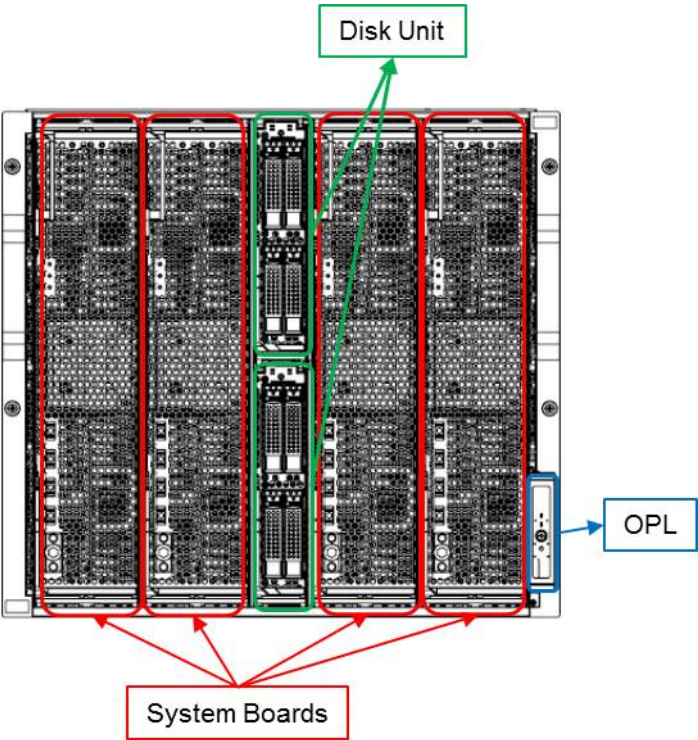


FIGURE 2.9 PRIMEQUEST 2800B3/2800B2/2800B rear view

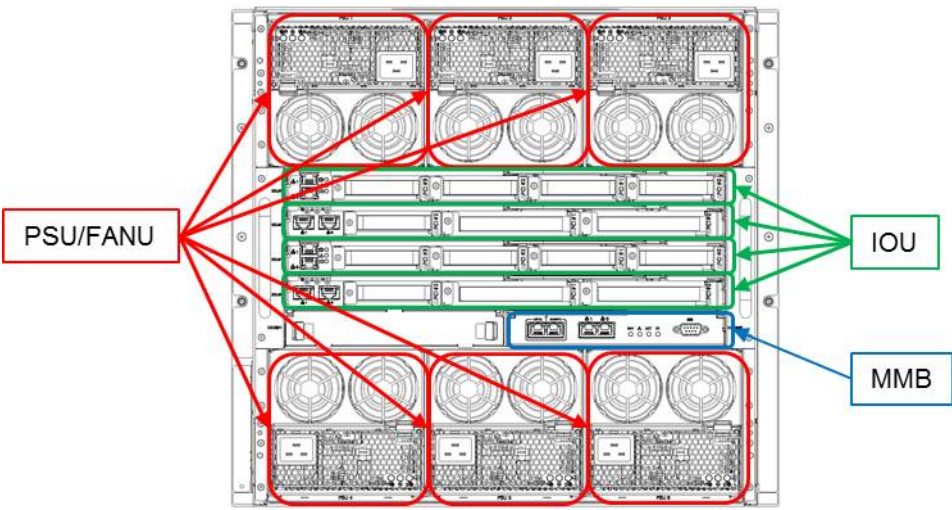


FIGURE 2.10 PRIMEQUEST 2800B3/2800B2/2800B top view

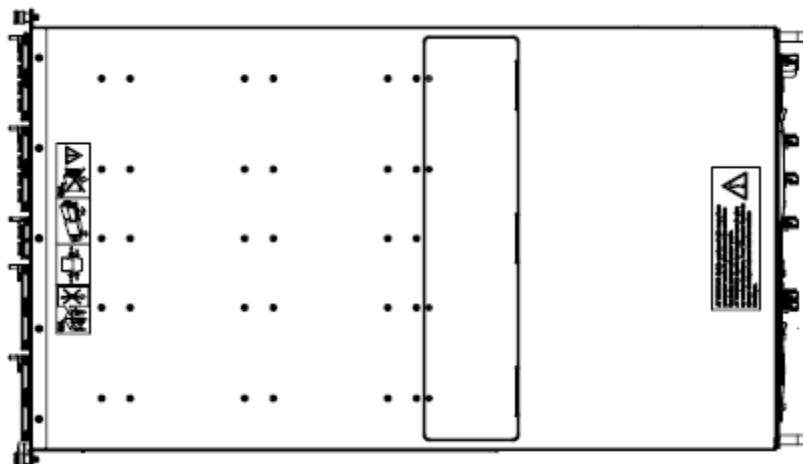


FIGURE 2.11 PRIMEQUEST 2800B3/2800B2/2800B right view

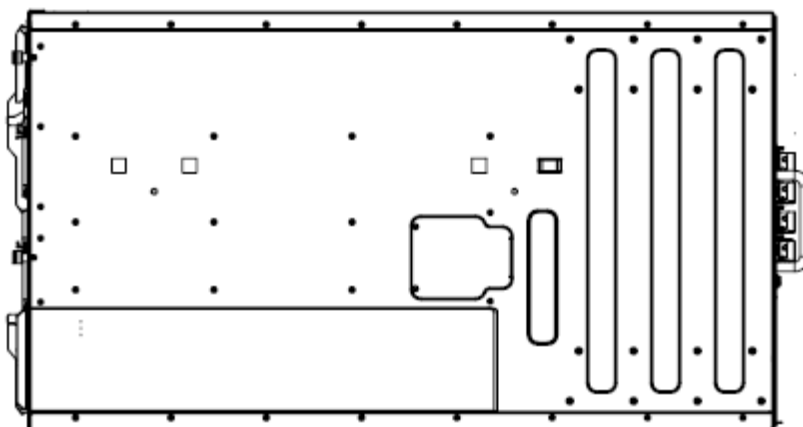


FIGURE 2.12 PRIMEQUEST 2800B3/2800B2 perspective view

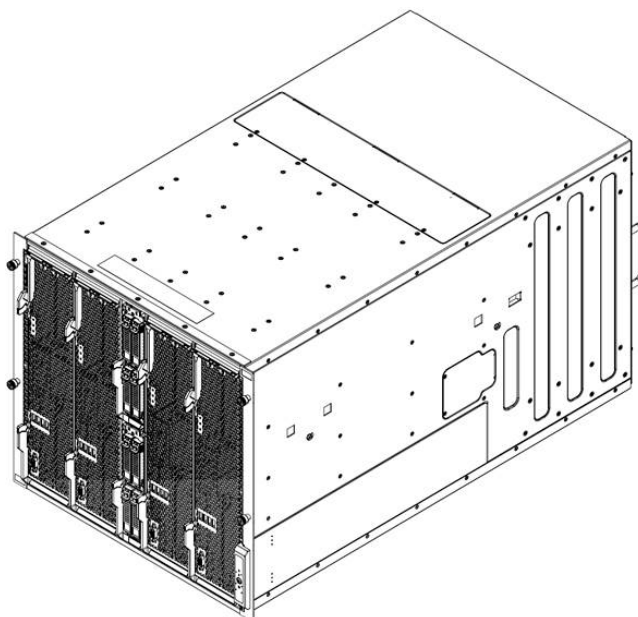
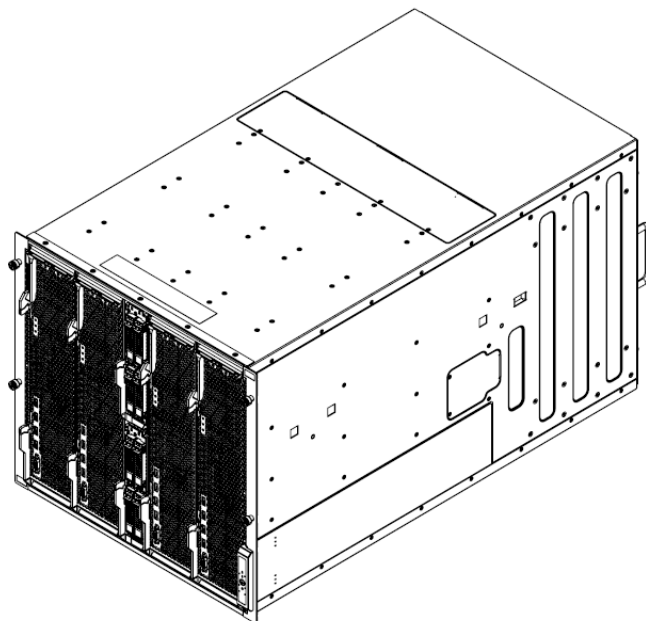


FIGURE 2.13 PRIMEQUEST 2800B perspective view



2.3 CPU

This section describes the CPU adopted in the PRIMEQUEST 2000 series.

2.3.1 Support CPU list

In PRIMEQUEST 2400E3/2800E3/2800B3, Intel(R) Xeon(R) processor E7 v4 product family is installed in the PRIMEQUEST 2000 series.

In PRIMEQUEST 2400E2/2800E2/2800B2, Intel(R) Xeon(R) processor E7 v3 product family is installed in the PRIMEQUEST 2000 series.

In PRIMEQUEST 2400E/2800E/2800B, Intel(R) Xeon(R) processor E7 v2 product family is installed in the PRIMEQUEST 2000 series.

TABLE 2.2 Available CPU (PRIMEQUEST 2400E3/2800E3/2800B3)

Model Name	Number of cores	Frequency	L3 Cache	QPI rate	PRIMEQUEST		
					2400E3	2800E3	2800B3
E7-8894v4	24	2.4 GHz	60 MB	9.6 GT/s	Available	Available	Available
E7-8893v4	4	3.2 GHz	60 MB	9.6 GT/s	Available	Available	Available
E7-8891v4	10	2.8 GHz	60 MB	9.6 GT/s	Available	Available	Available
E7-8890v4	24	2.2 GHz	60 MB	9.6 GT/s	Available	Available	Available
E7-8880v4	22	2.2 GHz	55 MB	9.6 GT/s	Available	Available	Available
E7-8870v4	20	2.1 GHz	50 MB	9.6 GT/s	Available	Available	Available
E7-8867v4	18	2.4 GHz	45 MB	9.6 GT/s	Available	Available	Available
E7-8860v4	18	2.2 GHz	45 MB	9.6 GT/s	Available	Available	Available
E7-8855v4	14	2.1 GHz	35 MB	8.0 GT/s	Available(*1)	Available	Available

*1: In PRIMEQUEST 2400E3, Xeon(R) E7-8855v4 can be installed in only partition without Memory Scale-up Board.

For details of the CPU specification, see 'TABLE 1.3 Hardware specifications'. For details of the CPU installation condition, see 'Appendix G Component installation condition' of (CA92344-0537) "PRIMEQUEST 2000 Series Administration Manual" (CA92344-0537).

TABLE 2.3 Available CPU (PRIMEQUEST 2400E2/2800E2/2800B2)

Model Name	Number of cores	Frequency	L3 Cache	QPI rate	PRIMEQUEST		
					2400E2	2800E2	2800B2
E7-8890v3	18	2.5 GHz	45 MB	9.6 GT/s	Available	Available	Available
E7-8880v3	18	2.3 GHz	45 MB	9.6 GT/s	Available	Available	Available
E7-8870v3	18	2.1 GHz	45 MB	9.6 GT/s	Available	Available	Available
E7-8860v3	16	2.2 GHz	40 MB	9.6 GT/s	Available(*1)	Available	Available
E7-8867v3	16	2.5 GHz	45 MB	9.6 GT/s	Available	Available	Available
E7-8891v3	10	2.8 GHz	45 MB	9.6 GT/s	Available	Available	Available
E7-8893v3	4	3.2 GHz	45 MB	9.6 GT/s	Available	Available	Available

*1: In PRIMEQUEST 2400E2, Xeon(R) E7-8860v3 can be installed in only partition without Memory Scale-up Board.

For details of the CPU specification, see 'TABLE 1.3 Hardware specifications'. For details of the CPU installation condition, see 'Appendix G Component installation condition' of (CA92344-0537) "PRIMEQUEST 2000 Series Administration Manual" (CA92344-0537).

TABLE 2.4 Available CPU (PRIMEQUEST 2400E/2800E/2800B)

Model Name	Number of cores	Frequency	L3 Cache	QPI rate	PRIMEQUEST		
					2400E	2800E	2800B
E7-8890 v2	15	2.8 GHz	37.5 MB	8.0 GT/s	Not available	Available	Available
E7-8880 v2	15	2.5 GHz	37.5 MB	8.0 GT/s	Not available	Available	Available
E7-8870 v2	15	2.3 GHz	30.0 MB	8.0 GT/s	Not available	Available	Available
E7-8850 v2	12	2.3 GHz	24.0 MB	7.2 GT/s	Not available	Available	Available
E7-8857 v2	12	3.0 GHz	30.0 MB	8.0 GT/s	Not available	Available	Available
E7-8893 v2	6	3.4 GHz	37.5 MB	8.0 GT/s	Available	Available	Available
E7-4890 v2	15	2.8 GHz	37.5 MB	8.0 GT/s	Available	Not available	Not available
E7-4880 v2	15	2.5 GHz	37.5 MB	8.0 GT/s	Available	Not available	Not available
E7-4870 v2	15	2.3 GHz	30.0 MB	8.0 GT/s	Available	Not available	Not available
E7-4850 v2	12	2.3 GHz	24.0 MB	7.2 GT/s	Available	Not available	Not available

For details of the CPU specification, see 'TABLE 1.3 Hardware specifications'. For details of the CPU installation condition, see 'Appendix G Component installation condition' of (CA92344-0537) "PRIMEQUEST 2000 Series Administration Manual" (CA92344-0537).

2.4 DIMM (Memory module)

This section describes the DIMM adopted in the PRIMEQUEST 2000 series.

2.4.1 Supported DIMM

The PRIMEQUEST 2400E3/2800E3/2800B3 supports 8GB, 16GB, 32 GB, 64 GB and 128GB DDR4 DIMMs. Memory transfer rate is 1333, 1600 and 1866 MTS (*1)

The PRIMEQUEST 2400E2/2800E2/2800B2 supports 8GB, 16GB, 32 GB and 64 GB DDR4 DIMMs. Memory transfer rate is 1333, 1600 and 1866 MTS (*1).

The PRIMEQUEST 2400E/2800E/2800B supports 8GB, 16GB, 32 GB and 64 GB DDR3 DIMMs. Memory transfer rate is 1066, 1333 and 1600 MTS (*1).

*1: MTS is abbreviation of Mega-Transfers per Second.

For details of DIMM specification, see '1.3.2 Hardware specifications'

2.4.2 DIMM slot locations

For details on the DIMM slot location on SB and Memory Scale-up Board, see 'G.2 DIMM' of "PRIMEQUEST 2000 Series Administration Manual".

2.4.3 DIMM installation group

The DIMM mounting group differs according to the Memory Operation Mode in the PRIMEQUEST 2000 series. For the details on the DIMM installation conditions, see 'G.2 DIMM' of the "PRIMEQUEST 2000 Series Administration Manual" (CA92344-0537).

2.5 SB (System board)

The number of the SBs available in the PRIMEQUEST 2000 series differs according to the model. For details, see '2.1 Components'.

2.5.1 SB specifications

The SB specifications are listed in the table below.

TABLE 2.5 SB specifications (PRIMEQUEST 2400E3/2800E3/2800B3)

Item			Specifications		
			2400E3	2800E3	2800B3
CPU	CPU		Intel(R) Xeon(R) processor E7 v4 product family		
	Socket		2		
System Interconnect	QPI speed		9.6 GT/s, 8.0 GT/s, 7.2 GT/s, 6.4 GT/s		
	QPI bandwidth		38.4 GB/s per port (bidirectional) (at 9.6 GT/s)		
Memory	DIMM type		DDR4 RDIMM, LRDIMM		
	Slot		48		
	Maximum capacity		6144 GB (for 128 GB-DIMM/2CPU)		
	Expansion unit	Normal Performance	2 DIMMs, 4 DIMMs, or 8 DIMMs (*1)		
		Full mirror	4 DIMMs, 8 DIMMs, or 16 DIMMs (*1)		
		Partial mirror	4 DIMMs, 8 DIMMs, or 16 DIMMs (*1)		
		Address range mirror	8 DIMMs or 16 DIMMs (*1)		
	Spare	6 DIMMs, 12 DIMMs, or 24 DIMMs (*1)			
	RAS		SDDC, Bank DDDC		
Error correction		ECC			
Port	USB (External)		4 (USB 1.1/2.0), connector type: USB Type A		
	VGA (External)		1 (D-sub 15 pin)		
LED			Power, Alarm, Location		
External dimension (mm) (excluding protrusions)			Width 90.5 x depth 528.1 x height 430.8		
Weight (kg) (without HDD/SSD)			11.9		11.6

(*1) For details on the expansion unit of DIMM, see 'G.2 DIMM' in "PRIMEQUEST 2000 series Administration manual" (CA92344-0537).

The following figure shows the overview of the SB.

TABLE 2.6 SB specifications (PRIMEQUEST 2400E2/2800E2/2800B2)

Item			Specifications		
			2400E2	2800E2	2800B2
CPU	CPU		Intel(R) Xeon(R) processor E7 v3 product family		
	Socket		2		
System Interconnect	QPI speed		9.6 GT/s, 8.0 GT/s, 7.2 GT/s, 6.4 GT/s		
	QPI bandwidth		38.4 GB/s per port (bidirectional) (at 9.6 GT/s)		
Memory	DIMM type		DDR4 RDIMM, LRDIMM		
	Slot		48		
	Maximum capacity		3072 GB (for 64 GB-DIMM/2CPU)		
	Expansion unit	Normal Performance	2 DIMMs, 4 DIMMs, or 8 DIMMs (*1)		
		Full mirror	4 DIMMs, 8 DIMMs, or 16 DIMMs (*1)		
		Partial mirror	4 DIMMs, 8 DIMMs, or 16 DIMMs (*1)		
	Spare	6 DIMMs, 12 DIMMs, or 24 DIMMs (*1)			
	RAS		SDDC, Bank DDDC		
Error correction		ECC			

Item		Specifications		
		2400E2	2800E2	2800B2
Port	USB (External)	4 (USB 1.1/2.0), connector type: USB Type A		
	VGA (External)	1 (D-sub 15 pin)		
LED		Power, Alarm, Location		
External dimension (mm) (excluding protrusions)		Width 90.5 x depth 528.1 x height 430.8		
Weight (kg) (without HDD/SSD)		11.9		11.6

(*1) For details on the expansion unit of DIMM, see 'G.2 DIMM' in "PRIMEQUEST 2000 series Administration manual" (CA92344-0537).

The following figure shows the overview of the SB.

TABLE 2.7 SB specifications (PRIMEQUEST 2400E/2800E/2800B)

Item			Specifications		
			2400E	2800E	2800B
CPU	CPU		Intel(R) Xeon(R) processor E7 v2 product family		
	Socket		2		
System Interconnect	QPI speed		8.0 GT/s, 7.2 GT/s, 6.4 GT/s		
	QPI bandwidth		32 GB/s per port (bidirectional) (at 8.0 GT/s)		
Memory	DIMM type		DDR3 RDIMM, LRDIMM, LV-RDIMM, LV-LRDIMM		
	Slot		48		
	Maximum capacity		3072 GB (for 64 GB-DIMM/2CPU)		
	Expansion unit	Normal Performance	2 DIMMs, 4 DIMMs, or 8 DIMMs (*1)		
		Full mirror	4 DIMMs, 8 DIMMs, or 16 DIMMs (*1)		
		Partial mirror	6 DIMMs, 12 DIMMs, or 24 DIMMs (*1)		
		Spare	6 DIMMs, 12 DIMMs, or 24 DIMMs (*1)		
	RAS		SDDC, DDDC		
Error correction		ECC			
Port	USB (External)		4 (USB 1.1/2.0), connector type: USB Type A		
	VGA (External)		1 (D-sub 15 pin)		
LED			Power, Alarm, Location		
External dimension (mm) (excluding protrusions)			Width 90.5 x depth 528.1 x height 430.8		
Weight (kg) (without HDD/SSD)			11.9		11.6

(*1) For details on the expansion unit of DIMM, see 'G.2 DIMM' in "PRIMEQUEST 2000 series Administration manual" (CA92344-0537).

The following figure shows the overview of the SB.

FIGURE 2.14 SB External view (2400E3/2800E3/2400E2/2800E2)

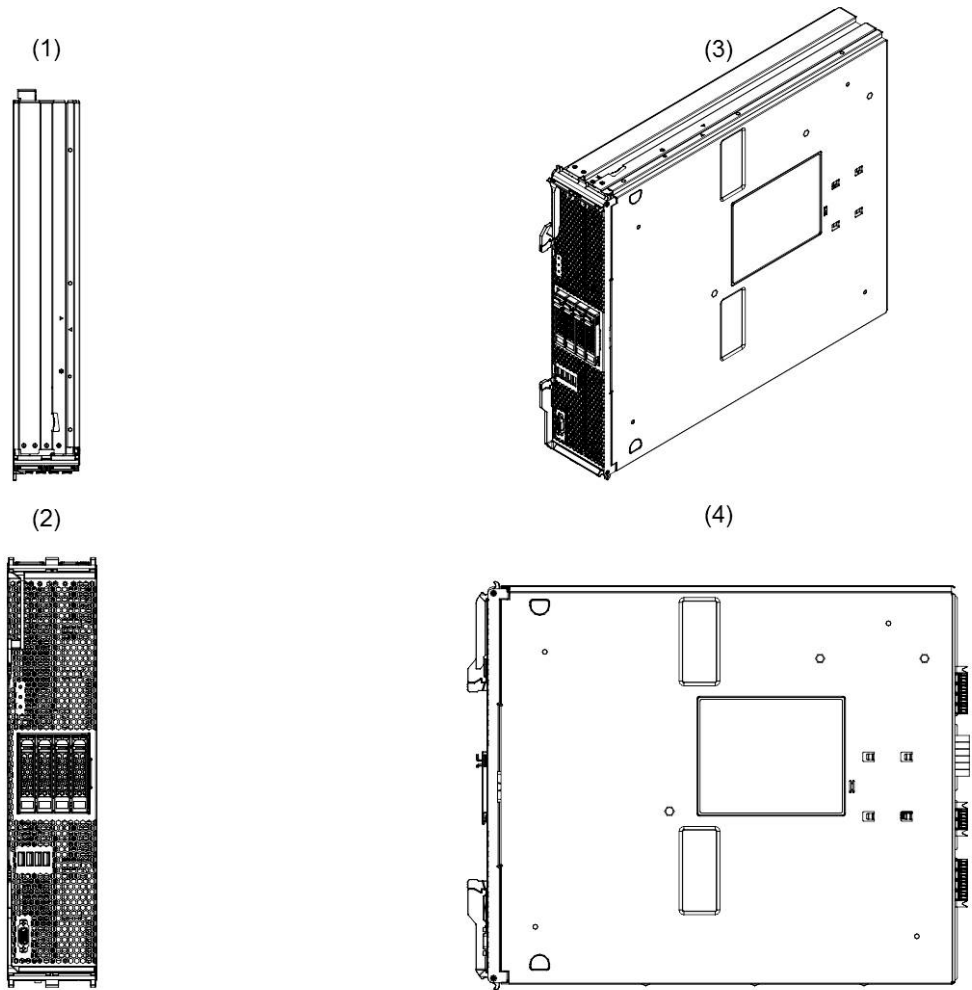


FIGURE 2.15 SB External view (2800B3/2800B2)

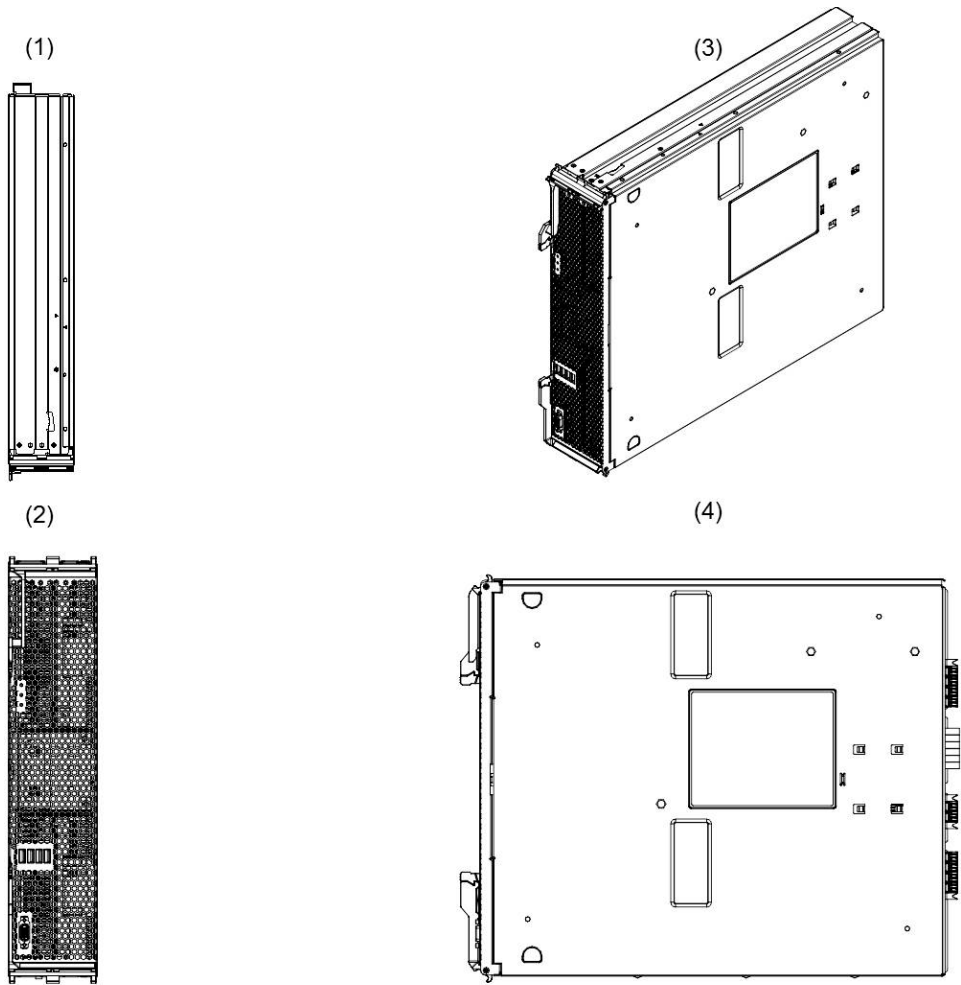


FIGURE 2.16 SB External view (2400E/2800E)

