User's Guide

NEC Express Server
Express5800 Series

Express5800/T120g
EXP331A, EXP332A

10.115.01-101.01
April 2016

Manuals

Manuals for this product are provided as booklets (📖) and electronic manuals (📄) in EXPRESSBUILDER.

📖 Safety Precautions and Regulatory Notices	Describes points of caution to ensure the safe use of this server. **Read these cautions before using this server.**
📖 Getting Started	Describes how to use this server, from unpacking to operations. See this guide first and read the outline of this product.

EXPRESSBUILDER

📄 User's Guide

Chapter 1: General Description	Overviews, names, and functions of the server's parts
Chapter 2: Preparations	Installation of additional options, connection of peripheral devices, and suitable location for this server
Chapter 3: Setup	System BIOS configurations and summary of EXPRESSBUILDER
Chapter 4: Appendix	Specifications and other information

📄 Installation Guide (Windows)

Chapter 1: Installing Windows	Installation of Windows and drivers, and precautions for installation
Chapter 2: Installing Bundled Software	Installation of NEC ESMPRO, Universal RAID Utility, and other bundled software

📄 Maintenance Guide

Chapter 1: Maintenance	Server maintenance and troubleshooting
Chapter 2: Useful Features	The detail of system BIOS settings, RAID Configuration Utility, and EXPRESSBUILDER
Chapter 3: Appendix	Error messages and Windows Event Logs

📄 Other manuals

The detail of NEC ESMPRO, Universal RAID Utility, and other features

Contents

Conventions Used in This Document

Signs and symbols for safety

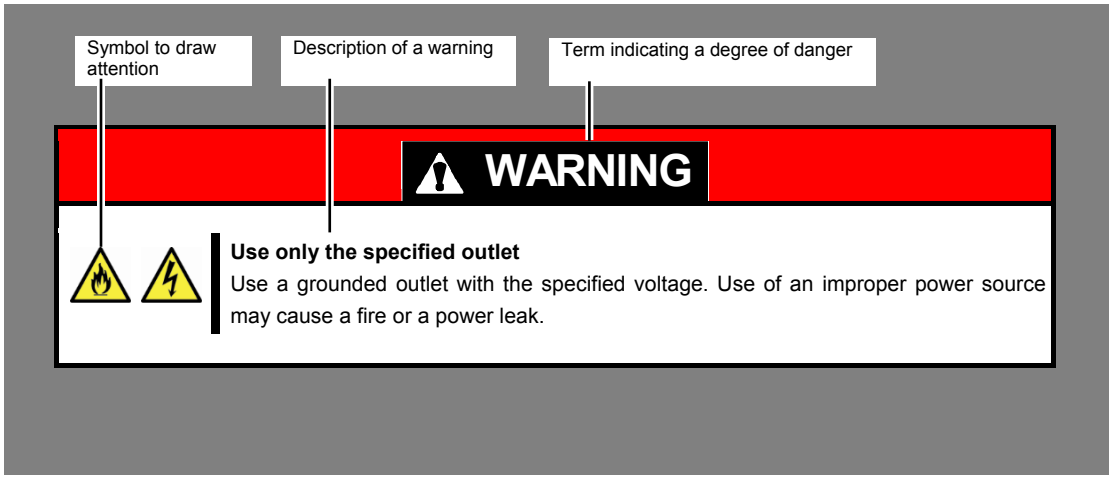
WARNING and CAUTION are used in this guide as following meaning.

WARNING	Indicates there is a risk of death or serious personal injury
CAUTION	Indicates there is a risk of burns, other personal injury, or property damage

Precautions and notices against hazards are presented with one of the following three symbols. The individual symbols are defined as follows:

	Attention	This symbol indicates the presence of a hazard if the instruction is ignored. An image in the symbol illustrates the hazard type.	(Example)  (Electric shock risk)
	Prohibited Action	This symbol indicates prohibited actions. An image in the symbol illustrates a particular prohibited action.	(Example)  (Do not disassemble)
	Mandatory Action	This symbol indicates mandatory actions. An image in the symbol illustrates a mandatory action to avoid a particular hazard.	(Example)  (Disconnect a plug)

(Example in this guide)



Notations used in the text

In addition to safety-related symbols urging caution, three other types of notations are used in this document. These notations have the following meanings.

Important	Indicates critical items that must be followed when handling hardware or operating software. If the procedures described are not followed, **server failure, data loss, and other serious malfunctions could occur**.
Note	Indicates items that must be confirmed when handling hardware or operating software.
Tips	Indicates information that is helpful to keep in mind when using this server.

Optical disk drive

This server is equipped with one of the following drives. These drives are referred to as *optical disk drive* in this document.

- **DVD-ROM drive**
- **DVD Super MULTI drive**

Hard disk drive

Unless otherwise stated, *hard disk drive* (HDD) described in this document refers to the following.

- **Hard disk drive (HDD)**
- **Solid state drive (SSD)**

Removable media

Unless otherwise stated, *removable media* described in this document refers to the following.

- **USB flash drive**
- **Flash FDD**

Abbreviations of Operating Systems (Windows)

Windows Operating Systems are referred to as follows.
See *Chapter 1* (*1.2 Supported Windows OS)* in *Installation Guide (Windows)* for detailed information.

Notations in this document	Official names of Windows
Windows Server 2012 R2	Windows Server 2012 R2 Standard
	Windows Server 2012 R2 Datacenter
Windows Server 2012	Windows Server 2012 Standard
	Windows Server 2012 Datacenter
Windows Server 2008 R2	Windows Server 2008 R2 Standard
	Windows Server 2008 R2 Enterprise

POST

POST described in this document refers to the following.

- Power On Self-Test

BMC

BMC described in this document refers to the following.

- Baseboard Management Controller

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EDK/EDKII

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This product includes cryptographic software written by Eric Young (eay@cryptsoft.com).
This product includes software written by Tim Hudson (tjh@cryptsoft.com).

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The most recent version of User's Guide, as well as other related documents, is also available for download from the following website.

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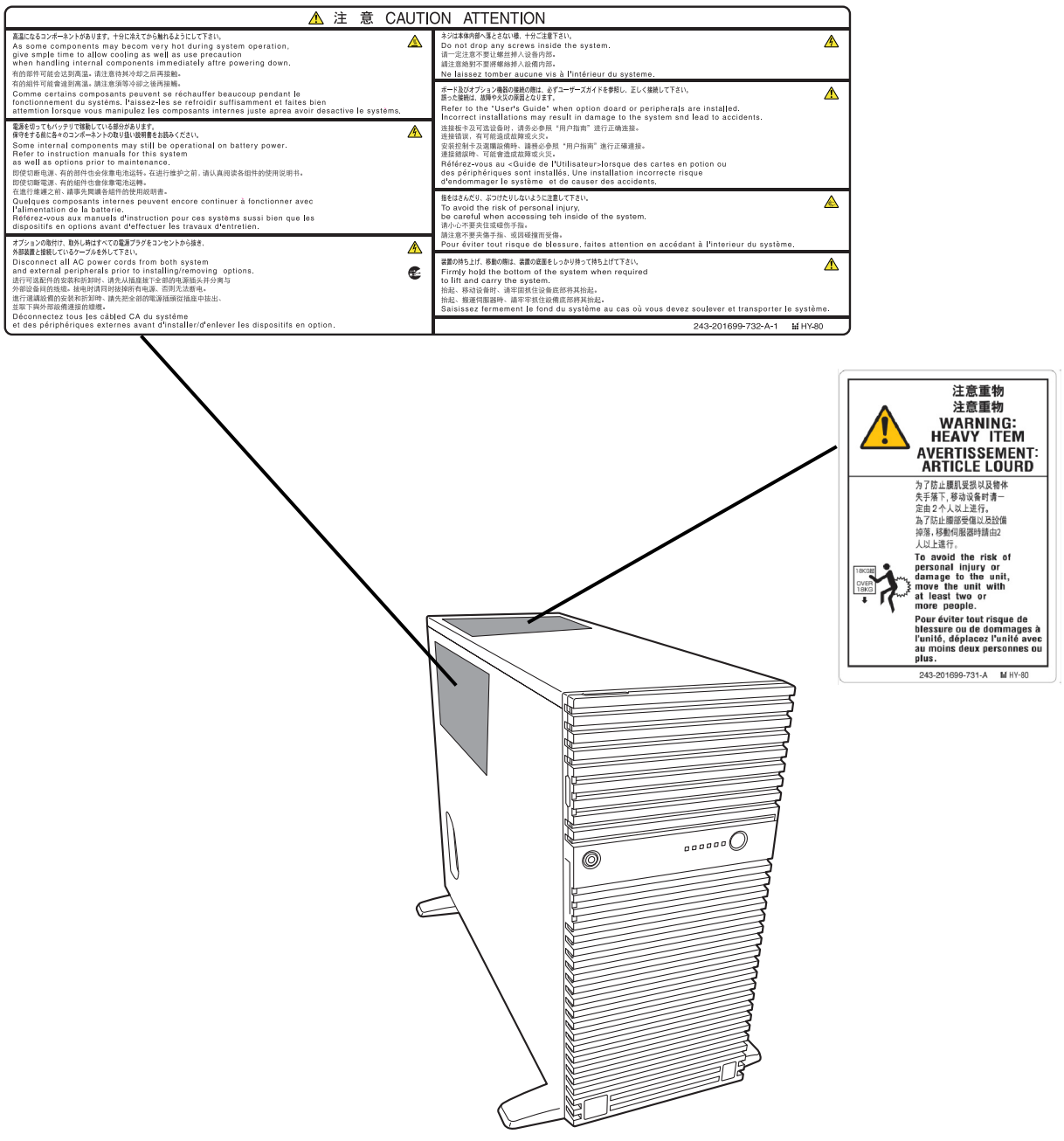
Safety notes

To use this server safety, read thoroughly "*Safety Precautions and Regulatory Notices*" that comes with your server.

Warning labels are attached on or near the components with potential hazards. These labels are attached or printed on the components.

Do not remove or black out these labels and keep them clean. If no labels are attached or printed on the server, contact your sales representative.



Handling precautions

Be sure to observe the following precautions for the proper functioning of the server. Ignoring the precautions may cause server malfunction or failure.

- **Do not use any cell phone or PHS and switch off them near the server. Electric waves from such devices can cause server to malfunction.**
- **Install the server in an appropriate place. For details about the installation location, see *Chapter 2 Preparations (2. Installation and Connection)*.**
- **Before connecting/removing cables to/from peripheral devices, make sure that the server is off and unplug the power cord, if they are non plug-and-play devices.**
- **Connect the provided power cord to a 100/200 VAC outlet.**
- **Make sure that the access LED on the server is off before turning off the power or ejecting an optical disk.**
- **Wait for at least 30 seconds before connecting power cord to power outlet after disconnecting it.**
- **If any Uninterruptible Power Supply (UPS) unit is connected, set it to wait for at least 30 seconds before turning on the server after power off.**
- **Do not press the POWER switch to turn on the server before the STATUS LED1, 2 (amber) is unlit.**
- **Wait for at least 30 seconds before turning on the server after turning off the server.**
- **Turn off the server and unplug the power cord before moving it.**
- **Regularly clean the server to prevent various types of failure. See *Chapter 1 Maintenance (2. Daily Maintenance)* in *Maintenance Guide* for details.**
- **Momentary voltage drop may occur due to lightning strike. To prevent this, use of UPS is recommended.**
- **Any copy-protected CD that does not conform to standards is not supported.**
- **In the following cases, check and adjust the system clock before operation.**
  - After transportation
  - After storage
  - After a period of disuse in which storage conditions did not conform to those at which server operations are guaranteed (Temperature: 5°C to 40°C [5°C to 45°C when an option is installed, subject to restrictions on the configuration], Humidity: 20% to 80%)
- **Check the system clock approximately once per month. Use of a time server (NTP server) is recommended if high accuracy timing is required by the system.**
- **Observe the storage conditions (Temperature: –10 C to 55°C, Humidity: 20% to 80%, No condensation of moisture) to store the server.**
- **Do not power off or reset the server, nor disconnect the power cord before POST completes.**
- **If this server, internal optional devices, and media set for the backup devices (tape cartridges) are moved from a cold place to a warm place in a short time, condensation will occur and cause malfunctions and failures when these are used in such state. To protect important stored data and property, make sure to wait for a sufficient period to use the server and components in the operating environment.**

  Reference: Time effective at avoiding condensation in winter (more than 10°C differences between the room temperature and atmospheric temperature)

  Disk devices: Approximately 2 to 3 hours Tape media: Approximately 1 day
- **For optional devices, we recommend you use our NEC products. Even if they are successfully installed or connected, installation of unsupported devices can cause the server to malfunction or even failure. You will be charged to repair failure or damage caused by use of such products even within warranty period.**

Tips for your health and safety

Using a computer extensively may affect different parts of your body. Here are tips you should follow while working on a computer to minimize strain on your body.

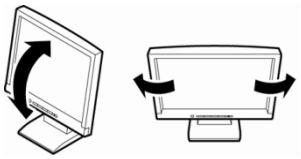
Keep proper posture

The basic body position for using a computer is sitting straight with your hands on the keyboard parallel with the floor, and your eyes directed slightly downward toward the monitor. With the proper posture described above, no unnecessary strain is applied on any part of your body, in other words when your muscles are most relaxed.

Working on the computer with bad posture such as hunching over or being too close to the monitor could cause fatigue or deteriorated eyesight.

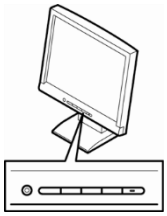
Adjust the angle of your display

Most display units are designed for adjustment of the horizontal and vertical angles. This adjustment is important to prevent the screen from reflecting bright lights and to make the display contents easy to see. Working without adjusting the display to a comfortable angle makes it difficult for you to maintain a proper posture and you will get tired easily. Adjust the viewing angle before use.



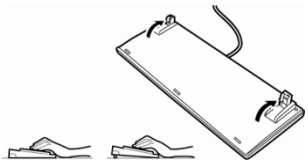
Adjust the brightness and contrast of the display

Display screens have functions to control brightness and contrast. The most suitable brightness/contrast depends on age, individuals, and environment, so adjust it to suit your preferences. A too bright or too dark display is bad for your eyes.



Adjust the angle of keyboard

Some keyboards are ergonomically designed, which allow the angle to be adjusted. Adjusting the angle of the keyboard is effective to reduce tension on your shoulders, arms, and fingers.



Clean your equipment

Keeping your equipment clean is important not only for the appearance but also for functional and safety reasons. A dusty monitor makes it difficult to see the display contents, so clean it regularly.

Take rest breaks

When you feel tired, take a break. Light exercise is also recommended.

NEC Express5800 Series
Express5800/T120g

1

General Description

This chapter introduces the features of this server and the name of each part.

1. **Introduction**

2. **Accessories**
   Describes the accessories of the server.

3. **Features**
   Describes the features of the server and server management.

4. **Names and Functions of Parts**
   Describes the name of each part contained in this server.

1. Introduction

Thank you for purchasing this NEC Express5800 Series product.

This high performance server is powered by the latest microprocessor "Intel® Xeon® processor/Intel® Pentium® processor".

NEC's latest technology and architectures realize high-power and high-speed operation that cannot be matched by existing servers.

The server is designed with consideration of not only reliability but also expandability, which enables you to use it as a network server.

Read this document before using the server thoroughly to fully understand handling of Express5800 Series Server and appreciate its functions to the maximum extent.

2. Accessories

The carton box contains various accessories which are required for setup or maintenance. **Make sure you have them all** for future use.

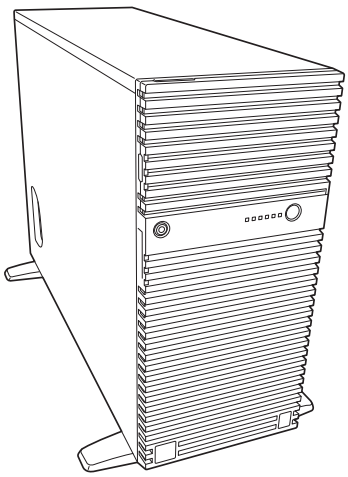
- **Bezel Lock Key (attached to Server)**
- **Safety Precautions and Regulatory Notices**
- **Getting Started**
- **Use notes**

Make sure you have all accessories and inspect them. If an accessory is missing or damaged, contact your sales representative.

Important **The chassis serial number plate and maintenance label is located on the server. If the serial number does not match the number on the warranty, you may not be guaranteed against failure even within the warranty period. Contact your sales representative if they do not match.**

3. Features

The server has the following features:



High performance

- Intel Xeon processor
  - N8101-1068F: E5-2603 v4 (1.70 GHz 6Core)
  - N8101-1070F: E5-2620 v4 (2.10 GHz 8Core)
  - N8101-1071F: E5-2623 v4 (2.60 GHz 4Core)
  - N8101-1072F: E5-2630 v4 (2.20 GHz 10Core)
  - N8101-1073F: E5-2650 v4 (2.20 GHz 12Core)
  - N8101-1074F: E5-2660 v4 (2.00 GHz 14Core)
  - N8101-1075F: E5-2690 v4 (2.60 GHz 14Core)
  - N8101-1076F: E5-2697 v4 (2.30 GHz 18Core)
- Turbo Boost feature *1
- Hyper Threading feature *1
- High-speed memory access (DDR4 1600/1866/2133/2400 supported)*2
- High-speed disk access (SATA 6Gbps, 6Gbps, and SAS 12Gbps supported)
- High-speed 1000BASE-T/100BASE-TX/10BASE-T (2 ports) interface (1Gbps/100Mbps/10Mbps supported)

High reliability

- Processor throttle-ring feature
- Memory monitoring feature (error correction/error detection)
- Memory degeneracy feature (logical isolation of a failed device)
- Memory x4 SDDC feature
- Memory mirroring, memory LockStep (x8 SDDC), memory sparing features
- Memory throttle-ring feature
- Bus parity error detection
- Temperature detection
- Error detection
- Internal fan monitoring feature
- Internal voltage monitoring feature
- Power redundant feature (hot swapping supported) *3
- RAID system (Disk Array)
- Auto rebuild feature (hot swapping supported)
- BIOS password feature
- The security lock that comes with Front Bezel
- Redundant fan system (hot swapping supported) *4
- HDD (hot swapping supported)

Management Utilities

- NEC ESMPRO
- ExpressUpdate
- Remote controlling feature (EXPRESSSCOPE Engine 3)
- RAID system management utility (Universal RAID Utility)
- Hard disk drive monitoring
- Power monitoring feature

Power saving and noiseless design

- Can select the best power supply unit according to system environment/load/configuration.
- Power monitoring feature
- Power control feature
- 80 PLUS® Platinum certified high efficiency power supply *5
- Fan control appropriate to environment, work load, and configuration
- Silent sound design
- Enhanced Intel SpeedStep® Technology supported
- Cold redundant feature*3

Expandability

- PCI Express 3.0 (x16 lanes): 2 slot
- PCI Express 3.0 (x8 lanes): 2 slots *6
- PCI Express 2.0 (x4 lanes): 1 slot (x8 socket)
- Large capacity memory of up to 512 GB *7
- Can upgrade to multi-processor system with up to two processors
- Expansion Bay (for hard disk drives): 24 slots *8
- Optical disk drive bay provided as standard
- USB3.0 interface (Front: 2 ports, rear: 2 ports, internal: 1 port)
- USB2.0 interface (Rear: 2 ports, internal: 1 port)
- Two LAN ports
- Management LAN port (1 port)

Ready to use

- No cable connection is required to install a hard disk drive and additional power supply unit (hot swap supported).

Many built-in Features

- Redundant power supply system supported *3
- El Torito Bootable CD-ROM (no emulation mode) format supported
- Software power-off
- Remote power-on feature
- AC-Link feature
- Remote console feature
- Power switch mask
- Baseboard Management Controller (BMC) conforming to IPMI v2.0
- Secure boot supported

Self-diagnosis

- Power On Self-Test (POST)
- Test and Diagnosis (T&D) utility

Easy setup

- EXPRESSBUILDER (setup utility)
- BIOS Setup utility (SETUP)

Maintenance features

- Off-line Tools
- Memory dump feature using DUMP Switch
- Feature to back up and restore BIOS/BMC settings using EXPRESSSCOPE Profile Key

*1: Unsupported on Xeon processor E5-2603 v4 embedded model.

*2: Processor core speed depends on processor type, number and type of DIMMs installed.

*3: N8100-2477F, 2478F and N8100-2479F.

*4: Requires N8181-130F redundant fan kit.

*5: N8100-2477F, 2478F and N8100-2479F. 80 PLUS Gold is certified for N8100-2476F.

*6: In 2-CPU configuration. One slot in 1-CPU configuration.

*7: In 2-CPU configuration. Up to 256 GB in 1-CPU configuration.

*8: Requires three N8154-77F 2.5-inch HDD cages. No slots in standard configuration.

3.1 Firmware and Software Version Management

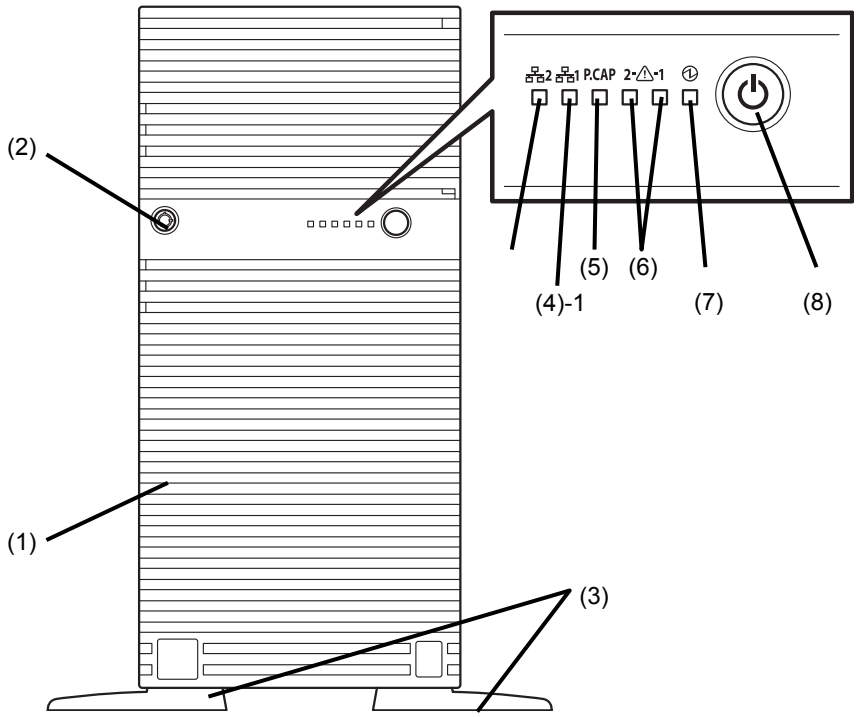
Use of NEC ESMPRO Manager and ExpressUpdate Agent allows you to manage versions of firmware and software as well as update them by applying update packages.

This feature automatically updates modules without stopping the system just by specifying the updating packages from NEC ESMPRO Manager.

4. Names and Functions of Parts

This section describes the names of the server parts.

4.1 Front View



(1) Front Bezel
A cover to protect the front of the server. This cover can be locked with the provided Bezel Lock Key.

(2) Key Slot
A slot for Bezel Lock Key that is used to lock Front Bezel.

(3) Stabilizers
Stabilizers for supporting the server.

(4) LINK/ACT LED
LEDs for showing the status of accessing to the network. **(→See page 34**)
The LED of (4)-1 means LAN1 and (4)-2 means LAN2.

(5) Power Capping LED
An LED for showing the power capping status. **(→See page 34)**

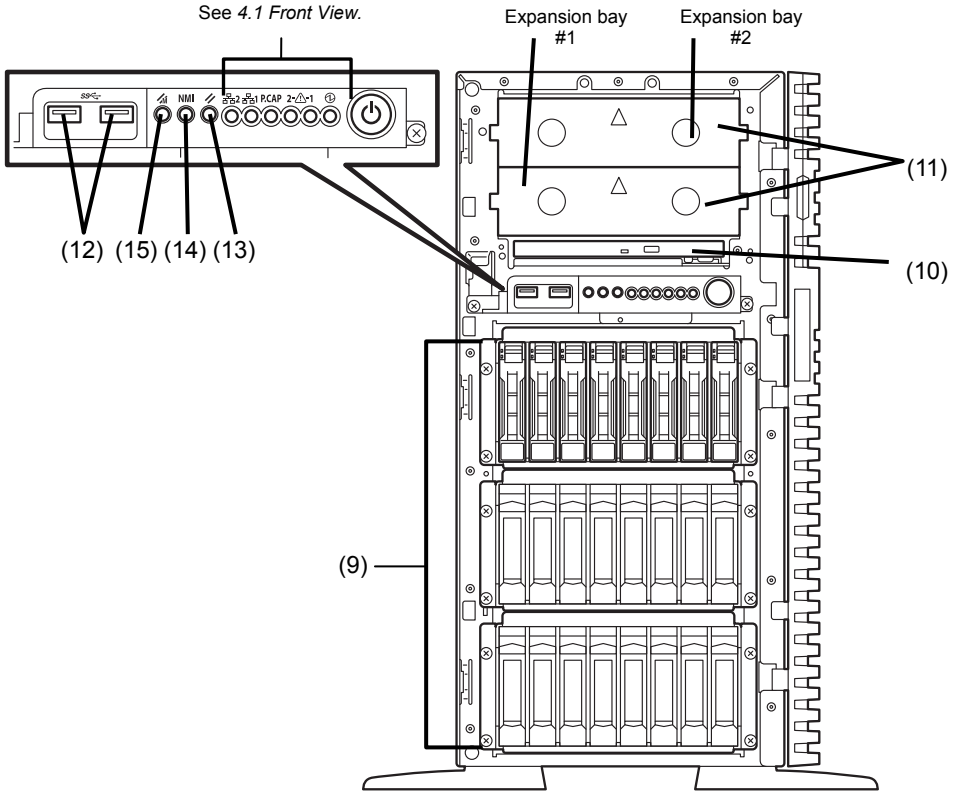
(6) STATUS LED 1, 2
An LED for showing the server status. It lights green when the server is operating normally. This LED flashes green when a degeneration is detected in redundant hardware configuration. If a failure is detected, it turns on or flashes amber. **(→See page 32)**

(7) POWER LED
An LED for showing the power status. This LED lights green when the power is on. This LED lights amber when power cord is connected to power outlet until the system becomes ready to power-on. **(→ See page 32)**

(8) POWER Switch
A switch for turning on/off the server. Press once to turn on the server. POWER LED lights when it is on. Press it again to turn off the server. Hold down the switch for four seconds or more to forcibly turn off the server.

4.2 Front View (without Front Bezel)

The illustration below shows the server with optional optical disk drive and 2.5-inch HDD cage are installed.



(9) Drive Bay

Bays for installing the optional HDD cage. The following optional cage can be installed:

- 2.5-inch HDD cage: Up to 3
- 3.5-inch HDD cage: Up to 2

Dummy trays are installed in all vacant slots of 2.5-inch HDD cage or 3.5-inch HDD cage in standard configuration.

* The illustration shows one 2.5-inch HDD cage is installed.

(10) Optical Disk Drive

An optical disk drive for reading CD/DVD. Either of the following drive can be installed:

- Slim DVD-ROM drive
- Slim DVD Super MULTI drive

The drive provides the following: an eject button to eject the tray; an LED that indicates a CD/DVD access; and an eject hole for forcibly ejecting the tray

(11) 5.25-inch Expansion Bay

Bays for installing the optional DAT drive, and other 5.25-inch devices. The bay is equipped with Blank Covers as standard.

(12) USB Connectors (front)

Connectors for connecting USB interface devices.

(13) DUMP Switch (NMI)

A switch for collecting the memory dump.

(14) RESET Switch

A switch for resetting the server.

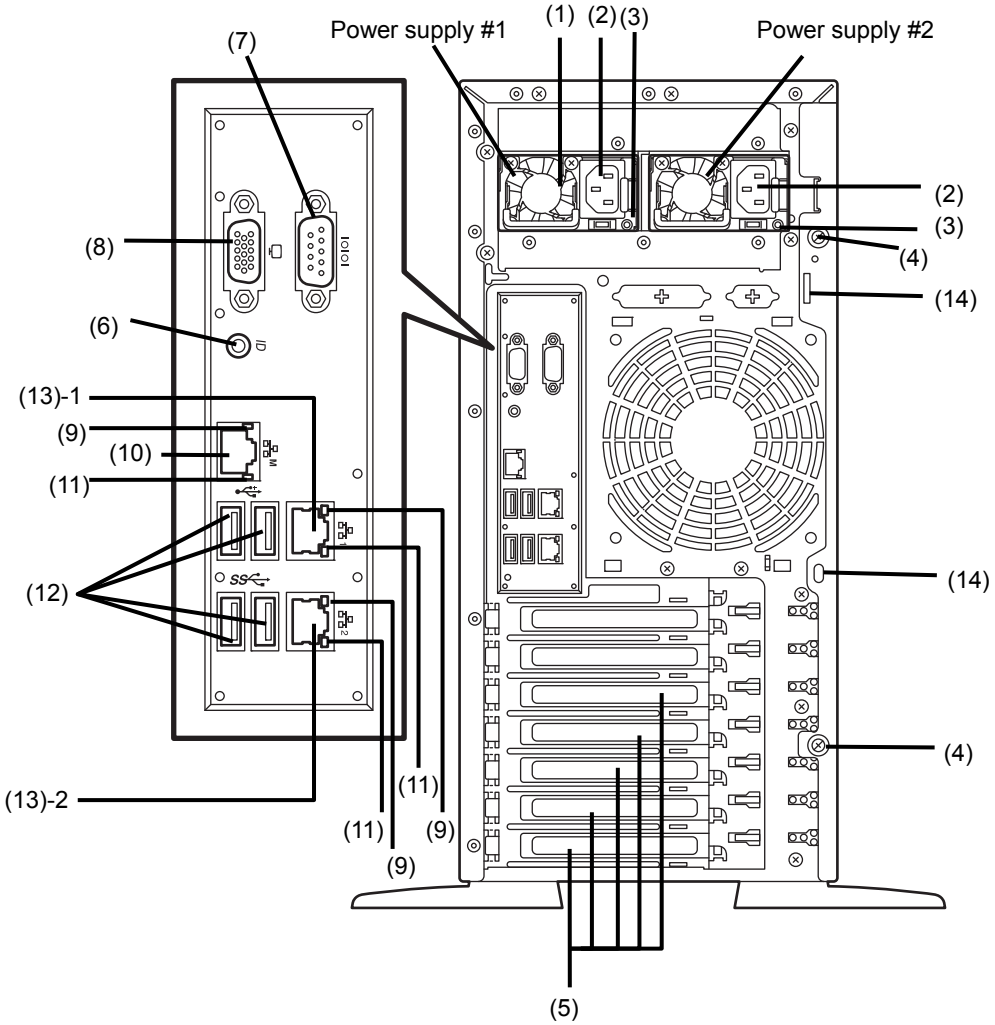
(15) BMC RESET Switch

A switch for resetting BMC of this server. Use the switch only when there is something wrong with EXPRESSSCOPE Engine 3 (BMC).

To use this switch, press it at least five seconds. The remote management feature is disabled for about 40 seconds after BMC is reset.

4.3 Rear View

The illustration below shows the server with optional redundant power supply unit installed.



(1) Power Supply Unit

A power supply for supplying the DC power to the server.

* The illustration shows when redundant power supply unit is installed.

(2) AC Inlet

A socket for connecting the power cord.

* Only one AC inlet with non-redundant power system.

(3) AC POWER LED (green/amber)

An LED for showing the power supply status.

The LED starts blinking when AC power is supplied from power cord, and stays lit green when the server is powered on.

* Redundant power supply unit only.

(4) Cap Screw

Screws for fixing the side cover.

(5) PCI Slot

Slots for installing full-height PCI cards.

(6) UID (unit ID) Switch/LED

Used to turn on and off the UID LED.

Pressing the switch once turns on the UID LED and pressing again turns off the LED.

Commands from software also cause the UID LED to turn on or flash.

(7) Serial Port (COM)

A connector for connecting serial interface devices. This cannot connect to a network line directly.

(8) Display Connector

A connector for connecting a display.

(9) LINK/ACT LED (green)

An LED for showing the access status of LAN

(10) Management LAN Connector

A LAN connector which supports 1000BASE-T/100BASE-TX/10BASE-T.

This port cannot be used as a data transmission port.

This port is used for connecting to EXPRESSSCOPE Engine 3.

(11) SPEED LED (green/amber)

An LED for showing the transfer speed of LAN ports

(12) USB Connectors

Connectors for connecting USB interface devices.

(13) LAN Connectors

LAN connectors which supports 1000BASE-T/100BASE-TX/10BASE-T.

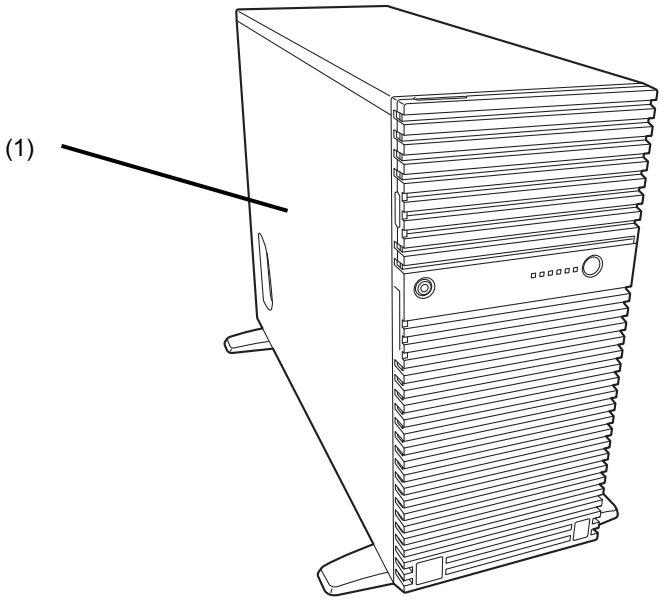
The LED of (13)-1 means LAN1 and (13)-2 means LAN2.

If Shared BMC LAN feature is enabled in ROM Utility, LAN connector 1 can also be used as the management LAN port. However, sharing port is not recommended from the point of performance and security, because LAN port 1 may receive both data.

(14) Chassis Lock

Slits for locking the side cover.

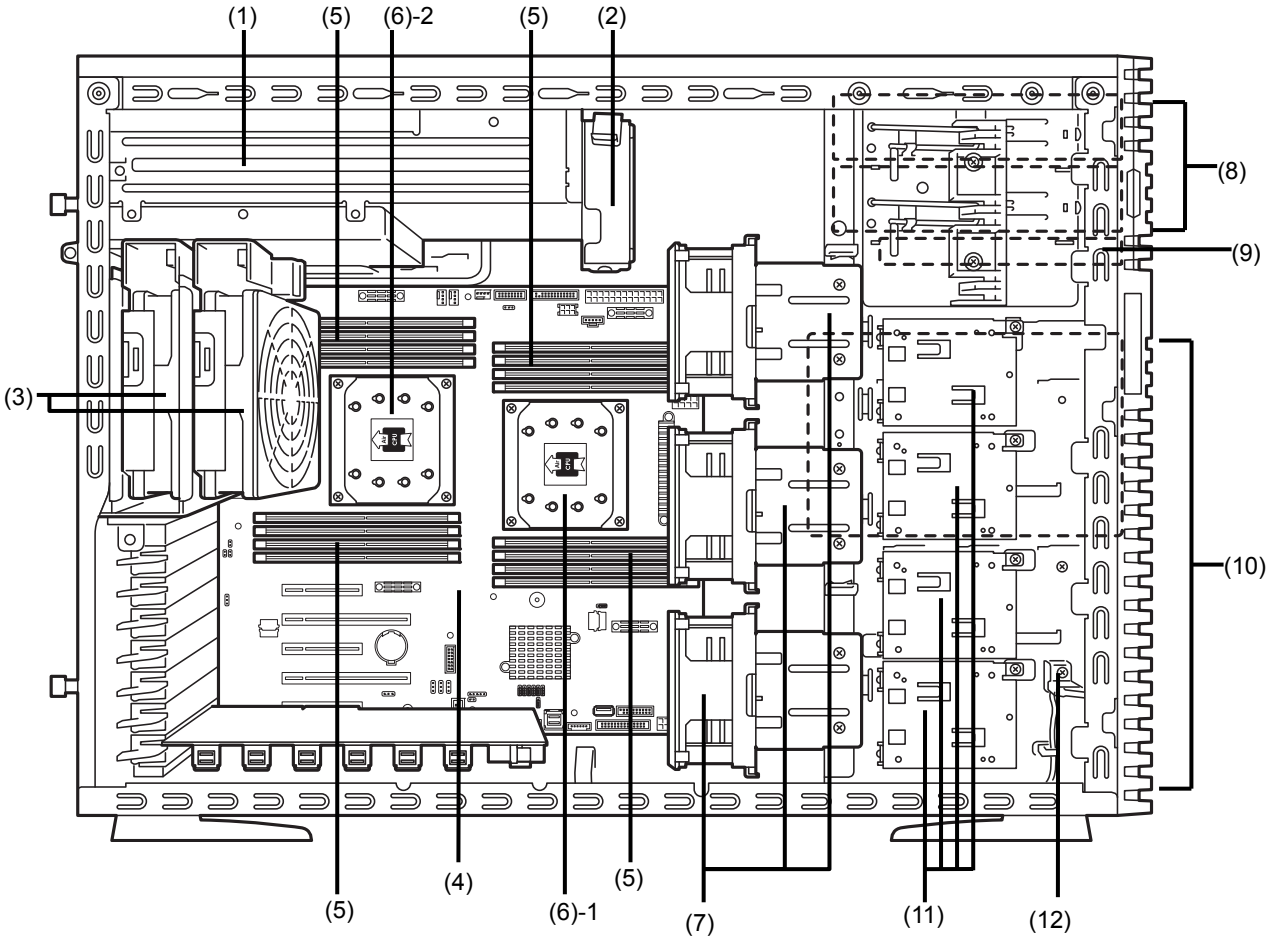
4.4 External View



(1) Side Cover

4.5 Internal View

The illustration below does not show the processor duct.



(1) Power Supply Unit

* The illustration shows when an optional redundant power supply unit is installed.

(2) Cooling Fan for Power Supply Unit

(3) Cooling Fans (Rear)

* The illustration shows when an optional redundant fan unit is installed.

(4) Motherboard

(5) DIMM

(6) Processor

* Processor is attached under the heat sink.

-1 Processor #1 (CPU #1)

-2 Processor #2 (CPU #2) (Optional)

(7) Cooling Fans (Front)

* The illustration shows when an optional redundant fan unit is installed.

(8) 5.25-inch Expansion Bay

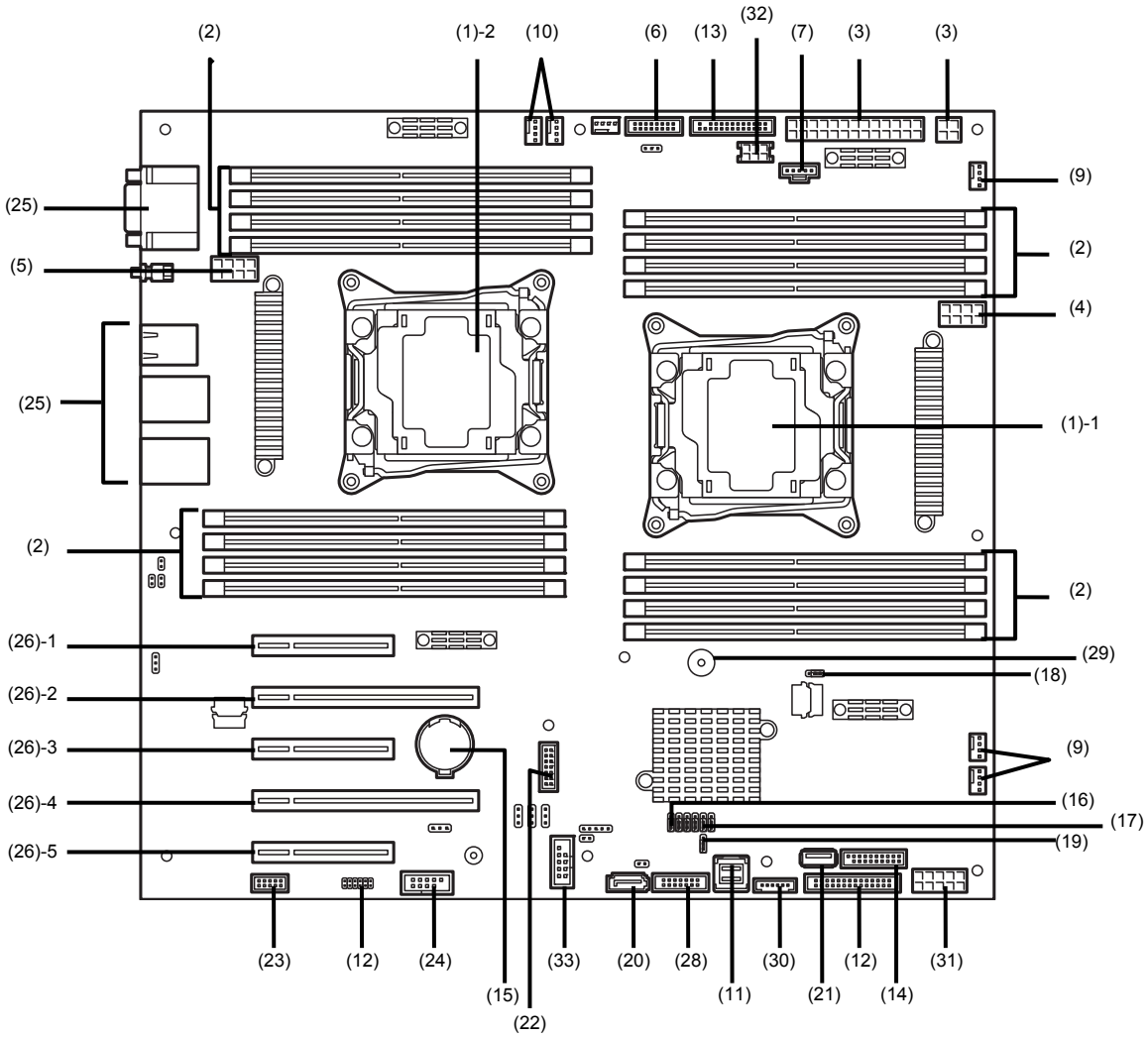
(9) Optical Disk Drive

(10) Drive Bay

(11) Battery Tray for RAID Controller

(12) Side Cover Open Switch

4.6 Motherboard



(1) Processor (CPU) Socket
-1 Processor #1 (CPU#1)
-2 Processor #2 (CPU#2)
(2) DIMM Socket
(3) DC Connector (MB)
(4) DC Connector (CPU#1)
(5) DC Connector (CPU#2)
(6) PM-BUS Connector (for redundant models)
(7) PM-BUS Connector (for non-redundant models)
(8) Connector for Power Supply Unit Cooling Fan
(9) Connector for Front Cooling Fan
(10) Connector for Rear Cooling Fan
(11) SATA HDD Connector
(12) Unused Connector
(13) Front Panel Connector
(14) USB Connector (front)
(15) Lithium Battery
(16) Clear CMOS Jumper
(17) Clear Password Jumper
(18) RAID Configuration Jumper
(19) Fan Configuration Jumper
(20) Serial ATA (DVD) Connector
(21) Internal USB Device Connector
Optional devices can use this connector exclusively each other.
(22) TPM kit Connector
(23) SPI Flash Mezzanine Connector
EXPRESSSCOPE Profile Key (SPI Flash memory) has been installed, where BIOS and BMC configuration data is stored. Relocate it when replacing motherboard to inherit configuration data.
(24) Connector for Optional COM
(25) Connector for External Devices
(26) PCI slots
(26-1) PCI EXPRESS 3.0 x8
(26-2) PCI EXPRESS 3.0 x16
(26-3) PCI EXPRESS 3.0 x8
(26-4) PCI EXPRESS 3.0 x16
(26-5) PCI EXPRESS 2.0 x4 (x8 socket)
(27) Connector for Side Cover Open Switch
(28) SGPIO Cable Connector
When using an optional hot-swap HDD cage, use this connector to connect the hot-swap HDD cage to the SGPIO connector on the HDD cage by using a cable.
(29) Buzzer
(30) Flow Sensor Connecter
(31) DC Connector (HDD cage)
(32) DC Connector (ODD/device)
(33) USB Memory Module Connector

4.7 Status Indicators

This section explains the indication and meanings of the server LEDs.

4.7.1 POWER LED (⏻)

POWER LED indicates power ON/OFF status of the server.

POWER LED pattern	Description
On (green)	The server is normally powered on.
Off	The server is off-powered. The server is in halt status.

4.7.2 STATUS LED 1, 2 (⚠)

While hardware is operating normally, STATUS LED 1 lights green. STATUS LED 2 is off.

STATUS LED 1 is off or STATUS LED 2 lights/flashes amber if there is a hardware failure.

Tips **If NEC ESMPRO is installed, you can view error logs to check the causes of failures.**

STATUS LED 1, 2 pattern		Description	Solution
STATUS LED 1	STATUS LED 2		
On (green)	Off	The server is operating normally.	–
On (green)	On (amber)	Initialization of BMC is in progress.	Wait until initialization completes.
Flashing (green)	Off	Memory is in a degraded state	Identify the device in degraded state by using BIOS Setup Utility (SETUP), and replace it as soon as possible.
		Operating while CPU error is detected.	
		In redundant power configuration, power is not supplied to either of power unit.	
Off	Off	The power is off.	Turn on the server.
		POST is in progress.	Wait for a while. STATUS LED will turn green after POST completes.
		Watchdog timer expired.	Turn the power off and then turn it on. If POST screen displays any error message, take notes of the message, and contact your sales representative.
		Memory dump is being requested. Note: It remains green if the dump is caused by software.	Wait until the memory dump is completed.
Off	On (amber)	A temperature alarm was detected.	Check the internal fan for dusts. Also check if the fan unit is properly connected. If the LED indication does not change, contact your sales representative.
		A CPU error occurred.	Turn the power off and then turn it on. If POST displays any error message, take notes of the message, and contact your sales representative.
		Abnormal CPU temperature is detected.	
		A PCI system error occurred	
		A PCI parity error occurred	
		A PCI bus error occurred.	
		A voltage alarm was detected.	Contact your sales representative.
		Fan error was detected.	
		Sensor error was detected.	
		A CPU temperature alarm was detected.	
		An error occurred on Intel Node Manager (one of the features of EXPRESSSCOPE Engine 3).	
Off	Flashing (amber)	Power Supply Unit is failing (in power redundant configuration).	Contact your sales representative.
		A fan alarm was detected.	Check if the internal fan cable is properly connected. If the LED indication does not change, contact your sales representative.
		A temperature warning was detected.	Check the internal fan for dusts. Also check if the fan unit is properly connected. If the LED indication does not change, contact your sales representative.
		A voltage warning was detected	Contact your sales representative.
		One or more hard disk drives are failing (excluding RAID0 or non-RAID configuration).	
		Side cover is open.	Close the side cover. If the LED indication does not change, contact your sales representative.
		A correctable memory error has often occurred.	Replace the failure DIMM.

4.7.3 LINK/ACT LED (1, 2, M)

LINK/ACT LED on front panel indicates the status of LAN port.

LINK/ACT LED pattern	Description
On (green)	The server is connected with network normally.
Flashing (green)	The server is accessing network.
Off	The server is disconnected from network.

4.7.4 Optical Disk Drive Access LED

The LED for optical disk drive at the front of the server flashes when a CD or DVD is being accessed.

4.7.5 Power Capping LED

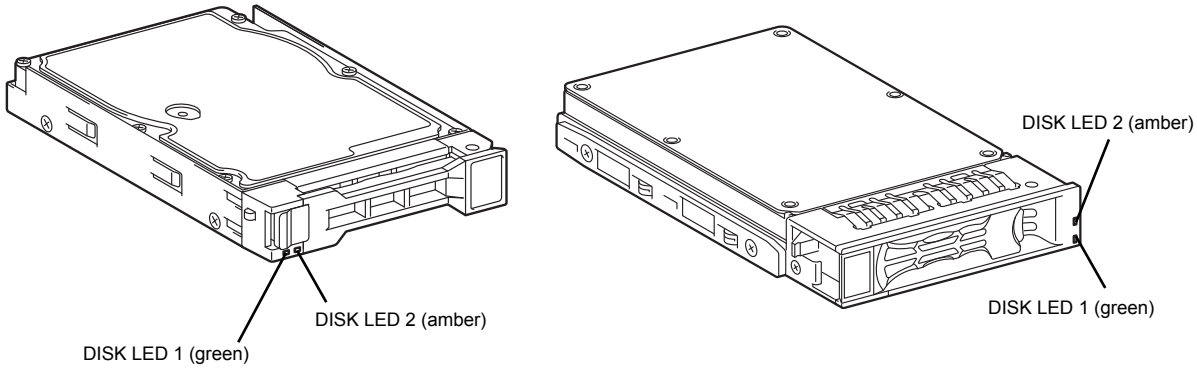
Power Capping LED indicates enabled/disabled status of PowerCapping feature as shown below.

Power Capping LED pattern	Description
On (green)	Power Capping feature is enabled.
Flashing (green)	Power Capping is enabled and power control (capping) is working.
Off	Power Capping feature is disabled.

Note The Power Capping LED seems to be lit or flashing amber when STATUS LED is lit or flashing amber. The amber STATUS LED indicates a hardware failure. Contact your sales representative.

4.7.6 LED on a hard disk drive

Each Hot-Swap HDD is equipped with DISK LED.



DISK LED indicates the following status by lighting.

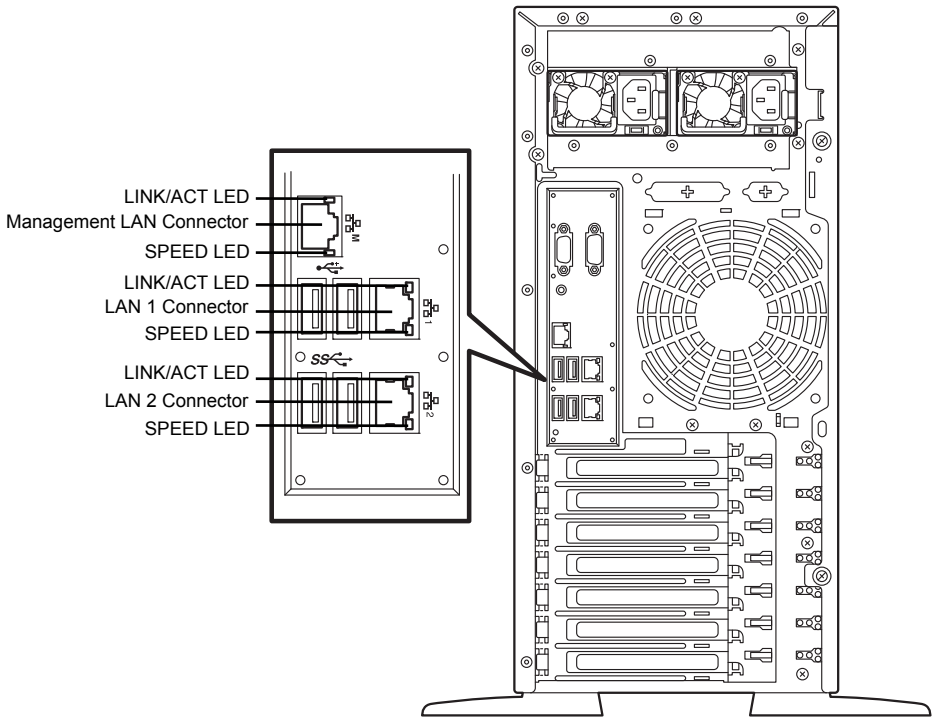
DISK1, 2 LED pattern		Description	Solution
DISK LED 1	DISK LED 2		
Flashing (green)	Off	Hard disk drive is being accessed.	–
Off	On (amber) (only when RAID system is configured)	Hard disk drive is failing.	Contact your sales representative.
Flashing (green)	Flashing (amber) (only when RAID system is configured)	Rebuild is in progress. When the failed hard disk drive is replaced, rebuild process starts automatically (auto rebuild feature).	–
Off	Off	Hard disk drive is halted.	–

Important **Observe the following precautions whenever you use the auto rebuild feature.**

- **Do not turn off or reboot the server while a HDD is being rebuilt.**
- **Wait at least 90 seconds before installing a HDD after removing one.**
- **Do not replace a HDD while another HDD is being rebuilt.**

4.7.7 LEDs for LAN connectors

The LAN connectors on rear panel have LINK/ACT LED and SPEED LED.



- **LINK/ACT LED (1, 2, M)**

  This LED indicates the state of the LAN port.

LINK/ACT LED pattern	Description
On (green)	The server is connected with network normally.
Flashing (green)	The server is accessing network.
Off	The server is disconnected from network.

- **SPEED LED (1, 2, M)**

  This LED indicates which network interface is used.

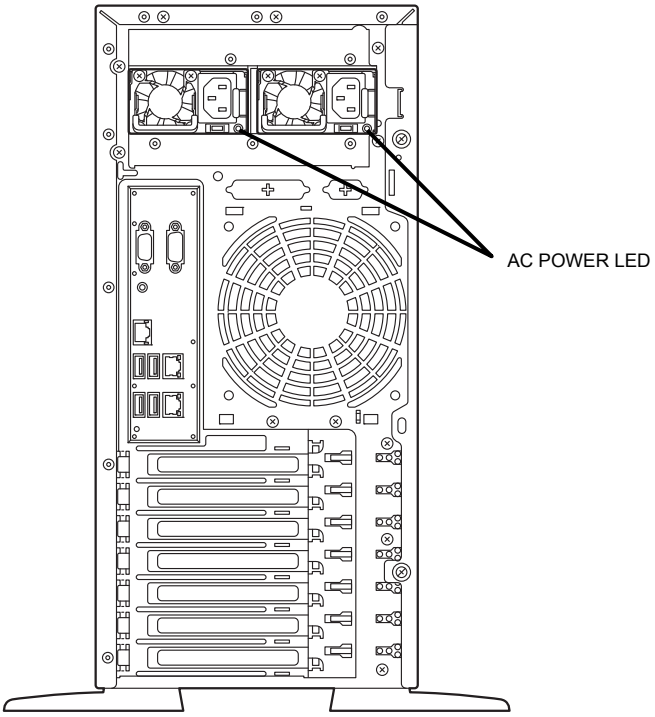
  —The standard LAN ports (1 and 2) support 1000BASE-T, 100BASE-TX, and 10BASE-T.

  —The management LAN port (M) supports 1000BASE-T, 100BASE-TX, and 10BASE-T.

SPEED LED pattern	Description
On (amber)	The port is operating with 1000BASE-T interface.
On (green)	The port is operating with 100BASE-TX interface.
Off	The port is operating with 10BASE-T interface.

4.7.8 AC POWER LED on power supply unit

When a redundant power supply unit is installed, the AC POWER LED is available on each power supply unit.



The following table lists LINK/ACT LED patterns.

AC POWER LED pattern	Description	Solution
On (green)	The server is powered on.	–
Flashing (green)	The power cable is connected and AC power is supplied.	–
	Cold Redundant feature is enabled.	–
On (amber)	The power cable is not connected in redundant power configuration.	Connect the power cable.
	Power unit is failing.	Contact your sales representative.
Flashing (amber)	Power unit is failing.	Contact your sales representative.
Off	The power is not supplied to the server.	Connect the power cable. If it is already connected, contact your sales representative.

NEC Express5800 Series
Express5800/T120g

2 Preparations

This chapter describes preparations for using this server.

1. **Installing Internal Optional Devices**

   Describes how to install or remove optional devices.

   You can skip this section if you do not add any optional devices.

2. **Installation and Connection**

   Describes how to place the server and connect the cables.

1. Installing Internal Optional Devices

This section describes the instructions for installing supported optional devices and precautions.
If you do not add any optional devices, you can skip this section.

Important **Use only the devices and cables specified by NEC. You will be charged to repair damages, malfunctions, and failures caused by the use of any devices or cables not specified for use with this server even within the warranty period.**

1.1 Safety Precautions

Be sure to observe the following precautions to install and remove optional devices properly and safely.

⚠ WARNING

Be sure to observe the following precautions to use the server safety. Failure to observe the precautions may cause death or serious injury. For details, see *Safety Precautions and Regulatory Notices*.

- **Do not disassemble, repair, or modify the server.**
- **Do not remove the lithium battery, NiMH battery, or Li-ion battery.**
- **Disconnect the power plug when installing and removing devices.**

⚠ CAUTION

Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, see *Safety Precautions and Regulatory Notices.*

- **Do not drop**
- **Make sure to complete installation.**
- **Do not get your fingers caught.**
- **High temperature**
- **Electrical shock**

1.2 Anti-static Measures

The server contains static-sensitive components. Follow the measures below to avoid a failure caused by static electricity when installing or uninstalling any optional device.

- **Wearing Anti-static Wrist Strap or Anti-static Gloves**
  Wear a wrist strap on your wrist and connect the wire to the chassis. If there is no wrist strap, touch an unpainted metal surface of the chassis connected to the ground to discharge static electricity from your body before touching the component. Touch the metal part occasionally to discharge the static electricity while working on the component.

- **Checking the Workplace**
  - Work on an anti-static floor or concrete floor.
  - If you work on a place where static electricity is likely to be generated (such as carpet), be sure to provide anti-static protection.

- **Using the Work Table**
  Place the server on a mat with Electrostatic Discharge (ESD) protection.

- **Clothing**
  - Do not wear wool or synthetic clothes.
  - Wear anti-static shoes.
  - Remove a ring, bracelet, wrist watch, and any kind of metal accessories.

- **Handling of Components**
  - Keep the component in an anti-static bag until you install it to the server.
  - Hold the component by the edges to avoid touching any terminals or mounting parts.
  - Place the component in an anti-static bag when storing or moving them.

- **Handling of Cables**
  When connecting a cable (a long LAN cable), static electricity may also be charged due to friction against the floor. Connecting the charged cable to the server will cause damage to the internal devices of the server. It is recommended to use a product such as electrostatic discharge kit to eliminate the static charge before connecting the cable.

- **Installing and Uninstalling the Optional Device**
  - To avoid electric hazard and malfunction, be sure to turn off the power switch of the server and unplug the power cord from the outlet before installing or uninstalling any optional device.
  - If the device is a hot-plug device, you do not need to turn off the power switch and unplug the power cord.
  - The device contains static-sensitive electronic components. When installing or uninstalling the optional device, wear an anti-static wrist strap on your wrist to avoid a failure caused by the static electricity. To use the strap, connect the wire to the chassis.

1.3 Overview of Installation and Removal

Install/remove components by using the following procedure.

When installing hot-plug hard disk drive with the server located on site, make a clearance of about 1 to 2 meters in front, rear, left, and top of the server.

CAUTION

Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, see *Safety Precautions and Regulatory Notices.*

- **Do not drop the server**
- **Beware of high temperatures**
- **Do not get your fingers caught when installing components**

1. If the server is on, turn it off.
   See *Chapter 3* (6. *Turning Off the Server*).
2. Disconnect the power cord from the outlet and the server.

Important

- **After disconnecting the power cord from the server, wait for at least 30 seconds before continuing to work because the components such as cooling fan on the motherboard might still be operating for about 30 seconds even after the power cord was disconnected.**
- **Make sure the AC POWER LED on power supply unit is unlit.**

3. Remove Front Bezel.
   See *Chapter 2* (*1.4 Removing Front Bezel*).
   If you want to install hot-plug HDDs only, go to step 11.
4. If the server is mounted on a rack, pull out the server from the rack when installing or removing the following component:

   Optical disk drive,

   DIMM, Processor,

   TPM, Additional HDD cage,

   PCI card, 5.25-inch device,

   RAID controller, Fan unit,

   Flash backup unit for RAID controller,
   Dust proof bezel (with sensor)

   When only adding a hot-plug hard disk drive, go to Step 12 with this server mounted on the rack.
5. Remove Side Cover.
   See *Chapter 2* (*1.5 Removing Side Cover*).
6. Remove a CPU duct.
   See *Chapter 2* (*1.6 Removing CPU Duct*).
7. Depending on the components to be installed or removed, follow the procedure in order.
   See *Chapter 2* (*1.7 TPM Kit* to *1.17 5.25-inch Device*).

8. Install a CPU duct.
   See *Chapter 2* (*1.18 Installing CPU Duct*).
9. Attach side cover.
   See *Chapter 2* (*1.19 Installing Side Cover*).
10. Locate the server at installation site.
    See *Chapter 2* (*2.1 Installation*).
11. Install hot-plug hard disk drives.
    See *Chapter 2* (*1.20 Hot-plug Hard Disk Drive*).
12. Attach Front Bezel.
    See *Chapter 2* (*1.21 Installing the Front Bezel*).

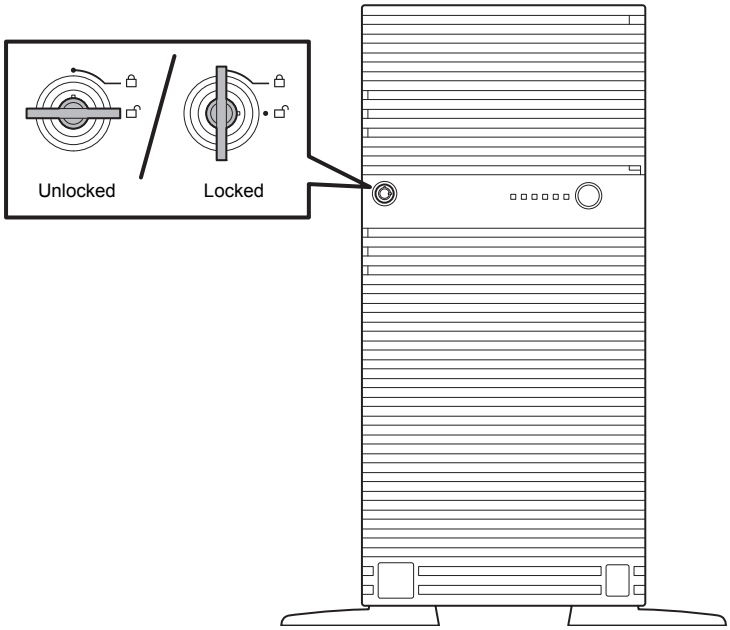
This is the end of the installation or removal procedures for internal optional devices.

Continue the setup with reference to *Chapter 2 (2.2 Connection)*.

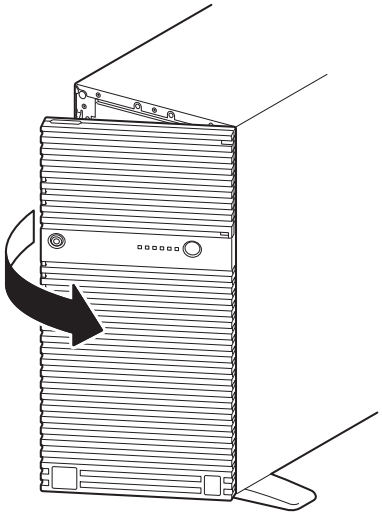
1.4 Removing Front Bezel

Remove Front Bezel when removing Side Cover or installing/replacing an optional device for Expansion Bay.

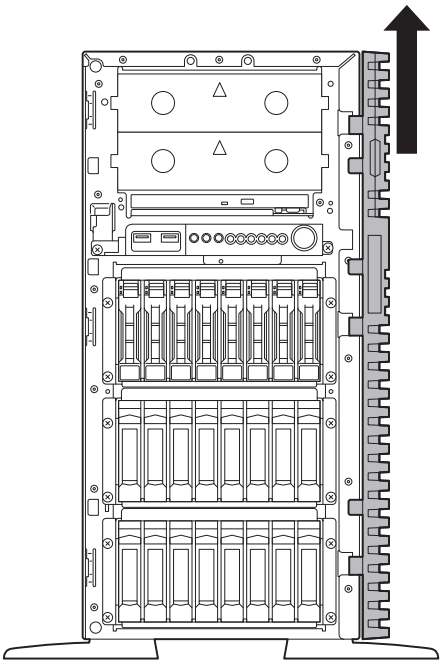
1. Unlock the bezel by using the attached Bezel Lock Key if Front Bezel is locked.



2. Hold the left side of Front Bezel and pull it toward you to open.



3. While opening Front Bezel, slide it upward to release the tab from the chassis frame, and remove Front Bezel from the server.

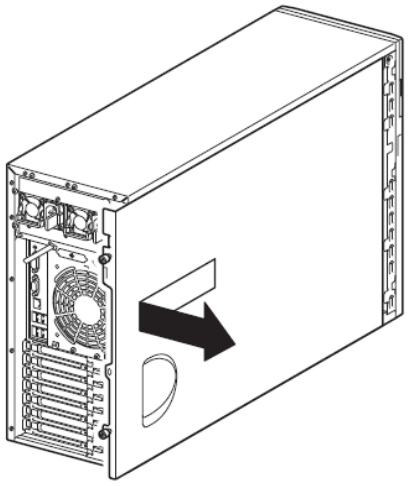


1.5 Removing Side Cover

Remove Side Cover when installing or removing the following component or change internal cable connection:

Optical disk drive, Processor,
DIMM, Additional HDD cage,
TPM, 5.25-inch device,
PCI card, RAID controller,
Power supply unit Fan unit,
Dust Proof Bezel with Sensor
Flash backup unit for RAID controller,

1. See steps 1 to 4 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Loosen Cap Screw on the rear of Side Cover.
3. Hold Side Cover and move it toward the rear of the server.
4. Pull Side Cover to remove from the server.



1.6 Removing CPU Duct

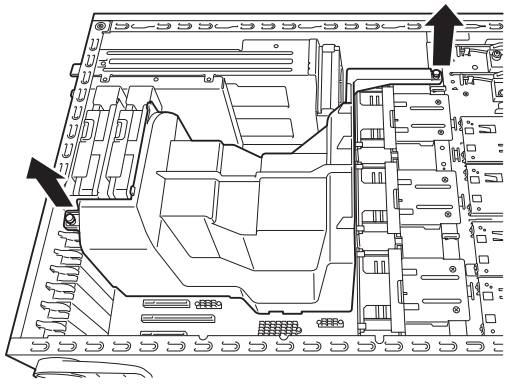
Remove CPU Duct when installing or removing the following components:

DIMM, Processor (CPU)

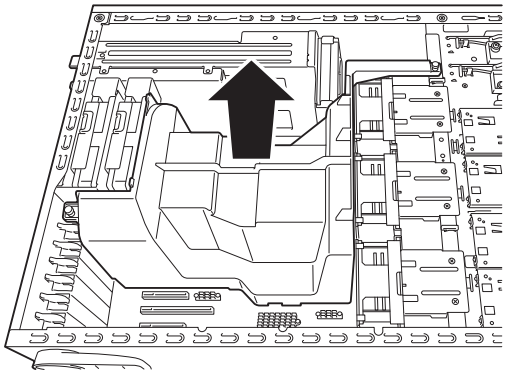
Fan unit Power supply unit

1. Pull the end of two rivets to unlatch CPU Duct.

   Note: Do not remove rivets, just pull them out.

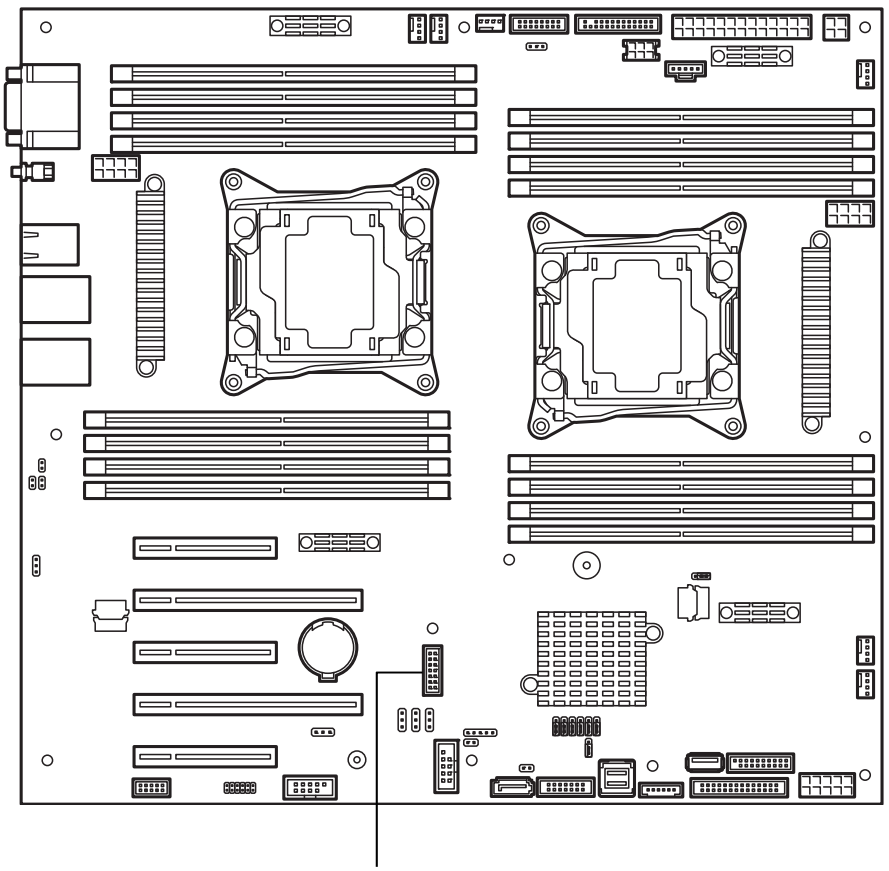


2. Hold CPU Duct, and remove it from chassis.



1.7 TPM Kit

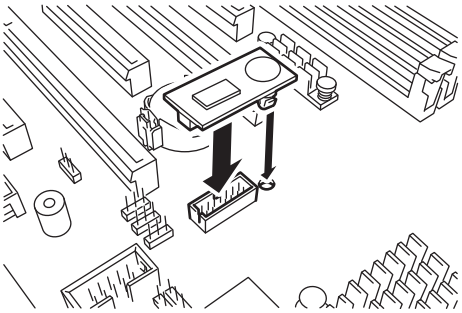
This section describes the procedure for installing optional TPM Kit.



1.7.1 Installation

Install TPM Kit in the following procedure.

1. See steps 1 to 5 in *Chapter 2* (*1.3 Overview of Installation and Removal*) for preparations.
2. Install TPM Kit and secure it by pushing the nylon rivet provided with TPM Kit.



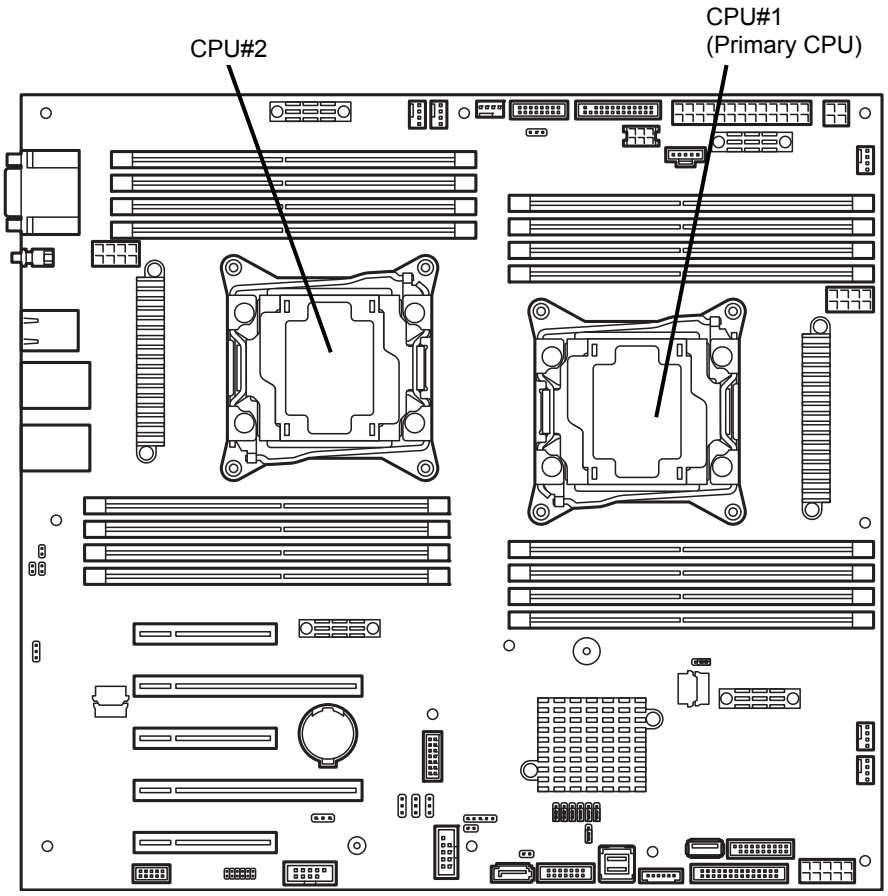
Important

The TPM Kit once installed cannot be removed.

Ask your sales representative for removal.

1.8 Processor (CPU)

You can configure the multi-processor system by adding an optional processor.



Important

- **You must avoid static electricity to work with the procedure below. For details, see *Chapter 2* (*1.2 Anti-static Measures*).**
- **Make sure to use the processor authorized by NEC. Installing a third-party processor may cause a failure of the processor as well as the motherboard. Repair of the server due to failures or damage resulted from installing such a processor will be charged.**
- **Two CPUs must have the same clock frequency. Make sure of the CPU type appropriate to the server.**
- **If you install an additional CPU, change DIMM installation location. See *Chapter 2 (1.9 DIMM)*.**

Tips

After adding the processor, Windows records the event log to System category of Event Viewer, but it is no problem for operation.

1.8.1 Maximum number of processor cores supported by this server

The maximum number of processor cores (logical processors) available on the server depends on the architecture (x86 architecture) and OS specs.

Maximum number of processor cores

OS	The maximum number of logical processors supported by OS	The maximum number of logical processors supported by this server
Microsoft Windows Server 2008 R2 Standard (x64) Microsoft Windows Server 2008 R2 Enterprise (x64)	256 *1	72
Microsoft Windows Server 2012 Standard Microsoft Windows Server 2012 Datacenter Microsoft Windows Server 2012 R2 Standard Microsoft Windows Server 2012 R2 Datacenter	640 *1	72
VMware ESXi 5.5 VMware ESXi 6.0	320	72

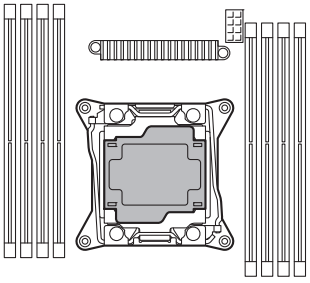
*1: When Hyper-V is used, the maximum number of logical processors is as shown below:
Windows Server 2008 R2: 64
Windows Server 2012, Windows Server 2012 R2: 320

1.8.2 Installation

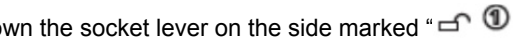
Follow the steps below to install the processor (CPU).

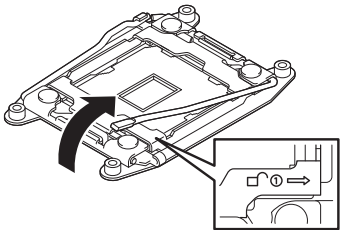
Important **The CPU is extremely sensitive to static electricity. Make sure to touch the metal frame of the server to discharge static electricity from your body before handling the CPU. Do not touch the CPU pins by a bare hand or place the CPU directly on the desk. For static notes, see *Chapter 2 (1.2 Anti-static Measures)*.**

1. See steps 1 to 6 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Locate the CPU socket to which you are going to install a processor.
3. Remove the protective cover from the CPU socket.

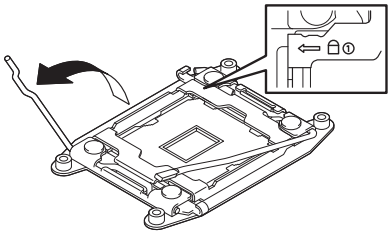


Note Keep the removed protective cover for future use.

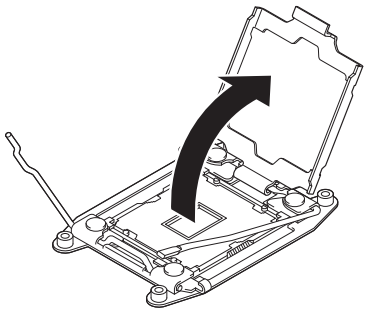
4. Push down the socket lever on the side marked "  →" to unlatch it from the hook, and then slowly open the lever until it stops.



5. Push down the socket lever on the side marked "←  " to unlatch it from the hook, and then slowly open the lever until it stops.

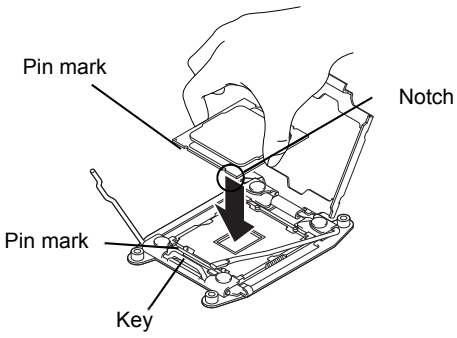


6. Push up the CPU socket holder.



Important **Do not touch the socket contacts.**

7. Put the additional CPU on the CPU socket slowly and gently.
   For easy installation, hold edges of the CPU with your thumb and index fingers so that the notch is aligned with the key on the CPU socket.

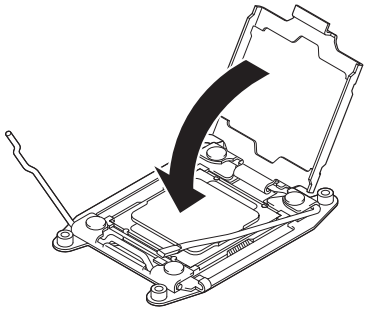


Important **Be sure to hold the CPU only at the edges. Pay attention not to touch the bottom of the CPU (pin section).**

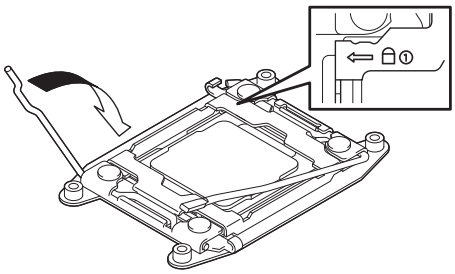
Note

- Insert the CPU while aligning the notch on the CPU with the key on the CPU socket.
- Bring down the CPU straight without tilting or sliding it in the socket.

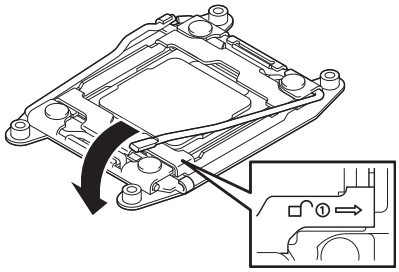
8. Press the CPU lightly onto the CPU socket, and then pull down the CPU socket holder.



9. Push down and lock the lever on the side marked "←🔒①".



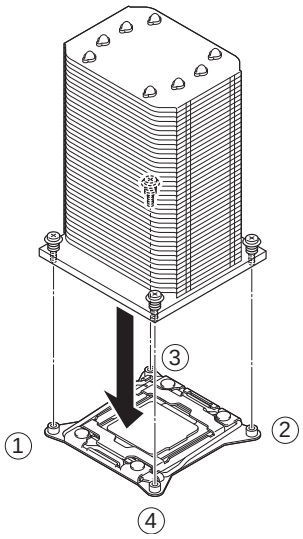
10. Push down and lock the lever on the side marked "🔓① →".



11. Put the heat sink on the CPU and secure it by using four screws.

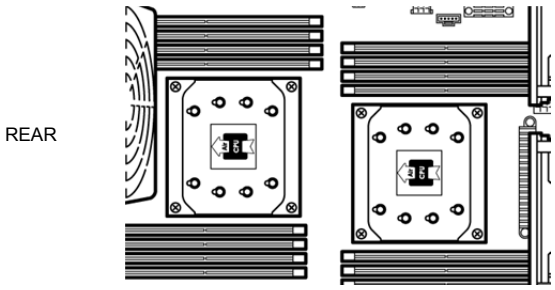
    When securing the screws, temporarily tighten the four screws on cater corner, and then tighten them securely. Make sure to align each screw and screw hole; otherwise, the screws may damage the motherboard.

    When putting the heat sink on the CPU, also pay attention not to touch the components around the CPU.



Note

The heat sink must be mounted in the predefined direction. Make sure the direction of heat sink before mounting it.



12. Make sure that the heat sink is installed on a level with the motherboard.

Note

- If the heat sink is not level, remove it, and then install it again. The following probably causes the heat sink not to be level:
  - The processor is not positioned correctly.
  - Some screws are not completely tightened.
- Do not move the secured heat sink.

13. Continue to install or remove internal optional devices, mount and connect the server, and then turn it on.
14. Run BIOS Setup Utility (SETUP) to confirm the following settings. See *Chapter 3 (2. System BIOS Setup)*.

    Advanced → Processor Configuration → Processor Information

    [CPU ID]
    [L2 Cache RAM]
    [L3 Cache RAM]

1.8.3 Replacement / Removal

Follow the steps below to replace or remove the processor.

Important

- **Do not remove any CPU unless it is failed.**
- **The cool sheet at the bottom of the heat sink may adhere to the CPU. To remove the heat sink from the CPU, first turn the heat sink to the left and right lightly to make sure that the heat sink can be apart from the CPU.**
  Removing the heat sink with it adhering to the CPU may cause the CPU and/or CPU socket to be defected.
- **If the CPU has been removed but the protective cover and dummy cover are not attached to the CPU socket, cooling effect degrades, which may cause a CPU failure.**

1. See steps 1 to 6 in *Chapter 2* (*1.3 Overview of Installation and Removal*) for preparations.
2. Locate the processor you are going to remove.
3. Remove screws from the heat sink, slightly move the heat sink horizontally, then remove the processor.

   Heat of processor may make the cool seat at the bottom of the heat sink adhere to the processor.
   To remove the heat sink from the processor, first turn the heat sink to the left and right lightly to make sure that the heat sink can be apart from the processor.

Important

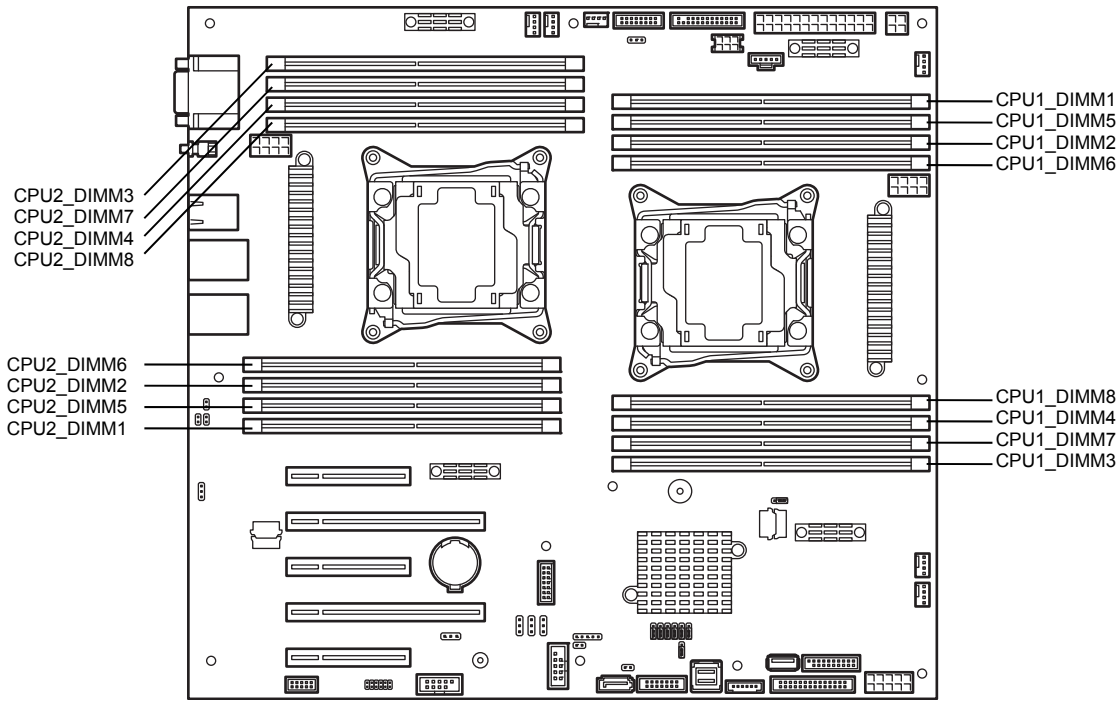
Removing the heat sink with it adhering to the processor may cause the processor and/or CPU socket to be defected.