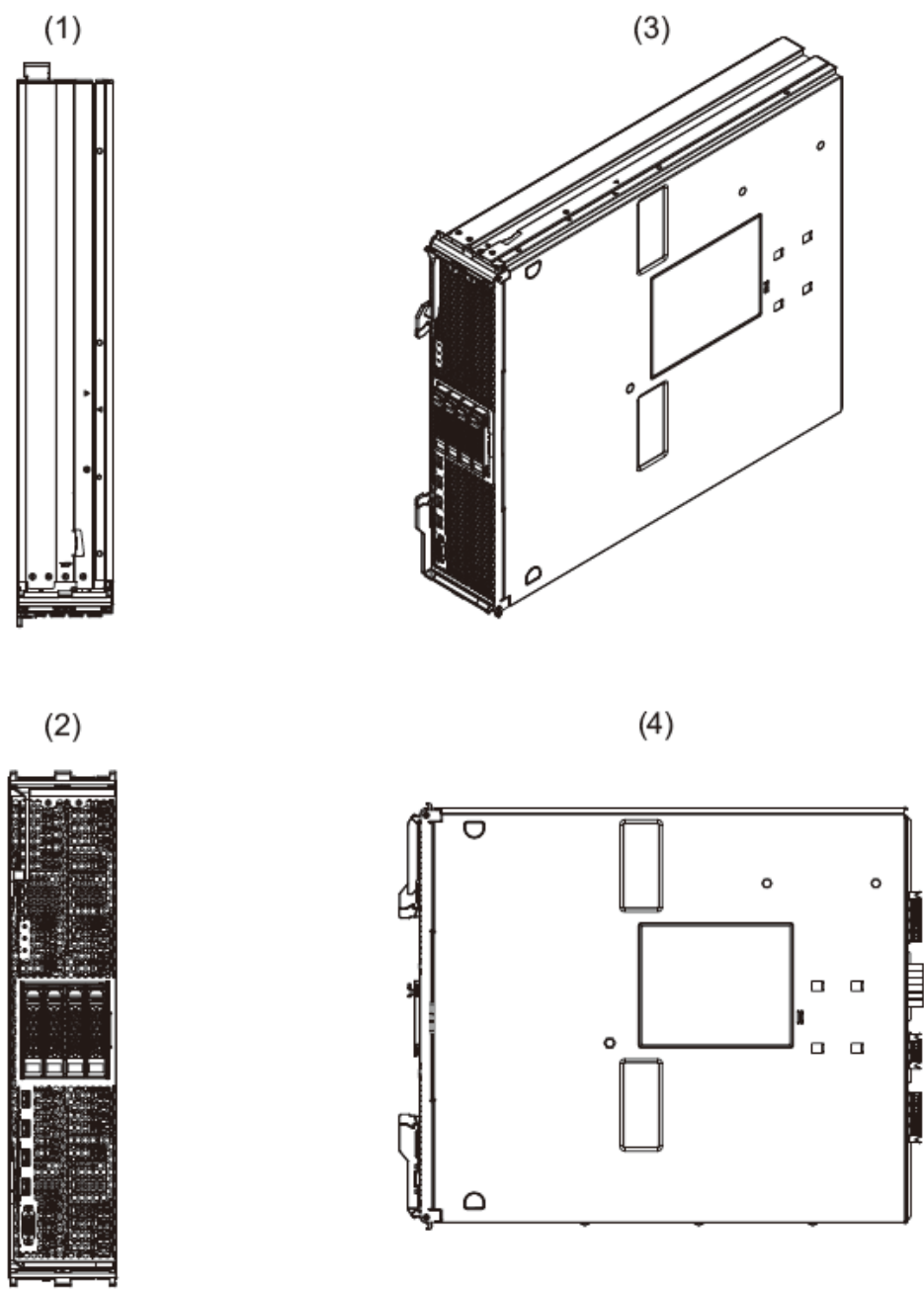
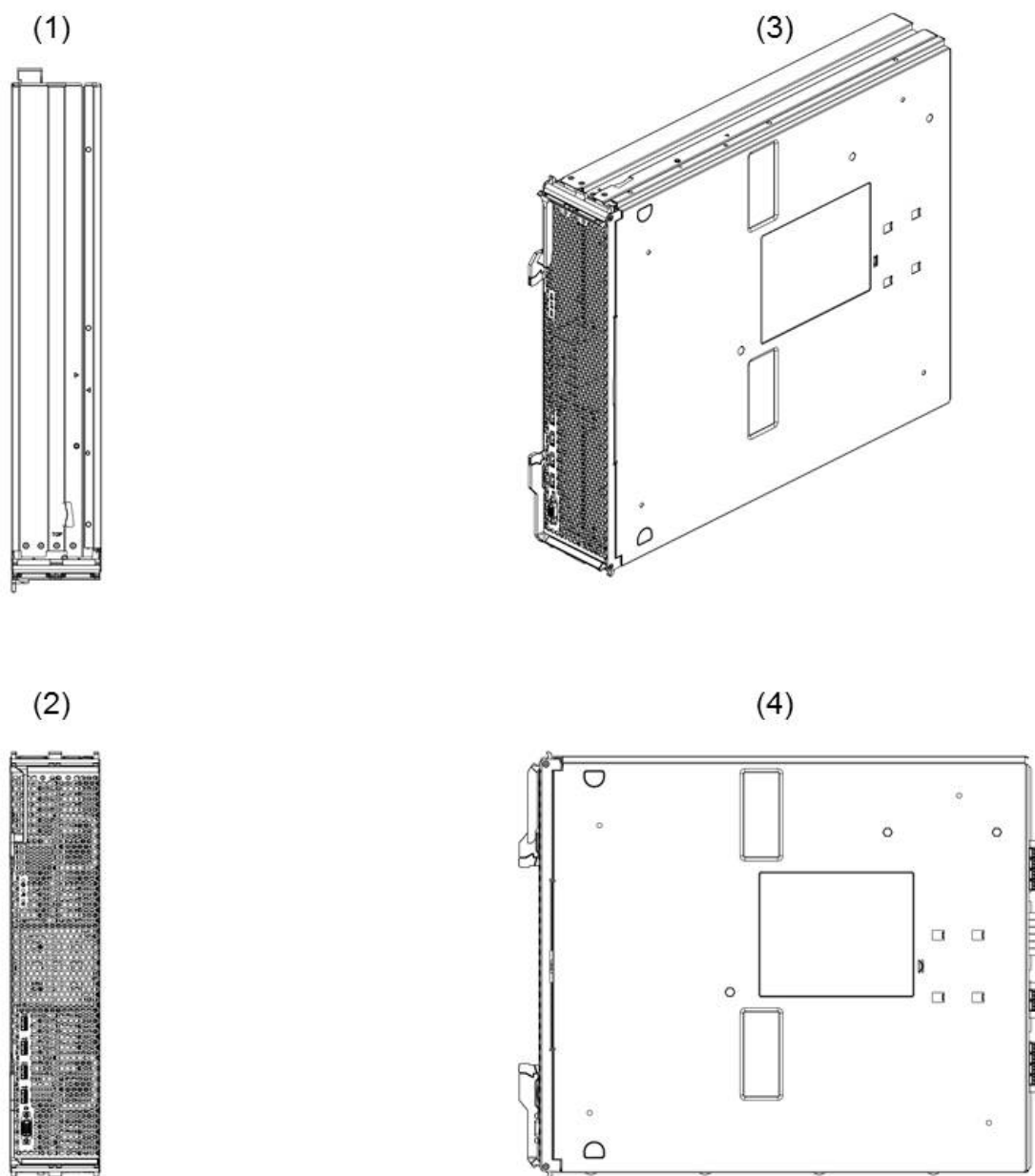


FIGURE 2.17 SB External view (2800B)



No.	Description
(1)	Top view
(2)	Front view
(3)	Front perspective view
(4)	Right lateral view

The outline of each component making up the SB is shown follows.

- CPU
Three system buses called Intel (R) QuickPath Interconnect (QPI) are output from each CPU. Large scale configuration (SMP) with up to 8 CPUs can be made, by connecting to other CPUs. A memory controller is also mounted in CPU and four SMI2 interfaces are output.
- Memory Buffer (MB)
In PRIMEQUEST 2400E3/2800E3/2800B3/2400E2/2800E2/2800B2, the MB is a converter chip that is connected to the CPU and memories.

One MB is connected per the SMI2 interface, and converts SMI2 channel to dual system DDR4 channel. A maximum of three DDR4 DIMMs can be connected to each DDR4 channel.

A maximum of 48 DIMM is supported in one SB. A maximum of 24 DIMMs are supported in one CPU socket.

In PRIMEQUEST 2400E/2800E/2800B, the MB is a converter chip that is connected to the CPU and memories.

One MB is connected per the SMI2 interface, and converts SMI2 channel to dual system DDR3 channel.

A maximum of three DDR3 DIMMs can be connected to each DDR3 channel.

A maximum of 48 DIMM is supported in one SB. A maximum of 24 DIMMs are supported in one CPU socket.

- Memory Mezzanine

Memory Mezzanine is a memory expansion board on which two Memory Buffers and 12 DIMM slots are mounted. Two Memory Mezzanines can be mounted for each SB.

- PCH

PCH is an LSI that controls the I/O of the legacy system and so on. It is connected to the CPU by a DMI interface. It has a USB controller, APIC, RTC, LPC bus, and SPI bus controller. There are four USB ports in the front as external connectors and one port as an internal connector. The USB outputs four ports as external connectors in the front. Keyboard and mouse can be connected in the external connector.

- BMC

BMC is an SB management LSI. It is connected to the LPC bus. It communicates with the MMB via the BMC built-in NIC and exchanges information of the PECI bus (interface to the BIOS) and the GPIO control.

- SPI Flash

SPI Flash is the abbreviation of the Serial Peripheral Interface Flash. It is a flash memory to store the BIOS code (UEFI).

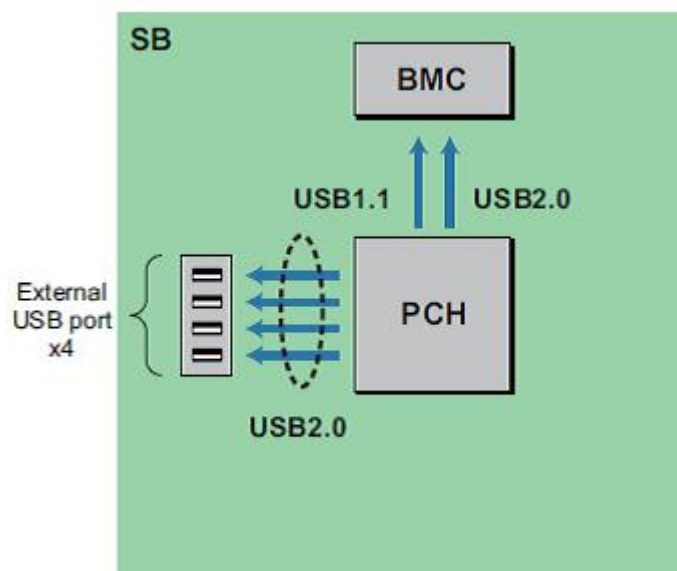
- TPM

TPM is a Trusted Platform Module (Option). Internally, it is connected to the LPC bus. Internally it has a dedicated processor, and has a function to save the secret key. The TPM is used in the BitLocker drive encryption function of Windows.

2.5.2 USB

The following figure is the USB system diagram.

FIGURE 2.18 system diagram



There are four external ports and two ports for BMC (for video redirection and virtualization media), from the PCH mounted in the SB.

With the USB Disable function, the SB external port can be set to enable/disable.

For details on the USB Disable function setup, see '3.4.11 [USB Configuration] menu' of the "PRIMEQUEST 2000 Series Tool Reference" (CA92344-0539).

2.5.3 VGA

The VGA function is included in the BMC. Signals are output directly to the external VGA port of the SB. In a partition configured with multiple SBs, the signals are only from the Home SB. It is displayed in a maximum of 1600 dot x 1200 dot, 65536 colors.

2.6 Memory Scale-up Board

Memory Scale-up Board can be installed in only PRIMEQUEST 2400E3/2400E2. Up to three Memory Scale-up Board can be included in one physical partition.
For details, see '[2.1 Components](#)'.

2.6.1 Memory Scale-up Board specifications

The Memory Scale-up Board specifications are listed in the table below.

TABLE 2.8 Memory Scale-up Board specifications

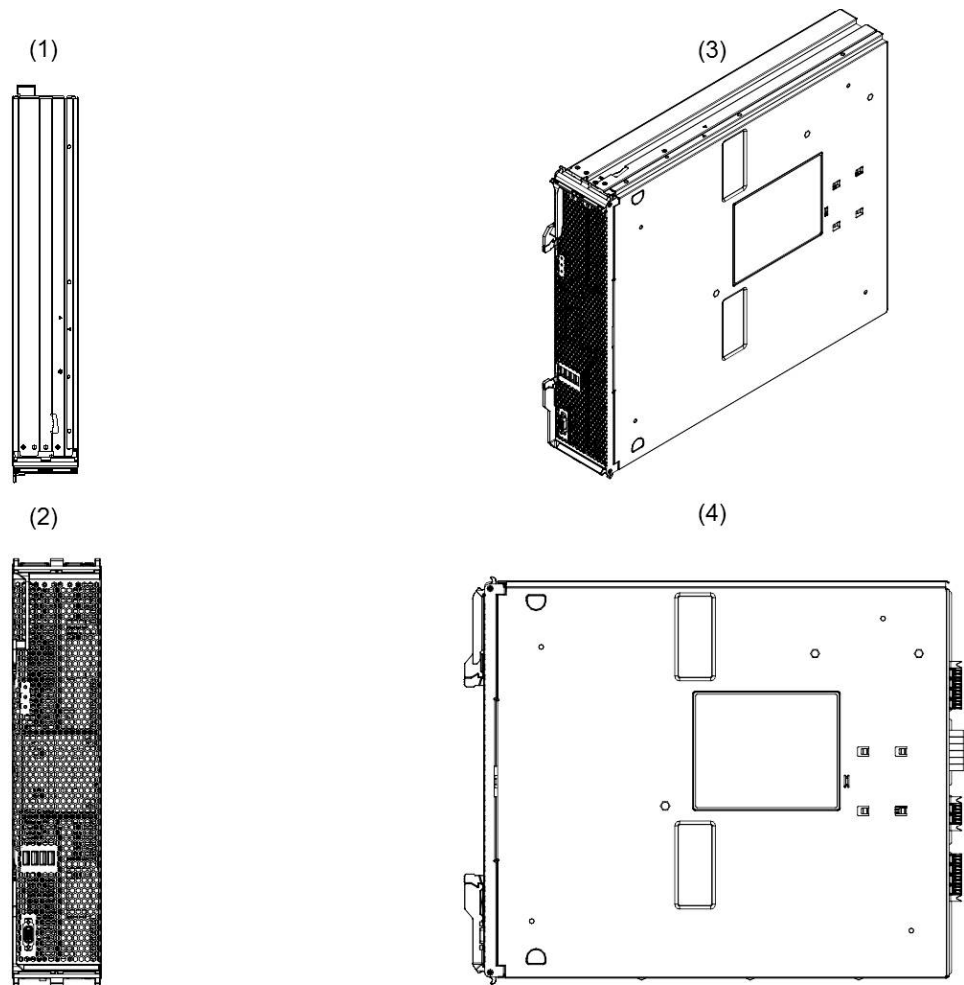
Item		Specifications	
		2400E3	2400E2
Memory	DIMM type	DDR4 RDIMM, LRDIMM, LV-RDIMM, LV-LRDIMM	
	Slot	48	
	Maximum capacity	6144GB(for 128-GBDIMM/2CPU)	3072 GB (for 64 GB-DIMM/2CPU)
	Expansion unit	Normal Performance	2 DIMMs, 4 DIMMs, or 8 DIMMs (*1)
		Full mirror	4 DIMMs, 8 DIMMs, or 16 DIMMs (*1)
		Partial mirror	4 DIMMs, 8 DIMMs, or 16 DIMMs (*1)
		Address range mirror(*2)	8 DIMMs or 16 DIMMs (*1)
		Spare	6 DIMMs, 12 DIMMs, or 24 DIMMs (*1)
	RAS	SDDC, Bank DDDC	
	Error correction	ECC	
LED		Power, Alarm, Location	
External dimension (mm) (excluding protrusions)		Width 90.5 x depth 528.1 x height 430.8	
Weight (kg) (without HDD/SSD)		11.9	

(*1) For details on the expansion unit of DIMM, see 'G.2 DIMM' in "*PRIMEQUEST 2000 series Administration manual*" (CA92344-0537).

The following figure shows the overview of the Memory Scale-up Board.

(*2) Address range mirror is available in only PRIMEQUEST 2400E3/2800E3/2800B3.

FIGURE 2.19 Memory Scale-up Board External view



No.	Description
(1)	Top view
(2)	Front view
(3)	Front perspective view
(4)	Right lateral view

The outline of each component making up the Memory Scale-up Board is shown follows.

- Memory Mezzanine
Memory Mezzanine is a memory expansion board on which two Memory Buffers and 12 DIMM slots are mounted. Two Memory Mezzanines are mounted for each Memory Scale-up Board.
- BMC
BMC is an SB management LSI. It is connected to the LPC bus. It communicates with the MMB via the BMC built-in NIC and exchanges information of the PECI bus (interface to the BIOS) and the GPIO control.
- SPI Flash
SPI Flash is the abbreviation of the Serial Peripheral Interface Flash. It is a flash memory to store the BIOS code (UEFI).

2.7 MMB (Management Board)

The Management Board (MMB) is a control board having a dedicated processor which differs from that on the SB.

It mainly controls the following.

- Partition configuration control in the cabinet
- Power control
- Memory Mode setup
- Resetting
- Monitoring the sensors
- Log management
- Schedule operation

The MMB is operated from a management network via a Web-UI. It can also be operated by connecting a management terminal to serial port of MMB via the CLI.

The MMB is mounted on the rear of the cabinet.

Remarks

Even one MMB can be operated. Up to two MMBs can be mounted in a cabinet. MMB is duplicated when two MMBs are mounted in PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E.

2.7.1 MMB specifications

The MMB specification is listed in the table below.

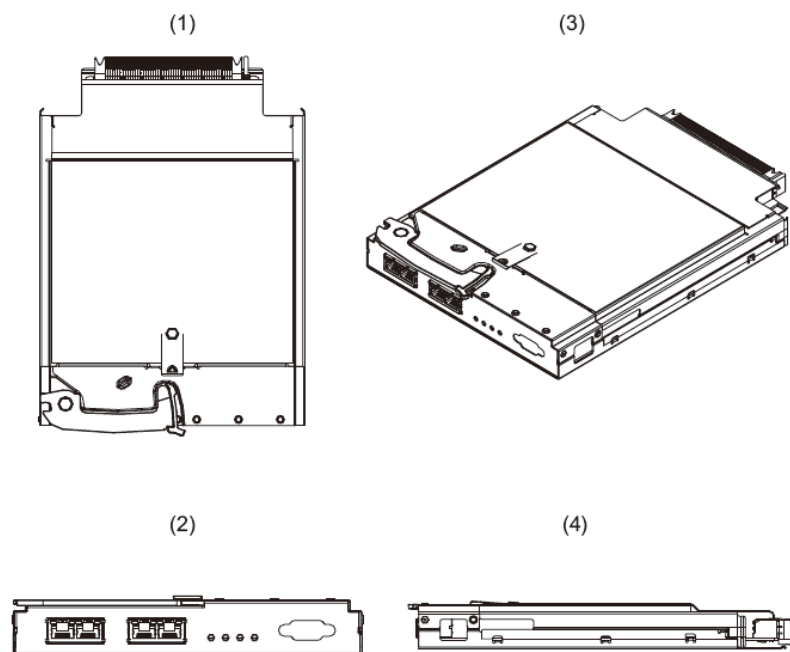
TABLE 2.9 MMB specifications

Item		Specifications
Serial interface COM port		DB9×1 port (For initial setup)
LAN interface	USER port #0/#1 (RJ45)	100 Mbps/1 Gbps × 2 ports
	REMCS port (RJ45)	100 Mbps ×1 port
	CE port (RJ45)	100 Mbps ×1 port
Hot plug		Supported (only in redundancy configuration)
LED		Ready, Active, Alarm, Location
External dimensions (mm) (remove protrusions)		Width 192.6 x Depth 269.2 x Height 31.4
Weight		1.2 kg

In PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E, a redundant configuration can be established by mounting two MMBs.

The following figure shows overviews of the MMB.

FIGURE 2.20 External view of the MMB



No	Description
(1)	Top view
(2)	Front view
(3)	Front perspective view
(4)	Right lateral view

2.7.2 MMB serial interface

The MMB has one serial port (Dsub-9 pin). MMB operations are carried out from a management network through a Web-UI. It can also be operated by connecting a management terminal to the serial port of the MMB through a CLI.

For details on accessing the MMB through the serial interface, see '3.3.1 Connecting the MMB console PC' in the *PRIMEQUEST 2000 Series Installation Manual* (CA92344-0536).

2.7.3 MMB LAN interface

The MMB has a total of three types of ports, namely, the GbE LAN port (for management), the CE port (for maintenance) and the REMCS port.

- USER port (#0/#1 port of the MMB)
These LAN ports are used to connect an MMB operation terminal for a user to the MMB. The user can use a Web browser from the MMB operation terminal to communicate with the MMB firmware and operate and manage the PRIMEQUEST 2000 series.
USER port can be duplicated. This port is for 1000Base-T support.
- REMCS port (MMB [REMOTE] port)
REMCS port is used for a connection (Internet connection, P-P connection, site server connection) to the Fujitsu Support Center (OSC) of the REMCS. This port supports 100Base-TX.
- CE port (MMB [LOCAL] port)
The CE port is used by a field engineer to install or repair the PRIMEQUEST 2000 series (server). It is a LAN port for connecting to the terminal of the field engineer (FST: Field Support Tool).

The MMB has a dedicated CPU and functions as one system management host.

The switching hubs for the management LAN, that for the LAN in the cabinet, and that for the BMC video redirection/ virtual media are all built into the MMB.

2.8 IOU (IO unit)

This section describes the IOU of the PRIMEQUEST 2000 series.

The IOU is a component shared by all the models. There are two types of IOUs, namely, IOU_1GbE and IOU_10GbE depending on the type of available PCI Express cards and bandwidth.

2.8.1 IOU (IOU_1GbE/IOU_10GbE) specifications

The specification of the IOU is listed in the table below.

TABLE 2.10 (IOU_1GbE/IOU_10GbE) specifications

Item	Specifications	
	IOU_1GbE	IOU_10GbE
Number of PCI Express slots	4 (Gen3 8Lane Low Profile)	2 (Gen3 16Lane Full Height) 1 (Gen3 8Lane Low Profile)
LED	Power, Alarm, Location	Power, Alarm, Location
External dimensions (mm) (Except protrusions)	Width 388 x Depth 288.9 x Height 28.2	Width 388 x Depth 288.9 x Height 28.2
Weight (kg) (without PCI Express card)	2.5 kg	2.6 kg

The specification of the LAN Controller included within the IOU below.

TABLE 2.11 The specification of the IOU built-in LAN Controller

Item	Specifications	
	GbE LAN Controller (IOU_1GbE)	GbE LAN Controller (IOU_10GbE)
LAN Controller	Intel Powerville HI350AM2	Intel Twinville JLX540AT2
Standards	IEEE802.3i 10BASE-T	IEEE802.1p
	IEEE802.3u 100BASE-TX	IEEE802.1q VLAN
	IEEE802.3ab 1000BASE-T	IEEE802.3ad LACP
	IEEE802.1q VLAN	IEEE802.3 2005 flow control support
	IEEE802.3x Flow Control	
	IEEE802.3ad LACP	
	IEEE802.3az Power Management and Saving	
	IEEE802.1as Time Sync	
	IEEE1588 Precision Time Protocol	
Teaming	Supported	Supported
Jumbo frame	Supported	Supported
VMDq	Supported	Supported
SR-IOV	Supported	Supported
Energy Efficient Ethernet	Supported	Not Supported
PXE	Supported	Supported
iSCSI boot	Supported	Supported
WOL	Supported	Supported
Network	10/100/1000BASE-T	100/1000/10000BASE-T
Connector	RJ45 port	RJ45 port

Up to four IOUs can be mounted at the rear of the cabinet. Any combinations of IOU_1GbE, IOU_10GbE installation are allowed. One and more IOU is required for each physical partition. PCI Express slot installed in each IOU is allocated to partition.

To connect the IOU and the PCI_Box, a PCI_Box Connection Card in IOU (PCNC) must be installed at the slot for connecting to the PCI_Box. PCNC can be installed at PCI express slot #2 or PCI Express slot #3 for

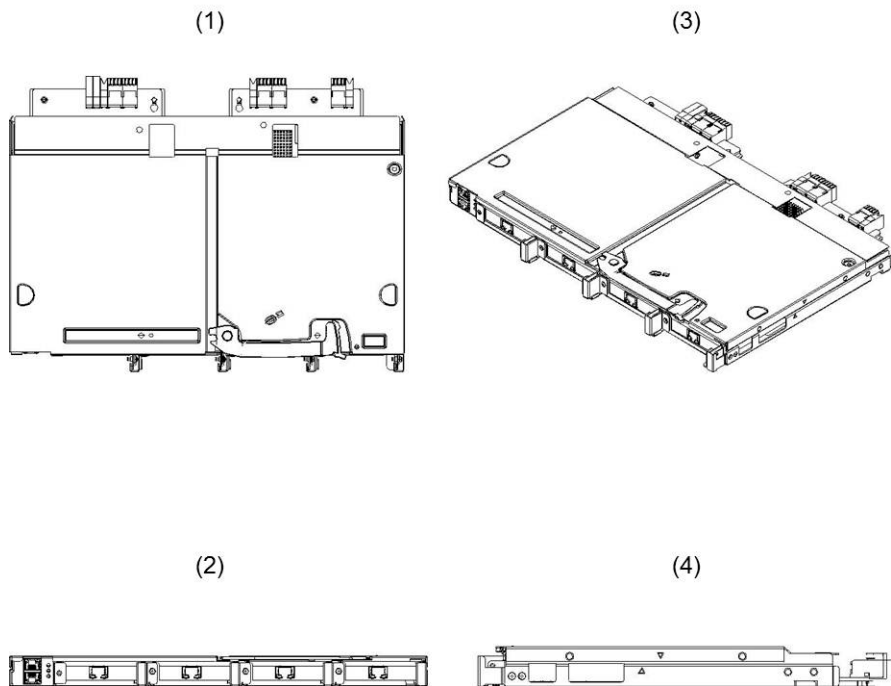
IOU_1GbE and can be installed at PCI express slot #2 for IOU_10GbE. The connector of the link card bracket and the connector of the PCI_Box connection are then connected by a dedicated cable. Up to two FBUs can be installed at PCI Express slot#0 for IOU_1GbE.

Note

- If a FBU is installed, a PCI Express card cannot be installed at PCI Express slot#0.
- A FBU cannot be installed into IOU_10GbE.

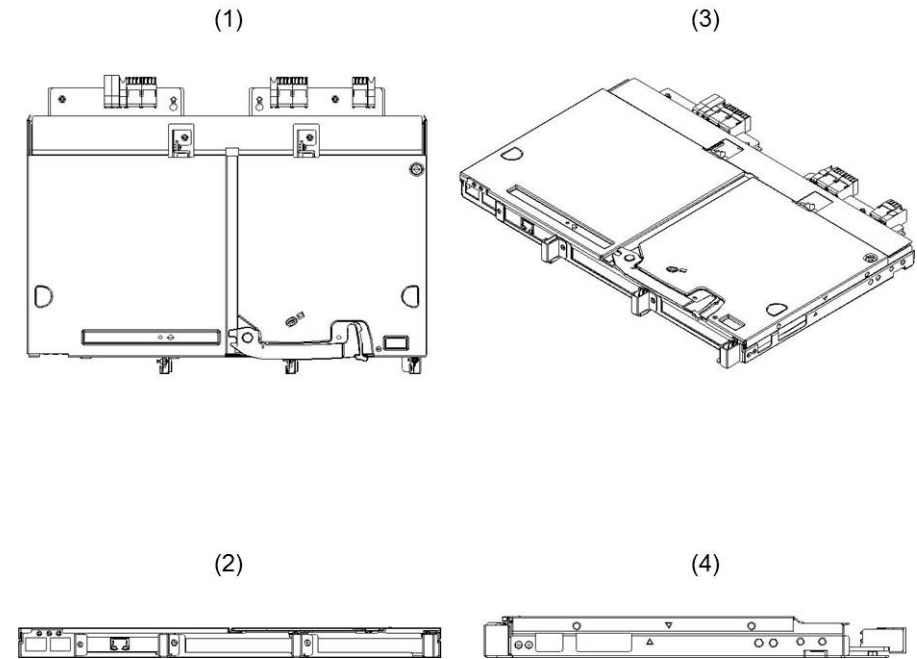
The overview of IOU_1GbE and IOU_10GbE are shown below.

FIGURE 2.21 External view of IOU_1GbE



No.	Description
(1)	Top view
(2)	Front view
(3)	Front lateral view
(4)	Right view

FIGURE 2.22 External view of IOU_10GbE



No.	Description
(1)	Top view
(2)	Front view
(3)	Front perspective view
(4)	Right view

IOU (IOU_1GbE/IOU_10GbE) has an LED. For details, see 'F.1.5 IOU' of the "PRIMEQUEST 2000 Series Administration Manual" (CA92344-0537).

2.8.2 IOU card slot

The IOU has to be removed from the cabinet while inserting and removing the card in the PCI Express slot of the IOU.

2.9 DU (Disk unit)

DU (Disk Unit) is a unit used to mount the HDD/SSD. One or two SAS RAID controller cards can be mounted in the DU.
In total, there are four 2.5 inch disk slots in the DU.
The DU is connected to the IOU by the PCI Express Gen2 4Lane interface. Connections of the IOU to the DU are listed in the table below.

TABLE 2.12 Connection of IOU with DU

Connection source	Destination	Connection destination HDD	
		For two HDD per SAS RAID controller card	For four HDD per SAS RAID controller card
IOU#0	DU#0-PCI Slot#0	HDD#2, #3 in DU#0	DU#0 HDD#0,#1,#2,#3
IOU#1	DU#0-PCI Slot#1	HDD#0, #1 in DU#0	DU#0 HDD#0,#1,#2,#3
IOU#2	DU#1-PCI Slot#0	HDD#2, #3 in DU#1	DU#1 HDD#0,#1,#2,#3
IOU#3	DU#1-PCI Slot#1	HDD#0, #1 in DU#1	DU#1 HDD#0,#1,#2,#3

2.9.1 DU specifications

This section shows the conceptual diagram and specifications of the DU.

FIGURE 2.23 DU conceptual diagram

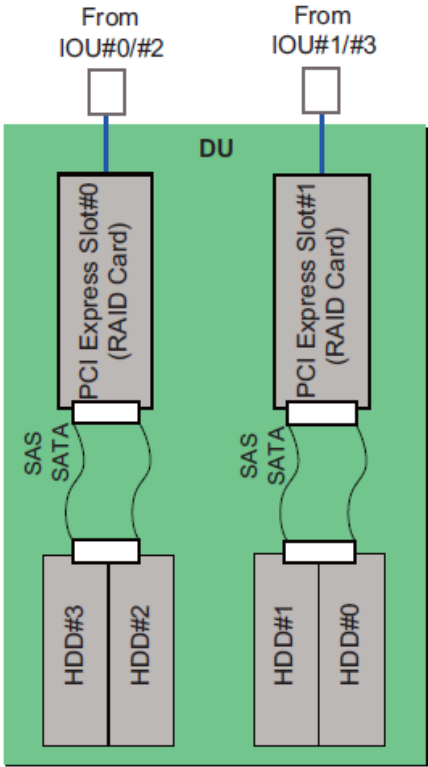


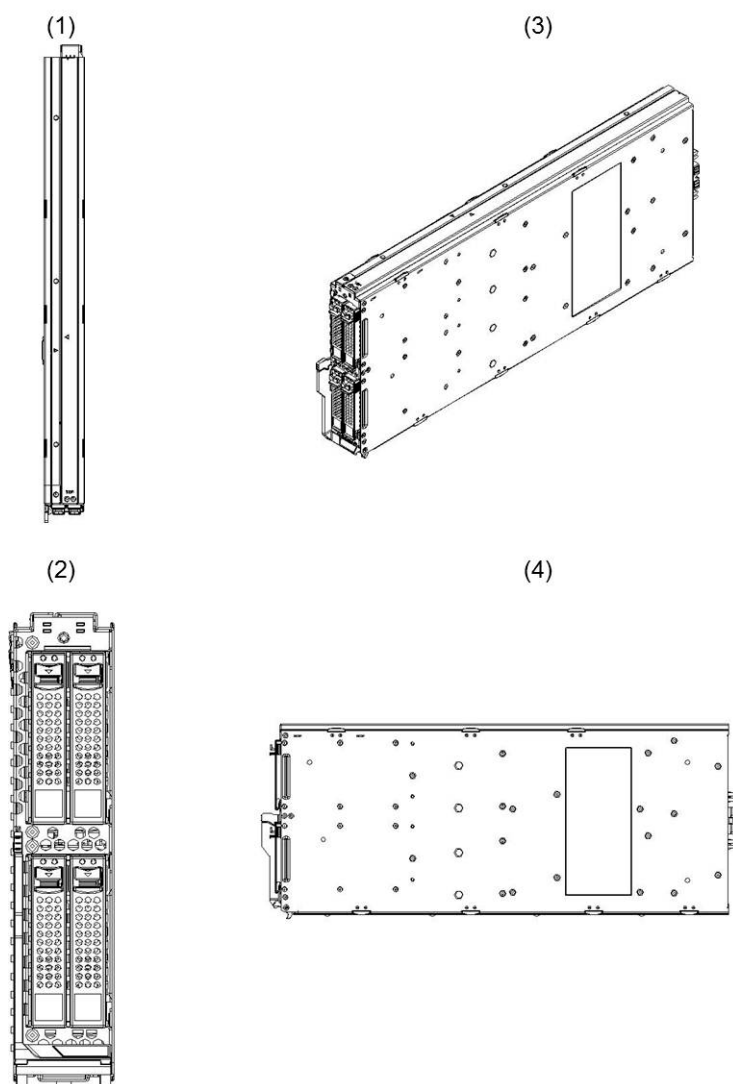
TABLE 2.13 DU specifications

Item	Specifications
PCI Express slot	PCI Express Gen2, 4 Lane slot x2
Main Board	PCI Express slot and SGPIO Controller for mounting the SAS RAID controller card
HDD slot	2.5 inch SAS/SATA-HDD slotx4
HDD hot plug	Supported (*1)
Enclosure Management	SGPIO Present monitoring and Fault LED control by SGPIO controller (each HDD)
Supported RAID level	0, 1, 5, 6, 10, 1E (*2)
LED	Power, Attention, Access LED (for each HDD), Alarm LED (each HDD)
Dimension (mm) (except protrusions)	Width 45 x Depth 526 x Height 215
Weight (kg) (without HDD/SSD)	2.9 kg

*1: Hot plug of HDD is enabled only when HDD is duplicated by the RAID.

*2: Usable RAID levels are dependent on the number of SAS RAID controller cards and the number of HDDs mounted in the DU.

FIGURE 2.24 External view of the DU



No.	Description
(1)	Top view
(2)	Front view
(3)	Front side perspective view
(4)	Right lateral view

2.10 Internal storage device

This section describes the internal HDD and internal SSD (solid state drive) supported by the PRIMEQUEST 2000 series.

Component that can include internal HDD/SSD in the PRIMEQUEST 2000 series is as below.

- HDD bays in the SB (Except for PRIMEQUEST 2800B3/2800B2/2800B)
- DU

For number of slot built-in SB and DU, see [TABLE 1.3 Hardware specifications](#).

The specifications and capacity of the components mounted in the internal HDD/SSD are listed in the table below.

TABLE 2.14 HDD bays in the SB and the HDD specifications of the DU (PRIMEQUEST 2400E3/2800E3/2800B3/2400E2/2800E2/2800B2)

	HDD bays in the SB (Except for PRIMEQUEST 2800B3/2800B2)	DU
Reserved SB and SB degradation support	Not supported	Supported
HW RAID (0, 1, 5, 6, 1+0, 1E) support	Supported (*1)	Supported (*1)
SW RAID support	Supported (*2)	Supported (*2)
Hot plug of HDD/SSD support	Supported	Supported
Number of HDD/SSD slots for each SB and DU	4	
Maximum capacity of supported HDD/SSD	HDD: 1.8 TB SSD: 1.6 TB	

*1: Available HW RAID levels differ depending on the number of SAS RAID controller cards HDDs mounted.

*2: HW RAID being RAID0 when using the SW RAID (GDS) is a condition.

TABLE 2.15 HDD bays in the SB and the HDD specifications of the DU (PRIMEQUEST 2400E/2800E/2800B)

	HDD bays in the SB (Except for PRIMEQUEST 2800B)	DU
Reserved SB and SB degradation support	Not supported	Supported
HW RAID (0, 1, 5, 6, 1+0, 1E) support	Supported (*1)	Supported (*1)
SW RAID support	Supported (*2)	Supported (*2)
Hot plug of HDD/SSD support	Supported	Supported
Number of HDD/SSD slots for each SB and DU	4	
Maximum capacity of supported HDD/SSD	HDD: 1.2 TB SSD: 1.6 TB	

*1: Available HW RAID levels differ depending on the number of SAS RAID controller cards HDDs mounted.

*2: HW RAID being RAID0 when using the SW RAID (GDS) is a condition.

2.10.1 Internal HDD (Hard disk drive)

The HDD capacity in the maximum configuration (*1), and the maximum LUN capacity in a RAID configuration are listed in the table below.

*1: In PRIMEQUEST 2400E3/2800E3/2400E2/2800E2, 1.8 TB conversion for each HDD

In PRIMEQUEST 2400E/2800E, 1.2 TB conversion for each HDD

TABLE 2.16 The HDD capacity in maximum configuration, and the maximum LUN capacity in a RAID configuration (PRIMEQUEST 2400E3/2800E3/2800B3/2400E2/2800E2/2800B2)

RAID configuration	PRIMEQUEST			Maximum LUN (*1)
	2400E3/ 2400E2	2800E3/ 2800E2	2800B3/ 2800B2	1.8 TB HDD
SAS (non-RAID)	28.8TB	43.2TB	14.4TB	1.8TB
SAS-RAID (RAID0)	28.8TB	43.2TB	14.4TB	7.2TB (x4)
SAS-RAID (RAID1)	14.4TB	21.6TB	7.2TB	1.8TB (1+1)
SAS-RAID (RAID5)	21.6TB	32.4TB	10.8TB	5.4TB (3+1)
SAS-RAID (RAID6)	14.4TB	21.6TB	7.2TB	3.6TB (2+2)
SAS-RAID (RAID10)	14.4TB	21.6TB	7.2TB	3.6TB (2x2)
SAS-RAID (RAID1E)	14.4TB	21.6TB	7.2TB	3.6TB (4/2)

*1: Common in all models

TABLE 2.17 The HDD capacity in maximum configuration, and the maximum LUN capacity in a RAID configuration (PRIMEQUEST 2400E/2800E/2800B)

RAID configuration	PRIMEQUEST			Maximum LUN (*1)
	2400E	2800E	2800B	1.2 TB HDD

RAID configuration	PRIMEQUEST			Maximum LUN (*1)
	2400E	2800E	2800B	1.2 TB HDD
SAS (non-RAID)	19.2 TB	28.8 TB	9.6 TB	1.2 TB
SAS-RAID (RAID0)	19.2 TB	28.8 TB	9.6 TB	4.8 TB (x4)
SAS-RAID (RAID1)	9.6 TB	14.4 TB	4.8 TB	1.2 TB (1+1)
SAS-RAID (RAID5)	14.4 TB	21.6 TB	7.2 TB	3.6 TB (3+1)
SAS-RAID (RAID6)	9.6 TB	14.4 TB	4.8 TB	2.4 TB (2+2)
SAS-RAID (RAID10)	9.6 TB	14.4 TB	4.8 TB	2.4 TB (2x2)
SAS-RAID (RAID1E)	9.6 TB	14.4 TB	4.8 TB	2.4 TB (4/2)

*1: Common in all models

2.10.2 Internal SSD

The SSD capacity in maximum configuration (*1) and the maximum LUN capacity in a RAID configuration are listed in the table below.

*1:1.6 TB conversion for each SSD

TABLE 2.18 The SSD capacity in maximum configuration and the maximum LUN capacity in a RAID configuration

RAID configuration	PRIMEQUEST			Maximum LUN (*1)
	2400E3/ 2400E2/ 2400E	2800E3/ 2800E2/ 2800E	2800B3/ 2800B2/ 2800B	1.6 TB SSD
SAS (non-RAID)	25.6 TB	38.4 TB	12.8 TB	1.6 TB
SAS-RAID (RAID0)	25.6 TB	38.4 TB	12.8 TB	6.4 TB (x4)
SAS-RAID (RAID1)	12.8 TB	19.2 TB	6.4 TB	1.6 TB (1+1)
SAS-RAID (RAID5)	19.2 TB	28.8 TB	9.6 TB	4.8 TB (3+1)
SAS-RAID (RAID6)	12.8 TB	19.2 TB	6.4 TB	3.2 TB (2+2)
SAS-RAID (RAID10)	12.8 TB	19.2 TB	6.4 TB	3.2 TB (2x2)
SAS-RAID (RAID1E)	12.8 TB	19.2 TB	6.4 TB	3.2 TB (4/2)

*1: Common in all models

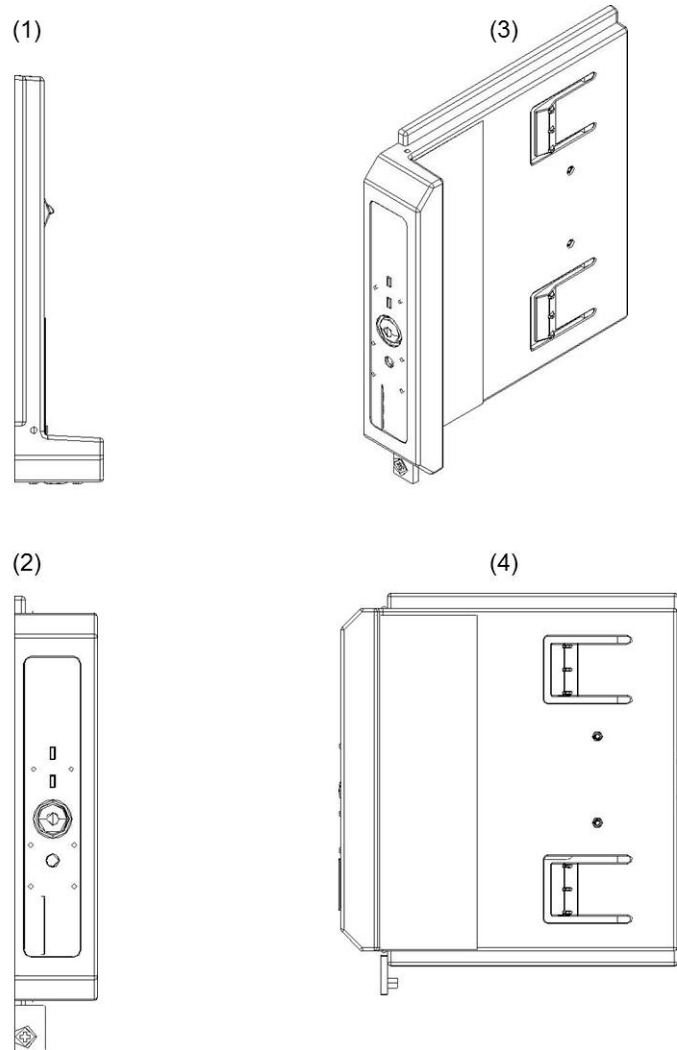
2.11 OPL (Operator panel)

The OPL (Operator panel) provides following functions.

- System LED
LEDs that display the status of the System are mounted
- System FRU
The System FRU (I2C EEPROM) that stores the device information is mounted
- Intake air temperature sensor
A sensor to monitor the temperature of the intake air of the device is mounted

An overview of the OPL is shown below.

FIGURE 2.25 External view of OPL



No.	Description
(1)	Top view
(2)	Front view
(3)	Front side perspective view
(4)	Right lateral view

2.11.1 OPL specifications

The specification of the OPL is listed in the table below.

TABLE 2.19 OPL specifications

Item	Specifications
LED	System Power, System Alarm, System Location, CSS
Dimension (mm) (remove protrusions)	Width 22 x Depth 101 x Height 112
Weight (kg)	0.06 kg

2.12 PCI_Box

PCI_BOX, which is a 4U size cabinet, is an extended I/O cabinet equipped with 12 PCI Express Gen3 8lane slots.

All PCI Express slots of the PCI_Box support PHP (PCI hot plug). PCI_Box provides LNKc slots for connecting to main cabinet in addition to PCI Express slots for connecting expansion cards.

The PCI_Box is internally halved and PCI Express slots are allocated to each partition by six ones. For details of the partition configuration, see '[5.2.1 Partition granularity](#)'.

There is no independent connector for the PCI_Box connection in the main unit side. A PCNC is mounted on the PCI Express slot of the IOU, and a cable is connected to the connector on the card.

2.12.1 PCI_Box specification

The specification of the PCI_Box is listed in the table below.

TABLE 2.20 PCI_Box Specification

Item	Specifications
PCI Express slot	12 (8 lane) (Gen3, 8GbpS)
PCI Express interface	2
LED	Power, Alarm, Location
Hot plug	Hot plug for PCI_Boxes itself: Supported Hot plug for PCI Express card: Supported
IO_PSU (Power Unit)	Single phase AC 100V-120V, 200V-240V +/- 10% Redundancy
Cooling mechanism	Fan ϕ 120 mm x2, redundancy (Standard)
External dimensions (mm) (Except protrusions)	Width 482 x Depth 740 x Height 175 (4U rack mount)
Weight (kg)	35.0

2.12.2 PCI_Box interface

This section describes the PCI_Box interface.

IOU interface

The PCNC is mounted in the PCI Express slot of IOU_1GbE and IOU_10GbE, and connected to the PCI_Box.

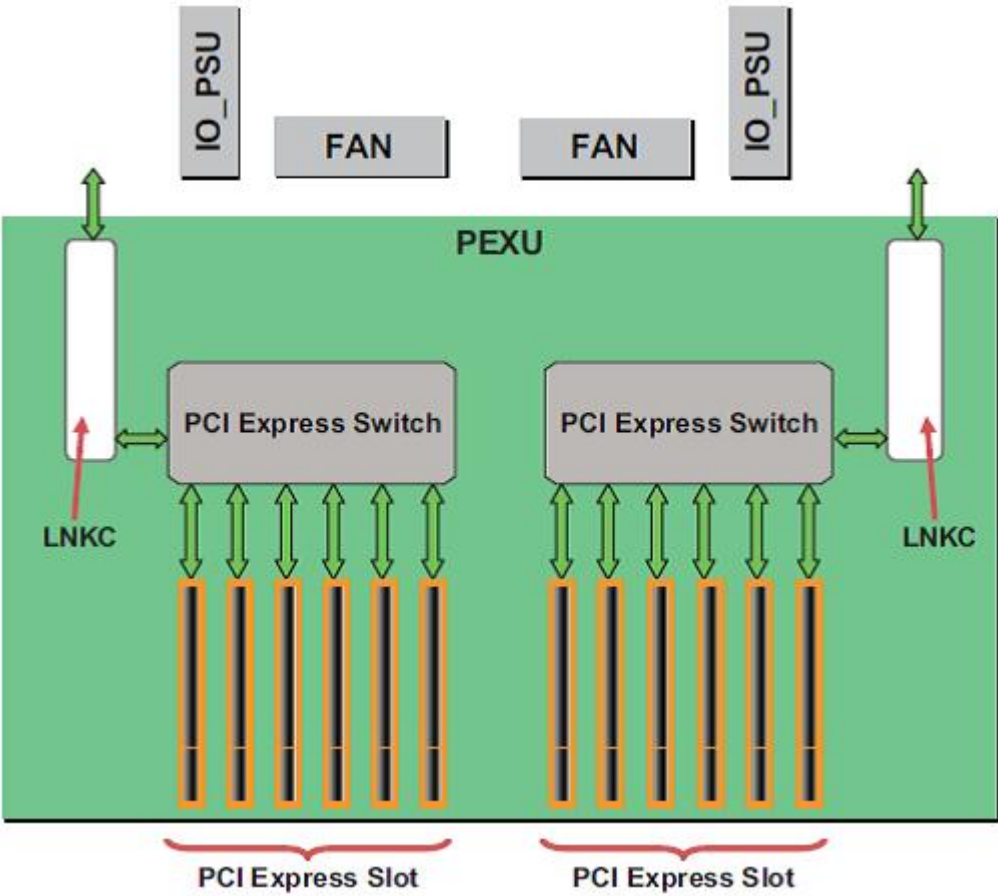
The PCNC can be mounted in slot#2 and slot#3 in IOU_1GbE.

The PCNC can be mounted in slot#2 in IOU_10GbE.

PCI_Box interface

PCI_Box has connection interface with IOU per PCI_Box LH, namely has two interfaces per PCI_Box.

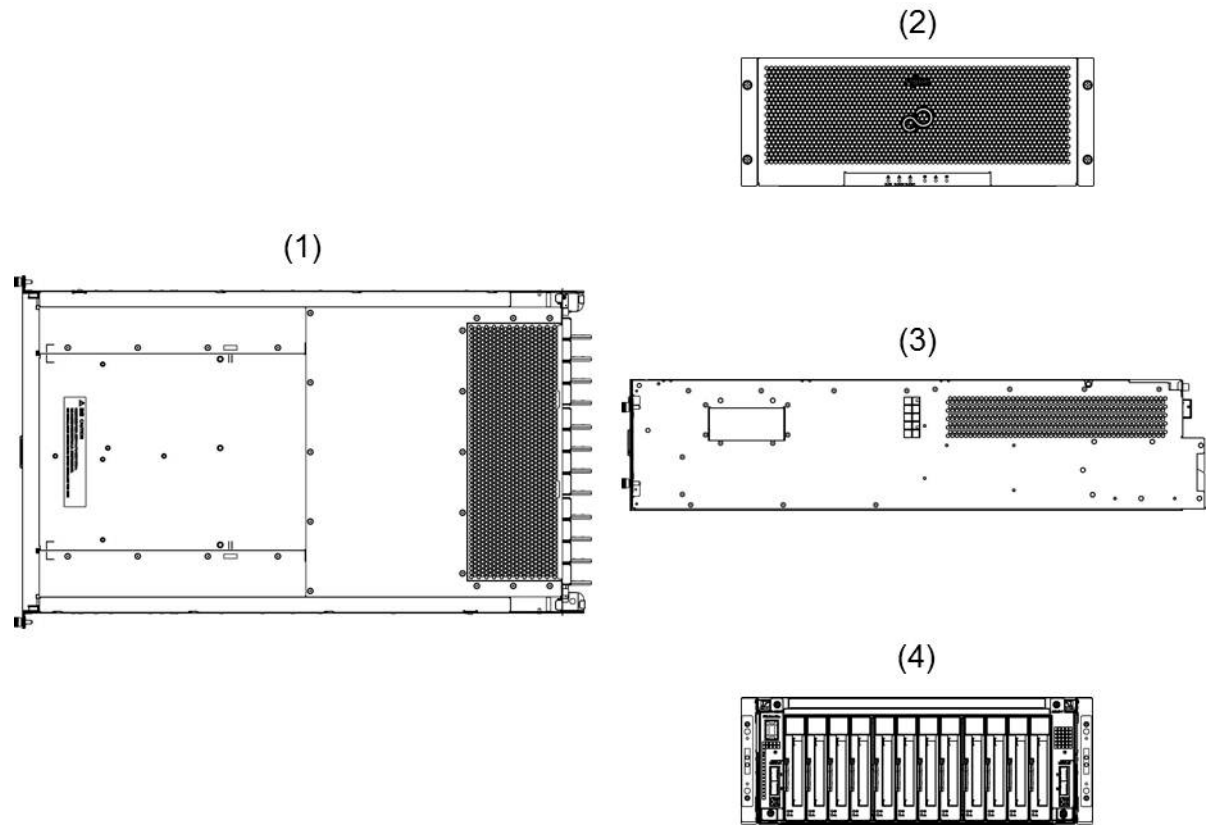
FIGURE 2.26 PCI_Box conceptual diagram



2.12.3 PCI_Box external view

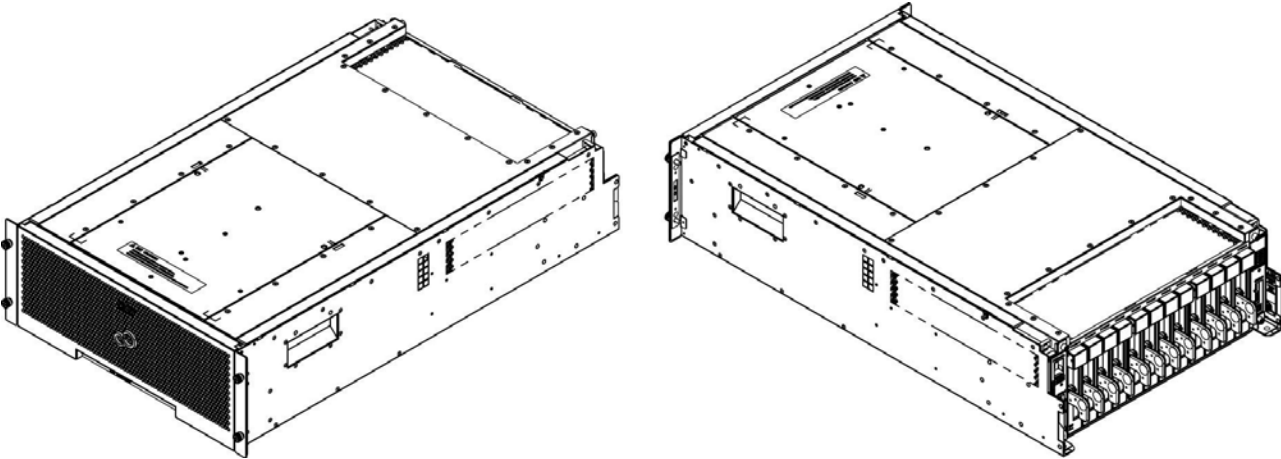
The following figures show external views of the PCI_Box cabinet.