4. Push down the socket lever on the side marked "  →" to unlatch it from the hook, and then slowly open the lever until it stops.
5. Push down the socket lever on the side marked "←  " to unlatch it from the hook, and then slowly open the lever until it stops.
6. Push up the CPU socket holder.
7. Bring up the CPU horizontally to remove it.
8. To remove the CPU, attach the protective cover to the CPU socket.

   To replace the CPU, install the CPU for replacement.
9. If the CPU has been replaced, install the CPU according to *Chapter 2* (*1.8.2 Installation*).

1.9 DIMM

Install a Dual Inline Memory Module (DIMM) to a DIMM socket on the motherboard in the server. The motherboard provides sixteen sockets to install DIMMs.



Important

- **You must avoid static electricity to work with the procedure below. For details, see *Chapter 2 (1.2 Anti-static Measures)*.**
- **Use only the specified DIMMs. Installing a DIMM from a third party may damage not only the DIMM but the motherboard. You will be charged to repair failures or damages caused by the use of such products even within the warranty period.**

Tips

Up to 512 GB (32 GB x 16) can be installed in 2-CPU configuration. Up to 256 GB (32 GB x 8) can be installed in 1-CPU configuration. No DIMM is factory installed in standard configuration.

1.9.1 Maximum supported DIMM size

The maximum available DIMM size on the server depends on the architecture and OS specs.

Maximum memory sizes

OS	The maximum memory size supported on each OS	The maximum memory size supported on the server
Microsoft Windows Server 2008 R2 Standard *1	32 GB	32 GB
Microsoft Windows Server 2008 R2 Enterprise *1	2 TB	512 GB
Microsoft Windows Server 2012 Standard *1 Microsoft Windows Server 2012 Datacenter *1 Microsoft Windows Server 2012 R2 Standard *1 Microsoft Windows Server 2012 R2 Datacenter *1	4 TB	512 GB
VMware ESXi 5.5 *2 Vmware ESXi 6.0 *2	4 TB	512 GB

*1: Shown below is the maximum memory size when Hyper-V is used:

- Windows Server 2008 R2 Standard: 32 GB
- Windows Server 2008 R2 Enterprise: 1 TB
- Windows Server 2012, Windows Server 2012 R2: 4 TB

*2: Up to 1 TB on virtual machine.

1.9.2 Memory clock

The server supports the memory clock speed of DDR4-1600/1866/2133/2400MHz but the actual memory clock speed depends on CPU and DIMM configuration. The all of DIMMs operate at the same clock speed.

Model Number (CPU)	DIMM type	Number of DIMMs (per 1 CPU)	Clock speed
N8101-1068F (E5-2603v4)	N8102-686F **4GB DDR4-2400 REG Memory Kit (1x4GB)** N8102-687F **8GB DDR4-2400 REG Memory Kit (1x8GB)** N8102-688F **16GB DDR4-2400 REG Memory Kit (1x16GB)** N8102-689F **32GB DDR4-2400REG Memory Kit (1x32GB)**	Up to 8 sets (8 DIMMs)	1866 MHz
	N8102-691 **16GB DDR4-2400 REG Memory Kit (2x8GB)** N8102-692 **32GB DDR4-2400 REG Memory Kit (2x16GB)**	Up to 4 sets (8 DIMMs)	
	N8102-693 **16GB DDR4-2400 REG Memory Kit (2x8GB)** N8102-694 **32GB DDR4-2400 REG Memory Kit (2x16GB)**	Up to 4 sets (8 DIMMs)	
N8101-1070F (E5-2620v4) N8101-1071F (E5-2623v4) N8101-1072F (E5-2630v4)	N8102-686F **4GB DDR4-2400 REG Memory Kit (1x4GB)** N8102-687F **8GB DDR4-2400 REG Memory Kit (1x8GB)** N8102-688F **16GB DDR4-2400 REG Memory Kit (1x16GB)** N8102-689F **32GB DDR4-2400REG Memory Kit (1x32GB)**	Up to 8 sets (8 DIMMs)	2133 MHz
	N8102-691 **16GB DDR4-2400 REG Memory Kit (2x8GB)** N8102-692 **32GB DDR4-2400 REG Memory Kit (2x16GB)**	Up to 4 sets (8 DIMMs)	
	N8102-693 **16GB DDR4-2400 REG Memory Kit (2x8GB)** N8102-694 **32GB DDR4-2400 REG Memory Kit (2x16GB)**	Up to 4 sets (8 DIMMs)	
N8101-1073F (E5-2650v4) N8101-1074F (E5-2660v4) N8101-1075F (E5-2690v4) N8101-1076F (E5-2697v4)	N8102-686F **4GB DDR4-2400 REG Memory Kit (1x4GB)** N8102-687F **8GB DDR4-2400 REG Memory Kit (1x8GB)** N8102-688F **16GB DDR4-2400 REG Memory Kit (1x16GB)** N8102-689F **32GB DDR4-2400REG Memory Kit (1x32GB)**	Up to 8 sets (8 DIMMs)	2400 MHz
	N8102-691 **16GB DDR4-2400 REG Memory Kit (2x8GB)** N8102-692 **32GB DDR4-2400 REG Memory Kit (2x16GB)**	Up to 4 sets (8 DIMMs)	
	N8102-693 **16GB DDR4-2400 REG Memory Kit (2x8GB)** N8102-694 **32GB DDR4-2400 REG Memory Kit (2x16GB)**	Up to 4 sets (8 DIMMs)	

1.9.3 Memory RAS feature

The server supports the following RAS features. Some restrictions (such as DIMM installation location) are imposed on using the Memory Mirroring or Memory Lock Step Memory Sparing feature. See *Chapter 2 (1.9.8 Using memory RAS feature*) for conditions appropriate to your requirements.

- Standard memory feature (x4 SDDC ECC memory)
- Memory Mirroring feature (restrictions imposed on DIMM configuration)
- Memory Lock Step feature (x8 SDDC ECC memory) (restrictions imposed on DIMM configuration)
- Memory Sparing feature

Supported RAS features depend on additional memory card.

See the table below for RAS features supported by additional memory card.

List of features supported by additional memory card

Model Number and Product Name	Standard feature (x4 SDDC)	Memory Mirroring feature	Memory LockStep feature (x8 SDDC)	Memory Sparing feature
N8102-686F 4GB DDR4-2400 REG Memory Kit (1x4GB)	N/A	N/A	N/A	N/A
N8102-687F 8GB DDR4-2400 REG Memory Kit (1x8GB)	N/A	N/A	N/A	N/A
N8102-688F 16GB DDR4-2400 REG Memory Kit (1x16GB)	○	N/A	N/A	N/A
N8102-689F 32GB DDR4-2400 REG Memory Kit (1x32GB)	○	N/A	N/A	N/A
N8102-691 16GB DDR4-2400 REG Memory Kit (2x8GB)	N/A	○	○	N/A
N8102-692 32GB DDR4-2400 REG Memory Kit (2x16GB)	N/A	○	○	N/A
N8102-693 16GB DDR4-2400 REG Memory Kit (2x8GB)	N/A	N/A	N/A	○
N8102-694 32GB DDR4-2400 REG Memory Kit (2x16GB)	N/A	N/A	N/A	○

○: Supported

1.9.4 DIMM installation order

Note

- DIMM installation order in 1-CPU configuration differs from that in 2-CPU configuration.
- If CPU2 is not installed, CPU2_DIMM1 to CPU2_DIMM8 are disabled.
- See *List of features supported by additional memory card* in *1.9.3 Memory RAS feature* before using memory RAS feature.

In 1-CPU configuration, install DIMMs starting from the smallest slot number.

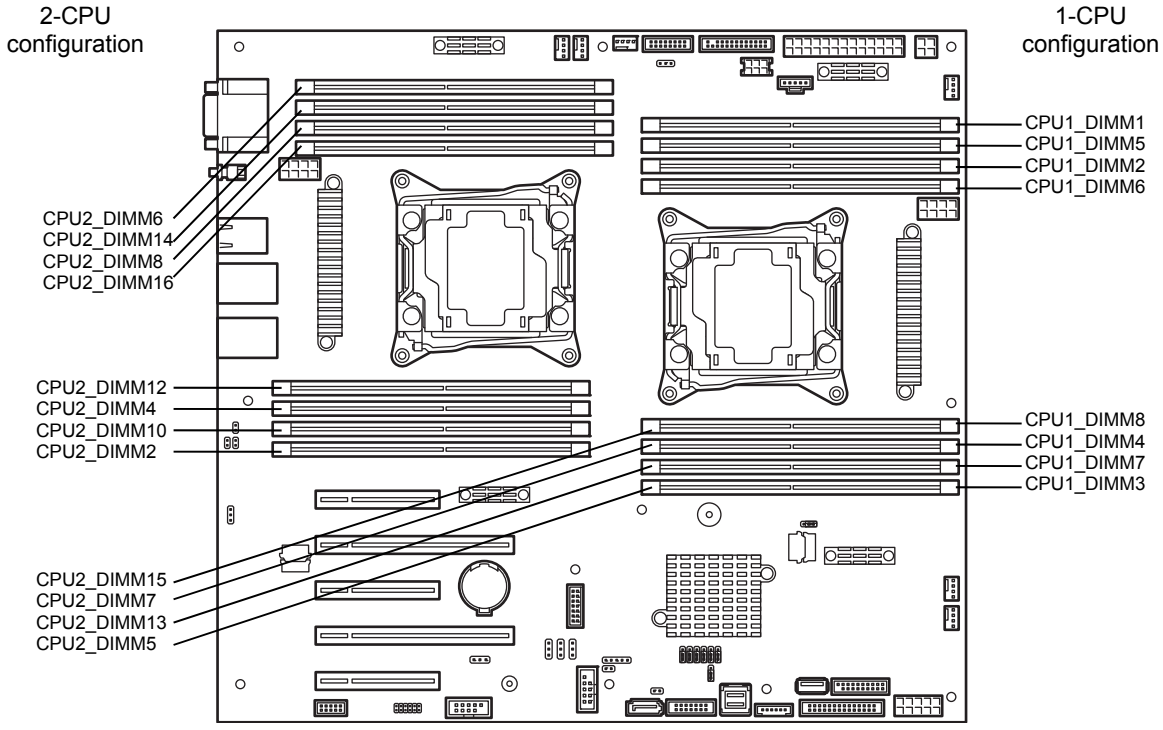
In 2-CPU configuration, alternately install DIMMs starting from the smallest slot number of each CPU.

Installation order depends on combination of DIMMs to be installed.

See the table below to find allowable combination of DIMMs, and install DIMMs starting from the largest capacity and from the smallest slot number.

Model Number	N8102-							
	686F	687F	688F	689F	691	692	693	694
N8102-686F	○	○	○	○	N/A	N/A	N/A	N/A
N8102-687F	○	○	○	○	N/A	N/A	N/A	N/A
N8102-688F	○	○	○	○	N/A	N/A	N/A	N/A
N8102-689F	○	○	○	○	N/A	N/A	N/A	N/A
N8102-691	N/A	N/A	N/A	N/A	○	○	N/A	N/A
N8102-692	N/A	N/A	N/A	N/A	○	○	N/A	N/A
N8102-693	N/A	N/A	N/A	N/A	N/A	N/A	○	○
N8102-694	N/A	N/A	N/A	N/A	N/A	N/A	○	○

○: Allowed to be install together

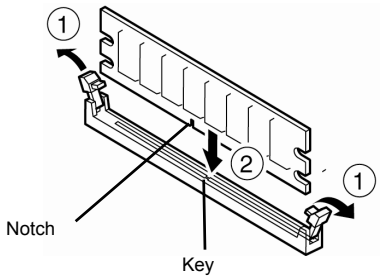


Slot	DIMM Installation Order	
	1-CPU configuration	2-CPU configuration
CPU1_DIMM1	1	1
CPU1_DIMM2	2	3
CPU1_DIMM3	3	5
CPU1_DIMM4	4	7
CPU1_DIMM5	5	9
CPU1_DIMM6	6	11
CPU1_DIMM7	7	13
CPU1_DIMM8	8	15
CPU2_DIMM1	–	2
CPU2_DIMM2	–	4
CPU2_DIMM3	–	6
CPU2_DIMM4	–	8
CPU2_DIMM5	–	10
CPU2_DIMM6	–	12
CPU2_DIMM7	–	14
CPU2_DIMM8	–	16

1.9.5 Installation

Install a DIMM by using the following procedure.

1. See steps 1 to 6 in *Chapter 2* (*1.3 Overview of Installation and Removal*) for preparations.
2. Open levers at both ends of the target DIMM slot.
3. Push the DIMM straight into the socket.
   When a DIMM is inserted into the socket, the lever automatically closes.



Important

- **Make sure the orientation of the DIMM. The DIMM has a notch, preventing being wrongly inserted.**
- **Do not apply too much pressure when you push a DIMM into the socket. Doing so can damage the socket or terminal part.**

4. Continue to install or remove internal optional devices, mount and connect the server, and turn it on.
5. Confirm that no error messages are displayed in POST screen.
   If any error messages are displayed, see *Chapter 3 (1. POST Error Message) in "Maintenance Guide*".
6. Run BIOS Setup Utility and select **Memory Configuration** and then **Memory Information** from the **Advanced** menu. Make sure the capacity of added DIMM is displayed properly.
   See *Chapter 2 (1. System BIOS) in "Maintenance Guide"*.
7. Select **Memory Configuration** from the **Advanced** menu, and then specify **Yes** for **Memory Retest**. After that, select **Save Changes and Exit** to reboot.
8. If using a Windows OS, see *Chapter 1 (7.1 Specifying Memory Dump Settings (Debug Information)) in "Installation Guide (Windows)"*.
   For other OS, follow the manual of the OS.

Tips

We recommend that the size of paging file be set to the recommended size (total memory size x 1.5) or more..

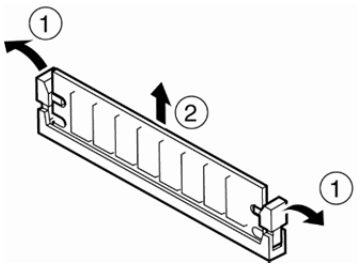
1.9.6 Removal

Remove a DIMM in the following procedure.

Note When removing a defective DIMM, check error messages displayed at POST or NEC ESMPRO and check the DIMM socket where the defective DIMM is installed.

1. See steps 1 to 6 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Open levers of the DIMM socket outward. The socket is unlocked and DIMM can be removed.

   Pull out the DIMM straight.



3. Confirm that no error messages are displayed on POST. If any error message is displayed, see *Chapter 3 (1. POST Error Message)* in "*Maintenance Guide*".
4. Run BIOS Setup Utility, select **Memory Configuration** from the **Advanced** menu, and then specify **Yes** for **Memory Retest**. After that, select **Save Changes and Exit** to reboot.
5. If using a Windows OS, see *Chapter 1 (7.1 Specifying Memory Dump Settings (Debug Information))* in "*Installation Guide (Windows)*".
   For other OS, follow the manual of the OS.

Tips We recommend that the size of paging file be set to the recommended size (total memory size x 1.5) or more..

1.9.7 Cluster On Die and Early Snoop features

To set the Cluster On Die option to Enabled on Advanced -> Memory Configuration submenu in system BIOS setup utility (SETUP), note the number of DIMMs to be installed.

For 1-CPU configuration
- Install DIMM on at least all of CPU1_DIMM1 to DIMM3 slots.

For 2-CPU configuration
- Install DIMM on at least all of CPU1_DIMM1 to DIMM3 and CPU2_DIMM1 to DIMM3 slots.

For effective use of the Cluster On Die feature, the recommended number of DIMMs to be installed is as follows.

For 1-CPU configuration
- Install DIMM on CPU1_DIMM1 to DIMM4 slots.
- Otherwise, install DIMM on CPU1_DIMM1 to DIMM8 slots.

For 2-CPU configuration
- Install DIMM on CPU1_DIMM1 to DIMM4 and CPU2_DIMM1 to DIMM4 slots.
- Otherwise, install DIMM on CPU1_DIMM1 to DIMM8 and CPU2_DIMM1 to DIMM8 slots

For 1-CPU configuration (Memory RAS Mode: Independent)

No. of installing DIMMs	Cluster On Die feature	Target DIMM slot
1	Not available	CPU1_DIMM1
2	Not available	From CPU1_DIMM1 to CPU1_DIMM2
3	Available	From CPU1_DIMM1 to CPU1_DIMM3
4	Available (recommended)	From CPU1_DIMM1 to CPU1_DIMM4
5	Available	From CPU1_DIMM1 to CPU1_DIMM5
6	Available	From CPU1_DIMM1 to CPU1_DIMM6
7	Available	From CPU1_DIMM1 to CPU1_DIMM7
8	Available (recommended)	From CPU1_DIMM1 to CPU1_DIMM8

For 1-CPU configuration (Memory RAS Mode: Independent/ Mirroring/ Lockstep)

No. of installing DIMMs	Cluster On Die feature	Target DIMM slot
2	Not available	From CPU1_DIMM1 to CPU1_DIMM2
4	Available (recommended)	From CPU1_DIMM1 to CPU1_DIMM4
6	Available	From CPU1_DIMM1 to CPU1_DIMM6
8	Available (recommended)	From CPU1_DIMM1 to CPU1_DIMM8

For 1-CPU configuration (Memory RAS Mode: Sparing)

No. of installing DIMMs	Cluster On Die feature	Target DIMM slot
2	Not available	CPU1_DIMM1 & CPU1_DIMM5
4	Not available	From CPU1_DIMM1 to CPU1_DIMM2 From CPU1_DIMM5 to CPU1_DIMM6
6	Available	From CPU1_DIMM1 to CPU1_DIMM3 From CPU1_DIMM5 to CPU1_DIMM7
8	Available (recommended)	From CPU1_DIMM1 to CPU1_DIMM8

For 2-CPU configuration (Memory RAS Mode: Independent)

No. of installing DIMMs	Cluster On Die feature	Target DIMM slot
1	Not available	CPU1_DIMM1
2	Not available	CPU1_DIMM1 & CPU2_DIMM1
3	Not available	From CPU1_DIMM1 to CPU1_DIMM2 From CPU2_DIMM1
4	Not available	From CPU1_DIMM1 to CPU1_DIMM2 From CPU2_DIMM1 to CPU2_DIMM2
5	Not available	From CPU1_DIMM1 to CPU1_DIMM3 CPU2_DIMM1 to CPU2_DIMM2
6	Available	From CPU1_DIMM1 to CPU1_DIMM3 From CPU2_DIMM1 to CPU2_DIMM3
7	Available	From CPU1_DIMM1 to CPU1_DIMM4 From CPU2_DIMM1 to CPU2_DIMM3
8	Available (recommended)	From CPU1_DIMM1 to CPU1_DIMM4 From CPU2_DIMM1 to CPU2_DIMM4
9	Available	From CPU1_DIMM1 to CPU1_DIMM5 From CPU2_DIMM1 to CPU2_DIMM4
10	Available	From CPU1_DIMM1 to CPU1_DIMM5 From CPU2_DIMM1 to CPU2_DIMM5
11	Available	From CPU1_DIMM1 to CPU1_DIMM6 From CPU2_DIMM1 to CPU2_DIMM5
12	Available	From CPU1_DIMM1 to CPU1_DIMM6 From CPU2_DIMM1 to CPU2_DIMM6
13	Available	From CPU1_DIMM1 to CPU1_DIMM7 From CPU2_DIMM1 to CPU2_DIMM6
14	Available	From CPU1_DIMM1 to CPU1_DIMM7 CPU2_DIMM1 to CPU2_DIMM7
15	Available	From CPU1_DIMM1 to CPU1_DIMM8 From CPU2_DIMM1 to CPU2_DIMM7
16	Available (recommended)	From CPU1_DIMM1 to CPU1_DIMM8 From CPU2_DIMM1 to CPU2_DIMM8

For 2-CPU configuration (Memory RAS Mode: Mirroring/ Lockstep)

No. of installing DIMMs	Cluster On Die feature	Target DIMM slot
4	Not available	From CPU1_DIMM1 to CPU1_DIMM2 From CPU2_DIMM1 to CPU2_DIMM2
6	Not available	From CPU1_DIMM1 to CPU1_DIMM4 From CPU2_DIMM1 to CPU2_DIMM2
8	Available (recommended)	From CPU1_DIMM1 to CPU1_DIMM4 From CPU2_DIMM1 to CPU2_DIMM4
10	Available	From CPU1_DIMM1 to CPU1_DIMM6 From CPU2_DIMM1 to CPU2_DIMM4
12	Available	From CPU1_DIMM1 to CPU1_DIMM6 From CPU2_DIMM1 to CPU2_DIMM6
14	Available	From CPU1_DIMM1 to CPU1_DIMM8 From CPU2_DIMM1 to CPU2_DIMM6
16	Available (recommended)	From CPU1_DIMM1 to CPU1_DIMM8 From CPU2_DIMM1 to CPU2_DIMM8

For 2-CPU configuration (Memory RAS Mode: Sparing)

No. of installing DIMMs	Cluster On Die feature	Target DIMM slot
4	Not available	From CPU1_DIMM1 & CPU1_DIMM5 From CPU2_DIMM1 & CPU2_DIMM5
6	Not available	From CPU1_DIMM1 to CPU1_DIMM2 From CPU1_DIMM5 to CPU1_DIMM6 From CPU2_DIMM1 & CPU2_DIMM5
8	Not available	From CPU1_DIMM1 to CPU1_DIMM2 From CPU1_DIMM5 to CPU1_DIMM6 From CPU2_DIMM1 to CPU2_DIMM2 From CPU2_DIMM5 to CPU2_DIMM6
10	Not available	From CPU1_DIMM1 to CPU1_DIMM3 From CPU1_DIMM5 to CPU1_DIMM7 From CPU2_DIMM1 to CPU2_DIMM2 From CPU2_DIMM5 to CPU2_DIMM6
12	Available	From CPU1_DIMM1 to CPU1_DIMM3 From CPU1_DIMM5 to CPU1_DIMM7 From CPU2_DIMM1 to CPU2_DIMM3 From CPU2_DIMM5 to CPU2_DIMM7
14	Available	From CPU1_DIMM1 to CPU1_DIMM8 From CPU2_DIMM1 to CPU2_DIMM3 From CPU2_DIMM5 to CPU2_DIMM7
16	Available (recommended)	From CPU1_DIMM1 to CPU1_DIMM8 From CPU2_DIMM1 to CPU2_DIMM8

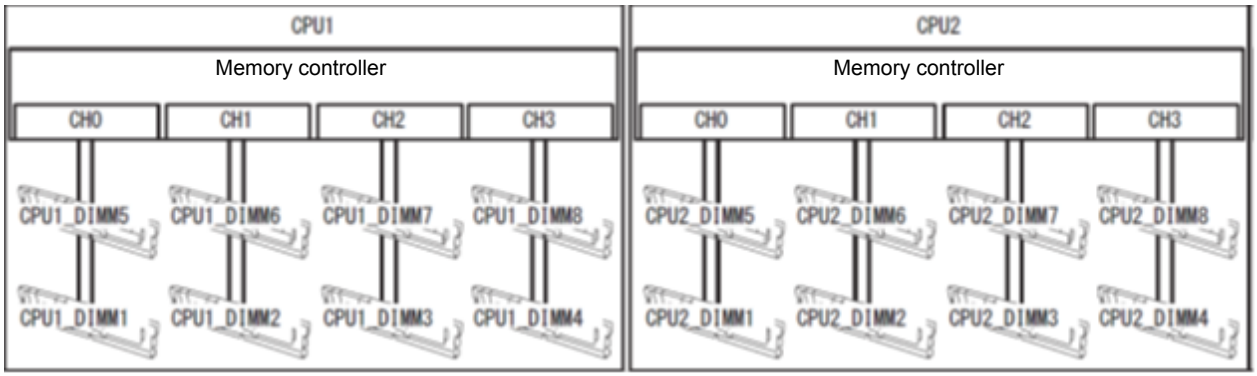
1.9.8 Using memory RAS feature

This server has RAS feature including Standard Memory feature (x4 SDDC ECC memory), Memory Mirroring feature, Lock Step feature (x8 SDDC ECC memory), and Memory Sparing feature. Single Device Data Correction (SDDC) allows automatic correction of memory error (multi-bit error).

Note

- See *List of features supported by additional memory card in 1.9.3 Memory RAS feature* before using memory RAS feature.
- Only the features that additional memory card supports can be used.
- N8102-686F/687F/691/692/693/694 are not supported to x4 SDDC.

The memory area on the motherboard of the server is divided into four memory channels.



Memory Mirroring and Memory Lock Step (x8 SDDC) features keep memory redundancy between memory channels by monitoring or altering memory active/inactive status, respectively.

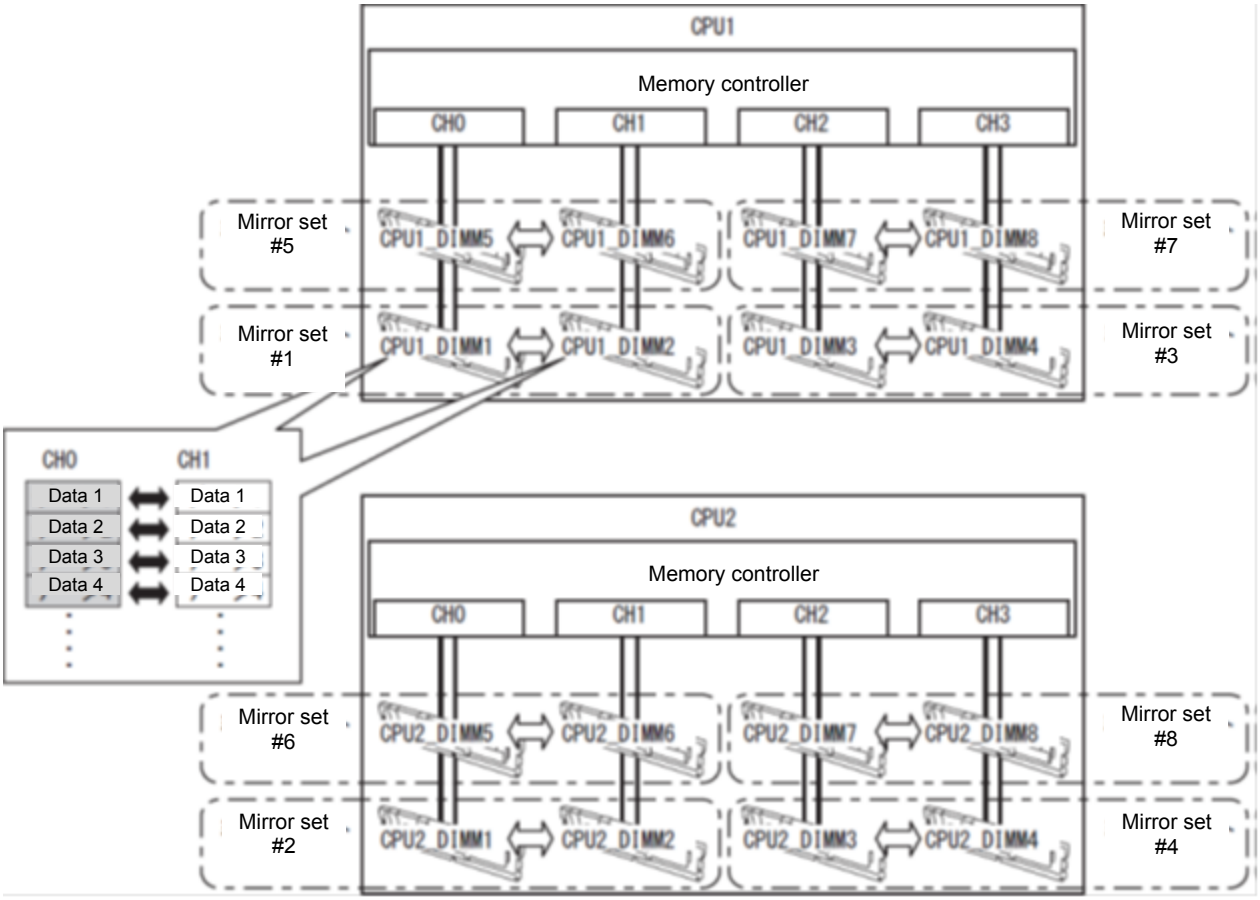
(1) Memory Mirroring Feature

Memory Mirroring feature writes the same data into two groups of DIMMs corresponding with each other between memory channels (channels 0 and 1, 2 and 3) to provide data redundancy.

Note

- Memory Mirroring feature uses channels 0 and 1 or channels 2 and 3.
- To use Memory Mirroring feature, install N8102-691/692 additional memory card (two DIMMs of same model).
- DIMMs used in mirror set must be of the same model number.

Example: 2-CPU configuration

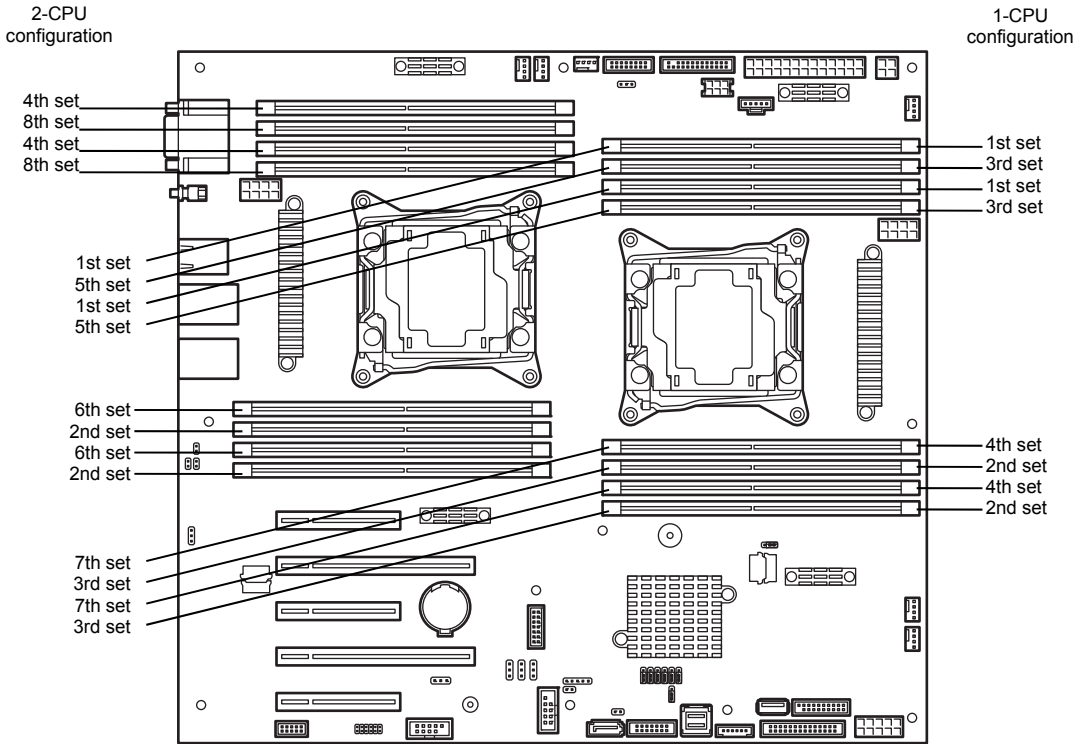


Tips

The operating system can use a half of the total physical memory capacity.

Memory Mirroring feature can be used under the following conditions:

- Install DIMMs in two DIMM sockets configuring a mirror set.
- All the installed DIMMs should have the same capacity.
- See *Chapter 2 (1. System BIOS)* in "*Maintenance Guide"*, run SETUP, change parameters as shown below, save the settings, and exit from SETP.
  Advanced → **Memory Configuration** → **Memory RAS Mode**: Change to **Mirroring**.
- After restart, run SETUP again, and check if "**Mirrored**" is displayed for the following parameter.
  Advanced → **Memory Configuration** → **Memory Information** → **CPUx_DIMMx Status**
- Memory Mirroring feature cannot be used together with the Memory Lock Step feature.
- Installation order depends on CPU configuration. See the figure below.



Slot	DIMM installation order	
	1-CPU configuration	2-CPU configuration
CPU1_DIMM1	1	1
CPU1_DIMM2	1	1
CPU1_DIMM3	2	3
CPU1_DIMM4	2	3
CPU1_DIMM5	3	5
CPU1_DIMM6	3	5
CPU1_DIMM7	4	7
CPU1_DIMM8	4	7
CPU2_DIMM1	–	2
CPU2_DIMM2	–	2
CPU2_DIMM3	–	4
CPU2_DIMM4	–	4
CPU2_DIMM5	–	6
CPU2_DIMM6	–	6
CPU2_DIMM7	–	8
CPU2_DIMM8	–	8

Memory Mirroring cannot be configured in the following case:

- Memory Mirroring within a specific memory channel

Notes on Configuring Memory Mirroring

If you additionally install or remove DIMMs that unable to configure Memory Mirroring configuration, Memory RAS Mode is changed to "Independent".

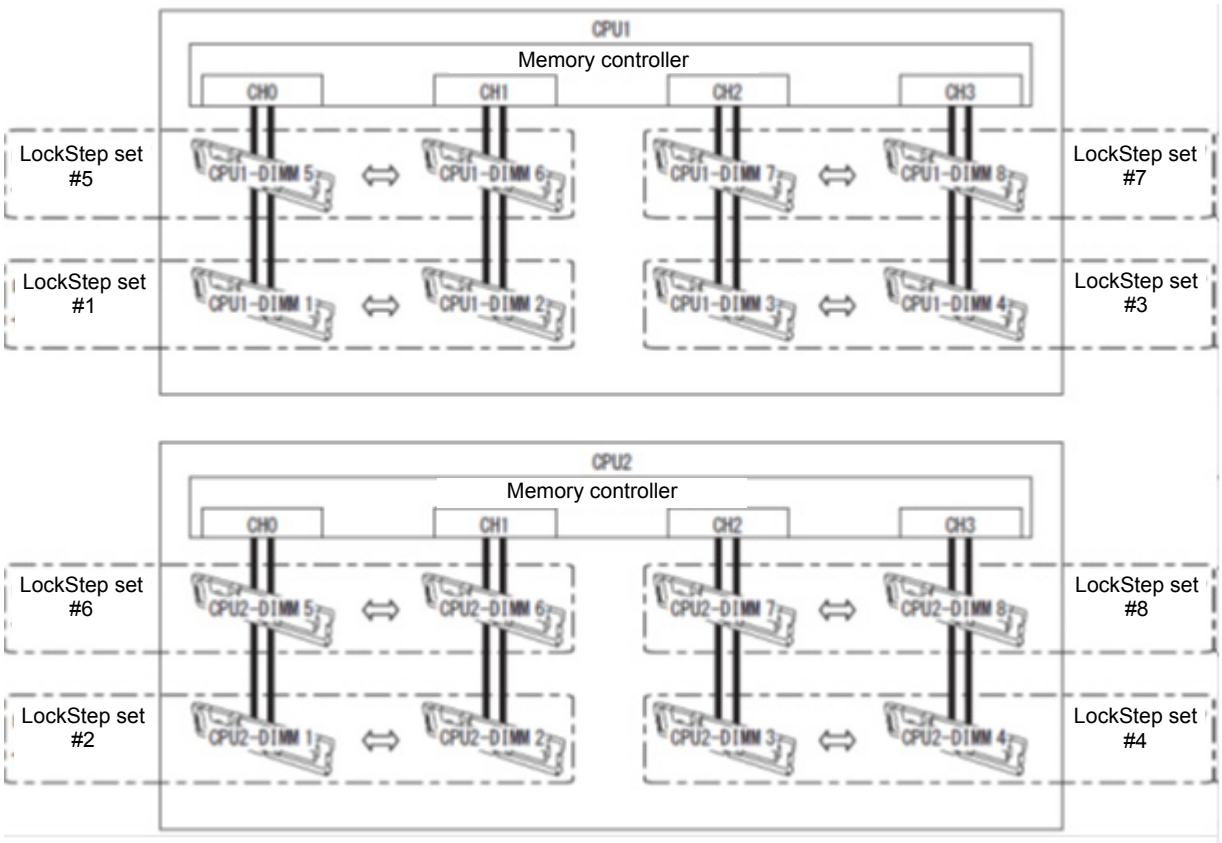
"Mirrored" is removed from **Advanced** → **Memory Configuration** → **Memory Information** → **CPUx_DIMMx Status xxxx MB (Mirrored)** in BIOS SETUP.

(2) Memory Lock Step Feature (x8 SDDC)

In Memory Lock Step feature, the DIMMs in two groups corresponding to two memory channels (channels 0 and 1, 2 and 3) is multiplexed and operated in parallel to enable x8 SDDC. With this feature, a single device can detect and correct one to eight-bit error.

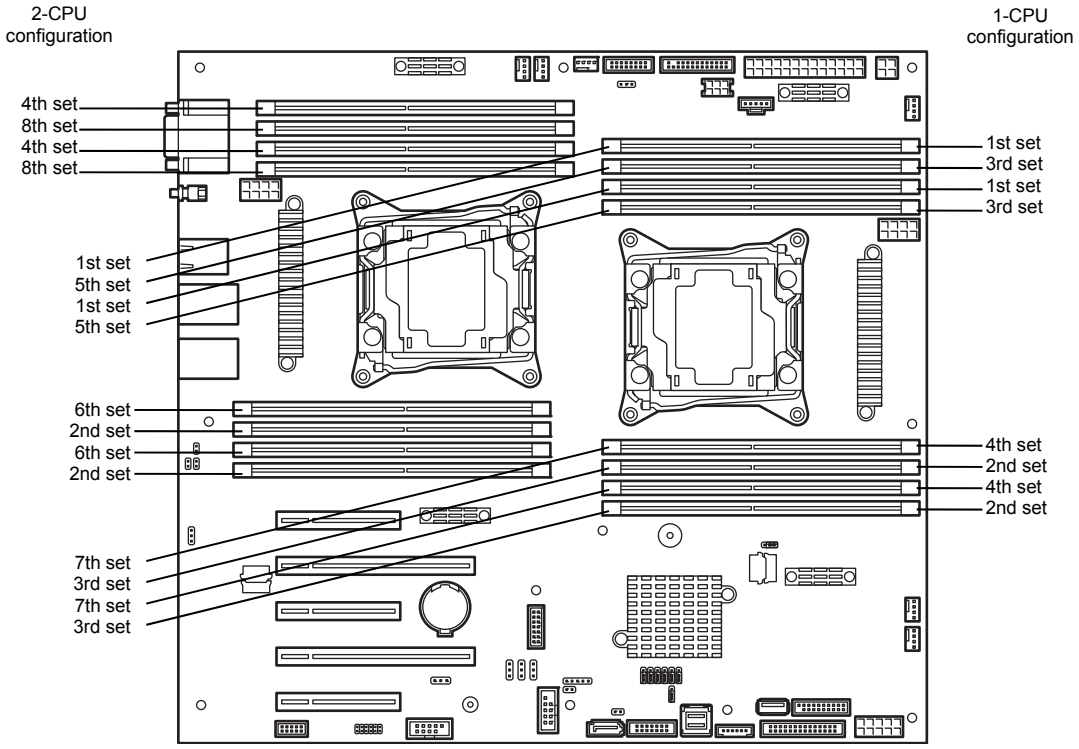
Note

- Memory LockStep feature (x8 SDDC) uses channels 0 and 1 or channels 2 and 3. To use Memory LockStep feature (x8 SDDC), install N8102-691/692 additional memory card (two DIMMs of same model).
- The N8102-691/692 additional memory card must not be installed with another memory card.



Memory Lock Step feature can be used under the following conditions:

- Install two DIMMs that operate in parallel in memory socket.
- All the installed DIMMs should have the same model number.
- See *Chapter 2 (1. System BIOS)* in *"Maintenance Guide"* to change parameters as shown below.
  Advanced → **Memory Configuration** → **Memory RAS Mode** : Change to **Lock Step**.
- After restarting, run SETUP again, and check if **Lock Step** is displayed for the following parameter.
  Advanced → **Memory Configuration** → **Memory Information** → **CPUx_DIMMx Status**
- The Memory Lock Step feature cannot be used together with the Memory Mirroring feature.
- Installation order depends on CPU configuration. See the figure below.



Slot	DIMM installation order	
	1-CPU configuration	2-CPU configuration
CPU1_DIMM1	1	1
CPU1_DIMM2	1	1
CPU1_DIMM3	2	3
CPU1_DIMM4	2	3
CPU1_DIMM5	3	5
CPU1_DIMM6	3	5
CPU1_DIMM7	4	7
CPU1_DIMM8	4	7
CPU2_DIMM1	–	2
CPU2_DIMM2	–	2
CPU2_DIMM3	–	4
CPU2_DIMM4	–	4
CPU2_DIMM5	–	6
CPU2_DIMM6	–	6
CPU2_DIMM7	–	8
CPU2_DIMM8	–	8

Memory Lock Step cannot be configured in the following cases:

- Memory Lock Step between memory channels of different memory controllers (CPU)
- Memory Lock Step within the same memory channel

Notes on Configuring Lock Step

If you additionally install or remove DIMMs that unable to configure Memory LockStep configuration, Memory RAS Mode is changed to "Independent".

"LockStep" is removed from **Advanced** → **Memory Configuration** → **Memory Information** → **CPUx_DIMMx Status xxxx MB (LockStep)** in BIOS SETUP.