FIGURE 2.27 Orthographic view of the PCI_Box cabinet



No.	Description
(1)	Top view
(2)	Front view
(3)	Right view
(4)	Rear view

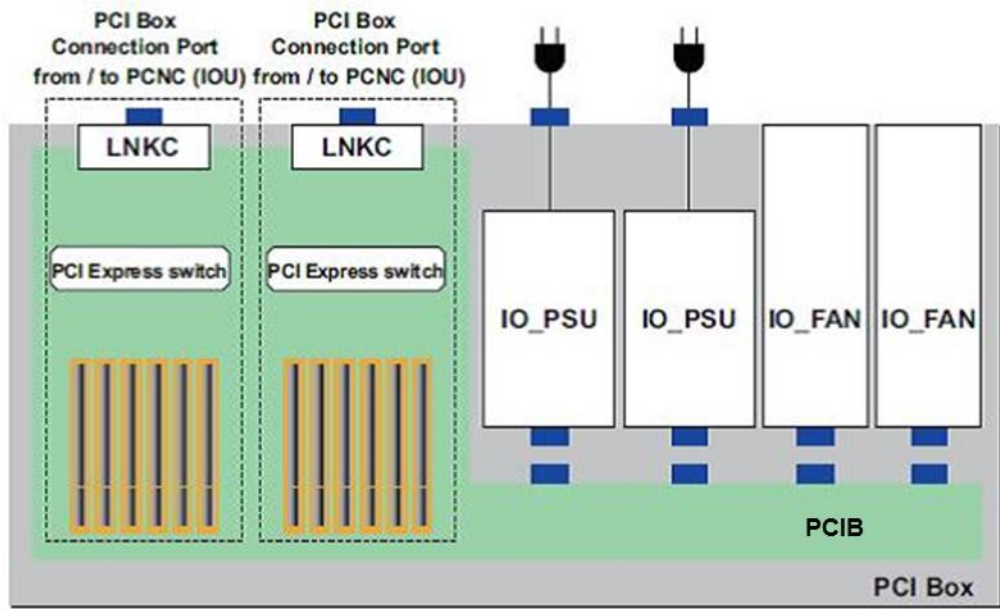
FIGURE 2.28 Perspective views of the PCI_Box cabinet



2.12.4 PCI_Box block diagram

PCI_Box block diagram is shown below.

FIGURE 2.29 PCI_Box block diagram



2.12.5 PCI_Box component list

PCI_Box component list is shown below.

TABLE 2.21 PCI_Box components

Component	Unit	Display format	Redundancy
PCI_Box		PCI_Box#0, #1, #2, #3	Possible by option
IO_PSU	2/PCI_Box	IO_PSU#0, IO_PSU#1	Possible by option
IO_FAN	2/PCI_Box	IO_FAN#0, IO_FAN#1	Possible as standard
PEXU	1/PCI_Box	PEXU	No
PCIB	1/PEXU	PCIB	No
LNKC	2/PCIB	LNKC#0, LNKC#1	No
PCI Express slot	12/PCIB	PCIC#0, PCIC#11, etc.	Possible by option

2.12.6 PCI_Box connection pattern

The PCI_Box is connected to the PCNC on the IOU.
One port on the PCI_Box is connected to one PCNC on the IOU by three PCI_Box connection cables (Two PCI Express cables and one PCI_Box control cable).
Number of connectable PCI_Boxes is shown in below list.

TABLE 2.22 Number of connectable PCI_Boxes

	PRIMEQUEST		
	2400E3/ 2400E2/ 2400E	2800E3 2800E2/ 2800E	2800B3/ 2800B2/ 2800B
Number of connectable devices	4	-	-

The diagram of the maximum PCI_Box connections is shown below.

For details on the connection conditions of the PCI_Box, see '2.12.7 PCI_Box connection conditions'.

FIGURE 2.30 PCI_Box connection diagram (maximum configuration) for mounted four IOU_1GbEs

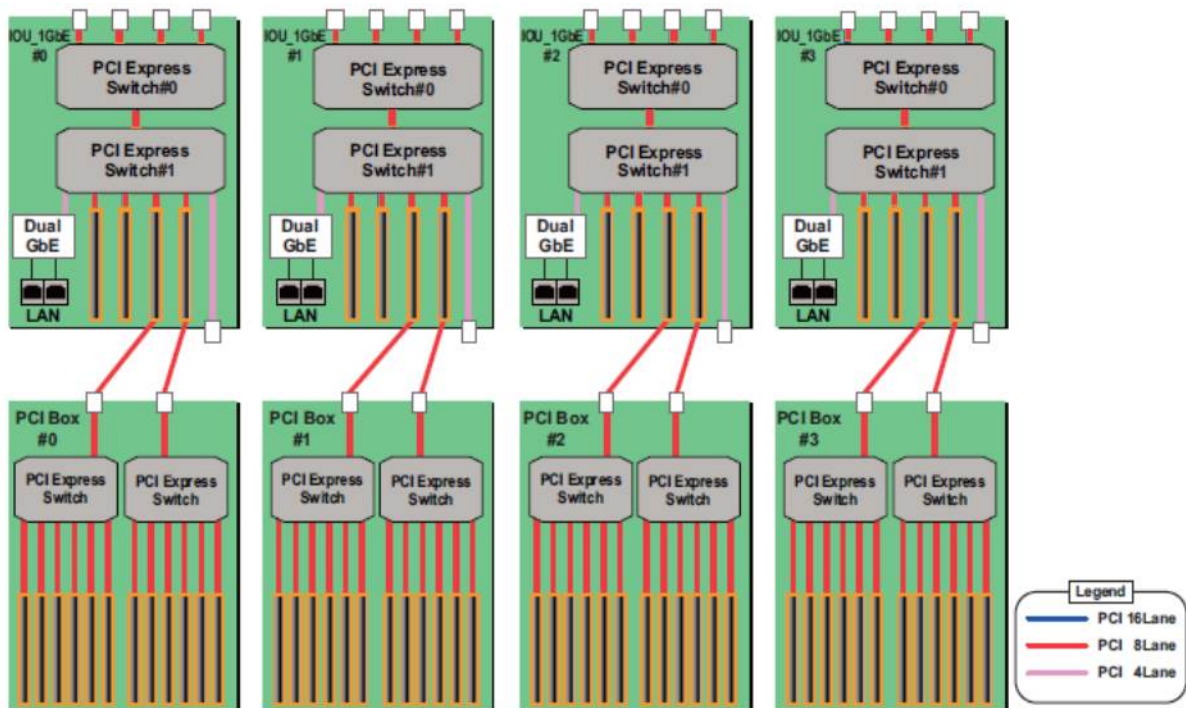
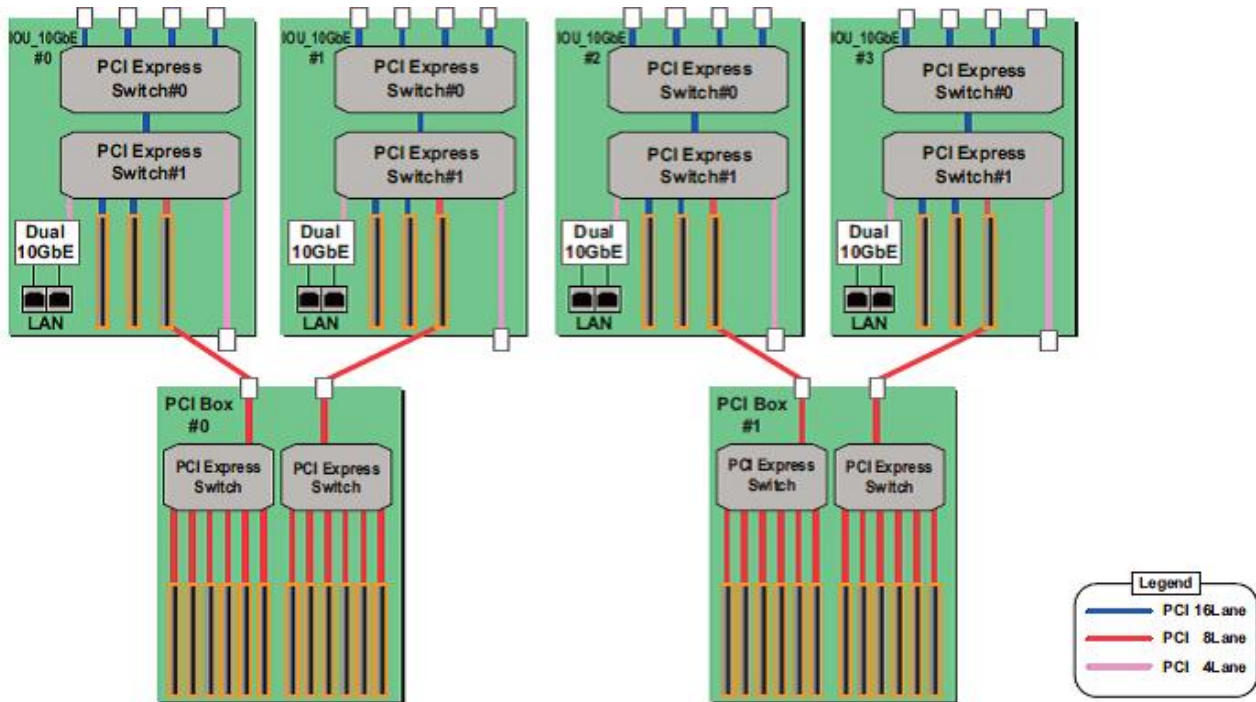


FIGURE 2.31 PCI_Box connection diagram (maximum configuration) for mounted four IOU_10GbEs



2.12.7 PCI_Box connection conditions

This section describes the PCI_Box connection conditions of the PRIMEQUEST 2000 series.

Remarks

Limitation for PCI_Box connections is as follows:

Different PRIMEQUEST 2000 series cabinet cannot be connected to the same PCI_Box (PCI_Box sharing).
Connection examples are shown below.

- Straight connections (permitted)
- Crossover connections (permitted)
- Connection to different PCI_Boxes pattern 1 (permitted)
- Connection to different PCI_Boxes pattern 2 (permitted)
- Connection from IOU_1GbE and IOU_10GbE (permitted)
- Sharing of one PCI_Box by different PRIMEQUEST series cabinet (cabinet (not permitted))

FIGURE 2.32 Straight connection (permitted)

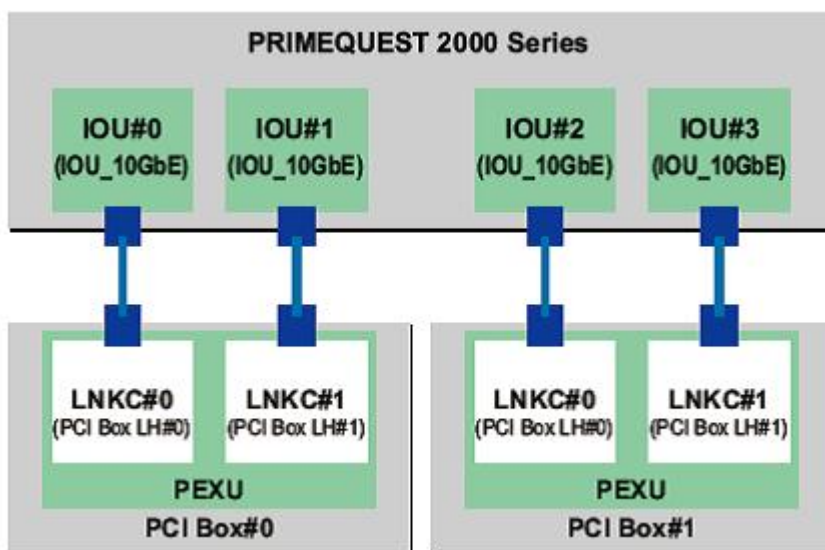


FIGURE 2.33 Crossover connection (permitted)

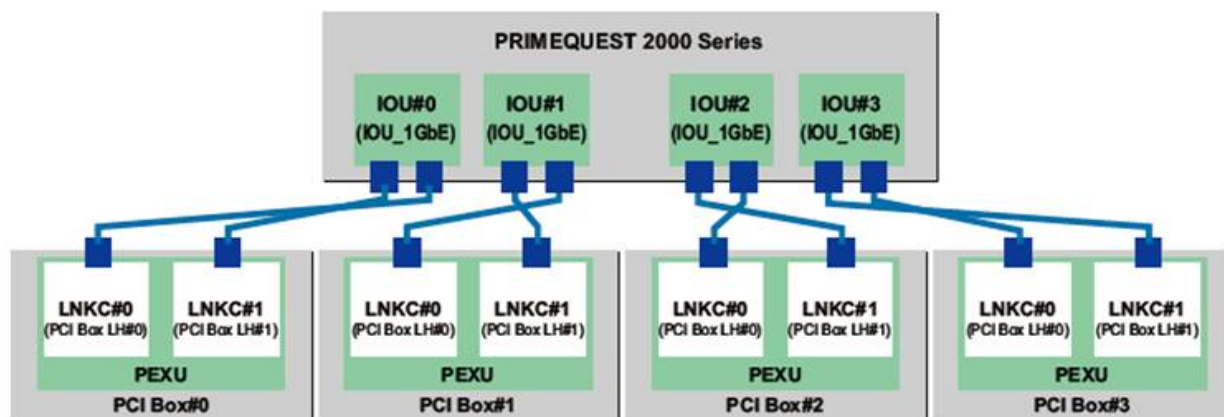


FIGURE 2.34 Connection to different PCI_Boxes pattern 1 (permitted)

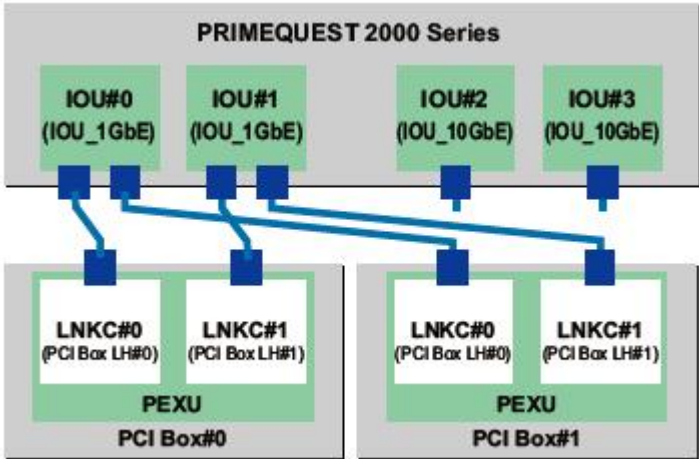


FIGURE 2.35 Connection to different PCI_Boxes pattern 2 (permitted)

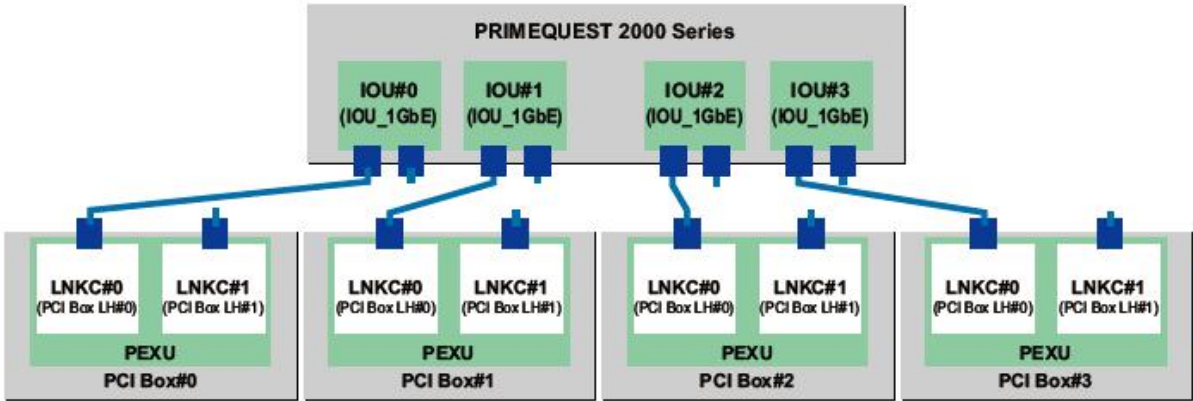


FIGURE 2.36 Connection from IOU_1GbE and IOU_10GbE (permitted)

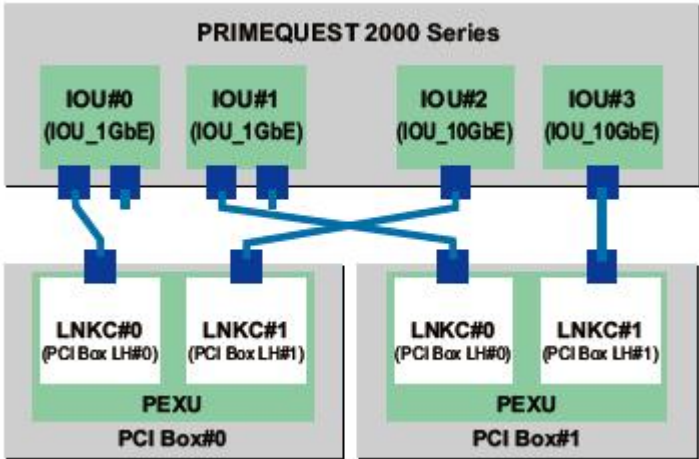
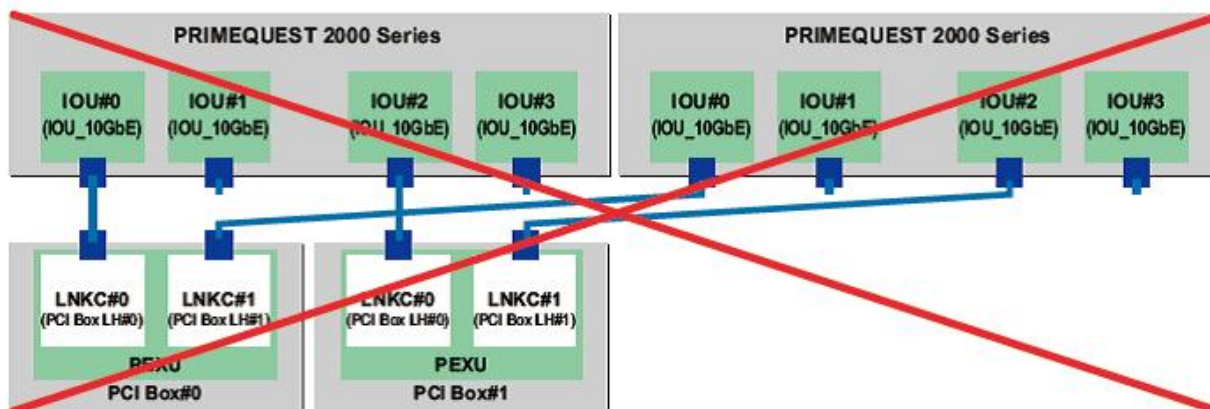


FIGURE 2.37 PCI_Box shared by different PRIMEQUEST cabinet (not permitted)



2.12.8 PCI_Box number

PCI_Box number can be set from 0 to 3 by using the switch provided in the PCI_Box.

2.13 PCI Express slot

An IOU has PCI Express slots in the PRIMEQUEST 2000 series. An extended I/O cabinet (PCI_Box) which expands number of PCI Express slot is also supported.

The usable number of PCI Express slot in maximum configuration is shown below.

TABLE 2.23 Usable number of PCI Express slots in maximum configuration

	PRIMEQUEST		
	2400E3/ 2400E2/ 2400E	2800E3/ 2800E2/ 2800E	2800B3/ 2800B2/ 2800B
Number of PCI Express slots (Short)	56 (*1)	56 (*1)	16

*1: Except PCI Express slots where the PCNC is mounted

The number of PCI Bus assigned per a slot can be set by BIOS menu. Default is '1'.

If a PCI Express card with bridge function is mounted, it is required to assign two or more PCI Buses per a slot.

2.13.1 PCI Express slot (IOU) specifications

There are two kinds of IOU in PRIMEQUEST 2000 series.

- IOU_1GbE
- IOU_10GbE

The specifications of the PCI Express slot (IOU) are listed in the following table.

TABLE 2.24 PCI Express slot (IOU) specifications

Specification		overview		PCI Hot Plug
		Length	Height	
IOU_1GbE	PCI Express Gen3 (8Gbps) 8 lane	Short	Low Profile	Not supported
IOU_10GbE	PCI Express Gen3 (8Gbps) 16 lane	Short	Low Profile	
			Full Height	

The number of PCI Express slots is shown below.

2.13.2 PCI Express slot (PCI_Box) specifications

Extended I/O cabinet (PCI_Box) is supported in the PRIMEQUEST 2000 series.
There are 12 PCI Express slots for each PCI_Box. All slots are PCI Express Gen3 8lane (8Gbps) slots.
All slots support PHP (PCI Hot Plug).
The PCI_Box specifications are shown below.

TABLE 2.25 PCI Express Slot (PCI_Box) specifications

Specification		overview		PCI hot plug
		Length	Height	
PCI_Box	PCI Express Gen3 (8Gbps) 8 lane	Short	Full Height	Supported

2.13.3 PCI Express cassette

The PRIMEQUEST 2000 series supports PCI Hot Plug for PCI Express cards on a PCI_Box. PCI Hot Plug for PCI Express cards on a IOU is not supported. A mounted PCI Express card cassette facilitates PCI Hot Plug operations.
The PRIMEQUEST 2000 series supports only one type of PCI Express card cassette (for short cards), which can be used for PCI_Box.

2.14 Middle Plane (MP)

The MP is an intermediate metal board for connecting SB, Memory Scale-up Board and IOUs. The MP has a structure in which SBs, Memory Scale-up Boards and IOUs are linked from both sides. The MP is used only for connections between boards. It has no power supply or devices

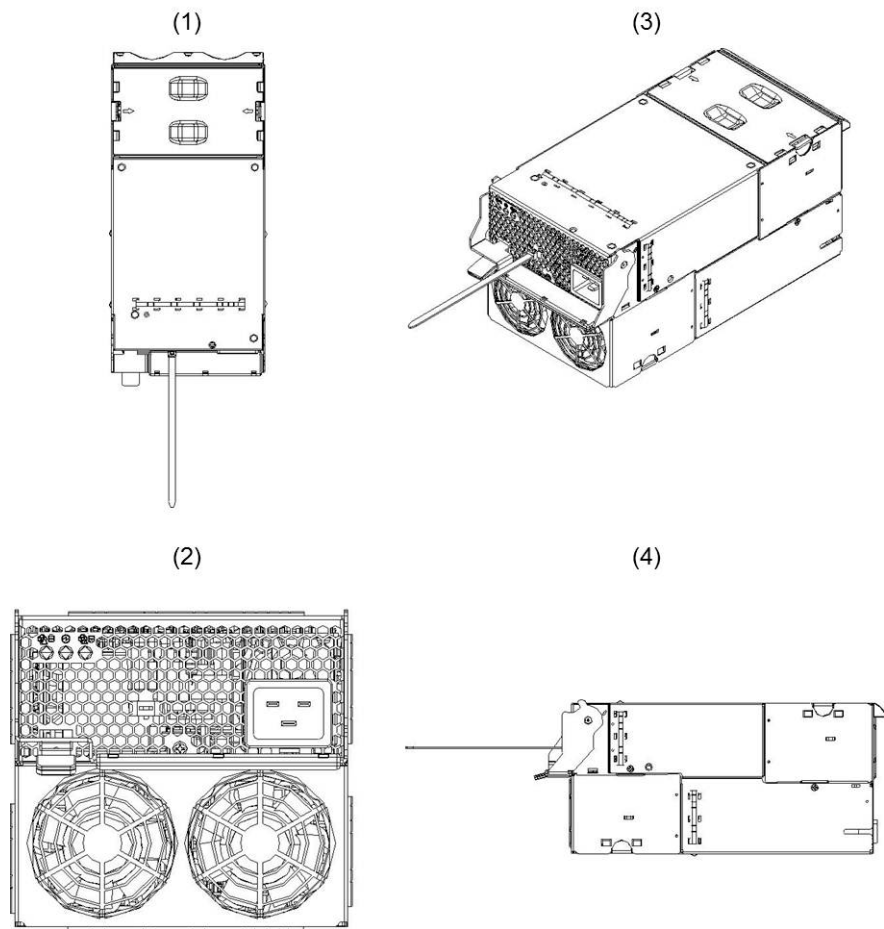
2.15 Power Supply Unit (PSU)

PSU is a power supply unit to convert the AC input to DC 12V.
In the PRIMEQUEST 2000 series, common PSU/Fan unit bays are provided in six places at the rear of the cabinet.
In the PRIMEQUEST 2000 series, no redundancy of PSU, namely single power feed is considered as the standard. Power feed redundancy can be configured by adding PSUs. This supports N+1 (PSU redundancy), N+N (dual power feed) configuration. The types of PSUs are as follows.

- PSU_P: For 80PLUS PLATINUM
- PSU_S: Corresponding to 80PLUS SILVER

An overview of the PSU is shown below.

FIGURE 2.38 External view of the PSU



Number	Description
(1)	Top
(2)	Front
(3)	Front perspective
(4)	Right lateral

Remarks
Different PSUs (PSU_P, PSU_S) cannot be mounted in the same cabinet.
For the configuration of the PSU, see [‘4.5.1 PSU Configuration’](#).

2.15.1 PSU_P specifications

The specifications of PSU_P are listed in the table below.

TABLE 2.26 PSU_P Specifications

Item		Specifications
Input voltage		1 ϕ AC 100 V-120V, 1 ϕ AC200 V-240 V
Output voltage		DC12V
Output power	AC100 V (*1)	1165 W
	AC200 V	2685 W
External dimensions (mm) (Excluding protrusions)		Width 137× Depth 255 ×Height 128
Weight (kg)		4.5

*1: AC 100V is not supported in the PSU_P.

2.15.2 PSU_S specifications

The specifications of the PSU_S are listed in the table below.

TABLE 2.27 PSU_S Specifications

Item		Specifications
Input voltage		1 ϕ AC 100 V-120V, 1 ϕ AC200 V-240 V
Output voltage		DC12V
Output power	AC100 V	1165 W
	AC200 V	2685 W
Dimensions (mm) (Excluding protrusions)		Width 137 \times Depth 255 \times Height 128
Weight (kg)		4.5

2.15.3 Number of PSUs required

As one AC source cable is used for one PSU, the number of PSUs used would be the same as the number of AC power cables used. The number of PSUs required differs depending on the model and the AC voltage conditions. For the configuration of the PSU, see [‘4.5.1 PSU Configuration’](#).

2.15.4 Dual power feed configuration

For details on the dual power feed configuration, see *PRIMEQUEST 2000 Series Installation Manual* (CA92344-0536).

2.15.5 AC cable specifications

For details on the AC cable specifications, see *PRIMEQUEST 2000 Series Installation Manual* (CA92344-0536).

2.15.6 Mounting conditions when using 100V power supply

For details on the mounting conditions when using 100 V power supply, see ‘Appendix G Component Mounting Conditions’ of the *“PRIMEQUEST 2000 Series Administration Manual”* (CA92344-0539).

2.16 Fan (Cooling mechanism)

The PRIMEQUEST 2000 series uses FANU and fan built in the PSU for cooling the main system. Cooling area is divided to two groups in a system. The rotation number of fan which cools the part with higher temperature is increased prior to other fans, which realize efficient cooling of the system.

Note

If all partitions are powered off, fans of PSU_P remain rotating.

In PRIMEQUEST 2000 series, the system is cooled by a total of six PSU built-in fans and FANUs. For details on the mounting locations of the fans in the PCI_Box, see [‘FIGURE 2.27 Orthographic view of the PCI_Box cabinet’](#) and [“FIGURE 2.28 Perspective views of the PCI_Box cabinet”](#).

CHAPTER 3 Software Configuration

This chapter describes the supported operating systems, bundled software, firmware, and operations management software of the PRIMEQUEST 2000 series.

3.1 Bundled electronic media

Electronic media are bundled with the PRIMEQUEST 2000 series.

The operations management software that includes the bundled software, bundled drivers and installation tools are recorded in electronic media.

DVD external drive is necessary when installing from the electronic media.

3.2 OS

PRIMEQUEST 2400E3/2800E3/2800B3 supports the following operating systems.