(3) Memory Sparing Feature

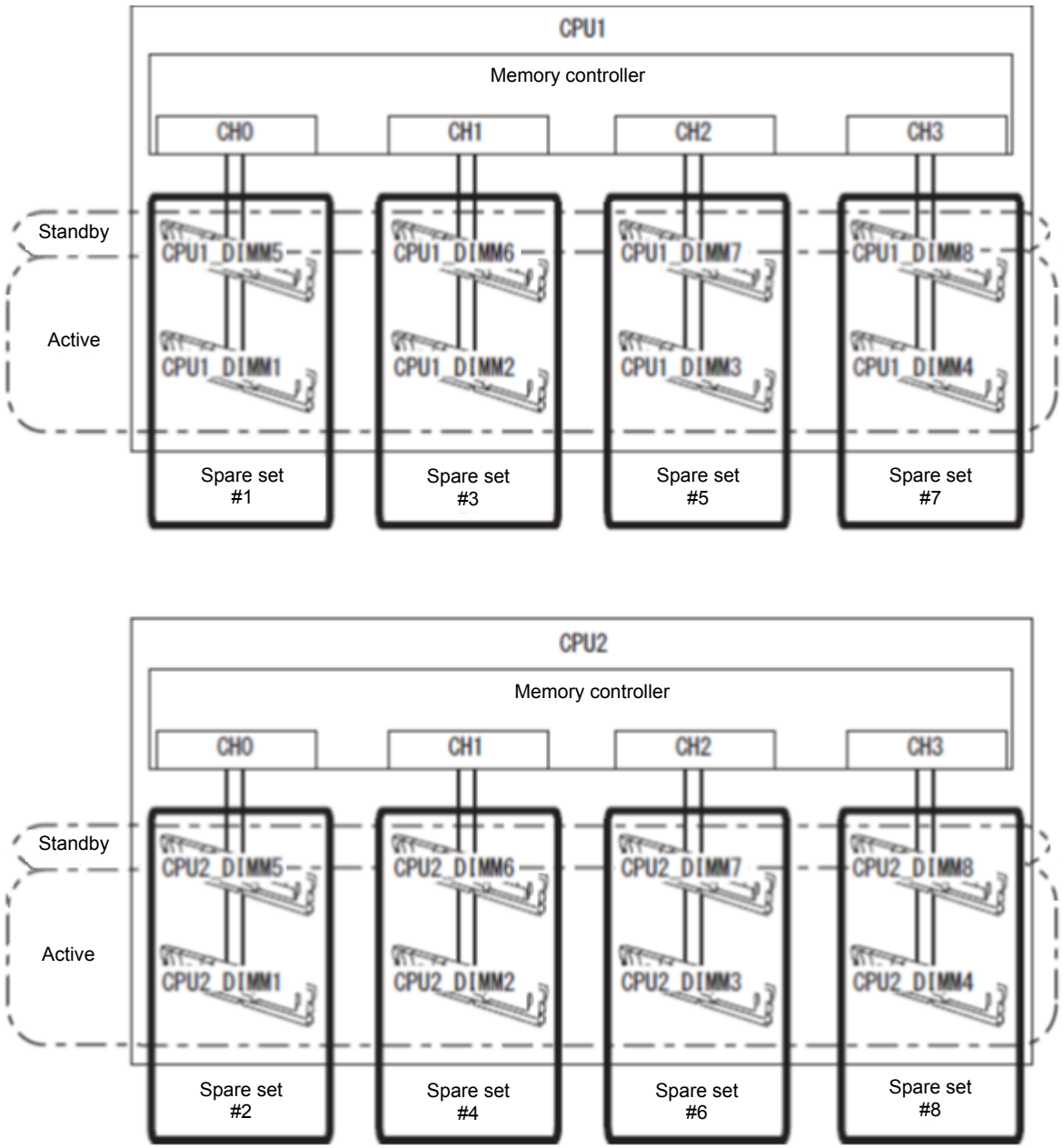
Memory Sparing feature puts a memory channel 2 of a memory controller in each CPU into standby status as spare devices. If a correctable error occurs in a DIMM in the active memory controller, the feature automatically changes the active DIMM from the failed one to a DIMM in the standby state to continue the processing.

Note To use Memory Sparing feature, install N8102-693/694 additional memory card (two DIMMs of same model).

Tips The operating system can use the DIMMs as those with capacities less than the actual physical capacities. The capacities vary depending on the number of DIMMs and the physical capacity per DIMM.

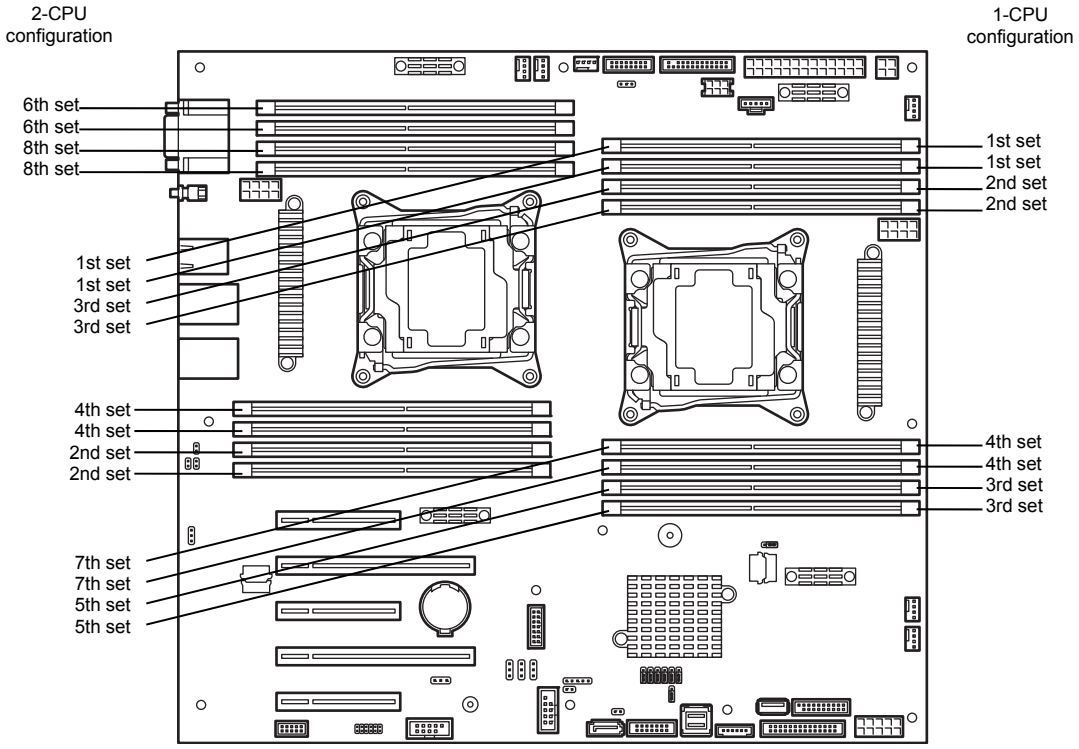
The following table shows configuration allowable for memory sparing and system logical memory capacity.

Number of CPUs	Number of DIMMs	Capacity of DIMM installed	
		N8102-693 (16 GB x2)	N8102-694 (32GB x2)
1	2	24 GB	48GB
	4	48 GB	96GB
	6	72 GB	144GB
	8	96 GB	192GB
2	4	48 GB	96GB
	6	72 GB	144GB
	8	96 GB	192GB
	10	120 GB	240GB
	12	144 GB	288GB
	14	168 GB	336GB
	16	192 GB	384GB



Memory Sparing feature can be used under the following conditions:

- Install DIMMs in two DIMM sockets configuring a spare set.
- DIMMs to be installed should have the same capacity.
- See *Chapter 2 (1. System BIOS)* in "*Maintenance Guide"* , run SETUP, change parameters as shown below, save the settings, and exit from SETUP.
  Advanced→ **Memory Configuration**]→ **Memory RAS Mode**. Change to **Sparing**
- After restart, run SETUP again, and check if "Spared" is displayed for the following parameter.
  Advanced → **Memory Configuration** → **Memory Information** → **CPUx_DIMMx Status**
- Installation order depends on CPU configuration. See the figure below.



Slot	DIMM installation order	
	1-CPU configuration	2-CPU configuration
CPU1_DIMM1	1	1
CPU1_DIMM2	2	3
CPU1_DIMM3	3	5
CPU1_DIMM4	4	7
CPU1_DIMM5	1	1
CPU1_DIMM6	2	3
CPU1_DIMM7	3	5
CPU1_DIMM8	4	7
CPU2_DIMM1	–	2
CPU2_DIMM2	–	4
CPU2_DIMM3	–	6
CPU2_DIMM4	–	8
CPU2_DIMM5	–	2
CPU2_DIMM6	–	4
CPU2_DIMM7	–	6
CPU2_DIMM8	–	8

The following Memory Sparing cannot be configured.

- A DIMM of different model number is installed.
- Memory Sparing with different memory channels

Notes on Configuring Memory Sparing

If you additionally install or remove DIMMs that unable to configure Memory Sparing configuration, Memory RAS Mode is changed to "Independent".

"Spared" is removed from **Advanced** → **Memory Configuration** → **Memory Information** → **CPUx_DIMMx Status xxxx MB (Spared)** in BIOS SETUP.

1.10 Flash Backup Unit for RAID Controller

If a RAID controller (N8103-176/177/178/179) is installed with a Flash Backup Unit (FBU), you can avoid data loss caused by accidents including temporary blackout during Write Back operation. The model of the FBU to be used depends on RAID controller.

- For N8103-176/177/178, use N8103-181
- For N8103-179, use N8103-179 accessories Flash Backup Unit (FBU)

1.10.1 Handling precautions

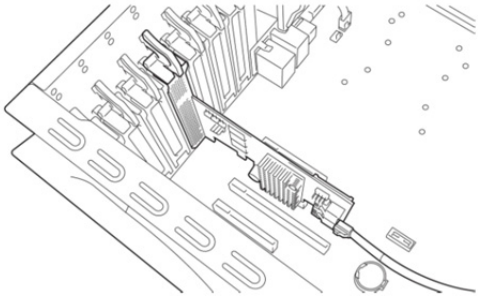
Observe the followings when using FBU. Ignoring these precautions may cause damage to your data or other devices.

- Use the FBU dedicated to the RAID controller you are using.
- The FBU is a very delicate electronic device. Before installation, touch the metal frame part of the server to discharge the static electricity from your body.
- Do not drop or bump the FBU.
- For recycling and disposing of the FBU, refer to the User's Guide that comes with it.
- The order in which FBU is installed on this server is as follows.
  (Top side of main unit) #1 → #2 → #3 → #4 (bottom side of main unit)

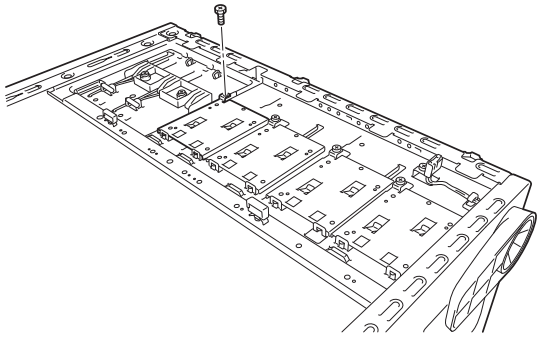
1.10.2 Installing FBU

This section describes the procedure of installing an FBU for RAID controller (N8103-176/177/178/179).

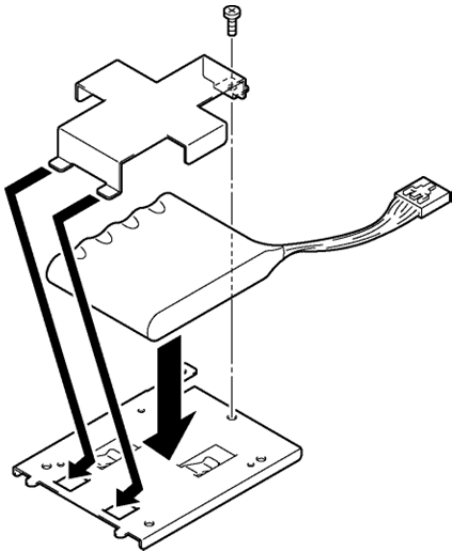
1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. If no RAID Controller is installed, install a RAID Controller in PCI slot, and connect SAS/SATA cable according to *Chapter 2 (1.16 Use of Internal hard disk drives in the RAID System)*.



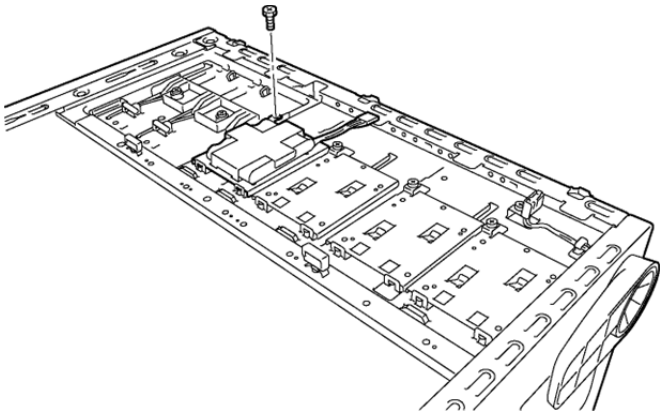
3. Remove one screw and remove battery tray for RAID controller.



4. Put an FBU on the battery tray and cover the FBU with the FBU bracket in accordance with the figure and fix them with one screw provided with the RAID controller.

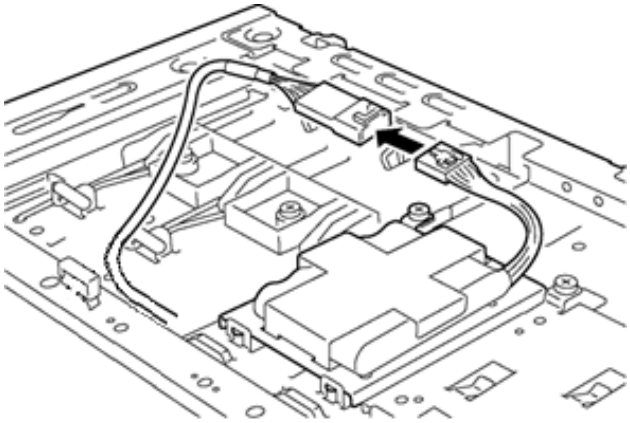


5. Fix the battery tray with one screw removed in Step 3.

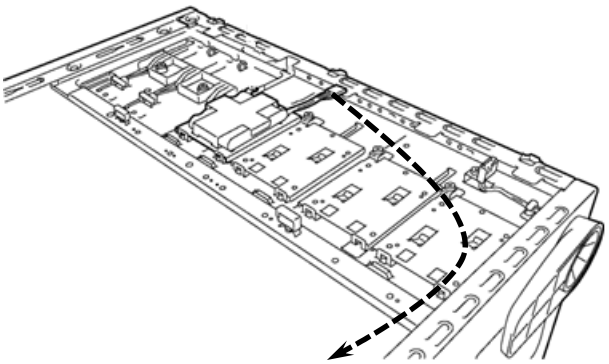


6. Connect the FBU control cable (650mm) to the FBU.

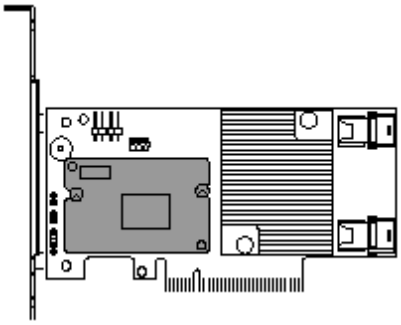
   Pass the FBU control cable through the cord clamp in accordance with the figure.



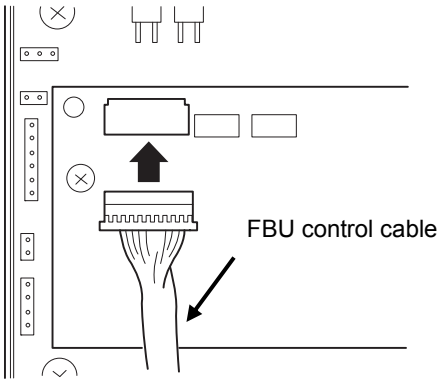
7. Route the FBU control cable as shown in the figure below.



8. Mount the adapter to the RAID controller.



9. Connect the FBU control cable to the RAID controller.



Important **When connecting an FBU control cable to a RAID controller, align a black mark on each connector of the FBU control cable and the RAID controller.**

1.10.3 Removal

For removing the FBU for the RAID controller, reverse the installation procedure.

1.11 PCI Card

The server is equipped with five slots for PCI card.

Important **You must avoid static electricity to work with the procedure below. For details, see *Chapter 2 (1.2 Anti-static Measures)*.**

1.11.1 Notes

Read the following notes when installing or removing a PCI card.

- Do not touch the terminals of the PCI cards and the leads of electronic components with your bare hand. Fingerprints and dust left on them cause the server to malfunction due to a connection failure or damage to the leads.
- PCI slot numbers are assigned as follows:
  #1, #2, #3, #4, and #5 from top. PCI slot #1 is disabled in 1-CPU configuration.
- The search order for PCI bus slot on boot is as follows.
  Slot3 → Slot2 → Slot4 → Slot5 → Slot1
- Bus number, device number and function number of PCI devices are as follows:

PCI device	Bus number	Device number	Function number
Slot 1	82h	0	X
Slot 2	20h	0	X
Slot 3	01h	0	X
Slot 4	40h	0	X
Slot 5	68h	0	X

- If an additional LAN card is installed, it is hard to push the catch of the connector with your finger that is connected to the LAN card. Disconnect the connector pushing the catch with a standard screwdriver. At this time, be very careful for the screwdriver not to damage the LAN card.
- If a bootable device such as a PCI card or USB device is added, the boot order is changed.
  In BIOS Setup Utility, select **Hard Drive BBS Priorities** from the **Boot** menu, and then specify a higher priority for the boot device.
  If an HDD under an optional RAID controller is connected, the boot device is `(Bus xx Dev 00) PCI RAID Adapter`. Note that the value for *xx* changes depending on the PCI slot where the RAID controller is installed.
- When an HDD under a RAID controller, LAN adapter (network booting), or Fibre Channel controller is not a bootable disk, disable the option ROM scan of BIOS settings. See *Chapter 3 (2. System BIOS Setup)* for how to specify it.

1.11.2 Supported PCI cards and available slots

The following tables list supported cards and slots available for them. For details of the features of each card, refer to the manual supplied with it.

Tips Different cards mounted on the same bus operate at the lower frequency.

Priority	Product number	Product name / Slot number	PCI #1 (2 CPUs required)	PCI #2	PCI #3	PCI #4	PCI #5	Remarks	
		PCI standard	PCIe 3.0				PCIe 2.0		
		PCI slot performance	x8 lane	x16 lane	x8 lane	x16 lane	x4 lane		
		Socket type	x8 socket	x16 socket	x8 socket	x16 socket	x8 socket		
		Transfer bandwidth (per lane)	8Gb/s				5Gb/s		
		Slot size	Full Height						
		Available card size	168mm max.	290mm max.			168mm max.		
High ↑	N8103-176	RAID Controller (1GB, RAID 0/1) (PCI Express 3.0(x8))	(4)	(2)	(1)	(3)	—	Dedicated to connecting with internal hard disk drives. Choose one card (N8103-176, N8103-177, or N8103-178).	Flash Backup Unit (N8103-181) can be mounted.
	N8103-177	RAID Controller (1GB, RAID 0/1/5/6) (PCI Express 3.0(x8))	(4)	(2)	(1)	(3)	—		
	N8103-178	RAID Controller (2GB, RAID 0/1/5/6) (PCI Express 3.0(x8))	(4)	(2)	(1)	(3)	—		
	N8103-186	SAS Expander Card	—	—	—	—	(1)	Required when connecting 9 or more HDDs.	
	N8103-179	RAID Controller (2GB, RAID 0/1/5/6) (PCI Express 3.0(x8))	(4)	(2)	(1)	(3)	—	For connecting with external devices; Up to 2 cards can be mounted.	Flash Backup Unit is factory installed.
	N8190-158A	Fibre Channel Controller (2ch) (16Gbps/Optical) (PCI Express 3.0(x8))	(4)	(2)	(1)	(3)	—	For connecting with external Fibre Channel devices	When the server installing Xeon E5-2603v4 is used in 1-CPU configuration, up to two port can be used. When the server installing Xeon E5-2603v4 is used in 2-CPU configuration, up to six port can be used.
	N8190-157A	Fibre Channel Controller (1ch) (16Gbps/Optical) (PCI Express 3.0(x8))	(4)	(2)	(1)	(3)	—	For connecting with external Fibre Channel devices	
	N8104-157	10GBASE-T Adapter(2ch) (PCI Express 3.0(x4))	(4)	(2)	(1)	(3)	—	For additional LAN port.	Up to three N8104-149, N8104-153 and N8104-157 cards can be mounted in total in 1-CPU configuration.*1 Up to five N8104-149, N8104-153 and N8104-157 cards can be mounted in total in 2-CPU configuration.*1
	N8103-184	SAS Controller (PCI Express 3.0(x8))	(4)	(2)	(1)	(3)	—	For connecting with external devices	Up to three cards including N8103-184 and N8103-142 can be mounted
	N8190-160	Fibre Channel Controller (2ch) (8Gbps/Optical) (PCI Express 2.0(x8))	(4)	(2)	(1)	(3)	—	For connecting with external Fibre Channel devices	
	N8190-159	Fibre Channel Controller (8Gbps/Optical) (PCI Express 2.0(x8))	(4)	(2)	(1)	(3)	—	For connecting with external Fibre Channel devices	
	N8104-153	10GBASE-T Adapter (2ch) (PCI Express 2.0(x8))	(4)	(2)	(1)	(3)	(5)	For additional LAN port.	Up to three N8104-149, N8104-153 and N8104-157 cards can be mounted in total in 1-CPU configuration.*1 Up to five N8104-149, N8104-153 and N8104-157 cards can be mounted in total in 2-CPU configuration.*1
Low	N8104-149	10GBASE Adapter (SFP+/2ch) (PCI Express 2.0(x8))	(4)	(2)	(1)	(3)	(5)	For additional LAN port. Prepare SFP+module N8104-129 if needed.	

Priority	Product number	Product name	Slot number	PCI #1 (2 CPUs required)	PCI #2	PCI #3	PCI #4	PCI #5	Remarks	
			PCI standard	PCIe 3.0				PCIe 2.0		
			PCI slot performance	x8 lane	x16 lane	x8 lane	x16 lane	x4 lane		
			Socket type	x8 socket	x16 socket	x8 socket	x16 socket	x8 socket		
			Transfer bandwidth (per lane)	8Gb/s				5Gb/s		
			Slot size	Full Height						
			Available card size	168mm max.	290mm max.			168mm max.		
High ↑ Low	N8103-142	SAS Controller (PCI Express 2.0(x8))		(4)	(2)	(1)	(3)	(5)	Dedicated to connecting with internal/external devices. Cannot connect with internal HDD/SSD.	N8103-184 and N8103-142 can be mounted up to three cards in total
	N8104-152	1000BASE-T Adapter (4ch) (PCI Express 2.0(x4))		(4)	(2)	(1)	(3)	(5)	For additional LAN port. LAN cable with boots cannot be used.	
	N8104-145	1000BASE-T Adapter (2ch) (PCI Express 2.0(x4))		(4)	(2)	(1)	(3)	(5)	For additional LAN port.	
	N8104-151	1000BASE-T Adapter (2ch) (PCI Express 2.0(x1))		(4)	(2)	(1)	(3)	(5)	For additional LAN port. Card type: PCI Express 2.0 (x4)	
	N8104-150	1000BASE-T Adapter (1ch) (PCI Express 2.0(x1))		(4)	(2)	(1)	(3)	(5)	For additional LAN port. Card type: PCI Express 2.0 (x4)	
	N8117-01A	Additional RS-232C connector		—	—	(1)	(2)	(3)	For additional serial port B (RS-232C). Only one card can be mounted.	

Note
PCI cards are listed in order of priority for mounting in slots. Numbers in parentheses indicate the priority of each slot for each card.
If "–" is displayed, the card cannot be mounted.

Example: Suppose you want to mount a N8103-176 RAID Controller (1GB, RAID 0/1), N8190-158A Fibre Channel Controller (2ch) (16Gbps/Optical), and N8103-142 SAS Controller. Select the controller to be mounted first based on the card priority, and then select the slot to mount the card based on the slot priority. In this case, the controllers should be mounted in the following order:
RAID Controller to #3 (the highest priority), Fiber Channel Controller-#2 (#3 is already used), SAS Controller - #4 (#3 and #2 are already used)

*1 Performance of LAN depends on the application and memory capacity. If you want to mount three or more 10G LAN cards, a sufficient verification under your system environment is needed.

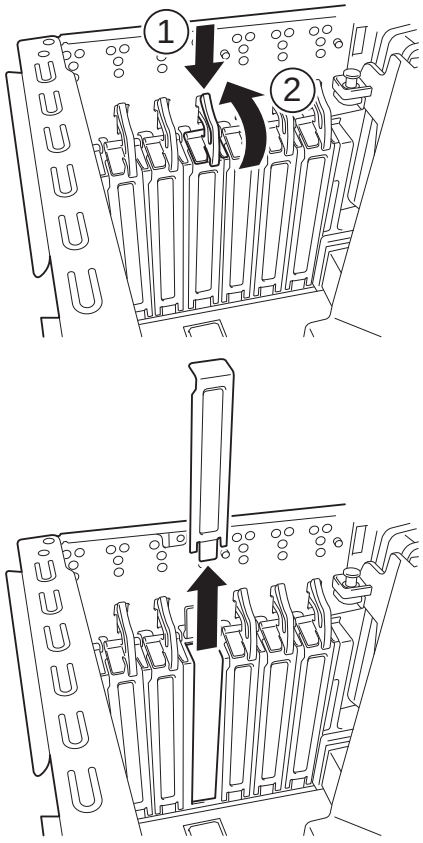
1.11.3 Installing PCI card

Install a PCI card to a PCI slot in the following procedure.

Important **When installing a PCI card, make sure the connector of the card fits the connector of the slot.**

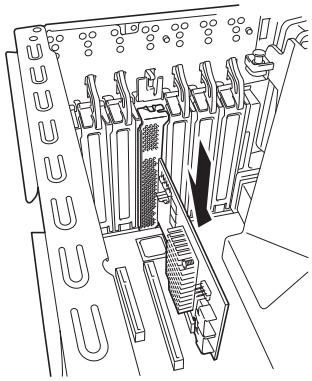
Note To install the FBU for RAID controller, see *Chapter 2 (1.10 Battery / Flash Backup Unit for RAID Controller)*.

1. See steps 1 to 5 in *Chapter 2* (*1.3 Overview of Installation and Removal*) for preparations.
2. Confirm the installation position with the reference to the table in *Chapter 2* (*1.11.2 Supported PCI cards and available slots*).
3. Push PCI Retention Latch to unlock the PCI card from PCI slot. Bring down the lever toward rear of the server, and remove the blank cover.



Note Keep the removed blank cover for future use.

4. Position the terminal part of the PCI card to the PCI slot and insert it.

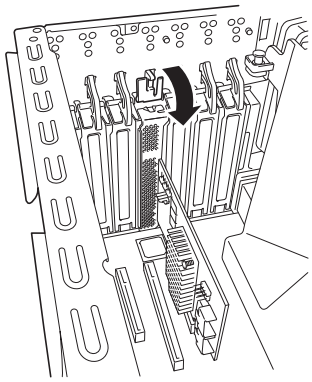


Important **Do not touch the connector of PCI slot or the terminal part of PCI cards and the signal pins of electric parts installed on the card. Installing cards with dirt or oil can cause malfunction.**

Note

- Make sure that the tip of bracket of PCI card is surely inserted into the PCI slot.
- Depending on type of PCI cards, the terminal part of the PCI card may be too large to fit in the connector.
- If you have trouble installing the card, remove the card once and try again. If you apply excessive pressure on the card, the PCI card or PCI connector might break.

5. Bring back the lever to its original position, and fix the PCI card.



Tips If the locking mechanism of PCI slot is tight, fix the PCI card slowly until it is surely locked.

6. Continue to install or remove internal optional devices, mount and connect the server, and turn it on.
7. Make sure that no error messages are displayed on POST screen.
   For details on POST error messages, see *Chapter 3 (1. POST Error Message)* in "*Maintenance Guide*".
8. Start the configuration utility installed on the mounted card to set up the card.
   For details, refer to the manual that comes with the card. **If a PCI card including RAID controller, SCSI controller, and LAN adapter which connects to any bootable device is added, the boot priority might be changed to the default setting.** In that case, configure the boot priority in **Boot** menu of BIOS Setup Utility. For details, see *Chapter 2 (1. System BIOS)* in "*Maintenance Guide*".

Using the optional controller (N8103-176/177/178/179)

For details, refer to the manual that comes with optional RAID controller (N8103-176/177/178/179).

Important

- **You must avoid static electricity to work with the procedure below. For details, see *Chapter 2 (1.2 Anti-static Measures)*.**
- **Do not change the mode to hibernate during building a RAID system.**

Note

- **Enable PCI Slot xx ROM** (xx is PCI slot number) of PCI Configuration in **Advanced** menu of BIOS Setup Utility.
- Set the boot priority to 8th or higher in the Boot menu of the BIOS Setup utility. If the setting is 9th or lower, the configuration menu for RAID controllers cannot be launched.

1.11.4 Installing SAS Expander Card (N8103-186)

N8103-186 SAS Expander Card can be installed in PCI slot #5.

Install the SAS Expander Card to a PCI slot in the following procedure.

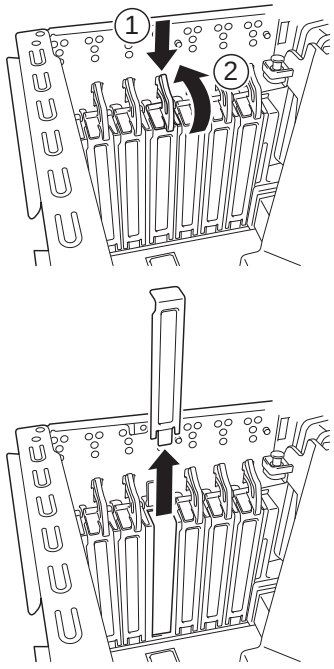
Important

When installing a SAS Expander Card, make sure the connector of the card fits the connector of the slot.

1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Confirm the installation position with the reference to the table on *Chapter 2 (1.11.2 Supported PCI cards and available* slots*)*.

   Push PCI Retention Latch to unlock the PCI card from PCI slot. Bring down the lever toward rear of the server, and remove the blank cover.

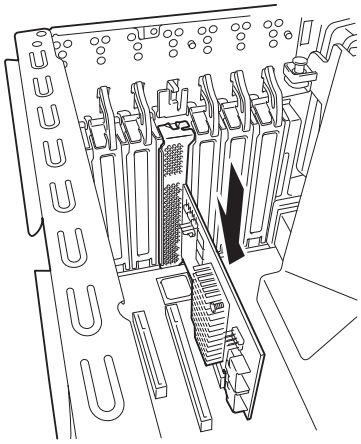
   The figure below indicates PCI card mounting method to a PCI#2 slot. Mount the SAS Expander Card into a PCI#5 slot by a way like a figure.



Note

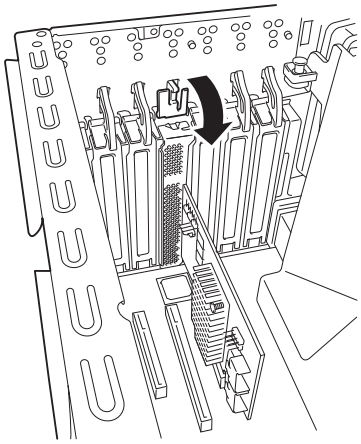
Keep the removed blank cover for future use.

3. Position the terminal part of the SAS Expander Card to the PCI slot and insert it.

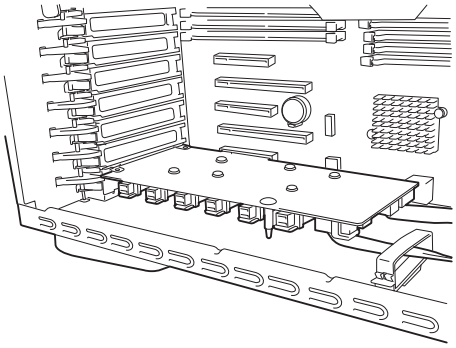


Important **Do not touch the connector of PCI slot or the terminal part of SAS Expander Card and the signal pins of electric parts installed on the card. Installing cards with dirt or oil can cause malfunction.**

4. Bring back the lever to its original position, and fix the SAS Expander Card.



The installation state of the SAS Expander Card and the RAID controller



Note

- Make sure that the tip of bracket of SAS Expander card is surely inserted into the PCI slot.
- If you have trouble installing the SAS Expander Card, remove the SAS Expander Card once and try again. If you apply excessive pressure on the SAS Expander Card, SAS Expander Card or PCI connector might break.

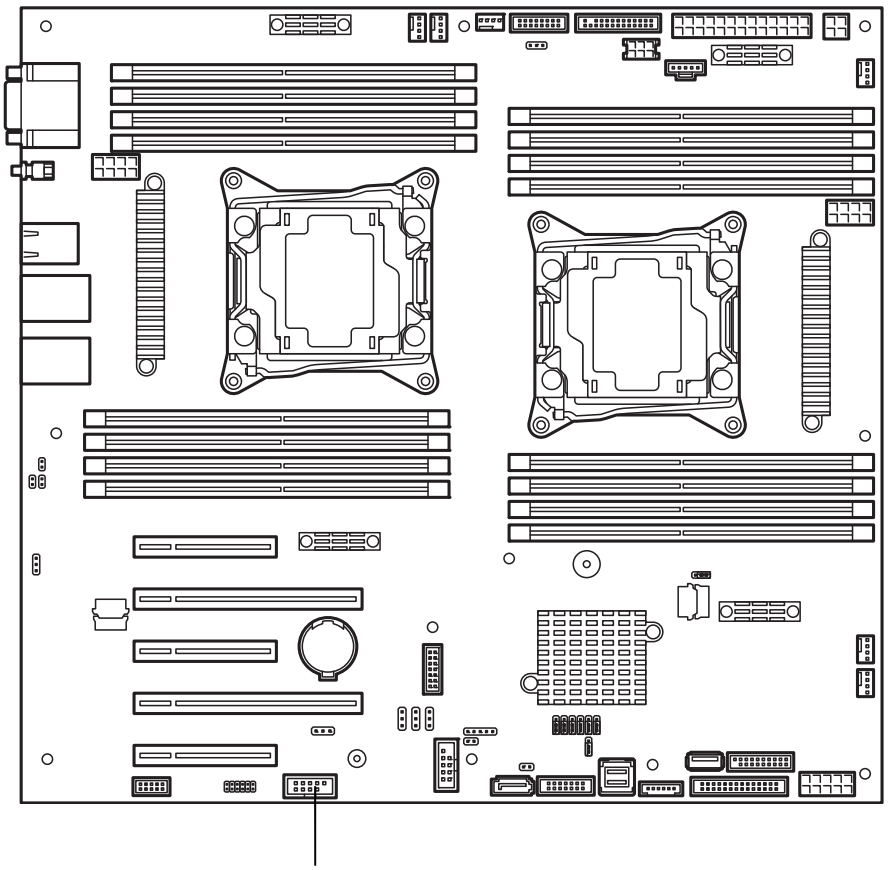
Tips

If the locking mechanism of PCI slot is tight, fix the SAS Expander Card slowly until it is surely locked.

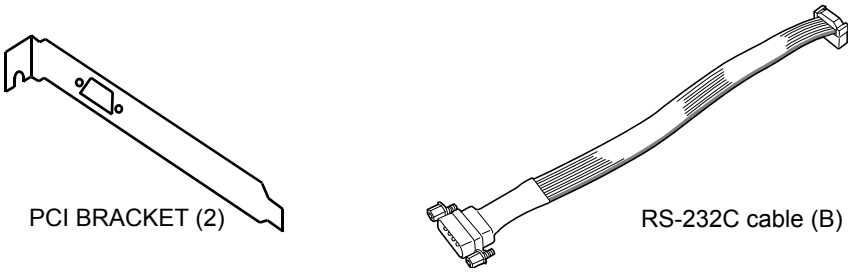
5. Connect cables between the SAS Expander Card, RAID Controller, and HDD cage according to *Chapter 2 (1.16 Use of Internal hard disk drives in the RAID System)*.

1.11.5 RS-232C Connector Kit

Install the RS-232C Connector Kit to a PCI slot in the following procedure.



1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Use the RS-232C cable (B) and PCI bracket (2) that comes with RS-232C Connector Kit



PCI BRACKET (2)

RS-232C cable (B)

3. Remove the screws attached to the RS-232C cable (B) and connect the RS-232C cable (B) to the PCI bracket (2) by using the removed screws.
4. Remove the COM slot cover referring to *Chapter 2* (*1.11.3 Installing PCI card*).
5. Check that the end of the bracket is correctly inserted in the frame guide, and then return the lock lever to its original position to firmly lock the bracket.
6. Attach the connector on the other end of the cable to the connector for attaching an extra RS-232C cable connector on the motherboard.
7. After attaching the connector, confirm the following BIOS settings.
   Advanced - **Serial Port Configuration** - **Serial Port B** - **Enabled**

1.11.6 Removal

To remove a PCI card, reverse the installation procedure.

Run SETUP and change boot order in Boot menu. See *Chapter 3 (2. System BIOS Setup)* for how to specify it.

If using the server while the card is removed, attach the blank cover that comes with the PCI slot.

Important **Pay attention in case that the Internal cables are hooked on a chassis when you removed the PCI card. If the cables are hooked the PCI card may be damaged.**

1.12 HDD Cage

The server can have HDD cage to install hard disk drives.

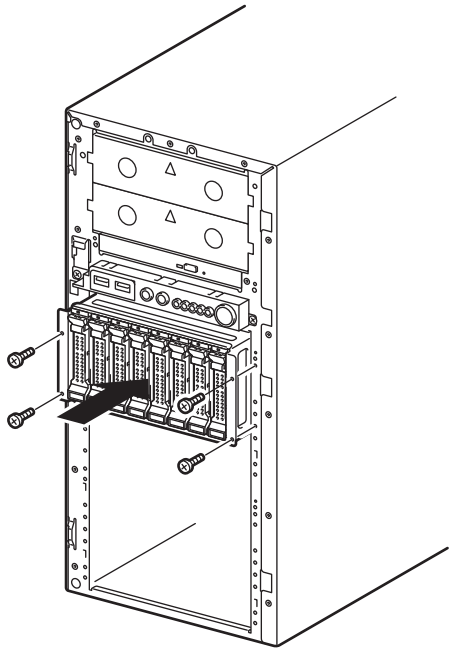
1.12.1 Installation

(1) 2.5-inch HDD cage

The server can contain up to three 2.5-inch HDD cages. Install cages starting from the top of Expansion Bay.

Install a 2.5-inch HDD cage in the following procedure.

1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Install 2.5-inch HDD cage in the bay, and secure it with four screws provided with the cage.



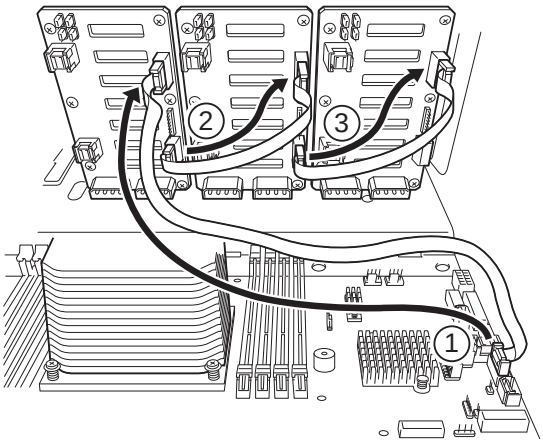
When installing only one 2.5-inch HDD cage, attach two blank covers provided with the cage to the vacant bays using four screws.

When installing two 2.5-inch HDD cages, attach one blank cover provided with the cage to the vacant bay using two screws.

3. Connect SGPIO cable provided with 2.5-inch HDD cage.

   When installing the first 2.5-inch HDD cage, use the SGPIO cable for connecting between motherboard and HDD cage. The SGPIO cable for connecting between HDD cages is not used.

   When installing the second or third HDD cage, use the SGPIO cable for connecting between HDD cages. Connect between the first and the second cages, then connect between the second and the third cages. SGPIO cable for connecting between motherboard and HDD cage is not used.



4. Connect SAS/SATA cable (option) and power cable.

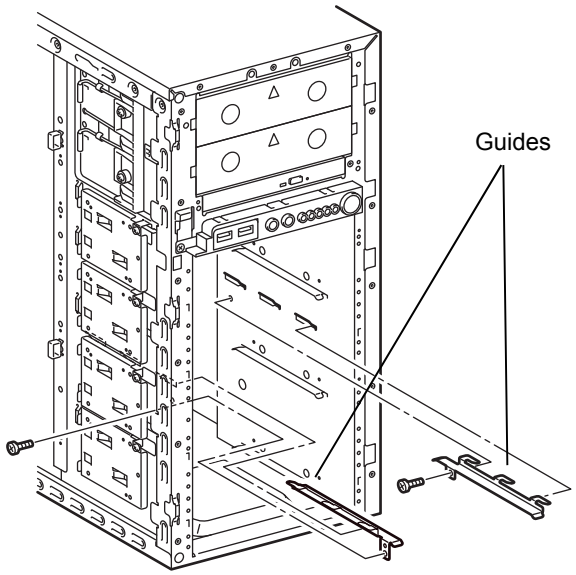
   See *Chapter 2* (*1.16 Use of Internal hard disk drives in the RAID System*) for how to connect SAS/SATA cable and power cable.

(2) 3.5-inch HDD cage

The server can contain up to two 3.5-inch HDD cages. Install cages starting from the top of Expansion Bay.

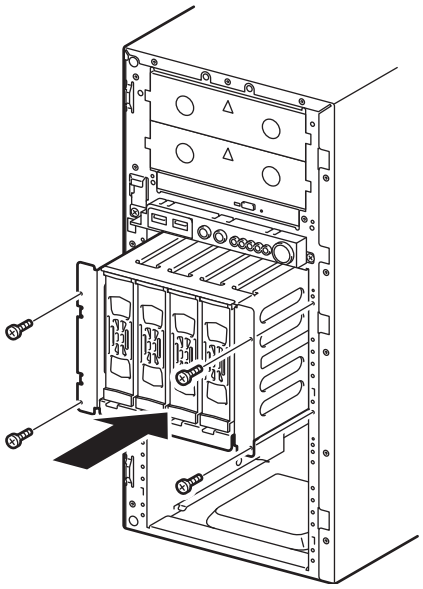
Install a 3.5-inch HDD cage in the following procedure.

1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Install two guides provided with the cage in server chassis by using two screws.



3. Install 3.5-inch HDD cage in the bay, and secure it with four screws provided with the cage.

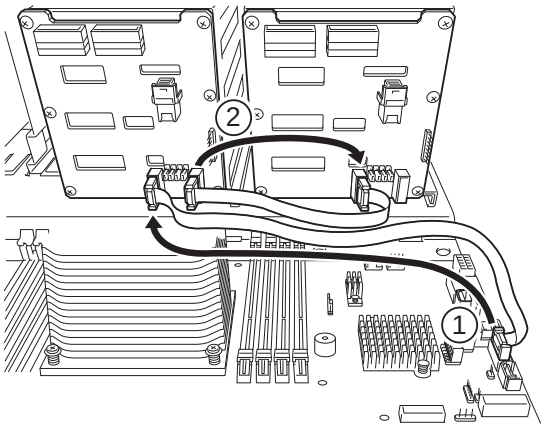
   When installing only one 3.5-inch HDD cage, attach one blank cover provided with the cage to the vacant bay using two screws.



4. Connect SGPIO cable provided with 3.5-inch HDD cage.

   When installing the first 3.5-inch HDD cage, use the SGPIO cable for connecting between motherboard and HDD cage. The SGPIO cable for connecting between HDD cages is not used.

   When installing the second HDD cage, use the SGPIO cable for connecting between HDD cages. SGPIO cable for connecting between motherboard and HDD cage is not used.



5. Connect SAS/SATA cable (option) and power cable.

   See *Chapter 2* (*1.16 Use of Internal hard disk drives in the RAID System*) for how to connect SAS/SATA cable and power cable.

1.12.2 Removal

(1) 2.5-inch HDD cage

The server can contain up to three 2.5-inch HDD cages. Remove cages starting from the bottom bay.

Remove 2.5-inch HDD cage in the following procedure.

1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Remove hard disk drives from 2.5-inch HDD cage.
3. Disconnect SAS/SATA cable, SGPIO cable, and power cable.
4. Remove screws that secure the 2.5-inch HDD cage.
5. Pull out 2.5-inch HDD cage from the server.
6. To use the server with 2.5-inch HDD cage removed, attach blank covers using screws.

Important **To keep the cooling effect in the server, be sure to attach blank covers.**

(2) 3.5-inch HDD cage

The server can contain up to two 3.5-inch HDD cages. Remove cages starting from the bottom bay.

Remove 3.5-inch HDD cage in the following procedure.

1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Remove hard disk drives from 3.5-inch HDD cage.
3. Disconnect SAS/SATA cable, SGPIO cable, and power cable.
4. Remove screws that secure the 3.5-inch HDD cage.
5. Pull out 3.5-inch HDD cage from the server.
6. To use the server with 3.5-inch HDD cage removed, attach blank covers using screws.

Important **To keep the cooling effect in the server, be sure to attach blank covers.**

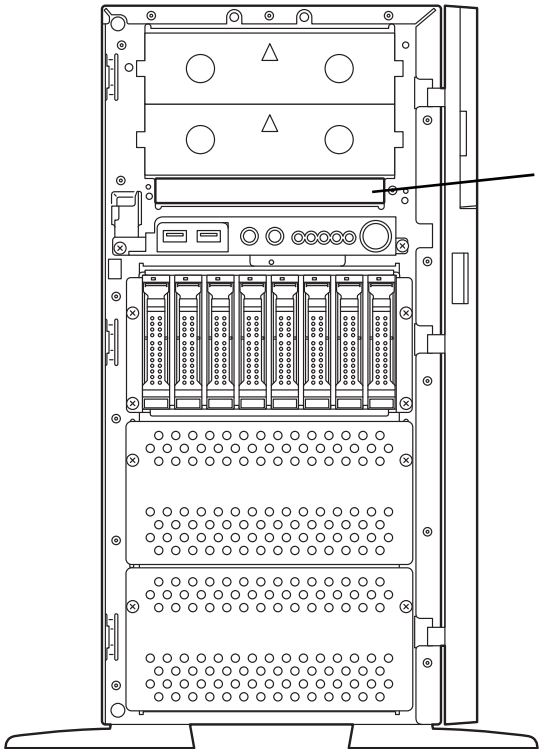
If you install another HDD cage, remove two guides.

1.13 Optical Disk Drive

This section describes the procedure for installing the optional optical disk drive.

Important **Do not install any unsupported optical disk drive.**

You need to install an optional optical disk drive when using this server.

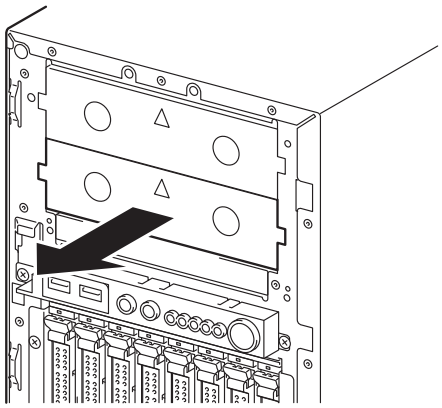


1.13.1 Installation

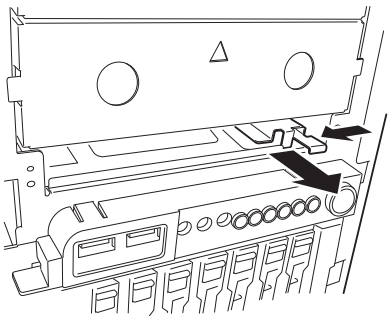
Install an optical disk drive in the following procedure.

1. See steps 1 to 5 in *Chapter 2* (*1.3 Overview of Installation and Removal*) for preparations.
2. Remove the blank cover from Expansion Bay 1.

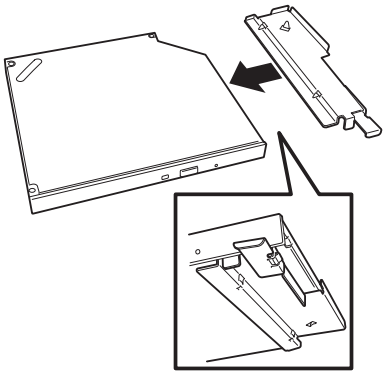
   If the bay contains any 5.25-inch device, remove the device before installing an optical disk drive.



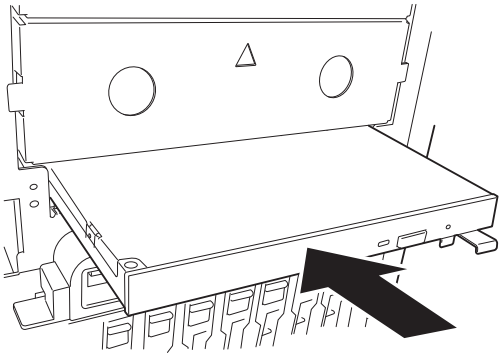
3. Move the lever on right side of optical disk drive bay to the direction shown by (1) in the figure and then pull it forward shown by (2) to remove the bracket from the chassis.



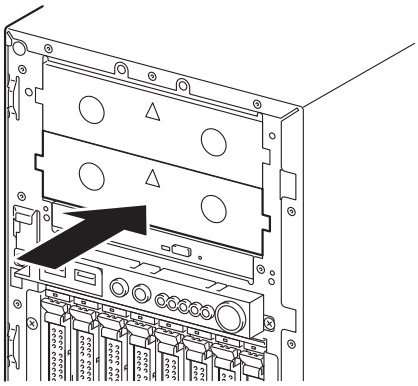
4. Mount the bracket to the optical disk drive so that the projection of bracket aligns with holes on side of the drive.



5. Insert the optical disk drive with the bracket mounted into the slot until the bracket is locked.



6. Connect a cable to optical disk drive.
7. Attach the cover removed in Step 2.

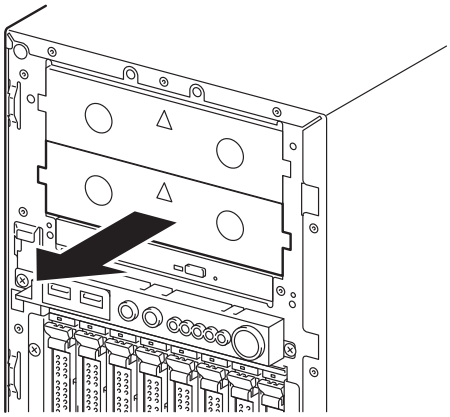


1.13.2 Removal

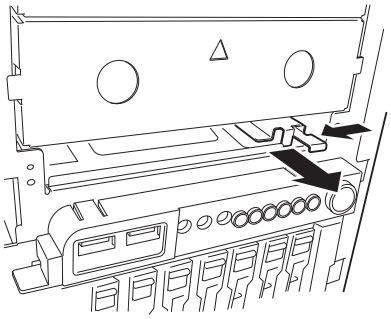
Remove optical disk drive in the following procedure.

1. See steps 1 to 5 in *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Remove the blank cover from Expansion Bay 1.

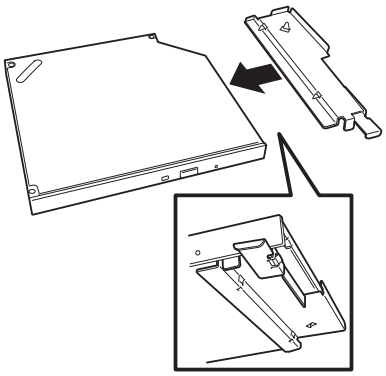
   If the Expansion Bay 1 contains 5.25-inch device, remove the device.



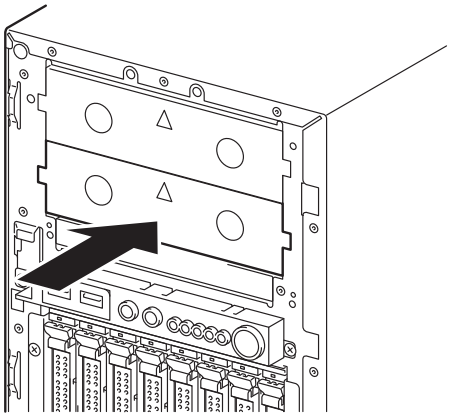
3. Push the latch on connector of optical disk drive to unlock the connector, then disconnect the cable from optical disk drive.
4. Move the lever of bracket located at lower right corner of optical disk drive bay to the direction shown by (1) in the figure and then pull it forward shown by (2) to remove the bracket and optical disk drive from the chassis.



5. Remove the bracket from optical disk drive, and mount the bracket to the chassis.



6. Attach the cover removed in Step 2.



Important **Do not use the server without an optical disk drive.**

1.14 Power Supply Unit

Models N8100-2477F, N8100-2478F and N8100-2279F are hot-plug redundant power supply units.

The redundant power system can be configured with two redundant power units.

In redundant power system, the server can continue operation even one of the power supply unit fails.

1.14.1 Replacing failed redundant power supply unit

Replace the power supply unit only when redundant power supply unit fails.

CAUTION

Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, see *Safety Precautions and Regulatory Notices.*

- **Pay attention to electric hazard.**

Important

- **Do not remove the power supply module that is working normally.**
- **Do not use the server with failed power supply module removed. Power supply module must be removed only when it is replaced.**

(1) Replacing power supply unit

1. Check the failed power supply unit on which AC POWER LED is lit amber or flashing amber.

Tips

If the system is running with two power supply units, the failed power supply unit can be replaced with the system power on.

2. Disconnect the power cord from the failed power supply unit found in Step 1.
3. Push the lever of power supply unit toward inside, and pull the unit while holding the handle.

Important

The failed power supply unit must be replaced. The system cannot run with a single power supply module.

4. Install the new power supply unit. Make sure that no error is indicated on STATUS LED or POST screen. If any error messages are displayed, see *Chapter 3 (1. POST Error Message) in "Maintenance Guide"*. If AC POWER LED is not lit, re-install the power supply unit. If the same error occurs, contact your sales representative. Be sure to install the module for replacement.

1.15 Fan Unit

The server can contain non-redundant fan unit or hot-plug redundant fan unit.

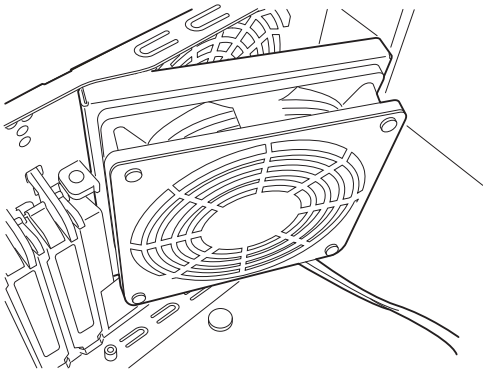
With redundant fan unit, the server can continue operation even one of the fan unit fails.

Note It is recommended to install fan unit after installing other optional devices except for hot-plug hard disk drive.

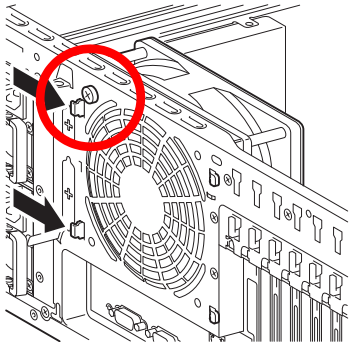
1.15.1 Installing non-redundant fan unit

Install fan unit in the following procedure.

1. See steps 1 to 6 in *Chapter 2* (*1.3 Overview of Installation and Removal*) for preparations.
2. Insert hooks on bracket for rear fan unit (120 mm sq.) into the mounting holes on rear face of the chassis.



3. Push the claw on the case of rear fan unit (120 mm sq.) into the mounting holes on rear face of the chassis until it clicks. Then, secure the fan bracket to the chassis with one screw.



4. Connect fan cable for rear fan unit to FAN5 connector on motherboard.
5. Connect three cables for front fan unit (92 mm sq.) to motherboard.

   Connect a cable for fan unit in FAN1 with FAN1 connector on motherboard.

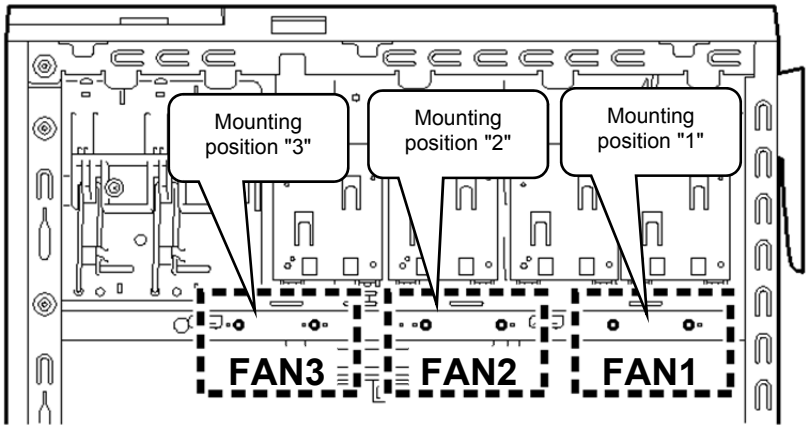
   Connect a cable for fan unit in FAN2 with FAN2 connector on motherboard.

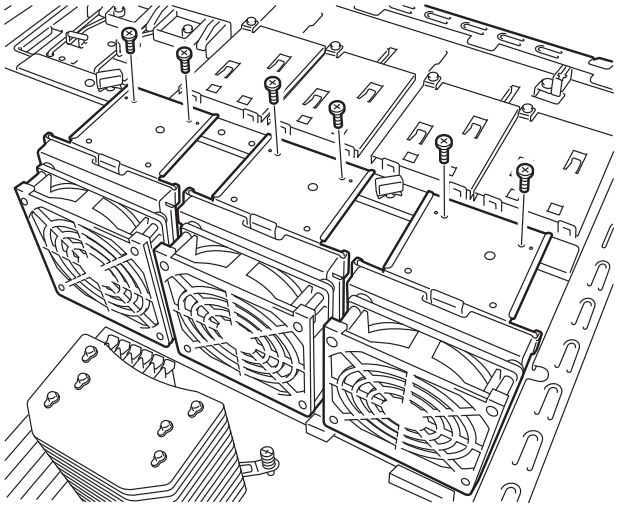
   Connect a cable for fan unit in FAN3 with FAN3 connector on motherboard.

   See the figure below.

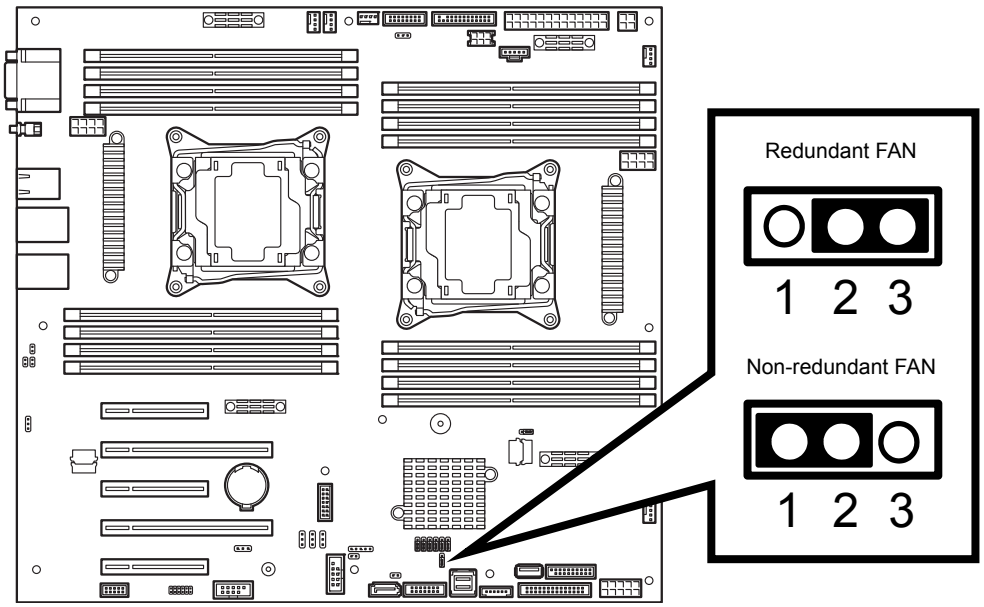
Note After the front fan is installed, it is difficult to connect a fan cable to motherboard. Thus, first connect fan cable to motherboard, then install the front fan.

6. Install three front fan units (92 mm sq.) to the locations FAN1, FAN2, and FAN3 (enclosed with dotted line in the figure below). Use the six screws (two screws for one fan unit) provided with non-redundant fan unit to secure the fan unit.





7. Change the jumper switch setting on motherboard to Non-redundant FAN.



1.15.2 Replacing/removing failed non-redundant fan unit

Replace the fan unit only when it fails.

1. Power off the server.
2. Disconnect power cord from power supply unit.
3. To remove the fan unit, reverse the installation procedure.

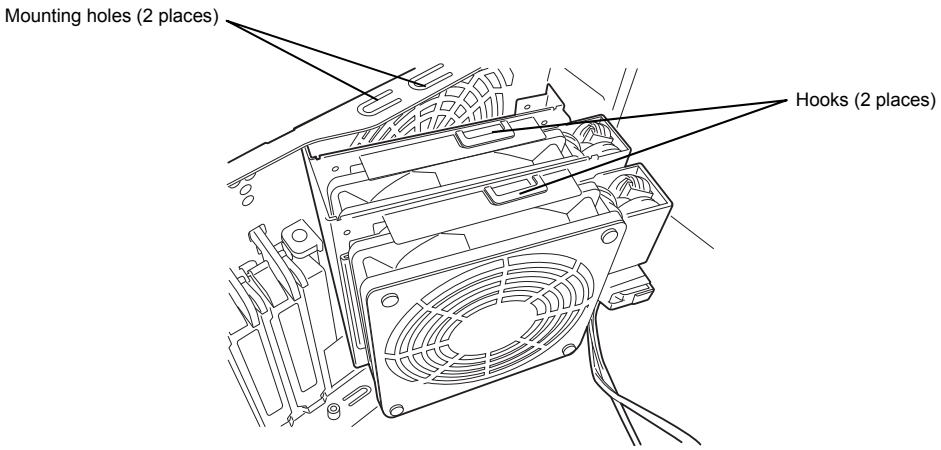
1.15.3 Installing hot-plug redundant fan unit

Install redundant fan unit in the following procedure.

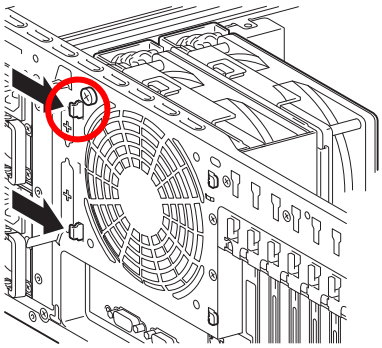
1. See steps 1 to 6 in *Chapter 2* (*1.3 Overview of Installation and Removal*) for preparations.
2. Connect the fan cables for rear fan units (120 mm sq.) to connectors on motherboard.

   Connect the fan cable for FAN4 to the connector FAN4 on motherboard.

   Connect the fan cable for FAN5 to the connector FAN5 on motherboard.
3. Engage hooks on bracket of rear fan unit (120 mm sq.) with mounting holes on rear face of the chassis.



4. Push the claw on the case of rear fan unit (120 mm sq.) into the mounting holes on rear face of the chassis until it clicks. Then, secure the fan bracket to the chassis with one screw.



Important **Be sure not to jam the fan cable between the fan holder and the chassis. Otherwise, the fan cable might become damaged, which might damage the server as well as the fan.**

5. Connect three cables for front fan (92 mm sq.) to motherboard.

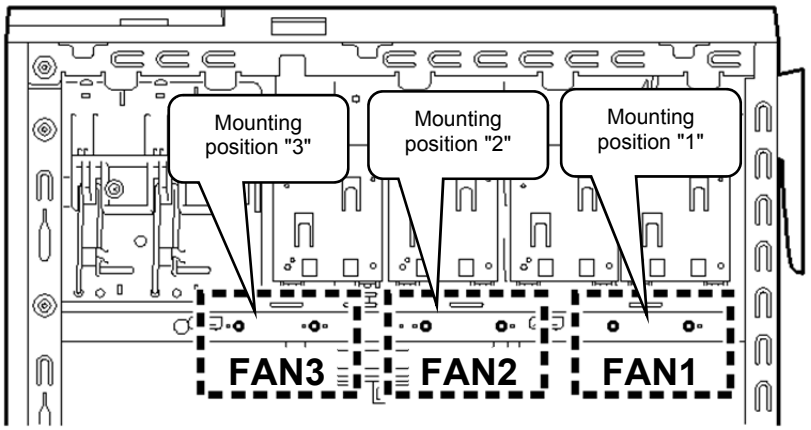
   Connect a cable for fan unit in FAN1 with FAN1 connector on motherboard.

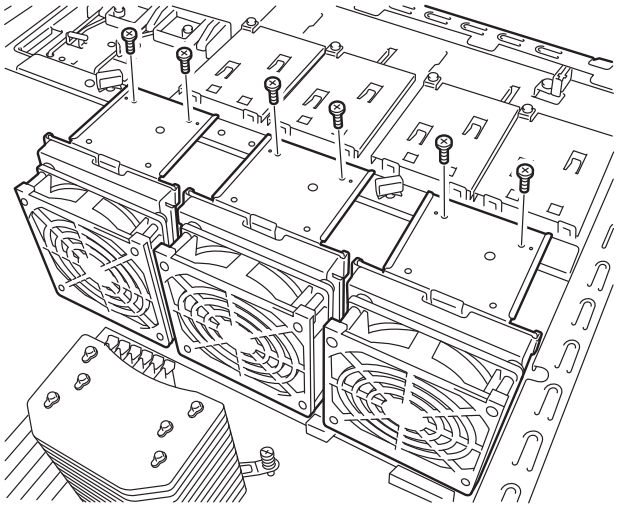
   Connect a cable for fan unit in FAN2 with FAN2 connector on motherboard.

   Connect a cable for fan unit in FAN3 with FAN3 connector on motherboard.

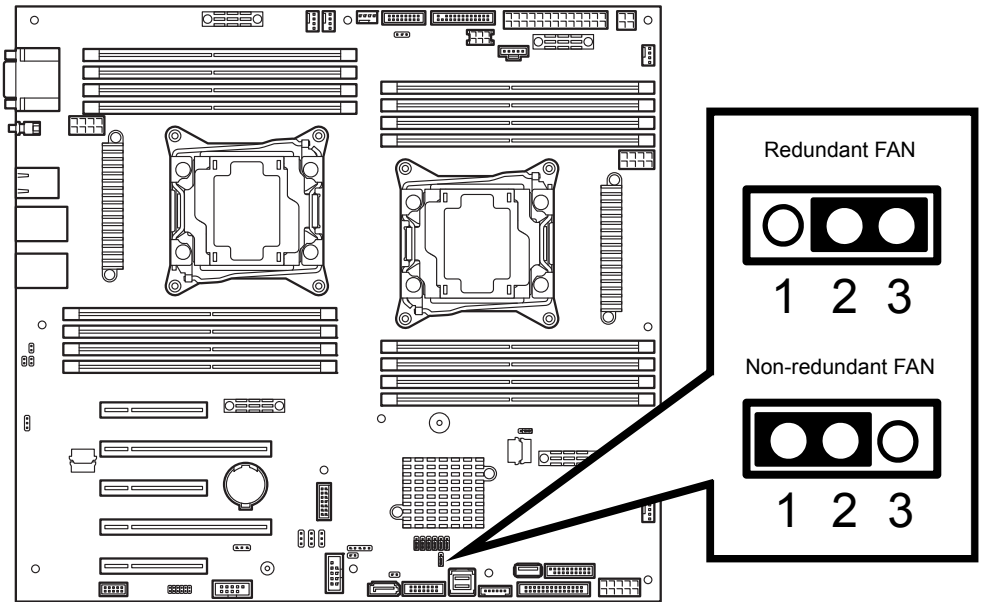
   See the figure below.

6. Install three front fan units (92 mm sq.) to the locations FAN1, FAN2, and FAN3 (enclosed with dotted line in the figure below). Use the six screws (two screws for one fan unit) provided with redundant fan unit to secure the fan unit.

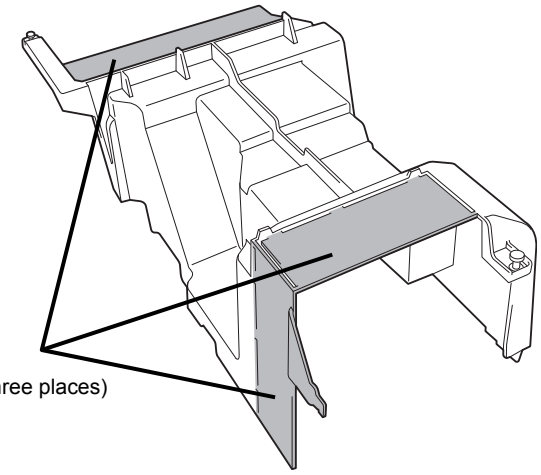




7. Change the jumper switch setting on motherboard to Redundant FAN.



8. Arrange the CPU duct according to the figure below.



Cut the shaded portion (three places) with a nipper or knife.

1.15.4 Removing hot-plug redundant fan unit

Replace the fan unit only when it fails.

1. Power off the server.
2. Disconnect the power cord from the power supply unit.
3. To remove the fan unit, reverse the installation procedure.

1.15.5 Replacing failed hot-plug redundant fan unit

Replace the hot-plug redundant fan unit only when it fails. The fan unit can be replaced while the system is powered on and running.

CAUTION

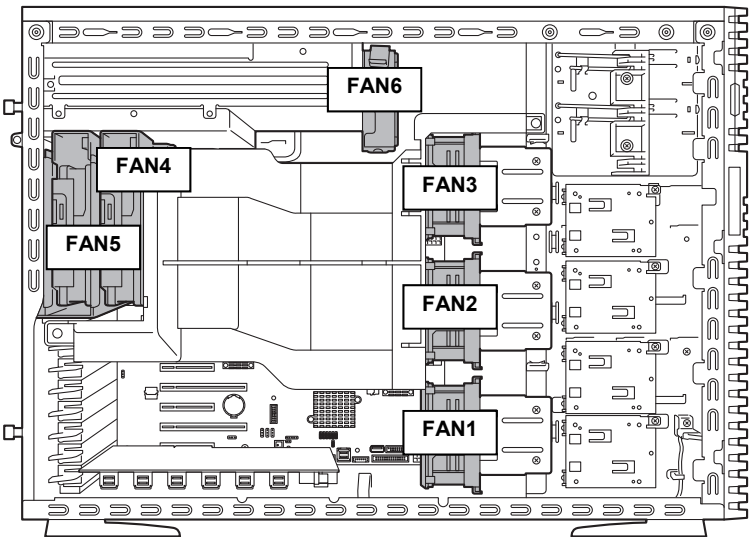
Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, see *Safety precautions* in *Precautions for Use.*

- **Pay attention to electric hazard.**

Important **Do not remove the fan unit that works normally.**

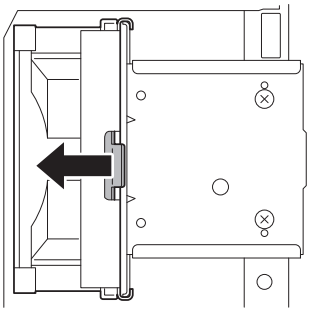
1. Check the failed fan unit using management tool such as EXPRESSSCOPE Engine 3.

   EXPRESSSCOPE Engine 3 shows an actual fan unit by using the fan ID (FAN1 to FAN6) as shown below.

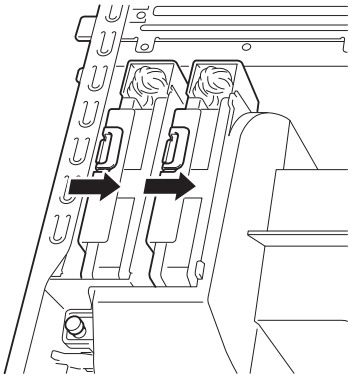


2. Unlock the fan bracket as shown below, and remove the failed fan from the fan case.

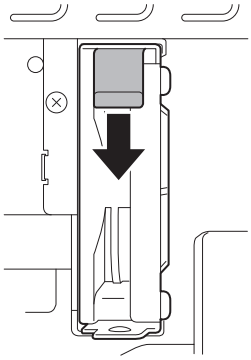
Front fan unit
(FAN1, FAN2, FAN3)



Rear fan unit
(FAN4, FAN5)



Power supply fan unit
(FAN6)



3. Insert the new fan unit for replacement into the fan case.

4. Confirm that no error messages are displayed in POST screen or STATUS LED does not show an error. If any error messages are displayed, see *Chapter 3 (1. POST Error Message) in "Maintenance Guide*".

1.16 Use of Internal hard disk drives in the RAID System

This section describes how to use the hard disk drives installed in the HDD cage at the front of the server in the RAID system.

Important

- **If you use hard disk drives in the RAID system or change the RAID level, initialize the hard disk drives. If the hard disk drive contains valuable data, be sure to back up the hard disk drive before installing the RAID controller and configuring the RAID system.**
- **If both PCI #1 and PCI #2 slots contain RAID controller, OS is installed in hard disk drive connected to RAID controller in PCI #2 slot. Use the hard disk drive connected with RAID controller in PCI slot #1 for storing data.**

Note

In the RAID system, use hard disk drives that have the same specifications (capacity, rotational speed, and standard) for each disk array.

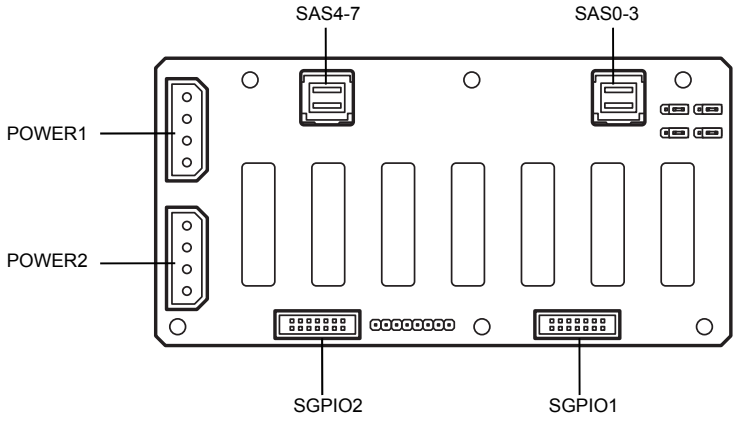
Tips

- Logical drives can be created even with only one physical device.
- When using SAS hard disk drives, RAID controllers must be connected.

1.16.1 Connecting cables

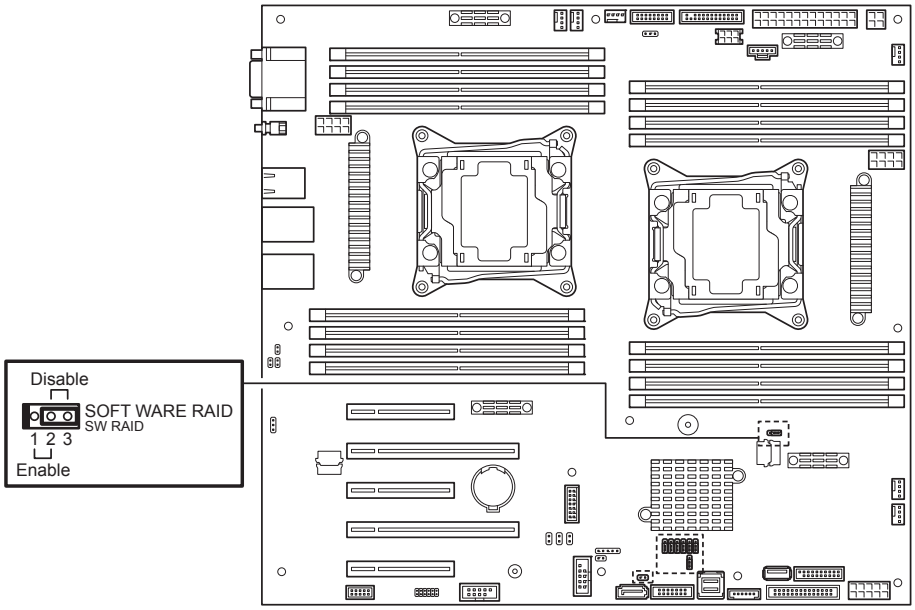
(1) 2.5-inch HDD cage

Connect cables to 2.5-inch HDD cage by referring to the illustration below.



(a) Using SW RAID for 2.5-inch HDD cage (1 to 4 HDDs)

Change RAID configuration jumper to RAID Enable by referring the illustration below.
Connect 2.5-inch HDD cage to motherboard using SAS/SATA cable provided with 2.5-inch HDD cage. Make sure the location of key pin of SGPIO cable.



Connect 2.5-inch HDD cage to the motherboard as listed in the table below.

Connector on motherboard	2.5-inch HDD cage
SATA0-3	First SAS0-3
SGPIO	First SGPIO1

(b) Using optional RAID controller for 2.5-inch HDD cage (1 to 24 HDDs)

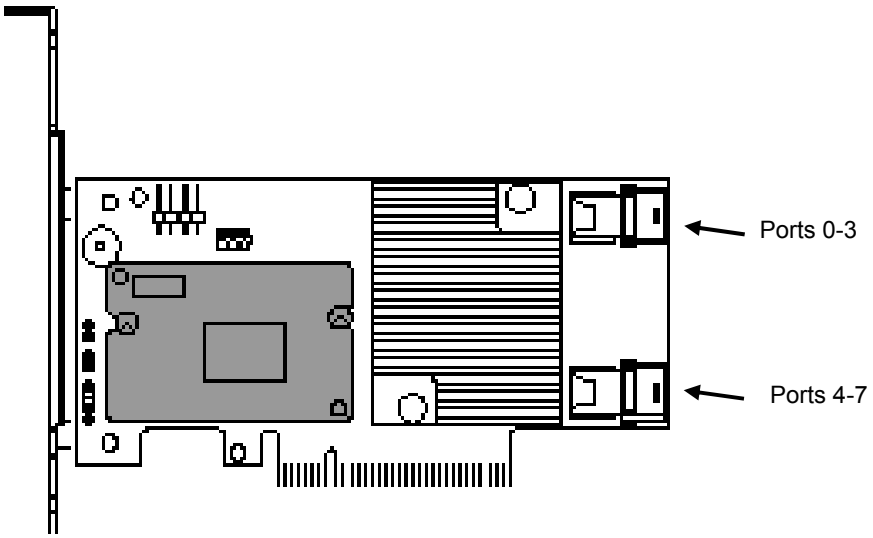
- To use eight hard disk drives, a single RAID controller and a single 2.5-inch HDD cage are required.
  The N8103-186 SAS Expander Card is required when using nine or more HDDs.

  To use 9 to 16 hard disk drives, two 2.5-inch HDD cage are required.
  To use 17 to 24 hard disk drives, three 2.5-inch HDD cage are required.

- A single internal SAS/SATA cable can use four hard disk drives.
  To use 5 to 8 hard disk drives, two internal SAS/SATA cable are required.
  To use 9 to 12 hard disk drives, three internal SAS/SATA cable are required.
  To use 13 to 16 hard disk drives, four internal SAS/SATA cable are required.
  To use 17 to 20 hard disk drives, five internal SAS/SATA cable are required.
  To use 21 to 24 hard disk drives, six internal SAS/SATA cable are required.

Connecting RAID controller to 2.5-inch HDD cage

- **Connector for N8103-176/177/178 RAID controller**

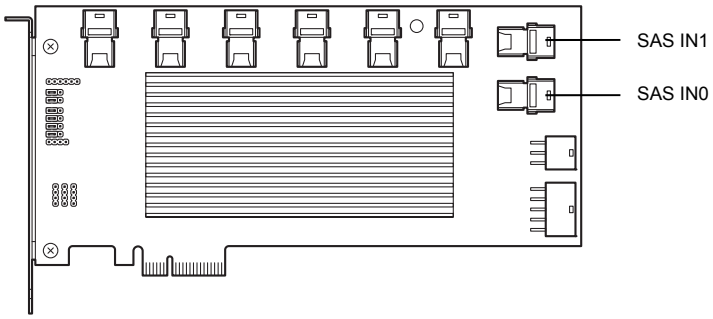


Connect the SAS/SATA cable provided with the 2.5-inch HDD cage as shown in the table below.

Optional RAID Controller	2.5-inch HDD cage
Ports0-3	First SAS0-3
Ports4-7	First SAS4-7

Connecting RAID controller to SAS Expander Card

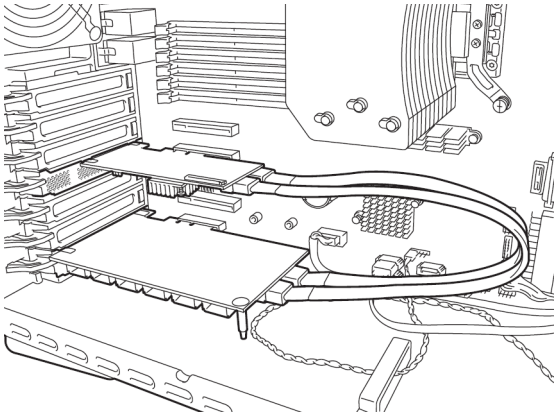
- **Connector for SAS Expander Card**



See the figure below and connect the RAID controller to the SAS Expander Card as shown in the table below by using the SAS/SATA cable that comes with the SAS Expander Card.

Optional RAID Controller	SAS Expander Card
Ports0-3	SAS IN0
Ports4-7	SAS IN1

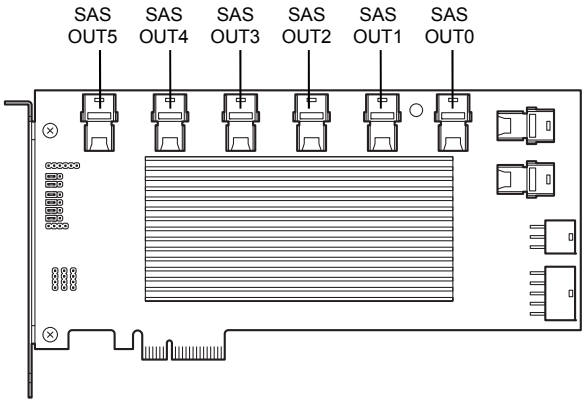
- Connecting N8103-176/177/178 RAID controller to SAS Expander Card



Connecting SAS Expander Card to 2.5-inch HDD cage

Connect the SAS Expander Card to the 2.5-inch HDD cage using SAS/SATA cable provided with 2.5-inch HDD cage.