Microsoft (R) Windows Server (R) 2016 Standard
Microsoft (R) Windows Server (R) 2016 Datacenter
Microsoft (R) Windows Server (R) 2012 R2 Standard
Microsoft (R) Windows Server (R) 2012 R2 Datacenter
Red Hat (R) Enterprise Linux (R) 7 (for Intel64) (*1)
Red Hat (R) Enterprise Linux (R) 6 (for Intel64) (*1) (*2)
VMware vSphere (R) 6 (*3)

SUSE (R) Linux Enterprise Server 12

SUSE (R) Linux Enterprise Server 11

*1: For details on the supported versions, contact the distributor where you purchased your product, or your sales representative.

*2: Red Hat (R) Enterprise Linux (R) 6.7 and later is supported.

*3: For the details of the supported versions, contact the distributor where you purchased your product, or your sales representative.

PRIMEQUEST 2400E2/2800E2/2800B2 supports the following operating systems.

Microsoft (R) Windows Server (R) 2012 R2 Standard
Microsoft (R) Windows Server (R) 2012 R2 Datacenter
Microsoft (R) Windows Server (R) 2012 Standard
Microsoft (R) Windows Server (R) 2012 Datacenter
Red Hat (R) Enterprise Linux (R) 7 (for Intel64) (*1)
Red Hat (R) Enterprise Linux (R) 6 (for Intel64) (*1) (*2)
VMware vSphere (R) 6 (*3)
VMware vSphere (R) 5 (*3)

SUSE (R) Linux Enterprise Server 12

SUSE (R) Linux Enterprise Server 11

*1: For details on the supported versions, contact the distributor where you purchased your product, or your sales representative.

*2: Red Hat (R) Enterprise Linux (R) 6.6 and later is supported.

*3: For the details of the supported versions, contact the distributor where you purchased your product, or your sales representative.

PRIMEQUEST 2400E/2800E/2800B supports the following operating systems.

Microsoft (R) Windows Server (R) 2012 R2 Standard
Microsoft (R) Windows Server (R) 2012 R2 Datacenter
Microsoft (R) Windows Server (R) 2012 Standard
Microsoft (R) Windows Server (R) 2012 Datacenter
Microsoft (R) Windows Server (R) 2008 R2 Standard (64bit)
Microsoft (R) Windows Server (R) 2008 R2 Enterprise (64bit)
Microsoft (R) Windows Server (R) 2008 R2 Datacenter (64bit)
Red Hat (R) Enterprise Linux (R) 7 (for Intel64) (*1)
Red Hat (R) Enterprise Linux (R) 6 (for Intel64) (*1) (*2)
VMware vSphere (R) 5 (*3)

SUSE (R) Linux Enterprise Server 11

*1: For details on the supported versions, contact the distributor where you purchased your product, or your sales representative.

*2: Red Hat (R) Enterprise Linux (R) 6.4 and later is supported.

*3: For the details of the supported versions, contact the distributor where you purchased your product, or your sales representative.

3.3 Bundled software

TABLE 3.1 List of bundled software

No.	Name	Function	Windows Server				RHEL	SUSE
			2016	2012R2	2012	2008R2		
1	DSNAP	Collects the basic information when the command is executed on Windows running as the base OS operation	Supported	Supported	Supported	Supported	Not Supported	Not Supported
2	Software Support guide	Provides guidance on collecting the information required for trouble shooting	Supported	Supported	Supported	Supported	Not supported	Not Supported
3	ServerView Operations Manager	Monitors the hardware	Supported	Supported	Supported	Supported	Supported	Supported
4	ServerView agent (SV Agent)	Monitors the hardware	Supported	Supported	Supported	Supported	Supported	Supported
5	ServerView RAID Manager (SV RAID)	Monitors the HDD for failures and the RAID status	Supported	Supported	Supported	Supported	Supported	Supported
6	HBA blockage function	Stops access to abnormal nodes	Not supported	Not supported	Not supported	Not supported	Supported	Not supported
7	ServerView Installation Manager (SVIM)	Supports setup work	Supported	Supported	Supported	Supported	Supported	Supported
8	ServerView Mission Critical Option (SVMco)	Necessary when linking clusters	Not supported	Not supported	Not supported	Not supported	Supported	Not supported
9	ServerView Agentless Service (SVAS)	Monitors the hardware in the partition unit.	Supported	Supported	Supported	Supported	Supported	Supported
10	Dynamic Reconfiguration utility	Provides a set of Dynamic Reconfiguration command user interface and related service scripts. And also provides some Dynamic Reconfiguration collaborate scripts.	Not supported	Not supported	Not supported	Not supported	Supported	Not supported

Remark

To use monitoring with SVOM, installing ServerView Agents is required.

To monitor RAID by SVOM, installing ServerView Agents and ServerView RAID Manager (SV RAID) is required.

To use PCL, installing HBA blockage function and SVMco is required.

3.4 Supplied Drivers

For the drivers supplied with PRIMEQUEST 2000 series, see below web site.
<http://support.ts.fujitsu.com/>

3.5 Firmware

The PRIMEQUEST 2000 series consists of the following firmware:

- UEFI (BIOS) firmware
- BMC firmware
- MMB firmware
- I/O device firmware

For details on the feature of each firmware, see '1.5.1 Firmware'.

3.6 Operations Management Software

PRIMEQUEST 2000 series is linked to the operation management products of Fujitsu Limited (Enterprise Server Management (ESM)) (*1).

It provides a function for linking with the major operations management software (IBM Tivoli, HP SIM) of other companies.

*1: Example) ServerView Resource Orchestrator

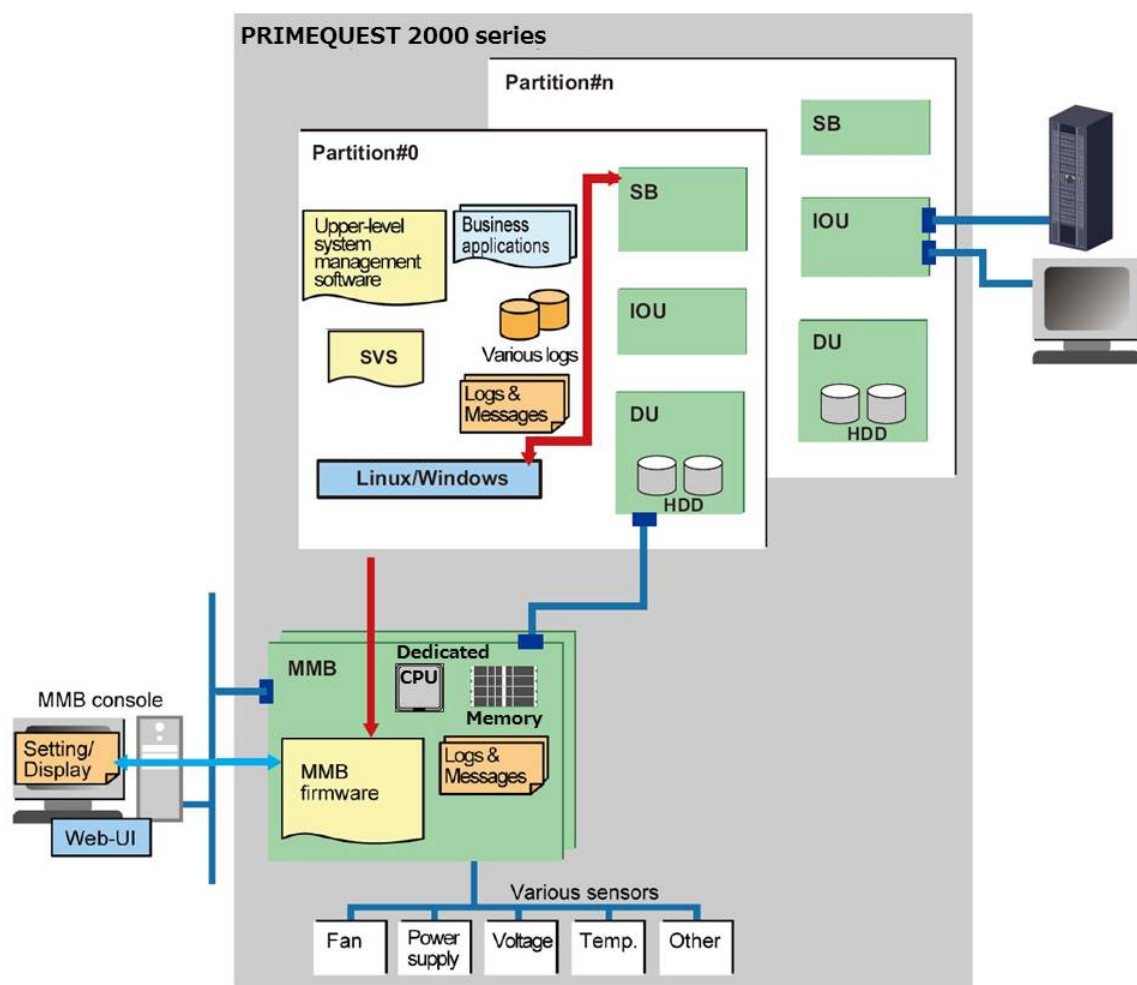
CHAPTER 4 Functions provided by the PRIMEQUEST 2000 series

This chapter describes the functions and architecture of the system provided by the PRIMEQUEST 2000 series.

4.1 Basic Architecture

The following figure shows the basic architecture of the PRIMEQUEST 2000 series for hardware system management.

FIGURE 4.1 Basic architecture



4.2 Management with MMB

This section provides an overview of the MMB management function and its operating environment.

4.2.1 MMB functions

The MMB firmware runs on a processor on the MMB, and enables the management functions of an entire system. For details on the functions of the MMB firmware, see '[1.5.1 Firmware](#)'.

Also, it controls the entire system in linkage with the BIOS firmware and the BMC firmware. It provides the interface to the higher level operations management software through the SNMP and IPMI.

4.2.2 MMB firmware

Firmware on MMB performs hardware configuration management, partition configuration management, hardware monitoring, power supply control, and so on of the PRIMEQUEST 2000 series

As shown in '4.1 Basic Architecture', the MMB is connected with each hardware component and LAN, and is also connected by internal buses to various sensors.

The MMB firmware uses this network in the cabinet and manages by linking with the BMC firmware and with SVAS or SVS and regularly monitoring the entire system. The MMB firmware provides an interface to the higher-level operations management via SNMP and IPMI.

MMB firmware controls the server by coordinating with BIOS firmware and BMC firmware.

4.2.3 User account management of MMB

There are two ways to manage user account of MMB in PRIMEQUEST 2000 series.

- Local user management
Local user is the user account registered in MMB.
User accounts of MMB are managed by registering the user account in MMB.
If LDAP function of MMB is disabled, user account management is Local user management.
- Global user management
Global user is the user account registered in LDAP server.
User accounts of MMB are managed by registering the user account in external LDAP server.
If LDAP function of MMB is enabled, user account management is Global user management.

FIGURE 4.2 Access to MMB in local user management (LDAP is disable)

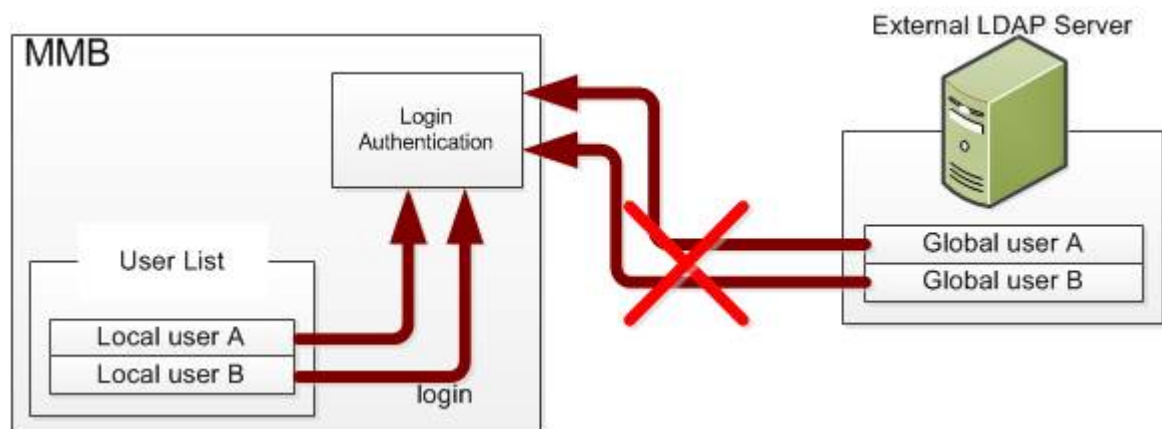
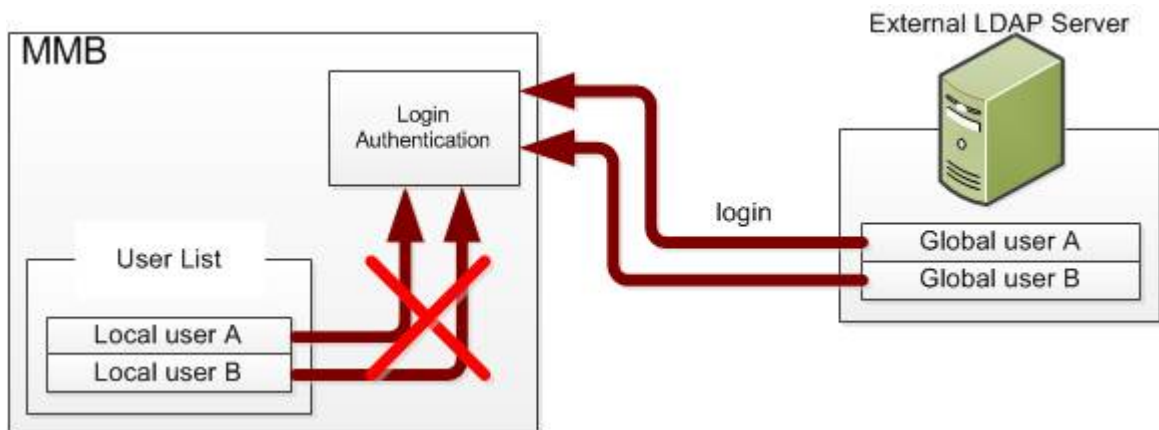


FIGURE 4.3 Access to MMB in global user management (LDAP is enabled)



Note

If you use Local user management, you cannot login MMB by the user account registered in external LDAP server.

If you use Global user management, you cannot login MMB by the user account registered in MMB.

Before you enable LDAP function, you must create special account in MMB. Special account is used to login MMB if LDAP server fails or error occurs in network path including the LDAP server.

For MMB Web-UI windows related to LDAP, see 'Chapter 1.4.4 [LDAP Configuration] window' of the "PRIMEQUEST 2000 Series Tool Reference" (CA92344-0539).

For setting of LDAP, see '3.6 Setting of LDAP' of the PRIMEQUEST 2000 Series Installation Manual (CA92344-0536).

4.2.4 MMB operating environment

This section describes the security in the MMB operating environment.

SSL support

The MMB encrypts Web and telnet access using SSL (Secure Sockets Layer). It creates secret keys and electronic certificates.

Remarks

The MMB is provided with interfaces, such as telnet and the Web-UI and also manages their system accounts. The MMB can be configured redundantly, so that the information specified for the Active side can be passed on to the Standby side.

Access control

To ensure security, the IP filter that permits access to MMB is set. The IP addresses that can be used are set for each protocol, and only those IP addresses can access the MMB.

MMB operator privileges

MMB Web-UI menu reference and operator privileges can be set for each user. For details on the security settings for MMB operating environment, see '6.5 Configuring Security' of the PRIMEQUEST 2000 Series Installation Manual (CA92344-0536).

For details on the operator (user) privileges for the MMB operating environment, see 'Chapter 1 Web-UI (Web user interface) operation' of the "PRIMEQUEST 2000 Series Tool Reference" (CA92344-0539).

4.2.5 Hardware monitoring and configuration display

Hardware configuration display

This function displays the configuration of all components, such as SB, the CPUs and memory in the components, including the fan and power supply units mounted in the PRIMEQUEST 2000 series.

FIGURE 4.4 [System Status] screen (Example of configuration display screen)

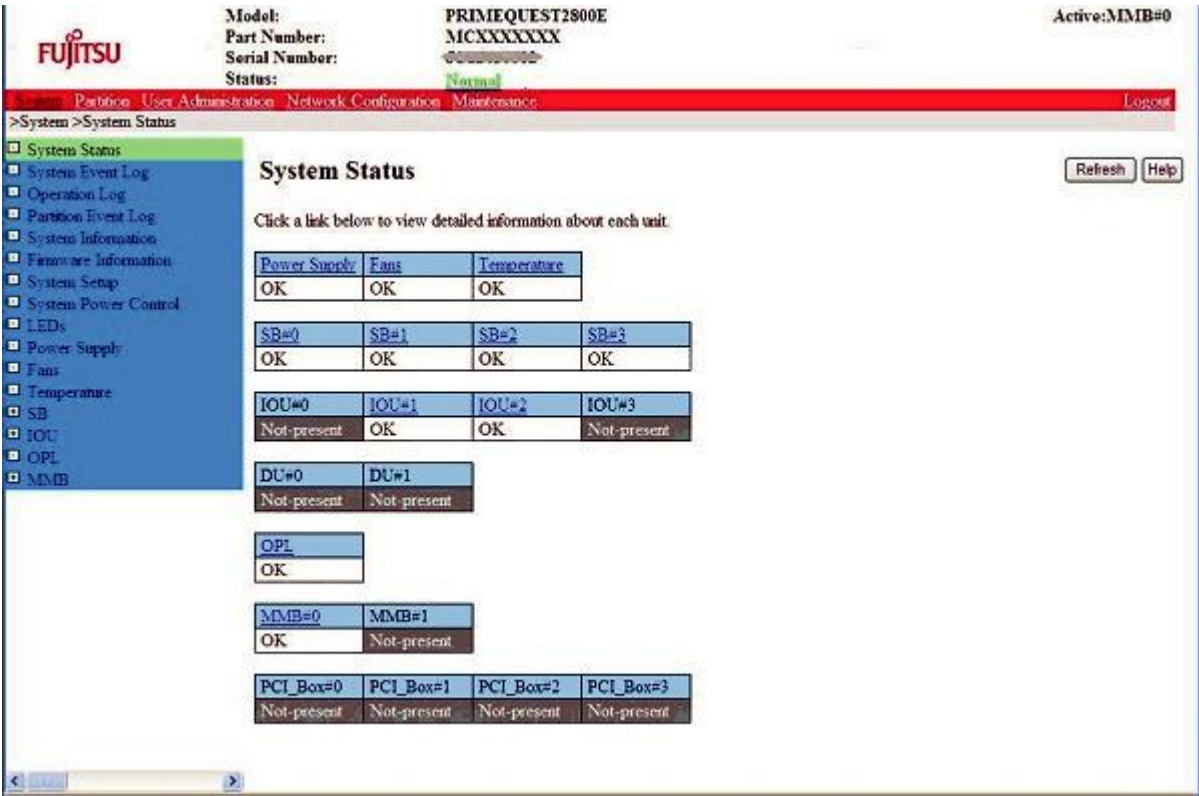


FIGURE 4.2 [System Status] window (example of configuration display screen) shows an example of the configuration of the PRIMEQUEST 2000 series. At the same time, the configuration information indicates the component status (e.g., normal, abnormal). If the state of the component is abnormal, the system administrator or a field engineer may have to take corrective action. Detailed information can also be displayed by clicking the link of a display item.

Hardware monitoring

Various check features and sensors detect hardware failures and errors. When a failure or error is detected, the MMB takes the required corrective action based on the status of the detected component. The MMB collects all logs of such event, log of a failure or error where processing could continue by using an alternate component or disconnecting the faulty component. To reduce the number of logs or messages displayed, all logs and messages can be filtered before display. The conditions for reporting detected abnormal states can also be specified.

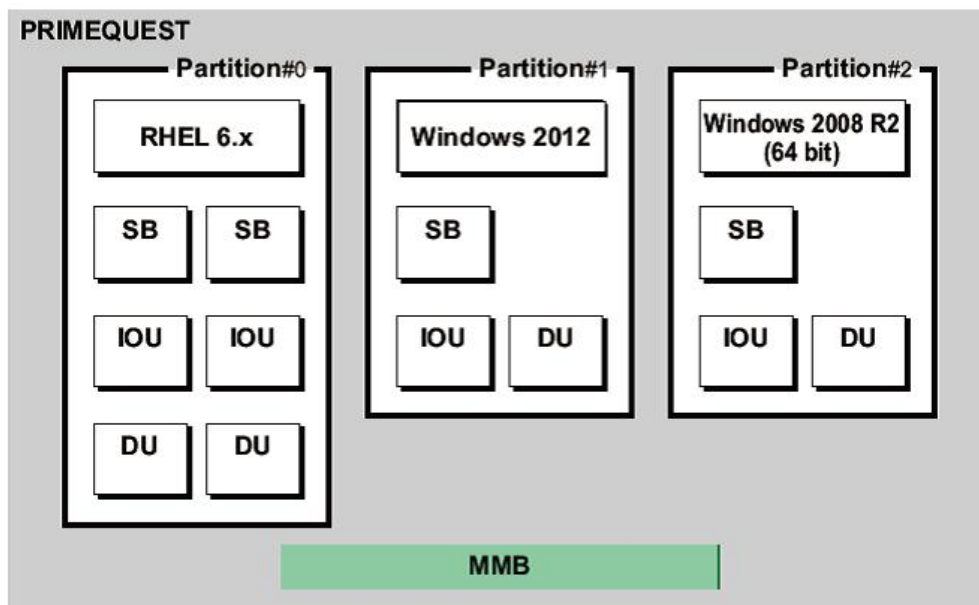
Hardware failure and error notification

If a failure or error occurs, an LED lights according to the level of the failure or error. Also, if SNMP Trap is specified, hardware failures and errors are reported to the operations management application. If Alarm E-Mail is set, they are reported to system administrator. If (REMCS (Remote Customer Support System) is registered, it is reported to the Fujitsu's Support Center (OSC). The REMCS Agent has a function for reporting error information and log information of the server system to the OSC on the Internet. Even the phenomenon on the partition side can be reported via the MMB firmware. For the details of the hardware configuration display and monitoring, see 'Chapter 1 MMB Web-UI (Web User Interface) operation' of the "PRIMEQUEST 2000 Series Tool Reference". For the details of the REMCS Agent, see "PRIMEQUEST 2000 series REMCS Service Manual" (CA92344-0542).

4.2.6 Partition settings and configuration display

It is a function that displays the settings and configuration of partition. Settings and configuration display of partition is used for determining the unit of management and controlling and distributing the hardware resources that are installed. Below is an example where in three partitions are set.

FIGURE 4.5 Example of mounting different OS and versions on each partition



The partitions are set up with specified combinations of the SB/Memory Scale-up Board and IOU. A displayed partition configuration can show each incorporated SB/Memory Scale-up Board and IOU and their components in detail. The partition can be changed by modifying the combination of the SB/Memory Scale-up Board and IOU in the same way as they were specified.

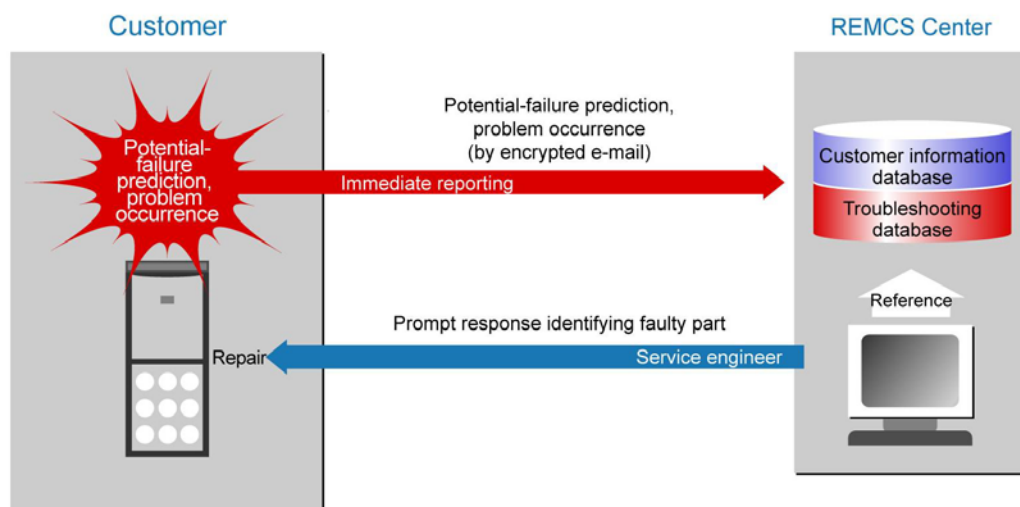
4.3 REMCS (automatic notification function)

The REMCS Agent automatically detects the hardware fault prediction information and reports the information to the OSC via e-mail.

In the OSC, professional experts working on behalf of the system administrator provide appropriate support based on the reported information, to prevent problems from occurring. They attempt to solve problems within a short time.

If any problems should occur, professional experts working on behalf of the system administrator would identify the source of the problem based on the reported information, prepare replacement parts and send service engineers.

FIGURE 4.6 REMCS (Automatic report function)



4.4 Saving and Restoring System Settings Information

The PRIMEQUEST 2000 series stores the system information as shown below. Therefore, even if there is failure in any one of the components, another component can take over the information from the failed component.

When configuring two MMBs

- OPL
- MMB#0
- MMB#1

When configuring one MMB

- OPL
- MMB

For details on storing system information, such as firmware setting information and device identification, see ['9.2.1 Firmware Setting Information'](#)

4.5 Power Supply Monitoring and Control

This section describes power supply monitoring and the system operations when there is a failure.

4.5.1 PSU Configuration

To design PRIMEQUEST 2000 series, you need to identify quantity of fan and PSU because relevant maximum numbers different by PRIMEQUEST models. The number of required PSUs and the dual power feed also differs in the 100 V power reception and the 200 V power reception. The power supply pattern is listed in the table below.

Remarks

The two types of PSU cannot be mixed. When connecting the PCI_Box, the power feed pattern of the PCI_Box is adjusted to the main unit cabinet of the PRIMEQUEST 2000 series.

TABLE 4.1 Power supply pattern

Input voltage	Power feeding method	Redundancy	PRIMEQUEST 2400E3/2400E2/2400E (*2)		PRIMEQUEST 2800E3/2800E2/2800B2/2800E/2800B		PCI_Box (*1)
			PSU	FANU	PSU	FANU	
100 V	Single	Non redundant	3	3	-	-	1

Input voltage	Power feeding method	Redundancy	PRIMEQUEST 2400E3/2400E2/2400E (*2)		PRIMEQUEST 2800E3/2800E2/2800B2/2800E/2800B		PCI_Box (*1)
			PSU	FANU	PSU	FANU	
200 V	power feed	Redundant	3 + 1	2	-	-	2
	Dual power feed	Redundant	-	-	-	-	2
	Single power feed	Non redundant	2	4	3	3	1
		Redundant	2 + 1	3	3 + 1	2	2
	Dual power feed	Redundant	2 x 2	2	3 x 2	0	2

(*1) Except for PRIMEQUEST 2800B3/2800B2/2800B.

(*2) In PRIMEQUEST 2400E3/2400E2, if you install Memory Scale-up Board, you must install PSU according to PSU configuration of PRIMEQUEST 2800E3/2800B3/2800E2/2800B2.

The PSU mounting location for each power feeding pattern of each model is fixed. The mounting location for each model is listed in the table below. .