Connector for SAS Expander Card

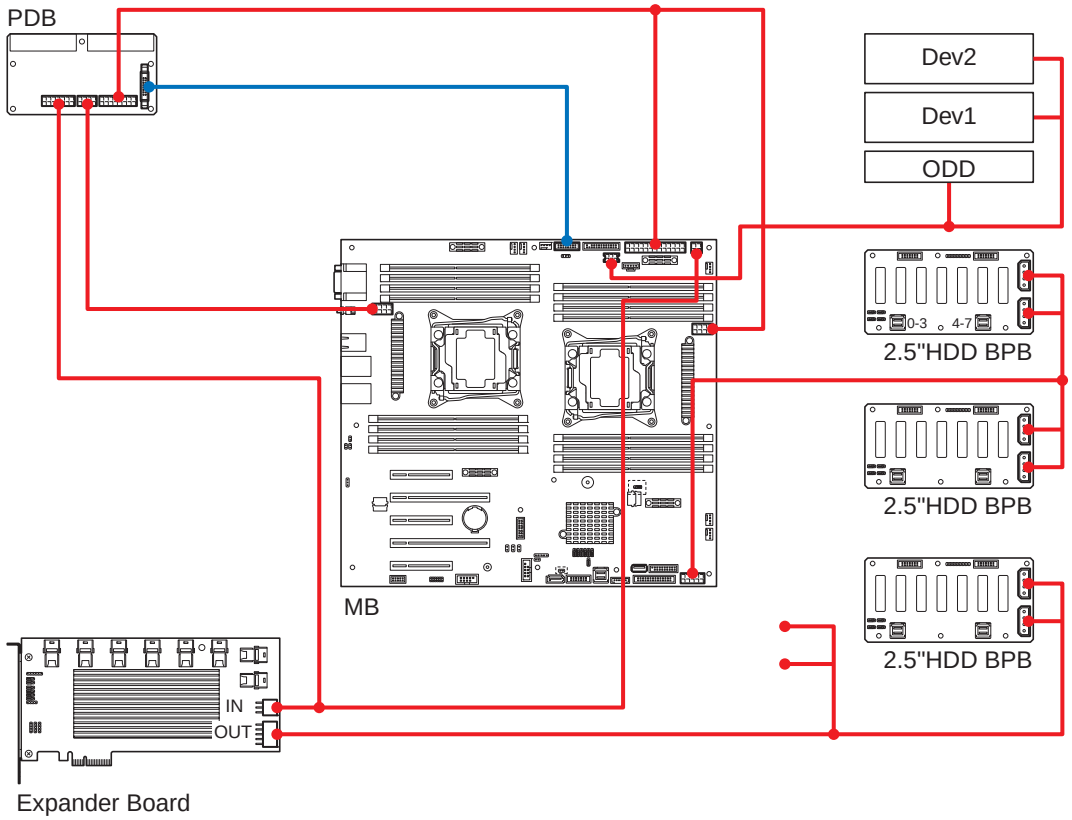


Connect the SAS Expander Card to the 2.5-inch HDD cage as shown in the table below.

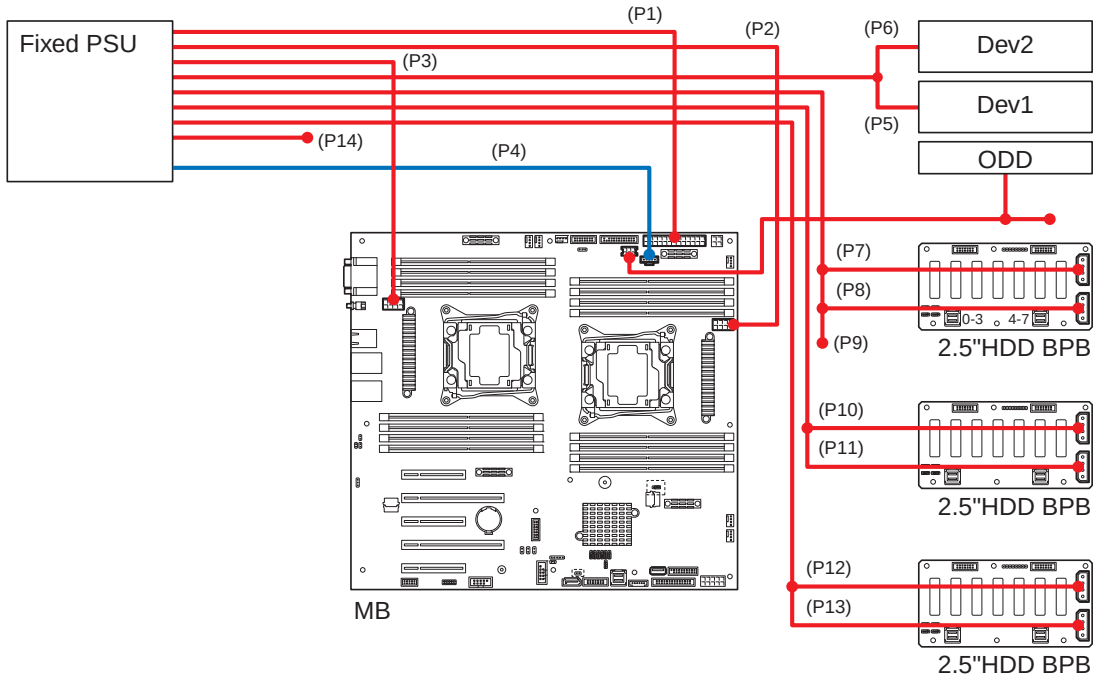
Optional SAS Expander Card	2.5-inch HDD cage
SAS OUT0	First: SAS0-3
SAS OUT1	First: SAS4-7
SAS OUT2	Second: SAS0-3
SAS OUT3	Second: SAS4-7
SAS OUT4	Third: SAS0-3
SAS OUT5	Third: SAS4-7

Note Route the SAS/SATA cable along the bottom of chassis. The rotational speed of fan may be increased due to deterioration of cooling effect in the server.

(c) Power cable connestion for Redundant PSU model

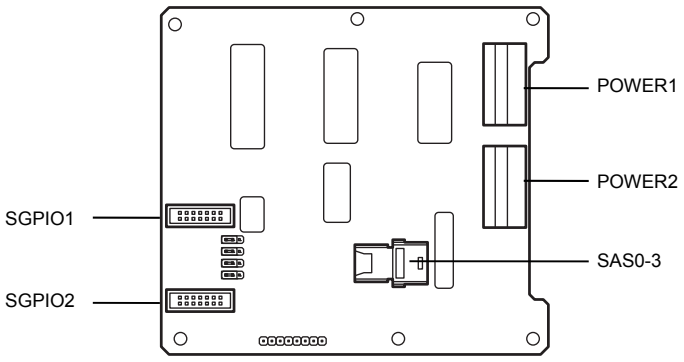


(d) Power cable connection for Fixed PSU model



(2) 3.5-inch HDD cage

Connect cables to 3.5-inch HDD cage by referring to the illustration below.



(a) Using SW RAID for 3.5-inch HDD cage (1 to 4 HDDs)

Connect 3.5-inch HDD cage to motherboard using K410-258(00) internal SAS/SATA cable provided with 3.5-inch HDD cage. Make sure the location of key pin of SGPIO cable.

See *Using SW RAID for 2.5-inch HDD cage (1 to 4 HDDs)* for connectors on motherboard and RAID configuration jumper switch setting.

Connect 3.5-inch HDD cage to motherboard as listed in the table below.

Connector on motherboard	3.5-inch HDD cage
SATA0-3	SAS0-3
SGPIO	SGPIO1

(b) Using optional RAID Controller for 3.5-inch HDD cage (1 to 8 HDDs)

- One 3.5-inch HDD cage can use four hard disk drives.
  To use 5 to 8 hard disk drives, two 3.5-inch HDD cages are required.
- One internal SAS/SATA cable can use four hard disk drives.
  To use 5 to 8 hard disk drives, two internal SAS/SATA cables are required.

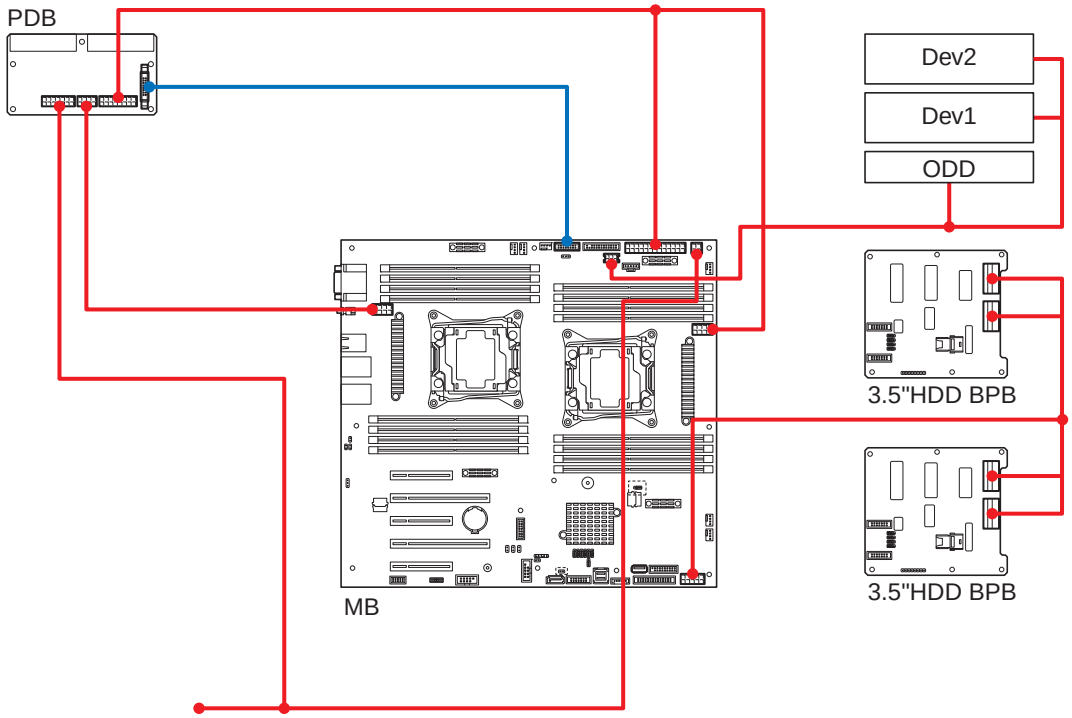
Connect 3.5-inch HDD cage to RAID Controller using optional K410-274(00) internal SAS/SATA cable.

See *Chapter 2, 1.16.1 (1)-(b)" Using optional RAID Controller for 2.5-inch HDD cage (1 to 24 HDDs)"* for connectors on RAID controller.

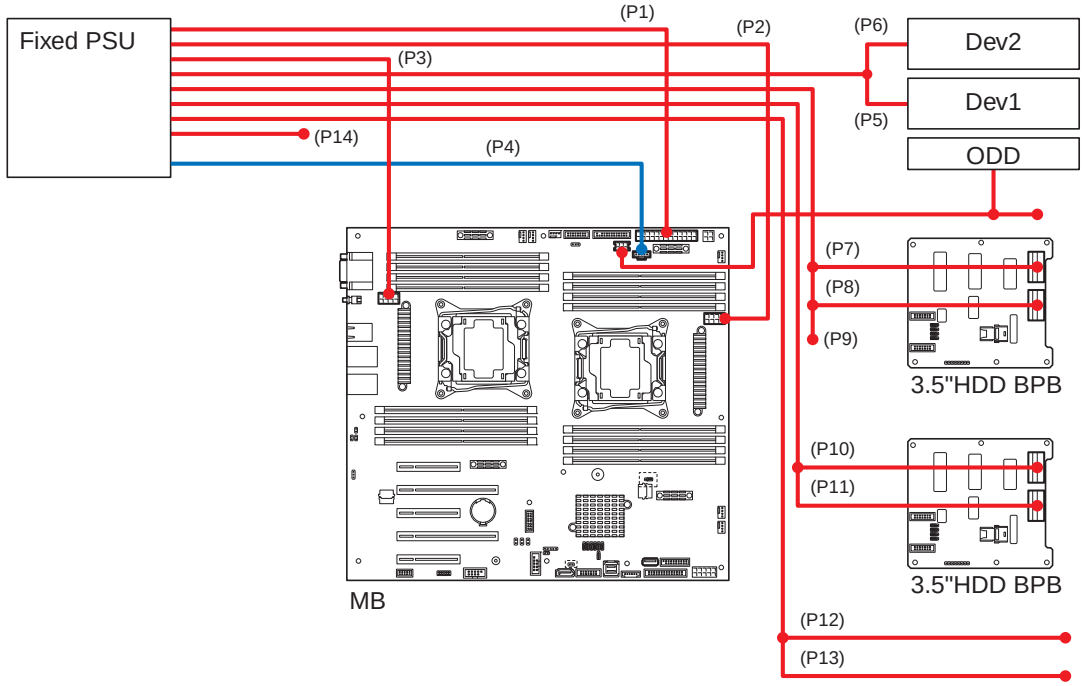
Connect 3.5-inch HDD cage to RAID controller as listed in the table below.

Optional RAID controller	3.5-inch HDD cage
Ports 0-3	First: SAS0-3
Ports 4-7	Second: SAS0-3

(c) Power cable connestion for Redundant PSU model



(d) Power cable connection for Fixed PSU model



1.16.2 Notes on setting up a RAID System

Note the following points when setting up a RAID system.

- The number of hard disk drives required varies in each RAID level.
- If the optional RAID controller (N8103-176) is used, the RAID system cannot be built in RAID5/RAID6/RAID50.

RAID level	The minimum number of hard disk drives	
	On-board RAID Controller or N8103-176	N8103-177/178
RAID 0	1	1
RAID 1	2	2
RAID 5		3
RAID 6		3
RAID 10	4	4
RAID 50		6
RAID 60		6

- Use SAS/SATA hard disk drives or SSDs that have the same capacity and rotational speed.
- EXPRESSBUILDER helps you to install the OS on a RAID array easily.
- If you want to install the OS manually, use a RAID System Configuration utility (Ctrl-R or HII). The utility can be run during POST which starts immediately after the server is turned on. For details on the procedure of configuring a Logical Drive, see *Chapter 2 (5. RAID System Configuration)* in *Maintenance Guide* or the manual supplied with the optional RAID Controller (N8103-176/177/178).

Important

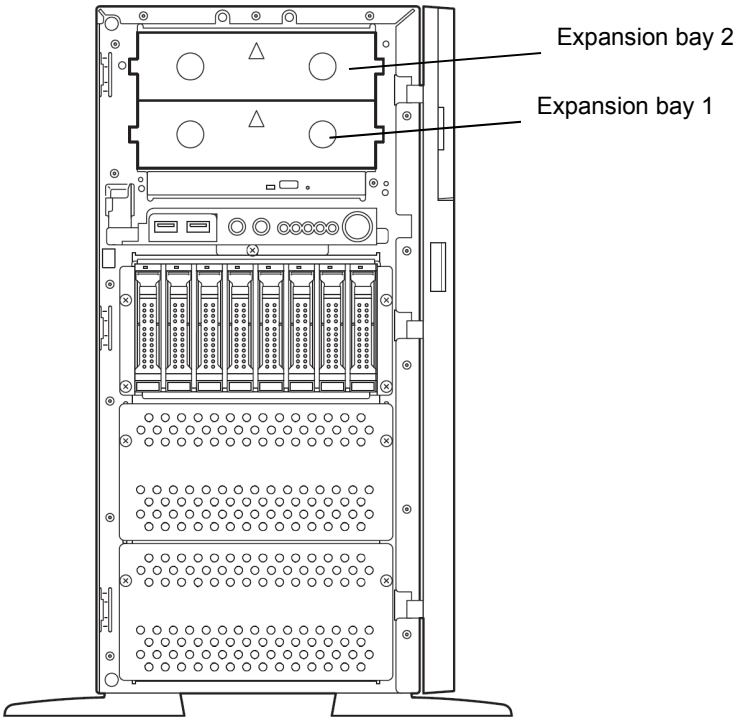
- **Do not change the mode to hibernate while building a RAID system.**
- **Build a disk array in the RAID system using hard disk drives that have the same specifications (capacity, rotational speed, and standard).**

1.17 5.25-inch Device

This section describes installation procedure for 5.25-inch device.

Important

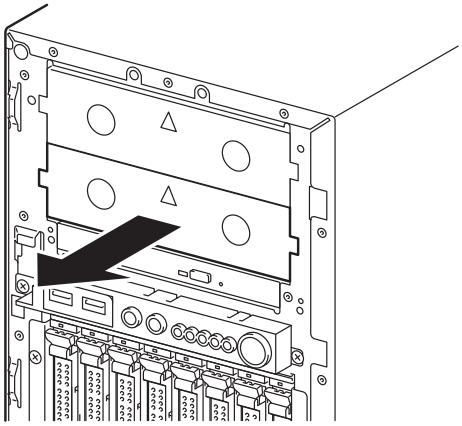
- **Do not use unsupported device.**
- **Only a single internal USB device can be installed.**



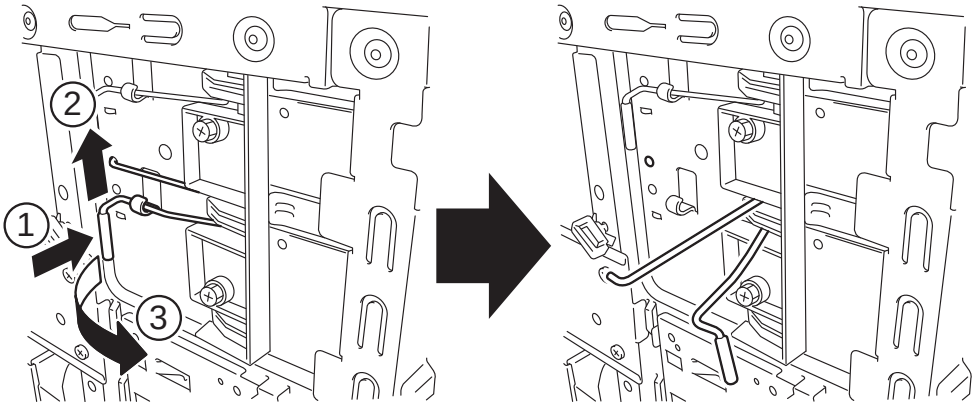
1.17.1 Installation

Install 5.25-inch device in the following procedure.

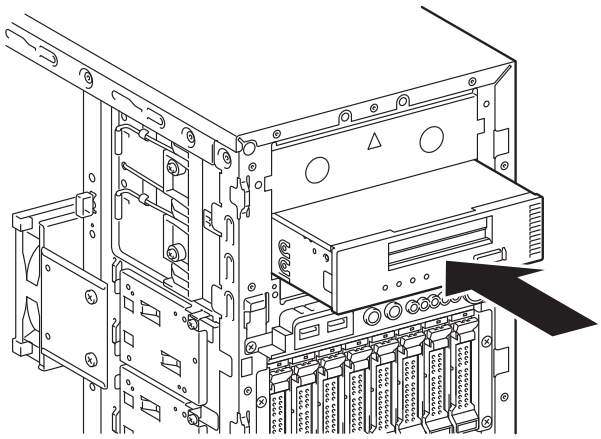
1. See steps 1 to 5 in *Chapter 2* (*1.3 Overview of Installation and Removal*) for preparations.
2. Remove the blank cover of Expansion Bay.



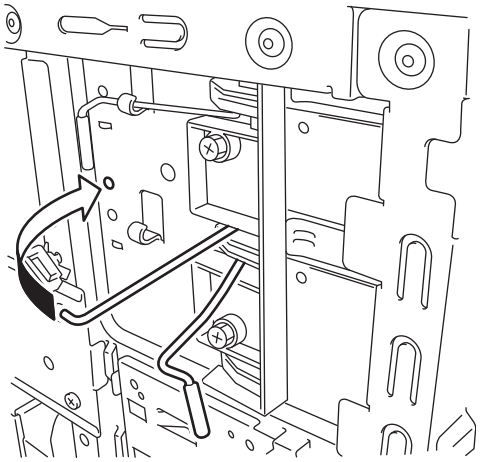
3. Unlock the fixing bracket while pushing the lever (blue) of fixing bracket and moving upward. Then, open the lever.



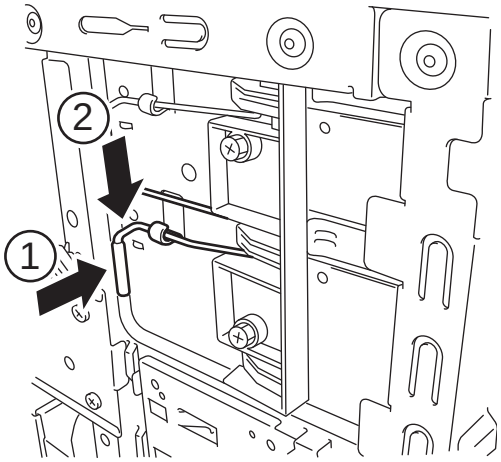
4. Insert the 5.25-inch device into the bay.



5. Connect a signal cable and a power cable to 5.25-inch device. If you install an internal USB device, connect the internal USB cable to USB2 connector on motherboard.
6. Align screw holes of 5.25-inch device with those on fixing bracket, and insert the end of fixing bracket into the screws holes of 5.25-inch device.



7. Lock the fixing bracket while pushing the lever (blue) of fixing bracket and moving downward. Then, fix the 5.25-inch device to the server.



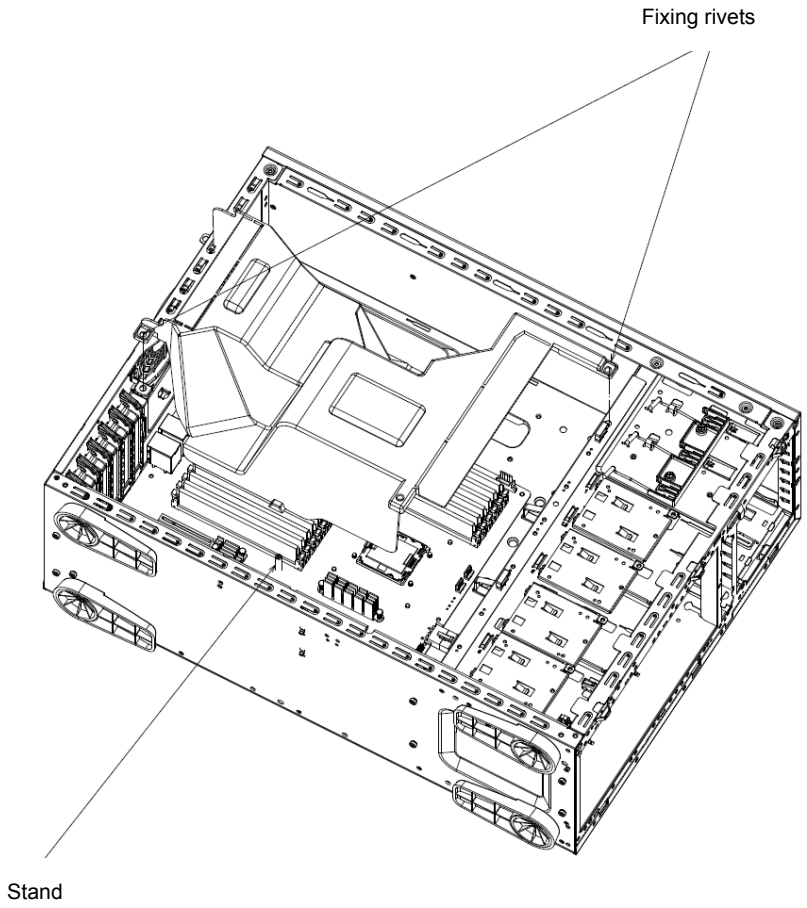
1.17.2 Removal

Remove 5.25-inch device in reverse procedure of installation.

1.18 Installing CPU Duct

Install the CPU duct according to the following procedures.

1. Insert the CPU duct so that the swelling of CPU duct covers the stand on motherboard. See the figure below.



2. Push the two rivets of CPU duct to secure the duct.

1.19 Installing Side Cover

Install Side Cover according to the following procedures.

1. Insert the guide metals (front and rear, two places) located lower inside of Side Cover, into the frame of the server.
2. Insert hooks (five places) located upper inside of Side Cover, into the holes on upper side of the server. Then, move Side Cover toward the front of server.
3. Tighten Cap Screw at rear of the server.

1.20 Hot-plug Hard Disk Drive

The server can contain HDD trays to connect with hard disk drives.

A hard disk drive mounted on a dedicated tray can be purchased. Install the hard disk drive on the server with it mounted on the tray.

Important **Use hard disk drives specified by NEC. Installing a third-party hard disk drive might cause a failure of the server and the hard disk drive.**

- 3.5-inch hot-plug HDD cage can contain four disk drives per one HDD cage.
- 2.5-inch hot-plug HDD cage can contain eight disk drives per one HDD cage.
- A unique port number is assigned to each slot.

Note the following precautions to install hard disk drives.

- Change the jumper switch setting or cable connection to build a RAID system.
- In 3.5-inch HDD cage, hard disk drives having different capacities, interface types, or rotational speeds cannot be installed together.
- In 2.5-inch HDD cage, hard disk drives or SSD having different capacities, interface types, or rotational speeds can be installed together, if the following conditions are satisfied:

  Mixture of SAS HDD, SATA HDD and SAS SSD in 2.5-inch HDD cage

  - You need to prepare the followings:
    One RAID controller or one RAID controller and one SAS Expander Card
    One to three 2.5-inch HDD cage
    Two to six internal SAS cables
  - You need to prepare RAID controller if internal disk drives of different types are installed together.
  - In the specific RAID group (pack), HDD and SSD cannot be installed together.
  - Three types of internal drives cannot be installed together under the specific RAID Controller (in the same HDD cage).
  - A 512-byte sector SAS HDD and 4 KB sector SAS HDD cannot be installed together.
  - To avoid mixture of different types of disk drives in specific pack, specify a hot spare disk for the disk drive of the same type.
  - With specific RAID Controller, connecting disk drives extending over several HDD cages is not allowed.

Internal drive	SAS HDD 10Krpm	SAS HDD 15Krpm	SATA HDD 7.2Krpm	SATA SSD	SAS SSD
SAS HDD 10Krpm	○	○	○	○	○
SAS HDD 15Krpm	○	○	○	○	○
SATA HDD 7.2Krpm	○	○	○	○	○
SATA SSD	○	○	○	○	○
SAS SSD	○	○	○	○	○

Allowable combinations of internal disk drives are listed in the table above.

- When installing different types of HDDs, first install the same type of HDDs in the slots starting from the smallest number in the 2.5-inch HDD cage, and then install the other types of HDDs in the remaining slots.

Example of mixture of internal disk drives

Install SAS SSDs in slots 0 to 2.
Install SATA HDDs in slots 3 to 6.
Leave slot 7 empty.

Install SAS HDDs in slots 0 to 4.
Install SAS SSDs in slots 5 and 6.
Leave slot 7 empty.

Install SAS HDDs in slots 0 to 4.
Install SATA HDDs in slots 5 and 6.
Leave slot 7 empty.

Install SAS HDDs 15K in slots 0 to 2.
Install SAS HDDs 10K in slots 3 to 6.
Leave slot 7 empty.

1.20.1 Installation

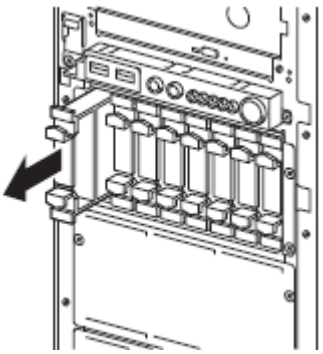
This section describes installation procedure for 2.5-inch hot-swap hard disk drives. Follow the same installation procedure for 3.5-inch hot-swap hard disk drive.

Note In the RAID group (pack), build a Disk Array using hard disk drives that have the same specifications (capacity, rotational speed, and standard).

1. See *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.

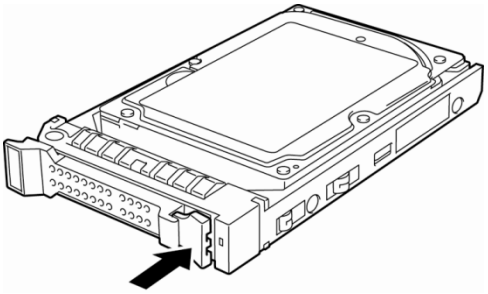
   Locate the slot where you install the hard disk drive.
   Install hard disk drives in ascending order of port number.

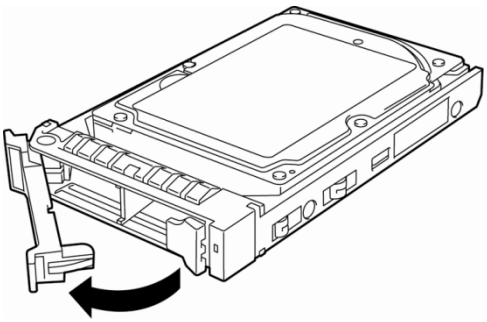
2. Remove the dummy trays.
   Dummy trays are installed in all slots.



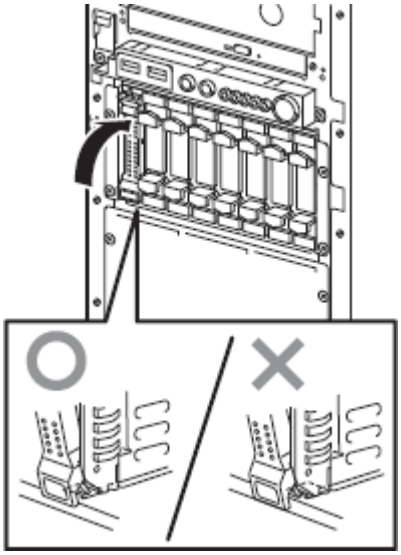
Note Keep the dummy trays for future use.

3. Unlock the handle of the drive carrier.





4. Hold the drive carrier firmly and insert it into the slot.



Note

- Push it all the way until the handle's lock touches the frame.
- Hold the drive carrier firmly with both hands.

5. Slowly close the handle.
   The drive carrier is locked making a clicking sound.

Note

When you push the drive into the slot, confirm the handle got hooked on the frame.

6. Turn on the server, start the SETUP utility, and then specify the boot order from the **Boot** menu. For details about the **Boot** menu, see *Chapter 3 (2. System BIOS Setup)*.

Tips

The saved boot order is cleared when a hard disk drive is added.

1.20.2 Removal

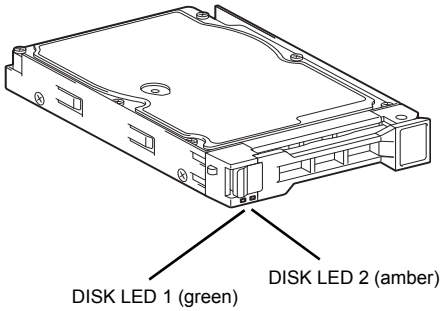
Remove a hard disk drive in the following procedure.

If you transfer or dispose of the removed hard disk drive, you must erase the stored data completely.

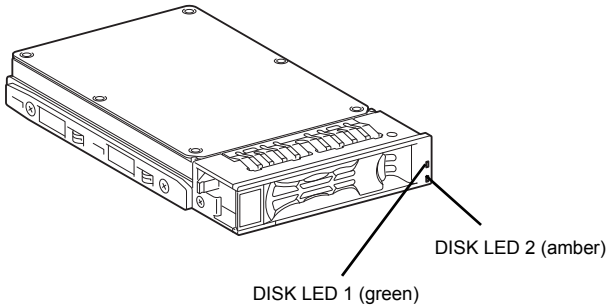
Important **NEC assumes no liability for data leakage should the product be transferred to a third party without erasing the data.**

Note If you have to remove a disk due to a hard disk drive failure, check the slot with its DISK LED lit in amber.

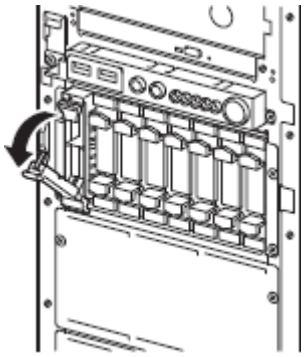
2.5-inch hard disk drive



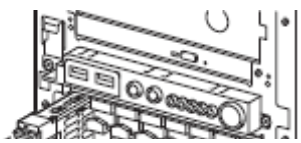
3.5-inch hard disk drive



1. See *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Push the lever to unlock and open the handle.



3. Hold the drive carrier firmly and pull out the hard disk drive.



4. If you intend to use the server while the hard disk drive is removed, fill the open slot with a dummy tray.

Note Do not pull the slot out from the handle. Doing so may damage the handle.

1.20.3 Replacing a hard disk drive in the RAID System

In the RAID System, you can use the auto rebuild feature to restore data back to the state before a failure occurred by writing the data saved before the replacement to a new hard disk drive after replacing the broken hard disk drive.

The auto rebuild feature is enabled in logic drives set to RAID 1, RAID 5, RAID 6, RAID 10, and RAID 50.

The disk is automatically rebuilt when hot swapping (replacing a disk while the power on) a failed hard disk drive.

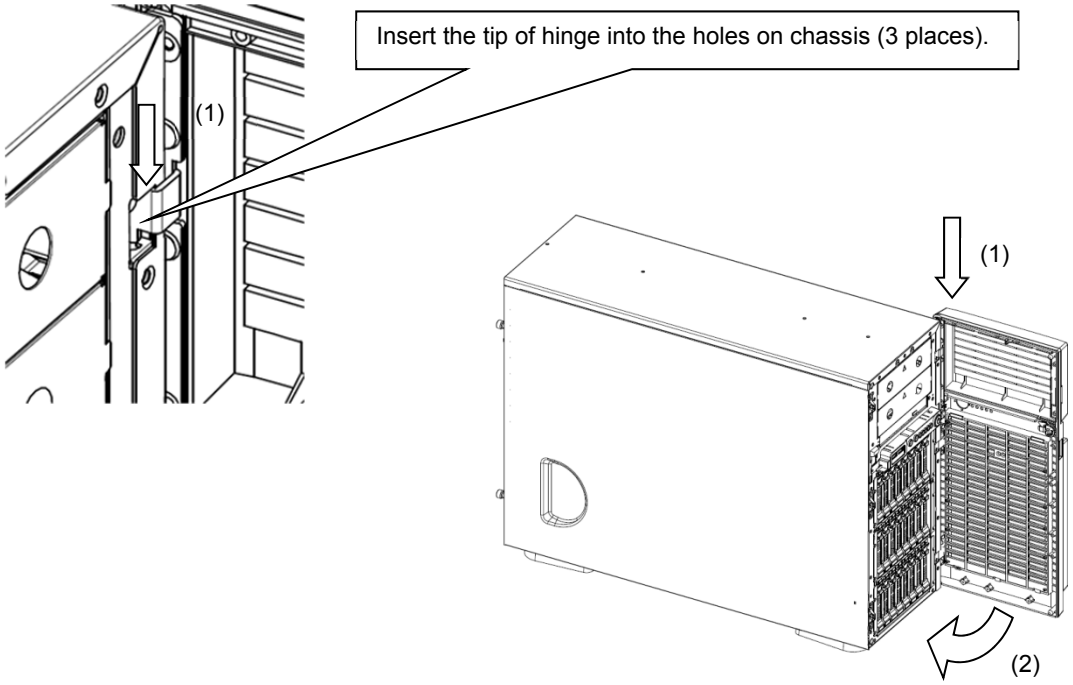
During the auto rebuild, the DISK LED on the hard disk drive flashes green and amber alternately to indicate that the autorebuild is being performed.

Observe the following precautions whenever executing the auto rebuild

- Do not turn off the server until the auto build completes after a hard disk drive fails.
- Leave an interval of at least 90 seconds between a hard disk drive removal and a hard disk drive installation.
- Do not replace a disk during the auto rebuilding of another hard disk drive (during an auto rebuild, the DISK LED on the hard disk drive flashes green and amber alternately).

1.21 Installing the Front Bezel

To install the front bezel, insert three tabs on left end of front bezel into frame holes on front right side of the server, and close the front bezel. After installation, lock the front bezel with Bezel Lock Key.



Important **Be careful not to press POWER Switch.**

1.22 Dust Proof Kit

The following dust proof bezels can be attached to this server.

- N8146-92 Dust Proof Kit

Note

The outer dimension after Dust Proof Kit is attached is as follows.

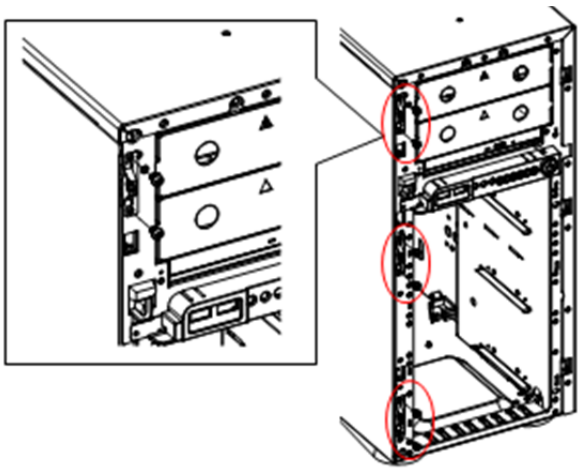
200.0 mm (width) X 613.5 mm (depth) X 438.0 mm (height) (projection excluded)

1.22.1 Installing Dust Proof Kit

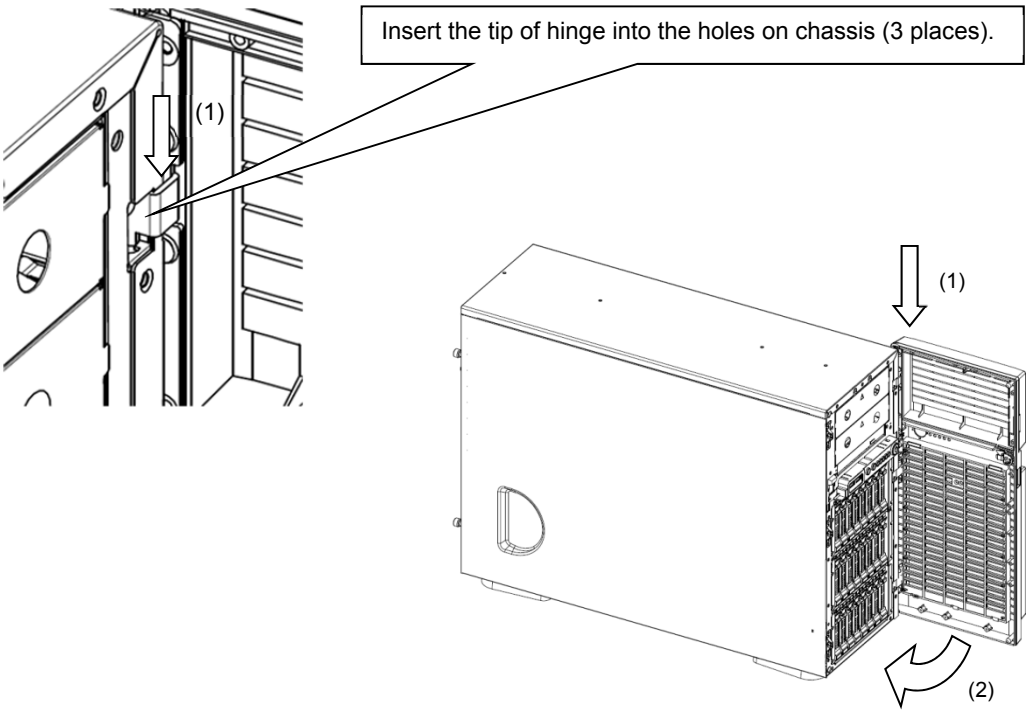
Perform the following steps to attach the Dust Proof Kit.

Perform steps 1 to 6 to attach the N8146-92 Dust Proof Kit.

1. See *Chapter 2 (1.3 Overview of Installation and Removal)* for preparations.
2. Remove the front bezel according to *Chapter 2* (*1.4 Removing Front Bezel*).
3. Mount the spring provided with the Dust Proof Kit to the front of chassis using two screws (3 places).



4. Install the front bezel to server chassis.



1.22.2 Removing Dust Proof Kit

To remove a Dust Proof Kit, reverse the installation procedure.

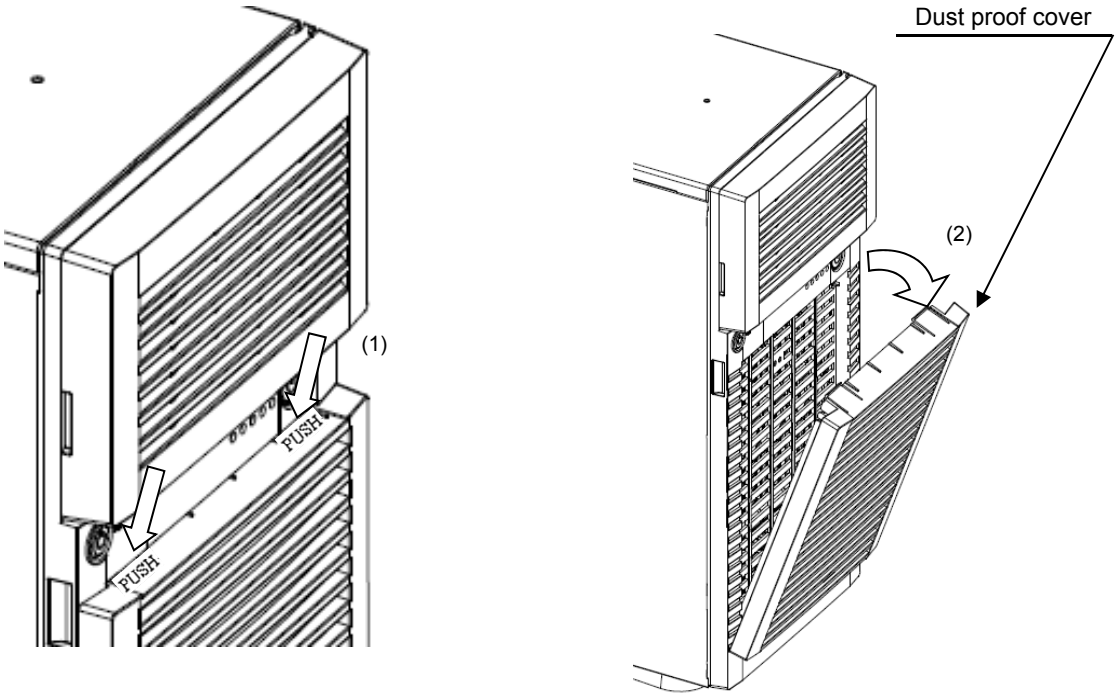
1.22.3 Replacement of Dust Proof Filter

The service life of dust proof filter is six months (recommended) or one year (maximum).