TABLE 4.2 PSU mounting location (PRIMEQUEST 2400E3/2400E2/2400E) (*1)

Input voltage	Power feeding method	PSU Configuration	Required number		Mounting location	
			PSU	FANU	PSU	FANU
100 V	Single power feed	3 + 0	3	3	#0, #3, #1	#2, #4, #5
		3 + 1	4	2	#0, #3, #1, #4	#2, #5
200 V	Single power feed	2 + 0	2	4	#0, #3	#1, #2, #4, #5
		2 + 1	3	3	#0, #3, #1	#2, #4, #5
	Dual power feed	2 x 2	4	2	#0, #1, #3, #4	#2, #5

(*1) In PRIMEQUEST 2400E3/2400E2, if you install Memory Scale-up Board, you must install PSU according to TABLE 4.3 PSU mounting location (PRIMEQUEST 2800E3/2800B3/2800E2/2800B2/2800E/2800B).

TABLE 4.3 PSU mounting location (PRIMEQUEST 2800E3/2800B3/2800E2/2800B2/2800E/2800B)

Input voltage	Power feeding method	PSU Configuration	Required number		Mounting location	
			PSU	FANU	PSU	FANU
200 V	Single power feed	3 + 0	3	3	#0, #3, #1	#2, #4, #5
		3 + 1	4	2	#0, #3, #1, #4	#2, #5
	Dual power feed	3 x 2	6	-	#0, #1, #2, #3, #4, #5	-

4.5.2 Power Consumption Monitoring

Power Consumption Monitoring is a function to display the power consumption of the PRIMEQUEST 2000 series and the PCI_Box.

The instantaneous value of the power consumption is displayed in the MMB Web-UI. The power consumption is also displayed as a graph by linkage with Systemwalker Centric Manager, which is operation management software. Therefore, it is effective in power optimization in the data center. The power consumption information is provided to the operations management software in the MIB information (Management Information Base) and the amount of power consumed can be visualized (converted to graph). As a result, an installation program for maximizing the energy efficiency based on the actual power consumed can be planned. By flattening power consumption throughout a center, you can anticipate possible reductions in power consumption by eliminating local high-temperature points and realizing more efficient cooling of an entire center.

4.5.3 Optimal Power Allocation

The PRIMEQUEST 2000 series is equipped with the optimal power allocation function that varies the number of active power supply units according to the system configuration. Optimal Power Allocation keeps the power supply highly efficient.

The Optimal Power Allocation function is always enabled. Optimal power allocation has the following two functions.

- Operating-PSU optimization
It controls the number of active PSUs depending on the quantity of powered on hardware resources.
- Operating-DDC optimization
It controls the number of active DDCs depending on the number of CPUs mounted in the SB.

4.5.4 Scheduled Operations

The PRIMEQUEST 2000 series can schedule the power-on/off time of each partition from the MMB, and can also control automatic operations according to the schedule.

The scheduled operations and the power restoration function are linked when power restoration mode is set to 'Schedule Sync.'.

For details, see '9.3 Scheduled operations' of the *PRIMEQUEST 2000 Series Administration Manual* (CA92344-0537)

4.5.5 Remote Power Supply Operations

The PRIMEQUEST 2000 series can control the power supply through connections to partitions from a remote terminal using the MMB Web-UI.

Power supply operation by WOL function is also available.

Both IOU_1GbE and IOU_10GbE support WOL.

Remarks

The support for WOL depends on the OS. Refer to each OS manual for details.

4.5.6 UPS

Uninterruptible Power System (UPS) is an external battery unit. With a UPS connected, the device can be prepared for a power failure or sudden power supply fluctuation.

The UPS of the PRIMEQUEST 2000 series is a SMART UPS. Shut down is instructed from PowerChute by the LAN connection.

4.6 Clock feature

This section describes the Clock feature of the PRIMEQUEST 2000 series.

4.6.1 MMB, BIOS and BMC Time Management

This section describes the MMB, BIOS/OS and BMC time management of the PRIMEQUEST 2000 series; this is separately done as shown below.

MMB

The MMB has an RTC and manages the time of the day independently. The RTC can be set by a user.

Notes

The MMB time and the partition time are managed separately by independent clocks.

The MMB clock does not report or adjust the time of the partition clock. Keep the MMB time and the partition time the same, or at least close, as they are needed for the following cases.

- When checking the MMB log against the OS log in a partition when there is a the hardware failure
- When conducting a system audit or security audit
- When an error occurs in time maintenance battery in a partition
Use either of the following ways to adjust the times.
- Adjusting the time manually from the MMB Web-UI

- Adjusting the time using NTP client function of the MMB

OS

The OS reads the RTC (PCH-RTC) which is built-in the PCH when booting, and manages the time of day by itself, using the timer while running. The PCH-RTC is driven by a battery on the SB (hereafter referred to as SB battery).

BIOS

The PCH-RTC is driven by the SB battery, and the PCH-RTC stops when the SB battery is run out.

BIOS acquires time from MMB to modify PCH-RTC at boot.

Thus, if PCH-RTC stops due to exhaustion of SB battery or if Home SB is switched due to Reserved SB or SB degradation, correct time is read out at OS boot.

When the SB battery runs out, the BIOS reflects the time of the MMB in the PCH-RTC.

BMC

The RTC of the BMC synchronizes with the RTC of the MMB immediately after the mounting the SB and the AC is turned on.

If the MMB time is modified manually, the BMC time synchronizes with the MMB time.

4.6.2 NTP client

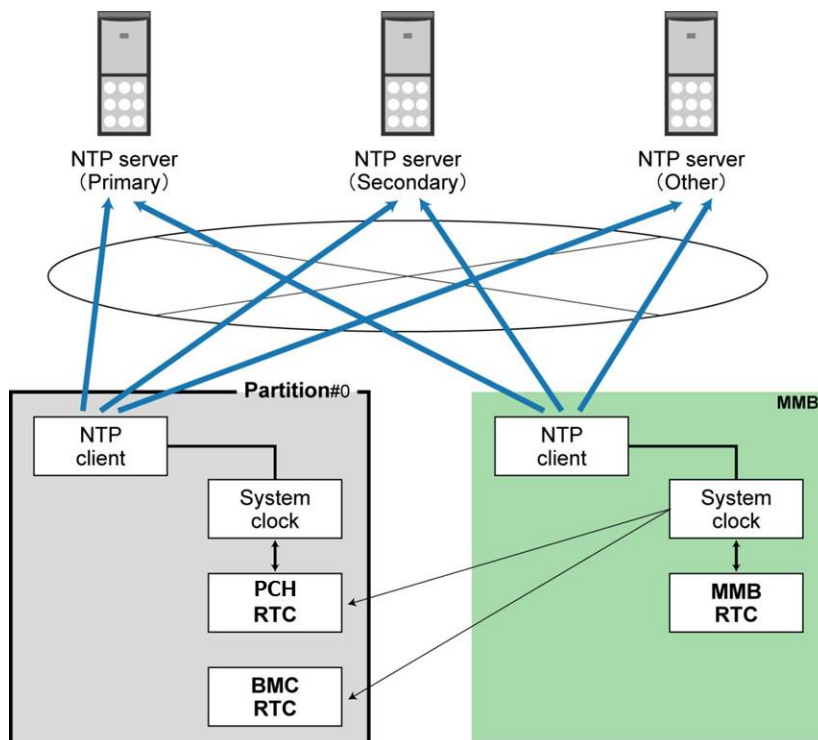
In PRIMEQUEST 2000 series, the MMB becomes an NTP client to synchronize the time with an external NTP server.

When NTP servers in an external network are not connected to the PRIMEQUEST 2000 series, it is recommended to use an NTP server device that uses an external clock. As shown in the following figure, the MMB can access another NTP server and synchronize the time with the NTP server. For stable NTP operation, each NTP client should have several NTP servers (at least three for RHEL).

Notes

When using more than one NTP server, use them in the same stratum (layer).

FIGURE 4.7 Diagram of time synchronization (of three 3 NTP servers)



Only one NTP server can be also specified. In this case, if the communication with the specified NTP server is disconnected, the NTP client loses the NTP server as there is no other target to synchronize. Until communication with the NTP server is re-established, the NTP client cannot adjust the time through the NTP. Therefore, if the time cannot be adjusted through the NTP, the time gap between the systems may increase, which could lead to malfunction of the middleware or application.

4.7 Proactive monitoring

This section describes the Proactive monitoring of the PRIMEQUEST 2000 series.

Proactive monitoring and linkage with the operations management server are performed for any system account.

The section describes the following.

- Two types of errors detected by hardware
- Overview of proactive monitoring
- Proactive monitoring operations

Two types of errors detected by hardware

The PRIMEQUEST 2000 series detects the following two types of errors, depending on the hardware.

- Uncorrectable Error (UE)
- Correctable Error (CE)

If an uncorrectable error occurs, the hardware stops all the partitions affected by the error, disconnects the component on which the error occurs, and tries a restart. (Alternatively, it keeps the partitions stopped and waits for maintenance.)

A correctable error is corrected by the hardware function. Therefore, the partition need not be stopped, or the faulty component need not be disconnected immediately. However, if the correctable error occurs frequently, the component may be degraded, making it likely that a fatal error will occur in the future.

Overview of Proactive Monitoring

Proactive monitoring in the PRIMEQUEST 2000 series monitors the occurrence of correctable errors.

If more correctable errors than the threshold for a given period occur, proactive monitoring detects the component causing the errors and reports it to the MMB. When an event report on an exceeded threshold value is generated, a prompt plan to stop and disconnect the component is requested.

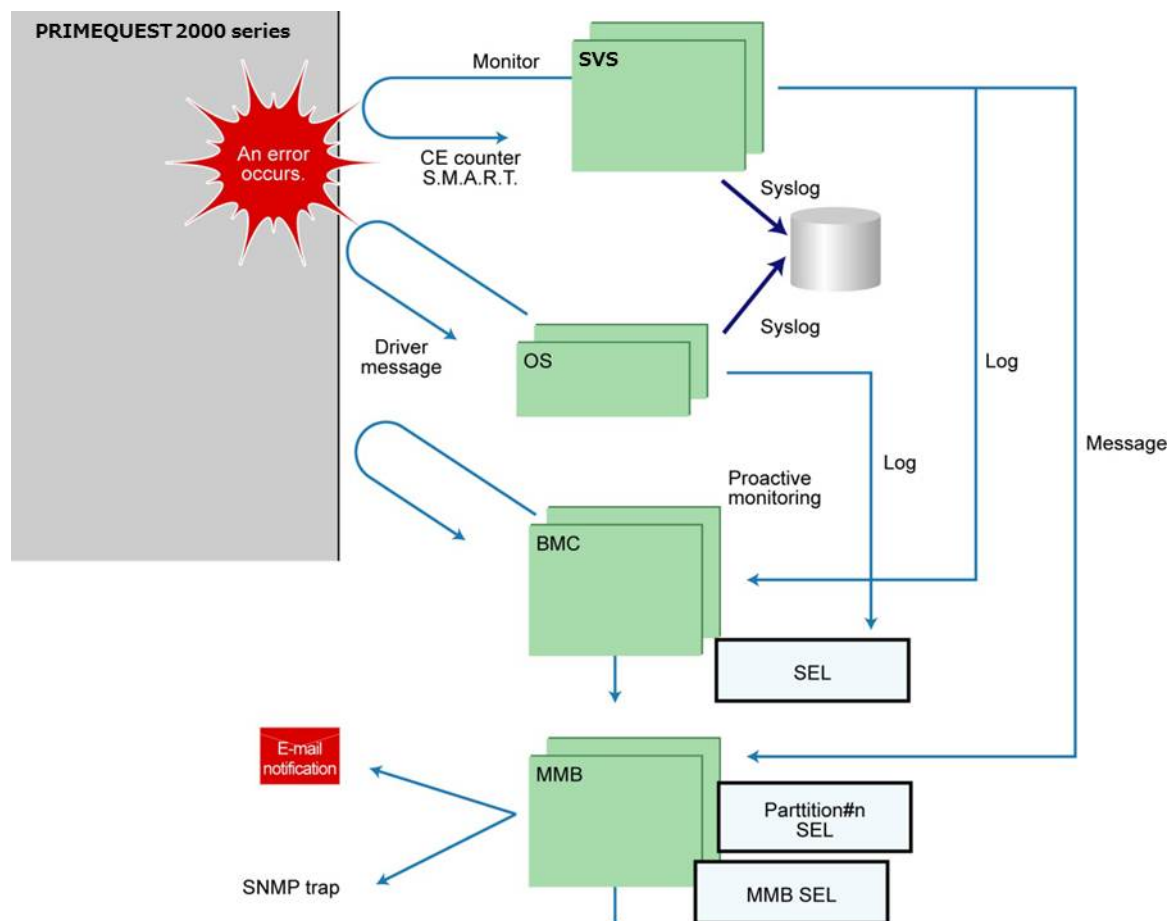
Proactive monitoring is performed by SVS, BIOS and MMB firmware. SVS is server management software that can perform integration management of the system built in several PRIMEQUEST 2000 series. For details on SVS, see '[1.5.3 Server management software](#)'.

The MMB firmware and BMC firmware manages the error analysis and the statistical information of each defective component. If the statistical information crosses the threshold value, a Warning is output to the System Event Log.

The SVS provides a notification function of the fault prediction information, using the S.M.A.R.T. function of the disk drive.

- Monitoring target
Disk drives mounted on the DU.
- Monitoring items
S.M.A.R.T. supports proactive monitoring of the following items.
- Temperature
- Read error rate
- Write error rate
- Seek error rate
- Spin-up time
- Number of replaceable sectors remaining
- Monitoring method
ServerView Suite (SVS) periodically polls the S.M.A.R.T. function of each disk to check for proactive detection of any events.
- Action taken with proactive detection
The following event notification actions are taken.
- E-mail notification (If e-mail notification is specified, the MMB sends e-mail.)
- REMCS notification (When REMCS connection is specified, the MMB sends a notification.)
The following figure shows the proactive monitoring flow.

FIGURE 4.8 Flow of Proactive monitoring



Operations in proactive monitoring are described below.

Action taken when the threshold value is exceeded

If any of the following monitored targets exceeds the threshold value, an event notification is issued to the MMB.

- Correctable DIMM error
- Correctable CPU error
- Correctable error by S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology).
The actions taken when notifying the correctable error are listed below. System Event Log is always output.
- Mail notification (If e-mail notification is specified, the MMB sends e-mail.)
- REMCS (notification (When REMCS connection is specified, the MMB sends a notification.)
- System Event Log output
The transmission destination for mail notification and REMCS notification has to be set in the Web-UI of the MMB. For the details on REMCS, see PRIMEQUEST 2000 series REMCS Service Manual (CA92344-0542).

4.8 Video Redirection

The video redirection function connects a unit to a partition from a remote terminal emulating the unit, which thus seems to be operated directly.

A Java applet is transferred when video redirection is started from a remote terminal. The terminal displays the VGA screen output transferred to a LAN through the Java applet.

Input from the mouse or keyboard connected to the terminal is transferred to the partition via the LAN.

4.9 Console redirection

The console redirection function directs the serial output from a partition to a terminal via a LAN. The console output to the COM port on a partition is redirected by this function to a terminal connected to a LAN. It also posts input from the terminal to the COM port on the partition.

4.10 Virtual media

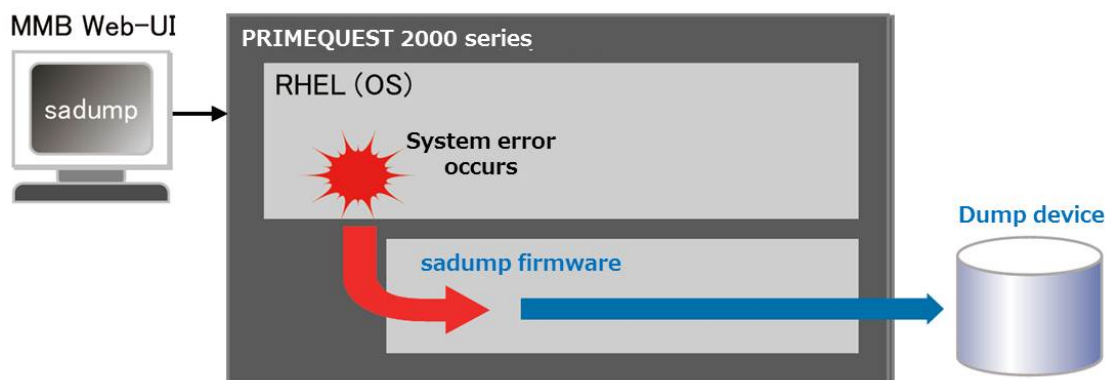
The virtual media is a function that emulates the storage device that connects other remote storage media (CD/DVD drive, ISO image, floppy disk, and USB device) to the partition. Up to three devices can be used at the same time.

4.11 sadump

sadump is supported in the PRIMEQUEST 2000 series (except for PRIMEQUEST 2800B3/2800B2/2800B). It is a memory dump acquiring function for investigating the source an error when the error occurs in RHEL. sadump provides the procedure to acquire the memory dump even when the memory dump could not be acquired by the memory dump function (kdump) provided by the RHEL (*1).

*1: When the memory dump could not be acquired during the early stage of booting up and just before shut down.

FIGURE 4.9 Sadump conceptual diagram



sadump is activated by selecting [sadump] in [Partition] → [Power Control] of the MMB Web UI when error occurs in the OS.

4.11.1 sadump firmware

The sadump is a dump acquiring firmware of the PRIMEQUEST 2000 series (except for PRIMEQUEST 2800B3/2800B2/2800B).

It provides a function that will acquire memory dump into the disk partition dedicated to sadump if an error occurs on RHEL operating system.

It enables investigation of the cause of error that occurred in the OS on the PRIMEQUEST 2000 series and therefore professional support can be obtained.

The sadump firmware is provided as part of the UEFI firmware, and the dump device can be setup from a setup dump menu.

For the details of settings of sadump, see '5.3 sadump Setup' of the *PRIMEQUEST 2000 Series Installation Manual* (CA92344-0536) and 'Chapter 5 sadump Environment Setup' of the *"PRIMEQUEST 2000 Series Tool Reference"* (CA92344-0539).

4.12 Memory Dump Function (Linux)

In RHEL and SLES, kdump function which is a standard function of the operating system is prepared as memory dump function. In RHEL, sadump function is also supported in addition to kdump function.

4.13 Memory Dump Function (Windows)

In Windows, the dump can be acquired using the standard functions of the OS. Before acquiring a dump, it is necessary to ensure the disk region in advance.

For details of settings for acquiring the dump, see '10.4.3 Setting up the dump environment (Windows)' of the *"PRIMEQUEST 2000 Series Administration Manual"* (CA92344-0537).

CHAPTER 5 Partitioning

This section describes functions like physical partitioning, Extended Partitioning and flexible I/O.

5.1 Partitioning Function

The PRIMEQUEST 2000 series has a partitioning function, which divides the hardware resources of a cabinet into several logical systems and operates each divided system independently.

The following section describes the partition granularity which is the partition component. After that, an example of the partition configuration is given and explained for each model.

5.2 Physical Partitioning (PPAR)

The Physical Partition (PPAR) can configure physical partitions in one cabinet to enable flexible system configuration and server integration while maintaining a high degree of failure isolation.

In the PRIMEQUEST 2000 series, the partition configuration can be changed with a static configuration control function. The function for changing the configuration of each partition is triggered by a power-off, power-on, or reboot. The maximum number of PPAR partitions is listed in the table below.

TABLE 5.1 Maximum number of partitions for each model (PPAR)

Model	Maximum number of partitions
PRIMEQUEST 2400E3/2400E2/2400E	2
PRIMEQUEST 2800E3/2800E2/2800E	4
PRIMEQUEST 2800B3/2800B2/2800B (*1)	1

(*1) In the PRIMEQUEST 2800B3/2800B2/2800B, components mounted in the cabinet can be used within one partition.

In the PRIMEQUEST 2000 series, physical partitions with any number of resources can be configured in the granularity unit, in combination of the SB/Memory Scale-up Board and IOU, using flexible I/O mode (*1).

*1: For the details, see '[5.10 Flexible I/O Mode](#)'

The conceptual diagram of the partitioning function for each model is given below.

FIGURE 5.1 Conceptual diagram of the partitioning (PRIMEQUEST 2400E3/2400E2)

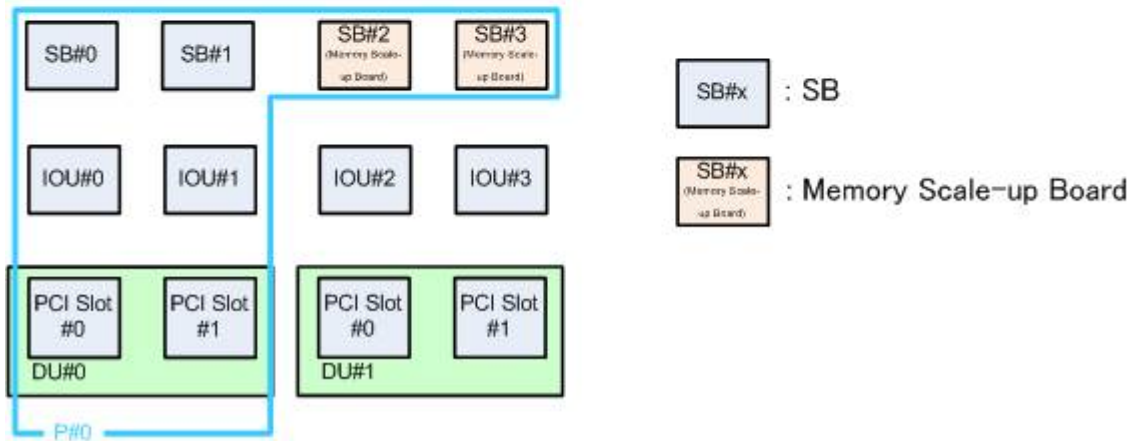
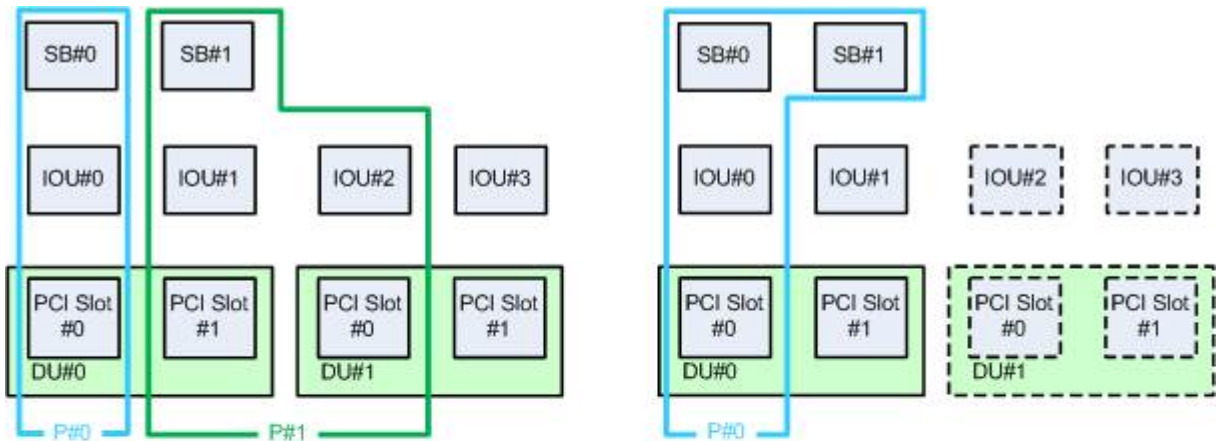


FIGURE 5.2 Conceptual diagram of the partitioning (PRIMEQUEST 2400E)

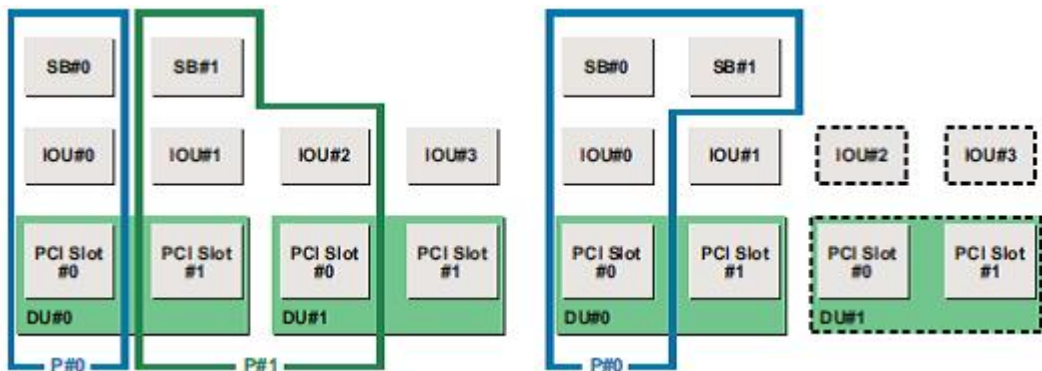
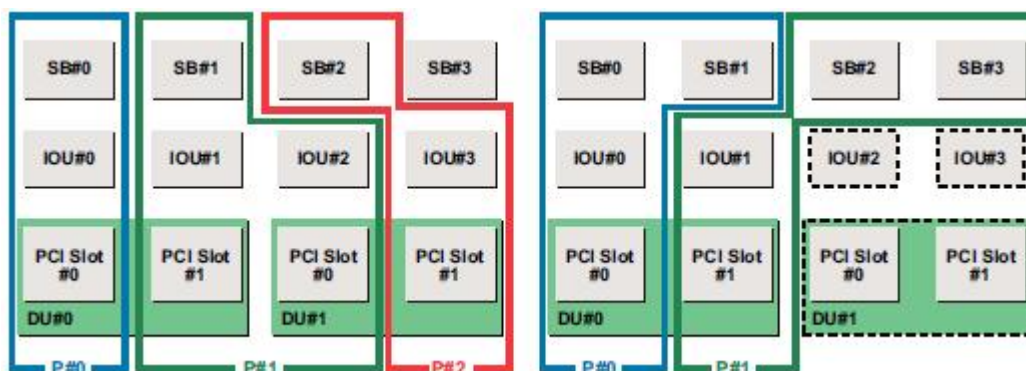


FIGURE 5.3 Conceptual diagram of the partitioning (PRIMEQUEST 2800E3/2800E2/2800E)



5.2.1 Partition granularity

Partition granularity refers to the smallest unit of the components making up a partition. The names that indicate granularity include SB, Memory Scale-up Board, IOU, DU and PCI_Box. The following table lists the partition granularity of the components that constitute a partition.

TABLE 5.2 Partition granularity of components making up a partition (PPAR)

Name indicating granularity	Minimum unit
SB	One physical SB
Memory Scale-up Board	One physical Memory Scale-up Board
IOU	One physical IOU
DU	Physical DU divided in two (Two HDDs/SSDs)
PCI_Box	Physical PCI_Box divided in two (Six slots)

SB partition granularity

The partition granularity of the SB is one physical SB.

Memory Scale-up Board partition granularity

The partition granularity of the Memory Scale-up Board is one physical Memory Scale-up Board.

IOU partition granularity

The partition granularity of the IOU is one physical IOU.

DU partition granularity

The partition granularity of the DU is a physical DU divided in two. Since four HDDs can be installed in each physical DU, the partition granularity of the DU is two HDDs.