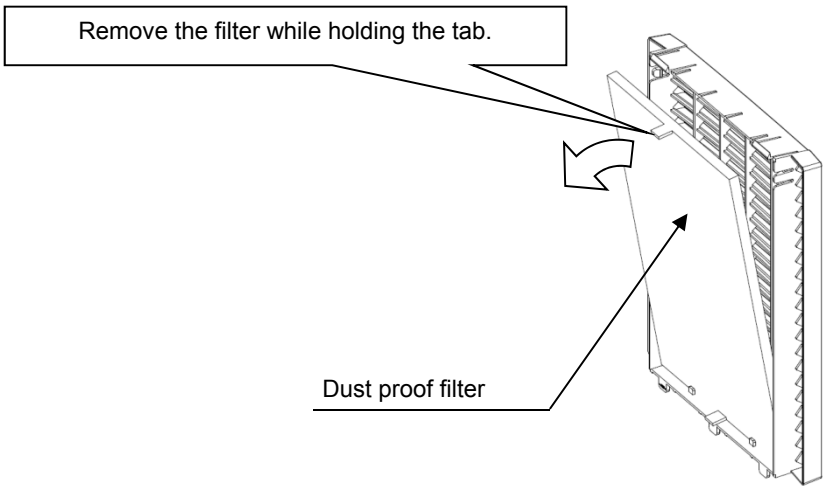
The life time depends on usage environment. Use N8147-24 Dust proof filter for replacement.

Important **If the server is operated for long time beyond the maximum service life, the temperature inside the device raises due to clogged dust, and may cause a device failure.**

1. Remove the dust proof cover by pushing down the portion marked with "PUSH" on dust proof cover.

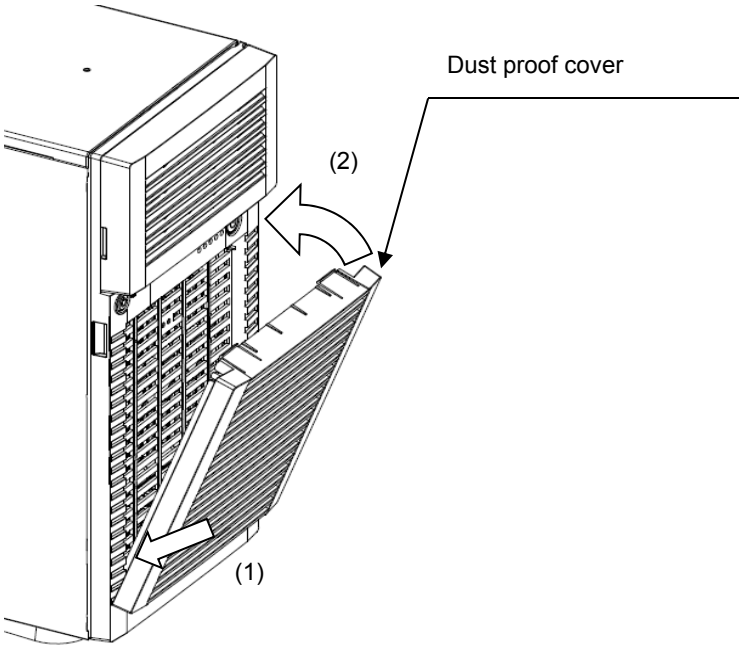


2. Remove the dust proof filter from inside of dust proof cover.



3. In the reverse procedure of removal, mount the filter to dust proof cover so that its tab faces toward you.

4. Install the dust proof cover to front bezel.



1.23 Dust Proof Bezel with Sensor

The following dust proof bezels can be attached to this server.

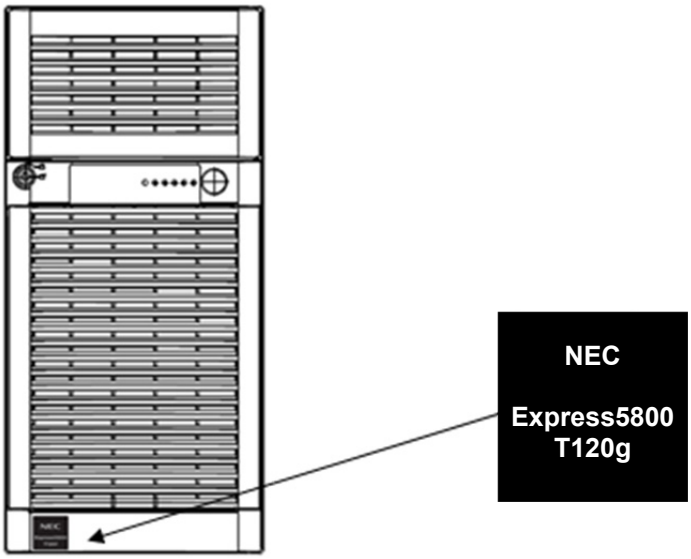
- N8146-91 Dust Proof Bezel with Sensor

Note The outer dimension after Dust Proof Kit is attached is as follows.

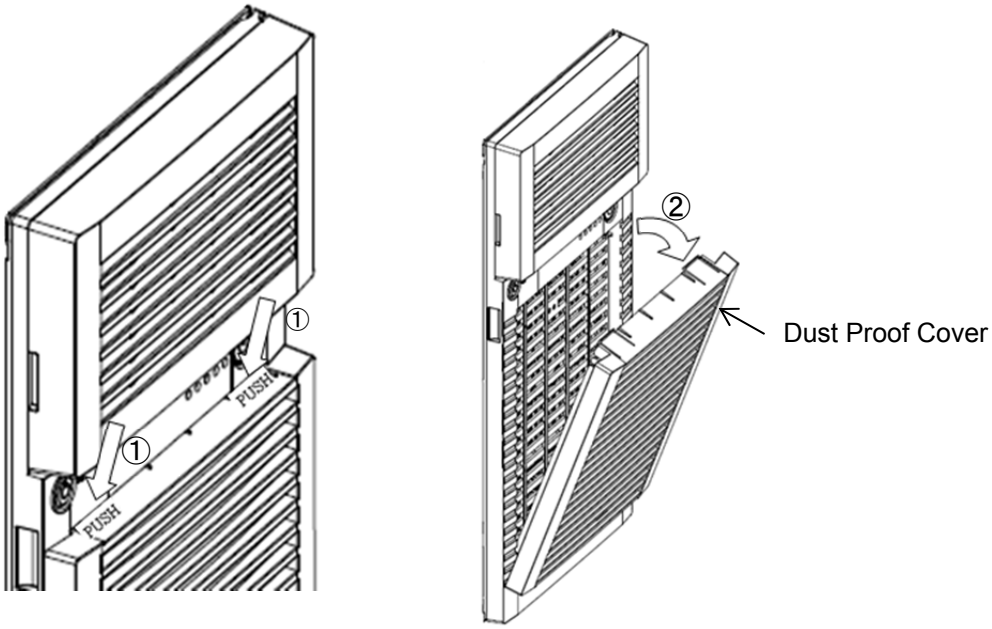
200.0 mm (width) X 613.5 mm (depth) X 438.0 mm (height) (projection excluded)

1.23.1 Installing Dust Proof Kit

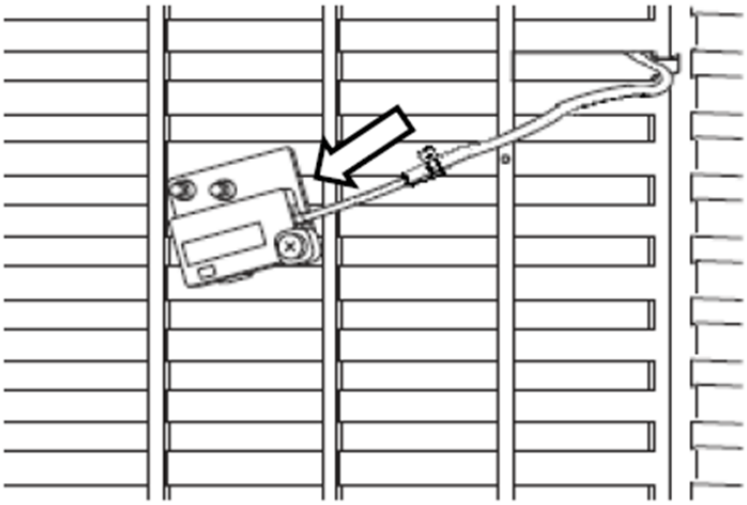
1. Stick a nameplate on the flat face of the dust-proof bezel lower part.



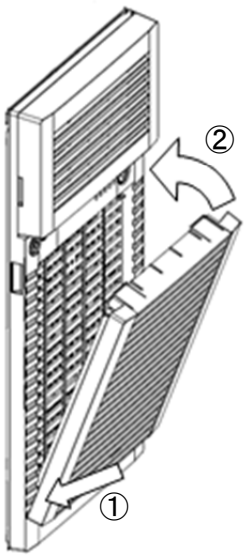
2. Push the dust proof cover as shown in figure below, and remove the dust proof cover.



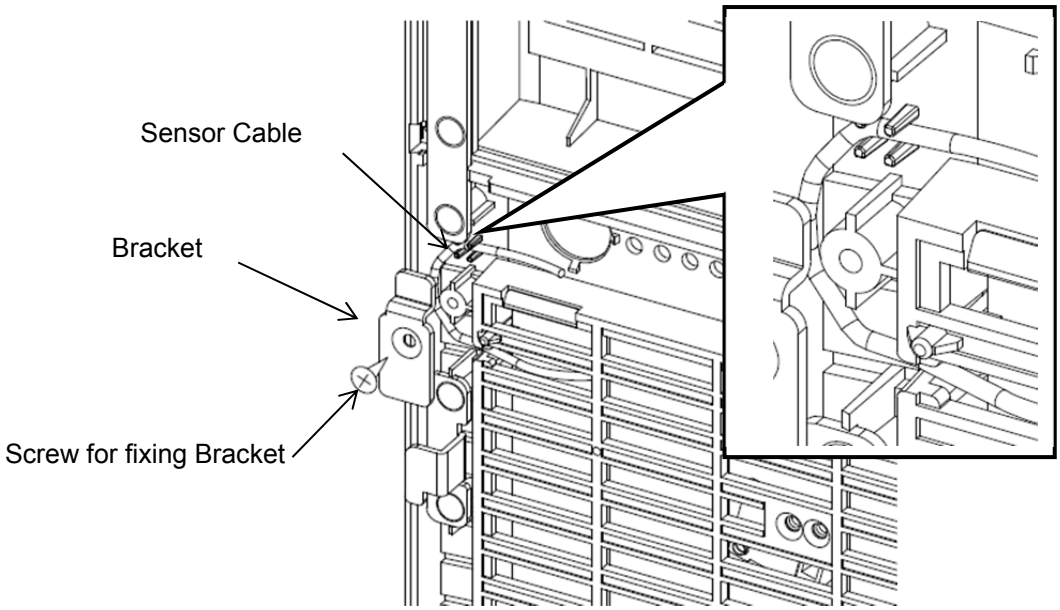
3. Pull the sensor cable from rear face of dust-proof bezel, and connect to filter replacement sensor as shown in figure below.



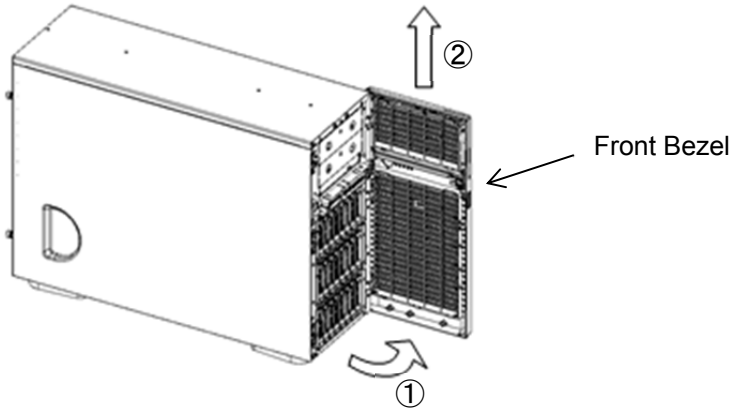
4. Install the dust proof cover to dust proof bezel as shown in figure below.



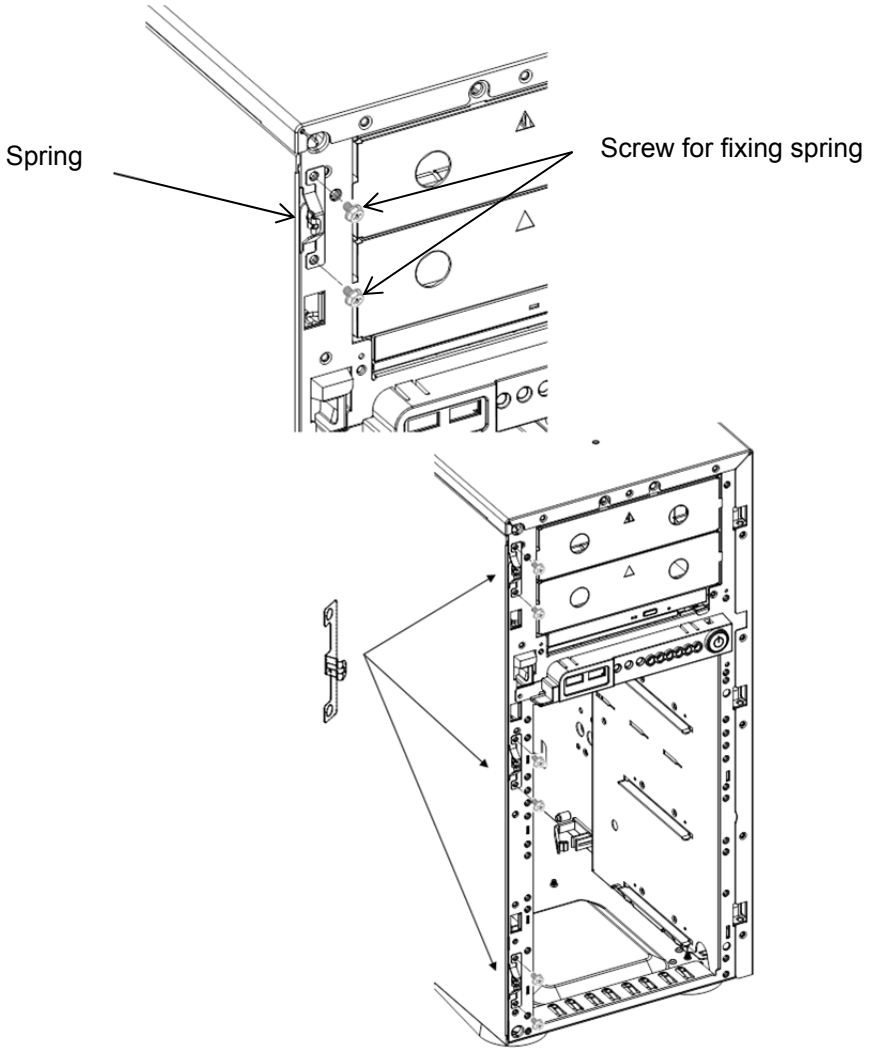
5. Secure sensor cable with bracket.



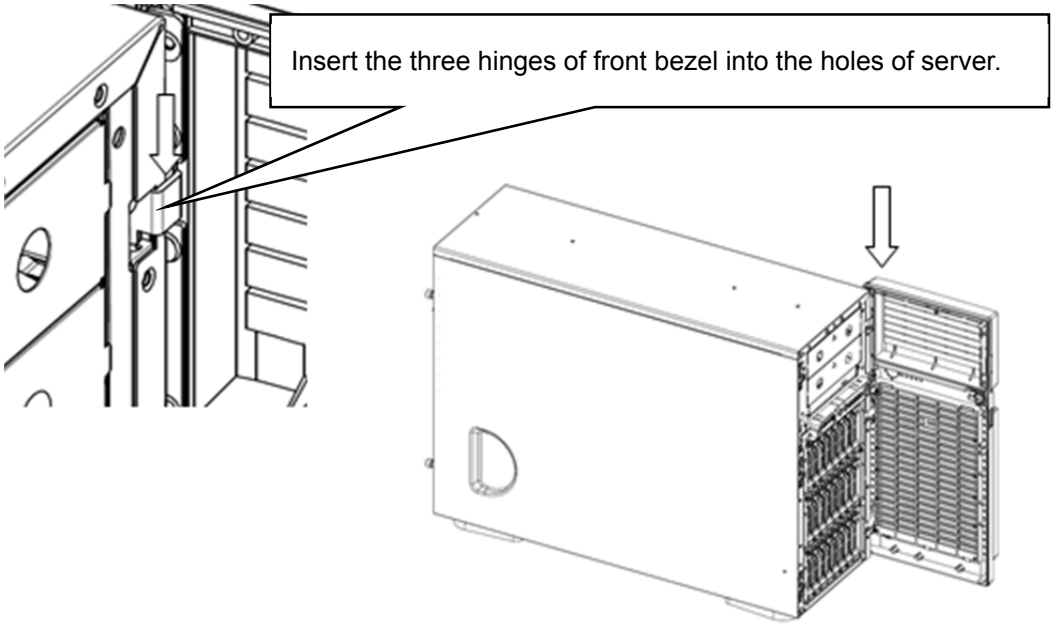
6. Lift the front bezel of the server as shown in figure below, then remove the front bezel.



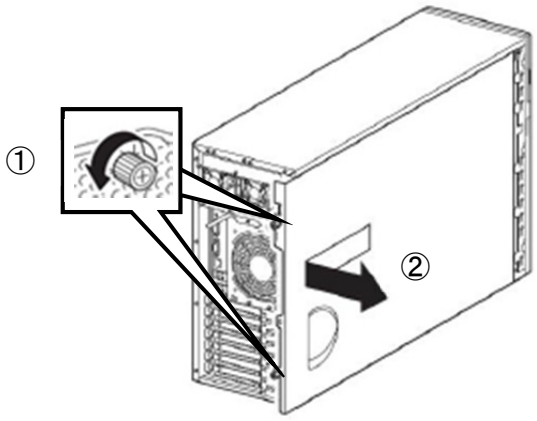
7. Install the 3 springs to the server as shown in figure below.



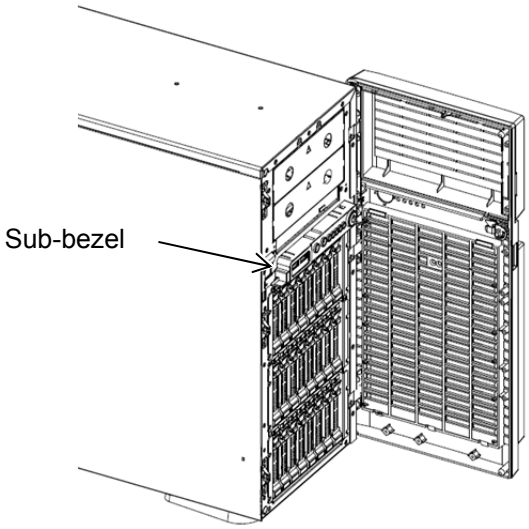
8. Install the dust-proof bezel to the server as shown in figure below.



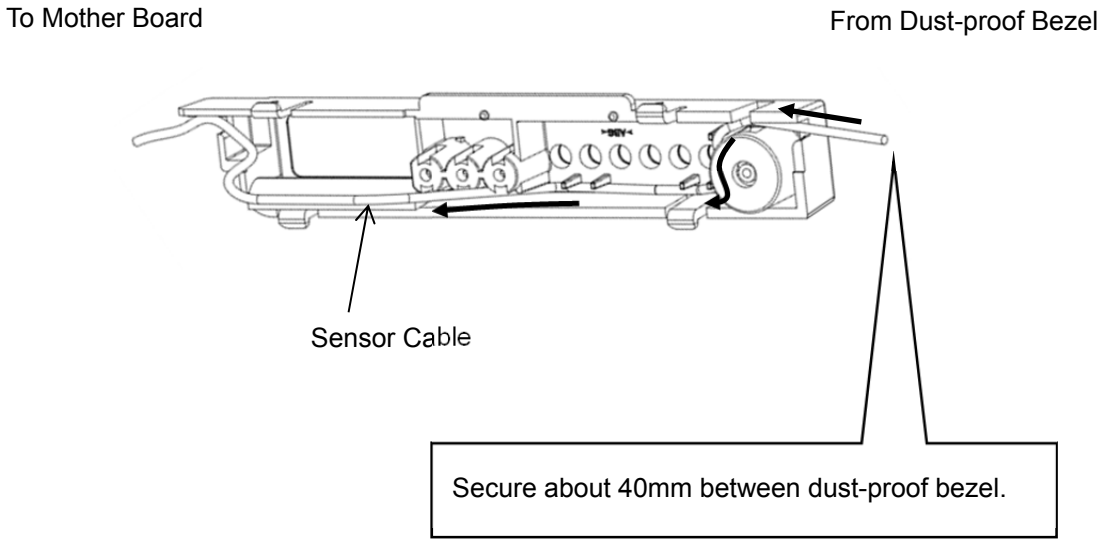
9. Remove side cover of the server.



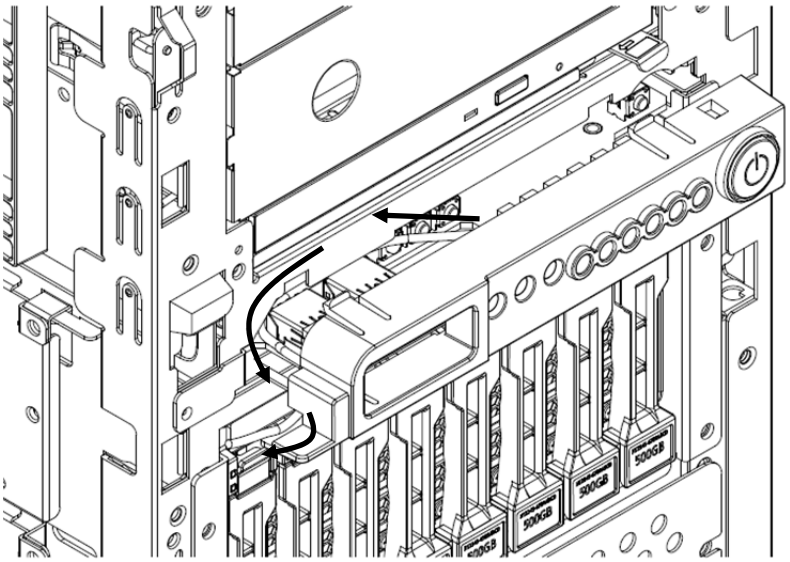
10. Remove sub-bezel of the server. Push the around catches (four places on top and bottom), and pull the sub-bezel.



11. Route the sensor cable in sub-bezel as shown in figure below.

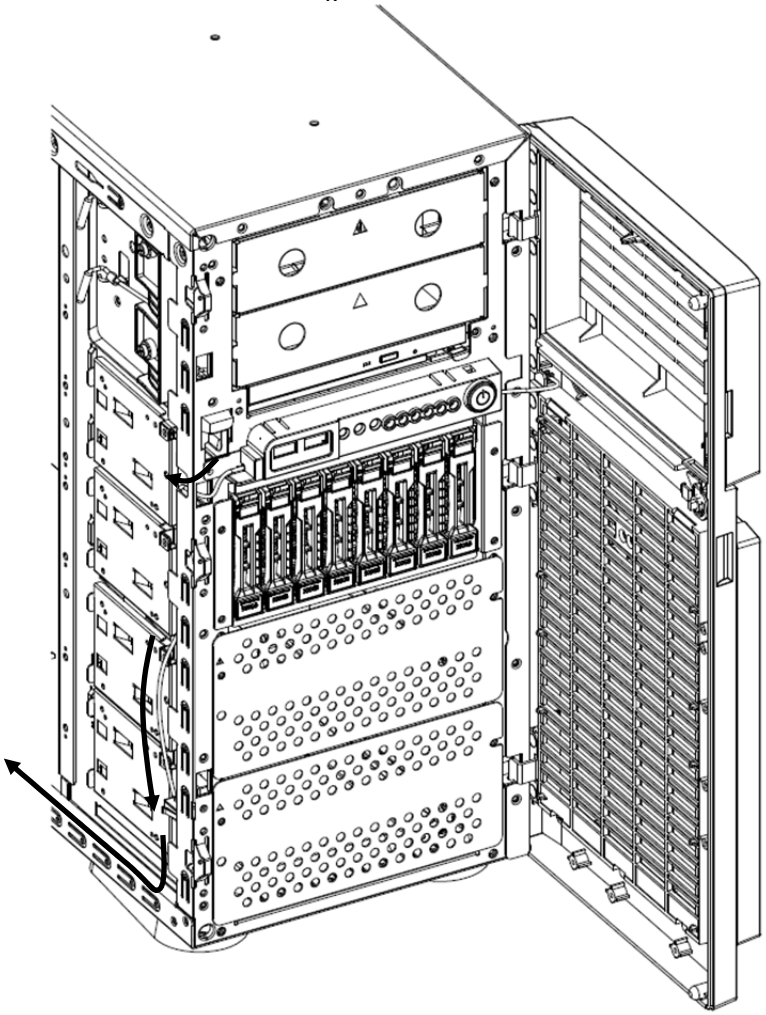


12. Install the sub-bezel, then pass the sensor cable through back of USB connectors.

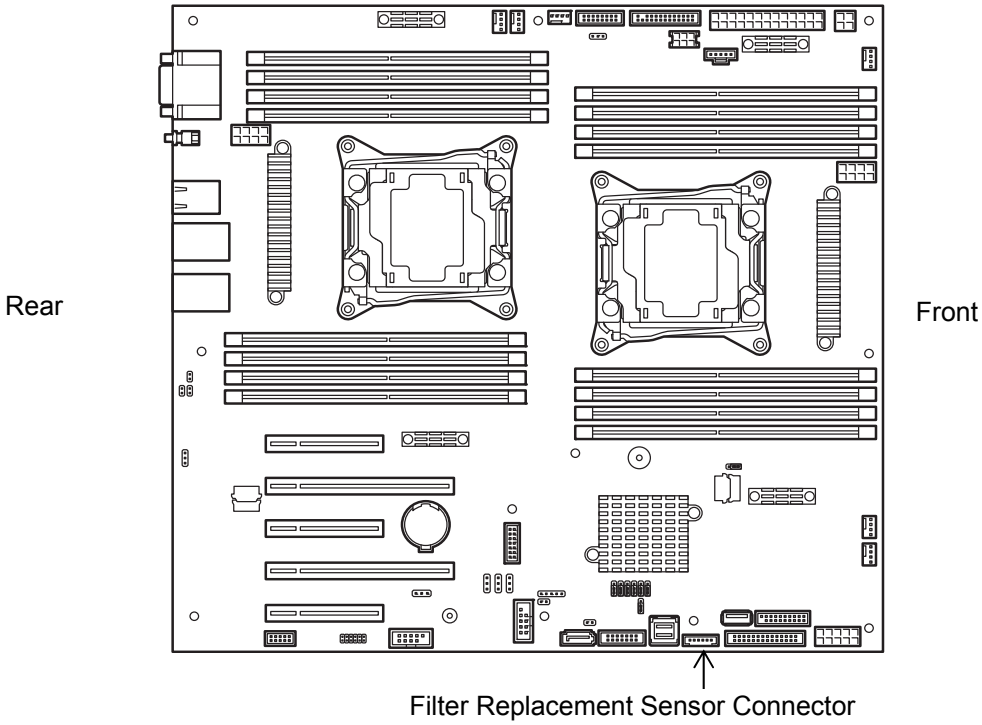


Note Be sure not to jam the sensor cable between the sub-bezel and the chassis.

13. Route the sensor cable as shown in figure below.



14. Connect the sensor cable to the connector on motherboard.



1.23.2 Removing Dust Proof Bezel with Sensor

To remove a Dust Proof Bezel with Sensor, reverse the installation procedure.

1.23.3 Replacement of Dust Proof Bezel

See Chapter 2 (1.22.3 Replacement of Dust Proof Filter) for replacement of a dust proof filter.

1.23.4 Filter Monitor Software Install

Regarding the installation procedure for the Filter Monitor Software, refer to
“Filter Monitor Software Instruction Guide” in the attached CD-ROM.

2. Installation and Connection

This section describes how to position the server and connect cables.

2.1 Installation

WARNING

Be sure to observe the following precautions to use the server safety. Failure to observe the precautions may cause death or serious injury. For details, see *Safety precautions* in *Precautions for Use*.

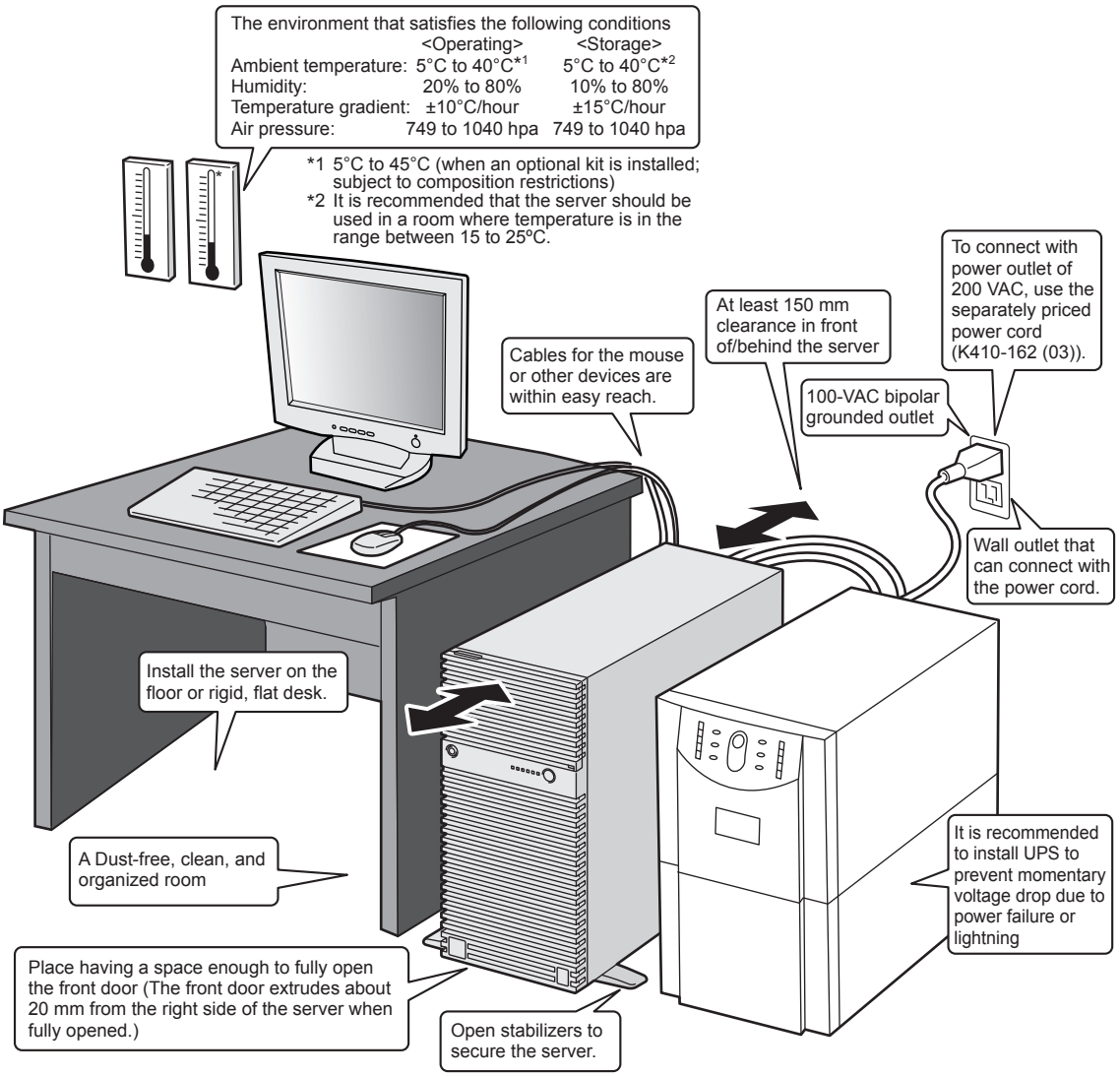
- **Use only in the specified environment.**
- **Do not connect the ground wire to a gas pipe.**

CAUTION

Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, see *Safety precautions* in *Precautions for Use.*

- **Do not carry or install the server only by a single person.**
- **Do not install the server so that the load may be concentrated on a specific point.**
- **Do not provide the wiring for the server to exceed the rating of the power supply.**
- **Do not use in the environment where corrosive gas is generated.**

The environment suitable for the server is as follows.

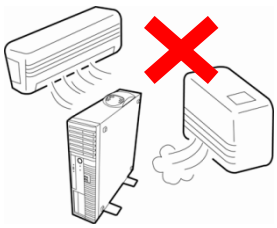


When you have selected a server site, hold the server by its bottom with at least two persons and carry it to the site, then place it slowly and gently.

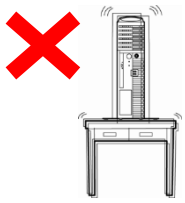
Important

- **Do not hold the server by its front bezel to lift the server. The front bezel may be disengaged and damage the server.**
- **Open the stabilizers and secure the server to the site.**
- **Do not hold the handle on the redundant power module when carrying the server.**

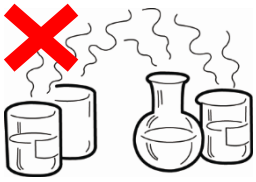
Do not install the server in an environment in which any of the following conditions apply: Installing the server in any of the following conditions will cause the server to malfunction.



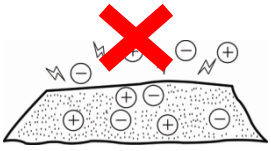
Place of drastic temperature change (near a heater, air conditioner, or refrigerator).



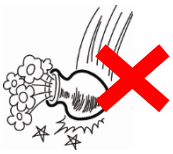
Place where intense vibration may be generated.



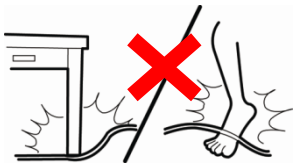
Places where corrosive gas is present (environments where there is sulfur vapor in the atmosphere), or places where chemicals are nearby or may be accidentally sprayed over.



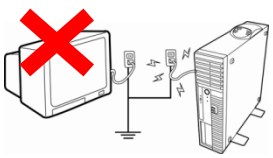
Place where a carpet not subject to anti-static process is laid.



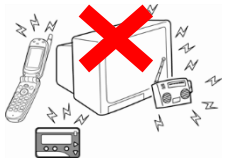
Place where some objects may be fallen.



Places where the power cords or interface cables might be stepped on or tripped over.



Place where the power cord of the server must be connected to an AC outlet that shares the ground wire with another outlet where another device with large power consumption is connected.



Place near a device generating intense magnetic field (such as TVs, radios, broadcast/communication antennas, power transmission wires, and electromagnetic cranes) is placed.

Do not install where there is power supply noise nearby (such as contact sparks when turning power on or off during power relays). (If you must install the server close to such equipment, have your maintenance service company separate power cables or install noise filter.)

2.2 Connection

Connect peripheral devices to the server.

Connectors that allow a variety of peripheral devices to be connected are provided at the front and rear of the server. The illustration below shows locations of peripheral devices and their connector available in standard configuration. First connect the peripheral devices and then connect the power cord to the server. After that, connect the power plug to the outlet.

WARNING

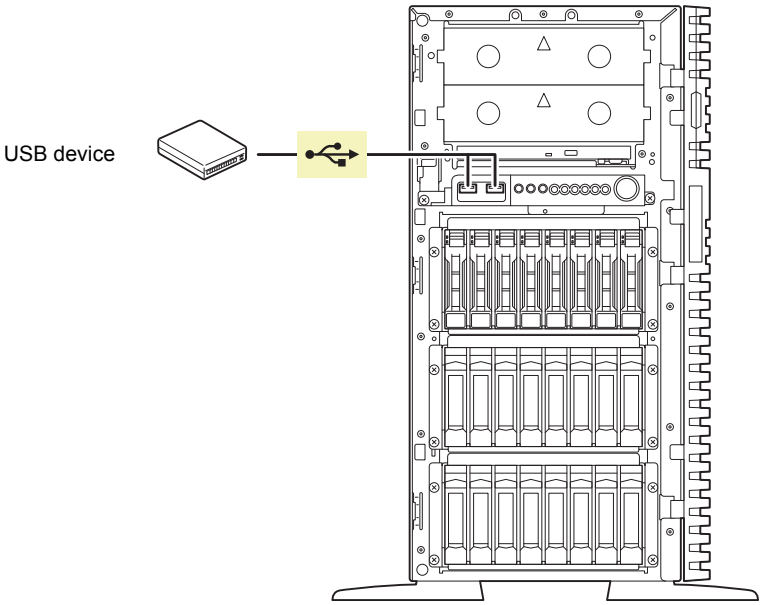
Be sure to observe the following precautions to use the server safety. Failure to observe the precautions may cause death or serious injury. For details, see *Safety precautions* in *Precautions for Use*.

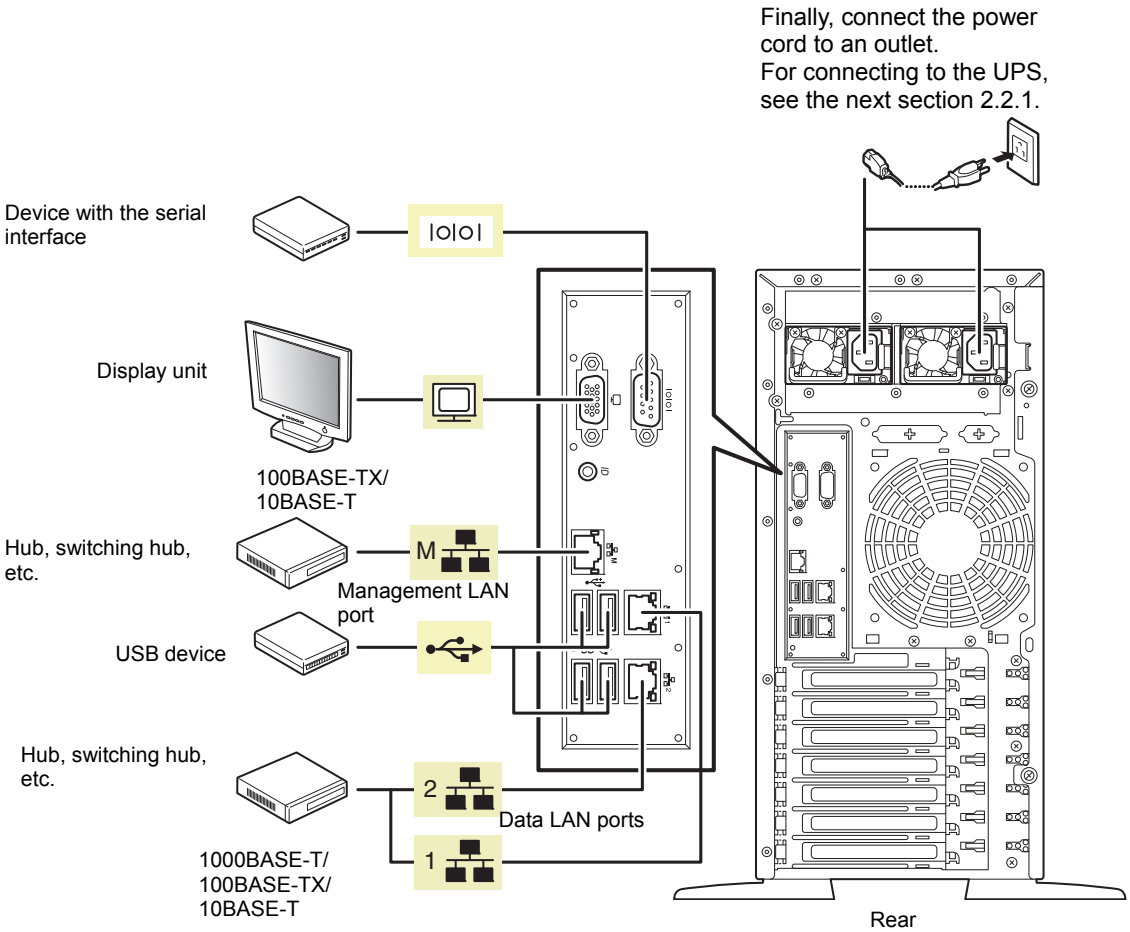
- **Do not hold the power plug with wet hands**
- **Do not connect the ground wire to a gas pipe**

CAUTION

Be sure to observe the following precautions to use the server safely. Failure to observe the precautions may cause burns, injury, and property damage. For details, see *Safety precautions* in *Precautions for Use.*

- **Use only the specified outlet to insert.**
- **Do not connect the power cord to an outlet that has an illegal number of connections.**
- **Insert the power plug into the outlet as far as it goes.**
- **Use only the specified power cord**
- **Do not connect or disconnect the interface cable with the power plugged in the outlet.**
- **Use only the specified interface cable**





Note To connect with a communications line, use the card that has been applied with a certifying organization.

Tips A dedicated line cannot be directly connected to the serial port connector.

Note the following precautions to connect cables.

- When the device is not Plug and Play device, turn off the server and devices to be connected before connecting.
- If connecting any peripheral device and its interface cable made by other companies (a third party), contact your sales representative to check if they can be used with the server beforehand.
- Fix the power cord or interface cable with cable ties.
- Make sure that no pressure is applied on the plug of power cord.

2.2.1 Connecting to a uninterruptible power supply (UPS)

To connect the power cord of the server to the uninterruptible power supply (UPS), use the connector output on the rear of the UPS. For details, refer to the manual supplied with the UPS.

When the power cord is connected to a UPS, the BIOS settings may need to be changed in order to link the server with the power supply from the UPS.

To change the settings, select **Server** and then **AC-LINK** in the BIOS setup utility, and change the displayed parameters. Select **Power On** to perform automatic operations by using the UPS. For details, see *Chapter 3 (2. System BIOS Setup)*.

NEC Express5800 Series
Express5800/T120g

3 Setup

This chapter describes how to set up the server.

1. **Turning on the Server**
   POST (Power-On Self-Test) is explained in this section.

2. **System BIOS Setup**
   You can customize the BIOS settings by following the instructions in this section.

3. **EXPRESSSCOPE Engine 3**
   EXPRESSSCOPE Engine 3 provides useful features through the Baseboard Management Controller (BMC).