TABLE 5.3 Relationship between DU and IOU connection

IOU	Connected PCI Express slot /DU
IOU#0	PCI Express slot #0/DU#0
IOU#1	PCI Express slot #1/DU#0
IOU#2	PCI Express slot #0/DU#1
IOU#3	PCI Express slot #1/DU#1

PCI_Box partition granularity

PCI_Box partition granularity is a physical PCI_Box divided into two. The partition granularity of the PCI_Box is called the PCI_Box LH. The PCI_Box LH is a PCI_Box divided into two.

One PCI_Box LH can be connected to one IOU. The PCI_Box LH belongs to the connected IOU. In other words, the PCI_Box LH is incorporated in the partition to which the connected IOU belongs. The connection between IOU can PCI_Box is optional. For details, see '2.12 PCI_Box'.

5.2.2 Partition Configuration rule

As a partition configuration rule, which is common to all models, specifies that the following condition must be satisfied.

- The partition should include at least one SB
- The partition should include at least one IOU

If the above condition is not satisfied, power-on would be prohibited to the corresponding partition. The Memory Scale-up Board, the DU and the PCI_Box are not required in the partition.

TABLE 5.4 Partition configuration rule (component)

Component	Required number (common to all models)
SB	1 or more
IOU	1 or more
Memory Scale-up Board	Optional
DU	Optional
PCI_Box	Optional

IOU to which the DU belongs should be available.

Example)

IOU#0 or IOU#1 should be available to use the DU#0

IOU#2 or IOU#3 should be available to use the DU#1

5.3 Extended Partitioning

The Extended Partitioning is a function that further divides the hardware resources that have been divided by partitioning. Those partitions can be used independently as servers.

5.3.1 Partition granularity of the Extended Partitioning

The Extended Partitioning can effectively use the server resources, with the fine granularity of partitions. The following table lists the partition granularity of the components that make up a partition.

TABLE 5.5 Partition granularity of each component that makes up the partition (Extended Partitioning)

Component		Granularity
SB	CPU	1 core
	DIMM	1GB
	HDD/SSD	4
	USB	2 USB ports
	VGA	2 USB ports and VGA
IOU	PCI Express	For each card
	Onboard LAN	LAN chip (Two ports)
DU	HDD/SSD	Half of DU
		2 HDD/SSDs
PCI_Box	PCI Express card	For each card

5.3.2 Use conditions of the Extended Partitioning

This section describes the main conditions for using the Extended Partitioning.

- DR and Extended Partitioning cannot be used at the same time. DR can be used in a partition that is operating as a physical partition.
- Extended Partitioning cannot be used in the partition including Memory Scale-up Boards.
- The following functions are not supported in the Extended Partitioning partition.
 - TPM
 - BitLocker drive encryption function

5.3.3 Configuration rules of the Extended Partitioning

The minimum and maximum configuration of Extended Partitioning is listed in the table below.

TABLE 5.6 Minimum and maximum configuration of Extended Partitioning

Component	Minimum configuration	Maximum configuration
CPU	1 core	the number of core is the total number of core of CPU allotted to relevant Extended Partition minus one.
DIMM	2 GB	Minus 2 GB for all mounted memory capacities
PCI Express slot	None	All PCI Express slots
Onboard VGA	No use	Use
Onboard USB	None	4 ports

5.4 Extended Socket

Extended Socket is the function which enables up to 40 Gbps high-speed communication among Extended Partitions on the same physical Partition.

Enable/Disable of Extended Socket to each Extended Partition can be set by MMB Web-UI.

Extended Socket has the Zoning function.

Zoning function is the function that an Extended Partitions can communicate by using Extended Socket with only particular Extended Partitions which is allowed to communicate.

In Extended Socket, there is "Zone" which is communication group. Zone is set to each Extended Partition.

Communication among only Extended Partitions which belong to same Zone is allowed.

Zoning function can be set to each EP by MMB Web-UI.

VLAN (tag-VLAN) function is the function that separates traffics within a divided zone. VLAN (tag-VLAN) function can be set by OS on the EP.

5.5 Memory Scale-up Board

Memory Scale-up Board is the board for expanding memory without increasing CPU.

Memory Scale-up Board is supported in only PRIMEQUEST 2400E3/2400E2.

Up to three Memory Scale-up Board can be installed.

For the details on the Memory Scale-up Board, see '[2.6 Memory Scale-up Board](#)'.

Use conditions of the Memory Scale-up Board

If you include Memory Scale-up Board into a partition, at least one SB must be included in the partition.

If you include Memory Scale-up Board into a partition, you must install CPUs other than Xeon (R) E7-8855v4 and E7-8860v3 on SB.

Note

- Memory Scale-up Board cannot be set to Home SB.
- Memory Scale-up Board cannot be set to Reserved SB.
- Extended Partitioning cannot be used in the partition including Memory Scale-up Board.
- Memory Scale-up Board cannot be hot added and hot removed by Dynamic Reconfiguration.
- Dynamic Reconfiguration cannot be used in the partition including Memory Scale-up Board.

Memory Scale-up Board does not switch to Reserved SB even if Reserved SB is set in the partition.

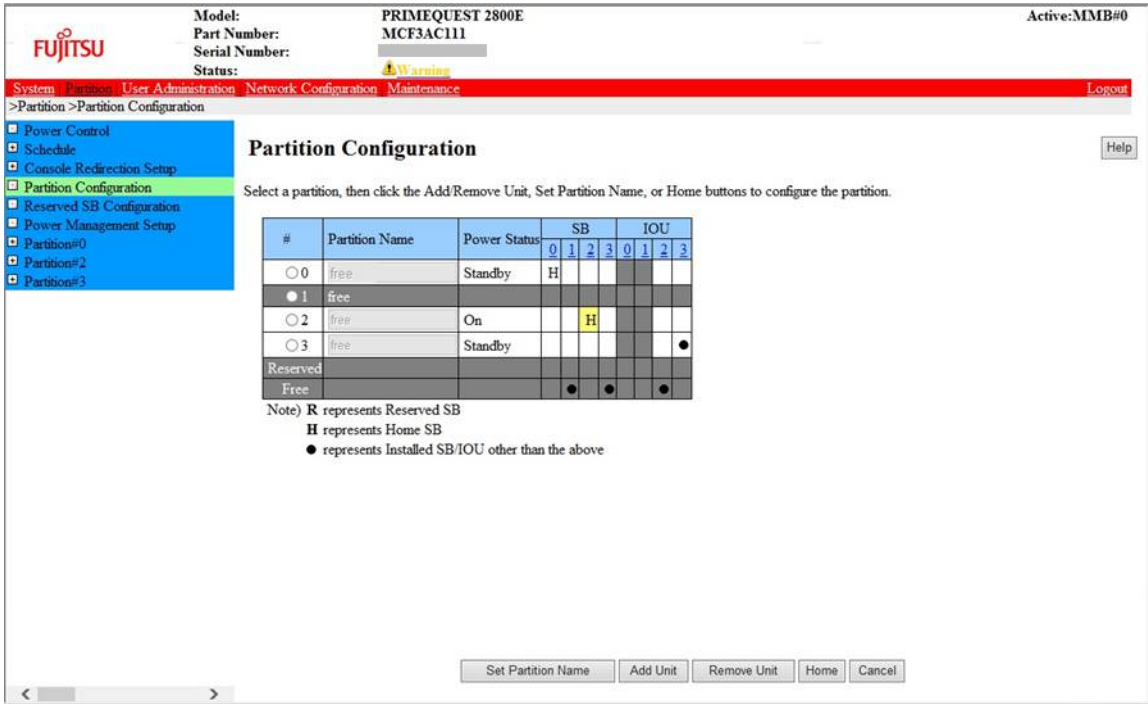
5.6 Reserved SB

For the details on the Reserved SB operating rules in the partitioning, see '3.2.3 Reserved SB' of the "*PRIMEQUEST 2000 Series Administration Manual*" (CA92344-0537).

5.7 Partition configuration definition method

The partition configuration is defined using MMB Web-UI.
To do so, a partition is first created. Next, SB, IOU and Home SB/Memory Scale-up Board, having specific partition identifiers, and belonging to the partition are registered in the MMB Web-UI [Partition] → [Partition Configuration] window. Then, the Memory Operation Mode and Reserved SB are set as needed.

FIGURE 5.4 [Partition Configuration] screen



For details on the setup procedure, see the “PRIMEQUEST 2000 Series Tool Reference” (CA92344-0539).
Remarks

The changes in the partition configuration are applied in the each partition unit when power cycled. The changes are not applied when rebooting the partition. Be sure to stop the partition once and then operate.

5.8 Notes on the partition configuration

This section provides notes on the partition configuration.
SB that operates a partition must use the CPUs and memory.
Memory Scale-up Board that operates a partition must use the memory.
Memory Scale-up Board cannot be set to Home SB. If you include Memory Scale-up Board into a partition, at least one SB must be included in the partition.
For the details on the partition configuration, see ‘3.1 Partition configuration’ of the “PRIMEQUEST 2000 Series Administration Manual” (CA92344-0537)

5.9 Dynamic Reconfiguration Function

Dynamic Reconfiguration (DR) is a function that changes the resource configuration of a partition without rebooting the partition.

5.10 Flexible I/O Mode

The PRIMEQUEST 2000 series (except for PRIMEQUEST 2800B3/2800B2/2800B) supports flexible I/O modes as I/O connection modes. The flexible I/O function can configure a partition by combining any SB/Memory Scale-up Board and IOU regardless of the mounting location.
The flexible I/O function makes it possible to respond flexibly to modifications of the SB/Memory Scale-up Board resources and I/O resources, and failure degradation.

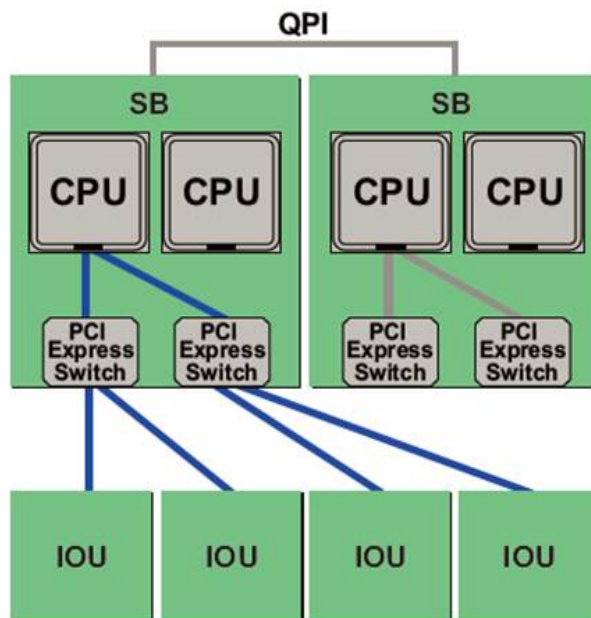
Each IOU from the SB can be connected to a bandwidth of 16 lanes through the PCI Express switch. Moreover, the input (side (8 lanes) of IOU_1G can connect only to the first half of 16 lanes.

Remarks

Since the structure of the PCI bus tree can be maintained even when the mounting locations of the SB/Memory Scale-up Board and IOU change, the I/O path other than CPU0 of the Home SB (the SB where PCH is operating) will be disabled.

For details on IOU_1GbE and IOU_10GbE, see '2.8 IOU (IO unit)'

FIGURE 5.5 Conceptual diagram of Flexible I/O



5.11 Home SB

Of the SBs making up a partition, the SB that enables the PCI Interface of CPU # 0 and Legacy of PCH is called the Home SB.

Each partition always contains one Home SB.

Selecting the Home SB

- PRIMEQUEST 2400E3/2800E3/2400E2/2800E2/2400E/2800E
However, there may be instances when an SB having a smaller number than the Home SB is added using the DR function, and when the Home SB is not necessarily the SB of the smallest physical number. To find out which SB is the Home SB, please check with the MMB Web-UI.
The setting of the Home SB during an SB degradation /Reserved SB operation is as follows.
 - When the Home SB is degraded, the SB with the smallest number among the remaining SBs becomes the Home SB.
 - If an SB other than the Home SB is degraded, the Home SB does not change
 - When switching the Home SB with the Reserved SB, the SB with the smallest number among the remaining SBs and the Reserved SB is considered as the Home SB.
- PRIMEQUEST 2800B3/2800B2/2800B
SB#0 is the Home SB. The Home SB cannot be selected and it can be seen which SB is the Home SB by MMB Web

Home SB function

Unlike the other SBs, the following functions are enabled on the Home SB.

- Legacy I / O
Since the Legacy I/O function is enabled, only the USB ports and VGA port of the Home SB are available for use
- Reference clock source
The clock source of the Home SB becomes the clock source in the partition

Note

- Hot replacement and hot remove of Home SB cannot be performed by Dynamic Reconfiguration.
- Memory Scale-up Board cannot be set to Home SB.

CHAPTER 6 Redundancy

This section describes the redundancy configuration of components.

6.1 Redundancy

In the PRIMEQUEST 2000 series, such as the memory, I/O, transmission paths, the power supply system and fan of the hardware configuration, most of the sections allow for redundancy, and achieve high reliability and high availability.

6.2 Redundancy of components

For details on the components with redundancy configuration, see '3.3.1 Replaceable components' of "PRIMEQUEST 2000 Series Administration Manual" (CA92344-0537)

6.3 Redundancy of HDD

This section describes the HDD redundancy in the PRIMEQUEST 2000 series.

6.3.1 Redundancy of the disk

In the PRIMEQUEST 2000 series, redundancy of system disk and data disk can be created using several procedures.

1. The redundancy in the single volume
The redundancy in the single volume is achieved using the hardware RAID function to disk in SB, DU within a cabinet or in an external RAID device.
2. The redundancy between multiple volumes
The redundancy of inter-volume is achieved by mirroring multiple disks with RAID0 configuration except for RAID0 configuration in SB, DU within a cabinet or in external RAID devices by using software mirroring such as PRIMECLUSTER GDS.
3. The redundancy between multiple redundant volumes
The redundancy of inter-volume is achieved by mirroring multiple disks with RAID configuration except for RAID0 configuration in external RAID devices by using software mirroring such as PRIMECLUSTER GDS.

Below table shows procedures of disk redundancy.

TABLE 6.1 System disk redundancy

#	System volume allocation	Redundancy procedure	Single volume	Inter-volume	Boot path
1	Within a cabinet: SB, DU (RAID other configuration than RAID 0) Outside a cabinet: External RAID device	The redundancy in the single volume is achieved using the hardware RAID function. The volume is not affected even if the HDD of the volume fails, and the system can continue booting or running. (This excludes RAID 0 configuration)	Redundancy is possible	Redundancy is not possible	Redundancy is not possible
2	Within a cabinet: SB, DU (RAID 0) Outside a cabinet: External RAID	Although redundancy is not possible in a single unit alone, it can be achieved by creating a software mirroring configuration using multiple volumes (using PRIMECLUSTER GDS and so on). Even if a problem occurs in the volume on one side, it is possible to continue the system boot and system startup in the volume on the	Redundancy is not possible	Redundancy is possible	Redundancy is possible

#	System volume allocation	Redundancy procedure	Single volume	Inter-volume	Boot path
	device	other side.			
3	Outside a cabinet: External RAID device	Redundancy can be achieved in a single volume, since the hardware RAID configuration is used in the external RAID device. Redundancy of boot paths is also possible by installing a multi-path configuration. Redundancy of volume can also be achieved by configuring software mirroring between volumes of multiple RAID cabinet (using PRIMECLUSTER GDS). If a problem occurs in the cabinet on one side, it is possible to continue the system boot and system startup in the cabinet on the other side.	Redundancy is possible	Redundancy is possible	Redundancy is possible

6.4 Redundancy of the Management LAN

The Management LAN is used for connecting the MMB Web-UI and SVMco. The management LAN of each partition is connected using a LAN port of IOU or a LAN card added in PCI Express slot to which the partition belongs. This management LAN is connected through MMB user support. The MMB has four external interface ports.

Two ports are allocated for maintenance, and the other two ports are used for connecting the console units or connecting nodes between cabinet in the cluster configuration, to create duplex configuration architecture (duplication).

For details on the management LAN, see '1.3 Management LAN' in the "PRIMEQUEST 2000 Series Administration Manual" (CA92344-0537).

6.5 Operation LAN Redundancy

This section describes the operational LAN redundancy that applies to the configuration of the operation system. Configuration of a redundant network or and network interface requires at least two network interfaces and an optional software for switching these interfaces.

The operation LAN redundancy supported by the PRIMEQUEST 2000 series is as follows.

- Duplication of a transmission path between servers (high-speed switching method)
Depending on the duplex network configuration of the transmission path due to PRIMECLUSTER GLS (Global Link Services) or the type of communication partner server, the transmission path can be duplicated by various procedures to achieve high reliability of the entire communication.
For details on the redundancy of operation LAN based on PRIMECLUSTER GLS, see PRIMECLUSTER Global Link Services Manual (Transmission path duplex functions edition).
- Teaming with Intel PROSet
It is possible to configure a teaming based on Intel PROSet. For more information, see Help in Intel PROSet.
- Redundancy using bonding
Linux supports redundancy using bonding.
- Redundancy using NIC teaming function
Windows Server 2016/ 2012R2/ 2012 support redundancy using NIC teaming function that is provided by the operating system.

Note

There are some precautions on teaming with Intel PROSet (R). For information on the items, see 'G.9 NIC (Network interface card)' of the "PRIMEQUEST 2000 Series Administration Manual" (CA92344-0537).

6.6 Degradation Function

The degradation function disconnects (degradation) a faulty component when there is a hardware failure. To continue operation, it configures the system with the remaining hardware resources. The system may be restarted when using the degradation function.

System operation can be resumed immediately without a prolonged system failure because the system is started with the faulty component disconnected.

CHAPTER 7 Applicable Components for Hot Maintenance

This section describes the hot maintenance of hardware components.

7.1 Overview of Hot Maintenance

Hot maintenance is a maintenance which is carried out on components wherein the status has changed from running to stopped due to a failure while the system is running, without stopping the partition which is operating. Components for which maintenance is completed can be reincorporated into the running system. The term 'hot maintenance' does not apply only to replacing a component whose status has changed from running to stopped because of a failure, without stopping the partition. It also includes the work of intentionally removing components from operation in the system and adding components for expansion purposes without stopping the partition.

As a general rule, a field engineer carries out the hot maintenance. For details on the components to which hot maintenance can be applied and the redundant configurations, see 'Chapter 3 Component Configuration and Replacement (Addition and Removal) in the *"PRIMEQUEST 2000 Series Administration Manual"* (CA92344-0537).

7.2 List of Components

This section describes the components to which hot maintenance can be applied. For details on each component, see 'Chapter 3 Component configuration and replacement (expansion, removal) of the *"PRIMEQUEST 2000 Series Administration Manual"* (CA92344-0537).

- PSU
A PSU alone can be replaced while the system continues running. Replacement of a PSU in a non-redundant configuration requires the system to be stopped.
- Fan
A fan alone can be replaced while the system continues running.
- SB
An SB can be replaced while the partition to be maintained is powered off.
The DIMM, CPU, BATTERY, Mezzanine Board and SAS RAID controller card that are mounted on SB can be replaced individually by physically removing the SB.
- IOU
An IOU can be replaced when partitions, to which the IOU to be maintained belongs, is switched off.
With the Dynamic Reconfiguration function, even an IOU that is incorporated into the partition can be replaced while the system continues running.
- HDD / SSD
An HDD / SSD alone can be replaced without removing the disk unit.
- MMB
Hot replacement is possible while the system is running, when two MMBs are mounted. As a standard, as the faulty MMB is swapped with the Standby MMB, the faulty MMB (Standby MMB) can be replaced as such. To replace an active MMB, maintenance replacement is done after swapping with the Standby MMB. It does not affect the control / monitoring in the system.
- PCI Express Card of PCI_Box
The PCI Express card of the PCI_Box can be replaced while the system is running only when the OS/Hypervisor is supported.

CHAPTER 8 Operations Management Tools

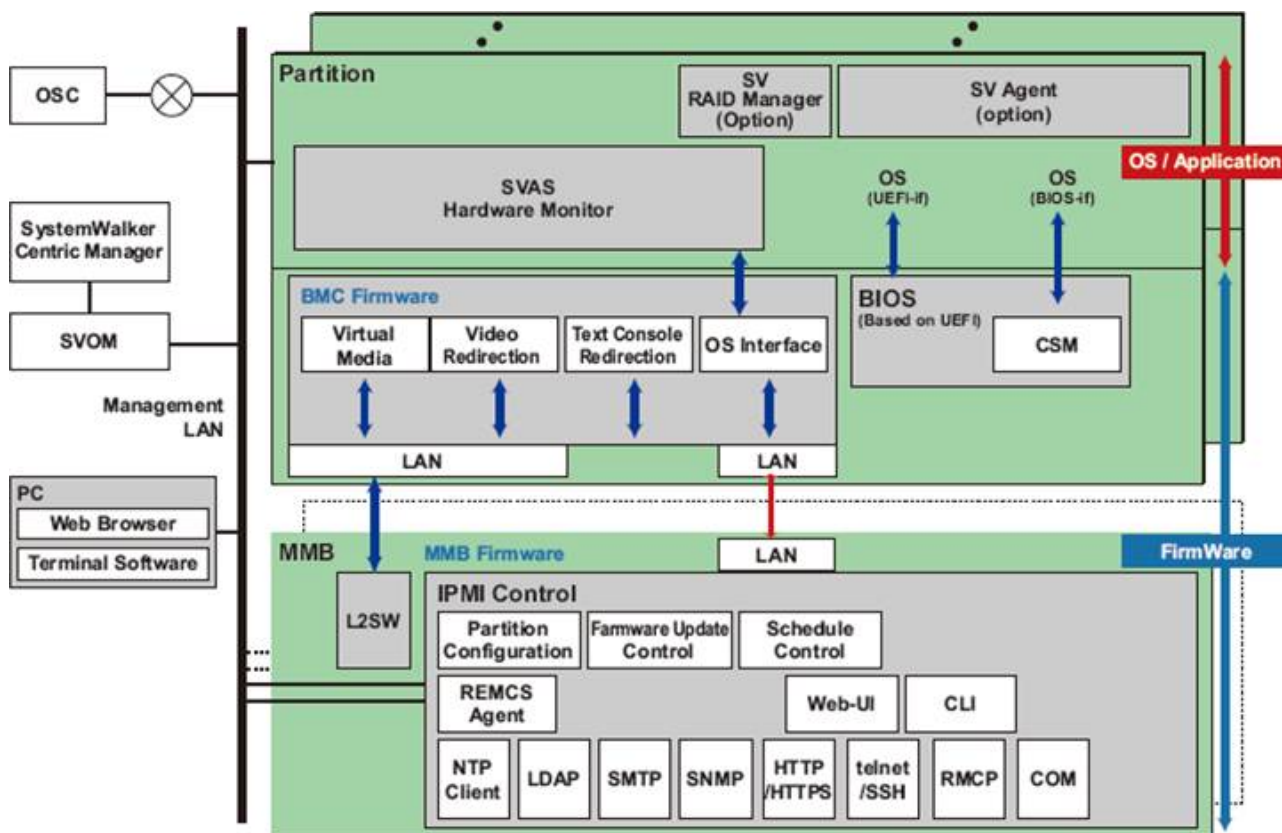
This section describes the operations management tools used in PRIMEQUEST 2000 series

8.1 Overview of Operations Management Tools

The operations management tools for the PRIMEQUEST 2000 series include the Management Board (MMB), the Unified Extensible Firmware Interface (UEFI) instead of BIOS that controls the hardware, Base Board Management Controller (BMC), drivers, ServerView Suite (SVS) of the server management software, and so on. These collectively provide the functions for managing the server system.

The following diagram lists the overall configuration of the operations management tools provided in the PRIMEQUEST 2000 series.

FIGURE 8.1 Overall configuration diagram of the operations management tools



The MMB Firmware controls the entire server system in linkage with the SVS and other firmware (BIOS or BMC Firmware).

SVS links with the MMB by communication with IPMI interface via the BMC, and by communication via an internal LAN.

8.2 MMB

The following MMB functions enable management of the entire system. The MMB also controls the entire system in linkage with the SVS, the BIOS and the BMC.

Regarding the MMB firmware, see '[1.5.1 Firmware](#)'.

8.2.1 Graphical User Interface (GUI)

This section describes the GUI functions of the MMB.

In the PRIMEQUEST 2000 series, the system can be managed with the Web-UI functions utilizing the http/https protocol of the MMB, even without any special software for system management. The GUI can be operated from a remote PC through a Web browser.
For details on how to use the MMB Web-UI, see 'Chapter 1 MMB Web-UI (Web User Interface) operations' of the *"PRIMEQUEST 2000 Series Tool Reference"* (CA92344-0539).

8.2.2 Command line interface (CLI)

MMB provides CLI for system operation.
The methods for accessing the CLI are as follows.

- Accessing via the serial port of MMB
- Accessing from a remote PC via the management LAN of the MMB

For details on how to use the CLI, see 'Chapter 2 Operation of CLI (command line interface) of MMB' of the *"PRIMEQUEST 2000 Series Tool Reference"* (CA92344-0539).

8.3 Video redirection

The video redirection is a function that emulates direct connection to a device by connecting to a partition from a remote terminal.

A Java Applet is transferred when connected by a video redirection tool from a terminal. The user terminal displays the VGA screen output (JViewer) transferred to a LAN through the Java Applet.

The input from the mouse or keyboard connected to the terminal is transferred to the partition via the LAN.
For details on the video redirection, see '1.6.2 Remote operation (BMC)' in the *"PRIMEQUEST 2000 Series Administration Manual"* (CA92344-0537).

8.4 Console Redirection

The console redirection function directs the serial output from a partition to a terminal via a LAN.

The console output to the COM port on a partition is redirected by this function to a terminal connected to a LAN through the console redirection.

In addition, the input from the terminal is notified to the COM port on the partition via the console redirection.
For details on the console redirection, see '1.6.2 Remote operation (BMC)' of the *"PRIMEQUEST 2000 Series Administration Manual"* (CA92344-0537).

8.5 Virtual Media

The virtual media is a function that emulates the storage device that connects other remote storage media (CD / DVD drive, ISO image, floppy disk and USB device) to the partition. Up to three devices can be used at the same time.

For details on the virtual media, see '1.6.2 Remote operation (BMC)' of the *"PRIMEQUEST 2000 Series Administration Manual"* (CA92344-0537).

8.6 ServerView Suite (SVS)

SVS is a group of tools to setup a server and monitor the status of a server, thereby enabling a more secure and reliable operation of PRIMEQUEST 2000 series to be achieved.

For details on the basic functions of the SVS, see 'ServerView Suite Basic Concepts'.

The following table lists the SVS manuals available for the PRIMEQUEST 2000 series.

For details on the functions of the SVS, refer the following manuals.

Contact your sales representative for inquiries about the ServerView manuals.