4. **EXPRESSBUILDER**
   EXPRESSBUILDER helps you to install Windows and maintain the server.

5. **Installing Software Components**
   You can install Windows and bundled software by following the instructions in "*Installation Guide (Windows)*".

6. **Turning Off the Server**
   Turn off power when not using the server.

1. Turning on the Server

Pressing the POWER switch at the front of the server turns on the server.

Turn on the server by using the following procedure.

Tips Wait for at least 30 seconds before turning on the server after turning it off.

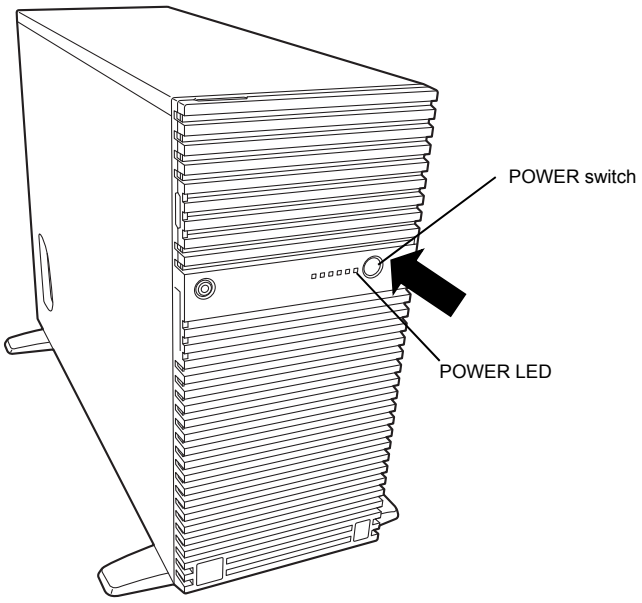
1. Turn on the peripheral devices and display unit.

Note If the power cord is connected to power control system such as an Uninterruptible Power Supply (UPS), make sure that the power control system is turned on.

2. If STATUS LED1, 2 are lighting green or amber, wait until it goes off.

3. Press the POWER switch at the front of the server.
   The POWER LED is turned on green and after a while, logo appears on the display.

Important **Do not connect or disconnect USB device while POST is running.**



While logo is being displayed, the self-diagnostic program (POST) runs and diagnoses the hardware.

For details, see Chapter 3 (1.1 POST).

1.1 POST

Power-On Self-Test (POST) is a self-diagnostic program stored in the server as standard. POST automatically runs immediately after the server is turned on and checks the motherboard, DIMM, and processor (CPU). POST also displays the start-up messages of different utilities during the operation.

Usually, you do not need to check the contents of POST. However, check messages displayed at POST in the following cases.

- When introducing a server
- If you suspect a failure
- When you hear beep many times during the time between Power ON and OS startup
- When any error message is displayed

1.1.1 POST sequence

Explains how POST runs in order.

1. When the server is turned on, POST starts, and an initialization message is displayed. The message to tell initialization of a memory and a PCI device. After an initialization message was displayed, a logo appears on the screen.

Note

- Keyboard becomes operable after the logo appears.
- While an initialization message is displayed, a screen is sometimes switched over to the screen by which nothing is displayed (black screen) several times. It's no problem for operation.
- An initialization message and logo may not be displayed by the occasion with which an option VGA controller was connected and setting of a BIOS setup utility (SETUP).
- An initialization message is not displayed on the console redirection screen of a serial port.

2. If Enabled is specified for Password On Boot in Security menu of SETUP, you will be prompted to enter password after the logo is displayed. If you enter the incorrect password three times consecutively, POST aborts. (You can no longer proceed.) In this case, power off the server, and power it on.

Important **Do not set a password before OS is installed.**

3. If the <Esc> key is pressed, the logo disappears and the details of POST are displayed.

Tips If **Quiet Boot** is **Disabled** from **Boot** menu in BIOS settings, the logo is not displayed without requiring <ESC> key to be pressed.

4. After a while, the following message is displayed on the screen.

   ```
   Press <F2> SETUP, <F3> Internal Flash Memory, <F4> ROM Utility, <F12> Network
   ```

   By pressing the designated function key following messages, you can call the functions below upon completion of POST.

   <F2> key: Run BIOS Setup Utility (SETUP). For information on the SETUP, see *Chapter 2 (1. System BIOS)* in "*Maintenance Guide*".

   <F3> key: Run EXPRESSBUILDER from Internal Flash Memory (optional). For information on EXPRESSBUILDER, see *Chapter 3 (4. EXPRESSBUILDER)*.

   Note If bootable CD/DVD is inserted into optical disk drive, the system starts from CD/DVD even if <F3> key is pressed.

   <F4> key: Run the offline tool. For information on the offline tool, see *Chapter 1 (9. Offline Tools) in "Maintenance Guide*".

   <F12> key: Boot from network.

5. When **Legacy** is specified for **Boot Mode**, if a controller which has its dedicated BIOS such as a RAID Controller is installed, a message that prompts you to start the dedicated utility to configure the card is displayed.

   Example: If an optional RAID Controller is installed

   ```
   Press <Ctrl> <R> to Run MegaRAID Configuration Utility
   ```

   The utility starts by pressing the <Ctrl> + <R> keys.

   For details on the utility, refer to the manual supplied with each optional board.

   Depending on the configuration, the message "Press Any Key" might appear to prompt a key entry. This is a behavior of the BIOS of the optional board. Continue to operate after checking the manual of the optional board.

6. If one of the following conditions is met when **Secure Boot** is set to **Enabled** in **Security** menu and **Invalid Signature Detection** is set to **Halt** in BIOS Setup Utility (SETUP), a message will be displayed saying that invalid signature data was detected:

   ・The boot image in a bootable device is unsigned

   ・The signature of the boot image in a bootable device is illegal

   In such case, turn off this server and check whether the signature of the boot image in a bootable device is correct. Connect the device for which Secure Boot is enabled to the server, and then turn on the server again.

7. The OS starts when POST is completed.

Tips

- When no bootable device is connected, the following message is displayed by terminating POST.

  Bootable media is not found.

  Press <F2> to enter SETUP.

  Press the <F2> key to boot the BIOS setup utility (SETUP).

- Even when any bootable device is connected, the following message may be displayed by stopping the utility.

  Bootable media is not found.

  Please restart this computer.

  In this case, the BIOS setup utility (SETUP) cannot be booted.

1.1.2 POST error messages

When POST detects an error, it displays an error message on the screen or beeps for some errors. For descriptions of error messages, causes, and countermeasures, see *Chapter 3 (1. POST Error Message)* in "*Maintenance Guide*".

Note Take notes on the indication displayed on display unit before consulting with your sales representative. Alarm messages are useful information for maintenance.

2. System BIOS Setup

This section describes how to configure Basic Input Output System (BIOS). Make sure you have read and understood this section to configure properly.

2.1 Overview

BIOS Setup Utility (SETUP) is a utility to do basic hardware settings. This utility is installed in a flash memory in the server as standard and can be run without requiring a media for boot.

BIOS settings were configured with optimal settings before the server was shipped to you. Therefore, in most of cases, you should not need to use the SETUP. **Use only when the case applies to any of cases described in *Chapter 3 (2.4 Basic Cases that Require Configuration)***.

2.2 Starting SETUP Utility

Run POST following *Chapter 3 (1.1.1 POST sequence)*.

After a while, the following message will be displayed on the lower left of the screen. (The on-screen message depends on your environment.)

```
Press <F2> SETUP, <F3> Internal Flash Memory, <F4> ROM Utility, <F12> Network
```

If you press the <F2> key, SETUP starts upon completion of POST, and the **Main** menu is displayed.

Tips

In Legacy boot mode, you can also launch SETUP by pressing the <F2> key while expanding option ROM.

Password

If you have set a password, a message prompt you to enter password will be displayed.

```
Enter password [                ]
```

You can attempt password entry up to 3 times. **If you entered a wrong password 3 times, operation stops.** (You cannot operate further.) Turn off the power.

Saving changes

If you finish configuration, select **Save & Exit** and then **Save Changes and Exit** to save changes and exit.

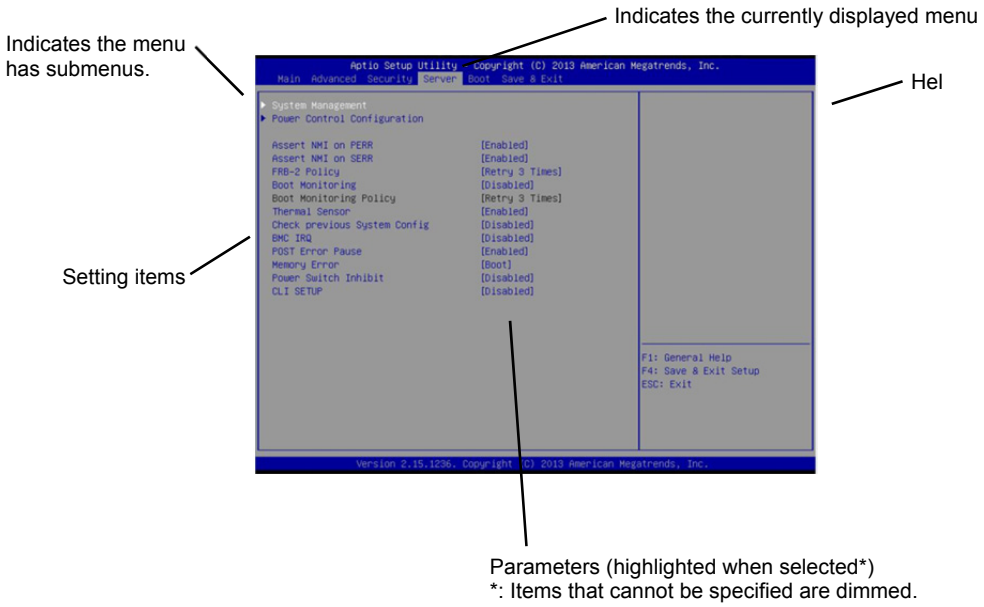
If you wish to exit without saving the changed parameters, select **Save & Exit** and then **Discard Changes and Exit**.

Tips

- If you wish to restore the setting to default values, select **Save & Exit** and then **Load Setup Defaults**.
- The default value might be different from the factory setting.
- You cannot restore the default value in the following submenus in **Advanced** menu:
  – **iSCSI Configuration** submenu
  – **UEFI Driver Configuration** submenu

2.3 Description on On-Screen Items and Key Usage

This section shows display examples and how to control the key. Use the keyboard to work with the SETUP utility.

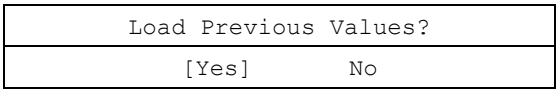


- ☐ Cursor keys (<↑>, <↓>)
  Select an item displayed on the screen. If characters of an item are highlighted, that means the item is currently selected.
- ☐ Cursor keys (<←>, <→>)
  Select menus including **Main**, **Advanced**, **Security**, **Server**, **Boot**, and **Save & Exit**.
- ☐ <–> key/<+> key
  Change the value (parameter) of the selected item. You cannot use this key when a menu which has ▶ on the left is selected.
- ☐ <Enter> key
  Press this key to confirm the selected parameter.
- ☐ <Esc> key
  Pressing this key cancels pop-up window. On the submenu, pressing this key takes you to the previous screen. On the top menu, the following window is displayed. If you select **Yes**, SETUP closes without saving the changed parameters.

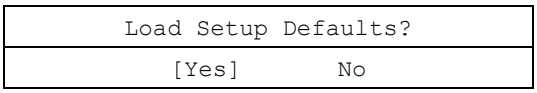
Quit without saving?
[Yes] No

- ☐ <F1> key
  Press this key to display help information. If you need help using SETUP, press this key. Press <Esc> key to go back to the original screen.

☐ <F2> key
If you press this key, the following window appears. If you select **Yes**, the previous parameter(s) are restored. If you have saved changes by selecting **Save & Changes**, pressing the <F2> key restores the saved value.

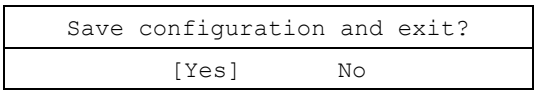


☐ <F3> key
If you press this key, the following window appears. If you select **Yes**, restore the parameters of the currently selected item to the default setting. (**This might be different from the parameters configured before shipment.**)



Note The values set on **iSCSI Configuration** submenu and **UEFI Driver Configuration** submenu are not returned to the default setting.

☐ <F4> key
If you press this key, the following window appears. If you select **Yes**, the parameter you configured is saved and SETUP closes.



2.4 Basic Cases that Require Configuration

Only if a case applies to any of following cases, use the SETUP utility to change a parameter which was configured as shipping defaults. A list of SETUP parameters and shipping defaults are described in ***Chapter 2 (1. System BIOS)*** **in "*Maintenance Guide*".**

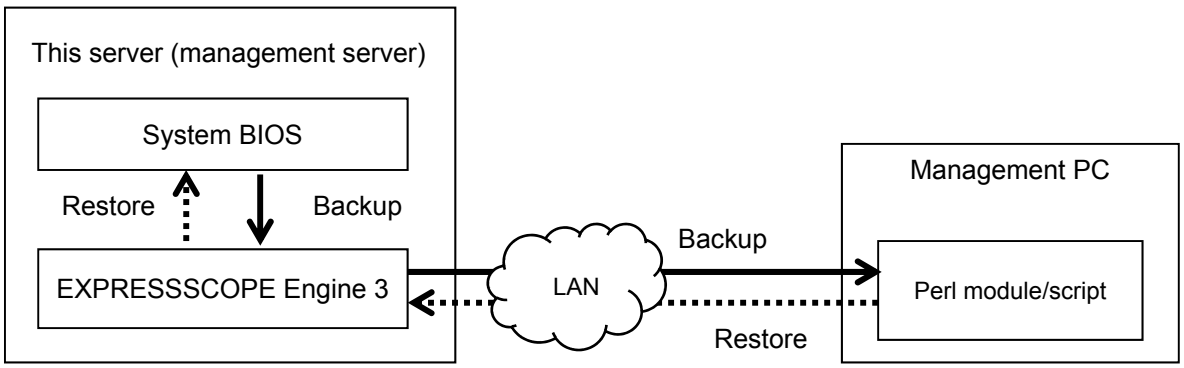
Category	Description	To be changed	Remark
Basic	Change date and time	Main → System Date Main → System Time	**Configurable on OS**
	On/Off NumLock on power ON	Boot → Bootup Numlock State → ON or OFF	
	On/Off the function to display NEC logo during POST	Boot → Quite Boot → Disabled	**By pressing <Esc> key, prevent the display of the logo.**
Memory	Add or change DIMM	Advanced → Memory Configuration → Memory Retest → Yes	**After rebooting, Memory Retest changes No automatically.**
	Use memory RAS feature	Advanced → Memory Configuration → Memory RAS Mode → change to RAS mode	**Some of RAS features may not be used depending on DIMM configuration.**
Optional board	Start the system from installed option board.	Advanced → PCI Configuration → PCI Device Controller and Option ROM Settings → PCIXX Slot Option ROM → Enabled	**XX is PCI slot number of the installed option board**
Boot	Set the boot mode to UEFI mode according to your OS.	Boot → Boot Mode → UEFI Select UEFI mode for the following OS. – Windows Server 2012 – Windows Server 2012 R2	**See "Before Starting Setup" in Chapter 1 (Installing Windows) in Installation Guide to determine the boot mode.**
	Set the boot mode to Legacy BIOS mode according to your OS.	Boot → Boot Mode → Legacy Select Legacy mode for the following OS. – Windows Server 2008 R2	**See "Before Starting Setup" in Chapter 1 (Installing Windows) in Installation Guide to determine the boot mode.**
	Change the boot order of devices	Boot → Boot Option Priorities → Change the boot priority	**When you use EXPRESSBUILDER DVD (option), set CD/DVD to the highest priority.**
	Use remote power on feature (via RTC alarm)	Advanced → Advanced Chipset Configuration → Wake On RTC Alarm → Enabled	
	Use console redirection feature	Advanced → Serial Port Configuration → Console Redirection Settings → Change respective setting.	**In console redirection connection, if the corrupted text is displayed on terminal screen, change font type (character code) appropriate to your environment.**
	Enable X2APIC feature according to your OS.	Advanced → Processor Configuration → X2APIC → Enabled Enable X2APIC for the following OS. – Windows Server 2012 – Windows Server 2012 R2	**See "Before Starting Setup" in Chapter 1 (Installing Windows) in Installation Guide to select Enabled or Disabled.**
	Disable X2APIC feature according to your OS.	Advanced → Processor Configuration → X2APIC → Disabled Disable X2APIC for the following OS. – Windows Server 2008 R2	**See "Before Starting Setup" in Chapter 1 (Installing Windows) in Installation Guide to select Enabled or Disabled.**
Security	Set a password	Security → Administrator Password → Enter a password (Set a password for Administrator first and then User)	**There are two types of password; Administrator and User. Settings for User password is limited compared to for Administrator.**
	Restrict bootup by entering password	Security → Password on Boot → Enabled	**Can be selected when password is set.**

Category	Description	To be changed	Remark
	Execute TBOOT (Trusted Boot) using the option TPM kit.	Mount the option TPM kit, select [Security] and set the following items under the [Trusted Computing] submenu to [Enabled]. ・[TPM Support] ・[TPM State] ・[TXT Support]	Do not disable TPM with the TPM management module with [TXT Support] set to [Enabled] and the OS started. Otherwise, it will no longer be possible to change [TPM Support] and [TXT Support]. In that case, execute [Save & Exit] and [Load Setup Defaults].
UPS Powerlink	When the server is supplied with power from UPS, always turn on the power.	Server → Power Control Configuration → AC-LINK → Power On	
	If it is turned off by using POWER switch, leave it off even when UPS supplies power.	Server → Power Control Configuration → AC-LINK → Last State	
	Keep the power off even when UPS supplies power.	Server → Power Control Configuration → AC-LINK → Stay off	

2.5 BIOS setting by network

2.5.1 Overview

You can backup and restore the BIOS setting via EXPRESSSCOPE Engine 3 by incorporating XPRESSSCOPE Engine 3 and BIOS.



Tips

See “EXPRESSSCOPE Engine 3 Scripting Guide” for the environment required for backup and restore of the BIOS setting, Perl modules and sample scripts.

☐ Backup

You can download XML format files describing the BIOS setting (hereinafter called BIOS setting file) remotely via EXPRESSSCOPE Engine 3.

Turn off the power of this server or activate OS before downloading. You cannot download the BIOS setting file under the following conditions.

・During POST

・Immediately after the completion of POST

・Immediately after turning off the power of this server

Tips

- It may take several minutes to enable downloading after the completion of POST and turning off the power. Wait for a while before downloading.
- The time to enable downloading may vary depending on the configuration and the operating condition of this server.

☐ Restore

You can restore the BIOS setting by uploading the BIOS setting file remotely via EXPRESSSCOPE Engine 3. The uploaded BIOS setting file will be reflected to BIOS when the server is booted next time.

Turn off the power of this server or activate OS before uploading. You cannot upload the BIOS setting file under the following conditions.

・During POST

・Immediately after the completion of POST

・Immediately after turning off the power of this server

Tips

- It may take several minutes to enable downloading after the completion of POST and turning off the power. Wait for a while before downloading.
- The time to enable downloading may vary depending on the configuration and the operating condition of this server.

2.5.2 Backing up the BIOS setting

This section describes how to back up the BIOS setting file from the management PC via a network.

1. Turn off the power of this server or activate OS.
2. Execute Perl scripts.

   The following processes are executed in the sample Perl script.

   ・HTTPS (or HTTP) connected to EXPRESSSCOPE Engine 3

   ・Login to EXPRESSSCOPE Engine 3

   ・Downloading the BIOS setting file

   Tips

   See “EXPRESSSCOPE Engine 3 User’s Guide” or “EXPRESSSCOPE Engine 3 Scripting Guide” for the user setting required for login to EXPRESSSCOPE Engine 3.

3. Store the output BIOS setting file to any folder as a backup file.

2.5.3 Restoring the BIOS setting

This section describes how to restore the BIOS setting file from the management PC via a network.

1. Refer to the backed up BIOS setting file and change the “operation” attribute of the “request_id” element from “response” to “request”.

   Note

   Save the file in the following format.

   ・Character code: Unicode

   ・Encoding: UTF-8

   ・Line feed code: [CR+LF]

   Tips

   Do not change other attribute than “operation” of the “request_id” element. If you change any other attribute, you may not restore the file correctly.

■Before change (Example of the backed up BIOS setting file)

```
<?xml version="1.0" encoding="UTF-8"?>
<root xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsl="http://www.w3.org/1999/XSL/Transform" version="1.0">
 <component name="BIOS">
  <target>
    :  (omitted)
  <target>
  <request_id operation="response"/>
  <category name="Server" id="1">
    :  (omitted)
  </category>
 </component>
</root>
(※Descriptions for some items are ommitted )
```

Tips The “operation” attribute of the “request_id” element indicates the request information of the BIOS setting file. It is set to “response” when the BIOS setting file is downloaded.

■After change (Example of the BIOS setting file to be restored)

```
<?xml version="1.0" encoding="UTF-8"?>
<root xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:xsl="http://www.w3.org/1999/XSL/Transform" version="1.0">
 <component name="BIOS">
  <target>
    :  (Omitted)
  <target>
  <request_id operation="request"/>
  <category name="Server" id="1">
    :  (Omitted)
  </category>
 </component>
</root>
```

(※Descriptions of some items are omitted.)

2. Turn off the power of this server or activate OS.

3. Execute Perl scripts.

The following processes are executed in the sample Perl script.

・HTTPS (or HTTP) connected to EXPRESSSCOPE Engine 3

・Login to EXPRESSSCOPE Engine 3

・Uploading the BIOS setting file

Tips See ”EXPRESSSCOPE Engine 3 User’s Guide” or “EXPRESSSCOPE Engine 3 Scripting Guide” for the user setting required for login to EXPRESSSCOPE Engine 3.

4. Turn on the power of this server if it is turned off. Restart OS if it has been started.

Tips

- The message notifying a change of the BIOS setting is displayed during POST. Then, this server automatically restarts.
- Download the BIOS setting file after the completion of POST and confirm that the BIOS setting has been restored.

2.5.4 Notes

- **You can't back up or restore the following settings.**
  - [Main] - [System Language]
  - [Main] - [System Date]
  - [Main] - [System Time]
  - iSCSI Configuration sub menu
  - UEFI Driver Configuration sub menu
  - Booting priority of each device type ([Boot] - [CD/DVD Priorities], [Removable Priorities]、[HDD Priorities], [Network Priorities])
- Display only menus (status and Revision) may not be backed up and restored
- You can't restore the backed up BIOS setting file for a different model.
- You can't restore the backed up BIOS setting file for a different BIOS version.
- A part of the BIOS setting is not reflected if the file is restored after changing the hardware configuration. Example: When you change the BIOS setting file backed up in the standard riser card configuration and restore it, you cannot restore the PCI3C Slot Option ROM setting.
- When you have restored the file after the completion of POST (after starting OS), upload the BIOS setting file and restart this server to reflect the setting to BIOS.
- It may take several minutes to download and upload the BIOS setting file. If you cannot download the file in 10 minutes or more while you use the remote KVM and remote media function of EXPRESSSCOPE Engine 3, disable these functions. Then, wait until the completion.

3. EXPRESSSCOPE ENGINE 3

3.1 Overview

EXPRESSSCOPE Engine 3 provides a variety of features using BMC (Baseboard Management Controller), which is a system management LSI.

EXPRESSSCOPE Engine 3 monitors the power unit, fans, temperature, and voltage of the server. If you have the management LAN port connected to the network, you can remotely perform the following over a web browser or SSH client:

- Manage the server
- Remotely control the keyboard, video, and mouse (KVM)*
- Remotely access a CD/DVD/floppy disk/ISO image/USB memory*.

* To enable this feature, the optional license for remote management (N8115-04) is required.

To actualize these functions, virtual USB mass storage (Remote FD, Remote CD/DVD, Remote USB Memory, or Virtual Flash) is always connected as USB mass storage.

3.2 EXPRESSSCOPE ENGINE 3 Network configuration

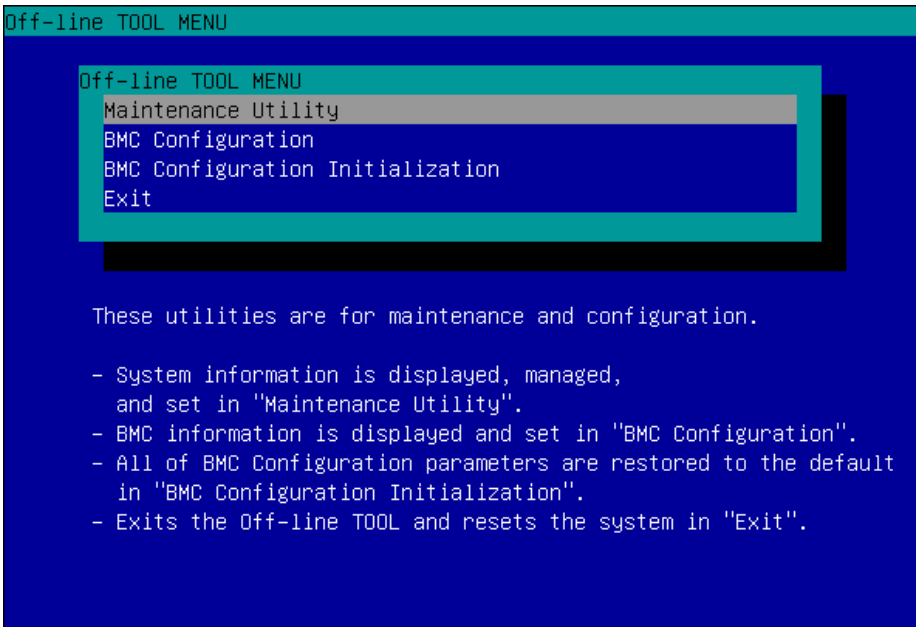
To enable EXPRESSSCOPE Engine 3 to be used via network, network configuration is required. Below is an example of the configuration procedure which enables EXPRESSSCOPE Engine 3 to be used via a web browser.

1. Run POST following *Chapter 3* (*1.1.1 POST sequence*). Wait until the following message appears on the lower left of the screen.

   ```
   Press <F2> SETUP, <F3> Internal Flash Memory, <F4> ROM Utility, <F12> Network
   ```

2. If you press the <F4> key at this time, ROM utility starts upon completion of POST. You can also press the <F4> key while the NEC logo is being displayed to open the Off-line TOOL MENU screen.
3. The keyboard selection screen appears. Select your keyboard type.
   After that, the Off-line TOOL MENU screen appears. On this screen, specify the network settings for EXPRESSSCOPE Engine 3.

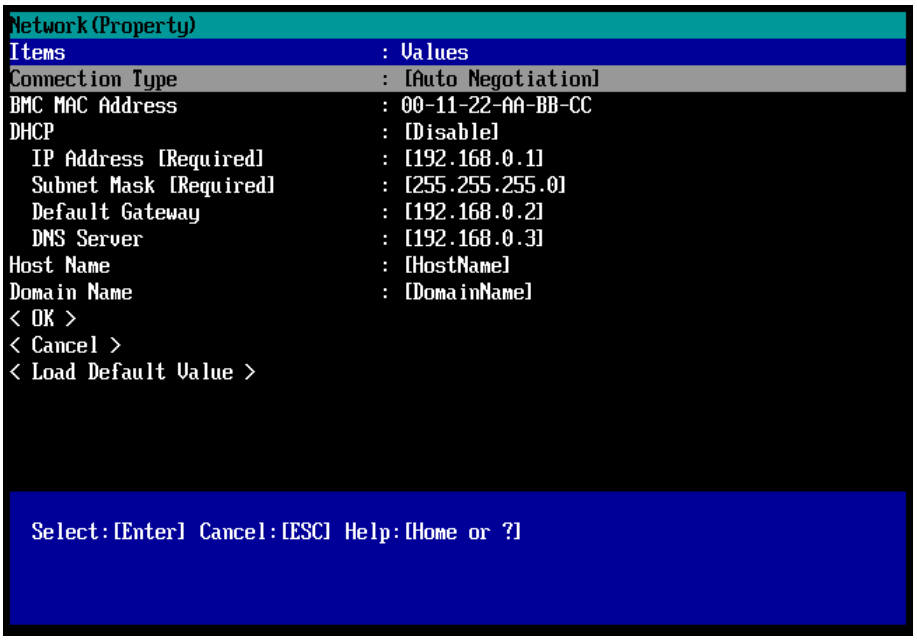
4. When the Off-line TOOL MENU appears, select **BMC Configuration**, **BMC Configuration**, **Network**, and then **Property**.



5. If **Property** is selected, the following screen is displayed. On this screen, specify whether to use DHCP and if DHCP is not used, configure IP Address/Subnet Mask.

Tips

If Shared BMC LAN is enabled, Web feature, remote media/KVM feature, or command line interface feature may be interrupted. In this case, wait for a while, and connect with network again.



6. Connect the LAN cable to the management LAN connector in order to connect to the network. It will be available for use if you access EXPRESSSCOPE Engine 3 via Web browser from PC for management according to the setting.

4. EXPRESSBUILDER

EXPRESSBUILDER helps you to install Windows or maintain the server.

4.1 Features of EXPRESSBUILDER

EXPRESSBUILDER provides the following features.

Feature	Description
Setup (Windows reinstallation)	Installs Windows on your server. Easily completes the process from RAID configuration to installation of applications. To use this feature, select **OS installation** in Boot Selection Menu.
Bundled software	Stores NEC ESMPRO, Universal RAID Utility, and other bundled software.
Maintenance	Diagnoses the server. To use this feature, select **Tool menu** in Boot Selection Menu.
Manuals	Stores User's Guide, Installation Guide, Maintenance Guide, and other manuals.

4.2 Usage of EXPRESSBUILDER

If you want to configure RAID arrays or install Windows, run EXPRESSBUILDER by using the following ways.

Internal Flash Memory

Ensure a CD/DVD is removed from the server, turn on the server, and then press <F3> key during POST.

Windows Application

Click the shortcut of NEC EXPRESSBUILDER on the desktop after installing Windows and Starter Pack.

EXPRESSBUILDER DVD

DVD does not come with the product. Download it from the following website.

http://www.nec.com/

- Support & Downloads

Set the DVD to an optical disk drive and restart this server or set the DVD to a computer running Windows.

5. Installing Software Components

Continue to install the OS and other software components.

See the instructions below.

- Installation Guide (Windows)

6. Turning Off the Server

Turn off the server by using the following procedure. If the power cord of the server is connected to a UPS, refer to the instruction manual supplied with the UPS.

1. Shut down the OS.
2. The server automatically turns off after the OS shuts down.
   Confirm that POWER LED is OFF.
3. Turn off peripheral devices.

Tips Hibernate feature of Windows Server cannot be used. Do not set Hibernate at Windows shutdown.

NEC Express5800 Series
Express5800/T120g

4 Appendix

1. Specifications
2. Interrupt Lines
3. Glossary
4. Revision Record

1. Specifications

Product Name			Express5800/T120g							
Part Number			N8100-2476F, N8100-2477F, N8100-2478F, N8100-2479F							
Processor Part Number			N8101-1068F	N8101-1070F	N8101-1071F	N8101-1072F	N8101-1073F	N8101-1074F	N8101-1075F	N8101-1076F
CPU	Processor		Intel® Xeon® processor E5-2603v4	Intel® Xeon® processor E5-2620v4	Intel® Xeon® processor E5-2623v4	Intel® Xeon® processor E5-2630v4	Intel® Xeon® processor E5-2650v4	Intel® Xeon® processor E5-2660v4	Intel® Xeon® processor E5-2690v4	Intel® Xeon® processor E5-2697v4
	Clock speed		1.70GHz	2.10GHz	2.60GHz	2.20GHz	2.20GHz	2.00GHz	2.60GHz	2.30GHz
	Standard / Maximum Count		0/2							
	Intel® Smart Cache (Last Level Cache)		15MB	20MB	10MB	25MB	30MB	35MB		45MB
	Number of cores (C) / Number of threads (T) per CPU (1CPU)		6C/6T	8C/16T	4C/8T	10C/20T	12C/24T	14C/28T		18C/36T
Chipset			Intel® C612 chipset							
Memory	Capacity, standard/maximum		Not pre-installed (selectable option)/Registered DIMM : 512GB (16x 32GB)							
	Memory module		DDR4-2400 Registered DIMM (4/8/16/32GB)							
Storage	Drive bay	Internal (standard)	—							
		Internal (maximum)	2.5-inch HDD cage(3x N8154-77F) HDD: SATA 48TB (24x 2TB), SAS 43.2TB (24x 1.8TB), SSD: SATA 38.4TB (24x 1.6TB), SAS 9.6TB (24x 400GB), 3.5-inch HDD cage (2x N8154-78F) is selected SATA 48TB (8x 6TB)							
	Interface / RAID level		SATA 6Gb/s : RAID 0/1/10 (standard), RAID 0/1/5/6/10/50/60 (optional), SAS 12Gb/s : RAID 0/1/5/6/10/50/60 (optional)							
	Optical disk drive		Not pre-installed (selectable option): Internal DVD-ROM or internal DVD SuperMULTI (optional) must be selected							
	Expansion bay		2x 5.25-inch bay + 1x Slim DVD bay							
Expansion slots	Supported slots		2x PCI Express 3.0 (x16 lane, x16 socket)(Full height, 290mm in length) 1x PCI Express 3.0 (x8 lane, x8 socket) (Full height, 290mm in length) 1x PCI Express 3.0 (x8 lane, x8 socket) (Full height, 168mm in length) (2-CPU configuration required) 1x PCI Express 2.0 (x4 lane, x8 socket) (Full height, 168mm in length)							
Graphics	Chip / VideoRAM		Management controller chip / 32MB							
Standard Interface			5x USB3.0 *1 (2x Front (TypeA), 2x Rear (TypeA), 1x Internal (TypeA)), 3x USB2.0(2x Rear (TypeA), 1x Internal (Box 10pin)), 1x Analog RGB (Mini D-Sub15 pin, 1x Rear), 1x Serial port (RS-232C compliant / D-Sub9 pin, Serial port A, 1x Rear, optional port can be used (up to two ports in total), 2x 1000BASE-T LAN connector (1000BASE-T/100BASE-TX/10BASE-T supported, RJ-45, 2x Rear), 1xManagement LAN connector (1000BASE-T/100BASE-TX/10BASE-T supported, RJ-45, 1x Rear)							
Redundant power supply			N8100-2476F: Unsupported / N8100-2477F, N8100-2478F, N8100-2479F: Supported in standard							
Redundant fan			Supported (option, hot-plug available)							
External dimensions (width × depth × height)*2			When 700-w power supply unit is selected: 200.0 mm x 599.0 mm x 438.0 mm (Stabilizers are closed, projections are excluded) 313.4 mm x 611.0 mm x 438.0 mm (Stabilizers are open, projections are included) When 460-w power supply unit or 800-w power supply unit is selected: 200.0 mm x 599.0 mm x 438.0 mm (Stabilizers are closed, projections are excluded) 313.4 mm x 625.4 mm x 438.0 mm (Stabilizers are open, projections are included)							
Weight (Minimum*3 / Max.)			17kg / 31kg							
Power Supply Unit			N8100-2476F: 700W non-Hot Plug Power Supply N8100-2477F: 2x 460W Hot Plug Power Supply N8100-2478F: 2x 800W Hot Plug Power Supply N8100-2479F: 2x 1000W Hot Plug Power Supply							
Power consumption (100V at maximum configuration, at 25ºC high-load state)			448VA/ 445W	464VA/ 461W	512VA/ 508W	534VA/ 530W	555VA/ 551W	610VA/ 606W	679VA/ 674W	688VA/ 684W
Power consumption (100V at maximum configuration, at maximum power)			626VA/ 622W	628VA/ 624W	678VA/ 674W	695VA/ 690W	758VA/ 753W	786VA/ 781W	856VA/ 850W	882VA/ 875W
Power consumption (200V at maximum configuration, at 25ºC high-load state)			444VA/ 441W	460VA/ 456W	507VA/ 503W	529VA/ 525W	550VA/ 546W	604VA/ 600W	672VA/ 667W	681VA/ 677W
Power consumption (200V at maximum configuration, at maximum power)			620VA/ 616W	622VA/ 618W	672VA/ 667W	688VA/ 683W	751VA/ 745W	778VA/ 773W	847VA/ 842W	873VA/ 867W
Environmental requirements on Temperature			Operating: 5 to 40ºC (when an option is installed: 5 to 45ºC, subject to restrictions on configuration), Storage: -10 to 55ºC							
Environmental requirements on Humidity			Operating: 20 to 80% Storage: 20 to 80% (no condensation either when operating or when stored)							
Regulatory and Safety			FCC, UL, CB, CE, BSMI, CCC, RoHS, WEEE							
Supported OS	Supported by NEC		Microsoft® Windows Server® 2008 R2 Standard, Microsoft® Windows Server® 2008 R2 Enterprise, Microsoft® Windows Server® 2012 Standard, Microsoft® Windows Server® 2012 Datacenter, Microsoft® Windows Server® 2012 R2 Standard, Microsoft® Windows Server® 2012 R2 Datacenter, VMware ESXi™ 5.5 Update 3 *4, VMware ESXi™ 6.0 Update 1 *4							

*1 Operates with USB2.0 interface when VMware ESXi 5.5 is installed.
*2 See "Front Bezel" in the Configuration Guide for external dimensions of the server with dust proof bezel installed.
*3 Minimum configuration allowable for operation (1x CPU, 1x DIMM, 1x HDD, and 1x Power Supply Unit)
*4 To install VMware ESXi™ 5.5 and 6.0, logical memory capacity must be larger than 5GB.

2. Interrupt Lines

Interrupt lines are assigned as factory settings as shown below. Use this table as a reference when you add optional devices.

- **Interrupt lines**

IRQ	Peripheral Device (Controller)	IRQ	Peripheral Device (Controller)
0	System timer	12	SM bus
1	–	13	Numeric data processor
2	–	14	–
3	COM 2 serial port	15	–
4	COM 1 serial port	16	SATA
5	PCI	17	–
6	–	18	USB
7	PCI	19	USB
8	Real-time clock	20	–
9	ACPI Compliant System	21	–
10	PCI	22	–
11	Motherboard resource	23	–

3. Glossary

Terms	Description
BIOS Setup Utility (SETUP)	Software for setting BIOS. You can run this software by pressing <F2> key during POST.
BMC	Baseboard Management Controller (BMC) is a built-in controller that supports the IPMI version 2.0 protocol. BMC can manage the server hardware.
BMC RESET Switch	A switch for resetting the BMC of the server. This resets the BMC without clearing the BMC settings. Use the switch if the problem on the BMC occurs.
DUMP Switch	A switch that is used for collecting the memory dump if an error occurs. You can specify the destination of the dump by using the OS function.
EXPRESSBUILDER	Standard software for setting up the server easily. This also includes several useful applications and instruction manuals.
EXPRESSSCOPE ENGINE 3	A name of BMC for NEC Express5800 series.
EXPRESSSCOPE Profile Key	A removable flash memory that stored the settings of BIOS and BMC. If the motherboard of the server is replaced, you can use former settings when moving this flash memory from the former motherboard.
Express Report Service	Software that can report the server failure to the contact center by E-mail or modem. This software is installed with NEC ESMPRO ServerAgentService to the server.
Express Report Service (HTTPS)	Software that can report the server failure to the contact center by HTTPS. This software is installed with NEC ESMPRO ServerAgentService to the server.
Express Report Service (MG)	Software that can report the server failure to the contact center by E-mail, modem or HTTPS without NEC ESMPRO ServerAgentService. This software is installed with NEC ESMPRO Manager to "PC for Management".
ExpressUpdate	A feature for updating BIOS, firmware, driver, or software of the server. This feature is available when NEC ESMPRO Manager cooperates with EXPRESSSCOPE ENGINE 3 and ExpressUpdate Agent.
ExpressUpdate Agent	Software for performing ExpressUpdate. This is installed to the server.
Flash FDD	An optional USB device that can use as a floppy disk drive.
Internal Flash Memory	A built-in flash memory that stored EXPRESSBUILDER as standard. You can start EXPRESSBUILDER from it without DVD when pressing <F3> key during POST.
NEC ESMPRO	Standard software for the server management. This consists of several applications for managing or monitoring.
NEC ESMPRO Agent Extension	Software for performing the scheduled operations. This works with NEC ESMPRO Manager.
NEC ESMPRO Manager	Software for managing plural servers on network.
NEC ESMPRO ServerAgentService	Software for monitoring the server. This works with NEC ESMPRO Manager. You can choose Service Mode or Non-Service Mode when installing this software. Service Mode resides as the OS service and Non-Service Mode does not use the OS service to reduce memory, CPU power and other OS resources.
OEM driver	A Windows driver for the mass storage device.
OS standard installer	An installer that stored in Windows installation disc. Use this installer if you want to install the OS manually.
Offline tools	Software that can confirm or change SEL, SDR, FRU, and other IPMI data. You can start Offline tools when pressing <F4> key during POST.
PC for Management	A computer for managing the server on network. A general Windows/Linux computer can be used as "PC for Management".
Product Info Collection Utility	Software for collecting several hardware/software statuses or event logs. You can easily collect the data for the server maintenance by using this software.
RAID Configuration Utility	Software for configuring RAID arrays. You can run this software during POST.
Server Configuration Utility	Software for setting BIOS or BMC. You can use as Windows application or run this software when pressing <F4> key during POST. This software is the same as BMC Configuration of former models.
Starter Pack	Software package for the server. This software includes the customized drivers for Windows. This must be installed before using Windows on the server.
TPM Kit	An optional product of Trusted Platform Module for the server.
Universal RAID Utility	Software for setting RAID arrays on Windows/Linux. This software is operated on "PC for Management" with NEC ESMPRO Manager.
Windows OS parameter file	A file that saved settings for installing Windows. You can install with the saved settings in this file when setting Windows with EXPRESSBUILDER.

4. Revision Record

Document Number	Date Issued	Description
10.115.01-101.01	April 2016	Newly created

NEC Express Server

Express5800/T120g
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