TABLE 8.1 List of SVS function manuals

Function category	Corresponding manual	Description
Installation	ServerView Suite ServerView Operations Manager Installation ServerView Operations Manager Installation ServerView Update Manager Installation ServerView Event Manager Installation ServerView Agents (Windows Server 2016/2012/2008/2003) ServerView database (Windows)	Manual for installing the Manager (SVOM) / Agent functions of the SVS in a Windows OS environment (This procedure is not necessary when installing the Manager function / Agent function using the SVIM)
	ServerView Suite ServerView Operations Manager Quick Installation (Windows)	Quick guide for installing the Manager (SVOM) of SVS in a windows OS environment (this procedure is not necessary when installing the Manager function using the SVIM)
Installation	ServerView Suite ServerView Operations Manager Installation ServerView Agents for Windows Installation ServerView-Agents (Windows Server2016/ 2012/2008/2003) Installation ServerView Update Agent	Manual for installing the agent function of the SVS (this procedure is not necessary when installing the agent function using the SVIM)
	ServerView Suite ServerView Operations Manager Installation under Linux Installation ServerView Operations Manager Installation ServerView Update Manager Installation ServerView Event Manager Installation ServerView Agents (SuSE, Red Hat, VMware) ServerView database (Linux)	Manual for installing the Manager (SVOM)/ Agent functions of SVS in a Linux OS environment and VMware environment (this procedure is not necessary when installing the Manager function / Agent function using the SVIM)
	ServerView Suite ServerView Operations Manager V4.92 Quick Installation (Linux)	Quick guide for installing the agent function of the SVS in a Linux OS environment (this procedure is not necessary when installing the Agent function Using the SVIM)
	ServerView Suite ServerView Operations Manager Installation ServerView Agents for Linux Installation ServerView Agents (SuSE, Red Hat and VMware) Installation ServerView Update Agent	Manual for installing the agent function of the SVS under Linux OS environment or VMware environment (this procedure is not necessary when installing the Agent function using the SVIM)
SVIM	ServerView Suite ServerView Installation Manager	Manual of SVIM as a tool for installing Windows OS or Linux OS, bundled software, etc.
SVOM Health Monitoring	ServerView Suite ServerView Operations Manager Server Management	Manual of SVOM which monitors hardware
SVOM Asset Management	ServerView Suite Asset Management Overview	Manual that provides an overview of the Asset function
	ServerView Suite ServerView Archive Manager ServerView Operations Manager	Manual that describes the Archive function (a function that records system data and operational data)
	ServerView Suite ServerView Inventory Manager ServerView Operations Manager	Manual that describes the Inventory function (a function that outputs system data and operational data in multiple formats)

TABLE 8.1 List of SVS function manuals (continued)

Functional classification	Corresponding manual	Description
SVOM Event Management	ServerView Suite ServerView Event Manager ServerView Operations Manager	Manual on the function that manages events, such as startup or failure, etc.
	ServerView Suite ServerView Threshold Manager ServerView Operations Manager	Manual on the function that manages event thresholds
SV-RAID RAID Management	ServerView Suite RAID Management	Manual on the RAID management function
SVUM Update Management	ServerView Suite ServerView Download Manager ServerView Operations Manager	Manual describing the function that downloads and acquires the updated information
	ServerView Suite ServerView Update Management	Manual describing the function that applies updates of drivers, firmware, etc.
	ServerView Suite ServerView Update Manager Express Installing BIOS and Firmware via ASPs Installing Drivers and additional Software via PSPs	Manual describing the function that applies the updates of firmware from bootable media
SVDM Deploy	ServerView Suite ServerView Deployment Manager	Manual that describes the provisioning function for servers (installation of OS, applications, etc.)
SVMco	ServerView Mission Critical Option	Manual that describes the essential functions specific of the PRIMEQUEST (cluster linkage).

8.7 UEFI

UEFI is an interface between the operating system and firmware, which controls the hardware in the place of BIOS.

The UEFI is used as a boot firmware in the PRIMEQUEST 2000 series.

The UEFI has a menu that offers operations including selective booting of the OS, starting the UEFI shell, and changing the settings of the boot options. Each of these functions can be realized by bringing the front page of the Boot Manager to the top, moving to the relevant menu.

For details on the how to use the UEFI, see 'Chapter 3 Menu operation of UEFI' of the "*PRIMEQUEST 2000 Series Tool Reference*" (CA92344-0539).

CHAPTER 9 Server Maintenance

This chapter describes the considerations to take into account in system designing for server maintenance. For details on maintenance of various components, see “*PRIMEQUEST 2000 Series Administration Manual*” (CA92344-0537).

9.1 Maintenance Policy / Preventive Maintenance

This section describes the maintainability and preventive maintenance in the PRIMEQUEST 2000 series.

Maintainability

In the PRIMEQUEST 2000 series, hot maintenance can be applied to a PSU and fan while the system is running. The PCI Hot Plug function can also be used to enable hot maintenance of HHD and PCI Express card, thereby achieving high maintainability.

Maintenance can be done from the front or rear for various components like SB, Memory Scale-up Board, IOU, MMB, PSU, fan unit and DU. Therefore, the devices need not be pulled out from the rack.

9.2 Notes on Maintenance

This section describes the points to be observed during management of system information and during maintenance.

Below settings are required for maintenance by the field engineers.

- Video redirection and virtual media are available.
For details on this setting, see '1.3.6 [Console Redirection Setup] window' in “*PRIMEQUEST 2000 series Tool Reference*” (CA92344-0539).
- Telnet or SSH is available.
For details on this setting, see '1.5.4 [Network Protocols] window' in “*PRIMEQUEST 2000 series Tool Reference*” (CA92344-0539).

9.2.1 Firmware Setting Information

The MMB is provided with the backup and restore function of the configuration information of UEFI of each partition, and of the MMB configuration information.

For the details on the UEFI configuration information, and the backup and restore function of the MMB configuration information, see 'Chapter 1 Web-UI (Web User interface) of the “*PRIMEQUEST 2000 Series Tool Reference*” (CA92344-0539)

9.2.2 Logs collected by the MMB

In the PRIMEQUEST 2000 series, the events that have occurred in the system can be collected by the MMB Web-UI. The system event log can store up to 32,000 events. When the system event log reaches the maximum allowable number of system event log entries, the oldest event log entry will be deleted to log the latest event that occurred.

FIGURE 9.1 [System Event Log] Screen



The operation for the system event log is as follows.

Downloading the event data stored in the system event log,

1. Click the [Download] button.
The dialog box for entering the path of the stored file appears. Download the event data to the PC displaying the Web-UI.

Narrowing down the events displayed on the window

Click the [Filter] button.
[System Event Log Filtering Condition] window for entering the filtering conditions appears.
Enter the conditions in the [System Event Log Filtering Condition] screen, and click the [Apply] button.
The browser returns to the [System Event Log] window, and the events that satisfy the specified criteria are displayed.

Displaying the details of events displayed on the window,

Click the [Detail] button.
The [System Event Log (Detail)] window appears displaying the details of the events.
For details on the Web-UI operation, see "PRIMEQUEST 2000 Series Tool Reference"(CA92344-0539).

CHAPTER 10 Hardware Installation and Connection

For details on the installation rack mounting and connection in the PRIMEQUEST 2000 series, see *PRIMEQUEST 2000 Series Installation Manual* (CA92344-0536).

Appendix A Component Mounting Locations

For details on the component mounting locations, see 'Appendix B Physical mounting position and port number' in the "*PRIMEQUEST 2000 Series Administration Manual*" (CA92344-0537).

Appendix B Mounting Locations, BUS numbers, and Slot numbers

For details on the correspondence between the physical location and the BUS number of the built-in I/O, and between the mounting location and slot number in the PRIMEQUEST 2000 series, see 'Appendix D Physical Locations and BUS Numbers of Built-in I/Os, and PCI Slot Mounting Locations and Slot Numbers' in the *"PRIMEQUEST 2000 Series Administration Manual"* (CA92344-0537).

Appendix C Status checks with LEDs

For details on the status check with LEDs in the PRIMEQUEST 2000 series, see 'Appendix F Status Check by LED' in the "*PRIMEQUEST 2000 Series Administration Manual*" (CA92344-0537)

Appendix D Component Mounting Conditions

For details on component mounting conditions, see 'Appendix G Component Mounting Conditions' in the *"PRIMEQUEST 2000 Series Administration Manual"* (CA92344-0537).

Appendix E Cable Specifications

For details on cable specifications, see 'Chapter 2 Connection Information' in the PRIMEQUEST 2000 series Installation (Manual (CA92344-0535)).

Appendix F Tree Structure of the MIB provided with the PRIMEQUEST 2000 series

For details on the MIB tree structure provided in the PRIMEQUEST 2000 series, see 'Appendix H MIB Tree Structure provided in the PRIMEQUEST 2000 series' in the "*PRIMEQUEST 2000 Series Administration Manual*" (CA92344-0537)'

Appendix G Linkage functions and Services

This section describes the various linkage functions and services provided in the PRIMEQUEST 2000 series.

G.1 Linkage with Systemwalker Centric Manager

For details on the Linkage with Systemwalker Centric Manager, see 'Appendix J Linkage with Systemwalker Centric Manager' in the "*PRIMEQUEST 2000 Series Administration Manual*" (CA92344-0537).

G.2 Remote Customer Support System (REMCS)

For details on Remote Customer Support (System (REMCS), see "PRIMEQUEST 2000 series REMCS Service Manual" (CA92344-0542)

Appendix H Right or wrong of combination of each function

H.1 Right or wrong of combination of each function in Microsoft (R) Windows Server (R) 2016 and Microsoft (R) Windows Server (R) 2012 R2

About the main function that user can set the enable/disable, the right or wrong of combination of each function in Microsoft (R) Windows Server (R) 2016 and Microsoft (R) Windows Server (R) 2012 R2 is shown to the following list.

Table H.1 Right or wrong of combination of each function in Microsoft (R) Windows Server (R) 2016 and Microsoft (R) Windows Server (R) 2012 R2

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
A	Flexible I/O	-	N	-	Y	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
B	Fixed I/O	N	-	-	N	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
C	Dynamic Reconfiguration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	Reserved SB	Y	N	-	-	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	-	Y	N	N	Y	Y
E	Extended Partitioning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Extended Socket	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G	Power Saving	Y	Y	-	Y	-	-	-	Y	Y	-	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
H	Segment Mode	Y	Y	-	Y	-	-	Y	-	N	-	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
I	Bus Mode	Y	Y	-	Y	-	-	Y	N	-	-	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
J	Memory Scale-up Board	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	Secure Boot	Y	Y	-	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
L	Memory Operation Mode (Normal)	Y	Y	-	Y	-	-	Y	Y	Y	-	Y	-	N	N	N	-	N	Y	Y	Y	Y
M	Memory Operation Mode (Performance)	Y	Y	-	Y	-	-	Y	Y	Y	-	Y	N	-	N	N	-	N	Y	Y	Y	Y
N	Full Memory Mirror	Y	Y	-	Y	-	-	Y	Y	Y	-	Y	N	N	-	N	-	N	Y	Y	Y	Y
O	Partial Memory Mirror	Y	Y	-	Y	-	-	Y	Y	Y	-	Y	N	N	N	-	-	N	Y	Y	Y	Y
P	Address Range Mirror	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q	Memory Spare	Y	Y	-	Y	-	-	Y	Y	Y	-	Y	N	N	N	N	-	-	Y	Y	Y	Y
R	TPM1.2 (*1)	Y	Y	-	N	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	-	Y	-	N	Y	Y
S	TPM2.0 (*1)	Y	Y	-	N	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	-	Y	N	-	N	Y
T	EFI boot	Y	Y	-	Y	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	-	Y	Y	N	-	Y
U	Legacy boot	Y	Y	-	Y	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	-

Y: Possible N: Impossible -: Same function or not supported
(*1) BitLocker is supported.

H.2 Right or wrong of combination of each function in Microsoft (R) Windows Server (R) 2012

About the main function that user can set the enable/disable, the right or wrong of combination of each function in Microsoft (R) Windows Server (R) 2012 is shown to the following list.

Table H.2 Right or wrong of combination of each function in Microsoft (R) Windows Server (R) 2012

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
A	Flexible I/O	-	N	-	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
B	Fixed I/O	N	-	-	N	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
C	Dynamic Reconfiguration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	Reserved SB	Y	N	-	-	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	N	N	Y	Y
E	Extended Partitioning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Extended Socket	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G	Power Saving	Y	Y	-	Y	-	-	-	Y	Y	-	-	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
H	Segment Mode	Y	Y	-	Y	-	-	Y	-	N	-	-	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
I	Bus Mode	Y	Y	-	Y	-	-	Y	N	-	-	-	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
J	Memory Scale-up Board	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	Secure Boot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L	Memory Operation Mode (Normal)	Y	Y	-	Y	-	-	Y	Y	Y	-	-	-	N	N	N	-	N	Y	Y	Y	Y
M	Memory Operation Mode (Performance)	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	-	N	N	-	N	Y	Y	Y	Y
N	Full Memory Mirror	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	N	-	N	-	N	Y	Y	Y	Y
O	Partial Memory Mirror	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	N	N	-	-	N	Y	Y	Y	Y
P	Address Range Mirror	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q	Memory Spare	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	N	N	N	-	-	Y	Y	Y	Y
R	TPM1.2 (*1)	Y	Y	-	N	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	-	N	Y	Y
S	TPM2.0 (*1)	Y	Y	-	N	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	N	-	Y	N
T	EFI boot	Y	Y	-	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	Y	Y	-	N
U	Legacy boot	Y	Y	-	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	Y	N	N	-

Y: Possible N: Impossible -: Same function or not supported

(*1) BitLocker is supported.

H.3 Right or wrong of combination of each function in Microsoft (R) Windows Server (R) 2008 R2 (64bit)

About the main function that user can set the enable/disable, the right or wrong of combination of each function in Microsoft (R) Windows Server (R) 2008 R2 (64bit) is shown to the following list.

Table H.3 Right or wrong of combination of each function in Microsoft (R) Windows Server (R) 2008 R2 (64bit)

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
A	Flexible I/O	-	N	-	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
B	Fixed I/O	N	-	-	N	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
C	Dynamic Reconfiguration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	Reserved SB	Y	N	-	-	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	N	N	Y	Y
E	Extended Partitioning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Extended Socket	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G	Power Saving	Y	Y	-	Y	-	-	-	Y	Y	-	-	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
H	Segment Mode	Y	Y	-	Y	-	-	Y	-	N	-	-	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
I	Bus Mode	Y	Y	-	Y	-	-	Y	N	-	-	-	Y	Y	Y	Y	-	Y	Y	Y	Y	Y
J	Memory Scale-up Board	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	Secure Boot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L	Memory Operation Mode (Normal)	Y	Y	-	Y	-	-	Y	Y	Y	-	-	-	N	N	N	-	N	Y	Y	Y	Y
M	Memory Operation Mode (Performance)	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	-	N	N	-	N	Y	Y	Y	Y
N	Full Memory Mirror	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	N	-	N	-	N	Y	Y	Y	Y
O	Partial Memory Mirror	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	N	N	-	-	N	Y	Y	Y	Y
P	Address Range Mirror	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q	Memory Spare	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	N	N	N	-	-	Y	Y	Y	Y
R	TPM1.2 (*1)	Y	Y	-	N	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	-	N	Y	Y
S	TPM2.0 (*1)	Y	Y	-	N	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	N	-	Y	N
T	EFI boot	Y	Y	-	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	Y	Y	-	N
U	Legacy boot	Y	Y	-	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	Y	N	N	-

Y: Possible N: Impossible -: Same function or not supported

(*1) BitLocker is supported.

H.4 Right or wrong of combination of each function in VMware vSphere (R) 6

About the main function that user can set the enable/disable, the right or wrong of combination of each function in VMware vSphere (R) 6 is shown to the following list.

Table H.4 Right or wrong of combination of each function in VMware vSphere (R) 6

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
A	Flexible I/O	-	N	-	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	Y	Y	-	-	Y	Y
B	Fixed I/O	N	-	-	N	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	Y	Y	-	-	Y	Y
C	Dynamic Reconfiguration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	Reserved SB	Y	N	-	-	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	Y	Y	-	-	Y	Y
E	Extended Partitioning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Extended Socket	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G	Power Saving	Y	Y	-	Y	-	-	-	Y	Y	-	-	Y	Y	Y	Y	Y	Y	-	-	Y	Y
H	Segment Mode (*1)	Y	Y	-	Y	-	-	Y	-	N	-	-	Y	Y	Y	Y	Y	Y	-	-	Y	Y
I	Bus Mode	Y	Y	-	Y	-	-	Y	N	-	-	-	Y	Y	Y	Y	Y	Y	-	-	Y	Y
J	Memory Scale-up Board	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	Secure Boot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L	Memory Operation Mode (Normal)	Y	Y	-	Y	-	-	Y	Y	Y	-	-	-	N	N	N	N	N	-	-	Y	Y
M	Memory Operation Mode (Performance)	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	-	N	N	N	N	-	-	Y	Y
N	Full Memory Mirror	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	N	-	N	N	N	-	-	Y	Y
O	Partial Memory Mirror	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	N	N	-	N	N	-	-	Y	Y
P	Address Range Mirror	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	N	N	N	-	N	-	-	Y	N
Q	Memory Spare	Y	Y	-	Y	-	-	Y	Y	Y	-	-	N	N	N	N	N	-	-	-	Y	Y
R	TPM1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	TPM2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T	EFI boot	Y	Y	-	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	Y	Y	-	-	-	N
U	Legacy boot	Y	Y	-	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	N	Y	-	-	N	-

Y: Possible N: Impossible -: Same function or not supported

(*1) If you set to PCI Segment mode, disable Intel(R) VT-d function.

H.5 Right or wrong of combination of each function in VMware vSphere (R) 5

About the main function that user can set the enable/disable, the right or wrong of combination of each function in VMware vSphere (R) 5 is shown to the following list.

Table H.5 Right or wrong of combination of each function in VMware vSphere (R) 5

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
A	Flexible I/O	-	N	-	Y	-	-	Y	-	Y	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
B	Fixed I/O	N	-	-	N	-	-	Y	-	Y	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
C	Dynamic Reconfiguration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	Reserved SB	Y	N	-	-	-	-	Y	-	Y	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
E	Extended Partitioning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Extended Socket	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G	Power Saving	Y	Y	-	Y	-	-	-	-	Y	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
H	Segment Mode (*1)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I	Bus Mode	Y	Y	-	Y	-	-	Y	-	-	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
J	Memory Scale-up Board	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	Secure Boot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L	Memory Operation Mode (Normal)	Y	Y	-	Y	-	-	Y	-	Y	-	-	-	N	N	N	-	N	-	-	Y	Y
M	Memory Operation Mode (Performance)	Y	Y	-	Y	-	-	Y	-	Y	-	-	N	-	N	N	-	N	-	-	Y	Y
N	Full Memory Mirror	Y	Y	-	Y	-	-	Y	-	Y	-	-	N	N	-	N	-	N	-	-	Y	Y
O	Partial Memory Mirror	Y	Y	-	Y	-	-	Y	-	Y	-	-	N	N	N	-	-	N	-	-	Y	Y
P	Address Range Mirror	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q	Memory Spare	Y	Y	-	Y	-	-	Y	-	Y	-	-	N	N	N	N	-	-	-	-	Y	Y
R	TPM1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	TPM2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T	EFI boot	Y	Y	-	Y	-	-	Y	-	Y	-	-	Y	Y	Y	Y	-	Y	-	-	-	N
U	Legacy boot	Y	Y	-	Y	-	-	Y	-	Y	-	-	Y	Y	Y	Y	-	Y	-	-	N	-

Y: Possible N: Impossible -: Same function or not supported

(*1) PCI Segment mode is not supported. Set PCI Bus mode as PCI address mode by MMB Web-UI.

H.6 Right or wrong of combination of each function in Red Hat (R) Enterprise Linux (R) 7 (for Intel64)

About the main function that user can set the enable/disable, the right or wrong of combination of each function in Red Hat (R) Enterprise Linux (R) 7 (for Intel64) is shown to the following list.

Table H.6 Right or wrong of combination of each function in Red Hat (R) Enterprise Linux (R) 7 (for Intel64)

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
A	Flexible I/O	-	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
B	Fixed I/O	N	-	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
C	Dynamic Reconfiguration	Y	Y	-	Y	N	N	Y	Y	N	N	Y	Y	N	Y	Y	Y	Y	N	-	Y	Y
D	Reserved SB	Y	N	Y	-	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	-	Y	Y
E	Extended Partitioning	Y	Y	N	Y	-	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	-	Y	Y
F	Extended Socket	Y	Y	N	Y	Y	-	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	-	Y	Y
G	Power Saving	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
H	Segment Mode	Y	Y	Y	Y	Y	Y	Y	-	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
I	Bus Mode	Y	Y	N	Y	Y	Y	Y	N	-	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
J	Memory Scale-up Board	Y	Y	N	N	N	N	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
K	Secure Boot	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
L	Memory Operation Mode (Normal)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	N	N	N	N	N	Y	-	Y	Y
M	Memory Operation Mode (Performance)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	-	N	N	N	N	Y	-	Y	Y
N	Full Memory Mirror	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	-	N	N	N	Y	-	Y	Y
O	Partial Memory Mirror	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	-	N	N	Y	-	Y	Y
P	Address Range Mirror	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	-	N	Y	-	Y	N
Q	Memory Spare	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	-	Y	-	Y	Y
R	TPM1.2 (*1)	Y	Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	Y	Y
S	TPM2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T	EFI boot	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	N
U	Legacy boot	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	-	N	-

Y: Possible N: Impossible -: Same function or not supported

(*1) BitLocker is not supported.

H.7 Right or wrong of combination of each function in Red Hat (R) Enterprise Linux (R) 6 (for Intel64)

About the main function that user can set the enable/disable, the right or wrong of combination of each function in Red Hat (R) Enterprise Linux (R) 6 (for Intel64) is shown to the following list.

Table H.7 Right or wrong of combination of each function in Red Hat (R) Enterprise Linux (R) 6 (for Intel64)

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
A	Flexible I/O	-	N	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
B	Fixed I/O	N	-	Y	N	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
C	Dynamic Reconfiguration	Y	Y	-	Y	N	N	Y	Y	N	N	-	Y	N	Y	Y	-	Y	-	-	Y	Y
D	Reserved SB	Y	N	Y	-	Y	Y	Y	Y	Y	N	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
E	Extended Partitioning	Y	Y	N	Y	-	Y	Y	Y	Y	N	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
F	Extended Socket	Y	Y	N	Y	Y	-	Y	Y	Y	N	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
G	Power Saving	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
H	Segment Mode	Y	Y	Y	Y	Y	Y	Y	-	N	Y	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
I	Bus Mode	Y	Y	N	Y	Y	Y	Y	N	-	Y	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
J	Memory Scale-up Board	Y	Y	N	N	N	N	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
K	Secure Boot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L	Memory Operation Mode (Normal)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	N	N	N	-	N	-	-	Y	Y
M	Memory Operation Mode (Performance)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	-	N	-	N	N	-	N	-	-	Y	Y
N	Full Memory Mirror	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	N	N	-	N	-	N	-	-	Y	Y
O	Partial Memory Mirror	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	N	N	N	-	-	N	-	-	Y	Y
P	Address Range Mirror	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q	Memory Spare	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	N	N	N	N	-	-	-	-	Y	Y
R	TPM1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	TPM2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T	EFI boot	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	-	Y	-	-	-	N
U	Legacy boot	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	-	Y	-	-	N	-

Y: Possible N: Impossible -: Same function or not supported

H.8 Right or wrong of combination of each function in SUSE (R) Linux Enterprise Server 12

About the main function that user can set the enable/disable, the right or wrong of combination of each function in SUSE (R) Linux Enterprise Server 12 is shown to the following list.

Table H.8 Right or wrong of combination of each function in SUSE (R) Linux Enterprise Server 12

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
A	Flexible I/O	-	N	Y	Y	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
B	Fixed I/O	N	-	Y	N	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
C	Dynamic Reconfiguration	Y	Y	-	Y	-	-	Y	Y	N	-	Y	Y	N	Y	Y	Y	Y	N	-	Y	Y
D	Reserved SB	Y	N	Y	-	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	N	-	Y	Y
E	Extended Partitioning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Extended Socket	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G	Power Saving	Y	Y	Y	Y	-	-	-	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
H	Segment Mode	Y	Y	Y	Y	-	-	Y	-	N	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
I	Bus Mode	Y	Y	N	Y	-	-	Y	N	-	-	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
J	Memory Scale-up Board	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	Secure Boot	Y	Y	Y	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	Y	Y	Y	-	Y	Y
L	Memory Operation Mode (Normal)	Y	Y	Y	Y	-	-	Y	Y	Y	-	Y	-	N	N	N	N	N	Y	-	Y	Y
M	Memory Operation Mode (Performance)	Y	Y	N	Y	-	-	Y	Y	Y	-	Y	N	-	N	N	N	N	Y	-	Y	Y
N	Full Memory Mirror	Y	Y	Y	Y	-	-	Y	Y	Y	-	Y	N	N	-	N	N	N	Y	-	Y	Y
O	Partial Memory Mirror	Y	Y	Y	Y	-	-	Y	Y	Y	-	Y	N	N	N	-	N	N	Y	-	Y	Y
P	Address Range Mirror	Y	Y	Y	Y	-	-	Y	Y	Y	-	Y	N	N	N	N	-	N	Y	-	Y	N
Q	Memory Spare	Y	Y	Y	Y	-	-	Y	Y	Y	-	Y	N	N	N	N	N	-	Y	-	Y	Y
R	TPM1.2 (*1)	Y	Y	N	N	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	-	-	Y	Y
S	TPM2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T	EFI boot	Y	Y	Y	Y	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y	-	-	N
U	Legacy boot	Y	Y	Y	Y	-	-	Y	Y	Y	-	Y	Y	Y	Y	Y	N	Y	Y	-	N	-

Y: Possible N: Impossible -: Same function or not supported

(*1) BitLocker is not supported.

H.9 Right or wrong of combination of each function in SUSE (R) Linux Enterprise Server 11

About the main function that user can set the enable/disable, the right or wrong of combination of each function in SUSE (R) Linux Enterprise Server 11 is shown to the following list.

Table H.9 Right or wrong of combination of each function in SUSE (R) Linux Enterprise Server 11

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
A	Flexible I/O	-	N	Y	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
B	Fixed I/O	N	-	Y	N	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
C	Dynamic Reconfiguration	Y	Y	-	Y	-	-	Y	Y	N	-	-	Y	N	Y	Y	-	Y	-	-	Y	Y
D	Reserved SB	Y	N	Y	-	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
E	Extended Partitioning	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F	Extended Socket	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G	Power Saving	Y	Y	Y	Y	-	-	-	Y	Y	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
H	Segment Mode	Y	Y	Y	Y	-	-	Y	-	N	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
I	Bus Mode	Y	Y	N	Y	-	-	Y	N	-	-	-	Y	Y	Y	Y	-	Y	-	-	Y	Y
J	Memory Scale-up Board	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	Secure Boot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L	Memory Operation Mode (Normal)	Y	Y	Y	Y	-	-	Y	Y	Y	-	-	-	N	N	N	-	N	-	-	Y	Y
M	Memory Operation Mode (Performance)	Y	Y	N	Y	-	-	Y	Y	Y	-	-	N	-	N	N	-	N	-	-	Y	Y
N	Full Memory Mirror	Y	Y	Y	Y	-	-	Y	Y	Y	-	-	N	N	-	N	-	N	-	-	Y	Y
O	Partial Memory Mirror	Y	Y	Y	Y	-	-	Y	Y	Y	-	-	N	N	N	-	-	N	-	-	Y	Y
P	Address Range Mirror	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q	Memory Spare	Y	Y	Y	Y	-	-	Y	Y	Y	-	-	N	N	N	N	-	-	-	-	Y	Y
R	TPM1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	TPM2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T	EFI boot	Y	Y	Y	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	-	-	-	N
U	Legacy boot	Y	Y	Y	Y	-	-	Y	Y	Y	-	-	Y	Y	Y	Y	-	Y	-	-	N	-

Y: Possible N: Impossible -: Same function or not supported

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